U.S. Department of Transportation Comprehensive Truck Size & Weight Limits Study

Public Session 2 Transcript

Wednesday, December 18, 2013

Operator: Good afternoon. At this time I would like to start the talking freight conference call. All lines have been placed on mute to prevent any background noise. After the speakers remarks there will be a question-and-answer session. To ask a question during that time, press star then one on your telephone keypad. You may ask a question using the webinar program. Jennifer Symoun, please begin.

Jennifer Symoun: Good afternoon and welcome to that talking freight seminar series. My name is Jennifer Symoun and I will moderate today's seminar. Today's topic is USDOT Comprehensive Truck Size and Weight Limits Study second outreach session. Before I go any further I do need to let those of you calling into the teleconference for the audio know, you do need to mute your computer speakers or we will be hearing the audio over the speaker as well. Today's webinar will feature several modules of presentation slides with time for questions between each module as well as time at the end of all presentations. We will be staying on track with the timing of each module. As a result we may need to move on after each question-and-answer period before we get to all questions. Keep in mind USDOT will be accepting questions from the web address CTSWstudy@dot.gov after the webinar and we will get that typed into the chat box. If you do think of a question, if you are on the webinar please type it into the chat area on the right side of the screen and make sure you send your question to everyone. We will be taking questions over the phone and the operator will give instructions on how to do that at that point.

The presentation is available for download from the file download box in the lower right corner of your screen. It will be available online within the next few weeks along with a recording and the transcript of the webinar and I will notify all attendees when it is available.

Today's seminar is eligible for four certification maintenance credits for AICP members and in order to obtain credit you must have logged in with your first and last name or if you are attending with a group of people type your name into the chat box. Today's webinar is not yet available on the AICP website, but I will send out a notice when it is. For those that are not AICP members but would like to receive PDH credits, please note FHWA does not formally offer PDHs however it is possible to obtain them if you are able to self-certify. To receive your PDHs please download the agenda from the file download box and send it to your licensing agency. With that I will now turn it over to Tom Kearney of the Federal Highway Administration to get started.

Tom Kearney: Good afternoon and good morning everyone. Thank you, Jennifer. My name is Tom Kearney. I am the freight operations program manager of Federal Highway Administration. The purpose of today's webinar is to present the work that we have completed in preparing project plans and desk scans that will be the foundation and the basis to guide the work and technical work that will be done to build the technical report produced to support the Report to Congress. I invite everyone to visit the project website. There's a lot of important information on the website. The desk scans are available on the website as are the project plans. The PowerPoint files used to support today's event are also available on that website as is the agenda. Another important link on the website is National Academy of Sciences peer review panel. We have met with them and we have had a session with them regarding Desk Scans on December 5. For more information on the construct and the operation of national academies peer panel can be

found on a link on a project website. Please visit the website and stay abreast of NAS, the National Academy, statuses and information available to the National Academy by checking the link on the website.

Right now what I like to do is give you a feel for today. I want to make it clear we will strictly adhere to the time allotment for each of the different areas of the study. We have a lot of material to cover. We do want to be very, very respectful of people's time. We may have callers coming in with specific interest on specific modules so we need to launch them on time. With that I will frame that as an apology in advance. If you have a question that you call in with and you get cut off, the e-mail address that Jennifer sited and we will put in the chat pod -- enter comments via the e-mail address or type them into the chat pod so your comments are recorded as part of today's session. I want to remind everyone and give everyone a brief overview of the MAP-21 requirements and talk about the project schedule, show you the configurations that will be studied as part of this project. We've been in the project plans and talked about methodology modeling. They will be presented by each of the task leaders on this project. We will be touching upon the desk scan findings.

Section 32801 of MAP-21 required USDOT to prepare and report in a variety of different areas the impacts that a change in current federal truck size and weight limits would have, in areas such as highway safety and crash, pavement and bridge service life and infrastructure's ability to accommodate such a change. The impacts on the enforcement community with the workload becoming heavier or lighter if you were to change congress has asked us to investigate that. An important aspect of the project is the impact on other modes or modal shift. How goods may be moved by different modes and how that would be impacted? That is foundational to the safety, pavement, bridge and enforcement pieces of the project. That is the piece we will be leading off with today, an important module.

In order to assemble a construct that will lead to successfully completing the report to Congress, USDOT asks Federal Highway Administration to take lead on preparing a report to Congress. Our first move was to put together a multidisciplinary policy oversight group and request that group to give us guidance on the direction of the study and keep their modal agencies abreast as to the status of the study efforts. The different agencies the Federal Highway Administration, the Federal Motor Carrier Safety Administration, National Highway Traffic Safety Administration, the Marine Administration and the Federal Rail Administration and representatives from the Secretary's Office all have representation on that policy oversight group.

At the technical level, we have also assembled a cross modal USDOT team of experts to help work with the project team to prepare the technical analysis that will be required to be put into the technical report. The representation runs across the modes. Federal Highway, Motor Carrier, Federal Rail and NHTSA have been actively working with the project team counterparts bringing this to today where we can report out on desk scans and project plans. I touched on the National Academy and the peer review. That is an independent review. Right now the peer panel is reviewing the contents and they will be providing comments back to USDOT.

Study schedule. In order to deliver -- if we start at the bottom… The report is due in the middle of November 2014. That is the absolute deadline driving the overall project schedule. Back to the

top we worked through the fall on the desk scans of the project plans. We had the meeting on December 5 with the National Academy. Today is December 18 and we are now presenting to you, our stakeholders, the contents of this project plan. We will be scheduling later this winter -- I would imagine at the end of February/March we will be conducting another webinar session to report out back to you where we are at with the technical work supporting the report to Congress which will be compiled into together in the spring of 2014. When that compiled technical report is assembled, we will be getting back together and presenting the contents of that to you and requesting feedback and input on that compiled technical report. National Academy will then through the spring and summer do an independent evaluation and review of the technical report.

Within the operations study itself we are -- we were charged with the language of section 32801 to specifically study a six axle truck configuration that would be included in the study but also to study alternative configurations of tractor-trailers to be included in the study. I thank all the stakeholders who are on the line today who provided input on May 29 and thereafter giving us advisement as to configurations that would be of interest. USDOT took your input into consideration and the final decision was made on what truck configurations would be included in the study. We had criteria and general criteria for the selections. We're operating under those they are shown on the screen right now.

The configurations that resulted that will be included in the study include two control configurations - the current surface transportation assistance act configuration - the five axle combination at 80,000 pounds, the twin trailer combination STAA twin pups if you will at 28/28.5 foot as control vehicles that we can run comparisons against as we analyze some of the other configurations. The six axle vehicle at 97,000 lbs will be studied -- six axle vehicles will be studied and 91,000 pound version of that that we found is closer to bridge formula compliance and it will be analyzed as part of that. I failed to mention that the other five axle configurations to be studied -- it's a gross vehicle weight limit close to the manufacturers recommended rating and that is and 88,000 pound truck and a five axle configuration.

Let me skip to the combinations, a twin 33’ trailer that is not currently in use but is of high interest to certain segments of the trucking industry will be included as part of the study. At the current Federal gross vehicle weight limit of 80,000 pounds. We will look at triple combinations got a lot of feedback and interest on triple combinations. We will be studying them at 105,500 pounds and then at a heavier level of 129,000 pounds, seven axle around 105,000, nine to ten axle on 129,000 pound combination. There are states right now where these combinations are in legal operation under the ISTEA freeze. We will be analyzing them under scenarios where they have expanded and enhanced mobility rights.

Scenarios to be evaluated. The roadway networks to be analyzed -- that these vehicles will be assessed on -- the interstate system and the rest of the national highway system which now as of MAP-21 is the principal arterial system. National Truck Network as it is defined by federal regulation. Use of the three primary roadway networks and we will be analyzing whether these vehicles operate safely or properly on these networks, as part of the evaluations that we do. We will also be looking at configurations as we evaluate them independently. We will allow test configurations as they ran simultaneously. We may run configurations in pairs. We're in the

process of developing scenarios that will be included in the study but generally that's the framework that we're following.

What will follow will be as you see on the agenda -- if you access the agenda on the website. Today's lineup is we will talk about the work to be addressed and done under the modal shift area. The output of the modal shift area's foundational to a lot of work done in pavement compliance, bridge and safety. We need to know what the future picture looks like as composition of the travel stream changes.

Modal shift will be spoken to first here today. We will get into the pavement implications and the impact on pavements of increased weight under the federal truck size and weight limit. The impacts in the compliance and enforcement area, the bridge area as well as safety and truck crash analysis are included in the Study. Generally that is this afternoon's program. The way it will operate is the government technical oversight committee member who has been working in the different disciplines will give you a general idea and feel for the overall work that will be conducted. A description of the work products that we expect to receive and develop under the project. It will be followed by much more detailed description of the actual work and the project plans in more detail that is derived from the desk scans completed.

At this point I'd like to switch over to modal shift. My partners from Federal Rail Administration, Scott Greene from the Federal Highway Administration the technical policy study area, Max Azizi -- they will describe the overall work under the modal shift analysis area.

Max Azizi: Thanks Tom. As Tom indicated my name is Max Azizi and I am with the Federal Highway Administration Office of Policy and also a member of technical oversight panel. With me today are Scott Greene of the Federal Rail Administration and Jim March of consultant team. I will provide a brief overview of modal shift analysis and then turn the meeting to Scott and Jim to provide detailed information on different parts of modal shift analysis. First what is the purpose of modal shift analysis? The purpose is first to assess the impact of increased federal truck size and weight limits on freight movement and also to determine the impact of shift on safety, operation, infrastructure, economy and environment. In conducting the modal shift analysis the team has decided to use the intermodal transportation and inventory cost model, known as ITIC. We also decided to select the ITIC model because both FHWA and consultant teams are familiar with the model. This model has been used for truck size and weight studies in the past. As for the source of data is concerned, the primary source of data are the FHWA Freight Analysis Framework and the carload waybill sample, Scott.

Scott Greene: One of the two components Max was talking about was the intermodal shift. We will also be looking at the rail modal shifts as a result of these new configurations operating on the highway system. We will be looking at the water freight shift to truck that might occur. As Max also noted, this study will also look at energy, emissions, infrastructure and all those components but I wanted to make it clear too that these components also encompass the DOT goals of safety and economic competitiveness, and state of good repair, and environmental sustainability and livability. As he also noted the results of this analysis or the umbrella for which all other components of this study will be assessed so they will feed into that. Also this is a since when we did the last truck size and weight study we advanced the state of the art in

modeling. This will continue as we move forward with this analysis. One of the things that we will be looking at that we didn't look at before -- we looked a Class I railroads before and what happened to them. We will be looking in this one will be the impact that will happen in short line railroad as these configurations move across the highway system.

So with that for the details I turn it over to Jim March.

Jim March: Thank you, Scott and Max. Before we get into detailed methodology I want to indicate a couple of the assumptions that underlie large parts of modal shift analysis and will influence what we do and the way we think about the results. The first is that we are assuming that states which have their own truck size and weight limits that are completely separate from the federal truck size and weight limits -- will change their size and weight limits to be consistent with the changes that we are analyzing for the federal truck size and weight limits. Second, all highways on the designated networks that we're evaluating are going to be assumed to be available for this scenario vehicles. In reality, there are going to be highways that may have deficient geometry, deficient bridges, and states immediately might not allow some of the scenario vehicles that we are studying to use those highways. Eventually we would expect states will bring those highways into adequate condition to accommodate the scenario vehicles. This may take a while but it is a necessary assumption for the analysis.

Related to the assumption is that we are going to be trying to estimate what the end state is going to be. We are not going to try to estimate how long it might take to reach the end state. We know shippers and carriers are not all going to be able to take advantage of the larger and heavier vehicles immediately. It's going to take a while before the industry comes into a new equilibrium that would include the scenario vehicles. In the analysis we are going to try to define what that new equilibrium is going to be.

Another assumption is the total freight that will be moved is not going to change as a result of the size and weight changes. And this was an issue for the 2000 comprehensive truck size and weight study. Economists would argue that if you reduce the cost of transporting goods on more productive vehicles that there should be more transportation involved and potentially increased freight production. For the comprehensive study in 2000 economist at the Volpe Center of USDOT prepared a white paper analyzing this issue. Their conclusion was that any such increase in total freight would be small enough that we could ignore it for purposes of the study. We will use the same assumption for the study and for the 2000 study.

Finally, just as today, not all vehicles travel fully loaded. Either they are cubic capacity or they are gross vehicle weight. And we will be assuming that would be true under the scenarios as well. Just can't create the efficiencies so that every vehicle is operating fully loaded all of the time. With those assumptions let me get into the methodology that we will be using. As Max and Scott indicated, we are going to be looking both at traffic that would shift from one truck configuration to another as well as traffic that might shift from either rail or water to trucks as a result of operations of the larger and heavier vehicles that we are looking at.

Each of the scenario vehicles that we are looking at has a different part of the industry that might benefit from use of that vehicle. The heavier tractor semi-trailers would benefit mostly truckload traffic whereas the doubles and the particularly lighter triple trailer combination would benefit primarily less than truckload traffic. So we are going to be working to identify the segments of the industry that potentially would benefit from the use of these vehicles and try to get an estimate of what portion of that traffic would shift to the scenario vehicles if they were permitted. Likewise, we will be looking at those types of commodities that potentially might shift from either rail or water onto the larger heavier tracks if they were allowed to operate. Let me give you an example and this is the slide that is up now. We will be estimating the base case traffic that is moving today under current size and weight limits. This will be done in a fair amount of detail. The Freight Analysis Framework that Max mentioned has commodity details for 43 different commodities. It includes transportation by all modes and the movements are being disaggregated down to the county level. We will have information on movements by all modes for 43 different types of commodities between counties of origin and counties of destination. The total base case is going to represent all truck traffic that is using the highway system today. It will be broken down into different vehicle configurations and their operating weight profiles.

The scenario case that we will estimate will see how this distribution of truck traffic on the various highway systems would change and provide detailed estimates of shifts from one configuration to another a different highway classes and different operating weight spectrums. These shifts are going to be estimated based upon the differences in using existing vehicles versus scenario vehicles on the total logistics costs for movement between each of the origins and destinations by the various vehicle types.

This gives a little diagram of how this analysis will work. There are going to be county to county commodity flows. We are going to develop routings between each county of origin and each county of destination for the various commodities by the vehicle classes. In some cases, the scenario vehicles will be able to use the same routes as existing vehicles do but in some cases such as triples, the scenario vehicles may not be able to use all highways that currently are being used by short twin trailer combinations today, for instance. We will have the routings that would be available for each of the vehicles and these in turn will have costs associated with them in terms of the distance, the operating weight, and certain logistics costs associated with the movements.

There is going to be a commodity attribute file that is also going to be developed that will help us assign the various commodities to particular types of vehicles both in terms their axle configurations as well as their body type. It's important to understand the body types because there are different costs associated with using a flatbed, versus a tanker, versus a reefer, versus a dry van. There are different implications for the ability to change modes as well. Some of these factors include commodity density and the value of the commodity and physical characteristics of the commodity. All of these will go into the assignment of traffic to different types of vehicle configurations.

As Max and Scott mentioned we will be using a model called ITIC, Intermodal Transportation and Inventory Cost model. This model is derived from model that was used in the 2000 Truck

Size and Weight Study that the department did. It was also used in earlier versions in a follow-on analysis done for the Western Governors Association looking at a regional truck size and weight policy. The ITIC model includes not only the transportation costs but also the inventory costs, -- the timeframe involved and how long the transit time is - transit time reliability. All of the non-transportation logistics costs that shippers are going to consider in making their decision.

For each of these commodity movements we are going to have both the transportation cost and the non-transportation cost associated with the move and we will be comparing those for scenario vehicles and the base case vehicles and when the scenario vehicles can be used at a lower cost. We will assume that traffic will shift to the scenario vehicles. We anticipate doing some sensitivity analysis it is clear that there are some factors that we can't model perfectly and so we expect even though the scenario vehicle might have a lower cost that shippers and in the short term and perhaps even in the long term still might not choose to use that vehicle. We are going to try to do some sensitivity analysis to give some bounds to the likely range of shifts that we would expect to see.

