MAILBOX HAZARD AND RISK ASSESSMENT

by

Chiara Silvestri Dobrovolny, Ph.D.
Associate Research Scientist

Kierstyn M. White
Graduate Assistant Research

and

Garret Haegelin
Student Technician

Contract No.: T4541-BE

Sponsored by
Roadside Safety Research Program Pooled Fund
Study No. TPF-5(114)

TEXAS A&M TRANSPORTATION INSTITUTE PROVING GROUND

Mailing Address:
Roadside Safety & Physical Security
Texas A&M University System
3135 TAMU
College Station, TX  77843-3135

Located at:
Texas A&M Riverside Campus
Building 7091
3100 State Highway 47
Bryan, TX  77807
DISCLAIMER

The contents of this report reflect the views of the authors who are solely responsible for the facts and accuracy of the data, and the opinions, findings and conclusions presented herein. The contents do not necessarily reflect the official views or policies of the Washington State Department of Transportation, the Roadside Pooled Fund Program, The Texas A&M University System, or Texas A&M Transportation Institute. This report does not constitute a standard, specification, or regulation. In addition, the above listed agencies assume no liability for its contents or use thereof. The names of specific products or manufacturers listed herein do not imply endorsement of those products or manufacturers.

Chiara Silvestri Dobrovolny,
Associate Research Scientist
Mailboxes are the closest obstacle permitted next to the travel lanes. Little, however, is known about the actual crash history. Although the Federal Highway Administration and the United States Postal Service encourage the use of crashworthy mailboxes, in the State of Alaska mailboxes are treated as a right of the property owner, and do not require a permit. Without a permitting process the department does not have a formal program to review mailbox crashworthiness with property owners. At least one state’s Department of Transportation policy is to install all roadside mailboxes, thereby establishing and enforcing crashworthiness outside of project funding.

The first purpose of this research is to evaluate the risk presented by mailbox supports. The second goal is to identify state permitting requirements and enforcement policies as they relate to mailbox supports. The third objective is to provide agencies with guidance for policy options to prioritize safety initiatives that may lead to reduction of risk and/or reduced crash severity.

In order to prioritize and comply with the roadside safety needs, the current level of crash risk against mailboxes was examined and compared with other roadside fixed object obstacles. Proportions of injury/fatality crashes were calculated to evaluate whether policies for stricter control of the run-of-the-way would affect any outcomes.

The information compiled from this research will enable policy makers to evaluate what policy changes may be optimal to affect a reduction of severe crashes. With this report, the authors want to provide with survey results on current state agencies permitting requirements and enforcement policies related to mailbox supports. In addition, this report includes guidance for policy options aimed at prioritizing safety initiatives for the reduction of mailbox supports risk and/or crash severity.
<table>
<thead>
<tr>
<th>Symbol</th>
<th>When You Know</th>
<th>Multiply By</th>
<th>To Find</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>LENGTH</td>
<td>in inches</td>
<td>25.4</td>
<td>millimeters</td>
<td>mm</td>
</tr>
<tr>
<td></td>
<td>ft feet</td>
<td>0.305</td>
<td>meters</td>
<td>m</td>
</tr>
<tr>
<td></td>
<td>yd yards</td>
<td>0.914</td>
<td>meters</td>
<td>m</td>
</tr>
<tr>
<td></td>
<td>mi miles</td>
<td>1.61</td>
<td>kilometers</td>
<td>km</td>
</tr>
<tr>
<td>AREA</td>
<td>in² square inches</td>
<td>645.2</td>
<td>square millimeters</td>
<td>mm²</td>
</tr>
<tr>
<td></td>
<td>ft² square feet</td>
<td>0.093</td>
<td>square meters</td>
<td>m²</td>
</tr>
<tr>
<td></td>
<td>yd² square yard</td>
<td>0.836</td>
<td>square meters</td>
<td>m²</td>
</tr>
<tr>
<td></td>
<td>ac acres</td>
<td>0.405</td>
<td>hectares</td>
<td>ha</td>
</tr>
<tr>
<td></td>
<td>mi² square miles</td>
<td>2.69</td>
<td>square kilometers</td>
<td>km²</td>
</tr>
<tr>
<td>VOLUME</td>
<td>fl oz fluid ounces</td>
<td>29.57</td>
<td>milliliters</td>
<td>mL</td>
</tr>
<tr>
<td></td>
<td>gal gallons</td>
<td>3.785</td>
<td>liters</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>ft³ cubic feet</td>
<td>0.028</td>
<td>cubic meters</td>
<td>m³</td>
</tr>
<tr>
<td></td>
<td>yd³ cubic yards</td>
<td>0.765</td>
<td>cubic meters</td>
<td>m³</td>
</tr>
</tbody>
</table>

NOTE: Volumes greater than 1000 L shall be shown in m³.

| MASS   | oz ounces    | 28.35      | grams        | g      |
|        | lb pounds    | 0.454      | kilograms    | kg     |
|        | T short tons (2000 lb) | 0.907 | megagrams (or "metric ton") | Mg (or "t") |

| TEMPERATURE | °F Fahrenheit | 5 (°F-32)/9 | Celsius       | °C     |
|             | or (°F-32)/1.8 |           |               |        |

| ILLUMINATION | fc foot-candles | 10.76 | lux           | lx     |
|              | fl foot-Lamberts | 3.426 | candelas/m²   | cd/m²  |

| FORCE and PRESSURE | lbf poundforce | 4.45 | newtons       | N      |
|                    | lbf/in² poundforce per square inch | 6.89 | kilopascals  | kPa    |

<table>
<thead>
<tr>
<th>APPROXIMATE CONVERSIONS FROM SI UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symbol</td>
</tr>
<tr>
<td>--------</td>
</tr>
<tr>
<td>LENGTH</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>AREA</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>VOLUME</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>MASS</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TEMPERATURE</th>
<th>°C Celsius</th>
<th>1.8°C+32</th>
<th>Fahrenheit</th>
<th>°F</th>
</tr>
</thead>
</table>

| ILLUMINATION | lx lux | 0.0929 | foot-candles | fc    |
|              | cd/m² candelas/m² | 0.2919 | foot-Lamberts | fl    |

| FORCE and PRESSURE | N newtons | 0.225 | poundforce | lbf   |
|                    | kPa kilopascals | 0.145 | poundforce per square inch | lbf/in² |

*SI is the symbol for the International System of Units. Appropriate rounding should be made to comply with Section 4 of ASTM E380. (Revised March 2003)*
ACKNOWLEDGMENTS

This research project was performed under a pooled fund program between the State of Alaska Department of Transportation and Public Facilities, California Department of Transportation (Caltrans), Louisiana Department of Transportation and Development, Minnesota Department of Transportation, Pennsylvania Department of Transportation, Tennessee Department of Transportation, Texas Department of Transportation, Washington State Department of Transportation, West Virginia Department of Transportation, and the Federal Highway Administration. The authors acknowledge and appreciate their guidance and assistance.

Roadside Safety Research Pooled Fund Committee

CONTACTS

Revised October 2012

ALASKA
Jeff C. Jeffers, P.E.
Statewide Traffic & Safety Engineering
Alaska Department of Transportation and Public Facilities
3132 Channel Drive
P.O. Box 112500
Juneau, AK 99811-2500
(907) 465-8962
jeff.jeffers@alaska.gov

CALIFORNIA
John Jewell, P.E.
Caltrans
Office of Materials and Infrastructure
Division of Research and Innovation
5900 Folsom Blvd
Sacramento, CA 95819
(916) 227-5824
john.jewell@dot.ca.gov

LOUISIANA (continued)
Justin Peltier, P.E.
Senior Engineer, Bridge Design
(225) 379-1069
(225) 379-1786 (fax)
Justin.Peltier@la.gov

MINNESOTA
Michael Elle, P.E.
Design Standards Engineer
Minnesota Department of Transportation
395 John Ireland Blvd, MS 696
St. Paul, MN 55155-1899
(651) 366-4622
michael.elle@state.mn.us

PENNSYLVANIA
Mark R. Burkhead, P.E.
Standards & Criteria Engineer
Pennsylvania Department of Transportation
Bureau of Project Delivery
400 North Street
Harrisburg, PA 17105
(717) 783-5110
(717) 705-2379 (fax)
mburkhead@pa.gov
TENNESSEE
Jeff Jones
Assistant Chief Engineer
Tennessee Department of Transportation
Suite 1300
James K. Polk State Office Building
Nashville, TN 37243-0348
(615) 741-2221
Jeff.C.Jones@tn.gov

Ali Hangul, P.E.
Civil Engineering Manager
(615) 741-0840
(615) 532-7745 (fax)
Ali.Hangul@tn.gov

WEST VIRGINIA
Donna J. Hardy, P.E.
Mobility and Safety Engineer
West Virginia Department of Transportation – Traffic Engineering
Building 5, Room A-550
1900 Kanawha Blvd E.
Charleston, WV 25305-0430
(304) 558-9576
Donna.J.Hardy@wv.gov

FEDERAL HIGHWAY ADMINISTRATION
Richard B. (Dick) Albin, P.E.
Safety Engineer
FHWA Resource Center Safety & Design Technical Services Team
711 South Capitol Blvd.
Olympia, WA 98504
(303) 550-8804
Dick.Albin@dot.gov

William Longstreet
Highway Engineer
FHWA Office of Safety Design
Room E71-107
1200 New Jersey Avenue, S.E.
Washington, DC 20590
(202) 366-0087
Will.Longstreet@dot.gov

TEXAS
Aurora (Rory) Meza, P.E.
Roadway Design Section Director
Texas Department of Transportation Design Division
125 East 11th Street
Austin, TX 78701-2483
(512) 416-2678
Rory.Meza@txdot.gov

WASHINGTON
Dave Olson, Chair
Design Policy, Standards, & Research Manager
Washington State Department of Transportation
P.O. Box 47329
Olympia, WA 98504-7329
(360) 705-7952
Olsonda@wsdot.wa.gov

Rhonda Brooks
Research Manager
(360) 705-7945
Brookrh@wsdot.wa.gov

TEXAS A&M TRANSPORTATION INSTITUTE
D. Lance Bullard, Jr., P.E.
Research Engineer
Texas A&M Transportation Institute
3135 TAMU
College Station, TX 77843-3135
(979) 845-6153
L-Bullard@tamu.edu

Roger P. Bligh, Ph.D., P.E.
Research Engineer
(979) 845-4377
RBligh@tamu.edu
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHAPTER 1. INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>OBJECTIVES / SCOPE OF RESEARCH</td>
<td>1</td>
</tr>
<tr>
<td>CHAPTER 2. LITERATURE REVIEW</td>
<td>3</td>
</tr>
<tr>
<td>BACKGROUND</td>
<td>3</td>
</tr>
<tr>
<td>USPS REGULATION</td>
<td>5</td>
</tr>
<tr>
<td>AASHTO: A GUIDE FOR ERECTING MAILBOXES ON HIGHWAYS</td>
<td>5</td>
</tr>
<tr>
<td>MAILBOXES NCHRP REPORT 350 OR MASH CRASH TESTED</td>
<td>6</td>
</tr>
<tr>
<td>CHAPTER 3. IDENTIFICATION OF PERMITTING REQUIREMENTS AND ENFORCEMENT POLICIES RELATING TO MAILBOX</td>
<td>7</td>
</tr>
<tr>
<td>MAILBOX SUPPORT POLICY</td>
<td>9</td>
</tr>
<tr>
<td>States Standards/Policies</td>
<td>11</td>
</tr>
<tr>
<td>SINGLE MAILBOX SUPPORT SYSTEMS</td>
<td>14</td>
</tr>
<tr>
<td>Single Mailbox Support System Types</td>
<td>14</td>
</tr>
<tr>
<td>Placement Regulation for Single Mailbox Supports</td>
<td>23</td>
</tr>
<tr>
<td>MULTIPLE MAILBOX SUPPORT SYSTEMS</td>
<td>34</td>
</tr>
<tr>
<td>Multiple Mailbox Support System Types</td>
<td>34</td>
</tr>
<tr>
<td>Placement Regulation for Multiple Mailbox Supports</td>
<td>41</td>
</tr>
<tr>
<td>CHAPTER 4. CRASH DATA ANALYSIS</td>
<td>49</td>
</tr>
<tr>
<td>CHAPTER 5. CONCLUSIONS</td>
<td>77</td>
</tr>
<tr>
<td>REFERENCES</td>
<td>107</td>
</tr>
<tr>
<td>APPENDIX A. MAILBOX GUIDELINES - USPS</td>
<td>109</td>
</tr>
<tr>
<td>APPENDIX B. AASHTO – A GUIDE FOR ERECTING MAILBOXES ON HIGHWAYS</td>
<td>113</td>
</tr>
<tr>
<td>APPENDIX C. MAILBOX SUPPORT SYSTEMS – FHWA LETTERS OF ACCEPTANCE</td>
<td>141</td>
</tr>
<tr>
<td>APPENDIX D. SURVEY - MAILBOX HAZARD AND RISK ASSESSMENT</td>
<td>173</td>
</tr>
<tr>
<td>APPENDIX E. SURVEY RESULTS - MAILBOX HAZARD AND RISK ASSESSMENT</td>
<td>197</td>
</tr>
<tr>
<td>APPENDIX F. STATUTES RELATING TO MAILBOX INSTALLATION</td>
<td>209</td>
</tr>
<tr>
<td>Section</td>
<td>Page</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>APPENDIX G. CRASH DATA ANALYSIS - CRASH SEVERITY FOR CRASHES INVOLVING MAILBOXES</td>
<td>237</td>
</tr>
<tr>
<td>APPENDIX H. CRASH DATA ANALYSIS - FIXED OBJECTS RELATED CRASHES</td>
<td>241</td>
</tr>
</tbody>
</table>
## LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 3.1.</td>
<td>Summary of States that Replied Partially or Fully to the Survey (Colored in Green).</td>
<td>7</td>
</tr>
<tr>
<td>Figure 3.2.</td>
<td>Number and Percentage of Participating States using the Identified Single Wood Mailbox Support System Type.</td>
<td>15</td>
</tr>
<tr>
<td>Figure 3.3.</td>
<td>Number and Percentage of Participating States using the Identified Single Polyurethane Mailbox Support System Type.</td>
<td>16</td>
</tr>
<tr>
<td>Figure 3.4.</td>
<td>Number and Percentage of Participating States using the Identified Single Steel Mailbox Support System Types.</td>
<td>18</td>
</tr>
<tr>
<td>Figure 3.5.</td>
<td>Number and Percentage of Participating States using the Identified Foundation Types for Single Mailbox Support System Types.</td>
<td>21</td>
</tr>
<tr>
<td>Figure 3.6.</td>
<td>Alaska Policy about Influence of Roadway AADT and Design Speed on Selection and Placement of Mailbox Support Systems (AKDOT Design &amp; Construction Standards, 2012).</td>
<td>27</td>
</tr>
<tr>
<td>Figure 3.7.</td>
<td>Minnesota Policy about Mailbox Supports (Mn/DOT Road Design Manual, 2012).</td>
<td>30</td>
</tr>
<tr>
<td>Figure 3.8.</td>
<td>Minimum Vertical Heights (h) in Inches from Road Surface to Bottom of Single Mailbox Recommended by the Participating state DOTs.</td>
<td>32</td>
</tr>
<tr>
<td>Figure 3.9.</td>
<td>Minimum Distance (d) in Inches from Curb Front Face to Single Mailbox Support Recommended by the Participating state DOTs.</td>
<td>33</td>
</tr>
<tr>
<td>Figure 3.10.</td>
<td>Minimum Distance (D) in Inches from Road Edge to Single Mailbox Support Recommended by the Participating state DOTs.</td>
<td>33</td>
</tr>
<tr>
<td>Figure 3.11.</td>
<td>Number and Percentage of Participating States using the Identified Multiple Wood Mailbox Support System Type.</td>
<td>35</td>
</tr>
<tr>
<td>Figure 3.12.</td>
<td>Number and Percentage of Participating States using the Identified Multiple Steel Mailbox Support System Types.</td>
<td>37</td>
</tr>
<tr>
<td>Figure 3.13.</td>
<td>Number and Percentage of Participating States using the Identified Foundation Types for Multiple Mailbox Support System Types.</td>
<td>39</td>
</tr>
<tr>
<td>Figure 3.14.</td>
<td>Minimum Vertical Heights (h) in Inches from Road Surface to Bottom of Multiple Mailbox Recommended by the Participating state DOTs.</td>
<td>47</td>
</tr>
<tr>
<td>Figure 3.15.</td>
<td>Minimum Distance (d) in Inches from Curb Front Face to Multiple Mailbox Support Recommended by the Participating state DOTs.</td>
<td>48</td>
</tr>
<tr>
<td>Figure 3.16.</td>
<td>Minimum Distance (D) in Inches from Road Edge to Multiple Mailbox Support Recommended by the Participating state DOTs.</td>
<td>48</td>
</tr>
<tr>
<td>Figure 4.1.</td>
<td>“Mailbox” Coded as Object Struck in State DOTs Databases.</td>
<td>49</td>
</tr>
<tr>
<td>Figure 4.2.</td>
<td>Electronic Crash Data Availability from States Containing “Mailbox” Coded as Object Struck in Their Crash Databases.</td>
<td>49</td>
</tr>
<tr>
<td>Figure 4.3.</td>
<td>Summary of States with Crash Data Availability (Colored in Blue).</td>
<td>51</td>
</tr>
<tr>
<td>Figure F1.</td>
<td>Mailbox Installation Details – Louisiana Department of Transportation and Development.</td>
<td>221</td>
</tr>
</tbody>
</table>
# LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 3.1</td>
<td>States and Agencies which Responded to the Survey.</td>
<td>8</td>
</tr>
<tr>
<td>Table 3.2</td>
<td>Summary of States Answers from Questions # 2, 3, 4, and 5.</td>
<td>9</td>
</tr>
<tr>
<td>Table 3.3</td>
<td>Single Wood Mailbox Support Systems used by States DOTs.</td>
<td>15</td>
</tr>
<tr>
<td>Table 3.4</td>
<td>Single Polyurethane Mailbox Support Systems used by States DOTs.</td>
<td>16</td>
</tr>
<tr>
<td>Table 3.5</td>
<td>Single Steel Mailbox Support Systems used by States DOTs.</td>
<td>17</td>
</tr>
<tr>
<td>Table 3.6</td>
<td>Other Types of Single Mailbox Support Systems used by States DOTs.</td>
<td>19</td>
</tr>
<tr>
<td>Table 3.7</td>
<td>Foundation Types Allowed in the States for Single Mailbox Support Systems.</td>
<td>20</td>
</tr>
<tr>
<td>Table 3.8</td>
<td>Single Mailbox Support Types NCHRP Report 350 Tested.</td>
<td>22</td>
</tr>
<tr>
<td>Table 3.9</td>
<td>DOTs Suggestions for Minimum Vertical Height from the Road Surface for Single Mailbox Installation.</td>
<td>24</td>
</tr>
<tr>
<td>Table 3.10</td>
<td>DOTs Policy about Influence of Roadway AADT on Selection and Placement of Single Mailbox Support Systems.</td>
<td>25</td>
</tr>
<tr>
<td>Table 3.11</td>
<td>DOTs Policy about Influence of Roadway Design Speed on Selection and Placement of Single Mailbox Support Systems.</td>
<td>28</td>
</tr>
<tr>
<td>Table 3.12</td>
<td>DOTs Suggestions for Minimum Distances from Front Face Curb and Road Edge for Single Mailbox Support System Installation.</td>
<td>31</td>
</tr>
<tr>
<td>Table 3.13</td>
<td>Multiple Wood Mailbox Support Systems used by States DOTs.</td>
<td>35</td>
</tr>
<tr>
<td>Table 3.14</td>
<td>Multiple Steel Mailbox Support Systems used by States DOTs.</td>
<td>36</td>
</tr>
<tr>
<td>Table 3.15</td>
<td>Foundation Types Allowed in the States for Multiple Mailbox Support Systems.</td>
<td>38</td>
</tr>
<tr>
<td>Table 3.16</td>
<td>Multiple Mailbox Support Types NCHRP Report 350 Tested.</td>
<td>40</td>
</tr>
<tr>
<td>Table 3.17</td>
<td>DOTs Suggestions for Minimum Vertical Height from the Road Surface for Multiple Mailbox Installation.</td>
<td>42</td>
</tr>
<tr>
<td>Table 3.18</td>
<td>DOTs Policy about Influence of Roadway AADT on Selection and Placement of Multiple Mailbox Support Systems.</td>
<td>43</td>
</tr>
<tr>
<td>Table 3.19</td>
<td>DOTs Policy about Influence of Roadway Design Speed on Selection and Placement of Multiple Mailbox Support Systems.</td>
<td>44</td>
</tr>
<tr>
<td>Table 3.20</td>
<td>DOTs Suggestions for Minimum Distances from Front Face Curb and Road Edge for Multiple Mailbox Support System Installation.</td>
<td>46</td>
</tr>
<tr>
<td>Table 4.1</td>
<td>DOTs Answers to Survey Part on Crash Data Availability.</td>
<td>50</td>
</tr>
<tr>
<td>Table 4.2</td>
<td>Mailbox Systems Installation Guidance for the State DOTs with Available Crash Data for this Survey Project.</td>
<td>52</td>
</tr>
<tr>
<td>Table 4.3</td>
<td>Different Properties of Available Crash Data per State DOT.</td>
<td>56</td>
</tr>
<tr>
<td>Table 4.4</td>
<td>Number of Years of Available Crash Data from the Participating State DOTs.</td>
<td>57</td>
</tr>
<tr>
<td>Table 4.5</td>
<td>Years Range of Available Crash Data and Type of Harmful Events from the Participating State DOTs.</td>
<td>57</td>
</tr>
<tr>
<td>Table 4.6</td>
<td>Comparison of States Total Crashes for All Types of Events, Mailbox (MB) Related and Fixed Objects (FO) Related.</td>
<td>60</td>
</tr>
<tr>
<td>Table 4.7</td>
<td>Proportions for States MB Related Crashes Types.</td>
<td>61</td>
</tr>
<tr>
<td>Table 4.8</td>
<td>Frequency for States MB Related Crashes with Respect to All Type Crashes.</td>
<td>62</td>
</tr>
<tr>
<td>Table 4.9</td>
<td>Frequency for States MB Related Crashes with Respect to FO Crashes.</td>
<td>63</td>
</tr>
<tr>
<td>Table 4.10</td>
<td>Fatalities and Injuries for MB Related Crashes.</td>
<td>64</td>
</tr>
<tr>
<td>Table 4.11</td>
<td>Fatality Rate for MB Related Crashes with Respect to Total Number of Fatalities from All Types of Crashes.</td>
<td>65</td>
</tr>
<tr>
<td>Table 4.12</td>
<td>Fatality Rate for MB Related Crashes with Respect to Total Number of MB Related Crashes.</td>
<td>66</td>
</tr>
</tbody>
</table>
Table 4.13. Injury Rate for MB Related Crashes with Respect to Total Number of Injuries from All Types of Crashes. ................................................................. 67
Table 4.14. Injury Crash Rate for MB Related Crashes with Respect to Total Number of MB Related Crashes. .................................................................................................................... 68
Table 4.15. State Frequency of FO Related Crashes. ................................................................................................................................. 69
Table 4.16. State Proportions of FO Related Fatalities and Fatal FO Related Crashes. .............................................................................................................. 70
Table 4.17. State Proportions of FO Related Injuries and Injury FO Related Crashes. ................................................................................................. 71
Table 4.18. Injury Severity Codes. .......................................................................................... 72
Table 4.19. Injuries Values for Mailbox Supports Related Crashes (MHE). ......................... 73
Table 4.20. Injuries Proportions for Mailbox Supports Related Crashes per Year. ............... 74
Table 5.1. Summary of Mailbox Systems Installation Requirements for State DOTs that provided with Crash Data for this Project. ............................................... 78
Table 5.2. Single Mailbox Support Types for State DOTs that provided with Crash Data for this Project. ................................................................. 80
Table 5.3. Multiple Mailbox Support Types for State DOTs that provided with Crash Data for this Project. ................................................................. 81
Table 5.4. Guidance and Mailbox Related Crashes for State DOTs that provided with Crash Data for this Project. ................................................................. 82
Table 5.5. Guidance and Mailbox Related Fatalities for State DOTs that provided with Crash Data for this Project. ................................................................. 85
Table 5.6. Guidance and Mailbox Related Injuries for State DOTs that provided with Crash Data for this Project. ................................................................. 88
Table 5.7. State Frequency and Severity for MB Related Crashes. ................................... 90
Table 5.8. State Frequency and Severity for MB Related Crashes for Crash Databases Including both FHE and MHE. ......................................................... 93
Table 5.9. Guidance and Policies for the States of CO, DE, KS, LA, MN, ND, PA, and WY. . 94
Table 5.10. State MB Related Policy, Frequency and Severity for States with Both FHE and MHE Data. ......................................................................................... 95
Table 5.11. Summary for the States of MN, and WY (Considered YES Policy). .................. 97
Table 5.12. Summary for the States of ND, and PA (Considered NO Policy). ..................... 97
Table 5.13. Summary for the States of CO, DE, and LA (Considered Having Guidance). ... 97
Table 5.14. Frequency and Severity for the States of MN, and WY (Considered YES Policy). 98
Table 5.15. Frequency and Severity for the States of ND, and PA (Considered NO Policy). .... 98
Table 5.16. Frequency and Severity for the States of CO, DE, and LA (Considered Having Guidance). ......................................................................................... 99
Table 5.17. ANOVA Analysis for Fatality Data. ................................................................. 101
Table 5.18. ANOVA Analysis for Injury Data. ................................................................. 103
Table D1. Single Mailbox Support Models Included in the Survey. ................................. 185
Table D2. Mailbox Support Foundation Types Included in the Survey. ......................... 190
Table D3. Multiple Mailbox Support Models Included in the Survey. ......................... 192
Table G1. Crash Severity for Crashes Involving Mailboxes - Colorado. ........................... 237
Table G2. Crash Severity for Crashes Involving Mailboxes - Delaware. ......................... 237
Table G3. Crash Severity for Crashes Involving Mailboxes - Louisiana. ......................... 238
Table G4. Crash Severity for Crashes Involving Mailboxes - Minnesota. ....................... 238
Table G5. Crash Severity for Crashes Involving Mailboxes - Pennsylvania. ................. 239
Table G6. Crash Severity for Crashes Involving Mailboxes - Wyoming. ......................... 239
Table H1. Fixed Objects Related Crashes - Alaska. ......................................................... 241
Table H2. Fixed Objects Related Crashes - Colorado. ..................................................... 242
Table H4. Fixed Objects Related Crashes - Kansas................................................................. 244
Table H5. Fixed Objects Related Crashes - Kentucky.............................................................. 245
Table H6. Fixed Objects Related Crashes - Louisiana.............................................................. 246
Table H7. Fixed Objects Related Crashes - Maine................................................................. 247
Table H8. Fixed Objects Related Crashes - Mississippi....................................................... 248
Table H9. Fixed Objects Related Crashes – North Dakota.................................................... 249
Table H11. Fixed Objects Related Crashes - Virginia............................................................. 250
Table H12. Fixed Objects Related Crashes - Washington.................................................... 251
INTRODUCTION

Mailboxes are the closest obstacle permitted next to the travel lanes. Little, however, is known about the actual crash history. Although the Federal Highway Administration (FHWA) and the United States Postal Service (USPS) encourage the use of crashworthy mailboxes, in the State of Alaska mailboxes are treated as a right of the property owner, and do not require a permit. Without a permitting process the department does not have a formal program to review mailbox crashworthiness with property owners. The opportunity for affecting general improvement occurs during capital projects for shoulder widening and realignment. On those projects, the department removes existing mailboxes and installs approved mailbox supports at little or no expense to the property owner. At least one state’s Department of Transportation (DOT) policy is to install all roadside mailboxes, thereby establishing and enforcing crashworthiness outside of project funding.

In order to prioritize and comply with the roadside safety needs, the current level of crash risk against mailboxes needs to be examined and compared with other roadside point obstacle such as signs, luminaires, utility poles, trees, guardrail end treatments, and other fixed objects. Proportions of injury/fatality crashes need to be calculated to evaluate whether policies for stricter control of the run-of-the-way would affect any outcomes.

OBJECTIVES / SCOPE OF RESEARCH

The first purpose of this research is to evaluate the risk presented by mailbox supports. The second goal is to identify state permitting requirements and enforcement policies as they relate to mailbox supports. The third objective is to provide agencies with a guidance for policy options to prioritize safety initiatives that may lead to reduction of risk and/or reduced crash severity.

The information compiled from this research will enable policy makers to evaluate what policy changes may be optimal to affect a reduction of severe crashes. With this report, the authors want to provide with survey results on current state agencies permitting requirements and enforcement policies related to mailbox supports. In addition, this report includes guidance for policy options aimed at prioritizing safety initiatives for the reduction of mailbox supports risk and/or crash severity.
CHAPTER 2. LITERATURE REVIEW

BACKGROUND

Although mailboxes are the closest obstacle allowed to the travel lane, their current level of crash risk is unknown. Fitzpatrick et al. (1974) collected accident data from four states (Michigan, Missouri, Texas and Washington) for the year 1972 and found that accidents against mailboxes represent a significant percentage of total fixed-object collisions. The Wisconsin Transportation Bulletin (1993) reported that limited data available suggests that, yearly, 70 to 100 highway deaths in the USA are related to mailboxes. The United State Postal Service has set some standards for residential mailbox installation and maintenance, and the AASHTO guide gives recommendations for both mailbox location and support types use (USPS, 2012; AASHTO, 1994). Some states, however, do not require a permit for mailbox installation, thus the level of the device crashworthiness cannot be verified.

The Texas A&M Transportation Institute (TTI) has been involved in various projects aimed at reducing the probability of injury when mailboxes are impacted by a vehicle. Already back in 1980, Ross et al. (1980) performed seven full-scale crash tests to evaluate the impact behavior of rural mailbox installation. Three tests (out of the seven performed) involved multiple boxes mounted on boards with wood-post supports, two tests considered single box installation with steel pipe and breakaway mechanism, and the last two tests involved steel-pipe, multiple box support in the shape of an inverted U. Test results encourage the use of breakaway devices which showed to allow for minimal vehicle damage and potential occupant injury. On the other side, wood posts as mailbox supports seemed to present a problem especially when installed on roadway sections with allowed speed vehicle higher than 40 mi/h (64.4 km/h). Concerns were directed to the brittle property of wood support under impact, which would fracture at bumper height and keep the upper part of the post connected to the mailbox to ultimately impact the windshield.

Later in 1984, TTI performed a test and evaluation of neighborhood mailboxes, which are typically twelve to sixteen boxes housed in a metal framework and supported by a single vertical post, attached to a concrete footing (Campise and Hayes, 1984). In neighborhoods, having one big mailbox for everyone will make is easier on the mail carrier. A neighborhood mailbox was impacted with a 1978 Honda at 60 mph. The vehicle exhibited a violent rollover and thus, did not meet the criteria of NCHRP Report 230 (Michie, 1981). Recommended criteria on these mailboxes have been made due to the results from the crash tests. This recommended criterion puts some limits on the supports to make these mailboxes acceptable. Until the changes are made to this type of mailbox, it was concluded that it should not be permitted on high-speed roadways. Authors believed a breakaway support would have made this a safer mailbox.

In 1993, tests were conducted by TTI to evaluate the performance of a new universal bracket which was designed by the Texas Department of Transportation (TxDOT) to attach different sizes of mailbox to the support post (Ross et al., 1993a). The hope for this new design was to reduce cost and to make the installation process easier. The universal bracket was designed such that it would fit any of the three standard mailbox sizes. A total of 11 crash tests were performed. Three categories were evaluated in each crash test: Structural Adequacy, Occupant Risk, and Vehicle Trajectory.
Three of the 11 tests were conducted with a modified version of the universal bracket. In some of the tests, minor errors occurred such as separation of the mailbox and the bracket. Tests were evaluated according to NCHRP Report 230. Only size no. 1½ vandal-proof mailbox demonstrated unacceptable performance.

New ideas for how to make roadways safer are being thought of everyday. In order to make sure these ideas are safe, full-scale crash tests are performed. These tests show the performance of the design and how to improve it. A new swing-away mailbox support was designed by the Minnesota Department of Transportation to help in areas with snow and ice. TTI (Mak and Menges, 1996) conducted evaluation tests on the swing-away mailbox support designed by the Minnesota Department of Transportation in accordance with the guidelines set by the 1985 American Association of State Highway and Transportation Officials (AASHTO) (AASHTO, 1985). Four full-scale crash tests were completed. One of the major components of this support is the cantilever arm which is supposed to allow a snow plow to operate without damaging the mailbox support. The swing-away mailbox support can hold one mailbox or a triple mailbox assembly. These both were part of the four crash tests. Crashes number 1, 2, and 3 caused little to no damage to the vehicle. These involved the single mailbox swing-away support and were said to have successfully passed the crash test. Crash number 4 caused much more damage to the car where the windshield shattered and pushed back in the occupant compartment. Crash number 4 was determined to have failed the crash test. The Minnesota swing-away mailbox resulted in successfully meeting the evaluation criteria for a single mailbox assembly required by NCHRP 350, but not for a triple mailbox assembly (Ross et al., 1993b).

More recently, TTI conducted a study to evaluate temporary barrel-mounted mailboxes to be used in work zones (Bligh et al., 2000). A mailbox on a plastic drum was impacted head-on by a Geo Metro at 56.7 mi/h (91.3 km/h). Based on the NCHRP Report 350 guidelines, the temporary mailbox support performed acceptably, since the mailbox on plastic drum did not penetrate the occupant compartment and both the occupant risks and vehicle trajectory requirements were met. In the same period, TTI evaluated the performance of molded plastic mailboxes on three different types of support posts, including a 4x4 wood, a 2 lb/ft U-channel, and a 3-inch diameter schedule 40 pipe (Bligh et al., 2001). The device met the NCHRP 350 requirements for all three support types. The 4x4 timber support, however, appeared to be the best alternative from a functional and impact performance standpoint, having resulted in the least amount of windshield damage to the test vehicle. A 4x4 wood support post was thus recommended by TTI researchers for use with molded plastic mailboxes.

Tahan et al. (2004) evaluated safety performance of security mailboxes using both crash testing and finite element computer simulations. Four different mailboxes were evaluated in this research study: Belaire 20, Belaire 16, Senator 16, and Senator 16 XL. Three different mounts and two different supports posts were tested for an overall total of 24 tests performed with different combinations of mailbox, mounts, and support posts. Along with the crashes, 24 finite element computer simulations were performed to support the investigation of the mailbox safety. Tests and computer simulations were performed with use of a passenger car (Geo Metro), at a nominal speed of 62 mph. None of the tests showed the potential for the mailbox or support to obstruct the occupant compartment.
In 2006, the Maintenance Division of Texas Department of Transportation (TxDOT) felt it was necessary to try out a newly designed multiple-mailbox system from Shur-Tite (Sheikh et al., 2006). In order to be used on Texas roadways it had to pass a full-scale vehicle crash test stated in the National Cooperative Highway Research Program criteria. Two tests were done using 1800 lb. vehicles. One test was done at 22 mph and the other at 62 mph. The Shur-Tite multiple mailbox system consists of four mailboxes: two small and two large. The two small mailboxes are mounted directly on the bracket mount and the two large mailboxes are mounted on bracket extensions. On impact the support was pulled out of the ground and ended up 73 feet from the original spot. All the mailboxes stayed intact but were deformed and the vehicle ended up with little damage to the bumper and the hood. The Shur-Tite multiple mailbox system passed the crash test and met the characteristics TxDOT was looking for.

USPS REGULATION

There are multiple factors that come into play with making a mailbox safe and convenient for the mail carrier and other vehicles. USPS has provided a set of guidelines for a good mailbox. This is what USPS suggests for the placement of a mailbox: “Your local postmaster must approve the location of your mailbox. Put a roadside mailbox where a carrier can reach inside without leaving the truck. That means positioning it about 41” to 45” off the ground and back about 6” to 8” from the curb. If you live in the city and are attaching the box to your house, just make sure it can be accessed easily from your sidewalk, steps, or porch. Because city carriers often shoulder heavy bags, put your mailbox about 4’ from the ground. That way, your carrier won’t have to stretch or bend to reach it. And remember to keep the path to your mailbox clear in inclement weather.” (USPS, 2012)

As far as the post, USPS has different recommendations. If a wooden post is used, it cannot be any larger than a 4”x4”. If still or aluminum is used then it must be a 2” pipe. In order for it to give way if obstructed by a vehicle, it must be buried less than 24” deep. USPS recommends not to use dangerous supports such as heavy metal pipes, concrete posts, and farm equipment. If living in an area where there is a lot of snowfall, then a semi-arch or extended arm-type support should be used so a snow plow can still dismiss the snow around the mailbox. USPS would like the owner to make a routine mailbox check to keep everything up to date and working. The following suggestions are listed by USPS: “replace loose hinges on the door, repaint rusty or peeling parts, remount the post if its loose, and replace missing or faded house numbers.”

USPS mailbox guidelines are reported in details in Appendix A.

AASHTO: A GUIDE FOR ERECTING MAILBOXES ON HIGHWAYS

The “AASHTO A Guide for Erecting Mailboxes on Highways” addresses various issues involving mailbox placement and design, to increase roadside safety (AASHTO, 1994). It suggests in detail where to safely place a mailbox with respect to the road geometry. This document describes what side of the roadway a mailbox should be in certain cases and recommends avoiding placing mailboxes on high-speed, high-volume highways, near intersections, or beyond sharp vertical crests. The AASHTO guide also describes the recommended dimensions and surface type of mailbox.
turnouts in specific cases. In addition to general roadway placement guidelines, this guide specifies certain distances a mailbox should be placed from the edge of a roadway for various conditions.

The mailbox support and attachment designs are major factors in the safety of the unit. In general, the AASHTO guide declares that all exposed mailboxes should be firmly attached to supports that yield or break away safely if struck by a vehicle. It goes on to define recommended material of the mailbox and support as well as the dimensions of the mailbox, support, and mailbox support hardware. It also recommends height of the mailbox, distance to embed the support in the ground, and the amount of weight the mailbox should be able to hold. Finally, this document states that multiple mailboxes must meet the same criteria as single mailboxes.

AASHTO guide for erecting mailboxes on highways is reported in Appendix B.

MAILBOXES NCHRP REPORT 350 OR MASH CRASH TESTED

Below is a list of FHWA letters of acceptance for mailbox support systems:


FHWA letters of acceptance for mailbox support systems are reported in Appendix C.
CHAPTER 3. IDENTIFICATION OF PERMITTING REQUIREMENTS AND ENFORCEMENT POLICIES RELATING TO MAILBOX

The researchers prepared a survey intended for State Departments of Transportation and aimed at gaining information regarding state permitting requirements and enforcement policies as they relate to mailbox supports. The survey addressed data concerning:

- type of mailbox supports (single and multiple) currently in use;
- placement of mailbox supports with respect to the roadway;
- standards for permanent mailbox supports;
- crashworthiness of mailbox supports;
- crash data involving mailbox supports;
- crash data involving fixed objects.

A copy of the survey sent to the DOTs is attached to this report as Appendix D. Pictures and a brief description of the mailbox supports and of the support foundations types included in the survey questions are listed in Tables D1, D2, and D3. Also, complete answers to survey questions are reported in Appendix E.

Out of 50 States contacted, a total of 28 States participated in this research study and answered either partially or fully the questions of the survey. Figure 3.1 illustrates the participating States and Table 3.1 reports the names of States Agencies which responded to the survey.

![Figure 3.1. Summary of States that Replied Partially or Fully to the Survey (Colored in Green).](image-url)
<table>
<thead>
<tr>
<th>Agency</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alaska DOT&amp;PF</td>
<td>AK</td>
</tr>
<tr>
<td>Arkansas Highway and Transportation Department</td>
<td>AR</td>
</tr>
<tr>
<td>California DOT</td>
<td>CA</td>
</tr>
<tr>
<td>Colorado DOT</td>
<td>CO</td>
</tr>
<tr>
<td>Delaware DOT</td>
<td>DE</td>
</tr>
<tr>
<td>Georgia DOT</td>
<td>GA</td>
</tr>
<tr>
<td>Kansas DOT</td>
<td>KS</td>
</tr>
<tr>
<td>Kentucky Transportation Cabinet</td>
<td>KY</td>
</tr>
<tr>
<td>Louisiana DOTD</td>
<td>LA</td>
</tr>
<tr>
<td>Maine DOT</td>
<td>ME</td>
</tr>
<tr>
<td>Minnesota DOT</td>
<td>MN</td>
</tr>
<tr>
<td>Mississippi DOT</td>
<td>MS</td>
</tr>
<tr>
<td>North Carolina DOT</td>
<td>NC</td>
</tr>
<tr>
<td>North Dakota DOT</td>
<td>ND</td>
</tr>
<tr>
<td>New Hampshire DOT</td>
<td>NH</td>
</tr>
<tr>
<td>New Jersey DOT</td>
<td>NJ</td>
</tr>
<tr>
<td>New York SDOT</td>
<td>NY</td>
</tr>
<tr>
<td>Ohio DOT</td>
<td>OH</td>
</tr>
<tr>
<td>Oregon DOT</td>
<td>OR</td>
</tr>
<tr>
<td>Pennsylvania DOT</td>
<td>PA</td>
</tr>
<tr>
<td>Rhode Island DOT</td>
<td>RI</td>
</tr>
<tr>
<td>South Dakota DOT</td>
<td>SD</td>
</tr>
<tr>
<td>Tennessee DOT</td>
<td>TN</td>
</tr>
<tr>
<td>Texas DOT</td>
<td>TX</td>
</tr>
<tr>
<td>Virginia DOT</td>
<td>VA</td>
</tr>
<tr>
<td>Washington State DOT</td>
<td>WS</td>
</tr>
<tr>
<td>Wisconsin DOT</td>
<td>WI</td>
</tr>
<tr>
<td>Wyoming DOT</td>
<td>WY</td>
</tr>
</tbody>
</table>
MAILBOX SUPPORT POLICY

The first part of the survey aimed at collecting States policy/standard or recommendation for mailbox support installation. Also, it was asked if the owner was responsible for the installation of the mailbox support system. From survey answers collection, it resulted that out of the 28 States that participated to the survey, a total of 19 States (67.8%) answered they have standards for mailbox support installation, while 7 States (25%) reported they don’t have standards. Two States, additionally, answered “Other”, but one did not give additional information when answering the question. A total of 14 States (50%) reported they follow the USPS standards.

Sixteen States reported that the mailbox support owner is responsible for installation of the system, while 6 States stated the owner is not responsible. Six other States answered this question by giving details on the owner’s responsibility: it appears that, for these States, generally the DOT (or the Contractor) becomes responsible for mailbox support installation on construction projects. At that point, usually, the DOT/Contractor becomes responsible to bring the existing installation up to standard at their cost.

It is interesting to note that, although some States answered they have State standards for mailbox support installation, they also noted that the owner is responsible for its installation. A common comment made by the DOTs was that the owner is responsible for first installation of the mailbox support, while the State can replace it only during road projects. Only at that point the State DOT has the authority to modify the mailbox support type and installation according to the standards the State might have. States answers are summarized in Table 3.2.

Table 3.2. Summary of States Answers from Questions # 2, 3, 4, and 5.

<table>
<thead>
<tr>
<th>State DOT</th>
<th>Does your State have standards for mailbox support installation?</th>
<th>Does your State follow USPS standards?</th>
<th>Provide own State standards and policies</th>
<th>Owner responsible for installation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK</td>
<td>Yes</td>
<td>Yes</td>
<td><a href="http://www.dot.state.ak.us/stwddes/desprecon/(stdwdgeng.shtml">http://www.dot.state.ak.us/stwddes/desprecon/(stdwdgeng.shtml</a></td>
<td>Yes</td>
</tr>
<tr>
<td>AR</td>
<td>Yes</td>
<td>Yes</td>
<td><a href="http://www.arkansashighways.com/roadway%E2%80%93design_division/usunits/33--MB-1.pdf">http://www.arkansashighways.com/roadway–design_division/usunits/33--MB-1.pdf</a></td>
<td>Yes</td>
</tr>
<tr>
<td>CA</td>
<td>Other</td>
<td>Yes</td>
<td>AASHTO Roadside Design Guide</td>
<td>No</td>
</tr>
<tr>
<td>DE</td>
<td>Yes</td>
<td>Yes</td>
<td><a href="http://www.deldot.gov/information/pubs_for">http://www.deldot.gov/information/pubs_for</a> ms/manuals/subdivisions/pdf/standards_and_r egulations_031108.pdf</td>
<td>Yes</td>
</tr>
<tr>
<td>GA</td>
<td>Yes</td>
<td></td>
<td><a href="http://www.ga.gov">www.ga.gov</a></td>
<td>Yes</td>
</tr>
</tbody>
</table>
Table 3.2. Summary of States Answers from Questions # 2, 3, 4, and 5 (Continued).

