

**DEPARTMENTWIDE
PROGRAM EVALUATION
OF THE
HAZARDOUS MATERIALS
TRANSPORTATION PROGRAMS**



EXECUTIVE SUMMARY

MARCH 2000



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OBJECTIVES

The objectives of the Departmentwide hazardous materials program evaluation are: (1) to document current hazardous materials movements, Operating Administrations¹ programs, and program delivery and (2) to assess the effectiveness of the Department of Transportation's (DOT) overall hazardous materials program as it affects each step in the hazardous materials transportation process, from packaging manufacturer to delivery to the end user; recommend improvements; and, identify areas for further study. The evaluation is intended to allow the Department to determine the effectiveness of the current hazardous materials programs, including the effectiveness and efficiency of DOT's allocation of its hazardous materials resources.

RESULTS IN BRIEF

There are roughly 300 million hazardous materials shipments in the nation each year and the vast majority of these shipments arrive at their destinations safely.² In 1998, there were 15,322 incidents, including 429 serious incidents; 13 deaths; and 198 injuries. Although this is a relatively good safety record, given the number of shipments and movements, there remains the potential for catastrophic incidents in the transportation of hazardous materials where multiple fatalities, serious injuries, large-scale evacuations, and other costs to society could result. For example:

- Chemical oxygen generators on a commercial airliner ignited causing the crash of ValuJet Flight 592 into the Florida Everglades in 1996 killing 110 passengers and crew.
- Unleaded gasoline spilled during unloading of a cargo tank in Biloxi, Mississippi, in 1998 resulting in 5 hazardous materials fatalities, the evacuation of over 80 people, and the closure of an interstate highway.

¹ In this report, the term Operating Administrations refers to the United States Coast Guard, the Federal Aviation Administration, the Federal Motor Carrier Safety Administration, the Federal Railroad Administration, and the Research and Special Programs Administration.

² All data used in the report that provides a measure of the volume of hazardous materials in transportation such as shipments, movements, and tons, represent domestic quantities only.

- Phosphoric acid being transported in intermodal freight containers on a barge were lost over the side or crushed in heavy seas in April 1998. Cleanup costs in the Morgan City, Louisiana, area totaled almost \$1 million.
- A flatbed tractor-trailer hauling black powder in an intermodal freight container overturned on Interstate-95 in Springfield, Virginia, in June 1999, inconveniencing 250,000 highway users and costing society \$25 million due to traffic delays even though there was no release of hazardous materials.
- Over 16,250 gallons of chlorine were released when a freight train derailed in Alberton, Montana, in April 1996 resulting in 1 fatality, 787 hospitalizations, 1,000 evacuations, and over \$4.5 million in cleanup costs.

Total tons of hazardous materials produced are forecast to grow by 2 percent per year. Growth in the amount of hazardous materials transported by air and intermodally could be 4 times and 3 times faster, respectively, than the overall production growth. Therefore, the potential risk to the public may also increase unless effective safeguards are in place. The Department has responsibility for protecting the public from the inherent risks associated with transporting hazardous materials.

The Hazardous Materials Program Evaluation (HMPE) team found that DOT's hazardous materials program works reasonably well but needs to be improved. The hazardous materials program lacks the Departmentwide strategic planning and direction necessary to ensure effective deployment of resources, and there are not reliable and sufficient data upon which to make informed program decisions. The program evaluation's major findings were:

- DOT has not achieved a Departmentwide approach to implementing its hazardous materials programs. Overall, the program lacks sound strategic planning and coordinated DOT-wide direction. No institutional capacity exists in the Department for setting Departmentwide policy and program objectives, or coordinating budget and resource strategies. In addition, DOT's Strategic Plan does not highlight the risks associated with hazardous materials, and the importance of hazardous materials is not emphasized in four of the five Operating Administrations' individual safety programs.
- Shippers of hazardous materials generally receive less attention DOT-wide than carriers, yet they offer the greatest opportunity to improve safety. Shippers are a common element across the Operating Administrations, perform critical functions early in the transportation

stream, and can impact safety system-wide. Currently, shippers account for roughly only 5 percent of all hazardous materials inspections conducted by the Department, although some detailed shipper inspections can take several hours to several days.³ Yet, analysis and public comment repeatedly identify the shipper, more often than the carrier, as the party most culpable for noncompliance with the Hazardous Materials Regulations (HMR). Shippers introduce hazardous materials into the transportation stream and their actions can affect the ability of carriers to safely deliver a product. The team recommends an institutional capacity to be responsible for planning and coordinating DOT-wide actions, including additional emphasis on shippers. Such a DOT-wide effort would have a more synergistic effect and should result in more efficient and effective use of resources.

