A New Approach to Managing Project Risks

Major Projects and Risk

A SHORT SUMMARY

A major cause of delays to completion of projects and to additional costs incurred is the occurrence of unanticipated risks and the failure to manage those risks which are anticipated.

Historically a simple solution for many owners was to transfer as much risk as possible to the prime contractor (in effect, a 'single point of responsibility'). The prime contractor then sought to reduce the financial burden of this risk by transferring as much as possible to subcontractors and suppliers. This arrangement was commonly seen in what are known as EPC (engineering, procurement, and construction) contracts.

The assessment of risks has traditionally been conducted by way of "risk registers" and numerous proprietary risk management tools. These have undoubtedly assisted in a better understanding of the risks which might potentially impact a project, and to evaluate the likelihood of those risks occurring. But a 'risk register' and these tools fail to address some fundamental issues which are at the root of fully understanding and managing project risks.

A number of changes in major project procurement demands significantly better risk identification and management:

- **there are fewer prime contractors willing to take single point of responsibility risk**
- **the increasing use of '*state of the art*' technology as a large part of the total project capital and operational costs and suppliers of that equipment not capable of managing completion risk and design and construction interface and coordination with others**
- **there is, accordingly, greater use of joint venture/consortium contractors but where these are led by the major equipment supplier the single point of responsibility is diluted with "carve-outs"**
- **public/private partnerships and similar contracts seek to make the prime contractor to be responsible for operational performance of the completed facility, and general contractors do not have the expertise for this**
- **the significant exposure of prime contractors because of the cascading effect of reducing total financial liability under the prime contract and subcontracts and supply agreements**

THE 'RISK MATRIX' WOULD PROVIDE A BETTER APPROACH TO THE IDENTIFICATION, ANALYSIS AND MANAGEMENT OF RISKS

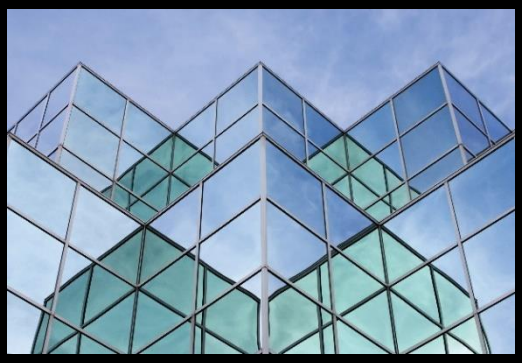
Major complex projects are regularly affected by delays to completion and cost overruns. Often those delays and cost overruns have been very significant, to the detriment of all involved.

There are many reasons for these delays and cost over-runs. However, key contributors have included issues of misunderstanding of risks and the consequential arguments about responsibility and liability:

- *misunderstandings of participants of the nature and scale of the risks in the project*
- *lack of clarity of the risks allocated to each participant*
- *lack of understanding of the capacity and capability of participants to carry and/or manage those risks*

- *lack of clarity of the nature and scale of the residual risks (and how these are to be managed)*
- *inadequate appreciation of the potential (or likely) financial impact of those risks*
- *insufficient expertise and experience in managing the allocated risks and residual risks.*

Accordingly, the financial and other effects of those risks are usually underestimated and risk management measures poorly planned and implemented. Ultimately these effects often manifest in the inability to forecast completion and operational start-up dates, and out-turn costs, and incorrect decisions at site and corporate level. Inevitably, this leads to all those involved being disappointed, and reputations and relationships damaged.



Today many different contracting structures are being employed, and most have similar fundamental risk allocation principles, and hence the same problems. A contracting structure commonly used is the '*Engineering, Procurement and Construction'* (often referred to as the EPC form).

