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DIVISION OF ENGINEERING SERVICES
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METHOD OF TEST FOR CRUSHING OF LONGITUDINALLY WELDED STEEL TUBULAR PRODUCTS (UNIVERSAL CRUSHING TEST)

A. SCOPE

This method describes the procedure for testing the welded seam in welded steel tubular products, such as highway lighting standards, by means of a crushing test. The procedure will demonstrate the quality of the welded pipe seam only. It does not provide an adequate test for the mechanical properties of the parent material.

The designation "Universal Crushing Test" refers to the fact that it is applicable to various welded tubular products provided they have an outside diameter of 2 in. or larger.

B. APPARATUS

Any type of machine or device capable of crushing the specimen down to a height of one-half its original outside diameter is required.

C. SAMPLES

Three tubular test sections, each 4 in. in length from the sample pipe.

D. PROCEDURE

1. Cut three tubular test sections, each 4 in. in length, from the sample pipe. The cuts may be made by sawing, although torch cuts are permissible if the burned edges are subsequently removed and squared by grinding.

2. Position the welded longitudinal seam 90 degrees from the point of transversely applied crushing force (see Figures 1 and 2). Crush each of these three sections cold (ambient temperature) down to a height of one-half the original outside diameter. The crushing force may be produced by any convenient means such as jacking or levering. Apply the force evenly along the length of the test specimen using parallel flat plates or wooden blocks.

3. If in *any* one of the three test sections the *sum* of all crack lengths and open defects along the weld seam exceeds 3/8 in., the sample pipe is unacceptable under this test method.

E. HAZARDS

Keep clear of the specimen and testing device during the test to avoid crushing fingers or similar injuries.

F. REPORTING OF RESULTS

Figures 3 through 8 show typical test specimens after crushing. All of these samples were crushed to the same extreme crushing height. It is apparent that a wide range of defect types and levels can be encountered in test sections. The gas hole defects shown in Figures 5 and 7 are especially common in this type of weldment. Care must be taken in measuring these small exposed pinholes so that they may be accurately included in the summation of defect lengths taken across the welded seam.

Create a test form showing date of test, test report number, sample number, size of sample and sum of defect lengths.

Report results of test on a form as acceptable or unacceptable with appropriate comments and notations of defects.

G. HEALTH AND SAFETY

It is the responsibility of the user of this test method to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use. Prior to handling, testing or disposing of any materials, testers must be knowledgeable about safe laboratory practices, hazards and exposure, chemical procurement and storage, and personal protective apparel and equipment.

Caltrans Laboratory Safety Manual is available at:

http://www.dot.ca.gov/hq/esc/ctms/pdf/lab_safety_manual.pdf

End of Text
(California Test 664 contains 6 pages)

