



## Structural Crack Repairs; Waterproofing – Chemical Grouting

Chemical grouting generally involves injection of epoxy or urethane resins into cracks or voids that are within, through or behind (or under) a structure or construction. In general, epoxy injection is used for structural repairs, actually gluing back together concrete or wood which has separated. Urethane injection may be appropriate for filling cracks or voids that are non-structural, often allowing water leakage.

There are some exceptions to these generalizations of use, where each may be used where the other is normally placed, but those exceptions few.

Understanding of construction, especially the construction of a problem structure, is critical to successful rehabilitation. Structural members crack for a reason, and the cause should be determined prior to repair. Indiscriminate use of structural crack repair methods in general, or incorrect application procedures where such crack repair methods are warranted, can exacerbate existing damage.

IIS prefers to consult with Owner's in-house professionals or other design professionals in critical applications. While our experience is substantial, we know our strengths and limitations. We can assist in providing pertinent information to determine correct approach, and we can assure correct application procedures and techniques.

Responsible approaches to structural repairs and waterproofing by use of chemical grouting in lieu of removal and replacement can save substantial sums of money in terms of construction, down time and interruption.

Correct resins and equipment for specific uses are also important for successful applications.

### Some Manufacturers With Whom IIS Partners in Chemical Grouting:

ChemCo Systems  
(formerly Adhesive Engineering Co)

Green Mountain International

Strata-Tech

Soil Stabilization, Epoxy Injection, Urethane Injection







### Structural Wood Repairs

Crouse College at Syracuse University is the oldest building on campus, with ornate wood columns and beams supporting the structure.

Cracks were epoxy filled as a precaution to restore strength.

Crack seals, after filling, were removed, leaving the repair unnoticeable.

## A Word About Epoxy Injection Equipment and Application

Epoxy injection resins are delivered into structures by pressure. Viscosity (thinness or thickness) and exothermic (heat build-up) properties of resins are important considerations in material choice. If a resin is used that is too high in viscosity, more pressure is required to deliver the resin completely into a small crack. If injected resin accumulates into a large crack the exothermic reaction of resin may generate a great deal of heat.

High pressure should be avoided in the injection process. Restrictions within a crack may impede flow of the material, or an inappropriate injection resin too high in viscosity may be being used. In either case, high pressure (more than 200 psi) may damage a structure or structural member, especially if one or more of the sides is unrestrained—such as a column or beam.

If large voids are anticipated within a structure or if cracks are known to be large, low exothermic resins should be used. Excessive heat build-up will also generate internal pressures, potentially causing damage.

In chemical grouting, especially epoxy injection, IIS only deals with manufacturers



Example of an epoxy injection pump with a maximum delivery pressure of 200 psi. Pump is also designed to shut down if material ratios are incorrect or set pressures are exceeded.

that offer grouting equipment fabricated to ensure correct mix ratios of delivered resins and maximum delivered pressures of 200 psi. Further, the manufacturer must provide a full line of resins for specific uses, and those resins must be formulated for use with the injection pump.

This philosophy, combined with our attention to detail, has resulted in extremely high success rates, with absolutely no problems with secondary damage.

Over the years, we have saved clients hundreds of thousands of dollars in construction costs, by permanently repairing structures or structural members, where the only other alternative was removal and replacement.