BOLTHOLD™ Rebar Spikes Evaluation

Application Note **AN61** V0

About this Application Note

One of the most common anchors used to fix objects to asphalt surfaces is a rebar spike.

The appeal of the spike anchors is their low price and the simplicity of their installation: Just hammer the anchors using a sledge hammer.

We have observed a high failure rate of these spikes when used as anchors. This application note provides test data and the reasons for these failures.

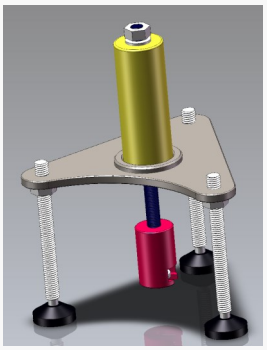
Spike Design

Most rebar spikes are constructed from a 12" to 14" length of 1/2" rebar iron with a welded head and a sharpened chisel end. In the case of spikes used for wheel stops, often there is no head at all.

The rebar has ridges along its length that are intended to provide resistance to pull forces. The welded washer head prevents the object from sliding up away from the asphalt.

Pull Test Details

We use a commercial hydraulic pull tester manufactured by HiChance, model HC-V3 with max pull force of 30 kN (6,700 lbs.). The tester is mounted on a custom base supported by 3 legs that are 8" apart. (Standard bases have legs that are only 3" apart.) This is crucial in order to get a meaningful failure reading, because the closer-spaced legs would keep the asphalt down and give a false high force reading.



We subjected a rebar spike sold by Uline (model H-2396) to our standard pull test. The pull force on the head of the anchor is increased until the head moves up by 1/2" as referenced against the surface 8" away. For more details see ANxx. Note that this is a stricter definition of failure than a full anchor pull-out. We believe that an anchor that moved at all has already failed, and continuing to pull it out further is not meaningful.

The results show that the spike failed at **228 lbs**. This compares with 1,500 lbs. for the smallest asphalt anchor that we manufacture, the SP10. The anchor types we recommend for anchoring speed bumps and car stops are rated for 2,500-5,000 lbs.

Why Are Spikes Failing?

Rebar spikes are forced in by hammering, and rely on friction between the ridges on the rebar and the asphalt that they displaced, to hold on. The ridges are very shallow (0.010") and only cover about half the area of the spike. Considering that asphalt is rarely deeper than 3", there is a very limited contact area between the spike and the asphalt.

Another reason for spike failures is that, as the spikes are hammered in, the ridges on the spike push and compress the asphalt along the way. This enlarges the hole being cleared in the asphalt. The asphalt is not elastic, and therefore once the ridge pushes the asphalt the asphalt does no snap back once the ridge has passed. The larger hole means that there is less applied force by the asphalt on the ridges, resulting in lower force retaining the anchor.

Some of the spikes are provided without rust protection. In the hostile environment of a parking lot with salt, slush, rain and engine dripping, the unprotected spike quickly rust. In the picture above, red circle A shows a rusted spike and B shows a spike that pulled out of the asphalt, allowing the wheel stop to be rolled over away from its original position.

Consult with Us

We have been designing, installing and marketing anchors for asphalt long enough to know where our products will work and where they will not. Contact us or our representatives for free consultation.

A Better Solution

Asphalt Anchors Corp. offers a line of anchors with pull resistance ratings from 1,500 lbs. to 5,000 lbs. The anchors are installed in the asphalt using a special adhesive that bonds the anchor to the asphalt in a stress-free process.

The anchors are installed flush to the surface, and have an internal thread that accepts a bolt that attached the object to the anchor.

Click on the links for details

Model	Thread x length	Pull rating	drill	Prices
SP10	3/8" x 6"	1,500	7/8"	SP10
SP12	3/8" x 12"	2,000	7/8"	SP12
SP18	7/16" x 12"	2,500	1"	SP18
SP58	5/8" x 10"	5,000	1-1/2"	SP58