

## Appendix 2

### Executive Summaries

The executive summary is a synopsis of a policy issue paper. The executive summary usually has these elements:

- Purpose of the issue paper or study being summarized
- Background of the problem or question addressed
- Major findings or conclusions
- Approach to analysis or methodology
- Recommendations (optional: depends on expectations of the client)

The following executive summary provides a synopsis of a 90-page study titled *Freight Trucking: Promising Approach for Predicting Carriers' Safety Risks* (Washington, DC: U.S. General Accounting Office, Program Evaluation and Methodology Division, April 1991).

<b>Executive Summary</b>	
Purpose	<p>Freight trucks pose special safety risks. Over 4,000 people are killed annually in accidents related to heavy trucks. Fatalities are about twice as likely in accidents involving tractor-trailer trucks as in those involving automobiles only.</p> <p>In recent years, the Congress has approved legislation to prevent situations that give rise to unsafe trucking operations. As a means toward this end, the House Committee on Public Works and Transportation and its Surface Transportation Subcommittee requested that United States General Accounting Office (GAO) determine whether certain economic and other conditions could be used as predictors of safety outcomes. GAO's study had the following three objectives: (1) to formulate a predictive model specifying hypothetical relationships between safety and a set of conditions in the trucking industry; (2) to assess the availability and quality of federal data required to test the model; and (3) to use available data, to the extent possible, to develop a set of indicators that would predict safety problems in the freight-trucking industry. The value of a workable model is that the Department of Transportation (DOT) could use it as an early warning system for predicting safety problems.</p>
Background	<p>Although the Motor Carrier Act of 1980 codified the relaxation of federal economic control over the trucking industry, the Congress approved legislation in the 1980s designed to monitor and prevent situations that result in unsafe trucking operations. GAO developed a model that hypothetically links changes in economic conditions to declining safety performance in the freight-trucking industry (see pages 18 through 23). The hypothesis is that a decline in economic performance among motor carriers will lead to declining safety performance in one or more ways, described by five submodels: (1) a lowering of the average quality of driver performance; (2) downward wage</p>

<p>Results in brief</p>	<p>pressures encouraging noncompliance by drivers with safety regulations; (3) less management emphasis on safety practices; (4) deferred truck maintenance and replacement; and/or (5) introduction of larger, heavier, multitrailer trucks.</p> <p>GAO's preliminary findings, using data on 537 carriers drawn from both DOT and the Interstate Commerce Commission (ICC), are that seven financial ratios show promise as predictors of safety problems in the interstate trucking industry. For example, three measures of profitability—return on equity, operating ratio, and net profit margin—were associated with subsequent safety problems as measured by accident rates. The data agreed with GAO's model for five of seven financial ratios: Firms in the weakest financial position had the highest subsequent accident rates. GAO also used a number of other factors to predict safety outcomes, including the following. First, the smallest carriers, as a group, had an accident rate that exceeded the total group's rate by 20 percent. Second, firms operating closer to a broker model—that is, those that rely on leased equipment and/or drivers to move freight—had a group accident rate 15–21 percent above the total group's rate.</p> <p>With regard to two of the submodels (driver quality and compliance), driver's age, years of experience, and compensation were all good predictors of safety problems. GAO's evidence is generally consistent with the model's hypotheses because younger, less experienced drivers and lower paid company drivers posed greater-than-average accident risks.</p> <p>GAO's study thus demonstrates the potential for developing preventive strategies geared to differences among carriers and drivers, and it also suggests the importance of monitoring by DOT of the variations in carrier accident rates in order to have a sound basis for developing those preventive strategies.</p>
<p>GAO's Analysis <i>Available Federal Data</i></p>	<p>To identify and evaluate data to test a carrier-safety model, GAO reviewed the literature, talked with industry experts, and conducted interviews with federal officials responsible for maintaining data sets. GAO then combined data provided by DOT and ICC to conduct analyses. GAO found that existing federal data sets did not bring together the necessary data to fully test this model. The federal collection of truck accident data was essentially independent of the gathering of economic data, and combining the two types of data from separate federal sources was generally impractical. Most importantly, the federal data allowing calculation of accident rates for individual motor carriers did not provide for a generalizable picture of a definable segment of the industry or an analysis of safety trends over time. The needed information about truck drivers and their accident rates was also lacking. As a result, GAO could test only two of the submodels (by obtaining data from two private surveys). One unfortunate implication of this is that even if all of the submodels do prove to have predictive validity, existing federal databases still do not contain sufficient information to convert the model to an effective monitoring system.</p>
<p><i>Economic Predictors</i></p>	<p>GAO judged that the best available accident rate data to combine with ICC's extensive financial data are those obtained from DOT's safety audits. Since the safety audits were discontinued after October 1986, GAO's analysis was limited to the larger, for-hire ICC carriers with financial reporting requirements that were also audited by DOT during the years 1984–1986.</p> <p>GAO found evidence among these interstate carriers that carriers in different markets or different financial situations pose different safety risks. For example, carriers with losses of 0.3 percent or more on equity had a group accident rate (rates are defined as accidents per million miles) 2 years later that was 27 percent above the overall group's rate.</p>
<p><i>Predictors from the Driver Quality Submodel</i></p>	<p>One of the private surveys GAO used supplied data on approximately 1,300 interstate drivers serving Florida in 1989. As was predicted by the driver quality submodel, GAO found that younger and less experienced truck drivers were more likely to be in accidents. For example, the odds for drivers aged 21 to 39 having been involved in an accident in the prior 12 months were higher than the odds for drivers over age 49 by a factor of 1.6.</p>
<p><i>Predictors from the Driver Compliance</i></p>	<p>The other private survey GAO used yielded pertinent data from a national sample of drivers in rail-competitive trucking. GAO found that lower paid drivers were more likely than their higher paid counterparts to violate safety regulations, but only in the case of company drivers and excluding owner-operators (those drivers owning their</p>

<i>Submodel</i>	own trucks). Among company drivers, those earning less than 18.5 cents per mile had about twice the odds of having received either speeding or hours-of-service citations (or warnings) in the past 90 days.
Recommendation to the Secretary of Transportation	<p>The monitoring, enforcement, and policymaking value of much of the truck accident information gathered by DOT is lessened by the inability to construct accident rates. Although DOT already collects accident data, the mileage data required to calculate accident rates are not routinely collected from carriers. As a first step toward reducing the accidents of motor carriers, GAO therefore recommends that the Secretary of Transportation direct the Administrator of the Federal Highway Administration (FHWA) to require that mileage data on motor carriers falling under FHWA regulations be obtained annually to improve accident analysis. How such data are obtained may depend on a number of considerations, such as costs and respondent burden, but the foremost consideration should be that data obtained allow for the calculation of accident rates for carriers falling under FHWA safety regulations in order to support monitoring and enforcement efforts and to permit analysis of safety trends.</p> <p>In implementing GAO's recommendation, DOT should consider further development of predictors of safety problems. For example, GAO's analysis suggests that indicators of financial health, market segment, and driver information may be useful to DOT in identifying higher risk groups of carriers for closer monitoring or enforcement efforts. More work needs to be done in validating these preventive indicators and identifying other predictors of safety outcomes. DOT should consider advancing this work on preventive indicators because, if successful, it would signal the policy changes needed to avoid or abate the predicted unsafe conditions. GAO's demonstration illustrates the kind of work that DOT will be able to do in prevention, particularly if better information on accident rates and economic and other intermediate factors is developed.</p>