



The Value of a Warehouse Floor— Raising Flooring Standards around the Globe



An IKEA warehouse floor in Dortmund, Germany placed with the Somero® SXP® Laser Screed®

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Why flooring standards are gaining global acceptance

As companies continue to increase the distribution of their goods around the globe, the construction of large industrial warehouses with consistent flooring standards gain importance in a company's overall logistics strategy. Everything that happens in a building needs a sound platform to operate on—manufacturing, storage and distribution, or retail—the concrete floors form the base on which all activities are carried out. The scale of these facilities and the speed with which they are constructed has increased in Europe, the United States, the Middle East and Asia. At the same time, there are increasing demands for heavier and higher racking that require concrete floors with greater tolerance standards. Successfully constructed floors are the result of an integrated and detailed planning process that focuses on the needs of the user to deliver a completed project with the appropriate tolerances and quality needed. A floor constructed correctly the first time, saves time and money in the long term.

Is a quality concrete floor really so important?

The concrete floor is an essential component of your distribution centre. The roof and walls of a warehouse protect the contents from the outside elements, but the floor carries the load of the entire business operation. It is now widely acknowledged that the floor is the most important component of a distribution centre. The warehouse floor is also the base for the racking systems employed, and it is the surface on which the materials handling equipment runs. Floor quality increases in importance in direct relationship to the height of the racking that will be installed, and the sophistication of the vehicles used to handle the warehouse contents.

Materials handling equipment is used in two different areas: areas of free-movement traffic and areas of defined movement traffic—very narrow aisles (VNA). Wherever materials handling equipment is used the regularity of the floor is a critical factor in the performance of that equipment. Poor surface regularity increases the risk of collision between the truck and the racking, can cause driver fatigue and forces the vehicles to be operated at lower speeds. Stresses from surface irregularity can occur in the mast and body of the truck causing premature failure of welds and disruption of the performance of electronic components.

What happens if a warehouse floor is not level, flat and durable?

If a floor is not level and flat (smooth), racking installation is more difficult. The racking uprights will require shims, resulting in time-consuming and more costly installation. Excessive shimming can also compromise the load-bearing characteristics of the shelving units as well as make them unstable. Materials handling equipment working at high levels will be endangered by potential static lean caused by sloping or uneven floors, amplified by the height of the mast. Loading and unloading pallets at high bay level can be extremely dangerous if the conditions for static lean are present. A poorly constructed floor is likely to crack and require the suspension of the business in order to fix it.

Examples of floors done badly



Excessive joints, unexpected cracks and uneven floors are at the very least unsightly and at the worst debilitating.

Badly positioned joints or large open cracks in aisles or free movement areas can slow down materials handling equipment movement, cause unnecessary wear to tyres, wheels and bearings, and potentially cause instability with loads. Uneven floors can have the same negative effect, slowing production and adding cost.

A poorly designed and improperly constructed floor may have problems such as:

- Cracking
- Inadequate joint performance
- Low abrasion resistance
- Poor surface tolerance

Various remedies and repairs can often rectify many of these defects, but at a great cost of time and money.

How to achieve a level floor

Floor surface regularity used to be measured simply as +/- X mm in three metres. In 1994, a far more accurate and scientific approach to measuring floor tolerances of random traffic floors was introduced in the Concrete Society publication Technical Report 34. Traditional hand screed methods of construction, whether using a straightedge or vibro-strike type tool, rely heavily on the skill of the team to set accurate wet pads and follow them precisely. Even amongst the most qualified team, errors between reference points will inevitably occur. A Somero Laser Screed®, using a laser level transmitter as a point of reference to control the height of the screed head, can achieve consistently accurate and level concrete adjusted to grade.

Concrete done right saves time and money

Successful concrete floors are the result of an integrated and detailed planning process that focuses on the needs of the user to deliver a completed project with the appropriate tolerances and quality required. Part of this process involves a design brief and establishing performance-based specifications. The finished concrete slab is then tested against this specification to ensure the user that the floor will perform as designed.

A concrete floor slab should provide a flat, durable surface, capable of supporting the loads it is designed to carry. It should be custom constructed for the building's purpose—neither over nor under specified. The basic steps of the process to reduce the hidden costs of remedial and maintenance repairs include:

- The correct floor specification
- Well-prepared ground work
- Proper reinforcement
- Well-planned joints appropriately spaced
- The correct concrete mix
- A well-planned and managed site with an even flow of concrete
- Accurate placement and levelling using a combination of skill and technology
- Good finishing and joint cutting, if needed
- The appropriate time for curing the finished floor before loading
- Good quality control, testing and measurement throughout

These steps are interrelated and dependant. A performance-based specification drawn up at the very early stages of a project's development is the only way to ensure success in the process being followed and ultimately, the achievement of a quality floor fit for the purpose intended.

