National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: July 27, 2000

In reply refer to: R-00-12

Class I Railroads
(See attached list.)

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

This recommendation addresses the adequacy of railroad industry training and practices with respect to emphasizing the importance of removing foreign objects from the wells of double-stack cars before loading. The recommendation is derived from the Safety Board's investigation of the derailment of Burlington Northern and Santa Fe Railway Company (BNSF) intermodal freight train S-CHILAC1-31, at Crisfield, Kansas, on September 2, 1998,[1] and is consistent with the evidence we found and the analysis we performed. As a result of this investigation, the Safety Board has issued nine safety recommendations, one of which is addressed to the Class I railroads. Information supporting this recommendation is discussed 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 recommendation.

About 6:10 a.m., central daylight time, on September 2, 1998, the 17th through 19th cars and the first two platforms of the five-platform 20th car of westbound BNSF intermodal freight train S-CHILAC1-31 derailed at Crisfield, Kansas. The accident occurred when the 18th car from the locomotive, DTTX 72318, an articulated, five-platform, 125-ton double-stack car, experienced a separation between the floor shear plate and bulkhead bottom angle at the leading end of the car's B platform. The separation allowed the car to sag below the rails, catch a part of a switch, and derail.

The train was traveling 68 mph through the east siding switch at Crisfield, milepost 291.7, on the Panhandle Subdivision of the railroad's Amarillo Division, when it began to derail. The

[1] For additional information, read Railroad Accident Report—*Derailment of Burlington Northern and Santa Fe Railway Company Intermodal Freight Train S-CHILAC1-31, Crisfield, Kansas, September 2, 1998* (NTSB/RAR-00/01).

train then went into emergency braking and stopped after traveling about 1/2 mile. The derailment resulted in a pileup involving four articulated multiplatform cars carrying intermodal shipping containers. Some of the containers were breached, resulting in the release of hazardous materials and fires. About 200 people were evacuated within a 5-mile radius. No injuries resulted from either the derailment or the hazardous materials releases. Estimated damage was $1.3 million.

The National Transportation Safety Board determined that the probable cause of this accident was the structural failure of intermodal car DTTX 72318 due to fatigue cracking initiated when a container was misloaded onto a foreign object. The misloading of the container occurred because of the railroad industry's inadequate preloading inspection procedures for double-stack well cars. Contributing to the accident was the improper and undocumented repair of the car.

All of the parties to the investigation of this accident, including the accident car manufacturer (Thrall Car Manufacturing Company—Thrall), the car owner (TTX Company), the Federal Railroad Administration (FRA), the Association of American Railroads (AAR), the BNSF, and the Union Pacific Railroad (UP), have found that all previous weld failures between the floor shear plate and the bulkhead bottom angle on Thrall 125-ton deep-well double-stack cars resulted from the placement of a loaded container on top of a hard foreign object. All agree and have concluded that these weld failures were the direct result of such misloadings. Investigators found that the cracks discovered in Thrall cars were not related to car age, mileage, service pattern, maintenance, or previous repairs but to stress forces caused by the presence of a foreign object on the floor of these cars.

The UP inspections of Thrall cars that ultimately prompted Early Warning Letter 161 (EW-161) provide additional evidence of this phenomenon. Further, inspections of 1,653 cars still in service since EW-161 was issued, in December 1997, have resulted in the repairs of 27 Thrall double-stack container cars, all of which had damage due to foreign objects. No evidence suggests that any of the weld failures found by the FRA or during the EW-161 inspections were the result of any other condition or phenomenon. Therefore, the Safety Board concluded that a direct causal relationship exists between the misloading of a loaded container on top of a hard foreign object and the weld failures at the floor shear plate to bulkhead bottom angle on Thrall 125-ton deep-well double-stack cars.

Loading a container onto a foreign object, such as a track spike, brake shoe, or interbox connector (IBC), is the only type of "improper securement" noted in AAR container loading and securement standards and inspection forms that is undetectable once the container is loaded. This is particularly true for longer containers, on which it is difficult to see whether one end of the container is higher than the other and possibly resting on a foreign object. If the end of a 40- or 48-foot-long container is raised no more than 6 inches, it may still appear level and pass any overhead clearance restrictions. Thus, the only effective way to ensure that foreign objects have been removed or that the car is "clean" is to inspect the car well when it is empty. However, current methods of loading, do not ensure that this occurs.

