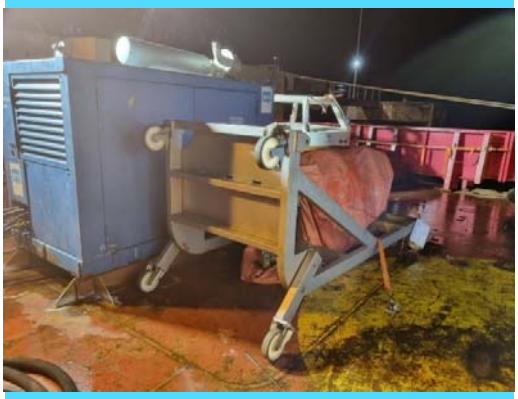
INTERNAL PILE CUTTER SPREAD



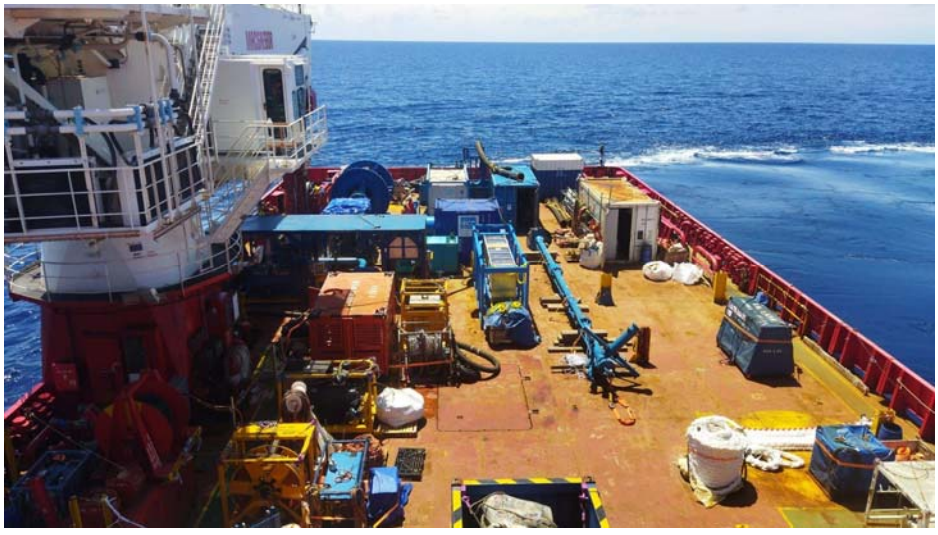
This spread was designed for Decommissioning scope, by using the concept of WAS (Water Abrasive Suspension) for cutting the underwater pile or pipe from internal with abrasive garnet which mixing in Abrasive Mixing Unit (AMU), combined to high pressure water supplied from high pressure pump (HPP). Abrasive suspension water from AMU outlet will be pumped to cutting nozzle at Cutting device via high pressure hose.

The WAS cutting system uses the kinetic energy of the abrasive grains suspended in the water stream. The material which the water jet is targeted, is abraded in a narrowly defined area and in this way cut through. The water jet escaping from the cutting nozzle acts like a fluid grinding wheel. This cutting process also known as cold cutting, will be performed without any noteworthy impacts or temperature increase in the material to be cut and thus represents a safe cutting method in hazardous environments.

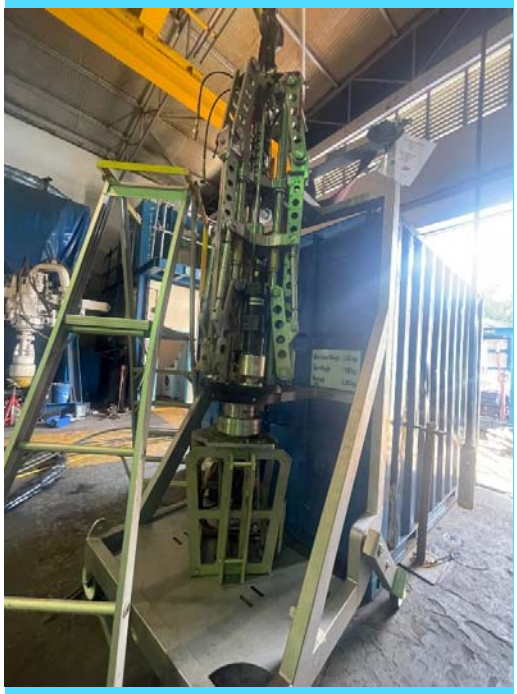
OCS occupied 2 type of cutting device as below