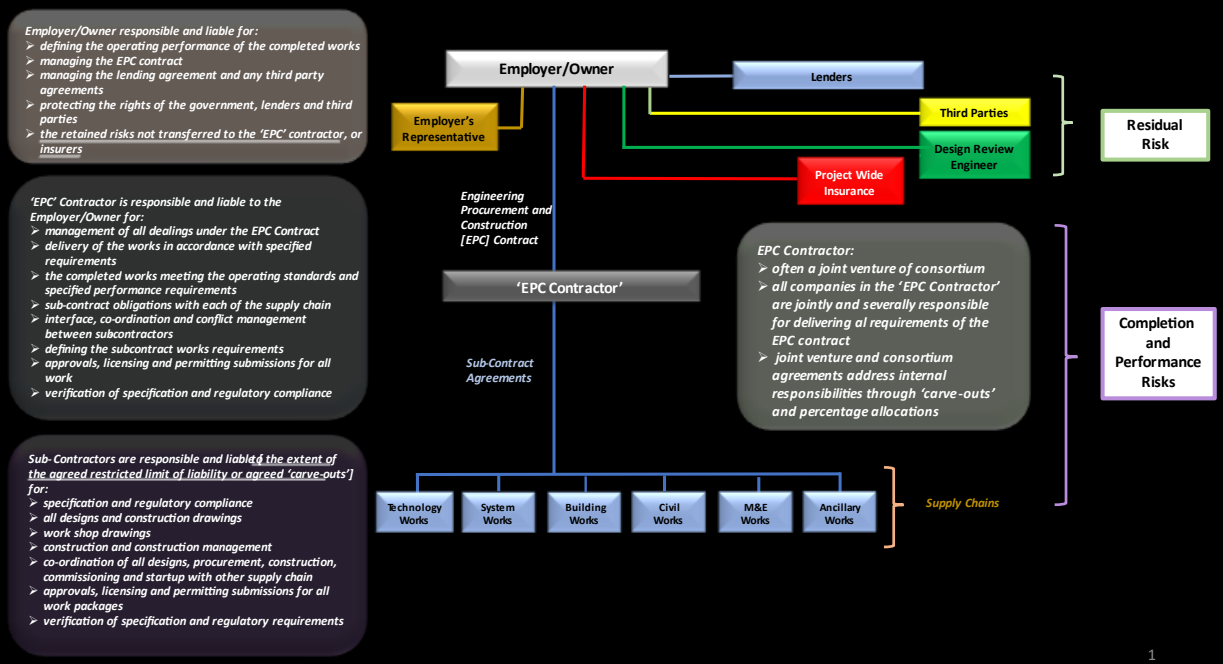
Major Project EPC Contracting and Risk Arrangements

Contracting Arrangements

Over the last decades contracts for major complex projects have historically been:

- *procured and funded by government (either directly, or indirectly through foreign institutional loans)*
- *schematically designed (together with a series of technical and operational requirements) by an engineering consultancy appointed by the government*
- *designed in detail, built, completed, commissioned, and put into operation by contractors appointed by the government (and supervised by the government appointed engineering consultancy).*

A simple outline of this contracting arrangement is shown below:



Often under these arrangements:

- *the contractor is required to be the 'single point of responsibility' for completing the project in accordance with the specified requirements*
- *the contract between the government and the contractor provided for both damages to be paid by the contractor if there was delay to completion, or if the completed work did not perform to prescribed operating performance requirements*

- *the contractor was required to provide performance bonds, and to have an overall limit of financial liability for failings under its contract with the government*
- *the contractor was also required to pass on any indemnities, guarantees and warranties provided by suppliers/vendors*
- *the contractor transferred some of these risks to subcontractors and suppliers, and to insurers.*

Risk Management Arrangements and the Use of Risk Registers

Risk registers are very commonly used as risk management tools designed to identify potential setbacks in projects.

The process associated with risk registers aims to identify, analyse, and solve risks. A 'risk register log' tracks potential risks in a project and will include information about the priority of the risk (sometimes ranked as 'low risk', 'medium risk', and 'high risk'), and the likelihood of that risk occurring. Risk registers will also include mitigation measures to manage the impact of any risk.

Risk registers are structured in many different ways but as a very minimum will often include categories for risks associated with:

- **technical issues** (including design, construction, commissioning and operational start-up);
- **communication issues** (including such things as inconsistencies in contract documents, and delays in the issuing or receipt of project information);
- **programme/schedule delays** (including such things as delays to progress of work, delays to delivery of key equipment, and delays to completion of the project); and
- **unplanned work** (including Variations/change orders, scope creep, and remedial work).

Risk logs usually contain: *risk identification (name and reference); risk description; risk classification (budget, quality, schedule, technology, information, operation/maintenance); risk likelihood; risk analysis (assessing the likely impact of a risk, and the trigger for the risk occurring); risk mitigation (essentially a risk response plan to lessen, or negate, the impact of the identified risks); risk priority (the order in which risks will have the most detrimental effect on the project); risk ownership (the individual responsible for managing the risk including implementing agreed mitigation measures); and risk status.*

Are Historical EPC Style Contracting Structures Sustainable?

