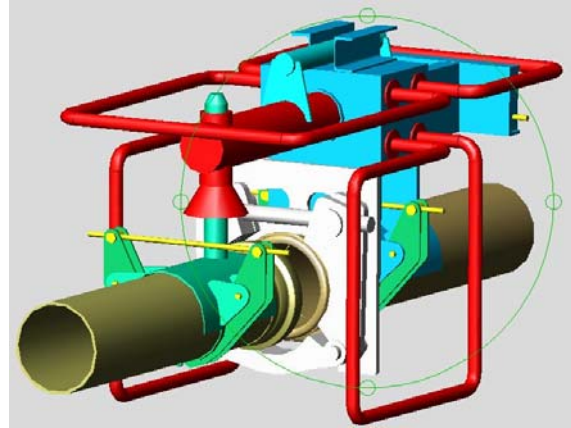


## Diverless Connector Assembly Tool

### What it does

A diverless connector assembly tool (DCAT) has been developed by Trevor Jee Associates, to enable the installation of mechanical connectors subsea without the need for divers. Used in combination with Grayloc mechanical connectors and a remotely operated vehicle (ROV), operators can install the connectors onto pipelines and spoolpieces without the need for costly diver spreads or shutting down topside operations on nearby facilities.



The basic principle behind the tool centres around three key procedures:

- Manoeuvring the tool over a guidepost to bring the connector hubs into coarse alignment
- Mechanically pulling the two connector halves together, until within rotational and axial capture tolerances of the clamp
- Flushing and make-up of the connector using the ROV operable clamp

### Case Study

The DCAT was initially developed for Clough Unithai Engineering Ltd (CUEL), with fabrication due to take place in early 2004. They are then planning to use the tool on a regular basis, to install spoolpiece tie-ins at platform approaches. The absence of a diver for these installations will enable CUEL to continue topside operations as the spoolpieces are installed.

A further study is currently in progress, which is investigating the feasibility of modifying the DCAT for use with standard Grayloc clamps instead of the remotely operable type. This would lead to significant savings per connector installed, as the remotely operated mechanism would be built into the tool. This allows it to be retrieved and re-used.

### Benefits

- Can operate cranes in drop-zone whilst installation continues
- Allows use of mechanical connectors in deepwater applications
- Installation procedure can be reversed to retrieve and re-use or repair spoolpiece or pipeline
- Grayloc connectors proven to be at least as strong as the pipeline
- Low cost connectors
- Easily deployable from an ROV DP construction vessel
- Simple mechanical tool – no power, comms or hydraulics
- 4-16" size range
- Operable by standard workclass ROV's

### Applications

- Rigid spools and pipelines
- Flexible jumpers
- Deepwater and diver depths