# Cleeton Compression for the New Year

**NEWSLETTER FOR THE CLEETON ALLIANCE AND FAMILIES**

## Other Pages



## International Recognition for CC Alliancing Achievements

The **European Institute of Advanced Project and Contract Management (Epci)** recently invited Martin Daniels, Deputy Project Manager (TJB) to present the Cleeton Alliance method of project execution to delegates in Stavanger, Norway.

According to research carried out by the Institute, the project has advanced the Alliance way of working much further than any other project and should be a basis for future projects to follow.

Senior management, mainly from Oil and Gas companies based in Norway, were so interested in what was being said that the session, originally planned for two hours, extended through most of lunch, lasting for a total of five hours.

Normally a fairly exclusive club, funded by a significant number of major client and contractor organisations, Epci have also requested that a paper be presented at their annual conference next year.

## CRINE Invites Project to Present its Best Practices

In further recognition of the success of the Cleeton Compression Alliance, Chris Harrison (Project Manager) and Martin Daniels have been asked to present at the annual CRINE conference to be held in London at the end of January.

**CRINE**, standing for **C**ost **R**eduction **I**nitiative for the **N**ew **E**ra is a high profile Government supported initiative sponsored by many companies in the Oil and Gas business with the aim of maintaining a competitive and active UK industry. The culture embodied within the initiative is currently being spread both across other industries and within other countries.

In addition to the conference paper, four specific practices are being incorporated into a CRINE Best Practices publication. The next issue of CRINEWATCH, to be published early in the New Year, also devotes its entire centre spread to some of the lessons learnt by the project.


## Project on Target for 18% Savings

The outcome for the project is now forecast at approximately £33m, representing a saving of 18% under approved budget, and over 40% saving on the original estimate.

Originally targeted to be ready for operation by October next year we are also one month ahead of schedule. After some uncertainties over gas contracts, which might have meant a delayed start-up, Cleeton is now producing at full nomination - early arrival might well be beneficial.

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# The Gas Turbine Driven Compression Package

## The Heart of the Cleeton Compression Platform


Describing the compressor as the heart of the platform is more appropriate than it first seems. The compressor itself occupies the small space in the middle of the module - indicated by the red item in the picture alongside (from the 3D model).

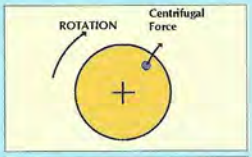
The grey mass to its left are mainly parts of the gas turbine used to drive the compressor; the chimney like exhaust stack in the centre and the louvered inlet ducting upper left. On top, toward the back, are the air coolers. In the foreground are the pipes used to carry the gas and utilities; water, oil, air, etc., and the cable trays for the power and signalling cables to be installed.

In order to make the compressor visible, the lube oil skid has been removed from this view. The rest of the kit, described briefly in the last issue, is not visible.

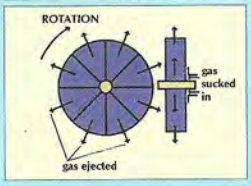
## The Centrifugal Compressor - How Does It Do That?

The compressors used in the Oil Industry are either of the centrifugal, like a fan, or reciprocating, like a foot pump, type. They are used to elevate the gas pressure to a level which assists in; either the transportion of gas from one point to another, or, achieving a chemical reaction which requires a higher pressure than normally available, or, returning gas into an oil well to maintain oil production (gas lift or reinjection).

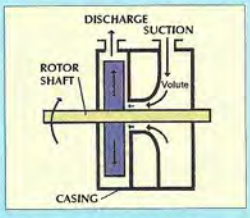
The Cleeton Compressor accelerates reservoir production by drawing in more gas at the suction nozzle in order to maintain a given flow rate and discharge pressure at the discharge nozzle. The principle is described below..



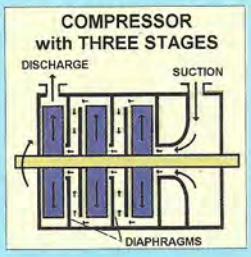

Centrifugal force is one which applies to any mass which is being swung and will tend to force the mass to the outside of the curve. This is true for a car going round a bend, a child on a roundabout, or specifically for gas going around an axis. If nothing retains this mass, it will be flung away from the axis of rotation, faster and with more force.




