

# Manual provides waterproofing guidelines

*The NRCA Waterproofing and Dampproofing Manual, Fourth Edition,* offers specialized information

by Mark S. Graham

**T**he *NRCA Waterproofing and Dampproofing Manual, Fourth Edition*, was published to provide technical information about the various uses, designs and application methods of waterproofing and dampproofing materials and systems. This manual proves useful to contractors, designers, consultants and building owners because it provides guidelines for proper practices in waterproofing and dampproofing.

## General overview

The manual begins with general waterproofing and dampproofing information. Although the manual addresses both systems, waterproofing and dampproofing are distinctly different; each is intended for separate purposes, which will be explained further in this article.

The manual also provides design guidance for waterproofing and dampproofing systems, including performance requirements and suggested uses of specific materials for particular building surfaces.

In addition, it details various waterproofing and dampproofing products, some of which lend themselves well to remedial repair situations (e.g., as will be discussed later in this article, applying a negative-side waterproofing material to a structure's foundation wall).

The manual's final section contains generic waterproofing details

that are not specific to particular materials or product types.

## Differences

One of the most important distinctions between waterproofing and dampproofing is the difference in intention.

The manual defines waterproofing as the treatment of a surface or structure to prevent the passage of water in the *presence* of hydrostatic pressure. Water lying against a barrier exerts a steadily increasing hydrostatic pressure as the water's depth increases. Standing water exerts a hydrostatic pressure of 62.4 pounds of force per foot (or 5.2 pounds of force per inch [1000 kg/m]) of depth. A waterproofing treatment keeps water from penetrating the substrate and infiltrating the interior.

Dampproofing is defined in the manual as the treatment of a surface or structure to resist the passage of water in the *absence* of hydrostatic pressure. Dampproofing materials need only resist the capillary action of moisture as it attempts to pass into or through a substrate. To reduce dampness within a structure, dampproofing materials generally are employed above grade only when groundwater is present; below-grade dampproofing is possible in the absence of groundwater and hydrostatic pressure.

It is important to note that a material or system designed to perform a

dampproofing function may not be successful as a waterproofing application because it was not meant to withstand hydrostatic pressure.

## Design guidance

Waterproofing and dampproofing systems can be used in many different situations, so the systems' designs should be tailored to specific applications. For example, waterproofing often is used to protect a below-grade concrete slab and exterior walls from groundwater penetration into a structure's interior. In other instances, waterproofing protects suspended structural decks (e.g., plaza decks) from water infiltration.

In many cases, waterproofing can be applied to either the positive or negative side of a structure to achieve watertightness. Positive-side waterproofing is an application where the waterproofing system and hydrostatic pressure's source are on the same side of the structural element. Conversely, negative-side waterproofing occurs when the waterproofing system and source of hydrostatic pressure are on opposite sides of the structural element.

Depending on the structural element, the most appropriate types of waterproofing will vary. For instance, a cast-in-place concrete foundation wall readily can be waterproofed with a bituminous or single-ply membrane if the positive side (i.e., earth side) is accessible. However, if the

earth side is not accessible (e.g., two buildings abut one another), negative-side materials, such as metallic compound, cementitious or crystalline waterproofing, can be applied to the foundation wall's interior side.

### Products

A wide variety of waterproofing and dampproofing materials and products are available. Although some may be appropriate in many waterproofing and dampproofing situations, each material and product has limitations and may not be appropriate for certain applications. For example, some thermoset membrane waterproofing products should not contact soil, which may contain certain acids, oils and solvents.

The manual's products section is useful for determining the appropriateness or limitations of most waterproofing and dampproofing materials. The section includes detailed descriptions of the compositions, applicable standards, basic uses and limitations of materials. Also highlighted are installation procedures, including surface preparation, application, flashing and protection course directions.

The manual also describes materials that generally apply to all waterproofing systems. These include protection courses, prefabricated drainage systems (i.e., geocomposites) and geoinclusions.

