

# Preliminary Selection of Waterproofing Systems

By Michael Chusid

**W**aterproofing can present a building project team with baffling choices. With dozens of manufacturers and hundreds of products to choose from, there is a formidable amount of data to evaluate. Yet there does not appear to be a standard, easy-to-follow methodology for making waterproofing product selections. This makes the task especially daunting for novice designers who have limited personal experience to draw upon. Yet even seasoned specifiers or contractors can find themselves stymied when confronted with unusual project conditions.

To address this concern, the Technical Committee of the Los Angeles Chapter of the Construction Specifications Institute has developed several resources to aid in waterproofing decisions. The Committee used “waterproofing” as it is defined in MasterFormat™, 1995 Edition: “Impervious, waterproofing membranes, coatings, and other materials applied to walls, slabs, decks, and other surfaces subject to continuous and intermittent hydrostatic pressure or water immersion.”

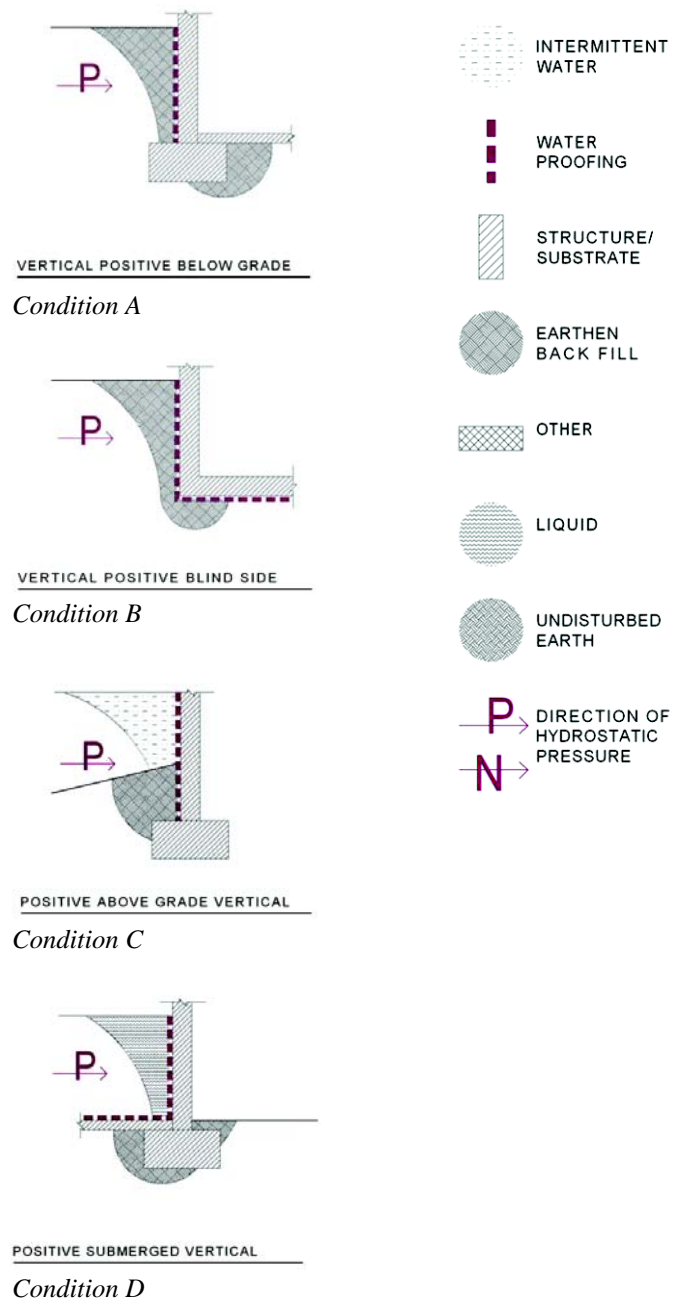
One of the resources they developed is a *Guide to Waterproofing Types and Locations* for making better-informed preliminary selections of waterproofing systems. It enables a designer or specifier to quickly and easily make preliminary decisions about waterproofing materials based on known project conditions. The guide allows users to identify the types of waterproofing that are most appropriate for further investigation, and which can be dropped from consideration. Committee member Michael Fuller, CDT, explains that, “With product catalogs and all the data on the internet, there are lots of sources for *detailed* information about waterproofing materials. Our new guide provides *generalized* information. It points a user in the right direction so he or she can concentrate their efforts on the types of products most likely to be useful on their project.”