In a centrifugal compressor the gas is directed to the centre of an impeller mounted on a shaft which provides the rotation. It is pushed towards the outside of the impeller for the reason explained above. During the travel to the outside of the impeller, the pressure increases. This pressure increase is greater the faster the impeller rotates or the greater the mass of the gas.




To make a single impeller compressor all that is needed is to place around the impeller a steel casing in a manner which guides the gas from the suction to the centre of the impeller and from the outside of the impeller to the discharge. The chamber at the entry of the compressor is called a suction volute. Its role is to guide the gas into the impeller wheel.




For most applications the pressure increase from a single impeller is not enough to obtain the discharge pressures required. It is therefore necessary to force the gas to circulate successively through several impellers, all mounted on the same shaft. This assembly constitutes a rotor. The internal guide walls which separate the different impellers from each other, and also guide the gas to the following impeller, are called diaphragms.

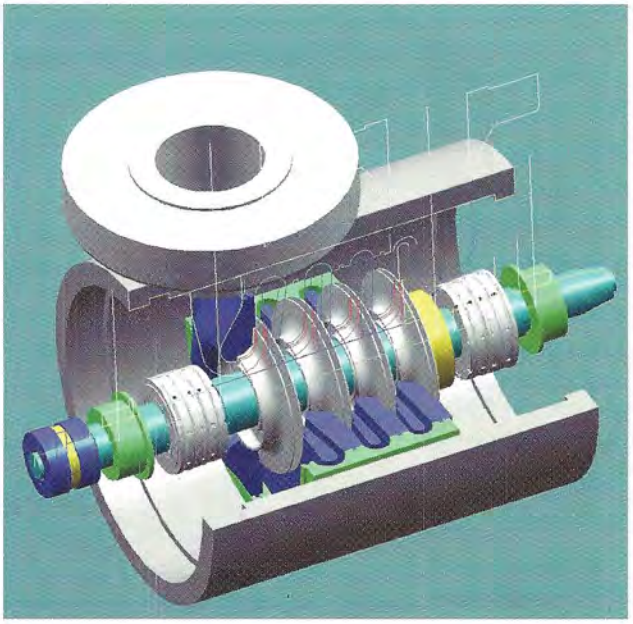
The compressor is completed by bearings at each shaft end and seals to contain the gas. For the Cleeton application we are initially using six impellers, in later years this will be increased to nine as the field depletes. Our compressor is driven by a gas turbine.

A 3D cutaway view of a typical compressor is shown below.

To the right is a photograph of our specific compressor, excluding the gas turbine driver, taken approximately one week before shipment to Nigg.

The panel on the left of the photograph supports much of the instrumentation for the machine. Some of the pipework connections can clearly be seen ready for welding up on site.

Apparently it took three attempts to agree on what colour the support skid was going to be!



