Global Arbitration Review

The Guide to Construction Arbitration

Editors

Stavros Brekoulakis and David Brynmor Thomas QC

Fourth Edition

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Publisher's Note

Global Arbitration Review is delighted to publish *The Guide to Construction Arbitration*.

For those unfamiliar with GAR, we are the online home for international arbitration specialists, telling them all they need to know about everything that matters. Most know us for our daily news and analysis service. But we also provide more in-depth content: books and reviews; conferences; and handy workflow tools, to name just a few. Visit us at www.globalarbitrationreview.com to find out more.

Being at the centre of the international arbitration community, we regularly become aware of fertile ground for new books. We are therefore delighted to be publishing the fourth edition of this guide on construction arbitration.

We are delighted to have worked with so many leading firms and individuals to produce *The Guide to Construction Arbitration*. If you find it useful, you may also like the other books in the GAR Guides series. They cover energy, mining, challenging and enforcing awards and M&A, in the same practical way. We also have books in the series on advocacy in international arbitration and the assessment of damages, and a citation manual (*Universal Citation in International Arbitration*). My thanks to the editors, Stavros Brekoulakis and David Brynmor Thomas QC, for their vision and energy in pursuing this project and to my colleagues in production for achieving such a polished work.

David Samuels
Publisher, GAR
September 2021

Contents

Part II: Dispute Resolution for Construction Disputes

Introduction

Stavros Brekoulakis and David Brynmor Thomas QC[1]

After two years of hiatus, we are delighted to introduce the fourth edition of *The Guide to Construction Arbitration*. And what a two-year break it has been! For the past 20 months, we have witnessed an unprecedented public health emergency that has significantly disrupted construction contracts and projects and has given rise to a significant number of construction arbitrations worldwide. There are two types of covid-19-related disputes that the pandemic has brought about. First, disputes concerning delay and disruption that has occurred at all developing stages of construction projects, including procurement, engineering, supply and building. Many construction sites had to suspend their works in the course of 2020. Now that construction work has started to resume, projects experience significant slowdown in supply chains for materials due to border closures, steep rises in freight rates and costs of materials, including, for example, steel prices, which have more than doubled in the past 12 months in Europe and the United States,[2] and labour shortages due to illness, self-isolation and travel restrictions. Contractors, subcontractors and suppliers have to abide by new health protocols that involve severe restrictions in the number of workers that can be on site at a certain time. These restrictions have affected the level of productivity and the ability of contractors to mobilise manpower, and have caused significant disruption and delays.

Second, disputes arising out of concession contracts concerning the operation of infrastructure projects. Because the pandemic has disrupted people's ability to travel and commute both internationally and domestically, operators and developers of infrastructure projects such as airports and highways have seen a dramatic decline in their earnings,

1 Stavros Brekoulakis is a professor and the director of the School of International Arbitration at Queen Mary University of London and an associate member of 3 Verulam Buildings. David Brynmor Thomas QC is a barrister at 39 Essex Chambers and visiting professor at Queen Mary University of London.

2 Turner & Townsend, 2021 International Construction Market Survey, p. 9.

which has left them exposed to financing and operational debts. As a result, they are now filing arbitration claims against states that have taken measures restricting travel to protect public health.

Against this background, the Guide aims to offer helpful insight in the field of international construction contracts and dispute resolution. A question that often arises is why international construction disputes are different from other types of commercial disputes and why do they require specialist arbitration knowledge? In the first place, construction projects are associated with a wide range of risks, including unexpected ground and climate conditions, industrial accidents, fluctuation in the price of materials and in the value of currency, political risks such as political riots, governmental interventions and strikes, legal risks such as amendments in law or failure to secure legal permits and licences, and – as we have all recently learned – global pandemics.

Further, time is typically critical in construction projects. A World Cup football stadium must be delivered well in advance of the commencement of the competition. Similarly, the late delivery of a power station can disrupt the project financing used to fund it.

In the second place, delay and disruption claims in construction arbitrations tend to be complex. Many phases of a construction project, such as engineering and procurement, can run concurrently, which often makes it difficult to identify the origins and causes of delay. Legal concepts such as concurrent delay, critical path and global claims are unique features in construction disputes.

