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Center for Advanced Infrastructure and Transportation

Project Overview Report

1. UTC Identifying Number

   DTRT13-G-UTC28

2. Center Identifying Number

   CAIT-UTC-NC46

3. Project Title

   Prediction of Hydroplaning Risk of Truck on Roadways

4. Principal Investigator & Contact Information

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5. Rutgers/CAIT Project Manager

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6. Customer Principal

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7. Project Description

   Accident data records have shown that wet pavement surface is a significant factor causing car and truck accidents. The vehicle operation, roadway geometric design, and pavement surface and drainage condition are critical factors affecting skid resistance on wet surface and hydroplaning risk. The current models of predicting hydroplaning risk are mainly based on regression analysis of the limited experiment data. These empirical models are difficult to capture the physic-based principle and thus cannot be applied outside the range of data that were used to develop the models. In addition, the current models are focused more on passenger car tires and did not consider water flow characteristics on rough pavement surface. The hydroplaning potential of truck tires at different conditions has not been thoroughly investigated. The research aims to develop an integrated hydroplaning model for trucks that can be used by transportation agencies to design safer roadways.

8. Implementation of Research Outcomes (or why not implemented)

   The research results will help state agencies better understand the mechanism of tire hydroplaning and design safer roadway considering comprehensive roadway characteristics (such as geometric design, drainage, pavement surface texture and groove, etc.). The quantification of pavement surface effects on hydroplaning will be useful in the selection of appropriate surface mixture and planning of pavement maintenance strategies.

9. Impacts/Benefits of Implementation (actual, not anticipated)

   TBD

10. Dates and Budget

    Start Date: 10/1/2016
    End Date: 12/31/2017
    UTC (CAIT) Dollars: $ 74,924
    Cost Sharing: $ 0
    Total Dollars: $ 74,924

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11. Keywords

    Roadway Safety, Hydroplaning, Drainage, Pavement Surface Characteristics, Finite Element Model

12. Web Links (Reports and Project Website)

    https://cait.rutgers.edu/cait/research/prediction-hydroplaning-risk-truck-roadways