SOCIETY FOR INDUSTRIAL ARCHEOLOGY
NEWSLETTER
Volume 15 Summer 1986 Number 2

HAER SETS MS LIBERTY'S RECORD STRAIGHT

Beyond being a powerfully symbolic, 100-year-old sculpture, who is Ms Liberty? Her vital statistics are awesome. Fingernails measure 13 x 10 in.; her mouth, 3 ft. wide; her classic Roman nose, 4 ft. 2 in. long; her head, 10 ft. from ear to ear and 17 ft. 3 in. from chin to cranium; her index fingers are eight ft. long and 3½ ft. in circumference at the second joint; her hands, 16 ft. 5 in. from wrist to finger tip. Her right arm is 42 ft. long and 12 ft. thick at the biceps. With a bicep of this size, she has had no trouble holding aloft, for a century, a 21-ft., 4,000-lb. torch. Her left arm holds a 2-ft.-thick tablet, measuring 23 ft. 7 in. by 13 ft. 7 in., with the date of July 4, 1776 inscribed in raised copper letters and Roman numerals. The seven spikes in her tiara measure 20 ft. and represent the world's seven continents and seven seas. Not seen by the visitor are the broken shackles and axe head on the base, symbolizing Liberty breaking the bonds of slavery and taking her first step of freedom. The statuesque lady's measurements are 45 x 35 x 45—not inches, but feet; proportionate human dimensions are 43 x 34 x 43.

Liberty's magnificent head. The dark area at the eye marks a graft of new copper skin. The lobe of the nose also has been repaired. Streaks on the face and neck were caused by a bicarbonate-of-soda solution, used to remove coatings on the interior surface, which oozed through joints between copper plates and through the holes for rivets connecting the skin with iron support straps on the inside. *Jet Lowe photograph for HAER (12-85).*

LIBERTY FOR THE INDUSTRIAL ARCHEOLOGIST

The industrial archeologist, however, craves engineering and technical data. Liberty stands 151 ft. on a 154-ft.-high concrete- and granite-pedestal, for a total height of 305 ft. Supporting the 3/32-in.-thick skin (comprised of 300 riveted copper plates weighing 100 tons), is a wrought-iron structural system designed by Gustave Eiffel. A central pylon of eight bents, 97 ft. high from the foot to the neck, supports a secondary structural system or armature of wrought-iron angles that approximates the internal configuration of her body. Radiating from the armature are single wrought-iron bars, the outer ends of which attach to 1,600 undulating wrought-iron straps that follow the curvature of the robe and skin. The pylon sits on built-up steel beams resting, at the top of the pedestal, on a concrete core wall. These beams in turn are anchored to another matrix of cross-beams embedded in the pedestal walls 60 ft. below the top by 16 pin-connected, steel eye-bars. The anchoring method allows the Statue to withstand gale winds over 100 mph.—Eiffel was one of the world's foremost authorities on the effect of wind on structures.

Equally interesting and of similar engineering accomplishment is the tubular aluminum scaffolding that enveloped Liberty during renovation and which now has been removed. Tied only at the top of the pedestal by steel cables, this rectangular, aluminum doughnut rose 150 ft. and stood free of the statue proper. The scaffolding was built of non-corrosive, 3½-in. aluminum tubing so as not to stain the copper skin during the work. Like Eiffel's iron skeleton, the scaffold was designed to resist 100 + mph. winds, with a maximum movement at the top of only 3 in. Platforms sliding inward from the rectangular scaffolding gave access to every square inch of the Statue's surface.

THE MYSTERIOUS PHOTOGRAPHIC RECORD

When architects and conservators began researching the Statue for renovation, one of the most critical records was found to be miss-

continued on next page

Published by the Society for Industrial Archeology Editor: Robert M. Frame III
Room 5020 National Museum of American History Smithsonian Institution Washington, D.C. 20560