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NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: November 13, 1985

Forwarded to:

Mr. K. C. Dufford
Vice President Transportation
Seaboard System Railroad
500 Water Street
Jacksonville, Florida 32202

SAFETY RECOMMENDATION(S)

R-85-102 through -104

About 7:15 a.m., on February 23, 1985, Seaboard System Railroad (SBD) train No. F-690 derailed at Jackson, South Carolina, while traveling about 53 mph. The train struck a cushion unit that had dropped from a cushion-underframe boxcar in a train which had passed through Jackson about 5 hours earlier. Eight of the 27 derailed cars were tank cars laden with cyclohexane. The tank cars did not have head shield protection. Cyclohexane was released through tank head penetrations and was ignited immediately. Although no fatalities or injuries resulted from the accident, damage was estimated at \$1,293,133, and residences within a 1-mile radius of the accident site were evacuated. 1/

Following the derailment of SBD train No. F-690, the crewmembers of SBD train No. F-481, en route from Florence, South Carolina, to Augusta, Georgia, were directed by the SBD dispatcher to stand by. Train No. F-481 stopped about 7:30 a.m. after proceeding through to the end of the Barnwell manual block 2/ at Robbins, South Carolina, on the Florence-Augusta main track. The engineer of train No. F-481 called the dispatcher, who told him that train No. F-690 was having trouble ahead and that he did not know how long the delay would be. About 8 a.m., the dispatcher informed the engineer of the accident, directed him to uncouple the locomotive units from train No. F-481 and move them to the rear of train No. F-690, and told him to contact the SBD official at the accident site for further instructions regarding cars to be moved from the accident site.

1/ For more detailed information read Railroad Accident Report--"Derailment of Seaboard System Railroad Train No. F-690 with Hazardous Material Release, Jackson, South Carolina, February 23, 1985; and Collision of Seaboard System Railroad Train No. F-481 with Standing Cars, Robbins, South Carolina, February 25, 1985" (NTSB/RAR-85/12).

2/ According to the SBD operating rules, a manual block is "A length of track of defined limits, the use of which is governed by verbal authority of the train dispatcher, or under the direction of the train dispatcher when the control station operator is not the train dispatcher."

The crew of train No. F-481 backed their train so that its freight cars were clear of a dirt road at-grade crossing at Robbins. The cars consisted of 25 loaded and 33 empty cars and a caboose, and included 2 piggyback cars. Handbrakes were applied on several cars at the head end of the train, and the two-unit locomotive was uncoupled from the cars. The lead car was left about four or five car lengths east of the dirt road crossing, according to the crew. The cars of train No. F-481 were left in the Barnwell manual block under an absolute block 3/ authority, while the crew on the two-unit locomotive was given verbal permission by the dispatcher to proceed to the accident site at Jackson, about 14 miles west. At the accident site, the crew was instructed to pull the rear underdetailed portion of train No. F-690, consisting of 97 freight cars, back to a siding at Ellenton, South Carolina. After returning to the accident site, they assisted in re-railing a car and placed two freight cars and their two-unit locomotive in a siding east of the accident site. The crew then reported off duty and were taxied to Augusta, where they delivered the waybills and train consist from train No. F-481 to the trainmaster's office.

Meanwhile, the crewmembers of SBD train No. F-757, consisting of 7 loaded and 35 empty cars, 1 locomotive unit, and 1 caboose and en route from Burton, South Carolina, to Augusta, had been advised of the derailment at Jackson, and were directed to stop at Robbins and put their train into the Barnwell manual block, where they were to couple onto the cars from train No. F-481 and back into the clear from the Savannah-Augusta main track. About 7 p.m., shortly after arriving at Robbins, the conductor of train No. F-757 contacted the SBD dispatcher for permission to enter the Barnwell manual block. According to the dispatcher, he granted the conductor "verbal permission to enter the Barnwell block, looking out for train F-481, now occupying the Barnwell block without protection." The crew then backed train No. F-757 onto the Barnwell manual block, with a flagman on the caboose. The flagman, using the two-way radio to communicate with the engineer, had the train stopped after sighting the cars from train No. F-481 east of the dirt road at-grade crossing, when his caboose was about three car lengths west of the crossing. The conductor later stated that at the time he believed the single-unit locomotive on train No. F-757 would be unable to push back the combined train clear of the crossing, and that he so advised the dispatcher.

