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Worlds Apart: EPC and EPCM Contracts: Risk issues and allocation

By Phil Loots and Nick Henchie
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Introduction

For many years now it seems that the most desired way for an Owner to procure a major construction project, particularly one being project financed, was via a fixed price, lump sum turnkey route; the so called engineering, procurement and construction contract ("EPC contract"). By this route, funders and Owners expect to get the degree of certainty as to time and costs that they require. Such has been the popularity of this method of procurement that organisations such as FIDIC responded to the need for appropriate standard forms that more closely reflected market conditions by, for example, the introduction of its Conditions of Contract for EPC/Turnkey Contracts (the Silver Book).[3] Orgalime[4] and ICC[5] followed suit to join other standard forms produced by organisations such as ENAA[6], ICE[7] and ECC[8]. Most recently, FIDIC has responded to the requirements of the major development banks by introducing the MDB Harmonised contract which contains certain amendments agreed with the multi – lateral funding agencies to FIDIC's Red Book.[9]

However, whilst it must always be appreciated that the lump sum EPC option usually remains the most desired procurement route for Owners and funders, in response to market conditions EPC contractors are increasingly proffering and, on occasion, demanding, alternatives. In recent years there has been an increase in cost reimbursable contracts (usually with a target price pain/gain share mechanism built in).[10] More recently, there has been a significant increase in the EPCM contract procurement route for international infrastructure and major construction works. Although historically

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3 See, for example, Nick Henchie "FIDIC Conditions of Contract for EPC Projects – The Silver Book, Problems in Store?" [2001] ICLR and AH Gaede, "An Unfortunate Shift from FIDIC's Tradition of Being Even Handed and Focussing on the Best Interests of the Project" [2000] ICLR 477.

4 Following the publication of the new suite of FIDIC contracts in 1999, in particular FIDIC's Silver Book, the Legal Committee of Orgalime decided to draft a new turnkey contract for industrial works, which could be used as an alternative to FIDIC's Silver Book, but which provided for a fairer allocation of risk between the parties – Nick Henchie reviewed the differences between these two contracts in "The Orgalime Turnkey Contract for Industrial Works - An Alternative to FIDIC's Silver Book?" [2004] ICLR at page 67.

5 The ICC Turnkey Task Force is currently drafting a turnkey contract which can be used as an alternative to FIDIC's Silver Book.

6 The ENAA have various model forms of contract for use on Power Plant Construction, Process Plant Construction and Industrial Plant.

7 For example, the ICE Conditions of Contract 7th Edition has been drafted by clients, consultants and contractors to provide a simple and standardised contract specifically tailored for civil engineering projects.

8 Engineer Construction Contract 3rd Edition which has already been used extensively on major infrastructure projects in the UK including Heathrow Terminal 5.

9 A modified form of the FIDIC Conditions of Contract for Construction, 1st Edition 1999, in which the General Conditions contain the standard wording which previously had been incorporated by MDBs in the Particular Conditions for MDB financed contracts.

10 See, for example, the ECC form of Contract, Option C used extensively on the Channel Tunnel Rail Link project in the UK.

this method of procurement was certainly not uncommon in the mining sector, the use of EPCM contracts has become more prevalent in other sectors of construction. Particularly, EPCM contracts are increasingly the market response to major projects in the petrochemical and mining sectors and also in the power and desalination sectors.

It seems to the authors that the meaning of EPCM (as opposed to EPC) is still relatively unknown amongst a large part of the construction fraternity. The key confusion which often arises is that whilst the "C" in "EPCM" stands for "Construction", this is in the context of "CM" i.e. Construction Management. Under the EPCM model the contractor does no building or construction – rather he develops the design and manages the construction process on the Owner's behalf. The confusion is added to because there does not appear to be any standard form of contract for this type of procurement. It is to be hoped that the likes of FIDIC and ECC will consider the possibility of developing such a form.

This change of emphasis away from lump sum turnkey perhaps reflects the bargaining position of many EPC contractors in today's market and, to some extent, the increasing size and complexity of the projects being tendered internationally. In the petrochemical sector, as an example, there are simply not enough contractors with the experience and balance sheet to take on the major capital projects that are coming on stream, particularly in the Middle East. Equally, with so few major EPC contractors with the know how, resource and experience to undertake such projects, funders have had to open their minds to other procurement routes (and greater risks) in the face of rising lump sum EPC prices. Bank rolling a major project with EPC contractors with no track record of success is not usually an attractive or viable option.

As a result, the major EPC contractors have seen their negotiating position significantly improved in recent times. This has arguably led to a correction in market prices (profit levels for EPC contractors have increased) and levels of risk being transferred back to project sponsors and lenders. This has resulted in a relative shift away from the lump sum turnkey model. In some markets (petrochemical and mining sectors particularly) obtaining a lump sum contract with one EPC contractor might even currently be considered the exception rather than the norm.

With these market conditions in mind, the authors of this article would like to explain how the typical EPCM contract works and, in doing so, identify some of the key differences to the EPC contract. After all, they sound the same but there are still many people involved in construction that are not able to elucidate the differences. Indeed, in writing this paper the authors have not come across a single article on EPCM contracts – a Google search of "EPCM" will bring up lists of EPCM contracts and EPCM contractors but virtually nothing explaining what an EPCM contract is!

