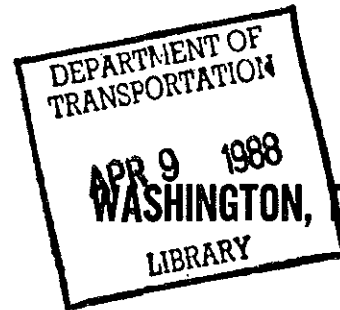
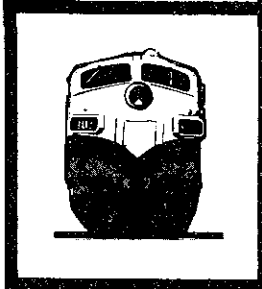


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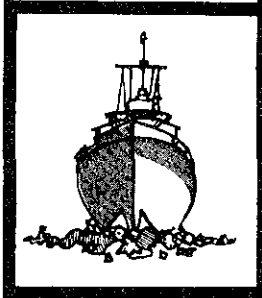
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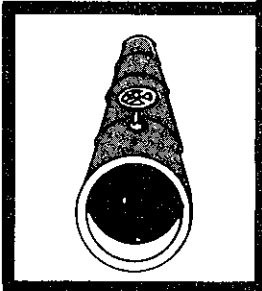
NATIONAL TRANSPORTATION SAFETY BOARD



RAILROAD ACCIDENT/INCIDENT SUMMARY REPORT



MIAMISBURG, OHIO - - JULY 8, 1986



NTSB/RAR-87/01/SUM



UNITED STATES GOVERNMENT

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TECHNICAL REPORT DOCUMENTATION PAGE

SUM

1. Report No. NTSB/RAR-87/01/SUM	2. Government Accession No. PB87-916306	3. Recipient's Catalog No.	
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		8. Performing Organization Report No.	
7. Author(s)		10. Work Unit No. 4462A	
9. Performing Organization Name and Address National Transportation Safety Board Bureau of Accident Investigation Washington, D.C. 20594		11. Contract or Grant No.	
		13. Type of Report and Period Covered	
12. Sponsoring Agency Name and Address NATIONAL TRANSPORTATION SAFETY BOARD Washington, D. C. 20594		14. Sponsoring Agency Code	
		15. Supplementary Notes	
16. Abstract This report is a summary of a hazardous material/railroad accident investigated by the National Transportation Safety Board. The accident location and date is Miamisburg, Ohio, July 8, 1986.			
17. Key Words derailment; tank cars; hazardous materials		18. Distribution Statement This document is available to the public through the National Technical Information Service, Springfield, Virginia 22161	
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**National
Transportation
Safety Board**

Washington, D.C. 20594

RAILROAD ACCIDENT/INCIDENT SUMMARY

File Number:	DCA 86 HZ 003
Location:	Miamisburg, Ohio
Date and Time:	July 8, 1986, 4:25 p.m., e.d.t.
Railroad:	CSX Transportation
Type of Train:	Freight
Persons on Board:	Four crewmembers
Injuries:	None
Damage:	\$3,540,000
Type of Occurrence:	Freight train derailment
Phase of Operation:	En route on main track

About 4:25 e.d.t., July 8, 1986, southbound CSX Transportation (formerly Baltimore and Ohio Railroad) freight train Extra 7614 South derailed 15 of the 44 cars in the train. The train was traveling about 45 mph at the time of the derailment. The derailed cars were the 24th through the 38th head cars of the train. The train was en route from North Dayton, Ohio, to Cincinnati, Ohio, with 1 locomotive unit and 44 cars. The train did not have a caboose. 1/

The derailment occurred at the site of a two-span, through-plate girder bridge about 163 feet in length. The derailed train was the second train to proceed over the track after a track surfacing gang worked on the track north and south of the bridge.

The track at the accident location was a tangent single main track, proceeding in a southerly direction on a descending gradient of about 0.20 percent to the two-span, through-plate girder bridge spanning Bear Creek. Past the bridge, the gradient continued descending in a southerly direction at about 0.06 percent. A sidetrack extended parallel to the main track for about 3/4 mile on either side of the bridge on the west side of the main track. The main track was constructed of 132-pound RE section continuous welded rail (CWR), atop 9-inch by 7-inch by 8-foot by 6-inch-treated oak wood crossties, laid in crushed granite ballast which extended about 18 inches beneath the crossties and 12 inches or more past the ends of the crossties. The width of the ballast shoulder section decreased near the north end of the bridge. The spiking pattern consisted of two rail holding spikes per tieplate, and the rail anchoring pattern was box-anchoring on each crosstie in the accident vicinity. About 50 percent of the rail anchors were not against the tie faces in the general area of the derailment.