## How the Guide Works

The committee organized the guide to be convenient for architects and engineers to follow. According to Melina Renee, CCS, “We visualized a designer or specifier looking at a detail and trying to figure out the best way to waterproof their structure.” The guide consists of two parts: a set of conceptual sketches to help users visually identify the waterproofing conditions on their project, and a table to guide the user to the types of waterproofing that could be considered for use with each condition.

The process begins with an assessment of the condition encountered on a project:

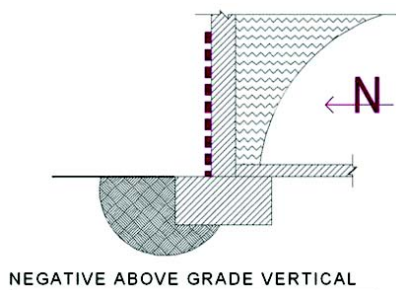
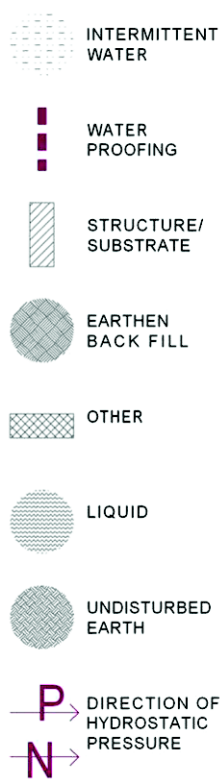
- *Horizontal or vertical structure:* This was made the first order of demarcation for two reasons. First, someone examining a waterproofing condition would be able to tell its general orientation at a glance, even if nothing else about the project’s waterproofing requirements was known. And second, from a materials standpoint, there are



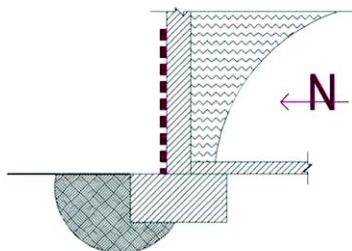
often major differences between the materials and techniques that can be used in each orientation.

- *Positive or negative hydrostatic pressure:* Positive pressure was defined as hydrostatic forces that tend to press waterproofing into the structure protected by the waterproofing. Negative pressure, on the other hand, was defined as hydrostatic forces that could cause waterproofing to separate from the structure being protected. This distinction is critical to the selection of a waterproofing but is not always easy to discern. For example, a waterproofing liner placed inside an underground water tank would ordinarily be under positive pressure. However, if the tank was drained and the water table outside the tank rose, the same waterproofing would be under negative pressure due to ground water trying to flow into the tank.

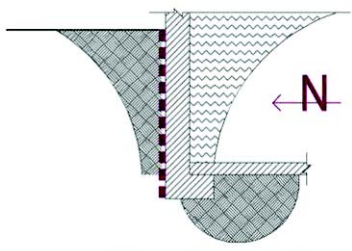
- *Condition of use:* A wide range of conditions of use could be encountered in a project. For example, pedestrian coatings and above-grade walls may have aesthetic considerations. And “blind-side” conditions require the installation of waterproofing before construction of the structural element, such as waterproofing placed before a floor slab is cast. It would be a rare project that required all the conditions identified. Some applications, like ceiling waterproofing under negative pressure, are more likely to be used in civil engineering projects than architectural applications.
- *Type of liquid or gas being contained by waterproofing:* Waterproofing compatible with potable water merited its own category in the table. Methane resistance was also considered because it is of increasing importance in Southern California and other areas with underground



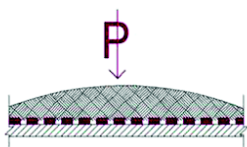
Condition E



Condition F

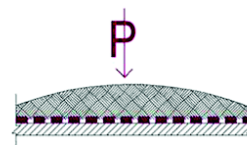


Condition G

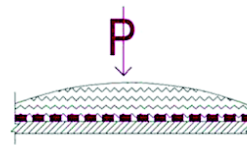


(I.E. TUNNEL ROOF)

Condition H

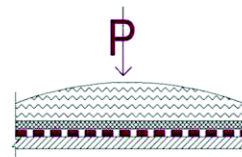


Condition I

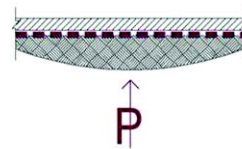


(I.E. BOTTOM OF TANK)

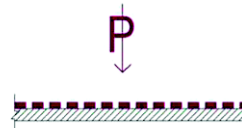
Condition J



Condition K



Condition L



Condition M

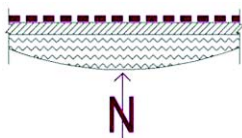
gas, petroleum, or contaminated soil. The table does not address waterproofing which must be compatible with sewage and other chemicals.