In short, an EPC contract is a design and construct contract where a single contractor takes responsibility for all elements of design (engineering)[11], construction and procurement. In contrast, an EPCM contract is a professional services contract which has a radically different risk allocation and different legal consequences. The key difference is that under an EPCM contract, other parties construct the project – the EPCM contractor is not the builder/constructor.

11 Except, on occasions, the process design (as to which see below).

The Project Participants

In addition to the Owner there are a number of other main participants in major projects. Where a patented process is involved there may be the process supplier, who is usually an engineering company with proprietary technology. Its prime business is to provide the process engineering design or technology, which consists to a large extent of the chemistry or technology necessary to achieve the process, which produces the product from the plant.[12] Where the process supplier is not also an EPC contractor, there will be separate EPC or EPCM contractor, who is primarily responsible for the remainder of the engineering design and, in the case of the EPC route, the construction of the project. There are then the trade or subcontractors and major vendors engaged either by the EPC contractor direct or, in the case of an EPCM arrangement (as explained below), direct by the Owner.

Finally, and perhaps most importantly, there are the banks which provide the finance for the project. For the project to proceed, the contract documents and the allocations of risk therein, must be bankable.

Front-End Engineering and Design (FEED)[13]

For major projects it is not unusual to split the project delivery process into two phases; in the first, engineers set the design parameters which define the work scope, and break the work down into work packages for budgeting and planning purposes, to a level sufficient to allow the Owner to go out to the market to tender the work.

This is often referred to as the Front-End Engineering and Design (FEED) stage which generates what is known as the basic (or conceptional) engineering. The FEED is usually executed predominately on a schedule of rates basis, although certain definable components can be lump-summed. The FEED stage usually includes, but is not limited to, basic engineering and design, project schedule and cost estimates for project control, and (sometimes) procurement of certain long-lead items of equipment. The FEED stage results in a basic engineering package or packages, sometimes referred to as process design packages (PDPs) which (ideally) are sufficiently progressed to enable competitive bids to be obtained on a lump sum basis.

The FEED may be produced by specialist engineering firms but increasingly major EPC contractors have the in house capability to do this themselves. Where this occurs the Owner's Stage 2 options (see below) may be increased. It is also important to note that it is not really possible or desirable to define what constitutes basic engineering or FEED in general terms – it will vary from project to project as well as between sectors. Across different projects and industries the FEED can be developed to a greater or lesser extent, sometimes getting close to or constituting an element at least of detailed design.

The adoption of a staged project delivery approach with contracting options exercisable by the Owner has the advantage of potentially providing contractual flexibility to the Owner after the Stage 1 FEED. The Owner has various options available for project

12 Sometimes the process supplier may itself also be an EPC contractor thereby capable of offering the single point of responsibility approach favoured by owners and funders. Indeed, where the process supplier is not also the EPC contractor, Owners will still endeavour to make the EPC contractor responsible for the process although few EPC contractors will accept this responsibility.

13 The term FEED is also used to refer to Front End Engineering & Development (as opposed to design) but it is not thought that there is any significant difference (if any) in the two meanings.

implementation – Stage 2, although the availability of such options may change according to the prevailing market conditions.

When planning the project the Owner and Lenders need to consider which of the following potential options they wish to be available at the conclusion of Stage 1 (FEED):

(i) If the FEED has been produced by an EPC contractor willing and capable to develop the FEED into a detailed design and to build the project, the Owner may seek to continue the FEED contract on the existing or similar terms and conditions and deliver the Project at the agreed tender rates using the FEED contractor – in certain market conditions, this is a solution that can be imposed by the FEED contractor – see (ii) below. This may lead to some bidders having to form joint ventures or consortia to carry out the work;

(ii) More often, at the end of the FEED Phase, the Owner may wish the FEED contractor to deliver the project in the form of a lump sum EPC contract. In order to ensure that a lump sum route is still available to the Owner at the end of the FEED stage, a mechanism ought to be built into the FEED contract thereby giving the Owner an option to covert the FEED contract into a lump sum turnkey contract on completion of the FEED. However, the FEED contractor often resists the imposition of such a mechanism since it knows that on completion of the FEED there may be no other EPC contractor available, or capable, or willing to develop the FEED and build the project. In such circumstances, the FEED contractor is in pole position either to be awarded the EPC contract (but at a negotiated price not dependent upon a pre-agreed formula or mechanism), or simply to insist that it will only build the project on a cost reimbursable basis (essentially option (i) above);

(iii) The Owner may appoint the FEED contractor (or another project management or engineering company) to assist the Owner to manage and procure a third party EPC Contractor to develop the detailed design from the FEED and build the project.

(iv) The Owner may appoint the FEED contractor (or possibly another engineering company) to develop the basic engineering/FEED into a detailed design and then manage on its behalf the procurement and construction of the works – this is the so called EPCM contracting model upon which this article will focus.[14]

(v) Of course, the Owner may elect not to proceed with the project at all.

