

### CONCLUSIONS

The conclusion of the study is that movement in plastic concrete before initial set can cause cracks in concrete. A deflection (as could be encountered during bridge construction) will cause cracking in concrete generally at a concrete setting penetration of between 200 and 300 psi (500 psi is initial set of concrete).

### RECOMMENDATIONS

Based on the study the following changes are recommended for bridge construction:

1. Iowa DOT Office of Materials Instructional Memorandum 403, "Inspection and Acceptance of Air Entraining, Retarding, and Water Reducing Admixtures for PC Concrete" should be revised to include a working limit. That limit should be set at 200 psi as measured by AASHTO T197. Figure 3 shows the time to 200 psi penetration resistance for each retarder and the time to initial set listed in I.M. 403 for each retarder.