

Log # 1114 R-73-22 thru 24

UNITED STATES OF AMERICA
NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: June 1, 1973

Adopted by the NATIONAL TRANSPORTATION SAFETY BOARD
at its office in Washington, D. C.
on the 1st day of June 1973

FORWARDED TO:)
Honorable John W. Ingram)
Administrator)
Federal Railroad Administration)
Washington, D. C. 20590)

SAFETY RECOMMENDATION R-73-22 thru 24

The explosion of 12 carloads of bombs in the Southern Pacific Transportation Company train near Benson, Arizona, is being investigated by the National Transportation Safety Board. This accident involved the transportation of military munitions containing a mixture of trinitrotoluene and aluminum powder. This mixture or variations thereof have been involved in three explosions in rail transportation of which the Safety Board is aware, including the explosion at Benson on May 24, 1973; an explosion at Roseville, California, on April 28, 1973; and an explosion at Tobar, Nevada, on June 29, 1969.

At this time, it has not been determined what probably caused the explosion at Benson. Until our investigation can be completed and this determination made, we cannot make the final or the most efficient recommendations to prevent future accidents of this nature. However, it appears that specific actions should be taken even before our investigation is complete to reduce the possibility of the exploding of these munitions in transportation, and to reduce the effects of such explosions if they occur.

Explosions can occur when the cargo is exposed to excessive heat. One source of excessive heat in rail transportation is the overheating of friction journal bearings, and the burning of oil and pads used in lubricating friction bearings. Roller bearings are less likely to overheat than friction bearings on railroad cars. The elimination of lubricating devices and free oil in friction bearing assemblies would minimize the likelihood of open flames should the bearing assemblies overheat.

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Another source of excessive heat occurs during brake applications or when brake shoes are dragging significantly. Cars equipped with standard cast iron brake shoes experience higher wheel temperatures during such braking operations than cars equipped with composition brake shoes. In addition, cast iron brake shoes produce a "sparking" phenomenon, during which hot metal occurring at the face of the brake shoes can be thrown against the car body. To minimize the temperatures attained during braking operations and to minimize the possibility of sparking, the use of composition brake shoes is desirable.

The Safety Board has no direct evidence of overheating of friction bearings, heating from brake applications or dragging shoes in this accident at this time. Nevertheless, these conditions are possibilities.

Some railroad cars are equipped with "spark shields" to prevent brake shoe sparks from striking the wooden floors. Such spark shields are installed on many box cars of the type used to transport the munitions. Their presence reduces the likelihood of car floor fires.

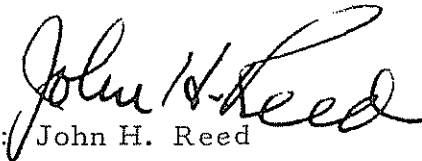
In addition to reducing the likelihood of overheating of such cargoes, efforts to reduce the effects of the explosions, when they occur, appear necessary. In both the Benson and Roseville explosions, the cars containing the munitions were located in consecutive order within the trains. In both instances, the explosions progressed through the adjacent cars until the munitions in all cars had exploded. At Tobar, Nevada, the chain of explosions terminated when the next car in the chain contained a nonexplosive cargo. This indicates that separation of the cars carrying explosives in trains would reduce the magnitude of the total damage by reducing the probability that explosion would spread to other cars, irrespective of the initial cause.

For transportation, munitions are heavily braced with wood dunnage inside the railroad cars. Of the 13 cars shipped in this case, one car was delayed en route, and the other 12 were destroyed at Benson. Observations of the surviving car indicated that minor shifting of some of the dunnage had occurred in transit, and that the floor was damaged. There has been one instance in recent years in marine transportation when dunnage failure preceded a low order explosion. While dunnage failure has not been determined to be a factor in the Benson accident, increased surveillance of the loading and bracing of such shipments would nevertheless appear desirable at this time. Increased surveillance of the loading and bracing of shipments of these cargoes would reduce the possibility that cargo might be shifting, with undesirable consequences, in rail shipments.

In view of the foregoing, and until its investigation of the Benson accident is concluded, the National Transportation Safety Board recommends that the Federal Railroad Administrator:

1. Issue temporary regulations requiring the use of cars with roller bearings and either composition brake shoes or spark shields for the rail transportation of military explosive munitions of the type involved in the Tobar, Roseville, and Benson explosions.
2. Require, on a temporary basis, the placement of at least one "spacer" car not containing materials regulated under 49 CFR 172-177 between cars of munitions when munitions cars are en route between origin and destination in railroad transportation service.
3. Increase inspection and surveillance of the car selection, loading and transportation of military explosives of the type involved in the Tobar, Roseville, and Benson accidents, enlisting the assistance of the Bureau of Explosives and the Department of Defense, as necessary, to assure conformance of such transportation with current regulations and best known safety requirements.

These recommendations will be released to the public on the issue date shown above. No public dissemination of the contents of this document should be made prior to that date.


By: John H. Reed
Chairman