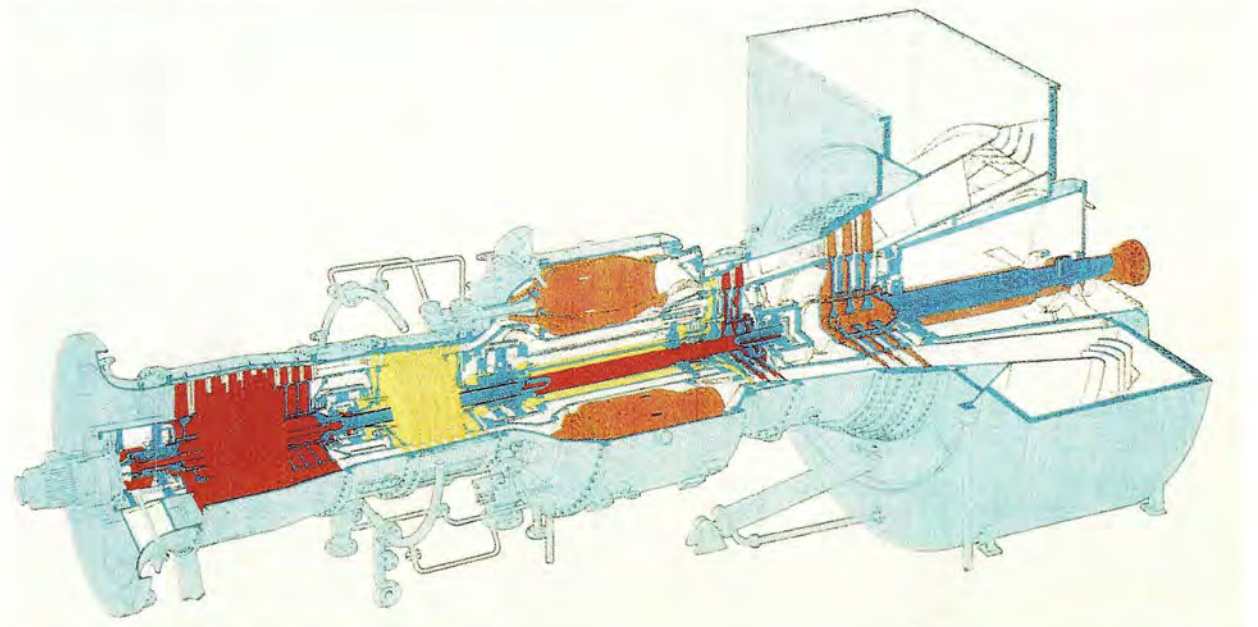
## ABB Stal GT35 Gas Turbine

Shown below is a cross-sectional view of the gas turbine driver. In terms of value, size, and complexity, it is a more significant piece of equipment than the compressor but it is still just its driver - albeit delivering approximately 13MW of power.

Paradoxically, the inlet of the turbine, to the left of the diagram, consists of two compressors! These force air into the combustion chambers. The latter, pictured in orange, have fuel, in our case produced gas, fed into them. The air and fuel are mixed and burnt causing a volume increase which can only expand via the turbine blades

It is this latter action which causes the shaft to rotate and which provides the driving force needed for the compressor. Finally the exhaust gases are ejected through the outlet ducting.

Because air will not be drawn in until the shaft starts rotating, and the shaft will not self-rotate until the fuel can burn in air, there is a separate electrical motor (not shown) which starts it.



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# People - Beyond Management!

This page is half an attempt at redressing the balance between senior management and those people at the next level in the organisation who turn the handle. Unfortunately, I am guilty of having most photos of those who I came in contact with when I happened to have a camera on me - so apologies for the Paddington bias and total absence of Seaway, TJB Offshore Services, and BP representation - next time perhaps?

Over the last couple of months we have had a number of "lessons learnt" sessions and two things have become apparent. Firstly, that there is an almost unanimous consensus that Cleeton Compression has been one of the best projects to work on from a personal perspective. Secondly, that the success of a project is down to how people contribute. Whilst credit has to go to management for providing an environment which has encouraged contribution, openness, and trust, we have been very fortunate in having a team of people who have created opportunities by taking on new responsibilities and coming up with ideas to maximise value to the project

The focus for the project has moved from engineering to construction and a significant number of people are now leaving to do other things. The "management" have asked me to thank all of those, past, and present, who have helped to create what, at this time, appears to be an outstanding success.

## Those Caught on Camera

Left to Right from TJB Paddington
Darrell Tucker (inset)
[Alliance Safety Manager],
Paul Cavallo
[current Lead Process]
Scott Greengrass
[Lead Piping and Layout],
Jeremy Jacobs
[Lead Structural]
Tony Daniels
[Lead Mechanical]
Phil Bell
[Lead Electrical & instruments]

Again Left to Right and all TJB John Morgan [Procurement Manager], John Gosling [Project Services Manager], Martin Keys [previous Lead Process], Ken Halse [Engineering Manager]:

L to R (BARMAC) : Bill Lawson [Fabrication Engineering Manager], Graeme (I am not a convict) Lister [Project Engineer], Neil MacArthur [Construction Manager], and (from Dresser Rand) Claude Rognin [ Project Engineer].

