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International Projects

Pricing FIDIC Variations

Jurisdiction in Focus: Indonesia

Megaprojects – On Time and on Budget

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Ground Risk in Construction Contracts

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Welcome to HFW's International Projects Magazine

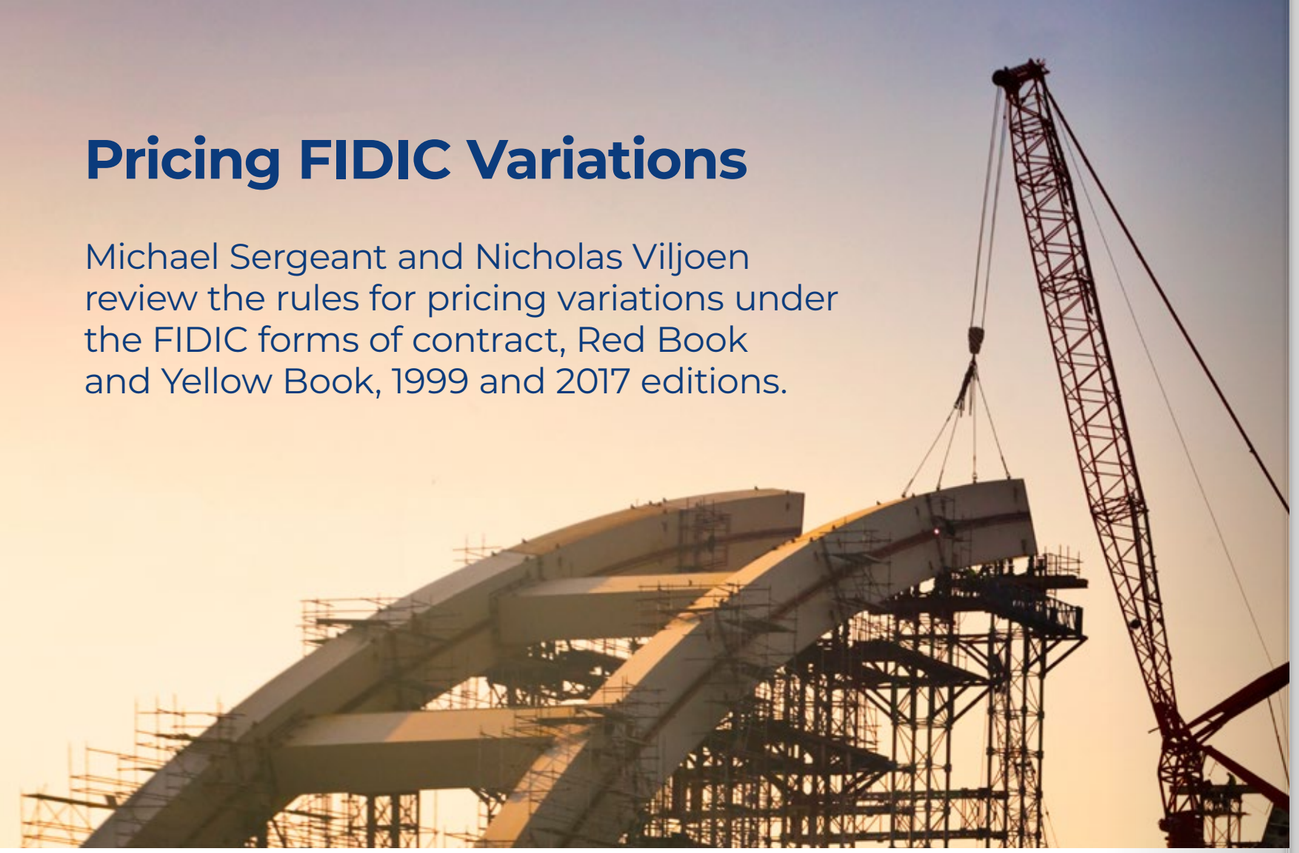
Our publication is designed to give people working on international construction projects a concise and user-friendly update on recent legal and contractual developments.

It reflects the issues we perceive as important to the industry such as contract risk allocation, claims and international dispute resolution processes. We hope you find our magazine interesting – but please let us know what you think, and what you would like to see covered in future editions.

HFW International Construction Team

Pricing FIDIC Variations

Michael Sergeant and Nicholas Viljoen review the rules for pricing variations under the FIDIC forms of contract, Red Book and Yellow Book, 1999 and 2017 editions.



In particular, we look at the approach typically adopted for pricing changes and the degree to which these forms of contract are in line with standard practice. We consider the quirks of these four contracts and the pitfalls that can arise.

Variation pricing rules

Variations are typically valued using a 3-stage set of rules. The approach depends on whether a rate or price is contained in the contract pricing documents that corresponds to the item of additional work. If a directly applicable rate exists in the documents, then one values the variation using Rule 1. If there is no such rate then one moves to Rule 2 to consider analogous rates, and so on.

- **Rule 1: Use contract rates or prices.** This applies where the work to be valued has a rate or price specified in the contract or is similar to work priced in the contract.
- **Rule 2: Derive a new (star) rate from existing rates.** This approach is triggered if the varied work is of dissimilar character or will not be executed under similar conditions to the work envisaged by the contract rates or prices.
- **Rule 3: Use a fair valuation.** This valuation method applies in circumstances where there are no rates or prices that are relevant for derivation of a new rate or price. How precisely one determines a fair valuation might be a matter of debate. This could involve looking at evidence of market rates. It might involve considering the actual cost of undertaking the variation, plus profit.

Some contracts use the three-rule approach. Others do not expressly specify the 3 stages, but quantity surveying practice might lead to this approach being adopted in any event. The approach under the FIDIC contracts is mixed.

The Red Book 1999 expressly sets out the 3 rule approach (clause 12.3(b)). However, the Yellow Book 1999 does not prescribe any rules. Under this form, the Engineer will either "agree" or "determine" adjustments to the Contract Price resulting from a variation. The only obligation on the Engineer when pricing the varied work is to "*include reasonable profit*" in the adjustment and to "*make a fair determination in accordance with the Contract, taking due regard of all relevant circumstances.*"[1]

When the 2017 suite was drafted, the Red Book remained largely the same (i.e. reciting the 3 rules), whilst the Yellow Book was changed and adopted the more prescriptive 3 rule approach for the first time.