- Human error continues to be the single greatest contributing factor in hazardous materials incidents and DOT has not been effective in changing this trend. The training requirements in the HMR need to be improved to change industry safety practices and ensure that those responsible for handling hazardous materials are adequately trained.
- DOT should develop a coordinated Departmentwide outreach program to increase the awareness of the traveling public. Passengers need to better understand the risks inherent in the transportation of hazardous materials they introduce into transportation. Passengers, often unintentionally, carry hazardous materials aboard a plane, train, ship, or bus, either in carry-on baggage or as stowed luggage. Also, drivers of passenger vehicles need to better understand the risks associated with placarded hazardous materials vehicles and gain an appreciation of the widespread consequences that could occur as a result of unsafe driver practices.
- DOT's lack of reliable data hampers program delivery decisions. DOT needs to have more reliable, accurate, and timely data to measure program effectiveness and make informed program delivery and resource decisions.
- The total amount of resources used by the Department to carry out the hazardous materials program is not easily identified. In fact, only one Operating Administration (the Research and Special Programs Administration (RSPA)) has a budget line item for its hazardous materials program. The budgets for the other Operating

³ Chapter 6 of this report discusses the variance in time between shipper, carrier, and vehicle inspections.

Administrations' hazardous materials programs are less visible because they are combined in their overall safety programs.

The HMPE team recommends the hazardous materials program be improved by:

- Strengthening strategic planning and coordination by establishing an institutional capacity in the Department to administer and deliver a coordinated hazardous materials program with the authority to establish DOT-wide policy, program objectives, and priorities and focus budget and resource strategies. For example, if analysis of inspection and incident data revealed that improper preparation of closure devices on plastic drums was becoming a problem, the recommended institutional capacity would be able to develop DOT-wide objectives and strategies to address the issue.
- Enhancing program delivery by identifying and focusing more on high-risk or problem shippers, more effectively using all available tools at DOT's disposal, and identifying other critical points in the transportation stream for program focus. For example, problem shippers, such as those with many hazardous materials incidents, may be targeted for inspections, while infrequent hazardous materials shippers may benefit more from outreach.
- Using strike force inspections to cross-train inspectors as well as enforce regulations. Strike force operations concentrate inspectors from the Operating Administrations and other Federal, state, and local agencies at intermodal locations for a specific time period to conduct hazardous materials inspections of more than one mode of transportation that use the targeted location. In addition to enforcing compliance, strike force operations can be used to train inspectors from one Operating Administration on the issues, problems, and regulatory requirements of another Operating Administration.
- Improving outreach aimed at the traveling public by better educating passengers on what materials are hazardous and should not be carried aboard, or placed in stowed luggage on, planes, trains, and buses, and better educating the driving public on the dangers associated with hazardous materials carried over the nation's highways.
- Strengthening the training regulations by tasking the institutional capacity to work with RSPA, the other Operating Administrations, and industry to identify ways to ensure hazardous materials employees are adequately trained to carry out their jobs in a safe manner.

- Enriching the quality of hazardous materials data by tasking the Bureau of Transportation Statistics to work with the Operating Administrations to determine data needs, collection strategies, and analytical techniques.
- Assign to the new institutional capacity the task of addressing several regulatory and programmatic issues identified by the team during the program evaluation, but which were too complex or time consuming for this program evaluation. These issues are described later in this executive summary.

BACKGROUND

Safety is Paramount

Types of hazardous materials range from relatively innocuous products, such as hair spray and perfumes, to bulk shipments of gasoline by highway cargo tanks and anhydrous ammonia by railroad tank cars. Annually in the United States, there are at least 300 million hazardous materials shipments totaling approximately 3.2 billion tons. In 1998, there were roughly 15,000 incidents related to hazardous materials shipments resulting in 13 deaths and 198 injuries.⁴ This is a relatively good safety record given the amount of hazardous materials traffic. There remains, however, the potential for hazardous materials incidents with catastrophic consequences. In many respects, the hazardous materials program is analogous to aviation safety programs because the devastating consequences that a single mishap can produce are an unacceptable outcome.

High risk, low probability events do not lend themselves to traditional cost-benefit analysis for deciding resource allocations. In these cases, DOT strives for zero tolerance and tries to organize its efforts and resources to achieve the goal as efficiently as possible. The public has the right to expect the government, shippers, and carriers to make every reasonable effort to protect it against even the remote possibility of a hazardous material disaster.

From 1993 through 1998, the annual number of hazardous materials incidents reported to DOT averaged 14,488 with relatively little variation in the number each year. During the same period, serious incidents averaged about 418 and ranged from 357 in 1993 to a high of 464 in 1996. RSPA defines a serious incident as one involving: a fatality or major injury due to a hazardous material; closure of a major transportation artery or facility or evacuation of six or more persons due to the presence of a hazardous material; or a vehicle accident or

⁴ As of February 2000, 1999 data were not available.

derailment resulting in the release of a hazardous material.⁵ DOT's Performance Plan sets a goal of 411 or fewer serious incidents for the year 2000. Table 1 shows the number of, and consequences resulting from, serious incidents for 1990 through 1998.