A discussion of products for repairing a waterproofing system is included in this section, as well. Certain waterproofing materials, such as metallic waterproofing compounds, polyurethane chemical grout and acrylamide gel chemical grout, lend themselves well to waterproofing repair. Because these materials can be installed easily from the negative-pressure side (i.e., inside) of a structure, they eliminate excavation along the structure's exterior to expose a leaking membrane.

### Waterproofing details

In waterproofing systems, as in roof systems, the interface between

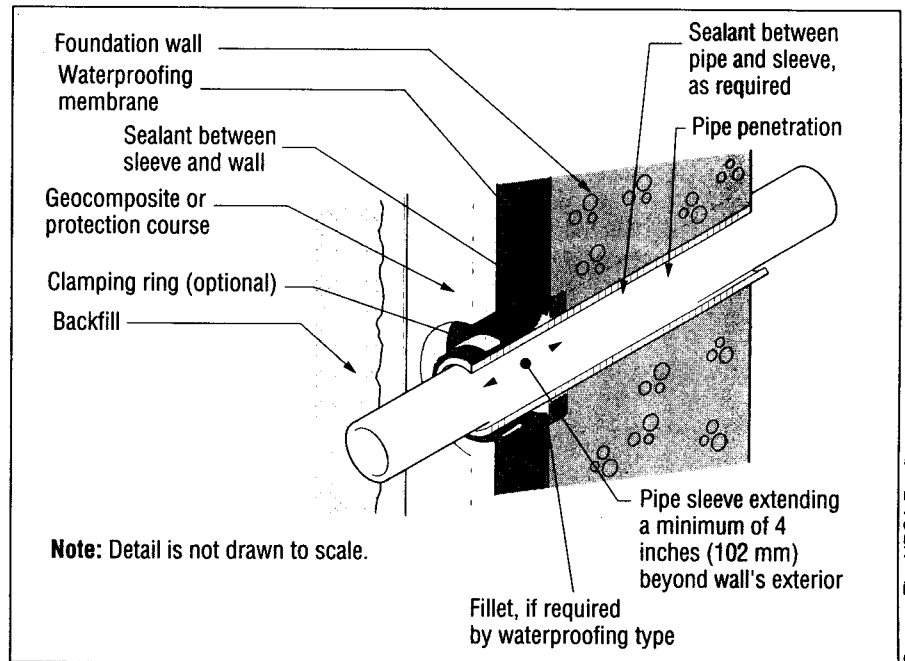


Figure 1: An example of a pipe penetration through a foundation wall.

vertical and horizontal surfaces and where joints, cracks or penetrations often occur are the areas most vulnerable to leakage. The manual's details show sound waterproofing construction design at common locations in foundation walls and horizontal slabs, such as a pipe penetration through a foundation wall, as shown in Figure 1. The details represent the most preferred or common techniques used by waterproofing contractors throughout the United States.

Within the details section, it is recommended that water stops not be relied on in waterproofing applications. Water stops are diaphragms used across joints as sealants, usually to prevent the passage of water; they generally are installed by someone other than a waterproofing contractor, typically a concrete contractor. Water stops can be damaged easily during steel reinforcement placement or the concrete pour—they often end up bent over, cut or improperly lapped at seams.

For these reasons, NRCA recommends waterproofing details be designed without reliance on water stops for watertight integrity of the

waterproofing system. If water stops are used, they only should be considered secondary or backup components of a complete waterproofing system.

### Summing it up

*The NRCA Waterproofing and Dampproofing Manual, Fourth Edition*, provides detailed, technical information tailored solely to waterproofing and dampproofing applications. Although they sometimes are similar to roof systems, waterproofing and dampproofing systems are highly specialized and only should be designed, manufactured and applied by knowledgeable professionals.

This manual should help advance the waterproofing and dampproofing profession and provide useful information to those considering entering the trade. **PR**

*Editor's note: The manual's waterproofing details are included on NRCA's Construction Details on CD-ROM for those wanting to manipulate and customize specific waterproofing details.*

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