

SPEX™

Offshore Marine Riser Severance System



Tool Requirement

In subsea well blowouts, marine riser removal may be necessary to gain access for well capping. Traditionally this has been addressed using super shears. However, in shallow water blowouts, vertical access to deploy shears is not assured. To address this, OSRL requested SPEX to develop an explosive cutting tool for a 21" marine riser. The tool would not require vertical access and would be deployable by ROV from a vessel 500m offset from the well location. SPEX selected a pre curved linear shaped charge (LSC) solution centralised inside a two-part housing for positioning around the riser. To achieve the required operational maximum depth, SPEX analysed and verified through pressure test, the design to 1.25x the working pressure.



Specification

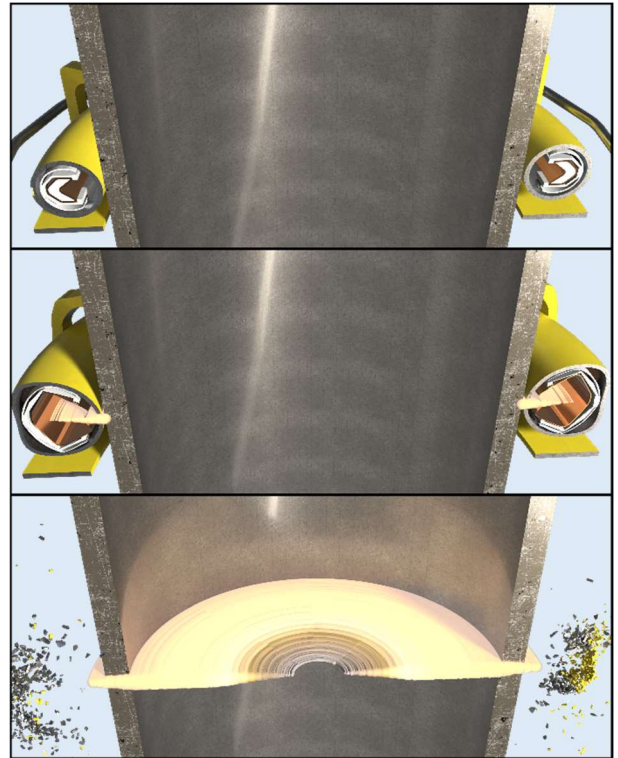
Tool weight in air	97Kg
Tool weight in water	82Kg
ROV interface	1 main lift point suitable for grabber 1 fishtail handle for closing mechanism
Surface connection	Armoured mono-core wire (e.g. Wireline unit or e-line unit) 7/32" or 5/16" wire diameter, Standard Mono cablehead
Firing mechanism	Surface initiated via firing panel. PX-1 – EBW - Perforator
Maximum working depth	12,500ft seawater (3810m)
Target (marine riser)	21" OD, 1.188" WT

Theory of Operation

The LSC is housed inside a split ring housing which is closed by ROV around the target riser. A voltage is passed down an armoured cable (wire or e-line both suitable) to the initiation system. This voltage triggers simultaneous firing of a detonator located on each half of the tool. Each detonator ballistically initiates a pair of shaped charge perforators which fire into the housing to set off the LSC centralised within.

The LSC creates a very fast-moving jet or blade of copper which is directed in towards the riser. After passing through the housing the jet proceeds to cut through the riser wall.

The blade rapidly develops from the initiation point and progresses around the circumference of the tool, completing the full cut of the riser.



Analysis of the LSC cutting through the housing and riser

