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Project alliancing in the offshore industry

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In this paper the shift towards new types of project organisation within the Offshore Industry is explained and discussed. Special focus is given to the organisational concept of Project Alliancing. The principles, structure and culture of a Project Alliance as applied within the Offshore Industry are described. In the paper the organisational concept of Project Alliancing is discussed on its potential to reduce project costs and enhance profits, both for the operator (oil and gas company) as well as for participating contractors. A Risk and Reward Mechanism developed to share project risks and rewards between allied parties is explained for an alliance case. Based upon an in-depth study carried out within a contractor company in the Offshore Industry the organizational and financial implications of Project Alliancing are presented.

Keywords: project alliances, project risk and reward sharing, offshore industry

Introduction

The world population and high economic growth leads to a rapid increase in energy demand, especially in developing countries. This is largely supplied by oil, gas and coal, for which resources are believed to be adequate, but dependent on political stability and increasingly complex technology for supply.

It is estimated that nearly one-third of the world's oil comes from offshore fields in the North sea, the Arabian gulf, and the gulf of Mexico where one of the world's first offshore platforms was built in 1947 in just seven metres of water. Thanks to technological advances in engineering, it is nowadays possible to build platforms anchored to the seabed in more than 400 metres of water.

Despite the rapid increase in energy demand, real oil prices are expected to continue to remain at historically low levels in the short to medium term.[1] Against this background the Offshore Industry is facing the need to undertake future oil and gas developments at significantly lower capital expenditure. This need is even reinforced by increasing competition between contractors in fabrication, installation and transportation of offshore equipment.

The traditional contractual situation in the offshore branch used to be based on individually-issued subcontracts by the operator (oil and gas company) of outfield development towards the discipline contractors (see *Figure 1*). Under this concept, the operator used to be confronted with clashing interfaces between separate subcontractors who mainly looked after their own particular interests, which led to inefficiency and budget overruns for the operator.

At the beginning of the eighties, a new contracting concept was developed: EPIC (Engineering, Procurement, Installation and Construction). Under this concept, the exposure of the interfacing and window setting between individual contractors was subdelegated to one particular main contractor, who in turn subcontracted the various work packages to the discipline subcontractors. This again proved to be unsatisfactory for the operator because the main contractor successfully excluded the financial exposure resulting from the interfacing between various subcontractors from its contract with the operator. The problem was shifted, not solved, with no cost saving for the operator.

Following the dissatisfaction with the existing contractual approaches, plus the need of the operator to undertake future field developments at significantly lower capital expenditure, at the beginning of the nineties the operating companies succeeded to introduce a new concept of alliancing. This new approach involves a style of relationship which replaces the traditional interfaces between contractual parties with a more effective integration of resources, and re-defines the boundaries within which new and unique methods of co-operation may be developed. Within the Project Alliance all parties are committed to working closely together with overall benefit to the project. The benefits achieved and identified as having resulted directly from the consequences of the relationship will then be

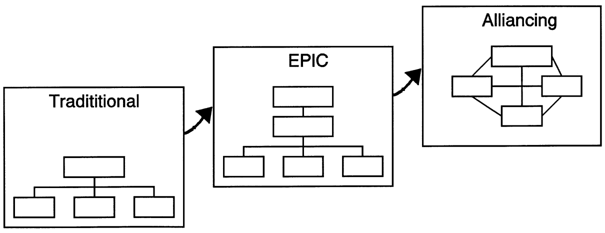

Figure 1 The change in organisation structures in the Offshore Industry

shared equally between parties, after taking into account the risks adopted by each party.

In this paper the new concept of Project Alliancing will be further explained and discussed, both from the perspective of the operator as well as from the other allied parties. Based upon an in-depth study carried out within a contracting company the importance to establish mutually agreed short-term as well as long-term objectives and to devise appropriate procedures to cooperate will be made clear.

The offshore engineering process

The development of an offshore oil or gas reserve is a process which can stretch over a long period, sometimes as long as 30 years.[2,3]

To start the building of an offshore platform, it is necessary to explore the oil or gas field and investigate whether the well is commercially feasible. An orientation of which parties to involve in the process is one of the activities in the *exploration phase*.

