



# National Transportation Safety Board

Washington, D.C. 20594

## Safety Recommendation

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**Date:** January 5, 2005

**In reply refer to:** R-04-15 and -16

Honorable Martin O'Malley  
Mayor of the City of Baltimore  
City Hall, Room 250  
100 N. Holliday Street  
Baltimore, Maryland 21202

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The National Transportation Safety Board is an independent Federal agency charged by Congress with investigating transportation accidents, determining their probable causes, and making recommendations to prevent similar accidents from occurring. We are providing the following information to urge you to take action on the safety recommendations in this letter. The Safety Board is vitally interested in these recommendations because they are designed to prevent accidents and save lives.

The recommendations address the inadequate interaction between CSX<sup>1</sup> and the city of Baltimore on construction and maintenance activities in and near the Howard Street Tunnel and the city of Baltimore's emergency preparedness documents for addressing possible discharges of hazardous materials in tunnel environments. The recommendations are derived from the Safety Board's investigation of the railroad accident involving hazardous materials that took place when a CSX freight train derailed in the Howard Street Tunnel and released a hazardous material, resulting in a fire in Baltimore, Maryland, on July 18, 2001, and are consistent with the evidence we found and the analysis we performed.<sup>2</sup> As a result of this investigation, the Safety Board has issued four safety recommendations, two of which are addressed to the city of Baltimore. Information supporting these recommendations is provided below. The Safety Board would appreciate a response from you within 90 days addressing the actions you have taken or intend to take to implement our recommendations.

On Wednesday, July 18, 2001, at 3:08 p.m., eastbound CSX freight train L-412-16 derailed 11 of its 60 cars while passing through the Howard Street Tunnel in Baltimore, Maryland. Four of the derailed cars were tank cars: one contained tripropylene, a flammable liquid; two contained hydrochloric acid; and one contained di(2-ethylhexyl) phthalate, which is a plasticizer and an environmentally hazardous substance. The derailed tank car containing tripropylene was punctured, and the escaping tripropylene ignited. The fire spread to the contents

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<sup>1</sup> CSX is more formally known as CSX Transportation or CSXT, a subsidiary of CSX Corporation.

<sup>2</sup> For additional information, see National Transportation Safety Board, Railroad Accident Brief NTSB/RAB-04/08, *CSX Freight Train Derailment and Subsequent Fire in the Howard Street Tunnel in Baltimore, Maryland, on July 18, 2001*.

of several adjacent cars, creating heat, smoke, and fumes that restricted access to the tunnel for several days. A 40-inch-diameter water main directly above the tunnel broke in the hours following the accident and flooded the tunnel with millions of gallons of water. Five emergency responders sustained minor injuries while involved with the on-site emergency. Total costs associated with the accident, including response and clean-up costs, were estimated at about \$12 million. Although the Safety Board could not identify convincing evidence to provide a probable cause for the accident, it found that the most likely scenario that could have resulted in the derailment involved an obstruction between a car wheel and the rail, in combination with changes in track geometry.

During the course of the investigation, it became apparent that information about modifications and construction in and near the tunnel had not been reliably documented or exchanged among interested parties. For example, there was a void in the tunnel's arch immediately below the 40-inch water main that broke following the accident where a repair had at least been started. Safety Board investigators attempted to obtain information about this void and repair, but neither CSX nor the city of Baltimore knew of or had documentation about when the void was first discovered or who had initiated the repair.

In another instance, information used by the city of Baltimore indicated that a storm sewer was 19 feet below the surface near a test drilling. However, during the drilling project, the drill struck the storm sewer, which was actually only about 8 feet below the surface. Also during the drilling project, it was discovered that a manhole had been moved and the move was not documented.

Documentation and information regarding construction and other alterations to the infrastructure near the Howard Street Tunnel are unreliable, and the exchange of such information between CSX and the city of Baltimore is inadequate. CSX railroad structures, portions of the Maryland Transit Administration light rail system and the Metro subway, and municipal and private utility lines and structures all coexist within a relatively compact area around the tunnel. Repairs and modifications to structures and utilities near the tunnel could have a significant effect on the tunnel's structural integrity and therefore on the structures of other nearby facilities. Consequently, the Safety Board believes that the city of Baltimore should take action necessary to enhance the exchange of information with CSX on maintenance and construction activities within and in the vicinity of the Howard Street Tunnel.

Another issue of concern during the investigation was the adequacy of the city of Baltimore's emergency preparedness documents. The need for effective preparedness plans, stressing coordination among response participants, is underscored by the risk posed by the frequent transportation of hazardous materials through the Howard Street Tunnel.

During the derailment, one tank car containing more than 28,600 gallons of tripropylene was punctured near its bottom. The flammable tripropylene was ignited, and the subsequent fire led to the ignition of paper and wood products in adjacent freight cars. The burning wood and paper products sustained the fire over the next several days. The release of the tripropylene initiated the fire and increased the severity of the accident.