In practice, on the larger projects the FEED stage may itself be broken up into separate process design packages with each of these been market tested and procured separately.

The decision as to which contracting model to use for the second phase is often deferred until the latter stages of the FEED, when the Owner is then able to test the market for prices, based on the process design packages prepared during the FEED, and will be able to assess the level of contingency required, the cost of risk transfer, and the appetite in the market for the EPC option. This is why, if a mechanism is not in built in the FEED contract for conversion to lump sum turnkey, the Owner may hand the initiative to the EPCM contractor, if the EPC option is not attractive to the wider market.

The nature of the Owner's organisation and degree of control which the Owner wishes to exercise during the second phase will also influence which option will be chosen.

14 There are however many variations on this theme such as appointing separate EP and CM contractors which is becoming more common in recent times.

Engineering, Procurement, Construction Management (EPCM)

This might be described as being primarily a professional services contract. In some ways the procurement structure is more akin to that under a typical construction management approach but with the vital difference that the detailed engineering and design function is carried out by the EPCM contractor.

Usually the EPCM contractor is responsible for:

(a) design (this includes producing the basic engineering/FEED and developing the detailed design);

(b) procurement of necessary materials and equipment;

(c) management and administration of the construction contracts.

An important difference between the EPCM and EPC form of contract is that in the EPCM model, the contractor is providing professional services (including design) and is not a principal (i.e. is not a party to a contract in respect of the construction of the project).

The EPCM contractor acts as the Owner's agent and creates (on behalf of the Owner) direct contractual relationships between the Owner and the suppliers and trade contractors. Each trade contract is a contract directly between the Owner and the trade contractor or specialist services provider or vendor. Ideally, in such an arrangement, as with typical construction management, the Owner ought to have a large and experienced in-house team to assist the EPCM contractor with the management and administration of these contracts. Whilst this is strictly speaking a very large part of the important role for which the EPCM contractor is paid, given the division of responsibilities between various parties in an EPCM arrangement it is vital that the Owner keeps a careful eye on performance of each, for reasons which will be explained below. Problems arising under trade contracts between the trade contractors and the Owner such as interfaces between trade contracts, delay and disruption and property and works damage claims, and other claims for extra time and money, are the ultimate responsibility of the Owner. Whilst the EPCM contractor must assist the Owner in the management and resolution of any claims, the EPCM contractor is not a party to any dispute which arises between the trade contractors and the Owner.

The EPCM contractor will not usually take full responsibility for delivering the completed project by an overall completion date (thus rarely are there liquidated damages provisions in EPCM contracts for delay to the project as a whole), nor will it take responsibility for care of the works or for the ultimate cost to the Owner of the project. However, incentives can and are often built in to the EPCM contract in this regard (see below).

Accordingly, the principal potential liabilities of the EPCM contractor relate to breach or negligence in:

(a) the performance of the design work;

(b) the preparation of the budget cost estimate;

(c) the preparation of the estimated duration of the work;

(d) managing the procurement and administration of the trade contracts.

(e) co-ordination of the design and construction between the trade contractors

However, proving breach of these obligations is rarely straightforward, and in respect of (b) and (c) the Owner may struggle to establish a real loss, however negligent the EPCM contractor may have been.

The Contractual relationships in a typical EPCM arrangement are illustrated in Figure. 1.

Figure 1. Typical EPCM Arrangement

This contrasts with the typical EPC model set out below:

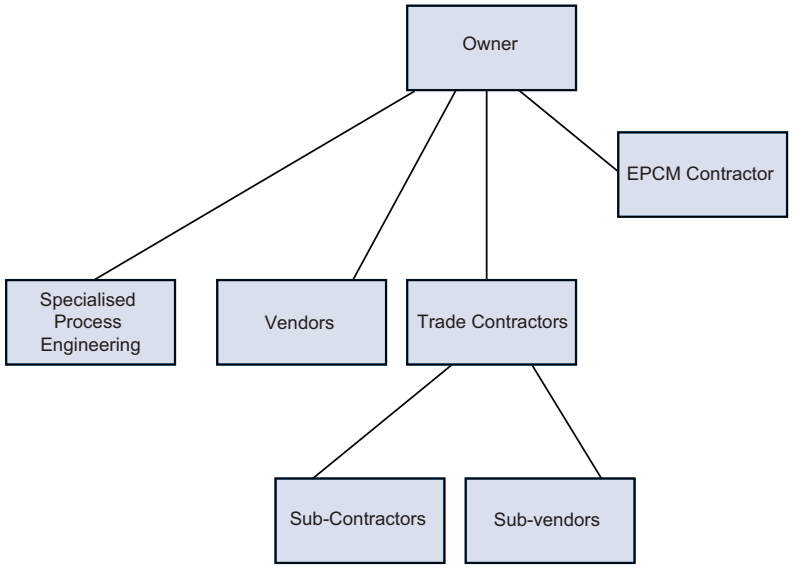
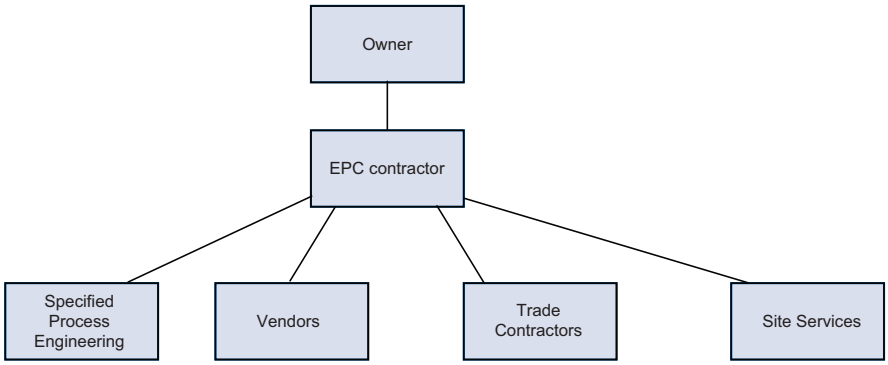