By order of the intended operator (an oil company), the design for the platform is executed. The *Design phase* consists of two stages, the first is FEED (Front End Engineering Design), this leads to a rough design. The rough design is followed by a detailed design. The platform design is split up into two parts. One part is the construction of the structure of the platform, the body-work. The other part is the process design. In the *fabrication phase* pre-fabricated parts of the platform, such as template, jacket, topsides and sub-sea manifolds are fabricated at a yard onshore. After being pre-fabricated, the components are loaded onto special transportation barges and towed to the offshore location, where they are assembled into complete platforms. This is the *transportation and installation phase*. The first installation operation involves the siting of the sub-sea template on the sea bed. The template is piled into the sea bed in a location considered to be the most favourable for reaching the hydrocarbon deposits. The initial part of the laying of the pipelines is the next step. Once located on the seabed, the jacket is secured by foundation piles. The next step is to install the topside. The topside weight of an installation may be as low as 200 tonnes for an unmanned installation or it may be as high as 35 000 tonnes. For the installation heavy lift cranes are used. The final phase before the platform is operational is *hook-up and commissioning*. All the services and systems on the platform are activated in this stage. In the *drilling phase*, pre-drilling activities are executed, and the first gas or oil is found. After the pipes are in place, the production on the platform can start. In the *production phase*, the oil or gas is pre-processed for transport to onshore. The oil and gas is further processed at the refinery. When the well is drained, the platform is no longer useful. It will be *removed* and dismantled onshore or offshore.

The traditional engineering process in the Offshore Industry, as illustrated in *Figure 2*, can be characterised as a sequential approach. Under the traditional approach the engineering process moves like a 'relay race'[4] with one group of functional specialists passing the baton to the next group. These specialized functions are generally performed by separate independent contractors. Each contractor is directly controlled by the client operator. Or in the EPIC contracting situation by the EPIC contractor. All contracts are fixed and based on detailed work performance specifications.

The new Alliancing concept on the other hand is more like a rugby's 'scrum and scramble' approach. The offshore platform emerges from the constant interaction of a multidisciplinary team whose members work together in a network-based organization from start to finish. The responsibility is shifted from the client operator to all Alliance members, without a formal hierarchy. The new Alliancing approach may be characterised more as a concurrent engineering approach, in which various engineering phases are overlapping.

Project Alliancing: concept and principles

The concept Alliancing can be typified as chameleonic, i.e. the word is used in many ways and is used in and out of season. Partnership and Alliancing are two concepts which are often used for the same kind of situations. For the purpose of this paper we will support the definition made by Farell and McDermott:[5]

> "Partnerships and alliances are arrangements which include a structure to share reward and/or risk between an operator (oil and gas company) and contractor(s). If the risk/reward relationship is between an operator and

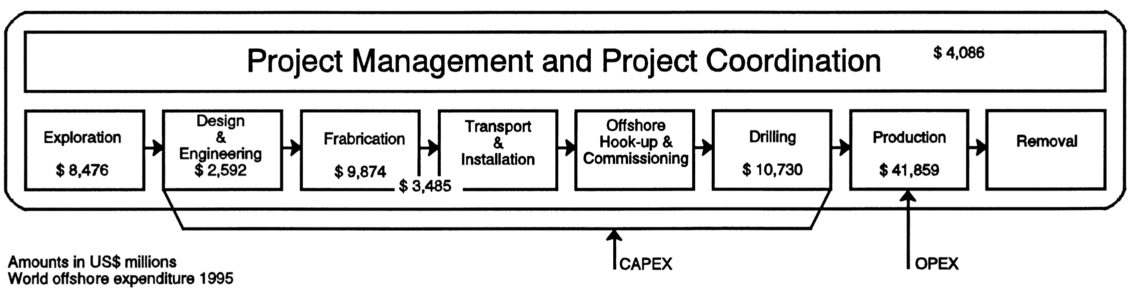

Figure 2 The traditional phases of an offshore oil and gas engineering and production process

a single contractor, it is called partnership. If there is interlocking risk/reward among multiple contractors and the operator, it is called an alliance''.

