Experimental Determination of Track Friction Coefficients

Exhibit D

Recipient/Grant (Contract) Number: University of Texas Rio Grande Valley (UTRGV)/Grant No. 69A3552348340

Center Name: University Transportation Center for Railway Safety (UTCRS)

Research Priority: Promoting Safety

Principal Investigator(s): Dr. Roger Cordes (PI, Texas A&M University (TAMU)) and Dr. David H. Allen (Co-PI, TAMU)

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Research Project Funding: $55,946 (Federal), $28,656 (Non-Federal Cost Share)

Project Start and End Date: 06/01/2024 to 08/31/2025

Project Description: It is well-known that aging track structure is one commonplace causal factor in train derailments. Furthermore, track buckling is observed to be more likely in older track. As described in our companion proposal, we are developing a computational track buckling model for deployment by U.S. Railroad Companies as a tool for predicting track buckling.

Over the course of the previous year, we have focused much of our attention on predicting the effects of both longitudinal and lateral crosstie-aggregate interfacial friction on rail buckling. We have shown that our model is capable of performing these friction-dependent predictions, but these predictions were made based on a very limited set of experimentally determined friction values. We therefore propose to set about the task of determining these complex material properties for a wide range of track structural materials. Obtaining these properties will then allow us to refine our predictive capabilities considerably.

US DOT Priorities: This research aligns with the following U.S. DoT goals: safety, economic strength and global competitiveness, climate and sustainability, and transformation.

Outputs: The expected products include:

1. The development of an experimental testbed for determining track structure coefficients of friction required in our buckling model.
2. The validation of accuracy of our friction testbed.
3. The ability to deploy these experimentally determined properties in our track buckling model (described in a companion UTCRS project titled *Advanced Model for Predicting Bucking in Rails*).
4. Dissemination of our results via conference presentations, workshops, conference articles, and journal articles, as well as meetings with BNSF and MxV Rail.

Outcomes/Impacts: The broader impact of this research is that it will significantly impact railway safety via the development of more scientifically based track failure models that will significantly mitigate the probability of future environmentally and socially impactful train derailment incidents.

Final Research Report: Upon completion of the project, a URL link to the final report will be provided.