

NOTICE OF SAFETY ADVISORY 97-1 - Damage to tracks, roadbed, and bridges resulting from uncontrolled flows of water and similar weather-related phenomena.

On September 4, 1997, FRA published Notice of Safety Advisory 97-1 in the Federal Register (Vol. 62, No. 171), addressing safety practices to reduce the risk of casualties from train derailments caused by damage to tracks, roadbed, and bridges resulting from uncontrolled flows of water and similar weather-related phenomena. This was amended on November 14, 1997 (Vol. 62, No. 220) by revising the recommendation concerning the transmission of flash flood warnings to train dispatchers or other employees controlling the movement of trains.

A recent derailment involving train number 4 of the National Railroad Passenger Corporation (Amtrak) on the Burlington Northern and Santa Fe Railway Company (BNSF) near Kingman, Arizona, on August 9, 1997, has caused FRA to focus on the effectiveness of railroad procedures for protection of trains and personnel from hazards caused by severe weather conditions. The investigation of that accident by the National Transportation Safety Board (NTSB) and FRA continues. The facts and findings developed in the investigation will be published when the investigation is complete.

Special Inspection Procedures: The Federal Track Safety Standards (49 CFR part 213) state, “In the event of fire, flood, severe storm, or other occurrence which might have damaged track structure, a special inspection must be made of the track involved as soon as possible after the occurrence .” (49 CFR 213.239). This provision is purposely general in nature, because it is not practicable to specify in a minimum safety standard all the conditions which could trigger a special inspection, nor the manner in which any particular special inspection must be conducted. However, in accordance with the primary purpose of the Track Safety Standards and associated railroad safety laws, these special inspections should be conducted so as to effectively prevent derailments. In light of recent occurrences and past experience, FRA now believes it necessary to issue this safety advisory to provide railroads with recommended procedures to further this objective.

FRA has investigated several train derailments in which damage from unexpected moving water was a causal factor. Incidents reported to FRA between January 1982 and March 1996 included 26 derailments caused by washouts of bridges or bridge approaches, and 16 derailments caused by washouts or water damage to culverts or subgrade not near a bridge. In most cases, the railroad had some form of notification of the severe weather conditions and either initiated or performed an inspection. When the derailment occurred, either the inspector had not reached the derailment site before the train, had inspected the track and not recognized a hazardous condition, or had performed the inspection before the damage had become detectible. FRA believes that more specific measures can be taken by each railroad that conducts operations on track subject to hazards from flowing water, to reduce the likelihood of future derailments caused by those hazards.

Vulnerable Structures and Track: FRA believes that several types of bridge and drainage structure components should be identified as vulnerable and be given special consideration in any decision related to the operation of trains both during and following a severe rainstorm. In particular, bents, piers, and abutments that rest directly on soil or degradable rock near the surface might be rapidly undermined in a severe rainstorm. Similarly, stream bed configurations in which the water course takes a bend or a change in slope near the track are often unpredictable in times of heavy flow. During such conditions, soil displacement can progress rapidly in an unpredictable manner in locations that are not visible to a person above the water surface. The size of a drainage structure, and whether it is categorized as a bridge or a culvert, is not as important as the vulnerability of the structure and its supported track to the effects of flowing water.

Recommended Action: FRA believes that the chance of further derailments, such as occurred near Kingman, Arizona, on August 9, 1997, would be greatly reduced by the inclusion of certain additional measures into the procedures for special inspections followed in the railroad industry in the event of a threat of a severe rainstorm, at the level of a flash flood. FRA has determined that each railroad that controls the operation of trains on Class 4 or higher track, or passenger trains in commuter or intercity service, should have in place a program to protect its train operations from the effects of damage to tracks and structures caused by severe weather conditions, particularly flash floods. Therefore, FRA issues the following advisory to each affected railroad:

1. The railroad should have in place a procedure that will assure that the train dispatchers or other employees controlling the movement of trains on all track of Class 4 or higher or upon which passenger trains operate in commuter or intercity service will receive timely warnings of any flash flood that might damage that track or its supporting structures. In the case of such track located outside of the warning area but subject to damage from water resulting from the storm, the information should be obtained in time to permit timely response by the railroad. The warning procedure should incorporate either:
 - a. The means to receive within 15 minutes of issuance by the National Weather Service (NWS) all NWS flood warnings for the area in which the track is located; or
 - b. An arrangement with a competent commercial weather service which receives and reviews warnings and weather data from the NWS as part of its warning procedures, and from which the railroad receives warnings and weather information that is specific to the situation and requirements of the railroad.
2. After the receipt of a warning of a flash flood which might damage track or bridges, the railroad should notify train crews and limit the speed of all freight and passenger trains to that which will permit the train to operate safely, consistent with the potential water levels and visibility conditions, on all track subject to damage from the flood. The limitations should continue until a special inspection in accordance with 49 CFR 213.239 has been performed of that track and it

is determined that a hazard no longer exists. In making that inspection and determination, the time taken for the heaviest flow of water to reach the track should be considered.

