CHAPTER 16.0 A-FRAMES AND TROLLEYS

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16.0 A-FRAMES AND TROLLEYS

16.1 Background
In April 2002 a hoisting and rigging occurrence indicated the need to address portable A-Frames and Trolleys. 2002-RL-HNF-0025, Lesson Learned –I-Beam Trolley Failure, was published.

16.2 Discussion and Resolution/Expectation
This chapter of the Hanford Site Hoisting and Rigging Manual (HSHRM) was originally published and implemented as an H&R Bulletin to address portable A-frames and trolleys. In 2015, ASME B30.17, Cranes and Monorails (with Underhung Trolley or Bridge), introduced Portable Gantry Cranes (A-frame) into the standard. This can be accessed thru Chapter 13.0, Overhead & Gantry Cranes; Cranes and Monorails.

16.2.1 Portable A-Frames and Trolleys
Manufacturers’ recommendations shall be followed regarding assembly, maintenance, and use of portable A-frames (Figure 16-1) and trolleys. Manufacturers’ instructions for use shall be posted in the area of use or on the portable A-frame, or personnel shall have been trained on the manufacturers’ instructions for use. Manufacturers’ instructions for assembly and maintenance of portable A-frames and trolleys shall be made available to inspection and maintenance personnel.

16.2.2 Documented Periodic Inspection
After repair or replacement of load-bearing parts, annually, and after being reassembled, an A-frame or trolley must undergo a documented inspection by a qualified inspector before being put into service. The inspection shall consist of a thorough examination of all components with a focus on any abnormality or damage that may affect the integrity or load-carrying capacity of the devices. Nondestructive examinations (i.e., magnetic particle or dye penetrant tests) are not required unless requested by an inspector. Written documentation of the inspection is required. The portable A-frames and trolleys shall be marked/tagged indicating the due date for the next annual inspection. The inspection shall cover the following items.

a. Look for bent, broken, damaged, corroded, cracked, or missing parts.

b. Verify that the following required markings are present and legible.
   - Each portable A-frame has its rated capacity legibly marked on the structure on each side of the primary beam.
   - The manufacturer’s name and model number are permanently and legibly marked on each portable A-frame.
   - A tag indicating due date of the next inspection is attached to the trolley, A-frame, and any attached hoist.

c. Ensure that trolley or beam clamp working load limits do not exceed the capacity rating of the A-frame. Hoists attached to the A-frame must have a rated capacity equal to or less than all supporting components.
d. Ensure that A-frame components from different manufacturers are not intermixed or that components from different A-frames are not combined, regardless of similarities in manufacturers or rated capacities.

e. Validate the proper dimensional relationship between the trolley wheels and rail. (See Figures 16-2 and 16-3.)
   • Load-carrying trolleys must suit the shape and weight of the specific load. Trolley wheel design must be matched properly to the rail shape and size to ensure that trolleys do not slip off the track and drop the load. Refer to Figures 16-2 and 16-3 for the proper dimensional relationship between the trolley wheels and rail.
   • If a new or replacement trolley is installed on a monorail, the qualified person installing the trolley shall ensure by actual operational verification or measurement that the installed trolley stops on the system are compatible with the new trolley, thereby preventing trolley travel past a point where it could fall from the rail.

f. Check for evidence of worn bearings and wheels on trolleys.

g. Observe trolley side plates for any bending or distortion.

h. Check for missing or loose bolts, nuts, and retaining pins or retaining devices on trolleys and A-frames.

NOTE: If any required information is missing or illegible, an attempt shall be made via engineering drawings, prints, evaluations, manufacturers catalogs, etc., to establish the A-frame’s manufacturer, rated capacity, and other pertinent criteria. If this attempt is unsuccessful, the A-frame shall be removed from service until engineering personnel have thoroughly evaluated the design and adequacy of the structure. Engineering calculations must support all conclusions. The A-frame shall be identified and marked accordingly.

16.2.3 A-Frame and Trolley Use

The user of a portable A-frame shall perform a pre-use inspection (documentation not required) before use or at least once each shift. The inspection shall consist of the following items.

a. Look for bent, broken, damaged, corroded, cracked, or missing parts.

b. Verify that required markings are installed and legible.
   • Each portable A-frame must have its rated capacity legibly marked on the structure on each side of the primary beam.
   • A tag indicating the due date of the next inspection is attached to the trolley, A-frame, and any attached hoist.

c. Verify that the rated capacity is legibly marked on the structure on each side of the primary beam.

d. Ensure that the trolley, beam clamp, or hoist working load limits do not exceed the capacity rating of the A-frame.

e. Perform a function test of the trolley and hoist to ensure proper operation.
f. If adjustments or repairs are necessary or any defects are found that affect safe operation, the operator shall stop work and report deficiencies to the supervisor or equipment custodian.

