Evaluation of the Impact of Queue Trucks with Navigation Alerts Using Connected Vehicle Data
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Abstract
Back of queue crashes on Interstates are a major concern for all state transportation departments. In 2020, Indiana DOT began deploying queue warning trucks with message boards, flashers and digital alerts that could be transmitted to navigation systems such as Waze. This study reports on the deployment and impact evaluation of digital alerts on 19 Queue trucks in Indiana. A novel analysis of queue warning trucks equipped with digital alerts was conducted during the months of May-July in 2021 using connected vehicle data.

Case Example
Speed Legend (mph)
- No Data
- 65 to 64
- 45 to 54
- 35 to 44
- 25 to 34
- 15 to 24
- 0 to 14
- Hard-braking Event (0.27g / 2.67 m/s²)
- Queue Warning Truck Location

Queue Warning Truck Absent
Thursday, 27th May 2021
h₁ 29 hard-braking events over 5 hours

Queue Warning Truck Present
Wednesday, 26th May 2021
h₂ 4 hard-braking events over 4.5 hours

High-level structure of data transfer
Queue Warning Truck (with digital alert transponder)

Hard-braking events and trajectories approaching queues
y = 0.127x (R² = 0.73)
y = 0.026x (R² = 0.82)

Analysis of nearly 370 hours of queuing showed an 80% reduction in hard-braking events when Queue Warning Trucks with digital alerts were present.