<table>
<thead>
<tr>
<th>State DOT</th>
<th>Does your State have standards for mailbox support installation?</th>
<th>Does your State follow USPS standards?</th>
<th>Provide own State standards and policies</th>
<th>Owner responsible for installation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>KS</td>
<td>No</td>
<td>N/A</td>
<td><a href="http://transportation.ky.gov/Organizatio-Resources/Policy%20Manuals%20Library/Maintenance.pdf">http://transportation.ky.gov/Organizatio-Resources/Policy%20Manuals%20Library/Maintenance.pdf</a></td>
<td>Yes</td>
</tr>
<tr>
<td>KY</td>
<td>Yes</td>
<td>Other</td>
<td>N/A</td>
<td>Yes</td>
</tr>
<tr>
<td>ME</td>
<td>Yes</td>
<td>No</td>
<td>N/A</td>
<td>Yes</td>
</tr>
<tr>
<td>MN</td>
<td>Yes</td>
<td>Yes</td>
<td><a href="http://dotapp7.dot.state.mn.us/edms/download?docId=1062364">http://dotapp7.dot.state.mn.us/edms/download?docId=1062364</a></td>
<td>No</td>
</tr>
<tr>
<td>MS</td>
<td>Other</td>
<td>Other</td>
<td>N/A</td>
<td>Other</td>
</tr>
<tr>
<td>NC</td>
<td>Yes</td>
<td>Yes</td>
<td>N/A</td>
<td>Yes</td>
</tr>
<tr>
<td>ND</td>
<td>Yes</td>
<td>Yes</td>
<td><a href="http://www.dot.nd.gov/divisions/design/docs/standards/D766-01.pdf">http://www.dot.nd.gov/divisions/design/docs/standards/D766-01.pdf</a></td>
<td>No</td>
</tr>
<tr>
<td>NH</td>
<td>No</td>
<td>N/A</td>
<td>N/A</td>
<td>Yes</td>
</tr>
<tr>
<td>NJ</td>
<td>No</td>
<td>N/A</td>
<td>N/A</td>
<td>Yes</td>
</tr>
<tr>
<td>NY</td>
<td>No</td>
<td>N/A</td>
<td>N/A</td>
<td>Yes</td>
</tr>
<tr>
<td>OH</td>
<td>Yes</td>
<td>Other</td>
<td><a href="http://www.dot.state.oh.us/Divisions/Engineering/Roadway/roadwaystandards/Pages/locationanddesignmanuals.aspx">http://www.dot.state.oh.us/Divisions/Engineering/Roadway/roadwaystandards/Pages/locationanddesignmanuals.aspx</a></td>
<td>No</td>
</tr>
<tr>
<td>OR</td>
<td>Yes</td>
<td>Yes</td>
<td>ftp://ftp.odot.state.or.us/techserv/roadway/web_drawings/roadway/rev_05/rd101.pdf</td>
<td>Other</td>
</tr>
<tr>
<td>PA</td>
<td>No</td>
<td>N/A</td>
<td>N/A</td>
<td>Yes</td>
</tr>
<tr>
<td>RI</td>
<td>Yes</td>
<td>No</td>
<td>N/A</td>
<td>No</td>
</tr>
<tr>
<td>SD</td>
<td>Yes</td>
<td>Yes</td>
<td><a href="http://www.sddot.com/pe/roaddesign/docs/rdmanual/rdmch16.pdf">http://www.sddot.com/pe/roaddesign/docs/rdmanual/rdmch16.pdf</a> on page 16-55</td>
<td>Other</td>
</tr>
<tr>
<td>TN</td>
<td>No</td>
<td>N/A</td>
<td>N/A</td>
<td>Yes</td>
</tr>
<tr>
<td>TX</td>
<td>Yes</td>
<td>Yes</td>
<td><a href="http://www.txdot.gov/insfdot/orchest/workserve/standard/maintcad.htm">http://www.txdot.gov/insfdot/orchest/workserve/standard/maintcad.htm</a></td>
<td>No</td>
</tr>
<tr>
<td>VA</td>
<td>Yes</td>
<td>Yes</td>
<td><a href="http://www.extranet.vdot.state.va.us/LocDes/Electronic%20Pubs/2008Standards/Section60/603_01.pdf">http://www.extranet.vdot.state.va.us/LocDes/Electronic%20Pubs/2008Standards/Section60/603_01.pdf</a></td>
<td>Yes</td>
</tr>
<tr>
<td>WS</td>
<td>Yes</td>
<td>No</td>
<td><a href="http://www.wsdot.wa.gov/Design/Standards/Plans.htm#SectionH">http://www.wsdot.wa.gov/Design/Standards/Plans.htm#SectionH</a></td>
<td>Other</td>
</tr>
<tr>
<td>WI</td>
<td>No</td>
<td>N/A</td>
<td>N/A</td>
<td>Yes</td>
</tr>
<tr>
<td>WY</td>
<td>Yes</td>
<td>Yes</td>
<td><a href="http://www.dot.state.wy.us/webdav/site/wydot/shared/Engineering_Services/Standard%20Plans/202-1%20%20.pdf">http://www.dot.state.wy.us/webdav/site/wydot/shared/Engineering_Services/Standard%20Plans/202-1%20%20.pdf</a></td>
<td>Yes</td>
</tr>
</tbody>
</table>
States Standards/Policies

Researchers collected all the document links the States provided and summarized each participating State’s mailbox installation policy. As noted, some of the States recommend following the USPS or the AASHTO policies. In some cases, however, States standards vary from the USPS and AASHTO policies. For those cases, State’s installation recommendation details are reported.

Alaska
- USPS Standards

Arkansas
- Use own standards
- Metal pipe for support shall be 2" outside diameter steel with a wall thickness of 0.145" and weight of 2.72 lbs/ft outside diameter and weight shall have tolerance of +/- 5%
- Wood or metal and anti-twist plates may be used but only on metal posts

California
- USPS Standards

Colorado
- Use own standards
- Semi-arch or extended arm which allows snow plows to sweep near/under mailboxes w/o damaging supports and provides easy access to the mailboxes by carriers and customers. 4"x4" wood post or a 2" diameter standard steel or aluminum
- Pipe buried no more than 24". This type of post should safely break away without causing damage or injury if struck.
- 48" from the bottom of the mailbox to the ground. Should be placed on the right hand side of the road and in direction of travel.
- Minimum of 8' from the edge of the highway on State Highways

Delaware
- USPS Standards

Georgia
- AASHTO Standards

Kansas
- Standards were not found

Kentucky
- Use own standards
- Wooden post no larger than 4"x4" in section and 5" in diameter. Larger wood posts may be used if holes are drilled near the ground line to render resistance no greater than above. Metal pipes no larger than 1.5" inside diameter. 2" perforated channel
Louisiana
- USPS Standards

Maine
- USPS Standards

Minnesota
- USPS Standards

Mississippi
- Standards were not found

New Hampshire
- USPS Standards

New Jersey
- Standards were not found

New York
- AASTHO Standards

North Carolina
- USPS Standards

North Dakota
- Uses own standards
  - Hardware details shall consist of the "V-Loc Mailbox Support System" manufactured by Tapco and Traffic and Parking Control Co. Inc. size must not exceed 4" by 4" for a wooden post or 2" diameter for a steel pipe post for roadside barrier safety
  - Mailboxes should be installed at least 42" high to provide clearance for the plow wing. 8-12" from the curb face. Must be located on the right hand side of the road in the direction of travel.

Ohio
- Uses own standards
  - The support structure (post) shall be either a wooden post (no larger than 4 inch x 4 inch square or 4 inch diameter round) or a metal post with a strength no greater than a 2 inch diameter standard strength steel pipe
  - pipe buried no more than 24"
  - Sufficient strength to prevent the box from separating from the post top if struck by a vehicle.
  - Placed at an offset from the edge of the pavement so that the road-side face of the mailbox is no closer than 3' from the edge of the pavement
Oregon
- AASTHO Standards

Pennsylvania
- Standards were not found

Rhode Island
- Standards were not found

South Dakota
- USPS Standards

Tennessee
- USPS Standards

Texas
- USPS Standards

Virginia
- USPS Standards

Washington
- USPS Standards

Wisconsin
- Uses own standards
- Pipes should be 1.5" inside diameter. 4"x4" square wood and no larger than 4" diameter. Metal channels should weight no more than 2 lbs.
- Pipe buried no more than 24”
- Attach the mailbox firmly to the support post using adequately strong bolts and plates.
- 42-48” above ground level.

Wyoming
- USPS Standards
SINGLE MAILBOX SUPPORT SYSTEMS

Single Mailbox Support System Types

One section of the survey was designed to obtain information regarding which types of single and multiple mailbox supports are currently used by the State DOTs. The researchers identified certain types of mailbox support systems (made of wood, polyurethane and steel) and included them in the survey so that each participating State could check the system currently in use (or anyhow allowed) in its territory. The States, however, were also given the option to include any other support system that was not identified by the authors with a literature review, but still allowed for installation. Tables 3.3 through 3.6 and Figures 3.2 through 3.4 list the identified single mailbox support systems made of different materials, and report the States answers about which systems are utilized by the DOTs. Table 3.7 and Figure 3.5 report States answers about the foundation types utilized by the DOTs for single mailbox support systems.

State DOTs were inquired about whether the single mailbox support systems in use in their territory have been tested for crashworthiness according to the criteria reported by the “Recommended Procedures for the Safety Performance Evaluation of Highway Features” (NCHRP Report 350) (Ross et al., 1993b). Results are reported in Table 3.8.
Table 3.3. Single Wood Mailbox Support Systems used by States DOTs.

<table>
<thead>
<tr>
<th>State</th>
<th>Single Wood</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MailMaster Deluxe, 4&quot; x 4&quot;</td>
</tr>
<tr>
<td>AK</td>
<td>X</td>
</tr>
<tr>
<td>AR</td>
<td>X</td>
</tr>
<tr>
<td>CO</td>
<td></td>
</tr>
<tr>
<td>CA</td>
<td></td>
</tr>
<tr>
<td>DE</td>
<td>X</td>
</tr>
<tr>
<td>GA</td>
<td>X</td>
</tr>
<tr>
<td>KS</td>
<td>X</td>
</tr>
<tr>
<td>KY</td>
<td>X</td>
</tr>
<tr>
<td>LA</td>
<td>X</td>
</tr>
<tr>
<td>ME</td>
<td>X</td>
</tr>
<tr>
<td>MN</td>
<td>X</td>
</tr>
<tr>
<td>MS</td>
<td>X</td>
</tr>
<tr>
<td>NC</td>
<td>X</td>
</tr>
<tr>
<td>ND</td>
<td>X</td>
</tr>
<tr>
<td>NH</td>
<td>X</td>
</tr>
<tr>
<td>NJ</td>
<td>X</td>
</tr>
<tr>
<td>NY</td>
<td>X</td>
</tr>
<tr>
<td>OH</td>
<td>X</td>
</tr>
<tr>
<td>OR</td>
<td>X</td>
</tr>
<tr>
<td>PA</td>
<td>X</td>
</tr>
<tr>
<td>RI</td>
<td>X</td>
</tr>
<tr>
<td>SD</td>
<td>X</td>
</tr>
<tr>
<td>TN</td>
<td></td>
</tr>
<tr>
<td>TX</td>
<td>X</td>
</tr>
<tr>
<td>VA</td>
<td></td>
</tr>
<tr>
<td>WA</td>
<td>X</td>
</tr>
<tr>
<td>WI</td>
<td></td>
</tr>
<tr>
<td>WY</td>
<td></td>
</tr>
</tbody>
</table>

Figure 3.2. Number and Percentage of Participating States using the Identified Single Wood Mailbox Support System Type.
**Table 3.4.** Single Polyurethane Mailbox Support Systems used by States DOTs.

<table>
<thead>
<tr>
<th>State</th>
<th>Single Polyurethane</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>AR</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>CO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KS</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>KY</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>LA</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>ME</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>MN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MS</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>NC</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>ND</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>NH</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>NJ</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>NY</td>
<td>not used</td>
<td>not used</td>
</tr>
<tr>
<td>OH</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>OR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PA</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>RI</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TX</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>VA</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>WA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WY</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Figure 3.3.** Number and Percentage of Participating States using the Identified Single Polyurethane Mailbox Support System Type.
<table>
<thead>
<tr>
<th>State</th>
<th>Single Steel Support Systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK</td>
<td>X</td>
</tr>
<tr>
<td>AR</td>
<td>X</td>
</tr>
<tr>
<td>CO</td>
<td>X</td>
</tr>
<tr>
<td>CA</td>
<td>X</td>
</tr>
<tr>
<td>DE</td>
<td>X</td>
</tr>
<tr>
<td>GA</td>
<td>X</td>
</tr>
<tr>
<td>KS</td>
<td>X</td>
</tr>
<tr>
<td>KY</td>
<td>X</td>
</tr>
<tr>
<td>LA</td>
<td>X</td>
</tr>
<tr>
<td>ME</td>
<td>X</td>
</tr>
<tr>
<td>MN</td>
<td>X</td>
</tr>
<tr>
<td>MS</td>
<td>X</td>
</tr>
<tr>
<td>NC</td>
<td>X</td>
</tr>
<tr>
<td>ND</td>
<td>X</td>
</tr>
<tr>
<td>NH</td>
<td>X</td>
</tr>
<tr>
<td>NJ</td>
<td>X</td>
</tr>
<tr>
<td>NY</td>
<td>X</td>
</tr>
<tr>
<td>OH</td>
<td>X</td>
</tr>
<tr>
<td>OR</td>
<td>X</td>
</tr>
<tr>
<td>PA</td>
<td>X</td>
</tr>
<tr>
<td>RI</td>
<td>X</td>
</tr>
<tr>
<td>SD</td>
<td>X</td>
</tr>
<tr>
<td>TN</td>
<td>X</td>
</tr>
<tr>
<td>TX</td>
<td>X</td>
</tr>
<tr>
<td>VA</td>
<td>X</td>
</tr>
<tr>
<td>WA</td>
<td>X</td>
</tr>
<tr>
<td>WI</td>
<td>X</td>
</tr>
<tr>
<td>WY</td>
<td>X</td>
</tr>
</tbody>
</table>
Figure 3.4. Number and Percentage of Participating States using the Identified Single Steel Mailbox Support System Types.
Table 3.6. Other Types of Single Mailbox Support Systems used by States DOTs.

<table>
<thead>
<tr>
<th>State</th>
<th>Single Other</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK</td>
<td><img src="image" alt="Shur-Tite Flex Mailbox Post, 2-3/8&quot; O.D." /></td>
<td>X</td>
</tr>
<tr>
<td>AR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GA</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>KS</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>KY</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>LA</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>ME</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>MN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MS</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>NC</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>ND</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>NH</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>NJ</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>NY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PA</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>RI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TX</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>VA</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>WA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WY</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note: X indicates the presence of the specified system.*
Table 3.7. Foundation Types Allowed in the States for Single Mailbox Support Systems.

<table>
<thead>
<tr>
<th>State</th>
<th>Frangible Base</th>
<th>Wedge and socket</th>
<th>Direct Embedding</th>
<th>Frangible Steel Nested</th>
<th>Slip Base</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>AR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CO</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>CA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DE</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>GA</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KS</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>KY</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>ME</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>MN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>MS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NC</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>ND</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NH</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>NJ</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NY</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>OH</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PA</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>RI</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TX</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>WI</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WY</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Figure 3.5. Number and Percentage of Participating States using the Identified Foundation Types for Single Mailbox Support System Types.
<table>
<thead>
<tr>
<th>State DOT</th>
<th>Mailbox Installation Policy</th>
<th>NCHRP Report 350 Crashworthy</th>
<th>Comments from State</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK</td>
<td>Yes</td>
<td>Don’t know</td>
<td>Hasn’t been tested</td>
</tr>
<tr>
<td>AR</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>CO</td>
<td>Yes</td>
<td>Don’t know</td>
<td>Hasn’t been tested</td>
</tr>
<tr>
<td>DE</td>
<td>Yes</td>
<td>Don’t know</td>
<td>Hasn’t been tested</td>
</tr>
<tr>
<td>GA</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>KY</td>
<td>Yes</td>
<td>Don’t know</td>
<td>Hasn’t been tested</td>
</tr>
<tr>
<td>LA</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>ME</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>MN</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>NC</td>
<td>Yes</td>
<td>Don’t know</td>
<td>Hasn’t been tested</td>
</tr>
<tr>
<td>ND</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>OH</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>OR</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>RI</td>
<td>Yes</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>TX</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>VA</td>
<td>Yes</td>
<td>Don’t know</td>
<td>Hasn’t been tested</td>
</tr>
<tr>
<td>WS</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>WY</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>KS</td>
<td>No</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>NH</td>
<td>No</td>
<td>Don’t know</td>
<td>Hasn’t been tested</td>
</tr>
<tr>
<td>NJ</td>
<td>No</td>
<td>Don’t know</td>
<td>Hasn’t been tested</td>
</tr>
<tr>
<td>NY</td>
<td>No</td>
<td>Don’t know</td>
<td>Hasn’t been tested</td>
</tr>
<tr>
<td>PA</td>
<td>No</td>
<td>Don’t know</td>
<td>Hasn’t been tested</td>
</tr>
<tr>
<td>TN</td>
<td>No</td>
<td>Don’t know</td>
<td>Hasn’t been tested</td>
</tr>
<tr>
<td>WI</td>
<td>No</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>CA</td>
<td>Other</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>MS</td>
<td>Other</td>
<td>Don’t know</td>
<td>Hasn’t been tested</td>
</tr>
</tbody>
</table>
Placement Regulation for Single Mailbox Supports

Part of the survey was designed to request information to State DOTs regarding possible regulation for placement of mailbox supports. Questions were addressed to identify policy/recommendation about single mailbox systems installation for minimum vertical height from the road surface (Table 3.9), roadway annual average daily traffic (AADT) and design speed influence on selection and placement of the support systems (Tables 3.10 and 3.11 and Figures 3.6 and 3.7), minimum distances from the front face of curb and from the road edge (Table 3.12).

From the results collected, it appears that 13 States (46% of participating States) require a minimum vertical height between 41 and 45 inches for multiple mailbox systems installation from the road surface, which is also the USPS requirement (Figure 3.8). Three States (11% of participating States) ask for a minimum vertical height between 42 and 48 inches. One State extended the vertical height recommendation installation to a height between 38 and 48 inches, while a couple of other States have requirements of 39 and 42 inches.

Twelve States (43% of participating States) have suggestions for placement of the single mailbox support system from the front face of the curb (Figure 3.9). While only one State responded that any distance between zero to 12 inches is allowed, the remaining 11 States suggest to place the single mailbox system at a distance between six and 12 inches from the front face of the curb.

Eleven States (39% of participating States) have suggestions for placement of the single mailbox support system from the road edge (Figure 3.10). The general requirement for single mailbox support system placement varies from six to 12 inches from the front face of the road edge.
Table 3.9. DOTs Suggestions for Minimum Vertical Height from the Road Surface for Single Mailbox Installation.

<table>
<thead>
<tr>
<th>State DOT</th>
<th>Mailbox Installation Policy</th>
<th>Min Vertical Height from Road Surface (in)</th>
<th>Comments from State</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK</td>
<td>Yes</td>
<td>38 &lt; x &lt; 48</td>
<td></td>
</tr>
<tr>
<td>AR</td>
<td>Yes</td>
<td>41 &lt; x &lt; 45</td>
<td>Same as USPS</td>
</tr>
<tr>
<td>CO</td>
<td>Yes</td>
<td>42 &lt; x &lt; 48</td>
<td></td>
</tr>
<tr>
<td>DE</td>
<td>Yes</td>
<td>41 &lt; x &lt; 45</td>
<td>Same as USPS</td>
</tr>
<tr>
<td>GA</td>
<td>Yes</td>
<td>41 &lt; x &lt; 45</td>
<td>Same as USPS</td>
</tr>
<tr>
<td>KY</td>
<td>Yes</td>
<td>N/A</td>
<td>No Standard</td>
</tr>
<tr>
<td>LA</td>
<td>Yes</td>
<td>41 &lt; x &lt; 45</td>
<td>Same as USPS</td>
</tr>
<tr>
<td>ME</td>
<td>Yes</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>MN</td>
<td>Yes</td>
<td>41 &lt; x &lt; 45</td>
<td>Same as USPS</td>
</tr>
<tr>
<td>NC</td>
<td>Yes</td>
<td>41 &lt; x &lt; 45</td>
<td>Same as USPS</td>
</tr>
<tr>
<td>OH</td>
<td>Yes</td>
<td>42 &lt; x &lt; 48</td>
<td></td>
</tr>
<tr>
<td>OR</td>
<td>Yes</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>RI</td>
<td>Yes</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td>Yes</td>
<td>41 &lt; x &lt; 45</td>
<td>Same as USPS</td>
</tr>
<tr>
<td>TX</td>
<td>Yes</td>
<td>41 &lt; x &lt; 45</td>
<td>Same as USPS</td>
</tr>
<tr>
<td>VA</td>
<td>Yes</td>
<td>41 &lt; x &lt; 45</td>
<td>Same as USPS</td>
</tr>
<tr>
<td>WS</td>
<td>Yes</td>
<td>39</td>
<td></td>
</tr>
<tr>
<td>WY</td>
<td>Yes</td>
<td>41 &lt; x &lt; 45</td>
<td>Same as USPS</td>
</tr>
<tr>
<td>KS</td>
<td>No</td>
<td>41 &lt; x &lt; 45</td>
<td>Same as USPS</td>
</tr>
<tr>
<td>NH</td>
<td>No</td>
<td>N/A</td>
<td>No Standard</td>
</tr>
<tr>
<td>NJ</td>
<td>No</td>
<td>N/A</td>
<td>No Standard</td>
</tr>
<tr>
<td>NY</td>
<td>No</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>PA</td>
<td>No</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>TN</td>
<td>No</td>
<td>41 &lt; x &lt; 45</td>
<td>Same as USPS</td>
</tr>
<tr>
<td>WI</td>
<td>No</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>CA</td>
<td>Other</td>
<td>41 &lt; x &lt; 45</td>
<td>Same as USPS</td>
</tr>
<tr>
<td>MS</td>
<td>Other</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>
Table 3.10. DOTs Policy about Influence of Roadway AADT on Selection and Placement of Single Mailbox Support Systems.

<table>
<thead>
<tr>
<th>State DOT</th>
<th>Mailbox Installation Policy</th>
<th>Roadway AADT Influence on Selection &amp; Placement</th>
<th>Comments from State</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK</td>
<td>Yes</td>
<td>Yes</td>
<td>Chart in Mailbox Location provides guidance considering AADT and Speed. This guidance has been revised in a draft revision, not yet released, but doesn't change the essential conditions. <a href="http://www.dot.state.ak.us/stwddes/dcstraffic/assets/pdf/metal_mailbox_support_design.pdf">http://www.dot.state.ak.us/stwddes/dcstraffic/assets/pdf/metal_mailbox_support_design.pdf</a></td>
</tr>
<tr>
<td>AR</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>CA</td>
<td>Other</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>CO</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>DE</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>GA</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>KS</td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>KY</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>LA</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>ME</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>MN</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>MS</td>
<td>Other</td>
<td>Other</td>
<td></td>
</tr>
<tr>
<td>NC</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>ND</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>NH</td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>NJ</td>
<td>No</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>NY</td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>OH</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>OR</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>PA</td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>RI</td>
<td>Yes</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>TN</td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>TX</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>VA</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>WS</td>
<td>Yes</td>
<td>Other</td>
<td>“It depends on type of highway facility. See Design Manual Chapter 530: <a href="http://www.wsdot.wa.gov/Publications/Manuals/M22-01.htm#Individualchapters">http://www.wsdot.wa.gov/Publications/Manuals/M22-01.htm#Individualchapters</a></td>
</tr>
<tr>
<td>WI</td>
<td>No</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>WY</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>
It appears that most of the participating States do not have any policy for regulation of single mailbox support systems selection and installation according to the roadway AADT. Only two out of 28 States (Alaska and Washington) indicated guidance for mailbox systems selection and location according to AADT consideration. Their regulations are reported below and in Figure 3.6.

**Washington State**

Extract from “[http://www.wsdot.wa.gov/Publications/Manuals/M22-01.htm#Individualchapters](http://www.wsdot.wa.gov/Publications/Manuals/M22-01.htm#Individualchapters)” (WSDOT Design Manual, 2012):

“In urban areas where sidewalks are prevalent, contact the postal service to determine the most appropriate mailbox location. Locate mailboxes on limited access highways in accordance with Chapter 530, Limited Access. A turnout, as shown in Exhibit 1600-6, is not needed on limited access highways with shoulders of 6 feet or more where only one mailbox is to be installed. On managed access highways, mailboxes are to be on the right-hand side of the road in the postal carrier’s direction of travel. Avoid placing mailboxes along high-speed, high-volume highways. Locate Neighborhood Delivery and Collection Box Units (NDCBUs) outside the Design Clear Zone.”

For more information, please refer to the above reported link to the Washington State Design Manual Chapter 530 (WSDOT Design Manual, 2012).
Table 3.11. DOTs Policy about Influence of Roadway Design Speed on Selection and Placement of Single Mailbox Support Systems.

<table>
<thead>
<tr>
<th>State DOT</th>
<th>Mailbox Installation Policy</th>
<th>Roadway Design Speed Influence on Selection &amp; Placement</th>
<th>Comments from State</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK</td>
<td>Yes</td>
<td>Yes</td>
<td>Chart in Mailbox Location provides guidance considering AADT and Speed. This guidance has been revised in a draft revision, not yet released, but doesn't change the essential conditions. <a href="http://www.dot.state.ak.us/stwddes/dcstraffic/assets/pdf/metal_mailbox_support_design.pdf">http://www.dot.state.ak.us/stwddes/dcstraffic/assets/pdf/metal_mailbox_support_design.pdf</a></td>
</tr>
<tr>
<td>AR</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>CA</td>
<td>Other</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>CO</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>DE</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>GA</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>KS</td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>KY</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>LA</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>ME</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>MN</td>
<td>Yes</td>
<td>Yes</td>
<td><a href="http://dotapp7.dot.state.mn.us/edms/download?docId=1062364">http://dotapp7.dot.state.mn.us/edms/download?docId=1062364</a></td>
</tr>
<tr>
<td>MS</td>
<td>Other</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>NC</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>ND</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>NH</td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>NJ</td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>NY</td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>OH</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>OR</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>PA</td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>RI</td>
<td>Yes</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>TN</td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>TX</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>VA</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>WS</td>
<td>Yes</td>
<td>Other</td>
<td><a href="http://www.wsdot.wa.gov/Publications/Manuals/M22-01.htm#Individualchapters">http://www.wsdot.wa.gov/Publications/Manuals/M22-01.htm#Individualchapters</a></td>
</tr>
<tr>
<td>WI</td>
<td>No</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>WY</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>
It appears that most of the participating States do not have any policy for regulation of single mailbox support systems selection and installation according to the roadway design speed. Only three out of 28 States (Alaska, Minnesota and Washington) indicated guidance for mailbox systems selection and location according to design speed consideration. Their regulations are reported below and in Figure 3.6.

**Washington State**


“In urban areas where sidewalks are prevalent, contact the postal service to determine the most appropriate mailbox location. Locate mailboxes on limited access highways in accordance with Chapter 530, Limited Access. A turnout, as shown in Exhibit 1600-6, is not needed on limited access highways with shoulders of 6 feet or more where only one mailbox is to be installed. On managed access highways, mailboxes are to be on the right-hand side of the road in the postal carrier’s direction of travel. Avoid placing mailboxes along high-speed, high-volume highways. Locate Neighborhood Delivery and Collection Box Units (NDCBUs) outside the Design Clear Zone.”

For more information, please refer to the above reported link to the Washington State Design Manual Chapter 530.

**Minnesota**

The Minnesota policy reported in Figure 3.7 provides guidance to location and installation of accepted mailbox supports on highways with speed limits of 40 mph (65 km/h) or greater (Mn/DOT Road Design Manual, 2012).
11-11.0 ROADSIDE APPURTENANCES

11-11.01 Mailbox Supports
Mn/DOT has developed this policy regarding mailbox supports on the Trunk Highway System. Minnesota Rules Chapter 8818, "Mailbox Installation and Support Standards" is used as a reference to the Mn/DOT policy.

This policy provides guidance to location and installation of accepted mailbox supports on highways with speed limits of 40 mph (65 km/h) or greater.

11-11.01.01 Policy
1. Mailbox installations and supports that have been accepted by the FHWA as meeting the NCHRP Report 350 crash worthiness criteria, meet Minnesota Rules Chapter 8818, U.S. Post Office recommendations, and are in compliance with Mn/DOT Policy are acceptable. To obtain a drawing with an example of a crash tested mailbox support, which satisfies the above requirements, contact the Design Standards Unit, Office of Technical Support.

2. All mailbox supports should be a breakaway design and support a standard mailbox size T2 with a 10 lb (4.5 kg) load.

3. Mailbox supports should consist of corrosion resistance materials, which, in accordance with project/site specific conditions, may be required to include, but not limited to, the following:
   a) Post, pipes and other steel components galvanized per Spec. 3392.
   b) Pipes conforming to Spec. 3362, Schedule 40 of ASTM A53/A53M.
   c) All fasteners conforming to Spec. 3391.

4. The installation should include the following:
   a) Location of the face of mailbox should be 8 in. to 12 in. (200 mm to 300 mm) outside the edge of the shoulder or 6 in. to 12 in. (150 mm to 300 mm) behind the face of the curb.
   b) The height of the mailbox bottom should be 42 in. to 48 in. (1 m to 1.2 m) above the pavement in rural and urban areas. Postal Service regulations will determine the height. The local mail carrier post office should be consulted to determine if any changes need to be made to the installation regarding height and offset distances.
   c) Adequate embedment depths of the mailbox support should be provided so that the structure does not sag or fall over. The embedment depths will vary from each installation by the type of support, the location of the structure on inslope, the steepness of the inslope, and soil condition or type. The details for the supports should include the proper embedment depths in the plans or have provisions in the plans for the embedment depth to be decided in the field. Preferably, the embedment depth shall not be less than 48 in. (1.2 m).
   d) The spacing between mailboxes should be a minimum of 30 in. (760 mm) from center to center of the supports. A multiple mailbox support can be considered if two or more mailboxes are at one location.

5. Alternate support designs may be approved by the Design Standards Engineer or the Project Engineer in consultation with the Design Standards Engineer.

Figure 3.7. Minnesota Policy about Mailbox Supports (Mn/DOT Road Design Manual, 2012).
Table 3.12. DOTs Suggestions for Minimum Distances from Front Face Curb and Road Edge for Single Mailbox Support System Installation.

<table>
<thead>
<tr>
<th>State DOT</th>
<th>Mailbox Installation Policy</th>
<th>Min Distance from Front Face of Curb (in)</th>
<th>Min Distance from Front Face of Road Edge (in)</th>
<th>Comments from State</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK</td>
<td>Yes</td>
<td>12</td>
<td>12</td>
<td>Beyond the shoulder, 12 inches from hinge point of the shoulder (road edge)</td>
</tr>
<tr>
<td>AR</td>
<td>Yes</td>
<td>No requirement</td>
<td>No requirement</td>
<td></td>
</tr>
<tr>
<td>CO</td>
<td>Yes</td>
<td>8-12</td>
<td>8-12</td>
<td></td>
</tr>
<tr>
<td>DE</td>
<td>Yes</td>
<td>6-12</td>
<td>8-12</td>
<td></td>
</tr>
<tr>
<td>GA</td>
<td>Yes</td>
<td>6-8</td>
<td>6-8</td>
<td></td>
</tr>
<tr>
<td>KY</td>
<td>Yes</td>
<td>No requirement</td>
<td>No requirement</td>
<td></td>
</tr>
<tr>
<td>LA</td>
<td>Yes</td>
<td>No requirement</td>
<td>No requirement</td>
<td></td>
</tr>
<tr>
<td>ME</td>
<td>Yes</td>
<td>No requirement</td>
<td>No requirement</td>
<td>Give min distance to post</td>
</tr>
<tr>
<td>MN</td>
<td>Yes</td>
<td>6-8</td>
<td>6-8</td>
<td></td>
</tr>
<tr>
<td>NC</td>
<td>Yes</td>
<td>6-8</td>
<td>6-8</td>
<td></td>
</tr>
<tr>
<td>ND</td>
<td>Yes</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>OH</td>
<td>Yes</td>
<td>No requirement</td>
<td>N/A</td>
<td>at the face of graded shoulder, or 1’ past treated shoulder (road edge)</td>
</tr>
<tr>
<td>OR</td>
<td>Yes</td>
<td>6-12</td>
<td>8-12</td>
<td>If no turnout then it can be 0</td>
</tr>
<tr>
<td>RI</td>
<td>Yes</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td>Yes</td>
<td>6-8</td>
<td>8 ft. when shoulder/construction is present</td>
<td></td>
</tr>
<tr>
<td>TX</td>
<td>Yes</td>
<td>6-8</td>
<td>N/A</td>
<td>ftp://ftp.dot.state.tx.us/pub/txdot - info/cmd/ceserve/standard/maint cad/mb09(2).pdf</td>
</tr>
<tr>
<td>VA</td>
<td>Yes</td>
<td>6-10</td>
<td>N/A</td>
<td>Shall be placed as to not interfere with safety, maintenance and use of highway (road edge)</td>
</tr>
<tr>
<td>WS</td>
<td>Yes</td>
<td>0-12</td>
<td>6-8</td>
<td></td>
</tr>
<tr>
<td>WY</td>
<td>Yes</td>
<td>No requirement</td>
<td>8-12</td>
<td></td>
</tr>
</tbody>
</table>
Table 3.12. DOTs Suggestions for Minimum Distances from Front Face Curb and Road Edge for Single Mailbox Support System Installation (Continued).

<table>
<thead>
<tr>
<th>State DOT</th>
<th>Mailbox Installation Policy</th>
<th>Min Distance from Front Face of Curb (in)</th>
<th>Min Distance from Front Face of Road Edge (in)</th>
<th>Comments from State</th>
</tr>
</thead>
<tbody>
<tr>
<td>KS</td>
<td>No</td>
<td>6-8</td>
<td>No requirement</td>
<td>Require an 8 foot turnout</td>
</tr>
<tr>
<td>NH</td>
<td>No</td>
<td>No requirement</td>
<td>No requirement</td>
<td></td>
</tr>
<tr>
<td>NJ</td>
<td>No</td>
<td>N/A</td>
<td>6-8</td>
<td></td>
</tr>
<tr>
<td>NY</td>
<td>No</td>
<td>No requirement</td>
<td>No requirement</td>
<td></td>
</tr>
<tr>
<td>PA</td>
<td>No</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>TN</td>
<td>No</td>
<td>No requirement</td>
<td>No requirement</td>
<td></td>
</tr>
<tr>
<td>WI</td>
<td>No</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>CA</td>
<td>Other</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>MS</td>
<td>Other</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

Figure 3.8. Minimum Vertical Heights (h) in Inches from Road Surface to Bottom of Single Mailbox Recommended by the Participating state DOTs.
Figure 3.9. Minimum Distance (d) in Inches from Curb Front Face to Single Mailbox Support Recommended by the Participating state DOTs.

Figure 3.10. Minimum Distance (D) in Inches from Road Edge to Single Mailbox Support Recommended by the Participating state DOTs.
MULTIPLE MAILBOX SUPPORT SYSTEMS

Multiple Mailbox Support System Types

Tables 3.13 and 3.14 and Figures 3.11 and 3.12 list the identified multiple mailbox support systems made of different materials, and report the States answers about which systems are utilized by the DOTs. Table 3.15 and Figure 3.13 report States answers about the foundation types utilized by the DOTs for multiple mailbox support systems.

State DOTs were inquired about whether the multiple mailbox support systems in use in their territory have been tested for crashworthiness according to the criteria reported by the “Recommended Procedures for the Safety Performance Evaluation of Highway Features” (NCHRP Report 350) (Ross et al., 1993b). Results are reported in Table 3.16. Six out of the 8 States with no policy for mailbox support installation answered that the systems used have not been crash tested or that they don’t know if the systems are crashworthy (Table 3.16). Only one DOT affirmed that all the multiple mailbox support systems used in its State were NCHRP Report 350 crashworthy.
Table 3.13. Multiple Wood Mailbox Support Systems used by States DOTs.

<table>
<thead>
<tr>
<th>State</th>
<th>Swing-A-Way</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>AR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DE</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>GA</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>KS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ME</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>MN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MS</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>NC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ND</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>NH</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>NJ</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>NY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PA</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>RI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TX</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>VA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WY</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 3.11. Number and Percentage of Participating States using the Identified Multiple Wood Mailbox Support System Type.
### Table 3.14. Multiple Steel Mailbox Support Systems used by States DOTs.

<table>
<thead>
<tr>
<th>State</th>
<th>Dual 8-Square Mailbox</th>
<th>Dual, vertical support, 2-3/8&quot; O.D., 14 ga</th>
<th>Dual 2 lb-ft winged channel</th>
<th>Dual 1.65&quot; O.D., 16 ga</th>
<th>Dual 2-7/8&quot; O.D., 11 ga</th>
<th>Shur-Tite Mailbox Double Adapter</th>
<th>Multiple S-Square Mailbox</th>
<th>Multiple Non-proprietary</th>
<th>Shur-Tite Multiple Mailbox Post</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>AR</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CO</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CA</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DE</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GA</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KS</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KY</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ME</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MN</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NC</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ND</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NH</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>NJ</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NY</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OH</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PA</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>RI</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TX</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WI</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WY</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Figure 3.12. Number and Percentage of Participating States using the Identified Multiple Steel Mailbox Support System Types.
Table 3.15. Foundation Types Allowed in the States for Multiple Mailbox Support Systems.

<table>
<thead>
<tr>
<th>State</th>
<th>Frangible Base</th>
<th>Wedge and Socket</th>
<th>Direct embedding</th>
<th>Frangible Steel nested</th>
<th>Slip Base</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>AR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CO</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DE</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>GA</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>KY</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>ME</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>MS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NC</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>ND</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>NH</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>NJ</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NY</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OH</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>PA</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>RI</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TX</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>WA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WI</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WY</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Figure 3.13. Number and Percentage of Participating States using the Identified Foundation Types for Multiple Mailbox Support System Types.
<table>
<thead>
<tr>
<th>State DOT</th>
<th>Mailbox Installation Policy</th>
<th>NCHRP Report 350 Crashworthy</th>
<th>Comments from State</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK</td>
<td>Yes</td>
<td>Don’t know</td>
<td>Hasn’t been tested</td>
</tr>
<tr>
<td>AR</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>CO</td>
<td>Yes</td>
<td>Don’t know</td>
<td>Hasn’t been tested</td>
</tr>
<tr>
<td>DE</td>
<td>Yes</td>
<td>Don’t know</td>
<td>Hasn’t been tested</td>
</tr>
<tr>
<td>GA</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>KY</td>
<td>Yes</td>
<td>Don’t know</td>
<td>Hasn’t been tested</td>
</tr>
<tr>
<td>LA</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>ME</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>MN</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>NC</td>
<td>Yes</td>
<td>Don’t know</td>
<td>Hasn’t been tested</td>
</tr>
<tr>
<td>ND</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>OH</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>OR</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>RI</td>
<td>Yes</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>TX</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>VA</td>
<td>Yes</td>
<td>Don’t know</td>
<td>Hasn’t been tested</td>
</tr>
<tr>
<td>WS</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>WY</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>KS</td>
<td>No</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>NH</td>
<td>No</td>
<td>Don’t know</td>
<td>Hasn’t been tested</td>
</tr>
<tr>
<td>NJ</td>
<td>No</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>NY</td>
<td>No</td>
<td>Don’t know</td>
<td>Hasn’t been tested</td>
</tr>
<tr>
<td>PA</td>
<td>No</td>
<td>Don’t know</td>
<td>Hasn’t been tested</td>
</tr>
<tr>
<td>TN</td>
<td>No</td>
<td>Don’t know</td>
<td>Hasn’t been tested</td>
</tr>
<tr>
<td>WI</td>
<td>No</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>CA</td>
<td>Other</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>MS</td>
<td>Other</td>
<td>Don’t know</td>
<td>Hasn’t been tested</td>
</tr>
</tbody>
</table>
Placement Regulation for Multiple Mailbox Supports

Authors designed certain survey questions in order to obtain information on policy/recommendation about multiple mailbox systems installation for minimum vertical height from the road surface (Table 3.17), roadway annual average daily traffic (AADT) and design speed influence on selection and placement of these support systems (Tables 3.18 and 3.19), minimum distances from the front face of curb and from the road edge (Table 3.20).

From the results collected, it appears that 11 States (39% of participating States) require a minimum vertical height between 41 and 45 inches for multiple mailbox systems installation from the road surface, which is also the USPS requirement (Figure 3.14). Two States have requirements of 42 inches, while four other States have suggestions for a minimum vertical height of 39, 40, between 42 and 48 inches, and between 38 and 48 inches, respectively.

Twelve States (43% of participating States) have suggestions for placement of the multiple mailbox support systems from the front face of the curb (Figure 3.15). While only one State responded that any distance between zero to 12 inches is allowed, the remaining 11 States suggest placing the mailbox system at a distance between six and 12 inches from the front face of the curb.

Eleven States (39% of participating States) have suggestions for placement of the multiple mailbox support systems from the road edge (Figure 3.16). While only one State responded that placement of the multiple mailbox system is allowed at any distance from the road edge in its territory, the other States require a distance between six to 12 inches from the front face of the road edge.
Table 3.17. DOTs Suggestions for Minimum Vertical Height from the Road Surface for Multiple Mailbox Installation.

<table>
<thead>
<tr>
<th>State DOT</th>
<th>Mailbox Installation Policy</th>
<th>Min Vertical Height from Road Surface (in)</th>
<th>Comments from State</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK</td>
<td>Yes</td>
<td>$38 &lt; x &lt; 48$</td>
<td></td>
</tr>
<tr>
<td>AR</td>
<td>Yes</td>
<td>$41 &lt; x &lt; 45$</td>
<td>Same as USPS</td>
</tr>
<tr>
<td>CO</td>
<td>Yes</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>DE</td>
<td>Yes</td>
<td>$41 &lt; x &lt; 45$</td>
<td>Same as USPS</td>
</tr>
<tr>
<td>GA</td>
<td>Yes</td>
<td>$41 &lt; x &lt; 45$</td>
<td>Same as USPS</td>
</tr>
<tr>
<td>KY</td>
<td>Yes</td>
<td>No requirement</td>
<td></td>
</tr>
<tr>
<td>LA</td>
<td>Yes</td>
<td>$41 &lt; x &lt; 45$</td>
<td>Same as USPS</td>
</tr>
<tr>
<td>ME</td>
<td>Yes</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>MN</td>
<td>Yes</td>
<td>$41 &lt; x &lt; 45$</td>
<td>Same as USPS</td>
</tr>
<tr>
<td>NC</td>
<td>Yes</td>
<td>$41 &lt; x &lt; 45$</td>
<td>Same as USPS</td>
</tr>
<tr>
<td>OH</td>
<td>Yes</td>
<td>$42 &lt; x &lt; 48$</td>
<td></td>
</tr>
<tr>
<td>OR</td>
<td>Yes</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>RI</td>
<td>Yes</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td>Yes</td>
<td>$41 &lt; x &lt; 45$</td>
<td>Same as USPS</td>
</tr>
<tr>
<td>TX</td>
<td>Yes</td>
<td>$41 &lt; x &lt; 45$</td>
<td>Same as USPS</td>
</tr>
<tr>
<td>VA</td>
<td>Yes</td>
<td>$41 &lt; x &lt; 45$</td>
<td>Same as USPS</td>
</tr>
<tr>
<td>WS</td>
<td>Yes</td>
<td>39</td>
<td></td>
</tr>
<tr>
<td>WY</td>
<td>Yes</td>
<td>$41 &lt; x &lt; 45$</td>
<td>Same as USPS</td>
</tr>
<tr>
<td>KS</td>
<td>No</td>
<td>$41 &lt; x &lt; 45$</td>
<td>Same as USPS</td>
</tr>
<tr>
<td>NH</td>
<td>No</td>
<td>No requirement</td>
<td></td>
</tr>
<tr>
<td>NJ</td>
<td>No</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>NY</td>
<td>No</td>
<td>No requirement</td>
<td></td>
</tr>
<tr>
<td>PA</td>
<td>No</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>TN</td>
<td>No</td>
<td>No requirement</td>
<td></td>
</tr>
<tr>
<td>WI</td>
<td>No</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>CA</td>
<td>Other</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>MS</td>
<td>Other</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>
Table 3.18. DOTs Policy about Influence of Roadway AADT on Selection and Placement of Multiple Mailbox Support Systems.

