

MARJEX CORE FRAME INSTRUCTIONS



Core Frames (aka “rocket launchers”) present structure in drill core in its original orientation so that they can be measured directly with a geologist’s compass in exactly the same way as it would be measured in a surface outcrop. This means that:

- The orientation of structures are known immediately *as the core is being logged*
- The *relationship between structures* (known as vergence) can be determined
- *The sense of movement* along the structure can be determined
- *The orientation of linear structure* (e.g. fold axes, bedding/cleavage intersections, orientation of elongate minerals and mineral aggregates, boudins etc.) can be measured. A core frame is the only tool which enables you to do that.

Setting up Your Frame

- Place the frame on a level table or box made of a non-ferrous material such as wood, plastic or aluminum. The frame should be able to be viewed from all directions, including from above. A level, 50cm square surface at 60-80cms above the ground, is ideal.
- The table should be close to your core trays but at least 3m away from any large iron objects such as steel core racks or parked vehicles
- Raise the core support rack to the inclination of the hole at the down-hole depth of the structure to be measured. A range in hole inclinations of a degree or so can be ignored.

TIP: Raise or lower the core rack by pushing or pulling the base of the core rack support strut. Never use the core rack as a convenient handle.

- Hold the support strut firmly in place with one hand while firmly pushing the sliding wedge below the base of the strut with the other.

TIP: Sometimes the sliding wedge mechanism is not sufficient to hold the core rack at the set inclination angle. This can happen at angles below 40° when a long or heavy core piece is on the Frame. The solution is to drape a cloth bag, half-filled with 1-2 kg of fine sand, across the base of the Frame (see picture on last page). The bag will give extra support to the strut. *It is a good idea to do this anyway, as a sandbag protects the frame from accidental knocks which might put the azimuth out of alignment.* .

- Remove the compass from its slot at the back of the frame. Set the rotating bezel to the azimuth of the down-hole depth of the structure being measured (remember to allow for any magnetic declination). Hole azimuth deviations of a degree or so can be ignored. Replace the compass in the frame, then rotate the whole frame until the red end (i.e. north) of the compass needle sits within the outline red arrow marked on the compass baseplate.
- To release the wedge, push the bottom of the rack support strut forward.

The Frame will only need to be set up once for all structures to be measured within a down hole deviation range of 2° in both inclination or azimuth. In many, if not most, cases a single frame set up will serve for all structural measurements in that hole.

Your Drill Core

A core orientation frame is designed for measuring the attitude of structure in *oriented core*.

Oriented core is marked with a line along its length indicating the intersection of the down gravity vector with the core surface, *before it was extracted from the ground*. This line is called the **Bottom of Hole**, or **BOH**, line.

The larger the diameter of core, the easier it is to observe structure and to make accurate measurements.

For this reason, wherever possible, structural measurements should be carried out on whole, not half, core.

The Marjex Frame can accept core pieces from 10 to 50cm long and diameters from BQ to PQ. It also accepts sawn half-core, provided the sawn surface is along the **Bottom Of Hole (BOH)** line, or within a few degrees of that line.

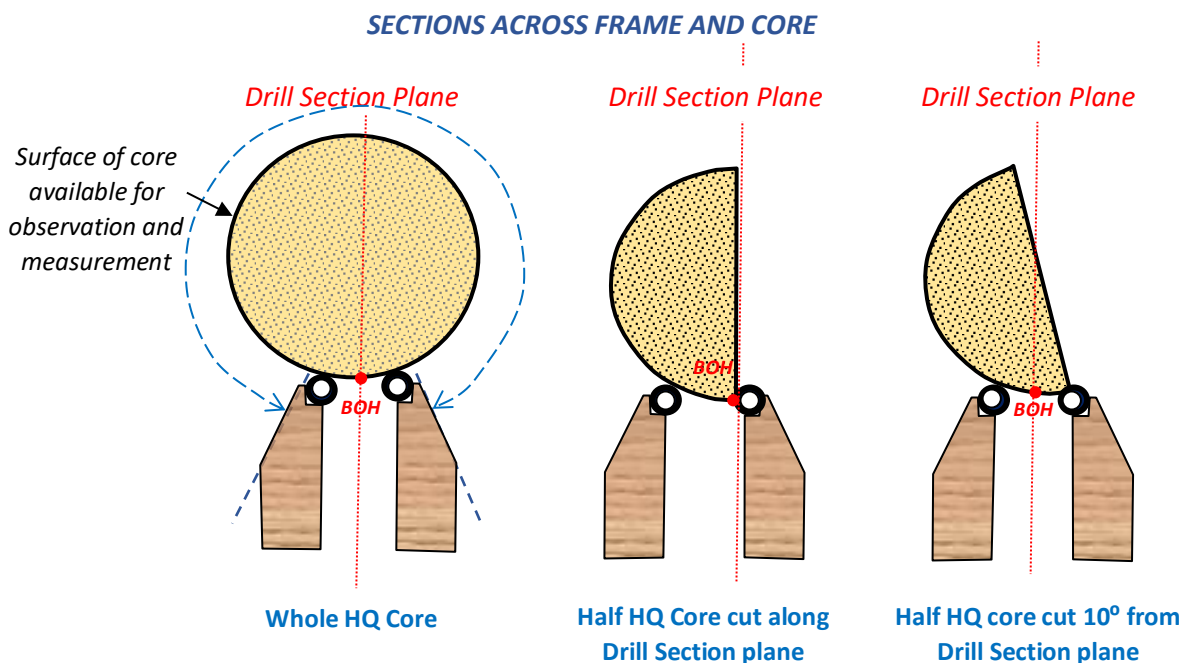
However, I would not advise putting a 50cm length of PQ core on the frame.

