HOUSTON LIGHTING & POWER COMPANY

SOUTH TEXAS PROJECT
PROCEDURE MANUAL

SUMMARY OF REVISIONS

PROC NO	SUBJECT
OEP-9.05Q	VT-3 Visual Examination of Component Supports

REVISION NUMBER	Quality Related: Yes — REVISION DESCRIPTION
0	Initial Issue

REVISION AUTHORIZATION

REVISION NUMBER	0					
DATE ISSUED	7-7-86					
PREPARED BY	R. E. Ciemiewicz					
APPROVED BY						
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1.0 PURPOSE

This procedure describes the visual examination criteria used to fulfill the requirements of the VT-3 examination for Preservice Inspection of component supports, as specified in the American Society of Mechanical Engineers - Boiler and Pressure Vessel (ASME B&PV) Code, Section XI, Division 1, Paragraph IWA-2213 and Subsections IWF and IWD.

2.0 SCOPE

This procedure is applicable to the visual examination (VT-3) by certified personnel of supports for Safety Class 1, 2 and 3 pressure retaining components (vessels, piping systems, pumps, heat exchangers, valves, etc.). In addition, it applies to Class 3 integral attachments to the pressure boundary. This procedure may also be utilized by non-certified personnel to perform non-code required visual examinations, similar to the VT-3 examinations, on safety and non-safety related component supports.

The South Texas Project Preservice Inspection Component Support Examination Plan identifies those supports which are required to be examined utilizing this VT-3 procedure. It further establishes the specific application of this procedure and relative scheduling of the examinations.

3.0 DEFINITIONS

3.1 Relevant Condition - A condition discovered during the examination which requires further evaluation by Level II or III personnel for acceptability and resolution.

4.0 REFERENCES

4.1 ASME B&PV Code, Section XI, Rules For Inservice Inspection Of Nuclear Power Plant Components, 1980 Edition through Winter 1981 Addenda (referenced as 'Code' throughout text).

4.2 ANSI - N45.2.6, Qualifications of Inspection, Examination and Testing Personnel for Nuclear Facilities, 1978 Edition.

4.3 Bechtel Pipe Support Field Fabrication and Installation Specification 5L340JS1002, latest revision.

4.4 NPSI Catalog-81, Piping and Equipment Supports.

4.5 Letter from NRC Assistant Director of Licensing (Robert C. Tedesco) to Houston Lighting & Power, dated October 17, 1980. Subject: Preservice Inspection and Testing of Snubbers. Document No. ST-AE-HL-608.

4.6 OEP-9.04Q - Personnel Certification Procedure for Visual Examination Per ASME B&PV Code, Section XI.

4.7 OEP-9.06Q - VT-4 Visual Examination of Component Supports.

5.0 RESPONSIBILITY

5.1 LEVEL I, VT-3 EXAMINATION PERSONNEL

Responsible for the performance of system walkdowns, determination of accessibility, requesting insulation removal (where applicable), examination of applicable component supports and documentation of findings on the VT-3 Examination Recording Form (Attachment OEP-9.05Q-05). Level I Personnel shall submit the examination results to and work under the direct supervision of Level II or III Visual Examination Personnel.

5.2 LEVEL II, VT-3 EXAMINATION PERSONNEL

In addition to performing any Level I function, Level II personnel are responsible for training, overseeing and supervising the functions of Level I personnel. Further, the Level II is responsible for reviewing the Examination Recording Forms, evaluating the relevant conditions recorded and determining and reporting potential deficiencies to the appropriate personnel.

5.3 LEVEL III, VT-3 PERSONNEL

Responsible for evaluating the adequacy of the training program for qualifying and certifying personnel as Level I or II VT-3 examination personnel. The Level III may perform Level I and II functions. The HL&P Level III shall be the final arbiter for the application or interpretation of this procedure as well as the evaluation of examination results.

6.0 REQUIREMENTS

6.1 PERSONNEL QUALIFICATIONS

Personnel performing Code required visual examinations per this procedure shall be certified in accordance with Reference 4.6. Examiners shall be able to read support design, isometric and component drawings and shall be able to use measuring equipment and optical aids.

6.2 EQUIPMENT

6.2.1 Measuring Equipment

Although the use of measuring equipment is not necessary for each examination, scales, angle readers, probes, rulers, feeler gauges, plumb bobs, protractors or weld gages may be necessary to specifically measure clearances, misalignment, or weld size.

6.2.2 Equipment Certification

Certification/calibration of equipment identified in this procedure is not required.