<table>
<thead>
<tr>
<th>State DOT</th>
<th>Mailbox Installation Policy</th>
<th>Roadway AADT Influence on Selection &amp; Placement</th>
<th>Comments from State</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK</td>
<td>Yes</td>
<td>Yes</td>
<td>See <a href="http://www.dot.state.ak.us/stwddes/dcstraffic/assets/pdf/metal_mailbox_support_design.pdf">http://www.dot.state.ak.us/stwddes/dcstraffic/assets/pdf/metal_mailbox_support_design.pdf</a>. Also, where possible, regions encourage gangbox installations on a side street.</td>
</tr>
<tr>
<td>AR</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>CA</td>
<td>Other</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>CO</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>DE</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>GA</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>KS</td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>KY</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>LA</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>ME</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>MN</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>MS</td>
<td>Other</td>
<td>Other</td>
<td></td>
</tr>
<tr>
<td>NC</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>ND</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>NH</td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>NJ</td>
<td>No</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>NY</td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>OH</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>OR</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>PA</td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>RI</td>
<td>Yes</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>TN</td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>TX</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>VA</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>WS</td>
<td>Yes</td>
<td>Other</td>
<td><a href="http://www.wsdot.wa.gov/Publications/Manu">http://www.wsdot.wa.gov/Publications/Manu</a> als/M22-01.htm#Individualchapters</td>
</tr>
<tr>
<td>WI</td>
<td>No</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>WY</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>
Table 3.19. DOTs Policy about Influence of Roadway Design Speed on Selection and Placement of Multiple Mailbox Support Systems.

<table>
<thead>
<tr>
<th>State DOT</th>
<th>Mailbox Installation Policy</th>
<th>Roadway Design Speed Influence on Selection &amp; Placement</th>
<th>Comments from State</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK</td>
<td>Yes</td>
<td>Yes</td>
<td>Chart in Mailbox Location provides guidance considering AADT and Speed. This guidance has been revised in a draft revision, not yet released, but doesn't change the essential conditions. <a href="http://www.dot.state.ak.us/stwddes/dcstraffic/assets/pdf/metal_mailbox_support_design.pdf">http://www.dot.state.ak.us/stwddes/dcstraffic/assets/pdf/metal_mailbox_support_design.pdf</a></td>
</tr>
<tr>
<td>AR</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>CA</td>
<td>Other</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>CO</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>DE</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>GA</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>KS</td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>KY</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>LA</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>ME</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>MN</td>
<td>Yes</td>
<td>Yes</td>
<td><a href="http://dotapp7.dot.state.mn.us/edms/download?docId=1062364">http://dotapp7.dot.state.mn.us/edms/download?docId=1062364</a></td>
</tr>
<tr>
<td>MS</td>
<td>Other</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>NC</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>ND</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>NH</td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>NJ</td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>NY</td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>OH</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>OR</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>PA</td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>RI</td>
<td>Yes</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>TN</td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>TX</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>VA</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>WS</td>
<td>Yes</td>
<td>Other</td>
<td><a href="http://www.wsdot.wa.gov/Publications/Manuals/M22-01.htm#Individualchapters">http://www.wsdot.wa.gov/Publications/Manuals/M22-01.htm#Individualchapters</a></td>
</tr>
<tr>
<td>WI</td>
<td>No</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>WY</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>
It appears that most of the participating States do not have any policy for regulation of multiple mailbox support systems selection and installation according to the roadway AADT. Only two out of 28 States (Alaska and Washington) indicated guidance for mailbox systems selection and location according to AADT consideration. Their regulations were reported already in the “Placement Regulation for Single Mailbox Supports” section above and in Figure 3.6.

It appears that most of the participating States do not have any policy for regulation of multiple mailbox support systems selection and installation according to the roadway design speed. Only three out of 28 States (Alaska, Minnesota and Washington) indicated guidance for mailbox systems selection and location according to design speed consideration. Their regulations were reported already in the “Placement Regulation for Single Mailbox Supports” section above and in Figure 3.6.
<table>
<thead>
<tr>
<th>State</th>
<th>DOT Installation Policy</th>
<th>Min Distance from Front Face of Curb (ft)</th>
<th>Min Distance from Front Face of Road Edge (ft)</th>
<th>Comments from State</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK</td>
<td>Yes</td>
<td>12</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>AR</td>
<td>Yes</td>
<td>No requirement</td>
<td>No requirement</td>
<td></td>
</tr>
<tr>
<td>CO</td>
<td>Yes</td>
<td>8-12</td>
<td>8-12</td>
<td></td>
</tr>
<tr>
<td>DE</td>
<td>Yes</td>
<td>6-12</td>
<td>8-12</td>
<td></td>
</tr>
<tr>
<td>GA</td>
<td>Yes</td>
<td>6-8</td>
<td>6-8</td>
<td></td>
</tr>
<tr>
<td>KY</td>
<td>Yes</td>
<td>No requirement</td>
<td>No requirement</td>
<td></td>
</tr>
<tr>
<td>LA</td>
<td>Yes</td>
<td>No requirement</td>
<td>No requirement</td>
<td></td>
</tr>
<tr>
<td>ME</td>
<td>Yes</td>
<td>No requirement</td>
<td>No requirement</td>
<td></td>
</tr>
<tr>
<td>MN</td>
<td>Yes</td>
<td>6-8</td>
<td>6-8</td>
<td></td>
</tr>
<tr>
<td>NC</td>
<td>Yes</td>
<td>6-8</td>
<td>6-8</td>
<td></td>
</tr>
<tr>
<td>ND</td>
<td>Yes</td>
<td>N/A</td>
<td>N/A</td>
<td><a href="http://www.dot.nd.gov/divisions/design/docs/standards/D766-01.pdf">http://www.dot.nd.gov/divisions/design/docs/standards/D766-01.pdf</a></td>
</tr>
<tr>
<td>OH</td>
<td>Yes</td>
<td>No requirement</td>
<td>N/A</td>
<td>at the face of graded shoulder, or 1' past treated shoulder</td>
</tr>
<tr>
<td>OR</td>
<td>Yes</td>
<td>6-12</td>
<td>8-12</td>
<td></td>
</tr>
<tr>
<td>RI</td>
<td>Yes</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td>Yes</td>
<td>8-12</td>
<td>8</td>
<td>AASTHO</td>
</tr>
<tr>
<td>TX</td>
<td>Yes</td>
<td>6-8</td>
<td>N/A</td>
<td>ftp://ftp.dot.state.tx.us/pub/txdot-info/cmd/cserve/standard/maintcad/mb09(2).pdf</td>
</tr>
<tr>
<td>VA</td>
<td>Yes</td>
<td>6-12</td>
<td>N/A</td>
<td>Shall be placed where interference with safety, maintenance, and use of highway</td>
</tr>
<tr>
<td>WS</td>
<td>Yes</td>
<td>0-12</td>
<td>6-8</td>
<td></td>
</tr>
<tr>
<td>WY</td>
<td>Yes</td>
<td>No requirement</td>
<td>8-12</td>
<td></td>
</tr>
</tbody>
</table>
Table 3.20. DOTs Suggestions for Minimum Distances from Front Face Curb and Road Edge for Multiple Mailbox Support System Installation (Continued).

<table>
<thead>
<tr>
<th>State DOT</th>
<th>Mailbox Installation Policy</th>
<th>Min Distance from Front Face of Curb (ft)</th>
<th>Min Distance from Front Face of Road Edge (ft)</th>
<th>Comments from State</th>
</tr>
</thead>
<tbody>
<tr>
<td>KS</td>
<td>No</td>
<td>6-8</td>
<td>0</td>
<td>8 foot turnout required</td>
</tr>
<tr>
<td>NH</td>
<td>No</td>
<td>No requirement</td>
<td>No requirement</td>
<td></td>
</tr>
<tr>
<td>NJ</td>
<td>No</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>NY</td>
<td>No</td>
<td>No requirement</td>
<td>No requirement</td>
<td></td>
</tr>
<tr>
<td>PA</td>
<td>No</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>TN</td>
<td>No</td>
<td>No requirement</td>
<td>No requirement</td>
<td></td>
</tr>
<tr>
<td>WI</td>
<td>No</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>CA</td>
<td>Other</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>MS</td>
<td>Other</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

Figure 3.14. Minimum Vertical Heights (h) in Inches from Road Surface to Bottom of Multiple Mailbox Recommended by the Participating state DOTs.
Figure 3.15. Minimum Distance (d) in Inches from Curb Front Face to Multiple Mailbox Support Recommended by the Participating state DOTs.

Figure 3.16. Minimum Distance (D) in Inches from Road Edge to Multiple Mailbox Support Recommended by the Participating state DOTs.
CHAPTER 4. CRASH DATA ANALYSIS

The authors designed the last part of the survey with the scope of obtaining information about fixed objects and mailbox supports related crashes. At first, State DOTs were asked whether “mailbox” was coded as an object struck in their State crash database. Also, DOTs were inquired whether they had electronic crash data that could be accessed for the scope of this research study. When both questions were answered affirmatively, the authors contacted the State DOT with the scope of retrieving the crash data. In most cases, a DOT representative collected the data requested and sent the results to the researchers by email as form of an Excel sheet. In a few cases, a DOT representative provided a website link to the authors, where crash data could be obtained by running an available program.

Out of the 28 States that participated to the survey, 20 States answered their crash database contains “mailbox” as an object struck (71% of participating States), while three States do not have the code “mailbox” in their crash database (11%), and five States did not answered the question or did not know (18%) (Figure 4.1). Out of the 20 States which contain “mailbox” as an object struck, 18 States gave availability of their electronic crash data for the purpose of this survey (90% of the States with a “mailbox” code in their crash database) (Figure 4.2). Survey answers indicated that crash data could have been retrieved via email from 12 States, and obtained by running some sort of program on internet for other four States. Finally, four States indicated there was not possibility of retrieving crash data for the scope of this research study. Results are summarized in Table 4.1. Authors had difficulties retrieving crash data from website links of two State DOTs: Ohio and Oregon. Thus, mailbox supports and fixed objects crash data related were retrieved from 14 States (Figure 4.3).

![Figure 4.1. “Mailbox” Coded as Object Struck in State DOTs Databases.](image)

![Figure 4.2. Electronic Crash Data Availability from States Containing “Mailbox” Coded as Object Struck in Their Crash Databases.](image)
Table 4.1. DOTs Answers to Survey Part on Crash Data Availability.

<table>
<thead>
<tr>
<th>State DOT</th>
<th>&quot;Mailbox&quot; as Object Struck</th>
<th>Availability of Crash Data</th>
<th>How Crash Data were Retrieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK</td>
<td>Yes</td>
<td>Yes</td>
<td>Email</td>
</tr>
<tr>
<td>CO</td>
<td>Yes</td>
<td>Yes</td>
<td>Email</td>
</tr>
<tr>
<td>DE</td>
<td>Yes</td>
<td>Yes</td>
<td>Email</td>
</tr>
<tr>
<td>GA</td>
<td>Yes</td>
<td>No</td>
<td>No data</td>
</tr>
<tr>
<td>KS</td>
<td>Yes</td>
<td>Yes</td>
<td>Email</td>
</tr>
<tr>
<td>KY</td>
<td>Yes</td>
<td>Yes</td>
<td>Internet</td>
</tr>
<tr>
<td>LA</td>
<td>Yes</td>
<td>Yes</td>
<td>Email</td>
</tr>
<tr>
<td>ME</td>
<td>Yes</td>
<td>Yes</td>
<td>Email</td>
</tr>
<tr>
<td>MN</td>
<td>Yes</td>
<td>Yes</td>
<td>Email</td>
</tr>
<tr>
<td>MS</td>
<td>Yes</td>
<td>Yes</td>
<td>Email</td>
</tr>
<tr>
<td>NC</td>
<td>Yes</td>
<td>Yes</td>
<td>No data</td>
</tr>
<tr>
<td>ND</td>
<td>Yes</td>
<td>Yes</td>
<td>Email</td>
</tr>
<tr>
<td>OH</td>
<td>Yes</td>
<td>Yes</td>
<td>Internet</td>
</tr>
<tr>
<td>OR</td>
<td>Yes</td>
<td>Yes</td>
<td>Internet</td>
</tr>
<tr>
<td>PA</td>
<td>Yes</td>
<td>Yes</td>
<td>Email</td>
</tr>
<tr>
<td>SD</td>
<td>Yes</td>
<td>Yes</td>
<td>No data</td>
</tr>
<tr>
<td>TX</td>
<td>Yes</td>
<td>Yes</td>
<td>Email</td>
</tr>
<tr>
<td>VA</td>
<td>Yes</td>
<td>Yes</td>
<td>Email</td>
</tr>
<tr>
<td>WS</td>
<td>Yes</td>
<td>Yes</td>
<td>Internet</td>
</tr>
<tr>
<td>WY</td>
<td>Yes</td>
<td>Yes</td>
<td>Email</td>
</tr>
<tr>
<td>AR</td>
<td>No</td>
<td>No</td>
<td>No data</td>
</tr>
<tr>
<td>NY</td>
<td>No</td>
<td>No</td>
<td>No data</td>
</tr>
<tr>
<td>TN</td>
<td>No</td>
<td>No</td>
<td>No data</td>
</tr>
<tr>
<td>CA</td>
<td>N/A</td>
<td>N/A</td>
<td>No data</td>
</tr>
<tr>
<td>NJ</td>
<td>N/A</td>
<td>N/A</td>
<td>No data</td>
</tr>
<tr>
<td>RI</td>
<td>N/A</td>
<td>N/A</td>
<td>No data</td>
</tr>
<tr>
<td>WI</td>
<td>N/A</td>
<td>N/A</td>
<td>No data</td>
</tr>
<tr>
<td>NH</td>
<td>Don’t know</td>
<td>No</td>
<td>No data</td>
</tr>
</tbody>
</table>
At this point, researchers re-analyzed the answers from the State DOT which participated to the survey. In particular, the authors aimed at understanding to which level each DOT has authority on the selection of the mailbox support system and on its placement relatively to the road.

In fact, the State DOT might have guidance for placement of these systems, but it is the owner of the mailbox who can choose the type of support and where to place it for the first installation. In other words, the State DOT gives suggestions about selection and placement, but cannot enforce the single individual to follow these suggestions for the mailbox installation.

Some State DOTs commented that the DOT has the authority to replace the mailbox system on construction projects. When the State needs to make improvements to the State highway and the mailboxes are part of the project scope, then the DOT (or the contractor) will install mailbox or bring the existing installation up to standard at their own cost.

After discussing these considerations with the sponsor, the authors decided to re-evaluate the authority of each State DOT on mailbox support systems selection and installation, according to the existence of State DOT guidance and to the DOT authority on enforcing the guidance on the single mailbox owner. Results are reported in Table 4.2. Detail explanation of the guidance for those DOTs that provided with crash data for this research study is reported in Appendix F.
Table 4.2. Mailbox Systems Installation Guidance for the State DOTs with Available Crash Data for this Survey Project.

<table>
<thead>
<tr>
<th>State DOT</th>
<th>Owner Responsible</th>
<th>Permit</th>
<th>DOT Guidance/Information</th>
<th>Checking of Existing MB Supports</th>
<th>Request to Change MB Support</th>
<th>Owner Pays for Replacement</th>
<th>Replacement w/ Hwy Projects</th>
<th>Replacement w/ FHWA Approved MB Support</th>
<th>Law Enforcement/Statute</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK</td>
<td>✓</td>
<td>✗</td>
<td>✓</td>
<td>✗</td>
<td>N/A</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>CO</td>
<td>✓</td>
<td>✗</td>
<td></td>
<td></td>
<td>N/A</td>
<td>✓</td>
<td></td>
<td>Owner can re-replace the new with the old mailbox system</td>
<td>✓</td>
</tr>
<tr>
<td>DE</td>
<td>✓</td>
<td>✗</td>
<td>Only for material &amp; geometry</td>
<td>✗</td>
<td>N/A</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>KS</td>
<td>✓</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>KY</td>
<td>✓</td>
<td>✗</td>
<td></td>
<td></td>
<td></td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>✓</td>
</tr>
<tr>
<td>LA</td>
<td>Other</td>
<td>✗</td>
<td>For State roads, permit needed, but no checking</td>
<td>✓</td>
<td>N/A</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>ME</td>
<td>✓</td>
<td>✗</td>
<td>Must be breakaway or guidance on material/geometry</td>
<td>✗</td>
<td>✓</td>
<td>✓</td>
<td>N/A</td>
<td>N/A</td>
<td>✓</td>
</tr>
</tbody>
</table>
Table 4.2. Mailbox Systems Installation Guidance for the State DOTs with Available Crash Data for this Survey Project (Continued).

<table>
<thead>
<tr>
<th>State DOT</th>
<th>Owner Responsible</th>
<th>Permit</th>
<th>DOT Guidance/Information</th>
<th>Checking of Existing MB Supports</th>
<th>Request to Change MB Support</th>
<th>Owner Pays for Replacement</th>
<th>Replacement w/ Hwy Projects</th>
<th>Replacement w/ FHWA Approved MB Support</th>
<th>Law Enforcement/Statute</th>
</tr>
</thead>
<tbody>
<tr>
<td>MN</td>
<td>✗</td>
<td>✗</td>
<td>✔️ For Hwy w/ limit ≥ 40 mph w/ MnDOT Projects</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>MS</td>
<td>Other</td>
<td>✔️</td>
<td>Specifications are part of driveway permit</td>
<td>✔️</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>ND</td>
<td>✗</td>
<td>✗</td>
<td>✔️</td>
<td>N/A</td>
<td>N/A</td>
<td>Only if need to move the MB system</td>
<td>N/A</td>
<td>Maybe necessary crash data analysis before changing MB system</td>
<td>✗</td>
</tr>
<tr>
<td>PA</td>
<td>✔️</td>
<td>✗</td>
<td>✔️</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Maybe some municipalities have some authority</td>
<td>✔️</td>
</tr>
<tr>
<td>TX</td>
<td>✗</td>
<td>✗</td>
<td>✔️ For Hwy w/ limit ≥ 40 mph w/ MnDOT Projects</td>
<td>N/A</td>
<td>✔️</td>
<td>N/A</td>
<td>✔️</td>
<td>County and City govmt might have control of some roads</td>
<td>✔️</td>
</tr>
</tbody>
</table>
Table 4.2. Mailbox Systems Installation Guidance for the State DOTs with Available Crash Data for this Survey Project (Continued).

<table>
<thead>
<tr>
<th>State DOT</th>
<th>Owner Responsible</th>
<th>Permit</th>
<th>DOT Guidance/Information</th>
<th>Checking of Existing MB Supports</th>
<th>Request to Change MB Support</th>
<th>Owner Pays for Replacement</th>
<th>Replacement w/ Hwy Projects</th>
<th>Replacement w/ FHWA Approved MB Support</th>
<th>Law Enforcement/Statute</th>
</tr>
</thead>
<tbody>
<tr>
<td>VA</td>
<td>✓</td>
<td>✗</td>
<td>Only for material &amp; geometry</td>
<td>N/A</td>
<td>✓</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>✗</td>
</tr>
<tr>
<td>WS</td>
<td>Other</td>
<td>✗</td>
<td>N/A</td>
<td>✗</td>
<td>✓</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>✗</td>
</tr>
<tr>
<td>WY</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
</tr>
</tbody>
</table>

54
When mailbox and other fixed objects crash data were received, the authors noticed the variety of crash data properties from the different DOTs (Tables 4.3 and 4.4). It immediately appeared impossible to make a complete comparison among the crash data obtained by the DOTs. In fact, some States record properties in their crash database that other States don’t. Especially, the authors were concerned about the fact that some DOTs include only the first harmful event, while others have first, second, third and even more harmful events in their databases. Certain DOTs record both first and most harmful events (Table 4.5). A First Harmful Event can be defined as the first collision or non-collision event used to define collision type and location. The Most Harmful Event can be defined as the event which results in the most severe injury or, if not injury, the greatest property damage.

Having recorded both first and most harmful events allows researchers for a better understanding of what is the cause of the accident, and what it would be the cause of injuries, fatalities and property damage (if any).
<table>
<thead>
<tr>
<th>Data</th>
<th>AK</th>
<th>CO</th>
<th>DE</th>
<th>KS</th>
<th>KY</th>
<th>LA</th>
<th>ME</th>
<th>MN</th>
<th>MS</th>
<th>ND</th>
<th>PA</th>
<th>TX</th>
<th>VA</th>
<th>WS</th>
<th>WY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Year</strong></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td><strong>Road Junction</strong></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong># of Vehicles</strong></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Accident Severity</strong></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td><strong>Total Injury</strong></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td><strong>Major Injury</strong></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Minor Injury</strong></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Fatality</strong></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td><strong>Event Type (FO)</strong></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td><strong>Event Location</strong></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Weather</strong></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td><strong>Road Character</strong></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td><strong>Surface Condition</strong></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td><strong>Light</strong></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td><strong>Rural/Urban</strong></td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Paved/Unpaved</strong></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Property Damage</strong></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td><strong>FHE</strong></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td><strong>MHE</strong></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td><strong>Crash Type</strong></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td><strong>Driver Action</strong></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Direction</strong></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Manner of Impact</strong></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 4.4. Number of Years of Available Crash Data from the Participating State DOTs.

<table>
<thead>
<tr>
<th>Years of Crash Data</th>
<th>Total # of States</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 years</td>
<td>3 (CO, VA, WY)</td>
</tr>
<tr>
<td>4 years</td>
<td>1 (PA)</td>
</tr>
<tr>
<td>5 years</td>
<td>9 (AK, KS, KY, LA, ME, MN, ND, TX, WS)</td>
</tr>
<tr>
<td>6 years</td>
<td>2 (DE, MS)</td>
</tr>
</tbody>
</table>

Table 4.5. Years Range of Available Crash Data and Type of Harmful Events from the Participating State DOTs.

<table>
<thead>
<tr>
<th>State</th>
<th>First Harmful Event (FHE)</th>
<th>Most Harmful Event (MHE)</th>
<th>Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alaska</td>
<td>X</td>
<td>X</td>
<td>2005-2009</td>
</tr>
<tr>
<td>Colorado</td>
<td>X</td>
<td>X</td>
<td>2008-2010</td>
</tr>
<tr>
<td>Delaware</td>
<td>X</td>
<td>X</td>
<td>2005-2010</td>
</tr>
<tr>
<td>Kansas</td>
<td>X</td>
<td>X</td>
<td>2007-2011</td>
</tr>
<tr>
<td>Kentucky*</td>
<td>X</td>
<td></td>
<td>2006-2010</td>
</tr>
<tr>
<td>Louisiana</td>
<td>X</td>
<td>X</td>
<td>2006-2010</td>
</tr>
<tr>
<td>Maine**</td>
<td></td>
<td></td>
<td>2006-2010</td>
</tr>
<tr>
<td>Minnesota</td>
<td>X</td>
<td>X</td>
<td>2006-2010</td>
</tr>
<tr>
<td>Mississippi</td>
<td>X</td>
<td></td>
<td>2006-2011</td>
</tr>
<tr>
<td>North Dakota</td>
<td>X</td>
<td>X</td>
<td>2007-2011</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>X</td>
<td>X</td>
<td>2007-2010</td>
</tr>
<tr>
<td>Texas</td>
<td>X</td>
<td></td>
<td>2007-2011</td>
</tr>
<tr>
<td>Virginia</td>
<td>X</td>
<td></td>
<td>2009-2011</td>
</tr>
<tr>
<td>Washington</td>
<td>X</td>
<td></td>
<td>2006-2010</td>
</tr>
<tr>
<td>Wyoming</td>
<td>X</td>
<td>X</td>
<td>2008-2010</td>
</tr>
</tbody>
</table>

*KY DOTs provided with mailbox crash data only
**Maine DOT suggested not to label the data as FHE and/or MHE since for the time frame the data were collected there was not report of it
With all these considerations, the authors decided to compare the crash data available in terms of mailbox and other fixed objects total crashes, fatalities and injuries.

Table 4.6 reports the total number of crashes of all types that were recorded in the different States and differentiates between the number of crashes involving fixed objects and the number of crashes involving mailboxes. Also, an additional differentiation was made for total crashes against mailboxes that included at least First Harmful Event (All FHE), at least Most Harmful Event (All MHE), FHE and MHE for the same crash event (FHE+MHE), only FHE (Just FHE), and only MHE (Just MHE).

Rates of mailbox related crashes for all possible combinations of FHE and MHE were calculated with respect to the total number of mailbox related crashes and reported in Table 4.7.

Frequency of mailbox related crashes was studied in Table 4.8, where the total number of mailbox crashes was related to the total number of crashes of all types occurred in each State. Also, a frequency was evaluated for only those mailbox related crashes which had mailbox hit as a first harmful event. In this case, the authors were looking for those accidents that had a mailbox as the first object struck during the crash event. For example, Minnesota had 611 mailbox related crashes in the 2006-2010 period, which had a mailbox listed as the first object hit in the crash event. That is, between the years 2006 and 2010, 0.16% of all the crashes recorded in Minnesota involved hitting a mailbox as a first harmful event.

Frequency of mailbox related crashes with respect to fixed objects related crashes was studied in Table 4.9, where the total number of mailbox crashes was related to the total number of fixed object crashes occurred in each State. For example, between the years 2006 and 2010, 1.19% of all fixed object related crashes recorded in Minnesota involved hitting a mailbox as a first harmful event.

Table 4.10 shows States data related to the number of fatalities, injuries, fatal crashes and injury crashes recorded for mailbox related crashes. For this evaluation, only crashes that had a mailbox listed as at least an MHE were considered, since the researchers wanted to make sure that the fatality/injury occurred because of the interaction between the vehicle and the mailbox. Some States only had FHE in their crash database. In those cases, severity in terms of fatality and injury data cannot be computed because it is not possible to identify the MHE.

In Table 4.11, the number of fatalities recorded from all those crashes that included a mailbox as a MHE was related to the total number of fatalities recorded from all crashes in a given year period. For example, 0.099% of all the fatalities recorded in the state of Pennsylvania in the years 2007-2010 appeared to be caused by hitting a mailbox.

In Table 4.12, mailbox fatality frequency was evaluated comparing the number of mailbox related crashes which resulted being a fatal accident to the total number of crashes which involved hitting a mailbox. There could be the case where multiple fatalities occurred during the same crash event, and that those multiple fatalities were due all to interaction between vehicle and mailbox. It can be noted that for the States here studied, the number of fatalities coincide with the number of crashes which resulted in fatalities. As an example, in the State of Pennsylvania, in the years 2007-2010, 0.203% of the total crashes involving hitting a mailbox resulted to be a fatal accident.

In Table 4.13, the number of injuries recorded from all those crashes that included a mailbox as a MHE was related to the total number of injuries recorded from all crashes in a given year.
period. For example, 0.050% of all the injuries recorded in the state of North Dakota in the years 2007-2010 appeared to be caused by hitting a mailbox.

In Table 4.14, mailbox injury frequency was evaluated comparing the number of mailbox related crashes which resulted being a injury accident to the total number of crashes which involved hitting a mailbox. There could be the case where multiple injuries occurred during the same crash event, and that those multiple injuries were due all to interaction between vehicle and mailbox. It can be noted that for the States here studied, the number of injuries coincide with the number of crashes which resulted in injuries. As an example, in the State of Wyoming, in the years 2008-2010, 5.26% of the total crashes involving hitting a mailbox resulted to be an accident which caused at least an injury.
### Table 4.6. Comparison of States Total Crashes for All Types of Events, Mailbox (MB) Related and Fixed Objects (FO) Related.

<table>
<thead>
<tr>
<th>State DOT</th>
<th>Total # Crashes</th>
<th>Total # FO Crashes</th>
<th>Total MB Crashes</th>
<th>All FHE MB-Crashes</th>
<th>All MHE MB-Crashes</th>
<th>FHE+MHE MB-Crashes</th>
<th>Just FHE MB-Crashes</th>
<th>Just MHE MB-Crashes</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK ('05-'09)*</td>
<td>59,939</td>
<td>4,211</td>
<td>204</td>
<td>204</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>CO ('08-'10)</td>
<td>306,609</td>
<td>29,156</td>
<td>350</td>
<td>338</td>
<td>257</td>
<td>245</td>
<td>93</td>
<td>12</td>
</tr>
<tr>
<td>DE ('05-'10)</td>
<td>117,179</td>
<td>17,453</td>
<td>724</td>
<td>656</td>
<td>305</td>
<td>237</td>
<td>419</td>
<td>68</td>
</tr>
<tr>
<td>KS ('07-'11)</td>
<td>323,884</td>
<td>55,431</td>
<td>1,406</td>
<td>1,351</td>
<td>299</td>
<td>244</td>
<td>1,107</td>
<td>55</td>
</tr>
<tr>
<td>KY ('06-'10)*</td>
<td>755,302</td>
<td>115,002</td>
<td>4,955</td>
<td>4955</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>LA ('06-'10)</td>
<td>782,919</td>
<td>30,901</td>
<td>2,921</td>
<td>1,496</td>
<td>2,271</td>
<td>846</td>
<td>650</td>
<td>1,425</td>
</tr>
<tr>
<td>ME ('06-'10)**</td>
<td>153,674</td>
<td>31,659</td>
<td>1,461</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>MN ('06-'10)</td>
<td>377,740</td>
<td>N/A</td>
<td>1,115</td>
<td>611</td>
<td>844</td>
<td>340</td>
<td>271</td>
<td>504</td>
</tr>
<tr>
<td>MS ('06-'11)*</td>
<td>108,437</td>
<td>24,722</td>
<td>565</td>
<td>565</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>ND ('07-'11)</td>
<td>86,188</td>
<td>6,639</td>
<td>191</td>
<td>136</td>
<td>137</td>
<td>82</td>
<td>54</td>
<td>55</td>
</tr>
<tr>
<td>PA ('07-'10)</td>
<td>626,898</td>
<td>N/A</td>
<td>3,448</td>
<td>3,308</td>
<td>809</td>
<td>669</td>
<td>2,639</td>
<td>140</td>
</tr>
<tr>
<td>TX ('07-'11)*</td>
<td>2,153,504</td>
<td>425,519</td>
<td>12,727</td>
<td>12,727</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>VA ('09-'11)*</td>
<td>220,126</td>
<td>24,130</td>
<td>253</td>
<td>253</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>WS ('06-'10)*</td>
<td>555,874</td>
<td>93,277</td>
<td>2,521</td>
<td>2,521</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>WY ('08-'10)</td>
<td>82,047</td>
<td>N/A</td>
<td>95</td>
<td>93</td>
<td>78</td>
<td>76</td>
<td>17</td>
<td>2</td>
</tr>
</tbody>
</table>

*FHE+MHE = both for the same collision event

*DOT crash database contains only FHE

**Maine DOT suggested not to label the data as FHE and/or MHE since for the time frame the data were collected there was not report of it (there are circumstances where it could be something else, besides FHE or MHE)
Table 4.7. Proportions for States MB Related Crashes Types.

<table>
<thead>
<tr>
<th>State DOT</th>
<th>Total MB Crashes</th>
<th>All FHE MB-Crashes (%)</th>
<th>All MHE MB-Crashes (%)</th>
<th>FHE+MHE MB-Crashes (%)</th>
<th>Just FHE MB-Crashes (%)</th>
<th>Just MHE MB-Crashes (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK ('05-'09)*</td>
<td>204</td>
<td>100%</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>CO ('08-'10)</td>
<td>350</td>
<td>97%</td>
<td>73%</td>
<td>70%</td>
<td>27%</td>
<td>3%</td>
</tr>
<tr>
<td>DE ('05-'10)</td>
<td>724</td>
<td>91%</td>
<td>42%</td>
<td>33%</td>
<td>58%</td>
<td>9%</td>
</tr>
<tr>
<td>KS ('07-'11)</td>
<td>1,406</td>
<td>96%</td>
<td>21%</td>
<td>17%</td>
<td>79%</td>
<td>4%</td>
</tr>
<tr>
<td>KY ('06-'10)*</td>
<td>4,955</td>
<td>100%</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>LA ('06-'10)</td>
<td>2,921</td>
<td>51%</td>
<td>78%</td>
<td>29%</td>
<td>22%</td>
<td>49%</td>
</tr>
<tr>
<td>ME ('06-'10)**</td>
<td>1,461</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>MN ('06-'10)</td>
<td>1,115</td>
<td>55%</td>
<td>76%</td>
<td>30%</td>
<td>24%</td>
<td>45%</td>
</tr>
<tr>
<td>MS ('06-'11)*</td>
<td>565</td>
<td>100%</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>ND ('07-'11)</td>
<td>191</td>
<td>71%</td>
<td>72%</td>
<td>43%</td>
<td>28%</td>
<td>29%</td>
</tr>
<tr>
<td>PA ('07-'10)</td>
<td>3,448</td>
<td>96%</td>
<td>23%</td>
<td>19%</td>
<td>77%</td>
<td>4%</td>
</tr>
<tr>
<td>TX ('07-'11)*</td>
<td>12,727</td>
<td>100%</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>VA ('09-'11)*</td>
<td>253</td>
<td>100%</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>WS ('06-'10)*</td>
<td>2,521</td>
<td>100%</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>WY ('08-'10)</td>
<td>95</td>
<td>98%</td>
<td>82%</td>
<td>80%</td>
<td>18%</td>
<td>2%</td>
</tr>
</tbody>
</table>

FHE+MHE = both for the same collision event
*DOT crash database contains only FHE
**Maine DOT suggested not to label the data as FHE and/or MHE since for the time frame the data were collected there was not report of it (there are circumstances where it could be something else, besides FHE or MHE)
<table>
<thead>
<tr>
<th>State DOT</th>
<th>Total Crashes (All Types)</th>
<th>Total MB Crashes</th>
<th>All FHE MB-Crashes</th>
<th>Frequency Total MB-Crashes w respect to total crashes</th>
<th>Frequency FHE MB-Crashes w respect to total crashes</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK ('05-'09)</td>
<td>59,939</td>
<td>204</td>
<td>204</td>
<td>0.34%</td>
<td>0.34%</td>
</tr>
<tr>
<td>CO ('08-'10)</td>
<td>306,609</td>
<td>350</td>
<td>338</td>
<td>0.11%</td>
<td>0.11%</td>
</tr>
<tr>
<td>DE ('05-'10)</td>
<td>117,179</td>
<td>724</td>
<td>656</td>
<td>0.62%</td>
<td>0.56%</td>
</tr>
<tr>
<td>KS ('07-'11)</td>
<td>323,884</td>
<td>1,406</td>
<td>1,351</td>
<td>0.43%</td>
<td>0.42%</td>
</tr>
<tr>
<td>KY ('06-'10)</td>
<td>755,302</td>
<td>4,955</td>
<td>4955</td>
<td>0.66%</td>
<td>0.66%</td>
</tr>
<tr>
<td>LA ('06-'10)</td>
<td>782,919</td>
<td>2,921</td>
<td>1,496</td>
<td>0.37%</td>
<td>0.19%</td>
</tr>
<tr>
<td>ME ('06-'10)*</td>
<td>153,674</td>
<td>1,461</td>
<td>N/A</td>
<td>0.95%</td>
<td>N/A</td>
</tr>
<tr>
<td>MN ('06-'10)</td>
<td>377,740</td>
<td>1,115</td>
<td>611</td>
<td>0.30%</td>
<td>0.16%</td>
</tr>
<tr>
<td>MS ('06-'11)</td>
<td>108,437</td>
<td>565</td>
<td>565</td>
<td>0.52%</td>
<td>0.52%</td>
</tr>
<tr>
<td>ND ('07-'11)</td>
<td>86,188</td>
<td>191</td>
<td>136</td>
<td>0.22%</td>
<td>0.16%</td>
</tr>
<tr>
<td>PA ('07-'10)</td>
<td>626,898</td>
<td>3,448</td>
<td>3,308</td>
<td>0.55%</td>
<td>0.53%</td>
</tr>
<tr>
<td>TX ('07-'11)</td>
<td>2,153,504</td>
<td>12,727</td>
<td>12,727</td>
<td>0.59%</td>
<td>0.59%</td>
</tr>
<tr>
<td>VA ('09-'11)</td>
<td>220,126</td>
<td>253</td>
<td>253</td>
<td>0.11%</td>
<td>0.11%</td>
</tr>
<tr>
<td>WS ('06-'10)</td>
<td>555,874</td>
<td>2,521</td>
<td>2,521</td>
<td>0.45%</td>
<td>0.45%</td>
</tr>
<tr>
<td>WY ('08-'10)</td>
<td>82,047</td>
<td>95</td>
<td>93</td>
<td>0.12%</td>
<td>0.11%</td>
</tr>
</tbody>
</table>

*Maine DOT suggested not to label the data as FHE and/or MHE since for the time frame the data were collected there was not report of it (there are circumstances where it could be something else, besides FHE or MHE)
Table 4.9. Frequency for States MB Related Crashes with Respect to FO Crashes.

<table>
<thead>
<tr>
<th>State DOT</th>
<th>Total FO Crashes</th>
<th>Total MB Crashes</th>
<th>All FHE MB-Crashes</th>
<th>Frequency Total MB-Crashes w respect to FO crashes</th>
<th>Frequency FHE MB-Crashes w respect to FO crashes</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK ('05-'09)</td>
<td>4,211</td>
<td>204</td>
<td>204</td>
<td>4.84%</td>
<td>4.84%</td>
</tr>
<tr>
<td>CO ('08-'10)</td>
<td>29,156</td>
<td>350</td>
<td>338</td>
<td>1.20%</td>
<td>1.16%</td>
</tr>
<tr>
<td>DE ('05-'10)</td>
<td>17,453</td>
<td>724</td>
<td>656</td>
<td>4.15%</td>
<td>3.76%</td>
</tr>
<tr>
<td>KS ('07-'11)</td>
<td>55,431</td>
<td>1,406</td>
<td>1,351</td>
<td>2.54%</td>
<td>2.44%</td>
</tr>
<tr>
<td>KY ('06-'10)</td>
<td>115,002</td>
<td>4,955</td>
<td>4955</td>
<td>4.31%</td>
<td>4.31%</td>
</tr>
<tr>
<td>LA ('06-'10)</td>
<td>30,901</td>
<td>2,921</td>
<td>1,496</td>
<td>9.45%</td>
<td>4.84%</td>
</tr>
<tr>
<td>ME ('06-'10)*</td>
<td>31,659</td>
<td>1,461</td>
<td>N/A</td>
<td>4.61%</td>
<td>N/A</td>
</tr>
<tr>
<td>MN ('06-'10)</td>
<td>N/A</td>
<td>1,115</td>
<td>611</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>MS ('06-'11)</td>
<td>24,722</td>
<td>565</td>
<td>565</td>
<td>2.29%</td>
<td>2.29%</td>
</tr>
<tr>
<td>ND ('07-'11)</td>
<td>6,639</td>
<td>191</td>
<td>136</td>
<td>2.88%</td>
<td>2.05%</td>
</tr>
<tr>
<td>PA ('07-'10)</td>
<td>N/A</td>
<td>3,448</td>
<td>3,308</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>TX ('07-'11)</td>
<td>425,519</td>
<td>12,727</td>
<td>12,727</td>
<td>2.99%</td>
<td>2.99%</td>
</tr>
<tr>
<td>VA ('09-'11)</td>
<td>24,130</td>
<td>253</td>
<td>253</td>
<td>1.05%</td>
<td>1.05%</td>
</tr>
<tr>
<td>WS ('06-'10)</td>
<td>93,277</td>
<td>2,521</td>
<td>2,521</td>
<td>2.70%</td>
<td>2.70%</td>
</tr>
<tr>
<td>WY ('08-'10)</td>
<td>N/A</td>
<td>95</td>
<td>93</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

*Maine DOT suggested not to label the data as FHE and/or MHE since for the time frame the data were collected there was not report of it (there are circumstances where it could be something else, besides FHE or MHE)
Table 4.10. Fatalities and Injuries for MB Related Crashes.

<table>
<thead>
<tr>
<th>State DOT</th>
<th>All MHE MB-Crashes</th>
<th>Fatal MB-Crashes</th>
<th>MB Fatalities</th>
<th>Injury MB-Crashes</th>
<th>MB Injuries</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK ('05-'09)*</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>CO ('08-'10)</td>
<td>257</td>
<td>0</td>
<td>0</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>DE ('05-'10)</td>
<td>305</td>
<td>1</td>
<td>1</td>
<td>38</td>
<td>38</td>
</tr>
<tr>
<td>KS ('07-'11)</td>
<td>299</td>
<td>2</td>
<td>2</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>KY ('06-'10)*</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>LA ('06-'10)</td>
<td>2,271</td>
<td>3</td>
<td>3</td>
<td>250</td>
<td>289</td>
</tr>
<tr>
<td>ME ('06-'10)**</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>MN ('06-'10)</td>
<td>844</td>
<td>0</td>
<td>0</td>
<td>114</td>
<td>118</td>
</tr>
<tr>
<td>MS ('06-'11)*</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>ND ('07-'11)</td>
<td>137</td>
<td>0</td>
<td>0</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>PA ('07-'10)</td>
<td>809</td>
<td>7</td>
<td>7</td>
<td>259</td>
<td>277</td>
</tr>
<tr>
<td>TX ('07-'11)*</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>VA ('09-'11)*</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>WS ('06-'10)*</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>WY ('08-'10)</td>
<td>78</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>9</td>
</tr>
</tbody>
</table>

*DOT crash database contains only FHE
**Maine DOT suggested not to label the data as FHE and/or MHE since for the time frame the data were collected there was not report of it (there are circumstances where it could be something else, besides FHE or MHE)
Table 4.11. Fatality Rate for MB Related Crashes with Respect to Total Number of Fatalities from All Types of Crashes.

<table>
<thead>
<tr>
<th>State DOT</th>
<th>Total Fatalities -All Crash Types- (#)</th>
<th>MB Fatalities (#)</th>
<th>MB Fatality Rate w respect to total fatalities in all crashes (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK ('05-'09)*</td>
<td>367</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>CO ('08-'10)</td>
<td>1,454</td>
<td>0</td>
<td>0.000%</td>
</tr>
<tr>
<td>DE ('05-'10)</td>
<td>741</td>
<td>1</td>
<td>0.135%</td>
</tr>
<tr>
<td>KS ('07-'11)</td>
<td>2,085</td>
<td>2</td>
<td>0.096%</td>
</tr>
<tr>
<td>KY ('06-'10)*</td>
<td>4,228</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>LA ('06-'10)</td>
<td>4,434</td>
<td>3</td>
<td>0.068%</td>
</tr>
<tr>
<td>ME ('06-'10)**</td>
<td>846</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>MN ('06-'10)</td>
<td>2,284</td>
<td>0</td>
<td>0.000%</td>
</tr>
<tr>
<td>MS ('06-'11)*</td>
<td>4,352</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>ND ('07-'11)</td>
<td>530</td>
<td>0</td>
<td>0.000%</td>
</tr>
<tr>
<td>PA ('07-'10)</td>
<td>7,064</td>
<td>7</td>
<td>0.099%</td>
</tr>
<tr>
<td>TX ('07-'11)*</td>
<td>16,620</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>VA ('09-'11)*</td>
<td>2,090</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>WS ('06-'10)*</td>
<td>2,676</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>WY ('08-'10)</td>
<td>790</td>
<td>0</td>
<td>0.000%</td>
</tr>
</tbody>
</table>

*DOT crash database contains only FHE
**Maine DOT suggested not to label the data as FHE and/or MHE since for the time frame the data were collected there was not report of it (there are circumstances where it could be something else, besides FHE or MHE)
Table 4.12. Fatal Crash Rate for MB Related Crashes with Respect to Total Number of MB Related Crashes.

<table>
<thead>
<tr>
<th>State DOT</th>
<th>Total MB-Crashes (#)</th>
<th>Fatal MB-Crashes (#)</th>
<th>MB Fatality Severity w respect to total MB-crashes (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK ('05-'09)*</td>
<td>204</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>CO ('08-'10)</td>
<td>350</td>
<td>0</td>
<td>0.000%</td>
</tr>
<tr>
<td>DE ('05-'10)</td>
<td>724</td>
<td>1</td>
<td>0.138%</td>
</tr>
<tr>
<td>KS ('07-'11)</td>
<td>1,406</td>
<td>2</td>
<td>0.142%</td>
</tr>
<tr>
<td>KY ('06-'10)*</td>
<td>4,955</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>LA ('06-'10)</td>
<td>2,921</td>
<td>3</td>
<td>0.103%</td>
</tr>
<tr>
<td>ME ('06-'10)**</td>
<td>1,461</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>MN ('06-'10)</td>
<td>1,115</td>
<td>0</td>
<td>0.000%</td>
</tr>
<tr>
<td>MS ('06-'11)*</td>
<td>565</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>ND ('07-'11)</td>
<td>191</td>
<td>0</td>
<td>0.000%</td>
</tr>
<tr>
<td>PA ('07-'10)</td>
<td>3,448</td>
<td>7</td>
<td>0.203%</td>
</tr>
<tr>
<td>TX ('07-'11)*</td>
<td>12,727</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>VA ('09-'11)*</td>
<td>253</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>WS ('06-'10)*</td>
<td>2,521</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>WY ('08-'10)</td>
<td>95</td>
<td>0</td>
<td>0.000%</td>
</tr>
</tbody>
</table>

*DOT crash database contains only FHE
**Maine DOT suggested not to label the data as FHE and/or MHE since for the time frame the data were collected there was not report of it (there are circumstances where it could be something else, besides FHE or MHE)
Table 4.13. Injury Rate for MB Related Crashes with Respect to Total Number of Injuries from All Types of Crashes.