Table 1
Serious Hazardous Material Incident History From 1990 Through 1998

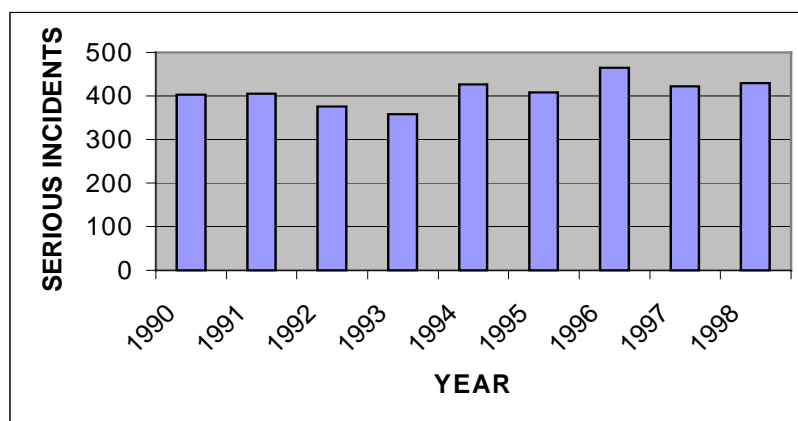
Year	Total Reported Incidents	Number of Serious Incidents	Number of Fatalities	Number of Injuries	Number of Persons Evacuated	Amount of Property Damage
1990	8,879	402	8	423	12,123	\$32,353,276
1991	9,110	403	10	439	10,502	\$38,350,611
1992	9,310	375	15	600	29,186	\$35,164,057
1993	12,830	357	15	627	18,237	\$22,801,551
1994	16,087	429	11	577	18,398	\$44,185,413
1995	14,743	409	7	400	11,444	\$30,903,281
1996	13,950	464	120 ¹	1,175 ²	19,556	\$46,849,243
1997	13,994	417	12	225	24,587	\$33,393,504
1998	15,322	429	13	198	9,181	\$45,497,550
Total	114,225	3,685	211	4,664³	153,214	\$329,498,486

Source: RSPA, Biennial Reports on Hazardous Materials Transportation, and RSPA Hazardous Materials Information System incident database as of October 21, 1999.

1. 110 deaths were the result of the ValuJet incident in 1996.
2. A single rail incident in Montana involving chlorine resulted in injuries to 787 people.
3. In summarizing serious incident injuries for the biennial report, RSPA combines hospitalization (serious) injuries with minor injuries.

Figure 1 shows the trend in serious incidents from 1990 through 1998.

Figure 1
Serious Incidents 1990-1998



Source: RSPA Biennial Report on Hazardous Materials Transportation and HMIS data as of October 21, 1999.

⁵ To meet the definition of serious, the persons evacuated are to be part of "the general public" and not transportation employees.

DOT Safety Issues

In the Hazardous Materials Transportation Act of 1974, Congress stated its intention to improve the regulatory and enforcement authority of the Secretary of Transportation to protect the nation against the risks to life and property, which are inherent in the transportation of hazardous materials in commerce.⁶ The Act allowed the Secretary to draw together previously fragmented regulatory and enforcement authority and provided the flexibility to organize the hazardous materials programs within DOT. The Secretary delegated authority and responsibility to the Operating Administrations to establish their respective programs, but created no organization with authority to coordinate and oversee a DOT-wide hazardous materials program.

HMPE Established by Strategic Plan

In the Department of Transportation's Strategic Plan for 1997-2002, DOT stated that it would undertake a multi-modal hazardous materials program evaluation in FY 1999. The Government Performance and Results Act (GPRA) of 1993 requires Federal departments to prepare Strategic Plans to bring about a fundamental transformation in the way government programs and operations are managed and administered. One of GPRA's purposes is to improve Federal program effectiveness and public accountability by promoting a new focus on results, service quality, and customer satisfaction.

On March 9, 1999, the Secretary announced the formation of a Hazardous Materials Program Evaluation (HMPE) team to conduct a DOT-wide hazardous materials program evaluation. The HMPE team included at least one member from the United States Coast Guard (Coast Guard), the Federal Aviation Administration (FAA), the Federal Motor Carrier Safety Administration (FMCSA) (formerly a part of the Motor Carrier and Highway Safety core business unit within the Federal Highway Administration), the Federal Railroad Administration (FRA), the Research and Special Programs Administration (RSPA), and the Office of Inspector General. A number of prior reviews of the hazardous materials program have been conducted by an internal DOT task force, the U.S. General Accounting Office, and the Transportation Research Board.

The HMPE team concentrated its efforts on cross-modal hazardous materials. Cross-modal hazardous materials activities are covered by Title 49 Code of Federal Regulations (CFR) related to rulemaking and hazardous materials program procedures, and the HMR, 49 CFR Parts 171-180, which govern the packaging and safe transport of hazardous materials by air, highway, rail, and water. Cross-modal movements increase the risk of an incident occurring because these

⁶ Public Law 93-633

movements involve multiple handlings (loadings and unloadings) by transportation providers, and the majority of hazardous materials incidents are attributed to human error. Figure 2 depicts the numerous movements and handlings that can occur in only one shipment of hazardous materials.

