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13. ABSTRACT

Describes a method for evaluation of radiographic pipeline weld equipment set operational and functional performance characteristics. Identifies supporting test, facilities, and equipment required. Provides procedures for functional suitability tests.

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US ARMY TEST AND EVALUATION COMMAND
SYSTEM SERVICE TEST OPERATIONS PROCEDURE

AMSTE-RP-702-108 25 February 1972
Test Operations Procedure 9-3-291

RADIOGRAPHIC PIPELINE CONSTRUCTION EQUIPMENT SET

SECTION I
GENERAL

1. Purpose and Scope. This TOP is to be used to test radiographic pipeline weld equipment sets. The system shall include a radioisotope type projector (camera) and a darkroom laboratory. This TOP is limited to the testing of radioisotope projectors that meet Atomic Energy Commission (AEC) specifications.

2. Background. In the past, pipeline welds were checked by pressure testing. However, pressure testing alone is not sufficient because girth welds may withstand a pressure test but still have structural defects which will fail during the placing of long sections of pipe on launching dollies, by forces imposed during launching, or subsequent forces caused by surf, underwater currents, bottom irregularities, erosion, and when coupled with tanker unloading hoses. The radiographic pipeline weld inspection set was developed to complement pressure testing by providing suitable nondestructive inspection of pipeline girth welds in the field under the same climatic and terrain conditions that welded pipelines are constructed.

3. Equipment and Facilities. The requirements for radiographics and equipment are outlined in MIL Specification R-11470, MIL-STD-453, and ASTM Specification E94, and the supporting tests listed in Section II below.

SECTION II
TEST PROCEDURES

4. Supporting Tests. Common Service TOPs, the test defined in Section III, and other published documents to be considered in formulating a service test plan are as follows:

	TEST SUBJECT TITLE	PUBLICATION NO
a.	Operator Training and Familiarization	10-3-501
b.	Safety Hazards	2-3-501
c.	Preoperational Inspection and Physical Characteristics	2-3-500
d.	Functional Suitability (refer to para 5)	
e.	Compatibility with Related Equipment	2-3-512
f.	Human Factors Engineering	2-3-516
g.	Surface Transportability (Vehicles)	2-3-519
h.	Maintainability	2-3-502
i.	Maintenance Evaluation - Tools and Test Equipment	2-3-527
j.	Maintenance Evaluation - Technical Manuscripts and Manuals	2-3-528
k.	Reliability	2-3-507

SECTION III
SUPPLEMENTARY INSTRUCTIONS

5. Functional Suitability.

a. Objective. To determine under field conditions the capability of the test item to produce radiographs of pipeline girth welds rapidly and the ability to detect all imperfections as described in the Materiel Need (MN) or other applicable requirement documents.

b. Method. Set up and operate the test item in accordance with applicable, approved technical publications, taking appropriate safety measures throughout operation. Perform radiography of various diameter and thickness pipe welds along pipeline construction sites. Radiographing of both ferrous and nonferrous pipe/welds may be required. Testing should include radiographing of welds with known and unknown defects, cracks, slag inclosures, weld craters, porosity, lack and excessive penetration, root concavity, etc. Develop and interpret resulting radiographs in accordance with applicable specifications. Note resulting film characteristics (e.g., resolution and contrast). Determine production rate of test item (i.e., number of radiographs per 8-hour day). Note consumption rates of required processing materials and weekly accumulated dosages of operating personnel.

c. Data Required.

(1) Nomenclature of test item and description of major components.

(2) Times and personnel required to obtain, develop, dry, and interpret radiographs.

(3) Deficiencies, shortcomings or other conditions observed.

(4) Overall remarks concerning operation of test item.

d. Analytical Plan. Evaluate test results to determine whether or not test item meets stated performance requirements.

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