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MEMORANDUM

To: Approved Applicators

From: Michael J. McLeod, P.Eng.

Subject: ABS Crack Stitching System – White Paper

This white paper serves as a brief description of the ABS Crack Stitching System.

Consider the following:

- If possible determine the type of stress that may have caused the crack to occur.
- If possible determine the type of movement the slab is experiencing.
- Generally, except for internal shrinkage cracks, accept the fact that all cracks are considered moving cracks.
- The conclusion that a crack that has been apparent on the slab for a very long time and is likely not moving anymore ... is a rationalization that if accepted will likely come back to haunt you later.
- The likelihood of eventual movement in the concrete structure from stresses that are too numerous to imagine will induce stresses that the crack stitching system can withstand or at a minimum restrict movement.
- The simple stresses are tension, compression, shear and rotation. At least one and more than likely any combination of these stresses must be considered in any crack stitching system.

ABS Crack Stitching “Solution”:

- The ABS Crack Stitching System is an effective means of stabilizing the existing crack prior to an overlay system.

- When movement occurs under an overlay system and cracks are present in the original slab, there is a possibility of movement at the crack. The stresses can be resolved and simply concluded that movement can occur in four directions:
 1. **Tension – apart**
 2. **Compression – together**
 3. **Shear – sliding**
 4. **Rotation – twisting**

Material:

Ideally the Crack Stitch material must be capable of restricting movement in all four directions and therefore must be 3-dimensional rather than 2-dimensional. As you can see when observing the crack stitching metal strips they have been bent into a serpentine configuration to give the 3-dimensional characteristics of the material.

Consideration is also given to the protection of ABS Crack Stitching steel reinforcement strips from corrosion. The use of galvanized steel is its first protection. The type of material used to fill around the strip is a second protection. The coating above could be considered a third but there is nothing to say that moisture intrusion could easily occur from below the slab.

Saw-Cutting:

Saw-cutting to a depth slightly deeper than the height of the metal strips allows for enough coverage over the strip with the filler material while maintaining a position in the upper half of the concrete slab thickness. This upper half is usually considered the tensile zone of the concrete. The tensile stresses are the most difficult to overcome in concrete and are usually attributable to all crack failures in concrete. The obvious reason is concrete has virtually no strength in tension, expressed as a percentage of the compressive strength of concrete as approximately 5%. For example if the concrete is designed for a 3000 psi compressive strength the theoretical tensile strength is approximately 5% or 150 psi.

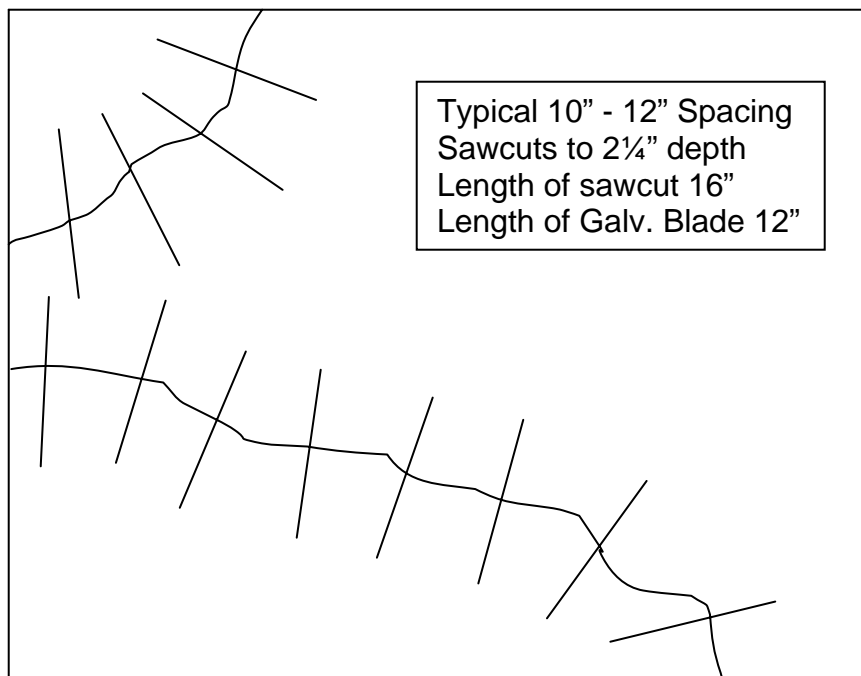
Filler:

There is no determined ideal type of filler material for every application. Consideration has been given in the design of the serpentine metal strips for a wedge effect to be created with the filler material and the wedge affect is the key to restricting the movement in four directions. Depending on the overlay system to be used and the desire for proper bonding of the overlay material in the vicinity of the crack stitching area the appropriate filler material should be used. For example, if Fusion-Crete is the product to be used as the overlay system generally a Fusion-Crete, sand and cement mix would be used. If an epoxy filler was to be used in this example than special provision would have to be made with a sand broadcast over any epoxy on the surface of the concrete to ensure a proper bond is achieved.

Conclusion:

Following the application of the overlay system and eventual movement of the slab, it is difficult to foresee or determine how much stress the concrete must withstand in terms of movement. However the success of the ABS Crack Stitching System is in providing a means of mechanically reinforcing the moving crack to mitigate or significantly reduce movement to provide what can be considered a controlled crack. Therefore when an overlay system is installed this controlled crack may reoccur on the surface of the overlay but because the crack stitching material is withstanding the movement in four directions it will at a minimum prevent the shear failure to cause an overlay system to delaminate on either side of the crack.

This is just a brief overview of the research and testing that has gone into developing the ABS Crack Stitching System. No guarantee is provided that will assure an owner that the crack stitching method will stop the original crack from reoccurring. However in our experience the method has worked extremely well in all applications under an overlay system including work done on the taxiways at the Calgary Airport, many municipal sidewalks and concrete slabs.



ABS Crack Stitching Method