Stakeholder Sessions 2013-2015: Feedback and Comments

Final Report

Comprehensive Truck Size and Weight Limits Study

April 2016

U.S. Department of Transportation

Federal Highway Administration

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1. INTRODUCTION

The Moving Ahead for Progress in the 21st Century Act (MAP-21) required the Secretary of Transportation to conduct a study and submit a report to Congress related to truck size and weight issues. The resulting Comprehensive Truck Size and Weight Limits (CTSWL) Study by the U.S. Department of Transportation (DOT) provided a comparative assessment between trucks operating at or within current Federal limits and trucks that operate above those limits. This report presents a quantitative and qualitative analysis of trends, themes, and patterns identified through the review of the comments received as part of this Study effort. This material also provides a summary of the disposition of those comments by the Department's subject matter experts who led the technical research.

The Federal Highway Administration (FHWA) oversaw the development and delivery of the Study and prepared the final Report to Congress, informed in part by input solicited in an open process from public meetings, webinars, and other tools to facilitate communication and engagement with the wide range of interested parties.

In the beginning, the FHWA assembled an internal DOT Policy Oversight Group (POG) to guide the technical work. The POG consisted of representatives from FHWA, Federal Motor Carrier Safety Administration (FMCSA), National Highway Traffic Safety Administration (NHTSA), Maritime Administration (MARAD), Federal Railroad Administration (FRA), and the Office of the Secretary of Transportation (OST). In addition, FHWA engaged a DOT Technical Oversight Team (TOC) comprised of FHWA, FMCSA, FRA, and NHTSA staff to develop the Statement of Work to procure contractual services and assist in overseeing the technical work. Finally, under contract to FHWA, the National Academy of Sciences (NAS) seated an independent Peer Review Panel to review and comment on the Desk Scans and resulting technical reports.

This report provides an analysis of the many comments received, presented in the following sections:

- **Section 2** describes the methodology used to compile and categorize comments and provides background information useful for understanding comments pertaining to the truck configurations analyzed as part of the Study,
- **Section 3** provides a quantitative summary of the comments by topic, by format received;
- **Section 4** presents a summary of key themes and trends; and,
- The **Appendices (A-D)** provide the disposition by DOT of individual comments.

2. METHODOLOGY

2.1 Acquiring Stakeholder Comments

The DOT received comments from stakeholders throughout the Study period beginning in May 2013 through the release of the technical reports in June 2015. The docket will remain open for a period of time following the release of the final Report to Congress. Most of public input was generated during and following four public input events convened by the Department to share information on the Study and gather feedback.

The first event, held on May 29, 2013, was conducted as an in-person meeting held at DOT, with webcasting to allow for broad participation. The Department leadership and FHWA team provided an introduction to the CTSWL Study. This event incorporated live breakout sessions for discussion of subsets of the technical areas of the Study. One session focused on the selection of the alternative configurations; another dealt with data, models and methodology. Topics such as pavement impacts, bridge impacts, modal shift, safety, compliance and enforcement were covered. Questions received during the live breakout sessions were addressed during the live sessions where possible; these questions as well as other feedback and suggestions were captured in a comment matrix. Comments related to the alternative truck configurations were compiled and used as part of the selection process. Additional comments received during the webinar through the chat box or verbally were recorded and included in a comment matrix. Comments subsequently received by letter or email following the event were included in the matrix.

The second stakeholder event, held on December 18, 2013, was conducted as a webinar and provided an update on the selected alternative truck configurations and on the progress of the Study. The third stakeholder event was conducted as a webinar on May 6, 2014. The event provided an overview of the Study's scope and purpose, Desk Scans and the NAS Peer Review Report #1. The fourth stakeholder event was conducted as a webinar on June 18, 2015. The event provided an overview of the Study's results. All comments and questions from these sessions (via phone, through the chat box, and in writing in follow up to the meeting) were categorized by topic area in a comment matrix.

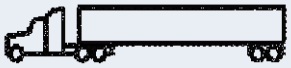
2.2 Comment Matrix and Disposition

Project team task leaders and government subject matter experts addressed each of the collected comments within their subject area, in a written response for the matrix. These responses answer questions regarding the topic area and offer insight into how the item was addressed in the Study. Comments that were provided as statements were also acknowledged and considered.

2.3 Alternative Configurations

The MAP-21 required analysis of a six-axle truck and allowed additional configurations. The FHWA sought public input to identify five alternative truck types for this Study and considered whether the vehicles were in use in the United States, Canada, or elsewhere, and whether they were operationally practical for use in the United States. **Table 1** provides the truck configurations, weights, axle count, and network for the six scenarios analyzed in the CTSWL Study. For improved clarity in the network description, this table replaces earlier versions.

Table 1: Truck Configurations and Weights Scenarios Analyzed in the CTSWL Study

Scenario	Configuration	Depiction of Vehicle	# Trailers or Semitrailers	# Axles	Gross Vehicle Weight (pounds)	Roadway Networks
Control Single	5-axle vehicle tractor, 53 foot semitrailer (3-S2)		1	5	80,000	Currently operating on the entire Interstate System and National Network, including most of the National Highway System
1	5-axle vehicle tractor, 53 foot semitrailer (3-S2)		1	5	88,000	Modeled to use same network as above
2	6-axle vehicle tractor, 53 foot semitrailer (3-S3)		1	6	91,000	Modeled to use same network as above
3	6-axle vehicle tractor, 53 foot semitrailer (3-S3)		1	6	97,000	Modeled to use same network as above
Control Double	Tractor plus two 28 or 28 ½ foot trailers (2-S1-2)		2	5	80,000 maximum allowable weight; 71,700 actual weight	Modeled to use same network as above
4	Tractor plus twin 33 foot trailers (2-S1-2)		2	5	80,000	Modeled to use same network as above
5	Tractor plus three 28 or 28 ½ foot trailers (2-S1-2-2)		3	7	105,500	Modeled to use a 74,500 mile roadway system including the Interstate System, approved routes in 17 Western States allowing triples, and certain four-lane roads in the Eastern United States.
6	Tractor plus three 28 or 28 ½ foot trailers (3-S2-2-2)		3	9	129,000	Modeled to use same network as Scenario 5.

April 2016 Report to Congress, Comprehensive Truck Size and Weight Limits Study, Moving Ahead for Progress in the 21st Century (MAP-21) Act

3. QUANTITATIVE ANALYSIS OF COMMENTS

This section provides a quantitative analysis of the comments by topic, derived from various communication formats.

3.1 Comments by Topic

3.1.1 May 29, 2013 Stakeholder Input Event #1

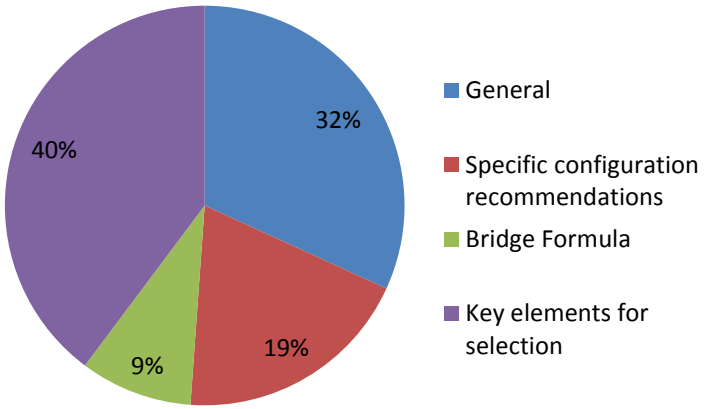
On May 29, 2013, the date of the first public input event, comments made by participants were transcribed from the two rounds of breakout sessions and collected from the webinar portion of the breakout sessions. At 120 comments, the data, models and methodology breakout sessions produced the most commentary of any of the three major categories of discussion during Stakeholder Input Event #1 (the other two categories were alternative truck configurations and general matters). This session also produced the most web-based comments for the May 29 event, with 45 total comments. Specific comments and responses are provided in Appendix A, which is comprised of 1) a transcript summarizing the breakout session discussion on alternative vehicle configuration, 2) matrices of comments from the breakout sessions on data, models and methodology and another set from the sessions on general discussion topics; followed by 3) matrices of comments from the web chat box on vehicle configurations; web comments on Web data, models and methodologies; and web comments on general discussion topics.

The following charts provide detail by session topic, according to the types of input (in-person or by comment in the webinar chat box).

Comments from the two consecutively held truck configuration breakout sessions were aggregated for this analysis. They yielded a total of 88 comments and/or questions. The largest percentage dealt with key elements for selection of the alternative configurations for study.

Figure 1 illustrates the percentage of comments received by sub-topic during the two truck configuration breakout sessions.

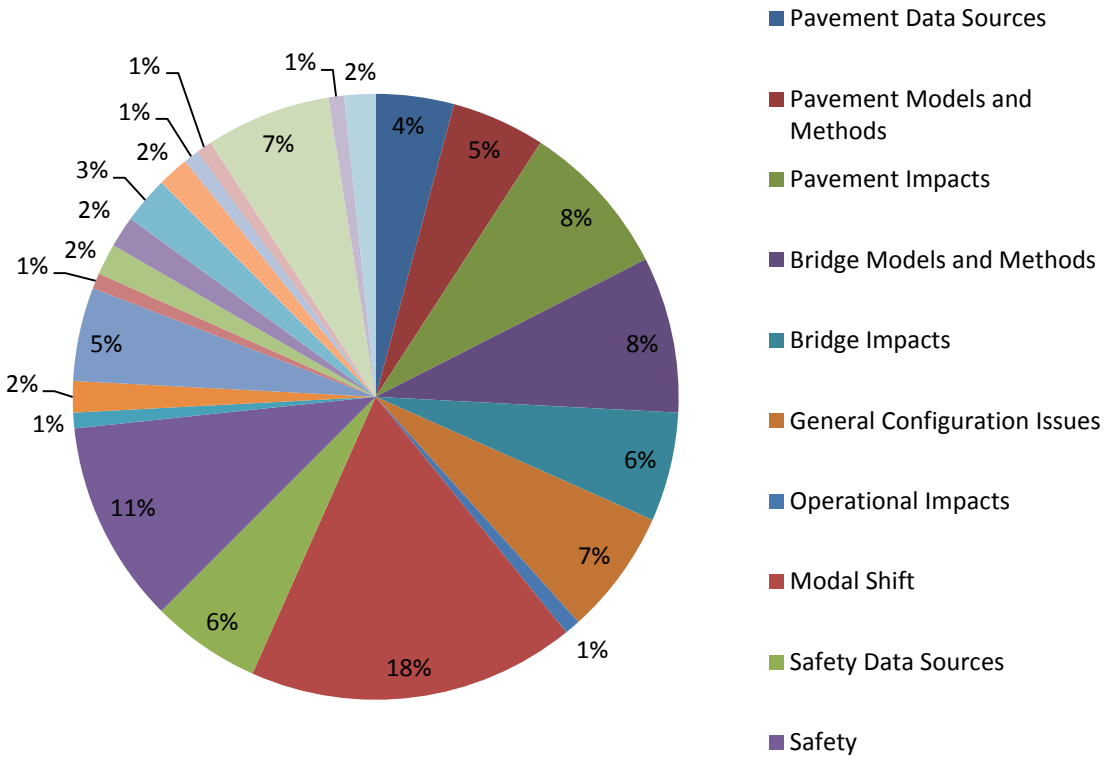
Figure 1: Truck Configuration Breakout Sessions



The two breakout sessions on data, models and methodology held on May 29, 2013, resulted in a total of 120 comments. The largest percentage dealt with modal shift, followed by safety.

Figure 2 illustrates the percentage of comments received by subtopic during these sessions.

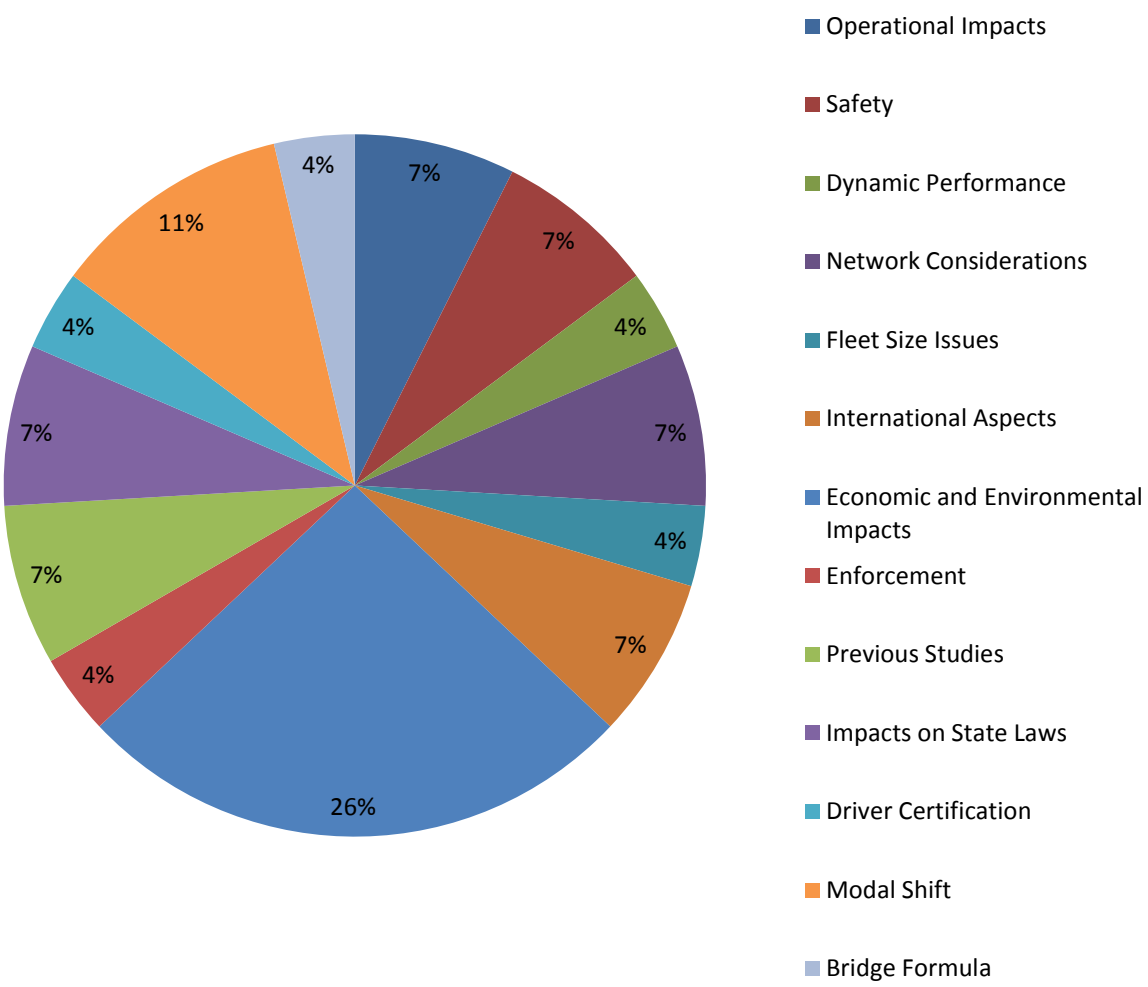
Figure 2: Comments Made During the Data, Models and Methodology Discussion



During the general discussion breakout sessions, 13 topics were discussed and 27 comments provided. Economic and environmental impacts generated the most comments and questions.

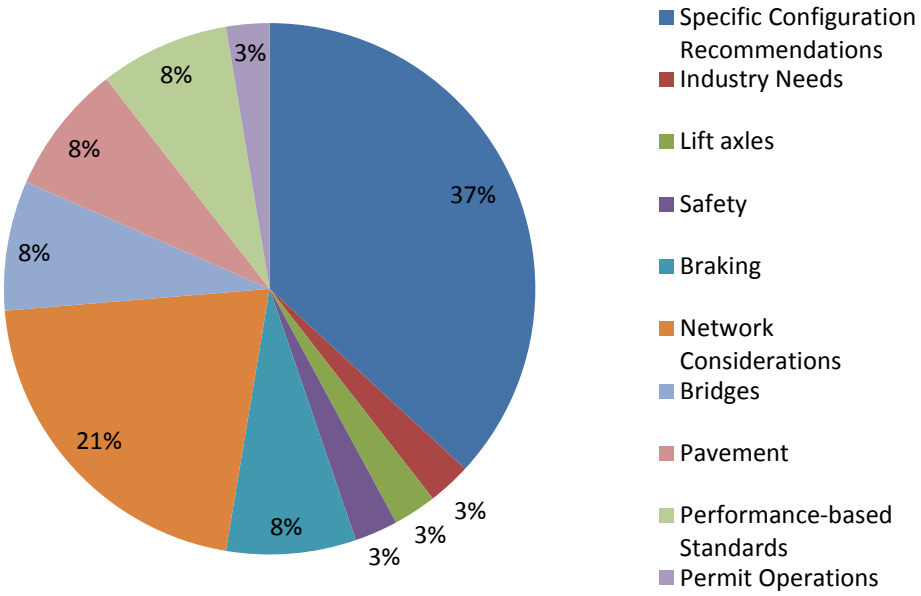
Figure 3 illustrates the percentage of comments by topic.

Figure 3: Comments Made During the General Discussion



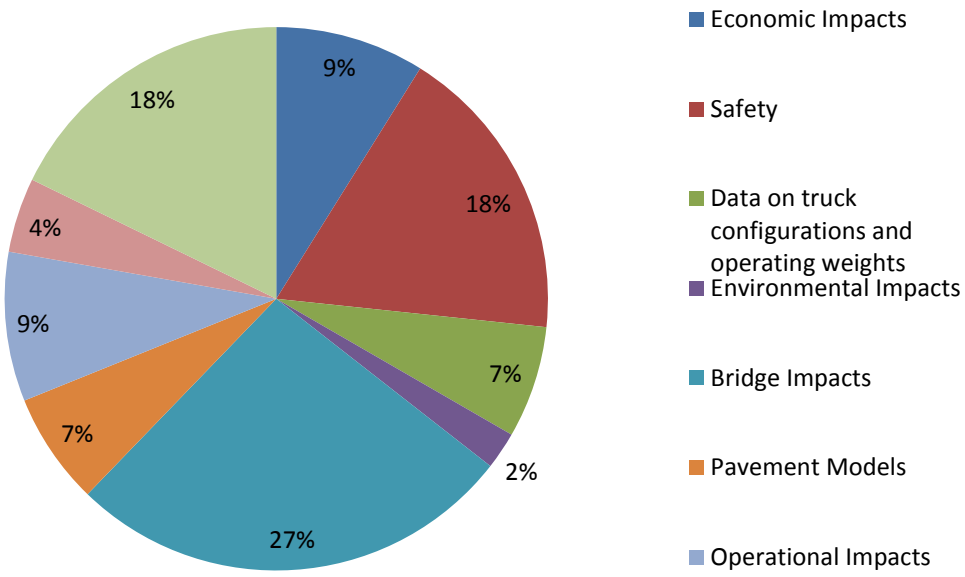
The webinar comments during the breakout sessions were also analyzed by subtopic areas. Within the breakout session on alternative configurations, there were 38 comments and questions recorded via the web chat pod. Specific configuration recommendations and network considerations were the subtopics most prominently addressed in the Web-based comments. The percentage by topic area is provided in **Figure 4**.

