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Seismic vault construction and challenges; HartRAO and Klerefontein

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The National Academic Co-located Seismology Network is a collaborative project between Hartebeesthoek Radio Astronomy Observatory (HartRAO) and Tshwane University of Technology (TUT) whereby at least twelve seismic stations are to be built across South Africa, Marion and Gough islands. These stations are to continuously monitor real-time seismic events for scientific use and seismic risk determination.

Before construction of each station various parameters need to be carefully considered: a geological survey of the site and the civil engineering design that will suit this geology, to cater for different environmental conditions. It is best for a seismic station to be located on bedrock, so as to ensure good coupling between instrumentation and the local geology.

An underground vault was constructed at HartRAO utilizing precast chamber sections: these sections are engineered to withstand the pressure of overburden safely.

The construction at Klerefontein is to have a similar design as at HartRAO with the main difference being the excavation process. Due to the shallow bedrock, the vault can be constructed at a site where it can be partly buried. The structure is to be placed directly on the surface and boulders of rock will be added around the structure to create a small man-made hill, blending with the local environment and effectively burying the vault. Klerefontein is a challenging site as it is remote and there is no easy access to building material and earth-working machinery.

The construction process and challenges experienced with the HartRAO vault will be discussed, together with an overview of anticipated construction steps and challenges at Klerefontein.

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