Procedure

- Fold down the Core Support Baseplate. Place a piece of core on the rack with the **down direction** of the core pointing towards the ground. This direction should already have been marked on the core by an arrow.

Note: when marking up, holes with a negative inclination (virtually all holes drilled from surface) the **down** direction is the **direction of drilling**. In holes with a positive inclination (many underground holes) the **down** direction is the **opposite** of the direction of drilling.

- Make sure the **BOH** line is facing down by viewing the core from below, while rotating it about its long axis (you can see this in the picture on the last page).

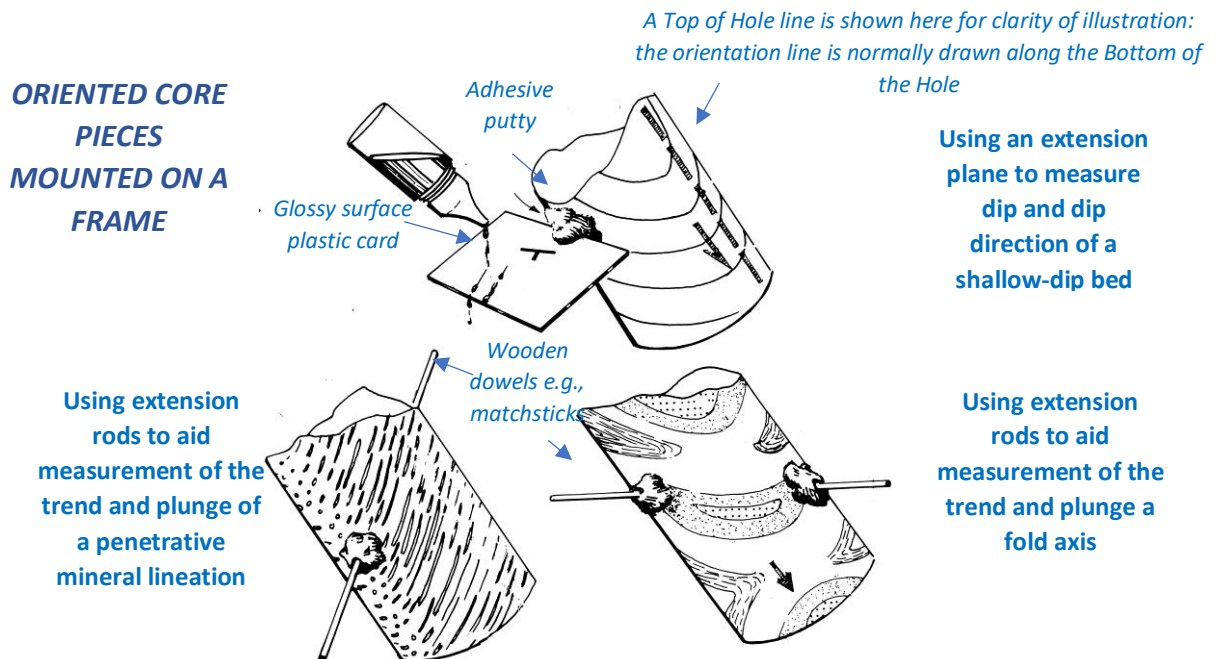


Measuring planar structure

Any planar structure (bedding, cleavage, joints, faults, veins etc.) exposed on cylindrical drill core appears as an elliptical trace on the surface. Where the plane is steep dipping, or exposed as a the broken surface at the top of the core, it can usually be measured with sufficient accuracy by sighting on to it with a geologist's compass (the Brunton compass is best for this).

TIP: if the structure is faint, trace its outline on the core with a yellow (yellow usually provides the best contrast) wax pencil before sighting on to it with your compass.

Determining an accurate strike direction for shallow-dipping planes (less than 45°) can be difficult, whether the plane is observed in outcrop or drill core. In this case, for maximum accuracy, use the following procedure (I got this idea from Bill Laing at James Cook University).



- Using a blob of adhesive putty (*BluTac™*, or similar), attach a rectangle of glossy-surface plastic (about the size and shape of a credit card) to the planar structure to be measured. Tilt and rotate the card until it is *parallel with the structure* by sighting on to it from several directions, including from above (see picture on last page).
- Allow a drop of water to run down the extension plane. The run of liquid defines the dip direction.