Operating oil and gas companies have introduced the Alliancing concept in order to explore marginal fields. A number of fundamental challenges are threatening their future prosperity:

- A lower oil price resulting in reduction of revenues
- Marginal oil and gas fields resulting in lower return on investment. With as a consequence, a lower ratio of investment in capital expenditures (capex) and oil production
- Failure of technology alone to adequately reduce costs.

Figure 3 shows how Alliancing is seen in a buyer/supplier relationship from the buyer's perspective. In the Offshore Industry temporary Project Alliances are more and more applied. The temporally basis of the cooperation is characteristic for the Offshore Industry. This is why agreements are made with a medium-term perspective. For operating oil and gas companies, the need to reduce costs has been the main drive to search for more efficient and effective ways to work. Contractors will be more open and willing to participate in cost reduction driven processes if they will also benefit from realized cost reductions or higher revenues. To realize a win–win situation all parties involved will have to negotiate about the interest they are willing to have in taking and sharing the project risks and rewards. This requires openness on objectives, understanding each other business drivers, and alignment of individual interests of all parties involved. In Section 5 a Risk and Reward Mechanism will be explained which has been successfully applied in a temporary Project Alliance.

The main principles on which the Project Alliancing concept is based are:

- An intensive alliance preparation phase in which much attention is paid to settle and secure the required conditions for openness, trust and close co-operation between the participants
- Agreement between participants on a system to share project risks and rewards
- Disclosure of cost information between participants insofar relevant to achieving the project objectives
- Each contractor stays responsible for the service in its own Works Contract

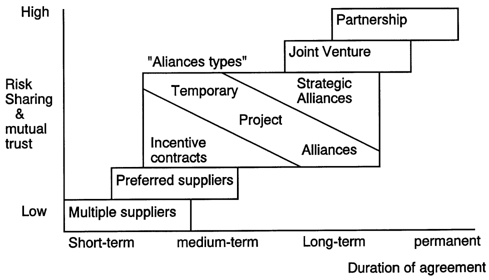

Figure 3 Alliances as an option for outsourcing of services (Source: Shell contracting and Procurement)

Project Alliancing: structure and culture

An intensive process of anticipating on each others motives takes place in an early stage of forming the Alliance. When the parties are getting more acquainted with each other, by means of for example team building workshops, the Alliance structure takes definite form. A *typical structure* of a Project Alliance consists of an Alliance Board, a Project Management Team and sub-contractors working for individual members of the Project Management team (see *Figure 4*).

The fundamental role of the *Alliance Board* is to ensure the outstanding performance of the project by guiding and supporting the Project Management team, ensuring commitment of the parties to the project and to each other, and to facilitate effective communication with other alliance(s) relevant to the project. The Alliance Board consists of one representative appointed by each of the relevant parties. The representative of the operating company is the chairman of the Alliance Board. This person is also the interface between the Alliance Board and the Project Management team.

The *Project Management Team* is established by the operating company and is made up of appropriate functional specialists from the various parties. The fundamental role of the Project Management Team is the management of, e.g. design, fabrication, installation, Hook-up and commissioning of the project facilities, so that the targets are achieved.

The *Alliance Agreement* is drawn up as an overarching agreement which binds the contractors together with the operator. It is this agreement which defines the targets, risk and reward mechanisms and the inter-relationship of the different contractors. Besides the Alliance Agreement the operator maintains individual Works Contracts with each contractor. In these Works Contracts various matters such as indemnities and work scope as the basis for the contractor's non risk/reward remuneration are addressed. They provide a base position in the event that there is failure to reach agreement on an Alliance or that through unforeseen circumstances the Alliance Agreement fails. The individual Works Contracts underpin the Alliance Agreement. An individual Works Contract with the specific contractor can be terminated while the Alliance Agreement will remain in force thus providing protection against a problem with an individual con-

