All Roads Transportation Safety (ARTS) Program

Using Federal HSIP funds

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Oregon Department of Transportation
August 2016
Federal Highway Safety Improvement Program (HSIP) Requirements

- Projects that Reduce fatalities and serious injuries
- Address safety on all public roads
- Data-driven safety analysis
- Consistent with States Strategic Safety Plan (address Emphasis Areas)
- HSIP Yearly Evaluation of Program
ARTS program principles

- Meet all requirements of HSIP (to be eligible for federal funding)
- Engage local agencies in the project selection process
- Funding allocation to Regions based on fatal and serious injury crashes
- Combination of Hot Spots and Systemic
- Projects selected by ODOT Regions and local agencies
- Blind to Jurisdiction
Funding Breakdown

The $87 million of 2022-2024 funds for the ARTS program (as determined by the Oregon Transportation Commission) was allocated to each ODOT region based on the relative frequency of fatalities and serious injuries. Within each region, approximately half of the funding was allocated for hot spot projects and half was allocated to systemic projects. This split is consistent with strategies identified in 2016 Oregon Transportation Safety Action Plan (TSAP), which identifies intersections and roadway departure as subareas under the Infrastructure Emphasis Area; and pedestrians and bicyclist as subareas under the Vulnerable Users Emphasis Area.
Agency Outreach and Coordination

ODOT hired a consultant to provide outreach and support to local jurisdictions

- Region kick off and informational meetings
- Data analysis
- Local agency support meetings
- Support for filling out applications

70% of the LPAs used the ODOT provided consultant technical support
## Crash Data

- Crashes are compiled for all reported crashes
- State Highways, City Streets and County Roads
- Supports various programs and planning efforts
- Data is checked and released about mid-year for previous year

### Crash Data Table

<table>
<thead>
<tr>
<th>Date</th>
<th>Type</th>
<th>MILE</th>
<th>CRASH DATE</th>
<th>STRIKE</th>
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<th>NO OFF</th>
<th>DAY/NIGHT</th>
<th>SURFACE</th>
<th>EVENTS</th>
<th>ROAD CHAR</th>
<th>OFF ROW</th>
<th>COLLISION TYPE</th>
<th>CAUSES</th>
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<td>2</td>
<td>0</td>
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<td>03</td>
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<td>N</td>
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<td>0</td>
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<td>06/06/2012</td>
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<td>Y FIX</td>
<td>01</td>
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</table>
Network Screening - Hot Spot

- SPIS - Safety Priority Index System (yearly around June to August)
- Uses Crash data by severity and location
- All public roads functional class collector or higher
- Site must have a Fatal or Serious Injury
- Must address crash problem

<table>
<thead>
<tr>
<th>Rd</th>
<th>Rte</th>
<th>Rdwy</th>
<th>BMP</th>
<th>EMP</th>
<th>Length</th>
<th>ADT</th>
<th>Crash</th>
<th>Fatal</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>PDO</th>
<th>City</th>
<th>County</th>
<th>Connection</th>
<th>Percent</th>
<th>SPIS</th>
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<tr>
<td>171</td>
<td>OR-213</td>
<td>1</td>
<td>4.27</td>
<td>4.36</td>
<td>0.09</td>
<td>37,500</td>
<td>146</td>
<td>0</td>
<td>3</td>
<td>9</td>
<td>60</td>
<td>74</td>
<td>Clackamas</td>
<td>HWY. 064 M.P. (2)/13.18</td>
<td>95</td>
<td>93.10</td>
<td></td>
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<tr>
<td>047</td>
<td>US-26</td>
<td>1</td>
<td>73.29</td>
<td>73.83</td>
<td>0.54</td>
<td>85,577</td>
<td>313</td>
<td>0</td>
<td>1</td>
<td>30</td>
<td>158</td>
<td>194</td>
<td>Portland</td>
<td>Multnomah</td>
<td>OR/CN. M.P. 2/73.81</td>
<td>95</td>
<td>90.15</td>
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<tr>
<td>160</td>
<td>OR-213</td>
<td>1</td>
<td>2.89</td>
<td>3.07</td>
<td>0.18</td>
<td>35,066</td>
<td>91</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>36</td>
<td>50</td>
<td>Oregon City</td>
<td>Clackamas</td>
<td>LEG (FROM BEAVERCREEK RD.)</td>
<td>95</td>
<td>89.88</td>
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<td>26,800</td>
<td>137</td>
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<td>5</td>
<td>7</td>
<td>65</td>
<td>60</td>
<td>Portland</td>
<td>Multnomah</td>
<td>SE KELLY ST.</td>
<td>95</td>
<td>89.65</td>
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</table>
Network Screening - Systemic