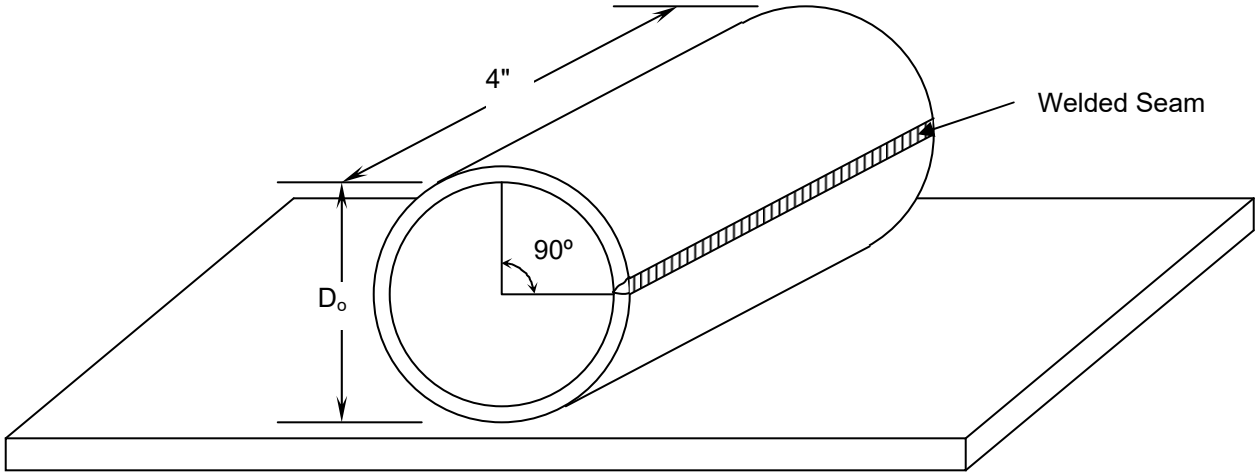

Figure 1. Initial Setup before Crushing

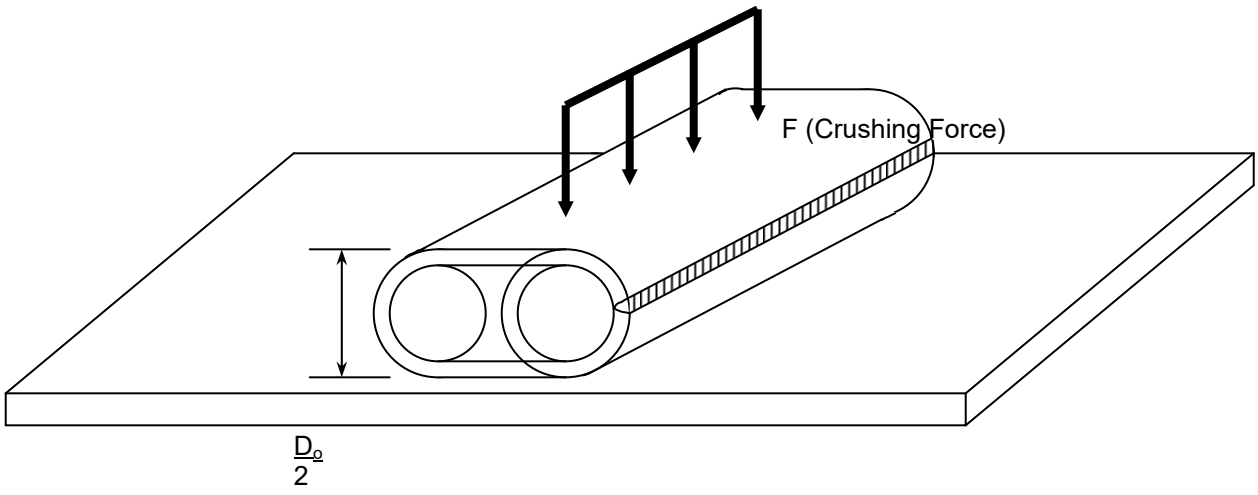

Figure 2. After Crushing

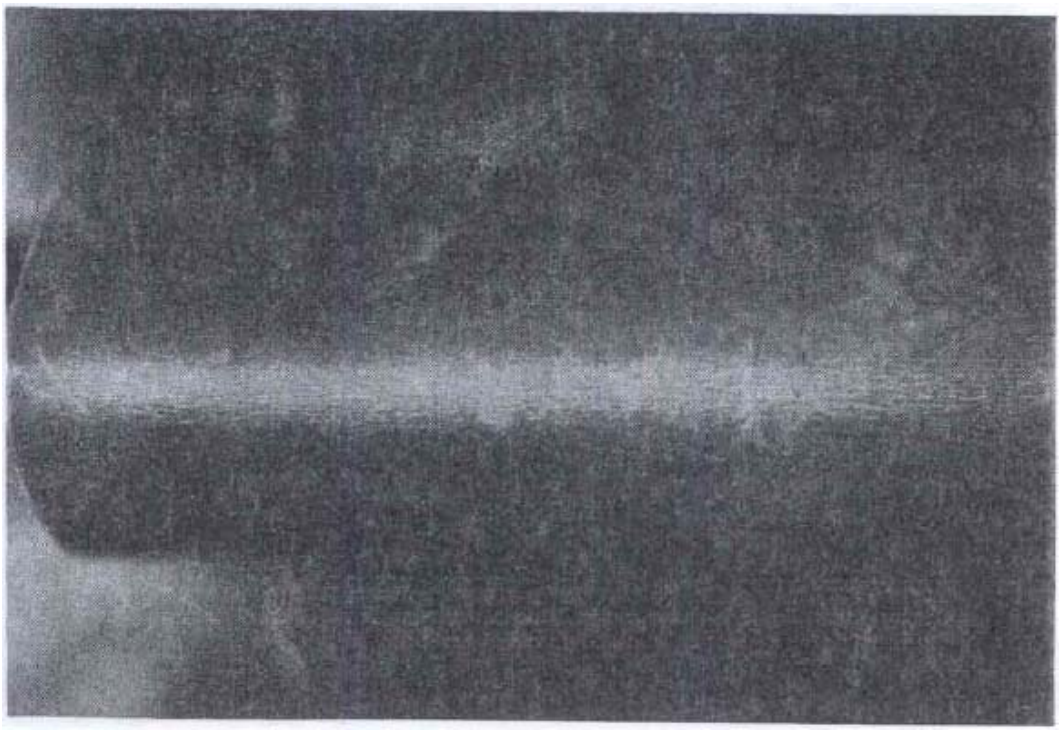

FIGURE 3. Resistance Welded – 7 ga.
