

1. Background

The BoltHold chemical asphalt anchors provide a method to mount equipment and devices directly to asphalt roadways and similar asphalt surfaces. The installation required drilling a hole in the asphalt deep enough to accommodate the length of the anchor, filling the hole with special grout, then pushing the anchor in all the way until the head of the anchor is flush with the asphalt surface.

2. Anchor Rating

The anchors are rated for pull resistance and for torque resistance:

	SP10	SP12	SP18
Asphalt depth	2.25" minimum		
Hole Depth	6"	12"	12"
Hole diameter, min	7/8"	7/8"	1"
Distance from edge	12" minimum		
Grout level	To asphalt level		
Rated Pull, lb.	1,500	2,000	2,500
Bolt Torque lb-in	200	200	280

Note that the majority of the strength of the installation depends on a bond between the anchor and the grout, and between the grout and the asphalt. The asphalt is usually quite thin, and thus failure to include the top area of the anchor with the grout will dramatically weaken the installation.

3. Reasons for Failures

Listed in this section are the various causes for failure of the asphalt anchors, when subjected to external forces.

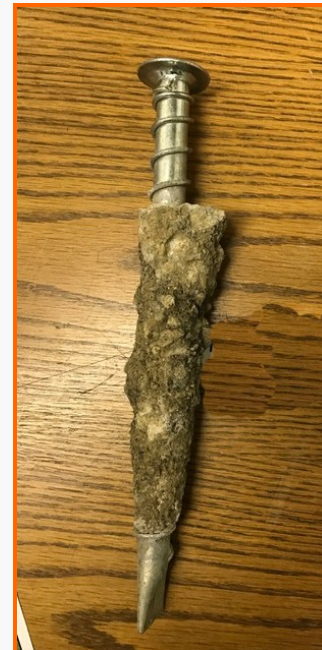
- A. **Poor Grout.** The grout MUST be either a 2-part epoxy, or AAC's EPX2 or

equivalent (Quikrete 1245). There are many cement based grouts out in the marketplace but they vary dramatically in certain aspects from the tested and approved grout. All bets are off if one uses untested grouts.

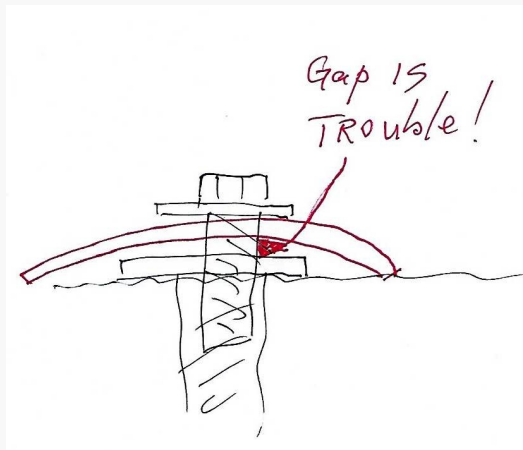
- B. **Poorly Mixed Grout.** It is critical that the grout is prepared to the correct consistency of heavy syrup. If the grout is watery, it will flow into the ground instead of covering the fill area from the top of the asphalt surface to the bottom of the anchor.

If the grout is too thick, it will clog the hole and prevent the rest of the grout from flowing down.

- C. **Hole not topped completely.** This is a common error. It can be caused by poorly mixed grout (above), or by the installer running out of grout to fill the hole (resulting failure shown below).



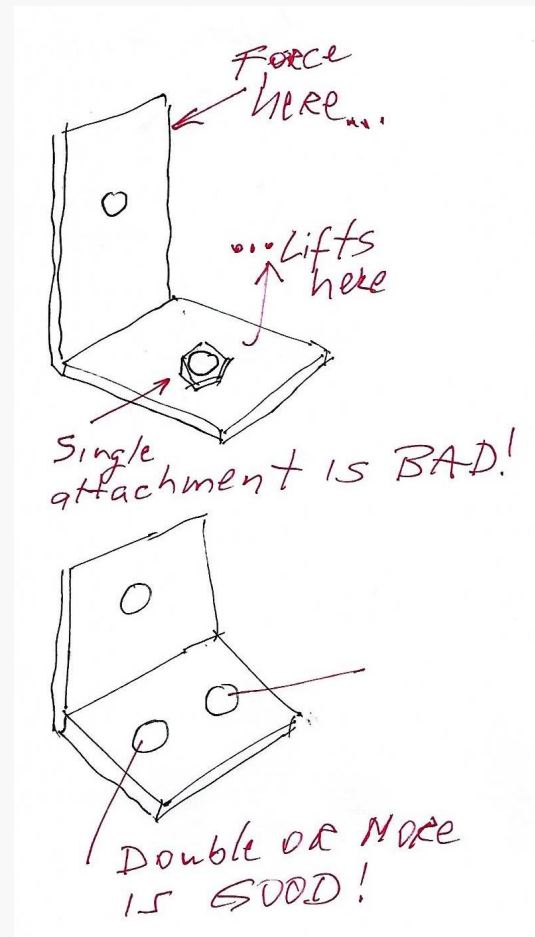
- D. Too Close to Edge.** The anchors must be located at least 9" from the edge of the asphalt.
- E. Excessive Tightening Force.** The torque rating is shown on the table at the left. If the installer uses a power tool to tighten the bolts, especially an impact wrench, the forces will exceed what the asphalt-grout bond can handle and the anchor will rotate free in the hole.
- F. Premature Force.** The grout needs 24 hours to reach its full strength, and longer at low temperatures.
- G. Attachment is not flush.** If the plate being attached to the anchor is hollow or curved, when the bolt is tightened it will pull the anchor out of the ground. The pull force applied by the bolt can readily reach thousands of pounds.



- H. Poor Asphalt.** If the asphalt is heavily cracked, or has exceeded its life span, it no longer offers a layer that can support significant forces. We have tested anchors on 25+ year old

asphalt with surface cracks, but the asphalt offered normal **resistance to drilling**, and the installation was sound.

- I. Improper Brackets.** When using brackets to attach to the anchors, the bracket **MUST** use 2 anchors as a mini-



mum. The reason is that a single bolt attachment allows lateral forces applied to the bracket to lift the bolt, with a huge mechanical gain.