

# Undervalued and under your feet

Floors tend to be taken for granted and get little or no attention unless there is a major fault staring the owner or tenant in the face. What is perhaps not well understood is the part played by the floor in the overall efficiency and safety of a warehouse. Tony Hulett explains.

**T**HERE are high productivity floors and poor productivity floors and, of course, many shades of grey in between. The worst floors will probably get noticed, for example, if there is a truck collision with the racking. However, many users probably just put up with mediocre or average floors unaware that they are inefficient – that is slow.

As in all business, the key to success is productivity. Warehouse productivity, measured in pallet throughput, is highly dependent on the operating speed of the stackers and order picking trucks. These in turn depend on the floor for speedy operation, particularly in narrow aisles with very high racks.

What makes a productive floor? Two elements: the condition of the joints, and the flatness.

## Joints

A necessary evil in concrete floors is joints. There is a limit on the amount of floor that can be laid at any one session and although concrete is an excellent material it shrinks as it dries out. Drying out is not to be confused with the hardening of the newly laid concrete which is a chemical process.

The drying that causes shrinkage is the loss of water from the floor to the atmosphere. The rate at which this happens depends on many factors but it is generally recognised that it takes up to two years in a typical warehouse environment. If the floor cannot shrink away from its joints then the floor will crack.

There are a number of types of joints for different purposes that would take too long to describe here. However, it is just worth mentioning that we do not have EXPANSION joints in warehouses as floors shrink but never get any bigger than the day they were constructed.

Joints slow trucks down either by being too wide, being irregular (having a step) or by being damaged and left un-repaired. Floors also sometimes curl at joints causing an “up and over motion” resulting in the operator slowing the truck.

Joints must therefore be considered in throughput deliberations. They need to be of the right type for the operations in the warehouse. For example, the requirements in large open

areas are different to those in very narrow aisles. Pallet trucks have small hard wheels that make much greater demands on joints than do counterbalanced trucks or very narrow aisle (VNA) stacker trucks.

Having selected the most appropriate joint type and layout, they then need to be maintained, remembering that the floor and its joint widths will change over the first two years as the concrete dries out.

## Measurements

Warehouse operators will readily appreciate that flatness is the key element in pallet throughput in very narrow aisles. What is perhaps not so well recognised is that the tolerances required are tight. These are built into the

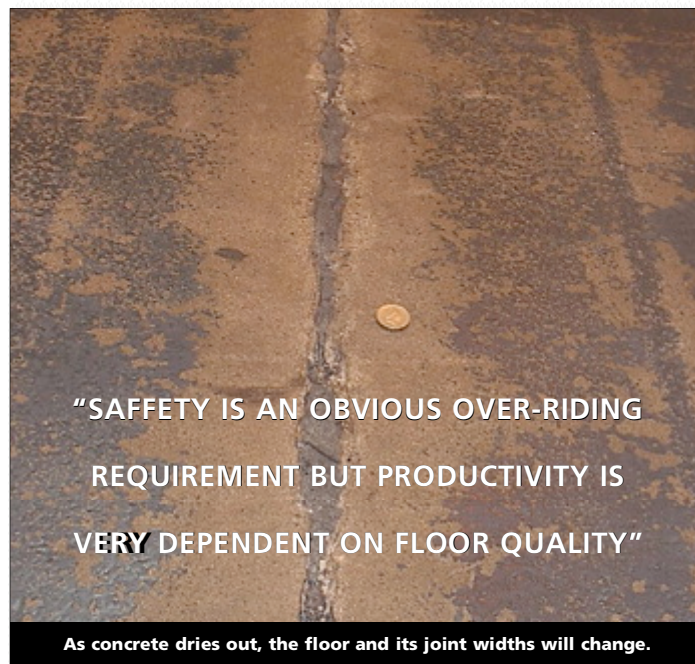
standards for floors, most notably the Concrete Society Report TR34, Concrete Industrial Ground Floors. What may also come as a surprise is the fact that not all of the obvious measurements of the floor are taken into account.

For a typical 1.5m wide truck operating up to a height of 13m the cross aisle level difference must be no more than 2.5mm. At the top of the mast, this equates to a sideways tilt of 22mm when the truck is still. When it is moving, the sideways tilt can be much greater, depending on the stiffness of the mast.

Such small tolerances will probably surprise the reader, as even 5mm over an aisle width of 1.5m sounds so small and could certainly not be seen by the naked eye, but the fact is that every millimetre counts – against throughput.

