

Introduction

The following four papers address ways in which individual building materials are assessed before, during, and after rehabilitation of existing structures. Case studies on the service life of some of the nation's best known historic structures are presented. Materials that are discussed include copper (Cliver and Baboian), exterior paint systems and cast iron (Slaton), reinforced concrete (Hunderman and Rewerts), and red sandstone (Arbogast).

Cliver and Baboian discuss analysis that was performed as a part of the preservation of a U.S. icon, the Statue of Liberty. Constructed in 1884, this national symbol is also an early use of an independent steel frame which fully supports an exterior skin. The statue required attention because of the effects of environmental pollutants on the copper skin and galvanic action between dissimilar metals, in this case, the copper skin and the wrought iron bars which connected it to the steel frame. Chemical testing of alternative metals to replace the wrought iron bars is described. The causes and effects of environmental weathering on the monument are discussed. It is significant that preservation efforts focused on protection of the copper patina rather than its removal.

Slaton addresses a program of laboratory and field testing for conservation of the paint and metal at the Cape Hatteras Lighthouse, a well-known national historic landmark constructed in 1869. The 200-ft (61-m) tall lighthouse is constructed of a brick and granite shaft surmounted by a cast iron and glass lantern and gallery. The lighthouse has been threatened by the harshness of its marine environment and related deterioration of its exterior iron elements, as well as the erosion of the nearby shoreline. The testing program described was the basis for the preparation of specifications for preservation.

Hunderman and Rewerts describe the investigative program that was implemented to evaluate the reinforced concrete of Unity Temple constructed in 1907. This Frank Lloyd Wright designed church is an early use of concrete technology in which the concrete is used for architectural expression as well as structure. The original design of the concrete elements has significantly affected the service life and appearance of the structure. The original construction technology; distress, which has occurred over the life of the structure; and previous repair programs are all discussed. The procedure described was used to develop a program for further investigation to determine appropriate methods of preservation.

Arbogast describes a basic nonintrusive visual inspection program to examine the exterior red sandstone facade of the Burlington Free Library constructed in 1888. The library was constructed before sandstone fell into disfavor for use in building construction because of durability problems. The physical makeup of the stone, types of distress, and problems caused by previously applied clear sealers are discussed. The sandstone is portrayed as one of a large array of similar stones that cannot be simply preserved based upon general categorization. Direction is given on pertinent issues in the preservation of archaic materials that are no longer available.