



U.S. Department
of Transportation
**Federal Railroad
Administration**

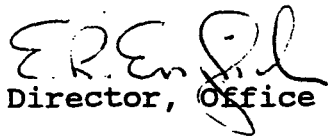
Memorandum

Date: FEB 1 1995

Reply to Attn. of:

T-95-01

Subject: Inspection of Conley Lift Rails

From: 
Director, Office of Safety Enforcement

To: All Regional Administrators, Deputy Administrators,
Track Specialists and Track Inspectors

Background: From time to time, FRA track inspectors have reported concerns about the conditions of "Conley Lift Rails." These assemblies have unique properties and functions. There has been some controversy concerning the level of hazard associated with worn and cracked Conley lift rails. Last year, a joint headquarters/field group, joined by Dr. O. Orringer of the Volpe National Transportation Systems Center, conducted a survey on a railroad which has several Conley lift rails. During that survey, fatigue cracks in Conley lift rails were observed in track and in scrap storage locations. In addition, Track Division staff interviewed maintenance officials on other railroads regarding these devices.

Discussion: The Conley Frog and Switch Company manufactures a device to provide a transition between a fixed span and a movable span

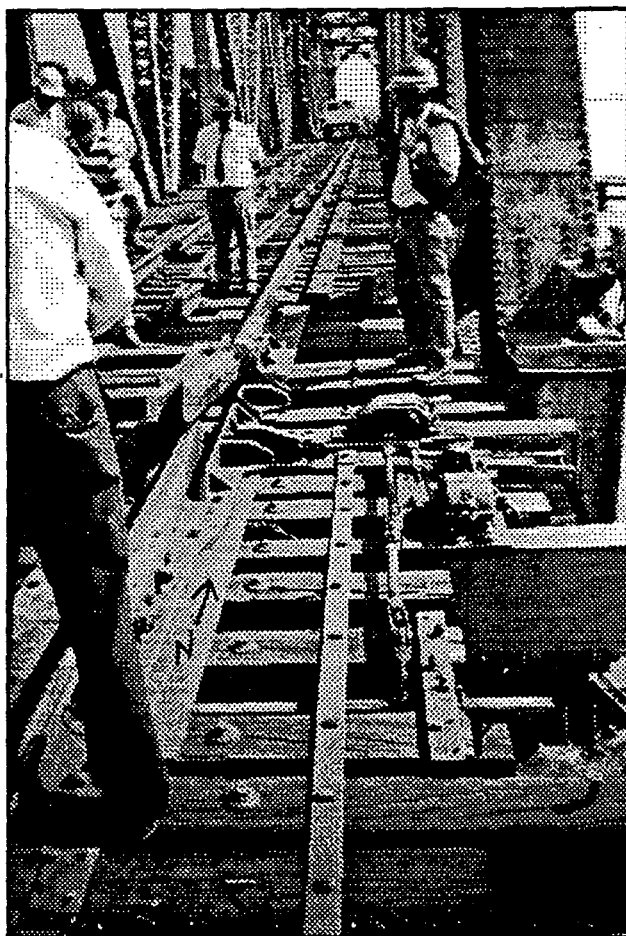


Figure 1 Conley Lift Rail

on lift bridges, swing bridges, and Bascules.

The photograph in Figure 1 provides a general view of a Conley lift rail. The lock is pulled back and the lift rail raised.

Lift rails are made of 3 pieces for swing bridges: a section on the fixed span, a section on the movable span, and the rocker which is shown raised in the figure.

In Conley literature the lift rails are called "Conley Expansion Rails" and some maintenance personnel call them Conley joints; however, the devices are most commonly called Conley lift rails. The fact that there are several synonyms for the devices points out that they can be viewed from several different perspectives.

Analogous to a rail in some respects, the Conley provides a running surface; similar to a rail joint, the device joins rails at the ends of bridge spans; and, it is made of manganese steel and has the appearance of a frog. However, the Conley lift rail is a unique appliance that cannot be readily classified in any of these categories.

Subpart E, Track Appliances and Track-Related Devices, Federal Track Safety Standards, does not presently address Conley lift rail or similar appliances.

The Conley lift rails have tapered male and female sections to reduce shock. The design provides for the transfer of wheels to take place on one span, rather than between spans.

The photograph in Figure 2 and the sketch shown in Figure 3 depict one type of crack which developed in the fixed portion of the Conley lift rail. This illustrates the type of crack that has been the focus of some concern by FRA field personnel. In this case, the crack has propagated across

