



REMR TECHNICAL NOTE CS-MR-3.8

CRACK REPAIR METHOD: DRYPACKING

PURPOSE: To provide guidance on use of drypacking 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 hand placement of a low-water-content mortar followed by tamping or ramming of the mortar into place, producing intimate contact between the mortar and the existing concrete. Because of the low water-cement ratio of the material, there is little shrinkage, and the patch remains tight and is of good quality with respect to durability, strength, and watertightness.

EQUIPMENT, TOOLS, AND PERSONNEL REQUIREMENTS: One man can repair cracks with this procedure using standard concreting hand tools. A tool such as a power-driven sawtooth bit for opening the crack to a minimum width of 1 in. and to a depth of 1 in. is required.

APPLICATIONS AND LIMITATIONS: Drypacking can be used for filling narrow slots cut for the repair of dormant cracks. The use of drypack is not advisable for filling or repairing active cracks.

STEP-BY-STEP PROCEDURE: Before a crack is repaired by drypacking, the portion adjacent to the surface should be opened up to be about 1 in. wide and 1 in. deep. This is most conveniently done with a power-driven sawtooth bit. The slot should be undercut so that the base width is slightly greater than the surface width.

After the slot is thoroughly cleaned and dried, a bond coat, consisting of cement slurry or equal quantities of cement and fine sand mixed with water to a fluid paste consistency, should be applied. Placing of the drypack mortar should begin immediately. The mortar consists of one part cement, three parts of sand passing a No. 16 sieve, and just enough water so that the mortar will stick together when molded into a ball by hand.

If the patch must match the color of the surrounding concrete, a blend of portland cement and white cement may be used. Normally, about one-third white cement is adequate, but the precise proportions can only be determined by trial.

To minimize shrinkage in place, the mortar should stand for 1/2 hour after mixing and then be remixed prior to use. It should be placed in layers about 3/8 in. thick. Each layer should be thoroughly compacted over the entire surface using a blunt stick or hammer, and each layer should also be scratched to facilitate bonding with the next layer. There need be no time delays between layers.

The mortar may be finished by laying the flat side of a hardwood piece against it and striking it several times. with a hammer. Surface appearance may be improved by a few light strokes with a rag or sponge float. The repair should be cured by using either water or a curing compound. The simplest method of moist curing is to support a strip of folded wet burlap along the length of the crack.

ENVIRONMENTAL CONSIDERATIONS: Reasonable caution should guide the preparation, repair, and cleanup phases of any crack repair activities involving potentially hazardous and toxic chemical substances. Manufacturer's recommendations to protect occupational health and environmental quality should be carefully followed. In instances where the effects of a chemical substance on occupational health or environmental quality are unknown, chemical substances should be treated as potentially hazardous and toxic materials.

- 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.