Figure 2
Depiction of Air Shipment Requiring Multiple Movements



The program evaluation did not include single-mode movements of hazardous materials that are not governed by the HMR, specifically, bulk shipments by water (involving only the Coast Guard) and pipeline shipments (involving only RSPA).

The HMPE team reviewed hazardous materials legislation and regulations; analyzed mission and function statements; reviewed prior internal and external reports; and interviewed hazardous materials managers and field personnel. In addition, the HMPE team analyzed responses to questions published in a Federal Register Notice (FR Doc. 99-17175) and results of focus group meetings; reviewed the Department's and Operating Administrations' Strategic and Performance plans; analyzed work plans, budgets, resources, and incident data; and participated in field inspections and enforcement activities.

The HMPE team used data from 1990 to 1998 to identify trends. To determine current conditions, the HMPE team used 1998 data to the maximum extent possible. However, when 1998 data were unavailable, the HMPE team used the most recent official data. October 21, 1999 is the latest data that was used by the

HMPE team from RSPA's various databases. During February, the Operating Administrations with hazardous materials responsibilities and selected Secretarial Officers reviewed drafts of the report together with the executive summary and provided the HMPE team with their technical and substantive comments which were incorporated in the final report. The HMPE team met, at the direction of the Deputy Secretary, with senior Operating Administration and Secretarial office officials to decide on the attributes and placement of the institutional capacity.

FINDINGS

DOT's Hazardous Materials Programs Lack DOT-wide Coordination, Direction, and Strategic Planning

DOT is responsible for ensuring the safe transport of hazardous materials by setting standards, inspecting carriers, shippers, and packaging manufacturers, and providing planning and training grants to those responding to hazardous materials incidents. The Secretary has delegated his regulatory authority to RSPA and his enforcement authority to FAA, FMCSA, FRA, RSPA, and the Coast Guard. The HMPE team found the Department's current hazardous materials program could be improved in the areas of program management and program delivery. Specifically, the team found:

- No institutional capacity exists in DOT that is responsible for establishing Departmentwide policy and program objectives, and overseeing budget and resource strategies. Without Departmentwide direction and oversight, DOT is unlikely to deploy its resources as effectively as it could. For example, more benefit might be achieved from a coordinated outreach and education program designed for *infrequent* shippers (most of which are multi-modal shippers) with the resource support of all of the Operating Administrations than could be accomplished through the uncoordinated efforts of the individual Operating Administrations.
- Hazardous materials programs are not emphasized in the Strategic Plan. DOT's Strategic Goal for Safety does not describe how the Department's hazardous materials program will contribute to achieving DOT's safety goal, nor does it include any hazardous materials performance measures or candidate indicators. Except for RSPA, the lack of emphasis on hazardous materials in the strategic plan lessens the importance of hazardous materials in the Operating Administrations' overall safety programs.

Earlier studies reached the same conclusion about the need for better planning and direction:

In a September 1978 report the Secretary and Deputy Secretary agreed to a recommendation made by a Departmentwide team to establish a standing committee to provide a Departmental focal point for carrying out all hazardous materials programs.⁷

A 1981 NTSB report on hazardous materials incidents caused by trucks found that RSPA had been unsuccessful in coordinating the Operating Administrations' hazardous material programs because RSPA was unable to exert influence over the larger Operating Administrations.⁸ The NTSB report found a need for clear and strong direction from the Secretary.

Yet, almost 20 years later, the HMPE team found that the hazardous materials programs still lack such direction. Each Operating Administration develops hazardous materials programs, priorities, strategies, and objectives independently of the other Operating Administrations and without DOT-wide coordination.

DOT's Hazardous Materials Program Delivery Could Be Improved

The HMPE team uses the term hazardous materials “program delivery” to designate the entire suite of activities undertaken by the Operating Administrations to increase compliance with the provisions of the HMR. Activities encompassed by program delivery include standards development, inspections, comprehensive assessments, compliance reviews, investigations, enforcement actions, civil penalties, training, and outreach.

Funding for the five Operating Administrations' hazardous materials programs supports five distinct enforcement and outreach programs resulting in an overall concentration on carriers. The five programs employ the equivalent of 256 hazardous materials field inspectors who are responsible for hundreds of thousands of shippers and carriers. In 1998, these inspectors conducted about 115,000 inspections, including 614 inspections of manufacturers of highway cargo tanks, rail tank cars, cylinders, fiberboard boxes, and drums; 5,228 shipper inspections; 19,299 carrier inspections; and, 89,633 railcar inspections.⁹ Table 2 shows the number of inspections performed at each location where inspectors intervene in the transportation stream.

⁷ U.S. Department of Transportation, Deputy Secretary's Report of the Hazardous Materials Task Force, September 1978.

⁸ NTSB Safety Effectiveness Evaluation, Federal and State Enforcement Efforts in Hazardous Materials Transportation by Truck, NTSB-SEE-81-2, February 1981.