1 Sub-Clause 13.3 read with 3.5.

"As valuation of variations is undertaken using contract pricing documents, the contract should be clear about what documents should be used."

Fair valuation – Rule 3

The standard 3 rule approach involves pricing changes on a "fair valuation" under Rule 3 if there is no directly applicable or analogous contract rate.

The three FIDIC forms of contract which expressly describe the 3 rule approach (i.e. both Red Books and 2017 Yellow Book) all refer to Rule 3 as involving a cost-based assessment.

A fair valuation will often, but not always, be cost based.

The issue has arisen in a number of cases where the claimant has not incurred any direct cost in undertaking the variation, because the work involved using plant that it owned rather than hired. In such cases, the respondent has argued that a "fair valuation" should involve a cost-based analysis, resulting in no meaningful quantum.[2]

The conclusion to be drawn from these cases is that under Rule 3 variations should not be rigidly valued on a cost basis. It was recognised (because of the express contractual wording or the parties' agreement) that the 'Rule 3 assessment' was required to be undertaken using a "fair valuation" and that did not necessarily mean valuing according to the cost incurred. The logic of this approach is illustrated by an example. Suppose a company had bought equipment and 3 years later it had been depreciated to nothing in the company's accounts. A variation involving the use of such equipment would be valued at zero using a cost-based analysis. However, a fair valuation would most likely assess a market value for the equipment, which seems a fairer approach.

The challenge with the FIDIC forms is that they expressly direct valuation to be undertaken at cost rather than through a fair valuation.

The contract pricing documents

Since the valuation of variations is typically undertaken using contract pricing documents it is important that the contract is clear and careful about what documents exactly should be used.

To begin with, an important distinction must be drawn between two different contractual approaches, each of which can lead to different types of pricing document being produced:

- **Breakdown of the contract sum.** The contractor will often provide a breakdown of its contract price which is then incorporated in the contract. This might be in the form of a Bill of Quantities or a build-up to the lump sum. The individual rates for specific work or materials in this document might then be used for the calculation of prices for variations.
- **Schedule of rates specifically for variations.** The contractor might be asked to produce a set of rates or prices to be used for the valuation of changes and extra work. These rates may bear no direct relationship to the lump sum price for the contract scope, being solely applicable to the pricing of extra work. There are risks associated with this approach. If there are very high (above market) prices for specific items of plant or materials in a lump sum build-up, this will more easily become apparent via the competitive tender process. But individually high prices in a schedule of rates can more easily be missed.

It is crucial that the contract pricing rules refer to the correct documents. If the intention is to use a schedule of rates (as described above) for pricing changes then that needs to be made explicit.

Often a contract will simply refer to the contract sum breakdown or more simply to the contract pricing information incorporated in the agreement. For example, the Red Book 1999 provides that the relevant rate or price to be used "*shall be the rate or price specified for such item in the Contract*". When the valuation of change is undertaken, there is therefore considerable leeway to consider any contract document containing pricing information, which might mean the Bill of Quantities but could include other documents depending on what documents have been incorporated.

There is a risk of being too prescriptive in terms of the contractual description of such documents. Take for example the FIDIC Yellow Book 2017. This states that variations shall be priced using documents called the "*Schedule of Rates and Prices*" which is in turn defined as "*documents entitled schedule of rates and prices (if any) in the Schedules*". This is fine if the parties have correctly inscribed these words on the relevant pricing documents. But the lump sum schedule might have been incorporated into the contract without the magic words "*Schedule of Rates and Prices*" appearing in the heading of the document, such that it cannot then be used for pricing changes. The intention of the drafters to create certainty is laudable, but such a prescriptive approach can often be exactly what leads to unintended consequences.

2 See *Laserbore Limited v Morrison Biggs Wall Ltd* (1993) CILL 896 and the Hong Kong case Maeda v. Bauer Hong Kong Ltd [2019] HKCFI 916.

FIDIC Standard Form	Variation provision, Clause 13	Measurement & Valuation rules: Clause 3, 12 or 13
Yellow Book 1999	Clause 13.3: Engineer proceeds in accordance with Clause 3.5 to determine adjustments to Contract Price.	Unlike the other contracts covered in this table, there is no procedure specified for pricing variations. Valuation is left to the Engineer's subjective determination (see Clause 3.5), who is only required to "*include reasonable profit*" in the adjustment and to "*make a fair determination in accordance with the Contract, taking due regard of all relevant circumstances.*"
Red Book 1999	Clause 13.3: All variations are valued using the procedure under Clause 12.	Clause 12.3(b) specifies a traditional 'three stage' approach to valuation: 1. Use Rates/Prices specified in the Contract; or 2. Modify the Contract Rates/Prices to create new Star Rates; or 3. If (1) and (2) do not apply, value at reasonable cost-plus profit.
Yellow Book 2017	Clause 13.3.1: Where there is a Variation by Instruction cost of the varied work is to be valued using the traditional 'three stage' approach.	A binary process applies, depending on whether the contract includes a 'Schedule of Rates and Prices' Option A: If there is a Schedule of Rates and Prices – the traditional 'three stage' approach seen in the Red Book Forms applies. Option B: If there is no Schedule of Rates and Prices – the varied works are measured using actual cost-plus profit. As we explain in the article, this may apply even if the contract includes other pricing documents such as a BOQ or lump sum breakdown.
Red Book 2017	Clause 13.1 provides that Variations by Instruction are valued using the procedure under Clause 12.	Uses substantially the same 'three stage' approach as the 1999 Red Book.

Sacrosanct rates

One of the common principles underlying the valuation of variations is the requirement to utilise the rates in the pricing document even though they may contain obvious errors.

The logic is that the parties have signed up to the pricing schedule, and it must therefore be used (i.e. it is sacrosanct) even if an individual price is wrong. This principle was established by the English Court of Appeal in the case of *Henry Boot Construction Ltd v Alstom Combined Cycles Ltd*[3] where the court held that errors in pricing do not enable the parties to adjust the rates.

