

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

ISSUED: May 25, 1983

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Forwarded to:

Honorable Elizabeth Dole  
Secretary  
Department of Transportation  
400 Seventh Street, S.W.  
Washington, D.C. 20590

SAFETY RECOMMENDATION(S)

H-83-16

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About 12:12 a.m. P.s.t., on April 7, 1982, several vehicles on westbound California State Route 24 entered the north, No. 3 Bore of the Caldecott Tunnel near Oakland, California. A Honda car driven by an intoxicated driver struck the raised curbs inside the tunnel and came to rest at the left edge of the roadway about one-third of the way through the tunnel. It was struck soon afterward by a following gasoline tank truck and tank trailer and then by an Alameda/Contra Costa (AC) Transit bus which subsequently struck the tank trailer. The busdriver was ejected, and the empty bus continued west, exited the tunnel, and struck a concrete road support pier. The tank trailer overturned, and gasoline was spilled inside the tunnel. A fire erupted and heavy black smoke quickly filled the tunnel. The tank truck and tank trailer, the Honda car, and four other vehicles that had entered the tunnel were completely destroyed by the fire. Seven persons were killed, and two people were treated for minor smoke inhalation. The tunnel incurred major damage. 1/

Westbound State Route 24 from Orinda consists of four 13-foot-wide concrete lanes with periodic on and off ramps. The roadway is bordered to the south by a solid yellow edgeline, an asphalt median strip, a metal beam guardrail, and a Bay Area Rapid Transit (BART) perimeter fence. The roadway is bordered to the north by a solid white edgeline, a 5-foot asphalt shoulder, and an open area. A "MAXIMUM SPEED LIMIT 55" sign is posted about 6.7 miles east of the tunnel. A 50-mph speed limit sign is posted about 727 feet east of the tunnel. There are no signs prohibiting hazardous material cargoes or passing in the tunnel, and there are no lane control signals in the tunnel or at the entrance. The first of three large overhead tunnel directional signs which read at the time of the collision "two left lanes closed" is posted 1.4 miles east of the tunnel. The tunnel consists of three one-way, two-lane bores and operates with up to four lanes in one direction and a minimum of two lanes in the other direction, depending on traffic demand. At the time of the collision, the 3,371-foot-long north No. 3 bore, where the accident occurred, was the only bore open to westbound traffic.

On April 28, and 29, 1982, the California Transportation Department (CalTrans) conducted traffic volume counts on State Route 24 to determine the average daily traffic (ADT) immediately east of the tunnel. The count indicated that 63,700 vehicles traveled the westbound route daily; of the 1,126 trucks, 26, including 8 flammable materials tankers, carried hazardous materials.

1/ For more detailed information, read Highway Accident Report—"Multiple Vehicle Collision and Fire, Caldecott Tunnel, Near Oakland, California, April 7, 1982 (NTSB/HAR-83/1).

The Safety Board reviewed accident records to determine the number of accidents that have occurred in the limits of the three bores of the Caldecott Tunnel. According to these data, 39 accidents occurred in a 3-year period ending December 31, 1981, resulting in 18 injuries and no fatalities; 16 of these accidents involved westbound motorists. Twenty accidents were rear-end collisions; 9 involved a stopped vehicle; 8 involved a slowing vehicle; and 3 involved a vehicle changing lanes. Eight accidents were sideswipe accidents, seven of which involved a vehicle changing lanes. Eight were hit-object accidents, of which three involved vehicles changing lanes. Two were broadside accidents, and one was an overturn accident.

The Safety Board reviewed the tank truck driver's planned route of travel (east on Route 4 to I-680, south to State Route 24, west on Route 24 to State Route 17, and then southwest on Fruitvale Avenue to 24th Street) and determined that alternate routes either to the north or the south of the planned route would have avoided the tunnel.

The "Explosions Routes and Stopping Places" map issued by the California Highway Patrol (CHP) in 1973 specifies alternate routes north and south of the Caldecott Tunnels for explosives transportation and does not permit the use of Route 24 through the tunnel.

A further consideration in route selections is that east of State Route 13, the BART system runs in the median of State Route 24 for about 7 miles, with two stations between the east and westbound roadways. At certain locations, the westbound roadway is elevated 10 to 15 feet above the BART system, separated only by a concrete median barrier and a chain link fence. The Safety Board has investigated a previous accident <sup>2/</sup> in which a tank trailer rolled over median barriers, ruptured, and as a result gasoline was spilled and ignited. An accident of this type would endanger BART passengers, and, according to the Oakland fire officials, firefighting efforts would be difficult because of the lack of hydrants.

The 49 CFR Section 397.9(a) states that:

- (a) Unless there is no practicable alternative, a motor vehicle which contains hazardous materials must be operated over routes which do not go through or near heavily populated areas, places where crowds are assembled, tunnels, narrow streets, or alleys. Operating convenience is not a basis for determining whether it is practicable to operate a motor vehicle in accordance with this paragraph. This paragraph does not apply to radioactive materials.

The Armour Oil Company management acknowledged its responsibility under 49 CFR Parts 386-399 for safe route selection for the shipment of hazardous materials. It did survey the area for feasible, alternate routes. Also, the Company involved the responsible drivers in its decisionmaking and decided that Route 24 through the Caldecott Tunnel was the safest and most convenient route and that there was no feasible alternate route.

In retrospect, considering the inadequacy of motorist protection and the consequences of the fire within the tunnel, it is easy to find fault with the Company's decision. It is difficult to envision an area along an alternate route where a similar accident would result in losses of similar magnitude. Consequently, the Safety Board

<sup>2/</sup> For more information read, Highway Accident Report—"Multiple Vehicle Collision and Fire, U.S. Route 101, Los Angeles, California, March 3, 1980 (NTSB/HAR-80/5).

feels that additional evaluation of hazardous materials delivery routes should be made by both the carriers and agencies of the State of California to provide guidance and regulations that are compatible with Federal regulations. The carriers and agencies should make use of the recently published Federal Highway Administration's (FHWA) Implementation Package, "Guidelines for Applying Criteria to Designate Routes for Transporting Hazardous Materials" (FHWA-IP-80-15) to provide hazardous materials cargo truckdrivers with the most recent information available, so that they will be able to make the safest route selection.

Determination of alternative routes should include an assessment of compatibility with other transportation systems, especially rapid transit systems. A hazardous materials tank truck with its high center of gravity (and some van type trucks) can override barriers such as exist along Route 24 and block the path of an oncoming high speed train.

The Safety Board has noted that rapid transit systems which are under construction in the medians of interstate routes in the Chicago and Washington, D.C. areas may give rise to similar problems. A survey and a risk analysis of these systems should be made by the U.S. Department of Transportation, which is providing the bulk of the funding for this construction.

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

Review the Federal Highway Administration and the Urban Mass Transportation Administration programs that encourage joint use of rights-of-way and determine if construction of rapid rail systems in highway rights-of-way presents an unnecessary risk to the public from hazardous materials truck movements on adjacent roadways; if so, modify the safety criteria appropriately. (Class II, Priority Action) (H-83-16)

BURNETT, Chairman, GOLDMAN, Vice Chairman, McADAMS, BURSLEY, and ENGEN, Members, concurred in this recommendation.

By: *Patricia A. Goldman*  
Jim Burnett  
Chairman *for*

