Title: Development of New Work Zone Traffic Signs for Road Reconstruction Processes

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Abstract:

After a natural disaster, one of the infrastructure sectors requiring rapid recovery is the transportation network. After hurricane María, 17% of the bridges in Puerto Rico were damaged, and 1.1% collapsed. The United States Geological Survey (USGS) reported approximately 70,000 landslides which greatly affected the island's highway system.

Rescuers, emergency management officers, and vital supplies use the highway system to access the affected zones. Therefore, it is necessary to expedite the reconstruction of roads to serve the community better. It is essential to mobilize construction workers and heavy equipment required in construction work zones. These areas represent a change in the road geometry to accommodate the reconstruction work while allowing the traffic to continue using the unaffected portion of the road. Signs, traffic control devices, changes in traffic flow, and changes in geometry are typically found in work zones. These changes increase the probability of incidents in which both drivers and workers may be at risk.

Searching for alternatives to improve safety for both drivers and construction workers during the reconstruction process, a total of 11 contractors and highway project managers were interviewed to identify which have been the most recurrent incidents involving workers' safety on their projects. 33% of the subjects interviewed indicated that speeding is the leading risk factor, and 81.8% have experienced a vehicle entering the construction work zone. The contractors interviewed were also asked about possible countermeasures that they understand can reduce the risk of incidents. 13% indicated the need for new types of traffic control devices as an alternative to improve safety in work zones.

Also, an online survey in which 427 authorized drivers in Puerto Rico participated was conducted. The survey was used to gather information about drivers' road safety knowledge and work zone signage interpretation. Based on the results of the interviews and the online survey, several alternative signs will be developed to guide drivers when traveling through a construction work zone. These alternative signs will be evaluated later using a driving simulation to assess driver's behavior.