Slab removal, processing and replacement

Concrete removal and replacement works at busy distribution centres and external concrete yards are extremely common in any business that has been operating for the past 15 years or, alternatively, operating on low budgets in terms of maintenance costs. A distribution hub and international rail freight terminal located at Daventry is incredibly busy, with a large number of train, articulated truck and container movements in the local area. ***Nationwide Concrete Flooring*** *has been contracted, on behalf of WH Malcolm, to carry out the necessary concrete floor slab replacement and removal works, in extremely difficult and awkward conditions.* ***Jon Wilcox*** *reports.*

Nationwide operatives arriving on-site.

Reach-stacking forklifts capable of carrying 40-tonne containers are constantly trafficking the working platform and due to the ongoing workload of the busy distribution company the operation is completely 24/7.

Nationwide Concrete Flooring adopted the design philosophy of the consulting engineer, The Sprigg Little Partnership. This well-established engineering practice is experienced in the provision of a quality concrete floor repair, with the repairs being designed as the works progressed, by Allan Bamforth, the company's production director.

Two layers of steel fabric reinforcement, instead of one layer, were catered for within every repair to add further robustness to the concrete slab replacement.

Due to the approximate 380mm depths of the reinstated concrete, it was considered that the design would benefit by installing resin anchored dowel bars staggered in both the top and bottom of the existing concrete slabs at 300 centres, instead of every 300mm in plane, to ensure the full-load transfer of the floor slab. This has worked in the past on previous repair projects and hence has become a preferred option on deep slabs.

Ready-mixed concrete with a silica fume addition was placed, compacted and finished by Nationwide Concrete Flooring. The addition of silica fume to concrete has been ongoing for many years to benefit both long- and short-term compressive strength development. At the distribution centre, sections of reinstated concrete slab are handed back to the tenant after a seven-day period. However, the concrete is designed with the supplier to achieve its target strength over a three-day period, again allowing for some comfort within the revised slab design. This approach helped ensure that the repairs had the best opportunity of surviving in extremely harsh in-service conditions.

> By recycling as works progress, truck movements on-site are kept to a minimum, thus reducing risk of accidents.

Live sites

Working at live sites is extremely tricky as the key to everything is ensuring the clients' activities are not hindered in any way. Instead of being able to work in large areas, such as constructing new warehouse floors, the rules completely change when dealing with a client's specific requirements. Most distribution centres operate every day, all day and night for the purposes of efficiency and usually work is restricted to specific areas at certain times. This puts the pressure on to ensure works are kept isolated, safe, tidy and that the project is completed on time.

During the concrete floor reinstatement process, Nationwide Concrete Flooring managed the whole process from start to finish. Supervisors and contracts managers are always on hand to alleviate any problems that might arise for the client and or end users.

The company also looks for opportunities to improve sustainability and one such investment is crushing the removed concrete on-site to prepare it for reuse.

In this regard, once the perimeter of the old slab is saw cut, a hydraulic pecker attachment is used to break the slabs into pieces small enough to fit within the concrete crushing bucket of an attachment connected to the firm's JCB excavator or 3CX back-hoe. The crushing system produces a material to an approximate grading of 75mm down to dust. This crushed concrete is generally suitable for use as the first layer of subgrade, especially in the case of the Daventry project, with laying and compacting depths of up to 500mm in places.

By recycling as works progress, truck movements on-site are kept to a minimum, thus reducing risk of accidents. This operation also ensures that works can be

Area of damaged concrete marked out prior to removal.

Kalmar lifters carrying container.

Slabs removed and stone compacted.

Silica fume concrete installed – it has a rough pan finish for durability.

carried out in controlled and restricted areas rather than planning traffic routes etc., with additional operatives within the confined areas.

When working on sites where excavated materials are to be removed, such as topsoil or clay, the company uses its own skip-loading vehicle and six skips.

The skips are loaded while the truck is tipping the material, which is used on the sites for landscaping purposes to avoid expensive landfill costs and further impact on the environment.

In-house capabilities mean that dealing direct with the client cuts out the need for surveyors, freelance advisors or main contractors. The single responsibility for all works is agreed before the breaking out of each area commences. This helps to minimise disruption during the removal and excavation process, again creating less disruption while on-site.

The benefits from this process of slab removal, material processing and replacement are obvious – to client, contractor and the environment.

The project to remove and replace existing reinforced concrete hardstandings at Daventry rail freight terminal was completed in December 2015. ■