6.2.3 Illumination

Lighting shall be sufficient to resolve a 1/32 inch or finer black line on an 18% neutral, gray card. Failure to meet the requirement demonstrates the need for supplemental lighting such as flashlights or floodlights.

6.2.4 Optical Aids

Optical aids may be used when performing the examination directly (within 24 inches of the surface) or remotely (beyond 24 inches). It is desirable to perform a direct examination (whenever practical) or to be as close to the component support as possible. Examples of direct and remote optical aids are as follows:

Direct Examination - Mirrors, magnifying glasses, etc.

Remote Examination - T.V. camera/monitor, binoculars, borescopes, etc.

6.3 CLEANLINESS

The items to be examined shall be free of dirt, contaminants or other debris that could interfere with the visual examination process.

6.4 EXAMINATION BOUNDARIES

The boundaries for the VT-3 visual examination of component supports extend from the component (see 6.4.1, 6.4.3 and 6.4.4) to the building structure (see 6.4.2 below). Material to be examined is listed in the Bill of Material of the pipe support or component drawing.

6.4.1 The attachment portions of intervening element(s) must be visually examined to the requirements of VT-3. This shall include the attachment portion of intervening element to the pressure retaining components, as well as the attachment to the support.

6.4.2 The building structure is considered the concrete floor or wall, overhead building structural beam, building column, or floor, wall or ceiling embeds. See Attachment OEP-9.05Q-01 for typical illustrations of connections to the building structure.

6.4.3 The examination boundary at the attachment to an uninsulated component ends at the weld* (intergral attachment) or point of contact with the component surface (non-integral attachment).

6.4.4 The examination boundary at the attachment to an insulated component ends at the insulation surface (see Attachment OEP-9.05Q-02, items 4, 5, 6). The following exceptions, however, apply:

a. Class 3 integral attachments since the examination boundary includes the weld to the component (see Attachment OEP-9.05Q-02, items 1 and 2).

b. Class 1 or 2 integral attachments where a non-pressure retaining weld or bolted connection lies beneath the insulation (see Attachment OEP-9.05Q-02, items 1 and 2).

c. Class 1, 2 or 3 snubber clamps (see Attachment OEP-9.05Q-02, item 3).

d. Class 1, 2 or 3 strut clamps, unless carrying the dead weight pipe load. (see Attachment OEP-9.05Q-02, item 3).

e. Other Class 1, 2 and 3 restraint type supports where the restraint is in tension.

6.5 EXAMINATION PREREQUISITES

6.5.1 Obtain the list of specific supports which require VT-3 examination.

6.5.2 Obtain the latest revision of the component support drawings and the latest copies of all outstanding change notices which apply to the subject supports.

6.5.3 Verify if scaffolding, ladders or supplemental lighting are necessary and available to perform the examinations.

* Visual examination of Class 3 integral attachments include the weld to the component.

6.5.4 Obtain the necessary measuring equipment, optical aids and supplemental lighting to perform the examinations.

6.5.5 Adhere to all HL&P safety procedures while performing all VT-3 examinations.

6.6 EXAMINATION CRITERIA

To satisfy the Code requirements, each non-exempt component support selected for examination, shall be VT-3 examined to determine its general mechanical and structural condition. The visual examiner shall identify and document on the VT-3 Examination Recording Form (Attachment OEP-9.05Q-05), all conditions which deviate from the criteria described in this section or the applicable design drawing. The form shall then be sent to a Level II or Level III for review, evaluation and disposition.

6.6.1 General Configuration and Material Conditions

The following requirements pertain to all items and components (as applicable) listed in paragraphs 6.6.2 through 6.6.7.

*a. The general configuration is in accordance with the design drawing.

b. The support is not performing any function other than supporting or restraining the intended component, as specified by the design drawing.

c. There are no obvious missing materials or parts.

d. There is no evidence of corrosion/erosion resulting in significant loss of metal or unusual contaminants such as boric acid on ferritic materials.

* Examination condition applicable to augmented PSI of snubber assembly.

e. There are no signs of wear, especially in areas where movement occurs.

f. There is no obvious physical damage (material hanging loose, bent, cracked, distressed, misaligned, etc.)

g. Frictionless pads are in place, secure, unpainted, appear lubricated and not deteriorated.

6.6.2 Welds

a. There are no visible cracks.

b. If corrosion with metal loss is evident, a measurement of the weld or base material shall be taken and compared to the design drawing and evaluated as necessary.