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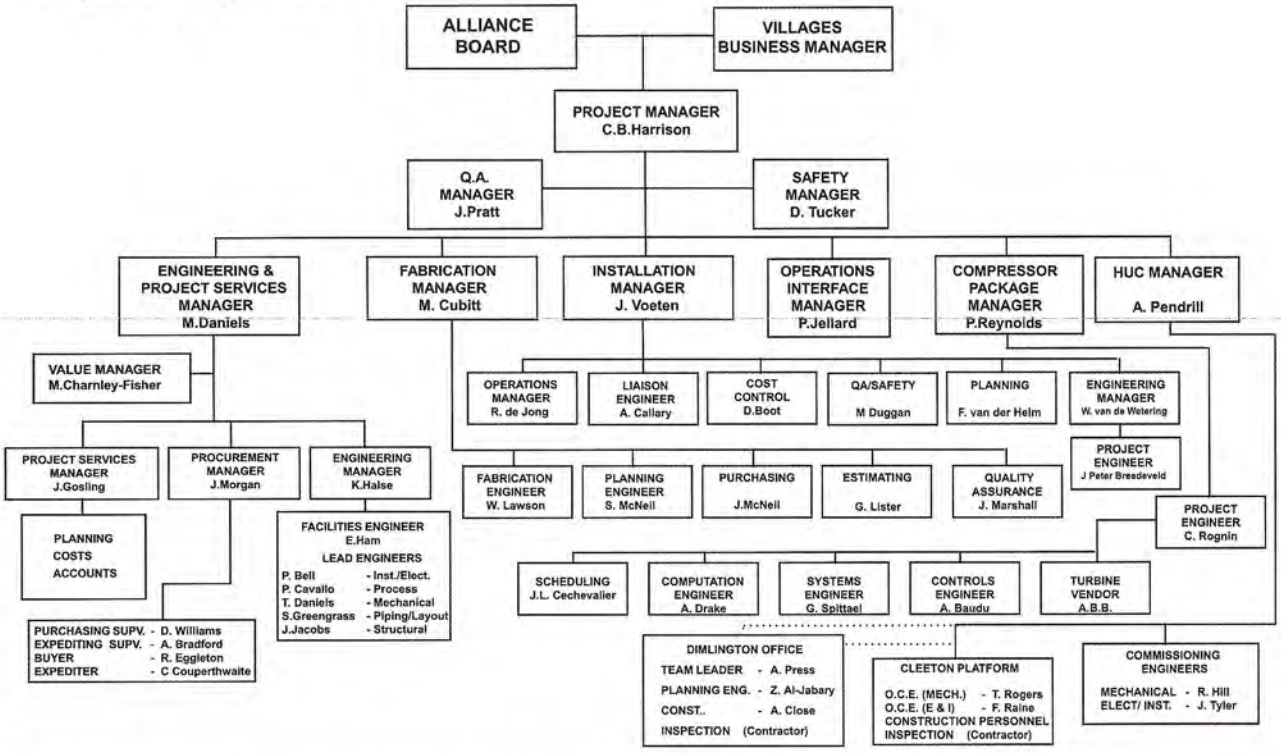
## Project Organisation Chart - And Those I Didn't Catch on Camera




# Status Update (and the Real Coalescer)

Focus has now moved to site with design virtually complete. Whilst a few activities, such as Safety related ones, are still going on in Paddington, the Electrical and Instrument group have relocated as has ongoing piping support.

Chris Harrison, Philip Jellard, and Elroy Ham, the BP component of the team have also moved.

In terms of physical progress, the structure came out of the paint shop, and the Coalescer has been lifted into place prior to the module being brought back into the main shop for fit-out.

All major equipment packages have been delivered as have the majority of bulk materials.

Piping fabrication has proceeded roughly to plan with most of the spools ready for erection - thus minimising the possible requirement for expensive labour.

