United States General Accounting Office

GAO

Report to the Chairman, Committee on Energy and Commerce, House of Representatives

November 1990

RAILROAD SAFETY

FRA's Staffing Model Cannot Estimate Inspectors Needed for Safety Mission

GAO/RCED-91-32

GAO

United States
General Accounting Office
Washington, D.C. 20548

Resources, Community, and
Economic Development Division

B-241384

November 21, 1990

The Honorable John D. Dingell
Chairman, Committee on Energy
and Commerce
House of Representatives

Dear Mr. Chairman:

Concerned about railroad safety, you asked us to assess the effectiveness of the Federal Railroad Administration's (FRA) safety inspection program. This report, the fourth in a series addressed to you, focuses on FRA's computerized staffing model and its usefulness in developing staffing standards to determine the number of inspectors needed to satisfy FRA's safety mission. In our prior reports,[1] we concluded that FRA did not have enough hazardous materials inspectors and that staffing levels in other disciplines might be inadequate.

Results in Brief

FRA does not know how many inspectors it needs to adequately cover the railroad industry because it had not fully developed inspector staffing standards for its inspector work force. Staffing standards are derived from formulas or mathematical models used to determine the number of employees needed to perform a function and to distribute these employee resources.

FRA developed a staffing model in 1986 to assist it in estimating how many inspectors it needs and how to allocate its inspector work force among the inspection disciplines and regional offices. To provide a staffing standard that would be useful in determining the number of inspectors needed to satisfy its safety mission, FRA's staffing model would need to provide for (1) calculating the number of inspectors it needs and allocating the inspectors among its offices, (2) incorporating inspection coverage standards that include information on the railroad operations needing inspections, the time required to perform inspections, and the frequency of inspections, and (3) using available data to

[1]Railroad Safety: FRA Needs to Correct Deficiencies in Reporting Injuries and Accidents (GAO/RCED-89-109, Apr. 5, 1989).

Railroad Safety: DOT Should Better Manage Its Hazardous Materials Inspection Program (GAO/RCED-90-43, Nov. 17, 1989).

Railroad Safety: New Approach Needed for Effective FRASafety Inspection Program (GAO/RCED-90-194, July 31, 1990).

target routine inspections toward high-risk locations and railroads with poor safety records. The model provides for the first part of the staffing standard, although it bases its estimates of staff needed on historical data and budgetary factors, such as authorized positions, total inspections performed, accidents, and funds allocated, rather than on mission factors. The model does not provide for the other elements.

Without incorporating inspection coverage standards or an inspection strategy to target high-risk railroads into its current staffing model, a new model, or some other analytical method, FRA will not have adequate staffing standards to determine the number of inspectors needed to satisfy its safety mission. In July 1990, FRA was in the process of designing safety inspector workload data needed to develop inspection coverage standards. Once these coverage standards are developed, FRA could use these standards, along with its safety data on high-risk railroads, to better determine the size and makeup of the inspector work force needed to carry out its safety inspection mission.

Background

FRA is responsible for enforcing federal railroad safety regulations. In September 1990, FRA had a work force of 361 safety inspectors in eight regional offices to accomplish its mission. FRA groups inspectors into five disciplines: track; motive power and equipment; operating practices; signal and train control; and hazardous materials. Inspectors conduct routine safety inspections at the railroads and investigate accidents and complaints. When inspections or complaint investigations reveal noncompliance with the laws, inspectors list the condition as a defect on an inspection report. When inspectors identify defects that pose an immediate safety hazard, they prepare a violation report that is submitted to FRA's Office of Chief Counsel to be used to assess the railroad a civil penalty. Inspectors also periodically participate in broad system assessments of a single railroad which includes an evaluation of a railroad's entire operation.

Executive Order 12552, dated February 25, 1986, established a governmentwide program to improve the quality, timeliness, and efficiency of services provided by the federal government. To achieve these goals, the executive order advocates the use of measurement systems and performance standards by government agencies. In response to the executive order, FRA developed the Quality Improvement Program to gather and develop inspector workload data. In response to a congressional directive, FRA developed the staffing model to give it a methodology to determine the size of its inspector work force and a plan to allocate

those resources. The model was designed to enable FRA to make more informed decisions about the size and deployment of its inspector resources.

Staffing Model Based on Historical Data

FRA's staffing model has three distinct parts. The first part uses information on the previous number of authorized positions, number of accidents, number of casualties, revenue ton-miles,[2] and total number of inspections performed to estimate the number of inspectors available to perform inspections. The second part allocates available inspectors to each of FRA's eight regional offices on the basis of each region's share of nine risk factors, such as accidents, population, density, and rail passenger traffic. The third part of the model takes the estimated allocation of inspector resources for each region and estimates how those resources should be distributed among the five disciplines, on the basis of previous work performed by each discipline.