⁹ Not included are 133,000 roadside inspections of commercial motor vehicles carrying hazardous materials conducted by the states under FMCSA's grant program.

**Table 2
Number of Inspections by Point of Intervention – 1998**

Point of Intervention					
Agency	Packaging/ Manufacturing	Shipper	Carrier/ Forwarder	Vehicles/ Railcars	Total
FAA	N/A	208 ¹	3,349	N/A	3,557
FMCSA	20	147	1,927	133,674 ²	135,768
FRA	134	3,617	5,124	89,633	98,508
RSPA	460 ³	1,256 ⁴	N/A	N/A	1,716
Coast Guard	N/A	0	8,899 ⁵	0	8,899
Total	614	5,228	19,299	223,307	248,448

1. Reflects only Repair Station Assessments conducted for 1998. The FAA did conduct hazardous material shipper inspections in 1998; however, this activity was not tracked.

2. Vehicle inspections performed by state resources under the Motor Carrier Safety Assistance Program.

3. Includes container manufacturers and cylinder retesters/reconditioners.

4. Includes shippers and shipper observations, freight terminals/docks, and exemption and approval holders.

5. Includes both vessels examined and intermodal freight containers inspected.

N/A means not applicable to the agency.

Source: Operating Administrations' Inspection Databases

The ONE-DOT HMPE team found program delivery could be improved by placing additional emphasis on (1) shipper inspections and outreach, (2) outreach programs for the traveling public, and (3) training for the hazardous materials community.

- *More emphasis should be placed on shippers.* Shippers introduce hazardous materials into the transportation stream and are responsible for correctly classifying the hazardous material. All subsequent compliance hinges upon proper classification. If a hazardous material is incorrectly classified, it cannot be packaged or labeled properly. Consequently, carriers and emergency response personnel will not be aware of the hazardous properties of the material. Focusing more on shippers helps ensure safe packaging and correct communication of the dangers of the hazardous material before it enters the transportation stream. The HMPE team found that 40 percent of violations discovered during carrier inspections can be traced to shippers and some unknown portion of another 37 percent could be shipper violations, but available information did not allow a further refinement. DOT should devote more effort toward identifying problem or high-risk shippers and directing more outreach and inspections to those shippers to reduce the number of noncompliant shipments being offered to carriers.

The result of the HMPE team's analysis that shippers are more often at fault parallels the results of a 1993 report by the TRB.¹⁰ TRB reported

¹⁰ Transportation Research Board, National Research Council, Hazardous Materials Shipment Information for Emergency Response, Special Report 239, 1993.

that emergency responders expressed concern about the frequency of missing or incorrect placards and shipping papers (shipper responsibilities) at hazardous materials incidents.¹¹ Using Federal Highway Administration (FHWA) data reflecting 1992, TRB reported that during roadside inspections, violations of federal requirements for placarding occur in about 30 percent of the trucks inspected, and violations of shipping paper requirements occur in about 25 percent. FHWA fiscal year 1998 data are slightly worse with improper placarding found on 32 percent of the hazardous materials vehicles inspected and violations of shipping papers found during 26 percent of inspections. A 1989 General Accounting Office report on FRA estimated that 75 percent of all hazardous materials releases could be traced to safety problems at shipper facilities.¹²

The HMPE team's review of FAA data for the past 3 years showed that 88 percent (139 of 158) of FAA's significant penalty assessments, defined as \$50,000 or more, were against shippers. These assessments were incident-driven: the cases were developed from inspections or investigations of shippers performed as a result of hazardous materials incidents reported by carriers. FAA found that these shippers were offering hazardous materials for transportation when they were not packaged, labeled, marked, classed, or in condition for shipment in conformance with the HMR. FAA also found that certain shippers were not ensuring that their employees were trained to properly package and handle hazardous materials. For example, in November 1999, FAA assessed a significant penalty against a shipper who offered for air transportation 525 cigarette lighters containing flammable gas. The lighters were in a fiberboard box and were not properly packaged, labeled, or marked. While a significant monetary assessment is indicative of its seriousness, additional emphasis via outreach and training, as well as inspections, could make a major contribution toward shipper compliance and transportation safety. The modal Operating Administrations currently focus on shippers in reaction to a violation. They should instead be more proactive and focus additional resources on high-risk or problem shippers.

- *Educating the traveling public.* The traveling public is largely unaware of the dangers of the hazardous materials they enter into the transportation system or actions they take on the nation's highways that

¹¹ Although placarding is a joint shipper/carrier responsibility, in the highway mode the shipper is required to provide the necessary placards (49 CFR 172.506).

