



PORTABLE PERFORMANCE

# Subsea Wellhead Removal Case Study



Above: Initial test cut at Mirage Subsea HQ.

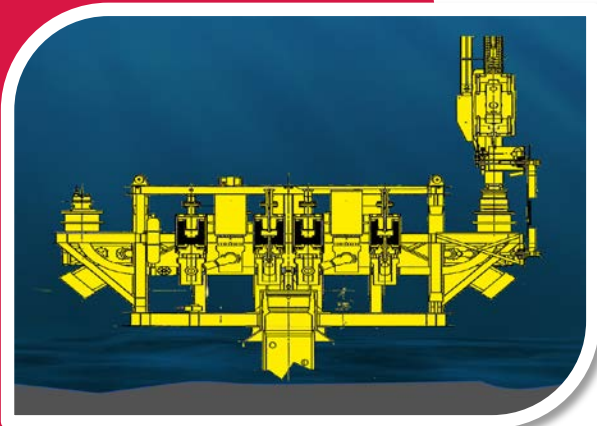
## REQUIREMENT

Our client's project was to remove a wellhead at a subsea depth of 7,000ft. Achieving this involved cutting an X-70, 36" diameter, 2" wall pipe, 3" above the mudline.

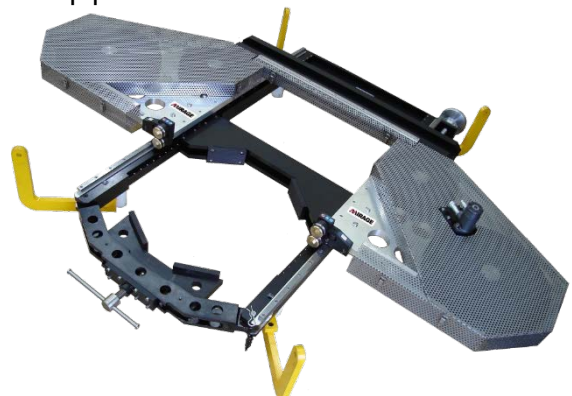
## SOLUTION

Although a diamond wire saw would be capable of making the cut on this project, this would not be the best solution, as it would require a change diamond wire rope part way through the cut, which due to the depth, would add an additional 12-15 hours to the project time.

Mirage Subsea recommended the 48" surface operated bandsaw, adapted for deepwater use. The client requested a test cut to be made, which was carried out topside at Mirage Subsea HQ taking just 18 minutes to cut through the 36" X 2" WTH pipe.



Above: Wellhead configuration at subsea depth of 7,000ft .



Right;The standard Mirage BS3248 Bandsaw prior to modification for the deepwater cut.

**SOLUTION continued**

Following the client's decision to proceed, the Mirage Subsea team developed the necessary equipment needed to allow the bandsaw to be used for this application.

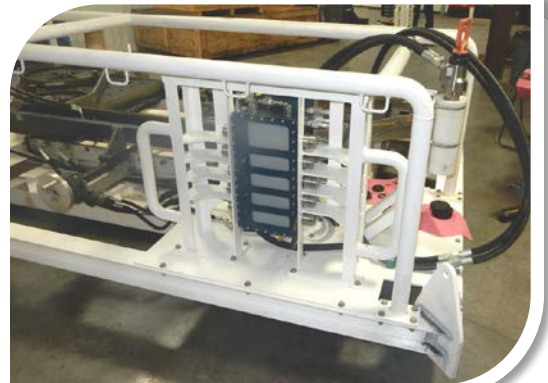
The Mirage project team consisted of Vice President, Tim Sheehan and Subsea Engineer, Randy Lewkoski, each calling on their decades of subsea project experience to integrate proven deepwater ROV tooling technology in to the surface operated tool.

**Key challenges were as follows:**

- Adaptation of the BS3248 for deepwater use, which involved the development of ROV operable ancillary equipment.
- Developing a frame design to facilitate access to the pipe situated underneath the main wellhead assembly.
- All equipment to be designed to require 100% NDT, Pull Testing.
- Testing the rig in water before delivery to the client.



Above: The frame assembly under construction.



Above: The manifold installed in the frame.



Above: Testing the rig underwater.

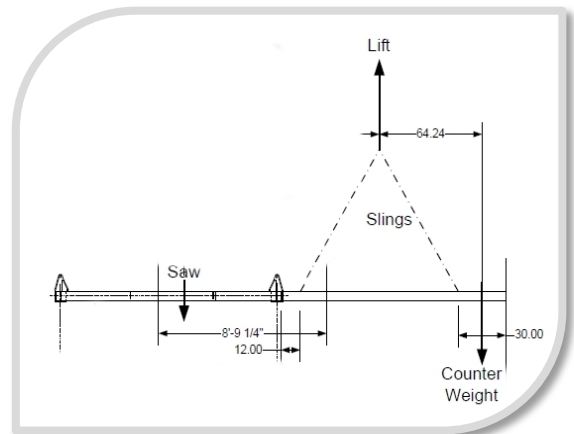
## SOLUTION continued

### Breakdown of the project

- Development of a steel frame to deploy the bandsaw, control panel 12.3 liter compensator and a crash cage. The frame also included an engineered mud mat specific to the site mud conditions and a hot stab holster.
- A last minute design of a cantilever frame, to allow the bandsaw assembly to be mounted to the wellhead underneath the main structure in the case that the structure was not able to be removed.
- Design of the ROV control panel.
- Development of a 4 function hydraulic manifold. This was used for the motor, clamp, emergency blade cutter and included 3 speed feed circuits to vary the feed motor speed during cutting through the top and bottom crown of the pipe.
- Design and manufacture, in the time required and within budget, a high volume compensator to accommodate the 7,000 FSW pressure differential.



Above: The whole assembly mounted into the cantilever frame.



Above: The cantilever concept.

## PROJECT OUTCOME

The wellhead was removed successfully, with all Mirage equipment performing as expected.

Although the bandsaw is capable of making fast cuts, the decision was made to carry out a much slower cut over 3 ½ hours. This ensured a successful and single complete cut, without the need to retrieve the bandsaw to replace the blade.