Tip: A small amount of dark food colour in the water will make the run of liquid easier to see.

- Measure the dip and dip direction of the extension plane with a geologist's compass in the usual way.

Measuring Linear structure

- Any linear structure cut by drill core will appear as two points on opposite sides of the core: one point where it enters the core and one where it exits.
- Attach small wooden dowells to the core surface at each end of the linear. Five-centimetre-lengths of bamboo meat skewers have been found ideal, but matchsticks will do almost as well. Tilt the two extension rods until they both lie *on a single straight line* when viewed from all angles, including from above.

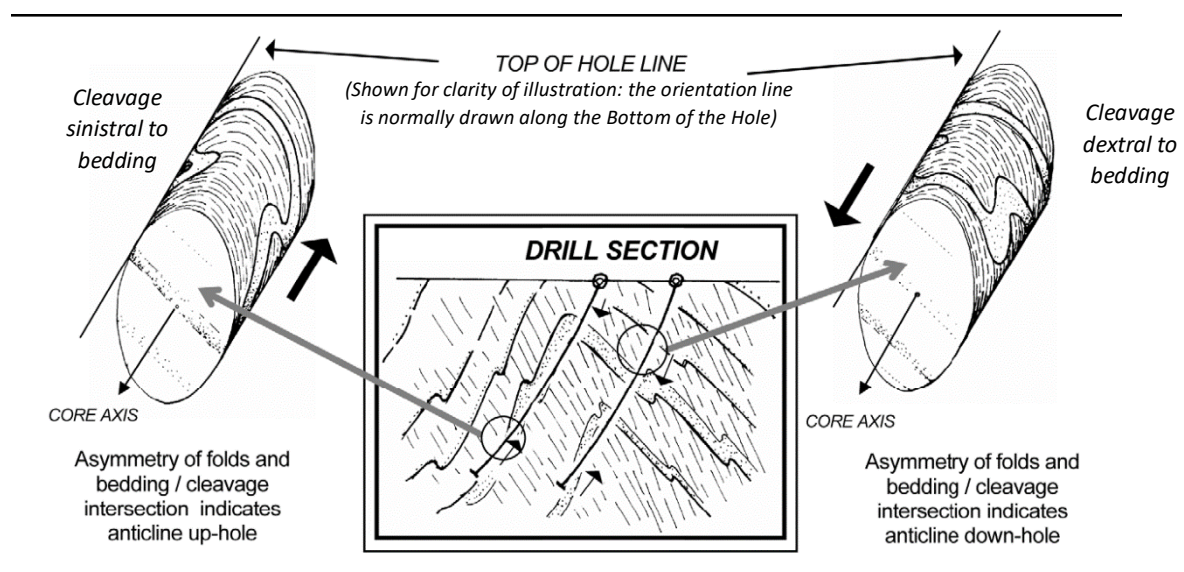
- Measure the trend and plunge of the linear using a geologist's compass in the usual way.

Vergences

Small vergence structures are readily observed in core but the information they can provide is only available when the core is oriented and mounted on a core frame.

The interpretation of vergence structures depends on observation of sense-of-movement and bedding cleavage relationships, not measurement.

An example of their use is shown below.



An example of the use of vergence information in oriented drill holes

Further Reading

For a comprehensive coverage on structural logging of drill core, see

[Geological Methods in Mineral Exploration and Mining](#): R W Marjoribanks. Springer (2nd Ed. 2010)

[Structural Logging of Drill Core](#): R W Marjoribanks. Australian Institute of Geologists Handbook 5 (2nd Ed. 2002)

Much more about core orientation methods and structural measurements in oriented core in relevant technical articles at www.rogermarjoribanks.info/blog

Guarantee

The Core Frame is relatively robust and should provide satisfactory service for many years. However it is not designed for rough handling or to be exposed to the elements for long periods of time. It should be treated with a degree of care as a scientific instrument.

If the frame has been used as designed, but ceases to be useable within five years of purchase due to faulty manufacture, you can return it to me and I will be happy to repair it free of charge – or, if repair is not possible – to replace it with a new one.

I would appreciate any feedback from your experiences in using the *Marjex Core Frame* as well as suggestions you might have for improving the design.

I would be happy to attempt to answer any general questions you have regarding structural logging of drill core.



Fold axes are marked with yellow pencil. These will be attachment points for extension rods. Along with matching rods on the opposite side of the axes, they enable the trend and plunge of the folds to be accurately measured.

Core frame setup with sandbag support for extra stability.

IMO, a Brunton is the most suitable compass for measuring structure in core.



Using adhesive putty to attach an extension plane for easy measurement of a faint planar structure. Elastic band secures core.

Checking from below for correct positioning of the Bottom Of Hole orientation line. In this pic. a wooden core model showing bedding and an oblique cleavage is used.

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