6.6.3 Bolted or Mechanical Connections

a. Nuts, bolts and bolted connection locking devices are in place and firmly seated against the connecting part and hand tight.

b. Friction clamps are tight on the components such that no play exists and there are no signs of clamp slippage along pipe.

c. Retaining devices (cotter pins, retainer rings, etc.) are correctly installed in shear load bearing pins.

d. A locking method is provided on all threaded connections, excluding concrete fasteners. Acceptable locking methods include lock nuts, jam nuts, thread staking or lockwire.

e. Full thread engagement shall be a minimum of one complete thread beyond the nut. Jam nuts must be fully engaged. The threads must be detectable in mechanical connections employing thread sight holes. If heavy hex head locknuts are used, 50% engagement is required.

f. Pipe clamp spacers are in place.

6.6.4 Base Plate Connections

a. There are no visible signs of cracks or spalling in concrete around anchors.

b. There is no visible play or gaps between fasteners (ie, washers, nuts, bolts or bolt heads) and the base plate or structural members such as channel or angle iron. There is no visible play or gaps between the base plate or structural member and the concrete other than those caused by surface irregularities of the concrete.

c. Assure base plates are not submerged in water unless specifically designed for a water environment.

6.6.5 Clearance Determination

*a. Swing Angles (see Attachment OEP-9.05Q-03) of Snubbers, Struts and Rod Hangers

1. Verify that binding (in the binding direction) of paddles has not, and appears will not, occur at either the pipe attachment or structural attachment end.

2. Verify that the swing angle (in the non-binding direction) appears to be within $\pm 4^{\circ}$ of the design angle shown on the component support drawing.

* Examination condition applicable to augmented PSI of snubber assembly.

b. Restraint Gaps

For component supports designed to restrict component movement (box guides, U-bolts, and U-straps), verify that the total gap is greater than 0", i.e. daylight ("total gap" is the combination of two opposite sides).

c. Non-restraint Gaps

For component supports designed not to restrict component movement, verify that approximately 1/2" exists between where the component would contact the component support or any other structure.

d. Interferences (see Attachment OEP-9.05Q-03)

Contact with surrounding equipment, structures, piping, etc. has not/will not occur, by observing approximately 1/2" clearance completely around the subject component support.

6.6.6 Snubbers (Mechanical and Hydraulic) and Struts

*a. Snubbers

1. This VT-3 examination procedure confirms the general mechanical and structural condition of the snubber attachments from the snubber unit to the component and to the building structure (i.e. pipe clamp, extension piece, auxiliary steel, and building attachment).

2. Examinations to confirm the structural condition and mechanical operation of the snubber unit will be conducted under the VT-4 Examination Procedure No. OEP-9.06Q.

* Examination condition applicable to augmented PSI of snubber assembly.

*3. Verify that bolts on the bolted connections between mechanical snubbers and their extension pieces or fixed end paddle (as applicable) are fully engaged (see Attachment OEP-9.05Q-04).

*4. Verify that the bolt locking device is installed. dynA/damp snubbers incorporate a locking wire at the extension piece.

*b. Struts and Snubbers

*1. Verify that the ball of the swivel ball bushing is free to move and degradation is not evident. Verify that the swivel ball bushings located at the paddle ends of struts and snubbers are aligned and in their proper position within the paddle (i.e. spacer washers as required).

*2. As applicable, verify that threads are detectable in sight holes of strut/snubber extension hardware.

6.6.7 Variable Supports

a. This VT-3 Examination Procedure confirms the general mechanical and structural condition of the spring support attachment hardware only (i.e. pipe clamp, building attachments, rods). Examinations to confirm the structural condition and mechanical operation of the spring can itself will be conducted under the VT-4 Examination Procedure No. OEP-9.06Q.

b. Verify proper locking and thread engagement of turnbuckles and rods attached to the spring housing.

c. Verify cotter pins or retaining devices are correctly installed on shear load pins.

* Examination condition applicable to augmented PSI of snubber assembly.

6.7 EXAMINATION AND DATA RECORDING INSTRUCTIONS

Conditions listed in Section 6.6, which are found during the VT-3 examinations, shall be noted on VT-3 Examination Recording Form. Any relevant condition shall be clearly addressed on the form.

Each examination shall be documented by including the appropriate information and examination results in the spaces provided on the Examination Recording Form as follows:

6.7.1 Fill in the reference information requested in Part A as applicable; if not applicable, enter N/A in the appropriate space.

6.7.2 Record type of optical aids or measuring equipment used in Part B; if not used, enter N/A in that space.

6.7.3 If support does not incorporate snubbers or variable springs then record "no" in Part B; if the support does then check "yes", and a VT-4 Examination Recording Form will be needed in addition to the VT-3 Examination Recording Form.

