

Haoaixi Steel Fiber Cutting Floor Suggestions

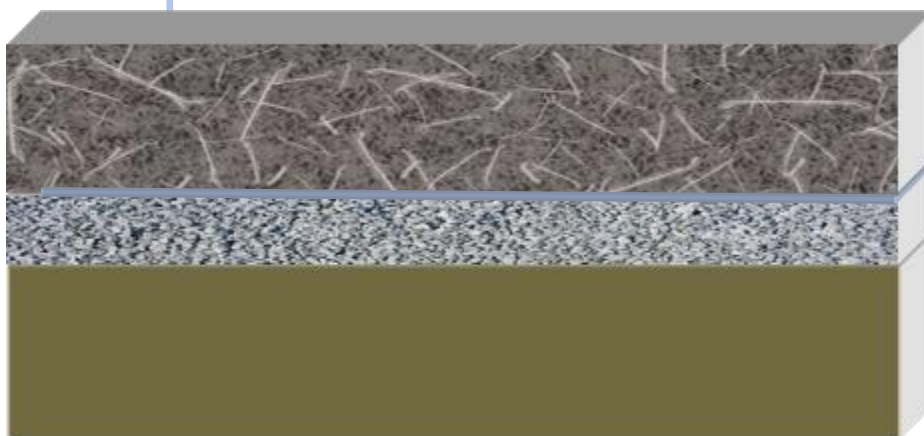
1. Steel fiber cutting floor considerations:

- (1) The uniformly distributed load is considered to be 3 tons;
- (2) The rated lifting capacity of the forklift is considered to be 3 tons;

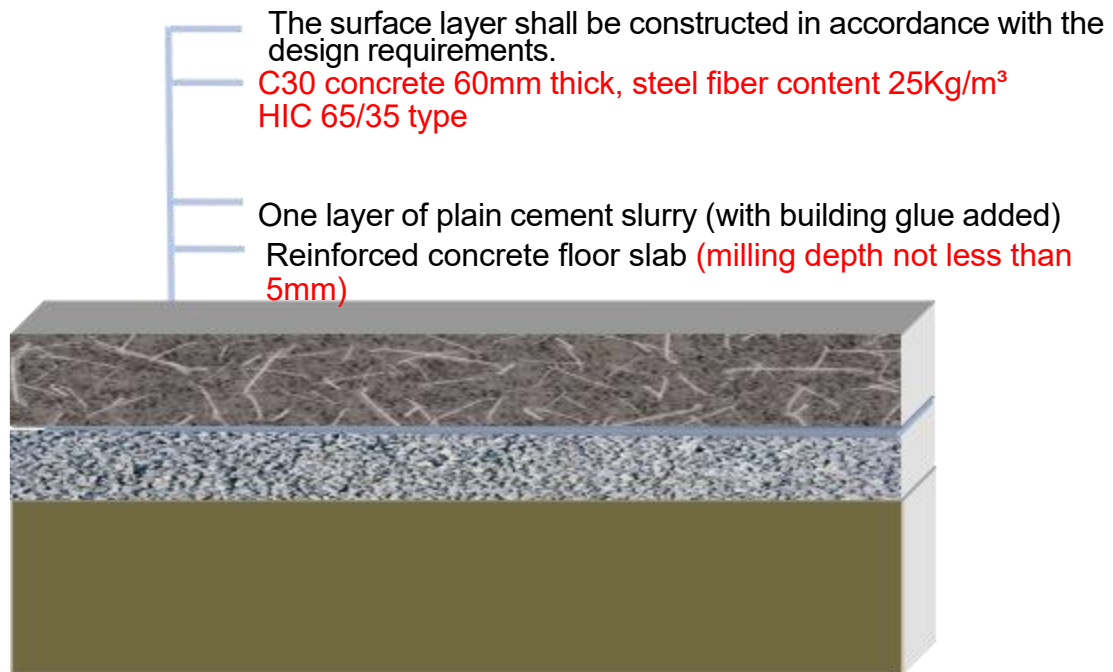
2. Floor construction method (from top to bottom according to the drawing requirements):