As Scott mentioned, this particular module also includes analysis of environmental impacts, traffic operations impacts, associated with the modal shifts. We will be looking at total energy consumption, emissions of CO2 and NOx, and based upon the literature search that we did we identified EPA greenhouse gas emissions model as the best one to use for this kind of analysis. It is flexible and will allow us to include a number of factors that haven't been considered in previous studies like this. For instance, it not only takes into consideration the engine size and horsepower when looking at fuel consumption but also rolling resistance and aerodynamic drag. Both of these factors can change considerably depending upon the vehicle configuration.

Regarding the number of axles, if we have more axles with rolling resistance and more trailers there will be more aerodynamic drag and these will influence total fuel consumption and environmental emissions. The traffic operations analysis is going to be based primarily on passenger car equivalents. This is consistent with the analysis that was done for the 2000 Comprehensive Truck Size and Weight Study. Passenger car equivalents are used by traffic engineers to try to estimate the relative effect of various trucks on the traffic stream on delay speeds and ultimately highway capacity. We will be looking at the Highway Capacity Manual but go beyond that to use some passenger car equivalents that have been estimated in simulation modeling for various purposes. The simulation models allow consideration of the additional vehicle length, the weight to horsepower ratio, and other factors on the traffic stream.

The data mentioned we will be using the Freight Analysis Framework and the latest version of this -- this will be a richer database than was available for the 2000 Truck Size and Weight Study. It will be disaggregated down to the county level. This was something that is being done just for the study although various others have requested that a county level FAF be made available. In order for us to be able to better isolate the effect of limiting certain vehicle configurations to a limited set of highway networks it is essential we have a fairly high level of disaggregation for the origins and destinations so differences can be identified. If we were to use the FAF at the regional level that has currently been released, at most of the FAF regions are likely to contain all of the highway networks that we are analyzing. With county level data there are going to be some counties that are not going to be accessible by one or more of the networks

that we're looking at. As in the 2000 Comprehensive Truck Size and Weight study if vehicles can't travel on the network and are not given reasonable access to points of loading and unloading and the like they will have to either assemble or disassemble and operate in smaller configurations.

This will give a brief summary of the desk scan that we did. We looked at a variety of studies that have been done in the modal shift area both those that have been related to truck size and weight policy options at the federal and state and local level, as well as potential modal shifts associated with other policy options. We've also looked at the relative impact of truck configurations on energy consumption, emissions, traffic operations and highway cost recovery. The primary federal studies have been sponsored by the USDOT as might be expected. Certainly the latest ones were the 2000 Comprehensive Truck Size and Weight Study as well as the 2004 Western Uniformity Scenario Analysis as I've mentioned. They are the basis for much of the analytical approach being taken in the current study. We didn't find any other national studies that provided substantially better or different methods.

At the state level we found different approaches to modal shift analysis have been used. That is because they're working at finer levels of geography. They also don't have the resources that federal studies have. A lot of the state studies have relied on expert opinion to try to decide whether or not shifts in traffic from one vehicle to another would take place. But I think in all cases the studies have tried to take into account the total logistics costs and not just differences in transportation costs. Because these are some of the important factors that shippers take into account when they make their decisions. Some of the academic studies have used econometric techniques that have tried to develop some cross elasticity and those are relatively robust but they ordinarily are useful from a policy standpoint because it's much more difficult to change some of the assumptions that are behind those econometric studies.

Finally, the desk scan related to traffic operations and energy consumption. There hasn't been a whole lot of literature on the effects of larger trucks or much heavier trucks in the traffic stream. There has been a lot of literature on just the relative effect of trucks versus automobiles on traffic operations. It has only been really within the perspective of some of these federal truck size and weight policy studies that we have done much in the way of research and analysis on the effects of larger and heavier trucks on traffic operations. Certainly one of the bigger facts as I mentioned is the weight to horsepower ratio as well as the vehicle length. These are important and we have found that in the literature.

As I mentioned, fuel consumption, as was the case with the traffic operations, hasn't been a whole lot of literature on the effects of larger and heavier trucks on fuel consumption particularly taking into account some of the factors that recent EPA models have allowed us to look at. I think we are using state-of-the-art models as much as we can for the energy and environmental emissions. For traffic operations, we are using some of the latest simulation models and we are going to make sure they are consistent with highway capacity manual and other recent USDOT literature. I think that is about what we're up to in the modal shift analysis work.

Tom Kearney: Max and Scott and Jim, thank you very much. Before we get into questions and answers we have a minute for me to go back and promote to stakeholders recent ongoing visits to

the project website. On the project website there is a link where we went to the Federal Register to let all our stakeholders know the meeting at the national academies with the peer review panel then announce today's webinar as a second stakeholder input meeting that we will hold as part of this project. We also, in that notice, announced we would be accepting comments up through January 3 on the project plans and desk scans that we have posted. I want to let everyone know that in the Federal Register today, I believe, we expect a notice to be published extending that comment period through January 17. Comments will be received and will be accepted through the end of January, January 31. The deadline for the comments on the plans and scans up until the 17th will be considered to be integrated in the work that we actually do. Through the end of January we will be considering these comments. I want everyone to note that since the beginning of this project we have had the CTSWstudy@DOT.gov e-mail address available to you as stakeholders to communicate to us. That e-mail address will remain open to the course of the preparation of the Report to Congress. At that point Jennifer, can you help me as we take on some questions and answers.

Nick Kehoe: The first question is what kind of impacts are you looking at for the railroad. Economic, or modal shift?

Tom Kearney: Let me ask Jim March. Scott Greene, if you would take the first crack as the Federal Rail representative and then work with Jim March to answer the question, please.

Scott Greene: We had a discussion on that this morning and if you remember back in the 2000 study one of the things look at was what affect modal shift had on the remaining traffic that was on the railroad system. And what that meant for the railroads ability to their contribution and fixed costs. We are going to do some of these things this time around. We worked with cost about elasticity and will be looking at finding this range of elasticities that we can use in this one also. We will be looking at financial impacts as well as traffic impacts.

Tom Kearney: Good. Thank you.

Nick Kehoe: Next question. What steps will the study be taking to examine the shift within trucking itself. There is a significant amount of the trucking industry, specifically small business trucking entrepreneurs that will be negatively impacted by the changes in limits. The examination of the impacts on the shipments seems to be focused on benefits to shippers.

Tom Kearney: Jim March can you take that question?

Jim March: We are not going to be looking at different segments of the carrier industry. We certainly recognize and will discuss qualitatively some of the potential effects on smaller carriers and the fact that they may not be able to utilize some of the equipment that we are looking at as efficiently and as quickly as larger carriers. We don't have a good way to analyze that and it is beyond the scope of our work.

Nick Kehoe: Next question is do you have further documentation on the county to county commodity flows and if so, please direct.

Tom Kearney: The preparation of the data set is being prepared by the freight office and an area that is very important and very difficult to do as everyone can imagine with a number of counties we have in the country. To marry the different configurations to specific roadway networks that we will be analyzing as part of the project, it is a necessary difficult step that we must take in this project and it will be done. In terms of the purpose and the need of that step I think I just addressed that. Max, anything to add quick to add.

Max Azizi: Nothing at this point.

Tom Kearney: I'm sorry. I need to footnote. We have the Freight Analysis Framework on the freight office website and the documentation on FAF is widely available to the public. I encourage people to visit the website if they need more information on the Freight Analysis Framework, the metadata, what goes in there and how we use the Freight Analysis Framework.

Nick Kehoe: The next question is will the modal shift analysis examine railroad and surface transportation board policies with regard to intra and intermodal competition, bottleneck rates, paper barriers, interchanges, terminal access, shuttle and unit train operations and the lack of rail service in parts of the United States.

Tom Kearney: I thank the questioner for the question. That is a heck of a study you came up with there. That would be multi-year and intriguing. Let me hand off to Scott Greene.

Scott Greene: Very detailed question. As Tom said that is a study in itself. I can't see it getting into that because this is beyond the scope of the study. This will be solely looking at this modal shift and what the impacts will be. However, I would also say that as the study is finished and we look at results of the shift I would have to guess that when we are talking about here are truck competitive goods being shipped and not goods you would normally think a in a bottleneck situation. Those goods would not be covered under this because they're not truck competitive as we normally think about.

Tom Kearney: I have to circle back and remind everyone that Congress asked us to assess and evaluate the impacts and implications that a change in federal truck size and weight laws would have so that is the primary line for the work of this project as directed by Congress.

Nick Kehoe: Next question is whether traffic shifts are not just a factor of costs but also profit margins. In many cases the traffic will not shift if the non-trucking mode ops to lower shipping rates. How will this be taken into account?

Tom Kearney: Once again a good question and I knew we should leadoff with this module because it is fundamentally important across the board to the whole study and thank you stakeholders for not letting us down with your interest and questions. Scott Greene?

Scott Greene: If I understand you correctly what you are saying is that we have a new configuration that is introduced and now the alternative mode whether it be truck or rail will start to lower its rate based upon the new truck configuration rate charge to maintain the traffic. The study will take that into consideration because that's part of the rail component of the modal

shift. Yes, the railroads will in the analysis be able to lower their rates down to what we call marginal cost to make that assessment.

Nick Kehoe: Next question is 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 capacity rating allowed by each state or even by existing facilities.

Tom Kearney: Thank you for the question. It's a good question however what we're looking at here is a change in federal truck size and weight limit where the triples as they are legally in operation in a number of the Western states right now -- we will be introducing them on highway networks throughout the United States. We are evaluating them as would be the case if they were suggested or look at to be a new surface transportation assistance act vehicle with the same ambient and widespread mobility rights across the national network, National Highway System Interstate System. So in that regard, we will not be using state laws and regulations controlling truck size and weight as a restriction or constraint on the study we intend to do here. We are looking at what the impacts of the change in the federal limits would be.

Nick Kehoe: The next question is how much added expenses do you expect will be shifted to the city budgets and truck stop operators. Does the shift of expenses from carriers to public for higher carrier profits?

Tom Kearney: We have had discussions particularly in the area of truck parking and impacts and the impact on public and private sector providing parking opportunities. Safety is a key area to the study and in everything we do in USDOT therefore hours of service need to be supported with adequate truck parking facilities. We have a separate study underway where we are assessing that and that was directed under MAP-21. The cost to the state is part of that bundle of cost implications that we need to consider as part of the modal shift as we evaluate longer vehicles that will require safe and adequate parking facilities as the study continues. Anything you want to add, Jim? It’s not something we can do an exhaustive intensive study but we do need to address within the modal shift area.

Jim March: I would just add that unlike some of the previous USDOT studies that have focused on longer combinations vehicles, this study really is looking primarily at vehicles that are about the same size or just marginally larger than the existing fleet with the exception of triples. So that some of those costs associated with factors that Tom was mentioning aren't going to be nearly as important for this study as for the previous USDOT studies. But they certainly are going to be looked at if there are staging areas that have to be constructed and operated. They will be examined and the cost implications.

I think Tom's answer was right on.

Tom Kearney: I have to loop around to the second part of the question and that was the impact on city budgets. We have gotten a lot of input from not only stakeholders but also from some of our Congressional Representatives. Voicing a concern in increase in truck size and weight limits and the impact it would have on local streets and local bridges and local infrastructure. Certainly

within the study we will be touching upon and evaluating the impacts especially with regard to reasonable access. We know this trucks need to access terminal points for loading and unloading. We will be touching upon in doing a very limited scale assessment of the impacts on local roads and local bridges tied to the reasonable access networks. I am not suggesting in any way that we will build an inventory of all the reasonable access route approved by the states right now and do a full evaluation of their condition, but we will be striving to make statements that would be representative to those reasonable access privileges within modal shift. This is something that Jim lowers his head when I mention because it's a huge undertaking in a separate study that would be multiyear regarding reasonable access and it's important what we need to touch on in the study.

Nick Kehoe: Next question is with the ITIC model how are the non-transportation costs developed and what was the data source.

Tom Kearney: Thank you for the question and I would probably have a few gentlemen in the room that have background with the model. Scott Greene.

Scott Greene: It has a number of parameters but they will have to go back and be revisited. We are in the process of doing the updating of parameters in the model and I will turn it over to Max. Those parameters are there. Let me hit on another thing. It is not only the non-transportation parameters but the transportation parameters are being updated to and we have conversations with the contractor. We can advance the state of this model to something it has never seen before.

Max Azizi: Some of the parameters that have been updated in the model associated with the cost both inventory and transportation costs but as far as every route probably we have samples of inventory costs and what is provided through rail through waybill if there are some of those data provided by different databases we have.

Tom Kearney: I would loop back around and say I think Jim and Scott and Max have touched upon is the opportunity to improve the state of the practice when it comes to modal shift within the study. It's important area to the study and for the six-axle heavier truck. There is federal legislation that suggests a weight limit of 97,000 pounds on six axles. Our ability to analyze and assess the impact of that vehicle on short heavy haul was limited in the past on our LCV studies we have done. In the past on studies we've done, we have modeled the impact on the Class I railroads and haven't developed a mature, widely accepted modeling protocol for short line impacts. Project team along with the subject matter experts at USDOT are in consultation conversation and coordinating closely with the Short Line Railroad Association seeking their assistance and advice on developing a good effective modeling capability exactly to that regard. It is a proven opportunity that we are happy that the Association has stepped forward in a partnership structure to be able to assist us with.

Nick Kehoe: We will do one more question before we turn to the next topic and this question is 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 has significant emissions result outside of the operational phase. The majority of the emissions of

PM 10 and SO2 and PV will be increased as infrastructure will have to be repaired more often and maintenance costs and emissions are much higher during the repair process.

Tom Kearney: I think we addressed that as part of Jim's presentation. I thank the stakeholder for the question -- Jim, you mentioned the use of the state-of-the-art EPA model and trying to understand those kinds of secondary impacts of modal shift.

Jim March: The EPA model looks at factors related to the vehicle itself. I think it is beyond the scope of the study to get into environmental impacts associated with perhaps more frequent construction and reconstruction.

Tom Kearney: Thank you very much. At this point I apologize. There are a host of other questions that have come in and they are recorded on the chat pod. We do have a record of your comments. We are moving to the pavement discussion. Scott and Max and Jim, thank you for presenting this work under their task area.

To lead the discussion and give an overview of the work on the pavement analysis area, I will call upon once again a friend and colleague Cheryl Richter who leads pavement research out of our Fairbanks Highway Research Center. Can you give us an overview of the work we expect to have done in the pavement analysis area?

Cheryl Richter: Good afternoon, everyone. The fundamental purpose of the pavement analysis portion of the truck size and weight study is of course to estimate the pavement costs that are related to the introduction or the possible introduction of alternative truck configurations. When I say cost, I need to acknowledge those costs could be both positive or negative - one way or the other. We are looking at the cost associated with changes in how the pavement performs as a result of the different traffic loading to which they might be subjected.

In pursuing this portion of the study, we will be taking a different approach than has been used in past FHWA truck size and weight studies. And the reason for that is simply this…with the adoption by AASHTO of the Mechanistic Empirical Pavement Design Guide several years ago and with the release of what we now know as the AASHTO pavement ME software tool, we have a much more powerful tool to analyze the impacts of changes in truck axle loads than we have had in the past. This will allow us to do a much better job of assessing those impacts than has been possible with previous analytical tools.

We will be relying on the pavement ME software tool and looking at a sample of pavement test sections that have been selected to be representative of the US highway system, and how the performance of those test sections will change as a result of different possible traffic scenarios and truck scenarios. We will use life cycle cost analysis to evaluate the cost. We will rely heavily on several existing databases in selecting our representative pavement test sections that we will be using in this study. We will be using the Highway Performance Monitoring System data to look at what the distribution of pavement cross-sections throughout the country is. We will be using data from the long-term pavement performance program which is a 20+ year investigation of the performance of in service pavement tech sessions throughout the United States and Canada that gives us well documented pavement cross-sections and some of the best traffic

weigh-in-motion data available for defining those pavement test sections that we will be using in our analysis. With that, I will turn the floor over to Mike Darter and Leslie McCarthy who will be leading the analysis.

Leslie McCarthy: Thank you Cheryl. This is Leslie McCarthy, Villanova University. And my colleague Mike Darter from Applied Research Associates is on the line. I will be talking through the different pavement analysis slides and then Mike and I will be available for answering questions. Our other colleague working on this is Harold Von Quintus from Applied Research Associates and also Roger Mingo from Mingo and Associates getting into the WIM data and coming up with the traffic scenario that we will be testing. Thank you for the overview. I want to move forward to the next slide and talk about the method we are using in this study.

