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Guideline for Condition Assessment of the Building Envelope

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ABSTRACT

The need to accurately assess the condition of a building has become more important as the adaptive reuse, rehabilitation, and improvement of existing buildings have assumed a more prominent role in meeting national needs. The condition of the building envelope is of concern since failures can result in safety and health problems, as well as structural damage. Evaluation of the building envelope is often the first step toward stabilization and rehabilitation of the building. Considerable information has been generated for various materials, components, and systems by manufacturers, organizations, and practitioners. However, a rational approach to condition assessment of the building envelope has often been lacking. This Standard Guideline for Condition Assessment of the Building Envelope has been prepared for use by qualified design professionals and regulatory officials. It is not intended to be inclusive or prescriptive. Methods and procedures are presented as a resource for reference purposes.

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STANDARDS

In April 1980, the Board of Direction approved ASCE Rules for Standards Committees to govern the writing and maintenance of standards developed by the Society. All such standards are developed by a consensus standards process managed by the Management Group F (MGF), Codes and Standards. The consensus process includes balloting by the balanced standards committee made up of Society members and nonmembers, balloting by the membership of ASCE as a whole, and balloting by the public. All standards are updated or reaffirmed by the same process at intervals not exceeding 5 years.

The following Standards have been issued.

ANSI/ASCE 1-82 N-725 Guideline for Design and Analysis of Nuclear Safety Related Earth Structures

ANSI/ASCE 2-91 Measurement of Oxygen Transfer in Clean Water

ANSI/ASCE 3-91 Standard for the Structural Design of Composite Slabs and ANSI/ASCE 9-91 Standard Practice for the Construction and Inspection of Composite Slabs

ASCE 4-98 Seismic Analysis of Safety-Related Nuclear Structures

Building Code Requirements for Masonry Structures (ACI 530-99/ASCE 5-99/TMS 402-99) and Specifications for Masonry Structures (ACI 530.1-99/ASCE 6-99/TMS 602-99)

ASCE 7-98 Minimum Design Loads for Buildings and Other Structures

ANSI/ASCE 8-90 Standard Specification for the Design of Cold-Formed Stainless Steel Structural Members

ANSI/ASCE 9-91 listed with ASCE 3-91

ASCE 10-97 Design of Latticed Steel Transmission Structures

SEI/ASCE 11-99 Guideline for Structural Condition Assessment of Existing Buildings

ANSI/ASCE 12-91 Guideline for the Design of Urban Subsurface Drainage

ASCE 13-93 Standard Guidelines for Installation of Urban Subsurface Drainage

ASCE 14-93 Standard Guidelines for Operation and Maintenance of Urban Subsurface Drainage

ASCE 15-98 Standard Practice for Direct Design of Buried Precast Concrete Pipe Using Standard Installations (SIDD)

ASCE 16-95 Standard for Load and Resistance Factor Design (LRFD) of Engineered Wood Construction

ASCE 17-96 Air-Supported Structures

ASCE 18-96 Standard Guidelines for In-Process Oxygen Transfer Testing

ASCE 19-96 Structural Applications of Steel Cables for Buildings

ASCE 20-96 Standard Guidelines for the Design and Installation of Pile Foundations

ASCE 21-96 Automated People Mover Standards—Part 1

ASCE 21-98 Automated People Mover Standards—Part 2

SEI/ASCE 23-97 Specification for Structural Steel Beams with Web Openings

SEI/ASCE 24-98 Flood Resistant Design and Construction

ASCE 25-97 Earthquake-Actuated Automatic Gas Shut-Off Devices

ASCE 26-97 Standard Practice for Direct Design of Buried Precast Concrete Box Sections

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FOREWORD

The need to accurately assess the condition of a building has become more important as the adaptive reuse, rehabilitation, and improvement of existing buildings have assumed a more prominent role in meeting national needs. The condition of the building envelope is most important since failures can result in safety and health problems, as well as structural damage. Proper evaluation of the building envelope is often the first step toward stabilization and rehabilitation of the building.

