Cost Reduction Initiative for the New Era

Cleeton Compression extends CRINE Culture

by the Cleeton Alliance,
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The Project

Originally estimated at over £58m, sanctioned at end of concept design for £40m, now incorporating scope growth of approximately £0.5m, the Cleeton Compression project is currently forecast to have a final cost of approximately £33m, representing a saving of some 40% over original estimate and 18% over sanctioned cost. This is for a facility which consists of a 1038Te (installed) compression module sitting on a jacket in 50m of water, bridge connected to the existing Cleeton Production and Accommodation platform.

The firsts claimed by the project include;

- the first project to have a supplier as a full participant in an Alliance
- the first project to fully utilise life cycle techniques to set and link CAPEX and OPEX gainshare.
- the first BP project to involve major modification to an existing operating platform on an Alliance basis and under an existing safety case based on a pre-Cullen design.
- The first project to make use of the common working practices arising out of the CRINE initiatives

These firsts have been managed under a project culture where CRINE principles have been fully exploited to achieve outstanding success. This article describes the relationship between fabricator and designer in this context from the perspective of BP (the Operator), Trafalgar John Brown (the Designer), and Brown & Root McDermott (BARMAC - the Fabricator).

Organisation & Relationships

Introduction

Whilst creative design has a significant impact pre-sanction, and CRINE deliverables like common working practices have a degree of impact post-sanction, without a doubt the single most important factor for a successful project is the way in which people contribute. Having collectively analysed our performance to date we have appreciated how important the CRINE buzzwords of openness, commitment, trust, team work, and empowerment have been to the current achievements. And this culture flows top down.

Alliance Contractual Basis

At the top-most level a significant amount of effort was spent in agreeing a legal contractual basis which;

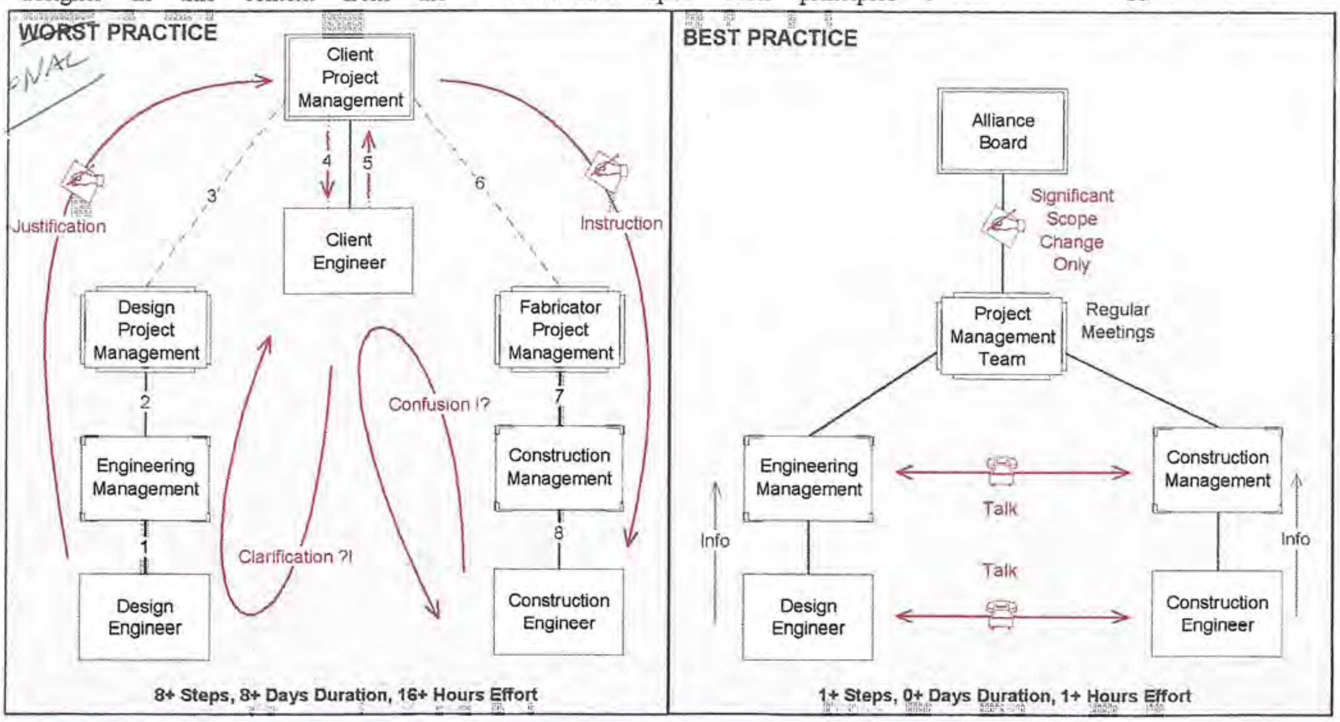
- fully empowered the Alliance board by delegating to it responsibility for the implementation contracts.
- in the event of any conflict between implementation contract and Alliance agreement gave the latter precedence.
- established open book principles between all members of the Alliance - including the right to audit BP costs.
- removed all commercial liabilities outside of Alliance gainshare.
- had identical contracts, with the exception of scope appendices, for all parties.