Figure 4: Web Comments During the Alternative Configuration Discussion



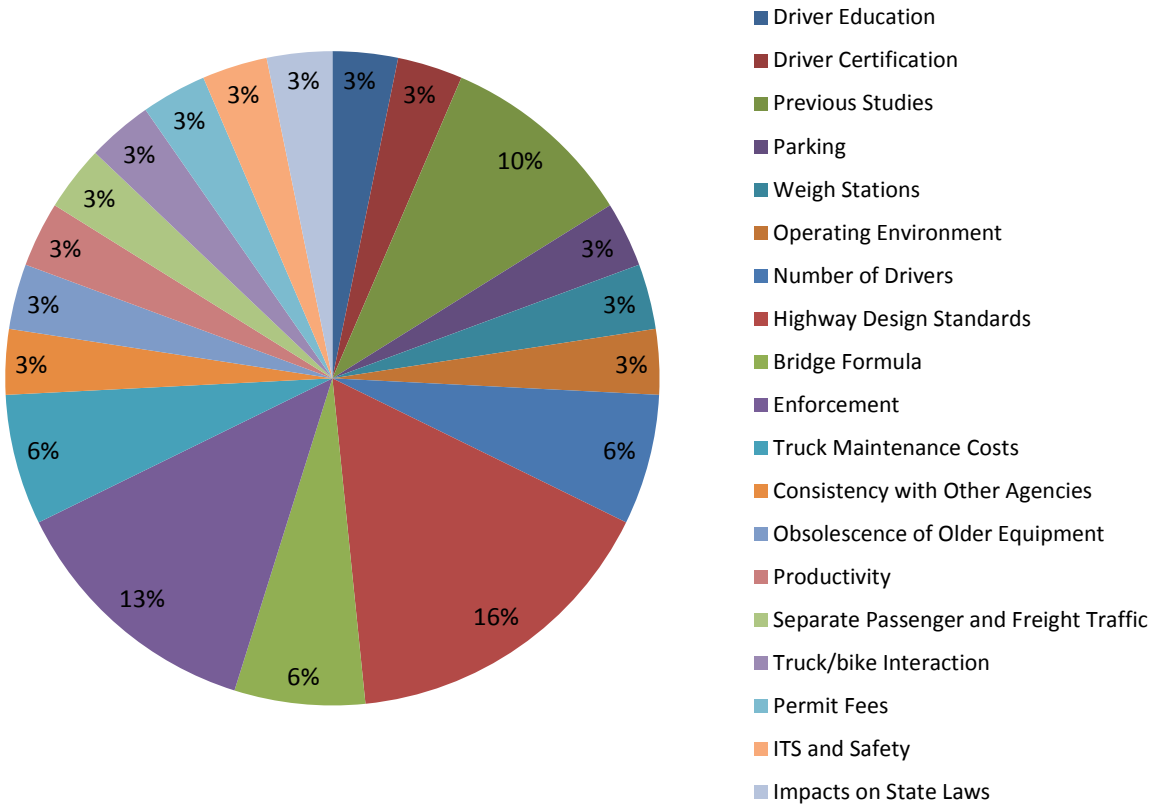
The webinar session related to data, models and methodology resulted in 45 comments or questions. The most prevalent comments related to bridge impacts, followed by safety and modal diversion in equal parts. The percentage of comments related to this subject by subtopic is shown in **Figure 5.**

Figure 5: Web Comments During the Data, Models and Methodology Discussion



A general topics session was also held during the webinar. This session resulted in 31 comments or questions related to 19 different topics, with highway design standards, enforcement and previous studies raised most often for comment or question. The percentage of comments by topic is illustrated in **Figure** 6**.**

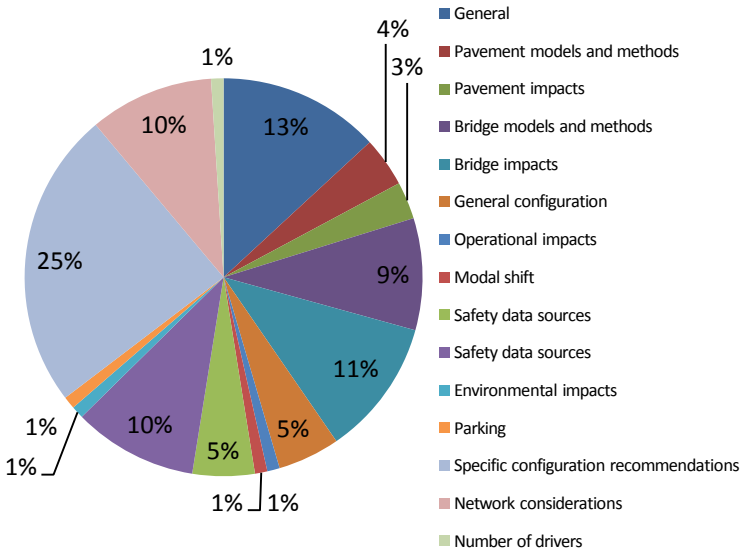
Figure 6: Web Comments During the General Topics Discussion



The May 29, 2013 event also generated a total of 99 written comments sent by email or letter to DOT officials and the Web site address. The comments were categorized into 14 topic areas, with an additional category for general issues. The most common topic among those comments submitted in writing related to recommendations for vehicle configurations.

Figure 7 illustrates the percentage of written comments received by topic area following the event on May 29, 2013.

Figure 7: Written comments

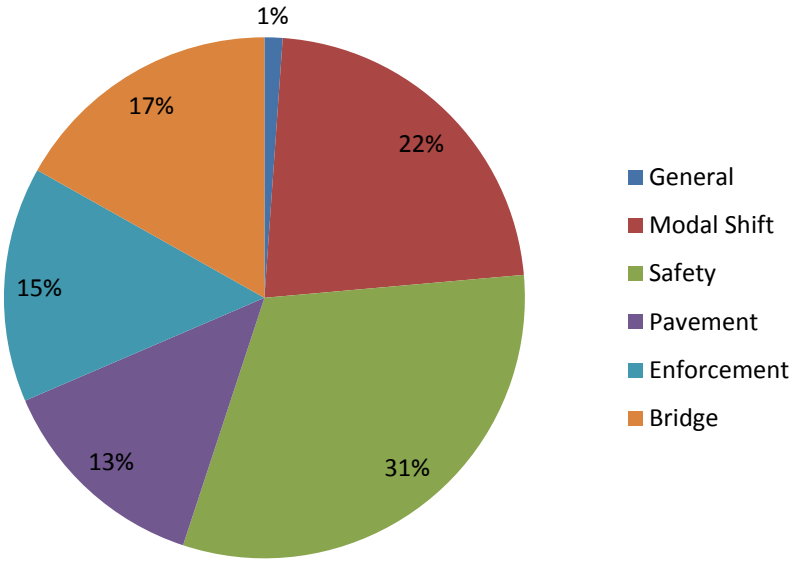


3.1.2 December 18, 2013, Stakeholder Input Event #2, Webinar

The December 18, 2013, Stakeholder Event webinar resulted in a total of 89 comments including comments received over the phone and those received through the webinar chat box. The topics of safety and modal shift comprised over half of the comments, followed by bridge impacts. Specific comments and responses are found in Appendix B.

Figure 8 illustrates **t**he percentage of comments by topic area generated during the webinar on December 18, 2013.

Figure 1: December 18, 2013 Comments

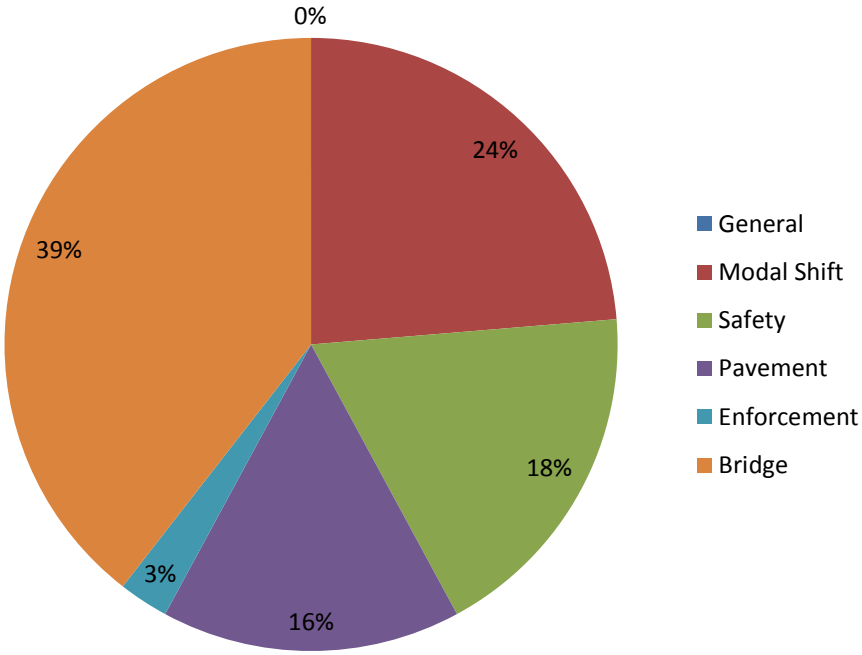


3.1.3 May 6, 2014, Stakeholder Input Event #3, Webinar

The May 6, 2014, Stakeholder Event webinar resulted in a total of 38 comments including comments received over the phone and those received through the webinar chat box. Nearly 40 percent of the comments dealt with bridge issues while nearly a quarter focused on modal shift. Specific comments and responses are found in Appendix C.

Figure 9 illustrates the percentage of comments by each topic area generated during the webinar held on May 6, 2014.

Figure 2: May 6, 2014 Comments

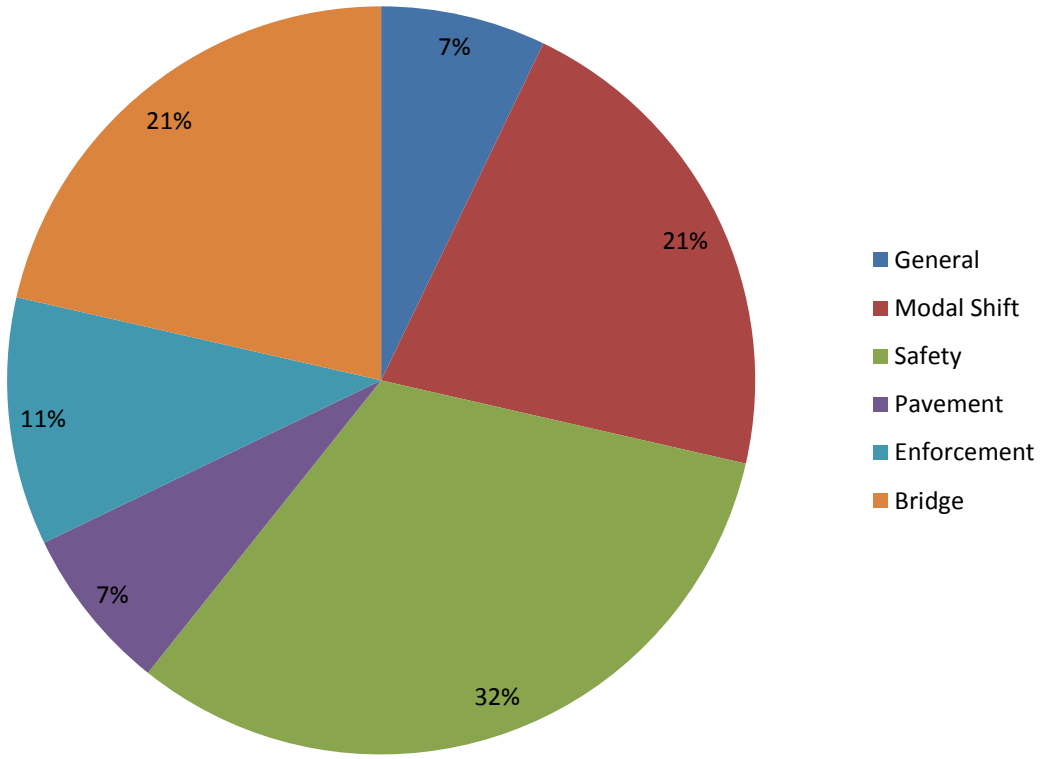


3.1.4 June 18, 2015, Stakeholder Input Event #4, Webinar

The final Stakeholder Event webinar, held on June 18, 2015, resulted in a total of 28 comments including comments received over the phone and those received via the webinar chat box. Safety topics led the comments, followed by equal numbers of comments on and modal shift and bridge topics. Eleven percent raised questions or comments regarding enforcement. Specific comments are found in Appendix D.

Figure 10 illustrates the percentage of comments by each topic area generated during the webinar held on June 18, 2015.

Figure 10: June 18, 2015 Comments



4. SUMMARY OF THEMES AND TRENDS

4.1 Significant Comments Affecting Content & Design of the Study

As presented in this section of the report on stakeholder input, "significant comments" were those that, in the context of this CTSWL Study either: 1) potentially changed the technical approach in the project plan, or 2) added resources to the Desk Scan. These comments and associated responses were generated by the breakout sessions and web discussions held on May 29, 2013, and follow by topic area. The comments include their disposition with respect to the Study.

Data, Modeling and Methodology:

- *"Look at GAO 11-134—A Comparison of the Costs of Road, Rail, and Waterways Freight Shipments That Are Not Passed on to Consumers."* – The study was included in the Desk Scan phase of the project.
- *"Build in behavioral factors in modal choice analysis – do not assume a strict cost-based choice basis."* – No generally accepted method was available to include this aspect of modal shift analysis.
- *"Virginia did a freight study a few years ago that we should look at."* – *The* Virginia Study was included in the Desk Scan phase of the project.

Safety:

- *"Perhaps, there could be an endorsement process for new weight and limits and configurations that would create a system of checks and balances."* – The comment is considered out of scope for the Study as it is not within the scope outlined by Congress.
- *"The study should look at how heavier and oversized trucks interact with roadway safety infrastructure (guard rails, etc.)."* – This assessment was attempted but tools available to assess median barrier and guard rail adequacy to accommodate impact from heavier trucks is currently not available. A recommendation that currently available tools be updated to evaluate heavier truck impacts is included as a recommendation in the Study findings.
- *"If weight increases it may overwhelm driver protection, and increase collision severity."* – Severity of truck crashes was assessed in the Study.
- *"The team should evaluate safety on a ton-mile basis since trucks might carry 20% more cargo. This is how rail safety is evaluated."* – Crash rates are based on travelled miles, not ton-miles. The Study used truck vehicle miles traveled (VMT) to evaluate crash rates due to data availability limitations.
- *"Societal costs of crashes should be included in the study."* – There is no uniform, generally accepted approach for completing such an assessment.
- *"ATRI recently completed a study on large truck safety trends that should be considered."* – ATRI's Study was included in the Desk Scan phase of the project and was considered.

- *"FMCSA-sponsored "Cost Benefit Analysis of Onboard Safety Systems" breaks out the real-world, line item costs of crashes by truck type, severity, and commodity-involvement."* – This work was evaluated as part of the Desk Scan phase of the Study.
- *"It's been a long time since the last DOT sponsored "Technology Scan" of Europe and Scandinavia but both places have vast amounts of safety info and wisdom and folks who may well be willing to share it. Specific to TSW [truck size and weight], there has been much in recent good work accomplished – hope you can include it in the American study."* – European and Scandinavian information was included in the Desk Scan phase of the Study.
- *"How will Study address previous studies, like the Vermont study?"* – Previously completed work such as that referred to was included in the Desk Scan phase of the Study.
- *"Reviewing findings of previous studies may help in assessing the vehicles to examine in this Study*." – The Desk Scan phase of the Study was helpful in doing so.
- *"Western Governors Association study included many aspects of what will be covered in the current TSW Study*." – The referenced Study was included in the Desk Scan phase of the Study.
- *"Longer Combination Vehicles (LCVs) don't always operate under perfect conditions. Consider operations in inclement weather, in mountainous terrain, in dense urban areas."* – The LCVs evaluated in the Study were analyzed under a variety of weather conditions and terrain type environments.

Bridge Impacts:

- *"In South Carolina Department Of Transportation (SCDOT) we did fatigue analysis for four archetype bridges."* – The South Carolina Study was included in the Desk Scan phase of the Study.
- *"The sample should be based on the corresponding percentages of different types of structures on the Interstate*." – The sampling framework applied in the structural analysis was constructed in agreement with the recommendation.
- *"Really should look at the process that NCHRP 12-78 used to make a sample set of bridge models that was reflective of the real-life bridges found in the NBI."*- The referenced National Cooperative Highway Research Program Study was included in the Desk Scan and considered as the sample framework was conducted.
- *"Idaho Department Of Transportation (Idaho DOT) did a bridge analysis in conjunction with an LCV pilot program."* – The work completed by Idaho DOT was included in the Desk Scan phase of the project.

Dynamic Performance:

- *"Truckingvideo.com/SafetyTruck has an online video that covers stability of trucks and considers the effects of uneven loads."* – The video was accessed and evaluated by the safety Project Team but not included as a reference in the Desk Scan.

Driver Certification:

- *"Driver experience is important. Current operations pick experienced drivers. If use became widespread it would bring in less-experienced and brand new drivers to operate the larger equipment."* – The consideration of driver age was made in various areas of the Crash/Safety Study area.
- *"FMCSA has driver data/scorecards."* – Noted by the Study team.
- *"The team should look at the results of a FMCSA recent listening session on new entrant standards. The quality of drivers and the details on driver regulations have large impacts on safety."* – Noted by the Study team.
- *"LCV operators should be certified."* – The requirements for graduated licenses for LCV operations were not considered as in-scope for the Study and therefore not evaluated.

Economic and Environmental Impacts:

- *"Include fuel usage for full as well as empty trucks."* – This suggestion was reflected in the analysis of fuel consumption impacts included in the Study as it relates to the economic and environmental elements of the Modal Shift analysis.

Braking:

- *"Longer, heavier (10/11 axle Rocky Mountain Doubles" have twice as many brakes for only 60 percent more weight. They corner and stop better than 80,000 lb. 5-axle trucks."* – Rocky mountain doubles were considered but not included in the Study due to the preference stakeholders identified for other alternative configurations.

Performance-based Standards:

- *"Consider configuration's handling, stability characteristics as well as its low-speed offtracking."* – This work was performed as part of the vehicle stability and control assessments in the Crash/Safety area of the Study.
- *"Focusing only on dimensions/lengths instead of focusing on the configuration's operational performance characteristics limits design possibilities*." – Noted.

Truck Maintenance Costs:

- *"Maintenance costs increase as truck weights increase."* – This point was examined in the Desk Scan phase of the project.
- *"More frequent inspections of truck frames, floors, and other load-bearing components."* –This comment was not considered as within the scope of the Study as outlined by Congress.

Note: Public comments from Stakeholder Events #2, #3 and #4 did not substantially alter the design of the Study as they were either previously addressed above or came in after the Study work had progressed past the point of modification.

APPENDIX A – DISPOSITION OF MAY 29, 2013, EVENT COMMENTS

Session A: Alternative Truck Configurations

Alternative Truck Configurations Breakout - 1

There was a lengthy discussion at the beginning with many questions regarding the template for submitting information to recommend alternative truck configurations.

Question from audience as to what the baseline will be: *Answer: for tractor trailers, it will be the 80,000 lb. 5-axle configuration and for double trailer combinations it will be the Surface Transportation Assistance Act of 1982 (STAA) double (twin 28 ft. trailers at 80,000 lbs.)*

Will there be 2 different kinds of axle weight? Will you look at 2 different weight distributions for 6 axles? *The required options for six-axle tractor semitrailers are: Option (i) 53 ft. trailer: GVW 97,000 lb. Axle weights: 12,000 lb. steer, 34,000 lb. tandem, 51,000 lb. tridem; Option (ii) 53 ft. trailer: GVW 97,000 lb. Axle weights: 12,000 lb. steer, 38,000 lb. tandem, 47,000 lb. tridem*

Alternate configuration recommendations from participants:

- Look at Straight trucks as an alternative configuration
- Trucking Industry would like to see analysis of Twin 33s (addresses volume)
- 97,000 lb. vehicle is a "*go almost anywhere vehicle"* (addresses weight)
- Look at triples
- Study weight limitation of 105,000 lb. and 7 axle configuration

General recommendations/comments for the Study:

- Some States allow 6-axle trucks on non-Interstate roads. In order to develop the data, you would have to look at some non-Interstate operations to reach your conclusions.
- Participant discussed the I-5 bridge collapse in Washington State. That truck was operating under a State-issued over-size permit and it took down the bridge. That will cost the taxpayers millions plus the extra costs for all travelers for rerouting (in terms of extra fuel and time) to use alternate routes. The costs of larger vehicles and their impact should be factored in. Look at effects of waivers and permitting in terms of the cost to taxpayers.
- Imperative to study cost impacts of non-divisible loads.
- When looking at the costs of heavier vehicles, or longer trucks, what about considering the cost savings of using them? Will you look at freight efficiency by truck type?
- Take input from industry on what configurations to study; their input will be the most relevant.
- One participant said he was impressed by his sense that the Study team will keep configurations distinct. He has seen others conflate some things as being the same. It is

clear that distinct configurations will be studied. One configuration will not be interpreted as another. Some people think that any change will be bad.