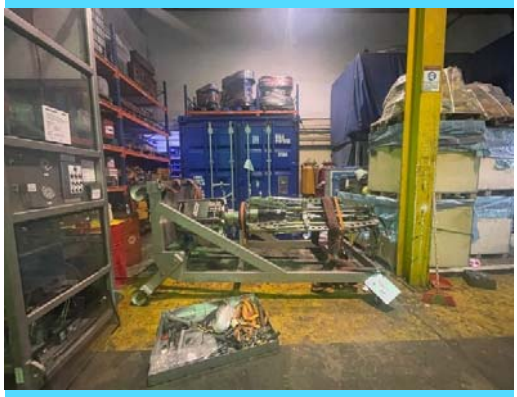
- Downhole Cutting Head 3 MK3 (DCH3 MK3) for pipe/pile in range of 30 to 72 inches OD
- Pile Cutting Head MK2 (PCH MK2) using for pipe/pile in range of 16 to 36 inches OD.

The cutting device will be equipped with essential sensors for transfer the cutting parameter data to Control unit which integrated with 3S Cut Verification System that able to control and monitor the cutting operation in the screen away from cutting location. This function is very beneficial in working as safer and faster way to operate the WAS cutting.



INTERNAL PILE CUTTER SPREAD



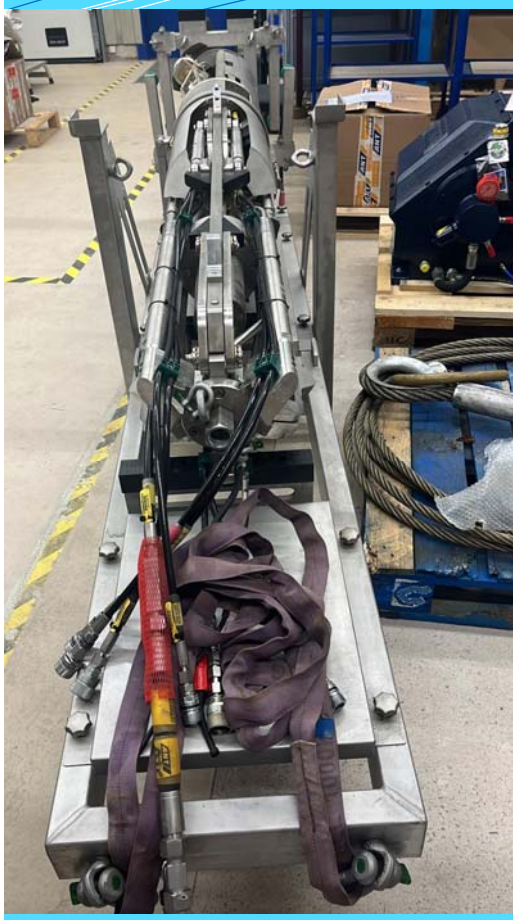


Downhole Cutting Head 3 MK3 (DCH3 MK3)

DCH3 MK3 was developed and built for the application as cutting unit of WAS jet cutting equipment. The application area is limited to underwater pipes and piles in vertical position, where the DCH3 is clamped in the inside. Then start the mechanism with cutting head, which includes the nozzle, rotates and fulfills the radial cut. The clamping mechanism and the movements of the cutting nozzle are hydraulically driven. The DCH3 MK3 must be controlled from safe distance. Integrated sensors enable the cut evaluation from the screen in Control unit.

Downhole Cutting Head 3 MK3 (DCH3 MK3)			
Range of pipe/casing for cutting	30 to 50 in and 50 to 72 in (OD) based on configuration		
Maximum water depth to operate	150 m		
Rotation speed	90.5° – 905°/hr with DCH3 Standard Drive train (i=2560)		
Maximum cutting depth or wall thickness of pipe/casing	102mm (4 in)		
Maximum pressure for WAS (Water Abrasive Suspension)	2,500 bar		
Air supply	Maximum pressured at 35 bar and maximum flow rate 30 m^3/min, oil free		
Drive	Hydraulic driven with function on Stepless clamping, endless rotation of the cutting head unit, stepless extension of the nozzle holder		
Cutting nozzle	UW Ø 1 mm		
Material	Structural and body part made of stainless steel and aluminium, c/w skid for storage and transportation purpose		
Allowable temperature for operation and storage	0 ~ 50 °C		
Dimensions (DCH3 only)	Configuration	Diameter (mm)	Approx. Length (mm)
	30″ – 50″	654	2865
	50″ – 72″	1104	2949
Dimensions (DCH3 with skid)	3300 (L) x 1500 (B) x 1500 (H) mm		
Gross Weight (DCH3 only)	Configuration	Aprrox. Weight (kg)	
	30″ – 50″	690	
	50″ – 72″	820	
Gross Weight (DCH3 with skid)	1,100 kg		

INTERNAL PILE CUTTER SPREAD



Pile Cutting Head MK2 (PCH MK2)

PCH MK2 was developed to cut underwater pipe/piles in a vertical position underwater, PCH MK2 must be lowered into a pipe/pile and clamped to hold the position. Same mechanism with DCH3 MK3 for cutting operation with nozzle. The PCH MK2 will be operated from a safe distance controlled via the Operating System from Control Unit. Integrated sensors enable the cut evaluation from the screen in Control unit.