It is certainly strongly arguable traditional EPC contracting structures are increasingly unsuitable because:

- *an increasing need to incorporate 'state of the art' or 'first of a kind' technology and the performance and financial risks associated with projects comprising a mix of complex technology and civil, structural, and architectural works are impossible to be carried by a single organisation*
- *fewer companies are willing to, or capable of, carrying the level of prime contractor risks (leading to the formation of joint ventures and consortia)*
- *these joint ventures or consortia regularly comprise organisations which have not previously worked together (each member having different management styles and systems, and different attitudes to risk assumption)*

- *the basic culture of technology providers is one of a manufacturer and supplier not a contracting partner or subcontractor (but they can often be responsible for the majority of the project cost)*
- *few technology providers or subcontractors have the skills or capacity to comply with the detailed procedural requirements of contracts (of such things as notifications and programme updating) and this creates increased uncertainty and further risks to be assumed by others*
- *few project participants fully understand the extent and complexity of the risks they are carrying, the risks carried by others, and the interface between them and very few, if any, prime contractors are prepared to assume the risks of large packages of work which they do not understand*
- *in many countries a requirement to utilise local companies (either as joint venture partners in the prime contractor or as subcontractors) and these are incapable of carrying their appropriate proportion of financial risk*
- *the remuneration, risks and rewards of the prime contractor, the technology provider and the supply chain are invariably misaligned*
- *the "single point of responsibility" prime contractor concept (with considerable risks transferred to the supply chain) is increasingly untenable*
- *"joint and several liability" for members of a joint venture or consortium cannot be viable where technology is a significant part of the required deliverables*
- *project outturns have become increasingly uncertain and unpredictable (and this is unacceptable to tax payers, investors, shareholders, and society).*

This is all exacerbated by:

- ***consequential sub-optimal or incorrect decision making by all stakeholders***
- ***a lack of impartiality in site reporting***
- ***a severe lack of certainty and predictability in project outturns***
- ***regular surprises for the public, shareholders, and executives.***

Are Risk Registers Suitable for Major Complex Projects?

In order to fully understand the risk profile of a project the following are necessary:

- *clarity in definition and a clear explanation of the 'fundamental project objectives', or imperatives, and how these are to be met*
- *total transparency in risk allocation and a common commitment to the fundamental project objectives'*
- *total openness in project information availability*
- *a clear understanding of key physical interfaces and dependencies*
- *a clear understanding of key contractual interfaces and dependencies.*

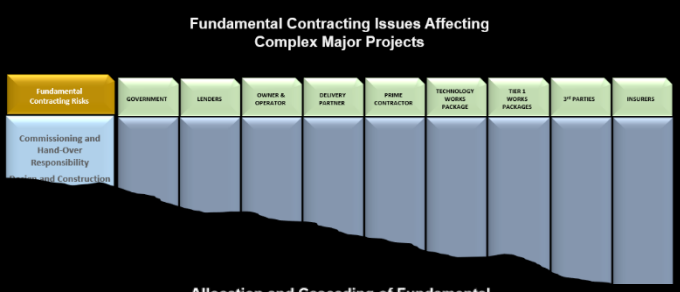
It is arguable that the traditional risk register does not deliver upon these requirements.
The alternative ***risk matrix*** addresses fundamental *project delivery risks* and *contracting risks* and requires:

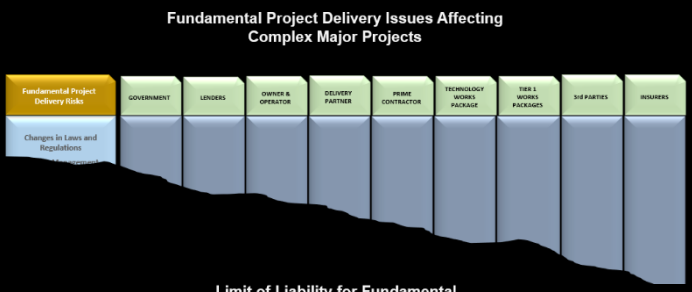
Stage 1 – Evaluation of Risks Individually and Collectively

