



FLANGE TOOL INNOVATION

CASE STUDY

CS-2013-02

LIFTING OF SUB-SEA HANG-OFF

LIFTING FPSO HANG-OFF BEND RESTRICTOR FLANGES TO ACCESS CORRODED HYDRAULIC HOSES

MINIMAL AND ZERO-GAP FLANGE SPREADING BY DIVERS

ASSIGNMENT

CUSTOMER:
SUBSEA ENGINEERING AND CONSTRUCTION COMPANY

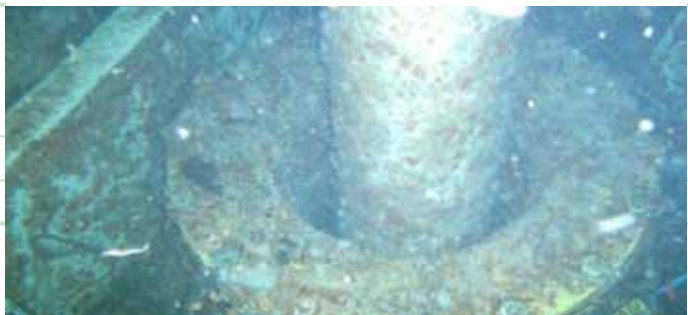
LOCATION:
NORTH SEA

DATE
2013

were found to lack the nylon spacer rings which should maintain a flange access gap. As a result the hang-off units had dropped so that the flanges were face-to-face, and heavily corroded together.

PROBLEM

Dive teams had been unable to spread some of the hang-off unit flanges due to their being insufficient gap available for the normal spreading wedges to be employed. The spreading force was unknown, though the weight of the hang-off including the bend-restrictor was thought to be around 10T. Heavy corrosion was suspected, so it was feared that considerable force would be required to break the initial adhesion between the flange faces.



BACKGROUND

Equalizer International were approached to suggest appropriate tooling for a difficult flange spreading scenario.

While inspecting and servicing hang-off connectors on the chain-deck of an ageing FPSO vessel, many



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TRADITIONAL METHODS

Hammering steel wedges into the gap risked injury and damage to the flanges and hydraulics. Using hydraulic pancake cylinders to jack the flanges apart was slow and fiddly, and required the insertion of packers, then further jacking, with the process becoming tiring and difficult.

EQUALIZER RECOMMENDATIONS

The geometry of the flange was requested and closely inspected by Equalizer International. 3-dimensional CAD models of the parts were created, and various tool geometry was inserted prior to any recommendations being made.

Two alternative approaches were selected as being the most appropriate:

SOLUTION #1

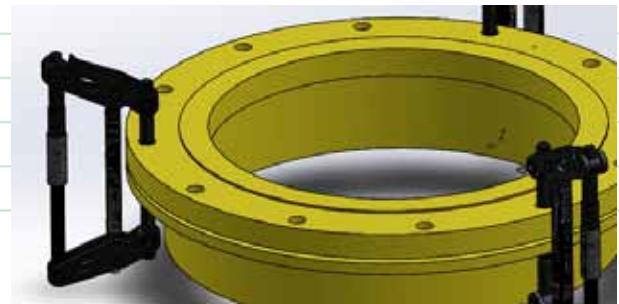


The MG7TM Mini-Gap flange spreader was proposed for the flanges where some degree of access gap was apparent, or where an initial gap had already been achieved. Three of the tools were recommended to be installed equally spaced around the flange, and the tools were intended

to create sufficient gap for the SW15TE tools to be installed, 6mm.

SOLUTION #2

The SG11TM tool was proposed for the flanges where no access gap was apparent. Three of the tools were recommended to be installed equally spaced around the flange. The lower flange was only 25mm thick, so in-house



prototype bolt-holes were created and testing was carried out to ensure the collets would grip effectively into such a short bolt-hole area.

MOVING FORWARD

Further to the success of the project, additional tooling has been discussed for subsequent mobilisations, primarily the use of SW120/25TE Flange Spreading Wedges which could enable a spread of 104mm by using the Stepped Block attachments. This would allow the 100mm jacks to be installed and remove the use of any packers, a clear benefit in terms of the reduced risk of slippage and dropped objects.

CUSTOMER BENEFITS

- Offering a spreading solution where no other safe options existed
- Sufficient lifting capacity for hang-off & bend restrictor
- Safe, controlled raising and lowering
- Varied toolkit of options available to the dive teams
- Reduction or removal of packers and other loose objects

TECHNICAL ENQUIRY?

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