There was a lengthy discussion of the **bridge formula**.

- How is the bridge formula being addressed?
- Is the bridge formula being used in the Study?
- Some of these configurations are not designed to the bridge formula. Panel comment: Methods for studying bridge effect are more developed (up to date) and focus on the structure's strength state. The bridge formula is used to limit truck weights and is not useful in assessing a bridge's ability to accommodate certain vehicles.
- Will the Study look at vehicles that fit the current bridge formula? Answer: the Study will look at both those that meet the Federal bridge and those that do not.
- Attendee expressed concern that the study of bridges has advanced; however, the bridge formula is a frame of reference for people reviewing your product.
- If you are studying impact, you need to start with the fact that the Interstate was built to certain specifications.
- If you will study something that does not meet the current bridge formula, you should make that very clear.
- Address how the configurations studied relate to the bridge formula.

The attendees were asked if there were any comments on **tire options** – No comments were received to the question but earlier the following comment was recorded:

- Wide tires have effect on safety, fuel economy.

Key Elements for Selection

- Access to routes, trucks are not just on the Interstates, look where else they are operating.
- Make the configurations studied as useful and practical as possible, need to hear from industry
- One consideration for all three of the alternative configurations should be stopping distance at normal highway speeds as compared to current vehicle configurations. Any new configurations should have comparable stopping distances at highway speeds.
- Need to define what the "old" configuration is. It is 5-axle, 80,000 lb. tractor semitrailer.
- Look at prior studies to see if the technology and equipment has changed today and base any changes on data.
- Parking – where will longer vehicles park on the side of the roads?
- What if you come up with a vehicle that is not practical for non-Interstate roads? How will these vehicles traverse? How do States manage this?
- Configuration compatible access with different classes of roads.
- A lot of States allow reducible loads off the Interstate. You should poll the states to see what the number is. With a lower amount, they are able to traverse anywhere.
- Are you considering increased rollover risk? Panel Comment: The public perception is that heavier loads result in higher rollover risk. This is a complicated issue and there are

data suggesting that good policy can result in heavier vehicles without compromising rollover risk. We will be investigating this issue in the safety analysis.

- There are studies that looked at the interaction between infrastructure and vehicles with a higher center of gravity. Others commented that the center of gravity depends on the cargo/load. There is an issue if you allow larger vehicles; the operator might not have a higher density vehicle to match the load.
- From FMCSA: truck parking is important because of the hours of service. If the driver cannot park his larger truck, he cannot operate. Currently doubles and triples are parking on the sides of the ramps. It was noted that there is a truck parking capacity study currently underway but it is not considering LCVs.
- Regarding Accessibility: Need to consider enforcement. Illinois had a two-tiered system and it was very complex for industry and enforcement to understand the access laws off the Interstate. Do not make it overly complex for industry and enforcement to understand the accessibility rules.
- Some States may not buy in to the 97,000 lb. 6-axle tractor trailer configuration.
- There are currently variations and any changes could impact the States.

What are the benefits of these elements?
Industry input is required to gain an understanding of what would be the most useful and widely used vehicle options and the benefits that could flow from them.

What are the disadvantages of these elements?
None were stated by participants.

The attendees were asked what **other areas should be considered when selecting alternative configurations**. The following list was produced based on attendee input:

- Training for operators.
- Impact on public safety, traveling public not knowing how to drive around these new vehicle configurations.
- Energy and environmental impacts; Environmental - fuel use, fuel savings, trucks taken off highway due to new configured trucks carrying more cargo - need less vehicles.
- Economic impacts.
- If it becomes more efficient to ship by truck, this could increase the number of trucks on the road since it is cheaper to ship by truck than by rail.
- Efficiency.
- Congestion.
- Consider if trailers will need to be modified. Counterpoint: Trailer configuration – assume whoever is using trailer, if they can get the appropriate rating what does this matter with regard to the Study?
- Consider if the tractor will need to be modified to haul the heavier loads.
- Consider at what speeds these vehicles can safely operate. Look at vehicle speed in context of stopping distance.
- What about data translation?

- Should also consider how to make States more uniform. The trucking industry would like this.
- What about tire usage issues? Dual vs. wide single.

Alternative Truck Configurations Breakout - 2

This group also questioned what the baseline will be. Answer: 80,000 lb. 5-axle configuration for tractor semitrailers and STAA 28 ft. doubles for multiple trailer configurations.

Alternate configuration recommendations:

- Use 3-axle single units with one steering axle and 2 drive axles (cargo vans). This could also be used as a baseline to compare safety and wear and tear.
- Use SU7 – this is a single vehicle, which is a specialized flat bed, open box with 7 axles. (Recommendation from a State DOT representative)
- Use a vehicle with a "spread axle" (referred to as split tandems, which carry 20,000 lbs. on the two axles, spread 10 ft. apart totaling 40,000 lbs. instead of 34,000 lb. standard tandem) which is the type of vehicle he drives. With this type of axle, he can carry more weight. The advantage is that the distribution of the load is shifted to match the equipment. Use the California Bridge law rather than what is legal in other states. (Truck driver recommendation)
- Use a 53 foot "step deck" configuration van can fill with more low density items and still haul within legal limits, lowers the center of gravity (even with high density cargo). The step is approximately 21 inches. Configuration can fit more cubic feet within this configuration (volume vs. weight). (independent truck driver recommendation)
- The 38,000 lb. tandem is of interest to the forestry/logging industry. (Forestry representative recommendation)
- Use a uni-body truck with 2 axles in front and 3 in back. This vehicle can be made wider with more axle weight as compared to a truck with multiple trailers and still hold within its lane. This type of truck is operating in Spain. Something similar is operating in Israel. (www.truckingvideo.com)
- Look at congressional intent, focus on what Congress is being asked to enact. Also recommended studying Twin 33, Rocky Mountain and Turnpike 53 ft. doubles and triples with 28 ft. trailers. Another audience member commented they thought the 6-axle 97,000 lb. configuration was a big focus in Congress.
- Twin 33 would be their first choice; this is of particular interest to the Less Than Truckload (LTL) sector. Triples would be the second choice. (Trucking Association recommendation)
- Agreed with Twin 33 and Triples being the top choice. No clear choice from either of them on the third pick. There was no clear preference between the two types of doubles. Some thought there would be more data for Rocky Mountain doubles in the United States. If using data from Canada, Turnpike doubles would have more miles. (Truck Safety advocate)
- 5-axle configuration with weight up to 100,000 lbs.

General recommendations/comments for the Study:

- Do not use any data from Europe as their regulations with regard to speed, Hours of Service, etc., are very different from the United States. Mexico and Canada should be part of the Study since freight runs from Mexico to Canada.
- Recommendation from a State bridge engineer: Include axle weight and spacing. With whatever configuration is studied, axle weight and spacing information is needed. Also important is tare weight and payload. Need to know what the increase in weight is associated with and how efficient the vehicle is in terms of the freight task. Is most of it going into the vehicle (for the extra axle for example) or into the payload.
- Recommended looking at each configuration to see where the weight will be used. Will weight be added to vehicle to increase driver safety and comfort, or just about adding cargo weight?
- If you increase spacing, axle weights – each one has an impact on many things such as safety, infrastructure, and maneuverability.
- Any analysis should include input from at least a couple drivers that have 20 years of experience. Increasing the number of doubles/triples would impact safety significantly. When studying alternative configurations you need to study the effects on all other aspects.
- Keep in mind that drivers who operate 97,000 lb. trucks are more experienced drivers – if this becomes a standard, will have drivers with less experience driving these. The analysis needs to control for driver experience.
- Get input from truck drivers.
- When interviewing drivers, only interview those that drive the configuration in question.
- You need to understand that every change that is made from the existing 5-axle 80,000 lb. configuration will reduce safety. How much safety are we willing to compromise?
- Do not give credence to emotional appeals – use data not emotion. Use a science-based approach.
- Need to consider diversion of large loads. For example, 100,000 lb. non-divisible container comes out of port; the logistics person can divert it so it does not go by any scales. Question and discussion about whether the configuration would be different since international containers are transported on 40 ft. chassis not 53 ft. chassis.
- Consider diversion in the Study and also the migration back to good roads if they did not feel the need to divert.
- Look at unbalanced loads.
- Look at as broad a network as possible, not just the Interstates. Noted example in Illinois where they have 9,000 bridges within 10 miles of the Interstates.
- Consider accelerated depreciation to implement the new equipment.
- How does taxation play into this?
- Component of Network Access: there are routes that are and are not used due to reasonableness of cost factors (example, toll roads).
- Look at infrastructure impacts in terms of if you increase the weight by 20 percent. The results are X.

- Are you looking at modal diversion? Getting more traffic away from rail, if so then there will be an increased impact on infrastructure. Will you assume that rail will not lower rates to counteract the shift?
- Use recent studies, no older than 5 years
- The 2000 Comprehensive Truck Size and Weight (2000 CTSW) Study was a good study – methodology was very good, could be useful. Additional point: Recommend reviewing the 2000 CTSW Study for any benefits or weaknesses of that study.
- One person noted a study (did not give study name) that looked at where truck and rail are competitive.
- Assess rate of adoption.

Key Elements for Selection

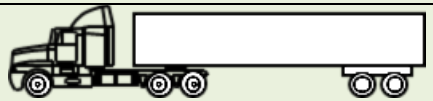
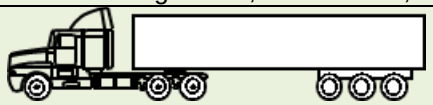
- North America, North American Free Trade Agreement (NAFTA) area.
- What Congress wants?
- Who uses the configurations to be studied, especially the last 4 on the graphic (LTL)?
- Practicality.
- Impacts on economy.
- Safety – focus on road safety and effects on guardrail or cable barrier.

Vehicle Configurations Distilled from the Listening Sessions

Following the FHWA May 29, 2013 input session, the table that follows is a proposed list of vehicles to be studied.

Main points –

1. Since the 6-axle tractor semitrailer at 97,000 lbs. does not comply with the bridge formula, include a variation that meets the bridge formula (approx. 91,000 lbs.) (Note: although this configuration was selected to represent a 6-axle vehicle that would be compliant with the bridge formula, the spacing on the rear tridem axle set for the vehicle used in the Study did not meet the consecutive axle test of the bridge formula.)
2. The LTL Industry strongly supports twin 33 ft. double at current 80,000 lb. limit. Suggested variations, examine this unit at 80,000 lbs. and at bridge formula limit in both the A and B configuration.
3. Include an analysis of triples trailers (meeting the bridge formula) in both the A and B configuration.
4. Include turnpike doubles consisting of twin 53 ft. trailers in the A-configuration only. This configuration uses currently available standard trailers.
5. Use the permitted STAA 28 ft. doubles as a reference control for the double combinations.

Truck Configurations	Generic Renderings (not to scale)
Confirmed Configurations for Study	
5-axle tractor 53' semitrailer	 Option (i) 53 ft. trailer: GVW 80,000 lb. Axle weights: 12,000 lb. steer, 34,000 lb. tandem, 34,000 lb. tandem (Control) Option (ii) 53 ft. trailer: GVW 88,000 lb. Axle weights: 12,000 lb. steer, 38,000 lb. tandem, 38,000 lb. tandem
6-axle tractor 53' semitrailer *	 Option (i) 53 ft. trailer: GVW 97,000 lb. Axle weights: 12,000 lb. steer, 34,000 lb. tandem, 51,000 lb. tridem Option (ii) 53 ft. trailer: GVW 97,000 lb. Axle weights: 12,000 lb. steer, 38,000 lb. tandem, 47,000 lb. tridem Option (iii) 53 ft. trailer: GVW 91,000 lb. Axle weights: 12,000 lb. steer, 34,000 lb. tandem, 45,000 lb. tridem (Bridge)
Short doubles Twin 28' or	 Twin 28' trailers: GVW 80,000 lb. Axle weights: 12,000 lb. steer, 17,000 Drive, 3 x 17,000 trailer axles (Control)
Twin 33' Trailer Combination	 Option (i) Twin 33' trailers: GVW 80,000 lb. Axle number and weights to be determined (low density) Option (ii) Twin 33' trailers GVW Bridge limited. GVW, axle number & weights to be determined (high density) Evaluate as A and B configurations
Turnpike Doubles	 Twin 53' trailers: Bridge limited. GVW, 9-axle weights to be determined – A-configuration only
Triples	 Option (i) Triple 28'or 28 ½' trailers: GVW 105,500 lb. 7-Axles (low density) Option (ii) Triple 28' of 28 ½' trailers: GVW 129,000lb. 9-axles (high density) Evaluate as A and B configurations

Session B: Data, Models, Methods (Breakouts 1 & 2)

Topic	Comments	Disposition
Pavement Data Sources	1. Look at Wisconsin Study 2009. 2. A 2012 Virginia Department of Transportation (VDOT) Study on pavement costs as a function of axle weights included all road systems. VDOT will send it to FHWA. 3. Maine, Minnesota, and Vermont Studies all included analysis of actual larger truck pavement effects. 4. Some previous studies have been done with preconceived conclusions. We should only use independent analyses. 5. Some previous pavement studies are great scientifically, but would have resulted in permit fees too great for the trucking companies to absorb. If we need to charge more, the fees need to be practical.	1. The 2009 Wisconsin Study was included in the relevant Desk Scans. 2. Because data required to assess a change in truck size and weight changes on local roads was not available on a national basis, the discussion of impacts on local roads was limited to a qualitative assessment in the Study. 3. Maine and Minnesota used Equivalent Single Axle Load (ESAL) assumption, and Vermont uses distress Load Equivalency Factors. These are outdated tools; the Study used the latest pavement assessment capability available through AASHTOWare® Pavement ME Design. 4. In conducting the Desk Scans, any bias evident in previously completed work was accounted for and controlled in cases where it was used in the conduct of the Study. 5. Recommendations on setting user fees or permit fees were not relevant to or included in the Study.
Pavement Models and Methods	1. Look at the Vermont study and figure out a way to apply the approach nationally while accounting for differences between States and scale. 2. Use the Pavement Damage Assessment Tool (PaveDAT) model to analyze differences in specific truck configurations. 3. The team should evaluate different types of pavement. There are key differences between rigid and flexible	1. In the Desk Scan phase of the project, the Vermont Study was considered; the latest pavement models were employed in analyzing impacts on pavements in the Study and were not available when the Vermont Study was conducted. 2. National Pavement Cost Model was used to allocate costs; to the extent costs were allocated within the Study, not directly to assess pavement impacts. PaveDAT did not yield any value in doing so. 3. We analyzed both types of pavement in the Study. Differences in the performance of rigid and flexible were understood from the outset.

	pavement. 4. Make sure to validate any use of past study results to see if they used the same kind of pavement we do today. 5. Ensure that cost of pavement damage includes costs imposed on trucks by poor quality pavements. 6. Consider that the biggest pavement impact will be off the Interstate System, including on local roads, ramps, and connectors.	4. We did not directly use any previous study results. 5. Impacts on other highway users are beyond scope of this Study. 6. We sought to include all highway systems in our analysis. (Note: Although it was originally intended, non-National Highway System (NHS) roadway sections were not included in the Study due to data availability challenges).
Pavement Impacts	1. The Study should look at western mountain passes. Trucks traveling through the mountains tend to be heavier, and there are examples in all environmental conditions from snow to rain to desert. Trucks braking downhill also cause more damage. 2. Look at wet areas particularly since pavements are less stable in wet conditions. 3. Egress/ingress issues will affect pavement impacts. 4. Use Weigh-in-Motion (WIM) results to focus our efforts on roads that have a significant amount of overweight vehicles to guide our analysis. 5. Include damage to shoulders and curbs, and look especially at stoplights for damage caused by sitting and stopping trucks. 6. Take pavement sections from the right lane and compare it with left lane-- there are obvious differences in how much wear there is where the trucks travel.	1. We included a full range of environments and traffic conditions in the Study, but our pavement models do not include braking effects. 2. We included a full range of environments in the Study. 3. We looked at all highway systems. (Note: Although it was originally intended, non-NHS roadway sections were not included in the Study due to data availability challenges). 4. We included a full range of traffic levels on the NHS. Consideration of shoulders, curbs, and damage due to braking forces and or the static weight of stopped trucks was beyond the scope of the study. 5. Shoulders were included in our pavement damage cost assessments; curbs were not due to the Study focus. 6. Ample empirical evidence showed that trucks cause damage. Our damage models looked at the lanes truck use.

	7. Consider distribution of weights to each axle. Uneven loading has different impact than uniform loading. 8. Existing conditions need extensive data for accuracy, but we have a limited number of WIM sites, and limited knowledge of truck types and how they might be operated. 9. Consider full range of roads, including pavements on local roads. 10. Consider the confidence level of not having enough data.	7. We used actual observed axle weights as basis for our analysis. 8. The data that FHWA compiles from the States through the Traffic Monitoring Program was used as the primary data source for conducting analysis in this area of the Study. 9. We intended to include all highway systems in our analysis. Ultimately, non-NHS roadway sections were not included in the Study due to data availability limitations. 10. This was considered and results were presented in alignment with confidence levels.
Bridge Models and Methods	1. Watch out for bridges designed for old standards and not rehabilitated (they don't even meet current load). 2. Ages and design loadings of the bridges in the sample of 500 bridges should match inventory distribution of actual bridges. 3. Bridges on the Interstate System have different design loadings than bridges off the Interstate System. 4. Consider original and current design loadings and ratings.	1. A full range of bridge construction dates were considered in selecting bridges analyzed. Bridges that require posting were specifically assessed and reported in the findings generated through the analysis. 2. This step in selecting samples was conducted and described in the Technical Report. 3. All bridges designed and built in the last 50 years on the NHS, which includes the Interstate, follow guidelines from AASHTO. Bridges designed and built off the NHS can use State specifications. All bridges, regardless of system, are load rated for the legal and unrestricted permit vehicles that use them in each State. When a bridge's load rating is not adequate for those vehicles, it is posted or restricted for load. 4. We considered loadings for the current truck fleet as well as the future truck fleet and estimated truck travel levels, known as the scenario traffic, from the Modal Shift Analysis.

	5. Consider deck and substructure separately.	5. The AASHTOWare® Bridge Rating (BrR) assesses the structural performance of bridges including superstructure. Bridge decks were not assessed due to the lack of generally accepted modelling tool. The development of such a tool is recommended as a finding reported in this Study.
	6. Watch for static load issues, with peak hour and construction equipment on bridges like the I-35 bridge collapse.	6. The AASHTOWare® BrR software used in the Study accounts for static loads, dynamic loads, and truck trains. Construction staging issues are outside the scope of the Study.
	7. The team should load test bridges in the field (ambient field loading).	7. This recommendation was outside of the scope of the Study. Studies conducted by others where this was performed were considered as part of the Desk Scans phase of the Study.
	8. There is not a complete dichotomy between the hypothetical bridge models and real experience. Some States allow our hypothetical configurations, so why live in a hypothetical world? Maine study, for example, showed little effect. Vermont's bridges are built differently, however, so be wary of extending those results or we may have an apples and oranges situation.	8. This was designed to be a national study that looked at regions and corridors with similar trucks in the current fleet. An alternative truck type of 97,000 lb. vehicles and other longer combination vehicles were studied to better understand the current conditions compared to the potential impacts of alternative configurations.
	9. Be careful not to extend special conditions in one State to other States.	9. States with similar trucking issues were studied as a region.
	10. Use instrumented bridges whenever possible, especially where study configurations are operating.	10. Existing studies on instrumented bridges were used when possible.
Bridge Impacts	1. Larger vehicles mean larger risk for catastrophic failure (I-5 in Washington, for example).	1. The bridge impact analysis looked at truck weight issues. Size issues came into play with trusses that have both horizontal and vertical limitations and need to be looked at on a case-by-case basis. Such an assessment was not included in the Study since it is very site-specific.
	2. The Study should include effects on delayed traffic from catastrophic failures.	2. This assessment was not included in the Study as it is very site-specific and not feasible on a national scale.