6.7.4 General Configuration; record "acceptable" or "relevant" in Part C to indicate if the as-found condition is acceptable or not. If a relevant condition is recorded, use the space labeled "remarks" to describe the condition. A sketch showing the location of the condition is advised. If additional remarks or sketches are needed to clearly depict the condition, use additional sheets and attach them to the examination form. Photographs could also be used to help depict or size the condition.

6.7.5 Directions for completing the remaining items of Part C are the same as those provided for "general configuration" above. For those items that do not apply, check N/A.

a. Welds
b. Bolted Connections
c. Base Plate Connections
d. Clearance Determination
e. Snubbers, Struts and Variable Supports

6.7.6 Miscellaneous conditions are those which are not listed on the report form, but may need to be examined and recorded in Part C.

6.8 EVALUATION OF EXAMINATION FINDINGS

If any relevant conditions are noted on the Examination Recording Form, Level II or III personnel shall review, evaluate and disposition the finding. If the condition is not acceptable as is, a recommended resolution shall be provided and appropriate parties notified via a Potential Deficiency Notification (PDN) to effect condition correction. Complete Part D of the Examination Recording Form.

6.9 REEXAMINATION

6.9.1 If support designs are modified/revised subsequent to examinations, a review of the content of the support revision shall be conducted. If the revision affects any attribute of the original examination, that attribute shall be examined utilizing a new Examination Recording Form.

6.9.2 For reexamination of corrections to relevant conditions found during initial examinations, Part E of the original Examination Recording Form will be completed upon reexamination of the corrected condition.

6.10 POST HEATUP DAMAGE EXAMINATION

As noted in the PSI examination plan for component supports, those supports affected by the thermal expansion of system heatup during preoperational and initial Startup testing will require an additional examination. This examination will be limited to those conditions related to support damage resulting from the subject thermal movement. The examination may be conducted subsequent to cooldown. Examination findings shall be noted on the Examination Recording Form, Part F. If the support is not affected by system heatup, indicate N/A for Part F.

6.11 EVALUATION OF POST HEATUP DAMAGE EXAMINATION FINDINGS

If any relevant conditions are noted on the Examination Recording Form Part F, Level II or III personnel shall review, evaluate and disposition the finding. If the condition is not acceptable as is, a recommended resolution shall be provided and appropriate parties notified via a Potential Deficiency Notification (PDN) to effect condition correction. Complete Part G of the Examination Recording Form.

6.12 POST HEATUP DAMAGE REEXAMINATION

For reexamination of corrections to relevant conditions found during post heatup damage examinations, Part H of the original Examination Recording Form will be completed upon reexamination of the corrected condition.

6.13 AUGMENTED PRESERVICE INSPECTION - SNUBBER EXAMINATION

Portions of this procedure can be used to satify some requirements of the NRC augmented PSI directive for snubbers (reference 4.5). Only those procedure steps with an asterisk (*) need to be performed to satisfy those requirements.

7.0 RECORDS

Upon successful completion of the examination program, all applicable examination documents shall be forwarded to STPEGS Records Management System for permanant retention.

