Scan 12-01 Advances in State DOT Superload Permit Processes and Practices
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There is a need to better understand the current State-of-Practice for “Superload” permitting as practiced by the States. This scan aims to gather and identify best practices, not only to become more efficient individually, but perhaps to improve the safety, mobility, and uniformity in transporting these large loads amongst all the States.
# 12-01 Panel

<table>
<thead>
<tr>
<th>Name</th>
<th>Organization</th>
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<tbody>
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<td>Idaho Transportation Dept. Chair</td>
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<td>FHWA</td>
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<td>Wisconsin DOT</td>
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<td>Randy Braden</td>
<td>Alabama DOT</td>
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<td>Jeff Honefanger</td>
<td>Ohio DOT</td>
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<td>Kevin Keady, P.E.</td>
<td>Caltrans</td>
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<td>Jonathan Mallard, P.E.</td>
<td>Virginia DOT</td>
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<td>Michael Wight, P.E.</td>
<td>Maine DOT</td>
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<td>Hani Nassif, P.E. Ph.D.</td>
<td>Report Facilitator</td>
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<td>SCAN MANAGEMENT</td>
<td>Arora and Associates, P.C. Lawrenceville, NJ</td>
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</tbody>
</table>
Introduction

Scan Approach (3 Stages)

• **Stage 1: Desk scan.**
  - Detailed literature review regarding the superload permitting practices and new development.
  - Multiple DOTs were surveyed to collect information regarding legal and superload limits and representative States were selected for further investigation.

• 18 states were selected: Florida, New York, California, Illinois, Indiana, Michigan, Ohio, Pennsylvania, Texas, Wisconsin, Washington, Idaho, Virginia, Louisiana, Maine, Minnesota, South Dakota, and Alabama.
Introduction

Scan 12-01 Host States
Introduction

Scan Approach (3 Stages)

• **Stage 2**: Comprehensive questionnaire with amplifying questions was distributed to the selected states and the current practices were collected:

  
  Topic 2. Current State-of-Practice of OW/OS permit monitoring, data analyzing and compliances.
  
  Topic 3. Current practices with regard to bridge analysis and rating for OW/OS vehicles.
  
  Topic 4. Current practices with regard to better uniformity in OW/OS permitting.
  
  Topic 5. Permit Questions.
Introduction

Scan Approach (3 Stages)

- **Stage 3**: Establish a workshop with DOT representative and oversize/overweight load permitting offices from various States.
  - A workshop was held to identify the best practices and propose the implementation plan and recommendations for the future.
## Introduction

<table>
<thead>
<tr>
<th>State</th>
<th>GVW (kips)</th>
<th>Steering Axle (kips)</th>
<th>Axle (kips)</th>
<th>Tandem (kips)</th>
<th>Tridem (kips)</th>
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<tbody>
<tr>
<td>Florida</td>
<td>80</td>
<td>22</td>
<td>22</td>
<td>44</td>
<td>66</td>
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<tr>
<td>New York</td>
<td>80</td>
<td>22.4</td>
<td>22.4</td>
<td>36</td>
<td>42</td>
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<tr>
<td>California</td>
<td>80</td>
<td>20</td>
<td>20</td>
<td>34 min and up. Depends on axle spacings</td>
<td>34 min and up. Depends on axle spacings</td>
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<tr>
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<td>80</td>
<td>20</td>
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<td>Indiana</td>
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<tr>
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<td>164*</td>
<td>12</td>
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<td>34</td>
<td>39</td>
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<td>Pennsylvania</td>
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<td>20/22.4**</td>
<td>34/36***</td>
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<td>Texas</td>
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<td>42</td>
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<tr>
<td>Wisconsin</td>
<td>80</td>
<td>20</td>
<td>20</td>
<td>34</td>
<td>42</td>
</tr>
<tr>
<td>Washington</td>
<td>105.5</td>
<td>20</td>
<td>20</td>
<td>34</td>
<td>Federal Bridge Formula</td>
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<tr>
<td>Idaho</td>
<td>80</td>
<td>0.6 kips/in.width of tire</td>
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<td>34</td>
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<tr>
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<tr>
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<td>34</td>
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<tr>
<td>Alabama</td>
<td>80</td>
<td>12</td>
<td>20</td>
<td>34</td>
<td>42</td>
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</tbody>
</table>

* There is an indirect limit caused by a combination of the maximum legal length of vehicles, maximum legal axle loads, axle spacing and total number of axles allowed.