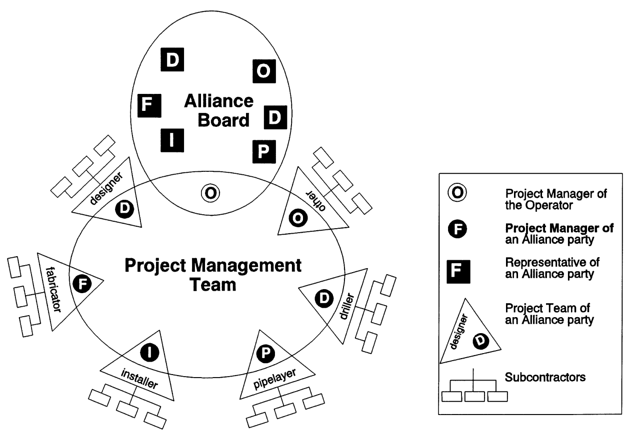

Figure 4 A typical structure of a Project Alliance

tractor which is beyond the capability of the Project Alliance to resolve.

The Project Alliance has its *typical culture*. It is very important that a commitment based on openness among all parties exist on objectives, understanding each other business drivers, and alignment of individual interests. The parties commit themselves to achieving outstanding returns for all participants in the project. Openness is one of the main differences with traditional and EPIC contracts. This openness is based on trust between the Alliance parties. Anyone may contact anyone else in order to progress an issue. Information will not be withheld, nor will it be distorted. Each individual is responsible for communication of information which could have an impact on others. In case a contractor is not performing correctly, this will influence the whole project. Without intervention, the other contractors will notice a decrease in profit. It is no use blaming the bad performing contractor, a better option is to help. Co-operation, creativity, an efficient communication, joint interest and an informal atmosphere will stimulate the problem solving process in finding innovative solutions and to produce exceptional results.

The risk and reward mechanism

The quality of the performance of the facilities and wells results from a combination of several factors. The physical facilities (including wells) must be capable of being operated when required, they must be able to process the appropriate quantities of fluids to the required specifications, and they should be able to do so within the budgeted costs. The Risk and Reward Mechanism has been developed as an incentive to reach this quality of performance. Through the Risk and Reward Mechanism, risks and rewards are shared. Parties concerned negotiate about the interest they are willing to have in taking these risks and rewards. All payments are capped at an agreed level. The Risk and Reward Mechanism can encompass the following elements:[5,6]

- *Capital expenditures (capex)*
  The purpose of Alliancing is to reduce costs and optimize return for the client and reduce costs in order to enhance profit for the contractor. Stretch targets are introduced to reach this win/win situation. Performance which produces a 'Final Cost' lower than the 'Target Cost' will produce a saving to be shared between participants on an agreed basis (positive Capex Result). A performance which produces a 'Final Cost' higher than the 'Target Cost' will produce an over-run to be shared between the participants on an agreed basis (negative Capex Result).
- *Schedule*
  This incentive is to complete the project before the scheduled date of completion. Where 'Actual Date' is delivered earlier than 'Target Date', the operator shall pay to each participant an amount for every day earlier than scheduled (positive Schedule Result). Where 'Actual Date' is later than 'Target Date' each participant shall pay to the operator an amount for every day delivered later than scheduled (negative Schedule Result)
- *Availability*
  The incentive is to produce more oil/gas than the target oil/gas production. Where 'Actual Production' is higher than 'Target Production', the operator shall pay to each participant an amount for each barrel that is produced over 'Target Production' (positive Availability Result). Where 'Actual Production' is lower than 'Target Production', each participant shall pay to the operator an amount for each barrel that is produced under 'Target Production' (negative Availability Result).

