TL-0013 (AP) — Forming Systems for Use with PREPRUFE® Technical Letter

Introduction

The PREPRUFE® waterproofing system, unlike conventional BITUTHENE® waterproofing systems, is designed specifically for use in blind-side applications. Typically, PREPRUFE® 160R membrane system is installed against a vertical soil retention structure such as timber lagging, sheet piling, shotcrete or foundations of adjacent buildings, while PREPRUFE® 300R membrane system is installed horizontally directly to a layer of lean concrete or blinding concrete, fully rolled gravel or fully compacted sand.

The construction sequence in a blind-side waterproofing application consists of the following steps: installing the waterproofing system, placing the steel reinforcement, constructing the forming system, and pouring the concrete.

There are several types of forming systems that are typically used in these applications. Many use form ties between the face sheets of the forming and the soil retention wall. The purpose of the form ties is to carry the lateral stresses imposed by the plastic concrete to the well braced soil retention system. The form ties are fastened directly to the soil retention wall and will penetrate the waterproofing system. Therefore, it is very important to use a forming system that minimizes the number of penetrations and ensures that the penetrations can be effectively waterproofed. During the constructing of the forming system, care should be taken to ensure the membrane is not penetrated when installing a bulkhead. An effective method has been found to be providing external bracing using the reinforcement steel members outside the pour.

Before placing any bulkhead or pour stop against PREPRUFE® membrane, ensure that PREPRUFE® CJ Tape and/or hydrophilic waterstop such as SWELSEAL® hydrophilic waterproofing strip or WATERBAR™ hydriphilic strip has been installed in the proper location. Please refer to the relevant GCP standard hydroohilic waterstop details (SWELLSEAL® waterproofing strip, WATER-BAR™ hydriphilic strip) provided by your local GCP Representative).

Compatible Forming Systems

There are several forming systems that are recommended for use in conjunction with the PREPRUFE® waterproofing system.

- One-Sided Wall Forming System A one-sided wall forming system is the ideal system to use in conjunction with the PREPRUFE® system. A one-sided wall forming system is externally braced. Therefore, there are no form ties that connect the forming to the soil retention wall. As a result, there are no penetrations through the waterproofing system. This type of forming system is commonly used in conjunction with shotcrete or gunite soil retention systems.
- Gang Forms With Load Gathering Form Ties Gang forming systems that utilize load gathering ties are also recommended for use with the PREPRUFE® Membrane system. The load gathering ties are fastened to either a pivot bracket anchor plate or to a threaded nut welded to the surface of the I-beams (timber lagging) or to the steel sheets (sheet piling).

Load gathering ties, such as taper ties, she-bolt ties, or lagstuds, have high ultimate load capabilities of between 50,000-100,000 lbs (222 400-444 800 N) per tie. Therefore, fewer ties are needed to carry the lateral stresses imposed by the concrete. Furthermore, the pivot bracket anchor plate or the welded nut assembly is installed on the waterproofing substrate prior to the waterproofing installation and is easy to detail around.

Incompatible Forming Systems

There are forming systems that are not recommended for use in conjunction with the PREPRUFE®60R Waterproofing System.

- Hand Set Forms With Conventional Ties

In general, hand set forms are not compatible. These systems use panel, flat or toggle form ties with ultimate load capabilities of less than about 10,000 lbf (44,480 N) per tie. There are many more form ties that penetrate the waterproofing system as compared to the load gathering ties described above.

- Stay-In-Place-Forming Systems

These forming systems pose several risks to the PREPRUFE® Membrane. Due to the construction of the forming system and occasional field cutting to size, many sharp edges exist that may puncture the PREPRUFE® Membrane. This forming system also allows for concrete paste to travel through the form and contaminate the PREPRUFE® Membrane. When used in a vertical blind side condition the stay form system can require a conventional tie system like the hand set forms mentioned above.

Conclusion

It is very important to specify a compatible forming system used in conjunction with the PREPRUFE® Membrane System. One-sided wall forming systems are clearly the best choice since there are no form ties used in this system; therefore, there are no penetrations to the waterproofing layer. Other compatible systems include gang forms with load gathering form ties. These systems minimize the number of penetrations and the penetrations are relatively easy to effectively waterproof.

Hand set forming systems, or more specifically, use of form ties with ultimate load capabilities of less than about 10,000 lbf (44,480 N) per tie are not recommended. These systems result in many form ties which penetrate the waterproofing layer.

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