Ground Practice 4:

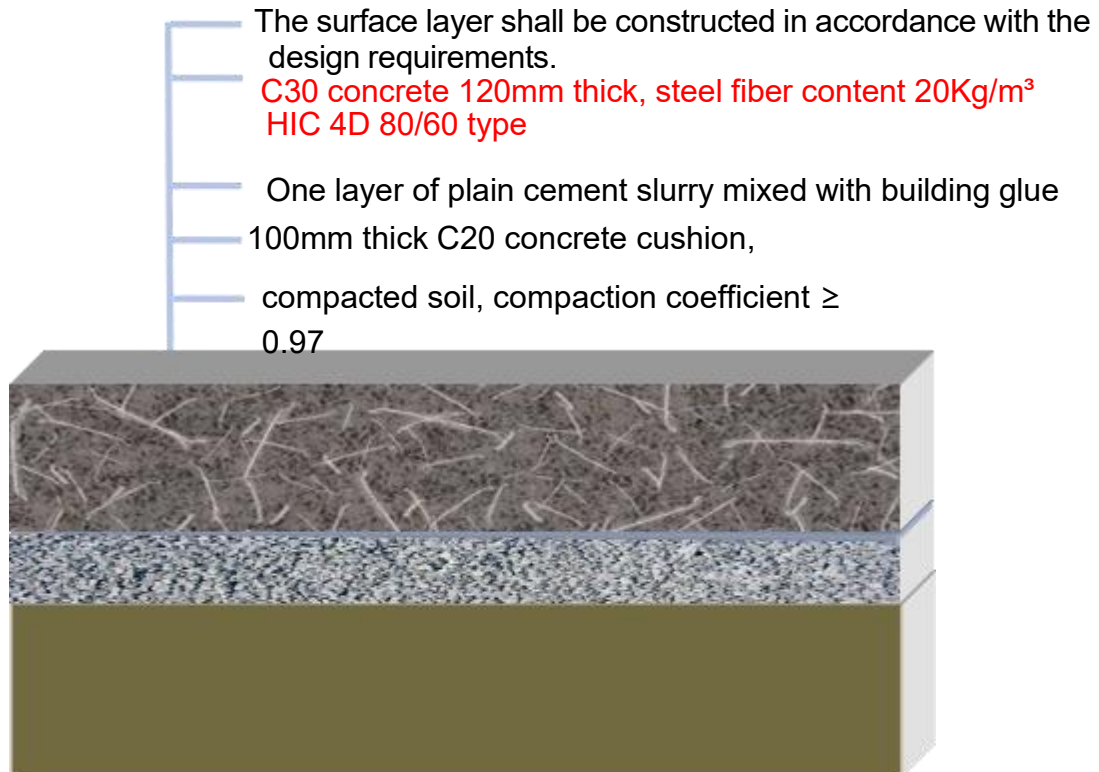
- The surface layer shall be constructed in accordance with the design requirements.
- C30 concrete 150mm thick, steel fiber content 20Kg/m³
HIC 4D 80/60 type
- 20mm thick 1:3 cement mortar protective layer
- 1.5mm thick synthetic polymer waterproof coating 2.0mm thick JS- II polymer cement-based waterproof coating 400mm up around the perimeter
- 150mm thick extruded polystyrene foam board insulation
- 1.2mm thick polyurethane vapor barrier
- The thinnest part is 20mm thick. 1:3 cement mortar slope leveling layer is smoothed.
- 150mm thick C15 concrete cushion layer is smoothed as it is poured
- 500mm thick medium sand with 250 cement ventilation pipe
- 200mm thick gravel cushion
- Compacting of bare soil, compaction coefficient ≥ 0.97



Floor method 4:



Ground Practice 5:



3. Material selection instructions for steel fiber cutting floor:

(1) Concrete slab thickness is 150/120/60mm and concrete strength is C30.

(2) Technical requirements for steel fibers:

① HIC 4D 80/60 type; length 60mm, diameter: 0.75mm, aspect ratio: 80. The steel fibers are bonded into rows with water-soluble glue, and "M"-shaped hooks are formed at both ends. The tensile strength of the steel fibers is not less than 1300Mpa, and the dosage is 20kg/m³.