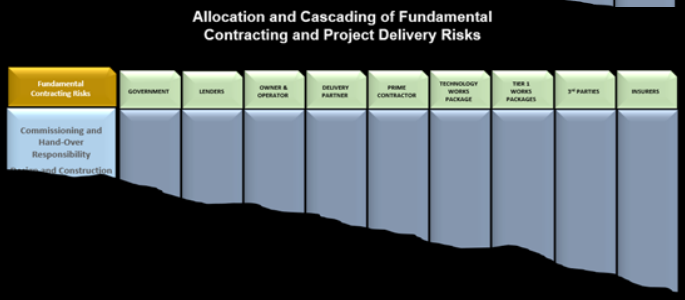
- *from the perspective of the responsibility each project participant carries*
- *from the perspective of the type and level of risk being carried by each project participant*
- *from the perspective of the capacity of each project participant to carry those risks.*

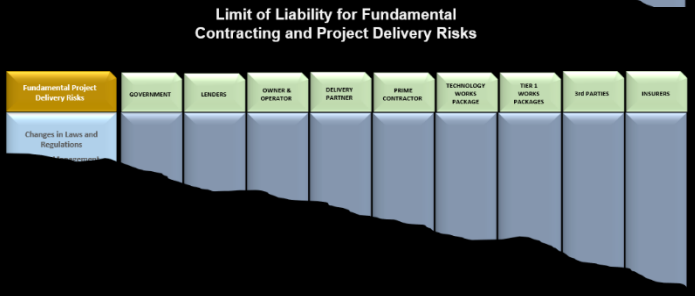
Stage 2 – Provisional Allocation of those Risks to Key Project Participants

This as a minimum would include the owner, the prime contractor, key subcontractors and equipment suppliers, and insurers)









Stage 3 – Defining Responsibilities for Deliverables, Interfacing and Coordination

The provisional allocation of the risks is then required to be agreed in the context of the obligations each participants has in respect of:

- *delivering the work, materials, or equipment required by its contract*
- *interfacing with other participants (including the provision of necessary information, directions and the like)*
- *coordinating its work with others.*

Each of these fundamental contracting and project delivery responsibilities have to be assessed from the perspective of:

- ***the obligation each project participant has for such responsibility***
- ***the type and level of risk being carried by each project participant***
- ***the capacity of each project participant to carry those risks.***

Stage 4 – Agreement of the Risk Allocation

The provisional allocation of the risks is then required to be agreed in a series of "*Risk Workshops*" in which is fully discussed:

- *the nature each of the risks*
- *the likely impact of each risk on each participant*
- *the entity required to carry the risk and the manner in which each risk is to be monitored and managed*

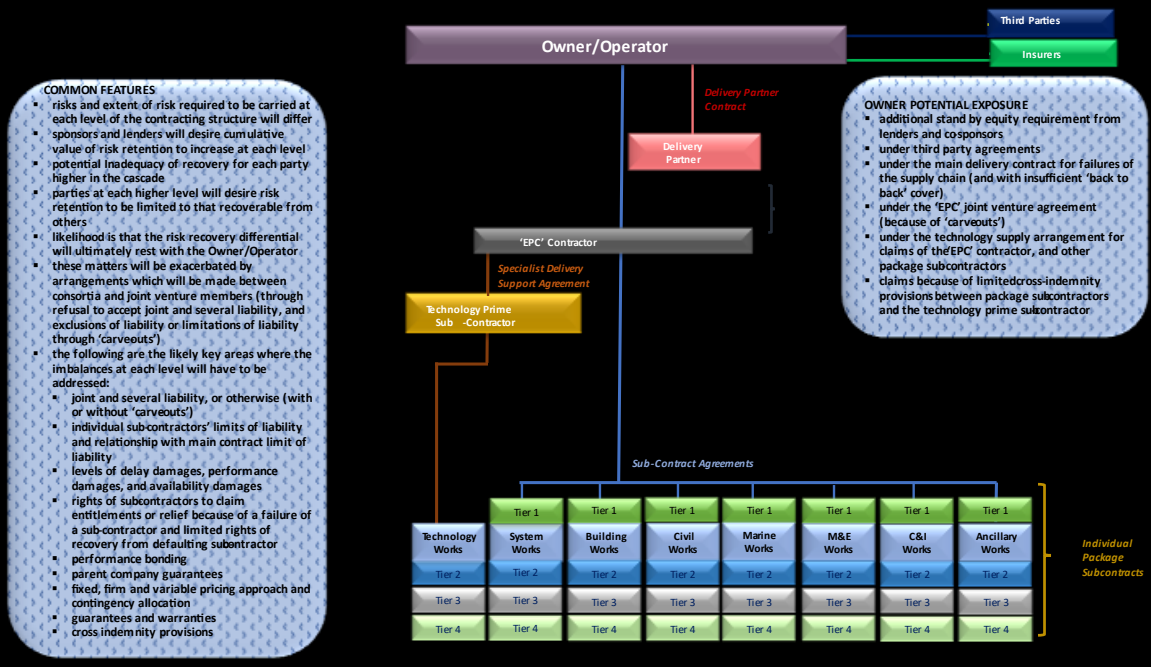
Stage 5 – Agreement of Cascading Financial Effect of Risks and Resultant Residual Risks