8.0 ATTACHMENTS

OEP-9.05Q-01. Typical Building Structural Attachments

OEP-9.05Q-02. Typical Examination Boundaries for Insulated Components

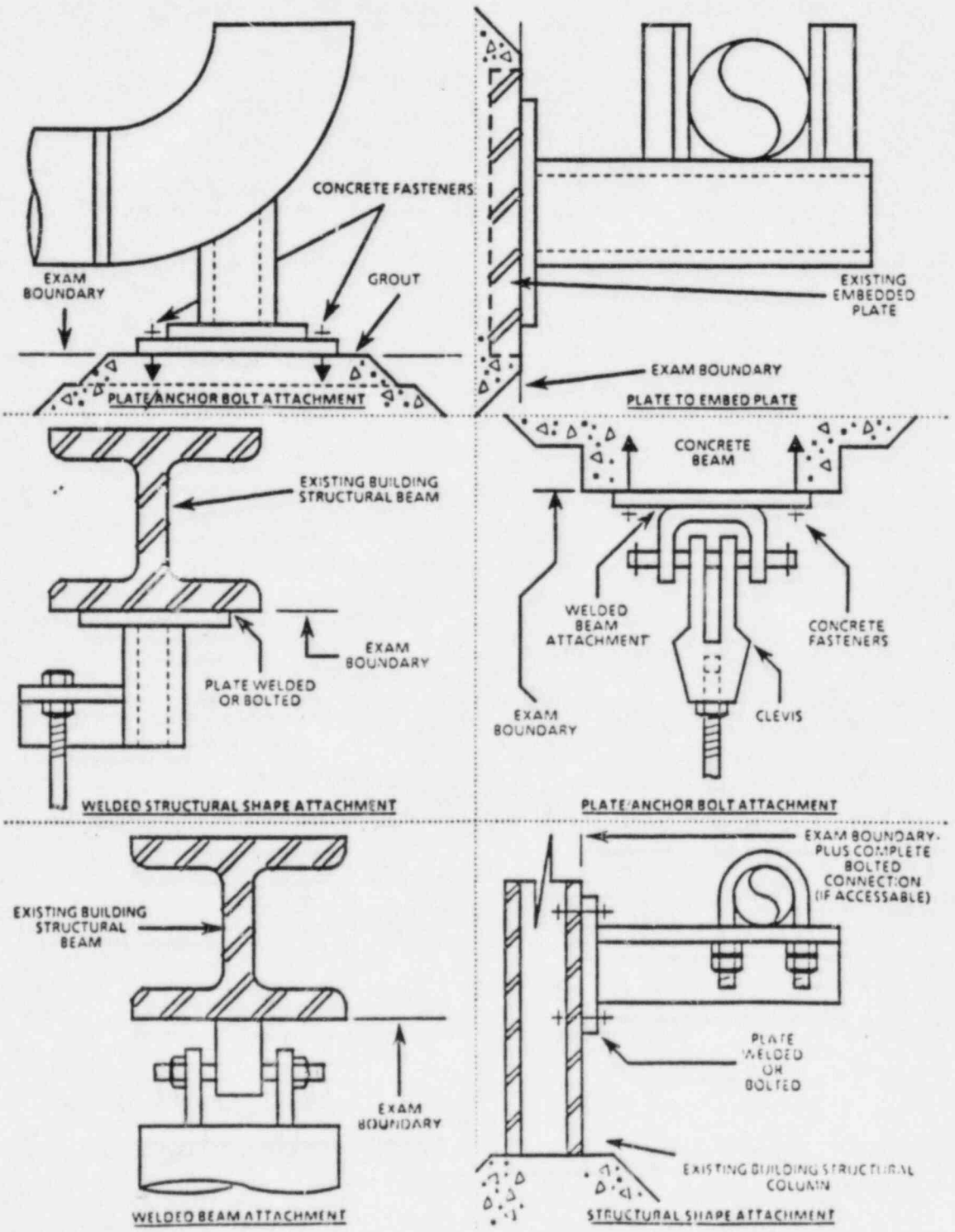
OEP-9.05Q-03. Rod Hangers, Rigid Strut and Snubber Swing Angle/Clearance Observation

OEP-9.05Q-04. Thread Engagement Requirements for Snubber Forward Brackets and Extension Pieces