<table>
<thead>
<tr>
<th>State DOT</th>
<th>Total Injuries -All Crash Types- (#)</th>
<th>MB Injuries (#)</th>
<th>MB Injury Rate w respect to total injuries in all crashes (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK (’05-’09)*</td>
<td>25,362</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>CO (’08-’10)</td>
<td>39,590</td>
<td>9</td>
<td>0.023%</td>
</tr>
<tr>
<td>DE (’05-’10)</td>
<td>46,520</td>
<td>38</td>
<td>0.082%</td>
</tr>
<tr>
<td>KS (’07-’11)</td>
<td>105,021</td>
<td>35</td>
<td>0.082%</td>
</tr>
<tr>
<td>KY (’06-’10)*</td>
<td>199,076</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>LA (’06-’10)</td>
<td>377,362</td>
<td>289</td>
<td>0.077%</td>
</tr>
<tr>
<td>ME (’06-’10)**</td>
<td>58,082</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>MN (’06-’10)</td>
<td>115,860</td>
<td>118</td>
<td>0.102%</td>
</tr>
<tr>
<td>MS (’06-’11)*</td>
<td>182,272</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>ND (’07-’11)</td>
<td>16,115</td>
<td>8</td>
<td>0.050%</td>
</tr>
<tr>
<td>PA (’07-’10)</td>
<td>455,014</td>
<td>277</td>
<td>0.061%</td>
</tr>
<tr>
<td>TX (’07-’11)*</td>
<td>426,634</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>VA (’09-’11)*</td>
<td>131,427</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>WS (’06-’10)*</td>
<td>257,556</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>WY (’08-’10)</td>
<td>28,139</td>
<td>9</td>
<td>0.032%</td>
</tr>
</tbody>
</table>

*DOT crash database contains only FHE
**Maine DOT suggested not to label the data as FHE and/or MHE since for the time frame the data were collected there was not report of it (there are circumstances where it could be something else, besides FHE or MHE)
Table 4.14. Injury Crash Rate for MB Related Crashes with Respect to Total Number of MB Related Crashes.

<table>
<thead>
<tr>
<th>State DOT</th>
<th>Total MB-Crashes (#)</th>
<th>Injury MB-Crashes (#)</th>
<th>MB Injury Severity w respect to total MB-crashes (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK ('05-'09)*</td>
<td>204</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>CO ('08-'10)</td>
<td>350</td>
<td>9</td>
<td>2.57%</td>
</tr>
<tr>
<td>DE ('05-'10)</td>
<td>724</td>
<td>38</td>
<td>5.25%</td>
</tr>
<tr>
<td>KS ('07-'11)</td>
<td>1,406</td>
<td>35</td>
<td>2.49%</td>
</tr>
<tr>
<td>KY ('06-'10)*</td>
<td>4,955</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>LA ('06-'10)</td>
<td>2,921</td>
<td>250</td>
<td>8.56%</td>
</tr>
<tr>
<td>ME ('06-'10)**</td>
<td>1,461</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>MN ('06-'10)</td>
<td>1,115</td>
<td>114</td>
<td>10.22%</td>
</tr>
<tr>
<td>MS ('06-'11)*</td>
<td>565</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>ND ('07-'11)</td>
<td>191</td>
<td>8</td>
<td>4.19%</td>
</tr>
<tr>
<td>PA ('07-'10)</td>
<td>3,448</td>
<td>259</td>
<td>7.51%</td>
</tr>
<tr>
<td>TX ('07-'11)*</td>
<td>12,727</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>VA ('09-'11)*</td>
<td>253</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>WS ('06-'10)*</td>
<td>2,521</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>WY ('08-'10)</td>
<td>95</td>
<td>5</td>
<td>5.26%</td>
</tr>
</tbody>
</table>

*DOT crash database contains only FHE
**Maine DOT suggested not to label the data as FHE and/or MHE since for the time frame the data were collected there was not report of it (there are circumstances where it could be something else, besides FHE or MHE)
Table 4.15 shows frequency of fixed objects related crashes. In this case, only those fixed object related crashes which involved hitting a fixed object as a first harmful event were considered. Although certain States gave availability of crash database regarding fixed objects, it was not possible to sort the data with some program such as Excel. Crash and injury data had to be counted manually and related to the report number (since multiple lines might have been related to the same crash event). Or, in other cases, report numbers from one Excel file for MHE data had to be manually connected to the same report number for injury count from another Excel file. Such an evaluation for mailbox object was possible considering the limited numbers of mailbox related crashes. However, the same type of evaluation was not feasible for all fixed objects due to the considerable numbers of data.

Table 4.16 reports results from evaluation of rate of fixed objects related fatalities with respect to the total number of fatalities occurred in crashes of all types. In this case, only those fixed object related crashes which involved hitting a fixed object as a most harmful event were considered. Also, severity in terms of fatality for fixed object related crashes was calculated. For example, Colorado resulted having 158 fatalities due to vehicle and fixed object impact in a 3-year period (2008-2010). This represented 10.87% of the total fatalities recorded in Colorado in the same period due to any type of collision event. However, only 142 were the crashes that resulted in a fatality after involving a fixed object. That represented 0.54% of the total crashes which involved somehow a fixed object. In other words, 0.54% of fixed object related crashes resulted in a fatal collision.

Table 4.17 reports results from evaluation of rate of fixed objects related injuries with respect to the total number of injuries occurred in crashes of all types. In this case, only those fixed object related crashes which involved hitting a fixed object as a most harmful event were considered. Also, severity in terms of injury for fixed object related crashes was calculated. For example, Colorado resulted having 3,156 injuries due to vehicle and fixed object impact in a 3-year period (2008-2010). This represented 7.97% of the total injuries recorded in Colorado in the same period due to any type of collision event. However, only 2,689 were the crashes that resulted in an injury after involving a fixed object. That represented 10.26% of the total crashes which involved somehow a fixed object. In other words, 10.26% of fixed object related crashes resulted in an injury collision.

Appendix G provides with more detailed data on fixed object related crashes for each state and each year of crash data availability.
### Table 4.15. State Frequency of FO Related Crashes.

<table>
<thead>
<tr>
<th>State DOT (Year)</th>
<th>Total # Crashes (All Types)</th>
<th>Total # FO Crashes (FHE)</th>
<th>Frequency (FHE FO crashes w/ respect to total crashes of ALL types)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK ('05-'09)</td>
<td>59,939</td>
<td>4,211</td>
<td>7.03%</td>
</tr>
<tr>
<td>CO ('08-'10)</td>
<td>306,609</td>
<td>29,156</td>
<td>9.51%</td>
</tr>
<tr>
<td>DE ('05-'10)</td>
<td>117,179</td>
<td>17,453</td>
<td>14.89%</td>
</tr>
<tr>
<td>KS ('06-'10)</td>
<td>323,884</td>
<td>55,431</td>
<td>17.11%</td>
</tr>
<tr>
<td>KY ('06-'10)</td>
<td>755,302</td>
<td>115,002</td>
<td>15.23%</td>
</tr>
<tr>
<td>LA ('06-'10)</td>
<td>782,919</td>
<td>30,901</td>
<td>3.95%</td>
</tr>
<tr>
<td>ME ('06-'10)**</td>
<td>153,674</td>
<td>31,659</td>
<td>20.60%</td>
</tr>
<tr>
<td>MN ('06-'10)</td>
<td>377,740</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>MS ('06-'11)</td>
<td>108,437</td>
<td>24,722</td>
<td>22.80%</td>
</tr>
<tr>
<td>ND ('07-'11)</td>
<td>86,188</td>
<td>6,639</td>
<td>7.70%</td>
</tr>
<tr>
<td>PA ('07-'10)</td>
<td>626,898</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>TX ('07-'11)</td>
<td>2,153,504</td>
<td>425,519</td>
<td>19.76%</td>
</tr>
<tr>
<td>VA ('09-'11)</td>
<td>220,126</td>
<td>24,130</td>
<td>10.96%</td>
</tr>
<tr>
<td>WS ('06-'10)</td>
<td>555,874</td>
<td>93,277</td>
<td>16.78%</td>
</tr>
<tr>
<td>WY ('08-'10)</td>
<td>82,047</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

* KY DOT = only mailbox crash data
**Maine DOT suggested not to label the data as FHE and/or MHE since for the time frame the data were collected there was not report of it (there are circumstances where it could be something else, besides FHE or MHE)
Table 4.16. State Proportions of FO Related Fatalities and Fatal FO Related Crashes.

<table>
<thead>
<tr>
<th>State DOT (Year)</th>
<th>Total # Fatalities (ALL Crash Types)</th>
<th>Fatalities FO (MHE) * = FHE data only</th>
<th>Severity FO Fatalities (MHE) w/ respect to total # fatalities in ALL crashes</th>
<th>All MHE FO-Crashes</th>
<th>Total # FO Fatal Crashes</th>
<th>Severity FO Fatal Crashes (MHE) w/ respect to total # FO crashes</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK ('05-'09)</td>
<td>367</td>
<td>N/A*</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>CO ('08-'10)</td>
<td>1,454</td>
<td>158</td>
<td>10.87%</td>
<td>26,206</td>
<td>142</td>
<td>0.54%</td>
</tr>
<tr>
<td>DE ('05-'10)</td>
<td>741</td>
<td>150</td>
<td>20.24%</td>
<td>13,670</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>KS ('07-'11)</td>
<td>2,085</td>
<td>138</td>
<td>6.62%</td>
<td>14,137</td>
<td>138</td>
<td>0.98%</td>
</tr>
<tr>
<td>KY ('06-'10)*</td>
<td>4,228</td>
<td>N/A*</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>LA ('06-'10)</td>
<td>4,434</td>
<td>1,143</td>
<td>25.78%</td>
<td>88,106</td>
<td>1,045</td>
<td>1.19%</td>
</tr>
<tr>
<td>ME ('06-'10)**</td>
<td>846</td>
<td>N/A*</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>MN ('06-'10)</td>
<td>2,284</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>MS ('06-'11)</td>
<td>4,352</td>
<td>N/A*</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>ND ('07-'11)</td>
<td>530</td>
<td>38</td>
<td>7.17%</td>
<td>5,206</td>
<td>38</td>
<td>0.73%</td>
</tr>
<tr>
<td>PA ('07-'10)</td>
<td>7,064</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>TX ('07-'11)</td>
<td>16,620</td>
<td>N/A*</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>VA ('09-'11)</td>
<td>2,090</td>
<td>N/A*</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>WS ('06-'10)</td>
<td>2,676</td>
<td>N/A*</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>WY ('08-'10)</td>
<td>790</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

* KY DOT = only mailbox crash data
**Maine DOT suggested not to label the data as FHE and/or MHE since for the time frame the data were collected there was not report of it (there are circumstances where it could be something else, besides FHE or MHE)
Table 4.17. State Proportions of FO Related Injuries and Injury FO Related Crashes.

<table>
<thead>
<tr>
<th>State DOT (Year)</th>
<th>Total # Injuries (ALL Crash Types)</th>
<th>Injuries FO (MHE) * = FHE data only</th>
<th>Severity FO Injuries (MHE) w/ respect to total # injuries in ALL crashes</th>
<th>All MHE FO-Crashes</th>
<th>Total # FO Injury Crashes</th>
<th>Severity FO Injury Crashes (MHE) w/ respect to total # FO crashes</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK ('05-'09)</td>
<td>25,362</td>
<td>N/A*</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>CO ('08-'10)</td>
<td>39,590</td>
<td>3,156</td>
<td>7.97%</td>
<td>26,206</td>
<td>2,689</td>
<td>10.26%</td>
</tr>
<tr>
<td>DE ('05-'10)</td>
<td>46,520</td>
<td>4,269</td>
<td>9.18%</td>
<td>13,670</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>KS ('06-'10)</td>
<td>105,021</td>
<td>3,675</td>
<td>3.50%</td>
<td>14,137</td>
<td>3,675</td>
<td>26.00%</td>
</tr>
<tr>
<td>KY ('06-'10)</td>
<td>199,076</td>
<td>N/A*</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>LA ('06-'10)</td>
<td>377,362</td>
<td>42,141</td>
<td>11.17%</td>
<td>88,106</td>
<td>31,925</td>
<td>36.23%</td>
</tr>
<tr>
<td>ME ('06-'10)**</td>
<td>58,082</td>
<td>N/A*</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>MN ('06-'10)</td>
<td>115,860</td>
<td>N/A</td>
<td>N/A</td>
<td>43,534</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>MS ('06-'11)</td>
<td>182,272</td>
<td>N/A*</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>ND ('07-'11)</td>
<td>16,115</td>
<td>1,054</td>
<td>6.54%</td>
<td>5,206</td>
<td>1,054</td>
<td>20.25%</td>
</tr>
<tr>
<td>PA ('07-'10)</td>
<td>455,014</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>TX ('07-'11)</td>
<td>426,634</td>
<td>N/A*</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>VA ('09-'11)</td>
<td>131,427</td>
<td>N/A*</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>WS ('06-'10)</td>
<td>257,556</td>
<td>N/A*</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>WY ('08-'10)</td>
<td>28,139</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

* KY DOT = only mailbox crash data
**Maine DOT suggested not to label the data as FHE and/or MHE since for the time frame the data were collected there was not report of it (there are circumstances where it could be something else, besides FHE or MHE)
Table 4.18 shows the injury severity code typical of the States that have provided with crash data. Table 4.19 reports the injuries values for mailbox related crashes that were calculated for each State. Also, in Table 4.20 rates were evaluated for mailbox crashes related injuries for each state, according to the number of years the State provided with crash data for this project. Appendix H provides with a more detail crash data analysis: crash severity is detailed collected for each State for each year of crash data available.
Table 4.18. Injury Severity Codes.

<table>
<thead>
<tr>
<th>State DOT</th>
<th>Fatality</th>
<th>Incapacitating Injury</th>
<th>Non-Incapacitating Injury</th>
<th>Possible Injury</th>
<th>Major Injury</th>
<th>Minor Injury</th>
<th>PDO/No Injury</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK</td>
<td>Yes</td>
<td>Equivalent to major injury</td>
<td>Equivalent to minor injury</td>
<td>N/A</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>CO</td>
<td>Yes</td>
<td></td>
<td>One Category</td>
<td></td>
<td></td>
<td>N/A</td>
<td>Yes</td>
</tr>
<tr>
<td>DE</td>
<td>Yes</td>
<td></td>
<td>One Category</td>
<td></td>
<td></td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>KS</td>
<td>Yes</td>
<td></td>
<td>One Category</td>
<td></td>
<td></td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>KY</td>
<td>Yes</td>
<td></td>
<td>One Category</td>
<td></td>
<td></td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>LA</td>
<td>Yes</td>
<td></td>
<td>One Category</td>
<td></td>
<td></td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>ME</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>MN</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>N/A</td>
<td>N/A</td>
<td>Yes</td>
</tr>
<tr>
<td>MS</td>
<td>Yes</td>
<td></td>
<td>One Category</td>
<td></td>
<td></td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>ND</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>N/A</td>
<td>N/A</td>
<td>Yes</td>
</tr>
<tr>
<td>PA</td>
<td>Yes</td>
<td></td>
<td>One Category</td>
<td></td>
<td></td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>TX</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>N/A</td>
<td>N/A</td>
<td>Yes</td>
</tr>
<tr>
<td>VA</td>
<td>Yes</td>
<td></td>
<td>One Category</td>
<td></td>
<td></td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>WS</td>
<td>Yes</td>
<td>N/A</td>
<td>N/A</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>WY</td>
<td>Yes</td>
<td></td>
<td>One Category</td>
<td></td>
<td></td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>
Table 4.19. Injuries Values for Mailbox Supports Related Crashes (MHE).

<table>
<thead>
<tr>
<th>State DOT</th>
<th>Fatality</th>
<th>Incapacitating Injury</th>
<th>Non-Incapacitating Injury</th>
<th>Possible injury</th>
<th>Major Injury</th>
<th>Minor Injury</th>
<th>PDO/No Injury</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO</td>
<td>0</td>
<td></td>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td>303</td>
</tr>
<tr>
<td>DE</td>
<td>1</td>
<td></td>
<td>38</td>
<td></td>
<td></td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>KS</td>
<td>2</td>
<td></td>
<td>35</td>
<td></td>
<td></td>
<td></td>
<td>1171</td>
</tr>
<tr>
<td>LA</td>
<td>3</td>
<td></td>
<td>289</td>
<td></td>
<td></td>
<td></td>
<td>334</td>
</tr>
<tr>
<td>MN</td>
<td>0</td>
<td></td>
<td></td>
<td>N/A</td>
<td>N/A</td>
<td></td>
<td>646</td>
</tr>
<tr>
<td>ND</td>
<td>0</td>
<td>1</td>
<td>5</td>
<td>2</td>
<td>N/A</td>
<td>N/A</td>
<td>129</td>
</tr>
<tr>
<td>PA</td>
<td>2</td>
<td></td>
<td>92</td>
<td></td>
<td></td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>WY</td>
<td>0</td>
<td></td>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td>N/A</td>
</tr>
</tbody>
</table>
Table 4.20. Injuries Proportions for Mailbox Supports Related Crashes per Year.

<table>
<thead>
<tr>
<th>State DOT</th>
<th>Fatality</th>
<th>Incapacitating Injury</th>
<th>Non-Incapacitating Injury</th>
<th>Possible injury</th>
<th>Major Injury</th>
<th>Minor Injury</th>
<th>PDO/No Injury</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO</td>
<td>0</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>303</td>
</tr>
<tr>
<td>DE</td>
<td>0.17</td>
<td>6.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>KS</td>
<td>0.4</td>
<td></td>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td>1171</td>
</tr>
<tr>
<td>LA</td>
<td>0.6</td>
<td>57.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>334</td>
</tr>
<tr>
<td>MN</td>
<td>0</td>
<td></td>
<td></td>
<td>N/A</td>
<td>N/A</td>
<td></td>
<td>646</td>
</tr>
<tr>
<td>ND</td>
<td>0</td>
<td>0.2</td>
<td>1</td>
<td>0.4</td>
<td>N/A</td>
<td>N/A</td>
<td>129</td>
</tr>
<tr>
<td>PA</td>
<td>1.5</td>
<td></td>
<td>23</td>
<td></td>
<td></td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>WY</td>
<td>0</td>
<td></td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>N/A</td>
</tr>
</tbody>
</table>
CHAPTER 5. CONCLUSIONS

Table 1 summarizes mailbox systems installation requirements for State DOTs that provided with crash data for this project. These requirements are related to installation location with respect to the road surface and with respect to the face curb and/or road edge. Mainly, these requirements are those reported by United States Postal Service (USPS) and don’t take into account request for crashworthy and/or NCHRP Report 350 crash tested mailbox support usage. Roadway AADT and design speed are rarely considered as a factor of influence in the decision of the location for the mailbox installation.

For those State DOTs that gave availability of crash data, the authors researched whether the identified single and multiple mailbox support systems have been tested according to NCHRP Report 230 or 350 (Tables 5.2 and 5.3). It resulted that all the mailbox supports included in the survey have met NCHRP criteria, whether it was 230 or 350. Still, for both single and multiple mailbox supports, some DOTs have expressed usage of certain supports that were not reported in the survey: for these cases, NCHRP Report 230 or 350 crashworthy eligibility was not investigated by the researchers.

Table 5.4 summarizes State guidance and frequency of mailbox related crashes, where hitting a mailbox was recorded as first harmful event. Table 5.5 shows State guidance and severity of mailbox fatality calculated as the percentage of crashes resulted in a fatality after hitting a mailbox with respect to the total number of crashes which involved hitting a mailbox, but not necessarily resulted in a fatality and/or injury. Table 5.6 shows State guidance and severity of mailbox injury calculated as the percentage of crashes resulted in an injury after hitting a mailbox with respect to the total number of crashes which involved hitting a mailbox, but not necessarily resulted in a fatality and/or injury.
Table 5.1. Summary of Mailbox Systems Installation Requirements for State DOTs that provided with Crash Data for this Project.

<table>
<thead>
<tr>
<th>State DOT (Year)</th>
<th>Min Vertical Height from Road Surface (in)</th>
<th>Min Distance from Front Face Curb (in)</th>
<th>Min Distance from Road Edge (in)*</th>
<th>Roadway AADT Influence*</th>
<th>Roadway Design Speed Influence*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SMS</td>
<td>MMS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AK ('05-'09)</td>
<td>38 &lt; x &lt; 48</td>
<td>38 &lt; x &lt; 48</td>
<td>12</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>CO ('08-'10)</td>
<td>42 &lt; x &lt; 48</td>
<td>42</td>
<td>8 – 12</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>DE ('05-'10)</td>
<td>41 &lt; x &lt; 45</td>
<td>41 &lt; x &lt; 45</td>
<td>6 – 12</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>KS ('06-'10)</td>
<td>41 &lt; x &lt; 45</td>
<td>41 &lt; x &lt; 45</td>
<td>6 – 8</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>KY ('06-'10)</td>
<td>N/A</td>
<td>No req.</td>
<td>No req.</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>LA ('06-'10)</td>
<td>41 &lt; x &lt; 45</td>
<td>41 &lt; x &lt; 45</td>
<td>No req.</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>ME ('06-'10)</td>
<td>N/A</td>
<td>40</td>
<td>No req.</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>MN ('06-'10)</td>
<td>41 &lt; x &lt; 45</td>
<td>41 &lt; x &lt; 45</td>
<td>6 – 8</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>MS ('06-'11)</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>ND ('07-'11)</td>
<td>42 &lt; x &lt; 48</td>
<td>N/A</td>
<td>N/A</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

**SMS** = Single Mailbox Support  
**MMS** = Multiple Mailbox Support  
* Same Results from SMS and MMS
Table 5.1. Summary of Mailbox Systems Installation Requirements for State DOTs that provided with Crash Data for this Project (Continued).

<table>
<thead>
<tr>
<th>State DOT (Year)</th>
<th>Min Vertical Height from Road Surface (in)</th>
<th>Min Distance from Front Face Curb (in)</th>
<th>Min Distance from Road Edge (in)*</th>
<th>Roadway AADT Influence*</th>
<th>Roadway Design Speed Influence*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SMS</td>
<td>MMS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PA ('07-'10)</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>TX ('07-'11)</td>
<td>41 &lt; x &lt; 45</td>
<td>41 &lt; x &lt; 45</td>
<td>6 – 8</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>VA ('09-'11)</td>
<td>41 &lt; x &lt; 45</td>
<td>41 &lt; x &lt; 45</td>
<td>6 – 10</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>WA ('06-'10)</td>
<td>39</td>
<td>39</td>
<td>0 – 12</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>WY ('08-'10)</td>
<td>41 &lt; x &lt; 45</td>
<td>41 &lt; x &lt; 45</td>
<td>No req.</td>
<td>8 – 12</td>
<td>No</td>
</tr>
</tbody>
</table>

**SMS** = Single Mailbox Support  
**MMS** = Multiple Mailbox Support  
* Same Results from SMS and MMS
### Table 5.2: Single Mailbox Support Types for State DOTs that provided with Crash Data for this Project.

<table>
<thead>
<tr>
<th>State</th>
<th>Single Wood</th>
<th>Single Polyurethane</th>
<th>Single Steel</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MailMaster Deluxe, 4” x 4”</td>
<td>Simulated Stone Column, 20” x 20”</td>
<td>Other</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>Other</td>
<td>Other</td>
</tr>
<tr>
<td>AK</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>CO</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>DE</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>KS</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>KY</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>LA</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>ME</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>MN</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>MS</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>ND</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>PA</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>TX</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>VA</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>WS</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>WY</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
Table 5.3. Multiple Mailbox Support Types for State DOTs that provided with Crash Data for this Project.

<table>
<thead>
<tr>
<th>State</th>
<th>Multiple Wood</th>
<th>Dual S-Square Mailbox</th>
<th>Dual S-Square Mailbox</th>
<th>Dual 2 lb/ft winged channel</th>
<th>Dual 1.66&quot; O.D., 16 ga</th>
<th>Shur-Tite Mailbox</th>
<th>Multiple S-Square Mailbox</th>
<th>Multiple Non-proprietary</th>
<th>Shur-Tite Multiple Mailbox Post</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>CO</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>DE</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>KS</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>KY</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>ME</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>MN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>MS</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>ND</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>PA</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>TX</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>VA</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WY</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 5.4. Guidance and Mailbox Related Crashes for State DOTs that provided with Crash Data for this Project.

<table>
<thead>
<tr>
<th>State DOT</th>
<th>Owner Responsible</th>
<th>Permit</th>
<th>DOT Guidance/Information</th>
<th>Checking of Existing MB Supports</th>
<th>Request to Change MB Support</th>
<th>Owner Pays for Replacement</th>
<th>Replacement w/Hwy Projects</th>
<th>Replacement w/FHWA Approved MB Support</th>
<th>Law Enforcement/Statute</th>
<th>Frequency MB Crashes (FHE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK</td>
<td>✓</td>
<td>x</td>
<td>✓</td>
<td>x</td>
<td>N/A</td>
<td>x</td>
<td>✓</td>
<td>✓</td>
<td>x</td>
<td>0.34%</td>
</tr>
<tr>
<td>CO</td>
<td>✓</td>
<td>x</td>
<td>✓</td>
<td>x</td>
<td>N/A</td>
<td>x</td>
<td>✓</td>
<td>✓</td>
<td>x</td>
<td>0.11%</td>
</tr>
<tr>
<td>DE</td>
<td>✓</td>
<td>x</td>
<td>Only for material &amp; geometry</td>
<td>x</td>
<td>N/A</td>
<td>x</td>
<td>✓</td>
<td>✓</td>
<td>x</td>
<td>0.56%</td>
</tr>
<tr>
<td>KS</td>
<td>✓</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>0.42%</td>
</tr>
<tr>
<td>KY</td>
<td>✓</td>
<td>x</td>
<td>✓</td>
<td>x</td>
<td>✓</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>x</td>
<td>0.66%</td>
</tr>
<tr>
<td>LA</td>
<td>Other</td>
<td>x</td>
<td>For State roads, permit needed, but no checking</td>
<td>✓</td>
<td>x</td>
<td>✓</td>
<td>N/A</td>
<td>✓</td>
<td>x</td>
<td>0.19%</td>
</tr>
<tr>
<td>ME</td>
<td>✓</td>
<td>x</td>
<td>Must be breakaway or guidance on material/geometry</td>
<td>x</td>
<td>✓</td>
<td>✓</td>
<td>N/A</td>
<td>N/A</td>
<td>x</td>
<td>N/A</td>
</tr>
</tbody>
</table>
### Table 5.4. Guidance and Mailbox Related Crashes for State DOTs that provided with Crash Data for this Project (Continued).

<table>
<thead>
<tr>
<th>State DOT</th>
<th>Owner Responsible</th>
<th>Permit</th>
<th>DOT Guidance/Information</th>
<th>Checking of Existing MB Supports</th>
<th>Request to Change MB Support</th>
<th>Owner Pays for Replacement</th>
<th>Replacement w/ Hwy Projects</th>
<th>Replacement w/ FHWA Approved MB Support</th>
<th>Law Enforcement /Statute</th>
<th>Frequency MB Crashes (FHE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MN</td>
<td>x</td>
<td>x</td>
<td>For Hwy w/ limit ≥ 40 mph w/ MnDOT Projects</td>
<td>N/A</td>
<td>For Hwy w/ limit ≥ 40 mph w/ MnDOT Projects</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>✓</td>
<td>0.16%</td>
</tr>
<tr>
<td>MS</td>
<td>Other</td>
<td>✓</td>
<td>Specifications are part of driveway permit</td>
<td>✓</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>0.52%</td>
</tr>
<tr>
<td>ND</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Only if need to move the MB system</td>
<td>Maybe necessary crash data analysis before changing MB system</td>
<td>✓</td>
</tr>
<tr>
<td>PA</td>
<td>✓</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Maybe some municipalities have some authority</td>
<td>0.53%</td>
</tr>
<tr>
<td>TX</td>
<td>x</td>
<td>x</td>
<td>✓</td>
<td>N/A</td>
<td>✓</td>
<td>N/A</td>
<td>✓</td>
<td>✓</td>
<td>County and City goverment might have control of some roads</td>
<td>0.59%</td>
</tr>
<tr>
<td>State DOT</td>
<td>Owner Responsible</td>
<td>Permit</td>
<td>DOT Guidance/Information</td>
<td>Checking of Existing MB Supports</td>
<td>Request to Change MB Support</td>
<td>Owner Pays for Replacement</td>
<td>Replacement w/ Hwy Projects</td>
<td>Replacement w/ FHWA Approved MB Support</td>
<td>Law Enforcement/Statute</td>
<td>Frequency MB Crashes (FHE)</td>
</tr>
<tr>
<td>-----------</td>
<td>------------------</td>
<td>--------</td>
<td>--------------------------</td>
<td>----------------------------------</td>
<td>-----------------------------</td>
<td>--------------------------</td>
<td>---------------------------</td>
<td>----------------------------------</td>
<td>--------------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>VA</td>
<td>✓</td>
<td>×</td>
<td>Only for material &amp; geometry</td>
<td>N/A</td>
<td>✓</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>×</td>
<td>0.11%</td>
</tr>
<tr>
<td>WS</td>
<td>Other</td>
<td>×</td>
<td>N/A</td>
<td>×</td>
<td>✓</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>×</td>
<td>0.45%</td>
</tr>
<tr>
<td>WY</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>N/A</td>
<td>✓</td>
<td>✓</td>
<td>×</td>
<td>0.11%</td>
</tr>
</tbody>
</table>

Table 5.4. Guidance and Mailbox Related Crashes for State DOTs that provided with Crash Data for this Project (Continued).
<table>
<thead>
<tr>
<th>State DOT</th>
<th>Owner Responsible</th>
<th>Permit</th>
<th>DOT Guidance/Information</th>
<th>Checking of Existing MB Supports</th>
<th>Request to Change MB Support</th>
<th>Owner Pays for Replacement</th>
<th>Replacement w/ Hwy Projects</th>
<th>Replacement w/ FHWA Approved MB Support</th>
<th>Law Enforcement /Statute</th>
<th>MB Fatality Severity w respect to total MB-crashes (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK</td>
<td>✓</td>
<td>x</td>
<td>✓</td>
<td>x</td>
<td>N/A</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>x</td>
<td>N/A</td>
</tr>
<tr>
<td>CO</td>
<td>✓</td>
<td>x</td>
<td>✓</td>
<td>x</td>
<td>N/A</td>
<td>✓</td>
<td>✓</td>
<td>✓ (Owner can re-replace the new with the old mailbox system)</td>
<td>x</td>
<td>0.000%</td>
</tr>
<tr>
<td>DE</td>
<td>✓</td>
<td>x</td>
<td>Only for material &amp; geometry</td>
<td>x</td>
<td>N/A</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>x</td>
<td>0.138%</td>
</tr>
<tr>
<td>KS</td>
<td>✓</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>0.142%</td>
</tr>
<tr>
<td>KY</td>
<td>✓</td>
<td>x</td>
<td>✓</td>
<td>x</td>
<td>✓</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>x</td>
<td>N/A</td>
</tr>
<tr>
<td>LA</td>
<td>Other</td>
<td>x</td>
<td>For State roads, permit needed, but no checking</td>
<td>✓</td>
<td>✓</td>
<td>N/A</td>
<td>✓</td>
<td>✓</td>
<td>x</td>
<td>0.103%</td>
</tr>
<tr>
<td>ME</td>
<td>✓</td>
<td>x</td>
<td>Must be breakaway or guidance on material/geometry</td>
<td>x</td>
<td>✓</td>
<td>✓</td>
<td>N/A</td>
<td>N/A</td>
<td>x</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Severity for MB fatality is calculated w/ respect to total # of MB Crashes
*DOT crash database contains only FHE
**Maine DOT suggested not to label the data as FHE and/or MHE
Table 5.5. Guidance and Mailbox Related Fatalities for State DOTs that provided with Crash Data for this Project (Continued).

<table>
<thead>
<tr>
<th>State DOT</th>
<th>Owner Responsible</th>
<th>Permit</th>
<th>DOT Guidance/ Information</th>
<th>Checking of Existing MB Supports</th>
<th>Request to Change MB Support</th>
<th>Owner Pays for Replacement</th>
<th>Replacement w/ Hwy Projects</th>
<th>Replacement w/ FHWA Approved MB Support</th>
<th>Law Enforcement/Statute</th>
<th>MB Fatality Severity w respect to total MB-crashes (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MN</td>
<td>x</td>
<td>x</td>
<td>✔️ ✔️ For Hwy w/ limit ≥ 40 mph w/ MnDOT Projects</td>
<td>N/A</td>
<td>✔️ For Hwy w/ limit ≥ 40 mph w/ MnDOT Projects</td>
<td>N/A</td>
<td>N/A</td>
<td>✔️</td>
<td>✔️</td>
<td>0.000%</td>
</tr>
<tr>
<td>MS</td>
<td>Other</td>
<td>✔️ ✔️ Specifications are part of driveway permit</td>
<td>✔️</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>ND</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>N/A</td>
<td>N/A</td>
<td>Only if need to move the MB system</td>
<td>Maybe necessary crash data analysis before changing MB system</td>
<td>x</td>
<td>0.000%</td>
</tr>
<tr>
<td>PA</td>
<td>✔️ ✔️ ✔️ ✔️</td>
<td>✔️ ✔️ ✔️ ✔️</td>
<td>✔️ ✔️ ✔️ ✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>TX</td>
<td>x</td>
<td>x</td>
<td>✔️</td>
<td>N/A</td>
<td>✔️</td>
<td>N/A</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
</tbody>
</table>

Severity for MB fatality is calculated w/ respect to total # of MB Crashes
*DOT crash database contains only FHE
Table 5.5. Guidance and Mailbox Related Fatalities for State DOTs that provided with Crash Data for this Project (Continued).

<table>
<thead>
<tr>
<th>State DOT</th>
<th>Owner Responsible</th>
<th>Permit</th>
<th>DOT Guidance/Information</th>
<th>Checking of Existing MB Supports</th>
<th>Request to Change MB Support</th>
<th>Owner Pays for Replacement</th>
<th>Replacement w/ Hwy Projects</th>
<th>Replacement w/ FHWA Approved MB Support</th>
<th>Law Enforcement/Statute</th>
<th>MB Fatality Severity w respect to total MB-crashes (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VA</td>
<td>✓</td>
<td>✗</td>
<td>Only for material &amp; geometry</td>
<td>N/A</td>
<td>✓</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>✗</td>
<td>N/A</td>
</tr>
<tr>
<td>WS</td>
<td>Other</td>
<td>✗</td>
<td>N/A</td>
<td>✗</td>
<td>✓</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>✗</td>
<td>N/A</td>
</tr>
<tr>
<td>WY</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>N/A</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
<td>0.000%</td>
</tr>
</tbody>
</table>

Severity for MB fatality is calculated w/ respect to total # of MB Crashes

*DOT crash database contains only FHE
Table 5.6. Guidance and Mailbox Related Injuries for State DOTs that provided with Crash Data for this Project.

<table>
<thead>
<tr>
<th>State DOT</th>
<th>Owner Responsible</th>
<th>Permit</th>
<th>DOT Guidance/Information</th>
<th>Checking of Existing MB Supports</th>
<th>Request to Change MB Support</th>
<th>Owner Pays for Replacement</th>
<th>Replacement w/ Hwy Projects</th>
<th>Replacement w/ FHWA Approved MB Support</th>
<th>Law Enforcement /Statute</th>
<th>MB Injury Severity w respect to total MB-crashes (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK</td>
<td>✓</td>
<td>x</td>
<td>✓</td>
<td>x</td>
<td>N/A</td>
<td>x</td>
<td>✓</td>
<td>✓</td>
<td>x</td>
<td>N/A</td>
</tr>
<tr>
<td>CO</td>
<td>✓</td>
<td>x</td>
<td>✓</td>
<td>x</td>
<td>N/A</td>
<td>x</td>
<td>✓</td>
<td>✓</td>
<td>x</td>
<td>2.57%</td>
</tr>
<tr>
<td>DE</td>
<td>✓</td>
<td>x</td>
<td>Only for material &amp; geometry</td>
<td>x</td>
<td>N/A</td>
<td>x</td>
<td>✓</td>
<td>✓</td>
<td>x</td>
<td>5.25%</td>
</tr>
<tr>
<td>KS</td>
<td>✓</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>2.49%</td>
</tr>
<tr>
<td>KY</td>
<td>✓</td>
<td>x</td>
<td>✓</td>
<td>x</td>
<td>✓</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>x</td>
<td>N/A</td>
</tr>
<tr>
<td>LA</td>
<td>Other</td>
<td>x</td>
<td>✓</td>
<td>x</td>
<td>✓</td>
<td>N/A</td>
<td>✓</td>
<td>✓</td>
<td>x</td>
<td>8.56%</td>
</tr>
<tr>
<td>ME</td>
<td>✓</td>
<td>x</td>
<td>Must be breakaway or guidance on material/geometry</td>
<td>x</td>
<td>✓</td>
<td>✓</td>
<td>N/A</td>
<td>N/A</td>
<td>x</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Severity for MB injury is calculated w/ respect to total # of MB Crashes
*DOT crash database contains only FHE
**Maine DOT suggested not to label the data as FHE and/or MHE
Table 5.6. Guidance and Mailbox Related Injuries for State DOTs that provided with Crash Data for this Project (Continued).

<table>
<thead>
<tr>
<th>State DOT</th>
<th>Owner Responsible</th>
<th>Permit</th>
<th>DOT Guidance/Information</th>
<th>Checking of Existing MB Supports</th>
<th>Request to Change MB Support</th>
<th>Owner Pays for Replacement</th>
<th>Replacement w/ Hwy Projects</th>
<th>Replacement w/ FHWA Approved MB Support</th>
<th>Law Enforcement /Statute</th>
<th>MB Injury Severity w respect to total MB-crashes (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MN</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>For Hwy w/ limit ≥ 40 mph w/ MnDOT Projects</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>✗</td>
<td>✗</td>
<td>10.22%</td>
</tr>
<tr>
<td>MS</td>
<td>Other</td>
<td>✗</td>
<td>✗</td>
<td>Specifications are part of driveway permit</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>ND</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Only if need to move the MB system</td>
<td>✗</td>
<td>4.19%</td>
</tr>
<tr>
<td>PA</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Maybe necessary crash data analysis before changing MB system</td>
<td>✗</td>
<td>7.51%</td>
</tr>
<tr>
<td>TX</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>N/A</td>
<td>N/A</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Severity for MB injury is calculated w/ respect to total # of MB Crashes
*DOT crash database contains only FHE
Table 5.6. Guidance and Mailbox Related Injuries for State DOTs that provided with Crash Data for this Project (Continued).

<table>
<thead>
<tr>
<th>State DOT</th>
<th>Owner Responsible</th>
<th>Permit</th>
<th>DOT Guidance/Information</th>
<th>Checking of Existing MB Supports</th>
<th>Request to Change MB Support</th>
<th>Owner Pays for Replacement</th>
<th>Replacement w/ Hwy Projects</th>
<th>Replacement w/ FHWA Approved MB Support</th>
<th>Law Enforcement/Statute</th>
<th>Severity MB Injuries (MHE and FHE) (w/ respect to total MB crashes – FHE and MHE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VA</td>
<td>✓</td>
<td>✗</td>
<td>Only for material &amp; geometry</td>
<td>N/A</td>
<td>✓</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>✗</td>
<td>N/A</td>
</tr>
<tr>
<td>WS</td>
<td>Other</td>
<td>✗</td>
<td>N/A</td>
<td>✗</td>
<td>✓</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>✗</td>
<td>N/A</td>
</tr>
<tr>
<td>WY</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>N/A</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
<td>5.26%</td>
</tr>
</tbody>
</table>

Severity for MB injury is calculated w/ respect to total # of MB Crashes

*DOT crash database contains only FHE
Mailbox crash frequency and severity was summarized in Table 5.7 for all those State DOTs that gave crash data availability. Not all States, however, provided with FHE and MHE for evaluation of frequency and severity, respectively. The researchers decided to consider only those States that gave availability of both FHE and MHE data (Tables 5.8). These were: CO, DE, KS, LA, MN, ND, PA and WY.

The researchers divided the States in 3 groups according to the knowledge previously acquired in terms of State availability of a policy for choice and installation of crashworthy mailboxes (Tables 5.9). The first group included MN and WY, which were the DOTs that resulted having a policy for mailbox support choice and for which the DOTs seems to be very pro-active in checking mailbox installations and, when necessary, replacing them with a crashworthy structure. The second group included ND and PA, which were the DOTs that resulted not having a policy regarding crashworthy mailbox support choice. The third group included CO, DE, and LA, which were the DOTs that resulted having a guidance for crashworthy mailbox support, but that, however, did not seem to have authority on the single owner about selection and installation of the suggested crashworthy mailbox support. Researchers were not able to find sufficient data for the State of Kansas in terms of permit requirements, guidance for crashworthy mailbox support choice and law enforcement about crashworthy mailbox support selection and placement. For this reason, researchers decided not to include the State of Kansas in any specific group.

Comparisons for the three groups are reported in Tables 5.10 (Yes policy DOTs), Table 5.11 (No Policy DOTs), and Table 5.12 (only guidance, but not authority DOTs). In order to consider a State DOT having a policy or not regarding crashworthy mailbox support selection and placement, the authors reviewed all the information collected either by web, phone conversation and/or email exchange with DOT personnel (for more details, see Appendix F).

As a result, Minnesota and Wyoming were considered “Yes Policy” States, based on the fact that:

- “… Minnesota can enforce the law on private citizen to replace a mailbox support when it is declared to be a public nuisance, a road hazard, and a danger to the health and safety of the traveling public if located along a street or highway having a speed limit of 40 miles per hour or greater. The mailbox installations that are documented to have passed an accredited crash test are acceptable. An accredited crash test is considered to be a test conducted in accordance with procedures described in the most recent National Cooperative Highway Research Program report.”
- “In Wyoming the single owner is required to have a permit for installation of mailbox support when that is in the right-of-way of the land. WYDOT has policies and checks whether the support is crashworthy. If it is not, WYDOT will take it away and require that is replaced with a crashworthy one.”


North Dakota and Pennsylvania were considered a “No Policy States”, based on the fact that:

- “The owner of the mailbox system can choose the system; there is not a need to go through selection. North Dakota DOT does not have a policy and the authority to do anything. Only with major projects, the DOT might need to move the mailbox system already installed and re-install a different type of mailbox support. It might be necessary to analyze crash data before making any decision about changing the mailbox support system.
- “The owner of the mailbox system can chose the system; there is not a need to go through selection. Pennsylvania DOT does not have the authority to do anything. It might be that only some municipalities have some authority, but that’s not a general rule.”

Colorado, Delaware and Louisiana were considered a “Having Some Guidance” States, based on the fact that:

- “Colorado DOT has not authority to enforce any law in the choice of a crashworthy mailbox support system. The DOT collaborates with USPS to inform the private owner of the importance and of the types of crashworthy systems available. The owner, however, can choose the mailbox support system he/she prefers, even if not crashworthy. When the DOT replaces the mailbox support system during major highway projects, it choses crashworthy support systems. The owner, however, could still re-replace the system installed by the DOT with the old one which was not crashworthy.”
- “Delaware DOT requires from the citizen to choose a mailbox system in a certain material and geometry range only. If the DOT is working on a highway project and needs to replace a mailbox support, then it is requested that the contractor chooses a mailbox support system with a FHWA letter of acceptance. However, when the private citizen choses and install the mailbox system, no FHWA letter is required.”
- “There is no permit required for selection and installation of new mailboxes and there is no checking. As for state road, there is a permit, however still there is no checking. LADOT issues guidance for choice of crashworthy mailbox support, but no law can be enforced. If an issue is raised for a particular mailbox selection and placement, then LADOT request that the mailbox would be changed, but again cannot enforce law. Last, if LADOT need to replace a mailbox support system, it will replace it with a choice of a crashworthy one.”
Table 5.7. State Frequency and Severity for MB Related Crashes.