	3. The Study should include the costs of decks and substructures.	3. Following thorough investigations, a generally accepted bridge deck deterioration model was not identified. For this reason, deck assessments were not completed in the Study. A recommendation that analytical tools be developed to assess bridge deck interactions with heavy trucks was included in the Study's findings.
	4. We should consider bridge measurements under actual traffic, and how much faster a bridge will deteriorate in ratings under heavier truckloads.	4. Technical analysis was conducted using in-use bridges and traffic that they accommodate along with the scenario traffic estimated as alternative configurations were evaluated.
	5. The legislation may allow individual States to make decisions on whether to allow heavier six-axle trucks, rather than requiring their use. This will result in a patchwork of rules and potentially could force some States to adopt the rules of their neighbors, but will result in lower bridge costs than if all States adopted the new standards.	5. Ultimately, the scenarios (vehicles and networks on which they operate) developed assumed size and weight impacts on a national scale. No State-option scenarios were tested in the Study. State options were interpreted to be out of scope for the Study.
	6. Last-mile routing of heavy loads must be made to protect bridge infrastructure off the Interstate System.	6. The analysis of structural strength of the bridges assessed in the Study considered bridges both on and off the Interstate System.
	7. Trucks on oversize or overweight waivers cost taxpayers money. Bridge failure on I-5, for example, imposed costs on other users in the form of extra hours and miles of travel.	7. Assessing such events is site-specific and not well-accommodated in a study of nation-wide impacts.
General Configuration Issues	1. There are three parts to this formula: cargo weight, cargo volume, and axle/trailer configuration.	1. All three components figured in the selection of configurations to include in the Study.
	2. Separate weight of truck from weight of cargo.	2. The Study sought to look at both gross vehicle and net cargo weight, as applicable.
	3. We should work to maximize existing volumes and capacities-- low-density cargo could benefit from belly loading with existing limits.	3. The action recommended was outside the scope of the Study.

	4. Take a look at the real world and how heavy some intermodal containers are now. 5. Consider lowering weight from 80,000 lbs. to 70,000 lbs. if we really want to improve safety. 6. Consider wider trucks, since adding width allows a higher safe center of gravity. 7. Always keep in mind the cost to taxpayer. 8. The last time higher weights were considered, the prior studies proved we have a lot of data available and that is how they settled on 80k lbs. and design standards. We should start there.	4. The Study sought to use actual, observed truck weights in the analysis. This proved challenging due to data limitations. 5. MAP-21 directed a study of heavier trucks in comparison to legal weight vehicles. Lighter-weight trucks were outside the scope. 6. Configurations for inclusion in the Study did not specifically address extra width vehicles. This did not prove to be a priority for those expressing interest in specific alternative configurations. 7. The Study focus related to the cost of the infrastructure. 8. The 80,000-pound truck was used as a control vehicle in the Study.
Operational Impacts	1. Include operational aspects--roadway geometry, barriers, and turning lanes-- in study.	1. To the extent possible, these factors were included in the Study, as appropriate. Barriers were not assessed due to the limitations of current modeling tools. Updating tools used to assess heavier truck impacts on median barriers and guard rail are recommended as a finding in the Study.

Modal Shift	1. Reflect the fact that a change in load height can also change modal choice.	1. Load height was not assessed due to the impracticality of delivering all changes to the highway infrastructure needed to accommodate trucks with increased height.
	2. Larger shippers can consolidate loads more readily than smaller shippers. Remember that partially loaded trucks are common.	2. The distribution of operating weights and the extent to which many trucks are only partially loaded was reflected in the truck weight data used.
	3. Historically, heavier trucks means more trucks. Previous studies support this finding, so we cannot assume fewer trucks.	3. The base case and scenario case(s) assumed for simplicity that the same overall volume of freight would be transported by all modes and redistributed traffic among modes and vehicle configurations according to a total logistics cost-based model in the mode shift area of the Study.
	4. Truck ton-miles should not be used as an evaluation tool, trucks are not rail.	4. Truck ton-miles proved to be a useful metric for some aspects of the Study.
	5. Factor in trip distances -- railroads should be used for longer and heavier freight trips.	5. Traffic assignments to modes and configurations were made on an origin-destination basis accounting for variability in trip distance.
	6. Many well-documented modal split models are available, but some assume that all trucks are full (which they are not).	6. We did not assume all trucks were full. The truck weight data used in the Study, where possible, was valuable in understanding loading.
	7. The Study team should interview shippers.	7. The Study team considered soliciting input from shippers as well as other segments of the freight transportation industry. The project schedule did not enable Study Team to conduct such time-intense activities.
	8. Structural shifts within trucking industry (concentration) affect modal choice.	8. The Study did not forecast geo-spatial structural changes in the trucking industry; this was beyond the scope.
	9. Look at GAO 11-134-- A Comparison of the Costs of Road, Rail, and Waterways Freight Shipments That Are Not Passed on to Consumers.	9. This Study was included in the Desk Scan phase of the Study.

	10. Detention times affect costs, and are a function of how much freight you need to load and unload. This is a larger issue for independent drivers than for larger fleets.	10. Assessing the impact of detention times on trucking operations was not within the scope of the Study.
	11. The Study should not just look at total logistics costs, but look at before and after case studies of locations where they have increased weight limits--in some cases, the shippers' prices stayed the same.	11. The Study focused primarily on freight transportation costs, not shipper prices.
	12. The team needs to understand how goods actually get from place to place. It is much more complicated and detail oriented than previous studies have assumed. Cannot assume perfect operations-- what are the actual practices and challenges?	12. The point was understood and, to the extent practical, used in the Study.
	13. Ideally, we should look at each configuration as a separate scenario, so we can isolate the effects of each, but there are practical constraints.	13. The Study reflected this recommendation.
	14. Build in behavioral factors in modal choice analysis-- do not assume a strict cost-based choice basis.	14. The modal shift analysis did not include any behavior-based factors in modeling shifts among truck types or between modes. Choice and shift was driven by logistics costs.
	15. There are many types of shifts, not necessarily just between the modes. Which configurations are used? How can trucking operations be more efficient and competitive?	15. Estimating shifts among different truck configurations was a key requirement of the Study. The Study focused on the impacts that various alternative configurations could be expected to generate; it was not intended to develop strategies to optimize operations.
	16. Everything is not a truck to rail shift.	16. Truck-to-truck shifts were estimated in the Study as well as truck-to-rail shifts.
	17. Is there a way to account for traffic that would not shift (paper for example)?	17. Each commodity has its own unique set of cost parameters that affect mode and configuration choice. This consideration was included in the modal shift analysis portion of the Study.

	18. Remember the very short truck trips-- a large share of trips are not county to county, but within county.	18. This was considered and, within the constraints of the modal shift model used, reflected in the modal shift analysis area of the Study.
	19. Prior DOT studies have a lot of data and analysis. We should use these studies as a start.	19. The Desk Scan phase of the Study was conducted for that purpose.
	20. Virginia did a freight study a few years ago that we should look at.	20. The Virginia study was included in the Desk Scan phase of the project.
	21. Consider that there are already many State exemptions for certain commodities, some of them seasonal.	21. These were included in the base case to the extent that they are reflected in truck weight data used in the Study.
Safety Data Sources	1. Some fleet data is available from current LCV operations in Western States and we should use it.	1. Fleet data was considered for use in the Study but was not ultimately used due to its adequacy in fitting the analytical needs of the Study.
	2. The State of Florida has a database that combines crash and permit data.	2. Florida data was considered but did not meet the needs of the Study as stated in the comment.
	3. There are some crash data for truck weights. Trucks Involved in Fatal Accidents (TIFA) provides fatality data by weight up to 2005, but we only know data for weight at time of crash, based on what trucking company reported.	3. TIFA sources are extensive and were included in the Study where appropriate.
	4. Multi-trailer crashes are noted in TIFA reports.	4. Noted.
	5. VMT data by weight and configuration is more difficult to obtain than is crash data, but we need VMT data to calculate crash rates. Carrier data may be available.	5. The Study team considered this to the extent possible and appropriate to the Study.
	6. States may have to change accident reporting processes. Virginia, for example, will change their reporting to better report crash data and capture weight info, but changes in processes will not be done in time for this Study.	6. The Study was based on existing, available data and this area was identified as suffering from a lack of data; this was noted in the findings generated from the Study.
	7. We should look at studies in other countries	7. This was done in the Desk Scan phase of the Study.

	8. There are problems with the current Motor Carrier Management Information System program in capturing fault. Even a parked truck can show up as a crash-- the system is flawed.	8. Noted.
Safety	1. The team should look at driver and other fleet characteristics (policies, logs, equipment, etc.) when analyzing safety. The team could get some of this data voluntarily from associations.	1. The Study included driver factors to the extent possible where relevant in the Safety analysis area of the Study.
	2. If we use Web data collection, look out for hackers.	2. Noted.
	3. Perhaps, there could be an endorsement process for new weight and limits and configurations that would create a system of checks and balances.	3. Solicitation of endorsements for changes in truck size and weight limits is outside the scope of this Study.
	4. The analysis should account for fleets that use various crash-avoidance technologies, speed limiters, etc. If there are higher limits more generally, the firms that take advantage of the greater weights might not adopt all the crash-avoidance technologies.	4. Any fleet study will attempt to account for all factors that affect crash probability, including technologies, to the extent they are present in data sets used in the Study. Evaluation of safety technologies is not within the scope of the Study.
	5. Are the States with new higher weight limits collecting data?	5. Idaho, Michigan, and Washington were the sources of such data used in the Study.
	6. The Study should look at United Kingdom's (UK) experience with bigger trucks, but should realize limitations in using the data. European trucks are speed regulated, hours of service are less, and piecework is illegal, for example. If looking at non-U.S., consider all the differences.	6. Differences between the United States and the European Union or other international entities are described in the research.
	7. The Study should look at how heavier and oversized trucks interact with roadway safety infrastructure (guard rails, etc.).	7. Current testing of median barriers and guard rail are cited in the recommendations as needing updates and improvement.
	8. If weight increases, it may overwhelm driver protection,	8. The evaluation of truck crash severity data included this

	and increase collision severity. 9. The team should evaluate safety on a ton-mile basis since trucks might carry 20percent more cargo. This is how rail safety is evaluated. 10. Current system undervalues effect of driver training and experience. 11. Truck safety should be held to a very high standard, especially for heavier trucks, since heavier weights are optional. 12. Ideally, for safety, trucks need to be lighter and slower. Technology would also help, however, paying drivers by the hour and not by the mile would make the biggest difference. 13. Look at vehicle wear and other impacts as a function of weight (tire and brake wear, for example, and component design).	factor to the extent that crashes involving over-weight permitted load movements reflect this situation. 9. Ton miles was a metric used in the Study, where it was relevant. 10. Driver factors were accounted for to the extent that available data enabled such an assessment. 11. The safety Study identified the safety effect of alternative configurations and account for the effect of other factors. 12. Driver pay is outside the scope, though it was considered in the fleet analysis. 13. The inspection data evaluation looked at the association of violations in critical mechanical systems related to operating weight.
Dynamic performance	1. Truckingvideo.com/SafetyTruck has an online video that covers stability of trucks and considers the effects of uneven loads.	1. The video was reviewed as part of the Crash/Safety Desk Scan work.
Vehicle Braking	1. Engine horsepower is a major part of the truck braking systems. Heavier trucks must be built with bigger engines to keep their ability to stop, since engines and technology are as important as brakes in stopping trucks. 2. Talk to truck manufacturers. What does it take to change vehicles and maintain safety? Also, talk to mechanics and component manufacturers.	1. Horsepower and carrying capacity were evaluated in the modal shift analysis and used in the fuel consumption and air quality areas of the modal shift analysis. 2. In the simulation analysis conducted, appropriate braking power was assessed.
Driver	1. The Study team should interview experienced truck drivers	1. The Study schedule did not lend itself to conducting

Certification	(more weight means more responsibility). 2. Driver experience is important. Current operations pick experienced drivers. If use became widespread, it would bring in less-experienced and brand new drivers to operate the larger equipment. 3. Seek opinions and data from drivers about effects of higher weights using a voluntary response option--perhaps from the trucking satellite radio station and/or using the crowdsourcing software from IdeaScale, since FHWA mentioned that they cannot get Office of Management and Budget (OMB) clearance to survey drivers within the time limitations of the Study. 4. FMCSA has driver data/scorecards. 5. The team should look at the results of a FMCSA recent listening session on new entrant standards. The quality of drivers and the details on driver regulation have large impacts on safety. 6. Drive cams could be effective safety devices.	widespread interviews. The research team sought input from a trucking industry expert for specifics on driver certification. 2. Driver age was included in the analysis of violation and citation analysis conducted as part of the Crash/Safety area of the Study. 3. The Study schedule did not lend itself to conducting widespread interviews. The research team sought input from a trucking industry expert in the relevant areas of the Study. 4. The Study did not extensively evaluate driver issues. 5. The violation and citation analysis conducted as part of the Crash/Safety area of the Study looked at driver age as a safety factor. 6. The effect of driver monitoring was considered out of the scope of the Study.
Network Considerations	1. We should consider the most effective network for each configuration rather than assuming universal operation. We should focus logical economic analysis of where and how each configuration should be used and not simply assume using a configuration throughout a corridor where we might have to replace 15 bridges.	1. We considered the extent to which each configuration could operate on different parts of the overall highway network and identified those types of highways suited for each configuration from a safety and geometric perspective.

Fleet Size Issues	1. When standards are increased, small fleets and independent drivers have to adapt all of their equipment immediately, or they have to turn down loads, whereas larger companies only need to convert 10 percent to 15percent of their fleets. 2. How much does it cost to be safe? Cost of safety is greater for independents.	1. The analysis assumed and measured the impacts at the point of full adoption of any of the alternative configurations studied. Estimating the time span to reach such a point was not included as part of the Study. 2. This issue can be discussed qualitatively, but a quantitative analysis of the issue was beyond the Study scope.
Permit Operations	1. The team should consider permitted and illegal overloads separately. 2. Current Federal legal limits include operations above 80,000 pounds through grandfather rights and provisions for special permits, so it is hard to separate legal and illegal loads based on observation.	1. This was assessed in the Crash/Safety area of the Study. 2. Noted; the researchers encountered this challenge.
Environmental impacts	1. Environmental and economic impacts are mentioned in legislation but do not seem to be reflected in the Study plan. 2. Look at the expressed values on the DOT Web site, where it implies that we should be moving away from the highway mode toward a more balanced system. We should be asking what would happen if we lowered weights, rather than raising them. 3. Look at environmental and fuel consumption impacts.	1. Environmental, energy, and economic impacts were estimated based on estimated modal shifts caused by each of the alternative configurations assessed. 2. This was outside of the Study's scope. 3. Environmental and fuel consumption impacts were examined in the modal shift area of the Study.
Parking	1. Truck stops will incur added costs for turning radii and other costs. 2. Longer configurations will have special parking demands limited by current capacity and geometry.	1. This was not extensively researched due to data limitations. 2. This was not extensively researched due to data limitations that prevented a national analysis.

Highway design standards	1. Consider costs of changes to ramps, roadway geometry.	1. Configurations and the networks they were envisioned to use were selected based partially on whether they could operate within existing roadway geometry.
Bridge Formula	1. Bridge formula in the 1980s was based on how bridges were built. It was a scientific formula, and we should revisit how it came to be and the reasoning behind it before we abandon it.	1. The bridge formula has not been part of the bridge design standard specification used in the U.S. It was addressed in the Study as a factor for enforcement effectiveness in the compliance assessment area of the Study.
Enforcement	1. Look at out of service violations as a function of weight. 2. Look particularly at the rate of bridge posting compliance. 3. Interview police officers and weight enforcement officers as part of this Study. 4. Turn drivers into enforcer-- now shippers can overload axles and driver is held responsible. 5. More trucks imply either a need for more enforcement effort and staffing or lower enforcement rates. 6. The FMCSA crash study underway will send FHWA citations of congressional studies concerning this issue. We currently have very low rates of truck inspections. 7. Look at percentage rates of waiver approvals, when waivers can be issued, annual vs. trip permits, and cost of not enforcing. 8. Go to States that grandfather trucks to find out how they run their programs, what kinds of special driver requirements, maintenance schedules, etc. are in place.	1. This assessment was completed in the Crash/Safety area of the Study. 2. Compliance with bridge weight restrictions was not included in the Study as it is considered out of the Study's scope. 3. Input from the Commercial Vehicle Safety Alliance (CVSA) informed and contributed to the Study. 4. This aspect is outside the scope of the Study. 5. This point was assessed in the compliance area of the Study. 6. Data from this FHWA/FMCSA Study was used in the safety/crash area of the Study. 7. Truck inspections were a factor for evaluating enforcement efficiency. 8. States with grandfather exceptions were included in the Study.
Obsolescence	1. If truck weights increase, what happens to intermodal? We	1. An assessment of intermodal chassis needs is outside the

of Older Equipment	will need chassis upgrades and perhaps other intermodal equipment modifications.	scope of the Study.
ITS Can Improve Safety	1. Must focus on human factors. Technology can fail, which adds stress to drivers. 2. A major source of stress to drivers is that electronic devices do not record detention time, so those hours count against hours of service requirements. This is going to be aggravated by new hours of service requires and potentially increased detention times with increased size/weight.	1. These areas were outside the scope of the Study. 2. The comment is outside the scope of the Study.

Session C: General Discussion (Breakouts 1 & 2)

Topic	Comments	Next Steps
Operational Impacts	1. Impacts of heavier trucks on small businesses. 2. Movement to small truck engines is a factor for hauling more weight	1. The impacts of heavier trucks on small businesses was included as a transportation cost in the modal shift analysis. 2. Engine size to operate the alternative configurations was included in the impact assessment on fuel consumption and air quality in the modal shift area of the Study.
Safety	1. Correlation of experience with safety 2. Bigger trucks are detrimental to safety	1. The Study analyzed experience and safety factors in the Crash/Safety assessment. 2. The comparative safety implications of the six alternative configurations were included in Crash/Safety area.
Dynamic performance	1. Truck growth is dynamic and must be factored into the Study and not held constant	1. The estimates of scenario traffic resulting from introduction of each of the alternative configurations was an important step included in the Study.
Network considerations	1. Study the impact of State and local roads carrying higher weight trucks 2. Trucks use certain roads or corridors-not all roads-study those well used roads	1. The impact of heavier trucks on State and local roads was qualitatively addressed in the Study; quantitative assessments were not possible due to limited data availability. 2. This was done in the Study.
Fleet Size Issues	1. Impacts of heavier weights on small truckers/owner operators: higher equipment costs, driving jobs, driver training, etc. Small truckers will not have leverage to set and collect higher rates to recoup higher costs and for more productivity for shippers.	1. Issues listed are very specific and data was not available to conduct an adequate assessment of these aspects.

