ROAD RANGER BENEFIT COST ANALYSIS

PROBLEM STATEMENT

The Road Ranger program is a high profile program supported by the Florida Department of Transportation (FDOT). It provides direct contact with the motoring public served by the Florida Intrastate Highway System . By quickly clearing the roadways of vehicles that run out of gas or need a tire changed, or by quickly removing debris from the roadway, the Road Rangers greatly reduce traffic congestion on Florida's roadways. As the various Districts consider extending and expanding their Road Ranger coverage, they must also consider how to fund this service, which raises the question: “Just how much benefit is being realized from this expenditure?” Thus, there is a need to quantify the benefit of the Road Ranger program so that a benefit-cost ratio may be developed. This information would allow the Department to clearly evaluate whether additional funding should be allocated to Road Rangers from an already-limited budget.

OBJECTIVES

The objective of this study is to examine and evaluate the benefits of the Road Ranger service patrol in light of their operating costs in Florida. Five Districts (2,4,5,6 and 7) and the Turnpike were chosen for study due to the availability of Road Ranger program data and activity logs.

FINDINGS AND CONCLUSIONS

Researchers analyzed the incident data and determined the benefits of the Road Ranger program. The findings and conclusions are summarized below:

1. The estimated net benefits based on average incident delay and fuel savings indicate that the Road Ranger program produces significant benefits in all of the study regions. The overall benefit/cost ratio for the Florida Road Ranger program is 25.8:1, with district-specific b/c ratios ranging from 2.3:1 to 41.5:1. The benefit/cost ratios for Districts 2, 4, 5, 6, and 7, and the Turnpike are approximately, 2:1, 21:1, 13:1, 42:1, 18:1, and 10:1, respectively. The study showed that across the districts, Road Rangers assist, on average, with seven incidents per hour. The number of assists per hour in the Turnpike area is approximately eighteen.

2. The type and duration of incidents vary by district. In general, the most frequent incident types are breakdowns. Incidents involving accidents and debris comprise a very small portion of Road Ranger responses. Some of the findings by area are as follows:

    a. In the Turnpike, incidents involving debris represent almost 30% of the total incidents.

    b. In District 2, flat tires can constitute as much as 22-35% of all the incidents. In fact, flat tire, fuel-related, and abandoned vehicle incidents make up almost 65% of the total incidents.

c. On I-275 in District 7, approximately 53% of the incidents assisted were flat tires or abandoned vehicles during a one month period (August).

d. On I-95 in District 4, Road Rangers assisted with 700 flat tire incidents in a single month (July).

These findings indicate that Road Rangers most frequently address flat tire incidents (followed by fuel-related incidents). Small incidents and minor repairs clearly occur more often than accidents and debris. While the frequency of accidents in most districts is low compared to other type of incidents, accidents last much longer than any other type of incident. The study found that, on average, an accident lasts for about 44 minutes, whereas breakdowns and debris-related incidents last, on average, 14 and 10 minutes, respectively. Incident durations for an incident type in a district are quite close, irrespective of freeway.

3. The latest Freeway Service Patrol Evaluation (FSPE) Model was found to be effective in evaluating the Road Ranger program. The model uses capacity reduction values from the Highway Capacity Manual and assigns incidents on freeway segments according to the vehicle miles traveled on that segment. The reduction in incident detection and response times with freeway service patrols, as opposed to without freeway service patrols, is an important parameter in determining the savings in delays. The model estimates reduction in response times using number of patrol vehicles, speed, beat length, and so forth. A deterministic queuing model is used to estimate the congestion related delay savings.

4. The Road Ranger service provides additional benefits not included in the calculation of the benefit/cost ratio. Consider the following: (1) the daily reductions in air pollutant emissions include a total of 3690 kg of reactive organic gases, 160 kg of carbon monoxide and 740 kg of oxides of nitrogen, (2) the presence of Road Ranger service provides a sense of security on the freeway, and (3) expediting the removal of incidents could reduce the number of secondary accidents.

Ultimately, the results of this study confirm that the Florida Road Ranger service is a successful, cost-effective operational program.

BENEFITS

The quantified benefits and B/C ratios of Road Ranger program will help the Department clearly evaluate the past performance of the program in each District and for the state as a whole. It also provides additional information to evaluate whether additional funding should be allocated to Road Rangers from the already-limited budget. The calibrated FSPE models for each District can be directly applied in future performance evaluations. The analysis results of incident types and durations will allow the Department to optimize the Road Rangers program.

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