<table>
<thead>
<tr>
<th>State DOT</th>
<th>All FHE MB-Crashes</th>
<th>All MHE MB-Crashes</th>
<th>Frequency MB-Crashes w respect to total crashes</th>
<th>Fatal MB-Crashes (#)</th>
<th>MB Fatality Severity w respect to total MB-crashes (%)</th>
<th>Injury MB-Crashes (#)</th>
<th>MB Injury Severity w respect to total MB-crashes (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK ('05-'09)*</td>
<td>204</td>
<td>N/A</td>
<td>0.34%</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>CO ('08-'10)</td>
<td>338</td>
<td>257</td>
<td>0.11%</td>
<td>0</td>
<td>0.000%</td>
<td>9</td>
<td>2.57%</td>
</tr>
<tr>
<td>DE ('05-'10)</td>
<td>656</td>
<td>305</td>
<td>0.56%</td>
<td>1</td>
<td>0.138%</td>
<td>38</td>
<td>5.25%</td>
</tr>
<tr>
<td>KS ('07-'11)</td>
<td>1,351</td>
<td>299</td>
<td>0.42%</td>
<td>2</td>
<td>0.142%</td>
<td>35</td>
<td>2.49%</td>
</tr>
<tr>
<td>KY ('06-'10)*</td>
<td>4955</td>
<td>N/A</td>
<td>0.66%</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>LA ('06-'10)</td>
<td>1,496</td>
<td>2,271</td>
<td>0.19%</td>
<td>3</td>
<td>0.103%</td>
<td>250</td>
<td>8.56%</td>
</tr>
<tr>
<td>ME ('06-'10)**</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>MN ('06-'10)</td>
<td>611</td>
<td>844</td>
<td>0.16%</td>
<td>0</td>
<td>0.000%</td>
<td>114</td>
<td>10.22%</td>
</tr>
<tr>
<td>MS ('06-'11)*</td>
<td>565</td>
<td>N/A</td>
<td>0.52%</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>ND ('07-'11)</td>
<td>136</td>
<td>137</td>
<td>0.16%</td>
<td>0</td>
<td>0.000%</td>
<td>8</td>
<td>4.19%</td>
</tr>
<tr>
<td>PA ('07-'10)</td>
<td>3,308</td>
<td>809</td>
<td>0.55%</td>
<td>7</td>
<td>0.203%</td>
<td>259</td>
<td>7.51%</td>
</tr>
<tr>
<td>TX ('07-'11)*</td>
<td>12,727</td>
<td>N/A</td>
<td>0.59%</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>VA ('09-'11)*</td>
<td>253</td>
<td>N/A</td>
<td>0.11%</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>WS ('06-'10)*</td>
<td>2,521</td>
<td>N/A</td>
<td>0.45%</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>WY ('08-'10)</td>
<td>93</td>
<td>78</td>
<td>0.11%</td>
<td>0</td>
<td>0.000%</td>
<td>5</td>
<td>5.26%</td>
</tr>
</tbody>
</table>

*DOT crash database contains only FHE

**Maine DOT suggested not to label the data as FHE and/or MHE since for the time frame the data were collected there was not report of it (there are circumstances where it could be something else, besides FHE or MHE)
Table 5.8. State Frequency and Severity for MB Related Crashes for Crash Databases Including both FHE and MHE.

<table>
<thead>
<tr>
<th>State DOT</th>
<th>All FHE MB-Crashes</th>
<th>All MHE MB-Crashes</th>
<th>Frequency FHE MB-Crashes w respect to total crashes</th>
<th>Fatal MB-Crashes (#)</th>
<th>MB Fatality Severity w respect to total MB-crashes (%)</th>
<th>Injury MB-Crashes (#)</th>
<th>MB Injury Severity w respect to total MB-crashes (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO ('08-'10)</td>
<td>338</td>
<td>257</td>
<td>0.11%</td>
<td>0</td>
<td>0.00%</td>
<td>9</td>
<td>2.57%</td>
</tr>
<tr>
<td>DE ('05-'10)</td>
<td>656</td>
<td>305</td>
<td>0.56%</td>
<td>1</td>
<td>0.138%</td>
<td>38</td>
<td>5.25%</td>
</tr>
<tr>
<td>KS ('07-'11)</td>
<td>1,351</td>
<td>299</td>
<td>0.42%</td>
<td>2</td>
<td>0.142%</td>
<td>35</td>
<td>2.49%</td>
</tr>
<tr>
<td>LA ('06-'10)</td>
<td>1,496</td>
<td>2,271</td>
<td>0.19%</td>
<td>3</td>
<td>0.103%</td>
<td>250</td>
<td>8.56%</td>
</tr>
<tr>
<td>MN ('06-'10)</td>
<td>611</td>
<td>844</td>
<td>0.16%</td>
<td>0</td>
<td>0.00%</td>
<td>114</td>
<td>10.22%</td>
</tr>
<tr>
<td>ND ('07-'11)</td>
<td>136</td>
<td>137</td>
<td>0.16%</td>
<td>0</td>
<td>0.00%</td>
<td>8</td>
<td>4.19%</td>
</tr>
<tr>
<td>PA ('07-'10)</td>
<td>3,308</td>
<td>809</td>
<td>0.55%</td>
<td>7</td>
<td>0.203%</td>
<td>259</td>
<td>7.51%</td>
</tr>
<tr>
<td>WY ('08-'10)</td>
<td>93</td>
<td>78</td>
<td>0.11%</td>
<td>0</td>
<td>0.00%</td>
<td>5</td>
<td>5.26%</td>
</tr>
</tbody>
</table>
Table 5.9. Guidance and Policies for the States of CO, DE, KS, LA, MN, ND, PA, and WY.

<table>
<thead>
<tr>
<th>State DOT</th>
<th>Owner Responsible</th>
<th>Permit</th>
<th>DOT Guidance/Information</th>
<th>Checking of Existing MB Supports</th>
<th>Request to Change MB Support</th>
<th>Owner Pays for Replacement</th>
<th>Replacement w/ Hwy Projects</th>
<th>Replacement w/ FHWA Approved MB Support</th>
<th>Law Enforcement /Statute</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO</td>
<td>✓</td>
<td>✗</td>
<td>✓</td>
<td>✗</td>
<td>N/A</td>
<td>✗</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>DE</td>
<td>✓</td>
<td>✗</td>
<td>Only for material &amp; geometry</td>
<td>✗</td>
<td>N/A</td>
<td>✗</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
</tr>
<tr>
<td>KS</td>
<td>✓</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>LA</td>
<td>Other</td>
<td>✗</td>
<td>For State roads, permit needed, but no checking</td>
<td>✓</td>
<td>✓</td>
<td>N/A</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
</tr>
<tr>
<td>MN</td>
<td>✗</td>
<td>✗</td>
<td>For Hwy w/ limit ≥ 40 mph w/ MnDOT Projects</td>
<td>N/A</td>
<td>For Hwy w/ limit ≥ 40 mph w/ MnDOT Projects</td>
<td>N/A</td>
<td>N/A</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>ND</td>
<td>✗</td>
<td>✗</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Only if need to move the MB system</td>
<td>Maybe necessary crash data analysis before changing MB system</td>
<td>✗</td>
<td></td>
</tr>
<tr>
<td>PA</td>
<td>✓</td>
<td>✗</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Maybe some municipalities have some authority</td>
</tr>
<tr>
<td>WY</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
<td>N/A</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
</tr>
<tr>
<td>State DOT</td>
<td>Policy</td>
<td>All FHE MB-Crashes</td>
<td>All MHE MB-Crashes</td>
<td>Frequency FHE MB-Crashes w respect to total crashes</td>
<td>Fatal MB-Crashes (#)</td>
<td>MB Fatality Severity w respect to total MB-crashes (%)</td>
<td>Injury MB-Crashes (#)</td>
<td>MB Injury Severity w respect to total MB-crashes (%)</td>
<td></td>
</tr>
<tr>
<td>-----------</td>
<td>--------</td>
<td>--------------------</td>
<td>--------------------</td>
<td>-----------------------------------------------------</td>
<td>----------------------</td>
<td>-------------------------------------------------------</td>
<td>-----------------------</td>
<td>------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>CO ('08-'10)</td>
<td>~</td>
<td>338</td>
<td>257</td>
<td>0.11%</td>
<td>0</td>
<td>0.000%</td>
<td>9</td>
<td>2.57%</td>
<td></td>
</tr>
<tr>
<td>DE ('05-'10)</td>
<td>~</td>
<td>656</td>
<td>305</td>
<td>0.56%</td>
<td>1</td>
<td>0.138%</td>
<td>38</td>
<td>5.25%</td>
<td></td>
</tr>
<tr>
<td>LA ('06-'10)</td>
<td>~</td>
<td>1,496</td>
<td>2,271</td>
<td>0.19%</td>
<td>3</td>
<td>0.103%</td>
<td>250</td>
<td>8.56%</td>
<td></td>
</tr>
<tr>
<td>MN ('06-'10)</td>
<td>✔</td>
<td>611</td>
<td>844</td>
<td>0.16%</td>
<td>0</td>
<td>0.000%</td>
<td>114</td>
<td>10.22%</td>
<td></td>
</tr>
<tr>
<td>ND ('07-'11)</td>
<td>❌</td>
<td>136</td>
<td>137</td>
<td>0.16%</td>
<td>0</td>
<td>0.000%</td>
<td>8</td>
<td>4.19%</td>
<td></td>
</tr>
<tr>
<td>PA ('07-'10)</td>
<td>❌</td>
<td>3,308</td>
<td>809</td>
<td>0.55%</td>
<td>7</td>
<td>0.203%</td>
<td>259</td>
<td>7.51%</td>
<td></td>
</tr>
<tr>
<td>WY ('08-'10)</td>
<td>✔</td>
<td>93</td>
<td>78</td>
<td>0.11%</td>
<td>0</td>
<td>0.000%</td>
<td>5</td>
<td>5.26%</td>
<td></td>
</tr>
</tbody>
</table>

Table 5.10. State MB Related Policy, Frequency and Severity for States with Both FHE and MHE Data.
### Table 5.11. Summary for the States of MN, and WY (Considered YES Policy).

<table>
<thead>
<tr>
<th>State DOT (Year)</th>
<th>Policy</th>
<th>All FHE MB-Crashes</th>
<th>All MHE MB-Crashes</th>
<th>Frequency FHE MB-Crashes w respect to total crashes</th>
<th>Fatal MB-Crashes (#)</th>
<th>MB Fatality Severity w respect to total MB-crashes (%)</th>
<th>Injury MB-Crashes (#)</th>
<th>MB Injury Severity w respect to total MB-crashes (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MN ('06-'10)</td>
<td>✓</td>
<td>611</td>
<td>844</td>
<td>0.16%</td>
<td>0</td>
<td>0.00%</td>
<td>114</td>
<td>10.22%</td>
</tr>
<tr>
<td>WY ('08-'10)</td>
<td>✓</td>
<td>93</td>
<td>78</td>
<td>0.11%</td>
<td>0</td>
<td>0.00%</td>
<td>5</td>
<td>5.26%</td>
</tr>
</tbody>
</table>

### Table 5.12. Summary for the States of ND, and PA (Considered NO Policy).

<table>
<thead>
<tr>
<th>State DOT (Year)</th>
<th>Policy</th>
<th>All FHE MB-Crashes</th>
<th>All MHE MB-Crashes</th>
<th>Frequency FHE MB-Crashes w respect to total crashes</th>
<th>Fatal MB-Crashes (#)</th>
<th>MB Fatality Severity w respect to total MB-crashes (%)</th>
<th>Injury MB-Crashes (#)</th>
<th>MB Injury Severity w respect to total MB-crashes (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ND ('07-'11)</td>
<td>✗</td>
<td>136</td>
<td>137</td>
<td>0.16%</td>
<td>0</td>
<td>0.000%</td>
<td>8</td>
<td>4.19%</td>
</tr>
<tr>
<td>PA ('07-'10)</td>
<td>✗</td>
<td>3,308</td>
<td>48</td>
<td>0.55%</td>
<td>7</td>
<td>0.203%</td>
<td>259</td>
<td>7.51%</td>
</tr>
</tbody>
</table>

### Table 5.13. Summary for the States of CO, DE, and LA (Considered Having Guidance).

<table>
<thead>
<tr>
<th>State DOT (Year)</th>
<th>Policy</th>
<th>All FHE MB-Crashes</th>
<th>All MHE MB-Crashes</th>
<th>Frequency FHE MB-Crashes w respect to total crashes</th>
<th>Fatal MB-Crashes (#)</th>
<th>MB Fatality Severity w respect to total MB-crashes (%)</th>
<th>Injury MB-Crashes (#)</th>
<th>MB Injury Severity w respect to total MB-crashes (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO ('08-'10)</td>
<td>~</td>
<td>338</td>
<td>257</td>
<td>0.11%</td>
<td>0</td>
<td>0.000%</td>
<td>9</td>
<td>2.57%</td>
</tr>
<tr>
<td>DE ('05-'10)</td>
<td>~</td>
<td>656</td>
<td>305</td>
<td>0.56%</td>
<td>1</td>
<td>0.138%</td>
<td>38</td>
<td>5.25%</td>
</tr>
<tr>
<td>LA ('06-'10)</td>
<td>~</td>
<td>1,496</td>
<td>2,271</td>
<td>0.19%</td>
<td>3</td>
<td>0.103%</td>
<td>250</td>
<td>8.56%</td>
</tr>
</tbody>
</table>
### Table 5.14. Frequency and Severity for the States of MN, and WY (Considered YES Policy).

<table>
<thead>
<tr>
<th>State DOT (Year)</th>
<th>Policy</th>
<th>Frequency FHE MB-Crashes w respect to total crashes</th>
<th>MB Fatality Severity w respect to total MB-crashes (%)</th>
<th>MB Fatality Severity Group (%)</th>
<th>MB Injury Severity w respect to total MB-crashes (%)</th>
<th>MB Injury Severity Group (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MN ('06-'10)</td>
<td>✓</td>
<td>0.16%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>10.22%</td>
<td>9.85%</td>
</tr>
<tr>
<td>WY ('08-'10)</td>
<td>✓</td>
<td>0.11%</td>
<td>0.00%</td>
<td></td>
<td>5.26%</td>
<td></td>
</tr>
</tbody>
</table>

### Table 5.15. Frequency and Severity for the States of ND, and PA (Considered NO Policy).

<table>
<thead>
<tr>
<th>State DOT (Year)</th>
<th>Policy</th>
<th>Frequency FHE MB-Crashes w respect to total crashes</th>
<th>MB Fatality Severity w respect to total MB-crashes (%)</th>
<th>MB Fatality Severity Group (%)</th>
<th>MB Injury Severity w respect to total MB-crashes (%)</th>
<th>MB Injury Severity Group (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ND ('07-'11)</td>
<td>✗</td>
<td>0.16%</td>
<td>0.000%</td>
<td>0.19%</td>
<td>4.19%</td>
<td>7.34%</td>
</tr>
<tr>
<td>PA ('07-'10)</td>
<td>✗</td>
<td>0.55%</td>
<td>0.203%</td>
<td></td>
<td>7.51%</td>
<td></td>
</tr>
</tbody>
</table>

### Table 5.16. Frequency and Severity for the States of CO, DE, and LA (Considered Having Guidance).

<table>
<thead>
<tr>
<th>State DOT (Year)</th>
<th>Policy</th>
<th>Frequency FHE MB-Crashes w respect to total crashes</th>
<th>MB Fatality Severity w respect to total MB-crashes (%)</th>
<th>MB Fatality Severity Group (%)</th>
<th>MB Injury Severity w respect to total MB-crashes (%)</th>
<th>MB Injury Severity Group (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO ('08-'10)</td>
<td>~</td>
<td>0.11%</td>
<td>0.000%</td>
<td></td>
<td>2.57%</td>
<td></td>
</tr>
<tr>
<td>DE ('05-'10)</td>
<td>~</td>
<td>0.56%</td>
<td>0.138%</td>
<td>0.10%</td>
<td>5.25%</td>
<td></td>
</tr>
<tr>
<td>LA ('06-'10)</td>
<td>~</td>
<td>0.19%</td>
<td>0.103%</td>
<td></td>
<td>8.56%</td>
<td></td>
</tr>
</tbody>
</table>
The researchers used the concept of ANOVA to statistically evaluate the results given in Tables 5.11 through 5.16. In statistics, ANOVA (ANalysis Of VAriance) provides a statistical test of whether or not the means of several groups are all equal, and therefore generalizes t-test to more than two groups.

ANOVA can be used to compare multiple groups, but can also be used to evaluate only two groups at a time. Here, researchers decided to apply ANOVA analysis to all three groups at the same time, but also to pair of different groups.

ANOVA evaluates and returns different variables, and one of them if the p-value. The p-value is defined as the probability of obtaining a test statistic at least as extreme as the one that was actually observed. When the p-value is less than a predetermined significance value n, usually chosen as 0.05, one often rejects the null hypothesis, indicating that the observed result would be highly unlikely under the null hypothesis. In other words, for the application on this particular study, if the calculated p-value results < 0.05, than the groups that were formed can be considered significantly statistically different in terms of fatality or injury rate.

Here, ANOVA analysis was applied on fatality percentages and injury percentages distinctly. This way, the analysis served to provide whether there is or there is not similarity between the mailbox injury severity and fatality severity means of each group.

Below is a list of the different ANOVA evaluations computed:

- Fatality for all groups (Table 5.17(a));
- Fatality between Yes- and No- Policy groups (Table 5.17(b));
- Fatality between Yes- and Maybe-Policy groups (Table 5.17(c));
- Fatality between No- and Maybe-Policy groups (Table 5.17(d));
- Injury for all groups (Table 5.18(a));
- Injury between Yes- and No- Policy groups (Table 5.18(b));
- Injury between Yes- and Maybe-Policy groups (Table 5.18(c));
- Injury between No- and Maybe-Policy groups (Table 5.18(d)).

If we limited ourselves comparing the fatality percentages for the States that have and have not a policy and also for those which have a sort of guidance, we could argue that not having a policy seems to cause more fatalities than having one. Also, it seems that having a sort of guidance (without necessarily a policy) helps in reducing the fatality rate for mailbox related crashes. However, in order to have a more objective comparison, we can introduce statistical analysis (ANOVA). ANOVA compares the group means to evaluate if they are statistically significantly different between each other.

With the ANOVA, according to the results reported in Table 5.17, it appears not to be a significant statistical difference between the groups chosen in terms of fatality rate. In other words, if we repeated the all analysis on mailbox related crashes once again, we could easily find that the fatality rate resulted from a State belonging to one group could be similar to the fatality rate resulted from another state belonging to another group. ANOVA was also performed on pair of groups to evaluate fatality rate, to compare groups directly one with another. In all these analysis, still ANOVA showed that it appears not to be a significant statistical difference between the two chosen groups, in terms of fatality rate.
Similarly, with the application of the ANOVA analysis on injury rates, it appears not to be a significant statistical difference between the groups chosen (Table 5.18). In other words, if we repeated the all analysis on mailbox related crashes once again, we could easily find that the injury rate resulted from a State belonging to one group could be similar to the injury rate resulted from another state belonging to another group. Again, ANOVA was also performed on pair of groups to evaluate injury rate, to compare groups directly one with another. In all these analysis, still ANOVA showed that it appears not to be a significant statistical difference between the two chosen groups, in terms of injury rate.
Table 5.17. ANOVA Analysis for Fatality Data.

(a) ANOVA Analysis for Fatality for all Groups

<table>
<thead>
<tr>
<th>Groups</th>
<th>Count</th>
<th>Sum</th>
<th>Average</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Column 1</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Column 2</td>
<td>2</td>
<td>0.203</td>
<td>0.1015</td>
<td>0.020605</td>
</tr>
<tr>
<td>Column 3</td>
<td>3</td>
<td>0.241</td>
<td>0.080333</td>
<td>0.005146</td>
</tr>
</tbody>
</table>

ANOVA

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>P-value</th>
<th>F crit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>0.011803</td>
<td>2</td>
<td>0.005901</td>
<td>0.763989</td>
<td>0.523585</td>
<td>0.944272</td>
</tr>
<tr>
<td>Within Groups</td>
<td>0.030897</td>
<td>4</td>
<td>0.007724</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>0.0427</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(b) ANOVA Analysis for Fatality Between Only Yes-Policy and No-Policy Groups

<table>
<thead>
<tr>
<th>Groups</th>
<th>Count</th>
<th>Sum</th>
<th>Average</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Column 1</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Column 2</td>
<td>2</td>
<td>0.203</td>
<td>0.1015</td>
<td>0.020605</td>
</tr>
</tbody>
</table>

ANOVA

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>P-value</th>
<th>F crit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between</td>
<td>0.010302</td>
<td>1</td>
<td>0.010302</td>
<td>1 0.42265</td>
<td>18.51282</td>
<td></td>
</tr>
<tr>
<td>Within</td>
<td>0.020605</td>
<td>2</td>
<td>0.010302</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>0.030907</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 5.17. ANOVA Analysis for Fatality Data (Continued).

(c) ANOVA Analysis for Fatality Between Only Yes-Policy and Maybe-Policy Groups

Anova: Single Factor

<table>
<thead>
<tr>
<th>Groups</th>
<th>Count</th>
<th>Sum</th>
<th>Average</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Column 1</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Column 2</td>
<td>3</td>
<td>0.241</td>
<td>0.080333</td>
<td>0.005146</td>
</tr>
</tbody>
</table>

ANOVA

<table>
<thead>
<tr>
<th>Source of Varic</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>P-value</th>
<th>F crit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Gp</td>
<td>0.007744</td>
<td>1</td>
<td>0.007744</td>
<td>2.25718</td>
<td>0.230011</td>
<td>10.12796</td>
</tr>
<tr>
<td>Within Grp</td>
<td>0.010293</td>
<td>3</td>
<td>0.003431</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>0.018037</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(d) ANOVA Analysis for Fatality Between Only No-Policy and Maybe-Policy Groups

Anova: Single Factor

<table>
<thead>
<tr>
<th>Groups</th>
<th>Count</th>
<th>Sum</th>
<th>Average</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Column 1</td>
<td>2</td>
<td>0.203</td>
<td>0.1015</td>
<td>0.020605</td>
</tr>
<tr>
<td>Column 2</td>
<td>3</td>
<td>0.241</td>
<td>0.080333</td>
<td>0.005146</td>
</tr>
</tbody>
</table>

ANOVA

<table>
<thead>
<tr>
<th>Source of Varic</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>P-value</th>
<th>F crit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Gp</td>
<td>0.000538</td>
<td>1</td>
<td>0.000538</td>
<td>0.052202</td>
<td>0.833963</td>
<td>10.12796</td>
</tr>
<tr>
<td>Within Grp</td>
<td>0.030897</td>
<td>3</td>
<td>0.010299</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>0.031435</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 5.18. ANOVA Analysis for Injury Data.

(a) ANOVA Analysis for Injury for all Groups

<table>
<thead>
<tr>
<th>Groups</th>
<th>Count</th>
<th>Sum</th>
<th>Average</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Column 1</td>
<td>2</td>
<td>15.48</td>
<td>7.74</td>
<td>12.3008</td>
</tr>
<tr>
<td>Column 2</td>
<td>2</td>
<td>11.7</td>
<td>5.85</td>
<td>5.5112</td>
</tr>
<tr>
<td>Column 3</td>
<td>3</td>
<td>16.38</td>
<td>5.46</td>
<td>9.0031</td>
</tr>
</tbody>
</table>

ANOVA

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>P-value</th>
<th>F crit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>6.627343</td>
<td>2</td>
<td>3.313671</td>
<td>0.370054</td>
<td>0.712104</td>
<td>6.944272</td>
</tr>
<tr>
<td>Within Groups</td>
<td>35.8182</td>
<td>4</td>
<td>8.95455</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>42.44554</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(b) ANOVA Analysis for Injury Between Only Yes-Policy and No-Policy Groups

<table>
<thead>
<tr>
<th>Groups</th>
<th>Count</th>
<th>Sum</th>
<th>Average</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Column 1</td>
<td>2</td>
<td>15.48</td>
<td>7.74</td>
<td>12.3008</td>
</tr>
<tr>
<td>Column 2</td>
<td>2</td>
<td>11.7</td>
<td>5.85</td>
<td>5.5112</td>
</tr>
</tbody>
</table>

ANOVA

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>P-value</th>
<th>F crit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>3.5721</td>
<td>1</td>
<td>3.5721</td>
<td>0.401089</td>
<td>0.591289</td>
<td>18.51282</td>
</tr>
<tr>
<td>Within Groups</td>
<td>17.812</td>
<td>2</td>
<td>8.906</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>21.3841</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 5.18. ANOVA Analysis for Injury Data (Continued).

(c) ANOVA Analysis for Injury Between Only Yes-Policy and Maybe-Policy Groups

<table>
<thead>
<tr>
<th>Groups</th>
<th>Count</th>
<th>Sum</th>
<th>Average</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Column 1</td>
<td>2</td>
<td>15.48</td>
<td>7.74</td>
<td>12.3008</td>
</tr>
<tr>
<td>Column 2</td>
<td>3</td>
<td>16.38</td>
<td>5.46</td>
<td>9.0031</td>
</tr>
</tbody>
</table>

ANOVA

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>P-value</th>
<th>F crit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>6.23808</td>
<td>1</td>
<td>6.23808</td>
<td>0.617489</td>
<td>0.489331</td>
<td>10.12796</td>
</tr>
<tr>
<td>Within Groups</td>
<td>30.307</td>
<td>3</td>
<td>10.10233</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>35.54508</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(d) ANOVA Analysis for Injury Between Only No-Policy and Maybe-Policy Groups

<table>
<thead>
<tr>
<th>Groups</th>
<th>Count</th>
<th>Sum</th>
<th>Average</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Column 1</td>
<td>2</td>
<td>11.7</td>
<td>5.85</td>
<td>5.5112</td>
</tr>
<tr>
<td>Column 2</td>
<td>3</td>
<td>16.38</td>
<td>5.46</td>
<td>9.0031</td>
</tr>
</tbody>
</table>

ANOVA

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>P-value</th>
<th>F crit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>0.18252</td>
<td>1</td>
<td>0.18252</td>
<td>0.023283</td>
<td>0.888408</td>
<td>10.12796</td>
</tr>
<tr>
<td>Within Groups</td>
<td>23.5174</td>
<td>3</td>
<td>7.899133</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>23.69992</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The researchers believe that having a bigger sample size of State DOTs crash database would have helped the research in terms of having more data for comparison between State DOTs with and without crashworthy mailbox support policy.

Also, researchers believe that more accurate data could be obtained and analyzed if all crash databases obtained from the different DOTs could have been more easily comparable. Some DOTs crash databases do not incorporate MHE and/or all collisions and their sequence from the same crash event. Because of this, some DOTs crash data could not be included in the final comparison, because did not allow for an exact evaluation of fatalities due to mailbox related crashes. Also, a deeper analysis could have been developed by considering a comparison among DOTs of the injury levels recorded from mailbox related crashes. With the data collected from the current DOTs databases, this could not be accomplished in this research. In fact, different DOTs had different injury severity codes which could not always be comparable.

Also, more detail analysis on road classification, posted speed limit, type of road, weather conditions (which might considerable vary between the northern and the southern States) might be a starting point for a deeper analysis of this data and for a more effective comparison.

With the very limited data that were available for the purpose of this research study, it appears that implementation of current policies for crashworthy mailbox supports selection and placement does not statistically contribute to the outcome of a lower fatality and injury rate for mailbox related crashes.
REFERENCES


Mailbox Guidelines

So what makes a good mailbox?

From the wear and tear of daily use to constant assault from the elements, these guidelines will help you set up a mailbox that stands up to it all.

If you're buying a new mailbox, look for the Postmaster General's seal of approval; every new mailbox design should be reviewed and approved before it goes to market.

If you opt to construct your own mailbox, you should run your plans by your local postmaster. Overall, the mailbox you build will need to meet the same size, strength, and quality standards as manufactured boxes.

The house or apartment number should be clearly displayed on your mailbox. And, if your mailbox is on a different street than your house, the street name should appear on it, too.

Placement

Your local postmaster must approve the location of your mailbox.

Put a roadside mailbox where a carrier can reach inside without leaving the truck. That means positioning it about 41" to 45" off the ground and back about 6" to 8" from the curb.

If you live in the city and are attaching the box to your house, just make sure it can be accessed easily from your sidewalk, steps, or porch. Because city carriers often shoulder heavy bags, put your mailbox about 4' from the ground. That way, your carrier won't have to stretch or bend to reach it. And remember to keep the path to your mailbox clear in inclement weather.
Mailbox Guidelines

So what makes a good mailbox?

From the wear and tear of daily use to constant assault from the elements, these guidelines will help you set up a mailbox that stands up to it all.

If you're buying a new mailbox, look for the Postmaster General's seal of approval; every new mailbox design should be reviewed and approved before it goes to market.

If you opt to construct your own mailbox, you should run your plans by your local postmaster. Overall, the mailbox you build will need to meet the same size, strength, and quality standards as manufactured boxes.

The house or apartment number should be clearly displayed on your mailbox. And, if your mailbox is on a different street than your house, the street name should appear on it, too.

Placement | The Post | Maintenance | Door Slots
---|---|---|---

If you're mounting a curbside mailbox on a post near the street, the support should be secure and safe. The best supports are designed to bend or fall away if a car hits them.

The Federal Highway Administration recommends...

- a wooden mailbox support no bigger than 4" x 4".
- a 2"-diameter standard steel or aluminum pipe.

Bury your post no more than 24" deep, so it can give way in an accident.

Don't use potentially dangerous supports, such as...

- heavy metal pipes.
- concrete posts.
- farm equipment, such as milk cans filled with concrete.

In areas with lots of snow, we suggest a semi-arch or extended arm-type support. That way, snowplows will be able to sweep under without knocking it down.
Mailbox Guidelines
So what makes a good mailbox?

From the wear and tear of daily use to constant assault from the elements, these guidelines will help you set up a mailbox that stands up to it all.

If you’re buying a new mailbox, look for the Postmaster General’s seal of approval; every new mailbox design should be reviewed and approved before it goes to market.

If you opt to construct your own mailbox, you should run your plans by your local postmaster. Overall, the mailbox you build will need to meet the same size, strength, and quality standards as manufactured boxes.

The house or apartment number should be clearly displayed on your mailbox. And, if your mailbox is on a different street than your house, the street name should appear on it, too.

![Maintenance](image)

Your mailbox takes a serious beating from the weather, especially in the winter. We suggest a routine mailbox check-up every spring.

You might just need to…

- Replace loose hinges on the door.
- Repaint rusty or peeling parts.
- Remount the post, if it’s loose.
- Replace missing or faded house numbers.

And year-round keep obstructions away from your mailbox. Your carrier may not deliver your mail if there’s a car, shrub, snowdrift, or unfriendly dog in front of it.
Mailbox Guidelines

So what makes a good mailbox?

From the wear and tear of daily use to constant assault from the elements, these guidelines will help you set up a mailbox that stands up to it all.

If you're buying a new mailbox, look for the Postmaster General’s seal of approval; every new mailbox design should be reviewed and approved before it goes to market.

If you opt to construct your own mailbox, you should run your plans by your local postmaster. Overall, the mailbox you build will need to meet the same size, strength, and quality standards as manufactured boxes.

The house or apartment number should be clearly displayed on your mailbox. And, if your mailbox is on a different street than your house, the street name should appear on it, too.

Some homes and apartments have a slot in the door for receiving mail. It should meet the following standards.

- The opening must be at least 1 1/2" x 7".
- Horizontal slots must have a flap hinged at the top. Vertical slots should be hinged on the opposite side from the door’s hinges.
- If you have an inside hood for more privacy, the hooded portion shouldn’t be below the bottom of the outside plate on a horizontal slot. On a vertical slot, the hood shouldn’t extend beyond the side of the outside plate on same side as the door’s hinges.
- The hood should not project more than 2 1/16" beyond the inside of the door.
- The bottom of the slot must be at least 30" above floor.
A Guide for Erecting Mailboxes on Highways

Prepared by the Task Force for Roadside Safety of the Standing Committee on Highways Subcommittee on Design

Published by the American Association of State Highway and Transportation Officials 444 North Capitol Street, N.W., Suite 249 Washington, D.C. 20001

©1994 by the American Association of State Highway and Transportation Officials. All rights reserved. Printed in the United States of America. This book, or parts thereof, may not be reproduced in any form without written permission of the publisher.

AASHTO EXECUTIVE COMMITTEE 1994

President
Howard Yerusalim
Pennsylvania

Vice President
Wayne Shackelford
Georgia

Secretary-Treasurer
Clyde E. Pyers
Maryland

ELECTED REGIONAL MEMBERS

Region I
Betty Hager Francis
District of Columbia

Region II
G. M. Roberts
Alabama

Region III
Charles Thompson
Wisconsin

Region IV
Donald Diller
Wyoming

NON-VOTING MEMBERS
Immediate Past President: Wayne Muri, Missouri
Executive Director: Francis B. Francois, Washington, D.C.

AASHTO HIGHWAY SUBCOMMITTEE ON DESIGN 1993

Chairman: Dan Flowers, Arkansas
Vice Chairman: Kenneth C. Afferton, New Jersey
Secretary: Thomas Willett, FHWA

Alabama, Don Artle, Ray D. Bass, J. F. Carway
Alaska, Ray Shankway
Arizona, Robert P. Nickelson, Dallis B. Sexton, John L. Louis
Arkansas, Bob Walter, Paul DeBusk
California, Walter P. Smith
Colorado, James E. Sobels
Delaware, Michael A. Angelo, Chao H. Hu
D.C., Charles F. Williams, Sanborn H. Vineck
Florida, Bill Dayo, Freddie Simmons
Georgia, Walker Scott, Hoyt J. Lively, Roland Hinnens
Hawaii, Kenneth W. G. Wong
Idaho, Richard Scovron, Jeff R. Miles
Illinois, Ken Lazar, Dennis Peschietti
Indiana, David M. Phoebenbaum
Iowa, George F. Sisson, Donald L. East, Dave Little
Kansas, Warren Sick, James Brewer, Richard G. Adams
Kentucky, Charles S. Raymer, John Sacksteder, Steve Williams

Louisiana, Al Dumas, William Hickey, Nick Kalivado
Maine, Charles A. Valley, Walter Henrickson
Maryland, Steve Drumm, Robert D. Douglass
Massachusetts, Sherman Edelman, Stanley W. Woods, Jr.
Michigan, Charles J. Arnold
Minnesota, Roger M. Hill
Mississippi, Wendel T. Ruff, J. Richard Young
Missouri, Frank Carroll, Bob Streeto
Montana, David S. Johnson, Ronald E. Williams, Carl S. Peil
Nebraska, Donald L. Turek, Eldon D. Poppe
Nevada, Michael W. McFall, Steve R. Oxboby
New Hampshire, Gilbert S. Rogers
New Jersey, Kenneth Afferton, Walter W. Caddell, Charles A. Goensel, Jim Snyder
New Mexico, Joseph Pacheco, Charles V. P. Trujillo
New York, J. Robert Lambert, Philip J. Clark, Robert A. Dennison
North Dakota, David K. O. Leer, Ken Brist
AFFILIATE MEMBERS

Alberta, Allan Kwan
Hong Kong, S. K. Kwee
Manitoba, A. Boychuk
Mariana Islands, Elizabeth H. Salas-Balajadia
New Brunswick, C. Herbert Page
Newfoundland, Terry McCarthy
Northwest Territories, Peter Vizian
Nova Scotia, Donald W. Macleod
Ontario, Gerry McMillan
Saskatchewan, Tom Guent

ASSOCIATE MEMBERS-STATE

N.J. Turnpike Authority, Arthur A. Linfield, Jr.
Port Authority of N.Y. & N.J., Harry Schenkel

ASSOCIATE MEMBERS-FEDERAL

Bureau of Indian Affairs-Division of Transportation, Kimo Nairwa
U.S. Department of Agriculture-Forest Service, Tom Pettigrew
MEMBERS

Standing Committee on Highways
Subcommittee on Design
Task Force for Roadside Safety

<table>
<thead>
<tr>
<th>Region</th>
<th>State</th>
<th>Members and Members' Representatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>New Hampshire</td>
<td>Keith A. Cota</td>
</tr>
<tr>
<td></td>
<td>New Jersey</td>
<td>C.A. Goessel</td>
</tr>
<tr>
<td></td>
<td>New York</td>
<td>Arthur D. Perkins</td>
</tr>
<tr>
<td></td>
<td>Vermont</td>
<td>John Armstrong</td>
</tr>
<tr>
<td></td>
<td>FHWA</td>
<td>J.H. Hannon, Jr. (Secretary)</td>
</tr>
<tr>
<td>II</td>
<td>Alabama</td>
<td>Jack F. Caraway</td>
</tr>
<tr>
<td></td>
<td>Arkansas</td>
<td>Paul DeBusk</td>
</tr>
<tr>
<td></td>
<td>Georgia</td>
<td>Walker W. Scott</td>
</tr>
<tr>
<td></td>
<td>Louisiana</td>
<td>William Hickey</td>
</tr>
<tr>
<td></td>
<td>South Carolina</td>
<td>Douglas McClure</td>
</tr>
<tr>
<td>III</td>
<td>Iowa</td>
<td>David L. Little</td>
</tr>
<tr>
<td></td>
<td>Kansas</td>
<td>Ron Seitz</td>
</tr>
<tr>
<td></td>
<td>Ontario</td>
<td>Tom Klement</td>
</tr>
<tr>
<td></td>
<td>Wisconsin</td>
<td>R.L. Cook</td>
</tr>
<tr>
<td>IV</td>
<td>Colorado</td>
<td>Kenneth Mauro</td>
</tr>
<tr>
<td></td>
<td>Oregon</td>
<td>Wayne F. Coble (Chairman)</td>
</tr>
<tr>
<td></td>
<td>Texas</td>
<td>Mark A. Marek</td>
</tr>
<tr>
<td></td>
<td>Washington</td>
<td>Don Gipone</td>
</tr>
<tr>
<td></td>
<td>Wyoming</td>
<td>Robert Milburn</td>
</tr>
</tbody>
</table>

Representing the Subcommittee on Bridges and Structures

<table>
<thead>
<tr>
<th>Region</th>
<th>State</th>
<th>Members</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>New Jersey</td>
<td>Robert A. Pege</td>
</tr>
<tr>
<td>II</td>
<td>South Carolina</td>
<td>Bennie A. Meeterze, Jr.</td>
</tr>
<tr>
<td>III</td>
<td>Kansas</td>
<td>Kenneth F. Hurst</td>
</tr>
<tr>
<td>IV</td>
<td>Wyoming</td>
<td>David H. Pope</td>
</tr>
</tbody>
</table>
# Table of Contents

INTRODUCTION ........................................... 1

GENERAL PRINCIPLES AND GUIDELINES .................. 5
   A. Control Regulations ................................. 5
   B. Mail Stop and Mailbox Location .................. 5
   C. Mailbox Turnout Design ............................ 9
   D. Mailbox Support and Attachment Design ........... 11

APPENDIX A
   MODEL REGULATION FOR THE ACCOMMODATION OF
   MAILBOXES AND NEWSPAPER DELIVERY BOXES ON
   PUBLIC HIGHWAY RIGHTS-OF-WAY .................... 21
   Location ............................................. 21
   Structure ............................................ 22
   Shoulder and Parking Area Construction ............. 23
   Removal of Nonconforming or Unsafe Mailboxes ....... 23

APPENDIX B ............................................. 25

APPENDIX C
   UNITED STATES POSTAL SERVICE .................... 27

APPENDIX D
   DOMESTIC MAIL MANUAL, USPS ....................... 29
List of Figures and Tables

Figure 1. Typical Single Mailbox Installations ........................................... 2
Figure 2. Examples of Hazardous Single Mailbox Installations .................... 3
Figure 3. Example of Hazardous Multiple Mailbox Installation .................. 4
Figure 4. Suggested Minimum Clearance Distances to Nearest Mailbox in Mail Stops at Intersections ......................................................... 7
Figure 5. Mailbox Turnout ........................................................................... 10
Figure 6. Mailbox Support Hardware Series A ........................................... 12
Figure 7. Single and Double Mailbox Assemblies Series A ......................... 13
Figure 8. Mailbox Support Hardware Series B ........................................... 14
Figure 9. Single and Double Mailbox Assemblies Series B ......................... 15
Figure 10. Single and Multiple Mailbox Assemblies Series C ..................... 16
Figure 11. Neighborhood Delivery and Collection Box Units ...................... 17
Figure 12. Cantilever Mailbox Supports ..................................................... 18
Figure 13. Breakaway Cantilever Mailbox Support ..................................... 20

Figure B1. Cantilever Mailbox Support ..................................................... 25
Figure B2. Multiple Mailbox Support ......................................................... 26
Exhibit A. Traditional Mailbox Design ....................................................... 27
Exhibit B. Contemporary Mailbox Design .................................................. 27
Exhibit C. Extended Arm Mailbox Support ............................................... 27

Table 1. Suggested Guidelines for Lateral Placement of Mailboxes .............. 8
INTRODUCTION

There are tens of millions of mailboxes on rural and suburban roads and streets. The design and management problems these mailboxes create for highway agencies are the same or similar to those they have in handling control of access, accommodation of utilities, and the design of bus stops and intersections. Furthermore, there is the added human problem that comes from a mailbox being a link with, if not an extension of, the home or business served by it. The postal patrons may view the mailbox as a part of their domain and resent, even resist, directions concerning their mailbox. Thus, an extra measure of diplomacy and public relations may be needed to effect changes in the design and location of mailbox installations.

Highway safety is the primary reason for a highway agency’s becoming involved with mailboxes, which, in some areas, are often the only fixed objects close to the road. Of course, there are also highway maintenance and traffic service considerations, but they are relatively minor in comparison with safety. Because most accident record systems do not isolate accidents associated with mailboxes, there is limited data on these accidents. However, what data there is suggests that possibly 70 to 100 people die annually in the United States in vehicles striking mailboxes where the design of the mailbox or, especially, its support can be shown to have contributed to the severity of the accident. While this number is low, it is significant because it is associated with obviously and unnecessarily hazardous mailbox installations.

The typical single mailbox installation (Figure 1), consisting of a light sheet metal box mounted on a 100 mm x 100 mm wooden post or a 38 mm diameter light gauge pipe, is not a serious threat to motorists, although improvements in typical post-to-box mounting details would further reduce its threat. (See discussion in the "Mailbox Support and Attachment Design" section.) It is the massive structures, such as the masonry columns, railroad rails and ties, tractor wheels, plow blades, concrete filled barrels, etc. (Figure 2), sometimes used to support mailboxes that turn a single mailbox installation into a lethal roadside obstacle that should be eliminated.

The typical grouped or multiple mailbox installation (Figure 3) is also a serious hazard to the motorist who strikes it. This installation consists of two or more posts supporting a horizontal member, usually a timber plank, which supports the group of mailboxes. The horizontal members in these installations are poised at windshield height and when struck, have impaled or decapitated motorists. For safe alternative designs for grouped mailbox installations, see section titled "Mailbox Support and Attachment Design."
Figure 1A. Mailbox with Wooden Post Support

Figure 1B. Mailbox with Steel Post Support

TYPICAL SINGLE MAILBOX INSTALLATIONS
EXAMPLES OF HAZARDOUS SINGLE MAILBOX INSTALLATIONS
EXAMPLE OF HAZARDOUS MULTIPLE MAILBOX INSTALLATION

Injury from striking a mailbox is not the only risk associated with mailboxes. The mail carrier's maneuvers in collecting and delivering mail and the patron's activities, as pedestrian or motorist, in depositing and collecting mail, create opportunities for traffic conflict and human error. Reducing the number and/or severity of these conflicts is an important objective of this guide.

It is only by banishing mailboxes from our highways that mailbox-related traffic accidents could be eliminated. This is impractical, but to the extent there are identifiable and correctable problems, there is room for improvement. Through cooperation between the highway agencies, the U.S. Postal Service, and the postal patron, improvements in mailbox installation details and, in many instances, locations can be effected with little or no increased cost to the public by simply seeing that good state-of-the-art practices are followed when mailboxes are installed or replaced. (A typical mailbox lasts from 5 to 20 years, depending on service conditions, with the average life being about 10 years. Traditionally, the postal service has had an annual mailbox improvement week. See Appendix C.) Furthermore, when highways are rebuilt or undergo significant upgrading, there may be opportunities to incorporate relatively inexpensive mailbox accommodation improvements.

The general principles and guidelines contained in this publication are also applicable to newspaper delivery boxes and similar devices located along public highways. These guidelines are compatible with the requirements of the U.S. Postal Service (see Appendix D) and are presented in the interest of providing the highest degree of safety practicable for the motoring public, mail carriers, and postal patrons. Highway agencies and localities are encouraged to use these guidelines in developing their own mailbox and newspaper box regulations and installation policies and standards. It should be understood that these are general guidelines and that local conditions, such as legal institutions and practices, population densities, topography, highway characteristics, snowfall, prevailing vehicle characteristics, etc., are factors to consider in developing regulations and standards.
GENERAL PRINCIPLES AND GUIDELINES

A. Control Regulations

It is recommended that each highway agency adopt control regulations for the placement of mailboxes and newspaper boxes within rights-of-way of public highways. Correlation of these regulations with those for the granting of driveway entrance permits might be considered. Mailbox and newspaper box control regulations should follow the principles and guidance contained in this document and include the following:

- a reference to pertinent statutes
- a statement that all mailbox installations must meet the requirements of the U.S. Postal Service
- a requirement that all mailbox and newspaper box installations conform to the current policies and standards of the highway agency regarding location, geometry, and structure of such installations
- information on where one can obtain copies of the current policies and standards
- a statement on permits, if required
- a statement on how approval of exceptions may be obtained
- a description of the highway agency's and the postal patron's responsibilities regarding new installations and regarding replacement installations
- a description of the distribution of responsibilities and the procedures to be followed in removing unsafe or nonconforming installations

Appendix A contains a model control regulation.

Appendix B is an example of an informative pamphlet on mailbox supports.