International Aspects	1. Comprehensive review of European methods to cover all aspects. 2. Foreign Competitiveness-higher weights to the ports	1. European studies were included in the Desk Scan phase of the Study. 2. The trucks assessed in the Study have implications in this area; a comparison of competitiveness by commodity is not within the scope of the Study.
Economic impacts/ productivity & Environmental impacts	1. Shipper inefficiencies at ports, etc. affect trucking productivity. 2. Economic impacts-thoroughly address 3. Include fuel usage for full as well as empty trucks. 4. Larger trucks potential to reduce number of trucks and positively affect congestion 5. Study the do-nothing option-has costs 6. Deficiencies of deadheading larger trucks 7. Review and address truck size and weight increases in the post-deregulation era. Trailers have increased several times: 45 ft.	1. This comment is not within the scope of the Study. 2. The economic impacts of changes to current Federal truck size and weight limits were addressed in the Study. 3. Both of these factors were included in the Study. Fuel use was assessed in the modal shift area of the Study while empty trucks were part of the truck weight data base used widely in the Study. 4. This comment was assessed in the modal shift area of the Study. 5. The Study focused on the MAP-21 requirement to identify and assess the impacts of various truck sizes and weight limits. The comment is not in the scope for the Study. 6. Deadheading alternative configurations was not assessed in the Study. The modal shift analysis would reflect empty trucks in the scenario traffic. 7. Where prior studies have been completed in this area, they were included in the Desk Scans for the project.

	to 48 ft. to 53 ft. and 57 ft. (in selected States)	
Enforcement	1. Static scale dimensions may be inefficient for weighing larger/longer trucks, increase time.	1. The time differential for weighing and inspecting the different configurations was included in the enforcement cost area of the compliance analysis of this Study. The need to replace weigh bridges currently in use was assessed with the assistance of CVSA.
Previous studies	1. Industry and Government may submit study materials 2. Control for bias to heavier trucks on contract team and in administration	1. The Desk Scans provided opportunity to do this. 2. FHWA controlled for potential bias throughout the Study process.
Impacts on State laws	1. Study States that have larger configurations on Interstate by grandfather provision or State road provision 2. State Option for truck configurations	1. The States of Idaho, Michigan, and Washington are examples of such States that were included in the Study. 2. Analysis of State options was not in the scope of the Study.
Driver Certification	1. Driver Training effect on retention and safety by truck configurations	1. An assessment of the effect of driving training is not in the scope of the Study.
Modal Shift	1. Commodities that will use larger trucks. 2. Modal shift-LTL's not affected 3. Key to freight haulage is intermodal and choice relates to rates for all modes	1. The modal shift analysis identified and applied impacts to shipping choice for general commodity types caused by the introduction of alternative configurations. 2. The modal shift assessment reflected this input. 3. The Modal Shift analysis included in this Study addressed the issue of rate adjustment for truck and rail modes.

Bridge Formula	1. Consider bridge formula in determinations	1. The Study included an application of the bridge formula in the compliance section, as a factor in enforcement effectiveness.

Webinar - Vehicle Configuration

Topic	Comments	Next Steps (Safety Group)
Specific Configurations recommended	1. 10-axle Rocky Mountain Double	1. This configuration was considered but not included in the Study in light of alternative configurations of greater interest to stakeholders.
	2. 9-axle turnpike double at 120,000 lbs.	2. This configuration was considered but not included in the Study in light of the alternative configurations of greater interest to stakeholders.
	3. 53' turnpike doubles as used in Ontario pilot program	3. This configuration was considered but not included in the Study in light of the alternative configurations of greater interest to stakeholders.
	4. The 8 and 9-axle B-double is in wide use in Canada and elsewhere. Highly recommend it be one of the configurations studied. The 8-axle B-double with 33-37-foot trailer lengths, coupled with performance-based standards	4. This configuration was considered but not included in the Study in light of the alternative configurations of greater interest to stakeholders.
	5. 4- or 5-axle truck cranes, dump trucks, other specialized hauling vehicles	5. These vehicles are not in the scope of the Study. Congress required that a six-axle semitrailer and other tractor-semitrailer configurations be assessed.
	6. Quad tractors and quad tankers for dairy industry – 120,000 lbs.	6. This configuration was considered but not included in the Study in light of the alternative configurations of greater interest to stakeholders.
	7. 5-axle 88,000 lb. vehicles since many States have ag [agriculture] and forestry exemptions.	7. This configuration was included in the Study.
	8. 5-axle at 88,000 would not require large investment in new equipment	8. This configuration was included in the Study.

Topic	Comments	Next Steps (Safety Group)
	9. 5-axle at 88,000 would result in 20 percent fewer trucks used to deliver to customers	9. This configuration was included in Study.
	10. 6-axle 107,000 lb. tankers widely used in New York. Study configurations used in some parts of country, but not in all parts.	10. Two 6-axle trucks were included in the Study: 91,000 lb. 6-axle truck and 97,000 lb. 6-axle truck. A 107,000 six-axle truck was not included in the Study in light of the alternative configurations of greater interest to stakeholders.
	11. It would be very efficient if one tractor could haul two 40 ft. containers into/out of ports on an appropriately designed configuration that was stable and maneuverable.	11. This configuration was not included in the Study in light of the alternative configurations of greater interest to stakeholders.
	12. The Study should consider heavier Canadian weight limits.	12. The Volume I Summary Report discusses truck weight limits in Canada and Mexico.
	13. 28 ft. doubles, a current legal configuration, needs to be part of this Study. The stability, and thus safety, of this setup is much different from the 53 ft. singles.	13. The 28' double configuration was used as a control vehicle in the Study for comparative analysis purposes with the multiple trailer combinations that were assessed.
Needs of different industries	1. Consider what changes to configurations may result from the new port operations projected in response to the Panama Canal expansion. Check with MARAD before final decision on configurations.	1. The Study included participation and input of MARAD staff on the POG. The alternative configurations studied reflected the input and interest of a wide range of stakeholders.

Lift axles, different axles spreads	1. These change the infrastructure impacts of vehicles.	1. While axle positioning does change the impact of the vehicles, doing an extensive comparison of axle placement within a configuration was beyond the scope of the current Study.
Safety	1. LCVs do not always operate in perfect conditions, e.g. bad weather	1. This is true for all vehicles. Furthermore, scientific literature in the Desk Scans indicated that special policies may be needed for LCV operations.
Braking	1. Longer, heavier (10/11 axle Rocky Mountain Doubles) have twice as many brakes for only 60 percent more weight. They corner and stop better than 80,000 lb. 5-axle trucks. 2. Would trucks need to be retrofitted to accommodate the need for stronger brakes? 3. 88,000 lbs. on 6 axles would not increase stopping distance nor cause any additional road/bridge degradation.	1. Rocky Mountain Doubles were not included in the Study in light of the alternative configurations of greater interest to the stakeholders. 2. This is outside the scope of the Study. 3. An 88,000 pound, six-axle configuration was not included in the Study in light of the alternative configurations of greater interest to stakeholders.
Network considerations	1. Interchange ramp clearance. 2. Operations in mountainous terrain. 3. Operations in urban areas. Large trucks have massive blind spots and require large road geometrics that in turn encourage fast driving by other vehicles. Both create hazards for pedestrians. Smaller, well-designed trucks are more appropriate for urban areas.	1. This analysis was not conducted due to a lack of data. 2. Various terrain types were included in the assessment of the alternative configurations assessed in the Study. 3. Vehicle tracking was included in the vehicle stability and control area of the Crash/Safety area of the Study.

	4. Parking and break-up issues for B-train configurations, other LCVs.	4. Break-up issues were qualitatively assessed in the modal shift area of the Study. Changes in truck parking needs were not addressed due to limitations on adequate, available data.
	5. Impacts on State networks.	5. The Study primarily addressed impacts on NHS routes due to the availability of adequate data.
	6. Need for staging areas when LCVs get to State roads.	6. Staging areas or break-up/make-up lots were qualitatively addressed in the modal shift area of the Study.
	7. Same degree of reasonable access likely will not be possible for longer vehicles.	7. Data availability limitations inhibited an assessment of reasonable access routes unless those routes were on the NHS.
	8. Port access and other last mile needs may not be feasible with LCVs.	8. Some LCVs may not be able to travel directly to ports or other destinations.
Bridges	1. Total distance between axles should comply with the Federal Bridge Formula	1. The Study was not limited to vehicles that comply with the bridge formula.
	2. Allow States to increase gross weight on the Interstate system as long as it meets Federal Formula B	2. The Study was not limited to configurations that complied with the bridge formula.
	3. The most important issue for States such as Washington with existing higher weight limits is the impact on bridges. We follow AASHTO bridge standards, and believe that higher weights proposed by some groups will damage bridges, regardless of axle configuration.	3. The Study assessed the extent of damage and the cost in relative terms.

Pavements	1. 10 axle Rocky Mountain doubles at 129,000 lbs. put less weight per axle group than 80,000/88,000 semis. 2. Balance fuel efficiency with pavement damage. 3. Test configurations with alternative axle loads to determine at where pavement impacts become unacceptable.	1. Rocky Mountain Doubles were not included in the Study in light of the alternative configurations of greater interest to stakeholders. 2. The assessments completed in the Study included both elements. Pavement was an area of analysis in the Study and fuel consumption implications were included in the modal shift area of the Study. 3. The Study assessed the impact that the alternative configurations were estimated to have on pavements including an analysis of the full spectrum of axle weights observed in WIM data.
Performance-based standards	1. Consider configuration's handling, stability characteristics as well as its low-speed off tracking 2. Focusing only on dimensions/lengths instead of focusing on the configuration's operational performance characteristics limits design possibilities. 3. Low speed off tracking performance assessment as it is now done assumes fixed trailer wheelbase lengths. If a performance standard approach was used, it is highly likely steerable axles could become prevalent while still enabling good maneuvering performance. This possibility should be considered.	1. This work was completed in the vehicle stability and control area included in the Crash/Safety analysis of the Study. 2. The value of assessing the alternative configurations in the vehicle stability and control area of the Study was understood and completed. 3. Assessments of vehicle stability and control did not include recommendations as to how to improve the tracking of the configurations; that was outside the purpose and scope of the Study.

Permit operations	1. Would certain vehicles operate only under special permit?	1. Whether certain vehicles would operate under special permit in the future did not relate to the analysis. Legal permitted loads were included in the truck weight data set used in the Study.

Webinar - Data, Methods, Models

Topic	Comments	Next Steps
Economic Impacts/ Productivity	1. A more productive trucking industry could lead to an increase in Gross Domestic Product (GDP). 2. Fewer trucks would be required to haul the same amount of freight. 3. Do studies not show that when weight limits go up, number of trucks also increase, since per ton mile cost goes down? 4. Separate study for non-divisible loads, i.e. bulk liquids/tankers. Vehicle dimensions do not change; simply add a 6th axle (tri-axle trailer) and increase productivity by almost 50 percent from 80k to 107k.	1. Macroeconomic modeling to estimate impact on GDP is beyond the scope of the Study. 2. The modal shift analysis area of the Study estimated the changes in truck travel levels needed to haul a given amount of freight using all modes. 3. The Desk Scans did show that truck traffic has not decreased following size and weight increases, but did not indicate a link between this increase and changes to costs per ton-mile. 4. The Study examined different alternative configurations including (in a limited way) various axle sets and configurations and the kinds of commodities carried by these configurations.

Safety	1. Societal costs of crashes should be included in the Study	1. The Study analyzed changes in crashes and safety associated with operating each of the alternative configurations but did not specifically determine the broader societal cost of crashes. Lack of truck weight data inhibited the extent to which this consideration could be conducted.
	2. ATRI recently completed study on large truck safety trends that should be considered.	2. Previously completed studies by ATRI were considered in the Desk Scans for the Study.
	3. The major limitation of TIFA is the lack of specificity with regard to the specific weight of the truck involved in the fatal accident.	3. This was true for all data sources examined and evaluated for use in the Study. The lack of truck weight data linked to truck crashes was reported as a finding in the Crash/Safety area of the Study.
	4. Will [the researchers] review and utilize the Dynamic Performance Indicator (DPI) method for determination of heavy truck safety? This model includes accident statistic data. Author/developer of the model is an Alfonso Corredor, PhD. Simulated data to consider rollover threshold, front and rear out-swings, off-tracking (low and high speed)?	4. The same metrics used for the 2000 CTSW Study were used in the current Study. DPI requires crash rates for specific configurations. Since crash rates by configuration are generally not reported, the use of DPI was not feasible. Tracking was a key element assessed in the vehicle stability and control area of the Crash/Safety analysis.

	5. When looking at historical crash data on oversize and heavier trucks, a researcher needs to look beyond the success stories and look at the additional driver training, screening and monitoring that exists behind the scenes.	5. Generally, this was considered in the assessments completed in the Crash/Safety area of the Study.
	6. Safety analysis: cannot simply extrapolate data from one State and apply nationally. What may be "safe" in Michigan may not be safe in a mountainous State or on high volume roadways.	6. Findings from the truck crash assessments were not extended to the national level, partially for this reason.
	7. FMCSA-sponsored "Cost- Benefit Analysis of Onboard Safety Systems," breaks out the real-world, line-item costs of crashes by truck type, severity, commodity-involvement	7. An evaluation of on-board safety systems is outside of the scope of the Study.
	8. It has been a long time since the last DOT sponsored "Technology Scan" of Europe and Scandinavia but both places have vast amounts of safety info and wisdom and folks who may well be willing to share it. Specific to truck size and weight (TSW), there has been much recent good work accomplished--hope you can include it in the American Study.	8. Studies completed in Europe were included in the Desk Scan phase of the Study. Data used in the Study was limited to U.S.-relevant data since differences in a variety of factors relating to trucking in other countries limit the applicability of the data to this Study.

Data on Truck Configurations and Operating Weights	1. Consider using virtual weigh station data. This would be what is actually out there. 2. Any States that have done or are doing calibration for Mechanistic-Empirical Pavement Design Guidelines (MEPDG) implementation should have higher quality truck and truck damage data than States that have not done this calibration 3. A State WIM network is probably the minimum requirement for providing competent data. 4. WIM data not always reliable.	1. The truck weight data sets reported to FHWA by the States was extensively used in the Study. To the extent that virtual weigh stations are a source for this reported data, it was used in the Study. 2. In selecting pavement sections to be assessed in the Study, Long Term Pavement Performance (LTPP) sites were used to the extent practicable, for this reason. 3. Truck weight data reported to FHWA by the States was used extensively used in the Study. 4. Quality control procedures applied by the States and FHWA render the best available truck weight data currently available; this data was extensively used in the Study. Additional evaluation of the truck weight data was applied to ensure the use of quality data.
Environmental Impacts	1. Optimization of freight produces fewer grams of CO2/ton-mile.	1. The modal shift analysis examined emissions resulting from the introduction of each alternative configuration.

Bridge Impacts	1. Must consider impacts of functionally obsolete bridges, not just the structural characteristics of the bridges. Look at the effect of heavier trucks on functionally obsolescent facilities.	1. We studied impacts on the most common and representative bridge types in FHWA's National Bridge Inventory (NBI). Functionally obsolete bridges were not included; bridge analysis focused on structural strength and the ability of the nation's bridges to accommodate the configurations.
	2. Truck weight limits are based on a 1950's study when most bridges and tunnels were new; most bridges are at a satisfactory rating so should we not be looking at lowering the weight limits until the infrastructure is back to 100 percent?	2. Load rating analysis reflected the current reported condition of all bridges; Study findings included the additional investment that would be required to accommodate the alternative configurations.
	3. In SCDOT, we did fatigue analysis for four archetype bridges.	3. The Study was included in the Desk Scan phase.
	4. The number of sample bridges seems insufficient.	4. Bridges selected for Study are representative of those located on the Interstate and NHS. The number of bridges included in the Study is affected by the availability of data needed to perform structural strength assessments using AASHTO's BrR.
	5. Not all States use Load Resistance Factor Rating. Determine fatigue of steel members and deck, salt induced decks and vibrations. Determine use of Posting, enforcement, re-evaluate bridge formula. Understand and use of practical rehabilitation and strengthening techniques to ensure level of uniform. Contact States and AASHTO 2010 posting analysis completed before Michigan. No deterioration models exist that determines quantifiable service life loss as weights increase.	5. We used Load Factor Design where quality Load Resistance Factor Rating models in ABrR (VIRTIS) were not available.

	6. Number of Bridges is too low. The sample should be based on the corresponding percentages of different types of structures on the Interstate.	6. The sample was drawn in consideration of this and of bridge types located on the NHS. Data available through the NBI was used to determine the bridge types that were included in the Study.
	7. The deterioration models from Bridge Management System consider time and service environment, but not load. Fatigue models consider load explicitly. For other impacts, more basic work is needed to relate bridge deterioration to truck weight.	7. Load was an important factor assessed in the bridge analysis area of the Study.
	8. Cluster data analysis on the various bridge structure types around the country.	8. This technique was applied in the bridge analysis area of the Study.
	9. Really should look at the process that National Cooperative Highway Research Program (NCHRP) 12-78 used to make a sample set of bridge models that was reflective of the real-life bridges found in the NBI.	9. NCHRP 12-78 was identified in the Desk Scan phase of the Study.
	10. Suggest you get both Boeing Aircraft engineering and ATI Wah Chang Corrosion analysis division in on the Study.	10. The reason for and relevance of this comment is not given.
	11. Idaho DOT did a bridge analysis in conjunction with an LCV pilot program.	11. The studies completed by Idaho DOT and reported to the State Legislature were included in the Desk Scans.
Pavement Models	1. Joints can be examined via the load transfer efficiency, but current models may not address durability issues in concrete	1. States collect pavement condition data. The AASHTOWare® Pavement ME Design model that was used is calibrated to empirical data.

	2. SCDOT used DARWIN in its pavement deterioration project.	2. AASHTOWare® Pavement ME Design is the latest pavement assessment and design model available and it was the primary tool used in the pavement assessment area of the Study.
	3. In GA, we are going through M-EPDG calibration now. It is apparent that WIM is critical. Currently, we have indications that we have high levels of non-compliance with weight limits.	3. "Non-compliant" trucks may be carrying a legally issued overweight hauling permit. Such vehicles were included in the Study to the extent that they are present in the truck weight data set supplied by FHWA.
Operational Impacts	1. Impacts of heavy trucks that are not able to maintain speed in mountainous terrain	1. Operational considerations, including operations in various terrain settings, were assessed in the modal shift analysis.
	2. Congestion in highway system or railway could be an issue.	2. Impacts on congestion levels were assessed in the modal shift analysis area of the Study.
	3. =Independent from injuries and fatalities, major highway shutdowns and closures seem to be from twin and triple trailers, but I have no data for this.	3. Agreed that LCV crashes may take longer to clear, but we were not able to evaluate the full extent of this impact due to data availability limitations.
	4. Acceleration data is needed since heavier trucks with same horsepower, torque, and gear ration will take longer to accelerate, which can affect signal timing, work zone stoppages, on-off ramps and safety when mixing in with cars.	4. Truck engine performance was evaluated for each of the alternative configurations included in the Study as part of the analysis completed in the modal shift area of the Study.
Dynamic Performance	1. Consider full dynamic performance analysis. Safety analysis must not only include accident statistics but also real world simulation techniques such as low-speed off-tracking, high-speed off-tracking, transient off-tracking, etc..	1. Tire type comparisons and evaluations are outside the purpose and scope of the Study. The vehicle stability and control area assessed vehicle tracking. Results in this area are included in the Crash/Safety technical report.

	Compare wide based single tires with dual tire set-up. 2. If increased weights mean higher loads, we will have even more rollovers. Talking about axles and brakes neglects this issue.	 2. Simulation and safety analysis sensitive to changes in the vehicle's center of gravity was completed as part of the vehicle stability and control assessment included in the Crash/Safety area of the Study.
Modal diversion	1. Consider the amount of freight tonnage that will be diverted from rail to highway due to the various configurations, and thus the acceleration in roadway deterioration 2. Take into account differing freight trends for each State. 3. Identify commodities that are candidates for modal shift. At the margin, there are commodities that are more likely to shift than others. Also, distance and time are important characteristics for modal shift. 4. Financial impacts on short-line railroads are important. 5. If you focus on commodities within a BEA - BEA level comparison may get around county details. You should also use this to get a base modal share within regional corridors.	1. Outputs that measured the effect of introducing each of the alternative configurations on shifts between modes were completed in the modal shift analysis area of the Study. 2. State trends were not separately derived in the Study; rather, they were based on modal shift impacts assessed on a corridor basis. Results were reported on a national basis. 3. This approach was followed in the modal shift analysis area of the Study. It was understood that certain commodities are more susceptible to rail-to-truck shifts and this consideration was applied in the Study. 4. Impacts on regional and short-line railroads were assessed in the Study. An enhanced capability to evaluate regional and short-line rail shifts is included as a recommendation of the Study. 5. The modal shift analysis area of the Study was conducted at the county level in order to get the finest level of Origin/Destination data to provide the best estimate of modal shifts among different vehicle configurations

	6. Need to consider the capacity of other modes to handle modal shift. 7. Many private sector companies likely have modal diversion models and related data. 8. Consider impacts associated with larger vessels using Panama Canal, especially for southern ports	6. This was considered as part of the modal shift analysis area of the Study. 7. In stakeholder input events, we requested information on such models but none were offered for use in the Study. 8. This was considered in the modal shift area of the Study to the extent that it is reflected in existing freight forecasts.