After locating the correct conditions of use on the table, users are directed to appropriate types of waterproofing materials, organized generally in accordance with MasterFormat. "Recommended" materials are those that are recommended for the conditions indicated in at least one manufacturer's published product literature. Because the criteria for "Recommended" is based upon *one* manufacturer's recommendation, users are cautioned that other manufacturers of similar materials may not recommend their products for the indicated conditions.

"Unacceptable" materials are those which, to the best knowledge of committee members, are not recommended by any manufacturer for the indicated conditions of use.

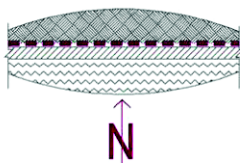
Between "Recommended" and "Unacceptable," the committee created, after much debate, a "Qualified" category. Products in this category are those that are not commonly used for the indicated conditions, and where no manufacturer currently recommends their product for the described conditions. However, in the consensus opinion of the committee, these materials may work in some applications. For example, some of the "Qualified" materials may be technically suitable but are not in common use because they are not economical for the indicated conditions.

The committee considered other factors that affect waterproofing but eventually decided they were beyond its scope. For example, what happens where a horizontal and a vertical condition meet? Once a broad category was selected, what are the performance and product variables that ought to be considered to further narrow one's options within



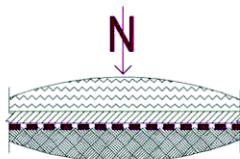
NEGATIVE ABOVE GRADE HORIZONTAL  
(I.E. TANK ROOF)

*Condition N*



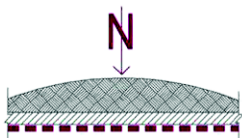
NEGATIVE EARTH COVERED ROOF  
HORIZONTAL (I.E. OVER TANK)

*Condition O*



NEGATIVE UNDER SLAB BLIND SIDE  
HORIZONTAL (I.E. TANK FLOOR)

*Condition P*



NEGATIVE CEILING HORIZONTAL  
(I.E. UTILITY VAULT CEILING)

*Condition Q*

## Waterproofing Guide is Result of Year-Long Effort

Working together for over a year, the L.A. Chapter's Technical Committee held monthly lunch-time meetings to coordinate the ongoing efforts of individual committee members and special task forces. The 21 people on the committee included a cross section of the industry, including architects, contractors, waterproofing consultants, manufacturers, sales representatives, and representatives of firms and agencies that own and operate buildings.

This diversity was ultimately the committee's strength as it assured that all facets of nonresidential waterproofing were considered. Initially, however, the differing viewpoints required the committee to struggle for consensus about fundamental questions such as: What is included in the scope of "waterproofing"? Do the waterproofing categories described in MasterFormat make sense? What is the best way to classify the various types of waterproofing conditions of use and service requirements? What should be the role of warranties in product selection? Who is responsible for the compatibility of different types of waterproofing at transitions from one building condition to another?

In addition to the product selection guide, the committee developed a guide to the roles and responsibilities of those involved in making and executing project waterproofing decisions. Waterproofing contractor Glen Hickman explains, "The success of a waterproofing project depends on all members of the project team working together with a clear understanding of each other's obligations to the project." While the specific relationships on any given project are determined by the terms of its construction contract, committee members feel the new document can help establish a common understanding between team members. A copy of the roles and responsibilities document can be downloaded from the L.A. Chapter's website at [www.lacsi.org](http://www.lacsi.org).

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WATERPROOFING TYPES <sup>1</sup> AND LOCATIONS <sup>2</sup>			07131 Self-Adhering Sheet Waterproofing	07132 Elastomeric Sheet Waterproofing	07133 Thermoplastic Sheet Waterproofing	07141 Cold Fluid-Applied Waterproofing	07142 Hot Fluid-Applied Waterproofing	07161 Modified Cement Waterproofing	07162 Crystalline Waterproofing	07163 Metal-Oxide Waterproofing	07170 Bentonite Waterproofing	07180 Traffic Coatings
<b>VERTICAL—Walls</b>												
POSITIVE PRESSURE	A. Below Grade	Water	●	●	●	●	●	✗	●	✗	●	✗
		Methane	✗	✗	✗	●	✗	✗	✗	✗	●	✗
	B. Blind Side	Water	▲	●	●	●	▲	▲	●	✗	●	✗
		Methane	✗	✗	●	●	✗	✗	✗	✗	● <sup>3</sup>	✗
	C. Above Grade		●	✗	✗	●	▲	●	●	✗	✗	✗
	D. Sub-merged	Potable	✗	✗	✗	●	✗	●	●	✗	✗	✗
		Non-Potable	✗	✗	✗	●	▲	●	●	✗	✗	✗
	NEGATIVE PRESSURE	E. Above Grade		✗	✗	✗	✗	✗	●	●	✗	✗
F. Blind Side		✗	✗	✗	✗	✗	✗	●	✗	✗	✗	
G. Below Grade		✗	●	●	✗	✗	●	●	▲	✗	✗	

(Notes apply to tables on pages 16 and 17)

1. Types are listed according to MasterFormat™ categories. New materials, such as polyurea and other evolving technologies, may also have waterproofing application but have not been considered.