FRA's staffing model provides an estimate of staffing needs that is highly dependent on historical data rather than on the staff needed to satisfy its safety mission. Further, past budgetary constraints have limited the size of FRA's work force, and funding shortfalls have prevented FRA from hiring enough staff to meet its authorized level. For example, for fiscal year 1990, FRA requested and received authority for 34 additional inspectors, but no funding was provided for these positions. Because the staffing model bases its estimates of staff needed on historical data, the model implicitly assumes that budgetary factors rather than mission factors will continue to control staff levels.

A Staffing Model Should Include Inspection Coverage Standards and Inspection Targeting

We reviewed FRA's staffing model as part of our management review of the Department of Transportation. Our management review was a broad-based review of the management of the Department. One element included in the review was how FRA could use productivity information to set program goals, evaluate results, and support resource decisions. We concluded in our April 1987 report that the model was not based on the actual time spent completing inspection tasks or on standards relating to the time those tasks normally should take. We recommended that FRA use current and accurate staffing standards in formulating its safety program budget.[3]

[2]Revenue ton-mile represents 1 ton carried 1 mile for which a charge is received.

[3]Department of Transportation: Enhancing Policy and Program Effectiveness Through Improved Management (GAO/RCED-87-3, Apr. 13, 1987).

In our July 1990 report on FRA inspections, we stated that FRA was not basing the number of inspectors needed on inspection coverage standards that consider time spent completing inspections and the frequency with which railroads' track and equipment should be inspected. We also found that FRA had not developed an inspection strategy based on existing safety data that would target inspection resources to high-risk railroads. Agreeing that it needed to be more systematic in its approach to inspections, FRA stated that it was making changes to use its safety data more effectively in planning inspections to make the pattern of inspections more strategic and that it was refining its management tools to enhance the inspection program. Once these actions are completed, FRA could incorporate inspection coverage standards and its strategy to inspect high-risk railroads into its current staffing model, a new model, or some other analytical method. FRA could then make staffing calculations based on the desired amount of inspection coverage, the amount of time required to complete this work, and the amount of time inspectors have available to perform inspections and other safety-related activities.

Inspection Coverage Standards

In our July 1990 report, we recommended that FRA develop inspection coverage standards that prescribe (1) the frequency with which railroads should be inspected, (2) the size of an inspector's territory, (3) the number of inspection locations an inspector can reasonably cover, and (4) the frequency with which locations should be inspected. In response to our recommendation, FRA stated that it was gathering the information necessary to develop inspection coverage standards, and plans to use coverage standards in its staffing model calculations.

FRA currently has two initiatives that should provide most of the data needed to develop inspection coverage standards. In January 1989, FRA initiated an effort called the Quality Improvement Program to gather and develop inspector workload data. This program is designed to determine how long it takes inspectors to conduct routine inspections, write reports, evaluate waiver petitions, and investigate accidents and complaints. Under this program, inspectors are required to submit a daily report that details their activities by the hour. In addition to providing information on how long it takes inspectors to perform safety-related activities, the program is intended to determine the amount of time spent on other activities such as breaks and travel between inspection points.

In the spring of 1990, FRA designed the Regional Inspection Points Program. FRA officials stated that this program is intended, in part, to provide FRA the detailed information it now lacks about railroad activity. The program requires inspectors to identify the inspection points in their territory and record information on the volume of railroad activity at, and the physical characteristics of, each point. For example, track inspectors must identify the railroad class, route miles, total track miles, and the number of switches and rail-highway crossings associated with each point. Once this effort is complete, FRA will have workload data from the Quality Improvement Program as well as data on railroad activity that are key to developing inspection coverage standards.

Targeting Inspections

In our July 1990 report on FRA's inspection program, we also stated that FRA does not use available data to target routine inspections toward high-risk locations and railroads with poor safety histories. This has occurred because inspectors independently schedule their inspection efforts absent any analysis of existing safety or accident data. Because of this, we found little relationship between changing accident trends and FRA inspection activity. As a result, railroads with increasing numbers of accidents did not receive additional inspection activity. We found in many cases inspections decreased for railroads with increasing numbers of accidents. This indicated a misallocation of inspection resources since a worsening level of safety on a railroad should require more, not less, inspection resources to determine the cause for the rise in accidents.

In our report, we made several recommendations to improve FRA's safety inspection program, including using its safety data to target high-risk railroads for routine inspections. We also recommended that FRA redefine the approach to system assessments by using existing inspection data to detect known areas of weakness and assign inspector resources to determine the underlying causes of the weaknesses. In response to our report, the Administrator, FRA, stated in September 1990 that

> FRA's safety inspection program would be greatly improved by targeting our resources more effectively on the basis of the wealth of statistics at our command. Given the size of our inspector force in relation to the size of the railroad industry, we can maximize the effect of our resources only by deploying them as scientifically and strategically as possible.

Conclusions

FRA does not know whether it has a sufficient number of safety inspectors to carry out its safety mission because FRA has not developed inspection coverage standards. FRA has initiated two efforts aimed at gathering the data it needs to develop such standards. Once inspection coverage standards are developed, FRA would need to incorporate them, along with an inspection strategy based on targeting high-risk railroads, into its existing staffing model, a new model, or some other analytical method to develop the type of staffing standards that would calculate the number and types of safety inspectors it needs to fulfill its safety mission.