Equally, the involvement of a wide number of parties with different capacities and divergent interests adds to the complexity of construction disputes. A typical construction project may involve not only an employer and a contractor, but also several subcontractors, a project manager, an engineer and architect, specialist professionals such as civil or structural engineers and designers, mechanical engineers, consultants such as acoustic and energy consultants, lenders and other funders, insurers and suppliers. A seemingly limited dispute arising from one subcontract may give rise to disputes under the main construction contract and the other subcontracts, as well as disputes under much wider documentation such as shareholder agreements, joint operating agreements, funding documents and concessions. Disputes involving several parties may give rise to third-party arbitration claims and multiparty arbitration proceedings.

Another important feature of construction disputes is the widespread use of standard forms, such as the FIDIC or the ICE conditions of construction contracts. Efficient dispute resolution requires familiarity and understanding of the, often nuanced, risk allocation arrangements in these standard forms. Good knowledge of construction-specific legislation is necessary too. While the resolution of most construction disputes usually turns to the factual circumstances and the provisions of the construction contract, legal issues may also arise in relation to statutory (frequently mandatory) warranty and limitation periods for construction claims, statutory direct claims by subcontractors against the employers,[3]

3 For example, in France, Law No. 75-1334 of 31 December 1975 on Subcontracting.

statutory prohibition of the pay-when-paid and pay-if-paid provisions[4] and legislation on public procurement.[5]

Finally, construction disputes are procedurally complex, requiring efficient management of challenging evidentiary processes, including document management, expert evidence, programme analysis and quantification of damages. The evidentiary challenges in construction arbitrations have given rise to the use of tools such as Scott Schedules (used to present fact-intensive disputes in a more user-friendly format), that are unique in construction arbitrations.[6]

It is for all these reasons that alternative dispute resolution and arbitration of construction disputes require special focus and attention, which is what *The Guide to Construction Arbitration* aims to provide.

The Guide to Construction Arbitration is designed to appeal to different audiences. The authors of the various chapters are themselves market-leading experts so that the Guide can provide a ready reference to specialist construction arbitration practitioners. At the same time, the Guide has been compiled and written to offer practical information to practitioners who are not specialists in international construction contracts and dispute resolution. For example, the Guide will be a practical textbook for in-house lawyers who may have experience in negotiating and drafting construction contracts but are not familiar with the special claims and remedies that exist under standard forms of construction contracts. Equally, construction professionals who may have experience in managing construction projects but lack experience in the conduct of construction arbitration will find the Guide useful. Last but not least, students who study construction arbitration will find it to be a helpful source of information.

While the main focus of the Guide is the resolution, by arbitration, of disputes arising out of construction projects, it also contains chapters that address important substantive aspects of international construction contracts. To understand how construction disputes are resolved in international arbitration, one has to understand how disputes arise out of a typical construction contract in the first place, and what are the substantive rights, obligations and remedies of the parties to a construction contract.

Thus, this book is broadly divided into four parts. Part I examines a wide range of substantive issues in construction contracts, such as the foundation of construction projects, the FIDIC suite of contracts, allocation of risk in construction contracts, contractors' claims, remedies and reliefs, employers' claims, remedies and reliefs, and examination of the critical topic of concurrent delay.

Part II then focuses on the processes for the resolution of construction disputes and addresses topics such as the claims resolution procedures in construction contracts, methods of dispute resolution in construction contracts, dispute boards, alternative dispute resolution in construction and infrastructure contracts, the suitability of various arbitration rules for construction disputes, arbitration clauses in construction contracts, subcontracts and

4 For example, in the United Kingdom, with the UK Housing Grants Construction and Regeneration Act 1996.

5 For example, EU Directive 2014/24.

6 J Jenkins and K Rosenberg, 'Engineering and Construction Arbitration', in Lew, et al. (eds), *Arbitration in England*, Kluwer (2013).

multiparty arbitration in construction disputes, interim relief and emergency arbitrators in construction arbitration, organisation of the proceedings in construction arbitrations, the management of documents and experts in construction disputes, and awards issued in construction arbitrations.

