

# Coastal Structure Design Life

The intended design life is an important performance criteria for coastal structures. Design life is usually considered by stakeholders in economic justification for capital investment. However, it is often given cursory attention by engineers in the design process.

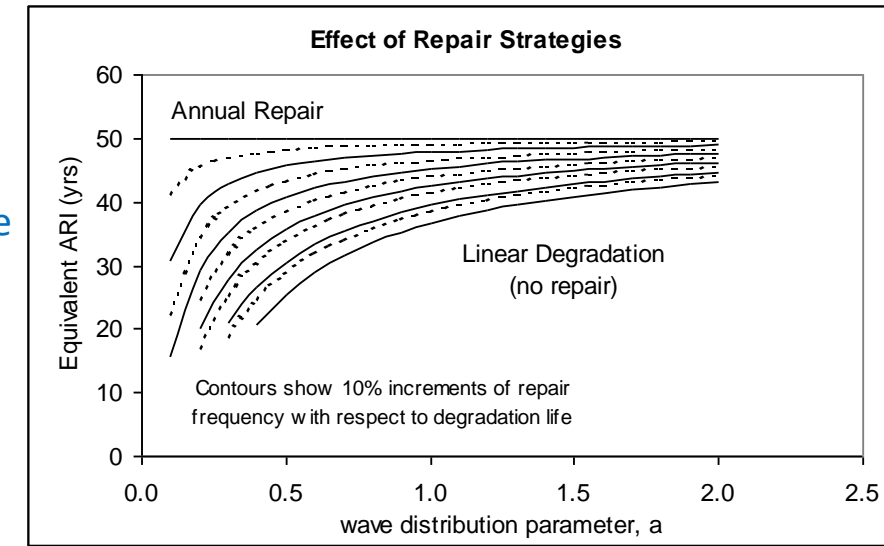
Selection of an ultimate limit (failure) design event likelihood, as outlined in AS 4997, provides a **first step** to cater for intended design life. This is modified by the residual capacity between initiation of damage and structural collapse, which is related to materials used.

Design event likelihood is commonly calculated by an equivalent incidence of failure for a constant standard of performance over its time of service. However, actual performance will vary substantially over the course of a structure's life-cycle.



Structural capacity changes with:

- Environmental degradation (storm damage, fatigue loading, vandalism)
- Material degradation (corrosion, loss of interlocking, cracking, swelling)
- Changing external conditions (seabed movement, environmental change)
- Changing internal connectivity (thermal creep, core loss, connection fatigue)



Material degradation rates are typically related to climate, including moisture effects in tropical settings or thermal effects (freezing / heat stress).

Maintenance, repair and material protection systems can potentially prolong structural life. Their effect is influenced by how often conditions approach the design threshold.

Maintenance has greater importance in locations frequently experiencing severe conditions (typically in mid-latitudes or shallow depths). In contrast, design event likelihood is crucial when severe events are rare, including tropical settings, deeper water, or structures positioned landward of the shoreline.