B. Mail Stop and Mailbox Location

Mailboxes should be placed for maximum convenience to the patron, consistent with safety considerations for highway traffic, the carrier, and the patron. Consideration should be given to (1) minimum walking distance within the roadway for the patron, (2) available stopping sight distance in advance of the mailbox site (especially troublesome on older roads), and (3) possible restriction to corner sight distance at intersections and driveway entrances. New installations should, where feasible, be located on the far right side of an intersection with a road or driveway entrance.
Boxes should be placed only on the right-hand side of the highway in the direction of travel of the carrier, except on one-way streets where they may be placed on the left-hand side. It is undesirable to require pedestrian travel along the shoulder. However, this may be the preferred solution for distances up to 60 m when compared to alternatives, such as constructing a turnout in a deep cut, placing a mailbox just beyond a sharp crest vertical curve (poor sight distance), or constructing two or more closely spaced turnouts.

The placing of mailboxes along high-speed, high-volume highways should be avoided if other practical locations are available. Mailboxes should not be located where access is from the lanes of an expressway or where access, stopping, or parking is otherwise prohibited by law or regulation. Where there are frontage roads, the abutting property owners may be served by boxes located along the frontage roads. No mailbox should be at a location that would require a patron to cross the lanes of an expressway to deposit or retrieve mail. Where the U.S. Postal Service deems that service is not warranted on both frontage roads, or where there is a frontage road only on one side, patrons not served directly should be accommodated by mailboxes at a suitable and safe location in the vicinity of the crossroad nearest the patron’s property.

Placing a mail stop near an intersection will have an effect on the operation of the intersection. The nature and magnitude of this effect depend on traffic speeds and volumes on each of the intersecting roadways, the number of mailboxes at the stop, extent of traffic control, how the stop is located relative to the traffic control, and the distance the stop is from the intersection.

At intersections where one roadway is given the right-of-way and the other is stop controlled, a vehicle at a mail stop on a through roadway approach to the intersection may restrict the view between a vehicle entering the intersection from the right and the through traffic behind the mail stop. A mail stop on the through road on the far side of the crossroad increases the chance the crossroad driver will pull into the path of the vehicle on the through road that is headed for the mail stop. A mail stop in advance of a stop sign creates the potential for a vehicle at the mail stop blocking the view of the stop sign. The least troublesome location for a mail stop at these intersections is adjacent to a crossroad lane leaving the intersection. Nevertheless, there is still a chance that a driver reentering traffic from the mail stop will not see or be seen from a vehicle turning onto the crossroad. Figure 4 shows possible locations of mail stops at a typical rural intersection. Using the mail stop location dimensions in the figure will minimize the effect a stop will have on an intersection’s operation and minimize the hazard to persons using the mail stop.

Mailbox heights are usually set to accommodate the mail carrier. Typically, the bottom of the mailbox is located 1 m to 1.2 m above the mail stop surface.

Mailboxes should be located so that a vehicle stopped at a mailbox is clear of the adjacent traveled way. An exception to this principle may be reasonable on low-volume, low-speed streets and roads. But basically, a vehicle stopped at a mailbox should be clear of the traveled ways and the higher the traffic volume or speed, the greater the clearance should be.

Most vehicles stopped at a mailbox will be clear of the traveled way when the mailbox is placed outside a 2.4 m wide usable shoulder or turnout. This position is recommended for most rural highways. For high-volume, high-speed highways, it is recommended that 3 m wide turnouts should be provided where the shoulder is not 3 m wide. Where conditions justify, 3.6 m wide turnouts should be provided. However, it may not be reasonable to require even a 2.4 m shoulder or turnout on very low-volume, low-speed roads or streets. To provide space outside the all-weather surface for opening the mailbox door, it is recommended that the roadside face of a mailbox be set 200 mm
Figure 4

SUGGESTED MINIMUM CLEARANCE DISTANCES TO NEAREST MAILBOX IN MAIL STOPS AT INTERSECTIONS

- $c$ - Average Daily Traffic on Cross Road Vehicles Per Day
- $y_m$ - Average Daily Traffic on Through Road Vehicles Per Day
- $n$ - Number of Mailboxes at Mail Stop
### Suggested Guidelines for Lateral Placement of Mailboxes

**Table 1**

<table>
<thead>
<tr>
<th>Highway Type and Traffic Conditions</th>
<th>Width of All-Weather Surface of Turnout or Available Shoulder at Mailbox - Meters</th>
<th>Distance Roadside Face of Mailbox is to be Offset Behind Edge of Turnout or Usable Shoulder - Millimeters</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Preferred</td>
<td>Minimum</td>
</tr>
<tr>
<td>Rural highway ADT over 10,000 vpd</td>
<td>&gt; 3.6</td>
<td>3.0</td>
</tr>
<tr>
<td>Rural highway ADT = 1,500 to 10,000 vpd</td>
<td>3.6</td>
<td>2.4</td>
</tr>
<tr>
<td>Rural highway ADT = 100 to 1,500 vpd</td>
<td>3.0</td>
<td>2.4</td>
</tr>
<tr>
<td>Rural road ADT under 100 vpd</td>
<td>2.4</td>
<td>1.8</td>
</tr>
<tr>
<td>Residential street without curb or all-weather shoulder</td>
<td>1.8</td>
<td>0</td>
</tr>
<tr>
<td>Curbed residential street</td>
<td>Not applicable</td>
<td></td>
</tr>
</tbody>
</table>

ADT = Average Daily Traffic  
vpd = Vehicles Per Day

* If a turnout is provided, this may be reduced to zero.
to 300 mm outside the all-weather surface of the shoulder or turnout. Suggested guidelines for the placement of mailboxes are shown in Table 1. These are based on experience and engineering judgment.

When a mailbox is installed in the vicinity of an existing guardrail, it should, wherever practical, be placed behind the guardrail.

C. Mailbox Turnout Design

Shoulder or turnout widths suitable to safely accommodate vehicles stopped at mailboxes are discussed in the "Mail Stop and Mailbox Location" section and are shown in Table 1.

The surface over which a vehicle is maneuvered to and from a mailbox must be sufficiently stable to support passenger cars stopping regularly during all weather conditions. Where the available shoulder surface strength or width are not sufficient for the purpose, they should be modified to provide a suitable all-weather mailbox turnout. In most instances, adequate surface stabilization can be obtained by the addition of select materials to the in-place soils. A mailbox turnout for grouped mailboxes may require greater stabilization or possibly a surface treatment course to accommodate multiple patron use. Special measures may also be needed where highway traffic conditions encourage hard braking or high acceleration of vehicles in a mailbox turnout.

Slowing a vehicle in traffic, as drivers are usually required to do when entering a mailbox turnout, increases the risk of an accident. The ideal way to minimize this risk is to provide a speed change lane. A wide, surface-treated shoulder can be used for this purpose. Unfortunately, at most mailbox turnout locations, suitable shoulders are not available and it would be far too expensive to provide shoulders or turnouts that would allow all speed change to be accomplished outside the traveled ways. Figure 5 shows a mailbox turnout layout considered appropriate for different traffic conditions.

Figure 5 shows the minimum space needed for maneuvering to a parallel position out of traffic and for returning to traffic. The typical driver would probably slow to about 15 km/h before starting into the low-speed turnout, making it unsuitable for high-speed highways where driver expectancy does not include such slow moving traffic.

Before entering a 2.4 m wide turnout with a 20:1 taper for high-speed traffic similar to that shown in Figure 5, a driver would probably slow to about 50 km/h and would slow considerably more, possibly to as slow as 10 km/h, before clearing the traveled way. While this is not an ideal exit maneuver, for the few stops generated by a single mailbox, it probably would not create an unacceptable hazard on most rural highways.

Increasing the width of the turnout to 3.6 m and maintaining the 20:1 taper rate suggested in Figure 5 might induce a driver using the turnout to enter it at about 70 km/h and to clear the traveled way at about 40 km/h. While this is still not ideal, it should be quite acceptable for all but very few sites. These very few sites might be found on highways operating at high speeds and carrying over 3,000 to 4,000 vehicles per day with a high percentage of vehicles on long trips. For these conditions, consideration should be given to providing shoulders or turnouts at unavoidable mail stops that will provide for greater speed change opportunity outside the traffic stream.
The tapers shown in Figure 5 represent theoretical layouts. It may be more practical to square the ends of the turnout or to provide a stepped layout with the full width of the shoulder strengthened, if required, for the length of the turnout and the shoulder widened to the full width of the turnout for the entire length of the portion of the turnout outside the shoulder width. It may also be simpler to construct a continuous turnout-width shoulder rather than individual turnouts where mailbox turnouts are closely spaced.
D. Mailbox Support and Attachment Design

All exposed mailboxes should be firmly attached to supports that yield or break away safely if struck by a vehicle. National Cooperative Highway Research Program Report 350, "Recommended Procedures for the Safety Performance Evaluation of Highway Features," contained performance criteria for mailbox supports when subjected to crash testing with an automobile. These criteria can be summarized as follows:

Mailbox supports should, with a minor qualification, be no more substantial than required to resist service loads and reasonably minimize vandalism. Nominal 100 mm x 100 mm square or 100 mm diameter wood posts or 38 mm to 50 mm diameter standard steel or aluminum pipe posts, embedded no more than 600 mm into the ground, are the maximum strength supports that should be considered. Lower strength supports, such as lightweight flanged channel steel posts, have given satisfactory service in most environments. A metal post should not be fitted with an anchor plate. However, an anti-twist device that extends no more than 250 mm below the ground surface is acceptable. The qualification to this criterion minimizing post strength is that for supports such as those made of wood that breaks rather than bends under impact, the support needs sufficient strength to accelerate the box to a speed approaching that of the impacting vehicle so that the chances of the box penetrating the vehicle’s windshield are minimized. Test results indicate that the 100 mm x 100 mm square or 100 mm diameter dimensions for wood supports should be both minimum and maximum post dimensions.

Mailbox to post attachments should prevent mailboxes from separating from their supports under vehicle impacts. The lighter the mailbox, the easier it will be to meet this criterion or, conversely, given sufficient post attachment strength, the less sensitive the safety of an installation will be to the mass of the mailbox. Figures 6 through 10 show acceptable attachment and support details. The exact support hardware dimensions and design may vary, such as having a two-piece platform bracket, or alternative slot and hole locations. The product must result in a satisfactory attachment of the mailbox to the post, and all components must fit together properly.

Multiple mailbox installations must meet the same criteria as do single mailbox installations. This requirement precludes the use of a heavy horizontal support member such as the one shown in Figure 3. Figures 7, 9, and 10 show acceptable multiple mailbox support systems. The use of a series of such installations or of individually supported boxes is acceptable. However, vehicle rollover occurred when a row of eight closely spaced mailboxes individually supported with 3 kg/m channel post supports was crash tested with a small car, impacting off center at high speed. Film from this test and results from other tests suggest that the reason for this performance was a ramping caused by the closely spaced mailboxes piling up. To avoid this problem, it is recommended that mailbox supports be separated a distance at least equal to three-fourths of their heights and preferably their full heights above ground. It is also preferred that multiple mailbox installations be located outside the highway clear zone, if feasible, such as on a service road or minor intersecting road.
Figure 7
SINGLE AND DOUBLE MAILBOX ASSEMBLIES
SERIES A
Figure 10
SINGLE AND MULTIPLE MAILBOX ASSEMBLIES
SERIES C

NOTE:
Support frame and foundation are proprietary products commercially available.

NOTE:
Opposite orientation with wedge on traffic approach side of post is allowable but not preferred.
COLLECTION UNIT ADJACENT TO AUXILIARY LANE

NEIGHBORHOOD DELIVERY AND COLLECTION BOX UNITS

Figure 11
The Neighborhood Delivery and Collection Box Units (NDCBU) are a specialized type of multiple mailbox installations (Figure 11) that should be located at sites that provide adequate safety to errant motorists and safe access by postal patrons and carriers. The NDCBU is a cluster of 8 to 16 locked boxes mounted on a pedestal or within a framework, the combination of which generally has a mass between 45 and 90 kg. While NDCBUs usually serve a limited number of single family residences in urban areas, their use has been observed in rural areas. A crash test of one of these units at 100 km/h showed that it failed to meet safety requirements. Therefore, NDCBUs must be located outside the clear area needed for the safe recovery of errant vehicles. Postmasters and their designers responsible for the location of NDCBUs should be instructed to contact local government authorities, including the appropriate highway officials (state, county, township, municipal, etc.) prior to installation to ensure safe location of NDCBUs.

In areas of high snowfall, some highway agencies have found cantilever mailbox supports advantageous. While such designs do permit windshield contact with the box without the vehicle first contacting the support, tests of the designs shown in Figure 12 did not reveal serious consequences. The operational advantage of these supports is that snow can be plowed close to the mailbox without the windrow from the plow pushing the support over.

Lightweight newspaper boxes may be mounted below the mailbox on the mailbox support.

Recently, mailboxes of heavy gauge steel or other substantial materials have been designed and sold as deterrents to vandalism. These massive boxes (over 5 kg) meet Postal Service requirements for minimum size, material durability, ease of access, etc. and are quite resistant to deformation. However, these boxes are potentially hazardous to occupants of errant vehicles regardless of the support used. They should be restricted to use only along low-speed, low-volume streets in residential areas.
Figure 13

BREAKAWAY CANTILEVER MAILBOX SUPPORT
APPENDIX C. MAILBOX SUPPORT SYSTEMS – FHWA LETTERS OF ACCEPTANCE

July 25, 2007

In Reply Refer To: HSSDSS-151

Mr. Darrell Heald
Vice President
SHUR-TITE Products
P.O. Box 2283
Round Rock, TX 78680

Dear Mr. Heald:

In your letter of December 14, 2006, you requested the Federal Highway Administration's (FHWA) acceptance of SHUR-TITE® multiple mailbox mount at the National Cooperative Highway Research Program (NCHRP) Report 350 test level 3 (TL-3). In support of your request, you provided a copy of the Texas Transportation Institute report dated November 2006, entitled “Crash Testing and Evaluation of the SHUR-TITE® Multiple Mailbox Mount” and digital video of the crash test conducted on the device.

Requirements

Product description
The SHUR-TITE® multiple mailbox mount is designed to support as many as 4 or 5 mailboxes (depending on their size and total weight) on a support frame that is fabricated from 2-3/8 inch (60.3 mm) diameter and 0.065 inch (1.7 mm) thick steel tubing. The top portion of the support frame consists of a horizontal tube, which is welded at both ends to a 25 inch (63.5 cm) radius, semi-circular shaped tube. The bottom of the semi-circular tube is welded to a 22.5 inch (57.2 cm) long vertical tube. Two detailed drawings of the multiple mailbox support are enclosed for reference.

Test article installation
The test installation had four mailboxes mounted on its top. Two of these mailboxes were smaller, measuring approximately 9 inches by 7 inches by 19 inches (229 mm x 178 mm x 483 mm) and weighing 7 lb (3.2 kg). The remaining two mailboxes were a larger size, measuring approximately 15 inches by 11.5 inches by 23.5 inches (381 mm x 292 mm x 597 mm) and weighing 15 lb (6.8 kg). The American economy

MOVING THE
AMERICAN
ECONOMY
597 mm) and weighing 13 lb 10 oz (6.2 kg). The small mailboxes were directly attached to the standard Texas Department of Transportation bracket mount with four 1/4 inch (6.4 mm) diameter bolts.

The mailbox frame was placed into a 12 inch (305 mm) diameter by 30 inch (762 mm) deep concrete footing. At the center of this concrete footing, a 3 inch (76.2 mm) diameter by 17 inch (43.2 cm) long plastic tube socket was used for mounting the mailbox support frame. Once the mailbox support frame was inserted into the footing, it was secured in place with a plastic wedge placed between the vertical support frame tube and the plastic socket in the concrete footing.

Testing
The criteria in the NCHRP Report 350 for mailbox supports specifies that to meet TL-3 they must successfully pass tests 3-60 and 3-61. These tests involve the standard 820 kg passenger car impacting the support head-on and at the critical impact angle at a speed of 35 km/h (test 3-60) and 100 km/h (test 3-61).

Both tests were conducted on your mailbox support. In test 3-60, the test vehicle impacted the device at an impact angle of 0 degrees and with the left quarter point of the vehicle aligned with the centerline of the mount. Upon impact, the support pulled out of the ground socket as designed. Contact with the windshield was made but no damage resulted. In test 3-61, the test vehicle contacted the device at an impact angle of 0 degrees and with the right quarter point of the vehicle aligned with the centerline of the support. Upon impact, the support pulled out of the ground base as designed and the mailboxes contacted the windshield. The windshield shattered an area of 5 square feet and depressed 3.2 inches (81 mm) inward without any holes or penetration into the occupant compartment. A summary of the test results is enclosed.

Based on the crash testing results, I agree that the SHUR-TITE® multiple mailbox mount meets the evaluation criteria for NCHRP 350 TL-3 for mailbox supports and may be used at all appropriate locations on the National Highway System (NHS) when selected by the contracting authority. The SHUR-TITE® multiple mailbox mount was tested in a configuration that included two small mailboxes weighing 7 pounds (3.2 kg) each and two large mailboxes weighing 13.6 pounds (6.18 kg) each. The total weight of the mailboxes is approximately 41 pounds (18.6 kg). Alternate mailbox arrangements are considered acceptable, provided that the total weight of the mailboxes does not exceed the total tested weight of 41 lb (18.6 kg).

Standard provisions
Please note the following standard provisions that apply to FHWA letters of acceptance:

- This acceptance is limited to the crashworthiness characteristics of the devices and does not include their structural features, nor conformity with the Manual on Uniform Traffic Control Devices.
- Any changes that may adversely influence the crashworthiness of the device will require a new acceptance letter.
• Should the FHWA discover that the qualification testing was flawed, that in-service performance reveals unacceptable safety problems, or that the device being marketed is significantly different from the version that was crash tested, it reserves the right to modify or revoke its acceptance.

• You will be expected to supply potential users with sufficient information on design and installation requirements to ensure proper performance.

• You will be expected to certify to potential users that the hardware furnished has essentially the same chemistry, mechanical properties, and geometry as that submitted for acceptance, and that they will meet the crashworthiness requirements of the FHWA and the NCHRP Report 350.

• To prevent misunderstanding by others, this letter of acceptance designated as number SS-151 shall not be reproduced except in full. This letter, and the test documentation upon which this letter is based, is public information. All such letters and documentation may be reviewed at our office upon request.

• The SHUR-TITE® multiple mailbox mount is a patented product and considered proprietary. If proprietary devices are specified by a highway agency for use on Federal-aid projects, except exempt, non-NHS projects, they: (a) must be supplied through competitive bidding with equally suitable unpatented items; (b) the highway agency must certify that they are essential for synchronization with the existing highway facilities or that no equally suitable alternative exists; or (c) they must be used for research or for a distinctive type of construction on relatively short sections of road for experimental purposes. Our regulations concerning proprietary products are contained in Title 23, Code of Federal Regulations, Section 635.411.

• This acceptance letter shall not be construed as authorization or consent by the FHWA to use, manufacture, or sell any patented device for which the applicant is not the patent holder. The acceptance letter is limited to the crashworthiness characteristics of the candidate device, and the FHWA is neither prepared nor required to become involved in issues concerning patent law. Patent issues, if any, are to be resolved by the applicant.

Sincerely yours,

George E. Rice, Jr.
Acting Director, Office of Safety Design
Office of Safety

Enclosures
Summary of Results for NCHRP Report 350 Test 3-60 on the Shur-Tite® Multiple-mailbox Mount.

**General Information**
- Test Agency: Texas Transportation Institute
- Test No.: 452106-1
- Date: 03-03-2006

**Test Article**
- Type: Mailbox Support
- Name: Shur-Tite® Multiple-Mailbox Mount
- Installation Height (inches): 42.0 to Bottom of Mailboxes
- Material or Key Elements: Four Mailboxes Mounted using Standard TxDOT Hardware
- Soil Type and Condition: Standard Soil, Dry

**Test Vehicle**
- Type: Production
- Designation: 820C
- Model: 1996 Geo Metro
- Mass (lb): 1755
- Curb: 1806
- Test Inertial: 170
- Dummy: 178
- Gross Static: 1976

**Impact Conditions**
- Speed (mi/h): 22.1
- Angle (deg): 0

**Exit Conditions**
- Speed (mi/h): N/A
- Angle (deg): 0

**Occupant Risk Values**
- Longitudinal: 3.9
- Lateral: 1.0
- THV (km/h): 4.4
- Ridedown Accelerations (g's): 0.2
- Longitudinal: 0.2
- Lateral: 0.3
- PHD (g's): 0.09
- Max. 0.050-s Average (g's): -1.1
- Longitudinal: -0.4
- Lateral: -0.7

**Test Article Debris Pattern (ft)**
- Exterior: 73.0
- Vehicle Damage: 3.0

**Vehicle Damage**
- Exterior: 12FD1
- CDC: 12FDEW1
- Maximum Exterior: n/a
- Vehicle Crash (inches): 0
- Interior: n/a
- OCIH: FS0000000
- Maximum Occupant: 0
- Crmpt. Deformation (inches): 0

**Post-Impact Behavior**
- (during 1.0 sec after impact)
  - Max. Yaw Angle (deg): -1
  - Max. Pitch Angle (deg): 1
  - Max. Roll Angle (deg): -1
Summary of Results for NCHRP Report 350 Test 3-61 on the Shur-Tite® Multiple-mailbox Mount.
Mr. Stuart Cole  
Northwest Pipe Company  
Traffic Systems  
P.O. Box 2002  
Houston, Texas 77252-2002

Dear Mr. Cole:

On February 27 an acceptance letter was sent to you, numbered SS-115, which found the following systems acceptable for use on the National Highway System:

1) Northwest Pipe POZ LOC S-Q Post™ Sign Support System
2) PozLoc Sign Support System with extended anchor for use in weak soils.
3) PozLoc Breakaway Mailbox Support System for snow regions.

Please note that we have found it necessary to revise the designation of that letter to "SS-119."

I apologize for any inconvenience, and I appreciate your understanding.

Sincerely yours,

John R. Baxter, P.E.  
Director, Office of Safety Design  
Office of Safety
Mr. Stuart Cole  
Northwest Pipe Company  
Traffic Systems  
PO Box 2002  
Houston, TX 77252-2002

Dear Mr. Cole:

Thank you for your letters of December 27, 2002, January 15, 2003, and February 10, 2003, requesting Federal Highway Administration (FHWA) acceptance of variations to your company’s breakaway support systems for use on the National Highway System (NHS). Accompanying your letters were: 1) a report from the Texas Transportation Institute (TTI) on the square slipbase system, and videos of the crash tests; 2) a 1996 TTI report on weak soil testing of the PozLoc system; and 3) drawings of the PozLoc Breakaway Mailbox Support. You requested that we find the following acceptable for use on the NHS under the provisions of National Cooperative Highway Research Program (NCHRP) Report 350 “Recommended Procedures for the Safety Performance Evaluation of Highway Features.”

1) Northwest Pipe POZ LOC S-Q Post™ Sign Support System  
2) PozLoc Sign Support System with extended anchor for use in weak soils.  
3) PozLoc Breakaway Mailbox Support System for snow regions.

Introduction


1) The Northwest Pipe POZ LOC S-Q Post™ Slipbase Sign Support System consists of a 2.5 x 2.5 inch x 10 ga and 12 ga perforated square steel tube signpost mounted in a triangular slip base system. This system uses a 0.02 inch thick triangular keeper plate separated from the base plate by circular cardboard washers. A 3 ¼ inch long horizontal 0.5 inch diameter pin through the holes in the signpost prevent the end of the post from dropping below the slip joint.

In test NWP-P1, the lower portion of the slip base was rigidly anchored to the steel anchor plate in the pendulum facility. In test NWP-P2, the lower portion of the slip base was mounted in a standard TxDOT concrete footing placed in NCHRP Report 350 standard soil at the pendulum Facility. Details of the triangular slip base system are detailed in the diagrams that are enclosed.
for reference. A 48 x 48 inch x 5/8-inch thick plywood sign panel was mounted at a height of 7 feet in test P1, and at a height of 7 feet, 2 inches in test P2. The slip base bolts were torqued to 40 foot-pounds in test P1 and to 60 foot-pounds in test P2.

**Testing**

Pendulum testing was conducted on the slip base system. The mass of the test bogie was 820 kg in all tests. The test bogie was equipped with a crushable honeycomb nose simulating the front end of a Volkswagen Rabbit. (Although no longer produced, this configuration is considered a “worst case” design.) The complete devices as tested are shown in the Enclosures.

<table>
<thead>
<tr>
<th>Test Number</th>
<th>NWP-P1</th>
<th>NWP-P2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foundation Type</td>
<td>Rigid test foundation</td>
<td>Concrete footer in Std soil</td>
</tr>
<tr>
<td>Pendulum Test Mass</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slip Base Bolt Torque</td>
<td>40 foot pounds</td>
<td>60 foot pounds</td>
</tr>
<tr>
<td>Impact Angle</td>
<td>Zero degrees</td>
<td>Zero degrees</td>
</tr>
<tr>
<td>Test Impact Velocity</td>
<td>21.1 mph (34 km/h)</td>
<td>21.2 mph (34.2 km/h)</td>
</tr>
<tr>
<td>Occupant Impact Speed</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Bogie Delta V</td>
<td>1.32 fps (0.43 m/s)</td>
<td>1.47 fps (0.47 m/s)</td>
</tr>
<tr>
<td>Extrapolated high speed Delta V</td>
<td>1.84 fps (0.56 m/s)</td>
<td>1.73 fps (0.53 m/s)</td>
</tr>
<tr>
<td>Stub Height</td>
<td>4 inches</td>
<td>3-1/2 inches</td>
</tr>
</tbody>
</table>

**Occup. Speed:** Occupant Impact Speed: Speed at which a theoretical front seat occupant will contact the windshield. Delta V: Speed change of the test vehicle / bogie.

**Findings**

Velocity changes were all within acceptable limits. Because stub heights were at the 4-inch maximum we recommend that installation instructions stress the need to keep the height of the lower slip plate below the 4-inch maximum as required by the AASHTO Specification. The results of testing met the FHWA requirements and, therefore, the Northwest Pipe Square Slipbase Sign Support System described above and shown in the enclosed drawings for reference are acceptable for use as Test Level 3 devices on the NHS under the range of conditions tested, when proposed by a State.

2) **PozLoc Sign Support System with extended anchor for use in weak soils.** The PozLoc sign support system was crash tested in weak soils in February of 1997. In both the low and high speed tests the post pulled the socket / anchor out of the ground (in strong soil, the post pulls out of the socket.) FHWA Acceptance Letter S6-65A dated 6-20-97, covered the PozLoc system in all soil types. The PozLoc anchor used in the testing was 33 inches (833 mm) long. Your current request is to find this system acceptable if anchors 48 inches (1220 mm) or 60 inches (1525 mm) long are used. Because of the increased embedment length it can be assumed that there will be greater resistance to pullout. After reviewing the prior crash testing we have concluded that the greater resistance will not be a disadvantage. If the anchor does not pull out then the system's
performance will be more like that seen in the strong soil testing. In those tests, the subject of
FHWA Acceptance Letter SS-1 dated 5-13-86, the vehicle velocity changes were also below the
"desirable" limits. Therefore, we concur that 48-inch and 60-inch long PozLoc anchors are
accepta ble for use.

90 Degree Poz-Loc Socket Assembly for use with mailboxes is similar to the POZ-LOC Socket
System with a minor difference. The single box cantilevered support system currently being used
is 1-1/4 inch Schedule 40 pipe fabricated with pipe fittings (drawings enclosed for reference) in a
concrete base. You proposed that the post be a 2-3/8 inch OD 14 ga pipe using a swaged elbow.
The post is to be mounted in a POZ-LOC Socket and wedge mounted in concrete. You also
requested a different single and double box support, which is a simple vertical 2-3/8 inch OD
14 ga pipe, mounted on a POZ-LOC post and socket. Because the Poz-Loc anchor performance
has been found acceptable for sign supports, and the thin 14 gage steel is specified for the pipe
supporting the mailbox, these systems can be expected to perform in an acceptable manner.

Findings:
In addition to the square slipbase system discussed as item 1) above, the Poz-Loc supports
covered as items 2) and 3), as shown in the enclosed drawings for reference, are acceptable for
use as Test Level 3 devices on the NHS under the range of conditions tested, or under the range
that similar systems were tested, when proposed by a state.

Please note the following standard provisions that apply to FHWA letters of acceptance:

1. Our acceptance is limited to the crashworthiness characteristics of the devices and does
   not cover their structural features, or conformity with the Manual on Uniform Traffic
   Control Devices.
2. Any changes that may adversely influence the crashworthiness of the device will require
   a new acceptance letter.
3. Should the FHWA discover that the qualification testing was flawed, that in-service
   performance reveals unacceptable safety problems, or that the device being marketed is
   significantly different from the version that was crash tested, it reserves the right to
   modify or revoke its acceptance.
4. You will be expected to supply potential users with sufficient information on design and
   installation requirements to ensure proper performance.
5. You will be expected to certify to potential users that the hardware furnished has
   essentially the same chemistry, mechanical properties, and geometry as that submitted for
   acceptance, and that they will meet the crashworthiness requirements of FHWA and
   NCHRP Report 350.
6. To prevent misunderstanding by others, this letter of acceptance, designated as number
   SS-115 shall not be reproduced except in full. As this letter and the supporting
   documentation that support its acceptance become public information, it will be available for
   inspection at our office by interested parties.

Northwest Pipe Company's Poz-Loc S-Q Post™ slipbase system is a patented product
and is considered "proprietary." The use of proprietary devices specified on Federal-aid
projects, except exempt, non-NHS projects (a) must be supplied through competitive bidding with equally suitable unpatented items, (b) the highway agency must certify that they are essential for synchronization with existing highway facilities or that no equally suitable alternative exists or; (c) they must be used for research or for a distinctive type of construction on relatively short sections of road for experimental purposes. Our regulations concerning proprietary products are contained in Title 23, Code of Federal Regulations, Section 635.411, a copy of which is enclosed.

Sincerely yours,

Michael S. Griffith
Acting Director, Office of Safety Design
Office of Safety

2 Enclosures

FHWA.HSA-10:NArtimovich:dbx61331:2/26/03
cc: Reader – HSA-1, HAS-10(Chron File, NArtimovich)
h:directoryfolder/Artimovich/9815r pipeFTN
Mr. Bryan Reeves
ARC Technologies, LLC
966 Liledeon Road
Taylorsville, NC 28681

Dear Mr. Reeves:

Thank you for your mail correspondence of August 18, 2006, requesting the Federal Highway Administration (FHWA) acceptance of your company's simulated stone mailbox columns for use on the National Highway System (NHS). Accompanying your letter was a report on testing of this roadside hardware conducted by the Texas Transportation Institute, test videos and digital photographs. You requested that we find it acceptable for use on the NHS under the provisions of the National Cooperative Highway Research Program (NCHRP) Report 350 "Recommended Procedures for the Safety Performance Evaluation of Highway Features."

Requirements

Product description
The ARC simulated stone mailbox column for use on the NHS is fabricated as a hollow, one-piece rotational casting. The hardened shell or wall of the column has a thickness that ranges from 0.19 in. (4.8 mm) to 0.38 in. (9.7 mm) and is comprised of two layers or coats. The first coat or face mix, which has a thickness ranging from 0.09 in. (2.3 mm) to 0.19 in. (4.8 mm), consists of gypsum, sand, liquid and dry resin, hardener, accelerator, and pigment. The second coat or back-up mix is comprised of a two-component polyurethane and has a thickness ranging from 0.09 in. (2.3 mm) to 0.19 in. (4.8 mm). The exterior surface of the column is molded to resemble stone masonry construction.

The column measures 20 in. x 20 in. x 62 in. tall (508 mm x 508 mm x 1575 mm). The upper cap of the mailbox column measures 24 in. x 24 in. (610 mm x 610 mm). A U.S. Postmaster approved T2 mailbox measuring 21 in. long x 8 in. wide x 10.5 in. high (533 mm x 203 mm x 267 mm) is cast into the column at a height of 40 in. (1016 mm) to the bottom of the mailbox. A 6 in. (152 mm) diameter x 16.5 in. (419 mm) long plastic newspaper tube is also cast into the
mailbox column at a height of 30 in. (762 mm) to the bottom of the tube. The upper two thirds of the hollow simulated stone column is backfilled with two-part Instapak FlowRite™ foam that has a molded density of 1.0-1.4 lb/ft³ (16.0-22.4 kg/m³).

Test article installation
In tests, the ARC simulated stone mailbox column was installed on precast concrete foundation pad measuring 24 in. x 24 in. x 2.5 in. thick (610 mm x 610 mm x 64 mm) and weighing 64 lb (29 kg) placed level to and flush with the surrounding ground. The pad was secured in place by driving two 0.38 in. (9.7 mm) diameter x 18 in. (457 mm) long anchoring spikes into the ground through precast holes. The bottom shell of the mailbox column was secured to the top surface of the concrete foundation pad through liberal application of Liquid Nails™ adhesive. The pattern used for the adhesive included a line around the perimeter of the mailbox column and several lines extending radially outward from the center to the outer edges of the column.

Testing
Full-scale automobile testing which included the NCHRP report 350 Test 3-60 (low-speed test) and the NCHRP Report 350 Test 3-61 (high speed test) was conducted on your company’s mailbox column. The complete device as tested is shown in the enclosed drawing. The NCHRP Report 350 test 3-60 involved an 820 kg passenger car (820C) impacting the mailbox column head-on with the left quarter point of the vehicle aligned with the centerline of the mailbox column at a nominal impact speed and angle of 35 km/h and 0 degrees, respectively. The NCHRP Report 350 test 3-61 involved an 820 kg passenger car (820C) impacting the mailbox column head-on with the right quarter point of the vehicle aligned with the centerline of the mailbox column at a nominal impact speed and angle of 100 km/h and 0 degrees, respectively.

Findings
In the low-speed test, the simulated stone mailbox column yielded to the vehicle by breaking apart at the base. The largest fragment, which weighed 75 lb (34.0 kg), rode up the windshield (which shattered) and over the top of the vehicle. The fragment did not penetrate or show potential for penetrating the occupant compartment, nor to present hazard to others in the area. No occupant compartment deformation occurred. The vehicle remained upright during and after the impact. Occupant risk factors were within the preferred limits. The vehicle did not intrude into adjacent traffic lanes, as it traveled through the test site and came to rest 103 ft (31.4 m) behind the point of impact. The summary of test results is enclosed.

In the high-speed test, the simulated stone mailbox column yielded to the vehicle by breaking apart at the base. The largest piece weighed 53 lb (24.0 kg), rode up the windshield (which shattered) and over the top of the vehicle. The fragment did not penetrate or show potential for penetrating the occupant compartment, nor to present hazard to others in the area. Occupant compartment deformation was 3.5 in. (91 mm) in the roof area over the right front seat, which is less than the maximum acceptable roof crush criterion for breakaway support structures of 5 in. (127 mm) as established by the FHWA. The vehicle remained upright during and after the collision event. Occupant risk factors were within the preferred limits. The vehicle did not intrude into adjacent traffic lanes, as it traveled through the test site and came to rest 370 ft (113 m) behind the point of impact and 11.8 ft (3.6 m) to the left of centerline. The summary of test results is enclosed.
The results of testing met the FHWA requirements and, therefore, the ARC simulated stone mailbox column described above and shown in the enclosed drawings for reference is acceptable for use as the NCHRP Report 350 Test Level 3 device on the NHS, when selected by the contracting authority, subject to the provisions of Title 23, Code of Federal Regulations, Section 635.411 as they pertain to proprietary products.

Standard provisions
Please note the following standard provisions that apply to the FHWA letters of acceptance:

- Our acceptance is limited to the crashworthiness characteristics of the devices and does not cover their structural features, nor conformity with the MUTCD.
- Any changes that may adversely influence the crashworthiness of the device will require a new acceptance letter.
- Should the FHWA discover that the qualification testing was flawed, that in-service performance reveals unacceptable safety problems, or that the device being marketed is significantly different from the version that was crash tested, it reserves the right to modify or revoke its acceptance.
- You will be expected to supply potential users with sufficient information on design and installation requirements to ensure proper performance.
- You will be expected to certify to potential users that the hardware furnished has essentially the same chemistry, mechanical properties, and geometry as that submitted for acceptance, and that they will meet the crashworthiness requirements of the FHWA and the NCHRP Report 350.
- To prevent misunderstanding by others, this letter of acceptance, designated as number SS-144 shall not be reproduced except in full. As this letter and the documentation which support it become public information, it will be available for inspection at our office by interested parties.
- The "ARC Simulated Stone Mailbox Column" is a patented product and is considered "proprietary". The use of proprietary devices specified on Federal-aid projects, except exempt, non-NHS projects: (a) must be supplied through competitive bidding with equally suitable unpatented items; (b) the highway agency must certify that they are essential for synchronization with existing highway facilities or that no equally suitable alternative exists or; (c) they must be used for research or for a distinctive type of construction on relatively short sections of road for experimental purposes. Our regulations concerning proprietary products are contained in Title 23, Code of Federal Regulations, Section 635.411, a copy of which is enclosed.

Sincerely yours,

/signed by/

John R. Baxter, P.E.
Director, Office of Safety Design
Office of Safety

Enclosure
Summary of results for NCHRP Report 350 test 3-60 on the simulated stone mailbox column.
<table>
<thead>
<tr>
<th>General Information</th>
<th>Impact Conditions</th>
<th>Test Article Debris Scatter (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Agency: Texas Transportation Institute</td>
<td>Speed (km/h): 99.6</td>
<td>Longitudinal: 23.3</td>
</tr>
<tr>
<td>Test No: 400001-AR2</td>
<td>Angle (deg): 0</td>
<td>Lateral: 7.62</td>
</tr>
<tr>
<td>Date: 06-08-2005</td>
<td>Exit Conditions</td>
<td>Vehicle Damage</td>
</tr>
<tr>
<td>Test Article</td>
<td>Speed (km/h): 96.0</td>
<td>Exterior</td>
</tr>
<tr>
<td>Type: Mailbox</td>
<td>Angle (deg): 0</td>
<td>VDS: 12FR2</td>
</tr>
<tr>
<td>Name: Simulated Stone Mailbox Column</td>
<td></td>
<td>CDC: 12/1 RAN2</td>
</tr>
<tr>
<td>Installation Length (m): 1.57</td>
<td></td>
<td>Max. Exterior</td>
</tr>
<tr>
<td>Material or Key Elements: Composite Shell; Lower Portion Hollow; Foam Backfill in Upper Two Thirds Standard Soil, Dry</td>
<td></td>
<td>Vehicle Crush: (mm): 50</td>
</tr>
<tr>
<td>Soil Type and Condition</td>
<td>Occupant Risk Values</td>
<td>Interior</td>
</tr>
<tr>
<td>Test Vehicle</td>
<td>Impact Velocity (m/s):</td>
<td>OCDI: RFID0000000</td>
</tr>
<tr>
<td>Type: Protection</td>
<td>Longitudinal: 1.4</td>
<td>Max. Occupant Compartment Deformation (mm): 91</td>
</tr>
<tr>
<td>Designation: 520C</td>
<td>Lateral: 1.2</td>
<td></td>
</tr>
<tr>
<td>Model: 1995 Geo Metro</td>
<td>THV (km/h): 6.7</td>
<td></td>
</tr>
<tr>
<td>Mass (kg): 790</td>
<td>Rideown Accelerations (g’s):</td>
<td></td>
</tr>
<tr>
<td>Curb: 820</td>
<td>Longitudinal: -0.4</td>
<td></td>
</tr>
<tr>
<td>Test Interior: 77</td>
<td>Lateral: 0.6</td>
<td></td>
</tr>
<tr>
<td>Dummy: 820</td>
<td>Pitch (g’s): 0.6</td>
<td></td>
</tr>
<tr>
<td>Gross Sarian: 897</td>
<td>ASI: 3.13</td>
<td></td>
</tr>
<tr>
<td>Max. 0.050-s Average (g’s):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Longitudinal: -1.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lateral: 0.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vertical: -1.1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Summary of results for NCHRP Report 350 test 3-61 on the simulated stone mailbox column.
Sec. 615.411 Material or product selection.

(a) Federal funds shall not participate, directly or indirectly, in payment for any premium or royalty on any patented or proprietary material, specification, or process specifically set forth in the plans and specifications for a project, unless:

(1) Such patented or proprietary item is purchased or obtained through competitive bidding with equally suitable unpatented items; or

(2) The State highway agency certifies either that such patented or proprietary item is essential for synchronization with existing highway facilities, or that no equally suitable alternate exists; or

(3) Such patented or proprietary item is used for research or for a distinctive type of construction on relatively short sections of road for experimental purposes.

(b) When there is available for purchase more than one nonpatented, nonproprietary material, semifinished or finished article or product that will fulfill the requirements for an item of work of a project and these available materials or products are judged to be of satisfactory quality and equally acceptable on the basis of engineering analysis and the anticipated prices for the related item(s) of work are estimated to be approximately the same, the FS&B for the project shall either contain or include by reference the specifications for each such material or product that is considered acceptable for incorporation in the work. If the State highway agency wishes to substitute some other acceptable material or product for the material or product designated by the successful bidder or bid as the lowest alternate, and such substitution results in an increase in costs, there will not be Federal-aid participation in any increase in costs.

(c) A State highway agency may require a specific material or product when there are other acceptable materials and products, when such specific choice is approved by the Division Administrator as being in the public interest. When the Division Administrator's approval is not obtained, the item will be nonparticipating unless bidding procedures are used that establish the unit price of each acceptable alternative. In this case Federal-aid participation will be based on the lowest price so established.

(d) Appendix A sets forth the FHWA requirements regarding (1) the specification of alternative types of culvert pipes, and (2) the number and types of such alternatives which must be set forth in the specifications for various types of drainage installations.

(e) Reference in specifications and on plans to single trade name materials will not be approved on Federal-aid contracts.
August 17, 2004

Mr. Tom Friend
Innovations
P.O. Box 636 Hibbing, Minnesota 55746

Dear Mr. Friend:

Thank you for your email correspondence of July 7, 2004, requesting Federal Highway Administration (FHWA) acceptance of modifications to your company’s breakaway mailbox supports for use on National Highway System (NHS). Accompanying your letter were drawings of the new Model #037 mailbox support. You requested that we find it acceptable for use on the National Highway System under the provisions of National Cooperative Highway Research Program (NCHRP) Report 350, “Recommended Procedures for the Safety Performance Evaluation of Highway Features”.

Introduction


The original Friend Town and Country Mailbox Support was found acceptable by the FHWA acceptance letter B-24 dated June 16, 1993. The acceptance was based on a comparison to the mailbox support designed and crash-tested by the Minnesota Department of Transportation. You also had an informal, live-driver test conducted at an impact speed of 62 mph.

The modifications to the Town and Country Mailbox are summarized below:

1) A single muffler clamp replaces the yoke clamps, used for height adjustments.
2) The extension U-post has been deleted.
3) Revised U-post driver, which is discarded upon installation.

We agree with your assertion that these modifications will have no significant affect on the breakaway performance of your company’s mailbox support. Therefore, the modifications to your mailbox support described above and shown in the enclosed drawings for reference are acceptable for use as a Test Level 3 device on the NHS under the range of conditions as the similar mailbox support was tested, when proposed by a State.

Please note the following standard provisions that apply to FHWA letters of acceptance:

Our acceptance is limited to the crashworthiness characteristics of the devices and does not cover their structural features, nor conformity with the Manual on Uniform Traffic Control Devices. Any changes that may adversely influence the crashworthiness of the device will require a new acceptance letter.

Should the FHWA discover that the qualification testing was flawed, that in-service performance
reveals unacceptable safety problems, or that the device being marketed is significantly different from
the version that was crash tested, it reserves the right to modify or revoke its acceptance.

You will be expected to supply potential users with sufficient information on design and
installation requirements to ensure proper performance.

You will be expected to certify to potential users that the hardware furnished has essentially the
same chemistry, mechanical properties, and geometry as that submitted for acceptance, and that they
will meet the crashworthiness requirements of the FHWA and the NCHRP Report 350.

To prevent misunderstanding by others, this letter of acceptance, designated as number SS-125
shall not be reproduced except in full. As this letter and the supporting documentation which support it
become public information, it will be available for inspection at our office by interested parties.

The Friend Town and Country Mailbox Support is a patented device and is considered
"proprietary." When proprietary devices are specified by a highway agency for use on Federal-aid
projects they: (a) must be supplied through competitive bidding with equally suitable unpatented items;
(b) the highway agency must certify that they are essential for synchronization with existing highway
facilities or that no equally suitable alternative exists or; (c) they must be used for research or for a
distinctive type of construction on relatively short sections of road for experimental purposes. These
provisions do not apply to exempt non-NHS projects. Our regulations concerning proprietary products
are contained in Title 23, Code of Federal Regulations, Section 635.411, a copy of which is enclosed.

This acceptance letter shall not be construed as authorization or consent by the FHWA to use,
manufacture, or sell any patented device for which the applicant is not the patent holder. The acceptance
letter is limited to the crashworthiness characteristics of the candidate device, and the FHWA is neither
prepared nor required to become involved in issues concerning patent law. Patent issues, if any, are to
be resolved by the applicant.