Considerable information has been generated for various materials, components, and systems by manufacturers, organizations, and practitioners. However, a rational approach to condition assessment of the building envelope has often been lacking. Basic information, procedures, and references have been compiled, subjected to a consensus review, and approved by this committee. This Standard Guideline for Condition Assessment of the Building Envelope has been prepared for use by qualified design professionals and regulatory officials.

This Standard is not intended to be inclusive or prescriptive. Methods and procedures are presented as a resource for reference purposes. Other methods and procedures are not only permissible, but are encouraged, so long as they are deemed reliable and sufficient comparisons are available with other recognized methods.

Inasmuch as interpretation of the results of the evaluation must be based on the professional experience and judgement of the practitioner, it is not a part of this Standard.

Utilization of this guideline may involve hazardous materials, operations and equipment. It does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this guideline to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

The material presented in this publication has been prepared in accordance with recognized engineering principles. This Standard Guideline should not be used without first securing competent advice with respect to its suitability for any given application. The publication of the material contained herein is not intended as a representation or warranty on the part of the American Society of Civil Engineers, or of any other person named herein, that this information is suitable for any general or particular use or promises freedom from infringement of any patent or patents. Anyone making use of this information assumes all liability from such use.

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This Standard was prepared through the consensus standards process by balloting in compliance with procedures of ASCE's Codes and Standards Activities Committee. Those individuals who served on the Structural Condition Assessment and Rehabilitation of Buildings Standards Committee are:

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Guideline for Condition Assessment of the Building Envelope

1.0 GENERAL

1.1 SCOPE AND INTENT

The intent of this Standard is to provide a guideline and methodology for assessing the condition and performance of existing building envelope systems and components and identifying problematic and dysfunctional elements. It applies equally to a building's envelope or portion whose primary purpose may be to serve as the supporting structural system of the building. The reader may also wish to refer to ASCE 11—*Guideline for Structural Condition Assessment of Existing Buildings*. This Standard may be a source of comprehensive information for clients such as building owners, prospective purchasers, tenants, regulatory officials, and others.

While the Standard is primarily directed toward a consultant-client relationship, modifications may be made to the content for condition assessments performed by staff personnel of public agencies and multi-building owners for management of facilities.

This Standard establishes an assessment procedure including investigation, testing methods, and a form for the report of the condition assessment. It will assist the investigator in developing a logical approach to the assessment of the building envelope in order to focus on fundamental defects rather than outward symptoms. The possibility of encountering hazardous materials, such as lead-based paint and asbestos containing materials, should be considered.

Since any evaluation will involve "professional judgment" and contains factors that cannot be readily defined and standardized, a section providing guidance is also included. This section must be used by the design professional as part of the evaluation.

1.2 PURPOSE OF ASSESSMENT

Condition assessment of an existing building envelope may be undertaken for a number of purposes. These may include developing a performance report, establishing building serviceability, planning for maintenance or repair, code compliance, life safety, durability, historic preservation, or a number of special purposes based on the specific building and its current or proposed occupancy or function.

1.3 TYPES OF ASSESSMENT

1.3.1 Cursory Assessment

This is a visual overview of the general condition of the building envelope. It is often used for screening multiple buildings to establish priorities for maintenance and repair or further study.

1.3.2 Preliminary Assessment

The preliminary condition assessment is usually limited in scope. It will consist of a site visit for familiarization and to identify problem areas, a review of available documents, an interview of involved parties, and a preliminary report of findings and recommendations.

1.3.3 Detailed Assessment

This is an expansion of the preliminary assessment. It will include a review of documentation, component classification, field investigation, testing, analysis, and report.

1.4 QUALIFICATIONS AND EQUIPMENT

1.4.1 Personnel Qualifications

All personnel involved in the assessment shall possess the technical qualifications, including practical experience, education and professional judgment required to perform the individual technical tasks assigned. Interpretation of results and conclusions shall be performed by a design professional qualified in the appropriate discipline.

1.4.2 Equipment

Equipment shall be obtained as appropriate to accomplish or perform the various tests and inspection methods specified in the standard. All equipment shall be in good working order. For equipment that should be calibrated for proper use in the given application, reports of calibration shall be available and the results provided if requested.

1.5 AGREEMENTS

1.5.1 Services

The scope of services for the condition assessment, including any limitations, shall be defined by the design professional and all conditions, applicable