Immediately behind the ruptured tripropylene car were two tank cars containing hydrochloric acid and one tank car loaded with di(2-ethylhexyl) phthalate, which is an

environmentally hazardous substance. Exposure of the hydrochloric acid tank cars to high temperatures for the duration of the fire resulted in thermal degradation of the cars' rubber linings and corrosive penetration of one of the cars by the acid.

The CSX route through Baltimore and the Howard Street Tunnel is a major rail artery and is a designated hazardous materials key route for all types and classes of hazardous materials. Congress recognized the significance of this rail route when it mandated that the U.S. Department of Transportation conduct a rail infrastructure study<sup>3</sup> for passenger and freight routes in the Baltimore corridor. Although the Federal Railroad Administration had not completed the final report for the study as of August 2004, it has indicated that three options for improving the freight infrastructure through Baltimore have been considered. All three options involve the construction of new, modern tunnels with estimated costs ranging from \$1 billion to \$3 billion. Because of the scope and expense of these options, replacement of the Howard Street Tunnel is not assured, and at best, several years will be required to complete such a project.

Given these factors, improving the safety of the transportation of hazardous materials through the Howard Street Tunnel and minimizing the potential for more serious hazardous materials incidents in the tunnel will, in the Safety Board's view, depend upon shared communication and coordination between CSX and the city of Baltimore about the volumes and types of hazardous materials that are transported through the tunnel, anticipation of the types of incidents that might occur, and the capabilities and/or limitations of the city to access the tunnel and respond to any hazardous materials incident in it. The desired level of communication and coordination can be achieved through comprehensive emergency preparedness planning, including joint drills and exercises.

Preparedness documents are vital tools in responding effectively to hazardous materials releases. The emergency preparedness documents compiled by the Baltimore Office of Disaster Control and Civil Defense that were reviewed by Safety Board investigators do not contain information on hazardous materials discharge response procedures specific to tunnel environments or infrastructure information on the Howard Street Tunnel. Although principals of the Baltimore City Fire Department and of the member organizations of the South Baltimore Industrial Mutual Aid Plan, Inc., told the Safety Board that their personnel were familiar with response procedures applicable to tunnel environments and with the infrastructure of the Howard Street Tunnel, such information was not in the written plans.

Investigators reviewed the existing *Hazardous Materials Action Plan* for the city of Baltimore. Although the plan had detailed infrastructure response information on virtually all the industrial facilities within the city of Baltimore, it did not have any information on the Howard Street Tunnel, which could easily present situations as dangerous to responders as some of the industrial facilities that are addressed in the plan.

Despite the representations of the Baltimore City Fire Department and the South Baltimore Industrial Mutual Aid Plan, Inc., organizations that their employees were familiar with the Howard Street Tunnel, during the emergency response, the CSX dispatcher had to tell responding fire department personnel where to find a street-level manhole access to the tunnel at

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<sup>3</sup> U.S. Department of Transportation's *Baltimore, Maryland, Freight and Passenger Infrastructure Study*, per Public Law 107-87.

the intersection of Howard and Lombard Streets. The fire department later determined this access point to be instrumental to the fire suppression effort.

Baltimore officials told the Safety Board that they had initiated revisions of their Emergency Response Plan and Emergency Operations Plan to address a number of issues that were identified during the tunnel incident. The city has not yet provided the Safety Board specific information on the expected revisions.

It has long been known that emergency responders should be provided with comprehensive information to effectively and efficiently discharge their emergency response duties. This is particularly true for those responding to hazardous materials incidents. The information should include not only specific emergency response protocols for addressing hazardous materials discharges that occur in a conventional (outdoor) environment but also protocols for discharges that occur in an unusual environment, such as inside a tunnel or on a long bridge at night, where conventional response protocols might not apply.

Emergency preparedness plans to address incidents within a tunnel environment could include, for example, considerations of the infrastructure, such as ambient ventilation, possible water infiltration, natural drainage, service and emergency lighting, emergency equipment, and personnel access, among other types of information that would not necessarily apply to an outdoor incident. Having such information clearly documented and instantly available is critical not only for experienced emergency responders but also for new emergency response recruits or support personnel unfamiliar with tunnel environment emergency response procedures. Consequently, the Safety Board believes that the city of Baltimore should update and revise its emergency preparedness documents to include information on hazardous materials discharge response procedures specific to tunnel environments, as well as infrastructure information on the Howard Street Tunnel.

Therefore, the National Transportation Safety Board makes the following safety recommendations to the city of Baltimore, Maryland:

Take action necessary to enhance the exchange of information with CSX Transportation on maintenance and construction activities within and in the vicinity of the Howard Street Tunnel. (R-04-15)

Update and revise your emergency preparedness documents to include information on hazardous materials discharge response procedures specific to tunnel environments, as well as infrastructure information on the Howard Street Tunnel. (R-04-16)

The Safety Board also issued two safety recommendations to CSX Transportation. In your response to the recommendations in this letter, please refer to Safety Recommendations R-04-15 and -16. If you need additional information, you may call (202) 314-6177.

Chairman ENGLEMAN CONNERS, Vice Chairman ROSENKER, and Members CARMODY, HEALING, and HERSMAN concurred in these recommendations.

By: Ellen Engleman Connors  
Chairman