It is a widely recognised principle of English law and other common law systems, but the same principle is also typically applied in civil law jurisdictions unless there is evidence of mistake that could allow subsequent adjustment.

An interesting commercial consequence of the principle is that contractors sometimes strategically price the Bill of Quantities anticipating an adjustment of quantities at a later stage. Where the contractor identifies that the quantity for an item in the BOQ is too low, it might "load" costs strategically onto that item, knowing that there will be a significant subsequent increase in quantities, leading to a valuable windfall. Certainly, in English law, such a premeditated pricing strategy will not invalidate entitlement.

Contract price negotiations

A number of challenging issues arise with lump sum contracts.

Very limited information may be provided by the contractor by way of a breakdown of the lump sum. This will mean that there may be very little to use as a means of valuing variations. In turn, this is likely to result in Rule 3 (see above) being utilised. If this is the case, many variations will be valued using "open market" prices, often given by the contractor's subcontractors. This can be frustrating for the owner if there is a sense that there is little that can be done to test whether the proposed subcontractor prices truly represent a competitive market price.

Another challenge may arise as a consequence of final tender stage discounts in the price. Suppose the contractor provided a contract sum breakdown giving a final lump sum price of say $500 million but then agreed a discount of $50 million to secure the contract. This means that the breakdown does not accord with the final price and inevitably arguments arise as to what this means in terms of the applicability of individual prices.

Finally, the contractor will often be asked in a formal dispute to provide disclosure of its tender lump sum price breakdown. The contractor will often be reluctant to provide this document because of commercial sensitivities. Challenges can then arise for the contractor in proving entitlement without such a key supporting document being in evidence.

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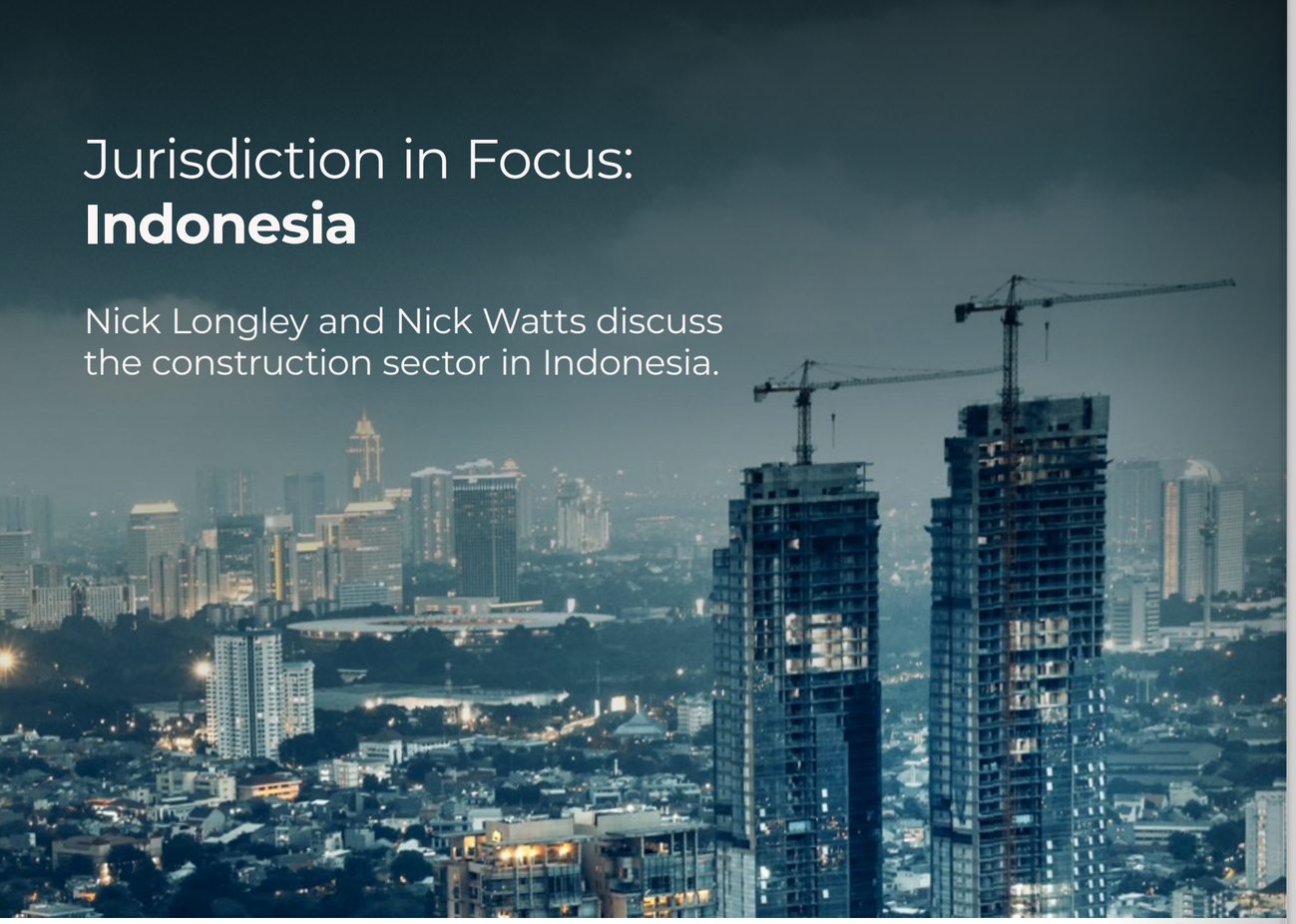
3 [2000] BLR 247.

Jurisdiction in Focus: **Indonesia**

Nick Longley and Nick Watts discuss the construction sector in Indonesia.



1. Can you give an overview of the current state of the construction market in Indonesia?

Indonesia's construction sector remains a key pillar of Southeast Asia's largest economy. In 2024, investment in the sector was valued at US$280 billion and is now likely to exceed US$300 billion. As the Indonesian archipelago integrates into global supply chains and its economy continues its transition from a producer of ore, resources and raw products to a refiner and energy producer, the demand for high-quality infrastructure for its logistics and transport networks, industrial and energy needs and urban developments has increased.