First thing we wanted to do is try to focus our efforts on looking at strictly the impacts of differences in the truck loads and truck axle configurations. One of the things that when you look at pavement design in general and how the AASHTO models are set up there two different types of load - traffic loading and environmental loading. We wanted to try at the outset to make sure we could control the environmental loading so we can hold that to a certain extent fixed and focus more on the true impacts of the differences in the truck loading and volumes and axle configurations. We went through analysis to select what would be the representative locations in each of the four long-term pavement performance climate zones. Those zones are known as the wet freeze and dry freeze and wet no freeze and dry no freeze zones. We looked at about 20 different sites and split out 40 -- we narrowed it down to 20. We ran base runs of the pavement ME design software through AASHTO and tried to rule out and screen out any type of extremes or invalid data for each of those climate zones. We were able to do that and come down and look at the results both in terms of pavement service life and stress levels predicted as well as the primary climate loading factors and pick a representative climate for each of those areas based on some of the representative means. We select a representative soil type for each of the four regions as well as pick the location that best represents the zone based on pavement service life performance.

The data is a combination of that coming out of LTPP instrumented sites across the United States as well as the National Cooperative Highway Research Program 9-23B Arizona State University zone map application. The combination of the two of them we could get the real-life soil and climate information. Once we have those representative sections, what we need to do is pick our sample pavement sections. We want to try and isolate the impacts of the differences in the way the truck loadings are going to be translated and we needed to take a higher level look and say we can't get down into every single type of pavement but let's look at what the most common pavement types are both in our higher class roadways as well as our lower functional class roadways. What we end up with is four different pavement types - our new flexible pavement, flexible pavement overlay over existing flexible pavement, jointed plain concrete pavement in a new form, and flexible overlay over a jointed plain concrete pavement. So those are our four pavement types. We needed to pick representative pavement sections.

Then we look at three different traffic volume levels. We call it the low traffic volume, moderate and high traffic volumes. Those are the three different volumes that we would be evaluating for

each of the pavement types in each of the four climate zones. So we were able to do that. Before we go into that we need to apply it to a pilot sample section.

If you go to the next slide, the next bullet talks about applying the pavement ME design software to a pilot sample section for each of the zones. In doing that that gives us a chance to really apply the entire method and do a full analysis for one pilot section of each of these pavement types to make sure the data we're getting out is sensitive to the traffic and is giving us results that make sense. Once we are able to go through that then we are able to say we will apply this to our base case traffic condition. Those will be based on a combination of data from the weigh-in-motion sites as well as HPMS and other sources where they have a lot of truck traffic data and information. We look at the estimates of the current truck travel estimates and apply those base case traffic conditions. And then run the pavement service life analysis.

The concept is trying to look at the impact of the truck loading and axle configurations and so that is where we start to apply this. If you go to the next slide you get more detailed into what these different scenario traffic variations would be. A lot of that will depend on some of the findings coming out of the modal shift. I think everybody heard the plan for the modal shift folks before we started talking about pavement. Our analysis at that point in time would depend on what the scenario traffic variations are going to look like as a result of some of the modal shift. We run our different pavement sections with a different scenario traffic and what we're trying to predict at each of these steps is the changes in pavement service life and basically we take these analyses and try to expand those sample results nationally and say we do these scenario traffic variations and what does this look like when we expand that out to representative roadways throughout the nation. What is the impact? It could be both positive or negative costs as a result of the analysis.

Moving on to the next slide. As Cheryl introduced, we are using the AASHTOWare Pavement ME design software that was developed by AASHTO. We have the most up-to-date version of that. That model is very powerful. What we will be focusing on is more of the stresses we see in the pavement service life that are more a function of traffic loading. If you're talking about flexible pavement you would be looking at rutting and fatigue cracking and rigid pavement we're focusing on transfer cracking as well as faulting. We want to look at the development of the distresses over the pavement service life and whether they exceed a given threshold over the service life and where that exceeding of the threshold occurs. There are certain things that we can't account for -- routine maintenance or other types of preservation treatments that may be applied during that time period. We can start to think about that when we go into the cost analysis and what will be using for the tool for the cost analysis is a Federal Highways program that is titled Real Cost. That gives us an opportunity to put in the key data points and analyze what the translation of the changes in pavement service life would be in terms of cost changes associated with these different size and weight scenarios.

These are the two main tools we are using. We are looking at whether there will be a change based on the different truck size and weight axle configuration scenarios on when threshold of damage over service life is exceeded. If it is in fact exceeded for these different traffic analyses. Moving on to the next slide.

Where are some of the data coming from that will be going into these analyses? It is important that we are pulling the most current data and the most meaningful data and so primarily the pavement data will be coming from the real world instrumented sites across United States that Federal Highway has through the LTPP program. That is primarily where we will be pulling most of our data from there. We also may have times where we need to make engineering judgments for data sets and those we would be basing on the AASHTO MEDPG manual practice. This accompanies the pavement ME design software and it has looked at nationally the different functional classes and what are the appropriate factors and design factors and inputs for different types of pavements. That is a backup tool where we don't have exact data from the field and we can have a good solid foundation for the inputs we select. The pavement software has default data based on hundreds of sites around the US and different pavement so you have the default data in there. We have the Highway Performance Monitoring System from Federal Highway. They have sample section data that will be important with defining the traffic scenarios. Also we have the travel and axle load spectra from the comprehensive truck size and weight traffic data sets that were generated in previous study. We can get data from the weight-in-motion sites – many State DOTs, along their interstates have weigh-in-motion sites and there is WIM data we are going to be using as part of the study.

Moving on to the next slide. Talking about the desk scan results. Prior to going into some of the analysis we did look at all of the information that was out there and lots of information on the impacts of size and weight on pavements and studies done in the past. We boiled this down to some key points. The first one is looking at the size and weight analysis methods. Primarily most of the studies that were done in the past -- maybe nine times out of 10 -- they are based on equivalent single axle loads or ESALS. Those originally stemmed from AASHTO road tests in the 1950s and estimate relative truck impact. These worked well for a long time but over the past 10, 15 years we have been able to do a better job with newer technology on looking at axle load spectra. Whether or not the studies can be as useful for the current study it doesn't seem so only because we are not basing this on ESALs anymore. We have the tools to do things better and look at the way the axle loads are applied. There are also previous federal studies that use the older pavement damage models. And some other studies that were done that use current pavement damage deterioration models. Those will be more important. We wanted to use the most up-to-date models that were developed through very comprehensive research that was funded by AASHTO and Federal Highway through National Cooperative Highway Research Program. Although we are aware of these past studies and have documented those, the relevance maybe isn't quite as significant for the study.

We looked at the application of current models on the next slide. We found there was one Federal Highway study that was important in which they applied the mechanistic empirical pavement design guide directly to simplify representation of shifts in axle weight spectra. And they looked at how these shifts in axle weight spectra might occur in both truck size and weight changes. One of the things that came out of the study was a systematic approach to applying the models in the pavement ME software would be helpful to allow more generalized findings. There are thousands of different pavement design analysis we can do but we are trying to get the general sense of what the impact is going to be with the shifts and changes in truck weight and axle configurations. That was something that the study concluded, we really have to look at this in a more systematic way. There were several studies that came after that that applied an earlier

version of the pavement ME software to look at the relative effects of various axle loads. To date, however, there haven't been a whole lot better than published with the newer version which is the AASHTO pavement ME design. There were a lot of great updates to that software within the last year that have approved the accuracy of the models. Over the course of the study there may be more research that comes out that is based on the newer versions of the software and we will keep our eye open and consider those as well as we go along. In terms of enhancements to the analysis on the next page --

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Tom Kearney: Can I ask you to wrap up in the next minute on the last two slides.

Leslie McCarthy: I would like to wrap up by saying one of the things that may be of interest when we are looking at different truck size and weight is the use of wide-based single tires. They may have some important impacts on pavement design particularly with their flexible design. One thing we wanted to note is this time the AASHTO pavement ME design software isn't able to directly model those. So we are not able to consider those because we've got constraints on how the models are working right now. We wanted to note through our desk scan result wide base tires should be considered in the future and they are being studied heavily through a pooled fund study that Federal Highway is leading. There will be important results. We wanted to note that's important.

There's a lot of reports that have used soil data and studies that were done in Maine and Michigan and other places and we are aware of those and it will help us develop representative data for the pavement sections. We will be using those as well is the LTPP information. That is a broad quick overview of our desk scan and results and our pavement analysis plan.

Tom Kearney: Thank you so much. Please take a deep breath. That was a great job and I'm sorry to rush you at the end.

I will ask Nick to share with us some of the questions the stakeholders have come in with but before I do I want to say Cheryl Richter's counterpart Tom Yu with the Federal Highway office of infrastructure, another pavement program specialist is here with us here and will be helping to support Cheryl in answering questions as is Mike Darter with ARA to support Leslie answering questions on behalf of the project team.

Nick Kehoe: First question on this topic. Will the pavement comparative analysis account for lesser pavement types prevalent on the local road systems including those areas of reasonable access included in the modal shift component that generally consist of a thin layer of aggregate on top of native earth with it seal coat service.

Tom Kearney: What I touched upon as we talked about modal shift we will have to address and discuss to a limited degree in deference to the project schedule, the impacts of changes in federal truck size and weight limits and the impact that would have on that reasonable access roadway system -- in a limited fashion we will be doing an assessment of the impact in that area. It will not be the same more intensive look. We will look at the roadway networks, the higher order roadway networks where the bulk of the truck travel occurs. It will be addressed within the study. I would invite Tom and Cheryl -- anything to add on that.

Cheryl Richter: I think you covered it, Tom.

Nick Kehoe: The next question is will the pavement wear consider the differences between two axle and multi-axle wear due to scrubbing and in different temperature zones as well as pavement types?

Tom Kearney: I thank the stakeholder for the question and I would ask Leslie/Michael, would you answer the question?

Leslie McCarthy: The question is will we be considering wear issues and scuffing is that correct? Yes, like at intersection locations. Some of the durability type considerations -- we will not be predicting those as part of the study. We are looking more at the structural distresses. Things like rutting and cracking and faulting. The durability type distresses aren't predicted in the pavement ME design software at this time.

Nick Kehoe: The next question on the topic, I think we did address at least some of it. Do the models we will be using allow for this testing to be related for tires scuffing in intersections and other areas where trucks will be turning and if not, what steps will be taken in the study to examine these issues?

Tom Kearney: I thank the stakeholder for the question. Leslie, I think we answered that.

Leslie McCarthy: I think we did. It's a very good point and I think that would be wonderful for future study to take on. We are not able to predict that type of distress with the AASHTO software at this time. It is a very good point.

Tom Kearney: I would invite the stakeholders to send a comment to the CTSWstudy@DOT.gov e-mail so we have a record of that question.

Nick Kehoe: The next question is your pavement evaluation based on the deterioration per vehicle, per tire or per unit of cargo shipped?

Tom Kearney: It has to do with the modeling protocol. I would ask Dr. McCarthy, from Villanova, will you take on the question please?

Leslie McCarthy: In the AASHTO design software they look at axle load spectra. It is per axle. And so how each weight of each axle and how many repetitions of that axle you will see in a -- whatever the scenario of traffic volume is for that particular roadway. It is per axle.

Cheryl Richter: If I could elaborate on that. It is the overall impact of the change in the traffic streams. We are not doing a truck configuration by truck configuration analysis. We are looking at, based on the modal shift analysis an estimate of how the traffic stream will change. How will the overall pavement performance change?

Tom Kearney: That was Cheryl Richter. Thank you for filling in. We are assessing the impacts and the implications of a change in federal truck size and limits. That is more the focus and doing more detailed pavement research which globally is ongoing.

Nick Kehoe: Next question is, are you considering the impacts of technologies like weight equalization across trailer axle groupings and self-steer axles.

Tom Kearney: It has more to do with the characteristics of the vehicle and less to do with the durability and characteristics of the pavement structure and will we be evaluating technologies like onboard weighing systems and technologies like that. The answer is we will be recognizing these technologies are emerging and do contribute to the effective safe operation of commercial motor vehicles. We will not be doing intense evaluations on the performance of such systems.

Nick Kehoe: Next question is, is there a list of what LTPP sections will be used for each of the four pavement categories studies?

Tom Kearney: Cheryl, would you like to start off.

Cheryl Richter: We don't have that list yet.

Tom Kearney: We are in the process of formulating and populating the matrices that will be used in the experimental design and that will be followed within this pavement study area.

Nick Kehoe: Next question, does the pavement analysis group believe that the completeness of this portion of the Truck Size and Weight study is limited by the Congressionally mandated timeline?

Tom Kearney: When it comes to pavement research we know the universe and the environment of pavement research is ongoing and it is very pervasive around the globe whether it is South Africa or Australia and across Europe. Certainly with the talent and expertise within USDOT on the technical oversight committee and the expertise within our project team we can study the implications of truck interactions with pavements for the next decade and would be happy in doing so. In terms of answering the question, that Congress asked within Section 32801 of MAP-21, we certainly will, within the timeframe given by Congress, do a very effective job in answering the question contained in the statute. And we have time for one more question, Nick.

Nick Kehoe: Last question on this topic. The use of wide base tires is on the rise. When will it be considered -- will it be considered on the study or just as a FHWA pooled funds study?

Tom Kearney: That I will redirect to Cheryl and she and her staff are very involved in the evaluation of the super-single tire. Cheryl, do you want to take that?

Cheryl Richter: I expect that potential implications of wide base tires will be acknowledged in the report but within the study constraints we do not have the opportunity to do a detailed investigation of how those changes might interact with the truck size and weight configurations. Adding that variable to the equation is beyond the scope of the study.

Tom Kearney: That will wrap up our time for the pavement module.

Between 4:30 and 5 pm, as part of this session, we will go back to answer questions we did not address so please don't give up hope. We will go back and revisit questions and address them at the tail end of the session. The next area is the compliance analysis area, the compliance and enforcement overview. I am the USDOT subject matter expert in this area so what I will do is describe to you the overall effort that will be undertaken and then I will call on my project team partners to help fill in the details of the project plan and the desk scan. What Congress has asked us to do is take a look at, number one - a baseline of trucks operating on the network today operating at and below current federal size and weight limits then look at the trucks that are operating above federal size and weight limits, be it under an exemption from federal weight limits or operating with a legally issued state permit. We do have trucks operating over the limits today we know and understand that we're working in partnership with enforcement community reaching out to them within our work plan to get an answer on a relative degree of difficulty on the impact of resources, the impact of costs for the over the limit trucks in comparison with those that operate at and below. The second side of the question is, what happens if there is a change in the federal size and weight limits, what is the impact on enforcement? We will get answers from the modal shift team where they will be estimating perhaps a reduction in truck travel based upon the expansion and extension of size and weight limits to reduce truck travel and reduce the burden of the workload of our enforcement officers. We still have to be cognizant of the answers developed on the first part. What relative degree of difficulty and effort assigns to expecting at and above or versus at and below type trucks, that will be recognized in the second part of the study but we will be evaluating and assessing the impact of a change in federal size and weight limits and how that would impact the operation of effective enforcement programs within each of our 50 states. Methodology -- I'm sorry -- another aspect that we were asked to take a look at.

If the federal size and weight limits were to change, we will identify every law and every regulation that would be affected. That requirement in section 32801 will be addressed under this compliance work task activity area. The methodology to be used, there's a lot of information that is held at the state level within the permit offices of our state DOTs with the enforcement agencies regarding manpower. We have a tremendous amount of information that is also reported to Federal Highway on an annual basis in annual certifications and in the development of the state enforcement plans. We will be using that information as part of the work in this compliance area and we will also be talking to a whole host and variety of folks involved including the getting the trucking industry's perspective on answering the question of the relative effort as part of the work in this area of the project. At this time I would like to hand-off to my project team partners, Mike Onder works with CDM Smith, and Dr. John Regehr, University of Manitoba, would you please walk us through in a more detailed fashion the work plan and the desk scan findings you developed. Thank you.

Mike Onder: Tom, can you hear me okay? This is Mike, Mike Onder.