- Emphasis areas:
  - Roadway Departure,
  - Intersections and Ped/Bike

- Develop plan of potential corridors with target crashes

- Target Crashes

- Basic Roadway features and site characteristics

Enhanced Signs and Markings for Curves Plus Flashing Beacons – State Rural Roads – 3,000-5,001 AADT

Threshold = 10

<table>
<thead>
<tr>
<th>COUNTY</th>
<th>HWY_NO</th>
<th>HWY_NAME</th>
<th>LOC_3000</th>
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<td>Washington</td>
<td>140</td>
<td>HILLSBORO-SILVERTON</td>
<td>15</td>
<td>18</td>
<td>1.47%</td>
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<tr>
<td>Douglas</td>
<td>9</td>
<td>OREGON COAST</td>
<td>355</td>
<td>18</td>
<td>1.47%</td>
</tr>
<tr>
<td>Lincoln</td>
<td>33</td>
<td>CORVALLIS-NEWPORT</td>
<td>29</td>
<td>16</td>
<td>1.31%</td>
</tr>
<tr>
<td>Douglas</td>
<td>9</td>
<td>OREGON COAST</td>
<td>364</td>
<td>14</td>
<td>1.14%</td>
</tr>
<tr>
<td>Washington</td>
<td>140</td>
<td>HILLSBORO-SILVERTON</td>
<td>14</td>
<td>13</td>
<td>1.06%</td>
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<tr>
<td>Tillamook</td>
<td>9</td>
<td>OREGON COAST</td>
<td>84</td>
<td>12</td>
<td>0.98%</td>
</tr>
<tr>
<td>Washington</td>
<td>140</td>
<td>HILLSBORO-SILVERTON</td>
<td>17</td>
<td>12</td>
<td>0.98%</td>
</tr>
<tr>
<td>Douglas</td>
<td>45</td>
<td>UMPQUA</td>
<td>31</td>
<td>11</td>
<td>0.90%</td>
</tr>
<tr>
<td>Lane</td>
<td>63</td>
<td>FLORENCE-EUGENE</td>
<td>63</td>
<td>11</td>
<td>0.90%</td>
</tr>
</tbody>
</table>
**Countermeasures with Crash Reduction Factors**

**ODOT Approved list of Mitigations**

- **Countermeasures** – a treatment or mitigation to reduce crashes
- **Crash Reduction Factors (CRFs)** – expected percentage change in number crashes
- Only approved measures can be used and measures must address crashes at the site

