Controlling Cracks

When it comes to concrete, random cracking is unsightly. But, due to the fact that concrete shrinks, it is going to crack. Our best defense for concrete cracking is to try to control where the cracks occur.

Cracks will appear at any time and place where the stress within the concrete to pull apart exceeds the strength of the concrete to hold itself together. Concrete will shrink at a rate of approximately 1/8 inch per 20 feet, and while it shrinks it will crack randomly. We can control this random cracking by pre-determined location of joints in the concrete.

Some forms of joints are:

1. **ISOLATION JOINTS** (also called expansion joints) – These are placed wherever complete separation between the floor and adjoining concrete is needed to allow them to move independently without damage. These isolation joints are often made with an asphalt-based cork-like material.

2. **CONSTRUCTION JOINTS** – These are placed in a slab where concrete operations are concluded for the day. However, if the concrete operation is interrupted long enough that a cold joint may appear, you should install a construction joint regardless of planned joint layout.

3. **CONTROL JOINTS** (also called contraction joints) – These are intended to create straight lines of weakness in the concrete that the cracks will occur along. They should be created to a depth of ***one forth the slab's thickness*** with a maximum joint spacing of 24 to 36 times the thickness of the slab.

Examples:

Slab thickness (in.)	For aggregate less than 3/4 in.	For aggregate 3/4 in. and larger	For slumps less than 4"
4	8 feet	10 feet	12 feet
5	10 feet	13 feet	15 feet
6	12 feet	15 feet	18 feet

Control Joints can be formed with a jointer, also called a groover. They have a cutting edge or bit that makes narrow grooves in the slab. For a 4-inch slab the depth of the cutting edge should be one inch, for a 6-inch slab the edge depth should be 1.5 in, and for an 8-inch slab the edge depth should be 2 inches. The radius at the top of the groove should be 1/8 in. for floors and 1/4 to 1/2 in. for sidewalks, driveways or patios. Shallow groover tools should only be used for decorative applications.

4. **SAW JOINTS** – These are control joints that are sawed in, straight as possible, clean lines about 1/4 the thickness of the slab. Sawing should be done as soon as the concrete is strong enough to resist tearing or other damage by the saw blade. A slight raveling of the sawed edge is acceptable. It is important not to delay sawing too long because the concrete may crack before it is sawed, or it will crack ahead of the saw blade. Saw joints are usually preferred over joints with a groover tool on floors that will carry forklift traffic or other industrial vehicles.

Cracks in concrete cannot be entirely prevented, but they can be minimized and controlled with properly designed joints.