Part III examines a number of select topics in international construction arbitration by reference to some key industry sectors and contract structures, including the field of investment arbitration, the energy sector, the mining sector, offshore construction disputes and concession contracts and turnkey projects. Part IV examines construction arbitration in specific jurisdictions of particular interest and with very active construction industries.

Overall, the fourth edition builds upon the outstanding success of the first three editions, which have made *The Guide to Construction Arbitration* one of the most popular guides in the GAR series. The structure and organisation of *The Guide to Construction Arbitration* is broadly based on the LLM course on international construction contracts and arbitration that we teach at Queen Mary University of London. The course was first introduced by HH Humphrey Lloyd in 1987 and was taught by him for more than 20 years. Humphrey has been an exceptional source of inspiration for hundreds of students who followed his classes, and we are personally indebted to him for having conceived the course originally and for his generous assistance when he passed the course on some years ago.

We want to thank all the authors for contributing to *The Guide to Construction Arbitration*. We are extremely fortunate that a group of distinguished practitioners and construction arbitration specialists from a wide range of jurisdictions have agreed to participate in this project. We further want to thank Bevan Woodhouse and Hannah Higgins for all their hard work in the commission, editing and production of this book. They have made our work easy. Special thanks are due to David Samuels and GAR for asking us to conceive, design and edit this book. We thoroughly enjoyed the task, and hope that the readers will find the result to be useful and informative.

Part III

Select Topics on Construction Arbitration

22

Construction in the Mining Sector

Tony Dymond and Sophia Burton[1]

Introduction

There are in the order of 12,000 mining projects under development worldwide with a total investment value of US$1.2 trillion, with about a sixth of that (by value) currently under construction.[2] By any measure, mining is an important source of high-value work for the construction sector.

That work includes the development of new mines, the expansion, upgrading and optimisation of existing mines, and the construction and upgrading of transport infrastructure.

The principal challenges facing construction in the sector are the costs and risks associated with labour and materials, the difficulties of working in remote locations, the pressure to complete projects on tight schedules and the risks arising from implementing new technologies. Environmental concerns and the need to efficiently operate depleting assets are driving innovation. New models for the ownership of, and access to, transport infrastructure impact procurement methods. Political risks can affect operator rights and directly or indirectly constrain mine development. Similarly, commodity price volatility and changes to long-term price forecasts impact the profitability of operation with consequent impacts on the scope, cost, schedule and even commercial viability of mining developments. The converse also holds; delays to construction can substantially affect the profitability and viability of a mine.

Addressing these risks through effective project structuring, contracting strategy and contract management is key to successful project delivery.

1 Tony Dymond is a partner and Sophia Burton is an associate at Debevoise & Plimpton LLP.
2 '2020 Global Project Spending Outlook', *Engineering & Mining Journal*, January 2020.

Stakeholder relationships

The mining company developing and operating the mine is at the centre of a network of stakeholders:

- joint venture partners: the developer or operator may itself be a joint venture between mining companies or between a mining company and an offtaker. In some jurisdictions, it is a legal requirement that government agencies or state-owned companies are joint venture partners;
- the host state from which the mining company needs permissions to develop and operate the mine – these may take the form of permits, licences, titles, concession agreements, etc.;
- lenders, who may be financing the project on a limited or non-recourse basis and who therefore have a direct interest in the project's success;
- mineral purchasers, who may be purchasing under long-term supply agreements that provide the mining company with some security of revenue, but can create liabilities arising out of supply or quality issues;
- providers, including construction contractors, consultants, commodity and utility suppliers, equipment and spares suppliers;
- employees; and
- third parties, including local and indigenous peoples and non-governmental organisations (NGOs).

Maintaining and, where possible, enhancing each of these relationships is vital to a successful project.

Mining life cycle

The mining life cycle is commonly said to have five phases.