Figure 2. EPC Arrangement



The Services to be Performed under EPCM Contract

(a) Engineering/design

If the project includes or incorporates a patented process, process design and assistance with commissioning, this will often be provided by a specialist supplier under a separate technology and licence agreement with the Owner. It is usual for the Owner of the process engineering technology to be engaged to do laboratory and other testing to modify previous proven processes used elsewhere to accommodate unique aspects of a particular natural resource. Multiple interfaces of cutting-edge technology present a significant risk. The technology and licence agreement will make provision for the upgrading of the process for a specified period so as to maintain the competitive advantage of the plant. The size and asset base of the process design provider should be assessed to test sustainability over the period specified. Because the process-engineering providers own the intellectual property which the Owner wishes to access, the provider of that technology can insist on very favourable terms.

Where the process provider insists upon extensive limitations on liability, such as limiting its liability to re-performance of its work-scope, further limited to a certain value, the Owner's sole rights associated with a process failure might be limited to having the process provider rectify the design and test work, which was the subject of the licence and ancillary service agreements, up to that limited value. These limitations on liability can produce significant problems from the Owner's risk point of view. A failure of the process engineering may be capable of being fixed relatively easily by introducing more equipment, for example, to deal with impurities that are adversely affecting the product. However, more fundamental problems with consumption of utilities and with the process itself can result in total project failure as a consequence of the plant being unable to process the particular raw material to produce the required quantity or quality of product at a viable cost.

Accordingly, care needs to be taken to ensure that the risk is adequately allocated to the appropriate party. This will usually require an initial in depth risk analysis, the development of a risk management plan, and careful negotiation of the relevant agreements with the process provider and other contractors, together with support from insurers.

Neither the EPCM nor EPC contractor would typically be willing to accept responsibility for any part of the process design (unless they were themselves the Owner of the process). This can create problems for the Owner where the plant, for whatever reason, fails to produce to the levels the Owner required. A defence for both EPCM and EPC contractor will often be that this is a result of a failure in the process design rather than the detailed engineering – getting to the bottom of such an argument may be well nigh impossible. Thus, it should be immediately evident to the reader why it is more preferable for the Owner to seek a single point of responsibility approach with the EPC contractor taking responsibility for all aspects of the construction detailed design, including process, if at all possible.

Under the EPCM model, the EPCM contractor will usually be responsible for the preparation of the FEED and the complete detailed engineering in accordance with normal industry and good engineering practices, which will be needed by the companies to be entrusted with the construction work.

Sometimes the EPCM contractor will merely complete the basic engineering package provided by the Owner but, whatever route is used, it is crucial from the Owner's perspective that the EPCM contractor is responsible for ensuring that the completed plant design will meet the required process performance. Thus, it is important that the EPCM Contractor co-ordinates his efforts with those of the other parties involved to ensure that the engineering and design of the project is in full compliance with the requirements of the approved project specifications, procedures and safety guidelines.

It is normal, therefore, for the EPCM Contractor to have overall responsibility for establishing and maintaining both the design and construction interfaces with vendors and construction contractors to the extent necessary to ensure that their work is performed to the required level and quality, and to a schedule which is compatible with the requirements of the overall project schedule. The EPCM contractor will usually be responsible for overall co-ordination of the design and construction process although often the EPCM contractor will also appoint a lead contractor amongst the various trade contractors that will take some responsibility for on site construction co-ordination – even though the EPCM contractor will of course have a heavy site presence with its own construction management team.

(b) Procurement

A key part of the EPCM contractor's role is to advise the Owner on the strategy for the construction and procurement of equipment and materials and then assist the Owner in implementing that strategy. Ideally, and usually, the Owner has an idea of its procurement strategy at the outset even before the EPCM contractor has been appointed. As explained above, it is important that the EPCM contract has been set up in a way which allows the Owner to exercise his chosen option by the time the FEED has been produced and construction activities are due to commence.

Where, however, the contract does not convert to an EPC contract at conclusion of the FEED stage, the EPCM contractor will need to assist the Owner in letting the major works packages to various trade contractors, advising on the terms of those packages, and putting the contracts in place. As with any project, the timing of the letting of the packages is a crucial factor in the success of the project – letting a package too early when there is insufficient information to obtain a lump sum may lead to a series of cost reimbursable trade packages or risks of large variation claims on lump sum packages - letting the packages too late runs the risk of failing to meet the overall project schedule.