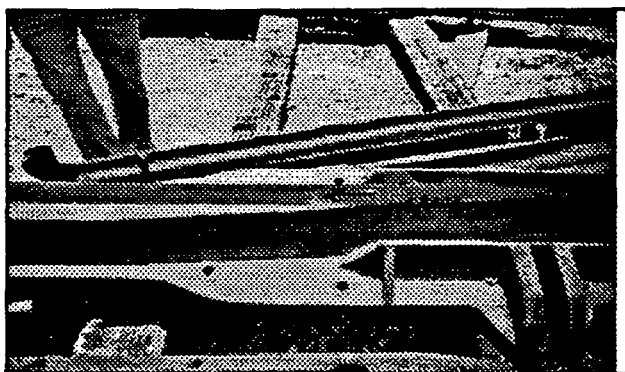


Figure 2 Crack in Running Surface of Conley Lift Rail

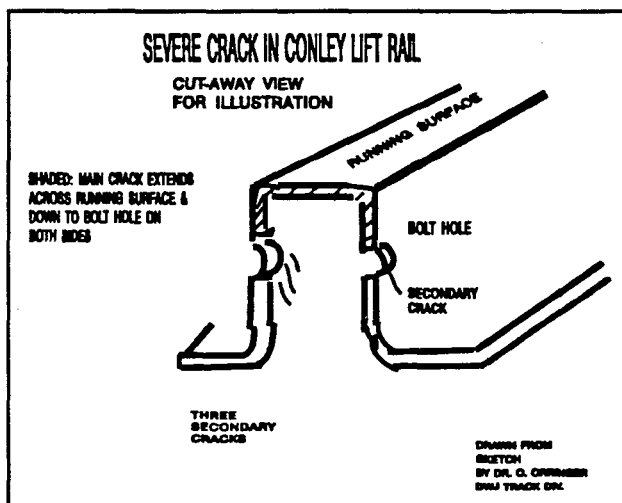


Figure 3 Severe Crack in Conley Lift Rail

the top and down both sides into bolt holes, but this type of crack also occurs when bolt holes are not present. Cracks can occur in the manganese casting almost anywhere. Common types of cracks include base cracks, web cracks, and head cracks.

Track and bridge maintenance personnel familiar with the Conley lift rail point out that cracks generally progress slowly. The propagation of cracks in manganese is common. Inspectors are familiar with cracks in railbound manganese frogs.

Two types of Conley lift rails were observed during the joint headquarter/region survey: an older style with no base flare and a newer style with a base flare.

Railroad maintenance officials advocate proper maintenance to prevent or reduce cracking. Because there is deformation of manganese over time, they recommend that metal flow be ground at the wheel contact point to reduce or prevent cracks.

Railroad maintenance personnel also emphasize that the bridge itself can aggravate wear and deterioration of Conley lift rails when the bridge needs to be adjusted or repaired. The condition of the bridge ties, for example, is an important factor in the maintenance of these of these assemblies.

The photograph in Figure 4, below and left of the arrow, shows a web crack which was also observed during the survey. The web crack ran from the fillet area to the base.

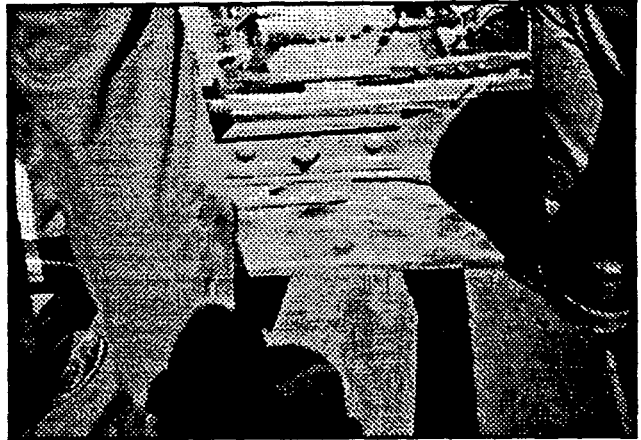


Figure 4 Web Crack in Conley Lift Rail

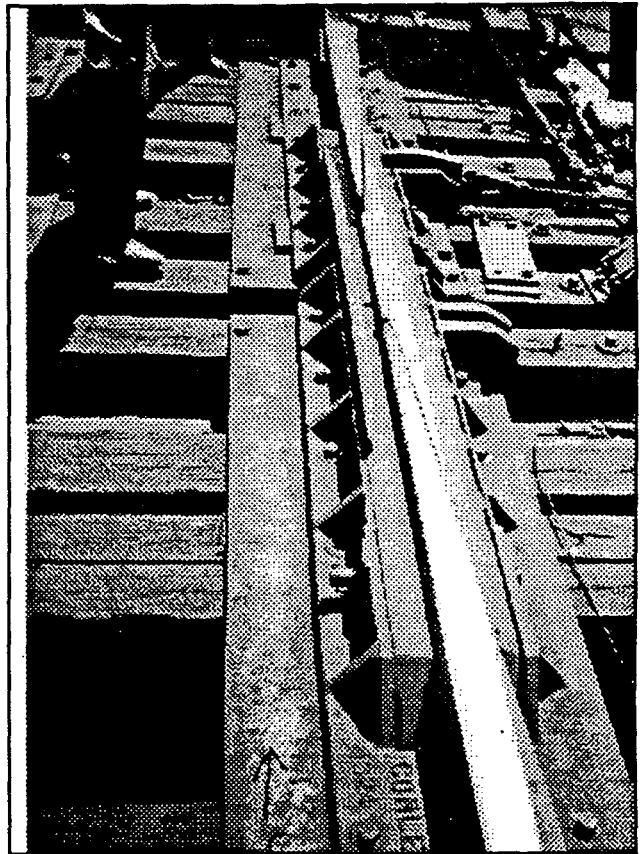


Figure 5 Conley Lift Rail Assembly in Closed Position

A closed assembly looking towards the fixed span and bridge approach is shown in Figure 5.

Policies regarding speeds on Conley lift rails are set by each railroad. Some railroads require a 25 mph maximum speed on all lift rails regardless of condition. Further reductions of train speeds are placed when the lift rails deteriorate to prohibitive levels. In deciding to place a speed restriction or remove a Conley lift rail from service, railroads consider a wide range of factors including the amount of traffic, bridge condition, and the condition of the Conley lift rail itself.

Conclusions:

1. Inspectors must use judgement in evaluating the safety of a Conley lift rail assembly. Although cracks are generally known to propagate slowly, cracks can be more hazardous under certain bridge conditions such as a deteriorated deck. Inspectors are cautioned against citing Section 213.113, Defective rails, to describe cracks in the manganese casting running surface of the Conley lift rail appliance.
2. Specific concerns about the safety of the Conley lift rails must be immediately brought to the attention of appropriate railroad management and discussed with the Regional Track Specialist.

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