The other surprise is that we do not in the UK routinely measure and control the tilt of the truck from front to rear, although this is now beginning to change. There are only three internationally established floor survey methods as standards, in the US, Germany and the UK. And the UK is the odd one out in this regard.

Simple geometry dictates that if the “up and over” scenario described above is to be dealt with, then a front to back control is required. This requirement is met by adopting the Appendix C survey method in the latest edition of TR34. Appendix C does NOT tighten tolerances but it does introduce a control over this



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◀ additional important dimension.

### Productivity

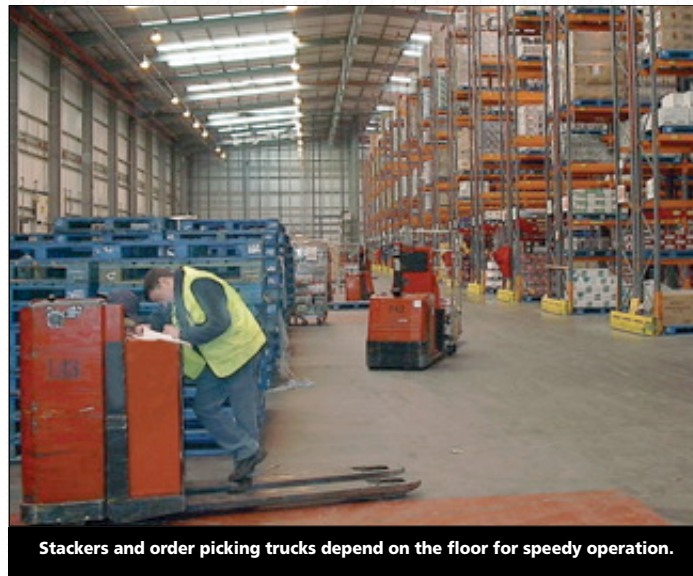
How do you know if your floor is productive? You may have obvious slow areas and possibly dangerous occurrences such as collisions with the racking, but it is the not so obvious that merits your attention if you are to raise productivity.

First of all, talk to your truck provider and ask if the trucks are running at their full design speed. This is really important as there is a fair amount of anecdotal evidence indicating that truck speeds are lowered to accommodate inadequacies in floors, perhaps without the knowledge of the warehouse management.

If the truck speed investigation suggests that there is scope for productivity improvements, then the next step is to have the floor surveyed. All floors built over about the past 15 years should have been surveyed soon after construction, so it makes sense to get hold of that survey report.

The survey will be of one of two types. Firstly, Free Movement floors intended for generally low level use and denoted by FM1, FM2 or FM3. These floors are not intended for very narrow aisle use. If your floor was built to one of these specifications and is now used for VNA, then productivity is likely to be poor.

The second type is known as Defined Movement. These are



Stackers and order picking trucks depend on the floor for speedy operation.

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denoted by Superflat, Category 1 or Category 2. Unfortunately, these and the Free Movement classifications tended to get mixed up by specifiers at the time of construction, so the present owner or tenant may need some assistance in deciding “what he has got” as well as “what he should have”.

Defined Movement floors are as the name implies intended for areas where the truck movements are defined, for instance as in VNA. If you can obtain the original survey report, then this needs careful interpretation as many reports are not particularly user-friendly.

If these lines of enquiry fail then

you will need to get a new survey. This might be the best approach in any event as you really need to survey VNA to the new TR34

Appendix C survey method which, for the first time in the UK, now takes account of “nodding” effects caused by unevenness along the aisles. The Appendix C survey simulates these movements of the trucks in the very narrow aisles.

Once problem areas have been identified, remedial actions to improve joints and flatness can be considered. At this stage, the owner or tenant is faced with a relatively simple investment calculation. Do the returns in raised productivity and/or lowered operating costs justify

the investment in the required remedial measures?

### Protection

Floors are a key element in the productivity of a warehouse. They need to be taken seriously by owners and tenants. When a roof leaks, everyone knows about it. When due diligence is being exercised and schedules of dilapidations are produced, all parties expect such items to be picked up, yet floors – perhaps apart from cracks – tend to be ignored. Inefficiency may be invisible but it is just as real as the overflowing guttering!

This seems to suggest that a valid floor flatness survey should be an integral part of every property transaction, along with a full condition survey of the floor, at the sale of property and at times of lease change or renewal – productivity may depend upon it.

### Summary

Warehouse operators need to know that they have the right floor in place. Safety is an obvious over-riding requirement but productivity is very dependent on floor quality. If your business is to be competitive, then you need to be sure that the floor in your facility is as good as or better than your competitor's. ■

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