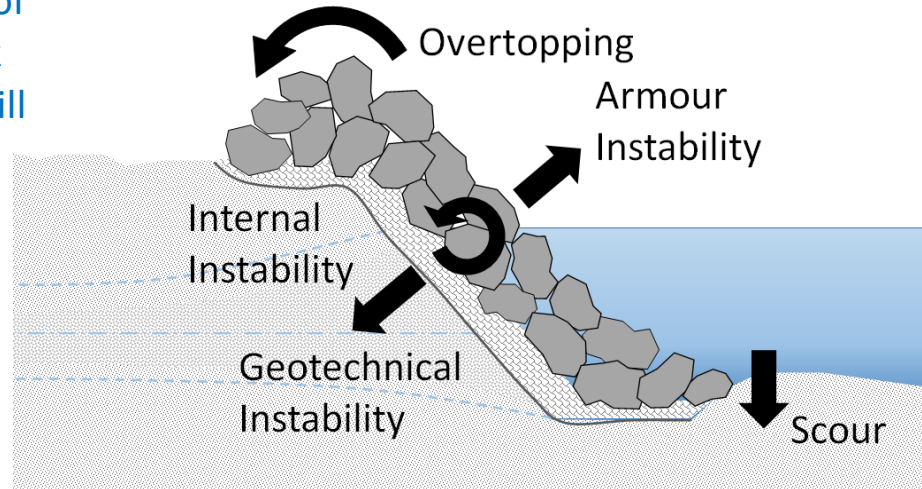


# Rock Structure Life Cycle

Sloped rock structures, including revetments and rubble mound breakwaters, are the most common form of coastal protection in Western Australia. Their prevalence is largely due to the comparatively low cost of rock armour, but also the longevity of rock structures, with some built in the 1890s still functioning, with suitable maintenance.



Rock structures usually have a narrow width of armour units, placed over a core of finer material, (rock or occasionally sand). Filters are often placed between, either as a finer rock layer or synthetic fabric. Stability of the armour is developed through both self weight and interlocking between units.



Construction with careful interlocking may improve stability, but can enhance wave overtopping.

Rock structures usually experience 'shakedown' during the first substantial storm, which moves loose units or core and causes the armour to settle.

Subsequent severe storms cause gradual loss of interlocking, mostly around the mid tide level. This reduces stability, with progressive decline.



A third life-cycle phase can be developed by scour or overtopping disturbance, at the base of crest of the structure.

Geotechnical degradation usually occurs over 10-20 years, including piping, core winnowing or fine sediment moving into the rock matrix.

Highly degraded rock structures can still act to retain sediment, with a flatter slope offsetting poor interlocking.



Performance of rock structures is typically characterised by the armour stability, expressed through relationships between armour unit size, placement slope and wave conditions. However, performance is also a function of the structure life-cycle, influenced by design, construction and maintenance.