

GROUND BEARING CAPACITY

EXPLANATION

Ground bearing capacity is the capacity of soil to support the loads applied to the ground from above. The bearing capacity of soil is the maximum contact pressure between the foundation/soleboard and the soil which should not produce shear failure in the soil or excessive settlement.

There are 3 common types of shear failure as depicted below but the general concept is that the soil is either compressed or the soil is forced outwards and upwards under the bearing plate/sole board.

If the sole board is next to a trench or wall, the pressure will push the soil sideways and cause the soil to shear at approximately a 30-45 degree angle from vertical.

1. General shear failure (Fig.1(a))
2. Local shear failure (Fig.1(b))
3. Punching shear failure (Fig.1(c))

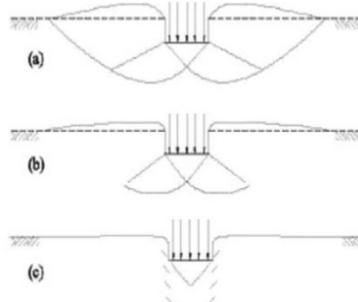


Fig.1: Shear failure in foundation soil

WHAT DO SOLEBOARDS DO?

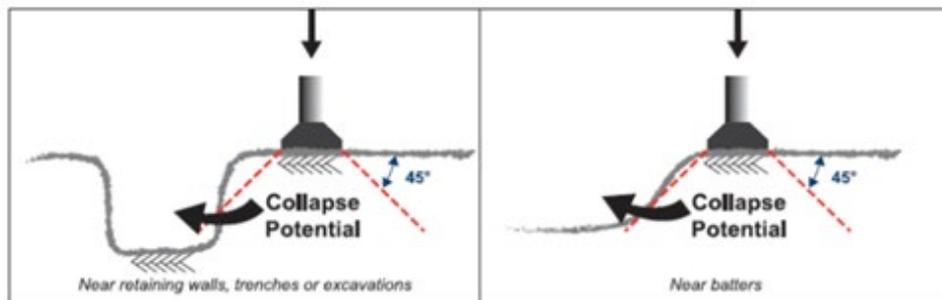
They are a spreader plate that essentially takes the concentrated load from the leg above and distributes it over a greater area.

CALCULATING THE REQUIRED GROUND BEARING PRESSURE

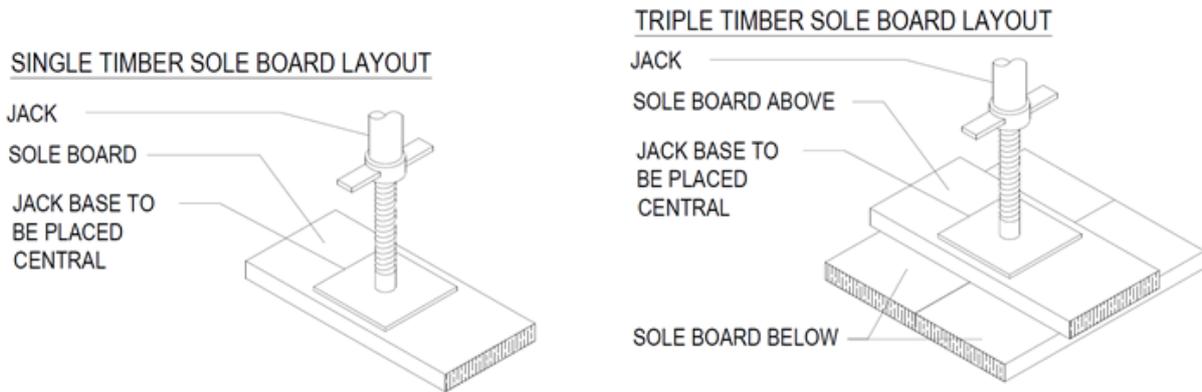
Ground bearing pressure is very simply just the pressure applied to the ground from the load above and is measured in kPa. The calculation is simply "LOAD/FORCE (kn) / AREA(m2)".

$$Pressure = \frac{Force}{Area}$$

- Falseworks must be built on 50mm thick soleboards, scaffold can be 35mm unless we specify otherwise.
- The minimum length and width of the soleboard is to be 500mm long and 225mm wide.
- Soleboards must be hardwood. You cannot use scaffold planks as these are more susceptible to moisture and bend easier.
- The soleboards should be placed on a flat and level surface with full contact to the ground. Slight digging may be required to slightly bury them to ensure they are level and in full contact.
- As a simple rule of thumb, anything under 100kPa is unstable ground with most engineered piling pads being 300kPa. This is the typical range to expect. If the heel of your boot sinks in the ground, it will most likely be less than 100kPa.
- Ground will typically fail at 30-45 degrees from vertical. As a general rule, make sure your scaffold or falsework leg is at least 1.5x the depth of the trench or batter from the edge. E.g. if a scaffold is next to a retaining wall 1m high, the leg should be 1.5m from the edge of the retaining wall. This is just a guide and when placing a leg next to a trench or batter you need to seek advice from a Geotech engineer.



TYPICAL SOLEBOARD ARRANGEMENTS



COMMON MISCONCEPTIONS

Bigger the soleboard the better, this is false.

There becomes a point where the length of the sole board effectively provides no more benefit because it will fail under the load and is not strong enough to spread the load out uniformly over the ground. If our standard 500mm long and 225mm soleboards were larger but were still 50mm thick, these would provide no benefit.

I do not need to use a soleboard on concrete.

This is typically true but keep in mind a 50mm thick blinding is not sufficient to replace a sole board for example. Also note that if the falsework or scaffold is on a waffle pod slab, speak to engineering immediately as these typically cannot take large point loads.

The soleboard needs to be under multiple legs.

This is false, the sole board can be individual boards under each leg.

CONCLUSION

Before you start a project you should ask for the Geotech engineers confirmation on the ground bearing capacity when doing scaffold or falsework.

All our drawings have a detail with the minimum required ground bearing capacity on it and it is the PC'S responsibility to either provide a suitable and stable compacted surface that meets or exceeds the required ground bearing capacity, or they supply the ground bearing capacity and we design accordingly.

No project should start until the PC has confirmed the supporting ground is sufficient. This

also includes when building our systems on suspended slabs.

Note that this advice and comments are general in nature and if in doubt ask!

We help build Australia **smarter.**

