Steel Fibres for Slabs-on-Ground

MATRIX Steel Fibres

Concrete slabs found in commercial and industrial facilities undergo intense stresses. These stresses are a result of imposed loads and changes in concrete's volume due to temperature and restrained shrinkage. A properly designed slab must take into account dynamic and static loads, as well as flexural fatigue and impact stresses. Below are common slab designs that incorporate the use of steel fibre reinforcing.

According to the American Concrete Institute's (ACI) 360 design documents, there are six major categories of slabs-on-ground. The majority of ground supported slabs are comprised of:

- **Type "B" - Slabs reinforced for temperature and shrinkage:** According to ACI 360 2.2 *"A Slab is assumed to remain uncracked due to loads placed on its surface"* It goes on to state *"The primary purpose of the reinforcement in the type B slab is to hold tightly closed any cracks that may form between joints."*
- **Type "F" - Slabs reinforced for structural action:** "*The Type F slab is designed with the assumption that it is possible for the slab to crack under loads applied to its surface."*

The requirements of both slab types can be accommodated by utilizing MATRIX Steel Fiber Reinforcing.

The forklift is a common design criteria for slabs on ground. The most common configuration is a single or dual wheel system, with either solid or pneumatic tires. In addition to creating high tensile stresses within the slab, forklift loading can also create fatigue and impact stresses that can have damaging effects on the performance of the slab over its required design life. The use of a proper steel fiber reinforced design can promote not only the increased flexural load carrying capacity of the slab, but also the increased flexural fatigue endurance and the shear-load transfer mechanism. As the design requirements of the slab increase, the amount of steel fibre reinforcing can be increased from lower quantities that provide only temperature and shrinkage resistance to higher quantities that improve the flexural capacity and durability of the slab. The improved performance, uniform distribution, guaranteed placement and the ease of use make steel fiber "The Reinforcement of Choice" for slabs subject to forklift loads. (You can learn more about forklift and other loading conditions in our technical design

Rack post loads or point loads are very common in today's commercial and industrial warehouses. Owners are constantly trying to maximize warehouse space. Modern rack systems pose very unique loading conditions for slabs-on-grade. Loads under the posts cause positive moments in the slab while unloaded sections of the rack system may create negative moments. MATRIX Steel Fibres incorporated into the rack system design will help insure against inter-panel cracking that can cause maintenance problems for the owners and facility managers. In a high density storage facility the thickness of the slab is usually determined by the rack design. Let our staff of professionals put our computer design analysis to work for you on your next project. (Actual design criteria is discussed in detail in our technical design manual)

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On the cutting edge of growth and development, FRC Industries is an innovative part of the fibre-reinforced concrete industry. We specialize in steel fibre reinforcing in place of rebar or wire mesh for industrial and warehouse floors. In addition to steel fibres, FRC also provides synthetic fibres as well as a hybrid blend of steel & synthetic fibers to meet the needs of almost every construction slab.
FRC's long-term commitment is to provide superior concrete solutions and value engineering for our clients. Our team of professional engineers and technical salesmen possess the most technologically advanced concrete reinforcing products, design programs, and optimal mix designs available in the industry.

We offer a variety of fibre designs to meet the needs of concrete slabs-on-ground applications. These fibres provide different tensile strengths, bonding characteristics, and performance levels. Our engineers and sales team can recommend a highly cost effective and proven fibre solution for your individual project requirements.

The typical slab on ground can be subjected to various loading conditions and as a result various design stresses. ACI 360 addresses some of the loading conditions that should be considered during design: Vehicle Loads, Forklift Loads, Concentrated or Point Loads (Rack Systems), and Uniformly Distributed Loads . A properly designed steel fibre reinforced slab can effectively address stresses associated with flexural load carrying capacity, fatigue endurance, impact resistance, and shear load transfer (stress design and characteristics are discussed on the opposite page and in our technical design manual). Because the steel fibres are uniformly distributed throughout the slab, the owner, engineer, and contractor can be assured of excellent crack control. MATRIX Steel fibres will allow the use of modern finishing equipment such as laser screeds and vibratory screeds to increase the quality of the finished product. MATRIX Steel fibres can be easily pumped, placed, and finished to provide a smooth, superior slab-on-ground.

In today's construction market, owners are looking for ways to decrease costs while maintaining quality on the jobsite. FRC can provide solutions that save time, money, and give excellent results. Remember FRC on your

FRC can value engineer a project for you by using their slab-on-ground design program. This program calculates the load stresses that result from imposed loads placed on the slab. By incorporating job specific information such as concrete strength, soil conditions and joint spacing, the program provides a fibre-reinforced, value engineering solution that determines not only the stresses and concrete thickness, but also the joint stability, and safety factors. Please contact the FRC engineering team to help with your next project.

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