

Weak Links

An engineered solution preventing catastrophic damage to subsea hardware

Weak links offer customers a solution when there is a risk of damage being caused to critical subsea structures. This damage, due to disruption of the umbilical subsea, may be caused by trawler boards and nets or a ship's anchor engaging and dragging an umbilical.

Weak links are designed to provide a controlled separation. Separation is calibrated to activate at a specified tensile load and mitigates the damage caused by unexpected events.

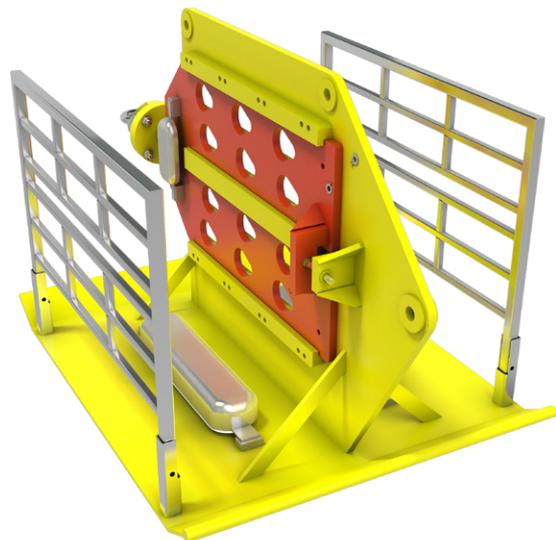


FEATURES

Re-usable

Reliable designs

Matched to umbilical system life



Weak Links

Available in flat plate and cylindrical designs to meet project specific needs.

	Flat Plate Design	Cylindrical Design
Suitable umbilical types	Thermoplastic hose umbilicals; may include low-voltage and/or fiber-optic cables	Thermoplastic hose umbilicals; may include low-voltage and/or fiber-optic cables Preferable for use with oscillatory cabled umbilicals
Design principle	Two vertical shear plates with calibrated shear bolt Activated by failure of the calibrated bolt, resulting in the shear plates cutting through the jumpers between the umbilical termination facility (UTA) and the subsea structure being protected	Two shear cylinders within a cylindrical housing. Umbilical components are fed through the shear cylinders. Activated by failure of the calibrated bolts at one end of the cylindrical housing, resulting in the two shear cylinders cutting through the umbilical components.
Location of Weak Links on umbilical	Assembled on jumpers between the UTA and subsea structure	Planetary cabled umbilical: < 20 meters from umbilical end Oscillatory cabled umbilical: any point on umbilical
Typical activation load	1–5 tonnes	1–5 tonnes
Maximum number of components or jumpers	Typically configured to meet project needs	Typically configured to meet project needs
Typical dimensions	Dependent on number of jumpers being incorporated	Dependent on components being incorporated
Bend protection required for umbilical	N/A	Requires bend protection at umbilical departure points [bend strain relievers (BSRs) typical]
Typical design life	25 years (dependent on coating and cathodic protection)	25 years (dependent on coating and cathodic protection)
Coating and cathodic protection	Subsea coating per Norsok M-501, with anodes included for cathodic protection	Subsea coating per Norsok M-501, with anodes included for cathodic protection
Fitting of Weak Links to umbilical	Loose item supplied for installation post umbilical installation	Fitted at umbilical manufacturing facility, prior to loadout
Packing and transport	Shipped as loose item	Suitable for reel and/or carousel packing, dependent on umbilical length
Installation considerations	Consideration needs to be taken with regard to diver-exclusion areas Requires two-point lift for installation Water depth limitations (diver installed)	Consideration needs to be taken with regard to diver-exclusion areas Water depth limitations (diver installed). Installation vessel Tensioner needs to be opened for installation to allow Weak Links assembly to pass through (umbilical hold-back system to be considered)
Preparation for activation	Installed with transport bolts to prevent accidental activation during installation (removed by diver)	Installed with transport bolts to prevent accidental activation during installation (removed by diver)
Additional considerations	Increased jumper length required to feed through plates (needs to be considered during design phase)	Needs to be brought back to the surface for repair using a repair joint. Additional Weak Links assembly will also need to be terminated further along the umbilical.
Repair requirements post activation	Requires replacement or repair of affected jumpers	Requires full umbilical repair kit

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