- Exploration: this is typically undertaken by prospectors or exploration companies. Research is undertaken to select target areas. Geological mapping and geochemical and geophysical surveys are then undertaken. Where the surveys suggest that there may be valuable deposits, drilling, core logging and assaying will be carried out. Exploration may be carried out, sometimes intermittently, over a period of two to 10 years or longer.
- Assessment and approval: this phase commences if exploration demonstrates the presence of potentially valuable deposits. Further work is undertaken to obtain more granular data on the extent and quality of deposits. Consultations with government bodies, local and indigenous communities and others will be undertaken. Stakeholder engagement programmes may be deployed to build trust and support for the development and to help define corporate social responsibility goals. Permits, licences or leases will be required. Pre-feasibility studies and environmental impact assessments will be completed. This phase usually lasts two to four years.
- Development: the development phase includes feasibility, geoscience and engineering studies. If these are satisfactory, and the necessary permitting is in place, financing can be obtained and a final investment decision may be taken. At this stage, the physical development of the mine and the supporting infrastructure can proceed. This is the most capital-intensive phase of the life cycle, which will typically extend over a period of two to five years.

- Production: this is the extraction, milling, separation and processing of the deposit, shipping of product and management of waste. Mines are typically operated for between 10 and 30 years.
- Closure and reclamation: when the mine is exhausted or no longer economical, it is closed. The facilities are decommissioned and dismantled, and the land is restored such that it provides a safe and healthy environment that can sustain a diverse ecosystem. Reclamation may take up to 10 years. Modern best practice dictates that planning for this eventuality should take place as early as possible as part of the evaluations and studies. While most mines last for their expected life cycle, it is possible to have a premature closure either because of decline in product prices or catastrophes such as flooding or fires. Whatever the reason for closure, it is important that the process is carried out correctly. The International Council on Mining and Minerals has published a 'Good Practice Guide on Integrated Mine Closure', which focuses on the importance of social transitioning, progressive closure and strategies for relinquishment and closure governance. Mining companies are often required to provide security for their reclamation obligations, which will be conditions of their operating approvals.

In reality, there is often a substantial temporal overlap between these phases, and the precise allocation of activities to phases will vary between projects and between jurisdictions with different regulatory frameworks. Mine development is often staged, with later stages taking place while the mine is in operation. Reclamation typically takes place throughout the life cycle of the mine.

Risk

Mining is a risky business. At every stage of the mining cycle, events may occur that threaten the commercial viability of the project. These risks will be investigated by the mining companies as part of the feasibility study and by prospective lenders to the project. Consideration will be given to which risks can been allocated to other stakeholders, which should be retained, how the risks can be mitigated, and costs of risk allocation and mitigation. Major risks can be categorised as follows.[3]

- Orebody risk: the orebody is the ultimate revenue-generating asset of the mining project. Overvaluation of the orebody is the most common cause of the failure or underperformance of a mining project.
- Technology risk: the principal technology risk relates to the processing of the extracted deposit. Mining companies and lenders typically prefer to use tried and tested rather than cutting-edge technology. Process guarantees may be sought from the specialist technology providers. In addition, performance and completion test requirements will be included in construction contracts to mitigate or transfer risk. Other technology risks include those relating to the selection of mining methods and equipment selection.

3 I Benning, 'Bankers' perspective of mining project finance', *The Journal of The South African Institute of Mining and Metallurgy*, May/June 2020.

