

SAFETY PERFORMANCE DATA

RSPA's Office of Hazardous Materials Safety (OHM) maintains the Hazardous Materials Information System (HMIS). This system is the principal source of safety data related to hazardous materials transportation. It contains comprehensive information on hazardous materials incidents, exemptions and approvals, enforcement actions, and other elements that support the regulatory program.

The HMIS is used by DOT, other Federal agencies, state and local governments, industry, researchers, the media, and the public. HMIS data supports regulatory evaluation and policy making, training programs, the better understanding of hazardous materials transportation incidents, and identification of possible safety problems.

To enhance the HMIS, menu-driven programs used by state and local governmental agencies continued to be improved. These improvements permit generation of additional summary statistical reports, expand the search criteria, and give the ability to sort records before printing. Other system and database modifications improved HMIS information storage and retrieval capabilities. The six subsystems improved are:

- < Incidents generally involving the transport of hazardous materials by one or more modes;
- < Exemptions issued under the Hazardous Materials Regulations;
- < Interpretations of regulations issued by RSPA;
- < Approvals of specialized container manufacturers, reconditioners, retesters, shippers, and explosives manufacturers;
- < Compliance activities, inspection data, and completed enforcement proceedings; and
- < Registrants to the Hazardous Materials Registration Program.

In addition, RSPA used emerging technologies to improve the responsiveness of the HMIS. Alternative methods of archiving incident source documents are ongoing to improve the HMIS storage capability and the ease of retrieving reports. Also, additional software improvements for the HMIS data entry program were completed in 1998. Work continued on migrating the HMIS from its existing database management system into a more robust environment to improve system performance, maintenance, and accessibility. In 1998, RSPA began an initiative to make more data and reports available to the public on the Office of Hazardous Materials Safety Internet Home Page.

1998 Safety Statistics

In 1998, 15,349 hazardous materials incidents were reported. The total number of incidents increased by 1,354 this year. This is an increase of 8.8 percent. Most of this increase is due to higher levels of reporting by small-package highway carriers. Another factor in the growth is an increase in air incident reporting.

Air incidents have gradually increased from being approximately four percent of all reported incidents in 1992 to being seven percent in 1997. In 1998, air incidents jumped to being nine percent of all 1998 incidents. Along with this trend, air incident injuries have decreased from a high of 54 in 1994 to 20 in 1998. This reflects continued efforts by both RSPA and FAA to improve carriers' awareness of the reporting criteria.

Overall, highway incidents increased by 1,107 to 12,968. Rail incidents declined, dropping by 112 to 990, their lowest level in the past decade. Although there were few non-bulk water incidents in 1995, their number more than doubled from five to 11. Reported air incidents increased by 353 (34 percent) to 1,380.

Examining the incidents by hazard class, flammable-combustible liquids and corrosive materials were involved in the most incidents, accounting for 77 percent of all 1998 incidents.

On October 1, 1998, HM-200 went into effect, subjecting intrastate motor carriers who transport hazardous materials to the Federal hazardous materials regulations and incident reporting requirements. No significant effects have been noticed from this rulemaking in 1998, due to only three months of reporting.

Serious incidents, which RSPA has defined as an incident that involves 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 derailment resulting in the release of a hazardous material, remain constant with less than a three percent increase from 1997 to 1998. The 432 serious incidents equal 2.8 percent of all 1998 incidents. Further, in 1998, bulk incidents, while only 20.1 percent of all incidents, accounted for 75.5 percent of all serious incidents.

One incident in 1998 resulted in a significant number of injuries and/or fatalities. This incident, a highway shipment of gasoline being unloaded in Biloxi, MS, caused five fatalities and one major injury. Another incident, a truck crash in Chester, PA involving gasoline, caused two fatalities and more than \$4 million in damages. Two incidents involved the evacuation of a large number of people. In one of these incidents, a truck carrying Type E Blasting Explosives in Milwaukee, WI was involved in a crash and although there was no release of product, 900 people were evacuated. The other incident involved the release of formaldehyde solution, a corrosive material, from a derailment of two rail cars in Cox Landing, WV. In this incident, 500 people were evacuated. Additionally, there were three train derailments in 1998 that resulted in damages greater than \$2 million. While the number of rail incidents decreased in 1998, the damages due to rail incidents nearly doubled; however, these three derailments accounted for nearly half of all damages due to rail. These incidents maintained the urgency of DOT's continuous work to improve safety in transporting hazardous materials.

