

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. In 1996, RSPA responded to 504 requests for HMIS data, and in 1997, RSPA responded to 533 requests. 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 interstate transport of hazardous materials by one or more modes;
- Exemptions issued under the HMR;
- 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, software improvements for the HMIS data entry program migration to a Windows environment were initiated in 1996 and completed in 1997. Personal computer upgrades were implemented and a full system conversion to an enhanced VAX computer was completed. Work began on migrating the HMIS from its existing database management system implementation into a more robust environment to improve system performance, maintenance, and accessibility.

1996 Safety Statistics

In 1996, 13,937 hazardous materials incidents were reported, continuing the downward trend started in 1995. The total number of incidents dropped by 806 this year. Combined with the drop of the previous year, this represents a total decrease of 13 percent from the 1994 level. Lower levels of reporting by small-package highway carriers continue to account for most of this reduction. Overall, highway incidents decreased by 855 to 11,911. Rail incidents declined slightly, dropping by 45 to 1,108. Although there were few non-bulk water incidents in 1995, their numbers were cut in half. Reported air incidents increased by 100 to 912, reflecting efforts by both RSPA and FAA to improve carriers' awareness of the reporting criteria. Examining the incidents by hazard class, flammable-combustible liquids and corrosive materials were involved in the most incidents, accounting for 79 percent of all 1996 incidents.

Serious incidents, which RSPA has defined as an incident that involves a fatality, major injury, closure of a major transportation artery or facility, evacuation of six or more persons, or a vehicle accident or derailment, increased 13 percent in 1996 with 464 serious incidents equaling 3.3 percent of all 1996 incidents. Further, in 1996, bulk incidents, while only 22.3 percent of all incidents, accounted for 76.5 percent of all serious incidents.

Four incidents dramatically affect the 1996 numbers of injuries and fatalities. An air shipment of undeclared chemical oxygen generators ignited in flight over Florida, resulting in 110 fatalities. A rail derailment in Alberton, MT resulted in the evacuation of the town, 1 fatality, and 787 minor injuries from inhalation of chlorine gas. Another derailment in Cajon, CA, involving four cars of flammable liquids, resulted in 1 fatality and 50 minor injuries. A rail unloading incident in Stratford, TX caused a release of anhydrous ammonia leading to 2 major and 24 minor injuries. These incidents increased the urgency of DOT's continuous work to improve safety in transporting hazardous materials.

1997 Safety Statistics

In 1997, 13,853 hazardous materials incidents were reported, a slight decrease from 1996. Overall, highway incidents decreased from 1996 by 161 to 11,750. Rail incidents declined slightly, dropping by 12 to 1,096, while non-bulk water incidents remained at a low level. Reported air incidents increased by 91 to 1,003, continuing to reflect efforts by both RSPA and FAA to improve carriers' awareness of the reporting criteria. Examining the incidents by hazard class, flammable-combustible liquids and corrosive materials were involved in the most incidents, accounting for 79 percent of all 1997 incidents.

Serious incidents declined 10 percent in 1997 with 417 serious incidents equaling 3.0 percent of all 1997 incidents. Further, in 1997, bulk incidents, while only 21.9 percent of all incidents, accounted for 71.2 percent of all serious incidents.

Unlike 1996, there was only one incident in 1997 that resulted in a large number of injuries or fatalities. This incident, in Industry, CA, involved a spill of hydrochloric acid during unloading of a highway cargo tank that resulted in 22 major injuries. However, there were two incidents resulting in the evacuation of a large number of people. One of these incidents involved a spill of chloroprene, a flammable-combustible liquid, in Ragin, MS from two rail cars following a derailment. This incident caused the evacuation of 6,000 people. The other incident caused the evacuation of 5,000 people and occurred in Appleton, WI. It involved a release of propane from two rail cars following a derailment.

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. 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 10 percent in 1997 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. The only rail fatalities from these incidents during this period 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 in 1996 and again in 1997. The number of hazardous waste incidents in 1997 is more than 39 percent lower than the peak value, which occurred in 1995. For the first time in more than 10 years, however, there was one fatality, occurring in 1996. All injuries involved highway and rail modes of transport.

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. 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.

Exhibit 3.1 displays the hazardous materials incidents reported since 1983 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 peak in incident reporting in 1994 is also particularly evident.

Exhibit 3.2 displays the serious hazardous materials incidents since 1990. Serious incidents have remained relatively steady throughout the 1990s, but have declined slightly 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 five 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. Poisonous gas moved to the top in 1996 due to a Montana rail incident where a chlorine gas release resulted in the evacuation of 1,000 people and 787 minor injuries. Excluding this incident in 1996, and for all of 1997, flammable-combustible liquids, corrosive materials, and poisonous materials accounted for more than 68 percent of the remaining 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 1996. Gasoline was also the material involved in most fatalities during 1997.

Exhibits 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, make up 72 percent of all incidents in both 1996 and 1997. The Exhibits list the commodity, corresponding hazard class, number of incidents reported for that commodity, and corresponding percentages.

Exhibits 4.5.1 and 4.5.2 rank the hazardous materials involved in serious incidents. These materials make up 3 percent of all incidents in both 1996 and 1997. The Exhibits list the commodity, corresponding hazard class, number of incidents reported for that commodity, and corresponding percentages.

Exhibit 5 characterizes incident damages into the five categories that appear on the report form. Product loss, carrier damage, and decontamination/cleanup costs make up most of the costs associated with incidents involving damages in 1996. In 1997, however, product loss decreased dramatically. Most other damage categories saw slight decreases in 1997.

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 both 1996 and 1997. Combined with package failure, these two causes are responsible for more than 96 percent of all incidents.

Exhibits 7.1 and 7.2 display information on incidents involving an evacuation. The incidents are broken down by mode, cause, and consequence. Although the total number of evacuation incidents decreased from 1996 to 1997, the number of people evacuated increased 26 percent.

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. After en route accidents, unloading incidents result in the most serious consequences.

Exhibits 8.2.1 and 8.2.2 display the consequences of bulk and non-bulk hazardous materials incidents. Although an equal number of minor injuries result from bulk and non-bulk incidents, bulk incidents lead to significantly more fatalities, major injuries, damages greater than \$50,000, and 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. Fatalities are distributed throughout the day, except for the three hours before midnight, in which none occurred.

Exhibits 9.1 and 9.2 show the number of serious bulk and non-bulk hazardous materials incidents by time of day. Most serious incidents occur between 6 a.m. and noon.

Exhibits 10.1 and 10.2 display the breakdown of hazardous materials incidents, injuries, fatalities, and property damages by state. States with large population centers and industrial cities had the most hazardous materials incidents.

Exhibits 11.1.1 - 11.6.2 display 1996 and 1997 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. Note that the exhibits for rail and en route incidents use a different classification scheme from the other exhibits.