Sincerely yours,

/Original Signed by/

John R. Baxter, P.E. Director, Office of Safety Design
Office of Safety
Enclosures
INSTALLATION INSTRUCTIONS


2. Insert 24" Bottom Pipe (not included) and the Cap U-Post to the Base U-Post.

3. Center U-Clamp assembly over slots in Bottom Pipe. Finger tighten. Then insert Middle Pipe (not included).

4. Cut 2 Wooden Blocks 1/8" narrower than the bottom inside of the mailbox. Then insert Wooden Blocks as shown in the drawing. Insert 2 Drywall Screws thru mailbox lip into Wooden Blocks and tighten. Now mark hole centers as shown. Using 3/16" drill bit, drill two Wooden Blocks and the bottom of the mailbox. Do not drill any sharp edges into the bottom of the mailbox.

5. With the mailbox on its side, insert 2 - 5/16" x 1" Carriage Bolts thru the holes from inside of the mailbox. Next, holding the Carriage Bolt in place with your left hand and using your forearm to hold the Carriage Bolt close to the screw, with your right hand and hold the Top Pipe between the two holes, line up the two holes with the Carriage Bolts and push both Carriage Bolts thru the Top Pipe. Slide 1 - No. 10 Washer over each Carriage Bolt and tighten 1/4" Nut until the Top Pipe is set in Wooden Blocks. Note: Wooden Blocks will show slight resistance.

6. If you have no paper tubes, go to instruction 5. To install up to 2 paper tubes, use 2 Drywall Screws and 2 - #10 Washers per paper tube. Hold tube under mailbox and Wooden Blocks. Tighten to the Top Pipe (as shown). Note: Paper tubes ends should go beyond end of top pipe. Fasten securely to Wooden Blocks (used 8" Phillips screwdriver) or fasten paper tube at bottom of support beam.

7. Slide Top Pipe over Middle Pipe (slotted pipe), and insert the 1/4" x 1" Self-tapping Screw with #10 washer into the hole on the underside of the Top Pipe. Make certain the screw is set into the slot of the Middle Pipe.

8. Adjust height; point towards the road. If everything looks good, tighten the U-Clamp Assembly Bolts and Flange Nuts securely. Tightening will cause the Bottom Pipe to compress around the Middle Pipe and lock it into position.
FRIEND INNOVATIONS

Installation Instructions

We are pleased to offer you our #037 Mailbox Support!

![Diagram](image)

**Model 037 PARTS LIST:**

1. Top Pipe - 1 1/4" O.D. x 36"  
2. Middle Pipe - 1 1/2" O.D. x 36"  
3. Bottom Pipe - 1 3/8" O.D. x 24"  
4. Cap U-Post 1/2" lbs/ft  
5. Base U-Post - 31" 2 1/2" Per ft  
6. Self-tapping Screw - 3/4" x 3  
w/ No. 10 Washer  
7. Bolt w/Nut 3/8" x 3"  
8. Bolt w/Nut & Washer 3/8" x 1 1/2"  
9. U-Clamp Assembly w/Saddle and 2 - 3/8" Flanged Nuts  
10. Drywall Screws  
11. Washers No. 10  
12. Carriage Bolt 5/16" x 4" w/Nut and Washer No. 10  
13. Wooden Blocks

**Used for Installation only:**

1. U-Post Driver - 2" x 2" x 2" Angle Iron, w/ 1 3/8" x 1 1/2" Bolt, w/ Nut & Washer. Also includes 2 Rubber Washers

**For special Needs:**

friend@msn.com

Phone/Fax/Message 218.263.4457

Copyright © 2003 Friend Innovations, Hibbing, MN 55746

**WARNING:**

1. Buried electrical lines, gas, steam, T.V., telephone, etc.
   MAY BE HAZARDOUS OR FATAL TO YOUR HEALTH
   check with your local utilities before installing the Base U-Post (in Minnesota call 1-800-282-1165)

2. Metal edges may be sharp, wear gloves and keep children away. Also
   wear eye protection, safety glasses, proper clothing, and keep others away in case metal fragments come flying about from hammering on the U-Post Driver.

Page 1 of 2
Material or product selection

Federal funds shall not be used, directly or indirectly, in payment for any premium or royalty on any patented or proprietary material, specification, or process specifically set forth in the plans and specifications for a project.

(a) Such patented or proprietary item is purchased or obtained through competitive bidding with equally suitable unpatented items, or

(b) The State highway agency certifies either that such patented or proprietary item is essential for synchronization with existing highway facilities, or that no equally suitable alternate exists, or

(c) Such patented or proprietary item is used for research or for a distinctive type of construction on relatively short sections of road for experimental purposes.

(d) When there is available for purchase more than one unpatented, nonproprietary material, component or finished article or product that will fulfill the requirements for an item of work of a project and there available materials or products are judged to be of satisfactory quality and equally acceptable on the basis of engineering analysis and the anticipated prices for related item(s) of work are estimated to be approximately the same, the PS&E for the project shall either contain or include by reference the specifications for each such material or product that is considered acceptable for incorporation in the work. If the State highway agency wishes to substitute one or more acceptable material or product for the material or product designated by the successful bidder or bid as the lowest alternate, and such substitution results in an increase in costs, there will be Federal participation in any increase incurred.

(e) A State highway agency may require a specific material or product when there are other acceptable materials and products, at which a specific choice is approved by the Division Administrator as being in the public interest. When the Division Administrator's approval is not obtained, the item will be nonparticipating unless bidding procedures are used that establish the same price of such acceptable alternative. In this case Federal participation will be based on the lowest price so established.

(f) Appendix A sets forth the FHWA requirements regarding (1) the specification of alternative types of culvert pipes, and (2) the number and types of such alternatives which must be set forth in the specifications for various types of drainage installations.

(g) Reference in specifications and on plans to single trade name materials will not be approved on Federal-aid projects.
Mr. Darren Hesse  
National Sales Manager  
S-Square Tube Products  
5495 East 69th Avenue  
Commerce City, Colorado 80022

Dear Mr. Hesse:

Thank you for your July 12, 2002, letter to Mr. Nicholas Artimovich requesting Federal Highway Administration (FHWA) acceptance of your company's NEX Tube as a breakaway component of a crashworthy mailbox support for use on the National Highway System (NHS). Accompanying your letter were photographs of your proposed mailbox mounting systems. You requested that we find the NEX Tube Mailbox Support System acceptable for use on the National Highway System under the provisions of National Cooperative Highway Research Program (NCHRP) Report 350 “Recommended Procedures for the Safety Performance Evaluation of Highway Features.” On October 12, 2002, you provided additional information on a redesigned support for accommodating multiple mailboxes.

Introduction

Pendulum and full-scale automobile testing of NEX Tube sign supports was completed in 1998, and was in compliance with the guidelines contained in the NCHRP Report 350, "Recommended Procedures for the Safety Performance Evaluation of Highway Features." Requirements for breakaway supports are those in the American Association of State Highway and Transportation Officials' Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals. Our Acceptance Letter, SS-81, found the NEX Tube sign supports acceptable for use on the NHS.

The NEX Tube mailboxes use the same deformed cross-section 14 gage steel pipe, formed into what might be called a “question mark” shape. The base of the support is inserted into a ground socket and secured with a wedge. Drawings of the supports are enclosed for reference.

Findings

The testing of the NEX Tube sign supports showed that the socket and wedge arrangement was a successful breakaway design, with vehicle velocity changes well below the desirable limit of 3 m/sec for single supports and approximately 3 m/s for a...
dual post support. You asked that we compare your socket design to the V-Loc system, which has already been tested as a mailbox support. We concur with your assertion that the same technology will be effective as a single/double mailbox support. Therefore, the NEX Tube sign support will be acceptable for use as a single/double mailbox support using the socket and wedge design as shown in the enclosed drawings.

You also asked that we accept the NEX tube for use with multiple mailboxes using the “inverted coat hanger” arrangement. When the V-Loc system was tested with a multiple mailbox support (using 14 gage steel pipe in an “inverted coat hanger” arrangement) the occupant impact speeds were almost at the limit of acceptability. Because your design did not replicate the basic “closed loop” shape of the V-loc system, we were not as certain that five-box support using the NEX tube would meet the occupant impact velocity requirements. You have since redesigned your multiple mailbox support to replicate the “inverted coat hanger” arrangement, which we expect will perform in an acceptable manner.

The single/double mailbox support and the “inverted coat hanger” multiple mailbox support described above and shown in the enclosed drawings for reference are acceptable for use as Test Level 3 devices on the NHS under the range of conditions tested, when proposed by a State. The single box supports are considered crashworthy for conventional rural mailboxes weighing up to 5 pounds. The multiple box supports are considered crashworthy when boxes weighing up to 3.5 pounds each, are used.

Please note the following standard provisions that apply to FHWA letters of acceptance:

- Our acceptance is limited to the crashworthiness characteristics of the devices and does not cover their structural features, nor conformity with the Manual on Uniform Traffic Control Devices.
- Any changes that may adversely influence the crashworthiness of the device will require a new acceptance letter.
- Should the FHWA discover that the qualification testing was flawed, that in-service performance reveals unacceptable safety problems, or that the device being marketed is significantly different from the version that was crash tested, it reserves the right to modify or revoke its acceptance.
- You will be expected to supply potential users with sufficient information on design and installation requirements to ensure proper performance.
- You will be expected to certify to potential users that the hardware furnished has essentially the same chemistry, mechanical properties, and geometry as that submitted for acceptance, and that they will meet the crashworthiness requirements of FHWA and NCHRP Report 350.
- To prevent misunderstanding by others, this letter of acceptance, designated as number SS-114 shall not be reproduced except in full. As this letter and the supporting documentation which support it become public information, it will be available for inspection at our office by interested parties.
- The Nex Tube is a patented product and is considered "proprietary." The use of proprietary devices specified on Federal-aid projects, except exempt, non-NHS projects: (a) must be supplied through competitive bidding with equally suitable unpatented items; (b) the highway agency must certify that they are essential for
synchronization with existing highway facilities or that no equally suitable alternative exists or, (c) they must be used for research or for a distinctive type of construction on relatively short sections of road for experimental purposes. Our regulations concerning proprietary products are contained in Title 23, Code of Federal Regulations, Section 635.411, a copy of which is enclosed.

Sincerely yours,

Carol H. Jacoby, P.E.
Director, Office of Safety Design

Enclosure
Sec. 635.411 Material or product selection

(a) Federal funds shall not participate, directly or indirectly, in payment for any premium or royalty on any patented or proprietary material, specification, or process specifically set forth in the plans and specifications for a project, unless:

(1) Such patented or proprietary item is purchased or obtained through competitive bidding with equally suitable unpatented items; or

(2) The State highway agency certifies that such patented or proprietary item is essential for synchronization with existing highway facilities, or that no equally suitable alternate exists; or

(3) Such patented or proprietary item is used for research or for a distinctive type of construction on relatively short sections of road for experimental purposes.

(b) When there is available for purchase more than one unpatented, nonproprietary material, unsanctioned or finished article or product that will fulfill the requirements for an item of work or a project and these available materials or products are judged to be of satisfactory quality and equally acceptable on the basis of engineering analysis and the anticipated prices for the related item(s) of work are estimated to be approximately the same, the PS&E for the project shall either contain or include by reference the specifications for each such material or product that is considered acceptable for incorporation in the work. If the State highway agency wishes to substitute some other acceptable material or product for the material or product designated by the successful bidder at bid as the lowest alternate, and such substitution results in an increase in costs, there will not be Federal-aid participation in any increase in costs.

(c) A State highway agency may require a specific material or product when there are other acceptable materials and products, when such specific choice is approved by the Division Administrator as being in the public interest. When the Division Administrator's approval is not obtained, the item will be nonparticipating unless bidding procedures are used that establish the unit price of each acceptable alternative. In this case Federal-aid participation will be based on the lowest price so established.

(d) Appendix A sets forth the FHWA requirements regarding (1) the specification of alternative types of culvert pipes, and (2) the number and types of such alternatives which must be set forth in the specifications for various types of drainage installations.

(e) Reference in specifications and on plans to single trade name materials will not be approved on Federal-aid contracts.

ENCLOSURE 2
Mail Box Brkt.
16 Ga Galv Steel
S Sets Reg'd.

Attachment Brkt
14 Ga Galv Steel
S Reg'd.
10 - 5/16" x 3/4" Carriage Bolt
10 - 5/16" Hex Nuts
10 - 5/16" Washers

Multi- Mail Box Support

Pat. # 5,393,502
Pat. # 415,247
APPENDIX D. SURVEY - MAILBOX HAZARD AND RISK ASSESSMENT

Mailbox Hazard and Risk Assessment

Scope of the survey

This survey is intended for State Departments of Transportation and aims at gaining information regarding state permitting requirements and enforcement policies as they relate to mailbox supports.

The survey will address data concerning:
- type of mailbox supports (single and multiple) currently in use;
- placement of mailbox supports with respect to the roadway;
- standards for permanent mailbox supports;
- crashworthiness of mailbox supports;
- crash data involving mailbox supports.

Contact Information

* 1. Please enter your contact information.

Name:
Title:
Agency:
Address:
City/Town:
State:
ZIP:
Email Address:

Mailbox Supports Policy

In this first part of the survey, you are asked to respond to a few questions regarding your State’s mailbox support policy (if any).

* 2. Does your State have standards for mailbox support installation?

☐ Yes
☐ No
☐ Other

If "Other", please specify

[Field for response]
Mailbox Hazard and Risk Assessment

3. Do you follow the United States Postal Service (USPS) Regulations?
   - [ ] Yes
   - [ ] No
   - [ ] Other
   If "Other", please specify

4. Please provide your own State standards and policies (you may provide the URL address where your policies can be accessed and/or appropriate contacts for further follow up)

5. Is the owner of the mailbox responsible for installation?
   - [ ] Yes
   - [ ] No
   - [ ] Other
   If "Other", please specify

Single Mailbox Supports

The scope of next part of the survey is to collect data regarding single mailbox supports (and foundations) available and acceptable for use in your State.

Available crashworthy single mailbox supports are grouped according to their material (wood, polyurethane and steel). A list of single mailbox supports is presented and the user is asked to choose ALL the single mailbox support types currently in use in his/her State.

Please note you can click on the link to visualize the listed mailbox support type.
### Mailbox Hazard and Risk Assessment

#### Single Mailbox Supports - WOOD

6. Which type of single wood mailbox supports are allowed in your State? Please check all that apply.

Please note that, for each option, you can click on the hyperlink to view a picture of the particular mailbox support model.

- [ ] Step 2 Company, MailMaster Deluxe, 4” x 4”
- [ ] Other

If 'Other', please describe (you can include description, pictures, drawings, links, etc... any information that you think it might be relevant to understand the type of mailbox support))

#### Single Mailbox Supports - POLYURETHANE

7. Which type of single polyurethane mailbox supports are allowed in your State? Please check all that apply.

Please note that, for each option, you can click on the hyperlink to view a picture of the particular mailbox support model.

- [ ] Arc Technologies LLC, Simulated Stone Column, 20” x 20” x 62”
- [ ] Other

If 'Other', please describe (you can include description, pictures, drawings, links, etc... any information that you think it might be relevant to understand the type of mailbox support))

#### Single Mailbox Supports - STEEL


Mailbox Hazard and Risk Assessment

8. Which type of single steel mailbox supports are allowed in your State? Please check all that apply.

Please note that, for each option, you can click on the hyperlink to view a picture of the particular mailbox support model.

- Step 2 Company, MailMaster Deluxe, 2 lb/ft U-channel
- Non-proprietary, 2 lb/ft winged channel
- Non-proprietary, Two 2 lb/ft winged channel
- Minnesota DOT, Swing Away, 3 lb/ft U-channel
- Rubbermaid, Rubbermaid Deluxe, 3-in diameter, Sch-40 pipe
- Northwest Pipe Co, PozLoc cantilever support with swaged elbow, 2-3/8" O.D., 14 ga steel pipe
- Northwest Pipe Co, PozLoc vertical support, 2-3/8" O.D., 14 ga steel pipe
- Non-proprietary, 2-3/8" O.D., 13 ga steel pipe
- Hyphenate S-Square Tube Products, NEX Tube, 2-3/8" O.D., 14 ga steel NEX pipe
- Shur-Tite, Shur-Tite Steel Mailbox Post, 2-3/8" O.D., 16 ga steel pipe
- Other

If ‘Other’, please describe (you can include description, pictures, drawings, links, etc... any information that you think it might be relevant to understand the type of mailbox support)

---

Single Mailbox Supports - OTHER

9. Which other types of single mailbox supports (recycled plastic, rubber, composite, ... ) are allowed in your State? Please check all that apply.

Please note that, for each option, you can click on the hyperlink to view a picture of the particular mailbox support model.

- Shur-Tite, Shur-Tite Flex Mailbox Post, 2-3/8" O.D.
- Other

If ‘Other’, please describe (you can include description, pictures, drawings, links, etc... any information that you think it might be relevant to understand the type of mailbox support)
Mailbox Hazard and Risk Assessment

Single Mailbox Supports - FOUNDATIONS

10. Which types of foundation are allowed in your State for single mailbox supports? Please check all that apply. Please note that, for each option, you can click on the hyperlink to view a picture of the particular mailbox support foundation.

- Frangible Base, [example]
- Wedge and Socket System, [example]
- Direct Embedded Support, [example]
- Frangible Steel Nested Support, [example]
- Slip Base Support, [example]
- Other

If 'Other', please describe (you can include description, pictures, drawings, links, etc... any information that you think it might be relevant to understand the type of mailbox support)

Placement Regulation for Single Mailbox Supports

The scope of the next part of the survey is to collect data regarding placement regulation for single mailbox supports in your State.

*11. What is the minimum allowable vertical height from the road surface to the bottom of the box, for single mailbox installation?

- No specific vertical height required
- Between 41 and 45 inches (USPS Regulation)
- Other

If "Other", please specify
Mailbox Hazard and Risk Assessment

12. Do your standards for single mailbox support selection or placement vary with design AADT of roadway?
   - Yes
   - No
   - Other
   If "Other", please specify

13. Please provide explanation on how the AADT affects the standards for single mailbox support selection or placement (you may provide the URL address and/or appropriate contacts for further follow up)

14. Do your standards for single mailbox support selection or placement vary with design speed of roadway?
   - Yes
   - No
   - Other
   If "Other", please specify

15. Please provide explanation on how the design speed affects the standards for single mailbox support selection or placement (you may provide the URL address and/or appropriate contacts for further follow up)
Mailbox Hazard and Risk Assessment

16. What is the minimum distance a single mailbox should be set from the front face of the curb?

- No specific distance required
- Between 6 to 8 inches
- Other

If "Other", please specify ____________________________

17. What is the minimum distance a single mailbox should be set from the front face of the road edge?

- No specific distance required
- Between 6 to 8 inches
- Other

If "Other", please specify ____________________________

18. Is your single mailbox support system NCHRP Report 350 crashworthy?

- Yes
- No
- Don't know, has not been tested

Multiple Mailbox Supports

The scope of next part of the survey is to collect data regarding multiple mailbox supports (and foundations) available and acceptable for use in your State.

Available crashworthy multiple mailbox supports are grouped according to their material (wood and steel). A list of multiple mailbox supports is presented and the user is asked to choose ALL the multiple mailbox support types currently in use in his/her State.

Please note you can click on the link to visualize the listed mailbox support type.

Multiple Mailbox Supports - WOOD
Mailbox Hazard and Risk Assessment

19. Which type of multiple wood mailbox supports are allowed in your State? Please check all that apply.

Please note that, for each option, you can click on the hyperlink to view a picture of the particular mailbox support model.

- Prairie Proto Products - Montana, Swing-A-Way, 4" x 4" (72" long)
- Other

If 'Other', please describe (you can include description, pictures, drawings, links, etc... any information that you think it might be relevant to understand the type of mailbox support))

Multiple Mailbox Supports - STEEL

20. Which type of multiple mailbox supports are allowed in your State? Please check all that apply.

Please note that, for each option, you can click on the hyperlink to view a picture of the particular mailbox support model.

- Dual, Hyphenate 5-Square Tube Products, S-Square Mailbox, 2-3/8" O.D. NEX steel post
- Dual, PozLoc vertical support, 2-3/8" O.D., 14 ga. steel pipe
- Dual, Non-Proprietary, 2 lb/ft winged channel
- Dual, Foresight Industries (V-Loc), 1.66" O.D., 16 ga steel pipe
- Dual, Foresight Industries (V-Loc), 2-7/8" O.D., 11 ga steel pipe
- Dual, Shur-Tite, Shur-Tite Mailbox Double Adapter, 2-3/8" O.D., 16 ga steel pipe
- Multiple (5), Hyphenate 5-Square Tube products, S-Square Mailbox, NEX Post 2-3/8" O.D., 14 ga steel pipe
- Multiple (4), Non-proprietory, Foresight Tubular Support Multiple Mailbox Post, 2-3/8" O.D.
- Multiple (4), Shur-Tite, Shur-Tite Multiple Mailbox Post, 2-3/8" O.D., 16 ga steel pipe
- Other

If 'Other', please describe (you can include description, pictures, drawings, links, etc... any information that you think it might be relevant to understand the type of mailbox support))

Multiple Mailbox Supports - FOUNDATIONS
Mailbox Hazard and Risk Assessment

21. Which types of foundation are allowed in your State for multiple mailbox supports? Please check all that apply. Please note that, for each option, you can click on the hyperlink to view a picture of the particular mailbox support foundation.

- Frangible Base, (example)
- Wedge and Socket System, (example)
- Direct Embedded Support, (example)
- Frangible Steel Nested Support, (example)
- Slip Base Support, (example)
- Other

If ‘Other’, please describe (you can include description, pictures, drawings, links, etc... any information that you think it might be relevant to understand the type of mailbox support)

Placement Regulation for Multiple Mailbox Supports

The scope of next part of the survey is to collect data regarding placement regulation for multiple mailbox supports in your State.

*22. What is the minimum allowable vertical height from the road surface to the bottom of the box, for multiple mailbox installation?

- No specific vertical height required
- Between 41 and 45 inches (USPS Regulation)
- Other

If "Other", please specify
Mailbox Hazard and Risk Assessment

**23.** Do your standards for multiple mailbox support selection or placement vary with design AADT of roadway?
- [ ] Yes
- [ ] No
- [ ] Other

If "Other", please specify

**24.** Please provide explanation on how the AADT affects the standards for multiple mailbox support selection or placement (you may provide the URL address and/or appropriate contacts for further follow up)

**25.** Do your standards for multiple mailbox support selection or placement vary with design speed of roadway?
- [ ] Yes
- [ ] No
- [ ] Other

If "Other", please specify

**26.** Please provide explanation on how the design speed affects the standards for multiple mailbox support selection or placement (you may provide the URL address and/or appropriate contacts for further follow up)
Mailbox Hazard and Risk Assessment

**27.** What is the minimum distance a multiple mailbox should be set from the front face of the curb?

- [ ] No specific distance required
- [ ] Between 6 to 8 inches
- [ ] Other

If "Other", please specify

**28.** What is the minimum distance a multiple mailbox should be set from the front face of the road edge?

- [ ] No specific distance required
- [ ] Between 6 to 8 inches
- [ ] Other

If "Other", please specify

**29.** Is your multiple mailbox support system NCHRP Report 350 crashworthy?

- [ ] Yes
- [ ] No
- [ ] Don't know, has not been tested

Crash Data

The scope of this part of the survey is to collect crash data information related to vehicle impacts against mailbox supports.
**30. In your State crash database, is "mailbox" coded as an object struck?**

- Yes
- No
- Other

If "Other", please specify

**31. Do you have electronic crash data that can be accessed for the scope of this project?**

- Yes
- No
- Other

If "Other", please specify

**32. Please provide contact information or link to crash data source.**
**Table D1.** Single Mailbox Support Models Included in the Survey.

<table>
<thead>
<tr>
<th>Material</th>
<th>Company</th>
<th>Model Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>WOOD</td>
<td>MailMaster Deluxe, 4&quot; x 4&quot;</td>
<td></td>
</tr>
<tr>
<td>POLYURETHANE</td>
<td>Arc Technologies LLC, Simulated Stone Column, 20&quot; x 20&quot; x 62&quot;</td>
<td></td>
</tr>
<tr>
<td>STEEL</td>
<td>Step 2 Company, MailMaster Deluxe, 2 lb/ft U-channel</td>
<td></td>
</tr>
<tr>
<td>STEEL - Non-proprietary, 2 lb/ft winged channel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STEEL - Non-proprietary, Two 2 lb/ft winged channel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STEEL - Minnesota DOT, Swing Away, 3 lb/ft U-channel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STEEL - Rubbermaid, Rubbermaid Deluxe, 3-in diameter, Sch-40 pipe</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>STEEL - Northwest Pipe Co., PozLoc cantilever support with swaged elbow, 2-3/8&quot; O.D., 14 ga steel pipe</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>
| STEEL - Northwest Pipe Co., PozLoc vertical support, 2-3/8" O.D., 14 ga steel pipe | }
Table D1. Single Mailbox Support Models Included in the Survey (Continued).

<table>
<thead>
<tr>
<th>Model Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>STEEL - Non-proprietary, 2-3/8&quot; O.D., 13 ga steel pipe</td>
</tr>
<tr>
<td>STEEL - Hyphenate S-Square Tube Products, NEX Tube, 2-3/8&quot; O.D., 14 ga steel NEX pipe</td>
</tr>
<tr>
<td>STEEL - Shur-Tite, Shur-Tite Steel Mailbox Post, 2-3/8&quot; O.D., 16 ga steel pipe</td>
</tr>
<tr>
<td>OTHER - Shur-Tite, Shur-Tite Flex Mailbox Post, 2-3/8&quot; O.D.</td>
</tr>
</tbody>
</table>
### Table D2. Mailbox Support Foundation Types Included in the Survey.

<table>
<thead>
<tr>
<th>Type</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frangible Base</td>
<td><img src="image" alt="Frangible Base Image" /></td>
</tr>
<tr>
<td>Wedge and Socket System</td>
<td><img src="image" alt="Wedge and Socket System Image" /></td>
</tr>
<tr>
<td>Direct Embedded Support</td>
<td><img src="image" alt="Direct Embedded Support Image" /></td>
</tr>
</tbody>
</table>
Table D2. Mailbox Support Foundation Types Included in the Survey (Continued).

<table>
<thead>
<tr>
<th>Frangible Steel Nested Support (example)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slip Base Support (example)</td>
</tr>
<tr>
<td>Model Description</td>
</tr>
<tr>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>WOOD - Prairie Proto Products - Montana, Swing-A-Way, 4” x 4” (72” long)</td>
</tr>
<tr>
<td>STEEL - Dual, Hyphenate S-Square Tube Products, S-Square Mailbox, 2-3/8” O.D. NEX steel post</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>STEEL - Dual, PozLoc vertical support, 2-3/8” O.D., 14 ga steel pipe</td>
</tr>
</tbody>
</table>
Table D3. Multiple Mailbox Support Models Included in the Survey (Continued).

<table>
<thead>
<tr>
<th>Model Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>STEEL - Dual, Non-Proprietary, 2 lb/ft winged channel</td>
</tr>
<tr>
<td>STEEL - Dual, Foresight Industries (V-Loc), 1.66&quot; O.D., 16 ga steel pipe</td>
</tr>
<tr>
<td>N/A</td>
</tr>
<tr>
<td>STEEL - Dual, Foresight Industries (V-Loc), 2-7/8&quot; O.D., 11 ga steel pipe</td>
</tr>
</tbody>
</table>
Table D3. Multiple Mailbox Support Models Included in the Survey (Continued).

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>STEEL - Dual, Shur-Tite, Shur-Tite Mailbox Double Adapter, 2-3/8&quot; O.D., 16 ga steel pipe</td>
</tr>
<tr>
<td>STEEL - Multiple (5), Hyphenate S-Square Tube Products, S-Square Mailbox, NEX Post 2-3/8&quot; O.D., 14 ga steel pipe</td>
</tr>
<tr>
<td>STEEL - Multiple (4), Non-Proprietary, Foresight Tubular Support Multiple Mailbox Post, 2-3/8&quot; O.D.</td>
</tr>
</tbody>
</table>
Table D3. Multiple Mailbox Support Models Included in the Survey (Continued).

| STEEL - Multiple (4), Shur-Tite, Shur-Tite Multiple Mailbox Post, 2-3/8" O.D., 16 ga steel pipe |
APPENDIX E. SURVEY RESULTS - MAILBOX HAZARD AND RISK ASSESSMENT

1) **Question**: Does your State have standards for mailbox support installation?
   **Answer:**

2) **Question**: Do you follow the United States Postal Service (USPS) regulations?
   **Answer:**
3) **Question**: Is the owner of the mailbox responsible for installation?
**Answer:**

![Pie chart showing responses]

4) **Question**: Which type of single wood mailbox supports are allowed in your State?
**Answer:**

![Bar chart showing percentages]

*Mailmaster Deluxe*
5) **Question:** Which type of single polyurethane mailbox supports are allowed in your State?

**Answer:**

6) **Question:** Which type of single steel mailbox supports are allowed in your State?

**Answer:**
7) **Question:** Which types of foundation are allowed in your State for single mailbox supports?  
**Answer:**

![Bar Chart](image1)

8) **Question:** What is the minimum allowable vertical height from the road surface to the bottom of the box, for single mailbox installation?  
**Answer:**

![Pie Chart](image2)
9) **Question:** Do your standards for single mailbox support selection or placement vary with design AADT of roadway?

**Answer:**

![Pie chart showing responses to the question](chart1)

10) **Question:** Do your standards for single mailbox support selection or placement vary with design speed of roadway?

**Answer:**

![Pie chart showing responses to the question](chart2)
11) **Question:** What is the minimum distance a single mailbox should be set from the front face of the curb?

**Answer:**

12) **Question:** What is the minimum distance a single mailbox should be set from the front face of the road edge?

**Answer:**
13) **Question:** Is your single mailbox support system NCHRP Report 350 crashworthy?  
**Answer:**

![Pie chart showing 48.0% Yes, 52.0% No]

14) **Question:** Which type of multiple wood mailbox supports are allowed in your State?  
**Answer:**

![Bar chart showing 75.0% Other, 33.3% Swing-A-Way]
15) **Question:** Which type of multiple mailbox supports are allowed in your State?

**Answer:**

16) **Question:** Which types of foundation are allowed in your State for multiple mailbox supports?

**Answer:**
17) **Question:** What is the minimum allowable vertical height from the road surface to the bottom of the box, for multiple mailbox installation?

**Answer:**

18) **Question:** Do your standards for multiple mailbox support selection or placement vary with design AADT of roadway?

**Answer:**
19) **Question:** Do your standard for multiple mailbox support selection or placement vary with design speed of roadway?

**Answer:**

20) **Question:** What is the minimum distance a multiple mailbox should be set from the front face of the curb?

**Answer:**
21) Question: What is the minimum distance a multiple mailbox should be set from the front face of the road edge?

Answer:

22) Question: Is your multiple mailbox support system NCHRP Report 350 crashworthy?

Answer:
23) **Question:** In your state crash database, is "mailbox" coded as an object struck?

**Answer:**

![Pie chart](chart1.png)

24) **Question:** Do you have electronic crash data that can be accessed for the scope of this project?

**Answer:**

![Pie chart](chart2.png)
APPENDIX F. STATUTES RELATING TO MAILBOX INSTALLATION

ALASKA

From: Phone conversation with Jeff C. Jeffers, P.E. Statewide Traffic & Safety Engineering, Alaska Department of Transportation and Public Facilities, Phone: 907.465.8962, Email: jeff.jeffers@alaska.gov

Alaska DOT has standard drawings that are FHWA approved for mailbox supports. On AKDOT mailbox page users are redirected to the USPS page for some details, however there is not guidance in the Alaska Traffic Manual (state supplement to the MUTCD), nor in the Preconstruction Manual or a departmental policy and procedure.

This is interpreted by the department to mean AKDOT does not have rights to request or require property owners to apply for an encroachment permit when it comes to mailboxes. The only opportunity AKDOT has to control mailboxes is during a project where AKDOT removes existing mailboxes and replaces them with AKDOT design at project expense.

It can be said that AKDOT does not have any policy on mailbox selection and placement from the crashworthiness point of view.

From: “The Alaska State Legislature”
Web address: http://www.legis.state.ak.us/basis/folioproxy.asp?url=http://wwwjnu01.legis.state.ak.us/cgi-bin/folioisa.dll/stattx11/query=*/doc/%7bt9551%7d?

Sec. 19.25.200. Encroachment permits; liability.

(a) An encroachment may be constructed, placed, changed, or maintained across or along a highway, but only in accordance with regulations adopted by the department. An encroachment may not be constructed, placed, maintained, or changed until it is authorized by a written permit issued by the department, unless the department provides otherwise by regulation. The department may charge a fee for a permit issued under this section.

(b) The provisions under (a) of this section do not apply to a mailbox or a newspaper box attached to a mailbox.

(c) Upon receipt of an application, the department shall issue an encroachment permit to a private person, a government agency acting in a business capacity, or an owner or lessee of land contiguous to the right-of-way for an encroachment that, on January 1, 2005, was present within the right-of-way of an interstate, primary, or secondary highway and is not authorized by a written encroachment permit if the department finds that

(1) the encroachment does not pose a risk to the traveling public, and the integrity and safety of the highway is not compromised;
(2) the applicant has demonstrated the encroachment was erected with the good faith belief it was lawful to erect and maintain the encroachment in its location;
(3) the denial of the encroachment permit would pose a hardship on the person, agency, owner, or lessee who applies for the permit;
(4) the issuance of an encroachment permit will not cause a break in access control for the highway;
(5) the land will not be necessary for a highway construction project during the initial term of the permit; and
(6) issuance of a permit is consistent with federal requirements regarding encroachments on federal-aid highways.
(d) The department may not remove an encroachment present within the right-of-way of an interstate, primary, or secondary highway on January 1, 2005, unless the owner, occupant, or person in possession of the encroachment or any other person causing or permitting the encroachment to exist receives the notice provided under AS 19.25.230 and is informed of the application process for an encroachment permit under (c) of this section. The department may charge a fee, not to exceed $100, for an encroachment permit issued under (c) of this section. An encroachment permit issued under (c) of this section may contain reasonable conditions to protect the traveling public, the safety and integrity of a highway's design, and the public interest.
(e) The land area described in an encroachment permit may not be used to meet minimum requirements for a contiguous land use under applicable municipal land use standards or under applicable regulations adopted by the Department of Environmental Conservation. The use of land contiguous to the land area described in the permit must satisfy the applicable municipal land use standards and applicable regulations adopted by the Department of Environmental Conservation without regard to the land area described in the permit.
(f) The issuance of an encroachment permit under AS 19.25.200 - 19.25.250 does not entitle the owner, occupant, or person in possession of the encroachment or any other person to a payment of compensation or of relocation benefits under AS 34.60 if the encroachment permit is revoked or not renewed or if the encroachment must be changed, relocated, or removed under AS 19.25.200 - 19.25.250.
(g) The state is not liable for damage to, or damage or injury resulting from the presence of, an encroachment in the right-of-way of a state highway.
If, incidental to the construction or maintenance of a state highway, the department determines and orders that an encroachment previously authorized by written permit must be changed, relocated, or removed, the owner of the encroachment shall change, relocate, or remove it at no expense to the state, except as provided in AS 19.25.020, within a reasonable time set by the department. If the owner does not change, relocate, or remove an encroachment within the time set by the department, the encroachment shall be considered an unauthorized encroachment and subject to the provisions of AS 19.25.220 - 19.25.250.
COLORADO

From: Phone conversation with David Wieder, Manager, CDOT Maintenance and Operations, Colorado Department of Transportation, Phone: 303.512.5502, email: david.wieder@dot.state.co.us

Colorado DOT has not authority to enforce any law in the choice of a crashworthy mailbox support system. The DOT collaborates with USPS to inform the private owner of the importance and of the types of crashworthy systems available. The owner, however, can choose the mailbox support system he/she prefers, even if not crashworthy. When the DOT replaces the mailbox support system during major highway projects, it choses crashworthy support systems. The owner, however, could still re-replace the system installed by the DOT with the old one which was not crashworthy.
SUBJECT: Mailbox Installation in County Rights of Way

Problem: Highway and roadside safety is the primary reason for Delaware County regulating the placement and type of mailboxes located within county rights of way. National crash data studies show that between 70 and 100 people die each year in crashes with improperly designed mailboxes and their supports (AASHTO statistics, 2002 Roadside Design Guide, 3rd Edition). Mailbox and newspaper delivery boxes like utility poles, telephone pedestals, and other appurtenances in the right of way are a necessary part of providing services and access to rural residences. Mailboxes however, much like traffic control devices and signs, are located very close to the traveled portion of the roadway, usually right on the shoulder of the road. Unlike traffic control devices and signs however, mailboxes and similar items are placed on the roadway at random by many different people and guidelines for their placement are often not known by those who install them. Also, unlike traffic signs and other traffic control devices, mailbox supports are installed with little regard to their potential for causing a roadside hazard if they are struck by an errant vehicle.

The large, unyielding mailbox supports placed by some rural residents, while intended to be attractive decorations or to provide vandal proof mounting for mailboxes or newspaper delivery boxes, can create a severe crash hazard by their very nature and location in the roadway. To achieve their purpose of allowing ready access to rural letter carriers, they are mounted at windshield height and placed on the edge of the road where they are vulnerable to being struck by an errant vehicle. Mailboxes create a hazard to vehicles and the occupants of those vehicles because of this windshield level mounting height since the windshield is the weakest part of the protective cage provided to vehicle occupants by the automobile frame and body panels.

Discussion: All mailbox installations must meet U. S. Postal Service Regulations, which are part of this installation policy, but those installations must also meet county requirements for safety so that the mailbox and its support are not a hazard to traffic. This mailbox installation policy is based on a sample policy provided within the AASHTO Roadside Design Guide, 3rd Edition, which was published in 2002 by the American Association of State Highway and Transportation Officials (AASHTO). This policy is also developed to keep the county in compliance with its legal duty to remove obstructions within the right of way as required by Chapter 319 of the Code of Iowa.
Policy: Mailbox and Newspaper Delivery Box Installation on County Roads

SECTION 1: SCOPE

No mailbox or newspaper delivery box, hereinafter both referred to as a mailbox, will be allowed to exist on Delaware County Secondary Road rights of way if it interferes with the safety of the traveling public or the function, maintenance, or operation of the highway system. A mailbox installation not conforming to the provisions of this regulation is an unauthorized encroachment within the right of way and may be declared as an obstruction under chapter 319 of the Code of Iowa.

The location and construction of mailboxes shall conform to the rules and regulation of the U.S. Postal Service as well as to standards established by the Delaware County Secondary Road Department. Delaware County standards for the location and construction of mailboxes are available from:

Delaware County Engineers Office  
P.O. Box 68 – 2139 Highway 38  
Delaware, Iowa 52036  
Phone: 563-927-3505

A permit for the installation of a mailbox is required by Section 319.14 of the Code of Iowa. That permit is available at the address listed above. A mailbox installation that conforms to the following criteria will be considered acceptable unless, in the judgment of the County Engineer, the installation interferes with the safety of the traveling public or the function, maintenance, or operation of the highway system.

SECTION 2: LOCATION

No mailbox will be permitted where access is obtained from a freeway or where access is otherwise prohibited by law or regulation.

Mailboxes shall be located on the right hand side of the roadway in the carrier’s direction of travel route except on one-way streets where they may be placed on the left hand side of the road. The bottom of the box shall be set at an elevation established by the U.S. Postal Service, usually between 39 inches and 48 inches above the roadway surface as measured from the shoulder of the road. The optimum installation height is 42 inches. The roadside face of the box shall be offset from the edge of the traveled way by a distance of no less than the greater of the following:

- 8 feet (where no paved shoulder exists and the shoulder cross slope is 13% or flatter);
- the width of the all weather (rock or turf) shoulder present plus 8”-12” to face of box;
- the width of an all weather turnout specified by the Secondary Road Department plus 8”-12” to the face of the box.
Exceptions to the placement criteria above will exist on subdivision streets and certain designated rural roads where the County Engineer deems it in the public interest to permit lesser clearances or to require greater clearances. On curbed streets, the roadside face of the mailbox shall be set back from the face of the curb a distance of 6” – 12”. On residential or subdivision streets and rural roads without all weather shoulders that carry low traffic volumes operating at low speeds, the roadside face of the mailbox shall be offset between 8” and 12” beyond the edge of the pavement or edge of the road. On very low volume rural roads with low operating speeds, the Secondary Road Department may find it acceptable to offset mailboxes a minimum of 6 feet from the traveled way and under some low-volume, low-speed applications may accept clearance as low as 32 inches.

Where a mailbox is located at a driveway entrance, it shall be placed on the far side of the driveway in the carrier’s direction of travel. This location better accommodates county snow removal operations.

Where a mailbox is located near an intersecting road, it shall be located a minimum of 100 feet beyond the centerline of the intersecting road in the carrier’s direction of travel. This distance shall be increased to 200 feet when the average daily traffic on the intersecting road exceeds 400 vehicles per day.

Where the mailbox is installed in the vicinity of an existing guardrail, it should, wherever practical, be placed behind the guardrail.

3.0 STRUCTURE

Mailboxes shall be of light sheet metal or plastic construction conforming to the requirements of the U. S. Postal Service. Newspaper delivery boxes shall be of light metal or plastic construction and of the minimum dimensions suitable for holding a newspaper. Some mailboxes approved by USPS may not meet county crash requirements. Manufacturers and models approved by USPS do not necessarily signify any endorsement by AASHTO or the Delaware County Secondary Road Department. Questions on compliance with USPS or Delaware County regulations should be directed your local postmaster and/or the County Engineer.

No more than two mailboxes may be mounted on a support structure unless crash tests have shown the support structure and mailbox arrangement to be safe. However, lightweight newspaper boxes may be mounted below the mailbox on the side of the mailbox support.

Mailbox supports shall not be set in concrete unless crash tests have shown the support design to be safe.

A single 4” by 4” square or 4” diameter wooden post; or metal post, Schedule 40 2” diameter (nominal size IPS; external diameter 2 3/8”; maximum wall thickness 0.154 inches) or smaller, embedded no more than 24 inches into the ground, shall be acceptable as a mailbox support. A metal post shall not be fitted with an anchor plat, but may have an anti-twist device that extends no more than 10 inches below the ground surface.
The post to box attachment details should be of sufficient strength to prevent the box from separating from the post top if the installation is struck by a vehicle. The exact support hardware dimensions and design may vary, such as having a two-piece platform bracket or alternative slot and holed locations. The product must result in a satisfactory attachment of the mailbox to the post, and all components must fit together properly.

The minimum spacing between centers of support posts shall be three fourths of the height of the posts above the ground line. Mailbox support designs not described in this section are acceptable if approved by the Delaware County Engineer. Illustrations of approved mailbox supports and attachments are included with this policy as appendix A.

SECTION 4: SHOULDER AND PARKING AREA CONSTRUCTION

It shall be the responsibility of the postal patron to inform the Delaware County Secondary Road Department of any new or existing mailbox installations where shoulder construction is inadequate to provide all weather access to the mailbox.

SECTION 5: REMOVAL OF NONCONFORMING OR UNSAFE MAILBOXES

Any mailbox or mailbox support that is found to violate the intent of this regulation shall be removed by the postal patron upon notification by the Delaware County Secondary Road Department under procedures described in Section 319.13 which states:

If the following constitute an immediate and dangerous hazard, …placed or erected upon the right of way of any public highway shall without notice or liability in damages be removable and the costs thereof assessed against … (t)he owner or person responsible for placement of all other obstructions.

Any such obstruction not constituting an immediate and dangerous hazard shall be removed without liability after forty-eight hour notice served in the same manner in which an original notice is served, or in writing by certified mail, or in any other manner reasonably calculated to apprise the person responsible for the obstruction that the obstruction will be removed at the expense of such person after the notice is given. Such removal and assessment of cost in the case of primary roads shall be by the department and in the case of secondary roads by the board of supervisors. Upon removal of the obstruction, the highway authority may immediately send a statement of the cost of removal to the person responsible for the obstruction. If within ten days after sending the statement the cost is not paid, the highway authority may institute proceeding in the district court system to collect the cost of removal.

At the discretion of the County Engineer, based on an assessment of hazard to the public, the patron shall be granted not less than 24 hours and not more than twenty days to remove an unacceptable mailbox and its support. After the specified period has expired, the unacceptable mailbox will be removed by the Secondary Rod Department at the postal patron’s expense.

SECTION 6: MAILBOXES AND SNOW REMOVAL
Delaware County conducts winter snow removal operations under the terms of Delaware County Ordinance number 3 which establishes the policy and level of service in respect to the clearance of snow and ice during winter months. Section 3 of the ordinance addresses mailboxes and states the following:

“The County will assume no liability for mailboxes and fences damaged because of snow removal unless such action can be determined to be malicious or by direct contact with a plow or wing blade. The County will not replace mailboxes damaged or knocked down by the force of snow thrown from the plow.”

