Oregon Department of Transportation

Research Stage 1 Problem Statement

Number 26-09 – "Revised Load Rating Practices and Best Management Practices to Support Truck Platooning Across Bridges"

1. Concisely describe the **transportation issue** (including problems, improvements, or untested solutions) that Oregon needs to research.

To support the documented fuel efficiency gained by truck platooning, Oregon HB 4059 Section 40 permits truck platooning without requiring permitting or notification to ODOT. Compared to the design vehicle and truck configurations used for load ratings, permitting heavy trucks to travel close together is known to potentially exceed permissible serviceability and strength criteria. Depending on the combination of axle spacing, truck spacing, number of trucks, and bridge configuration, there is the potential that unregulated truck platooning could be reducing the lifespan of Oregon's aging bridge inventory. At the national level, research has primarily focused on new bridge design and superstructure evaluation. Additional work is needed to understand impacts to the substructure, and to provide practical tools for quickly evaluating existing bridges on interstate and highways where truck platooning is feasible.

2. What **final product or information** needs to be produced to enable this research to be implemented?

The goal of the proposed research is to provide ODOT with the necessary information to set policy and regulatory recommendations for freight mobility that will guide management practices of Oregon's aging bridge infrastructure on interstates and highways where truck platooning is feasible. Research deliverables will include:

- Revised load rating practices for both bridge super- and substructures with consideration of vehicle configuration, spacing, number of platooning trucks, and bridge configuration and type.
- Best management practices for existing bridges shown to be deficient for truck platooning (either strengthening or increase of headspacings in advance of the deficient bridge).

The proposed research will use a previously funded ODOT research project (SPR-848) as a starting point for parametric structural analysis required to develop load rating recommendations. The SPR-848 study focused solely on superstructure analysis via an extensive parametric study using computer simulations of various truck and bridge configurations typically found in Oregon. This existing data set will be used to model typical substructure configurations found in Oregon. Once a method for quickly revising bridge load rating has been developed, all bridges within the range of parameters of the parametric study found on routes feasible for truck platooning can be evaluated for overload. This will require access to the loading ratings for those bridges. Bridges identified as locations of concern will be evaluated for remediation options including strengthening or increase of truck platoon headspacings.

3. (Optional) Are there any individuals in Oregon who will be instrumental to the success of implementing any solution that is identified by this research? If so, please list them below.

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4. Decision making lenses

Please complete the following three sections. Your answers to these questions will be applied on a programmatic basis to support agency decisions. Answering yes to the questions below is not required. Resolving a narrowly focused technical research problem may meet agency needs without answering yes to any of the following questions. The ODOT Research Section will seek a balanced portfolio some projects will answer yes to one of the three categories below (e.g. climate, equity, and/ or safety) and other projects in a different category.

We are looking for an overall program balance and no one project is expected to balance all categories. Generally, a research problem statement is expected to be able to answer yes with clear and verifiable information in only one of the three categories below, some projects may be able to answer yes in two or even three categories. Some projects (i.e. needs focused on specific elements of infrastructure design), may have no yes answers but may still be high value research need.

Climate

Oregon recognizes the climate crisis and makes systemic changes to reduce emissions caused by travel. Every mile driven in Oregon is powered by a clean source of fuel. We seek research that supports construction and maintenance operations are carbon neutral and investments in mobility that support travel by low and no emission modes. While every research project may not result in a reduction in emissions, transportation investments overall support emission reductions to achieve state goals. Oregon envisions a transportation system that is resilient in the face of seismic and climate events and impacts to the degradation of the natural environment are reduced. Our vision includes a transportation infrastructure is built in a way that avoids impacts on key habitat and results in better environmental conditions for wildlife and native vegetation. For definitions and details please review the equity vision, goals, and objectives of the ODOT Strategic Action Plan and Oregon Transportation Plan.

4f. Will addressing the **transportation issue** identified as a need in Question 1 develop, or validate methods for the estimation, measurement, or monitoring of transportation generated greenhouse gasses (GHG)?

☐ Yes ☒ No ☐ Unsure

4g. If climate or GHG is not the focus of this **transportation issue** identified in this problem statement, will the research apply a GHG analysis to transportation infrastructure, planning, operations, maintenance, or materials?

☐ Yes ☒ No ☐ Unsure

4h. Will the addressing the **transportation issue** include development or testing of construction practices, methods, or materials to establish potential reductions in greenhouse gas emissions?

☐ Yes ☒ No ☐ Unsure

4i. Will the solving the **transportation issue** in question 1 study or support the reduction of vehicle miles traveled and single occupancy vehicle travel or support transition to electric vehicles (or other types of zero emission vehicles) or low-carbon alternative fuels?

