

SP-20

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

Log I-74

ISSUED: APR 19 1985

Forwarded to:

Honorable Elizabeth H. Dole  
Secretary  
U.S. Department of Transportation  
Washington, D. C. 20590

SAFETY RECOMMENDATION(S)

I-85-13 and -14

At 3:30 p.m., on September 2, 1983, Baltimore & Ohio Railroad Company freight train No. 4032 derailed near Murdock, Illinois. Alcohol was released from some of the derailed tank cars, fire ensued, and all persons within a 1/2-mile radius were evacuated because the fire was impinging upon four tankcars loaded with flammable compressed gas. By 9:50 p.m., two of the tank cars had exploded, and three-fourths of one of the tanks had rocketed a distance of 3,630 feet from the derailment. Part of the available propulsive energy was dissipated when the end of the tank contacted a derrick and struck the ground during its flight. The emergency response agency established its command post on the perimeter of the evacuation area, and people congregated at points around this perimeter.

The U. S. Department of Transportation's Emergency Response Guidebook for Hazardous Materials Incidents (DOT Guidebook) was developed "for use by firefighters, police, and other emergency services personnel as a guide for initial actions to be taken to protect themselves and the public..." For the commodities involved in the Murdock fire, the DOT Guidebook recommends that the radius of the evacuation zone be 1/2 mile, or 2,640 feet. Since this distance is almost 1,000 feet less than the 3,630 feet that pieces of the tank car rocketed at Murdock, the Safety Board believes that the DOT Guidebook guidance on evacuation distances can create a false sense of security for emergency response personnel. The technical information used for developing recommended evacuations listed in the DOT Guidebook lists an earlier violent rupture where portions of a tank car traveled 4,900 feet, a distance much greater than the evacuation distance recommended by the DOT Guidebook.

The following are excerpts from information prepared by the National Aeronautics and Space Administration (NASA) Lewis Research Center, which was used in formulating the recommended evacuation zone sizes in the DOT Guidebook:

Evacuation areas are defined for those transportation accidents where volatile chemical propellant tanks are exposed to fire in the wreckage and eventually explode with consequent risks from fragments in surrounding areas. An evacuation area with a minimum radius of 600 m (2,000 ft) is recommended to limit the statistical probability of fatality to one in 100 such accidents.

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Fragments from such accidents, mostly large portions of tanks, were thrown or rocketed hundreds of meters and their impact in surrounding communities often caused casualties and extensive property damage.

The introduction to the DOT Guidebook states that the information in the book is intended to provide guidance primarily during the initial emergency response phase. However, it does not indicate that more extensive evacuations may be necessary when tanks are being impinged by flames. The user of the DOT Guidebook does not have access to the information used to arrive at the recommended evacuation distances in the DOT Guidebook; consequently, users are not aware that parts of tanks from chemical tank explosions have been known to travel distances that far exceed the recommended evacuation distances.

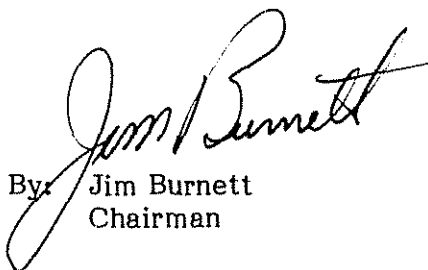
The Safety Board is concerned that because of the criteria used by the DOT in determining the recommended initial evacuation distances, firefighters, police, other emergency service personnel, persons who reside near the site of rail accidents that involve tank cars carrying liquid or gases, and spectators who may gather at the perimeter of the evacuation zones recommended by the DOT Guidebook nevertheless may be exposed to injury from debris propelled from exploding tank cars. Consequently, the recommended action in the DOT Guidebook must be qualified so that it will not be interpreted as the only action necessary. The Safety Board believes that users of the DOT Guidebook must be made aware that segments of tank cars may be propelled beyond the DOT-recommended evacuation zones. However, dissemination of this information is complicated by the DOT authorization for publication and distribution by others of the DOT Guidebook.

Therefore, the National Transportation Safety Board recommends that the U.S. Department of Transportation:

Amend the U.S. Department of Transportation Emergency Response Guidebook for Hazardous Materials Incidents to reflect the fact that parts of a rail tank car carrying liquids or gases may be propelled unpredictable distances should it rupture violently, that parts of such cars have been known to travel far greater distances than the recommended initial evacuation zones, and that far greater evacuation distances may be necessary to protect against injury. (Class II, Priority Action) (I-85-13)

Pending revision of the U.S. Department of Transportation Emergency Response Guidebook for Hazardous Materials Incidents to include warnings about the limitations of its recommended evacuation distances, publish similar warnings in periodicals in general circulation in the emergency response community, and notify all authorized private publishers and distributors of the guidebook to issue similar warnings. (Class II, Priority Action) (I-85-14)

BURNETT, Chairman, GOLDMAN, Vice Chairman, and BURSLEY, Member, concurred in these recommendations.

  
By: Jim Burnett  
Chairman