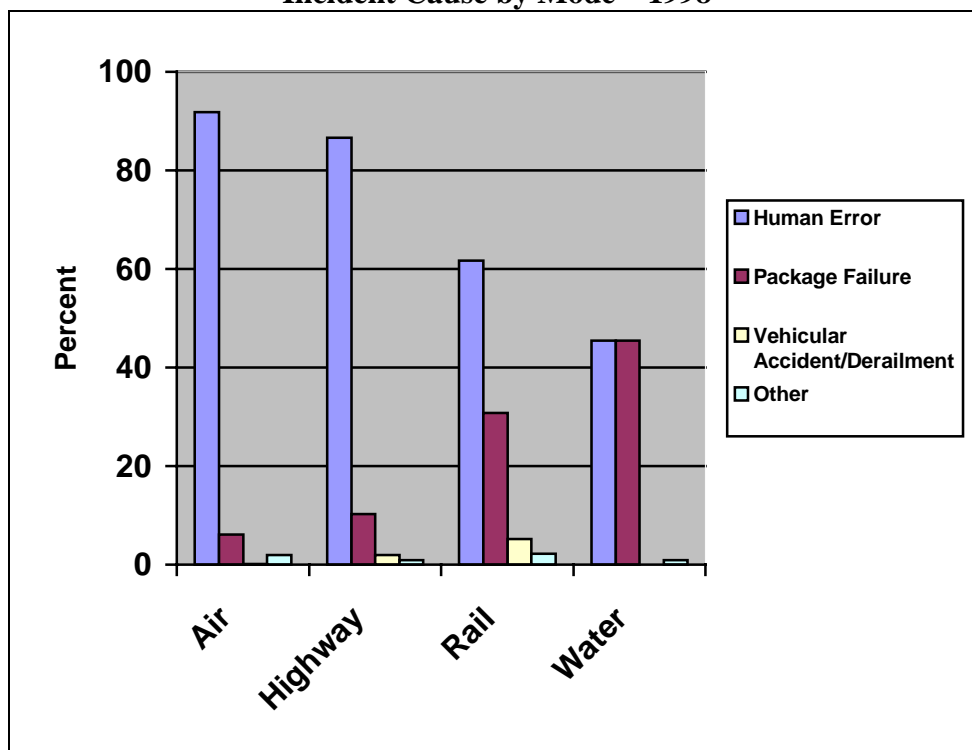
¹² U.S. General Accounting Office, DOT Should Better Manage Its Hazardous Materials Inspection Program, GAO/RCED 90-43, November 1989.

could affect safety. Except in the air mode, there are no requirements to warn the traveling public of the restrictions in the HMR on carrying hazardous materials in transportation. Recent outreach efforts, such as the distribution of a brochure titled “These Fly...These May Not,” have reached only a small percentage of the traveling public. Every day millions of travelers board planes, trains, ships, and buses unaware of the dangers of hazardous materials they may be carrying. Another area requiring improvement involves passenger vehicle driver awareness. The majority of hazardous materials fatalities are the result of highway incidents. These fatalities are primarily related to accidents involving passenger vehicles and motor carriers hauling flammable liquids such as gasoline, and the fatalities are often non-truck occupants. The single largest “driver” reason for truck crashes is a failure of the driver of a passenger vehicle to yield. Drivers of passenger vehicles need to be made aware of the severe consequences that could occur as a result of their unsafe driving practices - the crash of a vehicle hauling hazardous materials.

The HMPE team also found that current notification rules warning the airline traveling public of the dangers associated with transporting hazardous materials are ineffective. The requirement to notify airline passengers may be satisfied by posting a sign at ticket counters and boarding areas. The sign must be legible and prominently displayed. HMPE team members usually had difficulty locating these required notices in airports, and often had difficulty reading them because they were mounted at knee level, in baggage scale areas, or had baggage blocking them.

- *Human error is a major contributor to hazardous materials incidents.* Human error continues to be the single greatest contributing factor in hazardous materials incidents and DOT has not been effective in changing this trend. RSPA data show that roughly 80 percent of hazardous materials incidents are attributable to human error. RSPA, with input from the other Operating Administrations and industry, should identify training improvements for hazardous materials employees and areas of the HMR training requirements needing improvement. For example, there is a requirement that hazardous materials employees be trained and tested for general hazardous materials awareness and job-specific safety requirements. However, there is no requirement that they be trained in order to demonstrate a minimum level of knowledge. Figure 3 depicts the modal breakdown by cause for 1998 hazardous materials incidents.

**Figure 3
Incident Cause by Mode – 1998**



Source: Source: RSPA HMIS incident database as of October 21, 1999.

Lack of Reliable Data Hampers Program Delivery Decisions

The Department is hampered by inadequate information with which to measure program effectiveness and make informed program delivery and resource decisions. DOT lacks reliable information on the amount and types of hazardous materials being shipped and parties who ship and carry hazardous materials. Furthermore, the Department does not receive reports on all hazardous materials incidents, and the reports the Department does receive are often incomplete and inaccurate.

- DOT does not have comprehensive information on hazardous materials manufacturers, carriers, freight forwarders, and shippers. For example, RSPA established a Unified Shippers Enforcement Data System (UNISHIP) database for the Operating Administrations to record and track shippers who have violated the HMR. This information would be helpful in identifying repeat offenders for inspection and in establishing the amount of a subsequent penalty. However, the Operating Administrations do not update the database with enforcement results frequently enough to make it useful to inspectors. An additional example is RSPA's registration database that only contains information

on one segment of the hazardous materials industry -- those shippers that ship or offer for shipment very dangerous or very large quantities of hazardous materials.

