

## TECHNICAL TOPIC:

# Concrete Blow-Up

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### **BOTTOMLINE:**

*Other terms for concrete blow-up include: buckling and tenting. Although the concrete doesn't actually explode and blow-up, the pavement does lift (buckles or tents) up off of the subgrade. The cause is due to thermal expansion, although it alone is not culprit.*

When concrete hardens and dries we expect to see a shrinkage amount of about 1/16" for every 10' in length. We also see thermal movement from the cold of the winter to the heat of the summer of about half that amount. Ideally, these values would indicate since shrinkage is more than thermal movement there should never be a problem like "blow-up". But, unfortunately we do see them...as an upward dislocation/buckling of the slab...usually located on both sides of a control joint. Concrete usually will "blow-up" during hot weather when it is at its' largest thermal size.

### **What Happens Is:**

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- After placement the concrete dries and shrinks.
- The concrete cracks at the installed control joints, just as it is intended to do.
- If joints are spaced too far apart, we usually see random cracking as well.
- During the cold weather the joints / cracks are at their widest, as the overall concrete is at its' smallest thermal size.
- Over the course of time, these joints can get filled with incompressible material such as sand or dirt.
- When the concrete expands during the hot weather, there is insufficient room in the joints to accommodate the lateral expansion.

"Blow-up" can be prevented by providing contraction joints at regular spaced intervals. Generally speaking, for a 4" slab thickness, these joints should be spaced at 10' intervals. The joints should be sealed with an effective flexible sealant which will reject the intrusion of sand, etc.'

To repair concrete that has "blown-up", the damaged section must be removed and replaced with new concrete. Install functioning, sealed, expansion joints at the repaired area.

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Figure 1. This slab has "blown up" about 5"

Figure 2. The long, thin, ribboned driveway is where the blow-up from Figure 1 above occurred. The actual location was about mid length in the driveway.



Figure 3. Blow-ups can also occur in curbing.

On this project, the catch basin in the lower right of the photo acted as an "anchor" or immovable feature... not allowing for expansion. Of course, the several hundred feet of curbing with inadequate jointing was a contributor as well.

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Curbing from figure 3

Figure 5.  
Severe blow-up.



Figure 6: Blow-up from figure 5 above.  
Also known as "buckling" and "tenting".