

Concrete flooring finishes

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Concrete floor finishes may prove a conundrum for specifiers and clients. A vast range is available, and choices can be made according to aesthetics, cost, warranty and the desired performance of the system, amongst others. The proposed usage of the floor should be first established to enable the flooring finish selection to be narrowed down.

Monolithic floors

'Monolithic' is derived from 'mono', meaning single, and 'lithos', the Greek word for stone. In its simplest form, a monolithic floor can be the concrete itself. The concrete can be left in various degrees of finish, ranging from a brush finish to a highly polished and sealed power-floated finish. One of the main attractions of a monolithic finish is the predicted life, which tends to be greater than an applied topping. Specialist contractors can grind the concrete to a specified degree of polish (see Figure 1). Diamond grinding greatly increases abrasion resistance whilst producing a beautiful finish. The aggregates are exposed and the act of grinding these aggregates increases the effective polished stone value (PSV). Higher PSVs provide greater abrasion resistance. Impregnating the concrete matrix with densifier further strengthens the floor surface. Selected aggregates and cement types can produce many different and attractive finishes.

Dry-shake finishes may be used to harden a monolithic floor and provide various colour options. The selected material is applied to the wet concrete and hardens into the surface during concrete curing. This can be a very cost-effective method of producing a hard-wearing, maintenance-free, coloured floor. Typical uses are self-storage facilities, factories, engineering or retail warehouses. Waterproofing compounds can also be applied as part of a dry-shake fin-



Figure 1: Diamond grinding greatly enhances the aesthetics of the finished floor.

ish, producing slabs which are impermeable.

Terrazzo-substitute finishes

Decorative aggregates can also be added as a dry-shake system. When ground and polished these can produce beautiful terrazzo-style finishes (see Figure 2). Since Roman times, terrazzo finishes have been greatly admired for their beauty and timeless elegance. With a predominately stone surface, they provide excellent wearing characteristics; however, their use has been restricted because of the high cost and difficulty of installation.

Following the development of flooring systems with grinding, the benefits of a terrazzo surface can be harnessed without the disadvantages. The cost of terrazzo finishes compares extremely favourably with floor coverings such as tiles, epoxy or urethane coatings. Their life expectancy far exceeds any synthetic coating, making it considerably more cost-effective.

As a dry-shake finish, it can be applied to new slabs during placing, becoming homogenous with the concrete slab and facilitating incorporation within strength calculations. A further benefit is

(Photos: Permaban Ltd)

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Figure 2: The terrazzo-style finish can be most attractive.

that the slab can be installed early in the construction process. Other trades may complete works and the slab is then ground and polished to its final specified finish near the conclusion of the project. It is therefore protected during construction and there are cost-savings on build schedule. The dry-shake version can be supplied in the same wide range of matrix colours and aggregate choice as the pumpable system. The pumpable system can be applied to virtually any suitable surface, such as mezzanine or steel decking, aged and damaged concrete, domestic, commercial and industrial new-build applications. The colours and styles can be tailored to suit individual requirements. Aggregates such as marble, granite, basalt and limestone can be added. The matrix is a high-performance, cementitious compound, based on the latest silica fume and polymer technology. Smooth-flowing and fast-setting, it can be foot-trafficked after a few hours and take full vehicular trafficking after 24 hours. Upon curing, it produces an immensely strong, durable floor, suitable for the most demanding clients. Most colour pigmentations are available, making the system ideal for corporate identity usage.

Surface coverings

There are a vast range of surface coverings. Laminates, wood, vinyl, carpet, tiles and others are generally used to pro-



Figure 3: This pigmented floor exhibited excellent abrasion resistance and was used in a vehicle servicing area.

vide practical and decorative finishes. Resins and screeds are used in industrial and commercial applications that will be heavily trafficked and require a high level of abrasion and chemical resistance (see Figure 3). The resin market has grown considerably in the last decade:

- epoxy coatings continue to provide an attractive, hardwearing, economical flooring system, although with a limited lifespan
- polyurea resin is predominantly used in very fast, resin-bonded, aggregate systems, where the aggregate provides the wear surface and finish
- decorative resin finishes, such as stone carpet effects and resin bonded flakes, are being used in high profile areas such as retail environments. These systems are versatile and provide a hardwearing, decorative floor with a vast range of finishes
- polyurethane resins are becoming the preferred binder in performance screeds because they have greater chemical resistance and are more moisture tolerant when installed, although the greatest benefit is fast-track installation.
- polyurethane screeds and self-levelling systems can usually be trafficked six hours after installation and are self-sealing. The resin rich nature of polyurethane screeds makes them ideal for grinding or polishing. This exposes the aggregates and provides an attractive, fast-track, high-performance terrazzo-style finish.

Planning, preparation and installation

Careful planning for new construction, with early flooring finish selection, may produce cost and time savings because unnecessary processes can be designed out. For instance, if a screed topping were specified, then a highly polished, powerfloated finish would prove an unnecessary expense and actually retard the drying out period, leading to the requirement for extra surface preparations and treatments.

The need for good surface testing and preparation cannot be sufficiently stressed. Time spent on correct initial installation eliminates the requirement to 'build in' time for remedial work, following a poor installation. Flooring manufacturers usually help contractors and engineers achieve quality installation because it is in their interest to do so. Ultimately, main contractors should be satisfied regarding the competency of the installation contractor and the maintenance of quality records. Many factors can affect the floor installation integrity, including moisture content, environment, atmospheric conditions, dew point, surface profile etc. Testing with regularly calibrated instruments should be part of a quality installation.

Concluding remarks

Any surface preparation implications should be considered at the planning stage, regardless of flooring type. Many problems can be prevented with early planning, discussions with the flooring contractors and/or seeking advice from specialist consultants. Budget is usually a major factor, but caution should be exercised before opting for the cheapest price. It should be borne in mind that certain flooring finishes may save money during the construction period, but problems may arise in the short and medium term with costly consequences. At best, a poorly specified floor may require regular maintenance and at worst, the floor may require replacement or extensive repair. ■