The following elements are sub-targets:

- *Health, safety and environment*
  The cost reductions programs may not be at the expense of health, safety and environment. The amount of injuries and accidents are the measure for this element, the target is zero accidents.
- *Innovation*
  This is the incentive to stimulate new applications and technologies to perform more efficiently. A bonus for every innovation is a percentage of the savings accomplished with this innovation. This bonus is shared between the parties who contributed to the innovation.
- *Productivity*
  The Targets for Man-Hours per task are set on an annual basis for ongoing work. Productivity is calculated as percentage. If Actual Man-Hours are less then Target Man-Hours an improvement in productivity is reached. If Actual Man-Hours are more then Target Man-Hours, than there is a decrease in productivity. The Productivity Result leads to extra or less profit.
- *Quality*
  The measurement of this incentive depends on the conditions of the contract. It might be a combination of the elements listed above.

The OPCON Alliance case

This section will describe the OPCON Project as a case example of Project Alliancing. The OPCON Project is a development of several dissimilar reservoirs in the Atlantic Ocean. The platform substructures are piled steel jackets. The Operator has two separate alliances for the Development—a Facility Alliance focuses on the delivery of the platforms, subsea equipment, flowlines and pipelines, and a Well Alliance focuses on delivering the overall well program. Whilst these alliances have an important interface in the area of Schedule and Performance they can be managed as separate entities through the Development phase.

The tender procedure was considered as time-consuming because of the new type of contract. The Request For Quotation (RFQ) contained the design intent, explanation of the alliance procedure and a questionnaire. The design intent is intended to capture the high level scope of work. The questionnaire was used as a tool to survey if the contractors were capable to participate in an alliance. Differences in attitude are often the origin for a lot of conflicts. This is why the questionnaire emphasises a topic such as the organisation philosophy more than, e.g. technical ability and commercial viability. Because of the novelty of the contract it took the invited contractors many reading hours and the negotiation with the operator was experienced as intensive.

The project started in January 1995 and the drilling is planned over 3 years. The control of the project remains with the Operator. The fundamental role of the Alliance Board is to ensure the outstanding performance of the project by guiding and supporting the Project Management Team. This board consists of one representative appointed by each of the relevant parties and is chaired by the representative of the operator. The Project Management Team was established by the operator and compromised appropriate personnel from the alliance parties. In the OPCON project the parties involved in the Project Management team are: one design engineer who is also concerned with the project management, four fabricators, one transporter and installer, one pipelayer and subsea installer and one party concerning hook-up activities.

The quality of the performance of the facilities and wells results from a combination of several factors. As explained before, the physical facilities (including wells) must be capable of being operated when required, they must be able to process the appropriate quantities of fluids to the required specifications, and they should be able to do so within the budgeted costs. The Risk and Reward Mechanism has been developed as an incentive to reach this quality of performance. For the OPCON case the Risk and Reward Mechanism compromises the following elements:

- Capex (capital expenditures)
  CR = Capex Result
  FC = Final Costs
  CR_i = Capex Result of participant i
  TC = Target Costs
  PC = Provisional Costs
  r_i = Interest of participant i
  With:
  $CR = \Sigma CR_i$ and $CR_i = (TC - FC)*r_i$
  or if the parties have failed to reach an agreement on the level of final costs:
  $CR_i = (TC - PC)$
- Schedule Oil
  SOR = Schedule Oil Result
  ADO = Actual Date (first) Oil
  TDO = Target Date (first) Oil
  £ 'Q' = Amount to be agreed between parties
  With:
  $SOR = \Sigma SOR_i$ and $SOR_i = (TDO - ADO)$*£ 'Q'*r_i
- Schedule Gas
  SGR = Schedule Gas Result
  ADG = Actual Date (first) Gas
  TDG = Target Date (first) Gas
  £ 'X' = Amount to be agreed between parties
  With:
  $SGR = \Sigma SGR_i$ and $SGR_i = (TDG - ADG)$*£ 'X'*r_i
- Oil Production
  OPR = Oil Production Result
  AOP = Actual Oil Production
  TOP = Target Oil Production
  With:
  $OPR = \Sigma OPR_i$ and $OPR_i = (AOP - TOP)$*£1*r_i
- Gas Deliverability
  GDR = Gas Deliverability Result
  AGD = Actual Gas Date
  TGS = Target Gas Deliverability
  FD = Final Day (5 years from project start)
  £ 'Y' = Amount to be agreed between parties
  With:
  $GDR = \Sigma GDR_i$ and
  $GDR_i = (AGD - TGD)$*£'Y' * [$FD - ADG$ – (# days gas production = 0)]days*r_i
- General
  The maximum payment of the participants to the oil company [= negative Risk/Reward Result (RRR)] = £ 'Z'
  £ 'Z' = Amount to be agreed between parties
  With:
  $RRR = CR + SOR + SGR + OPR + GDR >$ £ 'Z'