The emphasis placed on postloading and predeparture inspections is illustrated by the descriptions given to Safety Board investigators of inbound and outbound inspection procedures by the Conrail carman at Croxton Yard and the two BNSF carmen at Corwith Yard and by the AAR's *Standard Operating Procedure [SOP] for Intermodal Securement*, inspection forms, and related training videos. Such an emphasis on postloading and predeparture inspections belies the importance of preloading inspections to ensure that car wells contain no foreign objects.

The procedures outlined by the Croxton and Corwith carmen illustrate actual operating conditions for many intermodal ramp operations, under which it is difficult to perform preloading inspections. At Croxton, the carman and the contractor personnel were allowed to work the train simultaneously. The Croxton carman stated that the container cars were not always empty when he inspected them because the contractor crew routinely unloaded containers from the inbound train and immediately loaded the train for the outbound movement. The carman said that most of the time he followed the contractor crew while conducting his inspections to avoid injury and to avoid getting in the way of the loaders. Therefore, the carman could not perform a consistent, comprehensive inspection of the car wells for foreign objects.

In addition, the Croxton carman stated that he conducted his night inspections from a repair truck with a search light. He said that although he was positioned to observe both the car's condition and the container's position, he would have been unable to completely see the floor of an empty car. Therefore, at each point, the carman's inspection was focused on ensuring the securement of the loads and the operation of car safety appliances before departure and not on inspecting the car wells for foreign objects.

When the car was placed in the accident train, the only opportunity to inspect the cars was the predeparture inspection conducted by the carmen. Since DTTX 72318 was already loaded at that time, the carman could not have determined whether the car was structurally sound (beyond the obvious sagging or structural failure) or have seen whether a container was loaded on top of an object. The Corwith carmen's inspection was limited to postloading, predeparture securement items emphasized in the AAR training and inspection forms. This situation is typical of many intermodal facilities, where postloading securement, not preloading inspection, is emphasized. The Safety Board, therefore, concluded that current preloading inspection procedures are inadequate to ensure that foreign objects are detected on the floors of well cars, particularly Thrall 125-ton double-stack cars.

Despite the fact that the AAR SOP requires that foreign objects be removed from rail car wells or surfaces, inspecting the wells of intermodal cars before loading is not included as a safety check on the AAR *Intermodal Securement Safety Audit Form*, nor is it listed as a securement failure on the *Internal and Inter-road Securement Failure Report*. Although these forms cover postloading and predeparture securement and inspection comprehensively, the only preloading consideration is to ensure that containers and trailers are structurally sound with closed and locked doors and that trailer hitches, IBCs, and other loading equipment are in safe working order. In short, the primary emphasis is on the importance of load securement and postloading inspection.

In the latest AAR video, the removal of foreign objects is briefly mentioned by a narrator, standing next to an intermodal flatcar, who says, "Ice and snow can build up and prevent a container from making proper contact. Brake shoes, IBCs, and rocks can also prevent a container from seating properly, so remember to remove these items before loading a container." This segment takes about 30 seconds of the 17-minute video and could be easily missed. The topic of removing foreign objects before loading intermodal cars is mentioned in passing without emphasis or example, and the only reason cited for its importance is the need to ensure the container is seated correctly.

The Safety Board concluded that had the railroad industry and the FRA placed sufficient emphasis on ensuring a complete preloading inspection of all well cars, the structural failure of DTTX 72318 may not have happened. The Safety Board also concluded that the EW-161 inspections did not address the root cause of the resulting structural failures: loaded containers placed on foreign objects on the floors of double-stack container cars. The Safety Board further concluded that to prevent the structural failure of double-stack container cars, all such cars must be inspected while empty to ensure that foreign objects are eliminated from the wells and platforms. This inspection can best be done at the intermodal facilities as part of a comprehensive program that focuses not only on postloading securement but also on preloading conditions when the car is empty. Since the Class I railroads own or control the intermodal terminals and the majority of intermodal equipment and cars, and since they coordinate intermodal operations and standards through the AAR Intermodal Committee, the Safety Board recommends that the Class I railroads:

> Require intermodal loading facilities to inspect double-stack well car floors before loading and remove any foreign objects. (R-00-12)

The Safety Board also issued safety recommendations to the Federal Railroad Administration and the Association of American Railroads. In your response to the recommendation in this letter, please refer to Safety Recommendation R-00-12. If you need additional information, you may call (202) 314-6170.

Chairman HALL and Members HAMMERSCHMIDT, GOGLIA, BLACK, and CARMODY concurred in this recommendation.

Original Signed

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