The information reported on DOT's reporting form for hazardous materials incidents, Form 5800.1, is often inaccurate and/or incomplete and, therefore, subject to misinterpretation during analysis. For example, the HMPE team analyzed the incident reports for 1996 to determine if our assessments of incident causes would match those of RSPA's contractor personnel.¹³

The HMPE team's results were markedly different than RSPA's. RSPA reported that package failure was the cause of 15.4 percent of all incidents versus the HMPE team's analysis of incident report data that determined a rate of 34.6 percent. The HMPE team also found three serious incidents that were not included in RSPA's database. Table 3 compares RSPA's causal data with the HMPE team's analysis.

Table 3
Distribution of Incident Causes

Cause	RSPA Determined Cause (percent of total)	Program Evaluation Team Determined Cause (percent of total)
Human Error	80.7	61.0
Package Failure	15.4	34.6
Vehicle Accident/Derailment	2.4	2.6
Other	1.5	1.8
Total	100	100

Source: RSPA, Biennial Reports on Hazardous Materials Transportation, and RSPA HMIS incident remarks subsystem report for 1996.

In a 1981 report, GAO stated that, historically, the Department of Transportation did not have the critical information necessary to manage its hazardous materials program.¹⁴ The HMPE team found this problem still exists almost 20 years later. Furthermore, no single entity within the Department has overall responsibility to develop and execute a data/information plan or analyze the data for use in directing the Department's hazardous materials program.

The Department is hampered by the lack of reliable, accurate, and timely information on which to evaluate program effectiveness and base

¹³ 1996 was selected because it is DOT's baseline year for the hazardous materials performance goal.

¹⁴ U.S. General Accounting Office, Programs For Ensuring The Safe Transportation of Hazardous Materials Need Improvement, GAO/RCED-81-5, November 1980.

program delivery decisions. A more complete and accurate collection and analysis of data would permit the Department to effectively measure its overall effectiveness, issue and implement proactive safety regulations, develop risk management methodologies, and make effective resource deployment decisions.

- The amount of DOT resources (both staffing and budget) actually used to carry out the hazardous materials program is not readily known by the Department. Only one Operating Administration has a separate budget line item for hazardous materials, and the HMPE team had difficulty determining resources applied to the hazardous materials program DOT-wide.

CONCLUSIONS AND RECOMMENDATIONS

Strategic Planning and Program Direction

The HMPE team has concluded that the Department has not taken a DOT-wide approach in administering the hazardous materials program. The Department lacks strategic planning and a coordinated DOT-wide program direction for hazardous materials. As a result, the Department is unlikely to improve and, because of forecasted growth, may not maintain the existing level of safety in hazardous materials transportation. To achieve a ONE-DOT approach to hazardous materials safety, the Department should:

- Establish an institutional capacity, complementary to the Operating Administrations at the Departmentwide level, to facilitate program coordination and direction to provide for more effective deployment of DOT's hazardous materials resources. The institutional capacity would administer and deliver a Departmentwide hazardous materials program to strengthen strategic planning, program coordination, and program delivery. It would have the authority to establish DOT-wide policy, program objectives and priorities, and focus budget and resource strategies. A Departmentwide hazardous materials program can best be instituted by delegating authority to a new or existing entity to be responsible for the program. Essential attributes of the new institutional entity should be to:
 - serve as the principal adviser to the Secretary on all intermodal hazardous materials matters;
 - act as the focal point for review of hazardous materials policies, priorities, and objectives;

- provide oversight for planning and budgeting strategies for hazardous materials programs DOT-wide;
- resolve disputes among Operating Administrations on hazardous materials issues;
- provide external reviews and continual monitoring of DOT's hazardous materials programs; and
- coordinate DOT-wide hazardous materials outreach and data activities.

The new institutional capacity also should be tasked with addressing several regulatory and programmatic issues identified by the team during the program evaluation, but which were too complex or time consuming for this program evaluation. These issues are described later in this executive summary.

Program Delivery

The Department needs to refocus its efforts to improve its impact on hazardous materials safety. Shippers of hazardous materials and the traveling public should receive more attention by DOT to improve safety earlier in the transportation stream. We recommend that the Secretary take the following actions to improve program delivery:

- Develop strategies and actions to identify and focus more on high-risk or problem shippers through development of better data, more outreach activities, and inspections.
- Develop a method to improve the use of strike force inspections to cross-train inspectors as well as enforce regulations.
- Develop a coordinated, Departmentwide outreach program that is well-designed, visible, and directed toward the traveling public.
- Develop strategies and actions to increase the effectiveness of activities targeted at the human factor contribution to incidents. The institutional capacity should plan and ensure implementation of a coordinated plan of action, including outreach, inspections, and strengthening training standards to improve industry safety practices.