OEP-9.05Q-05. VT-3 Examination Recordings Form for Component Supports

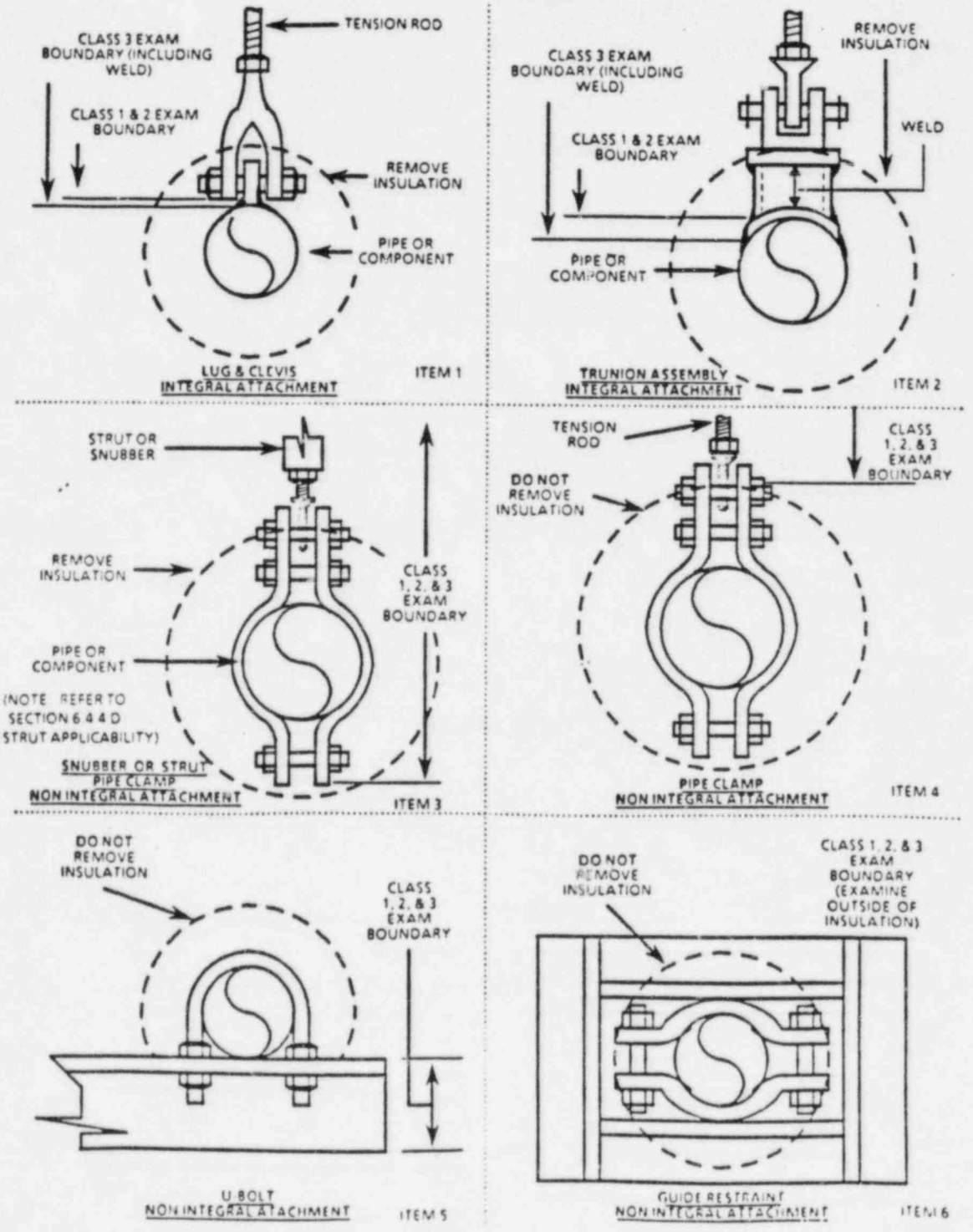
ATTACHMENT OEP-9.05Q-01

TYPICAL ILLUSTRATIONS OF STRUCTURAL/BUILDING ATTACHMENTS



ATTACHMENT OEP-9.05Q-02

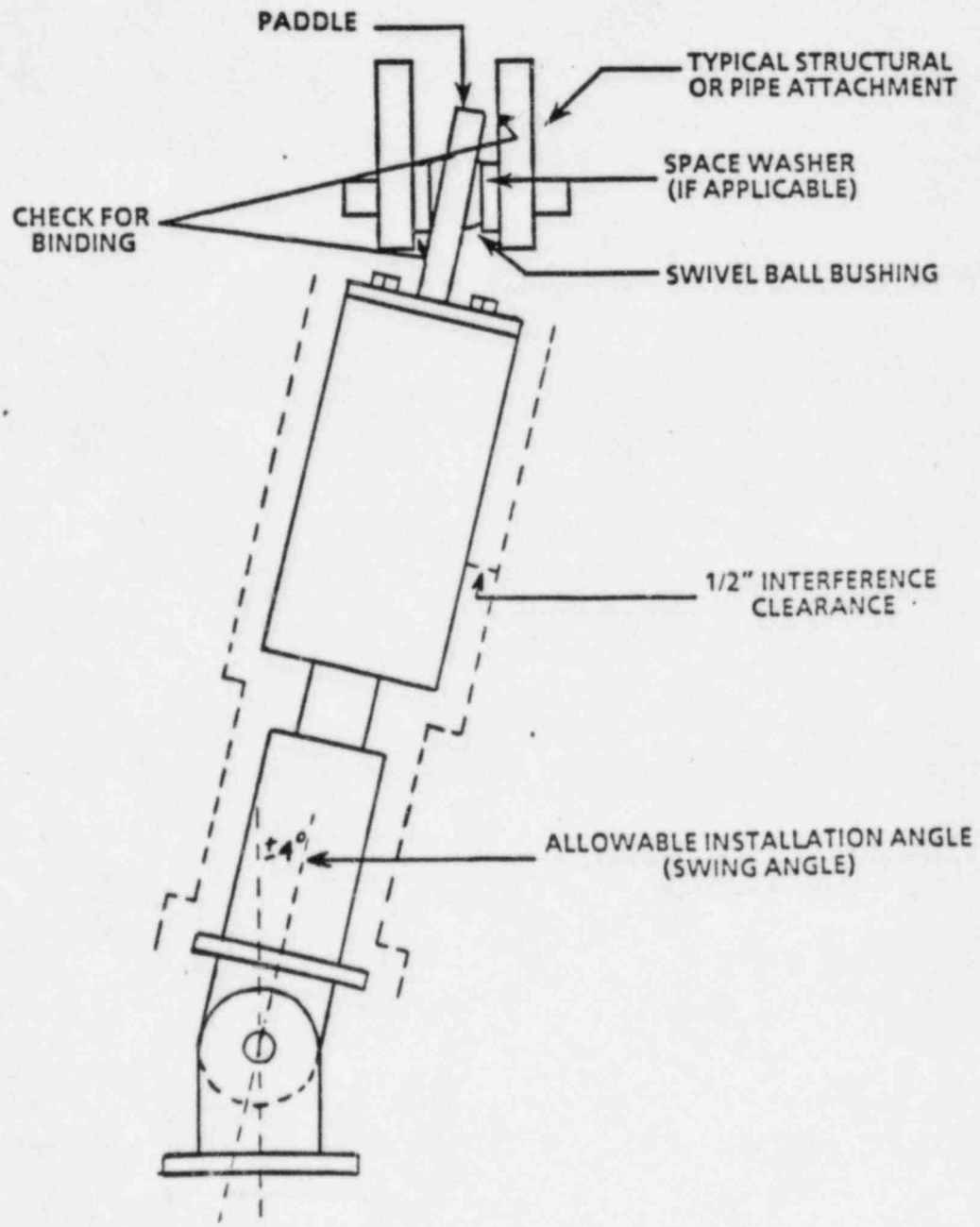
TYPICAL ILLUSTRATIONS OF COMPONENT ATTACHMENTS/EXAMINATION BOUNDARIES FOR INSULATED COMPONENTS