<table>
<thead>
<tr>
<th>Consider for Hotspot</th>
<th>Countermeasure Number</th>
<th>Countermeasure</th>
<th>Crash Type</th>
<th>Injury, PDO or All</th>
<th>Service Life (Years)</th>
<th>Existing Intersection Traffic Control</th>
<th>Urban or Rural</th>
<th>CRF %</th>
<th>Range of CRF</th>
<th>Who’s CRF?</th>
</tr>
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<tbody>
<tr>
<td>N/A</td>
<td>H24</td>
<td>Install Rural Median Acceleration Lane</td>
<td>All</td>
<td>All Injury</td>
<td>20</td>
<td>Non Signal</td>
<td>Rural</td>
<td>45</td>
<td>20 - 79%</td>
<td>Clearinghouse (not in HSM)</td>
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<tr>
<td>N/A</td>
<td>H25</td>
<td>Install Lighting at Intersection</td>
<td>Night</td>
<td>All Injury</td>
<td>20</td>
<td>Signal or Non Signal</td>
<td>Either</td>
<td>38</td>
<td>31 - 38%</td>
<td>HSM</td>
</tr>
<tr>
<td>N/A</td>
<td>H26</td>
<td>Install Lighting on a Roadway Segment</td>
<td>Night</td>
<td>All Injury</td>
<td>20</td>
<td>None - Roadway</td>
<td>Either</td>
<td>28</td>
<td>17 - 26%</td>
<td>HSM</td>
</tr>
<tr>
<td>N/A</td>
<td>H27</td>
<td>Install Any Type of Median Barrier</td>
<td>All</td>
<td>All Injury</td>
<td>20</td>
<td>None - Roadway</td>
<td>Either</td>
<td>30</td>
<td>-24 - 43%</td>
<td>HSM</td>
</tr>
<tr>
<td>N/A</td>
<td>H28</td>
<td>Install New Guardrail (Non-Median Barrier Application)</td>
<td>Run off the Road</td>
<td>All Injury</td>
<td>20</td>
<td>None - Roadway</td>
<td>Either</td>
<td>47</td>
<td>44 - 47%</td>
<td>Clearinghouse (not in HSM)</td>
</tr>
<tr>
<td>N/A</td>
<td>H29</td>
<td>Install Two Way Left Turn Lane on 2-Lane Road</td>
<td>Rear-end</td>
<td>All</td>
<td>20</td>
<td>None - Roadway</td>
<td>Either</td>
<td>38</td>
<td>-5 - 53%</td>
<td>Clearinghouse (not in HSM)</td>
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<tr>
<td>N/A</td>
<td>H30</td>
<td>Reduce Urban Driveways from 45 to 26 - 45 per mile</td>
<td>All</td>
<td>All Injury</td>
<td>20</td>
<td>None - Roadway</td>
<td>Urban</td>
<td>29</td>
<td>25 - 31%</td>
<td>HSM</td>
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<tr>
<td>N/A</td>
<td>H31</td>
<td>Reduce Urban Driveways from 26 - 45 to less than 10 per mile</td>
<td>All</td>
<td>All Injury</td>
<td>20</td>
<td>None - Roadway</td>
<td>Urban</td>
<td>31</td>
<td>25 - 31%</td>
<td>HSM</td>
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<td>Reduce Urban Driveways from 10 - 24 to less than 10 per mile</td>
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<td>All Injury</td>
<td>20</td>
<td>None - Roadway</td>
<td>Urban</td>
<td>25</td>
<td>25 - 31%</td>
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<td>Provide a Raised Median, Urban 2-Lane Road</td>
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<td>36%</td>
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<td>Provide a Raised Median, Urban Multi-Lane Road</td>
<td>All</td>
<td>All Injury</td>
<td>20</td>
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<td>Urban</td>
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<td>0 - 22%</td>
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<td>H35</td>
<td>Provide a Raised Median, Rural Multi-Lane Road</td>
<td>All</td>
<td>All Injury</td>
<td>20</td>
<td>None - Roadway</td>
<td>Rural</td>
<td>12</td>
<td>0 - 22%</td>
<td>HSM</td>
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</table>
Hot spot countermeasures (higher cost)

- 47% reduction in Injury ROR crashes
- 30% reduction in injury crashes
- 67% reduction Angle
- 143% increase in Rear-end
- 82% reduction in injury crashes
- 33% reduction in all crashes
- 6% reduction for every foot widened

Courtesy: FHWA
Systemic countermeasures (lower cost)

- 70% reduction in pedestrian crashes
- 36% reduction in bike crashes
- 30% reduction in night curve crashes
- 22% reduction in ROR crashes
- 13% reduction in injury crashes
- 9% reduction in night crashes
- 20% reduction in all crashes

Courtesy: FHWA
Determine potential sites (from SPIS, Plans or other)

Analyze crashes and Diagnose sites

Evaluate benefits and costs with eligible measures from ODOT CRF list addressing crash problem at the site

Complete Application with supporting materials

Submit Application to ODOT

Diagnose Sites and Submit Applications
Applications

- Benefit Cost worksheet
- Project Description
- Traffic Volumes
- Identification of problems
- Proposed Mitigations that directly address problems
- Aerial Vicinity Map
- Crash Data
- Warrant Studies (if needed)
- Collision Diagram
Project Selection

Applications are prioritized and refined
150-200% List

- Evaluate applications (are they addressing the problem)
- Validate countermeasure applicability, scope and cost of projects
- Prioritize applications based on benefit cost
- Create 150-200% list of potential STIP projects
- Verify project details and support with local agencies