Webinar - General Comments

Topic	Comments	Next Steps
Driver Education	1. Driver education will be important	1. This point is qualitatively addressed in the Crash/Safety area of the Study.
Driver Certification	1. LCV operators should be certified	1. This point is qualitatively discussed in the Crash/Safety area of the Study.
Previous studies	1. How will the Study address previous studies, like the Vermont Study? 2. Reviewing findings of previous studies may help in assessing the vehicles to examine in this Study. 3. Western Governors Association (WGA) study included many aspects of what will be covered in the current Study.	1. The Vermont Study was included in the Desk Scan area of the Study. 2. The Desk Scan phase of the Study was designed in part to accomplish this. 3. The WGA study was included in the Desk Scan phase of the CTSWL Study.
Parking	1. Parking and truck rest areas not designed for LCVs.	1. Parking facilities were not extensively assessed in the Study due to data availability limitations. This issue was qualitatively discussed in the Study.
Weigh stations	1. Most State scale facilities are not designed to weigh combination vehicles.	1. The Compliance and Enforcement area of the Study addressed this with input from the CVSA.
Operating environment	1. LCVs do not always operate under perfect conditions. Consider operations in inclement weather, in mountainous terrain, in dense urban areas.	1. The operation of the alternative configurations operating in a variety of terrain types was completed in the modal shift analysis area of the Study.
Number of drivers	1. Fewer, more experienced drivers required if LCVs allowed. Fewer drivers is not a benefit.	1. LCV driver qualifications were not specifically analyzed but a discussion on qualifications is included in the Crash/Safety area of the Study.

Highway design standards	1. Longer, heavier vehicles could create need to modify highway design standards 2. New truck configurations would require new load ratings for bridges. 3. Should include an impact study on cable barriers of trucks over 80k; could also recommend no trucks over 80k allowed in left lane to keep them away from the median cable barriers. 4. Would need collision force criteria for bridge rail and piers. 5. What would be the impact on the majority of the Interstate designed to old geometric requirements? (particularly interchanges)	1. The findings from the vehicle stability and control analysis area of the Crash/Safety analysis are useful in considering this need. 2. The bridge analysis area of the Study assessed the structural strength state of the bridges included in the Study; results of this analysis can be used to evaluate this need. 3. The issue of cable barriers was considered in the Study but could not be rigorously examined due to current limitations in the evaluation tools. A recommendation to enhance these tools is presented as a recommendation in the Study. 4. Collision force criteria is an aspect of barrier and guard rail assessment modeling capabilities that need upgrading, as discussed above. 5. See the vehicle stability and control area of the Crash/Safety analysis.
Bridge Formula	1. Would need a new bridge formula since 6-axle 97,000 tractor semitrailer does not comply with current bridge formula. The issue that seems to get pushed aside all too often...the Federal Bridge Formula is the prevailing standard...how will it be factored into this Study? Is it obsolete? Does it need to be amended? Either use it or get rid of it.	1. An evaluation of the Federal bridge Formula-B was not within the scope of this Study. The bridge formula was relevant to the compliance analysis area of the Study.

Enforcement	1. Bridge limits would need to be posted, enforced heavily, & made available for use in truck-specific GPS units. 2. Consider on-board weighing technology 3. The Study needs to evaluate and acknowledge current issues with existing trucks exceeding weight limits, in particular on local bridges, and lack of enforcement. Violations are an everyday occurrence with economic impact to counties. How might this be increased with heavier trucks? 4. Viable size and weight enforcement provision is inextricably linked to this Study.	1. Implications that each of the alternative configurations have on bridge postings was addressed in the bridge analysis area of the Study. 2. Evaluation of on-board weighing technology was outside the scope of the Study. 3. The truck weight data set included trucks of this type and was included in the assessments completed in the bridge analysis area of the Study. 4. The Study assessed the impacts on the delivery of effective enforcement generated through the operation of each of the alternative configurations.
Truck maintenance costs	1. Maintenance costs increase as truck weights increase. 2. More frequent inspections of truck frames, floors, and other load-bearing components.	1. Assessing vehicle maintenance needs is outside the scope of the Study. 2. Specific truck inspection actions were generally considered in the violation and citation area of the Crash/Safety analysis completed in the Study. Element-specific inspection assessments are outside the scope of the Study.

Consistency with other agencies' regulations	1. Consider impacts of performance on related rules such as Environmental Protection Agency (EPA)/NHTSA greenhouse gas and EPA SmartWay and State rules.	1. An evaluation of the elements included in EPA's SmartWay Program is beyond scope of the Study. The Study's fuel consumption analysis and air quality impacts, including greenhouse gas emissions, were included in the modal shift analysis area of the Study.
Obsolescence of older equipment	1. Apparent concern about existing equipment becoming obsolete and need for trucking companies to purchase new equipment.	1. The Study did not include an analysis of equipment obsolescence; rather, it assessed the impacts of each alternative configuration in areas outlined in the law.
Productivity	1. Cannot make current vehicle less competitive.	1. The modal shift analysis assesses the truck-to-truck shifts in load movements, including consideration of the impacts on the baseline vehicle, as part of the modal shift analysis.
Separate passenger and freight traffic	1. The best possible thing we could do is to build a separate, parallel Interstate highway system and separate cars and trucks. Would be great for everyone.	1. The Study did not include an assessment of the need for a duplicate, parallel Interstate System.
Truck/bike interaction	1. Bike use is growing and actively encouraged in cities. Bikes and trucks are operating in shared space. Will bike/truck safety be a priority in the Study? Also, can FHWA prepare expanded safety promotional materials to educate bikers and truckers about better safety practices, including blind spots, low profile recumbent bikes, wide turns, and loose equipment?	1. Consideration of the impacts on bicycle/truck safety was not within the scope of the Study. The recommendation for expanded safety materials is noted and has been shared with the relevant program offices.
Permit fees	1. Overweight permit fees do not typically cover cost of additional infrastructure damage.	1. The adequacy of permitting fees and charges required by the States was not addressed in this Study.

ITS can improve safety	1. Tomorrow's Intelligent Transportation Systems (most especially ITS safety systems) can change enhance yesterday's constraints re: truck size and weight issues and prospects. Suggest paying careful attention to 5.9 GHz technologies.	1. An assessment of Connected Vehicle Program benefits was outside the scope of the Study.
Impacts on State laws	1. Should also include an inventory of all State laws that would be affected by a change in Federal truck size and/or weight limits.	1. A separate provision of MAP-21, Section 32802, called for a compilation of State truck size and weight laws. This additional report was conducted separately from this Study and was released in the fall of 2015.

APPENDIX B – DISPOSITION OF DECEMBER 18, 2013 EVENT COMMENTS

Topic	Comments	Task Lead Response
General Comments	1. Why is there such a short timeline to submit comments?	1. FHWA invited and considered comments from May 2013, prior to the launch of the Desk Scans and selection of alternative configurations, data sets, models and methodologies, throughout the research phase of the Study and following the June 2015 release of the Technical Reports and September 2015 Peer Review. A public docket for submitting and sharing comments was created in the fall of 2014, populated with previously submitted comments, and will remain open for a period of time following the release of the final Report to Congress.
Modal Shift	1. Is the Study going to look into the effects of having longer combinations on surface streets and if not, are they going to take into account the need for more drop lots or perhaps warehouses to build up or break down the loads as they come in and out and off the Interstate?	1. The modeled twin 33' trailers were assumed to have the same access as the baseline twin 28' trailers. No assumption was made regarding infrastructure to accommodate twin 33's. Triples were assumed to be limited to a 74,500 mile network of Interstate and other principal arterial highways, with additional access of up to a maximum of 2 miles from that network. It was assumed that no public infrastructure would be provided for triples to assemble or disassemble.
	2. What kind of impacts are you looking at for the railroads? Economic, modal shift?	2. The study estimated the potential shifts of traffic from railroads to highways, potential reductions in rates that would be needed to retain certain traffic on railroads, and the loss of contribution toward meeting railroads' fixed costs.

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	3. What steps will the Study take to examine shift within trucking itself? There is a significant amount of the trucking industry – specifically small business trucking entrepreneurs – that will be negatively impacted by changes in limits, yet the examination of impacts on shipments seems to only be focused on benefits to shippers.	3. The Study examined impacts of scenario vehicles on truckload and less-than-truckload operations. The modal shift analysis included an assessment of truck-to-truck shifts that would occur through introduction of each of the alternative configurations. The Study did not differentiate impacts on specific segments of the trucking industry such as small business trucking entrepreneurs.
	4. Do you have further documentation on county-to-county commodity flows? If so, please direct.	4. County-to-county flows were developed by Oak Ridge National Laboratory based on FHWA's latest Freight Analysis Framework (FAF). Origins and destinations at the county level were estimated from regional flows in the FAF based on Bureau of Economic Analysis and other economic data. Documentation on the steps involved in preparing the county-to-county freight flows is included in the modal shift analysis final technical report.
	5. Will the modal shift analysis examine railroad and Surface Transportation Board (STB) policies with regard to intermodal and intermodal competition, bottleneck rates, paper barriers, interchange, terminal access, shuttle and unit train operations, and the lack of rail service in parts of the United States?	5. The modal shift analysis looked at potential modal shifts based on current policies, industry practices, and existing railroad services in different parts of the country. Waybill data limit the types of rail operations that can be analyzed. An assessment of STB policies is outside the scope of this Study.
	6. Whether traffic shifts or not is not just a factor of costs but also profit margins. In many cases, traffic will not shift if the non-trucking mode opts to lower shipping rates to retain the traffic. How	6. Rates reflect different market conditions between origins and destinations. In the case of railroad rates, it was assumed that railroads would lower rates, if necessary, to retain traffic, but their variable cost

Topic	Comments	Task Lead Response
	will that be taken into account?	represents a floor below which they would not lower costs.
	7. How are you incorporating the differences between the States with regard to their acceptance of each scenario? Some States still do not allow triples and the mods will depend on the current load rating/capacity allowed by each State or even by existing facilities.	7. For purposes of the Study, it is assumed that States would be required to comply with the scenario size and weight limits, much as they were required to allow twin trailers pursuant to the STAA of 1982. No State-by-State adoption assumptions were applied in the Study.
	8. How much added expenses do you expect will be shifted to city budgets and truck stop operators? Does this shift expenses from carriers to the public for higher carrier profits?	8. The Study did not attempt to break out costs that might be incurred by local governments or truck stop operators. The Study noted that some pavement and bridge costs associated with the various scenarios are traditionally borne by local governments (a fact highlighted in many public comments to the Study), but no assumptions were made regarding who would pay for any added infrastructure costs.
	9. With the ITIC model, how were the non-transportation costs developed and what is the data source?	9. FHWA has maintained and updated the theoretical and data underpinnings of the ITIC model since its first use in the 2000 CTSW study. The non-transportation cost estimation procedure of the model was updated by the Pennsylvania State University during the 2004 Western Uniformity Study and a subsequent 2006 study. The interest rate for inventory carrying cost was updated using Moody's investment grade bond yield for 2011 plus 1 percent; truck rates were updated using Producer Price Indexes for general freight trucking.

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	10. Are you going to consider the unintended environmental impacts when road freight movement is shifted to heavier vehicles? The new concept of environmental life-cycle assessment as significant emissions result outside the operational phase. The majority of emissions of PM10, SO2 and Pb will be increased as infrastructure will have to be repaired more often and those maintenance cost and emissions are much higher during repair processes.	10. No, environmental impacts associated with construction and maintenance activities were not estimated. Qualitative assessments on this subject are included in the Study.
	11. Will the modal shift analysis include road transport to/from the remote locations such as grain elevators that are the overwhelming source of the majority of commodity movement in most counties (Estimated at over 80 percent of counties in Illinois) and has the Agriculture Industry been invited to provide input into this process accordingly?	11. Local moves including shipments of cereal grains and other agricultural products identified in the FAF are included in the modal shift analysis area of the Study. All stakeholders were invited to share their input to the Study.
	12. Will the Study include a review/impact of time spent or delay due to check weighs or rework at each dock or terminal? (Before the vehicle actually hits the highway?)	12. The non-transport logistics cost calculation includes terminal/dock wait time – the time for each additional trailer is an additional 50 percent of the single trailer time. The analysis of compliance costs included an analysis of the additional time to weigh scenario vehicles for weight enforcement purposes.
	13. The modal shift analysis did not appear to take into account shifts or displacement within the	13. Truck-to-truck shifts generated through introduction of

Topic	Comments	Task Lead Response
	trucking industry. Increased use of larger, heavier trucks, and most specifically longer combination vehicles such as double and triple trailer combinations, will disadvantage the vast majority of motor carriers that are small businesses and exclusively operate truck semitrailer combinations. This may also coerce smaller operators who currently run legally to illegally overload their vehicles in order to remain competitive.	the scenario vehicles were included in the modal shift analysis area of the Study. The analysis did not explicitly attempt to quantify impacts on small trucking firms. Potential impacts were presented in general terms.
	14. Will additional loading and unloading time and hook-up and break down time be considered as an expense for the drivers because of reduced mileage?	14. The added time required to handle multi-trailer combinations is included in non-transportation logistics costs, but such costs were not assigned to different segments of the freight transportation industry – shippers, carriers, drivers, etc.
	15. How will this impact driver pay, do you expect drivers to get additional pay for the increased responsibility for the size of the proposed loads?	15. Potential impacts on driver pay were not explicitly considered in the Study, although the freight rates for multi-trailer combinations used in the modal shift analysis are higher than for single trailer configurations, reflecting higher equipment costs and driver wages for the multi-trailer combinations.
	16. The United Kingdom (UK) uses heavier six axle trucks and during the review of their implementation they saw more freight tonnage shipped on fewer vehicle miles. Would this real world example not be of use to the Study?	16. Studies from the UK were included in the Desk Scan phase of the Study. While findings from such studies are useful, freight transportation characteristics in the U.S. differ from those in other countries and it was important to reflect potential impacts in the U.S.
	17. Will the customers not make most modal shift decisions based on the best value to them?	17. A national study such as this cannot reflect all factors

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	18. Can you provide a list of the assumptions to be used in the ITIC model, and how they differ from those used in the 2000 CTSW Study, especially those that relate to rail diversion? 19. How will the modal changes impact different parts of the country? For instance, where there are large steel industries, how will modal impacts happen in Michigan (with very heavy trucks) versus Alabama, where there is a lot of steel, but low weights? 20. Any comments as to widened Panama Canal impacts on east/west coast freight?	that enter into individual mode choice decisions, but the Study attempted to consider major factors that generally affect mode choice decisions. 18. A complete list of assumptions used in the ITIC modal shift model was included in Appendix C of the modal shift technical report. Scenarios being analyzed in the current study were different from those analyzed in the 2000 CTSW Study and, as such, different assumptions were applied. 19. The analysis did not explicitly estimate differential impacts on modal diversion at the State level, however, the FAF data set and truck weight data used in the Study account to some extent for the situations referenced in this comment. 20. The Study analyzed 2011 freight flows and is not explicitly attempting to estimate how future changes to the global freight transportation network might be impacted as a result of Panama Canal widening or other external factors.
Safety	1. Will you be doing a study on crush and kinematic dynamics on heavier trucks as the crush factor on both the truck and whatever the truck hits (passenger cars) will exponentially increase hence more fatalities? Also, Commercial Motor Vehicle cab requirements-- are they suitable for accidents with heavier weightings?	1. We did not explicitly consider crush and vehicle kinematics. We assessed changes in severity of crash outcome.

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	2. With heavier trucks, there will be more of a roller coaster approach to hills. If speed is regulated downhill, how much more danger will the public be in from slow moving vehicles and will additional enforcement be needed as a result?	2. The operational impacts of alternative configurations on the traffic stream were assessed as part of the modal shift area of the Study.
	3. Should there be discussions to develop additional training for Commercial Drivers License (CDL) requirements to include a size and weight endorsement?	3. This is not within the scope of the Study.
	4. Is the technical data FHWA is collecting about safety performance based upon real-world experience, or is it simply information provided by manufacturers during test-track operations?	4. Technical data used in the crash/safety analysis area of the Study included crash analysis, inspection and violations analysis based on real-world experience. No manufacturers' test track data was used in the Study.
	5. Has any research been done on the effect of triples operating in congested eastern States taking into account the safety concerns of the aging population increasing?	5. Since the safety analysis used actual crash information, collected from the areas in which these vehicles operate, it was not possible to study the effect of triples in congested eastern States of the U.S.
	6. Will the highway safety/truck crash analysis account for the less accommodating geometrics of the Local Road system, including those areas of reasonable access?	6. The vehicle stability and control assessments conducted as part of the crash/safety analysis apply to those roadway systems; they are not specifically tied to the geometrics of Interstate or NHS roadways.
	7. The stopping distance data on the various configurations would seem to be directly on point with the information needed by Congress. Will DOT commit to including it in your analysis?	7. Findings from these FHWA/FMCSA braking distance tests were included in the Crash/Safety analysis area of the Study.

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	8. Will this analysis include winter driving conditions and load securement requirements for heavier loads?	8. The crash data examined included winter operations. An assessment of load securement was not conducted; it is outside the scope of the Study.
	9. In considering experiences in other countries, will FHWA be addressing the differences in driver training requirements between the United States (zero requirements) and foreign countries (high training requirements in Europe, for example)?	9. Information from studies conducted in other countries was evaluated for relevance in the Desk Scan phase of the Study, with critical differences identified. In this case, an assessment of driver training requirements in the US compared to other countries was not included in the Crash/Safety analysis; this is outside the scope of the Study.
	10. For fleet-based method, what steps will be taken to address potential bias with organizations and carriers providing fleet data that are also proponents of increases in truck size and weight?	10. An approach was designed to utilize information from three disparate sources (corridor-based, State data-based and fleet data-based) to control for any bias. Ultimately, fleet data was not used in the Study, rendering moot any concern over bias from commercial data sets.
	11. In the safety analysis Model Vehicle simulation, will tractor roll stability control and yaw stability control along with trailer roll stability control be considered in the performance measures evaluation?	11. Electronic stability control on the tractor or trailer was not included in the Study because NHTSA was pursuing rulemaking on electronic stability control as the Study was being conducted.
	12. Will the stopping distance analysis account for the current State of vehicle maintenance and overloading of vehicles as identified by roadside violation data? Will the analysis account for the less-than-ideal stopping distances for that portion of the vehicle fleet consistently found to have	12. Two of the scenarios that were simulated in the vehicle stability and control analysis included braking and were run using proper brakes and various brake failure conditions.

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	brake / tire / overloading issues? Will the analysis include an estimated impact upon safety in these areas when examining the proposed configurations?	
	13. What will you be doing to look at real world experiences? Are you talking to truckers who operate these vehicles?	13. Where possible, the Study methodology incorporated data from real world conditions. Truckers were not interviewed as part of the Study, however, trucking organizations submitted comments during the course of the Study and those comments were given consideration.
	14. How will the analysis account for the differences in operating conditions between the States involved in the Study and the expected operation and safety performance on roads nationwide?	14. Methods to extrapolate findings to the national scale are described in the relevant areas of the Crash/Safety analysis. It should be noted, however, that crash analysis findings could not be extended to a national level due to data limitations.
	15. While conducting the safety analysis, will you be studying actual trucks and truck crashes in a controlled environment?	15. The crash analysis conducted in the Study did not include truck crash testing in a controlled environment. Vehicle stability and control tests were simulation-based.
	16. How will you address crash severity with heavier trucks causing greater damage?	16. Comparisons of crash severity for baseline and candidate configurations were included in the Crash/Safety analysis area of the Study. Findings on crash severity differences for each of the alternative configurations are presented in the Study.