Tom Kearney: Hi, Mike. I can hear you just fine.

Mike Onder: Good afternoon, Tom and good afternoon to all of the stakeholders who are participating in this webinar. I am going to discuss a little bit of the compliance analysis methods. The following slide will deal with the data gathering. Those are the two slides that I'm going to concentrate on in the discussion this afternoon and then Jonathan Regehr my partner from the University of Manitoba will give you a little bit more detail on the desk scan items we think are appropriate or give us a path forward to being able to use work that is already been done in the past. Although not much has been done because this has all been very new collecting information on all of the cost of enforcement for truck size and weight throughout the country and also trying to identify effectiveness of enforcement or the compliance with the regulations and there we're going to be doing these alternative case studies or scenarios for the truck configurations that are primarily under study.

Just let me say that we have got to gather a lot of data in order to be doing these activities and certainly we will be capturing from selective number of states on the weighing violations and violations rates by type. Let me say to give you an idea of how we're going about this analysis and research since we don't have the capability, time and the budget in order to be able to look at all the states. We are actually going to look at a sample of states and we have gathered a sample of states through discussion with Federal Highway Administration and also discussion with the commercial vehicle safety alliance and for those of you who may not be familiar with commercial vehicle safety alliance there an organization that is international in nature and within North America and they have members from United States, Canada and Mexico. It is a tri- nation organization and they have been agreeable to form an advisory group for us of nine states so we're having that advisory group assist us in the ideas that we come up with we certainly do sanity checks with them and make sure there is a reasonableness of what we're trying to put together in our research design. That is one of the items that's going on and then we need to find both interstate and non-interstate, primarily the non-interstate national network and the National Highway System which would be off the interstate, study configuration for the scenario analysis on the other configurations.

We are in the process of gathering that right now. We're starting with the sampling of states – of 10 states to see if we already know just let me just back up a second and tell you that we have 29 states we are using in our sample that came out of this discussion with Federal Highway and also with the discussion of CVSA. Of those 29 we already have done the analysis on the interstate system so we know what configurations are in the scenario analysis are actually allowed on the Interstate System and because they don't match up absolutely one for one in some cases like 91,000 pounds or 88,000 pounds may not match up exactly. Certainly, we know that twin 33's are not operating out there. We may have to do some surrogates for doing our analysis. We have some assumptions for some of the surrogate analysis.

Once we have the states that have all of the configurations we need for our scenario analysis we will need to identify the roadway segments within those states that we are actually going to be studying then along with those roadway segments we're going to need weigh-in-motion measuring devices so that we can gather compliant status for that particular process. There is a process that we need to go through in order to be able to actually achieve the foundation elements that we need in order to do this study. As it says there in item number two we're gathering information about the enforcement programs resources technologies and activities.

One of the things we're working at is we are looking for the return on investment that states are getting for their enforcement activities. And that's primarily where you get the effectiveness measure.

We are also looking at technologies as an adjunct to those activities of effectiveness and so we have a member of our team that's primarily focused on gathering the technology information. It's technologies that are fairly well known, fairly well proven and fairly well tried so we're not actually looking at and not doing a comparative analysis of what technology to try to identify we're just looking at technology and what it means as it relates to being able to assist what might be considered to be the declining resources, state resources that are actually there to assist which is probably a growing population of trucks throughout the country. That's primarily what we're doing there and that we're going to take to determine cost and effectiveness we're gathering and primarily gathering all of the cost information and the next slide actually shows where the data sources are.

For the most part we're looking at enforcement program outputs which primarily would be the weight violations in violation rates and we're going to be looking at that based upon enforcement effort. It's not just strictly looking at violation rates and saying this is a measure of effectiveness. It is a part of a measure of effectiveness but not the total thing. Then we're looking at the compliance rates as I mentioned on the roadway segments so we will be studying and we will begin to define compliance rates for the STAA vehicles that are out there right now. The envelope vehicle five axle 80,000-pound vehicle that's allowed to traverse all the highways throughout the United States and also the twin 28 and 28.5-foot trailers that are part of that configuration as well thus we will be looking at the compliance rates associated with the configuration vehicles through the scenario analysis and then we are also, using the alternative configurations, what will happen to be the scenario vehicle so that will be another piece that we will be looking at these roadway segments that we are setting.

Tom had already mentioned that once we have most of all of this complete we're going to be doing an inventory of all federal laws and regulations and identify and report back to Federal Highway Administration on which ones of those need to be changed or any suggestion that might be made to Congress on that. If we could look at the next slide which primarily just gives you the data sources I just wanted to make you aware that if you're not their certifications that are required by the state to be made to the Federal Highway Administration each year and those certifications have considerable amount of data that we will be using to do this analysis and part of that, there's a separate report that comes in from the states called the State Enforcement Plan and the State Enforcement Plan also includes the enforcement cost and resources so we can use that information we are validating and verifying that back with the states to make sure that we have the best information that we can on those.

And then of course to be able to identify any of the trucks that may be operating on certain segments under permit we want to make sure that we have that. We can't equate the permit to the truck and doing this kind of analysis but we're going to have to do some positive analysis as it relates to relating permit data to roadway segments where these permits may be used on an ongoing basis. And then of course weigh in motion data is extremely important and that's another piece we will be using. We are also pulling in and order to be able to do our analysis nationwide

we have to have -- we need to do some analysis and neutralize the data we're trying to do that through truck registration data that comes from the states and it is vetted through Federal Highway or VMT data. We're still kind of open on that and we're going to discussing that with commercial vehicle safety alliance. I believe we're having a meeting with them tomorrow so we will get better feedback from them on what they think might be the best approach or.

With that I would like to turn it over to Jonathan. Jonathan if you would take us through the desk scan activities.

Jonathan Regehr: Can everyone hear me?

Tom Kearney: I can. I'm going to ask you to go through your slides and the next five minutes to go through the questions.

Jonathan Regehr: The purpose is to support our work for this compliance and we look at a number of different issues and the need for truck size and weight enforcement and the need for regulatory changes on the impact on enforcement programs, cost and benefits, effectiveness, technologies, and alternative approaches to compliance. We focused on literature published in the last decade or so and decided to review 120 documents in our review. If you refer to the slide on the screen now some of the general findings that we are revealed the scan are as follows. On the general compliance issue what we have seen is that nationwide estimates of non-complaint trucking and its impact are generally unavailable. This information at state levels in some states have done more specific work like Arizona, Minnesota and Indiana are doing that. On a nationwide level is a little more difficult and has not been well researched. There is some ongoing work being done to link overweight trucking and safety and that's being done by the FMCSA so that's an interesting development being undertaken currently. Like Mike said we will be working closely with CVSA to help us understand some of the effects of these more clearly.

Next slide please.

The impact of regulatory change on a truck size and weight enforcement program is another area that is not well researched on specifics. It's generally understood that regulatory complexity does hinder truck size weight and compliance and that is referenced in the number of prominent studies. On enforcement cost and benefit side of things generally the benefits when we're talking about enforcement benefits are limited to assessment benefits for pavements, cost of technologies are well researched and well dialogued. When you wrap that up to a national level scale the research gets a little thinner. Save for some work that was done by Australia that was done by the National Transport Commission down there that has tried to take a more holistic view of enforcement costs and benefits.

On enforcement effectiveness here we are looking at different ways of measuring enforcement effectiveness and among the most prominent that is apparent in the literature is the use of violation of rates and the literature's recognizing that that's not necessarily the best measure of effectiveness though is probably the most used and most easily obtained. Relatively few studies take the next step and talk about actual truck size and weight compliance rates. There are a few out there but relatively few.

I think an important point is something that was summed up in a recent and NCHRP review, I think 2011, where there basically is a lack of reliable evidence to link enforcement activities and compliance so there is this understanding that we do the enforcement to affect compliance but the reliability of the evidence of that relationship is a little bit lacking.

There is some work that does relate the effectiveness to the probability of detection and severity of penalties so there is that going down the deterrence way of thinking. There are studies on that but generally we can say that the measures of effectiveness when we're looking at truck size weight enforcement have not yet been standardized. A little bit of a word on enforcement technologies. These have generally been well catalogued by the research, there was a major OECD study done in 2011that looked at many of these technologies as well. Some work by Cambridge Systematics was done recently for the FHWA, which did similar work. Weigh-in-motion is a key enabling technology for weight enforcement not just on its own but often and more often now combined with other sorts of technologies like cameras, communication networks to create these virtual weigh scales. The literature review finally also looked at some alternative compliance approaches and among these were the accreditation programs and chain of responsibility policies. These have been a little bit more promoted internationally again particularly Australia has used some of these different approaches to achieve compliance in the truck size and weight arena. That is a rough summary of what we found in the desk scan.

Tom Kearney: Mike and John, I thank you for the great job you did presenting the desk scan of the project plan. Nick, do we have any questions?

Nick Kehoe: We do. The first question is many states utilize the federal bridge formula to enforce weight regulations. Will you come out with a new formula if the weights will be raised?

Tom Kearney: Certainly as I described in the alternative configurations and six axle truck in particular we are sensitive to the operation and the application of the federal bridge formula and that is why we came up with those 2-6 axle truck weight limits. One was bridge formula constrained and the other 97,000 pound, six-axle vehicle was not. We will not and have no intent to take a look, and I want to make it clear, overall this is an overarching comment, we will not and you will not see recommendations in the report to Congress resulting from the study effort. We are developing the finding that Congress has asked us and directed us to undertake. So no, we will not be identifying or developing an alternative bridge formula or recommending any changes in any federal size and weight laws and regulations and we will be identifying impacts throughout. If the stakeholder, and I appreciate the question, does have interest in bridge formula modifications, there's ongoing research please contact -- John Regehr has colleagues up at the University of Manitoba, the national commission Australia has undergoing research underway to change their national bridge formula, IFSTTAR (French Institute of Science and Technology, for Transport, Development, and Networks) has work underway to develop an original first time bridge formula for the EU. There is research underway but you will not find it in this study.

Nick Kehoe: The next question is will the enforcement and compliance assessment account for traffic to, from, and upon the local road systems including those areas of reasonable access?

Tom Kearney: We will and generally we will be recognizing the reasonable access provisions within modal shifts and the bridge and pavement impact provisions. The enforcement of truck size and weight limits on those roads is delivered by local officials under local law, local ordinances. Truck weight interest to the Federal Highway Administration is focused solely on interstate system at this time so we would not be doing evaluation of enforcement on those local roads if you will. They're outside of the statutory regulatory jurisdictions of the federal government.

Nick Kehoe: The next comment is estimates for and the effects of compliance or rather the noncompliance under this study any truck size and weight alternate study as part of the study must be included.

Tom Kearney: Say that again, Nick?

Nick Kehoe: Estimates for and the effects for compliance or rather non-compliance under any size and weight alternate studied as part of the study must be included.

Tom Kearney: I thank the stakeholder for the comment.

Nick Kehoe: Will you be looking at the lack of fixed scale facilities nationwide and/or collecting data state-by-state on the number of fixed and portable scales for state scales for State.

Tom Kearney: We will not be doing inventories of the fixed scales but we are sensitive to that within the cost of enforcement. But we will be sensitive to the ability of our current layouts of our weigh stations nationally, how they could be impacted if size and weight limits change. Mike, would you like to help me respond to that question?

Mike Onder: We are capturing information on the portable scales. Information on portable scales. That is part of our analysis. Jonathan -- Jonathan has been looking at more specifics on this and I don't know if he has a comment on that or not.

Jonathan Regehr: Some of that information is included in the data sets that we have available to us specific analysis on that is not within the scope but it is within I guess it does come into play in terms of the general enforcement efforts that are underway in various states.

Tom Kearney: Thank you very much. So we're not doing an inventory of the fixed scales versus semi portable scales but like Mike mentioned as a primary and important dataset the state enforcement plans, the certifications that are annually submitted to Federal Highway are being used and it sounds like Dr. Regehr has them under analysis right now. States report to us a number of ways by which weight enforcement is conducted by portable, semi portable by fixed scales and they will be incorporated into this component of the study.

Nick Kehoe: The next question, what is the role of composition of the CVSA state advisory group?

Tom Kearney: Nick, let me just clear up what might be a little bit of confusion. We don't have a state advisory group within CVSA, it may have been accidentally described as such but certainly what Mike and his team have done is engaged CVSA to bring a work group together, technical work group, representatives from the frontline to access frontline information regarding the actual operations and delivery of enforcement programs. There's not really a role of the advisory group that we don't have an advisory group but certainly what we have is our experts on the frontline. They are very knowledgeable on the relative difficulty of delivering enforcement and compliance determination and we're tapping into that. Mike, would you agree with that statement?

Mike Onder: I think that's a great way to describe it, Tom. Absolutely in some respects I would say it's an informal group of volunteers who did agree to be able to meet with us periodically so that we can bounce ideas against them and get their informal responses back so there's nothing formal about this group other than that they are experts in their own right for the work that they do in their own states. Somebody asked I think the composition of it we can certainly make that available. It's nine states and I can't recite them right off my head. I know it's Colorado, North Carolina, Arkansas, it starts to bleed out after that but there are nine states that are participating.

Tom Kearney: And certainly for us to come up with sturdy dependable answers on delivery of enforcement we need to talk to those who deal with it on day-to-day basis. Michael thank you and I tip my cap, and I say thank you to my friends at CVSA as to so many other stakeholder communities that step for us to help us with this really, really complex study.

Nick Kehoe: Will inspection facilities need to be upgraded to fit longer vehicles for level one inspections? And will multiple vehicle combinations be inspected at the same rate as regular trailer combinations?

Mike Onder: Tom, do you want me to respond to that? That's an excellent question. Because it's something that we will be looking at as far as the cost is concerned. I don't know if it's a sufficient answer but that's primarily yes it is being included in our analysis.

Tom Kearney: Sure Mike and I did touch on earlier the impact of these weigh scales we have out there now where a weigh-bridge might be 80-foot long and we start bringing in triples, certainly we're going to have some infrastructure needs emerging from that and an estimate of that cost. We will do our best to try to develop an estimate in that regard regarding the cost of enforcement programs.

A question or two. Let's see how we do.

Nick Kehoe: Next question, will the Study consider the increased restrictions expected to be caused by increased weight postings of bridges analyzed for specialized hauling vehicles.

Tom Kearney: Specialized hauling vehicles, the bridge engineers and bridge community know exactly and it draws a picture in their mind as to what they -- these vehicles are and they have been a population of trucks of concern since the 1950s and 60s. They are not within the scope, we are not doing an intense investigation of the impacts of special hauling vehicles on

infrastructure right now. So special hauling vehicles are outside the scope of this particular study. One more question.

Nick Kehoe: Final question on this topic for now is can trucks with on board scales assist with data accumulation for compliance?

Tom Kearney: The on board scales are an emerging technology. It is certainly an area of investigation and other research initiatives that are underway within the USDOT trying to identify and promote the use of technology and the delivery of effective enforcement programs as we continue to research opportunities to assist our partners that are out in the states delivering enforcement taking advantage of these technologies. At this time within the study we will not be doing, as I said earlier, an intense investigation on the performance of the value or the benefit of using onboard weighing systems but certainly there are other efforts within the USDOT that are looking into and investigating that exact area.

Thank you so much and I think we are wrapped up, at 3:00 p.m., the compliance analysis discussion and I thank John and Mike for the great job they did in describing the project plan and desk scan. Next up we will be taking on the bridge structural analysis area, the discussion of the project plan and the desk scan will be provided by Bala Sivakumar of Howard Needles Tannenbaum. I'm now going to call upon my friend and colleague who is the bridge research team leader from Turner Fairbanks Research Center, Ian Friedland. Ian, can you give us an overview of what we are to expect within this bridge structure analysis area?

Ian Friedland: Thank you, Tom. As Tom mentioned I am Ian Friedland, the assistant director for research and development with the Federal Highway Administration. I will be joined by Bala Sivakumar. Dr. Sivakumar is the Vice President of HNTB Corporation. Similar to the pavement analysis part of this study the bridge analysis part is really intended to look at two elements. The first is the strength. What is the impact in terms of the number of bridges that might need to be potentially posted as a result of this potential suite of additional vehicles on the Interstate System and the NHS and then at the serviceability issues with respect to the actual performance of the bridges and the potential cost associated with that. The way it's going to be done is essentially using that base case comparing legal vehicle and doing analysis of about 400 bridges that are pulled out of the National Bridge Inventory and these are bridges that will be representative of the vast majority of structures that you find on the interstate and NHS and using those alternate configurations doing comparisons of what the load rating would be on those bridges, the load capacity rating and making an assessment of how many bridges might have to be load posted as a result of these additional alternate configurations of vehicle weights and vehicle sizes.

