Twintec Advisory Paper 1: 21st Century Warehouses & Storage Facilities

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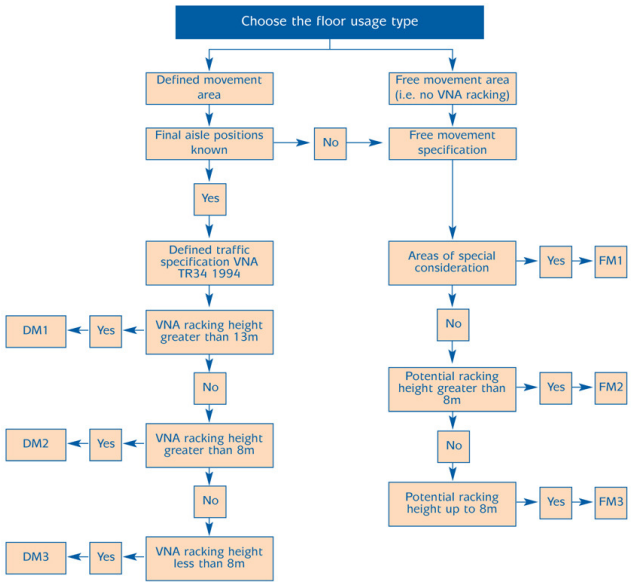
A modern 21st century warehouse is a very different place from its predecessor of the 1980s and 1990's. Developments in logistics technology and software along with advances in storage systems and mechanical handling equipment (MHE) have allowed manufacturers and distribution companies to become dramatically more efficient.

Racking systems are becoming higher, aisles narrower and automated systems commonplace, providing operators with efficient stock retrieval and faster delivery to the customer. These facilities are increasing in size in terms of footprint and height. These facilities place much greater demands on the flooring system including much more aggressive surface wear, much higher loads being imposed on the floor slab and an increase in the flatness tolerances required.

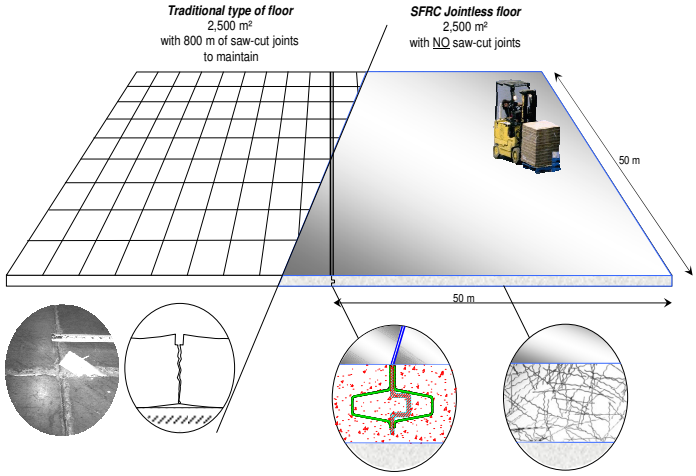


Another consideration that needs to be addressed in such a fast moving industry is 'future-proofing'. Continuing improvements in technology have led some consultants to suggest that changes to the logistics systems in a modern warehouse are needed every 5 – 10 years. This presents an additional problem for clients, tenants and third party logistics (3PL) companies and has a direct bearing on the type of floor specified and constructed in a new facility. Most of the maintenance problems in industrial concrete floors result from unevenness and disruptions of the surface, particularly at joints.

For the operator of a modern distribution facility, down time to repair the floor slab, or MHE damaged by a poor quality floor slab can be very disruptive. In addition, the curling and breakdown of sawn joints in a traditional system can cause major disruption for MHE in terms of picking speed. A further potential problem is the need to respect the designer's criteria regarding proximity of racking legs to floor joints; the more joints there are, the greater the likelihood that conflicts could arise.

Building owners are increasingly aware of such problems associated with saw-cut joints; therefore 'joint-free' industrial flooring systems such as steel fibre reinforced concrete (SFRC) are becoming more frequently specified and have proven to be a successful solution.

A SFRC 'joint-free' slab is designed to eliminate the need for saw cut induced contraction joints. The design is a well proven method with a thirty year track record. Eliminating the saw cut joints has a significant benefit to the end user in terms of increased flexibility of use, improved toughness and durability and reduced maintenance costs for both floor slab and forklifts.



Adopting a SFRC 'joint-free' system will not only minimise the problems identified above, but also improve the flexibility of the building in terms of 'future-proofing' it.

Conclusion

The quality and durability of a modern industrial floor slab is key to the success and efficiency of a modern logistics facility. UK Concrete Society Technical Report No 34 section 2.1 says that "an ideal floor would be perfectly flat and level and have no joints". This is more achievable with SFRC than with lightly reinforced floor slabs as it allows the elimination of saw-cut joints, and therefore ensures better long term flatness.

However, once building owners, consulting engineers, architects and general contractors have decided to opt for a 'joint-free' SFRC slab, they must take precautions in choosing the right specialist contractor for the job by carefully reviewing the following items:

- The contractor's track record in 'joint-free' SFRC floors
- Visit 'joint-free' reference floors and ask the opinion of their users
- Check the site quality control procedures proposed by the concrete contractor
- Ensure that adequate site conditions will be in place before, during and after the works
- Ensure early co-ordination takes place with the contractor to optimise the detailed design and particularly adjoining interfaces
- Limit the number of split responsibilities within the contract
- Be aware of and accept the possibilities of controlled cracks

If these factors are carefully considered, if the planning and design process is integrated carefully with the building and the logistics systems and if the correct contractor and supply chain is selected, then the end result will be that everyone gets exactly what is best for the project.

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