It is critical all project participants fully understand how risks cascade through the contracting structure and how any resultant residual risks (that is, those risks not fully absorbred within the structure) are to be monitored and managed.

The key issues to be dealt with will include:

- *what overall financial risks is the EPC contractor not willing to accept (including any limit of liability exposure with subcontractors, and joint venture/consortium "carve-outs")*
- *what financial risks related to the operation of the completed works will the EPC contractor not accept (especially so with state of the art technology and the technology supplier accepting only limited financial liability)*
- *claims by package subcontractors for failures of the technology supplier.*

The following structure identifies some key issues to be addressed where limits have to be incorporated into the *financial liability cascade*:



1

The risk matrix is fully focused, effective and manageable:

- **risks are considered horizontally across each project stakeholders**
- **risks are considered vertically through the contracting structure**
- **risks are considered in each of the various contracting agreements**

Combination of Risks

Conclusions

The facts show that:

- *the investigation of risks on construction projects is regularly carried out using risk registers which often focus heavily on technical challenges in design, construction, and commissioning activities*

- *however, these investigations invariably only analyse individual technical risks, or a series of individual technical risks but do not analyse these risks in combination with others*
- *importantly historical risk analysis has not addressed the contractual positions between the owner and the prime contractor, and between the prime contractor and its subcontractors and suppliers*
- *these positions (which vary on every project) are almost always inconsistent and where projects have a significant technology element they can be totally incompatible (and certainly from the perspective of capacity and capability to carry risks)*
- *most projects proceed in an environment where the risks being carried by individual project participants are not understood by them, and where risks lie and who is responsible for managing those risks is very often misunderstood*
- *project risks exist and react in a matix (which includes the contracting organisation structure and the interfaces between them).*

Accordingly, properly this 'risk matrix' should address the cascading of risks within that contracting structure and the ability to carry and manage allocated risks should be fully examined in pre-contract "risk workshops" attended by all key project participants.

The High-Point Experience

POWER GENERATION

350+
POWER GENERATION PROJECTS

Combined-Cycle
Hydroelectric
Nuclear
Renewable
Thermal

TRANSPORTATION

250+
TRANSPORTATION PROJECTS

Airports
Bridges
Highways
Maritime Facilities
Rail Systems
Tunnels

OIL, GAS AND INDUSTRIAL

450+
OIL, GAS AND INDUSTRIAL PROJECTS

Manufacturing
Mining
Oil & Gas Processing
Pipelines
Utilities

COMMERCIAL AND PUBLIC BUILDINGS

300+
BUILDING PROJECTS

Hotels & Resorts
Institutional Facilities
Offices & Retail
Sports & Leisure

PROCUREMENT TYPE
PPP, PFI, IPP, IWPP and PROJECT PARTNERING, EPC, EPCM, DESIGN AND BUILD,
DESIGN, BUILD and OPERATE, EARLY CONTRACTOR INVOLVEMENT and many HYBRID FORMS

TYPICAL CLIENTS
INSTITUTIONAL and PRIVATE FUNDERS, GOVERNMENT AGENCIES, PRIVATE SPONSORS, INVESTORS and DEVELOPERS,
INSURERS, MAJOR INTERNATIONAL CONTRACTORS, EQUIPMENT VENDORS/SUPPLIERS and OPERATORS

If you require any further discussion or explanation of the matters described above, then please let us know.

Kelvin Hingley
Managing Partner
High-Point Partnership LLP
E: kelvin.hingley@highpointpartnership.com

London Office
E: valerie.howell@highpointpartnership.com
M: +44 7827 927 795
O: +44 203 019 3830

www.highpointpartnership.com