The Government of Indonesia plays a central role in the sector by defining the priorities for national infrastructure development and over the last decade the focus of this development has been roads and railways, ports and airports, power generation, refineries, water systems, and urban mass transit.

These conditions make Indonesia an increasingly attractive market for international contractors, consultants and financiers, particularly for technically complex and capital-intensive projects.

Infrastructure Projects in Indonesia are delivered by state-owned construction companies, though foreign contractors are frequently used to deliver specific scope and/or expertise through joint ventures and consortia.

2. What is the legal framework governing construction contracts in Indonesia?

Law No. 2 of 2017 on Construction Services (Construction Law) and its implementing regulations provide the legal framework governing the full lifecycle of construction activities, including planning, implementation, supervision, and maintenance of construction works and the rights and obligations of service users (employers) and service providers (contractors, consultants, and supervisors).

The Construction Law sets out the standard mandatory terms and conditions that are required in construction contracts, including FIDIC contracts which are common in large scale financed projects.

Relevantly, all construction contracts must be in writing and governed by Indonesian law. Consortium agreements, joint venture agreements and offshore supply agreements may be governed by the laws of other jurisdictions.

The Construction Law is supplemented by others including government regulations and ministerial decrees, which address licensing, certification of construction businesses and workers, and standards for construction services. In the case of public infrastructure projects, these regulations prescribe strict procurement obligations that impose transparency, administrative and audit requirements.

Contracts governed by Indonesian law must adhere with the requirements of the Indonesian Civil Code which, among other things, enshrines the obligation of the parties to act and perform obligations in good faith. Certain provisions, such as Article 1266, which provides that termination of a contract may only be effected through a court order, may be waived and modified.

The Indonesian Civil Code also regulates matters and conduct that are not covered by the provisions of contracts, such as negligence and unlawful acts.

3. How are construction disputes typically resolved in Indonesia?

Dispute resolution in the Indonesian construction sector places strong emphasis on negotiation, mediation, conciliation, and arbitration, before resorting to local court proceedings. Mechanisms such as Dispute Avoidance Boards that are found in FIDIC contracts have been used with success on infrastructure projects such as the Jakarta MRT.

The Indonesian National Arbitration Board (BANI) is the default institution for most Indonesian construction contracts, and as an arbitral institution it is developing a panel of local and international arbitrators with expertise in construction matters.

Joint venture and consortia agreements that provide for a foreign choice of law invariably refer arbitrations to established institutions such as the ICC or SIAC.

There is scope for disputes and/or claims that fall outside the terms of the contract to be litigated in the local District Court and subjected to the local civil procedure and available remedies.

Where certain civil claims coincide with a criminal penalty, such as defamation or fraud and corruption, criminal prosecutions may run in parallel with the civil claims.

4. How are arbitration awards and court judgments enforced in Indonesia?

Enforcement of domestic BANI awards in the local District Court is relatively straightforward and the primary reason why BANI is a preferred choice.

Indonesia is a signatory to the New York Convention, the Washington Convention and a number of bilateral investment treaties that enable enforcement of foreign commercial awards, ICSID and investment treaty awards.

Enforcement of foreign commercial awards requires registration with the Central Jakarta District Court and the process of exequatur. Indonesia's rate of enforcement of foreign awards has improved.

Local District Court judgments are enforceable only after any appeals to the High Court (dibanding) and then the Supreme Court (cassation) have been exhausted. This may take several years, which is a reason why arbitration is a preferred process.

Foreign judgments are not enforceable in Indonesia.

5. How is the Indonesian government supporting infrastructure projects?

The Indonesian Government and the newly elected President Prabowo Subianto continue their commitment to the development and delivery of priority infrastructure projects for Indonesia and support for other delivery models, such as Public Private Partnerships in public and social infrastructure projects.

This in turn continues to attract international contractors and investment from the region, specifically from Korea, China, Japan and Australia, as well as Europe and the Middle East.

"In 2024, the investment in the sector was valued at US$280 billion and is now likely to exceed US$300 billion."

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The holy grail: Can megaprojects and new energy be delivered on time and on budget?

Simon Bellas and Stephanie Yu explore the ongoing tensions between the key drivers of delay and cost escalation versus key mitigation and improved project delivery strategies.

Megaprojects are unique. They are large-scale, billion-dollar ventures that take many years to deliver, often involving multiple public and private stakeholders. These cover public projects such as railways, highways, transportation hubs, power systems and private projects such as LNG, mining and related infrastructures together with new energy projects, such as offshore wind.

Not only are megaprojects getting bigger, but they are also becoming more complex and are not getting any easier to deliver. Amidst supply chain challenges and geopolitical instability, economic pressures and inflation, labour shortages and evolving technology, the challenge to deliver on time and on budge remains elusive. Apart from these external (uncontrollable) factors, megaprojects are also besieged with delay and cost overruns largely arising from more predictable (known) and controllable causes. This begs the questions: Why? What can be done about it? And why is this status quo being perpetuated?

The prevalence of the problem

Cost estimates are systemically over-optimistic. There is a recurring and reliable pattern of megaprojects being over budget and beyond schedule. This is illustrated by an empirical study[1] of around 400 major transportation and social infrastructure projects from 14 OECD nations, which revealed that 47% of projects went over budget and 30% of the projects went over schedule.

The situation is even more dire for the energy sector. Upon analysing 662 energy infrastructure projects across 83 countries[2], it is revealed that more than 60% of the projects went over budget, with an average cost escalation of 40.6%. To add insult to injury, an average energy project usually takes almost two years longer than originally planned to be completed.

The evidence is overwhelmingly clear. The average cost overruns of some key sectors/project types are alarming:

Project Type	Cost overrun
Nuclear power	**102.5%**
Hydropower	**36.7%**
Rail	**35%**
Road	**23%**
Geothermal	**20.7%**
Healthcare	**15%**
Schools	**11%**

While some lessons have been learned, many mistakes are unfortunately repeated.

1 The Boston Consulting Group. (2021). International Major Infrastructure Projects Benchmarking Review. Office of Projects Victoria. https://www.vic.gov.au/sites/default/files/2023-02/International-Major-Infrastructure-Projects-Benchmarking-Review.pdf.

