EPCM vs. EPC Contract Styles

THE ILLUSION OF WHOLESALE RISK TRANSFER ON EPC LUMP-SUM CONTRACTS

Most adherents of EPC lump-sum contracting for megaprojects argue that the contracting strategy effectuates significant transfer of risk and responsibility from the sponsors to the EPC lump-sum contractor. The facts, however, suggest that this really is not the case. Some lump-sum prime contractors did indeed lose significant amounts of money on megaprojects in our set. However, those losses for the contractors did not translate into gains for the sponsors. Instead, those losses translated into facilities with an endless stream of operating problems.

Significant risk transfer from sponsors to contractors is structurally impossible. Contractors, including the very large contractors that take leading roles in megaprojects, are too thinly capitalized to survive wholesale risk transfer on large projects. During the period of over-capacity of EPC services between the mid-1980s and the early years of the twenty-first century, the contractors that had to take on significant EPC lump-sum projects to have enough work mostly failed to survive. Many of those that survived were badly wounded, and all learned an indelible lesson: The failure to be carefully risk averse will surely result in bankruptcy. [1]

The above quote is based on a study of more than 300 global projects in several industrial sectors. Our experience is that, though these were large projects, this same outcome is seen on projects of a more modest size as well. We have recent experience on a large project where the exact scenario outlined above played out and nearly destroyed the project. The project Owner would tell you that our involvement was crucial is preventing a disaster.

[1] Edward W. Merrow, "Industrial Megaprojects", 2011, 276-277

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CHOOSING AN ENGINEERING AND CONSTRUCTION CONTRACT STYLE

There are many factors that guide the selection of a contract style for engineering, construction, and the management of those tasks. Important factors to consider:

1. **Level of design input by the Owner**. Owners that will become long term Owner/Operators of the plant often desire significant input during engineering to increase safety and maintenance effectiveness, while reducing cost of operations and utility costs.
2. **Level of project definition**. Projects lacking full definition at the time the construction price is contracted will see increased final costs by the general contractor to cover their risk. These projects are also more vulnerable to schedule overruns.
3. **Level of financial risk the Owner is prepared to take**. Reducing engineering and construction risk to the owner, by assignment to the contractor, translates to an increased total cost.
4. **Financing Constraints** – If the Owner is securing third party financing will the financiers require a specific contract model to attempt to reduce their risk?
5. **Owner's Team and Core Competencies.** Does the Owner have on staff, or available to them via a contract method, the skilled team needed to manage and control the project?

There are many variations of contract styles, with each having features and benefits providing solutions to the above challenges. We will contrast two styles, one where the Owner may assume increased risk but has increased technical influence on the outcome. The second is the reverse of that, where an Owner hires a contractor in an attempt to reduce their risk, at an increased price, with a corresponding reduced influence on the final outcome.

EPCM – Engineer, Procure, Construction Management

A traditional EPCM contract is a Professional Services Contract. In a traditional EPCM arrangement, the Owner selects an EPCM contractor who then provides management services via an agency agreement for the project on behalf of the Owner. Under this model, the EPCM contractor does no actual building or construction themselves, rather they oversee development of the design and manage the construction process on the Owner's behalf. The EPCM Contractor acts as the Owner's agent and creates and then manages direct

contractual relations between the Owner and vendors/contractors. In broad terms, those EPCM services include:

- Responsible for managing completion of the Engineering and Process Design (the E)
- Procures Equipment and Trade Contractors (the P)
- Manages the Construction Phase of the Project as the Owners Representative (the CM)

EPC – Engineer, Procure, Construct

By contrast, an EPC contract has a Contractor take **direct responsibility** for the above three components of the project. An EPC contract is a design and construct contract where a single contractor broadly takes responsibility for all project elements, including commissioning. Owners typically endeavor to make the EPC contractor responsible for the process although few EPC contractors will fully accept this requirement. The EPC contract has **perceived** advantages in a few areas:

- Cost and schedule at completion are defined early. However, each is subject to change based on how well defined the scope of work and performance criteria are.
- Sets a measurement for achievement of performance, subject to design changes.
- Disputes are with a single entity, the EPC Contractor. However, the EPC's internal grievances with suppliers often spill over into the Owner's domain.