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	17. Current LCV operations use drivers with above-average experience, more training and higher pay. How will these factors be taken into account in studying matched pairs?	17. The matched pairs technique originally proposed for use in the Study was not feasible due to data limitations; driver attributes were assessed as part of the violation and citation area of the Crash/Safety analysis area of the Study.
	18. Are you meeting with State Troopers or other first responders who are the usually the first people on the scene of a truck crash?	18. Enforcement personnel at CVSA contributed expert input to various areas of the Study. No outreach was conducted with first responders in the crash analysis area of the Study.
	19. As you are utilizing WIM data to determine results in your Study, how will you differentiate the information as there is no identifier as to what type of load was on the vehicle (reducible vs non-reducible)?	19. WIM data was used extensively across all areas of the Study. The aspect that a load might be divisible is not relevant to the analysis completed in the Study
	20. With increased size and weight, will there be any mandatory cab safety standards established to better protect the driver of the truck to increase probability of survival of a crash?	20. Developing new cab safety standards is outside the scope of the Study. The Study sought to address the potential impacts of changes in truck types.
	21. Will the analysis of crashes include property crashes off the Interstate System as LCVs off tracking can cause curb damage, signs knocked down and crashes from turning into local roads?	21. The vehicle stability and control assessment included in the Crash/Safety analysis area of the Study addresses and presents findings relevant to tracking issues.
	22. Will the CTSWL Study examine increased wear and tear on truck safety equipment, including brakes?	22. Within the limits of the data available to conduct such assessments, equipment-related violations (e.g., brake related) were compared between the alternative configurations and the control vehicle. In addition,

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		differential effects of brake failure were studied in the vehicle stability and control assessment area of the Crash/Safety analysis.
	23. Will engine horsepower be considered as a factor in holding back a load and pulling a hill faster?	23. Yes, the operational performance of each of the alternative configurations was assessed in the modal shift analysis area of the Study using various terrain settings. Horsepower and fuel consumption were included as part of the assessment.
	24. I was wondering if there were any studies done, or if it will be done in the Study as to whether the longer heavier combinations will increase the death rate among accidents? A few weeks ago it was mentioned at the HOS [Hours of Service] hearings by FMCSA that if the new HOS saves one life it is worth putting in. As longer combination vehicles increases the death rate then I do not feel that they should be allowed.	24. Differences in the distribution of crashes by severity type were assessed as part of the Crash/Safety analysis area of the Study.
	25. I just wanted to hit on something that did not seem to be addressed at all and that is railroad track crossings. One, they are going to wear more quickly and number two, it is going to take a longer time to stop and be prepared for that. How are you addressing that?	25. To the extent that grade crossing crashes were included in the data sets used in the Crash/Safety analysis area, they were included in the Study. Findings from the assessment of changes in stopping distances associated with each of the alternative configurations was included in the vehicle stability and control assessment in the Crash/Safety analysis area of the Study.
	26. My second part is, actually what is most important to me as the mother of someone who was killed in a truck crash, why is the crash data	26. DOT holds transportation safety as its highest priority. The Crash/Safety assessments were included in the Study along with other aspects of assessment in order

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	potentially inclusive? Why is it not one of the top considerations in truck size and weight increase?	to present a comprehensive picture of the impacts that a change in current Federal truck size and weight limits would have. Areas of the Study requiring assessment were outlined in MAP-21.
	27. I am wondering, are we going to be considering the Maine and Vermont pilot program study results when we talk about the infrastructure and bridge damage and safety concerns that was also noted in the 6-month evaluation?	27. The Desk Scan phase of the Study included the Maine and Vermont studies. Methods, data and models from those studies were considered similar to the other prior studies that were included in the Desk Scan phase.
	28. I have a question, has the agency considered the effects of longer and heavier vehicles such as triples accelerating from a standing stop to get through a highway railroad grade crossing? The reason I ask is, the current rules require 20 second warning before a train arrives at that crossing and also, the trucking regulations require trucks to stop before a grade crossing until there is sufficient room on the other side to clear the vehicle. With those factors in play, I wondered if the agency had considered LCVs accelerating from a standing stop at railroad grades?	28. The operation of LCVs at rail crossings was not a specific area of analysis in the Study. The operational performance of LCVS are assessed in the modal shift analysis area of the Study.
Pavement Comparative Assessment	1. Will the pavement comparative assessment account for lesser pavement types prevalent on the local road system, including those areas of reasonable access included in the modal shift component, that generally consist of a thin layer of aggregate upon compacted native earth with a sealcoat surface?	1. This area of assessment was only addressed in a qualitative manner due to a lack of data on local roadways.

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	2. Will the pavement wear consider the differences between two axle and multiaxle wear due to scrubbing and in different temperature zones as well as pavement types?	2. The pavement structural responses to two axles and multi-axle set configurations were assessed with regard to pavement impacts for the four different climatic regions in the United States. Findings of these assessments are found in the pavement analysis area of the Study.
	3. Do the models that FHWA will be using allow for this testing related to tire scuffing in intersections and other areas where trucks will be turning? If not, what steps will the Study be taking to examine these issues?	3. No, the AASHTOWare® Pavement ME Design software does not provide the capability to conduct such assessments.
	4. Is your pavement-wear evaluation based on (1) deterioration per vehicle, (2) per tire, or (3) per unit of cargo shipped?	4. The assessments completed in the pavement analysis area of the Study produced results attributed to the scenario traffic associated with each of the alternative configurations. Results were reported using measures of change in pavement service interval and life-cycle cost.
	5. Are you considering the impacts of technologies like weight equalization across trailer axle groupings and self-steer axles?	5. The research did not include assessments of advanced technologies; they were not in the scope of the Study.
	6. Is there a list of what LTPP test sections will be used for each of the four pavement category studies?	6. Yes, this information is presented in the appendices to the pavement analysis area of the Study.

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	7. Does the pavement analysis group believe that the completeness of this portion of the CTSWL Study is limited by the congressionally mandated timeline?	7. The time schedule for completing the Study did not adversely affect the robustness of the analysis performed with regard to pavement impacts.
	8. The use of wide base tires is on the rise, when will it be considered on this Study or just the FHWA pooled fund study?	8. The evaluation of wide-based-tires was not in the scope of this Study. Further, the AASHTOWare® Pavement ME Design software does not possess the capability of conducting such assessments.
	9. Will the Study consider the different stages of pavement life where the axle weights will affect the pavement differently?	9. Yes, the AASHTOWare® Pavement ME Design software consisted of incremental accumulated damage models for all of the pavements' structural distresses. It also has aging models built in for flexible pavements and strength gain models built in for concrete pavements. The software also considers changes in unbound layers over time as well as daily, monthly, and seasonally.
	10. Will your data modeling be updated to include information not currently available?	10. Recommendations for improvement in models or data availability were reviewed as they were submitted, and considered to the extent possible given the status of the Study. Additional recommendations resulted from the NAS Peer Review panel. There is no current program or plan to modify the technical work of the Study; however, data sets (such as FAF) that were used for the Study may follow their own update cycle.
	11. Given the State option nature of the six-axle proposal, it is good that you are reviewing certain networks and not all roads. States that do not allow the heavier configurations on their	11. Comment received; no response required.

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	Interstates certainly won't be allowing them on local roads. 12. First above regarding the pavement and infrastructure, are these studies assuming pristine infrastructure conditions at the onset or are the actual current of the structure conditions being used in any or all of the analysis?	12. The pavement analysis that was completed used the AASHTOWare® Pavement ME Design software. Due to the limitations of the currently available software, all analyses were for newly constructed pavements.
Enforcement and Compliance Assessment	1. Many States utilize the Federal bridge formula to enforce weight regulations. Will you come out with a new Federal bridge formula if the weights will be raised? 2. Will the enforcement and compliance assessment account for traffic to, from, and upon the local road system, including those areas of reasonable access? 3. Estimates for, and the effects of, compliance (or rather non-compliance) under any truck size and weight alternative studied as part of the Study must be included. 4. Will you be looking at the lack of fixed scales facilities nationwide, and/or collecting data State by State on the number of fixed and portable scales per State? 5. Will inspection facilities need to be upgraded to	1. Changes to the bridge formula are outside the scope of the Study. A list of current Federal laws that would be affected by any changes to allowable truck weights are identified in the compliance analysis area of the Study. 2. These impacts may be reflected in the self-reporting to FHWA by some States as part of annual certification of truck size and weight activities and state enforcement plans. 3. Impacts on the delivery of effective truck size and weight enforcement programs were assessed in the compliance analysis area of the Study. 4. Weighing equipment is included in data submitted to FHWA by the States in their State Enforcement Plans and Annual Certifications. This data was included in the compliance analysis area of the Study to the extent it was relevant to the work that was completed. 5. Expert opinion was provided by CVSA on whether

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	fit longer vehicles for level 1 inspections? Will multiple vehicle combinations be inspected at the same rate as regular truck trailer combinations?	changes to truck enforcement facilities, such as weigh-bridges, would be necessary if alternative configurations were allowed. The compliance analysis includes input on how LCVs are weighed and how the practice might need to be altered to reflect changes in vehicle types, however, no corresponding change was anticipated for inspection equipment.
	6. What is the role and composition of the CVSA (Commercial Vehicle Safety Alliance)?	6. From the CVSA.org Web site: *CVSA is an international not-for-profit organization comprised of local, state, provincial, territorial and federal motor carrier safety officials and industry representatives from the United States, Canada, and Mexico. CVSA's mission is to promote commercial motor vehicle safety and security by providing leadership to enforcement, industry and policy makers.*
	7. Will the Study consider the increased restrictions expected to be caused by increased weight postings of bridges analyzed for specialized hauling vehicles (SHV)?	7. An assessment of specialized hauling equipment was not within the scope of this Study.
	8. Can trucks with on-board scales assist with data accumulation for compliance?	8. This source of truck weight data was not made available for the CTSWL Study.
	9. In the phrase - "method to link overweight trucking and safety" - Do you define "overweight truck" as a vehicle in violation of current law or any of the configurations proposed for evaluation in the Study? Do we have an apples v. oranges problem?	9. The language in §32801 of MAP-21 required that legally operating over-weight trucks (those with a State issued permit) and illegally operating over-weight trucks be treated the same for the purposes of this Study.

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	10. Will you look at the impacts on enforcement cost and effectiveness due to heavier trucks shifting from non-Interstate to Interstate highways?	10. The scenario traffic used in the compliance analysis captured such shifts. Furthermore, enforcement effectiveness and cost metrics were reported in the compliance analysis of the Study.
	11. The 2009 WIM data from FHWA showed that the average single trailered combination weighed 54,000 pounds while the average multiple trailered rig weighed 59,000 pounds. Does that still sound about right?	11. Average truck weight was not reported in this Study, however, this information is available from the Traffic Monitoring staff in the FHWA Office of Highway Policy Information, who participated in the Study.
	12. Will performance measures be identified for enforcement and compliance programs?	12. These are included in the compliance analysis technical report.
	13. Will the Study look at the problems that LCVs will have on truck parking especially in rest areas and the fact that LCVs require pull through parking for the most part?	13. A qualitative discussion on this topic was included in the Study but no assessment was completed due to the lack of available data.
Bridge Comparative Assessment	1. Will the bridge analysis report mention the availability of simple, commercial, cost-effective monitoring tools bridge owners can use to provide early warning of overload damage, e.g. strain sensors, instead of continued reliance on subjective, biennial visual condition assessments which cannot detect onset of fatigue damage or accurately assess progression of other failure mechanisms, such as cracking?	1. No, the Study did not assess benefits of bridge monitoring technologies; this is not within the Study's scope.
	2. How will bridge substructures be included in the models?	2. The analysis and findings of fatigue included in the bridge analysis area of the Study included an

Topic	Comments	Task Lead Response
		assessment of superstructure impacts.
	3. Thank you for including impact caused by additional posted bridges. Will you study impact on increased costs to infrastructure, pavement, trucking industry due to increased number of miles traveled as result of new bridge postings?	3. The issue of detours created by bridge postings was qualitatively addressed in the Study. Each bridge posted would be associated with its own detour; thus, consideration of such detours would be too site-specific for extrapolation to a national study.
	4. What method will be used to select the bridges to be used in the model analysis?	4. We screened all of the approximately 143,000 bridges on the Interstate System and NHS included in FHWA's NBI and characterized them by bridge type, primary structural material, span length, year built, etc. We then procured 490 completed bridge analysis models (VIRTIS models) representative of the proportion of all similar bridges on the NHS.
	5. Four conventional trucks compare to 3 high-productivity trucks: will the Study present bridge wear estimates relative to this type of modal shift?	5. No; each of the alternative configurations were modeled through the modal shift analysis step and produced scenario traffic. Scenario traffic was compared to current traffic to develop findings on the impacts of introducing each of the alternative configurations.
	6. Will the bridge comparative assessment account for both NBI and non-NBI structures?	6. No, non-highway bridges and bridges not listed on the NBI were not included in the Study.
	7. Will the structure assessment methodology be able to predict the reduced life cycle of the structure, and how that affects agency asset management decisions?	7. Life-cycle-cost techniques were not applied in the bridge analysis area of the Study. With the lack of a generally accepted bridge deck deterioration model, LCC for bridges could not be accomplished.

Topic	Comments	Task Lead Response
	8. In States that already allow six axle trucks, allowing Interstate access will shorten some truck routes and take pressure off local bridges. Will the Study account for this?	8. In this national Study, we assessed the impacts of each alternative configuration, including total truck travel demand. Specific truck travel changes on specific roadway networks were not assessed in the Study.
	9. At the TRB meeting the number of bridges being used as a sample was stated as 500, the current presentation indicates about 400. Does this represent a change and does about 400 mean that it could be less than 400?	9. There are 490 samples used in the Bridge Analysis. Based on the characteristics of the Interstate System and NHS bridges listed on the NBI, the 490 bridges selected were representative of the population included in the analysis.
	10. Would additional assessment need to be performed using expensive live load testing to determine actual impact and potential need for strengthening or replacement before the heavier loads are permitted?	10. No, but load rating analysis may be necessary for specific bridges.
	11. How is the standardized axle method for bridge damage a different metric than the ESAL method for pavement damage? Would it be better to have consistent methods to estimate damage to bridges and pavements?	11. Neither was used. We used actual recorded axle weights. The pavement analysis area of the Study did not use Equivalent Single Axle Loads units; actual measured axle loadings were used to develop the load spectra required as input to the AASHTOWare® Pavement ME Design software.
	12. How many different Bridge designs were included in the 400 bridges and did you consider age of these bridges as a factor?	12. We did use the age of bridge as characteristic when constructing the sample framework. Bridges built between 1910 and 2004 were included. We included the eleven most common bridge types, representative of more than 96 percent of all bridges.
	13. With many States allowing gross vehicle weights over 95,000 pounds on five axle rigs, will the	13. The truck weight data set used in the Study includes actual vehicle weight measurements reported to

Topic	Comments	Task Lead Response
	Study account for the fact that many of these loads will shift to six axle rigs with lighter axle loads?	FHWA by the States. The situation described would be included in that data set. Shifts from truck-to-truck were modeled in the modal shift analysis area of the Study. To the extent it is in the WIM data used in the Study and the truck-to-truck modal shift analysis that was completed, such shifts were accounted for in the Study.
	14. We have trucks running well over 80,000 for over 25 years in nine Western States with different caps like 95,000 in Nebraska, 117,000 in Wyoming, 129,000 in the Dakotas, Nevada, and Utah. We have been doing this for years and years with the Interstate and secondary alike. Formula B since 1975 it has been used universally throughout the nation except maybe Michigan. There are thousands of pieces of equipment that are running now under formula B so it seems to me, if you just extend bridge formula B beyond the 80,000 pounds, we have already got history, proven specs and this would really be better for the economy and everybody would be on the same playing field and would have less pounds per square inch on their pavement if we would just use of federal formula B over 80,000 pounds.	14. Comment noted; no response required.
	15. With all due respect, your last commenter the Western States have been running have your trucks for years and years, I agree but their highways and bridges were also built to withstand those heavier trucks. I live in Pennsylvania and	15. Comment noted; no response required.

Topic	Comments	Task Lead Response
	Pennsylvania currently leads the Nation with 4479 structurally deficient bridges. We are 27th in the Nation with structurally deficient bridges that are posted for weight limit or closed and the average bridge age in Pennsylvania is 51 years old. We just recently went through in the last 4 or 5 months having 1000 new bridges added to that list and posted low weight limits. Pennsylvania is also one of the highest States in the Nation for truck miles traveled because of its geographic location leading into the east and northeast. I really do not think our roads and bridges in Pennsylvania can withstand that many more heavier combination vehicles traveling on the roadways without having them completely deteriorate with a going to be absolutely undrivable.	

APPENDIX C – DISPOSITION OF MAY 6, 2014 EVENT COMMENTS

Topic	Comments	Task Lead Response
Safety	1. Who are the safety experts you mentioned? How do you contact them?	1. Contact information for the DOT multimodal Technical Oversight team is available through the FHWA Office of Freight Management and Operations.
	2. How will you address potential bias with fleet data from carriers that are in favor of increases in size and/or weight? This data is not publicly available and therefore not transparent.	2. The Crash/Safety analysis area of the Study was designed to utilize information from three disparate sources (corridor-based, State data-based and fleet data-based) to control for any bias. Ultimately, fleet data was not used in the Study, rendering moot any concern over bias from commercial data sets.
	3. Does the fleet safety analysis also review short haul fleets and vocational type fleets (garbage, dump, cement haulers) within urban areas?	3. Specialized hauling vehicles were not included in the Study.
	4. Have you looked at how these combinations operate in States like Michigan, where weights are significantly higher than those combinations that you are studying?	4. We did not use data on the configurations that are unique to Michigan. In the Crash and Safety Analysis area, Michigan data was used for 3-S3 analyses in Scenarios 3 and 4.
	5. Since weight data is not included in the safety analysis, can you comment on the impact of this data gap to the expected study result?	5. The lack of vehicle weight data on crash reports severely inhibited our ability to do an adequate assessment of the alternative configurations with respect to crashes. An axle based assessment using data from a limited number of States was used instead, with the caveat that no national findings could be derived from the analysis.
	6. Under Limitations, please explain vehicle weight and its impact on road safety.	6. The limitation and its impact is described above in #5. In addition, stopping distance and other

Topic	Comments	Task Lead Response
		kinematic-related operational effects can influence safety. Further, as mass increases, force of impact increases.
	7. Would it be possible to secure a list of the names and contact information for the safety experts in order to contact them for future questions?	7. Please contact FHWA's Office of Freight Management and Operations for this information.
Pavement	1. 23 USC 127 and 23 CFR 658.17 applies to Interstate and defense highways. In addition, the regulation applies to "reasonable access thereto." How do you define the National Network?	1. The National Network is defined in Title 23 of the Code of Federal Regulations in Appendix A to Part 658. It was established by the Surface Transportation Assistance Act of 1982 and includes the Interstate System as well as principal arterial highways linking major cities.
	2. So I can understand the context applicable to me, into which road category have you placed the Alaska road system?	2. Like all other States, Alaska's National Network (AK 1, 2, and 3) is defined in Appendix A to Part 658 in 23 CFR as described above. Alaska's NHS roadways and non-NHS roadways would be handled as defined in their annual highway Performance Monitoring System (HPMS) submission.
	3. How do the higher weights, 97,000# affect current road pavement surfaces?	3. This information can be found in the findings for the pavement analysis area of the Study.
	4. Will pavement impact consider effect of Wide Base Single replacements at minimal, significant and total use for current duals application?	4. No, wide-based tires were not assessed as part of the Study; they are not within the scope of the Study.
	5. Various fleet weight studies have shown (65 percent to 80 percent) of the fleets bulk out before they reach 80,000 lbs. Will the pavement & bridge phases adopt some (one) of these profiles to	5. The modal shift analysis took into account which truck trips cube out and floor out before reaching the legal weight limit and which trucks reach the weight limit before reaching their cubic capacity. This is an

Topic	Comments	Task Lead Response
	facilitate more nearly real world truck weight impacts, and then effect of the various HPVs within the Study?	important determination when estimating the shifts from one truck class and operating weight group to another under each scenario. The bridge and pavement analysis took into account the base case or current load distribution situation and compared it to the scenario traffic by truck weight group and truck type.
	6. What are the differing impacts onto the roadways from empty trucks and their number of axles? - Does the use of tag or lift axles for reducing tire wear and increasing fuel efficiency when traveling empty have a place in this Study?	6. The pavement damage analysis used weigh-in-motion data to estimate the axle weights (and numbers of axles in contact with the road) of empty, partially loaded, and fully loaded vehicles. The Study did not assess tag or lift axles but they were included in the analyses to the extent they were present in the truck weight data used in the Study.
Bridge	1. On bridge, consideration of chlorides and non-chlorides does not necessarily imply that both urban and rural bridges are being considered. Chlorides do not discriminate. Also break down of bridge types does not necessarily imply rural and urban: most bridge type can be scaled down or up according to traffic needs.	1. Urban and rural were not characteristics used to select bridges from the NBI. Chloride and non-chloride States were groupings used and intended to be used in the modeling of deck deterioration, however, this work was ultimately not performed due to the lack of a generally accepted deck deterioration model.
	2. Not develop new forecasts of future travel levels because you assume it is increasing? Isn't it worth measuring how different configurations can influence the rate of increase?	2. FHWA determined that the use of truck travel forecasts and forecasts for the expected increase in freight demand over time would make it hard to isolate and identify the potential impacts to modal shift and other areas of analysis of different truck configurations compared to those under current Federal truck size and weight limits. For that reason, freight growth was artificially held constant in the Study.