The county further does not remove accumulated snow from in front of, underneath, or near the location of the mailbox to accommodate the delivery of mail. It shall be the responsibility of the postal patron to remove snow which accumulates around the mailbox to accommodate mail delivery.

SECTION 7: PERMITS

As required by Section 319.14 of the Code of Iowa, rural residents planning to install a mailbox should obtain a permit to perform the work from the County Engineer. Permits are available at the address shown in Section 1 of this policy.

From: Phone conversation with Robert King, Community Relations Officer, Phone: 302.760.2080, Email: bob.king@state.de.us

Delaware DOT requires from the citizen to choose a mailbox system in a certain material and geometry range only. If the DOT is working on a highway project and needs to replace a mailbox support, then it is requested that the contractor chooses a mailbox support system with a FHWA letter of acceptance. However, when the private citizen choses and install the mailbox system, no FHWA letter is required.
The researchers were not able to identify a guidance for Kansas DOT with respect to the selection and use of crashworthy mailbox supports and any authority the DOT might have on it.
Kentucky

From: “Kentucky Transportation Cabinet Department of Highways District 9 Permits Branch”
Web address:
http://transportation.ky.gov/Permits/Pages/default.aspx
Notice: It does NOT address mailboxes!

From: Phone conversation with Nancy Albright, P.E., Director of the Kentucky Transportation Cabinet – Maintenance Section, Kentucky Transportation Cabinet, Phone: 502.564.4556, Email: nancy.albright@ky.gov

Kentucky DOT does not have a policy for the selection and the installation of mailbox supports. KYDOT requires breakaway posts. There is no requirement for pre-approved mailbox support selection and installation. If DOT finds an “illegal” mailbox placement, in their ROW, a letter is sent to the owner of the mailbox asking for changing the mailbox. However, the law cannot be enforced on this matter.
Right-of-Way Permits

The DOTD Right-of-Way Permit Unit is responsible for regulating the location, design, methods for installing, adjusting, accommodating, and maintenance of non-DOTD facilities such as driveways and utilities on highway right-of-way. The types of permits issued include: Project, Residential and Commercial Driveway, Vegetation Enhancement, Vegetation Maintenance, Traffic Signal, Traffic Control Device, Geophysical, Movable Property, Mailbox, Wireless, and Fiber-Optic. Additionally, the Right-of-Way Permit Unit is responsible for negotiating joint use agreements for use of DOTD right-of-way.

All completed permit applications must be submitted to the District Right-of-Way Permit Specialist responsible for the Parish in which the work will take place. If the permit application includes more than one District, a separate permit must be prepared for each affected District. Be sure to attach to the permit application all additional documentation such as drawings. Any questions regarding the requirements for completing the forms listed on this web page should be directed to the appropriate District Right-of-Way Permit Specialist.

Applicant must submit entire permit application form including rules and regulations in order to be processed.

Notice of Disclaimer: I hereby certify that this permit is in its initial form and has not been altered, changed, or modified in any manner whatsoever without the express written consent of the Right-of-Way Permits Unit of the Louisiana Department of Transportation and Development (DOTD). I hereby agree that any alteration, change, or modification made to the initial form of this permit without the express written consent of the DOTD's Right-of-Way Permits Unit may result in the entire permit or any portion thereof, at the sole discretion of the DOTD, being deemed null and void.
From: Phone conversation with Chad Winchester, Road Design Administrator, Louisiana Department of Transportation and Development, Phone: 225.379.1048, Email: Chad.Winchester@la.gov

There is no permit required for selection and installation of new mailboxes and there is no checking. As for state road, there is a permit, however still there is no checking. LADOT issues guidance for choice of crashworthy mailbox support, but no law can be enforced. If an issue is raised for a particular mailbox selection and placement, then LADOT request that the mailbox would be changed, but again cannot enforce law. Last, if LADOT need to replace a mailbox support system, it will replace it with a choice of a crashworthy one.

Also, from drawing “Mailbox Installation Details” (Figure F1):

“… No more than two mailboxes may be mounted on a support structure unless the support structure and mailbox arrangement have been shown to be safe by crash testing in accordance with NCHRP Report 350. However, lightweight newspaper boxes may be mounted below the mailbox on the side of the mailbox support. … Mailbox support designs not detailed will be acceptable if crash tested in accordance with NCHRP Report 350 and if approved by the engineer.”
**Figure F1.** Mailbox Installation Details – Louisiana Department of Transportation and Development.
For convenience and practicality, mailbox installations have been allowed within the right-of-way of Maine’s state and state-aid highways; however it is important to recognize that such installations have two very important conditions:

1) The mailbox must be installed in accordance with applicable standards to ensure that mail can be delivered and that the mailbox does not create an obstacle or safety hazard to those that use or maintain the highway, and

2) The mailbox is installed entirely at the owner’s risk. In other words, if the mailbox incurs damage during any sort of highway operations or maintenance, the property owner is not entitled to replacement or compensation. In fact, if the mailbox was not installed in accordance with the applicable standards as stated above, the owner may even be held liable for injuries or damages that may have been incurred as a result.

Mailbox design and installation standards are available from several sources, and mailbox owners are expected to consult this information prior to undertaking any mailbox installation or replacement. The following standards have nationwide relevance and were developed in cooperation with one another:

The United States Postal Service (USPS) Mailbox Guidelines. The USPS defines the standards for mailbox construction, as well as the placement tolerance that must be met to accommodate postal operations. Specifics may be obtained from your local post office or online at: https://www.usps.com/manage/know-mailbox-guidelines.htm?

American Association of State Highway and Transportation Officials (AASHTO) Roadside Design Guide. The AASHTO Roadside Design Guide, Chapter 11: Erecting Mailboxes on Streets and Highways deals with the safety and construction of privately owned mailboxes, mailbox supports, and mailbox turnout designs and is less focused on postal operations. This publication may be obtained online through the AASHTO Bookstore at: https://bookstore.transportation.org/Item_details.aspx?id=1807

MaineDOT has developed this policy to promote compliance with these national standards and to help further clarify the expectations and responsibilities of Maine mailbox owners to improve the safety of our highways. The following pages further specify the details associated with the mailbox height, location, offset, and post type to minimize the potential hazards associated with mailbox installations and to reduce the opportunities for damage to mailboxes.
Mailbox Installation Standards

General Location:

Whenever possible, your mailbox should be located after your driveway opening. This location placement improves visibility, minimizes the amount of snow that comes off of the snow plow, and improves the approach for your mail carrier. The diagram below further clarifies this preferred placement:

Mailbox Support Design:

It is best to use an extended arm type of post with a free-swinging suspended mailbox. This allows snowplows to sweep near or under boxes without damage to supports and provides easy access to the boxes by carrier and customers. The following picture shows a free-swinging suspended mailbox:
**Offset:**

Mailboxes should be set back from the edge of the shoulder – regardless of whether the shoulder is gravel or paved. In other words, the face of the mailbox should be at least one foot (1’) back from the edge of the normally plowed surface of the highway or the face of curb. Greater offset distances are encouraged whenever possible to allow the mail carrier to get further out of traffic and to further minimize potential damage to your mailbox. The following picture shows a mailbox with a reasonable offset:

![Mailbox Offset](image1.jpg)

**Height:**

According to USPS standards, a mailbox must be installed with the bottom of the mailbox located between 41” and 45” high above the surface of the highway shoulder. MaineDOT recommends that this height be closer to the 45” measurement to minimize conflict with the height of the plow truck wing when snow is being pushed back during, or between, winter storms. The following picture further clarifies the height considerations:

![Mailbox Height](image2.jpg)
Post Size, Type and Embedment:

Mailbox posts must be sturdy enough to hold up the mailbox in all types of weather conditions, however they cannot be so rugged that they present a hazard to vehicles that inadvertently leave the road. If a mailbox support is struck by a vehicle, it must easily break away. Therefore, the following types of posts are deemed acceptable:

4” x 4” wooden posts embedded 2 feet into the ground. Larger wooden posts may be used only if the post is drilled through with an appropriate spade bit to create a shear plane that is no higher than 6” above the surface of the surrounding ground. The number and size of the drilled holes depends upon what is necessary to bring the cross-section of the larger post down to the equivalent cross-sectional area of a standard 4” x 4” post. (MaineDOT Standard Specification 606.06);
1” to 2” round diameter steel or aluminum pipe or standard U-channel post embedded 2 feet into the ground;
Unacceptable mailbox supports include: anything that is filled with concrete, masonry and stone structures, heavy steel structures, and most objects that were intended for other uses (e.g. antique plows, I-beams, and various other household tools and objects).

NOTICE: Mailboxes, attachments or support systems not consistent with this policy are considered “Deadly Fixed Objects” (aka. “DFOs”) and are in violation of 23 MRSA §1401-A. As such, when these installations are recognized by MaineDOT, the owner will be informed of the hazard and immediate removal will be requested. If the property owner does not comply with this request, MaineDOT may elect to remove the installation and seek reimbursement from the property owner for all costs incurred.

From: Phone conversation with Dale Peabody, Director of Transportation Research, Maine Department of Transportation, Phone: 207.624.3305, Email: dale.peabody@maine.gov

MaineDOT can inform the resident of a hazard and ask them to comply. We do not enforce the law but could remove the existing hazard and charge the resident for the work. Fines would be applied by law enforcement.
MINNESOTA

From: Email exchange with Alex Chernyaev, Assistant Design Standards Engineer, Minnesota Department of Transportation, Email: alex.chernyaev@state.mn.us

The selection and permissible locations of mailbox installations and supports on streets or highways in Minnesota are regulated by Minnesota Rules 8818.0100 to 8818.0300.

MnDOT Road Design Manual Chapter 11-11
http://dotapp7.dot.state.mn.us/edms/download?docId=1062364 provides guidance for mailbox support selection and installation on highways with speed limit 40 mph or greater under MnDOT projects. As per these guidance, the mailbox support shall be accepted by FHWA as meeting the NCHRP Report 350 crashworthiness criteria.

As per my understanding, Minnesota can enforce the law on private citizen to replace a mailbox support when it is declared to be a public nuisance, a road hazard, and a danger to the health and safety of the traveling public if located along a street or highway having a speed limit of 40 miles per hour or greater. The mailbox installations that are documented to have passed an accredited crash test are acceptable. An accredited crash test is considered to be a test conducted in accordance with procedures described in the most recent National Cooperative Highway Research Program report.
I am not aware if the single citizen need to have a permit to install the mailbox.

From: “Minnesota Administrative Rules”
Web address: https://www.revisor.mn.gov/rules/?id=8818.0300

8818.0300 PROHIBITED MAILBOX STRUCTURES; EXCEPTIONS.
Subpart 1. Unlawful installations and supports. The following mailbox installations and supports are declared to be a public nuisance, a road hazard, and a danger to the health and safety of the traveling public if located along a street or highway having a speed limit of 40 miles per hour or greater:
A. an installation that contains more than one vertical support;
B. a single support containing more than two mailboxes;
C. a wooden support with a cross-sectional area greater than 16 square inches at any above-ground point along the support (for example, the maximum allowable square and round support dimensions are four inches by four inches and 4.5 inches in diameter, respectively), except that larger wooden supports are acceptable if, at a height four inches above the ground, the support cross-sectional area is altered in some fashion so as to reduce the cross-sectional area at that point to 16 square inches or less;
D. a metal support of a weight of four pounds per foot or more for any one foot of vertical measurement above ground (for example, a standard steel pipe of up to two inches inner
diameter would be acceptable), except that larger metal supports are acceptable if, within the first three inches above ground the metal support is less than four pounds per foot (less than one pound for the three-inch length);
E. a mailbox that is not acceptable for delivery of mail by the United States Postal Service;
F. adjacent mailbox installations whose respective supports are spaced closer than 30 inches, as measured from center of support to center of support;
G. neighborhood delivery and collection box units, whether or not United States Postal Service approved;
H. a support comprised of material other than solely wood or metal that either exceeds 16 square inches in total cross-sectional area at a height four inches above ground or is of a weight of four pounds per foot or more for any one foot of vertical measurement above ground, unless within the first three inches above ground the support is less than four pounds per foot (less than one pound over the three-inch distance). Examples of such nonconforming supports could include supports such as filled milk cans, brick structures, plows, and concrete-filled pipe; and
I. an installation, whether a support or closed mailbox, that encroaches the usable roadway or its airspace.

Subp. 2. Exceptions. Notwithstanding subpart 1, mailbox installations that are documented to have passed an accredited crash test are acceptable. An accredited crash test is considered to be a test conducted in accordance with procedures described in the most recent National Cooperative Highway Research Program report, "Recommended Procedures for the Safety Performance Evaluation of Highway Appurtenances," published by the Transportation Research Board, National Academy of Sciences, 2101 Constitution Avenue N.W., Washington, D.C. 20418. This report and future revisions of this report are incorporated by reference. The report is not subject to frequent change and is available to the public at the State Law Library, Judicial Center, 25 Rev. Dr. Martin Luther King Jr. Blvd., St. Paul, Minnesota 55155, and through the Minitex interlibrary loan system.
MISSISSIPPI

From: “Sub-Part 7501 – Maintenance. Chapter 04013 Driveway and Street Connections, Median Openings, Frontage Roads”

509 Mail Boxes to be placed on highway right of way must meet the following specifications which are to be made a part of driveway permit applications:
Mailbox materials and size shall conform to the requirements of the United States Postal Service. Mailbox supports may be 4” x 4” square or 4” diameter round wood posts, 6” diameter PVC pipe, or any other mailbox supports listed in the current edition of the AASHTO Roadside Design Guide, Chapter 11 (The Roadway Design Division has a copy), or any mailbox found acceptable and certified under the NCHRP 350 testing program.
Mailbox front is recommended to be 8” to 12” from the edge of the shoulder or the curb face, with the post/support to be 39” to 47” above the shoulder edge or at a height specified by the local United States Postal carrier.
A cross-section view of the roadway at the mailbox location is shown below:
5. Any deviation from the above specifications must be approved by the District Engineer.
NORTH DAKOTA

From: Phone conversation with Shawn Kuntz, Traffic Operations Engineer, North Dakota Department of Transportation, Phone: 701.328.2673, Email: skuntz@nd.gov

The owner of the mailbox system can chose the system; there is not a need to go through selection. North Dakota DOT does not have a policy and the authority to do anything. Only with major projects, the DOT might need to move the mailbox system already installed and re-install a different type of mailbox support. It might be necessary to analyze crash data before making any decision about changing the mailbox support system.
The owner of the mailbox system can choose the system; there is not a need to go through selection. Pennsylvania DOT does not have the authority to do anything. It might be that only some municipalities have some authority, but that’s not a general rule.
From: Email exchange with Justin Obinna, Transportation Engineer, Texas Department of Transportation, Email: Justin.Obinna@TxDOT.Gov
Web address:

TxDOT furnishes the mailbox supports. Click on Mailboxes on State Highways and Mailbox Safety and FAQ's and TxDOT Mailbox Standards for more information.

The owner does not need a permit for the selection and placement of the mailbox support.

TxDOT use only FHWA crashworthy approved mailbox support systems. Click on Mailboxes on State Highways and Mailbox Safety and FAQ's

TxDOT has the authority to regulate the selection and installation of mailbox support also from a crashworthiness point of view:

Transportation Code Sec. 224.031. DUTY OF DEPARTMENT. (a) It states: The department has exclusive and direct control of all improvement of the state highway system. This exclusive and direct control authority also includes the roadside and associated roadside safety appurtenances of which mailboxes are a subset.
Crashworthiness is addressed in Mailboxes on State Highways and Mailbox Safety and FAQ's

TxDOT is responsible for making sure that mailboxes are FHWA crashworthy approved and only when their installation is being requested within TxDOT’s right of way.

Some roads in Texas are not under the control of TxDOT. Examples of such roads are county roads and city streets. County and City governments stipulate their rules for such roads working with their city or county engineer who, of course, are naturally bound by the Texas Engineering Practice Act. There may be other government body interests on roads such as improvement districts, like the Aldine Improvement District. This district played a leading role in a hazard elimination program project involving sidewalk improvements on the Aldine Mail Route road in the Houston Area.
Although the owner is responsible for installation of the mailbox, he/she does not need a permit for the selection and placement of the mailbox support. VDOT does not choose the mailbox support system. Guidance on this can be found in the Virginia administrative code (24VAC30-151-560. Mailboxes and newspaper boxes). VDOT does not have the authority to regulate the selection and installation of mailbox support also from a crashworthiness point of view.

When VDOT discovers a mailbox installation which creates a safety hazard for roadway traffic, the homeowner will be notified and requested to change the mailbox installation.

From: “24VAC30-151-560. Mailboxes and newspaper boxes”
Website:
http://leg1.state.va.us/cgi-bin/legp504.exe?000+reg+24VAC30-151-30
http://leg1.state.va.us/cgi-bin/legp504.exe?000+reg+24VAC30-151-560

24VAC30-151-560. Mailboxes and newspaper boxes

Mailboxes and newspaper boxes may be placed within VDOT right-of-way without a permit; however, placement should not interfere with safety, maintenance and use of the roadway. Lightweight newspaper boxes may be mounted on the side of the support structure. Breakaway structures will be acceptable as a mailbox post. Breakaway structures are defined as a single four-inch by four-inch square or four-inch diameter wooden post or a standard strength, metal pipe post with no greater than a two-inch diameter.
WASHINGTON

From: Phone conversation with Dave Olson, Design Policy, Standards, & Research Manager
Washington State Department of Transportation, Phone: 360.705.7952, Email: Olsonda@wsdot.wa.gov

Washington DOT can oblige the single private to modify the mailbox support if they see it is not safe (not crashworthy). However, the DOT does not check every single mailbox system. The DOT does not have any control on the selection of the mailbox support system and cannot enforce the law on the single private to change the system previously selected.

From: Web page

Mailboxes
For mailboxes located within the Design Clear Zone, provide supports and connections as shown in the Standard Plans. The height from the ground to the bottom of the mailbox is 3 feet 3 inches. This height may vary from 3 feet 3 inches to 4 feet if requested by the mail carrier. If the desired height is to be different from 3 feet 3 inches, provide the specified height in the contract plans. (See Exhibit 1600-6 for installation guidelines.) Coordinate with homeowners when upgrading mailboxes. In urban areas where sidewalks are prevalent, contact the postal service to determine the most appropriate mailbox location. Locate mailboxes on limited access highways in accordance with Chapter 530, Limited Access. A turnout, as shown in Exhibit 1600-6, is not needed on limited access highways with shoulders of 6 feet or more where only one mailbox is to be installed. On managed access highways, mailboxes are to be on the right-hand side of the road in the postal carrier’s direction of travel. Avoid placing mailboxes along high-speed, high-volume highways. Locate Neighborhood Delivery and Collection Box Units (NDCBUs) outside the Design Clear Zone.
WYOMING

From: Phone conversation with William Wilson, P.E., Standards Engineer, Wyoming Department of Transportation, Phone: 307.777.4216, Email: bill.wilson@dot.state.wy.us

In Wyoming the single owner is required to have a permit for installation of mailbox support when that is in the right-of-way of the land. WYDOT has policies and checks whether the support is crashworthy. If it is not, WYDOT will take it away and require that it be replaced with a crashworthy one.

From: Email exchange with William Wilson, P.E., Standards Engineer, Wyoming Department of Transportation, Phone: 307.777.4216, Email: bill.wilson@dot.state.wy.us

To the best of my knowledge, there are no Statutes in Wyoming in regard to mailboxes. I think that comes from our authority to regulate what is in the state highway right-of-way.
## APPENDIX G. CRASH DATA ANALYSIS - CRASH SEVERITY FOR CRASHES INVOLVING MAILBOXES

**Table G1.** Crash Severity for Crashes Involving Mailboxes - Colorado.

<table>
<thead>
<tr>
<th>Year</th>
<th>Fatalities</th>
<th>Injuries</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>2009</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>2010</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>0</td>
<td>9</td>
</tr>
</tbody>
</table>

**Table G2.** Crash Severity for Crashes Involving Mailboxes - Delaware.

<table>
<thead>
<tr>
<th>Year</th>
<th>Fatalities</th>
<th>Injuries</th>
</tr>
</thead>
<tbody>
<tr>
<td>'05-'10 Total</td>
<td>1</td>
<td>38</td>
</tr>
</tbody>
</table>

**Table G3.** Crash Severity for Crashes Involving Mailboxes - Kansas.

<table>
<thead>
<tr>
<th>Year</th>
<th>Fatalities</th>
<th>Injuries</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>2007</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>2008</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>2009</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>2010</td>
<td>1</td>
<td>29</td>
</tr>
<tr>
<td>Total</td>
<td>2</td>
<td>35</td>
</tr>
</tbody>
</table>
Table G4. Crash Severity for Crashes Involving Mailboxes - Louisiana.

<table>
<thead>
<tr>
<th>Year</th>
<th>Fatalities</th>
<th>Injuries</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>2</td>
<td>46</td>
</tr>
<tr>
<td>2007</td>
<td>1</td>
<td>50</td>
</tr>
<tr>
<td>2008</td>
<td>0</td>
<td>70</td>
</tr>
<tr>
<td>2009</td>
<td>0</td>
<td>69</td>
</tr>
<tr>
<td>2010</td>
<td>0</td>
<td>54</td>
</tr>
<tr>
<td>Total</td>
<td>3</td>
<td>289</td>
</tr>
</tbody>
</table>

Table G5. Crash Severity for Crashes Involving Mailboxes - Minnesota.

<table>
<thead>
<tr>
<th>Year</th>
<th>Fatalities</th>
<th>Injuries</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>0</td>
<td>22</td>
</tr>
<tr>
<td>2007</td>
<td>0</td>
<td>27</td>
</tr>
<tr>
<td>2008</td>
<td>0</td>
<td>16</td>
</tr>
<tr>
<td>2009</td>
<td>0</td>
<td>26</td>
</tr>
<tr>
<td>2010</td>
<td>0</td>
<td>28</td>
</tr>
<tr>
<td>Total</td>
<td>0</td>
<td>118</td>
</tr>
</tbody>
</table>

Table G6. Crash Severity for Crashes Involving Mailboxes – North Dakota

<table>
<thead>
<tr>
<th>Year</th>
<th>Fatalities</th>
<th>Injuries</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>2008</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2009</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>2010</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>2011</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>0</td>
<td>8</td>
</tr>
</tbody>
</table>
Table G7. Crash Severity for Crashes Involving Mailboxes - Pennsylvania.

<table>
<thead>
<tr>
<th>Year</th>
<th>Fatalities</th>
<th>Injuries</th>
<th>Fatalities</th>
<th>Injuries</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>0</td>
<td>8</td>
<td>1</td>
<td>60</td>
</tr>
<tr>
<td>2008</td>
<td>2</td>
<td>10</td>
<td>1</td>
<td>60</td>
</tr>
<tr>
<td>2009</td>
<td>1</td>
<td>14</td>
<td>1</td>
<td>44</td>
</tr>
<tr>
<td>2010</td>
<td>1</td>
<td>9</td>
<td>0</td>
<td>43</td>
</tr>
<tr>
<td>Total</td>
<td>4</td>
<td>33</td>
<td>2</td>
<td>147</td>
</tr>
</tbody>
</table>

Table G8. Crash Severity for Crashes Involving Mailboxes - Wyoming.

<table>
<thead>
<tr>
<th>Year</th>
<th>Fatalities</th>
<th>Injuries</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>2009</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>2010</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>0</td>
<td>9</td>
</tr>
</tbody>
</table>
APPENDIX H. CRASH DATA ANALYSIS - FIXED OBJECTS RELATED CRASHES

Table H1. Fixed Objects Related Crashes - Alaska.

<table>
<thead>
<tr>
<th>Fixed Object Type Hit</th>
<th># Total Crashes (2005-2009)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bridge Rail</td>
<td>94</td>
</tr>
<tr>
<td>Bridge/Overpass</td>
<td>55</td>
</tr>
<tr>
<td>Curb/Wall</td>
<td>396</td>
</tr>
<tr>
<td>Fence</td>
<td>361</td>
</tr>
<tr>
<td>Guardrail End</td>
<td>204</td>
</tr>
<tr>
<td>Guardrail Face</td>
<td>844</td>
</tr>
<tr>
<td>Light Support</td>
<td>331</td>
</tr>
<tr>
<td>Sign</td>
<td>604</td>
</tr>
<tr>
<td>Traffic Signal Pole</td>
<td>91</td>
</tr>
<tr>
<td>Tree</td>
<td>362</td>
</tr>
<tr>
<td>Utility Pole</td>
<td>302</td>
</tr>
<tr>
<td>Other Fixed Objects</td>
<td>567</td>
</tr>
</tbody>
</table>
Table H2. Fixed Objects Related Crashes - Colorado.

<table>
<thead>
<tr>
<th>Fixed Object</th>
<th>Total Object Crashes (2008-2010)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barricade</td>
<td>99</td>
</tr>
<tr>
<td>Bridge Structure</td>
<td>257</td>
</tr>
<tr>
<td>Cable Rail</td>
<td>650</td>
</tr>
<tr>
<td>Concrete Highway Barrier</td>
<td>4051</td>
</tr>
<tr>
<td>Crash Cushion/Traffic Barrel</td>
<td>200</td>
</tr>
<tr>
<td>Culvert Headwall</td>
<td>357</td>
</tr>
<tr>
<td>Curb</td>
<td>2534</td>
</tr>
<tr>
<td>Delineator Post</td>
<td>1454</td>
</tr>
<tr>
<td>Embankment</td>
<td>3397</td>
</tr>
<tr>
<td>Fence</td>
<td>2677</td>
</tr>
<tr>
<td>Front to Front</td>
<td>1</td>
</tr>
<tr>
<td>Front to Rear</td>
<td>4</td>
</tr>
<tr>
<td>Front to Side</td>
<td>3</td>
</tr>
<tr>
<td>Guardrail</td>
<td>3963</td>
</tr>
<tr>
<td>Involving Other Object</td>
<td>1277</td>
</tr>
<tr>
<td>Large Rocks/Boulder</td>
<td>947</td>
</tr>
<tr>
<td>Light/Utility Pole</td>
<td>2095</td>
</tr>
<tr>
<td>Other Fixed Object</td>
<td>1103</td>
</tr>
<tr>
<td>Pedestrian</td>
<td>1</td>
</tr>
<tr>
<td>Railroad Crossing Equipment</td>
<td>82</td>
</tr>
<tr>
<td>Side to Side</td>
<td>2</td>
</tr>
<tr>
<td>Sign</td>
<td>2233</td>
</tr>
<tr>
<td>Traffic Signal Pole</td>
<td>348</td>
</tr>
<tr>
<td>Tree</td>
<td>1598</td>
</tr>
<tr>
<td>Vehicle Debris or Cargo</td>
<td>1194</td>
</tr>
<tr>
<td>Wall/Building</td>
<td>443</td>
</tr>
<tr>
<td>Wild Animal</td>
<td>2</td>
</tr>
<tr>
<td>Overturning</td>
<td>7</td>
</tr>
<tr>
<td>Other Non-Collision</td>
<td>229</td>
</tr>
<tr>
<td>Mailboxes</td>
<td>338</td>
</tr>
</tbody>
</table>
**Table H3.** Fixed Objects Related Crashes - Delaware.

<table>
<thead>
<tr>
<th>Fixed Objects</th>
<th>Total Object Crashes (2005-2010)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact Attenuator/Crash Cushion</td>
<td>32</td>
</tr>
<tr>
<td>Bridge Overhead Structure</td>
<td>11</td>
</tr>
<tr>
<td>Bridge Pier Support</td>
<td>305</td>
</tr>
<tr>
<td>Bridge Rail</td>
<td>22</td>
</tr>
<tr>
<td>Cable Barrier</td>
<td>29</td>
</tr>
<tr>
<td>Culvert</td>
<td>44</td>
</tr>
<tr>
<td>Curb</td>
<td>291</td>
</tr>
<tr>
<td>Ditch</td>
<td>439</td>
</tr>
<tr>
<td>Embankment</td>
<td>3867</td>
</tr>
<tr>
<td>Guardrail Face</td>
<td>3380</td>
</tr>
<tr>
<td>Guardrail End</td>
<td>80</td>
</tr>
<tr>
<td>Concrete Traffic Barrier</td>
<td>169</td>
</tr>
<tr>
<td>Other Traffic Barrier</td>
<td>25</td>
</tr>
<tr>
<td>Tree</td>
<td>2254</td>
</tr>
<tr>
<td>Utility Pole</td>
<td>2565</td>
</tr>
<tr>
<td>Light Support</td>
<td>60</td>
</tr>
<tr>
<td>Traffic Sign Support</td>
<td>99</td>
</tr>
<tr>
<td>Overhead Sign Support</td>
<td>4</td>
</tr>
<tr>
<td>Traffic Signal Support</td>
<td>12</td>
</tr>
<tr>
<td>Fence</td>
<td>97</td>
</tr>
<tr>
<td>Other Post</td>
<td>301</td>
</tr>
<tr>
<td>Other Fixed Object</td>
<td>2711</td>
</tr>
<tr>
<td>Mailboxes</td>
<td>656</td>
</tr>
</tbody>
</table>
Table H4. Fixed Objects Related Crashes - Kansas.

<table>
<thead>
<tr>
<th>Fixed Objects</th>
<th>Total Object Crashes (2006-2010)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barricade</td>
<td>226</td>
</tr>
<tr>
<td>Bridge Rail</td>
<td>2062</td>
</tr>
<tr>
<td>Bridge Structure</td>
<td>961</td>
</tr>
<tr>
<td>Building</td>
<td>673</td>
</tr>
<tr>
<td>Crash Cushion</td>
<td>134</td>
</tr>
<tr>
<td>Culvert</td>
<td>2116</td>
</tr>
<tr>
<td>Curb</td>
<td>5042</td>
</tr>
<tr>
<td>Ditch</td>
<td>8823</td>
</tr>
<tr>
<td>Divider/Median Barrier</td>
<td>5823</td>
</tr>
<tr>
<td>Embankment</td>
<td>1889</td>
</tr>
<tr>
<td>Fence/Gate</td>
<td>3824</td>
</tr>
<tr>
<td>Guardrail</td>
<td>4065</td>
</tr>
<tr>
<td>Hydrant</td>
<td>626</td>
</tr>
<tr>
<td>Other</td>
<td>890</td>
</tr>
<tr>
<td>Other Post or Pole</td>
<td>1904</td>
</tr>
<tr>
<td>Overhead Sign Support</td>
<td>82</td>
</tr>
<tr>
<td>Railroad Crossing Fixtures</td>
<td>241</td>
</tr>
<tr>
<td>Sign Post</td>
<td>4272</td>
</tr>
<tr>
<td>Tree</td>
<td>4452</td>
</tr>
<tr>
<td>Unknown/Blank</td>
<td>425</td>
</tr>
<tr>
<td>Utility Devices</td>
<td>6626</td>
</tr>
<tr>
<td>Wall</td>
<td>700</td>
</tr>
</tbody>
</table>
Table H5. Fixed Objects Related Crashes - Kentucky.

<table>
<thead>
<tr>
<th>Fixed Object</th>
<th>Total Object Crashes (2006-2010)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bridge Pier Abutment</td>
<td>478</td>
</tr>
<tr>
<td>Bridge rail</td>
<td>1635</td>
</tr>
<tr>
<td>Building wall</td>
<td>4193</td>
</tr>
<tr>
<td>Cable Barrier</td>
<td>459</td>
</tr>
<tr>
<td>Concrete Barrier</td>
<td>1825</td>
</tr>
<tr>
<td>Crash Cushion</td>
<td>461</td>
</tr>
<tr>
<td>Culvert/Head wall</td>
<td>3450</td>
</tr>
<tr>
<td>Curb</td>
<td>4201</td>
</tr>
<tr>
<td>Embankment/Ditch</td>
<td>39606</td>
</tr>
<tr>
<td>Fence</td>
<td>9866</td>
</tr>
<tr>
<td>Fire Hydrant</td>
<td>1090</td>
</tr>
<tr>
<td>Guardrail</td>
<td>13178</td>
</tr>
<tr>
<td>Other</td>
<td>8302</td>
</tr>
<tr>
<td>Sign Post</td>
<td>3518</td>
</tr>
<tr>
<td>Tree</td>
<td>14138</td>
</tr>
<tr>
<td>Utility Pole</td>
<td>8602</td>
</tr>
</tbody>
</table>
Table H6. Fixed Objects Related Crashes - Louisiana.

<table>
<thead>
<tr>
<th>Fixed Objects</th>
<th>Total Object Crashes (2006-2010)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact Attenuator</td>
<td>271</td>
</tr>
<tr>
<td>Bridge Overhead Structure</td>
<td>654</td>
</tr>
<tr>
<td>Bridge Pier/Support</td>
<td>179</td>
</tr>
<tr>
<td>Bridge Rail</td>
<td>2324</td>
</tr>
<tr>
<td>Culvert</td>
<td>806</td>
</tr>
<tr>
<td>Curb</td>
<td>3046</td>
</tr>
<tr>
<td>Ditch</td>
<td>7644</td>
</tr>
<tr>
<td>Embankment</td>
<td>502</td>
</tr>
<tr>
<td>Guardrail Face</td>
<td>1377</td>
</tr>
<tr>
<td>Guardrail End</td>
<td>288</td>
</tr>
<tr>
<td>Concrete Traffic Barrier</td>
<td>1419</td>
</tr>
<tr>
<td>Other Traffic Barrier</td>
<td>409</td>
</tr>
<tr>
<td>Tree</td>
<td>2013</td>
</tr>
<tr>
<td>Utility Pole</td>
<td>3040</td>
</tr>
<tr>
<td>Traffic Sign Support</td>
<td>1290</td>
</tr>
<tr>
<td>Traffic Signal Support</td>
<td>254</td>
</tr>
<tr>
<td>Other Post/Pole</td>
<td>960</td>
</tr>
<tr>
<td>Fence</td>
<td>1001</td>
</tr>
<tr>
<td>Mailbox</td>
<td>1496</td>
</tr>
<tr>
<td>Other Fixed Object</td>
<td>1928</td>
</tr>
</tbody>
</table>
### Table H7. Fixed Objects Related Crashes - Maine.

<table>
<thead>
<tr>
<th>Fixed Objects</th>
<th>Total Object Crashes (2006-2010)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bridge Piers</td>
<td>149</td>
</tr>
<tr>
<td>Building/Wall</td>
<td>807</td>
</tr>
<tr>
<td>Construction, Barricades, Equipment</td>
<td>96</td>
</tr>
<tr>
<td>Crash Cushion</td>
<td>26</td>
</tr>
<tr>
<td>Culvert Headwall</td>
<td>385</td>
</tr>
<tr>
<td>Embankment, Ditch, Curb</td>
<td>7880</td>
</tr>
<tr>
<td>Fencing</td>
<td>543</td>
</tr>
<tr>
<td>Fire Hydrant/ Parking Meter</td>
<td>326</td>
</tr>
<tr>
<td>Gate or Cable</td>
<td>10</td>
</tr>
<tr>
<td>Light Pole</td>
<td>408</td>
</tr>
<tr>
<td>Median Safety Barrier</td>
<td>562</td>
</tr>
<tr>
<td>Other Guardrails</td>
<td>4088</td>
</tr>
<tr>
<td>Other Poles, Posts, or Supports</td>
<td>495</td>
</tr>
<tr>
<td>R.R. Crossing Device</td>
<td>41</td>
</tr>
<tr>
<td>Rock Outcrops or Ledge</td>
<td>1292</td>
</tr>
<tr>
<td>Sign Structure Post</td>
<td>1244</td>
</tr>
<tr>
<td>Traffic Signal</td>
<td>83</td>
</tr>
<tr>
<td>Tree or Shrubbery</td>
<td>8576</td>
</tr>
<tr>
<td>Utility Pole</td>
<td>5940</td>
</tr>
</tbody>
</table>
Table H8. Fixed Objects Related Crashes - Mississippi.

<table>
<thead>
<tr>
<th>Object Struck</th>
<th>Total Object Crashes (2006-2011)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Animal</td>
<td>2120</td>
</tr>
<tr>
<td>Attenuator/Cushion</td>
<td>92</td>
</tr>
<tr>
<td>Bridge Structure</td>
<td>1737</td>
</tr>
<tr>
<td>Crossover</td>
<td>1018</td>
</tr>
<tr>
<td>Culvert</td>
<td>431</td>
</tr>
<tr>
<td>Curb</td>
<td>1954</td>
</tr>
<tr>
<td>Ditch</td>
<td>4343</td>
</tr>
<tr>
<td>Embankment</td>
<td>1712</td>
</tr>
<tr>
<td>Other Fixed Object</td>
<td>2820</td>
</tr>
<tr>
<td>Fence</td>
<td>607</td>
</tr>
<tr>
<td>Guardrail</td>
<td>1693</td>
</tr>
<tr>
<td>Mailbox</td>
<td>565</td>
</tr>
<tr>
<td>Maintenance Equipment</td>
<td>114</td>
</tr>
<tr>
<td>Median Barrier</td>
<td>1621</td>
</tr>
<tr>
<td>Post/Pole/Support</td>
<td>3218</td>
</tr>
<tr>
<td>Tree</td>
<td>3815</td>
</tr>
<tr>
<td>Fixed Objects</td>
<td>Total Object Crashes (2007-2011)</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>Bridge/Pier/Abutment</td>
<td>113</td>
</tr>
<tr>
<td>Bridge Overhead Structure</td>
<td>25</td>
</tr>
<tr>
<td>Bridge Parapet End</td>
<td>9</td>
</tr>
<tr>
<td>Bridge Rail</td>
<td>283</td>
</tr>
<tr>
<td>Concrete Traffic Barrier</td>
<td>243</td>
</tr>
<tr>
<td>Culvert</td>
<td>115</td>
</tr>
<tr>
<td>Curb</td>
<td>654</td>
</tr>
<tr>
<td>Ditch</td>
<td>1755</td>
</tr>
<tr>
<td>Embankment</td>
<td>274</td>
</tr>
<tr>
<td>Fence</td>
<td>205</td>
</tr>
<tr>
<td>Guardrail End</td>
<td>47</td>
</tr>
<tr>
<td>Guardrail Face</td>
<td>334</td>
</tr>
<tr>
<td>Highway Traffic Sign Post</td>
<td>430</td>
</tr>
<tr>
<td>Impact Attenuator</td>
<td>24</td>
</tr>
<tr>
<td>Luminaire/Light Support</td>
<td>377</td>
</tr>
<tr>
<td>Mailbox</td>
<td>136</td>
</tr>
<tr>
<td>Other Fixed Object</td>
<td>548</td>
</tr>
<tr>
<td>Other Post/Pole/Support</td>
<td>413</td>
</tr>
<tr>
<td>Other Traffic Barrier</td>
<td>30</td>
</tr>
<tr>
<td>Overhead Sign Support</td>
<td>33</td>
</tr>
<tr>
<td>Traffic Signal Support</td>
<td>35</td>
</tr>
<tr>
<td>Tree</td>
<td>351</td>
</tr>
<tr>
<td>Utility Post</td>
<td>205</td>
</tr>
</tbody>
</table>
**Table H11.** Fixed Objects Related Crashes - Virginia.

<table>
<thead>
<tr>
<th>Fixed Objects</th>
<th>Total Object Crashes (2009-2011)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bank or Ledge</td>
<td>6913</td>
</tr>
<tr>
<td>Tress</td>
<td>6352</td>
</tr>
<tr>
<td>Utility Pole</td>
<td>2694</td>
</tr>
<tr>
<td>Fence or Post</td>
<td>1876</td>
</tr>
<tr>
<td>Guardrail</td>
<td>4751</td>
</tr>
<tr>
<td>Parked Vehicle</td>
<td>111</td>
</tr>
<tr>
<td>Tunnel, Bridge, Underpass, Culvert, etc.</td>
<td>907</td>
</tr>
<tr>
<td>Sign, Traffic signal</td>
<td>1574</td>
</tr>
<tr>
<td>Impact Cushioning Device</td>
<td>82</td>
</tr>
<tr>
<td>Other</td>
<td>3980</td>
</tr>
<tr>
<td>Jersey Wall</td>
<td>1481</td>
</tr>
<tr>
<td>Building/Structure</td>
<td>433</td>
</tr>
</tbody>
</table>
Table H12. Fixed Objects Related Crashes - Washington.

<table>
<thead>
<tr>
<th>Fixed Objects</th>
<th>Total Object Crashes (2006-2010)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roadway Ditch</td>
<td>12,566</td>
</tr>
<tr>
<td>Tree or Stump (stationary)</td>
<td>10,684</td>
</tr>
<tr>
<td>Fence</td>
<td>9,136</td>
</tr>
<tr>
<td>Utility Pole</td>
<td>8,426</td>
</tr>
<tr>
<td>Concrete Barrier/Jersey Barrier - Face</td>
<td>8,258</td>
</tr>
<tr>
<td>Guardrail - Face</td>
<td>6,979</td>
</tr>
<tr>
<td>Earth Bank or Ledge</td>
<td>5,608</td>
</tr>
<tr>
<td>Wood Sign Post</td>
<td>4,821</td>
</tr>
<tr>
<td>Over Embankment - No Guardrail Present</td>
<td>4,094</td>
</tr>
<tr>
<td>Bridge Rail - Face</td>
<td>3,767</td>
</tr>
<tr>
<td>Street Light Pole or Base</td>
<td>3,583</td>
</tr>
<tr>
<td>Curb, Raised Traffic Island or Raised Median Curb</td>
<td>3,490</td>
</tr>
<tr>
<td>Mailbox</td>
<td>2,521</td>
</tr>
<tr>
<td>Retaining Wall (concrete, rock, brick, etc.)</td>
<td>2,153</td>
</tr>
<tr>
<td>Other Objects</td>
<td>1,967</td>
</tr>
<tr>
<td>Building</td>
<td>1,649</td>
</tr>
<tr>
<td>Cable Barrier</td>
<td>1,643</td>
</tr>
<tr>
<td>Boulder (stationary)</td>
<td>1,185</td>
</tr>
<tr>
<td>Fire Hydrant</td>
<td>1,131</td>
</tr>
<tr>
<td>Utility Box</td>
<td>992</td>
</tr>
<tr>
<td>Guardrail - Leading End</td>
<td>967</td>
</tr>
<tr>
<td>Snow Bank</td>
<td>783</td>
</tr>
<tr>
<td>Metal Sign Post</td>
<td>774</td>
</tr>
<tr>
<td>Culvert and/or other Appurtenance in Ditch</td>
<td>756</td>
</tr>
<tr>
<td>Rock Bank or Ledge</td>
<td>686</td>
</tr>
<tr>
<td>Guardrail - Through, Over or Under</td>
<td>529</td>
</tr>
<tr>
<td>Crash Cushions - Impact Attenuators</td>
<td>498</td>
</tr>
<tr>
<td>Into River, Lake, Swamp, etc.</td>
<td>415</td>
</tr>
<tr>
<td>Signal Pole</td>
<td>413</td>
</tr>
<tr>
<td>Traffic Signal Pole or Box</td>
<td>404</td>
</tr>
<tr>
<td>Underside of Bridge</td>
<td>314</td>
</tr>
<tr>
<td>Fixed Objects</td>
<td>Total Object Crashes (2006-2010)</td>
</tr>
<tr>
<td>---------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>Temporary Traffic Sign or Barricade</td>
<td>274</td>
</tr>
<tr>
<td>Not Stated</td>
<td>233</td>
</tr>
<tr>
<td>Guide Post</td>
<td>193</td>
</tr>
<tr>
<td>Concrete Barrier/Jersey Barrier - Through, Over or Under</td>
<td>127</td>
</tr>
<tr>
<td>Bridge Column, Pier or Pillar</td>
<td>120</td>
</tr>
<tr>
<td>Construction Materials</td>
<td>109</td>
</tr>
<tr>
<td>Railway Crossing Gate</td>
<td>101</td>
</tr>
<tr>
<td>Concrete Barrier/Jersey Barrier - Leading End</td>
<td>97</td>
</tr>
<tr>
<td>Manhole Cover</td>
<td>85</td>
</tr>
<tr>
<td>Bridge Rail - Leading End</td>
<td>82</td>
</tr>
<tr>
<td>Bridge Abutment</td>
<td>47</td>
</tr>
<tr>
<td>Bridge Rail - Through, Over or Under</td>
<td>38</td>
</tr>
<tr>
<td>Railway Signal Pole</td>
<td>37</td>
</tr>
<tr>
<td>Parking Meter</td>
<td>30</td>
</tr>
<tr>
<td>Overhead Sign Support</td>
<td>21</td>
</tr>
<tr>
<td>Reversible Lane Control Gate</td>
<td>19</td>
</tr>
<tr>
<td>Toll Booth Island</td>
<td>6</td>
</tr>
<tr>
<td>Drawbridge Crossing Gate Arm</td>
<td>5</td>
</tr>
<tr>
<td>Miscellaneous Object or Debris on Road</td>
<td>4</td>
</tr>
<tr>
<td>Toll Booth</td>
<td>4</td>
</tr>
<tr>
<td>Closed Toll Gate</td>
<td>4</td>
</tr>
<tr>
<td>Mud or Landslide</td>
<td>2</td>
</tr>
</tbody>
</table>