Now in terms of cost, what essentially comes out of that would be questions that the states would then have to address with respect to if bridges are being posted as a result of potential changes in the vehicle configurations and weights, what this cost may be associated with the enforcement which is being done in another part of the study or alternately with respect to strengthening or replacement of those bridges. At the service limit state, the real impacts are going to be primarily on bridge decks in the additional wear and tear that those bridges decks might be subject to additional impacts would be primarily with respect to the superstructures, steel superstructures and fatigue, steel fatigue that can occur as a result of higher stress induced by the higher truck

weight. Now similar to comments made previously, we are not quick to presuppose that costs or actions are going to go up. It's going to have to result from the modal shift from the alternate configurations and a number of things that are going to be considered within the study. The way that the study is it going to be conducted essentially is using what is known as the AASHTO bridge rating analysis program. It is something that used to be called VIRTIS and has now been included in the AASHTOWare bridge suite of software and then once the structural analysis is done, trying to identify them and the associated costs with any potential structural impacts on these bridges. With that let me turn it over to Dr. Sivakumar who will take us through the actual analysis method and the desk scan.

Bala Sivakumar: Thanks, Ian. Can you hear me alright?

Ian Friendlan: Yes.

Bala Sivakumar: Let me begin with the desk scan results and I will start with the structural analysis. As Ian mentioned one of the key factors to consider with the alternative truck configurations is the impact on load ratings and postings and what we intend to do here is to work with 400 bridges that are representative of the current bridge types on the interstate, the NHS and the truck networks and these would be obtained from the various DOTs that are currently implementing the AASHTOWare program also known as VIRTIS. And we will obtain these bridges from the different climatic regions that will be defined for this project and we believe this analysis will be pretty accurate and appropriate for the task at hand. We will also work within the parameters defined by the AASHTO manual for bridge evaluation which is the standard for load rating and posting of bridges nationally. Intent is to use load and resistant factor rating methodology which is the state-of-the-art method for rating and posting bridges and we'll also look at the load factor rating methodology where the data needs are such that we might have to use both methods. We will also look at that NCHRP studies the 1276 project, that project defined the use of WIM data for bridge design and that can also be used for bridge evaluation so there is a lot of technology available for incorporating current WIM data and bridge design and rating. So the load ratings will focus on the base conditions which are the current truck fleet and also look at the alternate truck configurations that have been proposed as part of this study.

The next important aspect of this study, as Ian mentioned, was the cost allocation as we transition into a new fleet of vehicles. We have looked at a fairly extensive literature associated with previous cost studies, many done at the state level within the US. Many of them following the NCHRP 495 project which was on the impact of increasing truck weights on the network or the bridge network cost. That is been modified somewhat in some of these studies and we also looked at studies done in the EU and Australia. They had published reports on cost allocation of transportation infrastructure that presents some concepts that also merit study under this project. Basically the states have used an absolute based methodology which is a dominant methodology in the pavement cost area and it's also been applied to bridges on what happens when truck weights or axle weights increase and the impact on bridge performance and deterioration. The goal for the study is to assign bridge cost responsibility by vehicle class. We have the existing truck fleet and we will also assign what kind of cost would be associated with the future truck fleet as proposed. As you can imagine, much of the analysis will depend on a lot of data. The National Bridge Inventory is a database of all of the 600,000 plus bridges that we have and that

will provide us a good source of data for screening and selecting bridge types. We will also look at the various legal weight limits and in fact many states have exemptions to federal weight limits, some states have much higher load limits on the interstate and other road systems. The WIM data would be a critical part of the analysis particularly with respect cost. We have very good sources of WIM data that is representative of the various truck networks being investigated so we will look at WIM data from the various climatic regions and we will also derive the cost allocations associated with the future truck fleet based on the project cost data that's available from the financial management information system and use that to allocate the cost that would be resulting from the changes to the truck fleet. Next slide please.

In terms of the bridge analysis we have as can see in these bullets three different analytical models that would be utilized. The first one would be the load rating and posting analysis based on the AASHTOWARE rating program also called VIRTIS and this is a very comprehensive and pretty rigorous analysis of the structural capabilities of the bridge based on the current fleet of vehicles and the proposed fleet of vehicles and that will give us an impact be it load posting of additional bridges or possibly strengthening our replacing bridges that may be warranted. The next analysis would be based on regional bridge deterioration models with increasing axle loads and the environmental impacts to bridge decks, bridge deterioration could be altered by changes to the truck fleet and that will be identified using the deterioration model that will be developed for the climatic regions. The next concern would be the fatigue impact and fatigue could be fatigue is it pertains to steel bridges with fatigue sensitive details. We also have concrete fatigue that we see in the concrete deck with increased axle loads and increased number of cycles as deterioration that's associated with concrete fatigue. So both are important in terms of assessing impacts with changing truck fleets.

One of the key variables in the deterioration or cost allocation studies would be the impact of the environment or the climatic impacts to deterioration so one of the approaches taken here is to break this out into three climatic regions. One would be states that use chlorides, generally the northern states and they would have a certain deterioration profile for the bridge deck specifically and then we have another subset of states that have the chloride use and they also allow heavier trucks already, states that come to mind would be states like Michigan and Maine where they have higher limits than some of the other states and then you will have the rest of the states which don't belong in that same climatic region or are not currently permitting heavier loads on the interstates or the NHS. Those are the three different climatic regions under consideration. The analysis of the bridges, this is for the purposes of determining the structural capacity for load ratings and postings. We will utilize the NBI or the National Bridge inventory to screen out four hundred representative bridges that are representative of the common bridge types that we have on this national highway system or the interstate route, generally. We have found that they would fall into 13 different bridge types that are quite common on these highway systems. These bridge types would be load rated for the current truck fleet and for the proposed alternate truck configurations. The structural demands on these bridge types will be analyzed in a pretty rigorous fashion using actual bridge models and then we will provide load ratings for the current and the proposed bridges along with changes to the posting and then try to extrapolate from that what the future implications are with the changing truck fleets.

Next please.

As for the cost allocation method, the WIM data would be a critical part of allocating cost based on deterioration and we will utilize the entire load spectra for each bridge and for the different climatic regions. The deterioration models, they incorporate the changing axle loads as well as the environmental factors, the environmental factors magnify the impact of the axle loads on bridge decks and that would be factored into the deterioration model and visibly this would be used to assess the damage as a result of axle loads or increasing axle loads and how they contribute to the total bridge cost and this could be either linear or exponential with respect to the axle load. That means increasing axle loads by a factor two could increase the deterioration exponentially and what that exponent would be would be derived as part of the study.

One of the methodologies that's been looked at and recommended would be the relative damage share method of assessment where the axle load ratios and an exponent and this is a composite exponent which multiplies this ratio and then you multiply that number by the number of cycles to come up with what's known as a relative damage share. So the higher the axle ratio or the higher the exponent in the higher the number of axles that will significantly increase the damage that these trucks cause to the bridge deck and based on this we propose to identify the damage that each vehicle or truck classification will contribute to the cost for maintaining bridges under the changing truck configurations. The WIM data and derived Relative Damage Share values for each of these alternate configurations will be used in the cost allocation methodology so the WIM data is a critical component and the exponent that reflects the environmental considerations would also be a significant factor in how the cost allocation would be derived. Variation of this was applied in the district DC truck weight study. So the WIM data will be used to assess the cost affects and the WIM data would be obtained from each of the regional or climatic regions, three or four different WIM sites will be utilized and used in the deterioration studies and the total bridge cost on a regional basis will be estimated using this bridge deterioration model that has been developed for each of these climatic regions and the findings with respect to the relative cost impacts of the truck types and configurations will be presented by allocating the bridge cost to each of these new vehicle classifications. The study is focused on coming up with a cost allocation method that ties each of the cost increases to a vehicle class that is being proposed and this will be done with the help of the WIM data and the bridge deterioration models for the different climatic regions because cost is a factor that is driven by both the axle loads and the amount of salt usage and the region of the country that the bridge is located so both of these would be critical factors in the cost allocation study.

Next slide.

The next impact of increasing alternate configurations on bridges would be their impact with regard to fatigue. There are two main categories that are typically evaluated. One has to do with fatigue of steal bridges and the second has to do with fatigue in reinforced concrete deck with increasing axle loads in the number of cycles, concrete fatigue that eventually results in the cracking and spalling of the decks and with ingress of salt it leads to corrosion and axle rated bridge decks. So that would be a part of the study and how to define the impact of these axle loads on fatigue.

We will not be looking at other types of fatigue for instance distortion-based fatigue and so on which are very rigorous in analytic approaches and are more bridge specific and cannot be easily extrapolated to a more national level such as this. So the effects of increasing numerous heavy axles on bridges have been studied in the past and methods have been proposed including the NCHRP 1251 study which is now available as Report 495 and that study also looked at going back at least 10 or 12 years ago how increasing truck rates caused increasing fatigue then at damage and retrofit costs that would be a basis for the study that's planned in this ongoing study and we would extend that to reflect additional fatigue caused or resulting from these alternate truck configurations. Those are the three key factors that the structural or the bridge analysis will focus on and summarize: an impact of cost and also impact to bridge load ratings, postings, and the fatigue aspect and additional repair or retrofit for costs that might arise with the impending retrograde situations and the WIM data would consider that preparing a modal shift and if the when data would be impacted with the changes in the truck fleet and obviously that would also be factored into the cost allocation studies. So that's all I have.

Tom Kearney: I would like to thank you for the great job presenting the work in the bridge task area. Before we get started I want to make a note when we use the term cost allocation within the USDOT it means a very specific thing to us. Within the confines of the study, the way I would rather think about it, and with the terminology I have used, is the cost responsibility and that is, the cost responsibility of certain vehicles and that is the assignment of the cost in the operation of certain vehicles. We are not doing a cost allocation study as a subset or sub-activity within the study and I just wanted make that clear. That is an enormously heavy and very, very complex project activity unto itself. So I just wanted to clear up that terminology and I also want to touch upon what could be a little bit of a confusing factor to our stakeholders and that was back in May, we told you we were going to go out and study 500 bridges and today we're saying we're going to study 400 bridges. I want to make it clear to everyone that what is driving the number of bridges to be analyzed within the study gives us a study research matrix and that will be the climate zones and the different bridge types that we will analyze. Back in May we told you within the time schedule and allotment to prepare the report to Congress, we did not have the luxury of analyzing in-depth any more than 500 bridges. Right now we feel within the study design matrix, if you will, that number will fall between four and five bridges but it will be driven by the representativeness of the bridges within the different climatic zones and the expansion of those bridges to make statements at the national level will be the key ingredient. Does anybody have any questions during that presentation?

Very good.

Nick Kehoe: The first question is will is a bridge analysis report mentioned the availability of simple commercial cost-effective monitoring tools for bridge owners can use to provide early warnings of overload damage for example strain tensions instead of continued reliance on projected visual conditioned assessments which cannot assess the onset of fatigue damage or accurately assess progression of other failure mechanisms.

Tom Kearney: I thank that the stakeholder for very good question and I ask Ian to help address the question.

Ian Friendland: As Mr. Sivakumar said on several occasions the objective of the study is to report back to Congress on the potential impacts as a result of the potential increases in truck size and weight so other than reporting on the results of these types of analyses that's really going to be the limit of what is being reported back to Congress as result of the basis of this study.

Tom Kearney: Thank you, Ian.

Nick Kehoe: Next question is how will bridge substructures be included in the models?

Tom Kearney: Bala would like to handle that one?

Bala Sivakumar: The current plan is only to study the bridge superstructures and if you look at the AASHTO manual for bridge evaluation of the general load rating methodology adopted in the US is that it's primarily the superstructures that are generally analyzed for live loads, we do analyze substructures on a very selective basis because what happens in a substructure is they are carrying a large proportion of the load. To do substructure analysis, dead load not live loads are analyzed so that takes an awful lot of changes to the live load to make an impact on the load capacity envelope rating of the substructure. So the general rule that is adopted at the AASHTO level is only to analyze substructures that have reasons to believe that the change in the live load may in fact impact the safety of the substructure. This happens from time to time with timber substructures where there is reason for concern or steel and generally we find for the vast majority of bridges a small change in the live load weight of the load type does not have any significant impact to substructure safety. We don't intend to do that as part of this study.

Nick Kehoe: The next question is, will you study the impacts on increased costs to infrastructure, pavement, and the trucking industry due to the increased number of miles traveled as a result of the new bridge postings?

Tom Kearney: I would call on Ian. Would you take on a question?

Ian Friendland: One of the issues with posting bridges is obviously going to be the issue of diversions if vehicles are no longer allowed across certain bridges as a result of increased legal weights that they just can't carry it and that's certainly one of the impacts that has to be considered in the diversions analysis and also the enforcement analysis that would be conducted under the study.

Tom Kearney: Thank you.

Nick Kehoe: Next question is what method will be used to select the bridges to be used in the model of analysis?

Tom Kearney: I think that was laid out pretty well. Bala would you like to revisit that?

Bala Sivakumar: We have looked at the National Bridge Inventory and screened the inventory for the types of bridges that are common on the networks that are being analyzed and based on that we have come up with a set of 13 different bridge types that would form the base data set for

this analysis and we think that's very representative and addresses both steel and concrete bridges and simple and continuous spans and that is the basis for selecting these bridges. These 13 bridge types would be very representative, not 100% of it but very close to that off of the bridge types that we see on the networks that are part of this study and I think that it's a valid way of doing it.

Tom Kearney: Certainly we do need to make, within the Report to Congress, within our technical study, the especially difficult leap to make statements on that national level and for those systems completely.

Nick Kehoe: This next question similar to the previous one asked for Ian, it states for conventional trucks compared to three high productivity trucks, will this study present bridge wear estimates relative to this type of modal shift?

Tom Kearney: The modal shift thing at the end is throwing me but the impact of the three study vehicles is exactly what we are taking on within the work scope of this activity area. Modal shift, certainly that team will be developing the travel and the exposure, the wear if you will, the infrastructure will be exposed to. So, yes, it's totally within scope and it's the whole purpose of this task.

Any more questions?

Nick Kehoe: Will the bridge comparative assessment account for NBIS and non-NBIS structures?

Tom Kearney: Would you like to take the first crack at that, Ian?

Ian Friedland: NBIS stands for the National Bridge Inspection Standards and it's the law and the regulations under which bridges in the United States that are open to the public are actually required to be inspected and data reported on a biannual basis. The NBI is probably what the person is referring to which is the national Bridge inventory that is that database that Bala talked about from which we will be using this representative four hundred bridges that will be used in the bridge analysis part of the study.

Tom Kearney: Thank you very much and thank you for the clarification. I believe we are ready to move on. Thank you so much for your participation today and for the great job you did.

It is now time for the discussion on the safety analysis, the safety analysis; the presenters in this discussion will be Luke Loy from the Federal Motor Carrier Administration, he specializes in truck crash analysis, inspection and compliance. We also have George Soodoo. George will be speaking to you in the area of vehicle stability and control and vehicle performance that NHTSA is very adept and proficient at conducting. I now hand over to my two subject-matter experts with USDOT. Can you describe for the community that's joined us today what the work is that will be analyzed and included in the safety analysis and truck crash analysis area.

Luke Loy: I'm Luke Loy a senior engineer with FMCSA vehicles and roadside operations division. MAP-21 is directing DOT to evaluate the heavy truck safety as it relates to the

alternative configuration of trucks that was identified earlier in this webinar. There are four main areas that are identified in the current vehicle safety project plan. The first is an analysis of truck crash data, the second is analysis of vehicle stability and control, the third is commercial motor vehicle inspections and violations and the fourth is truck crash interaction with roadside features and safety devices. There are difficulties in identifying the alternative configuration trucks currently being operated in states under statute or permit because the model minimum uniform crash criteria also known as MUCC that's the data normally collected it roadside and that data is not normally specific enough to identify truck configurations at least as reported nationally. Paul Jovanis and David Harkey will, later in this presentation, explain the analysis scenarios in an attempt to address these data shortcomings.

