

Asphalt Floors for Bunker and Stack Silos

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The two most common floor surfaces for bunker and stack silos are poured concrete and asphalt. Both work well for the first few years, but eventually silage acids begin to deteriorate the concrete and in ten years or so many concrete silo floors are in such poor condition that they must be replaced. Asphalt, however, is impervious to silage acids. If properly installed, farmer experience across the U.S. confirms that asphalt silo floors will remain in excellent condition for twenty years or more. However, for a long-lasting floor the job must be done right.

Start with an excellent base

Asphalt pavement is very flexible on whatever base it is placed. If there are low areas in the base the asphalt will settle over that area, while concrete will bridge small low areas. For this reason a firm, well-drained base is essential. In regions where the ground freezes in winter, water be prevented from getting under the asphalt floor. If the silo is located in a wet area, drainage tubing and or geotextile fabric may be necessary. Often a foot or more of gravel fill is needed, but this depends entirely on the location including whether the silo floor is above or below grade.

Asphalt vs. concrete cost comparisons

While price shouldn't be the only determining factor, an installed asphalt floor will almost always cost significantly less than will poured concrete—assuming both are done by a contractor. A 2002 cost analysis by the University of Wisconsin estimated that asphalt cost about 50% as much as concrete. However, the added gravel fill that may be needed for an asphalt floor could reduce this cost difference somewhat.

Hiring the right asphalt contractor

Choose an asphalt contractor with care, ideally one who has already installed an asphalt silo floor so you can observe the results. If this isn't possible, choose a contractor with a reputation for quality work, preferably one with experience in building asphalt roads since what you really need is an asphalt "road" in your silo. In some regions asphalt paving is a seasonal business, and you may be able to get a better price in the spring than in the late summer or early fall. If you're having the base prepared by someone other than the asphalt contractor, get the price quote after the base is done. If the contractor sees a level, compact base he may offer a better price.

Asphalt installation

Asphalt should be installed in two layers or “lifts”. The first layer should be between 2” and 3” thick. It’s difficult to properly compact and level much more than a 3” layer of asphalt. This should be followed by a second layer of asphalt 1” to 2” thick, this layer consisting of a fine aggregate. The fine aggregate will result in a uniform, smooth surface that won’t collect and hold moisture and debris. There’s nothing magic about layer thickness: We’ve seen good, long-lasting asphalt bunker floors with a finished thickness of 3”, and ones that are almost 5” thick.

The contractor should use two rollers: A heavy (12-14 ton) static roller or a vibratory roller, and then a finish roller to work out any ripples or seams. When finished, the surface should be flat and very uniform, with bunker silo floors sloping slightly back to front to permit effluent and precipitation runoff.

Finishing touches

While it’s generally recommended that concrete silo floors be allowed to cure for a month before use, asphalt floors can be used much sooner than that—perhaps 10 days after installation. This time can be well spent in ramp construction.

Asphalt has excellent horizontal strength, but poor vertical strength and is very prone to crumbling and shearing off at any working edge that’s not protected by a ramp. This can be constructed of well-compacted gravel, but concrete makes for a more lasting ramp, especially at the front of a bunker silo. No coating will be needed on the asphalt (the kind sold in 5-gallon pails for driveways), either now or in the future. We know of asphalt bunker and stack silo floors in both the Western and Eastern U.S. that are over 20 years old that are still in excellent condition. At Miner Institute we have many years’ experience with both concrete and asphalt silo floors, and will never again use concrete.

Resurfacing concrete silo floors with asphalt

There’s not nearly the range of experience with installing an asphalt floor over an old concrete floor, but what we know and have heard is encouraging. As with a new silo, preparation is important: The old surface needs to be swept or power-brushed completely free of silage debris, dust, and old aggregate. Next, “Tack Bond” is sprayed onto the old concrete floor to improve the adhesion of the asphalt. Then the asphalt is installed, preferably in two layers with a final thickness of about 3”. As with new asphalt floors there is no “correct” thickness: 3” is what the asphalt contractor recommended for resurfacing our badly worn concrete silo floor. Concrete and asphalt have different coefficients of expansion, so any resurfacing job must be a complete “edge to edge” job and not simply patchwork.