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MARYLAND MOTOR CARRIER PROGRAM PERFORMANCE ENHANCEMENT

Problem

The Maryland Motor Carrier Program (MMCP) involves the regulation of commercial vehicle safety inspections. This includes roadside inspections programs which have a goal of improving safety and reducing crashes involving commercial vehicles. The MMCP is based on federally provided safety standards and is administered by state agencies including the Maryland State Highway Administration, Maryland State Police, and the Maryland Transportation Authority (MDTA).

As Maryland's economy and population continues to grow, commercial vehicle traffic is also expected to increase on already congested highways. This additional traffic also leads to increased safety concerns for transportation and enforcement officials. Safety inspection programs are one very important component in helping to improve safety and to prevent certain crashes involving commercial vehicles. Therefore, evaluating the effectiveness of these programs and determining the best way to allocate resources is critical.

Objective

With the number of commercial vehicles on Maryland highways expected to continue to increase, the objective of this project was to develop a resource allocation model in order to maximize the benefits of the roadside inspection program.

Description

Using inspection summary data from 2006 – 2010 and inspection and violation files from the Motor Carrier Management Information System (MCMIS) from the same years, roadside inspections were compared with peer states and the national average. The study found that Maryland was 7th nationally in terms of the absolute number of inspections, 10th in inspections normalized by population, and 10th in inspections based on vehicle miles traveled.

Using the data, a resource allocation model was developed to identify ways to reallocate resources to maximize program benefits (i.e. reduction in commercial vehicle crashes, fatalities, and injuries). As expected, the models behaved consistently; allocating more resources to high-return inspection levels and locations based on the trade-offs among Safety Measurement System (SMS) severity values, costs, benefits, and total number of inspections.

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Results

An integer programming resource allocation model was successfully developed. The modeling findings suggest that the current level of inspections are effective and generate significant benefits to Marylanders. The effectiveness of programs is also supported by the comparative analysis of MCMIS data. Furthermore, the findings indicate that the effectiveness of roadside inspections programs can bring about additional benefits by reallocating resources. Detailed information about ways to maximize benefits can be found in the final report.

While the findings of the study are based on mathematical formulation using available data, there are several points to keep in mind prior to implementing the findings:

1. **The definition of the benefits generated by the inspection program should be clearly understood.** As shown in the model formulation, the benefits are monetized values from preventing crashes. Thus, the generated benefits from the modal need to be understood as social benefits not monetary benefits.
2. **The model is flexible.** That is, crash reduction coefficients and upper/lower boundaries of the number of roadside inspections can be changed. Based on professional expertise scenarios can be evaluated to find better resource reallocation options.
3. **Decision making should be based on expertise.** The model gives priority to high severity violations. As a result, for some Truck Weigh and Inspection Stations, reduction or removal of level IV, V, and VI inspections is suggested. This is because in general, violations from these levels had lower SMS severities. However, eliminating these levels is neither reasonable nor recommended.

Report Information

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Link to Final Report

http://www.roads.maryland.gov/OPR_Research/MD-14-SP708B4D_MD-Motor-Carrier-Program-Performance-Enhancement_Report%20.pdf