

## Project Spotlight



### ProLogis Developments Peterborough, UK

## Design and Construction of 48,384m<sup>2</sup> Steel Fibre Reinforced Concrete (SFRC) Pile Supported Ground Floor Slab for ProLogis

**ProLogis is the largest developer worldwide of industrial/distribution warehouses, building speculatively to a very high quality, retaining a long-term interest in business/distribution parks and the communities they serve. Winvic specialise in the construction of such developments and have earned an enviable reputation for delivering such schemes on time and within budget.**

This project utilises the latest advances in materials and equipment to overcome challenging site conditions, a tight programme and onerous operational requirements. The ground conditions and intensity of loading prevented the use of a ground bearing floor slab and the project team decided that a suspended ground floor slab was required.

Twintec, Winvic, the design team and piling sub contractor Stent, then undertook an integrated and detailed planning process that considered techniques and materials that could provide better performance and better value. This included options for pile type and spacing, slab thicknesses and reinforcement types; these were all reviewed until the most appropriate option was selected, 250mm sq piles @ 3.5m x 3.5m grid with 900mm pile caps.

Taking account of loadings of UDL 50 kN/m<sup>2</sup> and also 90 kN individual racking leg load, the selected design option was a steel fibre reinforced concrete (SFRC), "joint free" Freeplan S® floor slab, 250mm thick. The floor was constructed using 12,000m<sup>3</sup> of C40 grade concrete reinforced with AFT +1/60 steel fibres at a dosage rate of 45kg/m<sup>3</sup>, and finished to a flatness tolerance of FM2 Special in accordance with TR34 (2003 Edition).

The surface of the floor was finished with Twintop natural dry shake which provides the floor with a smooth and highly durable surface.

### Project Data

|                      |                                  |                    |                      |
|----------------------|----------------------------------|--------------------|----------------------|
| Application Type:    | Pile supported ground floor slab | Concrete Supplier: | Hanson               |
|                      |                                  | Fibre Type/s:      | AFT+1/60             |
|                      |                                  | Fibre Dosage:      | 45kg/m <sup>3</sup>  |
| Main Contractor:     | Winvic Construction              | Total Area:        | 48,384m <sup>2</sup> |
|                      |                                  | Slab Depth:        | 250mm                |
| Consultant Engineer: | Nolan Associates                 | Completion Date:   | September 2006       |

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A total time on site of only 6 weeks for the project was made up of 10 days preparation (sub base trimming followed by joint installation) and 21 slab casting days. Twintec Industrial Flooring is the UK's only steel fibre reinforced concrete (SFRC) specialist. Over 90% of our workload is constructed with SFRC and one third of that is suspended on piles. Twintec carries out all aspects of the work from budget proposals through to detailed design along with full supply and installation. Twintec's team is entirely "in house" and includes structural engineers with over 20 years experience of designing concrete floor slabs reinforced traditionally and with SFRC. Our preferred option is fibre only, simply supported 2 way spanning as shown below:

Working partners with:

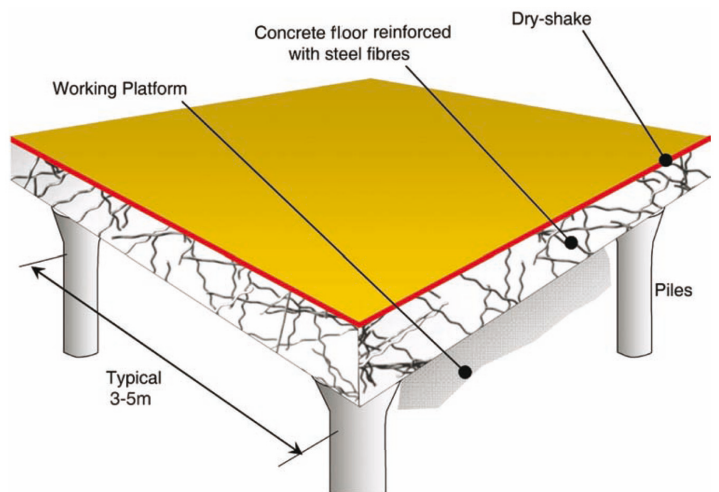
**PROPEX**  
CONCRETE SYSTEMS

### Judges comments:

"What makes the project special is the use of steel fibre concrete in a suspended slab design, with significant savings from the avoidance of conventional steel fixing. The benefits of steel fibre reinforced slabs have been proven in ground-bearing situations, offering rapid, low-cost construction. This application in suspended slab design proves the technology can also be applied successfully. The design does not require that the piles are tied to the slab, which avoids the additional congestion that this will cause."



2007 Winners  
Concrete Performance Award



The design methodology for the fibre-only systems combines the yield line theory (e.g. Johansson) together with other well established industry touchstones such as Meyerhoff and Westergaard. The designs use structural steel fibres which have both a high tensile strength (typically 1200 - 1400 N/mm<sup>2</sup>) and special profiles designed to maximise anchorage within the concrete.

This project truly showcases the perfect match SFRC is to the high demands of developers like ProLogis and the distribution centres they build.

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