Topic	Comments	Task Lead Response
	3. How can the current bridges handle the 97,000 lb when they are all failing?	3. The Study team analyzed the effects of the alternative configurations on each of the 490 representative bridges and provided immediate structural impacts and the longer term accrued damage costs, which can be found in the bridge analysis technical report. The 'normalized' Rating Factors attributable to each Scenario were tabulated and compared in terms of bridge type, age of bridge, and span length.
	4. Your slide mentioned "reasonable access" to Interstates. It is important to distinguish between the concept of "reasonable access" under a Federal mandate such as the current 80,000 single axle weight limit as opposed to a State option approach that would allow states to allow interstate access to heavier, six-axle trucks. There is no need for reasonable access requirements under the State option approach since States will continue to control weight limits on non-Interstate roads.	4. The Study did not assess a State option approach; it was not considered in the scope of the Study.
	5. It is a common misconception that current US bridges are ALL failing. Many, many bridges now considered structurally deficient can safely handle increased weights, especially those on the NHS, and in particular, if they have structural monitoring systems installed.	5. Comment noted; no response required.
	6. Could you please confirm that the cost of each of the proposed trucks will be A+B+C+D+E (i.e., your 5 subtasks)?	6. The bridge analysis technical report identifies one-time costs resulting from the need to strengthen or replace bridges as a result of introducing certain alternative configurations. As explained in the Volume I Summary report, costs across the Study analysis areas are not

Topic	Comments	Task Lead Response
		additive, and the one-time structural costs represent an extreme upper bound.
	7. How can you map subjective NBI data on bridges to actual damage resulting from overweight trucks vs. inadequate maintenance, for example? Seems like a stretch to me. Perhaps the bridge study should have a serious disclaimer.	7. We used the NBI data to screen the 490 bridges to be structurally analyzed such that they are representative of the national inventory of bridges for each region and highway network, by bridge type, span length, and age.
	8. What is the range of span lengths that will be included in the bridge study?	8. The span lengths for all bridges listed on the NBI were used. The length intervals can be found in Table 6 of the bridge analysis technical report.
	9. What percentage of repair costs is being attributed to loads?	9. Intended analysis on accrued bridge damage costs was not completed due to the lack of a generally accepted modelling method and approach.
	10. Do you have any preliminary results from the bridge analysis to share?	10. Results were not available at the time the request was made (May, 2014) but all information developed as part of the bridge analysis area of the Study is available in the technical report that was made publicly available on June 5, 2015.
	11. On one of the slides it stated that 500 representative bridges would be used in the Study and only LRFR rated bridges would be evaluated. Since FHWA only required LRFR ratings on bridges that have been built in the last 10 years or so, will you in effect only use new bridges with a higher than average load capacity be evaluated?	11. No, the bridges that were analyzed were screened to ensure they were representative of the NBI in terms of age and design standards.

Topic	Comments	Task Lead Response
	12. Can you please clarify how a comparative study of rating factors for the different loads might translate into damage and repair costs?	12. These two issues are pursued on separate paths for the purposes of this Study. The comparison of rating factors was employed to identify those bridges that have posting issues or that would face an immediate structural risk in response to the alternative truck configurations, and then to derive and tabulate the corresponding costs to strengthen or replace those bridges. The analysis of accrued damage costs that was attempted but not completed was designed to use a separate axle load based allocation of bridge damage costs by vehicle (truck) class.
	13. How can the calculation of rating factors based on strength capture deterioration (i.e., a service limit State phenomena)?	13. They are separate analyses. See the response to question 12, above.
	14. Rating factors are based on a strength-level analysis. If a cost is not being calculated for fatigue and deck subtasks, how will deterioration (i.e., a service limit State phenomenon) be captured cost-wise? Will the bridge cost estimate be based on the sum of three of the subtasks?	14. Please see the response to questions 6 and 12 above.
	15. Glad to hear that the percentage of load-related bridge costs is still being worked on.	15. Comment noted; no response required.
Enforcement/ Compliance	1. As most heavy vehicles (Class 8) on the road do not know, at the point of loading, how much they carry and how their loads are distributed across the axles, will there be a requirement for trucks to carry on-board scales for management of truck weight and load weight?	1. The Technical reports did not make recommendations regarding introducing new technologies or systems on trucks.
Modal Shift	1. Will there be any analysis done on the	1. The impacts of truck size and weight scenarios on fuel

Topic	Comments	Task Lead Response
	environmental impact of increasing weight limits (i.e., heavier loads = less trips = less fossil fuels being used)?	consumption and carbon dioxide and nitrogen oxide emissions were assessed in the modal shift analysis area of the Study. Findings from the work completed in that area of the Study are found in the technical report including impacts from changes in VMT and changes in fuel consumption and emissions rates for each of the alternative configurations included in the Study.
	2. How will this Study factor in any environmental improvements from reduced carbon emissions that result from fewer trips? Interested in the correlation between weight/trips/carbon footprint.	2. Emission rates for the scenario vehicles were estimated based on their estimated operating weight distributions and the increased engine size they are assumed to require. Emissions rates for scenario and base case vehicles are applied to base case and scenario VMT to estimate impacts of each scenario on CO2 and NOx emissions.
	3. Have you decided to incorporate the possibility of a competitive response by the railroads in your analysis of intermodal shift? In other words, if the railroads lower their rates to keep business, this will be a factor in any shift of freight from rail to truck. Are you considering this?	3. Yes, railroads were assumed to lower rates if necessary to retain existing traffic. Rates could not be lowered below variable costs, however. The Study also estimated impacts of changes in rail rates on the contribution of traffic to meeting rail fixed costs.
	4. Where does operating cost/efficiency based on truck size/weight enter the diversion analysis?	4. In general, operating costs per mile are combined with non-transportation logistics costs to estimate total costs for base case and scenario vehicles to transport different commodities between various origins and destinations. The alternative with the lower total transportation and logistics costs was assumed to be chosen.
	5. Does DOT have Drag & Rolling Resistance data compatible with the EPA-Truck GHG Rule or the	5. The fuel consumption model used for this Study includes drag and rolling resistance factors compatible

Topic	Comments	Task Lead Response
	HPVs being considered in the Study?	with EPA's GEM model.
	6. Has there been any analysis or consideration given to intermodal/transloading type jobs due to trucks being able to carry larger loads?	6. Estimating potential impacts of truck size and weight scenarios on employment is not within the scope of this Study.
	7. Will the Study consider the private sector pavement in other services? Garages, dealers, truck stops?	7. No, estimating impacts on paved surfaces at private sector facilities that serve scenario vehicles was not within the scope of this Study.
	8. When considering cost to the industry would you not consider the cost of purchasing new equipment required to meet new standards?	8. Detailed cost estimates for different segments of the trucking industry to shift to new equipment are not within the scope of this Study. The differential cost of operating scenario equipment compared to base case vehicles was considered in estimating the extent to which shifts would occur, however.
	9. Can you work through a hypothetical case? For example, if cost per Gross Ton Miles for a larger truck were 20 percent lower than the base case, how would you determine the public cost impact of achieving that operating saving?	9. Each commodity type was assumed to be hauled in one or more body types that have different operating costs per mile and to have different payload distributions – all vehicles do not operate fully loaded all the time. For those shipments that could benefit from the higher weights allowed on the scenario vehicles, operating costs were combined with inventory carrying costs and other non-transport logistics costs to estimate the total costs of using the scenario vehicle compared to base case vehicles for shipments between all origins and destinations between which each commodity is transported. The alternative with the lower costs was assumed to be selected. Potential modal shifts were estimated for all commodities traveling between all origins and destinations. Based on this analysis, changes

Topic	Comments	Task Lead Response
		in VMT and operating weights for base case and scenario vehicles were estimated for each highway functional class. These changes in VMT and operating weights were used to estimate changes in pavement and bridge costs, crashes, enforcement costs, transportation and logistics costs, railroad impacts, fuel consumption, and CO2 and NOx emissions. Quantitative impacts were estimated for each of these areas, but only the pavement and bridge costs, transportation and logistics costs, and rail impacts were estimated in monetary terms.

APPENDIX D – DISPOSITION OF JUNE 18, 2015 EVENT COMMENTS

Topic	Comments	Response:
Safety	1. The WA State data shows there were no fatalities on 6-axle trucks and fewer injuries on 6-axle trucks vs. 5-axle trucks. You chose to highlight a higher crash rate on a very small sample, but didn't mention the lower injuries and fatalities. Why?	1. Crash severity differences are included in the Safety and Crash Analysis Report and are presented on pages 30-35.
	2. There are numerous references to inadequate data for truck configurations that are generally uncommon. I fear we have to conclude that any future/speculative configuration (or any transportation modification) will be DOA since there won't be adequate data. Is it more appropriate to conclude that we didn't build the models necessary to draw conclusions?	2. From the outset, the Study was proposed as a data-driven effort. The Study teams did not anticipate the pervasive lack of accurate, complete, replicable, available data that could be extrapolated to draw national-level conclusions. There was no intent on the part of the FHWA, DOT or Study teams to do less than necessary to achieve the requirements of MAP-21. The first report of the NAS Peer Review identified potential issues for drawing national-level findings but was similarly unable to identify any better models for this purpose.
	3. What is the impact of the increase in truck weights on roadside safety, i.e., roadside appurtenances?	3. The Safety and Crash Analysis technical report found that current testing methods for roadside appurtenances cannot adequately assess the impacts of heavy trucks.
	4. When you reference that trucks weighing more than 80,000 pounds had an 18 percent higher level of brake violations, this appears very similar to work FMCSA has long done on overweight 5-axle trucks, not properly loaded 6-axle configurations. Does this 18 percent figure	4. The higher level of brake violation applies to both six-axle configurations; the analysis on citations and violations lacked crash data so a comparison was made between trucks with 5 axles versus 6 axles. This data can be shared by making a request of the FHWA Office of Freight

Topic	Comments	Response:
	apply to the two 6-axle configurations, and can you share that specific data.	Management and Operations.
	5. In a 1992 air brake performance study the NTSB found in an inspection of 15,000 brakes that the 5th axle brake on a 5-axle truck tractor semitrailer was most often out of adjustment followed by axles 4,3,2 and #1. The reason was disruption of aerodynamic air flow to cool the brakes. Since it is not just a function of added weight but adding an additional axle. I would expect that a three-axle semitrailer would frequently have defective brakes on the rear axle. Perhaps this could be addressed. I would expect an overall increase in defective brakes found on longer combination units with more axles.	5. Comment noted. The research phase concluded with the release of the technical reports and is not open to modification at this time.
	6. Could you go over the logic of higher weights resulting in greater numbers of truck weight measurements?	6. All scenarios modeled showed a reduction in truck VMT. Under the assumption that States would keep enforcement resource levels and expenditures constant, the potential existed for enforcement to weigh more trucks. That was one way of representing the savings.
	7. Maine and Vermont implemented statewide pilot programs to allow Interstate access for six-axle trucks in 2011 and have seen record low highway fatality rates following implementation. The UK implemented widespread use of heavier, six-axle trucks in 2001 and issued an extensive report in 2006 documenting impressive productivity and safety gains, yet it doesn't appear DOT made any	7. These referenced efforts were included in the Desk Scan phase of the project from which they informed the development and selection of the analytical framework, models and data.

Topic	Comments	Response:
	use of this data. Can you comment?	
	8. The various data sets reviewed appear to ignore Maine and Vermont. Why?	8. Data available from all States, including Maine, and Vermont, was considered and used in the Study as appropriate, within the limitations imposed by specific data.
	9. I commend DOT for including specific recommendations for improving the quality of crash rate data. Do you have any plans yet to follow up on these recommendations and will there be an opportunity for stakeholders to participate in this process?	9. Stakeholders may have the opportunity to participate in follow up activities if or when an entity acts to undertake subsequent research in these areas. The DOT and FHWA will conclude their responsibilities regarding this Study with the release of the final Report to Congress for the CTSWL Study.
	10. Did you receive voluntary submissions of truck crash data or other data from motor carriers or trucking associations and, if so, how was this data used and evaluated?	10. Data was received but not used in the Study due to its lack of completeness and adequacy for use in the intended analysis.
	11. DOT/FHWA did a great job on this Study, but I do have a question on slide 24: 1) Vehicle weight reported and did not provide meaningful analysis. 2) Yet, as noted in points 2, 3, & 4 show higher violation rates correlated to heavier vehicles. 3) Then what is the basis for point 5 that indicates vehicle weight is not a strong overall factor for predicting probability of violation?	11. The analysis found that violation rates were higher for heavier vehicles. When the regression model was applied to the data, weight was not identified as a strong factor in predicting the probability of receiving a citation. These are two separate analyses that were conducted and are not contradictory.
Pavement	1. Did you do any analysis on fire damage to the pavement?	1. No, the focus of the Study was on the potential impacts of the alternative configurations on pavement condition and integrity.

Topic	Comments	Response:
	2. The six-axle vehicle configurations that were studied were both reported as reducing life-cycle pavement costs. The savings are expressed as percentages. As the pavement study was for the entire National Highway System, modest percentage savings could translate to significant dollar savings. What are the estimated life-cycle savings for pavement costs in dollars as a result of six-axle trucks?	2. We did not calculate such an estimate in the Study. We focused on assessing the differences between the base case and the scenarios to address the research areas outlined in MAP-21.
Bridge	1. Any updates to November 15, 2013, Krolak Memo Load Rating of Specialized Hauling Vehicles? 2. Some studies have shown that the dynamic increase factor decreases for higher truck weights. Have you considered this in your analysis? 3. The FHWA revised its pamphlet "Bridge Formula Weights" (August 2006). Specifically, footnote 2 on page 6… is superseded and replaced with the following: "Pursuant to 23 CFR 650.3 13, all bridges must be inspected, rated to safe load-carrying capacity, and if required, posted or restricted with respect to the maximum allowable weight." 4. Regarding bridges, the Study document described one-time bridge costs related to accommodating study configurations as "an extreme upper bound." See page ES-7 of the bridge paper in Volume 2 of the technical report. What are the lower range and mid-range cost estimates, not just the "extreme upper bound"?	1. This vehicle type and referenced topic is not within the scope of the Study. 2. We used the AASHTOWare® BrR software. The AASHTO Manual for Bridge Evaluation does not recognize a decrease in dynamic load allowance with increase in truck weight. This is also the case with AASHTOWare® BrR. 3. This comment does not relate to the scope of this Study or meeting. 4. Lower bound and mid-range costs were not calculated. The framework for estimating the costs as upper bound costs is predicated on the assumptions that were applied in developing this analysis. Lower and mid-range costs would depend on state policies and vary by state. There is no available data to calculate such estimates.

Topic	Comments	Response:
	5. In estimating modal shift, the Study assumes (Vol.1, page 36) that all bridge one-time cost improvements are made and does not assume that a State would, instead, post some bridges. Given current infrastructure budgetary pressures, if some bridges are posted rather than modified, wouldn't that result in less modal shift under the model?	5. The Bridge Analysis Report includes an estimate of bridges that may need posting associated with each scenario. Refer to page 62 of the Volume I Summary Report to find: *Table 10. Projected Number of Bridges with Posting Issues for the Entire NHS Inventory.* It is not possible to accurately predict the number of bridges that would be posted as opposed to modified, so a straight calculation was made assuming one-time replacement.
	6. Do these test vehicles fall within the HL-93 loading that States are currently designing to? Or, are these vehicles that we need to add to our State-specific design loads?	6. The configurations that were studied were not specifically compared to HL-93 as the focus of the bridge areas of study was the impact on bridge posting, which is independent of design loading. Such analysis could help determine the effect of configurations in relation to HL-93.
Enforcement/ Compliance	1. RE: Commercial Weight Enforcement Innovation Weight Methods for Detecting Vehicles -- These methods will prove essential tools for enforcement, provide data to State DOTs when considering impacts of SHVs.	1. Specialized Hauling Vehicles were not included in the Study; they are out of the scope of the Study.
Modal Shift	1. How do you account that VMT decrease would only be short-term (e.g., in increases back to normal levels) with the assumption that traffic was kept constant in the 50 year analysis?	1. These are two different scenarios. When you remove the artificial freeze on freight growth, the projected VMT levels using the alternative configurations rises and outstrips the prospective reduction within a year: For analytical purposes, the ton-miles of freight hauled were assumed to remain constant over the analysis period. Under this assumption, reductions in VMT associated with each scenario would extend throughout the analysis period. In reality, future ton-miles of

Topic	Comments	Response:
		freight are expected to increase, although VMT under each of the scenarios would be expected to remain lower than VMT under current limits.
	2. Is modal shift expected across the board for all RR's, or will short-lines be disproportionately affected?	2. No analysis of impacts on individual railroads was conducted and there was insufficient data to reliably estimate differential impacts on short-line railroads.
	3. Does the modal shift analysis assume ideal levels of efficiency, that is, 97,000 pound trucks always carrying payloads of 97,000 pounds. Did the analysis consider alternative scenarios in which less than optimal efficiency would occur?	3. As shown in the modal shift chapter, not all scenario vehicles were assumed to operate at the maximum gross vehicle weight for the scenario. The operating weight distribution for each vehicle was typical of current operating weight distributions for those vehicles adjusted to reflect the maximum gross vehicle weight limit for the scenario.
	4. The report indicates that very extensive consultations were undertaken with short line railroads regarding data and modeling. Were there any such consultations with shippers (companies that are neither trucking companies nor railroads)?	4. We did not have extensive discussions with the shipper community.
	5. Did the speaker say that the truck VMT reduction would only last for 1 year?	5. Yes, the absolute reduction in heavy truck VMT was estimated to last about a year, but relative to VMT under base case truck size and weight limits, scenario VMT would be lower into the future.
	6. Why is it assumed that, in terms of the net impact of the S&W shift, the VMT shift is temporary?	6. The VMT shifts under each scenario would not be temporary, but the absolute reductions in

Topic	Comments	Response:
		heavy truck VMT would be expected to be temporary. In the long term total truck VMT would be expected to increase, but VMT under scenario size and weight limits would remain below VMT under existing size and weight limits.
Miscellaneous	1. Can you provide the axle spacing and weights for the cases that were used? 2. Relative to my comment above, we don't have any operational networks of 5.9 DSRC/Connected Vehicles -- yet NHTSA and RITA have documented detailed (albeit modeled) crash reductions.	1. That information is found in the Safety and Crash Analysis Report on pages 56 and 57 of the Vehicle Stability and Control section. 2. Comment noted; no reply required.