By having this contractual basis, the Alliance management team has been able to;

- fully adopt the principle of mutual support, regardless of individual performance.
- embrace significant movements of scope to the benefit of the whole.
- maximise the concept of "best man for the job" e.g. BP engineering input accountable to TJB design management.
- resist those occasional corporate pressures which are unaligned to Alliance principles.
- encourage adoption of CRINE type practices.

Open Communication and Trust

Having empowered the board and established the management team, the project has been able to cascade empowerment down to individual engineers. This has led to one-to-one communication resulting in significant cost savings - a total of five (5) formal site queries have been logged - and fabrication



is 45% complete! However this requires;

- responsible, experienced engineers who are commercially aware enough to filter sensitive issues up the organisation.
- "hands-off" project management and controls and trust in the people.

The Non-Cultural Achievements

What Achievements to Date?

The following specific design / fabrication achievements contribute to the 18% CAPEX savings identified to date;

- Increased fabrication productivity at 25% overall and 32% for structural.
- Anticipated rework at under 1% and much better "holds" management.
- Early completion - at least one month ahead of schedule overall.
- Single shift working.
- 5% to 7% structural material wastage compared with 15% traditionally. More efficient bulk steelwork take-off and procurement allowing for further savings of 5% to 10%.
- much reduced site structural drafting - 3 draughtsmen, peaking at 5, compared with 10 to 15 normally.
- significant reductions in inspection, welder re-qualification, hydro-testing, NDE, etc..
- much reduced design man-power peaking - 20% to 30% less than on a traditional contract.
- negligible expensive site presence by the design team.
- less expensive construction.
- 10% to 15% design house savings

How Have We Achieved This?

CRINE Working Practices

The Cleeton Compression project has used the following practices;

- Primary Steelwork Fabrication.
- Non-primary Steelwork Fabrication.
- Pipework Fabrication, Installation, & Testing.

Benefits

- Less prescriptive, allows use of in-house practices.
- Eliminates duplication of QA/QC.
- No need to re-qualify existing weld procedures, or write additional ones.
- Applies the concept of criticality to reduce unnecessary inspection, NDE, and testing (but see below).
- Recognises use of smaller sub-contractors for non-critical work.

Potential Pitfalls

- Unclear mechanism for identifying "criticality"
- Temptation to add project specific "addenda" - totally counter to the principle of the practices.
- Interference by "experts" with self-interests
- Danger if used by a "cowboy" organisation.

Aside from the cultural issues already discussed, following are the specific steps which have contributed to current success;

- early involvement by the fabricator in establishing and requesting significant changes to design details. Structurally this included a 50% reduction in deck-beam section size variations, a move away from light weight heavily stiffened members to slightly heavier sections, and design modifications which allowed for low cost pre-fabrication of sub-assemblies.
- significant early fabricator input ensured that design documents contained construction information; weld details, piping spool breaks, field fit welds, etc..
- a move away from fixed artificial AFC milestones toward phased release of drawings to match fabrication requirements.
- more timely release of support information; e.g. cable tray runs, lighting layouts, concurrent release of piping isometrics and supports - minimises post-paint rework.
- movement of steel-work material take-off and procurement scope from designer to fabricator.
- use of CRINE originated Common Working Practices (see separate box).
- extensive use of electronic transfer of drawings, material information, and lists via floppy disk and email.
- interactive and full multi-discipline use of the very visible 3D PDMS model, extending its application to non-traditional areas, e.g. small bore piping.
- active participation by all in the Ideas for Improvement (IFI) system and an environment which encourages feed-back.
- increased awareness of factors which drive the fabrication costs.
- above all, the principle that the designer is a service to the fabricator.

Room for More?

Design is largely complete, most equipment and materials have been delivered, and fabrication is 45% complete, however, there is still room for further achievement. Because there is such an open relationship we have already collated feed-back on areas for further improvement next time:

- completely revisit the traditional procurement cycle and the way in which the interface with package suppliers is handled.
- review the invitation for tender process, the practice of fixing large elements of cost which are, in fact, variable, and the mechanism for accessing the impact of design change on fabrication.
- investigate other areas where more procurement scope might be with the fabricator.
- further improve incorporation of fabricator information within design deliverables.
- extend the use of electronic and visual communication
- revert back to fabrication spool drawings and erection piping isometrics but generate both of these from the 3D design model.
- further refine the timing of events between fabricator, designer, and supplier programmes.
- significantly improve the flow of engineering information into the commissioning systems.

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