While the EPC advantages seem intriguing, it is difficult for projects of many types to meet the strict design criteria that must be quantified, qualified, contractually defined, and ultimately achieved by the EPC contractor. Successful EPC projects generally require high levels of project and process definition in their bid documents, and even if that is provided, the overall project comes with increased total cost. Performance guarantees defined in the bid documents can include design criteria which are difficult to define, or even know, on some emergent process industries.

One specific design challenge is holding the EPC contractor responsible for the process design if the Owner or a third-party OEM is providing significant portions of the process design. In such cases, the EPC typically insists on exclusionary language to exempt their responsibility for that portion of the

process design, including downstream balance of plant support services. In the event of a dispute due in any part to these 'provided process designs', the EPC Contractor will claim their plant design failure was due to a failed process design, and not their balance of plant design – getting to a satisfactory resolution is nearly impossible from the Owner's perspective.

EPCM provides advantages to an Owner, as contrasted to an EPC Contract:

Attribute	EPCM	EPC
Suitability for Project	Best suited for lesser defined projects with expected changes during design. Well suited where Owner desires meaningful design input and intends to be the Owner/Operator of the plant.	Best suited for very well-defined process plants, or projects wherein numerous plants of the same type have been successfully built.
Design Input by Owner	Owner has control over design evolution, with an increased opportunity to realize vision, function, and ROI targets. Owner will spend more time with the design team, but the EPCM can limit this using experienced staff.	Hands Off Approach – **Design is the contractor's prerogative.** Clear front-end process definition, performance metrics, and deliverables must be defined and contracted in the bid documents. EPC is meant for projects with known processes that can be accurately financially quantified.
Cost Magnitude	Overall cost is lower due to reduced mark-up for contract risk. **Owner enjoys savings due to competitive market pricing**.	Cost of Risk approaches a 10-20% increase. Highest cost option and reduced ROI.
Cost Transparency	Owner has visibility on costs from bidders and sees how Change Orders are priced.	Little visibility on EPC cost build up or how increased risk is priced. Change Order cost visibility is reduced.
Engineer Selection	Owner has input/choice for selection	Owner's has limited if any input. EPC selects the Engineer.
Contractor Selection	Owner has input/choice for selection. Owner can influence bidder lists	Owner input is greatly limited. Sub-contractors generally chosen on low price or prior EPC relationships; quality can suffer.
Litigation Potential	Reduced – teams identify issues earlier and provide remedies to control price escalations and remove litigation events.	Increased. This is a performance-based contract. Results strongly correlate with the quality of early bid documents.
Risk Profile	Increased risk due to numerous contracts held by Owner, and the CM's need to manage multiple contractors. Risk mitigation through the EPCM is needed	Increased risk from Change Orders. Increased risk from ill-defined work scopes and performances measures. Increased risk from internal strife on the EPC team.

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Engineering and Construction Performance	Performance increases. Construction is based on complete bid documents, which are then used to measure and guide progress. **EPCM provides a consistent bridge between design and construction. EPCM is the Owners advocate.**	The EPC's designs and cost are based on documents not of the EPC's origin. The EPC likely will not satisfy itself as to the accuracy of the bid information but will hold the Owner contractually accountable to it. Any mismatch from the bid document results in change orders and potential reduced quality.
Liability Resolution and Risk Assignment	There is no intermediary designer between the bid documents and final designs. There is an increase in the number of liability holders, however access to each is defined and can be evaluated and monetized.	Placing defect resolution on the EPC Contractor greatly increases the cost of risk and reduces the number of interested EPC bidders.
Dispute Resolution	Multiple disputes are a potential but are mitigated via the actions of a skilled EPCM Professional.	Multiple disputes are avoided; however, the Owner can suffer if the EPC and its Subcontractors have internal strife.