☐Yes ☒No ☐Unsure

4j. Will the solving the **transportation issue** in question 1 lead to work that will support, measure, monitor, transportation system resilience in response to expected climate events, effects, or natural disasters in general?

☐Yes ☒No ☐Unsure

4k. Will the solving the **transportation issue** in question 1 lead to work that may result in better environmental conditions for wildlife and native vegetation?

☐Yes ☒No ☐Unsure

4l. If you answered yes to any of the climate questions above or can provide alternative details related to climate, please provide additional information:

Assessing Oregon's bridge inventory for potential overload due to unregulated truck platooning supports ODOT's climate focused initiatives indirectly by providing thoughtful recommendations that take full advantage of the fuel efficiencies gained by truck platooning without reducing the lifespan of Oregon's aging bridge infrastructure. It is acknowledged there is embodied energy associated with strengthening an otherwise functioning bridge to accommodate truck platooning. While outside the scope of the proposed study, it may be more climate crisis sensitive to increase truck platooning spacing rather than strengthening a bridge or vice versa. The purpose of the proposed study is to provide a basis for making the most informed decision.

Equity

Equity can have many dimensions and impacts relating to communities, and transportation. It is important that problem statement proposals clearly explain in what capacities are equity dimensions or impacts being examined within problem statements. It is a goal of the OTP to "Improve access to safe and affordable transportation for all, recognizing the unmet mobility needs of people who have been systemically excluded and underserved. Create an equitable and transparent engagement and communications decision-making structure that builds public trust". Proposed research may have the intent of studying elements of this goal or apply analysis to specific transportation topics to ensure the resulting research recommendations is consistent with our equity goals. For definitions and details please review the equity vision, goals, and objectives of the ODOT Strategic Action Plan and Oregon Transportation Plan.

4a Is the **transportation issue** identified as a need in Question 1 specifically focused on transportation equity?

☐Yes ☒No ☐Unsure

4b If the **transportation issue** is not focused on transportation equity, will the primary topic be assessed for equity benefits or impacts within the research project?

☒Yes ☐No ☐Unsure

4c Is the implementation of potential findings from this research likely to directly involve participation from an identified group that would benefit from an equitable process or outcome?

☐Yes ☒No ☐Unsure

4d Is the intended final product or information expected to support ODOT's equity efforts (Including but not limited to supporting one of the equity related objectives of the ODOT's Strategic Action Plan or Oregon Transportation Plan) ?

☐Yes ☒No ☐Unsure

4e If you answered yes to any of the equity questions above or can provide alternative details related to equity, please provide additional information:

Assessing Oregon's bridge inventory for potential overload due to unregulated truck platooning supports ODOT's equity initiatives indirectly through fiscal responsibility. By working with freight mobility partners, ODOT will help the trucking industry reduce fuel consumption and associated costs which are passed onto consumer via the price of goods sold. Similarly, this study supports mindful allocation of limited state transportation funding to maintain bridge infrastructure.

Safety

Research outcomes may include interventions and countermeasures to prevent or reduce the frequency of crashes or other causes of transportation-related injury or death; or may include measures to reduce severity of injury (including prevention of death) after a crash or other injurious event. For definitions and details please review the equity vision, goals, and objectives of the ODOT Strategic Action Plan, Oregon Transportation Safety Action Plan and Oregon Transportation Plan.

4m. Will solving the **transportation issue** in question 1 support improving **safety culture** for either transportation workers or the traveling public?

☐Yes ☒No ☐Unsure

4n. Will the solving the **transportation issue** support improving safety through **healthy and livable communities**?

☐Yes ☒No ☐Unsure

4o. Will solving the **transportation issue** support improving safety through using **best available technologies**?

☒Yes ☐No ☐Unsure

4p. Will solving the **transportation issue** support improving safety through **communication and collaboration**?

☐Yes ☒No ☐Unsure

4q. Will the solving the **transportation issue** support improving safety through **investing strategically**?

☐Yes ☒No ☐Unsure

4r. If you answered yes to any of the safety questions above or can provide alternative details related to safety, please provide additional information:

To take full advantage of the fuel economy gained via truck platooning using the latest autonomous vehicle technologies, ODOT must also assess the safety implications for the traveling public as related to the potential overload of Oregon's bridge inventory due to unregulated truck platooning in two ways. First, thoughtfully considering safe operating headspacings of truck platoons involves how passenger vehicles interact with truck platoons. If trucks are spaced optimally from a load rating perspective, passenger vehicles may enter the truck platoon unsafely. While outside the scope of this study, other studies have considered safety in this way. Second, this study is looking directly at the structural safety of bridge transportation infrastructure which is of concern to the traveling public.

5. Other comments:

None.

6. Corresponding Submitter's Contact Information:

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