Modular Rig suitability assessment…

…Engineering phases

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INTROCUCTION

The use of a mobile modular lightweight rig designed to perform drilling, workover and well interventions services, and are ideally suited to support and service Intermittent Operator sequencing and provides a number of both soft and hard issues for the client and contractor industries.

By design, Modular Rigs are very flexible with respect to installations on a range of platform styles (i.e. standalone wellhead and or production) and in performing numerous 'well work' related operations (work over, drilling and remedial well intervention).

For 'Offshore Platforms' which have surpassed their development and primary production phase, Modular Rigs are a tried, tested and trusted mode of operation, which provides Platform Operators (*Dry Tree Market*), with a safe, cost effective and efficient means of remedial well work without the major investment / re-investment and operational & maintenance costs associated with a traditional Platform Rig, or alternatively, engaging a Jack Up Rig and the associated Marine support, to address their Well issues.

The use of a mobile lightweight modular rig to perform the broad spectrum of well maintenance and remedial operations, including:

- Select Side Track Drilling
- Well Work Over / Re Completion,
- Heavy Intervention: i.e. Though Tubing Fishing / Milling / Plug Installation - Recovery and coiled tubing,
- Well Kill, Scale Squeeze, Zonal Isolation,
- logging operations etc.

is well documented.

The primary challenge faced by both the Operator and the Contractor, in using a lightweight modular rig, is the safe and compliant installation and operation of the modular rig on the facility.

This is achieved by conducting a structured and robust ***Modular Rig Suitability Assessment*** Process.

The 'Assessment Process' is structured into a 'Multi-Phase' Engineering Process covering initial conceptual / feasibility review, and ultimately through to Onsite Construction and Integration Testing of the Modular Rig Package with the 'host' Facility.

A high level overview of the Engineering Phased Approach to the Suitability Assessment is presented in the following pages.

Phase 1. Feasibility Study – Desktop Study

The Feasibility Desktop Study is an office-based study. The primary focus of the study is to establish whether a Modular Rig can be installed on the installation / location.

To understand the equipment requirements, we first need to establish the operational parameters of which the client wishes to achieve. For example, well programme, string weights, torque, power system standalone / location supplied, fluid & system requirements, bulk storage, and so on.

The study would investigate what existing facilities can be re-utilised (if available) to reduce the need for rental equipment and additional modular equipment on site. The findings of the desktop study shall form a detailed task and checklist to be verified during *'phase 2'*. The desktop study phase can take between 3 -6 weeks depending upon complexity.

Phase 2. Feasibility Study – Site Survey

The Site Surveys consist of a team of personnel travelling to the site / location to verify the findings of the desktop study, establish condition of existing equipment (if applicable) and capture any anomalies. The personnel shall be of Operations, Structural, Mechanical and Electrical discipline. The Site survey duration could take several days depending upon complexity and access to site.

Phase 3. FEED Study

The Front-End Engineering Design (FEED) Study is conducted post Site Survey / Inspection. The aim of the study is to prepare technical specifications and scopes of work for the Modular Rig interface and if required equipment modification, conduct HAZID and Safety Case review activities. At this stage 'costs estimates' to conduct engineering activities and high-level material costs would be established.

Phase 4. Detailed Engineering – Modular Rig Interface

Phase 4 consists of Detailed Engineering Design, Inspection, HAZOP and Procurement activities. Utilising the data gathered during the FEED Study, the information is developed in detailed Engineering Drawings, Work-Packs. Material and Engineering CTR's are revised during this phase.

If during the Site Survey it is established that existing equipment shall require more detailed inspection by OEM or NDT companies etc., this shall be carried out at this stage.

The deliverable of this phase is to establish and present the Engineering Work-Packs, Cost, Time and Resources required to fabrication and delivery of the Modular Rig Package interface activities to allow the Modular Rig Package to be mobilised to site on a "Plug & Play" basis.

Phase 5. Engineering Interface Project

Phase 5 is the onsite construction project, where integrated engineering, construction and operations teams are mobilised to the location to conduct the required 'interface activities' required to install the Modular Rig on the location.

These activities for example can include tie into location Fire and Gas system, Emergency shutdown system, Seawater, Firewater and Fuel oil supply, Power supply, Bulk and Fluid systems. These activities are conducted off the 'critical path' ahead of mobilisation to mitigate any exposure to delays during the Modular Rig mobilisation.

Conducting the 'interface activities' ahead of mobilisation allows for small construction crews to be located on platform whilst minimising impact on daily location activities.

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