2 Benjamin K. Sovacool, Hanee Ryu, Beyond economies of scale: Learning from construction cost overrun risks and time delays in global energy infrastructure projects, Energy Research & Social Science, Volume 123, 2025, 104057, ISSN 2214-6296, https://doi.org/10.1016/j.erss.2025.104057.

The key drivers of time and cost blowouts

1. Poor project scope definition at inception

Inadequate scope definition before FID (final investment decision), contract execution or mobilisation is one of the most common root causes of overruns, often arising from incomplete designs, insufficiently investigated ground conditions, and the failure to consider interfaces, resourcing and risks. This is often compounded by optimism bias (i.e. the propensity to be 'overly positive' when forecasting and planning tasks[3]) and strategic misrepresentations (i.e. the tendency to underestimate costs, durations and risks in order to secure project approval).

"Fast-tracking" is another issue where design and construction are often carried out at the same time. Optimism bias and strategic misrepresentation are often linked, where parties who lock in prices and schedules and commence construction before the scope is sufficiently mature, only to address resulting problems later at far greater and unexpected costs.

The simplistic solution:

- Clearly consider and account for the risks of greater complexity, scope changes, unexpected geological features etc;
- Better front-end planning with realistic contingency, robust reference-class forecasting based on the 'outside objective view' of the particular project;
- Increase the % of engineering completion before mobilising to site; and
- Address constructability concerns throughout the engineering process and design, e.g. maximising modularisation and pre-fabrication.

The complex reality:

Industry-wide reform is needed to achieve these solutions involving buy-in from many (often reluctant) stakeholders, disappointingly that can involve governments.

2. Project delivery choice and risk allocation

Commonly used project delivery models in large scale construction projects include construct-only, EPC and EPCM agreements which are often selected based on market forces or perceived risk transfer rather than project fundamentals.

The unfortunate default with risk allocation is to place as much risk as possible down the supply chain via market power. However, risks do not disappear just because they are allocated to one party in a contract. If the 'weaker' party cannot price or manage a risk, it will either price it conservatively with hidden costs (driving up cost) or fail to manage it all (driving delay, disputes or worse). This goes against the well-known Abrahamson principles, where risks are to be allocated broadly to the party most efficiently able to manage that risk.

Possible solutions (which also require broad stakeholder 'buy-in'):

- Select delivery models critically based on project complexity, market capability, principal experience and control over design instead of habit;
- Allocate risk more efficiently by aligning risk with control, testing whether transferrable risks are genuinely manageable and insurable, and sharing uncontrollable risks (including gainshare and painshare mechanisms); and
- Improve bespoke drafting of contractual terms and mechanisms to avoid ambiguity and subjectivity in their meaning and effect.

3. Execution issues: poor records, poor communication and lack of compliance

Inadequate contemporaneous record keeping remains an issue during project execution. A lack of project documents can contribute to poor project performance as well as impacting credibility and trust between the parties which can lead to disputes.

Possible solutions:

- Deploy digital management system to enhance transparency and accountability with real-time project management, record-keeping and site-level discipline;
- Ensure project records are accurate, objective, honest, consistent, sufficiently detailed, recording important events and issues;
- Set up clear governance and communication protocols.

As a final point, when disputes do arise in megaprojects, they ought not default automatically to arbitration or litigation. We suggest considering other proven options for efficient dispute resolution, such as dispute avoidance boards (DABs or a standing DB) and mediation.

Conclusion

This article posed the question: Considering the track-record and undeniable statistics, can megaprojects and new energy developments be delivered on time and on budget?

The answer – the root causes are known and documented and the solutions on one level are not complicated. The challenges sit with a need for change to the status quo requiring innovation, generational, industry-wide, and cross-stakeholder reforms.

With that, much better outcomes could be achieved. For now, the holy grail remains elusive and important progress remains slow, but steady.

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3 Aaron Chadee, Salisha R. Hernandez, Hector Martin, The Influence of Optimism Bias on Time and Cost on Construction Projects, Emerging Science Journal, Volume 5, 2021, ISSN 2610-9182, https://www.ijournalse.org/index.php/ESJ/article/view/594.

Industry in Focus: **LNG**

Recent years have seen a rapid expansion in global LNG markets, with demand projected to increase by around 60% by 2040. Whilst this growth presents significant opportunities for industry stakeholders, the inherent complexity and capital intensive nature of constructing LNG infrastructure, alongside market uncertainty, give rise to significant risks. In this article, Tom Hutchison and James Stewart explore recent developments and consider the headline risks to LNG projects.

Liquefied natural gas (LNG) has rapidly evolved from a peripheral fuel source into a core component of many national energy strategies worldwide. This growth has been driven by various forces, including:

- **Energy transition priorities**: Countries are shifting away from coal and seeking a lower carbon, reliable baseload power source during the transition to renewables.
- **Rising energy consumption:** Industrial expansion, particularly across Asia, and the proliferation in energy intensive data centres are pushing energy demand higher.
- **Geopolitical pressures:** The need for energy security has intensified, particularly following the disruption of Russian pipeline gas supplies after its 2022 invasion of Ukraine.

Demand for LNG is forecast to increase further over the coming decades as natural gas is increasingly used as a lower carbon fuel through the energy transition, particularly for industries where electrification remains challenging. Whilst supply is expected to stabilise and meet demand in the near term, there are a number of LNG projects currently under construction and under pressure to come online as soon as possible.

To meet rising LNG demand, additional LNG infrastructure – across liquefaction, storage and regasification facilities, and ports and marine infrastructure – is required. Global export capacity is set to increase by 300 billion cubic metres (bcm) by 2030, with new projects forecast to come online in both established (US, Canada and Qatar) and emerging (Mozambique, Senegal and Mexico) natural gas producing nations. This includes Qatar's North Field East development, which is forecast to be the world's largest LNG project, as well as the United States' major LNG production and export terminals, Rio Grande LNG and Louisiana LNG.

