

Water

In Exterior
Building Walls

Problems and Solutions

Thomas A. Schwartz, editor



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Foreword

This publication, *Water in Exterior Wall Systems: Problems and Solutions*, contains papers presented at the symposium of the same name, held in Dearborn, MI on 25–26 Oct. 1990. The symposium was sponsored by ASTM Committee E-6 on Performance of Building Constructions. Thomas A. Schwartz of Simpson, Gumpertz & Heger in Arlington, MA presided as symposium co-chairman and is the editor of the resulting publication.

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Overview

Nothing in our known universe is at once as constructive and destructive as water. It supports life while it turns stone to sand. It provides energy and delivers essential services to our built environment, while simultaneously degrading the materials in that built environment by corrosion, erosion, dissolution, decay, and expansion due to freezing. The papers presented in this Special Technical Publication (STP) explore both the problems associated with water in the exterior walls of buildings and the solutions to those problems.

The architectural and engineering journals are replete with stories about the adverse consequences of uncontrolled water in building walls; major overhauls of recent construction due to persistent water penetration, corrosion of light gage metal components, decay of organic materials, and damage to interior finishes. Our courtrooms are deluged with dissatisfied owners seeking restitution for building envelope defects. The source of these performance deficiencies include the following:

- wall designs that fail to recognize and accommodate the movement of moisture in both its liquid and vapor forms;
- installation workmanship that fails to implement the wall design faithfully; and
- materials and material systems that fail to deliver their advertized performance.

Correcting structures, once built, generally requires creative and usually expensive remedial measures. Anticipating and correcting problems, before construction, is much easier and certainly less costly. Problem prevention requires unwavering respect for the laws of physics, meticulous attention to detail, and a healthy appreciation for the lessons of history.

Despite constant changes in materials and methods, the construction of watertight, durable building enclosures relies now, as it has for decades, on the prudent application of building technology. As in politics, we must be students of history or we are doomed to repeat it. The consequence of ignoring the lessons of our past experience is highlighted by an article in *Engineering News Record* entitled "How to Build Leaky Brick Walls with Good Materials," which suggests the following elements to help assure water problems in masonry walls:

- Combine materials of varying coefficient of expansion to assure that cracks will develop through the veneer.
- Keep the edge of flashings 1/2 in. or more back from the face of the wall so that the outside appearance of the wall is not marred.
- Lap or loose lock, but do not solder, the laps of metal flashings.
- Do not turn up inboard edge of flashing and do not seal the flashing around penetrations and termination points.

- In laying brick, butter the outer edge with mortar, so that the finished wall looks good, but do not provide full head and bed joints.

This article was published in 1938. Those involved in the investigation of leaky brick walls in the 1980's have seen striking similarities in the current practice with that of the 1930's. Without action to improve the state of our art, the 1990's are unlikely to provide a significantly different experience.

Solutions to the problems of water in exterior building walls are at hand, but problem recognition, the first step in prevention, has proven evasive. The papers in this STP go a long way in both recognizing the problems and providing methods to solve them.

The papers included herein present diverse, and sometimes controversial opinions on the subject. A contrast of opinions is expected, given the disparate professional experiences of the authors. I welcome this diversity as an essential element in the development of consensus and improved practice.

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