The bridge consisted of a two-span, through-plate girder bridge structure of open-hearth structural steel. The double track bridge rested atop reinforced concrete backwalls and a center-reinforced concrete pier. The spans were 81 feet 6 inches in length.

1/ For more detailed information, read Hazardous Materials Accident Report--"Hazardous Materials Release Following the Derailment of Baltimore and Ohio Railroad Company Train No. SLFR, Miamisburg, Ohio, July 8, 1986" (NTSB/HZM-87/01).

Maximum allowable timetable track speed at the accident site was 50 mph, with a maximum allowable timetable track speed of 45 mph beginning 0.20 mile south of the bridge. The bridge was located at milepost 49.7. According to the Federal Railroad Administration (FRA) Track Safety Standards, the classification of the track was within the parameters of class 4 track. Except for the damaged bridge and track structure, the original condition of which could not be documented, the track met or exceeded the requirements of the FRA's minimum Track Safety Standards.

A programmed cyclic track surfacing gang had been raising the track in the vicinity of the bridge on the day of the accident. The track surfacing gang consisted of a combination tamper/liner, a ballast regulator, and a backup spot tamper. Manpower consisted of eight men with the track surfacing gang consisting of the machine operators, track laborers, and one foreman in-charge. The track surfacing was being performed out-of-face with a reported maximum raise of 3 inches in one pass. Out-of-face surfacing was performed north of milepost 49.7 and south of the bridge and was completed at 2:01 p.m. on July 8, 1986.

The U.S. Weather Bureau's recorded ambient temperatures for the general area on July 8, 1986, were as follows:

<u>Time</u>	<u>Temperature (°F)</u>
7 a.m.	72
8 a.m.	74
9 a.m.	79
10 a.m.	83
11 a.m.	86
12 noon	88
1 p.m.	88
2 p.m.	88
3 p.m.	90
4 p.m.	90
5 p.m.	90

CSX Engineering Department Procedure Bulletin R-39 provides that when the ambient temperature is expected to exceed 85° F and out-of-face surfacing operations have been performed at temperatures below 85° F, the imposition of a temporary speed restriction of 10 mph on the track being surfaced is required during the passing of 12 freight trains subsequent to the surfacing operation. The bulletin also requires the same 10-mph speed restriction to be imposed on the track not dressed or having a substandard ballast section. The track surfacing operations on the track in question began about 11 a.m. and continued until about 2 p.m.; no slow order was placed on the track after surfacing operations on July 8, 1986.

Observations made subsequent to the accident indicated that the track structure immediately north of the bridge shifted laterally. Inspection of the rails and the rail anchors in the section of track immediately north of the bridge did not indicate any sudden or recent longitudinal displacement of the anchors relative to the rail. The maximum lateral displacement of the track structure was measured about 5 inches to the west at a point about 35 feet to the north of the north backwall of the bridge.

Observations of the bridge structure indicated damage from impact with derailed freight cars as well as substantial thermal damage from a fire subsequent to the derailment. The north end of the bridge's north span was displaced about 28 inches to the east. Impact marks were noted on several freight cars which, although derailed, negotiated passage over the bridge and came to rest south of the bridge structure.

Damage assessments provided by CSX indicate that bridge 49.7 was destroyed in the accident, as was 457 feet of main track with an additional 1,950 feet of main track damaged and 500 feet of sidetrack destroyed.

The lateral shift of the track structure immediately north of bridge 49.7 is significant to the events of the derailment sequence. This lateral shift of the track structure measured a maximum of about 5 inches to the west at a point about 35 feet to the north of the north backwall of the bridge. It is improbable that this lateral shift of the track structure could have occurred due to the dynamics of the derailment sequence itself. The lateral force necessary to accomplish such a displacement typically manifests itself as rail turned over in the edge of the seat of the tieplates or as rail displaced laterally from the seat of the tieplate. Further, there were no indications, such as bent-over track spikes or tieplate displacement to support a theory of lateral track displacement resulting from the dynamics of the derailment sequence.

The lateral shift of the track structure was also unlikely to have occurred as a result of thermal stresses. Although thermal damage to the bridge structure was significant, the rail does not possess the degree of lateral rigidity that would have been necessary to transmit those stresses laterally and force the entire track structure intact, 5 inches through the roadbed. Further, the freight cars sitting on the track after the derailment and through the fire would have significantly arrested lateral shift of the track structure. The transmission of thermal forces longitudinally through the rails was not possible in this particular situation since the rails were not restrained on the bridge structure itself during the fire. Expansion of the unrestrained rails from the fire's heat could not have been transmitted through the restrained rails in the ballast roadbed.

