

CTU Online Anytime Module 1.3 – The Nature of Concrete

Key Takeaways

- **Concrete Curing**
 - Concrete is cost effective and readily available but typically needs surface preparation.
 - It is said there are two types of concrete: already cracked and going to crack.
 - A concrete slab acts like a sponge; flat when wet and contracts and curl as it dries.
 - Approximately 35% of the water used in concrete is used for hydration, while the remaining 65% deemed “water of convenience” is evaporated. This evaporation can lead to shrinkage.
 - As concrete cures, slab movement is greatest in the first 12-18 months. Crack isolation membranes help to manage this movement and protect the tile assembly.
- **Flat vs. Level**
 - When it comes to flat versus level, flat is the primary goal. However, levelness may be included in the specifications.
 - Flatness is defined by ASTM E1155 and ACI 117. F numbers indicate flatness on day one.
 - The concrete industry uses F-numbers to qualify flatness, while the tile industry uses a 10-foot straight edge.
 - Concrete contractor executes flatness during finishing stage on day one.
 - Once concrete is placed and begins to cure, it experiences mass change
 - Flatness requirements depend on tile size, according to ANSI 108.02.4.1.4.3.1 Sub-floor surfaces
 - Traditional tile (all edges shorter than 15 inches) maximum variation allowed:
 - $\leq 1/4''$ in 10 feet
 - $\leq 1/16''$ in 1 foot
 - Large format tile (any edge longer than 15 inches) maximum variation allowed:
 - $\leq 1/8''$ in 10 feet
 - $\leq 1/16''$ in 2 feet
 - Estimated Ff number versus straight edge measurements

F-Number	Gap Under 10' straight edge
12	1/2"
20	5/16"
25	1/4"
32	3/16"
50	1/8"

- It is important to note that surface prep is usually required to meet standards.
- **Division 3 vs. Division 9**
 - Concrete contractors are responsible for meeting the floor flatness requirements of Division 3.
 - Tile contractors are responsible for meeting the floor flatness requirements of Division 9.
 - ASCC Position Statement #6 recognizes the differences between Division 3 and Division 9 and recommends owners provide bid allowance to meet Division 9 requirements.