1999 Safety Statistics

In 1999, 16,992 hazardous materials incidents were reported. The total number of incidents increased by 1,643 this year. This is an increase of 10.7 percent. This increase can be attributed to continued higher levels of reporting by small-package highway carriers and continued growth in reporting by air carriers and increased reporting by intrastate carriers. Overall, highway incidents increased by 1,383 to 14,351. Rail incidents increased by 65 to 1,055, still lower than the years prior to 1998. The non-bulk water incidents continue to be rare, decreasing from eleven in 1998 to eight in 1999. Reported air incidents increased by 198 (14.3 percent) to 1,578 and air injuries decreased by seven (35 percent) to 13, continuing to reflect the efforts of RSPA and FAA to improve carriers' awareness of the reporting criteria. Examining the incidents by hazard class, corrosive materials and flammable-combustible liquids were involved in the most incidents, accounting for 80 percent of all 1999 incidents.

Serious incidents, which RSPA has defined as an incident that involves 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 derailment resulting in the release of a hazardous material, dropped by 14.6 percent from 1998 to 1999. The 369 serious incidents equal 2.2 percent of all 1999 incidents. Further, in 1999, bulk incidents, while only 17.5 percent of all incidents, accounted for 73.4 percent of all serious incidents.

Of the six incidents resulting in fatalities, four were the result of a vehicle crash that caused the load of gasoline to ignite. The other two fatalities were the result of errors made by the operator when unloading the material. Three incidents involved the evacuation of a large number of people. In one of these incidents, a rail car carrying an Organic Toxic Liquid, n.o.s., released vapor and product in the Temple, TX rail yard. Local authorities evacuated approximately 2,500 people, including about 2,200 student and faculty of a local high school and about 300 of the nearby residential and commercial populace. The second large evacuation incident involved an en-route release of about 30 gallons of sulfuric hydrochloric acid from a tank truck in Selinsgrove, PA. The road was closed for about 30 hours and approximately 1,000 people were evacuated from the surrounding area. Six people suffered minor burns to their arms and nasal passages. The third large evacuation incident involved a spill of a poisonous corrosive material when two drums were punctured by a forklift during unloading. 1,000 people were evacuated from the area. Additionally, there were three train derailments in 1999 that resulted in damages greater than \$1 million. These three derailments accounted for nearly half of all damages due to rail. These incidents maintained the urgency of DOT's continuous work to improve safety in transporting hazardous materials.

Description of Charts and Graphs

Exhibits 1.1 and 1.2 summarize hazardous materials transportation incidents over the past eight years. During this time, the number of incidents increased every year to a peak in 1994 and has declined through 1997. In 1998, however, there was an 8.8 percent increase in the number of incidents and in 1999 there

was a 10.7 percent increase. Highway, clearly the most prevalent mode for incidents, accounted for the majority of incidents (85 percent) in that period and for all fatalities except in 1996 when an air incident and two rail incidents resulted in fatalities. Serious incidents have remained relatively steady throughout the 1990s, but declined 7 percent in 1998 and 21 percent in 1999 from a high reached in 1996.

Exhibit 1.3 summarizes vehicular accident and derailment incidents over the past eight years. The average number of incidents per year has been just under 300. All fatalities from these incidents were highway-related, except for two rail fatalities that occurred in 1996. All injuries involved highway and rail modes of transport.

Exhibit 1.4 summarizes hazardous waste incidents over the past eight years. The total number of hazardous waste incidents dropped each year from 1996 through 1998 and then rose by four percent in 1999. The number of hazardous waste incidents in 1998 is more than 37 percent lower than the peak value, which occurred in 1995. In 1999, it is more than 35 percent lower than the 1995 peak value. After a long period with no fatalities, there was one fatality in 1996 and two more in 1998. Most injuries involved highway and rail modes of transport. The only injuries involving the air mode of transportation occurred in 1998.

Exhibits 2.1 and 2.2 display hazardous materials transportation incidents and fatalities over the past eight years and correspond to data from Exhibit 1.1.

Exhibits 2.3 - 2.6 display the number of incidents by mode over the past eight years. Exhibit 2.5 shows the noticeable increase in reporting of air incidents in 1998 and 1999. The number of incidents that are bulk and non-bulk is also shown for highway and rail. The number of bulk incidents has remained fairly steady since 1990, except for a noticeable reduction in bulk rail incidents in 1998.

Exhibit 3.1 displays the hazardous materials incidents reported since 1985 and regulatory changes affecting reporting requirements. The graph is segmented into highway and all other incidents, and shows the impact highway incidents have on the trend of incidents. The peaks in incident reporting in 1994 and 1999 are also particularly evident.

Exhibit 3.2 displays the serious hazardous materials incidents since 1990. Note that serious incidents are measured on a different scale than all incidents. Serious incidents have remained relatively steady throughout the 1990s, but have declined from a peak in 1996.

Exhibit 3.3 illustrates the number of all incidents since 1990 that involved commodities shipped in bulk packagings. The number of bulk incidents has remained fairly constant during this period; most of the variability in the number of incident reports is due to changes in the number of non-bulk incidents.