Sufficient and Reliable Data

The Department is hampered by the lack of reliable, timely, and accurate information with which to evaluate program effectiveness and base program

delivery decisions. As a result, the Department is unable to gauge its effectiveness or accurately assess its impact on achieving hazardous materials safety or better develop risk-based regulations. To improve the quality and quantity of hazardous materials data, the HMPE team recommends that the Secretary:

- Task the Bureau of Transportation Statistics, supported by the Operating Administrations, to review and analyze all existing databases containing hazardous materials information to make the data more useful in supporting a DOT-wide hazardous materials program. The project would also identify additional hazardous materials program data needs, including better information on incident causes, and establish and implement a plan to acquire the needed data.
- Require the modal Operating Administrations to identify in their budgets the funding and staffing levels being used to carry out their hazardous materials programs.

ADDITIONAL HAZARDOUS MATERIALS ISSUES TO BE RESOLVED

During the program evaluation, the team identified a number of issues that should be addressed by the Department, but which were too complex and time-consuming for this program evaluation. However, the HMPE team believes that DOT needs to resolve these issues for DOT to operate an effective, vigilant, and visible ONE-DOT hazardous materials program. The Department should task the new institutional capacity with addressing the following issues:

- Gain a better understanding of the nature of shipper and carrier practices related to undeclared hazardous materials shipments to determine whether additional Departmental efforts or resources are needed.
- Continue to clarify and improve the effectiveness of the hazardous materials regulations. During focus group meetings, several attendees commented on the difficulty for individuals or small businesses to use the regulations correctly.
- Review the adequacy of the Performance Oriented Packaging regulations. Comments made at the focus group meetings and the HMPE team's analysis of incident reports show a much higher percentage of incidents related to package failure than is currently identified by DOT.
- Continue to increase DOT's cooperation with the United States Postal Service to identify any potential safety gaps as they relate to hazardous material shipments in the United States mail system.
- Continue DOT's efforts to reauthorize its hazardous materials safety program, including expanding inspection authority to open packages suspected to be

non-compliant or containing hidden shipments of hazardous materials as has been proposed in the Hazardous Materials Reauthorization Act as well as in the ongoing rulemaking. Until DOT inspectors are aided by material changes in inspection and enforcement authority, the Department should identify ways to better use and improve upon its current inspection and enforcement strategies.

- Identify a measure for the performance plan that more fully reflects activities and outcomes over which the HMR have influence, rather than the current “serious incidents” measure. A proper performance measure would allow the Department to accurately assess the success of the hazardous materials program.

DOT's SENIOR LEADERSHIP RESPONSE

The program evaluation found that DOT's hazardous materials programs works reasonably well but needs to be improved through DOT-wide strategic planning and program coordination, more focused delivery, and better data.

To address the recommendations contained in the report, DOT's Deputy Secretary met with the HMPE Sponsors (the Assistant Secretary for Budget and Programs/Chief Financial Officer, the Inspector General, and the Administrator, Research and Special Programs Administration) and the HMPE team on December 14, 1999, to provide input and direction. The Deputy Secretary asked for two subsequent meetings with the HMPE Sponsors, the HMPE team, and DOT's Senior Leadership Team (comprised of DOT's Secretarial Officers and Heads of Operating Administrations) on January 13, and March 16, 2000. During February, the Heads of Operating Administrations with hazardous materials responsibilities and selected Secretarial Officers reviewed drafts of the report and provided the HMPE team with their technical and substantive comments which were incorporated in the report.

On January 13th, the HMPE team briefed the Senior Leadership Team on each of the recommendations contained in the report. At this meeting, the Deputy Secretary asked the HMPE team to meet with senior policy representatives from each of the affected Operating Administrations to develop an implementation strategy to establish the recommended institutional capacity to coordinate hazardous materials programs in the Department. The HMPE team and the policy representatives met on February 4 and 7, 2000, to discuss various organizational locations and structures for the institutional capacity.

On March 16th, the HMPE team met with the Senior Leadership Team to report on a proposal to implement an institutional capacity developed by the combined HMPE and policy team on February 4th and 7th. A unanimous decision was reached by the Senior Leadership Team to place this capacity in the Office of

Intermodalism under the Associate Deputy Secretary. It was also agreed during this meeting that DOT should begin drafting Secretarial delegations to place the additional necessary responsibilities and authorities under the Associate Deputy Secretary. On March 16th, the HMPE Sponsors tasked RSPA's Office of the Chief Counsel to work with the Department's Assistant General Counsel for Regulation and Enforcement to start drafting appropriate delegations. The draft delegations are expected to be completed shortly and coordinated within DOT.

Once the institutional capacity is in place and staffed, its first task will be to oversee implementation all of the recommendations in the report related to coordination, program delivery, and data and oversee the areas identified for further analysis. DOT's Senior Leadership Team also supported the recommendation that the Operating Administrations and the Bureau of Transportation Statistics work together to improve specific program delivery and data issues following issuance of the report.

