

Lessons in Welding from the 1985 Mexico City Earthquake

Analysis of welded rebar samples collected from earthquake ruins points out the need for a national Mexican welding code

BY L. MARTINEZ, J. L. ALBARRAN AND J. FUENTES

The Mexico City earthquake of September 1985 killed thousands of people and destroyed many buildings. The effects of the earthquake have motivated many studies by the international scientific community, especially by countries that have urban centers in high-seismicity zones. The analysis of the destruction caused by this earthquake is very valuable for improving design criteria and codes.

In fact, there were two main types of failures: 19 and the other 21. The first type was larger, and the second type was smaller. The first type was the vibration of the structure, and the second type was the failure of the welded joints.

Dyn
particul
severely
defects h
joints of s
failures are

This work was collected from the ruins of the earthquake. An analysis of the weldability of the steel during the process of resistance to vibration, predicated upon the practical limitation of reinforced concrete by-piece or story-to-cast all the concrete structure, it is impossible to cast all the concrete bars throughout any building. Although there are welded joints in buildings.

Welding procedures are well established in codes. The codes usually indicate the main concerns in welding, such as chemical composition verification; V-groove, bevel or other

bar end preparation; electrode selection; welder qualification; supervision; inspection. In Mexico, there are no national oil (PEMEX) or national welding codes, that do have internal regulations, there is not a national code for welding procedures for reinforcing steel.

Steel is highly dependent on the manganese. In lesser proportion, elements such as copper, nickel, vanadium (Ref. 7). The content of carbon is also be critical. The carbon content to AWS and ASTM, is given

WELDING JOURNAL

(ISSN 0043-2296)
Volume 66 • Number 3 • March 1987

Feature Articles

Lessons in Welding from the 1985 Mexico City Earthquake, by L. Martinez, J. L. Albarran and J. Fuentes	23	+ %Ni/20 + %Cr/10 (1)
Improved Properties in Welded HY-80 Steel for Australian Warships, by J. C. Ritter and B. F. Dixon	33	carbon equivalent is a
Development of a CCTV System for Welder Training and Monitoring of Space Shuttle Main Engine Welds, by S. S. Gordon, L. A. Flanagan and G. E. Dyer	47	able when the carbon
A Power Source for Gas Shielded Arc Welding with New Current Waveforms, by T. Ogasawara, T. Maruyama, T. Saito, M. Sato and Y. Hida	57	considered in many
Monumental Sculpture Honors Farmers	65	9-11). It is the user
Process Control Package Designs, Monitors, Evaluates Welding Operation, by S. Habib	69	chemical composition,
Custom-Made Collector Clears the Air at Welding School	73	welding procedure
Engine Parts Rebuilt with Electrochemical Process	74	ing steel produced
		example, the U. S.
		duced under a
		composition to
		an analysis will
		were used in
		comparison is made with
		that are generally accepted.
		many of a set of samples of steel used in
		buildings that collapsed is studied and related to
		current reinforcement steel production in Mexico.

Welding Procedures

Local medical facilities, critical in confronting major disasters, were severely damaged in the earthquake (Ref. 1). Among these was the Hospital Juarez, an 11-story building, located in downtown Mexico City. It was built in the late 1960's and finished in 1970. During a search of the ruins, of approximately five hours, four welded butt joints in bars were found. The diameters of the bars were between 32 mm (1¼ in.) and 38 mm (1½ in.). The welds were found in different sections on the ruins, about 15 m (45 ft) distant from each other.

L. MARTINEZ, J. L. ALBARRAN and J. FUENTES are with the Institute of Physics, National University of Mexico, Mexico City.

Work supported by CONACYT-MEXICO, grant PUT/NAL/85/3219.