<table>
<thead>
<tr>
<th>Crash Type</th>
<th>Site Specific Crash Count</th>
<th>Site Specific Proportion</th>
<th>Statewide Proportion</th>
<th>Chance of Observing</th>
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<td>Right angle</td>
<td>5</td>
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<td>27%</td>
<td>92%</td>
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<td>0%</td>
<td>1%</td>
<td>--</td>
</tr>
<tr>
<td>Fixed object</td>
<td>3</td>
<td>10%</td>
<td>3%</td>
<td>6%</td>
</tr>
<tr>
<td>Left-turn</td>
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<td>9%</td>
<td>--</td>
</tr>
<tr>
<td>Other multiple-vehicle</td>
<td>10</td>
<td>33%</td>
<td>8%</td>
<td>0.01%</td>
</tr>
<tr>
<td>Pedestrian</td>
<td>0</td>
<td>0%</td>
<td>1%</td>
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<td>Rear-end</td>
<td>9</td>
<td>30%</td>
<td>44%</td>
<td>95%</td>
</tr>
<tr>
<td>Sideswipe, opposite direction</td>
<td>0</td>
<td>0%</td>
<td>2%</td>
<td>--</td>
</tr>
<tr>
<td>Sideswipe, same direction</td>
<td>2</td>
<td>7%</td>
<td>5%</td>
<td>43%</td>
</tr>
<tr>
<td>Total</td>
<td>29</td>
<td>100%</td>
<td>100%</td>
<td>--</td>
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</table>
Timelines

- **Consultant Solicit project Applications**
  - Compile preliminary list for locals
  - Present information to local agencies at each region

- **Prepare and submit Applications**
  - ODOT and LPAs diagnose potential sites
  - Prepare applications

- **Review and Prioritize Applications**
  - Regions review applications
  - Regions prioritize and create 150% list

- **Jan – March 2018** 90 days
  - Next Round: Sept 2020

- **March – May 2018** 60 days
  - Dec 2020 (90 days)

- **May – July 2018** 60 days
  - March 2021
Results from ARTS - Round 2 (2022-2024 Projects)

- 232 Applications ($245 million)
- Prioritized list to 184 projects for 300% list (three times $87 million)
- Further refine project budgets and verify projects with local agencies
- 133 projects selected in 150% list for scoping
- 39% Hot Spot and 61% Systemic

The 300% list includes enough projects to spend 300% of available funding, which provides ODOT flexibility in project scoping and delivery. The 150% list of candidate projects moves forward into scoping.
ARTS Projects

Four different program areas

All Regions had enough applications to spend 300% of the available funding

Highest priority (best benefit cost) moved forward to the 150% list (132 applications) to be scoped
Number of Projects and LPAs

- How many projects per region? (150% List)
  - Region 1: 45
  - Region 2: 51
  - Region 3: 14
  - Region 4: 15
  - Region 5: 7

- How many agencies submitted applications?
  - Unique Cities: 17
  - Unique Counties: 15
Lessons Learned

• Some requested an earlier start on outreach to allow for additional planning and technical support.

• Some expressed a desire for separate funding for proven countermeasures, (i.e., roundabouts and road diets) to encourage their use.

• ODOT needs to clarify approved funding from previous cycles.

• More data analysis and overview of problem areas for LPAs.

• Years of data used proved problematic for some agencies.

• Promote countermeasure list more with applicants.
Lessons Learned

• Estimating project costs was the most difficult part
• A consistent tool for estimating costs
• Some LPAs struggled to complete the Benefit calculations, over estimating safety benefits or doubling counting was a common error
• The Cost Effectiveness Index (CEI) for Bike and Ped projects was confusing
• Develop additional training for benefit cost calculations
• Review the need for one on one support for LPAs
2018 ARTS - A Success!

Goal - to reduce fatal and serious injuries on all roads in Oregon

ODOT promoted best practices for infrastructure safety on state and local agency roads

ODOT and LPAs submitted 242 project applications asking for $245 million in funding

It is expected that the final 100% list to be incorporated in the STIP will reduce the number and severity of crashes throughout Oregon

Next STIP cycle will incorporate the lessons learned and improve!
Thank You

For more info, please contact:

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