

## ***Rethinking Effects of Time and Construction Procedures on Compliance with Construction Tolerances***

Most contractors are aware of the criteria established by ACI 117-15 “Specifications for Tolerances for Concrete Materials and Construction” for measuring floor surfaces “within 72 hours after completion of slab concrete finishing operations and before removal of any supporting shores.” The criteria apply for slabs measured by both the F-Number System and the gap under a straightedge methodology. These two requirements were established because the floor surface profile changes with time due to either concrete shrinkage or deflection. And we recognize that the contractor is not responsible for these two issues.

If that is all true, and we agree with the concepts, why do we blame the contractor for the following?

- Drainage issues that occur years after the building is open
- ADA slope non-compliance when the ramp is measured months after construction, at substantial completion, or later
- Retaining walls moving after the wall is backfilled
- Floor elevation changes after the surface has deflected
- Movement of perimeter building elements after post-tensioning

Aren't these all examples of the same issue supported by the 72-hour time limit and the construction procedure requirement of measuring before removal of any supporting shores? **If the surface profiles of slabs on ground and suspended slabs can change with time, why do we not expect ramp and drainage slopes not to change more than 72 hours after construction?** If deflection affects the floor flatness and levelness and must be measured within 72 hours, why can the contractor be held responsible for changes in surface elevations years after construction? Finally, if we know retaining walls rotate and deflect after backfilling, and that building elements move after post-tensioning, why do we not acknowledge in ACI 117 that such movements have an influence on location tolerances?

These questions were all posed at the ACI Convention in Denver at a presentation I made during a session sponsored by the ACI 117 Tolerances and ACI 435 Deflections Committees. Unfortunately, contractors are blamed for these issues and we don't have any criteria in ACI 117 to indicate that out-of-tolerance conditions measured perhaps months or years after construction are often not the fault of the contractor. Yet I have seen attempts made to show that a concrete contractor had not complied with the contract requirements because measurements showed members in a 17-year-old building to be out of tolerance. Seems a bit unreasonable, eh?

Currently there is only one limit on construction procedure in ACI 117 for making measurements to determine compliance with tolerance requirements—the requirement for measuring floor flatness and levelness before removing any supporting shores. It would be appropriate to apply that same limit before measuring floor elevation, but ACI 117 doesn't do that. Other construction procedures that can affect compliance with tolerance requirements include backfilling walls or post-tensioning operations that can change the location of constructed concrete elements. Again ACI 117 doesn't address the effects of these procedures.

**We need to start rethinking the effects of time and construction procedures on when tolerance compliance should be determined. At the ACI Convention in Denver, I presented issues I have been challenged with over the years. I think there are many more of these situations and would like to hear from contractors who have faced tolerance issues related to time or subsequent construction procedures. Call, email, or see me at World of Concrete and let's discuss this important issue.**