- Operational risk: efficient and cost-effective operations may be affected by a broad range of matters including poor management, equipment failure, inflation and commodity[4] price fluctuation. Operational risk is highest at the start of operations. This may be a challenging period for many projects because debt burden tends to be high and the project has only just begun to generate revenue.
- Market risk: this is the risk that the product supplied by the mine will fail to achieve the price forecast in the budget. It may arise from a host of complex factors, including market cyclicality or the development of substitute products or new technology that drives down the cost of production at new mines. This can be mitigated by long-term offtake contracts, other forward-selling arrangements, hedging of currency risks, etc.
- Infrastructure risk: this presents real challenges to remote mines, particularly in states that generally have poorly developed infrastructure. It can present problems both for the supply of key utilities, including power and water to the mine, and for the export of product from the mine. Investors and lenders will want to ensure that the infrastructure is robust and that there are alternative supply and transport routes. Alternatively, new or upgraded infrastructure may be a key component of the project – and its cost will then be a significant factor in the project economics.
- Political risk: the risk of governmental action (or inaction) that causes project failure or adversely affects its economics is present in every jurisdiction, although the degree of risk and the ability to mitigate it varies widely. Political risks include the risk of expropriation or nationalisation, revocation or curtailment of mineral rights, titles, licences and permits, imposition of exchange controls, changes in tariffs, subsidies, taxes, royalties, etc., changes in other legislation including environmental legislation, and other acts that change the commercial or economic environment. Political risk insurance is available to cover some of these risks in some but not all jurisdictions. Mining companies may also structure their investments to take advantage of investment treaties that enable international arbitrations to be brought against the host state for breach of the investment protections contained in the treaty. It is generally not possible for mining companies to transfer political risks to other non-governmental stakeholders; for example, construction contractors will seek to ensure that change of law risk and other risks with a political element (such as permitting, land assembly, etc.) are retained by the owner.
- Construction risk: time and cost overruns can affect any construction project. Multiple studies demonstrate that the risk of overrun increases with project value and complexity. For example, a 2016 McKinsey review found that large projects across asset classes typically take 20 per cent longer to finish than scheduled and are up to 80 per cent over budget. Construction in the mining sector is no exception. The scale, interface risks, changes in requirements, technical challenges, labour and supply risks result in overruns in a high proportion of the construction phases of mine developments. Overruns can threaten the economics of the mine and the funding model, and even result in the invalidation of permits and licences. These risks can be mitigated by good planning, the

4 That is, those commodities consumed by the mine, such as chemicals, power, diesel and water.

selection of an effective procurement method and high-quality experienced contractors, well-drafted and properly negotiated contracts that appropriately allocate risk and responsibility, and a 'best for project' approach to management by all parties.

- Environmental, social and governance (ESG) risk: ESG issues rank high on the priorities of most mining companies. Primary risks include the use and consumption of natural resources and the degradation or contamination of those resources. Mining requires high volumes of water and considerable power supplies that may have a significant carbon or other environmental footprint. It generates large quantities of waste, including waste water. The failure of wet tailings dams has caused widespread environmental damage and loss of life, generated public hostility and resulted in huge and expensive clean-up operations. In addition, tailings can create water and soil contamination through seepage, and challenges for rehabilitation and subsequent land use. Social risks arise from the relationship between the mining company, the local communities and the wider host society. That relationship may be affected by a number of factors, including the effect of mining on indigenous lands, migration, displacement and resettlement, the use of local labour and the broader impact on the local economy, and the perception of unfairness in the distribution of project benefits and impacts. Governance issues include the implementation of policies and codes of conduct for corporate disclosure and transparency, labour relations and compensation, and bribery and corruption. Assets may be significantly impaired by ESG risks, and some projects do not proceed, or are suspended or aborted, as a result.

Mining infrastructure

Mining infrastructure comprises the mine itself, on-site processing facilities, waste management facilities, utilities including power and water, accommodation and other facilities for workers, and infrastructure for the transport of product.

The nature of the infrastructure is dependent upon a number of factors, including the nature and grade of the mineral to be extracted, regional security,[5] the type of mine, power and water supply and economics, the extent of processing to be carried out on site, and the proximity of the mine to existing transport infrastructure and ports, and the capacity of those facilities.

The cost of on-site development is typically between US$500 million for a small mine and US$5 billion for a large mine. The cost of transportation infrastructure varies even more widely; the cost of upgrading a port and constructing rail facilities to serve a remote mine can substantially exceed the costs of construction at the mine site itself.

Mines are either surface or underground, with several sub-classifications within each type. The decision on the type of mine is primarily driven by the proximity of the orebody to the surface, its geometry and orientation. In some cases, only one method is practicable, whereas in others either method may be technically and commercially feasible. An orebody may be extracted initially through a surface mine and subsequently or simultaneously with

5 For example, gold and diamonds are often airlifted from, and explosives airlifted to, mines in regions where security is poor.

an underground mine. Where feasible, surface mining is generally considered to have a number of advantages over underground mining in terms of recovery, grade control, safety and working environments.[6]

Surface mines require the removal of material above the orebody (overburden), the construction of access roads and the establishment of the initial bench geometries before mining can commence. The volume of overburden may be large, but the process is relatively straightforward. By contrast, the development of an underground mine is considerably more complex, entailing the construction of shafts or ramps, raises between different levels, horizontal drifts for haulage, ventilation or exploration, among others. Ventilation, water control and lighting must all be provided. There are several different ways in which an underground mine may be developed, with the choice depending upon the nature and orientation of the orebody and the surrounding rock quality, among other considerations.