16.2.4 Conduct of Operations

a. When performing a lift, the load shall be positioned directly under the trolley. Side loading is prohibited. Side loading may spread the side frames, bend the suspension plate, and cause the trolley to fall from the A-frame.

b. The operator shall not pick up a load in excess of the rated capacity of the trolley except in the performance of a properly authorized load test. Load weight shall be known or a load-measuring device shall be installed to prevent overloading the hoist and/or system.

c. Attaching the hoist to the A-frame by suspending it from slings wrapped around the structure is prohibited without written approval from the manufacturer.

CAUTION: Working on or under a suspended load is prohibited, except when the load can be supported by blocking or cribbing, can be securely braced, or can be supported substantially by some other means that would prevent the load from moving. Some loads being lifted and set in place may require special handling control measures such as inspecting, landing, setting, or controlling the load, that may require personnel to position their hands or other body parts under the load when no other method is feasible. These special handling control activities MUST BE APPROVED by management and industrial safety PRIOR TO BEING PERFORMED.

16.2.5 Qualifications of Personnel

Personnel operating hoisting equipment installed on a portable A-frame, or assembling and inspecting portable A-frames and trolleys must be trained/qualified in accordance with requirements outlined in Chapter 4.0, Personnel Qualification and Training.
FIGURE 16-1: PORTABLE GANTRY CRANE (A-FRAME)
FIGURE 16-2: TROLLEY WHEEL FIT

GENERAL NOTES:
(a) To adjust for wider flange widths, use additional washers inside as required. Equal numbers of washers should be used at each of cross pin.
(b) Gap between drop lugs shall be less than half of the beam width.

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16.3 **Inspection Tags**

A-Frames, trollies and any attached hoist used at Hanford shall be tagged by any one of the following methods to indicate the next periodic inspection due date.

1. Institute a comprehensive marking program (such as color coding) to indicate when the next inspection is required
2. Mark each hoist with a tag that indicates when the next periodic inspection is required.

16.4 **Load-Test Tags (Proof Test)**

Maintenance files contain the proof test (load test) report for the portable gantry (A-frame), trolley, and hoist. Proof tests shall never be less than minimum requirements defined in the ASME B30 series standards. A tag indicating the date of the load test may be affixed to the device for filed verification. See examples in Figures 16-4 and 16-5.

See Attachment 16-1 on the next page for an A-frame preuse inspection checksheet sample.
Attachment 16-1: A-Frame Pre-Use Inspection Checksheet Sample

A-Frame Identification: __________________________ Date: ___/___/______

The user shall perform the following checklist prior to performing hoisting and rigging operations with this A-Frame. Correct Unsat items found during this inspection before using this equipment. If Unsat items cannot be corrected, tag the equipment out of use. Mark not applicable (N/A) for items not contained or applicable to this A-Frame.

<table>
<thead>
<tr>
<th>A-Frame Inspection Areas</th>
<th>N/A</th>
<th>SAT</th>
<th>UNSAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturers' instructions for use are posted in the area of use or on the portable A-Frame.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Look for bent, broken, damaged, corroded, cracked, or missing parts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Verify required markings are installed and legible: Rated capacity legibly marked on the structure on each side of the primary beam, and a tag indicating the due date of the next inspection is attached to the trolley, A-Frame, and any attached hoist.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ensure the trolley, beam clamp, or hoist working load limits do not exceed the capacity rating of the A-Frame</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perform a function test of the trolley and hoist to ensure proper operation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>If adjustments or repairs are necessary or any defects are found that affect safe operation, stop work and report deficiencies to the equipment custodian.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operator is qualified in accordance with the Hanford Site Hoisting and Rigging Manual (HSHRM) to perform H&amp; R operational activities</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of hoist used on the A-Frame:</th>
<th>None</th>
<th>Air</th>
<th>Manual</th>
<th>Electric</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hoist Inspection Areas</td>
<td>N/A</td>
<td>SAT</td>
<td>UNSAT</td>
<td></td>
</tr>
<tr>
<td>Unusual sounds</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brakes working properly</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hooks inspected in accordance with Chapter 5.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Housing integrity intact</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supporting structure sound</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Load bearing parts (Yoke, Clevis)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cable/Chain in operating condition</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating controls respond properly</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Load limiting devices functional</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Limit switches work properly</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Warning labels installed in accordance with HSHRM</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sheaves and Drums inspected for damage/wear</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lubrication in accordance with manufacturers’ instruction manual</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collectors/Load chain buckets properly affixed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evidence of wiring wear or damage</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supply air system at rated air pressure</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

COMMENTS:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________