Sum Defect Lengths = 0" – Acceptable

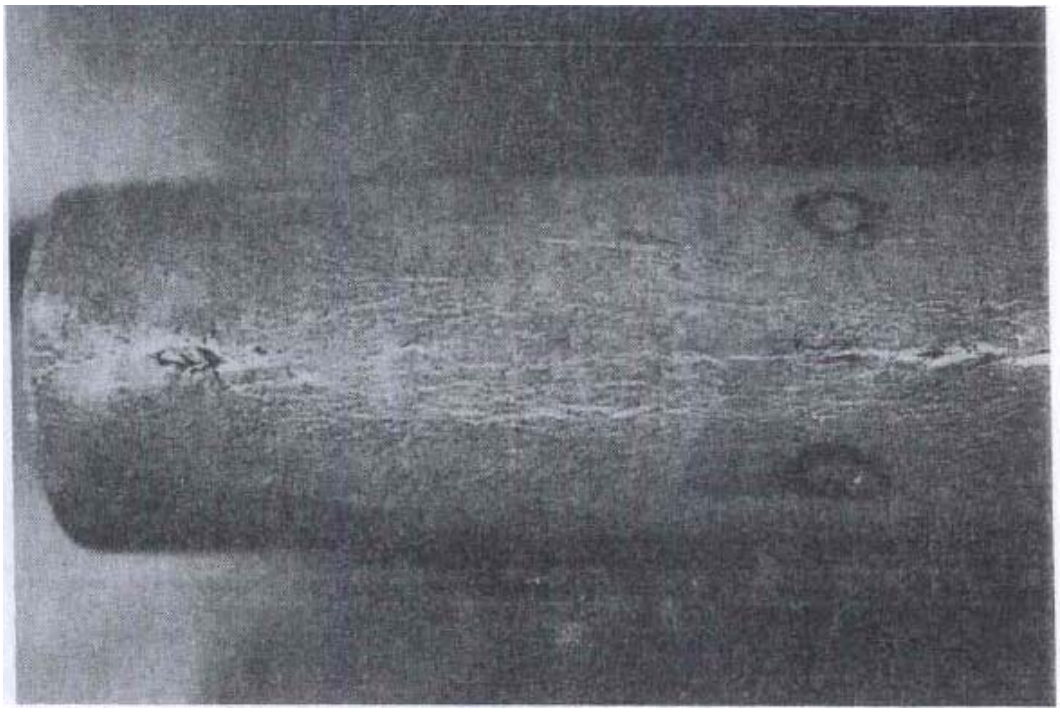

FIGURE 4. Resistance Welded – 7 ga.
Sum of Defect Lengths = 1" – Unacceptable

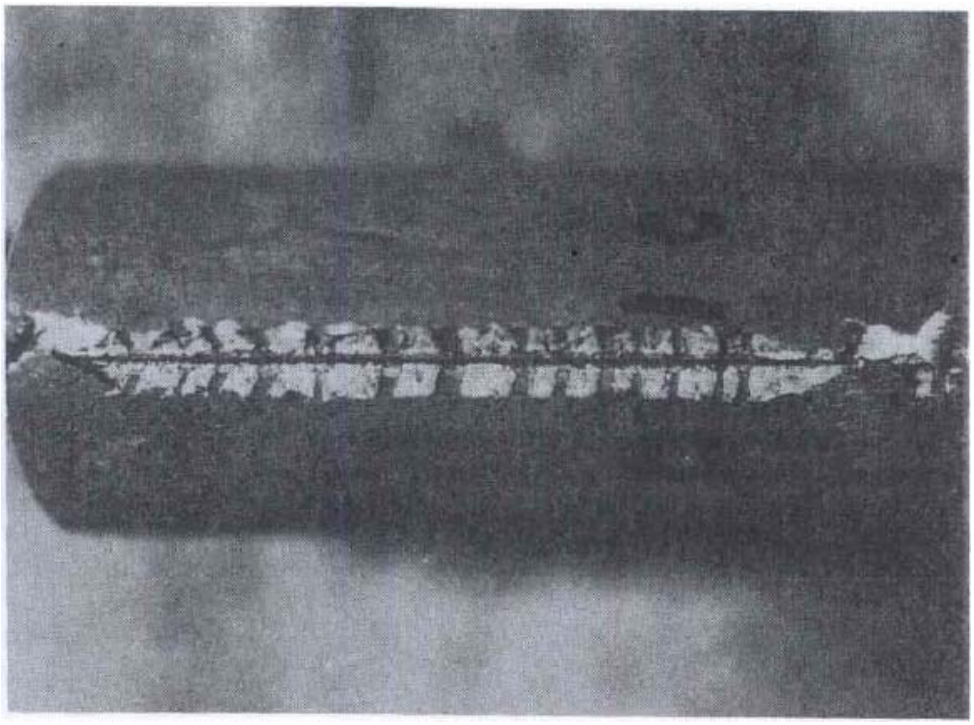