3. Each railroad affected by this advisory should identify its bridges carrying track of Class 4 or higher or over which passenger trains operate in commuter or intercity service, which are vulnerable to damage from flash floods or similar weather-related phenomena. Particular attention should be given to bridges which incorporate piers, bents, or abutments, which are founded on soil or degradable rock which could lose its integrity as a result of scour by moving water, and which are commonly referred to as “mud sills” or “spread footings.”
4. The information developed in paragraph 3 should be compiled and made available to each person who can be called upon to perform special inspections on the subject track following a flash flood warning. Consideration should be given to placing identifying marks on bridges that need particular attention in special inspections, along with the bridge number, to assist inspectors in locating them with certainty during inclement weather. Consideration should also be given to the use of automated high water detectors or similar sensing and warning systems on specific bridges which could incur water damage that would be hidden from or not otherwise detectable by a human inspector.
5. In addition to the bridge-specific information called for in paragraph 3, each affected railroad should implement a training program for the persons performing special inspections. The training should include methods to recognize and protect the safety of railroad operations from the damaging characteristics of flowing water in general, with particular regard to the effects of a watercourse that takes a significant change in horizontal direction or vertical profile near the track; the effects of drift material accumulation on scour and the capacity of the waterway opening; and the potential for damage by impact of heavy floating objects.
6. Refresher training of track inspectors on the subjects addressed in paragraph 5 should be conducted at least once each calendar year. Where practicable, that refresher training should include a joint inspection by a track inspector and a cognizant bridge maintenance or engineering employee over the inspector’s assigned territory. During that joint inspection they should locate the vulnerable components in the bridges identified in paragraph 3, discuss the precautions to be taken in the event of indications of distress in those components, observe drainage conditions on and adjacent to the right-of-way, and note changes for inclusion in the revisions of information called for in paragraph 9.

7. If a track inspector is assigned to perform a special inspection in accordance with paragraph 2, and bridges identified as vulnerable are in the track segment subject to damage from the flash flood, a cognizant bridge maintenance or engineering employee should be readily available by telephone or radio to assist in the interpretation of findings by the track inspector.
8. Each affected railroad should brief all of its track and bridge inspectors on the contents of this advisory. These briefings should occur within 14 calendar days of the date of publication of this safety advisory in the Federal Register.
9. FRA believes that the actions described in paragraphs 3, 4, and 5 should be completed within 60 calendar days of the date of publication of this safety advisory in the Federal Register. During this period, each affected railroad should complete an initial review of its bridges for vulnerability to high or rapidly flowing water and provide that information to its inspectors. More detailed reviews should be substantially completed and provided to inspectors during calendar year 1998 and then maintained in a current status.
10. FRA requests a letter within 45 calendar days of the date of publication of this safety advisory in the Federal Register from each affected railroad specifying the actions it has taken and will initiate to enhance the safety of train operations in the event of a flood or a high or rapid water condition. Such letters should be addressed to the Associate Administrator for Safety, FRA, RRS-1, Mail Stop 25, 400 Seventh Street, S.W., Washington, DC 20590.

Notice of Safety Advisory Amendment: FRA is amending Safety Advisory 97-1, which addresses safety practices to reduce the risk of casualties from train derailments caused by damage to tracks, roadbed, and bridges resulting from uncontrolled flows of water and similar weather-related phenomena, by revising the recommendation concerning the transmission of flash flood warnings to train dispatchers or other employees controlling the movement of trains.

On September 4, 1997, FRA issued Safety Advisory 97-1, recommending that railroads take certain actions to reduce the risk of train derailments which could result from severe weather conditions, particularly undetected flash floods. The first recommendation of SA 97-1 reads as follows:

1. The railroad should have in place a procedure that will assure that all notifications issued by the National Weather Service (NWS) of flash flood warnings will be received within 15 minutes of issuance from the NWS, directly or through a contract weather forecasting service, by the train dispatchers or other employees controlling the movement of trains on all track of Class 4 or higher or upon which passenger trains operate in commuter or intercity service, within the warning area. In the case of such track located outside of the warning area but subject to damage

from water resulting from the storm, the information should be obtained in time to permit timely response by the railroad.

The intent of the recommendation is for all flash flood warnings issued by the NWS for the area in which an affected railroad operates to be received by the personnel who control train operations in the area of the warning. It is not necessary that the warning come directly from the NWS, but it should be received intact and in a timely manner.

Since SA 97-1 was issued, FRA has become aware of several circumstances in which large railroads with centralized dispatching operations have contracted with specialized weather services for weather information tailored to the situation and requirements of the railroad. Several of those contract services do not pass on all NWS warnings, but instead analyze the warnings in the light of other weather data available to them and their knowledge of the specific situation and requirements of their clients in order to provide only the weather information that affects the client and to filter out irrelevant information. This process reduces the amount of information that the client is required to consider and evaluate, and allows the client to focus on information that, in the view of the contract weather service, might actually affect the client's property and operations.

FRA now believes that this procedure offered by contract weather services might meet the requirements of some railroads better than if all NWS warnings are passed on by the contract weather service en masse, regardless of their relevance to the individual railroad. Therefore, SA 97-01 is amended in part by revising Recommendation 1.

Paperwork Reduction Act Provisions: This advisory does not require that any records or reports be kept or submitted. It merely recommends that railroads collect or provide certain information. Nevertheless, because some might see these recommendations as paperwork burdens, FRA will seek approval of them....See Federal Register notice for additional language on the paperwork reduction act provisions...

FRA may modify Safety Advisory 97-1, issue additional safety advisories, or take other appropriate necessary action to ensure the highest level of safety on the Nation's railroads.

Issued in Washington, DC, on September 2, 1997. James T. Schultz, Associate Administrator for Safety. The amendment was issued in Washington, DC, on November 10, 1997. George A. Gavalla, Acting Associate Administrator for Safety.