

# Flying high at Heathrow's Terminal 5

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**Designed to handle 30 million passengers every year, Heathrow Terminal 5 was one of the largest construction projects in Europe, costing some £4.2 billion to build.**

ALAN BEATTIE, LYTAG

Construction on Terminal 5 brought together modern and sustainable construction techniques. Minimising the environmental impact of the new terminal was a vital component in the planning and management of the entire project and sustainability is at the very heart of this state-of-the-art building. The use of sustainable materials is one method that has helped to deliver this important element.

In the terminal buildings, a floor screed was chosen that fully embraced these credentials. Lytag is a secondary aggregate produced from pulverised fuel ash, a by-product of coal-fired power stations that would otherwise be disposed of at landfill. By processing the ash into rounded pellets and sintering (heating) to temperatures around 1100°C, a hard, honeycombed, lightweight aggregate is formed. This aggregate can be used for many applications within the construction and civil engineering industry.

Not only were the environmental aspects beneficial but specifying no-fines Lytag screed, as opposed to traditional screed, reduced the loading imposed by the screed on the upper floor by almost 50%, which was a key consideration when working over such a large area.

Lytag floor screed was chosen for both the main terminal (126,000m<sup>2</sup>) and also for the first of two smaller satellite buildings (25,000m<sup>2</sup>), the second of which will be constructed by 2011. Two different types of screed were specified: structural lightweight concrete screed for the back-of-house handling areas and no-fines screed for the main passenger facilities.

An 8:1 Lytag:cement mix was used for the no-fines screed placed on the upper floor, which is the main passenger departure area. Vetter (UK) laid the no-fines mix in the main passenger areas of the terminal using a compressed air system, which allowed the contractors to move the screed across the floor area. The screed was laid onto the structural slab, to a thickness of 85mm with a 20mm topping of cement:sand screed, with terrazzo ceramic tiles then laid on top.

In the back-of-house handling areas the structural screed was the final finish for the floor. Therefore, it needed to have the structural integrity to be able to ensure that regular vehicle traffic could be accommodated without damage to the surface. Lytag lightweight concrete offered the same structural properties as traditional concrete but, being 25% lighter, reduced the loading within the building structure. The concrete screed was pumped into place and finished by powerfloating. Both the no-fines and concrete screeds were supplied ready-mixed by London Concrete's Heathrow plant.

Lytag floor screeds meet the requirements of the UK Code of Practice BS 8204-1<sup>(1)</sup> and, depending upon the application, a no-fines base coat of 10:1, 8:1 or 6:1 by volume can be used. This base coat can be bonded to a concrete sub-base, unbonded or floating over an insulation

**Figure 1 below: Lytag no-fines screed being pumped into place.**

**Figure 2 below right: Strip of placed Lytag no-fines screed.**

(Photos: Lytag Ltd.)





Figure 3: Upper floor of T5 during construction.

layer. The material can be laid in deep sections and is easily formed to falls. The free passage of air through the no-fines base coat can improve drying rates over comparable thickness cement:sand screed. Low shrinkage characteristics of around 0.04% and a thermal conductivity ( $\lambda$ ) value that is three to four times lower than traditional screeds both add to the benefits of lightweight no-fines screeds. Depending on the covering to be laid onto the screed, a thin topping of 15–20mm of cement:sand can be applied the following day, to provide a smooth finished surface to lay carpet or vinyl for example. Alternatively, paving can be laid on a mortar bed applied directly to the no-fines screed.

### Concluding remarks

This was the first time that Peter McColm, T5 project manager at Vetter (UK), had used Lytag floor screed. He comments, “There is always a learning curve when using new materials; however, Lytag floor screed turned out to do exactly the job we were looking for. After some initial experimenting in pumping the no-fines screed, in the quantities required to progress the contract, we ended up using a Putzmeister compressed air screed pump. We were also impressed with how well the structural concrete screed pumped and the quality of the finish achieved. We power-floated the lightweight concrete and although we were warned we may get the lighter material ‘floating’ to the top, the mix was perfect.

“For us, the contractor, it was more important to procure a product that we were confident would deliver a high-quality finish. This product achieved this; the fact that it is sustainable is an added bonus. Sustainable construction is becoming increasingly important to our clients and to have a product that achieves on both levels is excellent.” ■

### Reference:

1. BRITISH STANDARDS INSTITUTION, BS 8204. *Screeds, bases and in situ floorings. Part 1 – Concrete bases and cement sand levelling screeds to receive floorings. Code of Practice*, BSI, 2003.