

Recipe for concrete success

A.J. Clark Concrete Flooring Ltd was launched in 1996 and is part of the Clark Group. The company is Scotland's leading industrial floor specialist and coordinates projects of all sizes. A.J. Clark was the first Scottish Registered Company to purchase a laser screed. During 2003, A.J. Clark placed more than 80,000m³ of concrete. The company operates a programme of appropriate investment and expansion and is able to undertake projects of all types. Two examples are described in this article.

Figure 1 top: The external paving at Scottish Courage must withstand very heavy loadings during a lengthy service life.



(Photos: A.J. Clark Concrete Flooring)

Figure 2 middle: A brush finish was applied to the slab.



Figure 3 bottom: The floor for Rolls-Royce was installed using a laser-screed and dry-shake topping machine.



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Scottish Courage despatch area

Client AWG appointed A.J. Clark as specialist contractor for replacement of the despatch area at Scottish Courage's main distribution depot near Livingston, West Lothian. This two-phase contract involves removing and replacing 30,000m² of external concrete hardstanding which could not withstand warehouse trafficking.

Removal and preparation

The existing 180mm-thick concrete slab, which incorporated conventional reinforcement. This was broken out and crushed prior to removal for use as aggregate at another local site. The sub-base was also replaced prior to casting new slabs.

Concrete requirements

The client needed assurance that the replacement slab would not suffer similar failure. Great care was thus taken to achieve the required concrete quality in optimal placing conditions. Tubular steel frame covers were purchased specifically for the operation to avoid weather damage to the surface during casting of the new slab (see Figure 1). This was installed using long-strip techniques with timber formwork, square dowels and B 785 reinforcing fabric mesh. An FND2 foundation concrete mix was used and levelled using a bunion striker tube, after which a brush finish was applied (see Figure 2).

Rolls-Royce aero-engine facility

The decision by Rolls-Royce to relocate its aero-engine production to Inchinnan, near Paisley, required construction of a facility with a 50,000m² floor. Amec was appointed as main contractor on a design-and-construct basis. It enlisted the services of A.J. Clark to undertake the flooring package on a similar basis⁽¹⁾.

Design requirements

Three different design solutions were required for the floor, owing to the variable geotechnical conditions of the site:

- a pile-supported steel-fibre-reinforced 280mm-thick jointless slab with prefabricated reinforcement mats between piles

- a 200mm-thick steel-fibre-reinforced jointless ground-bearing slab on vibro-compacted areas
- a 150mm-thick steel-fibre-reinforced jointless ground-bearing slab.

The slab design had to remain sufficiently flexible to accommodate the needs of the client regarding the machinery to be installed within the facility. This often resulted in sections of slab being completely isolated from adjacent areas to eliminate vibration, either from the equipment or other pieces of plant.

Construction

The slab was installed using a laser screed and dry-shake topping machine over a three-month period. Altogether, 10,000m³ were used, the largest panels being up to 1800m² (see Figure 3). As the finished surface required a high degree of abrasion resistance, dry-shake toppings were applied. This also provided a degree of fibre suppression. The total fibre content was greater than 400,000kg, or 1.2 billion fibres. Timber formwork was used at construction joints, which incorporated Permaban steel aris strips for durability and Diamond Dowel plates to provide shear transfer across these joints.

Concluding remarks

A.J. Clark realises the need to stay aware of current requirements. This has prompted the establishment of offices in Elgin, creating a firm base from which to meet the requirements of the market in northern Scotland to supplement the well-established central base. Both these projects serve to demonstrate how difficult ground and weather conditions were overcome to produce floors that will be durable over a very long period. ■

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Reference:

1. CAMERON, G. Providing a floor slab fit for Rolls-Royce, *CONCRETE*, Vol.37, No.7, July/August 2003, p.36.