SECTION 11.3
Volume II

PHASED ARRAY ULTRASONIC TESTING

11.3.1 PURPOSE

This procedure provides guidance for the development and implementation of procedures for the use of Phased Array Ultrasonic Testing on Florida Department of Transportation structural steel bridge projects.

11.3.2 AUTHORITY

Section 20.23(3)(a) and 334.048(3) Florida Statues.

11.3.3 REFERENCES

For all reference documents, always use the most current approved version at the time of the project letting, unless otherwise specified in this section.

ASTM E494 Standard Practice for Measuring Ultrasonic Velocity in Materials

ASTM E543 Standard Specification for Agencies Performing Nondestructive Testing

ASTM E2700 Standard Practice for Contact Ultrasonic Testing of Welds Using Phased Arrays

ASTM E2491 Guide for Evaluating Performance Characteristics of Phased-Array Ultrasonic Testing Instruments and Systems

ASTM E1316 Standard Terminology for Nondestructive Examinations

ASNT SNT-TC-1A Recommended Practice for Personnel Qualification and Certification in Nondestructive Testing

AASTHO/AWS D1.5 Bridge Welding Code

11.3.4 INTRODUCTION

This procedure provides mandatory requirements that shall apply when Phased Array Ultrasonic Testing (PAUT) is approved for use on any single FDOT project. This procedure is limited to material certified from the mill to either ASTM A709 or AASHTO M270, for grades of material less than 100ksi yield strength.

11.3.5 SCOPES

This procedure establishes the Department's requirements and activities for the use of Phased Array Ultrasonic Testing on Structural Steel for use in bridge components. These requirements and activities pertain to the procedure, operator qualification, and inspection process. Provide this information to the Department for review and approval for initial use and if any of the requirements change.

The procedural requirements are in addition to the requirements set forth in the most publicly available version of the 'Advanced Ultrasonic Examination' Annex of the AASHTO / AWS D1.5 Bridge Welding Code.

11.3.6 DEFINITIONS

11.3.6.1. Refer to the 'Advanced Ultrasonic Examination' Annex of the AASHTO / AWS D1.5 Bridge Welding Code

11.3.7 JOINT SPECIFIC QUALIFICATION PROCESS FOR PHASED ARRAY IN LIEU OF STANDARD METHODS

11.3.7.1 The submittal must include the use of material specific reference blocks and/or mock-up specimens, prepared in accordance with the most publically available version of the Bridge Welding Code. The submittal may include a combination of reference blocks and/or mock up specimens to demonstrate a sound scan plan and operator qualification, for each joint under consideration. Procedures must utilize the same instrument, cable and probe throughout the project or requalify.

When inspectors are planning to test non-redundant tension members, (previously identified as 'fracture critical') each operator must validate their first production complete joint penetration joint (minimum one inch thick), using radiography. Operators must keep a record of their initial validation scans (phased array and radiography). Each operator must requalify annually using this method when performing non-redundant tension members.

11.3.8 PERSONNEL QUALIFICATION REQUIREMENTS

11.3.8.1. Individuals who perform and review PAUT scans shall meet the qualifications outlined in this section, in addition to the requirements set forth in the most publically available version of the 'Advanced Ultrasonic Examination' Annex of the AASHTO / AWS D1.5 Bridge Welding Code. Where conflicts exist between this Materials Manual and the Welding Code, the more strict of the two will apply. Individuals remain qualified unless there is a lapse in performing phased array for more than 180 days without an additional practical examination or there is a specific reason to question the inspector's capability. All inspectors shall meet the following:

1. Individuals who review scan plans shall be certified in conformance with ASNT as a UT Level III individual and have the supplemental qualification for PAUT.

2. Individuals who review and sign off on the entire submittal shall be registered as a Professional Engineer in accordance with Florida Statute 471.

3. Individuals who perform PAUT shall have a record of having performed a minimum of 100 documented hours of PAUT inspection specific to AASHTO / AWS D1.5 Bridge Welding Code.

4. Individuals who perform PAUT shall demonstrate the ability to identify loss of back reflection and perform rafter scanning on at least three material specific reference blocks and/or mock-up specimens.

11.3.9 SCAN PLANS

11.3.9.1. A scan plan shall be developed for the welds to be examined. The scan plan should incorporate a simple dead element check and be specific to the project, and must exclude any extraneous information. The scan plan shall be approved by two individuals:

1. Signed by an individual qualified to UT Level III, with the supplemental qualification for PAUT.

2. Signed and sealed by an individual registered as a Professional Engineer in accordance with Florida Statute 471.