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4910-06-P

DEPARTMENT OF TRANSPORTATION

Federal Railroad Administration

Safety Advisory 2023-05; King Pin Assemblies in Highway-Rail Grade Crossing Warning Systems

AGENCY: Federal Railroad Administration (FRA), Department of Transportation (DOT).

ACTION: Notice of safety advisory.

SUMMARY: FRA is issuing Safety Advisory 2023-05 to heighten awareness within the railroad industry of the potential failure of king pin assemblies in highway-rail grade crossing warning systems equipped with breakaway gates. This Safety Advisory recommends that railroads inspect and replace all worn components in king pin assemblies. This Safety Advisory also recommends that railroads develop inspection and maintenance programs for king pin assemblies.

FOR FURTHER INFORMATION CONTACT: Gabe Neal, Staff Director, Signal, Train Control and Crossings Division, Office of Railroad Safety, FRA, 1200 New Jersey Ave., SE, Washington, DC 20590, (816)-516-7168, gabe.neal@dot.gov.

Disclaimer: This Safety Advisory is considered guidance pursuant to DOT Order 2100.6A (June 7, 2021). Except when referencing laws, regulations, policies, or orders, the information in this Safety Advisory does not have the force and effect of law and is not binding in any way. This document does not review or replace any previously issued guidance.

SUPPLEMENTARY INFORMATION:

Background

King pin assemblies were introduced in the early 1990s as the rail industry transitioned from wooden crossing gate arms to aluminum and/or fiberglass crossing gate arms. Inspection and maintenance programs for king pin assemblies have not, however, been widely adopted and implemented within the railroad industry, even though some king pin assemblies have been in service since their original installation. King pin assemblies cannot be inspected without removing the crossing gate arm. In addition, the recommended maintenance of king pin assemblies is not usually conveyed by manufacturers in published guidance.

For highway-rail grade crossing warning systems equipped with king pin assemblies, the crossing gate slides onto the king pin at a 90-degree angle when the crossing gate is installed. The crossing gate is then pushed all the way up on the king pin and rotated into place. Shear bolts are installed to keep the crossing gate in position. When properly installed, the bulk of the crossing gate's weight rests permanently on the king pin and post pin tabs.

However, the king pin assembly can be damaged under normal operating conditions by vehicle strikes, high winds, rust, worn gate boot(s), and corrosion. If the highway-rail grade crossing gate is being held in place by a worn or damaged king pin assembly, the crossing gate may drop off the king pin and post pin tabs. When this occurs, the crossing gate may be held in place by only the shear bolts, which are not designed to hold the weight of the crossing gate. Therefore, if relied upon to hold the crossing gate in place, the shear bolts could stretch and break unexpectedly,

allowing the crossing gate to fall. This could happen very quickly, potentially causing injury to railroad employees or members of the general public in close proximity to the crossing gate.

Illustrations of Defects

Figure 1-King pin and gate assembly



Figure 2-King pin and gate assembly close-up

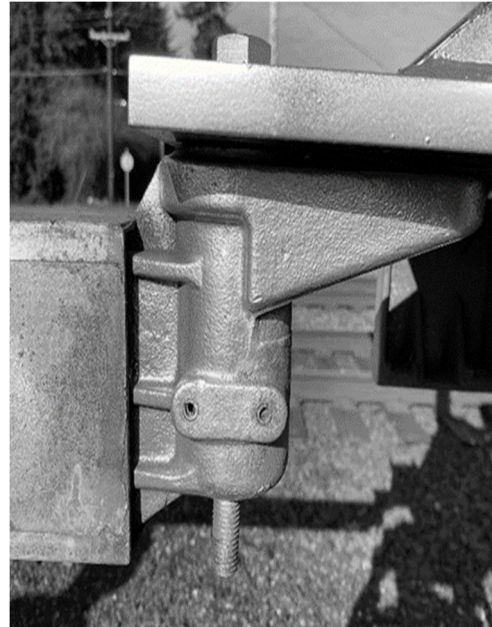


Figure 3-King pin with gate removed



Figures 4,5,6-Heavily oxidized and worn king pin tabs



Figure 7-Roll pin crack on king pin



Recommended Actions

To ensure the safety of the Nation's railroads, their employees, and the general public, FRA recommends that railroads take the following actions:

1) Inspect king pin assemblies in highway-rail grade crossing warning systems and replace all worn components.

2) Develop inspection and maintenance programs for king pin assemblies that incorporate maintenance procedures recommended by the manufacturer (if applicable), including lubrication of king pin assemblies to reduce wear and tear on the components. These inspection and maintenance programs should include periodic inspections of the king pin assembly with the crossing gate removed, as well as inspection of the king pin assembly each time the crossing gate is re-hung or replaced. These inspection and maintenance programs should also address the replacement of worn components and give special consideration to highway-rail grade crossing warning systems that are exposed to high levels of salt, which can cause corrosion.

3) Issue instructions requiring employees to stay clear of descending crossing gates until fully lowered and to discuss potential failure of the king pin assembly in job safety briefings, when applicable. Railroads should also issue instructions requiring employees to warn others to stay clear of descending crossing gates until fully lowered.

Issued in Washington, D.C.



Amitabha Bose,

Administrator.