

# Dock leveller innovation

*“As well as precision, the other guiding principles should be simplicity of detail and minimising the amount of movement at the critical locations.”*

**In modern warehouses one of the most highly trafficked and most critical areas is the interface between the general free movement area and the dock levellers, ie, the transition from the floor to the mechanical dock leveller. The purpose of this article is to describe some experiences and observations on the use of precast dock leveller pits/walls.**

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The Concrete Advisory Service has for many years pointed out that the most vulnerable parts of power-floated concrete floors are the formed joints. These joints are also generally constructed as free contraction joints, which make them even more likely to be damaged. The use of AlphaJoint in these locations (providing arris edge armouring with dowels permitting movement in two directions) has greatly improved the performance of these details.

In heavy-duty concrete floors, future wear and tear can be minimised by constructing the floor and especially the detail items to a degree of precision. Using a precast concrete pit/wall with steel channel cast into the top will allow the items to be factory controlled to the required accuracy.

As well as precision, the other guiding principles

should be simplicity of detail and minimising the amount of movement at the critical locations.

If the back wall of the dock leveller pit is plain and vertical it can have Diamond Dowel Sleeves cast-in for load transfer (where so required by the design). The need for arris edge protection would only be on the back wall, ie, the area where traffic will be passing over it.

The wider the joint between the dock leveller and the floor, the greater the potential for damage to both the floor and the goods being carried. Hence (see Figures 1 and 2) it is helpful to locate the AlphaJoint nearby. In the four year old, very busy warehouse floor shown, the adjacent AlphaJoint ensured that the gap between the pit wall and the Strip Joint (caused by normal shrinkage contraction) has only opened 2–3mm. Note also that there is no arris protection on the pit side walls and there is a saw cut between the corners.

The arris protection is provided by Strip Joint Single. This is a 10mm x 50mm strip, which is produced to the necessary precision and secured in the concrete with locating Nelson Pins.

Regarding load transfer, the best solution is to use cast-in dowel sleeves. Alpha Dowels should be used if the joint opening will be more than 10mm. However, the use of a nearby AlphaJoint is recommended to keep the joint opening to a minimum and hence the Diamond Dowel would be suitable. This type of dowel accommodates movement in two directions. The sleeves are cast-in flush, which avoids damage in transit and means the pit wall is a flat surface allowing proper compaction of the sub-base right up to the

(Photos: Permaban.)



**Figure 1 above: Precast dock leveller after four years in a busy distribution centre. Note the AlphaJoint approximately 1.5m away.**

**Figure 2 above centre: Close-up of transition from floor to dock in Figure 1.**

**Figure 3 above right: Precast dock leveller pit with Strip Joint for casting into floor edge.**

**Figure 4 left: Precast back wall for dock leveller pit.**

**Figure 5 far left: Top of wall in Figure 4 with the mechanical part welded at centres to the top of the wall.**



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Figure 6 above: As Figure 5 with Strip Joint ready to be cast into the floor edge.

wall. The Diamond Dowel plates are then inserted before the floor laying.

Another option if load transfer is required might be to form the precast element with a shelf as in Figure 3. Permaban does not favour the use of arris protection for the sides of the pit as shown in the photograph and of course the steel bolts would need to be replaced with nylon bolts before casting the concrete or else the free movement will be prevented.

Figures 4–7 show a precast wall being used with deep fill behind and, in this case, no specific load transfer. The same principles are followed in that the wall is capped with steel channel and the concrete is cast with Strip Joint Single protecting the concrete arris. The reason the pit wall is cast with a steel top is to allow the dock leveller mechanism to be welded to it. The fact that this steel top also protects the precast wall is a happy consequence, although there have been cases where, sadly, the steel was designed to cover only half of the pit wall top.

**Concluding remarks**

To carry out this work with precast units requires early planning, design and order-

ing of the items but the detail where it suits has shown itself to be simple, clear and effective. ■



Figure 7 below: As Figure 5 after casting. The joint between floor and dock leveller has opened and is protected by Strip Joint.

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