At that time, the single-unit locomotive and three cars of train No. F-757 extended west of the Barnwell manual block limit board just east of the Robbins depot. After the conductor marked the location of the most westerly car on train No. F-757 that was clear within the Barnwell manual block limit, the engineer pulled the train forward to allow the flagman to get off the caboose. The train was then backed to the same location, according to the crew, and handbrakes were set on several freight cars at the west end of the train starting at the fourth head car. The single-unit locomotive and the three remaining cars were placed onto the house track west of the depot at Robbins. The cars remaining on the Florence-Augusta main track consisted of 6 loaded cars, 33 empty cars, and the caboose from train No. 757, and the 25 loaded cars, 33 empty cars, and the caboose from train No. F-481. The two "cuts" of cars were not coupled and were separated at the dirt road at-grade crossing. The crew was then taxied from the depot at Robbins, across the dirt road at-grade crossing, and to Augusta, where they delivered the waybills and train consist from train No. F-757 to the trainmaster's office. The waybill for a placarded tank car of formaldehyde was left on the caboose of train No. F-757.

3/ A block in which no train is permitted to enter while it is occupied by another train.

About 10 p.m., on February 24, 1985, a traincrew consisting of a conductor, engineer, brakeman, and flagman reported for duty at Augusta, where they were issued their train orders, including a copy of a handwritten work message. The work message contained instructions to the conductor and engineer to proceed to the siding near Jackson, and using the two locomotive units left there by the crew of train No. F-481, to proceed as train Extra 5523 West eastward to Robbins, where the crew was to pick up the locomotive unit and three cars left in the house track by the crew of train No. F-757 and the 32 loaded and 68 empty cars (including 2 piggyback cars) from the Barnwell manual block. The work message also contained instructions to pick up, while en route back to Augusta as train Extra 5523 West, the 97 cars from train No. F-690 that had been left at the siding at Ellenton. The work message, originated by the dispatcher at Florence, had been relayed to an operator at Augusta.

The crew was taxied from Augusta to Jackson where they picked up the two locomotive units and obtained block authority from the dispatcher to proceed as train Extra 5523 West to Robbins at about 12:15 a.m., on February 25, 1985. About 12:45 a.m. the dispatcher, after receiving a request from the conductor of train Extra 5523 West, granted permissive block authority to occupy the Barnwell manual block "looking out for F-481's train occupying the main track in the Barnwell block." The dispatcher did not mention the cars left on the track by train No. F-757. The dispatcher issued the authority directly to the conductor, referencing the control station operator located at Yemassee, South Carolina; the Barnwell manual block is under the jurisdiction of the control station operator located at Florence. When the operator at Yemassee noted that fact to the dispatcher, the dispatcher replied, "Well, it don't matter that much, you just ended up with it now, far as they (Extra 5523 West) know." Shortly thereafter, the conductor queried the dispatcher as to the "paperwork on these cars we've got to pick up" and was advised that all the waybills were at Augusta. The dispatcher also advised the conductor that he wished to pass another train westbound to Augusta by Robbins on the Savannah-Augusta main track. The conductor replied that as soon as they picked up the locomotive unit and three cars in the house track they would "clear up over here in the Barnwell block."

While at Robbins, the conductor requested information concerning the placarded tank car in the house track, which the operator at Augusta then furnished to the conductor. The engineer of train Extra 5523 West backed the locomotive unit and three cars onto the main track and coupled to the two locomotive units picked up from Jackson. The three-unit locomotive and three cars were then backed and coupled onto the 39 cars at the Barnwell manual block limit board that had been left by train No. F-757. While the train's airbrake system was being charged, the flagman released the handbrakes which were set on the cars at the west end of the cut of cars left by train No. F-757. Train Extra 5523 West was then pulled forward onto the Savannah-Augusta main track, through the crossover, and onto the passing siding. No member of the crew walked eastward to the end of the cut of cars left by train No. F-757. At this time the conductor was standing outside the depot at Robbins. After the track switches were returned to the normal position, the conductor contacted the dispatcher and advised him "conductor . . . on the 5523, release all these blocks, we took the siding at Robbins, we didn't back up in that Barnwell block." The dispatcher acknowledged the transmission and noted the time at 1:30 a.m. The other westbound train was then given authority to proceed.

About 1:36 a.m., the conductor contacted the dispatcher again and advised him that they had picked up "about 40 or 50 some cars" and further that there were no piggyback cars in the pickup. The dispatcher replied to the conductor, "Well, it shows here 25 [loaded cars] and 33 [empty cars] including 2 pigs" and further "at Ellenton is where you get your big part, 90, according to what I've got here, it says 97." The dispatcher had referred to a notation written by the dispatcher on the previous shift regarding the placement of the trains to be held temporarily. The conductor stated, "OK, we came out with the cab, I presume that's the whole train," to which the dispatcher responded, "OK." The crew did not make a list of the cars in their train, nor did they perform a walking inspection or initial terminal brake test of their train as required by Federal regulation. About 2:49 a.m., train Extra 5523 West was given authority at Robbins to proceed westbound, and picked up 95 of the 97 cars at Ellenton.

