Overview

In our modern era, the terms preservation and standards have rested uneasily when placed side by side. This phenomenon is deeply rooted and can be traced back as far as the Industrial Revolution. Building preservation is closely associated with culture in that the preservationist cherishes unique physical embodiments of human heritage in art and architecture. Standards, on the other hand, have become closely associated with the machine, industry, and mass production. The machine is neither human, nor widely accepted as art; it does not cherish, nor is it unique.

Ancient Standards

Any archeologist who has ever held a brick or documented building remains in any culture can attest to the use by the ancients of standards in building construction. These uses of standards did not exist in a vacuum but are recurring threads interwoven through history.

From ancient times, standards have played a role in architecture. Standards have included written guides, regulations, and accepted construction practices. Technical standards have played a key role in communication of ideas between those who design, construct, and maintain building structures. The Code of Hammurabi of 18th Century BC Babylonia is the most frequently cited example of a law that included provisions for building practices. First Kings Chapters 6 and 7 in the Bible reads like the specifications for the Temple of Jerusalem and Solomon's Temple Complex. The Greeks and Byzantines relied heavily upon mathematically complex proportions to achieve beauty and stability. The gothic masters sought harmony in the use of pattern in geometry for plan, facade, and space design. This use of proportion and geometry achieved many things, one of which was the establishment of a standard of modular design.

A good example of standard modules and interchangeable parts (a precursor to mass production) is recorded by the sixteenth century traveler. Archbishop Deacon: "Among the curiosities of Moscow, I must not omit the market for the sale of houses. It . . . exhibits ready-made houses, strewed on the ground. The purchaser who wants a dwelling, repair to this spot, mentions the number of rooms he requires, examines the different timbers, which are regularly numbered, and bargains for what suit his purpose. The house is sometimes paid for on the spot, and removed by the purchaser; or the vendor contracts to transport and erect it upon the place where it is designed to stand. It may seem incredible, but a dwelling may be thus bought, removed, raised, and inhabited, within the space of a week; but it will appear easily practicable by considering that these ready-made houses are in general merely collections of trunks of trees, mortised and tendoned at each extremity, so that nothing more is required than the labor of transporting and adjusting them."

Standards Are Not the Result of the Machine

The Industrial Revolution raised the use of standards to a new and unprecedented level in building construction. It was also at this time when the appropriateness of standards within the creative process began to be questioned. London's Crystal Palace (Joseph Paxton, 1851) was identified by Nicholas Pevsner as the "touchstone" of those technical achievements in building that pointed to the future. This magnificent structure exhibited the rapidly growing trends in which the machine would eventually supplant hand craftsmanship. It was an early example of

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the use of mass-production, where standard sections of cast iron and glass were repeated in a module throughout the structure.

Not surprisingly, criticism of the Crystal Palace was widespread during its construction and shortly thereafter. Not only was Paxton a gardener rather than an architect or engineer, but the London architectural community objected to the standardized, modular, prefabricated construction designed for quick erection, and the use of glass and iron rather than the more permanent masonry. However it was soon apparent that machine aided techniques in building construction were here to stay.

Art historian Bernard Berenson viewed the Wright Brother's airplane and made this prophetic statement which fit the mood of many on the emerging technology: "I cannot tell you how I hate this innocent monster which is going to destroy the World I love. It will destroy my beloved world, the world of level vision or vision from below upwards, in other words a whole way of looking at things. . ."

In 1907, German architect Peter Behrens founded the Deutscher Werkbund, a group concerned with the interaction of architects, craftsmen, and manufacturers. The Werkbund's contemporaries, the Italian Futurists, wished to "invent and build modern building like a gigantic machine." However, the Belgian architect Henri Van de Velde warned that, "As long as there are artists in the Werkbund . . . they are going to protest against any suggestions of a canon of standardization."

Le Corbusier insisted that "a house is a machine for living in." In response, Frank Lloyd Wright, who characterized standardization as the soul of the machine, said, "Recognize that a house is a machine in which one lives, but architecture begins where this perception of the house ends. All of life is a machinery in a rudimentary sense and yet machinery is the life of nothing. Machines are only machines because of life."

The ensuing design tenets, which came to be known as the Modern Movement, became deeply planted in a Europe where the building stock was decimated by the First World War. As the Movement progressed, however, the integration of technology became more influenced by industrialization of technical solutions and less by human values. The Modern Movement made its way to North America in the 1930s.

Thus was established the myth of the machine—the antithesis of culture—as the symbol of the 20th Century and standardization (and standards) as the inescapable result. This unfair characterization of standards and their negative impact on the creative process has remained in place until today.

