

Proposed Safety Appliance Attachment Weld Inspection Program

Scope

The Federal Railroad Administration (FRA) interprets Federal safety appliance regulations to prohibit the use of welds in the attachment system securing safety appliances to carbodies. A significant number of existing vehicles have one or more safety appliances that do not conform to this interpretation. Therefore, the American Public Transportation Association (APTA) and its members are proposing a waiver to the FRA for this existing equipment.

As part of this waiver, the operating entities will conduct an inspection of existing nonconforming safety appliance systems. This document provides the outline of the technical portion of the proposed inspection program.

The philosophy of the inspection program is to establish that no cracks have occurred during service that would make these welds unable to perform their function(s).

Location Identification and Data Handling

All weld locations to be inspected will be identified to the inspectors. For each car type, inspectors will receive detailed instructions and sketches showing the locations to be inspected and the type of weld at each location. A uniform designation system will be used so that data from various agencies can be compared and combined for a comprehensive analysis of the data.

A uniform database will be developed by the affected agencies for recording the inspection results. This database will list all affected vehicles (per Attachment 2, as supplemented) and the locations inspected. The database will be based on commercially available software such as Microsoft Access, and will be made available to all affected agencies.

Inspection Technique

Visual inspection will be used on the subject welds. The operating property will disassemble as necessary to permit the visual examination. Additional

preparations will be limited to local cleaning to remove dirt, grease, and rust; removal of paint will not be required. Viewing aids such as mirrors or other location-specific aids may be used in lieu of extensive disassembly. Visual examination will be done following written procedures.

Evaluation of Results

If any cracks, as defined in AWS D1.1, are detected during the inspection, the operating property will conduct a failure analysis to determine the root cause of the crack. There are three potential scenarios that could result in cracking:

1. Impact of the safety appliance by an outside force during service or accident (crash damage).
2. Cracking of a weld that does not conform to the engineered design (improper construction).
3. Cracking due to unanticipated stresses during regular service (inadequate design).

The applicable scenario will be determined to guide the need for additional inspections of safety appliance attachments on other cars in the same fleet or similar attachments on other car designs.

All cracks will be reported and repaired. Repair will be done using the following guidelines:

1. Crash damaged areas will be repaired so that the safety appliance and attachment are as strong as the original design. Repair of supporting structure may be required. Repairs will be done in accordance with the welding procedures specified in APTA SS-C&S-020-03, Standard for Passenger Rail Vehicle Structural Repair.
2. Cracks due to improper construction will be removed and the safety appliance re-welded to the original design dimensions using the welding procedures specified in APTA SS-C&S-020-03, Standard for Passenger Rail Vehicle Structural Repair.
3. Cracks due to inadequate design (including fatigue failure) will be repaired by replacing the weld attachment with one using mechanical fasteners. On a case-by-case basis, welds may be used to reattach an affected safety appliance if the use of mechanical fasteners is impractical (example, would require major redesign) or will compromise the structural integrity of the carbody.

Following the initial inspection of the affected fleet, the APTA team will review the data with the FRA and determine if any general conditions exist.

Personnel Qualifications

Inspectors for this program may be qualified by one of the following methods:

- AWS Certified Welding Inspector (CWI) designation
- Canadian Welding Bureau (CWB) certification
- American Society for Nondestructive Testing SNT-TC-1A visual examination, Level I or II (one Level II can supervise Level I inspectors but all evaluation of discontinuities must be done by Level II personnel)
- QMP certified personnel with four hours of specific training on the safety appliance inspection program.

The selection of the specific qualification program will be done by the operating agency.

If a potential crack is detected, an inspector certified as CWI, CWB, or Level III will view the location and make the final determination. Alternately, an engineer experienced in welding and/or materials may make this determination.

Any crack will have the relevant portion cut out for failure analysis, and an engineering analysis will be done to determine if the crack is the result of crash damage, a fabrication deficiency, or a design deficiency.

References

American Welding Society D1.1-2004, “Structural Welding Code- Steel”

American Society for Nondestructive Testing, SNT-TC-1A, Recommended Practice for Non-Destructive Testing, 2001 Edition.

APTA SS-C&S-020-03, Standard for Passenger Rail Vehicle Structural Repair