Placing concrete slabs correctly

Concrete floor slabs have traditionally been cast in long strips, typically 4-to-6 metres wide. These strips are laid alternatively, with infill strips being placed later. This method has several significant drawbacks—it is extremely slow, set up of formwork is critical,

the resulting floor has many formed construction joints and consequently, surface tolerances, particularly across the bays, can be inadequate. Large bay construction methods were developed to overcome these limitations. Manual hand-screeding techniques reduce the number of construction joints but highly skilled crews are required, and even then a high level of flatness is not possible.



Mechanised large bay construction using the Somero SXP® Laser Screed® allows very large areas to be cast as a single continuous pour, thereby eliminating the need for construction joints. With constant reference to a laser level, surface tolerances are optimised and are uniform in all directions. Whether in the UK, Europe or the United States, there is rarely a large industrial concrete floor being poured these days without the use

of the patented Somero Laser Screed®. Its ability to screed 4,000 square meters per day given a good concrete supply is why it has been specified for the construction of floors by Home Depot, B&Q, IKEA and others at their projects around the globe.

Environmentally friendly aspects of the Somero family of Laser Screed® equipment used in placing and finishing high quality, high tolerance concrete slabs:

- SXP® Laser Screed®—sound trap reduces excess noise; tier 3 engine reduces emissions; catalytic muffler is standard; load-sensing hydraulics for minimal engine load, fuel usage and emissions; engine is biodiesel capable.
- SXP®-D™ Laser Screed®—(all of the above, plus) auto-throttle for less fuel usage and emissions; selected engine capable of burning higher levels of biodiesel; easier-to-clean machine uses less water for cleaning.
- CopperHead® XD® 3.0 and PowerRake® 2.0—diesel engine now available; catalytic converters are an option; load-sensing hydraulics for minimal engine load, fuel usage, emissions
- STS-132—tier 3 engine reduces emissions
- Pervious Head attachment—designed head to pour environmentally friendly Pervious Concrete (Pervious concrete pavement is one of the leading materials used by the concrete industry in effecting significant “Green” industry practices and is recognized as a Best Management Practice by the U.S. Environmental Protection Agency (EPA) for providing pollution control, storm water management and sustainable development.); biodegradable release agent recommended for use with this head

Why testing concrete floors is a good idea

A lot of effort and consideration has taken place at the design stage to understand the end users requirements which results in very specific performance requirements such as flatness and abrasion resistance. Achieving these requirements is key to reducing overall operational costs for the end user. A flooring contractor that knows the floor will be tested upon completion will ensure his quality controls are in place, resulting in generally better quality all round. Testing ensures the specification has been satisfied.

How to ensure the most effective and efficient design, construction and testing of your concrete floor

There are a variety of important factors to consider when planning the construction of a warehouse as part of a supply-chain logistics strategy. The proper construction techniques for a high-quality, high-tolerance floor should be considered to be as important to the overall success of the building as its proximity to ports and transportation networks. One way to ensure that the floor of your warehouse will be the most effective for your usage is to begin the process with the counsel of experts in flooring. The concierge-approach to warehouse concrete floor design and construction offered by Construct-a-Slab integrates the expertise of four leaders in the concrete slab construction field: Somero Enterprises, Ltd.; Face Consultants, Ltd.; Permaban Ltd.; and MultiQuip (UK) Ltd. The Construct-a-Slab alliance exists to promote the building of quality concrete floors, fit-for-purpose and right the first time. More information can found at www.constructaslab.com.

Global companies insist upon high-tolerance floors

The flooring standards of Technical Report 34 have been readily accepted in the UK, and in more and more countries in Europe. The productivity and resultant floor quality obtained using Somero's patented Laser Screed® equipment has therefore become specified for the construction of many large warehouse and retail flat floors. Somero Laser Screed equipment is used for placing concrete floors in IKEA, Wal-Mart, B& Q, Tesco, and other companies that require high-tolerance floors wherever they are built around the world. Logistics warehouses share similar requirements for floors that must withstand high traffic and heavy racking usage, and Somero Laser Screed machines are used on builds in Europe for Prologis and Gazeley. Successful supply chain logistics planning should include a detailed planning process for the floor construction that focuses on the building's usage requirements. In today's economy, time and money are crucial considerations for all aspects of construction, including pouring a quality concrete floor, right the first time.

Somero Enterprises, Inc[®], sells and markets its equipment in over 60 countries including Russia, China, the Middle East and Latin America with customers in every time zone around the globe. Its SXP[™] Laser Screed[®] and CopperHead[®] XD[™] Laser Screed[®] are now specified in the construction of warehouses, retail centres, ice rinks and other commercial construction projects that require extremely flat concrete slab floors. With executive offices in Florida, USA, Somero operates a manufacturing facility in Michigan, USA, and an international sales and service office in Chesterfield, UK, answering customer service calls 24/7 on a dedicated global support line. Somero is listed on the Alternative Investment Market (AIM) on the London Stock Exchange (SOM.L.) For more information please visit www.somero.com



Somero Enterprises, Broombank Road, Chesterfield Trading Estate,
Chesterfield, Derbyshire, S41 9QJ, England

Contact: Charles Nichols, Business Development Manager

Telephone: +44 (0)78 2566 7158 **Email:** cnichols@somero.com