Mining operations require substantial power supplies. The major load is typically the crushing and grinding circuit. Underground mines require more power than surface mines. Power may be supplied in a variety of ways: grid connection, diesel or gas generation, or renewables including hydropower, wind and solar. These can be significant projects in their own right, which are carried out by third-party contractors. Where available, grid connection will typically require the least capital investment, but the cost of power over the lifetime of the mine may be uneconomical by comparison with on-site power generation, and concerns about the resilience of grid-supplied power may also militate in favour of on-site generation.

Water is also a critical utility for mining. It is used for ore processing, dust suppression, chemical reagents, heating and cooling of machinery, and human consumption and hygiene. The potential water sources are surface water, ground water, seawater, rainwater, recycled water (mine water) or water from public water supplies. Infrastructure is required to collect, process and transport water supplies. Lack of water can substantially constrain mining throughput. Many mines operating in conditions in which freshwater is scarce incorporate desalination facilities, which generates significant additional power requirements and the need to discharge waste brine.

Metal mining operations will require a range of facilities depending upon the metal, the nature of the ore, the extent of on-site processing and the processes being employed. They might typically include conveyors, crushing and grinding facilities, concentrators, leach pads and smelters.

Mining operations inevitably generate large quantities of waste products, some of which may be toxic, and which all require management. Those products include dust, waste rock, gases and particulate matter released through stacks, chemical reagents, tailings and slag. Large mines often relocate millions of tonnes of waste rock that are transported from the pit in haulage trucks and placed in waste rock piles. This waste rock may ultimately be used for backfilling exhausted portions of the mine and, where suitable, for the construction of roads on the site. Tailings are the fine particulate waste material remaining after separating the valuable fraction of the ore. Tailings are typically pumped as a slurry into tailings ponds or other surface containment, which can occupy hundreds or thousands of

6 D Nilsson, 'Surface v underground methods', Section 23.2 of H L Hartman (ed.), *SME Mining Engineering Handbook*, Second edition, SME (1992), pp. 2058–2068.

acres of a mining site and often represent the greatest significant potential environmental liability for a mining project. Other methods of disposal include discharge into rivers and submarine discharge, both of which have been criticised for their environmental impacts. The use of paste tailings, dry stacking and underground storage in a solid fill mixed with waste aggregate and cement are alternative methods of tailings management that may have environmental and other benefits where they are technically and commercially practicable.

Mines require substantial transport infrastructure, both within the site for the movement of materials and waste products between facilities, and for the delivery of product to the purchasers. Within the site, the infrastructure will consist of access and haulage roads, and conveyors that may be up to several kilometres in length. Product is often shipped worldwide from ports, which may need to be constructed or upgraded. Transport to port may be by road, rail or pipeline. Again, in each case, these transport facilities may need to be constructed or upgraded. The associated costs will often be a key determinant of the economic viability of the project.

Accommodation and other facilities will be needed for workers on remote mining projects. Workers will also need to be transported to and from site and their accommodation. This may be a significant undertaking. For example, Rio Tinto has procured the construction of an airport in Western Australia to serve the Koodaideri iron ore project in the Pilbara. It is expected to handle 600 workers per day at peak operating times.

Procurement methods

Historically, mining majors have retained significant in-house capability to self-perform the procurement and construction of mining infrastructure. However, since the 1980s, the trend has been for the majors to outsource the preponderance of the engineering design, procurement, construction management and construction. Junior mining companies do not have in-house capability to self-perform mine development; rather, their expertise is generally focused on prospecting and exploration. A number of the state-owned mining companies, including the Chinese mining companies that are active in international mine development, have the capability to self-perform development or to deliver through sister companies, or both. This model has driven significant mining development across Africa.