Through the Risk and Reward Mechanism, risks and rewards are shared. During the Alliance Start-up phase concerned parties have negotiated about the interest they are willing to have in taking these risks and rewards. This can result into an agreed interest division between the allied parties. With the exception of the Capex reward, all payments can be capped between an agreed minimum and maximum level.

Discussion

Different positive experiences with Project Alliances in the oil and gas industry have been reported so far. One of the first alliance projects of BP, Andrew Field Development, has resulted in a 21% reduction in capital expenditures.[7] This reduction came from:

- Reduction of BP personnel by combining resources (7%);
- Improved supplier relationship, less documentation, non-prescriptive specifications (3%);
- Reduced interfaces, integration, integration of design and fabrication teams, optimum equipment delivery (8%);
- Design innovations (3%).

According to a study made by Farrell[6] on experiences with alliances, the questioned managers were convinced that their projects were and are more cost efficient under a partnering or alliance structure than they would have been in a traditional setting. Farrell gives a few examples of cost reductions with experienced savings varying between 8% to 25%. Because of the project nature of the Offshore Industry however, there is no control against to judge cost saving claims made by an alliance. Savings could also have been made in any case.

After having carried out an in-depth study on the organizational and financial effects of Project Alliancing within one of the allied parties in this alliance case, it became clear to us that this company is in a changing phase and it takes time to get used to this new situation. One of these changes is the exposure of the cost structure. The cost structure of this contractor is to a great extent untransparent for the operator. The costs are capital driven and mainly fixed, with variable costs that are only a small part of the total budget. For this reason it is very unattractive to settle for a price based on day-rates.

Concerning the organizational effects it became clear that the open communication results in more deliberations and is as a consequence more time consuming. Because of the early involvement of all parties, the partners have to deal with problems of other partners where they used to have no dealing with. There is also a danger of information overflow. It is important in this respect to structure the information flow on beforehand. Because of the conceptual stage of involvement, the planning of resources is subject to change. For senior management priority setting between projects becomes more important, it is far from easy to judge the significance of the projects in this very early stage of development.

Taking the financial effects into consideration, one may conclude that due to the uncertainties on the outcome on the Risk and Rewards the financial outcome is more difficult to forecast. This results in an indistinctness on the volume of the revenues and that the timing of the payments is spread over a longer period. In case there are different alliance projects at the same time, the impact on the financial future position of the contractor will be even more difficult to estimate.

The in-depth study made also clear that for the contractor the increased influence on the technique to be used to develop the field is experienced as very positive. Also the learning from other contractors has been found out as very interesting. Information on new technologies and specifications have become in this way of working within reach.

We have concluded that in the short term, the transaction costs of a Project Alliance are relatively high for this contractor. On the long term however, the financial benefits can come from the share in the yield of the oil field or a long term financial benefit, not on the project directly but on future projects from the same operator. A comparable distinction can be made between long-term and short-term technological benefits. On the short term, a field development is project specific and not directly useful for other projects. A long-term commitment with allied parties however will enable the contractor to develop and to invest in a technological research programme from which future projects may benefit. A future built on technological competences will strengthen the competitive position of the contractor, and by this enhance the chances for the continuity of the firm.

Operating oil and gas companies have introduced the alliancing concept in order to explore marginal fields. Contractors will be more open and willing to participate in cost reduction driven processes if they will also benefit from realized cost reductions or higher revenues. This paper has highlighted a number of important conditions to realize a win–win situation for all allied parties in a Project Alliance in the Offshore Industry.

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