2. This table is for preliminary product selection only. Obtain qualified professional assistance and carefully evaluate applicable industry standards and manufacturers' product data before specifying or using any type of waterproofing.

3. Based on use of bentonite as part of a composite-sheet waterproofing membrane.

Notice: Copyright 2003 by Los Angeles Chapter of Construction Specifications Institute (www.lacsi.org). Table has been amended since appearing in August 2002 issue of *The Construction Specifier*. Table reflects consensus opinion of LACSI Waterproofing Task Force based upon information provided by representatives of waterproofing industry. LACSI does not endorse products nor does it recommend one product or waterproofing system over another. LACSI will not be responsible for the use or misuse of table.

each product category? For example, application thickness, availability of materials and labor, costs, warranty provisions, environmental factors, project limitations, and other factors must be considered. Also, the guide does not address dampproofing, water repellents, or roofing—processes that are sometimes grouped inappropriately with waterproofing.

In all cases, users of the guide must read manufacturer literature and carefully evaluate proposed materials before specifying or using them on a

specific application. When necessary, qualified professional advice should be obtained and, if necessary, tests should be performed to demonstrate the effectiveness of a product. The committee also found the *Below Grade Waterproofing Manual*, published by the Sealant, Waterproofing and Restoration Institute, to be an authoritative reference.

The committee recognizes that, as with any consensus effort, its waterproofing guide will not satisfy everyone in the waterproofing industry.

WATERPROOFING TYPES <sup>1</sup> AND LOCATIONS <sup>2</sup>													
●	<b>Recommended:</b> Published recommendation in at least one manufacturer's literature.		07131 Self-Adhering Sheet Waterproofing	07132 Elastomeric Sheet Waterproofing	01733 Thermoplastic Sheet Waterproofing	07141 Cold Fluid-Applied Waterproofing	07142 Hot Fluid-Applied Waterproofing	07161 Modified Cement Waterproofing	07162 Crystalline Waterproofing	07163 Metal-Oxide Waterproofing	07170 Bentonite Waterproofing	07180 Traffic Coatings	
▲	<b>Qualified:</b> Not commonly used; no published recommendation by manufacturer; limited published information from manufacturer.												
✗	<b>Unacceptable:</b> Not recommended by manufacturer.												
<b>HORIZONTAL—Floors, Ceilings, Decks</b>													
POSITIVE PRESSURE	H. Blind Side	Water	●	●	●	●	●	●	✗	▲	✗	●	✗
		Methane	✗	✗	✗	●	✗	✗	✗	✗	✗	●	✗
	I. Earth Covered Roof		●	●	●	●	●	●	▲	▲	✗	●	✗
	J. Submerged	Potable	✗	●	✗	●	●	●	●	●	✗	✗	✗
		Non-Potable	✗	●	✗	●	●	●	●	●	✗	✗	✗
	K. Between Substrates	Between Slabs or Mortar Bed	●	●	●	●	●	●	▲	▲	✗	●	✗
		Under Pavers	●	●	●	●	●	✗	✗	▲	✗	●	✗
		Under Thinset Tile or Stone	●	●	●	●	✗	✗	✗	▲	✗	✗	✗
	L. On-Grade Blind Side		●	●	●	●	✗	✗	✗	●	✗	●	✗
	M. Traffic/Pedestrian Surfaces		✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	●
NEGATIVE PRESSURE	N. Above Grade		✗	✗	✗	✗	✗	✗	✗	●	✗	✗	✗
	O. Earth Covered Roof		✗	●	●	✗	✗	✗	✗	▲	✗	✗	✗
	P. Underslab Blindside		●	●	●	✗	✗	✗	✗	▲	✗	●	✗
	Q. Ceiling		✗	✗	✗	✗	✗	✗	▲	▲	✗	✗	✗

Variations in regional practices or changes in technological and economic conditions may lead to different guidelines for waterproofing selection. Still, the committee hopes its efforts have filled a critical gap in the information available to specifiers.

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