** 20 kips for GVW > 73.28 kips and 22.4 kips for GVW of 73.28 kips or under

*** 34 kips for GVW > 73.28 kips and 36 kips for GVW of 73.28 kips or under
<table>
<thead>
<tr>
<th>State</th>
<th>Permit Weight Limits</th>
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<tbody>
<tr>
<td>Florida</td>
<td>No tire may exceed 550 lbs per inch of tire section width</td>
</tr>
<tr>
<td>New York</td>
<td>Depends on routes, axle spacings and vehicle configuration</td>
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<tr>
<td>California</td>
<td>Depends on axle spacings</td>
</tr>
<tr>
<td>Illinois</td>
<td>Depends on axles 20 25 44-48 60</td>
</tr>
<tr>
<td>Indiana</td>
<td>120 28 28 48 60</td>
</tr>
<tr>
<td>Michigan</td>
<td>Depends on routes, vehicle gauge and tire sizes</td>
</tr>
<tr>
<td>Ohio</td>
<td>120 29 36/50* 47/60**</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>- 27 52 63</td>
</tr>
<tr>
<td>Texas</td>
<td>254.3 - 25 46 60</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>- 20 30 81</td>
</tr>
<tr>
<td>Washington</td>
<td>- 600 lbs/in. width 22 43 65</td>
</tr>
<tr>
<td>Idaho</td>
<td>Depends on routes, axle spacings and vehicle configuration</td>
</tr>
<tr>
<td>Virginia</td>
<td>- 24 24 44</td>
</tr>
<tr>
<td>Louisiana</td>
<td>- - 24/20*** 48/40**** 60</td>
</tr>
<tr>
<td>Maine</td>
<td>- - - 39.1 62.1</td>
</tr>
<tr>
<td>Minnesota</td>
<td>Depends on axles 20 40/46**** 60</td>
</tr>
<tr>
<td>South Dakota</td>
<td>Permits may be issued up to 1.533 times the legal bridge limit. Maximum weight on an axle is limited to 600 lbs/inch tire width.</td>
</tr>
<tr>
<td>Alabama</td>
<td>- - 22 44 66</td>
</tr>
</tbody>
</table>

* 36 kips for 4’ spacing and greater, 50 kips for 4’ spacing
** 47 kips for 4’ spacing and greater, 60 kips for 4’ spacing
*** 24 kips for GVW of 120 kips and below and 20 kips for GVW greater than 120 kips
**** 48 kips for GVW of 120 kips and below and 40 kips for GVW greater than 120 kips
***** 46 kips w/bridge check
“Superload” WASHTO (2009)
Findings and Observations based on Responses to Amplifying Questions and Discussions during Workshop

- **Permitting offices and staffs:**
  - About half the States centralize their permitting functions. States such as Alabama, California, Illinois, Michigan, Minnesota, Ohio, Texas, Virginia.
  - While the other participating States decentralize and have more than one office to handle permits.
Findings and Observations

- **Number of permits issued every year**
  - The number of permits issued every year varies significantly from State to State. For example, **Texas** has **268,491** permits issued for the year of 2012.
  - All the States issued permits with some permits being automated and self-issued, while some permits require special analysis.
Findings and Observations

• **Definition of superload**
  The definition of superload varies amongst participating scan States. Some have no definition, some define based on the dimensions only (e.g. Michigan) or weight only (e.g. Florida), or a combination of both dimensions and gross vehicle weight (e.g. New York).

• **Number of revisions allowed**
  A number of the states allows unlimited revisions till the permit is issued (e.g., Alabama) while other states only allow a limited number of revisions (e.g., Illinois). Moreover, 33% of the participated states do not allow revisions on the permit once the permit is issued (e.g., Wisconsin).
Findings and Observations

• Permitted vehicles allowed to leave the designated route

• Bridge analysis methods
  44% of participating States use LFR only or dominantly, while 56% of selected States also use other methods (i.e. LFR, LRFR, or ASR)
Findings and Observations

• **Speed and traffic restriction on permits**
  Most of states use speed and traffic restriction on permits. Some of the states occupy two lanes and/or speed limits for superloads (e.g., Minnesota) while some of the states even have more severe restrictions. For instance, the State of Maine restricted the speed to 5 mph and only allow one vehicle along centerline of the bridge for severe conditions.

