REMR TECHNICAL NOTE CS-MR-3.3

CRACK REPAIR METHOD: DRILLING AND PLUGGING

PURPOSE: To provide guidance on use of drilling and plugging 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 involves drilling down the length of a crack and plugging it with grout or a soft, resilient material (such as bitumen) to form a key.

EQUIPMENT, TOOLS, AND PERSONNEL REQUIREMENTS: A concrete drill capable of drilling a 3-in.-diameter hole, normal hand tools, and some method of cleaning out the drilled hole and crack are required. One man can repair cracks using this method, but a two- or three-man operation is more efficient.

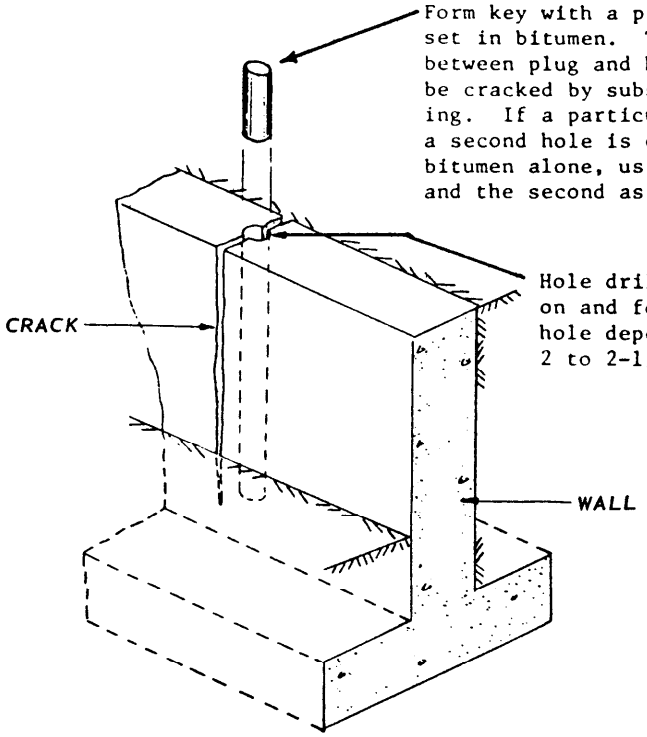
APPLICATIONS AND LIMITATIONS: This repair method can be used only where cracks run in a reasonably straight line and are accessible at one end. Although this configuration is not common, it sometimes does occur in walls or similar structural elements where the cracks are basically due to shrinkage or temperature. The most common use is to repair vertical cracks in retaining walls. The grout key prevents relative transverse movement of the sections of concrete adjacent to the crack or joint, which can be important in some applications. It also reduces heavy leakage through the crack or loss of ground from behind a leaking wall. The seal will not be perfect, and if such sealing is required, soft, resilient material should be used in lieu of grout.

STEP-BY-STEP PROCEDURE: A hole, typically 2 to 3 in. in diameter, should be drilled, centered on, and following the crack. The hole must be large enough to intersect the crack along its full length and provide enough repair material to structurally take the loads exerted on the key. The drilled hole should then be cleaned, made tight, and filled with grout. If water tightness is essential and structural load transfer is not, the drilled hole should be filled with resilient material of low modulus in lieu of grout. If the keying effect is essential, the resilient material can be placed in a second hole, the first being grouted.

ENVIRONMENTAL CONSIDERATIONS: Consideration must be given to proper disposal of debris resulting from this type of repair to prevent degradation of water quality.

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.

c. Guide to joint sealants for concrete structures. ACI Committee 504. In: ACI Manual of Concrete Practice, Part 5, American Concrete Institute, Detroit, MI, 1983. ACI 504R-77.