In addition, FMCSA's contributing data from our cooperative project with Federal Highway and CVSA regarding heavy and overweight vehicles safety inspections. Data's been gathered for the past two years on heavy and overweight trucks that may identify potential issues regarding truck systems affected by running vehicles at heavy or permitted weights. In addition to that, FMCSA is also conducting a combination vehicle stopping distance test. We're doing this in concert with the Federal Highway Administration, we are running five axle and six axle semi-tractor combinations of various weights, compliant with the bridge formula, as the maximum permitted weights that are currently being operated in states. What we're looking to determine is the impact on the increase in maximum stopping distance under various conditions. While this exercise was not being run for the purpose of the Comprehensive Truck Size and Weight Study, the data will be provided to the study team for analysis and potential inclusion into the study. Now I turn it over to George Soodoo to talk about vehicle stability and control.

George Soodoo: My name is George Soodoo and I am an engineer with the National Highway Safety Traffic Administration. I would like to take a few minutes to provide some brief background information on two areas of performance that are most likely to be impacted by an increase in size and weight limit. Those two areas are stopping distance performance and low stability performance. But let's start with stopping distance performance. The current federal regulations require stopping distance performance test to be conducted. At light load conditions and at the vehicle condition which is the fully loaded condition. For the fully loaded condition it's loaded to GVWR without exceeding the GAWR limit or the gross axle weight limit. A specified controlled field for testing purposes to load the vehicle up. Stopping distance performance conducted on the dry road service to 60 miles an hour are required to stop in 250 feet in a loaded condition which is the vehicle GVWR. All the brakes are operational and the automatic slack adjusters are essentially at the proper adjustment specifications. The federal regulation for trailers included performance brake test on a dynamometer. It does not require road test weight performance for trailers. What do we expect from this evaluation? Essentially what we're expecting is for this study the vehicle simulation will be used to evaluate performance measures of various configurations and compare them with the baseline. We hope this evaluation will provide information in how stopping distance performance is impacted by increase in weight limit. The second item is roll stability and there currently is no performance standard for roll stability control in heavy vehicles. Since 1997, all tractors have been required to have anti-lock brakes, which basically helps maintain vehicle direction control with braking but this is not roll stability control.

The two roll control stability systems currently available on heavy vehicles are RSC which is roll stability control and ESC. RSC helps to mitigate rollover crashes. ESC, electronic stability control, helps to mitigate both rollover and directional loss of control crashes.

DOT expects to have a final rule on stability control in 2014. We are currently in the process of rule-making on stability control. What can you expect from this evaluation on roll stability in total on high weight limits? Essentially we hope evaluation provides information on how the greater weights and resulting increase in the center of gravity heights will affect the roll stability.

Tom Kearney: Thank you, Luke, and thank you, George. I want to turn to Dr. David Harkey from the University of North Carolina. If you could you please walk us and the stakeholders through the project plan and disclose to us some of the findings you made during the desk scan phase of the process.

David Harkey: Thank you to all of the stakeholders for participating. Let me start with the first slide here where we talk about the multi-level approach and the data sources they're using and what they have available. One of the things they are facing on the safety side is we don't have as robust a data source for doing the type of analysis that's required for this study. One of the first things that we're going to try to do, and Luke touched on this a little bit, is this is going to be a multi-level effort where we're going to try to do three different things. One is we are going to look at a crash based analysis. We are also going to look at violations and inspections and then they're going to try to look at vehicle stability and control and George did a good job at laying out what the expectations are. This is a multi-level approach and this is to be able to take the findings from each of those and put them together in a fashion that gives us a much more comprehensive picture of safety for these future configurations.

Next slide please.

Let me start with crash analysis method, three methods, two of those involve state crash data and one of those involve fleet data and I will start with the one at the top, there, where those route-based method compared crash rates of routes with differing levels of legal heavies. We're going to look at two different things here. We are going to look at both the legal heavies versus the 3S-2, 80K trucks baseline vehicle that there now and then we're going to be looking at the triple versus the twins. Those are kind of the two comparisons that we are making within all of the safety analyses that we are conducting. The route based method is an approach that we have put into the plan and it's kind of the same task that I talked about with regard to the multi-level analysis, overall, for safety. This is what we propose for the crash level is kind of a multilevel crash based analysis because we are not sure that each one of these methods, independently, is going to give us the complete picture. We are proposing something where we think we're going to get some information from each of these methods and it's very much data dependent. If you think about the crash-based method that we are using, we've gotta have two things. We've got to have good information on the crash report either from the fleet or from the state about the configuration of the vehicle in terms of the number of trailers and the number of axles and that is essentially going to serve as a means for us determining the type of truck we are looking at. We do not have weights, unfortunately, on any of the crash reports out in the state. It's not something that officers have access to or we currently collect.

The other piece of information that you have to have is the exposure information. You have to have that same type of data. Got to have number trailers and the number of axles to be able to define the configuration of interest to get your exposure measure. So that route based measure is the one that we are using to look at routes in states where they allow the baseline configurations that we currently have in place and there may be other routes in the state where they allow future configurations that were laid out early in the presentation today. The idea would be the note at the bottom of the slide that says Highway Safety Manual methods apply if possible and the idea would be that we're going to produce safety performance functions for the baseline routes and be able to use those regression models that are producing those negative binomial equations, apply those to the routes where the future configurations are running and then compare the predicted crashes from that model on those future configuration routes to the actual crash numbers of the future configurations on that route. This is a way for us to be able to get a handle on the differences between what the baseline vehicles are and the future configurations are at a route level or corridor level analysis.

The other state based analysis that we're going to do is more on a statewide level. We hope to produce state wide crash rates and here we're going to be looking for information specifically from states that allow the configurations of interest. For example, we've got to know which states are allowing triples, the weight configuration that we are interested in, we have to know which ones are using the legal heavies of the weights that we're interested in. We're doing a lot of work to be able to track those down and the project plan currently presents some of the states that we think are the leading contenders at this point of time to have that information. We are working closely with the compliance team to help us determine what is being allowed particularly in terms of the legal heavy side of things in terms of what is being allowed. Then ask them to help us come up with the right group of states for this particular evaluation.

And finally, the fleet based analysis is a little different and what we're going to do is we are reaching out to, we already reached out to some of them, a number of fleets to try to get data directly from them to be able to use in our efforts to look at both the triples versus the twins and then the legal heavies versus the 80K vehicles is the idea. Institute a paired comparison analysis. Supposed to be able to find fleets that are running with a triples in certain states on certain of roadways and they may be running twins in other states with the same types of roadways and that we can do a paired comparison analysis and they will also provide us with exposure data, either in terms of vehicle miles traveled for those particular vehicle types or they will provide us with dispatch information and we can turn that into an exposure method. Those are kind of the three crash base analyses that we're going to try to undertake this effort next slide please.

In this slide I want to point out two things. We mentioned -- Luke mentioned earlier the safety inspections violation effort. Goal here is very similar. We're going to be looking at the enforcement and inspection data and particularly the level one inspection information and trying to do an analysis to look and see how the violations compare between the baseline configurations and the future configurations and for the simulation effort I'll say more about that on the next slide but one of the things to point out here is one of the things that the simulation effort will do for us is to help us fill in any gaps we have in the crash analysis and one of the big gaps we have in the crash analysis is the twin 33. That the future configurations and it is not currently out there in operation so we don't have any way to do a crash based analysis on that so we will rely on the

performance metrics and the results that come out of the simulation effort to look and see what differences are there from the baseline configurations and use that in our summary of our findings. And the last bullet there is what I said earlier is we will pull the information together from all of these areas and see where the commonalities are and where the differences are and what we find in see if we can get a comprehensive safety assessment.

One thing I want to mention on the vehicle stimulation slide that George referred to, a couple of these things, but we have a number of metrics that we're going to be looking at including the low-speed and high-speed off tracking those will be things that will be looked at closely and the straight-line braking as well as braking on a curve and any avoidance maneuver issues and that would include things such as transient off tracking and rear road amplification. We will be taking what Luke referred to, the results from the DOT efforts on stopping distance and braking, and that will be part of what we include either in helping set up the simulations or potentially using an additional data point after the fact of the simulations to try and put together again kind of a comprehensive picture of what the results are from that effort.

Next slide.

The data is an important part for the safety piece, the violation effort obviously we can get that from MCMIS and we will have that information. Crash data is something that we will rely on a couple of different sources. We have the highway safety information system, at least three of the states that we've identified so far the data are available and FHWA HSIS and we will be able to access the data there, the remainder of the data that we will get will be directly from the states themselves many of whom have been contacted and have either provided or are providing the data. We will also the acquiring from those sources their roadway inventory data that will be used in the production of the safety performance functions that I alluded to earlier as well as their AADTs which they produce and the truck percentages which they produce from their permanent count stations. That information will be combined with weigh-in- motion data and that we will be getting from others on the team to help us get a good idea of what we have out there and terms of truck configurations and different types and on what routes they run. One of the things important for the crash based analysis to understand is that the weigh-in-motion data that you heard some of the other presentations talking about doing things that are regional level. Then one of the things we're going to need are going to be at the state level and some are going to be down at route level and that makes our task a little more difficult and were working closely with the folks on the weigh-in-motion side to help us to be able to do that. There may be also data that we acquire from the Highway Performance Monitoring System from FHWA and some of these other things that are listed here.

Next slide please.

Very quickly some things from the desk scan that's important and kind of what led us into the methodology that we proposed is that one is the availability of the crash exposure data to support this type of analysis is very limited. We realize that in setting up our methodology what is driving a lot of what we're doing particularly on the stateside is kind of what Luke referred to earlier. That's what information is available on the police crash report. What is included that the investigating officers put on the crash report that helps us identify the truck configuration of

interest. That is that critical driving factor in what we're doing with regard to the route-based method and the statewide method that I alluded to earlier. That is a real big piece of the essential data that is required and it's something that is lacking in past studies. There have been a couple of pilot studies that have been conducted in some small states but at this point they do not have sufficient crash data sizes to be able to get a true picture of what the safety performance will. One of the of advantages we have is we're going to try to look at a number of states distributed geographically around this country with different configurations of roadways and a lot of different configurations of trucks and be able to include that in the analysis and hopefully that will be representative enough to be able to expand back out to a national level.

The other thing that's important to mention here is, that one of the things that is certainly of interest, is impacts into medium barriers either barrier incursions or rolling over the top of the barrier. While these events are not numerous, thank goodness, they are very dramatic and they can have very devastating affects when they do occur. One of the goals in this effort is we will attempt to look at barrier incidents and see what we can either quantify and if we can't quantify we will try to qualify the effect of these future configurations and any differences that we see versus the baseline configurations. We know from crash data that the numbers that we are talking about in terms of total truck crashes even with a larger number states is still small. The number of barrier incidents can become very small and so what we will be able to say quantitatively is still open for discussion at this point and we really won't know that until we get into the data analysis.

Next slide.

Finally with regard to some of the safety studies that are out there, there have been studies for example in Alberta showing LCVs operating under permits and relatively good safety performance records and the translation of that into the US is an unknown. One of the things that we don't know is either differences obviously in regulations on equipment as well as driver qualifications but there is evidence that some of these vehicles have operated safely in other places. The other thing that is out there, depending on what sorts of literature you look at, is that the crash severity between semis and LCVs or twins can be higher or lower or about the same depending on which study you look at. There's really, I would say, no definitive answer that one is safer than the other at this point based on what's been conducted.

Is that it? I think that's it, Tom.

Tom Kearney: David, thank you very much. I don't think finishing the presentation of little bit early here is going to hurt based on the volume of questions I've seen come in. Stay on the line with us here, with Luke and George, and we will begin processing the questions that the stakeholders are sharing with us.

Nick Kehoe: The first question is will the highway safety truck crash analysis account for the less accommodating geometrics of the local road system, including those areas with reasonable access?

Tom Kearney: Once again, it’s a topic that keeps coming back and there are 4 million miles of public roadway in the United States and I'm sure everyone appreciates the effort that would have to be involved to analyze each and every one of those miles within the safety task here. Impacts of truck crash, larger truck crashes while they are in transit on reasonable access routes will be addressed, within the resources and schedule available for completing the study. David would you take on the question and do you expect to be able to do any kind of assessment including those reasonable access routes.

David Harkey: Sure. It's a very good question and one of the things we know we're going to be somewhat limited to, is where the truck crashes are occurring. From the state-level analysis we will know once we get the data in-house to see where these truck crashes are occurring and how many of them aren't on Interstate System roadways, how many are on other functional classifications and try to do an analysis accordingly. We have no doubts that we think the approaches that we are proposing are going to be able to give us good answers with respect to the Interstate System just because that's where the bulk of the exposure’s going to be and that's where we expect many the crashes to be and we don't know yet until we get the data and start looking at it what we're going to be able to find on the other roads including those that provide reasonable access, that we're certainly interested in, that and we will try to take a look at it.

Tom Kearney: Thank you, David.

Nick Kehoe: The next question is the stopping distance data on the various configurations mentioned by Mr. Loy seem to be directly on point with information needed by Congress. Will the DOT commit to including it in your analysis?

Tom Kearney: Nick, I maybe a little bit confused, but I’m pretty sure that was Luke's point. Luke would you like to take on that question?

Luke Loy: Yes, our intention that we're going to provide and have started providing that information to the study team. We are sort of adamant that it be included in the report so we will have the basis to include it in the Report to Congress.

Tom Kearney: Very germane to the analysis is the work we're doing in the safety area, ongoing research as Luke said, and the partnership between Motor Carrier and Federal Highway. Certainly we will be capitalizing on findings coming out of that research within our study and not duplicating it.

Nick Kehoe: Will this analysis include winter driving conditions and load securement requirements for heavier loads?

Tom Kearney: Let me start with the second part say we're not doing an assessment or evaluation on the performance of securement devices, that is in the regulatory area that Motor Carrier takes very seriously and has responsibility toward work. It is not germane to the question of the change in truck size and weight limits, a change in those limits the federal level. It would be a subject of a separate study. The first question, and the first part of what Nick just shared was a question toward including slippery and wintry road surfaces?

In the North East, what a timely question. David would you like to -- actually our friend, George, would you like to take the first crack and you can always handoff to Dr. Harkey, please.

George Soodoo: The stopping distance rule has been changed recently. We don't take into consideration. That's something the Motor Carrier, FMCSA that is, handles.

Tom Kearney: What about wintry roads?

Luke Loy: That would be included in the trucks in the simulation you're attempting to run; it will be covered by the greatest extent possible.

David Harkey: There is two points here. One is the parameters under which the simulation will be performed is still to be defined. We are still working with the DOT to specifically define that and whether that's going to be under dry weather conditions or whether it's going to include wintry weather conditions; that is something we will have to define and lay out before doing the simulation. With respect to the crash analysis the goal is to obtain the crash data and weather information and road surface conditions at the time of the collision and these will be two of the variables that we will collect as part of that. The piece that we're not sure about is the information on exposure side and that's the piece that may be a little difficult for us to acquire. We have talked with the folks doing the WIM data about the possibilities of looking at seasonal variations. It might be something we can include a look at and we will do our best to look at it.

Tom Kearney: I thank the stakeholder for the question. Very good point.

Nick Kehoe: Next question is in considering experiences in other countries, will Federal Highway Administration by addressing the differences and driver training requirements between the US zero requirements, and foreign countries such as the high requirement in Europe, for example?

Tom Kearney: I think they would back away from saying we have zero requirements here in the US on commercial vehicle drivers. Luke, would like to take that question?

Luke Loy: I would back away from that, too, because one of the other questions coming up actually said that the drivers of doubles and triples have additional experience and required experience in order to operate. And Dave, Professor Harkey, may add to this but I think other than identifying what the requirements are in the other countries that might be the limit that we would go to with respect to the study.

David Harkey: I think that's right. I will say the one piece of information we are going to collect from the fleet data is information on experienced drivers and driver experience and we will see what that turns up in the analysis but it at least is included in the variables that we are going to collect because we do know that it may be an important factor to consider.

Tom Kearney: Next question please.

Nick Kehoe: 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?

