



REMR TECHNICAL NOTE CS-MR-3.4

CRACK REPAIR METHOD: EXTERNAL STRESSING

PURPOSE: To provide guidance on use of external stressing to repair cracks in concrete. (NOTE: Before selecting any method for repair of cracks, REMR Technical Note CS-MR-3.1, "Selection of a Crack Repair Method," should be reviewed.)

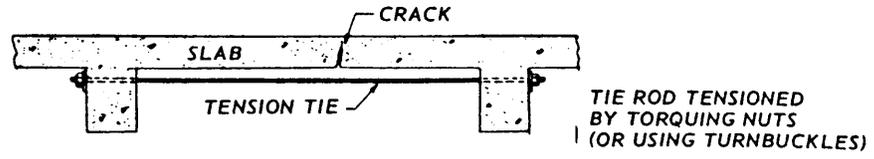
DESCRIPTION: This method uses prestressing strands or bars to apply a compressive force of sufficient magnitude to close a crack or to arrest further cracking.

EQUIPMENT, TOOLS, AND PERSONNEL REQUIREMENTS: A concrete drill and normal hand tools are required. One man can repair cracks by this method, but a two- or three-man operation is more efficient.

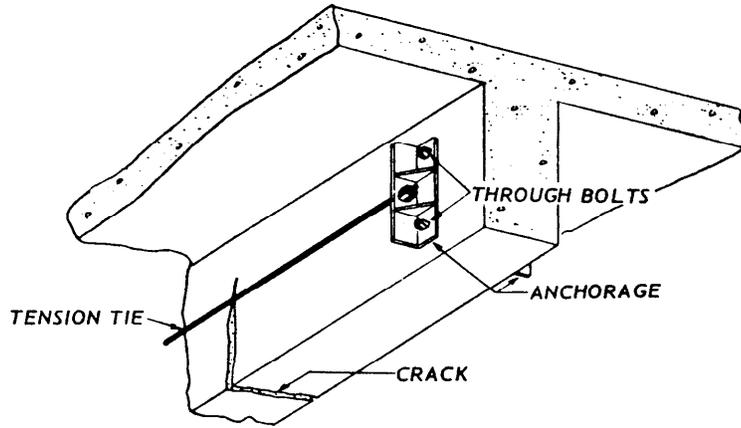
APPLICATIONS AND LIMITATIONS: External stressing is often a desirable solution when a major portion of a member must be strengthened or when the cracks that have formed must be closed. Adequate anchorage must be provided for the steel tension ties, and care must be exercised so that the problem will not migrate to another part of the structure. The effects of the tensioning force (including eccentricity) on the stresses within the structure should be carefully analyzed. For indeterminate structures posttensioned using this procedure, the effects of secondary moments and induced reactions should be considered.

STEP-BY-STEP PROCEDURE: A structural analysis of the cracked member should be conducted to determine loads on the member and the stresses imposed after proposed posttensioning. Anchorage for the steel tension ties must be established first. Strongbacks bolted to the face of the concrete and holes drilled through the concrete through which the tension ties can be passed and anchored are two methods of anchorage. Steel tension ties (prestressing wires or rods) are then fastened to the anchors and tension is applied. The amount of tension applied to each tension tie should be that which was calculated in the structural analysis and should be applied in increments to each tension tie to minimize eccentric loadings.

- REFERENCES:
- a. Maintenance and repair of concrete and concrete structures. US Army Corps of Engineers, Washington, DC, 1979. Engineer Manual 1110-2-2002.
 - b. Causes, evaluation, and repair of cracks. ACI Committee 224. In: Journal of the American Concrete Institute, Vol 81, No. 3, American Concrete Institute, Detroit, MI, 1984. ACI 224.1R-84.



a. TO CORRECT CRACKING OF SLAB



b. TO CORRECT CRACKING OF BEAM