Further, during the FEED stage, the EPCM Contractor will usually advise the Owner that for the project schedule to have a chance of being met, long lead items of equipment must be ordered ahead of the appointment of the contractors and often ahead of the detailed engineering being completed, which itself creates risks.

The EPCM contractor will be responsible for the preparation of comprehensive invitations to tender and then for awarding of contracts for delivery and construction services to be rendered by third parties. A well drafted EPCM contract would require that, for the protection of the Owner and to ensure competitive pricing, the number of suppliers invited to quote shall be such that at least a minimum of three fully responsible quotations are obtained.

The EPCM contractor will then be required to carry out a careful analysis of the offers received and to make a recommendation of the technical and economic advantages and disadvantages involved in each offer, and proposals for the awarding of contracts, with reasons, for the Owner's approval.

The EPCM contractor will then prepare the commercial and technical agreements. The terms and conditions of such agreements must be agreed with the Owner in advance but it is usually for the EPCM contractor to prepare the standard contract documents and to ensure that these are suitable for the type of procurement being used.

Ideally, from the Owner's perspective, a series of lump sum contracts will then be put in place by the EPCM contractor, on the Owner's behalf. These contracts will be direct agreements between the Owner and the trade contractors. It is crucial that the terms of these contracts are properly co-ordinated with one another and protect the Owner's interests. The Owner may face claims during the currency of the works that it wishes to pass on to either the EPCM contractor or to the defaulting trade contractor responsible – the contracts must be drafted in such a way that this is made possible.

When projects go wrong, inevitably one of the accusations levelled by Owners at EPCM contractors is a failure to obtain competitive bids, a lack of transparency in the tender process and even the wrong selection of contractors.

(c) Construction Management

The EPCM Contractor will be responsible for the overall management and supervision of all construction activities. This will entail managing, supervising and co-ordinating all of the construction contractors to ensure that the work is carried out in a safe manner and in compliance with the demands of the project schedule, to a quality which meets the standards required by the project.

This will include organisation and supervision of the safety management on the construction site and comprehensive quality assurance, the securing of evidence for any defective third party services, including the consequences arising there from, the establishment of facts in the event of default and defective services, including complete documentation, so that the Owner is protected against claims from trade contractors.

Cost Control

The EPCM contractor is usually paid a project fee divided monthly across the term of the project for the performance of its role. In addition, it is often paid on an actual cost basis at rates and prices agreed in the contract for the performance of its services. So as to keep a check on such costs and provide the EPCM contractor with an incentive to keep costs down, often a target price will be set with the EPCM contractor sharing in any saving if actual costs are less than the target price. There is often a schedule to the EPCM contract which sets out the budgeted man hours for the EPCM contractor's team – this may be divided between the Project Management team (including the project director, project managers, planners, cost engineers, HSE Engineer etc), procurement (mainly buyers), construction (construction managers, site supervisors, site planners, secretaries) and engineering (engineers split between the main disciplines, civils, piping and instrumentation, controls, electrical and mechanical).

However, since the EPCM contractor does not construct the project, Owners and funders will be concerned to ensure there is some control on outturn costs for the whole project. What responsibility does the EPCM contractor have for the project outturn costs and how does the Owner effectively control costs without the protection and relative certainty afforded by a fixed price lump sum that the EPC contract can offer? In answering this question, it is important to note that, at the time the EPCM contractor is first appointed, the Owner may have little idea what the project will cost since the design will be in its infancy and the construction packages will not have been let. It is therefore vital that the EPCM contractor is incentivized to bring the project in within an agreed budget with the Owner. This is also something which the funders will be acutely aware of.

As part of its services the EPCM contractor will be responsible from a very early stage for developing budgets for the construction works and procuring, managing and administering the construction contracts in accordance with those budgets. Of course it is only in extremely rare instances that an EPCM contractor would ever consider offering any form of guarantee that the project outturn costs will come within a set budget.[15] More commonly, EPCM contractors are often content to set a target price for the outturn costs of the works package contracts and share in any saving and, sometimes, contribute to any losses but even this, particularly in today's market, is rare. However, this does not mean that the EPCM contractor typically avoids any liability for a project which comes in significantly over the budgeted cost. There are usually detailed provisions regarding the EPCM contractor's obligations to safeguard and advise the Owner on project costs.

Usually the schedule of services attached to the EPCM contract will go into great detail as to the level of services to be provided by the EPCM contractor in this regard and the types and frequency of cost reporting and estimating required. A typical overriding obligation[16] would be as follows:

> **"The EPCM Contractor shall be responsible for monitoring and reporting on anticipated outturn costs for the Project. Costs shall be estimated, budgeted, reported, forecast and controlled throughout the project period by the Contractor. The Contractor must implement cost controls in every phase of this Project showing the development of the expected outturn costs. In particular, after the completion of the detailed engineering for**

15 Indeed in the author's joint experience they know of only one project where this has occurred.

16 Usually developed in more detail in the scope of services.

each section of the works, the costs determined for this are to be calculated, to be compared with the costs previously estimated, and to be submitted in writing to the Owner.