A specialised and sophisticated industry comprising contractors, suppliers, consultants and service companies serves the mining sector. A typical structure for the development of a new mine or the extension of an existing mine will see a major international engineering contractor appointed as an engineering, procurement and construction (EPC) contractor or an engineering, procurement and construction management (EPCM) contractor. That contractor will then appoint or manage a network of consultancies, suppliers and construction contracts or subcontracts. Contracts for the construction of whole facility buildings will usually be let on an EPC-style contract, against output specifications, with the contractor bearing the risk of the detailed design as well as much of the cost and completion risk. These contracts typically contain sophisticated performance and completion testing regimes to ensure that the facility can maintain warranted throughput, utility consumption rates and environmental requirements. Other parts of the mine development may be contracted on the basis of rates and prices with the mining company taking volume risk, or on a time and materials basis with the mining company retaining productivity risks.

The EPCM model has proved very popular for mine development and extension, particularly for larger mines. The large engineering companies active in the sector often will not, or would prefer not to, take full EPC risk on multibillion dollar projects in which actual supply and construction is being carried out by other specialised contractors and suppliers. The EPCM model enables the project sponsors to take advantage of the engineering company's expertise in the management and integration of large complex projects but does not in general impose responsibility on that company for the delays or defaults of the package contractors, suppliers or consultants.

The funding model may impact the procurement of the mine development. For example, much mine development is project financed with the lending banks having limited or no recourse against the sponsors or mining companies. Project finance lenders will seek to mitigate their risks by a variety of means, including by ensuring that prices and completion dates are fixed so far as is possible, and that performance and other warranties are provided in favour of the project company or special purpose vehicle (SPV) by counterparties with suitably deep pockets and that those warranties are supported by appropriate security. The EPCM model is less attractive to project finance lenders than a single EPC contract because the project company or SPV retains some of the interface risks between the various package contractors and is therefore exposed to some technical, price, construction and completion risks. Project finance lenders may therefore require completion warranties from project sponsors that extend until the mine is operating at specified production and recovery rates, quality parameters and operating costs.

The mining transport infrastructure for the delivery of product from the mine is generally procured separately from the mine development itself. It may be procured by the mining company, or it may be procured by third parties; for example, by public authorities upgrading existing public assets to provide additional capacity to transport product. There has been considerable recent interest in new forms of financing, ownership and procurement of transport infrastructure serving multiple remote mines in diverse ownership, particularly in Africa. The construction of transport infrastructure can be a significant benefit to host countries, many of which could not practically finance such an undertaking alone. Public–private partnership models in which the private sector, potentially including both rail and mining companies, take equity in a concession to build and operate a railway serving multiple mines as well as providing a general freight and passenger service may ultimately prove attractive. Variations on that model may also be effective for road and port development.

The design and construction of the transport infrastructure will generally be undertaken by engineering companies, consultancies and contractors with transport rather than mining expertise (though, of course, some may have both).

There are no internationally recognised standard form contracts developed specifically for mining projects. Most contracts are let on bespoke forms developed by mining companies or the EPCM contractors managing the projects, and on suppliers' standard terms. Increasingly however, standard form contracts are being used in the industry with a particular emphasis on the International Federation of Consulting Engineers (FIDIC) forms. The FIDIC rainbow suite is, of course, very familiar to the international contracting sector. The three principal forms are the Red Book, used where the contractor does not take design responsibility, the Yellow Book, for design and build procurement, and the

Silver Book, for full EPC scope. The 2019 introduction of the Emerald Book, which provides conditions of contract for underground works, has generated interest in the mining industry. It may prove to be suitable for underground mine construction, although it has been criticised in some quarters both for its complexity and for the many opportunities it affords to contractors to claim additional time and money. Whichever forms are used as a starting point will, despite the exhortations of the institutions publishing them, inevitably be heavily amended to conform to the requirements of the industry and the characteristics of the particular project and its participants.

