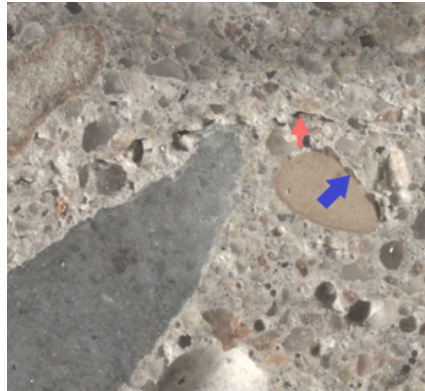




**Figure 1**  
*Top surface of a fragment removed from a warehouse slab that is delaminating*



**Figure 2**  
*Cut, polished cross sections of the delaminating concrete slab*

## Concrete Delamination

### Determining cause of concrete delamination

A concrete petrographic examination can determine the cause of delamination of a hard-troweled concrete surface. Hard trowel finishing densifies the surface layer, resulting in a hard, smooth surface for warehouse concrete slabs. Delamination can be the result of finishing the concrete early before bleeding is complete or hard-troweling air-entrained concrete. It is important to include the surface in a sample that is submitted to determine the cause of delamination. The fragment in Figure 1 was removed from a delaminating hard-troweled concrete slab in a warehouse.

### Observations that concrete was finished early

One of the features observed in a petrographic examination that indicate the concrete was finished early is the presence of bleed water voids. They are often observed along aggregate margins (blue arrow) and can be trapped just below the densified surface layer (red arrows), causing a plane of weakness where delamination is more likely to occur (Figure 2).