As soon as the EPCM Contractor recognises in the course of the services to be performed matters which indicate that the outturn costs may exceed the budget, the EPCM Contractor must inform the Owner thereof immediately in writing, indicating the reasons, even if the EPCM Contractor is not at fault for the additional cost. Thereafter, the EPCM Contractor shall immediately develop proposals and measures in the shortest possible time to remove or minimize the cost excess, to inform the Owner thereof in writing, and provide all necessary information and data which make it possible for the Owner to take an appropriate decision on the further manner of proceeding."

It is important to recognise that with this typical type of obligation, the EPCM contractor will not be liable to the Owner simply because the project costs exceed the budgets and cost estimates provided at the outset. However, as the EPCM contractor performs a largely professional role it will usually have an overriding obligation to exercise reasonable skill and care in carrying out its services.

Common claims and complaints arising against EPCM contractors for breach of its primary professional obligations include:

- the initial base estimate on which the decision to proceed with the project was based was negligently low;
- that proper updates and costs estimates have not been provided;
- that the Owner's authorisation was not obtained when contractors were incurring additional costs;
- failure to carry out the engineering correctly/timeously;
- that contractors' claims for payment have not been properly assessed and certified;
- that contra charges and other claims have not been properly levied against defaulting contractors.

However, in relation to the first three of these complaints, it may be difficult for the Owner to establish any real loss.

Thus, whilst an overun in project costs beyond the budgets set by the EPCM contractor will rarely of itself give rise to a claim by the Owner against the EPCM contractor, the EPCM contractor will need to explain and justify the reasons for the overrun. As the party in ultimate control of the project, and the party which has estimated the outturn costs, it must account to the Owner for the reasons for the overrun. Usually this will lead to the EPCM contractor blaming the poor performance of the contractors which may then have knock on effects against other contractors leading to delays and claims for extra payment against the Owner by trade contractors and the EPCM contractor. Often this is where a dispute between Owner and EPCM contractor can arise. The packaging, letting and administration of the various trade contracts is within the ambit of the EPCM contractor. Since it is also responsible for design, when co-ordination issues arise which lead to claims by the trade contractors against the Owner, such claims may well arise

from a failing on the part of the EPCM contractor. This places the EPCM contractor in an invidious position since often part of its role is to certify payment and assess claims by the trade contractors against the Owner. It is clearly in its interest not to elucidate the real reasons for claims against the Owner, if these flow from failings by the EPCM contractor itself (for example, defective engineering, late procurement or negligent construction management).

It is also for this reason that the authors believe that it is essential that Owners have a competent in house team to help administer the trade contracts and oversee the performance of the EPCM contractor.

Schedule Control

The EPCM contractor is responsible for managing the co-ordination of the various trade contractors in an attempt to ensure that the project programme is met. Usually, the development and agreement of an overall programme for the works is the responsibility of the EPCM contractor. One would expect to see a detailed (albeit preliminary) project schedule included within the EPCM contract itself. This will project the final completion date of the project and show details of when detailed design will start/finish and the schedule for the procurement and completion of the major packages, testing and commissioning. Of course, unlike with an EPC Contract, the EPCM contractor is in a strong position to argue that it should not accept total responsibility for achieving this project schedule because the EPCM contractor will not assume responsibility for the performance of the various works package contractors. Thus the EPCM contractor's strict time obligations are sometimes confined to ensuring that it produces the necessary design deliverables in accordance with the schedule in the EPCM contract. Sometimes liquidated damages are payable upon late delivery of design deliverables but, as this is totally within the province of the EPCM contractor, this is usually acceptable.

Notwithstanding this, it is fair to say that there is no one person in a better position to influence successful and timely delivery of the project than the EPCM contractor. Being responsible for the design and procurement process, means that delays by the EPCM contractor are likely to seriously jeopardise the project schedule. The EPCM contractor arranges the tender process and selects (in conjunction with the Owner) the trade contractors. The EPCM contractor advises on contract/procurement strategy. Thus, a well drafted EPCM contract should place the risk of schedule slippage firmly at the door of the EPCM contractor, but allow extensions of time for the poor performance of one or more defaulting contractors. In practice, with multiple interfacing contractors each of which may themselves be more or less culpable for some of the delay, making a successful delay claim against an EPCM contractor is fraught with difficulty.

Typically the trade contractors who are delayed will claim from the Owner that the EPCM contractor provided the design late, or that the design had errors and was incomplete, that it was delayed by an interfacing trade contractor or by reason of a failure to co-ordinate the packages properly etc – all of these give rise to potential claims by the trade contractors against the Owner – equally the EPCM contractor may claim the delay was caused by inadequate resources by the contractor in question or defective work. Without a good in house team cognisant of where the truth lies, one can see that the EPCM arrangement has the potential to leave the Owner in a very difficult position if the project is late and over budget; hence also the need for a project-wide rapid adjudication system.

One common way of incentivising good performance by the EPCM contractor is by offering an early completion bonus so that achieving the project and/or key milestones by or before the scheduled dates, generates a bonus for the EPCM contractor.

