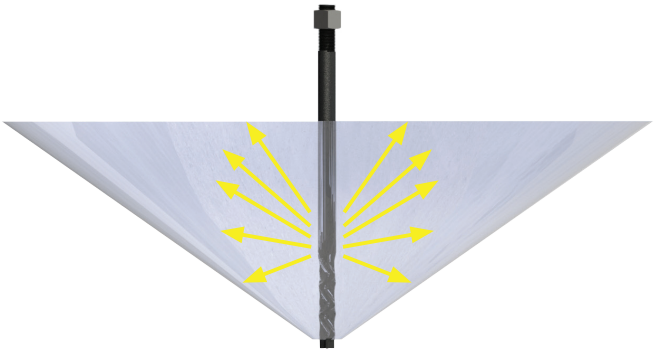
Anchoring Fundamentals



There are a few common reasons for installing equipment with anchors.

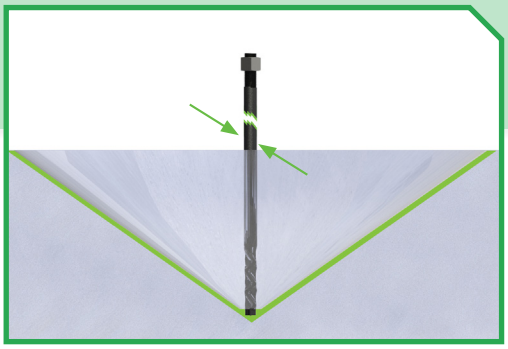
- Prevent equipment from walking about of position.
- Help alignment of the machine.
- Stabilize the machine by connecting it to the supporting concrete.

Maximizing the benefit of anchors requires an understanding of how they work. Anchors take the forces required to hold the machine in a stable position and translate those forces into the supporting concrete. Those machine forces are countered by what is called a "shear cone" that develops in the concrete. When a load is applied, it ends up being countered by the shear strength of the concrete surrounding the anchor.

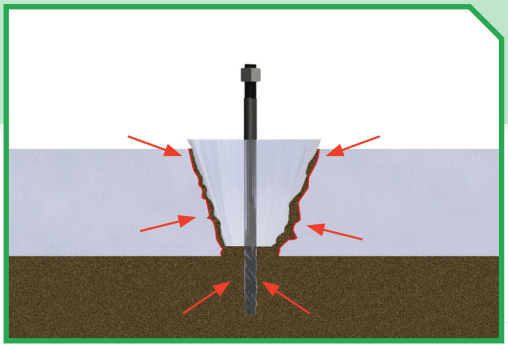
Anchor Selection

The best practice is to know the forces that will be applied to the anchors. Select anchors that will safely contain those forces. Evaluate the shear cone needed to exceed the maximum failure load of the anchors. Then design a concrete section that is deep enough to create a sufficiently strong shear cone.

A properly designed anchor installation will ensure that the strength of this shear cone far exceeds the capacity of the anchor.



If an anchor is not embedded deep enough, then there is a risk that the shear cone will pull out of the floor under extreme conditions.



Failing to use a robust section of supporting concrete invites significant damage to your facility and potentially to your equipment. As an example, Unisorb recommends a minimum embedment of 8" when using our EM 20 Vector Bolts. Embedding that anchor size in 4" of concrete will definitely not provide enough shear cone capacity to keep that anchor in position if a challenging load is applied.

Properly designing an embedment may require conformance to national standards as well as local codes. Always consult with a competent civil/structural engineer to ensure that your installation complies with all the appropriate requirements.