Common LNG project disputes

While liquefaction is not new – LNG has been produced for over 50 years – LNG plants are technically complex, capital-intensive, and interface-heavy due to the number of component parts, from pre-treatment facilities to liquefaction trains, storage tanks and jetties. Whether procured on a full EPC basis, or a multi-package basis, there are complex interfaces between contractors and suppliers which need both careful management and clear risk allocation. As a result, the industry continues to see significant disputes involving delay, defects and cost overruns.

Delay

In common with most large construction projects, delay is one of the most common and costly risks to LNG projects, whether liquefaction or import and regasification facilities.

Delays on LNG projects often have their origin in incomplete or immature Front End Engineering Design (FEED). FEED is required to determine the project's commercial and technical viability, including by fixing major design choices, identifying the specification of key equipment and clearly defining interfaces. This is crucial given that a robust understanding of project cost, risk and timelines is required for owners to make the Final Investment Decision (FID) and for contractors to field realistic bids for each work package.

Even small deficiencies in FEED can ultimately cause significant project delays, particularly where late design changes are required to rectify issues in the early engineering. This is particularly disruptive for LNG projects given their complexity – late changes often require re-engineering across several disciplines, including civil and structural, mechanical, process, electrical and controls and instrumentation, disrupting procurement and pushing back construction milestones. Where major components are ordered before the design is adequately developed, compatibility issues can arise, requiring on site rectification during integration. This issue is compounded by the long lead times and off site fabrication of key equipment, meaning that any re-engineering and re-work can significantly delay the delivery of components.

Inadequate FEED can also lead to substantial project delays when it fails to address project interfaces. LNG projects typically involve multiple stakeholders with interdependent scopes and, if there are unidentified and unresolved interface issues, especially in multi-package contracting, there is a risk of inconsistencies in specifications and design standards. This frequently leads to late stage changes and variations, re-design and re-work, with responsibility for resulting impacts frequently disputed between owners, main contractors and key equipment suppliers (particularly when such suppliers are selected by the owner).

Defects

As many LNG projects are constructed on a modular basis, with key major components being fabricated off-site, defects can have a disproportionate impact on both schedule and cost. This is due to the technical complexity of undertaking remedial work on site and the time taken to procure, or fabricate, key components. Given the inter-dependence of all project systems, a single component failure can compromise the performance of an entire facility, even if there are multiple liquefaction trains and storage tanks, and can prevent commissioning from being completed or regulatory approvals from being obtained.

Material defects often first become apparent after integration and during commissioning (both of individual components and the facility as a whole), even when all factory tests and inspections have been passed. At this stage, defects can halt the achievement of commissioning and the commencement of commercial operations. Full commissioning tests may need to be undertaken once again (with the consequent potential for other failures to occur), exacerbating parties' exposure to substantial liabilities under performance guarantees and, potentially, offtake arrangements.

“Global LNG demand will continue to rise in the long term amidst growing energy needs and geopolitical uncertainty. Such demand will lead to pressure to bring new projects online quickly.”

Given these risks, a clear contractual allocation of liability is essential. Contractors should seek to cap their exposure and exclude liability for any consequential losses the owner might suffer as a result of delay in completing commissioning. This is more critical where commissioning is to be undertaken by the owner, rather than the contractor and therefore if there are limitations on the contractor’s liability for commissioning, they should be clearly set out. Parties should also ensure that the contract clearly defines the interface between completion of both construction and commissioning, when (and if) liquidated damages may become payable for delay caused by defects identified during commissioning, and what the contractor’s responsibilities are for the consequences of defects arising after completion of commissioning. For owners, the completion of commissioning may be a key trigger for the commencement of obligations to its downstream customers.

Cost overruns

One of the primary drivers of cost overruns in large-scale LNG projects is scope creep arising from incomplete or insufficiently developed FEED, leading to an under-developed cost estimate at the time the FID is taken.

For contractors, where fixed prices have been tendered based on incomplete FEED, disputes can arise as to whether certain work falls within the original scope or amounts to a variation, for which it is entitled to additional time and cost. Such uncertainty often leads to variation claims, re-pricing exercises and disagreements over entitlement to additional time or money, each contributing to increased project costs and delays to the programme. For owners, such claims and cost overruns may require it to turn to lenders and investors for additional capital and, in turn, lead to greater scrutiny over the financial viability of the project and management of the construction phase.

Scope change is not limited to immature design or incomplete FEED and can also arise during lengthy construction periods, in particular due to evolving long-term requirements for complex LNG facilities. To mitigate these risks, a well-developed specification, FEED, clear scope definition, and robust variation mechanisms are essential to manage change and avoid disputes. Ensuring that the EPC and supply contracts set out transparent procedures for identifying, valuing and implementing variations is critical to maintaining control over cost and the programme.

Dispute resolution and avoidance

In addition to the measures described above, parties can also avoid costly dispute escalation by establishing clear contractual dispute resolution procedures. ‘Tiered’ dispute resolution procedures can assist in early resolution and prevent escalation to formal, costly processes such as arbitration and litigation. Contracts may, for example, provide for a standing Dispute Adjudication Board (DAB), an ad-hoc DAB or another mechanism to deliver interim binding decisions on disputes as they arise, helping to prevent disputes impacting on project progress. Given issues may have an impact across construction and supplier contracts, project agreements often provide for aligned dispute resolution provisions (in particular regarding the applicable arbitration rules, tribunal members and arbitral seat) and include express consolidation mechanisms allowing related disputes to be combined and resolved more efficiently than through multiple parallel proceedings.

Considerations for Offtakers

In addition to disputes arising out of the construction contracts, disputes can also arise in the context of offtake agreements when firm, regular supply commitments are to commence, delay of which can often necessitate procuring cargoes on the spot market to satisfy downstream commitments.

Recently reported disputes between Venture Global (VG) and several major offtakers over VG’s Calcasieu Pass liquefaction and export facility have brought the risks for offtakers of newly built LNG facilities into sharp focus.[1] BP and Shell (amongst others) are reported to have commenced arbitration proceedings concerning the timing of VG’s declaration of completion of commissioning and commencement of commercial operations for the facility. It is alleged that VG delayed commissioning in order to delay its obligations to supply its offtakers under long term Sale and Purchase Agreements (SPAs) and instead sell LNG cargoes into the spot market to obtain significantly higher prices as demand surged following Russia’s invasion of Ukraine. While limited in detail, public reports indicate that the cases have focused on the interpretation of the Commercial Operation Date (COD) provisions, specifically whether VG’s plant was sufficiently commissioned to trigger delivery obligations under the SPAs, or whether VG was entitled to treat the commissioning process as ongoing and instead sell LNG cargoes on the spot market.

