Placing and Finishing Flatwork

FLATWORK FINISHING

Once freshly mixed concrete is cast into a desired form; it takes a skilled flatwork finisher to provide a surface finish with desired smoothness or texture to provide a durable concrete slab. The function of the concrete determines the type of finish the concrete flatwork will receive. The concrete may receive decorative, textured, or burnished flatwork finish. Interior concrete flatwork, like warehouse floors, may need to have a tight tolerance on floor flatness and levelness. Most exterior concrete typically only needs a textured surface to provide a slip resistance. It is up to the finishing foreman to be familiar with specifications or contractor's requirements for concrete finishing procedures.
There are many stages in producing a high quality concrete slab-on-ground.

The following steps must be timed properly to achieve a high quality finish:

- ▪Placement or Casting
- ▪Consolidation (by vibration)
- ▪Screeding or Strike-off
- ▪Bull-floating, Darbying, Straight edging
- ▪Wait Period (remove bleed water)
- ▪Edging and Jointing
- ▪Float-Wait-Trowel (hand or power)
- ▪Curing

PLACEMENT

When placing concrete several factors should be considered, like:

- -Rate of concrete delivery and finishing
- -Proper tools to minimize segregation
- -Requirement for floor flatness/levelness
- -Weather conditions
- -Grade requirements
- -Reinforcement and joint layout

All excavation and site preparation should be done prior to concrete delivery. Placement should be as close to the final destination as possible. If floor levelness is a critical property to achieve then use rigid formwork like temporary pipe or rail screed guides. If there are fairly large tolerances for flatness and levelness then a wet screed is acceptable. Never use garden rakes to spread concrete due to risk of segregation. Use comealongs and square-nose shovels to spread concrete. Make sure the rate of finishing and concrete delivery rate is matched to maximize the quality of the finished concrete.

CONSOLIDATION

All concrete requires consolidation before or during screeding or strike-off to remove entrapped air in the fresh plastic concrete. Entrapped air can rise to the surface with bleed water after sealing the surface increasing the risk of blisters and delamination formation. Consolidation can be accomplished with a vibratory screed or internal vibrators. When using internal vibrators the concrete should never be pushed horizontally with the vibrating head. Always insert vibrators vertically into the fresh concrete to prevent segregation of the paste from the aggregate.

SCREEDING OR STRIKE-OFF

Screeding is the removal of excess concrete with a straightedge to a predetermined height or grade. The screeding is usually done to the level of the rigid formwork or adjacent hardened concrete. Make sure the concrete head is above the straightedge to fill in low spots. This stage of finishing has the greatest impact on floor levelness. When using vibrating screeds move the screed as rapidly as possible to achieve proper consolidation to prevent too much mortar being brought to the surface in normal weight concrete or too much aggregate for lightweight concrete.

BULLFLOATING OR DARBYING

This step involves smoothing out high and low spots with a bullfloat or darby. This should be done with the float surface kept as flat as possible to prevent sealing the surface. A sealed surface increases the likelihood that bleed water and air bubbles will be trapped at the surface causing delamination. Be sure to complete the process of bullfloating or darbying before the bleed water rises to the surface. Use a highway straightedge for very flat surface requirements.

EDGING AND JOINTING

Edging at the edge forms allows the corners of the slab to be rounded to a neat radius to prevent chipping and providing durable round edges. When jointing with a groover, the depth of the formed and all contraction joint should be at least ¼ the concrete slab depth to provide a weakened place where cracks form drying shrinkage can form under the straight joint and not randomly cracked on the surface.

WAIT PERIOD

Wait for the concrete to finish bleeding, remove all bleed water with a squeegee or by dragging a rubber hose over the surface before continuing finishing operations. Never finish bleed water into the surface or dusting, scaling, and crazing surface defects will occur. Do not sprinkle water on a dry surface to aid finishing or shake cement powder on the surface to absorb bleed water. This is poor flatwork finishing practice. Wait until the concrete stiffens and no more than a ¼ inch indention is left by walking on the concrete surface. This indicates time for final floating and /or troweling procedures.

FLOAT-WAIT-TROWEL

Once the concrete stiffens, float the surface to embed larger aggregates, level and smooth the surface in preparation for troweling or texturing. After properly floating the surface, wait for the concrete to stiffen a little more, then trowel the surface (if required) by hand or power trowel to the appropriate smoothness. Repeated passes with a steel trowel will produce a very slick finish that may be a falling hazard when wet. For this reason, a rough broom texture may be necessary for exterior concrete. Never trowel air entrained concrete because this removes needed entrained air at the surface reducing freeze-thaw durability.

CURING

Factors impacting curing are time, concrete temperature, and moisture content. Curing involves retaining moisture for a period of seven days and concrete temperature of at least 50^{o}Fahrenheit. Allowing concrete to dry for the first seven days will cause low strength and durability.

Additional Questions?

Contact:
Nick Gallagher
South Ready Mix
641-522-9206