FIGURE 5. Resistance Welded – 7 ga.
Sum of Defect Lengths = 4" – Unacceptable

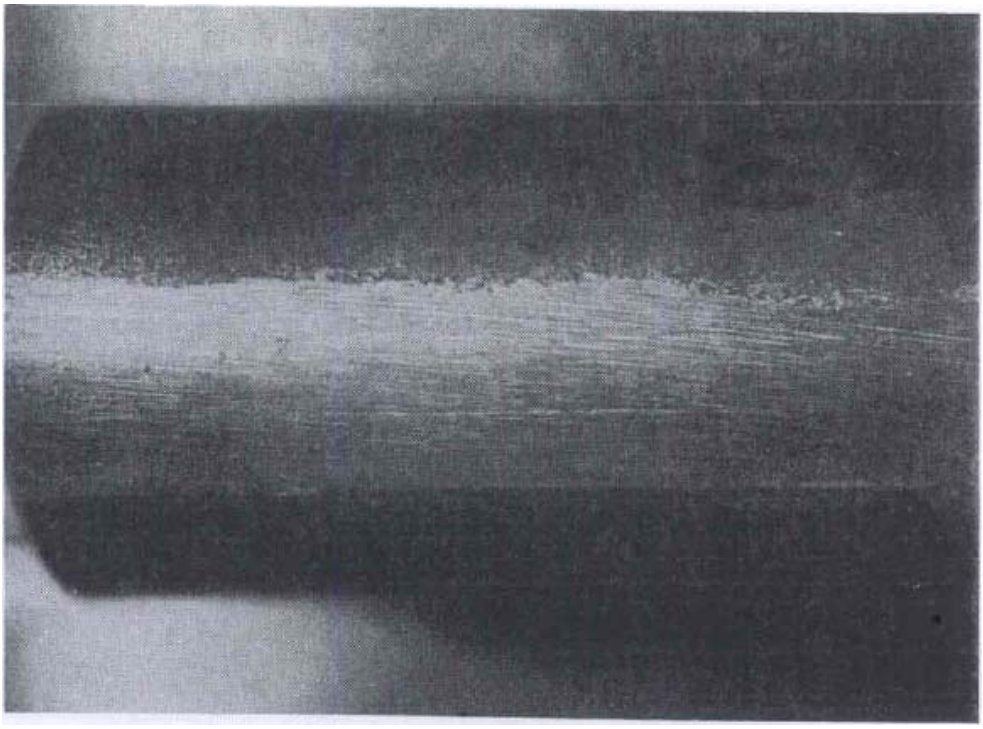

FIGURE 6. Sub-Arc Welded – 7 ga.
Sum of Defect Lengths = 0" – Acceptable