② HIC 65/35 type; length 35mm, diameter: 0.55mm, aspect ratio: 65. The steel fibers are bonded into rows with water-soluble glue and hooked at both ends. The tensile strength of the steel fibers is not less than 1100Mpa, and the dosage is 25kg/m³.



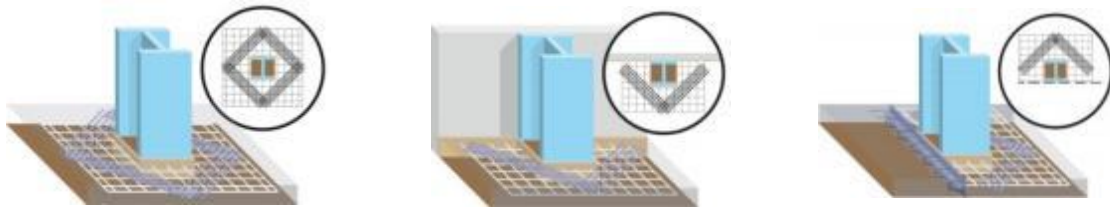
③ Steel fiber products need to pass IS9001 quality system certification.

4. Requirements for concrete mix ratio

- (1) Aggregates should be graded continuously, with the maximum particle size not exceeding 25mm. The mud content in aggregates and sand should be kept within the minimum range.
- (2) Concrete strength must reach C30.
- (3) The maximum water-cement ratio of steel fiber concrete on site should not exceed 0.55.
- (4) Fly ash and mineral powder should be avoided as much as possible.
- (5) The slump of steel fiber concrete should be 160~180mm when unloaded directly on site and 180~200mm when pumped.

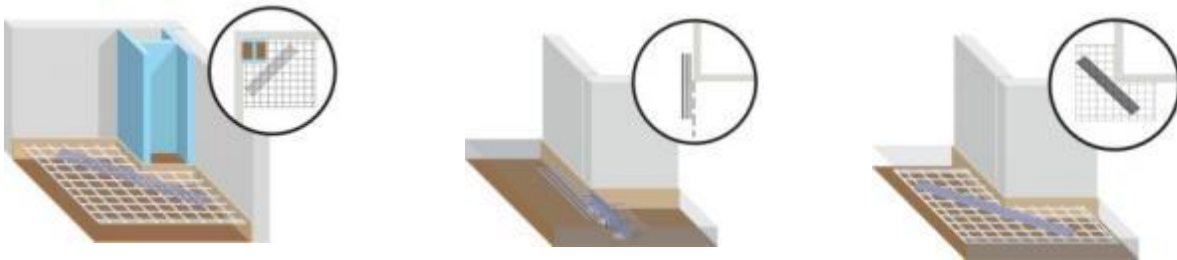
5. Construction

- (1) Construction joints: Construction joints must be set between steel fiber concrete floor compartments (strips). Dowel bars are set at the construction joints. The diameter of the dowel bars is Φ16 or Φ20, the length is 600mm, and the spacing is 300mm. There is a plastic sleeve on one side. The floor must be poured in one compartment at a time. No cold joints can appear in the middle. If the concrete pouring is interrupted, a construction joint must be set and a dowel bar must be placed. It is recommended to use prefabricated construction joints with edge protection (armored joints).



(2) Isolation joints: Extruded boards with a thickness of 10 mm are placed around the walls, columns and equipment foundations.

(3) Nodes: Additional steel bars are arranged at the corners of columns, walls and equipment foundations. The steel bars are made of $5\Phi 12@100$ steel mesh.



(4) Steel fiber placement and mixing

It is recommended that steel fiber be added at the mixing station, and the amount of each addition should be strictly measured. It should be noted that before other materials such as sand, aggregate, cement, etc. are placed in the hopper, steel fiber should not be added for mixing first. Steel fiber should be evenly placed on the coarse aggregate and can be mixed with sand, cement and aggregate in the mixing equipment. After 50 seconds of mixing, check whether the steel fiber is evenly mixed. If two steel fibers are stuck together, continue mixing until the steel fiber is completely dispersed into a single fiber.