This example highlights the importance of ensuring SPAs clearly define when supply obligations commence and what the consequences for failure to supply at the outset will be. If such obligations are tied to the completion of construction or commissioning, uncertainty can arise as to when long-term supply obligations begin.

This is particularly problematic when commissioning is within the facility owner’s control and offtakers have limited visibility of progress. This can create concerns that the owner may delay commissioning to postpone long-term supply obligations and instead pursue more commercially attractive opportunities, or avoid paying compensation for failure to supply. Conversely, owners will need flexibility to accommodate change on construction schedules and the obtaining of regulatory approvals to commence operation, both of which may be out of its control.

To mitigate this risk, offtakers should tie the triggering of SPA supply obligations to clear and objective milestones and require regular owner reporting on commissioning and the reasons for any delay. Offtakers should also assess their contractual rights if the operation of a new LNG facility is delayed. While a right to terminate for prolonged delay is typical, it may not fully protect an offtaker from the losses it could suffer. Liquidated damages could be a valid means of providing offtakers with compensation for inexcusable or excessive delay. However, owners are likely to strongly resist such provisions, given that the achievement of completion may be wholly dependent on the performance of their contractors.

An alternative approach which, though unique, has the potential to limit such disputes between owner and offtaker is that of the LNG Canada Kitimat project in which the joint venture owners of the facility (Shell, Petronas, PetroChina, Mitsubishi and Korea Gas) are also the suppliers of feed gas and the offtakers of the LNG produced. This alignment of ownership, supply and offtake has the potential to limit disputes which can arise in traditional projects when facility completion is delayed.

“Clarity in the project parties’ interfaces, responsibilities and obligations regarding completion are critical in reducing the risk of delays, defects, and cost overruns, issues which can prove catastrophic for large, complex LNG developments.”

Conclusions

Global LNG demand will continue to rise in the long term amidst growing energy needs and geopolitical uncertainty. While such demand will lead to pressure to bring new projects online quickly, in order for projects to be delivered successfully, stakeholders should ensure that the foundation of the design, and cost estimates, are grounded in a well-developed FEED. Stakeholders should also prioritise robust project controls and interface management from the outset, particularly for multi-contract packages where interface risk is greater. Clarity in the project parties’ interfaces, responsibilities and obligations regarding completion are critical in reducing the risk of delays, defects, and cost overruns, issues which can prove catastrophic for large, complex LNG developments.

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1 These awards have not been made public. For the purposes of drafting this article, we rely solely on media reports and other open-source information.

Ground Risk in Construction Contracts

Ground risk is one of the most common sources of claims in infrastructure projects worldwide. By their nature, subsurface conditions involve uncertainty. When actual conditions diverge from those anticipated, the consequences can be severe: programme delays, cost overruns, design changes, and protracted disputes over who bears the risk. This article explores how ground risk is allocated under some of the standard form construction contracts commonly used on international projects.

How do construction contracts typically allocate these risks?

Allocation of ground risk varies widely. Some contracts place the entire risk on the contractor, while others require the contractor to price anticipated or foreseeable conditions but allow additional time and cost for materially different conditions. Below, we outline key similarities and differences in commonly used standard forms.

FIDIC

Under the 1999 FIDIC Yellow Book, contractors are entitled to additional time and money "*if and to the extent that the Contractor encounters physical conditions which are Unforeseeable*". "*Unforeseeable*" in this context is anything which is "*not reasonably foreseeable by an experienced contractor by the date of the submission of Tender*". Foreseeability is therefore assessed objectively from the perspective of an experienced contractor. The FIDIC 2017 edition adds a requirement for the assessment to be made by the "*Base Date*", which means 28 days before the latest date for the submission of tender.

In contrast, the FIDIC Silver Book adopts a much firmer risk allocation in favour of the employer as the contractor accepts total responsibility, and is deemed to have "*obtained all necessary information as to risks, contingences, and other circumstances which may influence or affect the Works*". This is applicable even where contractors have no actual knowledge of the ground conditions which may apply, and the Contract Price would not be adjusted to take account of any unforeseen difficulties or costs.

NEC4

Under the NEC4 suite of contracts, a contractor will be entitled to time and money if it encounters "*physical conditions*" which an experienced contractor would have judged at the Contract Date "*to have such a small chance of occurring that it would have been unreasonable to allow for them*". This is an objective, probability-based approach based on reasonableness rather than the foreseeability test applied in FIDIC.

Site Data / Site Information under FIDIC and NEC

A consistent theme in the standard forms referred to above is that the contractor is expected to bear the risk for foreseeable or probable ground conditions. To enable contractors to assess the risk, employers are often required to provide information they have about site conditions. This allows contractors to make an informed decision about the ground risk, and price accordingly.

In the FIDIC forms, the employer must make available to the contractor the "*Site Data*" defined as "*all relevant data in the Employer's possession on subsurface and hydrological conditions*" (there is an additional requirement of providing data on the topography and climatic conditions in FIDIC Yellow Book 2017). This is a wide-ranging obligation, intended to capture both data gathered specifically for the project, as well as ancillary or historical data which concerns the site. In the Silver Book, the Employer is further made responsible for the correctness of "*data and information which cannot be verified by the Contractor*".

"The allocation of ground risk must be negotiated with care and supported by clear drafting, guided by what an experienced contractor ought reasonably to have foreseen."

However, in FIDIC contracts, the contractor remains responsible for interpreting the Site Data provided. The contractor cannot assume that the Site Data represents a complete or definitive description of ground conditions, and under the Silver Book must also take steps to verify it.

NEC contracts envisage that Site Information is provided by the employer and included in the Contract Data, but they do not specify the range or type of "*Site Information*" to be provided. NEC does however contain a provision that where the Site Information is ambiguous, contractors may assume that "*more favourable*" conditions are present.