Exhibits 4.1.1 - 4.1.4 show reported incidents and damages by hazard class. The first four columns of Exhibits 4.1.1 and 4.1.2 present and rank incidents by hazard class, and the last four columns present the number of incidents involving dollar damages, damages by dollar amount, percent, and rank. The majority

of incidents and damages involved flammable-combustible liquids and corrosive materials. Exhibits 4.1.3 and 4.1.4 graphically depict the distribution of incidents among the top five hazard classes.

Exhibits 4.2.1 and 4.2.2 display injuries by hazard class. Also included is a breakdown between major and minor injuries. In 1998, corrosive materials, flammable-combustible liquids, and poisonous materials accounted for more than 85 percent of injuries. In 1999 they accounted for more than 82 percent of injuries.

Exhibit 4.3 lists the hazardous materials involved in incidents resulting in fatalities. One air incident in 1996 involving oxidizers resulted in 110 fatalities. Of the remaining materials, gasoline accounted for the most fatalities in both 1998 and 1999.

Exhibit 4.4.1 and 4.4.2 rank the 50 top hazardous materials involved in incidents. These 50 materials, out of approximately 3,000 hazardous materials identified in the Hazardous Materials Table, 49 CFR §172.101, were involved in 72 percent of all incidents in 1998 and 74.7 percent in 1999. The Exhibits list the commodity, corresponding hazard class, number of incidents reported for that commodity, and corresponding percentage.

Exhibits 4.5.1 and 4.5.2 rank the hazardous materials involved in serious incidents. These materials were involved in less than three percent of all incidents in 1998 and 1999. Gasoline accounts for more serious incidents than any other hazardous material. The Exhibits list the commodity, corresponding hazard class, number of incidents reported for that commodity, and corresponding percentage.

Exhibit 5 shows the distribution of incident damages in the five categories that appear on the report form. Carrier damage and decontamination/cleanup costs made up 71.6 percent of the costs associated with incidents involving damages in 1998 and 81.3 percent in 1999.

Exhibits 6.1 and 6.2 show the breakdown of incident causes by mode of transportation. Human error was the main cause of incidents in 1998 and 1999. Combined with package failure, these two causes are responsible for nearly 97 percent of all incidents each year. Note that for accidents and derailments the cause of the incident is not determined.

Exhibits 7.1 and 7.2 display information on incidents involving an evacuation. The incidents are broken down by mode, cause, and consequence. Human error was the main cause of evacuation incidents in 1998 and in 1999. For rail, while human error is the leading cause of all rail incidents, it causes the fewest number of rail evacuations. When looking at total incidents with evacuations, accidents and derailments are nearly nine times as likely to cause evacuations than human error, package failure, and other incident causes combined.

Exhibits 8.1.1 and 8.1.2 show the consequences of hazardous materials incidents by transportation phase. As can be expected, most incidents resulting in high damages were due to en route accidents. En route

accidents also result in a higher average number of minor injuries per incident than the other incident types. Unloading incidents result in the second largest number of fatalities, the most major injuries, and by far the largest number of incidents.

Exhibits 8.2.1 and 8.2.2 display the consequences of bulk and non-bulk hazardous materials incidents. Although an approximately equal number of minor injuries result from bulk and non-bulk incidents, bulk incidents lead to significantly more fatalities, major injuries, and damages greater than \$50,000. Non-bulk incidents accounted for the majority of evacuations.

Exhibits 8.3.1 and 8.3.2 illustrate the consequences of hazardous materials incidents by time of day. Most injuries occur between 9 a.m. and noon. In 1998, fatalities are distributed throughout the late evening and early morning and the three hours after noon. In 1999, fatalities are distributed throughout the morning and early afternoon.

Exhibits 9.1 and 9.2 show the number of serious bulk and non-bulk hazardous materials incidents by time of day. In 1998, most serious incidents occurred between 6 a.m. and noon. In 1999, most serious incidents occurred between 6 a.m. and 3 p.m.

Exhibit 10.1 displays the breakdown of hazardous materials incidents, injuries, fatalities, and damages by state. States with large population centers and industrial cities had the most hazardous materials incidents.

Exhibits 11.1.1 - 11.7.2 display 1998 and 1999 incident data by county. The areas with the greatest concentration of hazardous materials incidents either were industrial centers or included numerous terminal facilities. Exhibits 11.1.1 and 11.1.2 display the location of all incidents reported to RSPA. Exhibits 11.2.1 and 11.2.2 show the origin of shipments that resulted in an incident. Exhibits 11.3.1 and 11.3.2 show the location of highway incidents and Exhibits 11.4.1 and 11.4.2 display the location of rail incidents. Exhibits 11.5.1 and 11.5.2 show the location of loading and unloading incidents and Exhibits 11.6.1 and 11.6.2 show the location of incidents that occurred en route. Exhibits 11.7.1 and 11.7.2 show the location of serious incidents. Note that the exhibits for rail, en route, and serious incidents use a different classification scheme from the other exhibits.