Shortly after 3 a.m., the conductor of train No. F-481 of February 25, en route from Florence to Augusta, contacted the dispatcher and inquired, "Did they move the train from our side?"; the dispatcher responded, "Yeah, they finally got it." The flagman and brakeman, both of whom were on the locomotive, had been crewmembers of train No. F-481 of February 23 when the cars of that train were left in the Barnwell manual block. About 4:38 a.m., train No. F-481 of February 25 was given authority by the dispatcher to proceed through three additional blocks, including the Barnwell manual block. The flagman and brakeman said that while train No. F-481 of February 25 was proceeding in the Barnwell manual block, they discussed the cars they had left in the block 2 days earlier. The engineer stated that he had put the train in dynamic braking and was making the second application of the automatic airbrake as the train was approaching an overhead bridge east of Robbins. The engineer said that the speed of the train had been reduced from 49 mph to about 40 mph; at that time the train was in a 2°30' curve to the right and on a variable descending grade of about 0.5 percent. As the locomotive neared the overhead bridge, the flagman and brakeman, both seated on the left side of the locomotive control cab, simultaneously saw a caboose and cars ahead of them on the single main track. The engineer immediately placed the automatic airbrake into emergency application. The flagman and brakeman both exited the locomotive control cab through the left-side front door; the flagman jumped off the front platform on the right side while the brakeman jumped off the front platform on the left side. The engineer exited the locomotive cab through the right-side rear door and jumped off the rear platform on the right side. About 7:50 a.m., train No. F-481 of February 25 struck the rear of the standing cut of cars left by train No. F-481 of February 23. The accident resulted in three serious injuries, and damage was estimated at \$66,455.

The collision at Robbins was the culmination of a series of errors by the involved dispatchers and the crew of train Extra 5523 West, which were initiated by the derailment at Jackson of train No. F-690. The blockage of the single main track at Jackson necessitated the temporary holding of westbound trains to Augusta at various locations along the main line. The cars from train No. F-481 of February 23 were left in the Barnwell manual block under an absolute block occupancy authority. An absolute block, according to SBD operating rules, specifically prohibits another train from entering that block; however, train No. F-757 was authorized to enter that block with verbal permission, although the SBD operating rules cite no such provision. Further, after the crew of train No. F-757 released the verbal permission and prepared to be taxied from Robbins after leaving their train in the Barnwell manual block, the dispatcher highlighted the entry on the manual block sheet, indicating that train No. F-757 was no longer occupying that block. Subsequently a permissive block occupancy authority was established for train Extra 5523 West to enter the Barnwell manual block to pick up the cars from train No. F-481 and all of train No. F-757. The SBD operating rules cite no provision for this procedure either.

The work message issued to the crew of train Extra 5523 West contained instructions to pick up 32 loaded and 68 empty cars, for a total of 100 cars in the Barnwell manual block, including 2 piggyback cars, and 97 cars at Ellenton. The work message made no reference to the fact that the cars in the Barnwell manual block were from two separate trains, or that they were not coupled together. Since the presence of train No. F-757 had not been carried forward on the manual block sheets, the dispatcher made no reference to that fact when instructing the crew of train Extra 5523 West. Also, the dispatcher advised the conductor of train Extra 5523 West when at Robbins to clear the main track between Savannah and Augusta expeditiously, because he wanted to pass another train westbound to Augusta. The conductor replied that he would clear up in the Barnwell manual block after picking up the locomotive unit and three cars in the Robbins house track. That action would have necessitated a crewmember being sent to the rear of train No. F-757 to provide protection as the train was being backed up, because the cars from train No. F-757 were just inside the Barnwell manual block limit, and the locomotive and three cars were not in the clear. However, no crewmember was sent to the rear of the train. Had a crewmember been sent to the rear of the train to provide protection for a reverse movement, the cars from train No. F-481, about seven or eight car lengths to the east of the rear of train No. F-757, would have become evident. Thus, the accident at Robbins could have been prevented. Further, had a crewmember been sent to the rear of train No. F-757, a proper inspection of the train equipment and airbrake system could have been accomplished at that time. During the 1 hour 13 minutes on the Robbins sidetrack, the crew failed to perform a proper inspection of the train equipment and airbrake system.

When train Extra 5523 West advanced onto the siding at Robbins after picking up the cars from train No. F-757, the conductor advised the dispatcher to release the block authorities that had been granted. At that time however, he apparently was not aware that the total of 100 cars, including 2 piggyback cars, had not been picked up. The conductor contacted the dispatcher 6 minutes after he released the block authority and advised that he had only 40 or 50 cars. The dispatcher compounded the errors which had been made up to that point when he read only partially from the chief dispatcher's message regarding the holding of trains No. F-481 and No. F-757, reading only that portion concerned with the former train. The dispatcher apparently rationalized the car count discrepancy by referring to additional cars to be picked up at Ellenton. However, 1 hour 13 minutes elapsed between that conversation and the train's departure westbound from Robbins. During that time period, the conductor failed to make a list of the cars in his train, despite the discrepancy in the car count. Had he done so, he would have discovered that the train contained 42 cars and a caboose, rather than the 58 cars referred to by the dispatcher. Further, although the conductor knew that he did not have the two piggyback cars referred to in the work message, he failed to reconcile the discrepancy. That discovery should have led to a realization on the part of the dispatcher and/or conductor that all of the intended cars had not been picked up.