Tom Kearney: That is a very good question and I do want to remind everyone, the commitment USDOT has to providing findings that are developed objectively and transparently, we are protecting against bias at every turn within the study. We will continue to do so. The use of the fleet based data within the safety analysis, if we recall in the overview that Dr. Harkey gave us, there are three tracks that are going to be progressed simultaneously. None of the three tracks deliver the final answer. Certainly fleet based data will be used in parallel and in comparison with the corridor based or route based data that David described as well as looking at the state-based data. We're not relying on a single source; we're not subjecting ourselves to any bias that might be associated with or affiliated with the source in any specific source. I would say that while we are driven more by taking three tracks on safety due to a lack of robust definitive information from a single source, if we had weight on our crash reports and it was nationally, widely available, certainly this would be a much easier task to tackle. It is that lack of information that forces us onto a triple track and also creates a check, a balance of an independent validation of the information that we are getting to protect against bias.

Nick Kehoe: In the safety analysis model vehicle simulation, will a tractor roll stability control and yaw stability control along with trailer roll stability control be considered in the performance measures evaluations?

Tom Kearney: George, would you like to open? You can certainly hand it up to Dr. Harkey as fast as you need.

George Soodoo: The roll stability control system that is available in trucks, where those systems that NHTSA is currently evaluating to complete a rulemaking process. My expectation is that the systems that are currently available in the market will be used as part of the analysis. The simulation methods include a hard loop system that have incorporated roll stability control and the trans-stability control system both in the trailers and in the tractors.

Tom Kearney: Dr. Harkey, do you anything to add?

David Harkey: No, nothing. The only thing we would add is that I get that is one of those final details before we run the simulation that we will work out very carefully and in collaboration with DOT to make sure that we have all the right parameters before move forward with that.

Nick Kehoe: Next, the questioner has a couple of questions so I will read them all and break them up if needed. Will be stopping distance analysis account for the current state of vehicle maintenance and overloading of vehicles identified in road side violation data? Will the analysis account for the less than ideal stopping distances of that portion of the vehicle fleet consistently found have a brake, tire overloading issues and will the analysis include an estimated impact upon safety in those areas when examining the proposed configurations?

Tom Kearney: This is a very well structured question and I thank the stakeholder for the question. You are touching one, two, three areas of key concern for our leadership and Federal Motor Carrier Safety Administration. I would invite my friend and colleague Luke, would you like to address the question?

Luke Loy: On the first two portions of the question, in the testing that FMCSA has done, we have looked at the baseline vehicle, the five and six axle vehicle combinations. We have looked at that with the full effectiveness brakes, adverse weights from 60 MPH and at various levels of brake degradation. All of that information will be provided to the study team and we anticipate that will flow through and be presented in the Report. On those two aspects that data will be provided and it will probably be a direct pass up, so we will know. Then you would have to, within the study, you have to put any data you have to do two sets together, what the violation data shows as far as what types of brake defects you are seeing on the vehicles that we are currently inspecting and then translate that into if they have that sort of level of brake defects, what might the stopping distances be with that level of defects at this sort of weight that we are anticipating. We have to realize, when we're doing control testing like this in a laboratory environment, it is an idealized failure because everything is furnished to the nth degree, everything is adjusted, it may not be completely representative of what we see at roadside but it is the best that we can do to get repeatable data. That part of it will be in. The third part of the question is a bit of a different. Can you re-read that?

Nick Kehoe: The third part of the question is, will the analysis include an estimated impact upon safety in these areas when examining the proposed configurations?

Luke Loy: Tom?

Tom Kearney: That is totally within scope. That is the evaluation that we will be conducting on the alternative configurations within the study. Yes, they will be included. Luke, I will also remember back with you, as we were developing our work program for the study, how important it was to the leadership of the Federal Motor Carrier Safety Administration that inspection and compliance be considered not within the stand alone area that Congress had directed but as specific investigation area to be included in their safety to make sure that that link was known and that it has been placed appropriately within the safety investigation area.

Nick Kehoe: What will you be doing to look at real world experiences? Are you talking to truckers who operate these vehicles?

Tom Kearney: To this point I do not think we have. I would go to Dr. Harkey and David please correct me and please update me, could you take on that question?

David Harkey: Yes. There's no current plans for us to do any kind of interviews or surveys of truckers directly who are operating these vehicles. We think the real world experience that we are going to get is from the real-world crashes that we are identifying as part of our safety analysis.

Tom Kearney: I do thank the stakeholder for the question as it is a very good point. Thank you.

Nick Kehoe: 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 of the roads nationwide?

Tom Kearney: That transcends each of our task areas in the work that we do and that the level of the engineering analysis required across the board, be it safety, bridge, pavement, that has to be undertaken here. Intense work limited, if you will, data sets to be used. Very careful selection of the data to be incorporated in a sample so that we can expand those samples out to make those network levels or national statements. A lot of care is being taken in that area. I do not think that the safety area is unique or special in that regard. Is certainly included within the challenge that we have: taking the information available within the time period of the study to make statements at that national system wide level.

Nick Kehoe: While conducting the safety analysis, will you be studying actual trucks and truck crashes in a controlled environment?

Tom Kearney: Luke, would you like to take the first part of that question?

Luke Loy: We are not doing any truck crash testing, that is not part of what is in the project plan. That would be extremely cost prohibitive to do that level. There are other studies like that that are being conducted, not necessarily at the weights of the vehicles that we are currently talking about but there are other crashworthiness, truck crashworthiness projects going on both within NHTSA and FMCSA.

Tom Kearney: Dr. Harkey, have anything to add?

David Harkey: No, I think Luke said that very well.

Nick Kehoe: How will you address crash severity with heavier trucks causing greater damage?

Luke Loy: I think it is not so much while it may be crash severity, you might have to make some sort of assertion that if you have longer stopping distances, as accident reconstructionist do, you would get a longer stopping distance you're going to involve more vehicles in a crash of that nature. I am not sure that that is really within the scope.

Tom Kearney: Actually the severity is within scope.

Luke Loy: Severity is within the scope?

Tom Kearney: That is a good question to pass on to Dr. Harkey for his input.

David Harkey: One of the things that we will be collecting for both the fleet data as well as the state data will be the severity of the crash. We will look at that. We will try to take a look and see if there are differences in crash severity and some of the models that I referred to earlier that we are going to produce for the route level analysis for example, and even the fleet level analysis,

will indeed, we will try to produce models not only for total crashes the we will try to break those crashes down or produce separate models by severity levels. For example you may have fatal plus injury crashes as being the most severe. Typically we will put those together and we will have a separate model for that level of severe crash and see if there are differences between our baseline vehicles and the future configuration vehicles a based on the severity models in addition to looking at the total crash models. The same thing will hold true in the state level analysis where we are producing crash rate. We will produce crash rate, total crash rates and will also produce crash rates by severity where there is enough data to do so.

Tom Kearney: Dr. Harkey you would say that frequency and severity are two key drivers in the work that you're doing in the safety area?

David Harkey: Correct.

Nick Kehoe: Current LCV operations use drivers with above-average experience, more training and higher pay. How will these factors be taken into account in the study matched pairs?

Tom Kearney: I can start of the answer by saying these factors will be considered within the study and I would turn to Dr. Harkey and have Dr. Harkey talk about how.

David Harkey: This is, as I said earlier, this is one of the variables that we are collecting on the fleet side we're trying to get information from them with respect to age of drivers, number of years of experience of the drivers that are involved in any of the incidents. That will be one of the independent variables that go into the models that will be developed for the fleet analysis. We will include that, just like we will include some of the other independent variables of weather condition and some of the other things that we talked about earlier.

Tom Kearney: Thank you Dr. Harkey

Nick Kehoe: Are you meeting with state troopers or other first responders who are usually the first people on the scene of a truck crash?

Tom Kearney: Good question. Dr. Harkey, I'm going to ask you to take on that question as well.

David Harkey: No, I think we are not planning to do that within the time constraint of this project. We have done that on other projects in the past but this is not one where we have the time available to do that. I am not sure in this particular case that we would learn a lot more given what we're trying to accomplish in this study. They provide valuable information and we have got other studies that we have worked on in the past and we know from those efforts we can integrate into our results some of the information that we have learned historically.

Tom Kearney: Thank you Dr. Harkey. I would just go back and remind folks that in the compliance presentation we made earlier, the Commercial Vehicle Safety Alliance was identified as a key partner as we are taking on the enforcement and the compliance task work area. Certainly were engaging with CVSA quite seriously.

Nick Kehoe: As you are utilizing WIM data to determine results in your study, how we differentiate information as there is no identifier as to what type of load that was on the vehicle?

Tom Kearney: I am not certain I follow the question.

Nick Kehoe: Reducible versus non-reducible.

Tom Kearney: Okay. Those operating above federal legal under a permit, with divisible load permit. The commodity by type is obviously, it is not taken into account in the crash analysis or to the highway safety investigation under this task area. In cases where the load could not have been divided, separate question. We have a dialogue open with permits officials to understand what is in the corporate database to be used to support the entire project. We need to know and understand the trucks operating above federal limits therefore we will have a handle on those trucks operating under permits, under the different roadway networks within the crash area, the divisible and non-divisible loads, Dr. Harkey is that a variable or area of investigation that is included?

David Harkey: No. That is not something we're going to be able to look at. One of the issues that we knew early on in this effort was that we were going to not be able to address this particular question. From the WIM data, one of the things that we will be able to use, that we are planning to use, from that is because we're trying to tie to our crash data where we have used number of axles and trailers, those are the two variables from the WIM data that we're going to be using to heavily drive our exposure metrics. The other thing that I would say, and total concurrence with what Tom just said, we will be working again with the compliance team and understanding what is permitted, on what routes will be very important in helping us to determine how the WIM data affects our projections of exposure for our particular analysis.

Tom Kearney: Thank you very much. Certainly telemetry in the roadway is not cognizant of the presence or absence of a state issued permit. The being able to provide the vehicle and allocate those weights by axle and gross vehicle weight limit is very important, very valuable information underlying each area that we are undertaking within the study.

Nick Kehoe: With increased size and weight will there be any mandatory cabin safety standards established to better protect the driver of the truck to increase probability of survival in a crash?

Tom Kearney: George, this sounds like an area of rulemaking that may result. However, within the study, go back to the scope of work Congress has asked us to do and that is to assess and identify the implications and impacts that a change in federal size and weight limits would have. It is not within the prerogative of USDOT or within the study limits certainly, to make recommendations on changes to federal truck size and weight limits. Just understand the impacts they would have if there is a change at some point in time. I'm not suggesting there will be, if there were, certainly there would be rulemaking processes commencing.

George Soodoo: I think this is a crashworthiness issue that this study is not addressing.

Tom Kearney: Thank you, George.

Nick Kehoe: The next question is, 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 the damaged to bridges and pavement?

Tom Kearney: I'm going ask you hold this question until 4:30 PM when we open the webinar for questions. We will bring in our bridge experts to be able to address that question. It does not really fit within the safety discussion we are having right now.

Nick Kehoe: Will the study look at the problem that LCVs will have on truck parking especially in rest areas and the fact that LCV require pull through parking for the most part?

Tom Kearney: There is a safety implication within there but as we had talked about, I think that would fit within our compliance and our enforcement study area regarding the cost of enforcement and compliance and the truck parking fitting in with the weigh scale aspect. Dr. Harkey, is this question within scope?

David Harkey: That is not something we have planned to look at this point.

Tom Kearney: I have to apologize; I have to say, Jim, I think we did talk about modal shift is looking at the longer combinations and impacts on truck parking and some of the infrastructure that may be impacted by a change in federal size and weight limits as a cost consideration. It is actually modal shift and enforcement/compliance that the weigh bridges will be assessed; not within safety. It is certainly something that we are considering within the overall study.

Nick Kehoe: Last question in this section, will the analysis of crashes include property crashes off the interstate system as LCV off-track can cause curb damage, signs knocked down and crashes from turning into local roads.

Tom Kearney: That is a good question and I thank the stakeholder for the question. Dr. Harkey would you like to address that question?

David Harkey: It is a good question and it is not something that we had planned to look at which is the damage to the infrastructure so to speak in this way, different from bridges and pavement. I'm not sure that there is not a good database of that information for us to rely on to be able to do that type of analysis unfortunately.

Nick Kehoe: Two other questions just came into the chat pod. The first is with the study examined increased wear and tear on truck safety equipment including brakes?

Tom Kearney: I will thank the stakeholder for the question and ask my friend and colleague, Luke Loy, to give an answer.

Luke Loy: In the study that FMCSA is doing with FHWA and CVSA on having overweight truck inspections, that piece of data information will be provided to the study team.

Tom Kearney: That is the consideration and within safety, the performance of the different components of the truck is under consideration. Increased vehicle wear and tear and vehicle maintenance are being addressed.

Nick Kehoe: The next question, will engine horsepower be considered as a factor in holding back a load and pulling a load up a hill faster?

Tom Kearney: That, I think Jim March touched on in modal shift when he was talking about the horsepower ratios. So it doesn't fit within safety. Is that the last question, that we have on safety at this time?

We're going to commence with the open period for open discussion questions I'm going to call Jim, and Jim can revisit the response to that question.

Tom Kearney: If anyone has questions generally on any of the information presented today that includes safety for those that are still thinking and digesting the safety discussion. I know Dr. Harkey went through a lot of material, a lot of information. Obviously this discussion is open for you to advance those questions and we will address them to the best of our ability.

Jennifer Symoun: After we address this question, we will actually open the phone lines for some questions. Let's address the last question and then have the operator give instructions on asking a question over the phone.

Jim March: The question was whether weight to horsepower ratios will be considered for hill climbing. Yes, and we are going beyond hill climbing to general traffic operations, it can be a factor in all environments.

Jennifer Symoun: Operator, please give instructions for anybody who may have a question over the phone?

Operator: At this time I'd like to inform everyone in order to ask a question, press star and the number one on your telephone keypad. If you would like to withdraw your question press the pound key. We will pause for a few months to compile the Q&A roster.

Again, to ask a question on the phone press star one. The first question is from the line of a participant whose information has not yet been gathered. Your line is open. Please state your name.

If you have pressed star one, your line is open. Please state your name.

Steve Bixler.

Tom Kearney: We are ready for your question, Steve.

Steve Bixler: I was wondering if there was 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 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.

Tom Kearney: I appreciate your position on that. It is included within the study and I am going to call on Dr. Harkey in a second. This fits, your question fits right into the area of severity and it is an area that we are investigating under the safety task. Dr. Harkey, would you like to help me respond to the question?

David Harkey: I think collectively we are going to try very hard to determine what the differences are in terms of crash frequency rate as well as crash severity rate for the baseline configurations that are out there operating now and the future configurations that are being proposed. We will hopefully, from that analysis, determine if there are any projected differences in either the fatality rate or the overall crash rate.

Tom Kearney: Thank you Dr. Harkey. We're looking for the marginal change, the increase/decrease that would go along with the change in the composition of the current traffic stream.

Walter Willis, your line is open.

Walter Willis: I just wanted to hit on something that did not seem to be addressed at all and that is railroad track crossings. One, they're 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?

Tom Kearney: Thank you for the question. It was an item that the Federal Rail Administration had brought up and the wear and tear breakdown of the rail crossings was a concern to the Federal Rail Administration. Within the overall infrastructure impact that we are looking at, regarding additional cost or additional maintenance requirements that may go along with a change in federal size and weight limits will be evaluated, not specifically rail crossings, but it is not unrelated. It is not completely unrelated to the pavement research work that we're doing under that task. In a way, yes we are addressing it but, no, we are not specifically looking at the infrastructure impacts at railroad crossings.

Tom Kearney: Jackie Novack. We are ready for your question.

Jackie Novack: I actually have a two-part question. First above regarding the pavement and infrastructure, are these studies assuming pristine infrastructure conditions at the onset or are the actual, current structural conditions being used in any or all of the analysis? 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 potentially inclusive? Why is it not one of the top considerations in truck size and weight increase?

Tom Kearney: Let me take on the first part of your question and perhaps Dr. McCarthy, could you help me address that part of the question, please?

-- [Silence]

Tom Kearney: The question is whether an assumption of a pristine, or a pavement section in perfect condition is included in the analysis, as an analysis section.

