

GENERAL OVERVIEW

Concrete is one of the most commonly used building materials in history. Its durability and low cost have contributed to its wide use. Due to age, abuse, or improper design, concrete repair is a growing sector of the construction industry. Therefore, a basic understanding of concrete repair materials is necessary, especially when installing subsequent materials such as polymer (resinous) coatings. The purpose of this bulletin is to introduce basic repair considerations as well as to briefly introduce the composition of repair material and their recommended uses.

ADDITIONAL RESOURCES

Wolverine Coatings Corporation (WCC) has developed this bulletin along with other technical information to help all interested parties, from specifiers to applicators to owners, have a better understanding of the considerations, materials, and techniques required for proper installation. Consult all relevant information before using WCC materials.

WCC Technical Information Bulletins
TIB: "Preparing Concrete to Receive Coatings or Linings"

WCC Technical Detail Drawings
TDD: N/A

WCC Technical Data Sheets
TDS: N/A

WCC Safety Data Sheets
SDS: N/A

SAFETY

Prior to commencing work, carefully read and follow all SDS (formerly MSDS), Technical Data Sheets, and any Instruction Manuals for products and equipment used during installation. Following the safety regulations of jobsite, local, state, and federal authorities is the responsibility of the installation company, general contractor, and/or facility owner.

DISCLAIMER

This Document does not purport to address all applicability and safety concerns, if any, associated with its use. It is the responsibility of the user to determine applicability of the information and to establish appropriate safety practices.

GENERAL CONCRETE REPAIR CONSIDERATIONS

When specifying materials and procedures for concrete repair, there are many factors to consider for a proper repair. While each factor could have its own bulletin, the following is a partial list of considerations and a brief discussion of each:

- **Aesthetics** – Carefully consider concrete condition and expectations for the finished surface when specifying materials and procedures. The aesthetics and performance of subsequent coatings is highly dependent on the quality of a repair.
- **Compatibility** – Repair materials should be compatible with both the substrate and subsequent coating material to prevent disbonding and/or inter-coat adhesion failure. Consult the Technical Data Sheets (TDS) of the repair material as well as those of the subsequent materials when choosing a repair material.
- **Performance** – The repair material must be able to withstand conditions it will experience while in service. These conditions include impact, temperature swings, temperature extremes, compression load, movement, chemical exposure, etc. Also, carefully consider how dissimilar materials bonded together will perform while in service.
- **Time** – Cure and re-coat times can greatly influence choice of materials and procedures. Fast turn-around times require fast-cure repair materials. Also multiple coat solutions require multiple cure times. This may exclude some repair materials. Consult the TDS of materials under consideration to minimize surprises.
- **Surface Preparation** – Selection of repair materials may be influenced by the surface preparation methods available for use. Site conditions and other requirements may dictate one preparation method while prohibiting another. Consideration of available preparation methods may greatly influence material choice.

CONCRETE REPAIR MATERIALS

This TIB will focus mainly on polymer (resinous) repair options. Cementitious materials are available for consideration but will not be covered in detail here. But briefly, cementitious repairs have slower cure times, lower strength, and typically require further surface preparation before applying additional coats. Some cementitious mortars may require over 28 days of cure, as does standard concrete.

There are numerous resin chemistries available for concrete repair materials. An example is epoxy resin, which is a very versatile chemistry with a broad array of physical properties to fit most applications. Factors such as chemical resistance, flexibility, impact and abrasion resistance are critical considerations in proper selection. Decide which factors are critical, then consult the TDS of repair materials for applicability.

There are also numerous physical compositions available for concrete repair materials. The most basic classifications of these compositions are: conventional polymer repair mortar (grouts), self-leveling liquids, hybrid mortars, and putties. Understanding the uses, application methods, and limitations of each will be critical when faced with concrete repair scenarios.

CONVENTIONAL POLYMER REPAIR MORTAR (GROUTS)

A polymer repair mortar is a resin blended with some sort of aggregate. Generally the resin components are properly mixed and then aggregate is added to obtain the desired consistency. Mortars can range from flowable slurries to viscous products designed to hang on overhead or vertical surfaces. They are normally trowel applied or formed, but in some cases, a repair mortar is raked over a surface and lightly smoothed.

Mortars are normally best suited for thicker repairs where the concrete is highly eroded and must be resurfaced. But mortars may have upper and lower thickness limits. A mortar that is too thin may not have required strength when in service. Also a thin mortar edge at an improper termination is a common failure point of repairs and mortar floors. Conversely, mortar not designed to be applied in thick applications can crack due to shrinkage. Consult the TDS for minimum and maximum thickness limits of the material.