Electrical cables are now being installed, with the focus on clearing the Local Equipment Room so that the major power and control systems can be made live.

Productivity at the yard, a direct consequence of working closely together, has improved by 25% over the norms, anticipated rework is minimal, yard drawing office costs have been significantly reduced, particularly in structural - all contributing to the overall savings.

The next major focus of attention is on completing E&I work and moving on to completion and commissioning.

The photograph below is of the real Coalescer, being fitted out with piping. In the few weeks since this and the front page photo were taken much more progress has been made.

# An Example "Opportunity" - Mechanical Completion


The above figure is a simplified flow chart which illustrates the opportunities which can arise when there is a culture which both accepts challenges to traditional methods and embraces change if they shown to be previously inefficient.

The "traditional" side of the flowchart follows the life-span of an Inspection Test Report (or ITR for short). Its intent is to ensure that a procedure is followed for testing kit prior to systems going live.

Over the years, in order to "make sure" that the tests have been done a complete process has evolved for approving and storing these test sheets - the traditional approach.

Whilst there is as yet no industry standard ITR, and the project did unfortunately go through the first phases of the "traditional" route, the project is adopting a practice which thereafter follows the "best" route.

This eliminates unnecessary approvals, storage and handling of documentation and instead employs spot audits to ensure compliance with procedure.

Like many opportunities, this relies heavily on trust that those doing the work know what they are doing - without this the approach fails.

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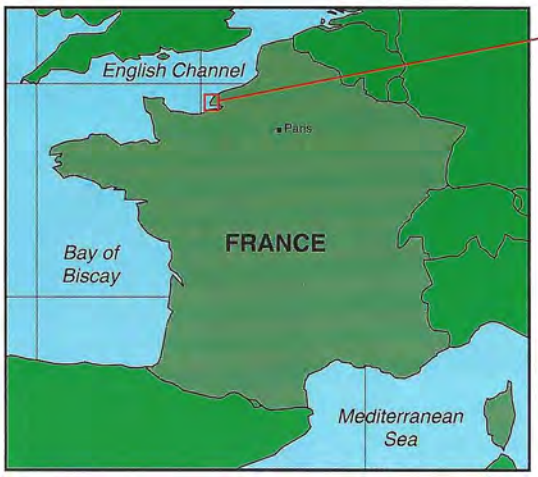
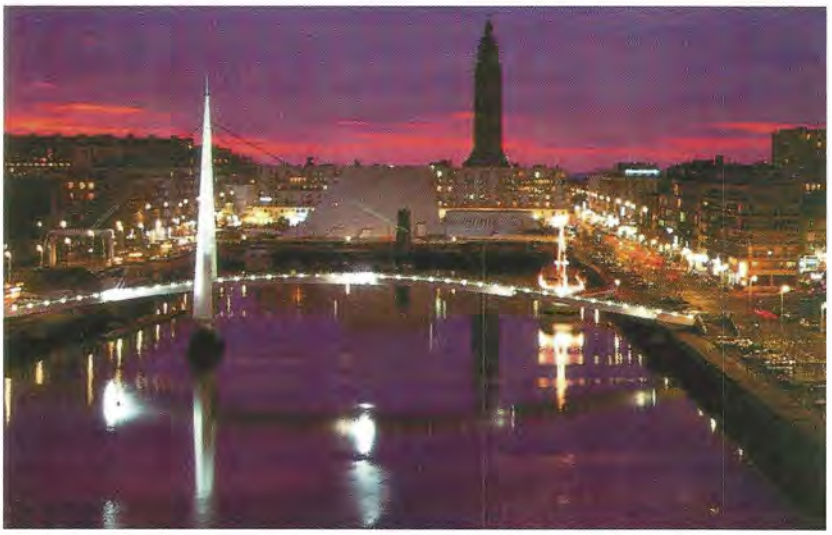
# Project Locations - Le Havre

## Home of DRESSER-RAND

TURBO PRODUCTS DIVISION







## Places to See and Eat

The most noticeable feature when you arrive in the centre of Le Havre is the unusual pedestrian bridge spanning the dock (see left) and the peculiar shaped theatre / leisure complex in the background. There is still something left of the ancient town including a museum and cathedral, but the main area of interest to the visitor is probably the harbour and yachting area.