Interpretation by English Courts

Several cases shine a light on how ground risk clauses have been interpreted by the courts.

Notably, in *Obrascon v Gibraltar*,[1] the contractor argued that excessive levels of contamination discovered on site (a former military airfield) were unforeseeable on the basis that the environmental statement provided by the employer during the tender indicated only a low level of contamination. The court rejected this argument – given the site's history as a military base, an experienced contractor should have anticipated the risk of significant hydrocarbon residues and other contamination.

The court emphasised that a contractor cannot "*simply accept someone else's interpretation of the data and say that is all that was foreseeable*".[2] Rather, an experienced contractor is expected to use its own experience to make an independent assessment of the physical conditions.

A similar interpretation has been applied in other cases. In one instance, the contractor claimed that the discovery of peat at depths lower than those identified by ground surveys was unforeseeable.[3] As with Obrascon, the court disagreed. On the facts of this case, an experienced contractor should have foreseen that where shallow peat was revealed by surveys, deep peat was also likely to occur in pockets along the pipeline.

It was not sufficient for the contractor to point to the limits of the available survey data which showed peat only to a certain depth. The court instead found "*it is for an experienced contractor to fill in the gaps and take an informed decision as to what the likely conditions would be overall*".[4]

Practical takeaways

These examples highlight the importance of site data and professional judgment when applying ground risk allocation in construction contracts.

Under FIDIC contracts, the foreseeability test does not allow contractors to rely uncritically on tender information. It is expected that an experienced contractor would review all available data and make its own informed assessment. Where the information is incomplete, it needs to assess what conditions are likely overall.

While the NEC4 contract adopts a probability test, the expectation is similar. It includes an objective standard, requiring a contractor to take an informed, experience driven assessment of risk.

Ultimately the allocation of ground risk must be negotiated with care, supported by clear drafting, and is often dependent on the site data available and the professional judgment required to assess what an experienced contractor ought reasonably to have foreseen from that data.

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1 Obrascon Huarte Lain SA v Her Majesty's Attorney General for Gibraltar [2015] EWCA Civ 712.
2 Obrascon, 90.
3 Van Oord UK Ltd & Anr. v Allseas UK Ltd [2015] EWHC 3074 (TCC).
4 Van Oord, 193.

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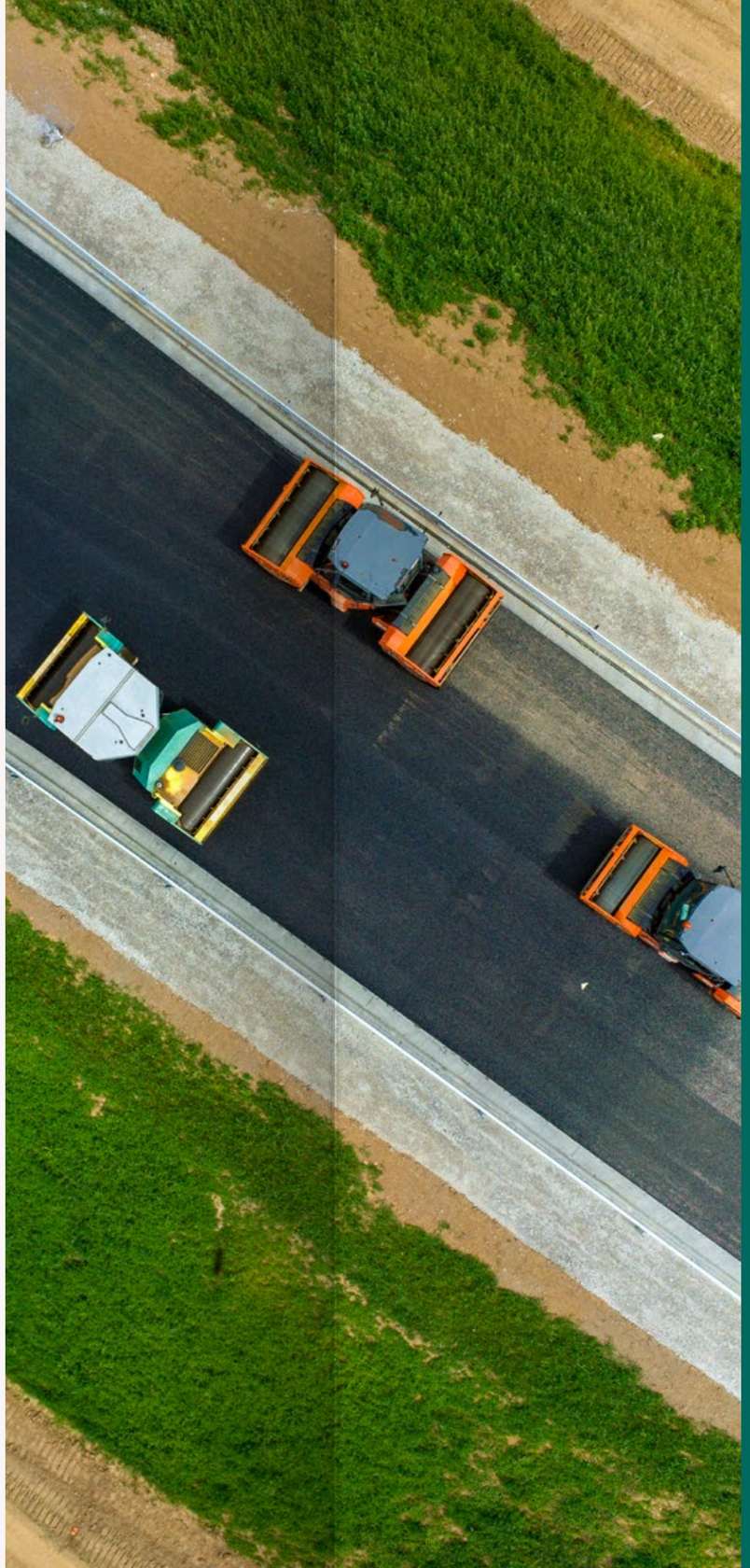

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