• **Modifications to AASHTO Method**
  - 43% of participating States have no modification to AASHTO load rating method:
  - 57% of participating States have modification to AASHTO load rating method: California Idaho, Louisiana, Michigan, New York State, Virginia, Washington State.
Findings and Observations

• Load rating level for acceptance criteria
  Most of the states (83% of participating States) use operating level as acceptance criteria except Maine (usually inventory level) and Texas (do not use a load rating level when considering a superload).

• Refined analysis for OS/OW rating
  Most of the participating states use refined analysis for certain conditions (e.g. Maine use refined analysis for the bridge in poor condition and no other routes are available). AASHTOWare is the most popular software for refined analysis.

• Computer software for OS/OW rating
  Most of the states use AASHTOWare for OS/OW rating while some of the states use in-house software for OS/OW rating (e.g. Maine and Virginia).
Findings and Observations

• **Joint State coalitions for better uniformity**
  Most of the states already are or are willing to be a members of State coalitions that aim at improving permitting.

• **Hands-on analysis/review for permits**
  Nearly all the States have developed screening systems to facilitate permit review or automated on-line systems.

  About half of the participating States report that more than 5% of single-trip permits issued require hands on analysis/review. About half report that less than 5% of permits issued require hands on analysis.

  What percentage of single-trip permits requires hand-on analysis/review by a structural engineer?

  ![Pie chart showing 53% >5% and 47% <5%](chart.png)
Select Best Practices from DOTs

- Many States have established a Superload weight threshold for screening purposes, but there is no single definition.
- Many States weigh Superload permit vehicles to verify axle loads, some States inspect permit vehicles to verify rigging, vehicle maintenance and good working order.
- Many States have an automated system for issuing permits.
- Many States have embraced Automation, but require rigorous QA/QC for reliable and verifiable bridge information.
More Select Best Practices from DOTs

- Washington - offers training on permit policies and statues to State police, load raters and others.
- New York - requires heavy haulers to hire consultants for Superload analysis.
- Pennsylvania – developed a P3 to fund an automated permitting system.
- Florida - Customer is responsible for horizontal and vertical clearance checks, reduces risk on the State.
- Indiana - 200,000 lbs or greater and/or over 17 feet wide requires police escort.
Recommendations for harmonization:

- Collectively consider developing a National Permit Map with Heavy Haul Corridors among different States with industry participation.

- Collectively consider developing a national or regional “Superload” permit vehicle with industry participation.

- Encourage cross-cultural meetings and regional collaboration for routine and annual permits to ensure harmonization.

- Educate, collaborate and assist local jurisdictions with permits.
Consider-
- Establishing **route surveys**.
- Performing vehicle inspections.
- **Verify vehicle/axle weights** prior to moves.
- Requiring submittal of detailed shop drawings of the hauled weight.
- Performing **pre- and post-move surveys** for bridges to establish what kind of damage could be or was caused by the move.
- Consider **training and education for local jurisdictions** regarding overweight permits and superloads.
- Consider **certification for truck operators** regarding truck leveling and load distribution systems including certification for escort services.
• **Recommendations to AASHTOWare BrR:**
  
  – Develop a rapid route capacity analysis module for AASHTOWare BrR to facilitate on-line self-issuance permitting.
Recommendations for Automation Process for Self Issuance Permitting

(1) Central database
(2) Data entry and verification interface (Graphical User Interface (GUI))
(3) Routing system module with geographical database.
(4) Bridge structural analysis module with Application Program Interface (API)
(5) Payment and billing system with user interface
• **Future Trends:**
  - Geofencing
  - Virtual routes.
  - Crowdsourcing.
  - WIM for enforcement of permit weights and routes.
  - New Information Sharing Technologies
Recommendations for Future Research

- Research or information sharing is needed to confirm the assumptions made regarding lift/drop axles, self-propelled cranes, platform trailers and other loading mechanisms. (e.g., Self-leveling suspension, etc.).

- Further research for bridge load testing and “Smart Bridge” technology is necessary to verify assumptions.

- There is a need for funding to develop advanced sensing technology in regards to fatigue and fracture.

- Further advances in refined analysis techniques and guidance with examples highlighting when refined analysis can be beneficial.

- Develop criteria or guidance for load raters when analyzing or permitting “Superloads” over 1,000,000 pounds.
Acknowledgement

• National Cooperative Highway Research Program (NCHRP).

• Thanks to technical project panel for the guidance and Dr Nassif for all their hard work.

• Thanks to Harry Capers and Arora and Associates for Scan Management responsibilities.

• U.S. Federal Highway Administration and other agencies.
Thank you!