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8. The wooden pallets, blocking, and bracing in Car 38 intensified the fire adjacent to heat-sensitive munitions.
9. Existing Federal regulations do not address the problem of detection and suppression of fires in railcars transporting munitions.
10. The explosion at MP 1052.6 was probably the bursting of the bomb casing caused by external heat, rather than the result of an internal chemical reaction.
11. The consecutive placement of the cars carrying bombs in the train increased the probability of the en masse, multiple-car explosions and increased the size of the danger zone in the accident.
12. The quality of the bombs deviated from the design specifications. Although the effects of these deviations on the safety of the bombs in transit could not be determined conclusively, the deviations probably did not initiate the fire in Car 38.
13. The requirements in 14 CFR 170 - 174 for removal of potentially hazardous residues from railroad cars after unloading were not clear as to responsibility for, or method for, proper and timely cleaning.
14. The circumstances of this accident indicate that improved coordination or integration of the compliance activities of all parties who prescribe safety requirements intended to assure safe transportation of hazardous materials could raise the overall level of safety. This warrants further study.

#### PROBABLE CAUSE

The National Transportation Safety Board determines that the probable cause of the accident was the exposure of heat-sensitive bombs in Car 38 to a fire inside the car. The fire most likely originated from sparks off the brakeshoes which ignited the sodium nitrate impregnated floorboards.

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#### RECOMMENDATIONS

The National Transportation Safety Board recommends that:

1. The Secretary of Transportation reassess the regulations applicable to the packaging, loading, storing and transportation of military munitions and develop a safety compliance program to unify and coordinate Federal activities relating to the shipment of military munitions as now authorized by the Transportation Safety Act of 1974. (Recommendation R-75-8)

2. The Federal Railroad Administration in conjunction with the Secretary's program develop and require the use of a mechanism for the

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timely detection of fire by crews of trains carrying Class A explosives.  
(Recommendation R-75-9)

3. The Secretary of Defense design, develop and use special rail cars for the transportation of military munitions which are constructed of noncombustible materials, or are otherwise resistant to ignition from sources external to the car, and reduce or eliminate the use of wooden or other combustible sheathing, blocking and bracing inside the cars.  
(Recommendation R-75-10)

As the result of this accident the Safety Board on June 1, 1973, made three recommendations to the Federal Railroad Administration which would require (1) the use of cars with roller bearings and either composition brakeshoes or spark shields in the transport of military munitions, (2) the placement of "spacer" cars between cars transporting munitions, and (3) increased inspection and surveillance of freight car loadings in the transportation of military explosives. (See Appendix D.)

The Federal Railroad Administration on November 19, 1974, promulgated a regulation effective July 1, 1975, establishing new requirements for selection, preparation, inspection, certification, and loading of rail cars transporting Class A explosives. (See Appendix F.)

BY THE NATIONAL TRANSPORTATION SAFETY BOARD

/s/ JOHN H. REED  
Chairman

/s/ FRANCIS H. McADAMS  
Member

/s/ LOUIS M. THAYER  
Member

/s/ ISABEL A. BURGESS  
Member

/s/ WILLIAM R. HALEY  
Member

February 26, 1975

CAR NUM

SP 1870  
SOU 265  
SOU 170  
IC 13668  
SP 5121  
SOU 267  
LINX 42  
NW 164  
DRGW 1  
TTBX 9  
SPFE 45  
NP 9609  
MP 7860  
UPFE 4  
SSW 34  
SOU 40  
NW 285  
TTRX 9  
CG 1136  
SSW 47  
SOU 30  
FEC 924  
CEI 345  
SP 2114  
CO 1235  
CO 1188  
CEI 701  
SP 2241  
SOU 50  
SOU 45  
SOU 36  
SOU 26  
SOU 30  
SFRE 2  
SCL 20  
ACL 98  
IC 4220  
UTLX  
SSW 23  
UTLX  
UTLX  
DUPX  
NW 310  
NYC 15  
NW 16  
CNW 4  
PRR 40  
NW 16  
SP 329  
ITC 72  
ITC 73  
PFE 14  
PFE 45  
SP 660