The manual block system of train dispatching is regarded as an operationally efficient method, and the Safety Board does not question its appropriateness. However, disregard of established and documented procedures will invariably invalidate the safeguards established in these procedures. The actions of the dispatchers involved in the movements of trains at or near Robbins indicate a disregard for the established and documented procedures of the SBD, which resulted in lack of specificity, and incomplete understanding in communications between the dispatchers and the train crewmembers. The cars from train No. F-481 of February 23 were left in the Barnwell manual block under an absolute block authority, which specifically precludes entry into that block by another train; however, train No. F-757 was directed into that block with verbal

permission, a procedure for which there is no provision in SBD rules, and train Extra 5523 West was directed into that absolute block with a permissive block authority, again a procedure also for which there is no provision in the SBD rules. It was necessary that the block occupancy status for the cars of train No. F-481 of February 23 be revised from absolute block to permissive block, before train No. F-757 or Extra 5523 West could have been directed into the Barnwell manual block by the dispatcher to comply with SBD's established and documented procedures. Moreover, if the entry onto the manual block sheet for train No. F-757 had not been highlighted, which indicated that train No. F-757 was no longer occupying the Barnwell manual block, the dispatcher directing the movement of train Extra 5523 West probably would not have transmitted erroneous information to the conductor of that train.

A total of 36 hours 10 minutes elapsed from the time train No. F-757 was left in the Barnwell manual block without being referenced on the manual block sheet until the collision at Robbins. The Safety Board believes that this was certainly a sufficient time span in which SBD management, especially the Florence division chief dispatcher, should have become aware of the situation and taken measures to ensure the safe operation of trains affected by the derailment at Jackson. The Safety Board believes such action was especially necessitated in view of the chief dispatcher's supervisory evaluation of the three dispatchers who were working during the period of extraordinary dispatching events after the derailment at Jackson. The chief dispatcher's failure to make any special efforts to supervise individuals he considered to be marginal in terms of job performance was not a responsible exercise of his responsibility to ensure compliance with the established and documented procedures of the SBD.

Although radio communication capability was not a factor in either accident, crewmember statements that permanent radios on cabooses malfunction more often than not, and the master mechanic's acknowledgement that reports of malfunctioning radios occur at a rate of 25 percent, leads the Safety Board to believe that the SBD should investigate whether unreliable radio communication capability is affecting the safe operation of trains. Although SBD rules regarding manual block system dispatching also permits the use of telephone, the Safety Board is concerned that inadequate radio communications (whether due to equipment failures or system design) will compromise a dispatching system based on verbal communications between dispatchers and train crewmembers to the detriment of safety.

Therefore, the National Transportation Safety Board recommends that the Seaboard System Railroad:

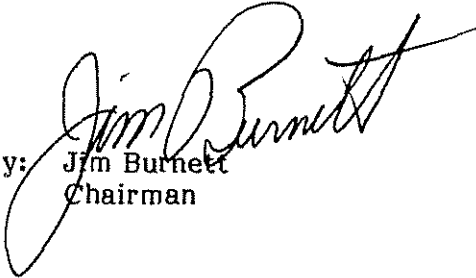
Establish a procedure in territories where trains are dispatched by manual block rules to ascertain that equipment temporarily stored on main tracks is removed before resuming dispatching of trains over those tracks. (Class II, Priority Action) (R-85-102)

Review and upgrade, as necessary, train radio communications capability to better ensure the safe dispatching of trains, particularly in territories where trains are dispatched by manual block rules. (Class II, Priority Action) (R-85-103)

Provide formalized and definitive training to train crewmembers regarding inspection practices for assembling trains at designated initial terminals as well as at other than normally designated initial terminals, to ensure that proper inspections of train equipment and airbrake systems are made. (Class II, Priority Action) (R-85-104)

The National Transportation Safety Board is an independent Federal agency with the statutory responsibility ". . . to promote transportation safety by conducting independent accident investigations and by formulating safety improvement recommendations" (Public Law 93-633). The Safety Board is vitally interested in any actions taken as a result of its safety recommendations and would appreciate a response from you regarding action taken or contemplated with respect to the recommendations in this letter. Please refer to Safety Recommendations R-85-102 through -104 in your response.

BURNETT, Chairman, GOLDMAN, Vice Chairman, and BURSLEY, Member, concurred in these recommendations.

By: 
Jim Burnett
Chairman