Tom Kearney: I apologize. Dr. McCarthy is not with us at this time. Within the study, no, we're not idealizing the conditions of our infrastructure as we do our evaluations or our assessments. These are engineering studies. We are looking at the sampling that goes along with the design matrices for pavement and for bridge. We will be looking at the current condition of the bridge and then the relative or the marginal increase or impact that a change in the traffic stream composition would have. We are trying to be as practical as we can be and as applied as we can be from the get go. The second part of the question is, yes, I think we are right there with you on the safety data. I have a lot of respect for the amount of effort and work that the safety project team, co-leads in particular, have been beating the bushes all over the place and I cannot imagine that we have a data set that is of more importance than the safety and the truck crash data set and I really do think highly of the rigor that they have applied to looking in every little nook and cranny trying to get the information they need to develop very sound, very sturdy findings. They know, my co-leads, are two accomplished professors that have a long background in doing a variety of safety type research in the commercial vehicle safety arena. I am blessed to have them on our team and I really do admire the amount of effort that they have applied in trying to pull data together. I was quite impressed with the development of the three track approach, if you will, doing the safety whereas maybe other folks would say; harder work or more focus on one of those tracks may lead to something worthwhile. They knew from the very beginning, hard work on any one of the single tracks would not develop as robust a set of findings as if we progressed all three as hard as we could. They have and they lead a very accomplished safety team and it is of very high priority within the project. We have done a lot of work in the modal shift area because that is also extremely important to the work we are going to do within this study and that the safety team needs that work in order to do their evaluations. There a couple of real key data sets that we are working hard to try to develop good sturdy dependable data.

Thank you for your question.

Operator: There are no further questions at this time.

Tom Kearney: Nick, do you have anything online?

Nick Kehoe: Yes. We'll go back to the question we skipped. The question reads, how is the standardized axle method for bridge damage a different metric than the ESAL method for pavement damage? Would be better to have consistent methods to estimate damage on bridges and pavement?

Tom Kearney: I thank the stakeholder and I do apologize for putting you off, but thank you for the very good question. I'm going to turn to my friend and colleague Ian Friedland to address the question please.

Ian Friedland: Thank you, Tom. One of the problems that we have for bridge analysis, bridge deck analysis, is that we still do not have any reliable models that relate truck weight to bridge deck condition and performance. That is one of the things that we are attempting to get a handle on. This and the models today are not very reliable and not very consistent; it is one of the difficulties we have in terms of trying to identify how much bridge deck damage occurs as a result of a marginal increase in truck weight. The pavement analysis, as was discussed, has moved on to a mechanistic pavement analysis methodology as promoted by AASHTO. On the bridge side, what we are looking at is using the best that we can of the models that are out there. The ESAL method currently uses an exponent in the range of 2.9 based on a literature search that has been done. We found that some of the numbers can range anywhere from 1.5 to 3.0 on that range. What we are trying to do is fine tune to a point where at least we have some level of confidence in the type of damage that you would expect on a bridge deck or type of additional wear that a bridge deck would incur as a result. We do not have anything I would call mechanistic "pavement analysis and bridge" at this point, so there is that difference.

Tom Kearney: I believe at the National Academy meeting I made a plea to the Peer Panel if anyone knew of a good bridge deck model please pass on that information as soon as possible. When we think about the modeling that goes along with pavement, that regiment is very cognizant of the environment of the pavement itself. The geo-technic considerations and the hydraulic strains in the strains and stresses that are introduced against that pavement structure as well as environmental temperature fluctuation. If we think about a bridge deck, the variables representing that environment are completely and separately different.

Cheryl Richter: If I may Tom, this is Cheryl. I would just like to reinforce on the pavement analysis, we're not using ESALs in this study because the modeling, the mechanistic empirical design guide and the AASHTO ME pavement on the software allows us to get away from that very approximate methodology. That may be a simple, fine assumption inherent in the ESAL.

Tom Kearney: Thank you, Cheryl. I appreciate that. Once again, my request is out there. If anyone has a bridge deck deterioration model please send that in for our evaluation and use as soon as possible. Operator, do we have questions on the line?

Operator: Ray your line is now open.

Ray Burgener: This is Ray Burgener with Truckers for Common Sense. 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 Wyoming, Wyoming 129,000, Nevada, Utah, Dakotas. 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 formula B beyond the 80,000 pounds, we have already got proof, 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.

Tom Kearney: I thank the stakeholder for the question and comment in your bringing me back in time during the discussion, during the 1970s as the bridge formula was being contemplated by Congress. Certainly there was discussion to the effect that the gross vehicle axle weight and single axle weight limits would be retired and replaced wholly with a bridge formula and that discussion did not carry. Back in 1974, adjustments were made to the federal truck weight limits bringing them to their current levels. You do bring me back in time and I do appreciate that you had more of a comment than the question. Thank you so much. By the way, Michigan does adhere to the federal bridge formula as part of their over-heavy truck that was grandfathered and allowed to run. Thank you for that comment.

Operator do we have another question?

Operator: Steve your line is open.

Steve Bixler: This is Steve Bixler, again. With all due respect your last commenter, the Western States have been running 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 Pennsylvania currently leads the nation with 4,479 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 in Pennsylvania is 51 years old. We just recently went through in the last four or five months having 1,000 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 network that is going to be absolutely un-drivable.

Tom Kearney: Thank you, Steve, for the comment and I think, as you heard, as we laid out the bridge and the pavement research areas we talked about those study designs and we talked about the climatic regions. Certainly as a resident of upstate New York, I would just point out that you missed freeze/thaw as something in Pennsylvania and New York that we also pay a lot of attention to in our infrastructure planning and construction activities. That variation regionally around the United States and the impact of loadings on pavement and bridges structures, it is built within the study designs so that we do not treat them all the same. Is Arizona the same as New Hampshire? Freeze thaw is very present in one state and absent in the other. We do need to come up with statements that are sturdy and sound at the national level. We need to sensitize those findings so that they are built on good sturdy engineering that is accurate within the settings and we must be sensitive to the climatic impacts of the environmental strain on our infrastructure. Thank you for the comment Steve.

Operator do we have another question?

Operator: At this time that was the last question.

Tom Kearney: Thank you. Nick would like to move on?

Nick Kehoe: With some unanswered questions from each of the different modules. Would you like to go back to the first one?

Tom Kearney: Yes. Thank you.

Nick Kehoe: The next question we have is from the modal shift module and it says, will the modal shift analysis include local road transport to and from the remote locations such as grain elevators that are the overwhelming source and the majority of commodity movement in most counties, estimated at over 80% of the counties, in Illinois and has the agricultural industry then provided input into this process accordingly?

Tom Kearney: I thank the stakeholder. A very good question. I would turn to Jim. Would you like to take on a responding to the question?

Jim March: Yes. We are going to look at traffic on all highway systems so rest assured we're not looking just at the interstate system or the national highway system but also the heavy truck traffic that could shift to other systems; we will be looking at it.

Scott Greene: Let me also add that with regard to the analysis of short line railroads this would be a component that would have to be looked at also because they do serve these rural communities that carry grain.

Tom Kearney: That was part of the discussion that we have had with the Shortline Rail Association. It is on the table and is being looked at and we talked to the agricultural community. We talked to the transport sector that serves that community and we are trying to introduce them into the study as best as we can.

Nick Kehoe: Will the study include a review of the time spent or delay due to check weights or rework at each dock or terminal before the vehicle actually hits the highway?

Tom Kearney: What you are talking about is the loading/unloading and the delay in that activity. That is within the gate, if you will, at the terminal location. That is outside of the scope of the study. I do not believe that we are looking at that as a cost impact within the mode shift area. Jim, correct me if I am wrong.

Max Azizi: Actually the ITIC model, one of the inputs to the ITIC model is that kind of data. Those issues are covered in the model, and the modeling process of the models.

Tom Kearney: I thank the stakeholder for the question and yes it is being addressed. Thank you for correcting me, Max.

Nick Kehoe: The modal shift analysis did not appear to take into account shifts or displacement within the 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 the motor carriers that are small businesses and exclusively operate truck semitrailer

combinations. This may also cause smaller operators, who currently run legally, to run illegally in order to remain competitive.

Tom Kearney: I thank the stakeholder for the question and I do want to go back and remind folks that when we say modal shift, that Jim described for us, there are three prongs to modal shift and that is, shifts between truck types if there were a change in limits, trucks that shift their use of roads they might use if there is a change within the modes and shifts between the modes that might result if there are changes within limits. Jim would you like to add to the response?

Jim March: Just to repeat what I had said earlier about not being able to take into account the effect on smaller carriers other than in a qualitative way, we are not going to be doing any quantitative analysis related to different impacts on different size carriers.

Tom Kearney: It would be by the configurations actually and from the configurations perhaps the different sectors in the trucking industry.

Jim March: Different sectors for sure but the carrier size is something that we cannot consider.

Tom Kearney: Thank you Jim.

Nick Kehoe: Will additional loading and unloading time and hook up and breakdown time be considered as an expense for drivers because of the reduced mileage?

Max Azizi: Again this is one of those considerations in modeling process so it will be included.

Tom Kearney: It is included within the factor of the ITIC model.

Nick Kehoe: Why is there such a short time line for to submit comments?

Tom Kearney: I will just repeat, we are accepting comments through January 17, the Federal Register notice is hopefully out there right now to that effect. We are considering comments received up to the 17th, inviting them through January 31. Like I said before, the CTSWstudy@DOT.gov, the e-mail account will be opened to the course of the entire study and stakeholders have been very good about sharing thoughts with us up to deadlines and beyond and we have not discounted the input we have we received. Certainly at the end of January, technical work within the study will have crest to a point such that it will be very difficult to change course and to make strategic changes within the paths of the research and the workflow, but we will be accepting and considering considerations as we have been through the course of the study.

Nick Kehoe: 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 study especially those that relate to the rail diversion?

Tom Kearney: I am going to turn to my two modal shift experts and, not to put you on the spot for the shortlist. There's been a lot of work, we're talking about enhancements that have occurred over the last 13 years, and there has been a lot of work at improving the modeling regiment in the operation within ITIC, but any general response?

Scott Greene: I cannot remember where we have actually catalogued where the changes have occurred over the past 15 years. I guess we could go back. As we go through making assessments and completing the study with our contractors, we could probably list some of the changes. Max, do you have any?

Max Azizi: I guess Jim covered some of them. First of all, as we discussed earlier, these shipments are between County to County so that is basically one consideration in a modeling process. The other consideration is basically all or nothing shipment when cost is lower; the model considers that all shipments are going to be transferred to the new configuration or from rail to truck. As for, off the top of my head, another consideration is that the model does not allow for time, for adjustment and by that I mean the shift happens immediately so it does not allow for time for the either trucking system to modify the fleet to allow for new loads or higher loads or allow for improving the highway network to accommodate the new trucks with the heavier axle load. These are some of the assumptions or considerations that are included in the model.

Tom Kearney: Jim?

Jim March: I don't know that there was ever explicit list of assumptions for the 2000 study but in terms of generalized assumptions in the model, there really are very few changes. I think with respect to the railroads, we're going to do a better job of analyzing the short line railroad than we did in the 2000 study but I think with respect to Class Is, the analysis is going to be very similar.

Scott Greene: I will just add one thing, the conversation we had today was looking at transit times and refining the ability to determine what transit time over to rail system by corridor and by commodity. That is one of the features that we are looking at.

Tom Kearney: As a footnote to the whole discussion, what I would add, the investment and refining and advancing the operation of all of the models hosted by our Policy Office that supports Federal Highway Administration is very dynamic and it is ongoing. There is continued research going on to basically improve ITIC and other policy analysis tools that Max Azizi and his shop operates. The list we give you would be outdated quickly and we would have to send you a list the next week or the week after because I think we are striving to always improve the tools that we have and we live within an environment that is very dynamic that requires our models to be refined and improved on a continuous and ongoing basis. Good question. Thank you very much for the question.

Let me check with the operator. Does the operator have any questions in the queue?

Jackie Novack: Jackie Novack again.

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 six-month evaluation?

Tom Kearney: What I would point to, and Dr. Harkey if you are still on the line you can verify this, but certainly that was included in the desk scan that was performed in the safety area. Yes, the whole purpose, why we operated a desk scan and I personally saw the activity as an important activity that was not to re-create or recover ground that had not been done previously but to build from that work and improve, basically, our knowledge and understanding from the point of those studies being completed. Maine and Vermont study was included in the desk scan within the safety study area. Dr. Harkey, to have anything to add to?

David Harkey: Yes. We will definitely include those as they are some of the starting points for the analysis that we are conducting and you will see in the project plan that is posted on the website that Maine is one of the states that we are considering for further evaluation in this effort to hopefully get more data and do more with that effort.

Tom Kearney: I would just add ditto in the pavement and bridge area because there was a lot of intense investigation analysis done in those two areas as well. Again, they keep reoccurring within the desk scans because it did touch on so many of the other similar areas. Thank you Jackie.

Operator: Do we have more questions?

Operator: Your line is open.

Steve Bixler: Steve Bixler, I am apologizing in advance if this question was already asked because I logged in late, had to work this morning. 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?

Tom Kearney: Steve, we had that question and I do not mind visiting it again. That is, we are considering a change in federal truck size and weight limits that Congress had asked us to measure the impacts or implications of. Therefore within the local street network, they would be the reasonable access routes that would be of interest to within the study within the scope of the study. I am going to hand off to Jim March and Jim, with regard to the question, how about break down lots and other infrastructure needs and, as we get into these scenarios and look at the mobility and the performance of configurations like triple trailers, we would be looking at other enhancements or improvements that would be required?

Jim March: The scenarios have not been completely defined particularly in the area of reasonable access but for the 2000 study for instance, triple trailers and other longer combination vehicles were not allowed to travel off the designated networks. That very well could be the situation in this study as well. In which case, some sort of breakdown facilities would be required or else the operators would have to break down at either terminals that are adjacent to the network, and many of them are, or in private lots. But the cost of breakdown in logistics costs as well as cost of any publicly provided breakdown areas would be included.

Tom Kearney: Steve, thank you for the question. Operator, are there other questions in the queue?

Operator: There is one from the line of David Tanner.

David Tanner: 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?

Tom Kearney: As a specific issue, we have not looked at that. We have been keying in on the safety performance of the braking distances that will be tied to the triple trailer at the heavier weights, 105,000 129,000. With regard to the performance characteristics that would be at grade crossing, specifically, we do not have that currently within the scope of the study. Thank you for the question.

Operator: We have no further questions over the phone.

Tom Kearney: Nick Kehoe, do you have any other questions?

Nick Kehoe: With heavier trucks there'll 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 some additional enforcement be needed as a result?

Tom Kearney: Thank you for the question, stakeholder. Dr. Harkey get ready I'm going to throw it to you but what we are talking about is within the scenarios we're building, different terrain types are included. We're building different situations that are typical out on our roadway network. It would be tied to the AASHTO design manual, the requirements for highway design. We are not going to be in a simulation setting, I believe. We would do evaluations on the performance of the vehicles and we would set those simulations up with inputs from the scenarios such that we could effectively measure and evaluate the performance and impact on other travelers. Dr. Harkey, please correct me where I was wrong or add to my answer.

David Harkey: I think this is back to some of the comments that we have made previously where we will need to work with our simulation team and with the folks at FMCSA, FHWA and NTSHA to determine what those simulation parameters will be with respect to some of these scenarios. This is a case where you are talking about trying to add some sort of grade factor in order to be able to determine that. That is where, if that is going to be done as part of this effort, that is where we would have to do it because I can tell you from the crash analysis side, while we are going to collect roadway inventory information from the state, our historical knowledge of roadway data typically, grade is not one of those things that a lot of states have. So, it is doubtful that we will be able to do anything with that of the crash analysis side.

Tom Kearney: So, that is simulation and that would be the scenarios and the inputs to the simulation tool. At this point I would like to thank all of the stakeholders that have participated in today's session. I really appreciate the fantastic input that we have received. We are looking forward to your input over the next several weeks. I wish everyone happy holidays. I thank my subject matter experts for supporting us today in the presentation of the project plans and the desk scans and I would also like to thank our partners on the project team for the outstanding job they did today describing to us the work that is planned in each of these very complex areas of the Study as we move forward with the Study. Everyone have a safe and happy holidays, happy new year, thank you so much for your participation today.