Disputes

The diversity of the stakeholders on a mining project means that there is a potential for disputes arising under an array of instruments in different forums. In most jurisdictions, mining companies will prefer to resolve disputes through international arbitration, which provides a neutral forum, experienced decision makers and the ability to enforce decisions worldwide under the New York Convention or the ICSID Convention.[7]

Disputes with host states arising under concession agreements will be subject to the dispute resolution provisions in those agreements or provided in the general law. Often these provide for the resolution of disputes by international arbitration, but some host states have policy objections to disputes being resolved other than in their domestic courts. Importantly, some governmental actions may give rise to breaches of bilateral or multilateral investment treaties, entitling investors to bring claims in international arbitration, even if the commercial agreements with the host state provide for litigation in domestic courts. Mining companies and their investors have proved to be active users of investment treaty arbitration. Increasingly, host states have raised environmental counterclaims to investment claims brought by mining companies.[8]

By contrast, disputes brought against mining companies by local groups, indigenous peoples and NGOs will generally be brought in local courts or, potentially, in the courts of the states in which the mining companies are headquartered or registered. Additionally, mining company-led operational-level grievance mechanisms can prevent the escalation of human rights-related disputes and provide access to remedies for harms suffered.[9]

Arbitration is typically the preferred method for dispute resolution in the mining sector with non-state contractual counterparties, with the possible exception of employee disputes. In the construction context, arbitration of disputes has long been the norm in most jurisdictions. Typically, disputes concern time, money or quality, with the latter encompassing the meeting of performance warranties, including environmental performance. EPCM contracts rarely give rise to major disputes, principally because of the limited risks usually

7 The United Nations Convention on the Recognition and Enforcement of Foreign Arbitral Awards (New York, 10 June 1958); and the International Centre for Settlement of Investment Disputes Convention on the Settlement of Investment Disputes between States and Nationals of Other States 1966.

8 Y Lahlou, R Willard and M Craven, 'The Rise of Environmental Counterclaims in Mining Arbitration', in Jason Fry QC and Louis-Alexis Bret (eds), *The Guide to Mining Arbitrations*, First edition, Global Arbitration Review (2019).

9 R Lindsay and A Kirkpatrick, 'Human Rights and International Mining Disputes', in Jason Fry QC and Louis-Alexis Bret (eds), *The Guide to Mining Arbitrations*, First edition, Global Arbitration Review (2021).

accepted by the contractor, although there may also be other factors at play.[10] More typically, disputes arise between the mining company and its construction/EPC contractors and between those contractors and their subcontractors and suppliers. Sometimes those disputes may involve other stakeholders and generate disputes under other contracts. For example, delays under a construction contract might constitute a default under a concession or funding agreement, or an allegation by a host state that a mining company has breached environmental standards can give rise to a claim by a mining company against its EPC contractor. Risks of inconsistent decisions arise where contractual instruments provide for related disputes to be resolved in different forums. Recent rule changes of various arbitral institutions facilitate the consolidation or hearing together of related disputes where the relevant contracts contain compatible arbitration provisions.

Tiered dispute resolution has long been a feature of sophisticated construction contracts. The FIDIC suite perhaps exemplifies this, having four steps for most contractor claims, with the final step being International Chamber of Commerce arbitration. There is an increasing recognition that some form of third-party interim binding dispute resolution of the kind offered by adjudication boards can help keep major projects on track. The mining industry, which has not widely adopted standard form contracts, has yet to embrace adjudication boards and their ilk, although in some jurisdictions mining construction contracts will be subject to statutory adjudication schemes.

10 EPCM contractors are generally drawn from a small pool of highly reputable and experienced international engineering companies.

Edited by the academics who run a course on construction contracts and arbitration at the School of International Arbitration, Global Arbitration Review's *The Guide to Construction Arbitration* brings together both substantive and procedural sides of the subject in one volume. Across four parts, it moves from explaining the mechanics of FIDIC contracts and particular procedural questions that arise at the disputes stage, to how to organise an effective arbitration, before ending with a section on the specifics of certain contracts and of key countries and regions. It has been written by leaders in the field from both the civil and common law worlds and other relevant professions.

This fourth edition is fully up to date with the new FIDIC suites, and includes chapters on expert witnesses, claims resolution, dispute boards, ADR, agreements to arbitrate, investment treaty arbitration and Brazil. It is a must-have for anyone seeking to improve their understanding of construction disputes or construction law.

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