Mortars may be resin rich (wet) or aggregate rich (dry). Drier mortars are porous and when over-coated may soak up thin primers and topcoats leaving an uneven, pin-holed surface. A mortar may require additional coats prior to installation of subsequent coatings. When over-coating a mortar repair, consider the time and cost of an additional sealer coat.

When faced with a large repair, polymer mortars are generally your best choice. In addition, polymer mortars are very strong and durable, with uses ranging from small repairs to resurfacing entire areas of deteriorated concrete.

SELF-LEVELING LIQUID

A self-leveling liquid is self-explanatory. Resinous materials are poured on a surface and allowed to find their own level. This is a popular option because repairs can be completed with low skill labor. While this may appear to be a good repair method on paper, it rarely works as expected.

Self-leveling liquid can be a good option for a perfectly level surface, but perfectly level concrete is a rare find. Typically, as the resin levels, it overflows edges and/or leaves other edges exposed. In many cases, this type of repair looks like pancake batter poured on a surface, which is normally not an ideal appearance. In addition, this type of repair has a high failure rate because of improper edge preparation. In general, the other classes of repair materials will be a better choice for increased performance, aesthetics, and longevity.

HYBRID POLYMER MORTAR

A hybrid mortar is similar in composition to a conventional polymer mortar, but is installed differently. Instead of pre-mixing the aggregate and resin, dry aggregate is first placed into the area to be repaired and then resin applied to penetrate and bind the aggregate together. Hybrid mortars are by their nature intended for horizontal repairs. Thicker repairs may require multiple layers. The benefit of this method over other repair materials is the possibility of using resin chemistries with ultra-fast cure times, allowing almost immediate return to service.

POLYMER REPAIR PUTTY

Repair putty is normally a viscous material applied by tools such as putty knives, squeegees, small trowels, etc. Repair putty is the preferred material for repairing small imperfections such as spalls, bug holes, cracks, etc. Unlike mortars, it can be applied in a smooth, thin film, thereby reducing edge preparation time and fine grinding after cure.

WOLVERINE COATINGS CORPORATION'S MOST POPULAR REPAIR PRODUCTS

TrowelEase1160	General Purpose Surfacing Mortar – 1/8" to 8"
TrowelEase1162	Flexiblized Surfacing Mortar – 1/8 to 8"
TrowelEase1181	Epoxy Block Filler – Up to 1/2" on vertical surface
FlashPatch1221	Fast Cure Repair Putty
BondTite1101	Fortified with AVR 200 – Field Prepared Repair Putty
CoveEase1901	Epoxy Cove Gel used as Repair Putty
BondTite1101	Clear, Highly Self-Leveling Epoxy Primer – 5 to 50 mils
LiquaTile1184	Pigmented Self-Leveling Epoxy Coating – 12 to 50 mils
IntegraFlex1980	Pigmented Flexible Self-Leveling Membrane – 20 to 125 mils

TIB: Basic Concrete Repair Guide - Rev 191218

SAFETY

For your safety, all required personal protection equipment should be used when operating machinery or handling chemicals. Concrete dust is a source of silica particles and other hazardous materials that can cause silicosis and other illnesses. Proper safety equipment and methods are the responsibility of the installation company, general contractor, and/or facility owner.

WARRANTY

Wolverine Coatings Corporation warrants its products to be free from defects in material and workmanship. Wolverine Coatings Corporation's sole obligation and Buyer's exclusive remedy in connection with the products shall be limited, at Wolverine Coatings option, to either replacement of products not conforming to this Warranty or credit to the Buyer's account in the invoiced amount of the nonconforming products. Any claim under this warranty must be made by the Buyer to Wolverine Coatings in writing within five (5) days of Buyer's discovery of the claimed defect, but in no event later than the expiration of the applicable shelf life, or one year from the ship date, whichever is earlier. Buyer's failure to notify Wolverine Coatings of such nonconformance as required herein shall bar Buyer from recovery under this warranty.

Wolverine Coatings makes no other warranties about the product. No other warranties, whether expressed, implied, or statutory, such as warranties of merchantability or fitness for a particular purpose, shall apply.

Any recommendation or suggestion relating to the use of the products made by Wolverine Coatings, whether in its technical literature, or in response to specific inquiry or otherwise, is based on data believed to be reliable; however, the products and information are intended for use by Buyers having requisite skill and know-how in the industry, and therefore it is for the Buyer to satisfy itself of the suitability of the products for its own particular use and it shall be deemed that Buyer has done so, at its sole discretion and risk. Variation in environment, changes in procedure of use, or extrapolation of data may cause unsatisfactory results.

LIMITATION OF LIABILITY

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LITERATURE REVISION

Published literature is subject to change without notice. Wolverine Coatings Corporation is constantly formulating innovative products, new technologies, and practices. Please check www.wolverinecoatings.com for the latest product data sheets.



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