ATTACHMENT OEP-9.05Q-03

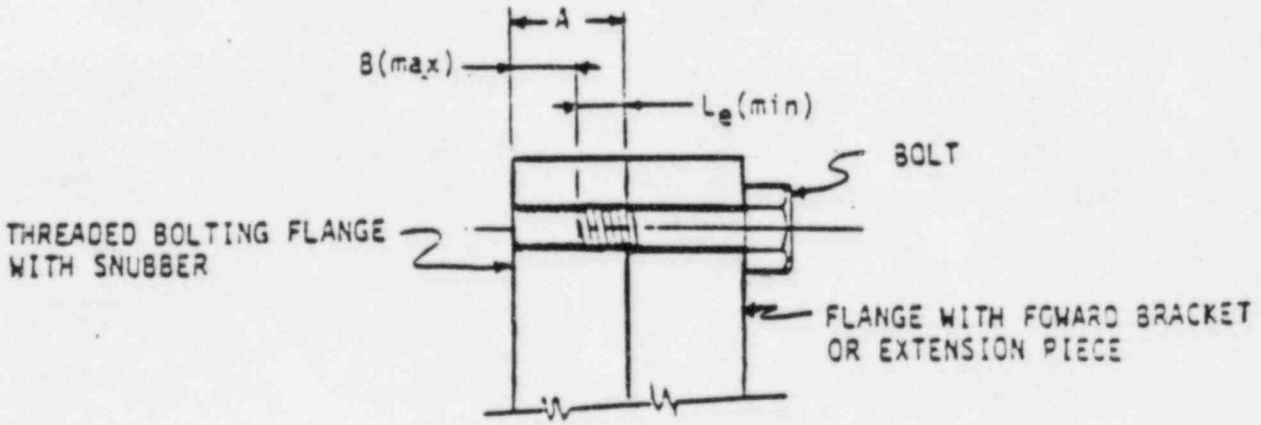
ROD HANGER, RIGID STRUT, AND SNUBBER SWING ANGLE CLEARANCE OBSERVATION

Examine the support attachment points. Verify that the swing angle of the support does not inhibit free motion of the support. Assure that the swivel ball bushing (if applicable) ends are not binding and the paddle ends of the support are not in contact with the structural attachment or pipe attachment.



ATTACHMENT OEP-9.05Q-04

THREAD ENGAGEMENT REQUIREMENTS FOR SNUBBER FORWARD BRACKETS AND EXTENSION PIECES, SIZES 41 THRU 1601



L_e = Length of engagement

MODEL	"A" (ref)	L_e	"B" (max)
AD-41, AD-71	.375	.131	.244
AD-161	.625	.175	.450
AD-501	.750	.366	.384
AD-1601	.687	.595	.092

Note: All dimensions are in inches.