Recommendation

We recommend that the Secretary of Transportation direct the Administrator, FRA, to develop staffing standards that determine the number of safety inspectors it needs to carry out its safety mission. Such standards should include (1) a method of calculating the number of inspectors it needs and distributing them by discipline to FRA's regional offices; (2) inspection coverage standards that include information on the railroad operations needing inspections, the time required to perform inspections, and the frequency of inspections; and (3) a strategy of using available data to target routine inspections toward high-risk locations and railroads with poor safety records.

Views of Agency Officials

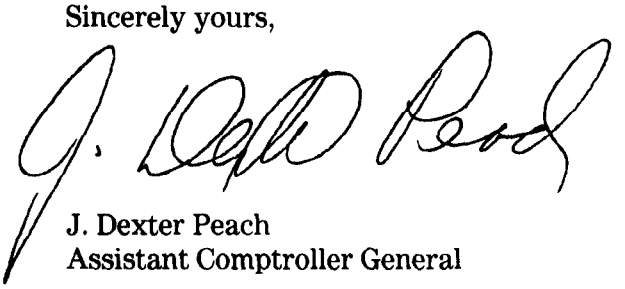
We discussed the findings in this report with FRA officials, who generally agreed with our findings. They said that in response to our July 1990 inspection report they have devised an extensive management program that will be used to quantify the number of state and federal inspectors needed to accomplish inspection coverage standards that are being developed. Included in this management program will be data from both the Quality Improvement and Regional Inspection Points programs. In addition, FRA officials said that they are introducing an inspector resource allocation plan that will consider, among other things, an overall risk profile of each railroad. As requested, however, we did not obtain official agency comments on a draft of this report.

We performed our work for this review from July 1989 to October 1990 in accordance with generally accepted government auditing standards. Appendix I contains details of our objective, scope, and methodology. As arranged with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days from the date of this letter. At that time we will send copies to the Secretary

of Transportation; the Administrator, FRA; and other interested parties. We will make copies available to others upon request.

This work was performed under the direction of Kenneth M. Mead, Director, Transportation Issues, who may be reached at (202) 275-1000. Major contributors to this report are listed in appendix II.

Sincerely yours,



J. Dexter Peach
Assistant Comptroller General

Contents

Abbreviations

DOT	Department of Transportation
FRA	Federal Railroad Administration
GAO	General Accounting Office

Objective, Scope, and Methodology

This report addresses the Federal Railroad Administration's (FRA) efforts to determine its safety inspector work force needs. Our objective was to assess the usefulness of FRA's staffing model in estimating inspector needs in relation to satisfying FRA's safety mission. We reviewed FRA's staffing model. We did not attempt to validate this model because it is a policy-assisting model. Models such as this cannot, by its very nature, be validated to the extent that its output can be relied upon as an exact predictor of the future. We reviewed the model to enhance our understanding of its output. We focused on the major assumptions of the model and the relationships between these assumptions. We reviewed all spreadsheet formulas. In this context, we observed no major problems; however, this does not attest to the validity of FRA's model.

FRA's existing staffing model estimates staffing needs based on historical data and then allocates these estimated resources by region and discipline. Because this report focuses on satisfying FRA's safety mission, we refer to only selected portions of FRA's staffing model in the body of this report.

We reviewed reports and other documents discussing the staffing model's development and usage. We interviewed FRA's Office of Safety officials to determine how they use the model to make staffing decisions and the sources of the data used in the model. We reviewed staffing decisions made by FRA without model input. We further reviewed and discussed planned program improvements with Office of Safety and regional officials.

We conducted our review from July 1989 through October 1990 at FRA headquarters in Washington, D.C.; region 2 headquarters in Philadelphia; and region 3 headquarters in Atlanta. This review was performed in accordance with generally accepted government auditing standards.

Major Contributors to This Report

Resources, Community, and Economic Development Division, Washington, D.C.	John W. Hill, Jr., Associate Director, Transportation Issues Roy J. Kirk, Assistant Director John S. Kalmar, Jr., Assignment Manager Judy K. Pagano, Senior Operations Research Analyst
Philadelphia Regional Office	Richard A. McGeary, Regional Management Representative LaVerne G. Tharpes, Evaluator-in-Charge Nancy D. Wagner, Evaluator

Ordering Information

The first five copies of each GAO report are free. Additional copies are $2 each. Orders should be sent to the following address, accompanied by a check or money order made out to the Superintendent of Documents, when necessary. Orders for 100 or more copies to be mailed to a single address are discounted 25 percent.

U.S. General Accounting Office
P. O. Box 6015
Gaithersburg, MD 20877

Orders may also be placed by calling (202) 275-6241.

United States
General Accounting Office
Washington, D.C. 20548

Official Business
Penalty for Private Use $300

First-Class Mail
Postage & Fees Paid
GAO
Permit No. G100