Insurance

As with other contracts, an EPCM contract will contain obligations and indemnities resulting in possible risks for either the Owner or EPCM contractor or both. In their broadest sense, insurances are generally employed to cover the risks associated with those obligations and indemnities or to cover statutory obligations (such as an Owner's liability to its employees). It should be noted from the outset, however, that some risks are simply not insurable.

The EPCM is essentially a professional services contract. An Owner may wish to see the EPCM contractor's obligations with respect to design backed by an appropriate professional indemnity insurance to cover negligent design of the EPCM contractor. Whilst professional indemnity insurance policies are generally considered the norm for consultants providing services in the United Kingdom[17], it is often the case that organisations operating outside of the United Kingdom do not in fact carry such insurance or are reluctant to offer such insurance. In these circumstances, if the EPCM contractor does not normally carry such insurance, the Owner will have to weigh up the advantage of having such insurance against the likely increased cost to the Owner in asking the EPCM contractor to procure the insurance.

In terms of the policy cover, levels of cover should be checked together with whether the policy operates on an "each and every claim basis" or an "in the aggregate basis". In the case of the latter basis, the Owner may find the potential insurance exhausted if, in the same year as the Owner notifies a claim, another unrelated claim has been lodged in priority of time which could "wipe-out" the insurance coverage for that year. This is particularly important if the EPCM contract contains an express provision (as it often does) to the effect that the EPCM contractor's liability is to be limited to the amount recoverable under the insurance policies to be maintained by the EPCM contractor under the contract.

Other insurances which are usually required in the EPCM contract and which may need to be taken out by either the Owner or the EPCM contractor include third party liability insurance, medical/disability insurance, workman's compensation insurance and automobile liability insurance. It is rarely the case that construction all risks (CAR) or transit insurance is required under the EPCM contract (as the EPCM will not be constructing the works and it is unlikely the EPCM will be providing any goods or materials). Consideration may need to be given, however, to the impact of the EPCM's presence on site on the policies to be maintained by the other project participants.

Finally, it should be noted that the EPCM contractor is often required, as part of the services to be performed, to advise the Owner on required insurances for the project and upon the suitability of policies proposed by the project participants. On large scale projects, the Owner may be well advised to take out "all embracing" project wide

17 Although the availability of professional indemnity insurance at commercially reasonable rates is a hot topic in the United Kingdom construction industry following large increases in premiums and it remains to be seen what effect the increases in premiums will have on the long-term viability of such policies and the terms upon which the policies are offered.

insurance policies, naming the various project participants as co-insureds. This gives the Owner the advantage of controlling the various insurance policies but also minimises wasted costs by effectively reducing the overlap between individual policies of the project participants (which ultimately the Owner would otherwise end up paying for).

Net Contribution

If current trends in the United Kingdom construction market are anything to go by, the use of so called "net contribution" clauses is likely to become more apparent in EPCM contracts than it currently is. At present, net-contribution clauses are more the exception than the norm in both EPCM and EPC contracts, although it should be noted that the FIDIC Client/Consultant Model Services Agreement (commonly referred to as the "White Book") contains a rudimentary form of net contribution clause.

A net contribution clause aims to limit the proportion of any loss or damage payable by a party to that party's 'fair share' or such share as would be 'just and equitable' for them to pay (usually making certain assumptions, including that all others who may be to blame have paid their fair shares).

This device is used because construction disputes often involve more than one party that is alleged to be at fault, typically due to a mixture of design and workmanship alleged deficiencies. This is particularly the case in an EPCM arrangement with multiple contractors in direct agreement with the Owner. In England and Wales, under the law of joint and several liability, any one "wrongdoer" who can be shown to have breached its obligations could be held responsible for all of the damages suffered. This means that the "innocent" party can choose simply to sue one of the wrongdoers. If there is the perception that the consultant has the deepest pockets (backed by a professional indemnity insurance policy), it may well be that it is only the consultant (EPCM Contractor) who is sued, rather than other alleged wrongdoers.

To get around this problem, the net contribution clause was developed as a contractual device to achieve a more equitable split in liability apportionment. The effect of the net contribution clause is that a party will only be liable for his proportion of the damages, whether not a contribution can be obtained from the other parties. In terms of risk allocation, inclusion of such a clause transfers to the Owner the risk of insolvency amongst the contractors and other consultants appointed on the project.

Dispute Resolution

From the Owner's perspective a vital and often overlooked factor in the correct structuring of an EPCM project are the provisions for dispute resolution. These provisions should always be drafted with a view to what remedies the Owner will have in circumstances where the project, as a whole, goes badly awry. When this occurs under a typical EPC contract, the Owner will obviously have the advantage of a single point of responsibility, being the EPC contractor, and will not have to worry about separate or parallel proceedings and difficulties with joinder and consolidation of separate actions since usually only one party (the EPC contractor) will be responsible. Thus, under an EPC contract, if there is a design issue, a workmanship issue, or a time issue, then the dispute is simply between the Owner and the EPC contractor and that can be resolved in a single forum.[18]

18 This assumes that the project involves a single EPC contract. However, large projects will frequently involve 2 or more separate EPC contracts, possibly with an EPCM overlaid.