The Reality of Standards and Preservation

Contrary to their characterization as described previously, standards have proven to be extremely useful in preservation work. The most widely-accepted standard of preservation in the United States is the Secretary of Interior's *Standards for Rehabilitation.* This document provides a series of philosophical guidelines by which to approach the preservation of historic structures. The *Standards for Rehabilitation* have been adopted and are used religiously by state and local municipalities in their preservation ordinances. Internationally, there are a variety of similar standards including the *Carta del Restauro,* developed in Athens in 1931; the *International Charter for the Conservation and Restoration of Monuments and Sites,* developed in Venice in 1964, which formed a precedent for the U.S. *Standards for Rehabilitation*; and the *BURRA Charter,* adopted by the Australian chapter of ICOMOS in 1981.

Standards influence the priorities established for the care and maintenance of our historic landmarks. The preservation profession has traditionally dealt with standards in the form of governmental regulations. Local building codes address issues of public health, safety, and welfare. The federal Occupational Safety and Health Administration (OSHA) standards provide

for the protection of contractors, workers, and others who maintain buildings and structures. In some areas of the country, earthquake standards may take precedent over decisions of preservation philosophy. Standards are also used every day by preservation professional to evaluate building products, establish quality control, and implement meaningful laboratory analysis and testing.

In North America, preservationists cherish heritage which includes wide-span bridges, skyscrapers, concrete structures, and other edifices that have been indelibly touched by the machine. Consequently our cultural heritage must include these technologies as well as art and architecture. Buildings of the Modern Movement are today considered for designation as historic landmarks, as are the products of the industrialization of architecture such as gas stations, diners, and billboards. The use of machine-age standards in the design of these structures is of historical interest and is actually a large component in their interpretation as embodiments of our culture.

The Objectives of the Special Technical Publication

While there are many existing standards for architecture, engineering, and construction, that are applicable to some aspects of preservation work, relatively few technical standards exist that directly respond to the special requirements of preservation and its technology. Standards for preservation can be a useful method of transferring lessons learned. Those who are practitioners in preservation can use standards as a database of knowledge and need not "invent the wheel" over and over again.

ASTM Subcommittee E6.24 on "Building Preservation and Rehabilitation Technology" was established in the early 1980s to "develop standards in the technology of conservation, preservation, and rehabilitation of buildings and structures." Since that time, E6.24 has helped to define the technical problems facing the preservation practitioner and has led the way in achieving recognition of technical issues in preservation.

The Subcommittee recently sponsored the "International Symposium on Standards for Preservation and Rehabilitation," held in October 1993 in Dallas/Fort Worth, Texas. This Symposium, co-sponsored by the Association for Preservation Technology (APT), the American Institute for the Conservation of Historic and Artistic Works (AIC), the American Society for Nondestructive Testing (ASNT), and the American Society of Civil Engineers (ASCE), brought together a diverse group to present papers on the application of standards to preservation. This Special Technical Publication (STP) is the result of the Symposium and includes a presentation of state-of-the-art methods used in the investigation, rehabilitation, and maintenance of existing structures; a review of guidelines, practices, and test methods that are presently being utilized; and the establishment of needs for future standards in preservation.

The STP is a collection of articles that deals with philosophical, methodological, and technical standards and how they relate to preservation. Due to the rapidly changing technologies that we face, this subject remains dynamic and will need to be updated in the years ahead. The STP provides a forum for preservation practitioners. The authors represent the private, public, governmental and educational sectors, and profit as well as not-for-profit enterprises. Perspectives are offered from Sweden, France, and Italy as well as the United States. Architects, engineers, conservators, scientists, contractors, and building owners are included among the authors.

The papers presented in the STP are divided into five chapters. *Perspectives on Preservation* contains papers that give a general view of preservation. Here is included the philosophical framework that makes up The Secretary of the Interior's "Standards for the Treatment of Historic Properties," the roles of the engineer and conservator in preservation, and the issue of special certification for those in the preservation practice. *Methodologies of Preservation*

offers papers which discuss the different approaches to preservation practice. *Preservation and Building Systems* deals with building systems and components—wood structures, cast iron columns, masonry arches, and window systems—and how archaic systems can be approached for renovation today. *Preservation and Building Materials* focuses on terra cotta, mortars, brick, stone, and the timely topic of the building materials which are the product of our 20th century industrial society. *Preservation and Its Effect on the Environment* contains those papers which focus on environmental issues such as how the presence of asbestos and lead paint will affect future preservation projects.

The objectives of the STP were considerable and all encompassing. Though comprehensive, the STP only scratches the surface of this interesting, controversial, and ever evolving topic. It will define the focus of ASTM Subcommittee E6.24 in the coming years.

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