ATTACHMENT OEP-9.05Q-05
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PRESERVICE AND INSERVICE INSPECTION
VT-3 EXAMINATION RECORDING FORM
FOR COMPONENT SUPPORTS

This examination is performed using OEP-9.05Q Rev ____, to satisfy:

PSI		ADG PSI		ISI
__Initial	__Reexam.	__Initial	__Reexam.	__

PART A - REFERENCES (procedure ref. 6.7.1)

System: _____ Support MK Number: _____
Exam Date: _____
System Line Number (if applicable): _____
Isometric Number: _____ Rev.: _____
Support Drawing Number: _____ Rev.: _____
Change Document(s)

No.	_____	Rev.:	____	No.:	_____	Rev.:	_____
No.	_____	Rev.:	____	No.:	_____	Rev.:	_____
No.	_____	Rev.:	____	No.:	_____	Rev.:	_____

PART B - MISC. (procedure ref. 6.7.2, 6.7.3, 6.7.5, 6.7.6)

Optical Aids/Measuring Equipment Used: _____ ( ) N/A
Is VT-4 Applicable to this Support? ( ) yes ( ) no
If yes, attach VT-4 Examination Recording Form

PART C - EXAMINATIONS (procedure ref. 6.7.4, 6.7.5, 6.7.6)

General Configuration: Ref. 6.6.1

Conditions To Examine For	Condition Noted Acceptable	Relevant	Conditions To Examine For	Condition Noted Acceptable	Relevant
*Conforms to Drawing			Physical Damage:		
Support Function			Loose Parts		
Missing Mtrl./Parts			Cracks		
Corrosion/Erosion			Bent Parts		
Wear			Misalignment		
			Friction Pads		
Welds: Ref. 6.6.2 _____ N/A					
Cracks			Corrosion		
Bolted Connections: Ref. 6.6.3 _____ N/A					
Nuts/Bolts Tight			Locking Device		
Friction Clamps Tight			Thread Engagement		
Retaining Device			Pipe Clamp Spacers		
Base Plate Connections: Ref. 6.6.4 _____ N/A					
Concrete Condition			Base Plate to Concrete		
Bolt/Nut to Base Plate			Base Plate Submerged		

Support MK Number _____

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VT-3 EXAMINATION RECORDING FORM
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PART C (continued)

Support MK Number: _____

Clearance Determination: Ref. 6.6.5 ____ N/A

Conditions To Examine For	Condition Noted Acceptable	Relevant	Conditions To Examine For	Condition Noted Acceptable	Relevant
*Swing Angle			Nonrestraint Gaps		
Restraint Gaps			Interferences		

Snubbers, Struts, and Variable Supports: Ref. 6.6.6, 6.6.7 ____ N/A

Conditions To Examine For	Condition Noted Acceptable	Relevant	Conditions To Examine For	Condition Noted Acceptable	Relevant
*Thread Engagement			*Spacers Installed		
*Locking Device			*Retaining Device		
*Ball Bushing:					
Ball					
Bushing					

*Examination conditions applicable to Augmented PSI

Miscellaneous: Explain:

Remarks:

Examiner _____ Cert. Level _____ Date _____

PART D - EVALUATION OF EXAMINATION FINDINGS (procedure ref. 6.8)

Relevant Condition Noted: ( ) yes ( ) no
Supplemental Dwg./Photograph Attached: ( ) yes ( ) no

	Relevant Conditions	Recommended Resolution	PDN Number
1.			
2.			
3.			

Examiner _____ Level II or III Date _____

Support MK Number: _____

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PART E - REEXAMINATION (procedure ref. 6.9)
( ) N/A

Support MK Number: _____

Condition Reexamined and Condition Acceptable

Examiner _____ Cert. Level _____ Date _____

PART F - POST HEATUP DAMAGE EXAMINATION (procedure ref. 6.10)
( ) N/A

Conditions To Examine For	Condition Noted Acceptable	Relevant
Bent Parts	_____	_____
Cracks	_____	_____
Misalignment	_____	_____
Base Plate to Concrete	_____	_____

Other Conditions:

Remarks:

Examiner _____ Cert. Level _____ Date _____

PART G - EVALUATION OF POST HEATUP DAMAGE EXAMINATION FINDINGS (procedure ref.6.11)
( ) N/A

Relevant Conditions	Recommended Resolution	FDR Number
1.		
2.		
3.		

Examiner _____ Level II or III Date _____

PART H - POST HEATUP DAMAGE REEXAMINATION (procedure ref. 6.12)
( ) N/A

Condition Reexamined and Condition Acceptable

Examiner _____ Cert. Level _____ Date _____

Support MK Number: _____

050012C (7-86)