A significant disadvantage to the Owner of the EPCM route is that if the project goes awry, the Owner can find itself faced with a number of battlefronts. The Owner is likely to find itself in dispute with one or more of the major trade contractors which may be claiming extensions of time and loss and expense. In order to defend itself properly, the Owner will need the assistance of the EPCM contractor, but also may need to join in those that are truly responsible for the matters which have led to the claim against it. If there is late provision of design, then the Owner will want recourse against the EPCM contractor. If it is the default of another trade contractor then the Owner may equally need recourse against that trade contractor.

Further still, problems can arise with inconsistency in the drafting between trade contracts such that the claim by one trade contractor against the Owner may be governed, for example, by German law, and yet a potential claim by the Owner against the responsible defaulting trade contractor, or the EPCM contractor, may be governed by, for example, Sharia law. Whilst this may seem an extreme example, it is in fact based on a real life project.

Thus, it is the responsibility of the EPCM contractor to have regard to the Owner's interests in such scenario. Since the EPCM contractor is responsible for the placing of the main trade contracts and for advising the Owner on the same, the EPCM contractor and Owner ought to be having this potential situation in mind when doing so. Thus, there is good reason for the EPCM contractor to be providing the Owner with the ability to join all of the potentially major responsible parties to the project together in one set of proceedings under one governing law, to protect itself against the risk of multiple proceedings in different jurisdictions with the attendant costs and legal risks involved. It is not the purpose of this article to advise whether courts or arbitration and, if so in what jurisdiction, are preferable. Suffice to say that careful consideration needs to be given to the drafting of the trade contract and the EPCM contract in this regard. Drafting effective, valid and enforceable joinder provisions is fraught with difficulty and will usually require the assistance of specialist lawyers, brought in by the EPCM contractor (or its own in house legal function) and paid for by the Owner.[19]

Conclusion

As can be seen from the above analysis, there are good reasons for concluding, as the title of this article suggests, that EPC and EPCM contracts are worlds apart.

The advantage from the Owners' point of view of an EPC contract is that the contractor takes full responsibility in respect of the following:

- cost of completion if it is a lump sum contract (subject to limited adjustments);
- the time for completion (subject to extensions of time);
- the quality of the design and work and achievement of performance guarantees (subject to any exclusion).

This means that the potential for multiple disputes is also avoided. However, the major disadvantage for the Owner of the EPC contract, when compared to the EPCM contract, is that the detailed design is the contractor's prerogative. Accordingly, in an EPC contract, great care needs to be taken that the Owner specifies and defines the design parameters and deliverables (including consumption of utilities and emissions) so that

19 Of course sophisticated Owners may well have access to their own legal teams in this regard.

the Owner obtains a project of the required standard. This usually requires more than simply stipulating performance criteria in relation to the output of the plant, and will include design-life and maintenance issues.

Equally, from the EPC contractor's perspective, recurring problem areas in EPC contracts are bridging the interfaces between the basic engineering and the FEED, with execution under an EPC contract, in circumstances where the EPC contractor did not execute the FEED itself. The EPC contractor is usually required to satisfy itself as to the accuracy of basic engineering and/or FEED, or is deemed to have done so even where the bid period is patently insufficient to allow it physically to do so. Current practice in many sectors often requires the EPC contractor to accept this risk. Indeed, even in some of the standard forms this is the case.[20]

From the Owner's point of view, resolving liability for and the consequences of basic engineering and/or FEED "defects" in the Employer's Requirements will be extraordinarily difficult and expensive which is why it is wise to try to place full responsibility on the EPC contractor. The contractor which accepts such a risk without having carried out a thorough evaluation of the basic engineering and FEED does so at its peril and is unlikely to have recourse against the perpetrator of the errors. It could be a costly miscalculation.

The solution for the Owner in bridging the interfaces if the EPC contractor is not willing to assume responsibility for the basic engineering and/or FEED or it is considered unlikely at project inception that any EPC contractor would take such a risk is to consider alternative contract strategies including EPCM which has the potential for providing seamless and continuous responsibility for the engineering. But these issues need to be thought through at conception of the contract strategy taking into account the contractors' appetite for risk gauged according to the expected market conditions at the time of execution. Further, since the EPCM route splits responsibility for engineering and construction, the well advised Owner ought to be far more pro-active in its management of the project.

Thus, the Owner is well advised to ensure that it has sufficient in-house or other resources available to it to monitor and check the performance of the EPCM contractor during the FEED and detailed design phases, to ensure that the Owner is getting exactly what it wants in terms of performance, operability, maintenance and whole of life cost and by passing as much of the risk as possible in relation to the cost of construction, time for completion and quality of the construction work to the trade contractors by effective trade contracts.

The selection of the appropriate pricing structure in combination with the above will reduce the Owner's risk.

The low EPC lump sum price is not always what it appears to be, particularly where (as is often the case) the winning contractor has "skinnied the bid" in order to win the contract, with a view to making claims to recover the profit.

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20 See for example FIDIC's Conditions of Contract for EPC Turnkey Projects (The Silver Book) where the Contractor is responsible for errors in the Employer's Requirements (which often comprises a basic engineering package).

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