Enough of the things to see! there are a couple of reasonable restaurants in the town although none with Michelin stars. Le Grignot, below, provides welcome refreshment for the late arriver travelling on the turboprop from London Gatwick.

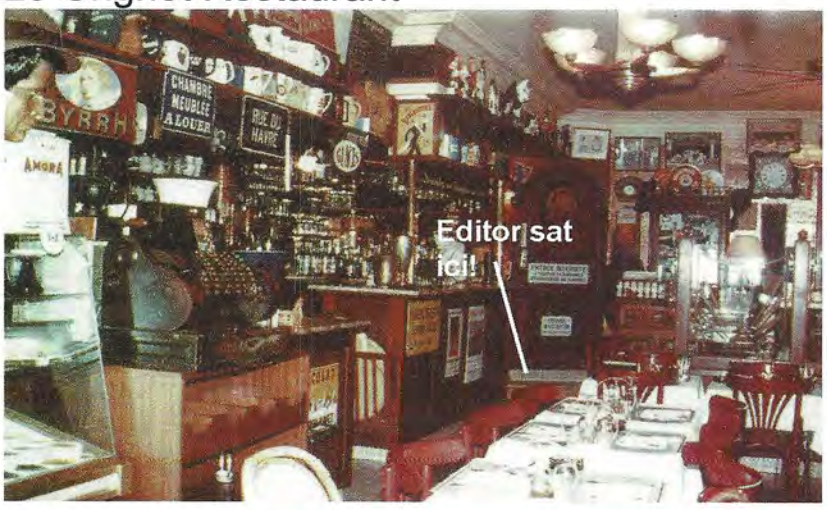
## The Town

Le Havre is situated at the mouth of the Seine in North Western France. Its main claim to fame is that it is the second port of France, after Marseille.

As it says in the Blue Guide to France it "is of little attraction to the visitor without commercial or maritime interests" - one way of saying that you are unlikely to spend a holiday there.

Much of the reason for this is that, as a major port, it was a target for extensive Allied bombing during the War. However, as an industrial base for Dresser Rand France activities it is ideal. There is also an airport but there is no need to rush to check in!

## Le Grignot Restaurant



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## Compression Team Win BP Dimlington Golf Trophy - They Wish!

Representatives from the project team entered the BP Dimlington golf tournament held earlier in the year. Whist the team didn't win they came a creditable second overall. Pictured left to right are Bill Lawson, Derek Williams, Brian Impey, John Morgan, Dale Ewles, and Phil Bell. Apparently Bill didn't play as well as he should - hence the slightly glum face.

Competition to join the team was fierce and a local London based pre-qualification round had to be held to determine who should go.

## Cleeton Births

There was originally going to be a competition along the lines of "whose the real father, and why?" but I didn't get enough response to run it sensibly.

The pictures below are of Harry Voeten, born on the 3rd March, 1995 at a weight of 3620 grams (full face), and Jonathan Charnley-Fisher, born 20th, February 1995 (crawling). Both of these photographs were taken for the previous issue of the magazine so both are now five months older.

There have been one or two other births during the course of the project but I do not have the details

## New Competition

A bit cruel this time! The picture below is a composite created by combining a well known vertebrate with a photograph of one of the individuals who has appeared in this or the previous issue The competition is "Who is it? And Why!". The most imaginative answer sent to Chris Harrison will be rewarded with a suitable prize.

## Ian Cameron Wins Competition for Best Contribution to Previous Issue

Chris Harrison hands over a bottle of Champagne to Ian for his contributions to the last issue of the magazine.

Martin Daniels hangs on in the background - presumably hoping he might get a glass..

In practice Ian was the only non-editorial contributor so whilst his contribution was good - there was no competition!

Given that Paddington activities are winding down, contributions and suggestions for the next issue are probably best sent to Nigg, care of Chris Harrison.