



REMR TECHNICAL NOTE CS-MR-3.10

CRACK REPAIR METHOD: FLEXIBLE SEALING OR MASTIC FILLING

PURPOSE: To provide guidance on use of a mastic or other flexible seal 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.)

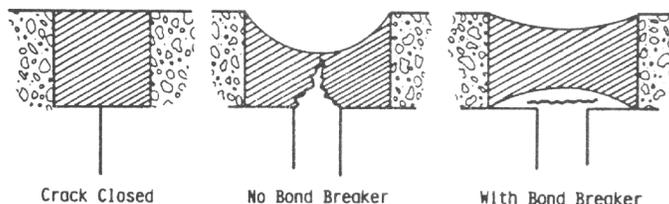
DESCRIPTION: This method involves routing out active cracks; cleaning them by sandblasting, air-water jetting, or both; and filling them with a mastic or other suitable field-molded flexible sealant. Flexible surface seals can also be used for active cracks when a bond breaker is placed over the crack and the crack is not in a wearing surface such as a floor.

EQUIPMENT⁵ TOOLS^J AND PERSONNEL REQUIREMENTS: A concrete saw or other equipment for routing the crack is required for recessed or flush flexible sealing. Equipment for cleaning the crack such as a sandblaster or air-water jet is also required. Equipment for installing anchors is sometimes required for mastic filling. One man can repair cracks using this method.

APPLICATIONS AND LIMITATIONS: Flexible seals can be used to effectively seal an active crack against the migration of water into the crack. Mastic filling with a retainer plate can be used to seal cracks in canal and reservoir linings or low-head hydraulic structures. However, neither will restore strength or stiffness to a structure.

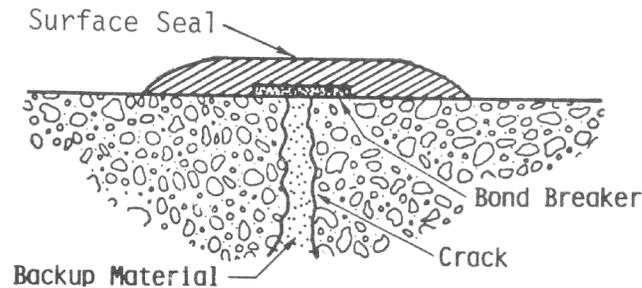
STEP-BY-STEP PROCEDURE: Selection of a suitable sealant and installation method should follow the procedure for equivalent joints as given in ACI 504R (Ref c).

For a recessed flexible seal, the crack should be routed to provide a sealant reservoir (slot) that complies with the requirements for width and shape factor of a joint having equivalent movement. The crack should then be cleaned by sandblasting, air-water jetting, or both. A bond breaker should be provided at the bottom of the slot to allow the sealant to change shape without a concentration of stress on the bottom.



The bond breaker may be a polyethylene strip, pressure-sensitive tape, or other material which will not bond to the sealant before or during cure.

Narrow cracks subject to movement, where esthetics are not important, may be sealed with a flexible surface seal.

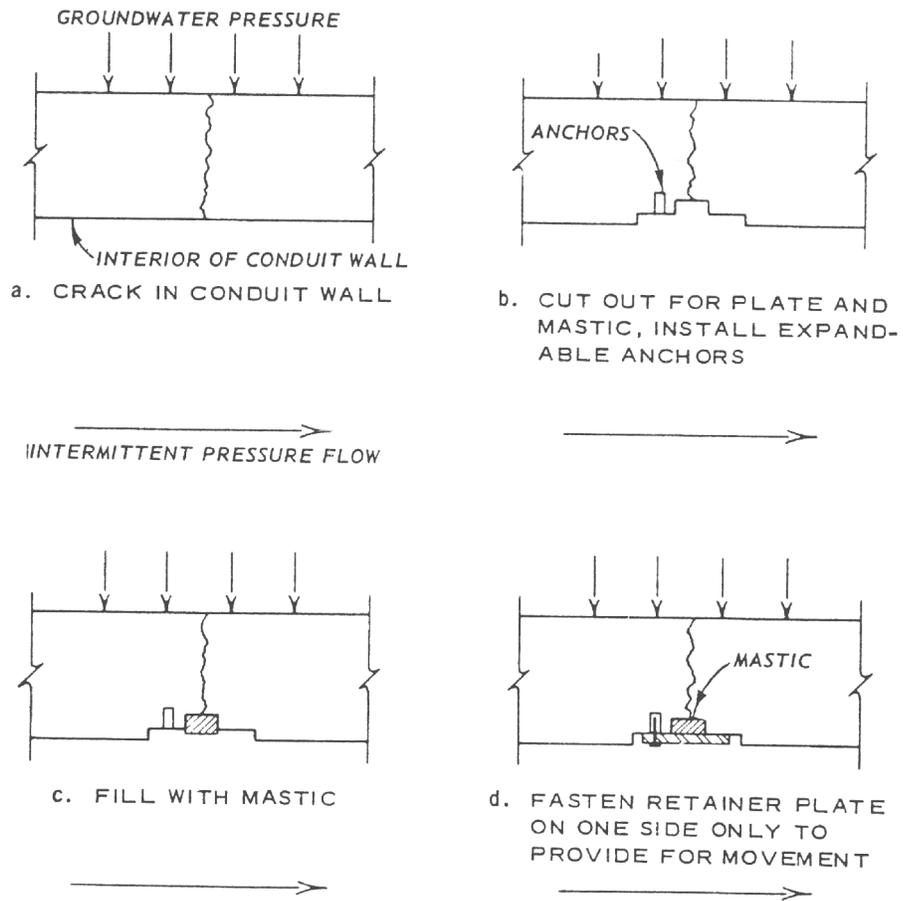


By using a bond breaker over the crack, a flexible joint sealant may be troweled over the bond breaker providing an adequate bonding area. This is a very economical procedure and may be used on the interior of a tank, a roof, and other areas not subject to traffic or mechanical abuse.

For sealing canal and reservoir linings subjected to low groundwater pressure, the crack should be routed to provide a mastic area (slot) that complies with the requirements for width and shape factor of a joint having equivalent movement. To maintain hydraulic efficiency in some structures, it may be necessary to cut the concrete surface adjacent to the crack and to place the retaining cap flush with the original flow lines. The crack should then be cleaned by sandblasting, air-water jetting, or both.

The mastic is placed into the routed crack slot and a retaining cap placed over the mastic to confine it. A simple retainer can be made by positioning a metal strip across the crack and fastening it to expandable anchors or grouted bolts installed in the concrete along one side of the crack.

- 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. ACT Committee 224. In: Journal of the American Concrete Institute, Vol 81, No. 3, American Concrete Institute, Detroit, MI, 1984. ACT 224.IR-84.
 - c. Guide to joint sealants for concrete structures. ACT Committee 504. In: ACT Manual of Concrete Practice, Part 5, American Concrete Institute, Detroit, MI, 1983. ACT 504R-77.



Repair of crack by using retainer plate to hold mastic in place against external pressure