Repairing Failures Between Block and Mat

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Technology from the Leaders in Foundation Repair and Regrouting

Until recent years, foundation failures on reciprocating equipment between the concrete block and concrete mat were a rare occurrence. At present, this type of failure is becoming more common. This increase in failures can be attributed to poorer construction practices and postponement of equipment maintenance.

Before the concrete block is poured the mat must be chipped to expose course aggregate. This is the only good method of removing the laitance from the surface of the mat and providing an anchor pattern between the block and mat. This requires chipping away at least 1/2" to 1" from the surface of the mat. Sandblasting, raking the concrete surface prior to curing, or roughening the surface with a bushing tool as a means of surface preparation is unacceptable. These methods do not remove all the laitance nor do they expose course aggregate in the concrete.

Lateral dynamic forces are generated by most reciprocating equipment, and in particular with gas-engine compressors. Consider what happens when maintenance is postponed. Take the ignition system, for example. Everyone knows what to expect from an automobile with the engine idling after one or two spark plugs have been disconnected. Imagine the same circumstances with a large industrial gas-engine compressor running at 100% capacity. Next, suppose there are lubricating-oil leaks which puddle on the foundation shoulder. If any movement exists between the machine and grout, oil will penetrate voids caused by the movement, and hydraulically fracture any remaining bond between the machine base and grout. As movement between the machine and grout increases, forces exerted on the foundation increase at an exponential rate because of change in direction and impact. At 330 rpm there are 475,200 cycles per day, 14.3 million cycles per month, 172 million cycles per year, 1.7 billion cycles in 10 years, and 3.4 billion cycles in 20 years. Most reciprocating equipment is expected to last more than 20 years.

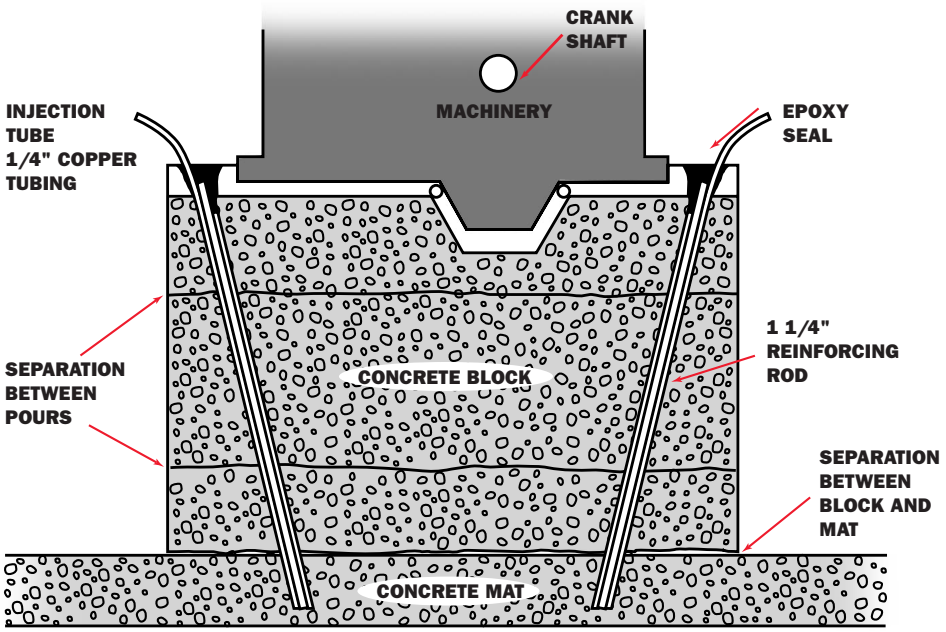

Figure 1:

A method of repairing compressor foundations when the block has separated from the mat.

Operating under these conditions will ultimately result in foundation cracking, separation between the block and mat, or both types of failure.

Figure 1 illustrates a method of repairing separation between the block and mat. Vertical, or near vertical, holes are drilled through the foundation and into the mat. These holes are usually placed in the foundation around the outer periphery of the equipment. Next, rebar is placed in the holes along with an injection tube, and the entrance of the hole is sealed with an epoxy material. After the seal cures, the annular space around the rebar is pressure-filled with an epoxy liquid, and any cracks that the holes cross are then pressure-grouted from the inside out as pressure builds. The curing of the injected epoxy completes the foundation repair.

Reprints of this and other reports are available. For more information or recommendations on specific repairs, please call or write:

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