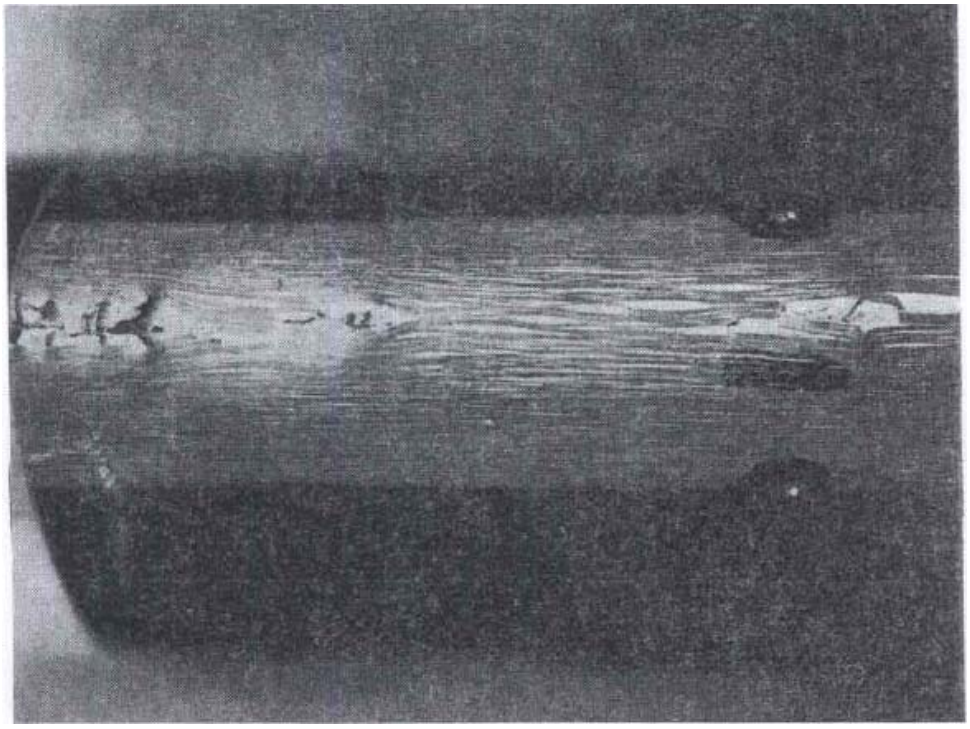

FIGURE 7. Sub-Arc Welded – 7 ga.

Sum of Defect Lengths = 2" – Unacceptable

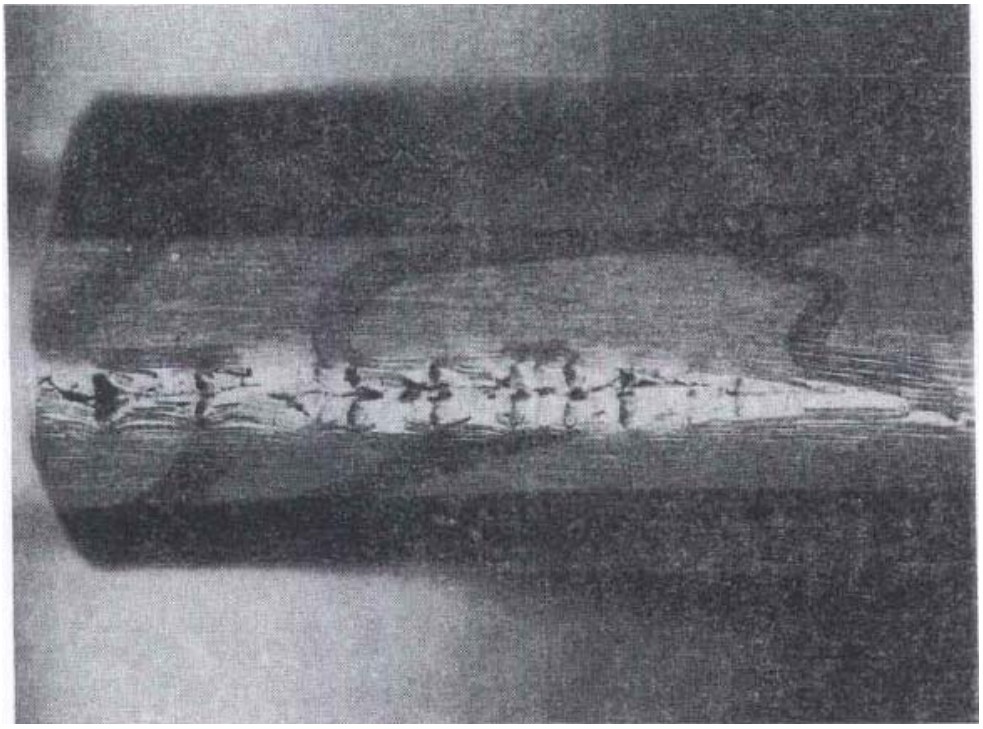

FIGURE 8. Sub-Arc Welded – 7 ga.

Sum of Defect Lengths = 4" – Unacceptable