Pile Cutting Head MK2 (PCH MK2)	
Range of pipe/casing for cutting	16 to 36 in (OD)
Maximum water depth to operate	150 m
Rotation speed	395° – 3,950°/hr with Standard Drive train (at hydraulic oil flow rate 0.6 – 6 L/min)
Maximum cutting depth or wall thickness of pipe/casing	102mm (4 in)
Maximum pressure for WAS (Water Abrasive Suspension)	2,500 bar
Air supply	Maximum pressured air supply at 35 bar and maximum flow rate 13 cu.m/min, oil free
Drive	Hydraulic driven with function on Stepless clamping, endless rotation of the cutting head unit, stepless extension of the nozzle holder
Cutting nozzle	UW Ø 1 mm
Material	Structural and body part made of stainless steel, c/w skid for storage and transportation purpose
Allowable temperature for operation and storage	0 ~ 45 °C
Dimensions (PCH only)	Total diameter Ø336 mm, Overall length approx. 3,000 mm
Dimensions (PCH with skid)	3500 (L) x 700 (B) x 960 (H) mm
Gross Weight (PCH only)	490 kg
Gross Weight (PCH with skid)	672 kg

Control Container (For Control Unit and HPU)

Control Container (For Control Unit and HPU)	
General Description	10ft DNV 2.7-1 Offshore CSC Container c/w slings and shackles, Air Conditioning Unit
Operation System	"3S Cut Verification System" PLC with touch panel HMI, which provide real-time data for monitoring and controlling cutting operation performed by a DCH or PCH. Main feature included Cutting result, Cutting quality, Cutting Parameter, Sensor amplitudes and Rotational ganging. The sensor reading can be recorded to a file for reference use.
Hydraulic Power Unit (HPU)	HPU HS202003028 Viereck & Co. c/w skid and shock absorber at legs for DCH3 MK3 and PCH MK2 operation, including pressure gauge panel for monitoring
Dimensions	2991 (L) x 2438 (B) x 2591 (H) mm
Gross Weight	3,700 kg

INTERNAL PILE CUTTER SPREAD

Abrasive Mixing Unit (AMU) 2500-100 MK2

AMU function for admix an adjustable amount of abrasive suspended in water from a high pressure reservoir to a high pressure water jet. Then abrasive suspension is pumped to the cutting device along a high pressure hose.

Abrasive Mixing Unit (AMU) 2500-100 MK2	
Skid Frame	AMU mounted in steel frame with upending function to switch between vertical or horizontal orientation during operation or transportation purpose respectively
Abrasive type	HPX 80, with concentration 10% by mass
Mixing Hopper	Capacity Volume at 100L (26 Us gal), maximum of 200 kg of abrasive garnet, Including Vibrator and sieve with 4mm mesh size for abrasive filtering. The abrasive discharge rate can be adjusted between 0 and 5 kg/min.
Range of cutting nozzle to operate	Between 0.6 mm and 1.0 mm
Maximum working pressure	2400 bar (34,800psi)
Pressure Valves Operation	Pneumatic
Operator panel	At both Filling side and cutting side for pump, valves, etc. controlling
Dimensions	AMU only (Vertical) 1495 (L) x 1075 (B) x 4150 (H) mm
	AMU (horizontal) with Upending frame 6058 (L) x 1860 (B) x 2454 (H) mm
Gross Weight	4,200 kg for AMU in empty condition
	7,820 kg for AMU with Upending frame
Connection	
HP Water inlet	M26 x 1.5, 9/16"-18 UNF LH
HP Suspension outlet	M36 x 2 / M20 x 1.5 LH
Pneumatic supply	DN8, minimum pressure 8 bar (116 PSI), Minimum flow rate 300 L/min (11 CFM)
Fresh water supply	1/2", minimum pressure 6 bar, 87 PSI, Minimum flow rate 50 L/min (13 US gal/min)

Spooler with Umbilical Reel

Spooler with Umbilical Reel	
Umbilical Length	115 m
Spooler with Umbilical Reel Gross Weight	10,000 kg
Spooler with Umbilical Reel Dimension	4873 (L) x 3100 (B) x 3480 (H) mm
Drive	Hydraulic
HPU Gross Weight	3,500 kg
HPU Dimension	2520 (L) x 1200 (B) x 2040 (H) mm

36 Kian Teck Road Singapore 628781
Telp: +65 6898 0210
Fax: +65 6898 0209
Email: info@offshore-ocs.com
www.offshore-ocs.com