Although the ballast shoulders surrounding the track structure north of bridge 49.7 were sufficiently wide, more than half of the depth of the crossties were exposed. This condition seriously impaired the ability of the ballast shoulder section to resist lateral forces. The ballast track section had also been disturbed by the out-of-face track surfacing operation conducted shortly before the derailment. The maximum raise of the track was reported to have been 3 inches, raised in one pass. The National Transportation Safety Board believes that it was poor practice not to have imposed a slow order on the track until the track could have regained stability.

The conditions noted at the accident site and the practice employed in the track surfacing operation indicate that the 5-inch lateral shifting of the track very likely occurred during the passage of the freight train, which in turn derailed due to the track shifting underneath. The dynamic forces imposed by the passing train in combination with the inadequate condition of the ballast section probably caused the lateral shift of the track structure. Whether the entire 5 inches of track shift occurred at once or some minor portion of the track shift was attributable to the derailment sequence or the thermal stresses could not be determined. See the attached brief of accident for the Safety Board's determination of probable cause for the derailment discussed in this summary report.

BY THE NATIONAL TRANSPORTATION SAFETY BOARD

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Member

September 29, 1987

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C. 20594

BRIEF OF ACCIDENT

File No. - DCA 86-HZ-003 07/08/86 Miamisburg, Ohio Time (Lcl) - 1625 EDT

---Basic Information---

Reporting Railroad - CSX Transportation	Property Losses	Injuries			
Type of Accident - Derailment	Railroad - \$430,000	Fatal	Serious	Minor	None
Operating Phase - En Route	Non-Railroad - \$3,110,000	Employees 0	0	0	0
Method of Operation - Traffic Control	Fire	Passengers 0	0	0	0
	Yes	Motorist 0	0	0	0
		Other 0	0	569	0

---Railroad/Personnel Information---

Train Data	Train Consist/Damage	Crew Information
Railroad - CSX Transportation	No. Loco. Units - 1	Front End - 4
Type of Train - Freight	No. Cars/Caboose - 44/0	Rear End - 0
Train ID - Extra 7614 South	End of Train Monitor - Yes	Toxicology Performed - Yes
Direction - South	Length (Feet) - 3,185	Results - Negative
Speed (Est.) - 45	Trailing Tons - 3,737	Radio Communications
Speed (Actual) - 45	Loco. Damaged/Derailed - 0/0	Radio Available - Yes
	Cars Damaged/Derailed - 15/15	Operational - Yes

---Environment/Operations Information---

Weather Data	Itinerary	Hazardous Materials
Weather Condition - Clear	Last Departure Point	Involved - Yes
Condition of Light - Daylight	North Dayton, Ohio	Evacuation - Yes
Sight Distance - 5,000	Destination	Cars Involved - 1
	Cincinnati, Ohio	Track Information
		Owner - CSX Transportation
		Type/No. of Tracks - Main/2
		Gradient/Alignment - .2% Des./Tangent

---Narrative---

About 1625 EDT, July 8, 1986, a southbound CSX Transportation (formerly Baltimore and Ohio Railroad) freight train derailed 15 cars of the 44 cars in the train. The train was traveling about 45 MPH at the time of the derailment. The derailed cars were the 24th through the 38th head cars of the train. Three of the derailed cars were tank cars, one containing yellow phosphorous, one containing tallow, and the other molten sulphur. All three cars released their contents. A massive fire resulted in large evacuations of the local population. The derailment occurred at the site of a two-span through plate girder bridge about 163 feet in length. The derailed train was the second train to proceed over the track, after a track surfacing gang worked on the track north and south of the bridge.

BRIEF OF ACCIDENT, continued

File No. - DCA 86-H-2003

07/08/86

Miamisburg, Ohio

Time (Lc1) - 1625 EDT

Occurrence #1 - Derailment

Phase - Maintaining Speed

Finding(s)

1. Main track - Shifted
2. Track slow order - Not issued - Track Gang Foreman
3. Main track - Raised

Occurrence #2 - Rupture of Tank Car

Phase - Stopping

Finding(s)

4. Other underframe - Fractured

Occurrence #3 - Hazardous Materials Leak/Spill (Fumes/Smoke)

Phase - Stopping

Occurrence #4 - Fire

Phase - Stopping

---Probable Cause---

The National Transportation Safety Board determines that the Probable Cause(s) of this accident is/are finding(s) 1, 2

Factor(s) relating to this accident is/are finding(s) 3, 4