(5) Separate bin pouring, laying, vibrating, leveling and exposed treatment of steel fiber concrete

① The floor is poured in bins or strips. The size of each bin or strip is determined by the construction unit according to the site conditions. Concrete must be poured in one bin or strip at a time, and construction joints should not be left at will. If construction joints are left, force transmission rods must be installed at the construction joints.

② It is strictly forbidden to add water on site when pouring steel fiber concrete.

③ The floor should be leveled using a vibrating leveler (vibrating beam), roller leveler or laser leveler to vibrate and compact the surface and raise the slurry.



④ The surface of steel fiber concrete needs to be polished in time, and the exposed steel fibers should be covered with slurry before the initial setting of the concrete. The best time to polish the original slurry concrete is to polish the slurry with a polishing machine: when the footprints of a normal adult wearing flat shoes are very light, and when there are almost no footprints, start grinding and polishing the slurry with a polishing machine. It is best not to bring out the steel fibers when polishing; the number of times of polishing should be sufficient, and polishing should be done after the surface has a certain hardness to avoid bringing out the steel fibers when polishing. When polishing, you can judge whether the blade is too high at a certain stage of surface hardening based on the sound of the blade rubbing on the concrete floor; the blade inclination must be corrected reasonably and timely, otherwise it will cause delamination, scratches, and exposed steel fibers.

Polishing and finishing of the surface of wear-resistant materials: The best time to polish the surface with a trowel: When the footprint of a normal adult wearing flat shoes is 3-5mm deep, start grinding and finishing with a trowel; the number of times of polishing should be sufficient, and polishing should be done after the surface has a certain hardness to avoid bringing out the steel fibers during polishing. When polishing, the sound of the blade rubbing against the concrete floor can be used to judge whether the blade is too high at a certain stage of surface hardening; the blade inclination must be corrected reasonably and promptly, otherwise it will lead to problems such as delamination, scratches and exposed steel fibers.

If there are still a small amount of steel fibers on the surface, workers should be arranged to check, pick out or cut them off in the initial stage of polishing (after the first polishing), and the concrete surface slurry should be polished and repaired during the

second polishing, so that there will be no hole work residue on the concrete surface after forming.

(6) Cutting: In principle, cutting can be done when the strength of steel fiber concrete reaches 10~15MPa. The cutting depth should not be less than 1/3 of the floor thickness, and the cutting width should be 3-5mm. The longitudinal and transverse cutting should divide the floor into a square as much as possible. If it is a rectangle, the length-to-width ratio should not exceed 1.5. The cutting time should be determined according to the actual situation on site.

6. Storage and preservation of steel fiber

Steel fiber should be moved gently and not thrown violently to prevent the fiber from breaking and scattering before feeding. Steel fiber must be stored in a dry and ventilated room and not exposed to water (rain, etc.). The bottom should be raised with wooden pallets to prevent moisture. Otherwise, the steel fiber will easily clump after being dispersed by water and the tensile strength will be significantly reduced after rusting. It is strictly forbidden to add rusted steel fiber to concrete for mixing. After unpacking the steel fiber, the loose steel fiber in the box must be used up as soon as possible. If it is not used temporarily, it should be stored carefully and not exposed to water.

7. Floor maintenance requirements

The floor must be poured 28 days before the design load can be applied. During this period, the concrete must be cured. Plastic film should be laid on the floor surface and water should be sprinkled continuously to keep the floor surface moist for 14 days.

8. Construction environment requirements

Sunlight exposure (especially high temperature in summer) or strong ventilation will cause excessive water loss of concrete and fail to reach the design strength or even crack (cracking). The large temperature difference between day and night is not conducive to the development of concrete strength. In addition, before the concrete reaches the initial setting, rain will damage the concrete surface on the poured ground. It is recommended that concrete construction should be carried out in an environment with closed surroundings (roof and wall construction completed).

9. Other matters not covered shall be implemented in accordance with the specifications in combination with the actual project.