Disputes on Major Subsurface Projects: Sources, and the Promise of Early Contractor Involvement

March 2025

Author: David J. Hatem, PC

mgmlaw.com
Boston | Chicago | Dallas | Hattiesburg | Irvine | Jackson | Los Angeles | Madison County/St. Louis | Miami
New Jersey | New Orleans | New York | Providence | San Francisco | Walnut Creek | Wilmington

Contents

Introduction

Disputes are inherent on major subsurface projects. Typically, these disputes arise out of differing subsurface conditions and disagreements about the roles, responsibilities and risks (the 3Rs) of the various project participants in the design and construction processes. Risk allocation approaches in the various project delivery methods influence the occurrence, character and magnitude of these disputes.[1] This paper will discuss the sources of these disputes and potential solutions presented by early contractor involvement ("ECI") approaches.

Disputes: Sources

Typically, disputes on subsurface projects derive from the following principal sources:

- Differing subsurface conditions.
- Disagreements and misunderstandings as to the roles, responsibilities and risks of project participants concerning:
    - Permanent works design adequacy, suitability and constructability and compatibility with encountered subsurface conditions; and
    - Performance v. design (prescriptive) specifications.
- Construction means/methods selections, appropriateness and implementation in anticipated and encountered subsurface conditions.
- Contractual and commercial implications of modifications to planned design and construction approaches due to subsurface conditions encountered during construction.

Given the sequential and linear progression of subsurface work, disputes occur frequently and often with the potential to cause significantly adverse critical path impacts on cost and schedule expectations.

Differing Subsurface Conditions: Effective Risk Allocation

The objectives of effective subsurface conditions risk allocation include:

- Clear and consistent definition of the 3Rs in the contract documents.
- Fairness and balance in approach.
- Contractual documentation of the informed and mutually understood commitments of the parties as to the 3Rs.[2]

Geotechnical baseline reports (GBR) are a salutary approach to achieve those objectives.[3] Baselines in a GBR need to be grounded in adequate subsurface investigation and defined in a manner that reflects realistic and balanced professional judgment in the evaluation of predicate subsurface data.[4] A GBR should be classified as a Contract Document, and, as to conditions baselined, the GBR should have the highest order of precedence among those documents. That said, it is neither realistic nor reasonable to expect that a GBR will be the universal and exclusive contractual basis for subsurface conditions risk allocation.[5] Effective risk allocation is influenced by several interrelated and interdependent factors that transcend the articulation of baselines in a GBR.

On subsurface projects, there are critical dynamics, interfaces and interdependencies among various factors that impact effective subsurface conditions risk allocation:

- The scope and quality of subsurface investigation.
- The realistic and reasonable assessment and evaluation of available subsurface data relative to the permanent works design and constructability (temporary works, means/methods) approaches.

---

[1] *Alternative Delivery Drives Alternative Risk Allocation Methods* (NORTH AMERICAN TUNNELING (NAT) CONF., 802, 802-811) (Alan Howard, Brett Campbell, Derek Penrice, Matthew Preedy, and Jim Rush, eds., 2018); David J. Hatem & Patricia Gary, eds., *Risk Allocation and Professional Liability Issues for Consulting Engineers on P3 and DB Projects,* in PUBLIC-PRIVATE PARTNERSHIPS AND DESIGN-BUILD: OPPORTUNITIES AND RISKS FOR CONSULTING ENGINEERS (ACEC, 3d ed., 2020); Mats Tidlund, Geotechnical Risk Management Using the Observational Method (2021) (Ph.D. dissertation, KTH Royal Inst. of Tech., Dept. Civ. & Arch. Eng.); David Chesser, Erin Sibley, & Randall Essex, *Avoiding and resolving disputes in underground construction* (Tunnelling for the Future — Sustainable and Smart Conf., Nov. 2022); Randall Essex, Means of avoiding and resolving disputes during construction, 11 TUNNELING AND UNDERGROUND SPACE TECH., 27, 27-31 (1996).

[2] David J. Hatem, *Improving Risk Allocation on Design-Build Subsurface Projects,* TUNNEL BUS. MAG. (JUN. 2020)

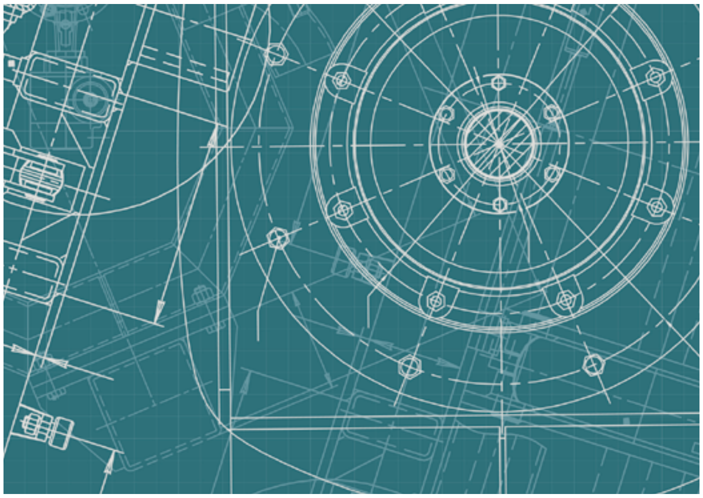
[2] Tidlund, *supra* note 1; Chesser, Sibley, & Essex, supra note 1.

[4] David J. Hatem, *Should Geotechnical Baseline Reports Be the Universal and Exclusive Contractual Basis for Subsurface Conditions Risk Allocation?*, TUNNEL BUS. MAG. (Jan. 2020)

[5] *Id*

- The assessment and evaluation of available subsurface data relative to the permanent works design and constructability (temporary works, means/methods) approaches.
- The compatibility, suitability and constructability of those design and constructability approaches in the reasonably anticipated subsurface conditions based upon available subsurface data and related evaluations.
- The opportunity to reasonably evaluate subsurface data and assessments and final design development prior to committing to construction price and risk allocation terms.
- The expectation that the behavior of subsurface conditions during construction may be influenced by construction means/methods.
- The recognition that planned design and constructability methodological approaches may require modification within reasonably defined parameters due to subsurface conditions encountered in the field, and the inclusion of contractual terms to address the risk allocation and the cost and time consequences of those modifications.

Effective risk allocation on subsurface projects must account for the dynamics, interactions and interdependencies among these factors.[6]



Roles, Responsibilities and Risks (the 3Rs) of Project Participants

On subsurface projects there are critical variables in the dynamics, interactions and interdependencies among the respective 3Rs of the project participants that both impact effective subsurface conditions risk allocation and are often sources of disputes:

- The performance of project participants may vary from the contractual delineation of the 3Rs.
- The content of design or construction methods submittals or review comments may vary from contractually-defined requirements and terms, including the 3Rs.
- The performance, communications and directions among project participants may vary from contractually-defined terms and 3Rs.[7]

In addition, subsurface conditions actually encountered during construction may necessitate modifications to permanent works design and planned construction means/methods in manners that potentially and significantly vary contractual risk allocation. Design and construction methodological modifications produced by encountered subsurface conditions are inherent in major underground projects. If the potential for those modifications and appropriate cost and time adjustments are not (contingently or provisionally) anticipated and addressed in the contract documents, disputes are likely to arise among project participants as to whom bears the risk, cost and schedule impacts of those modifications. Contract documents, at most, are often plans that realistically should be expected to evolve in project execution guided by prudent anticipatory *planning*.[8]

Performance vs. Design (Prescriptive) Specifications

Disputes on subsurface projects are often generated by disagreements as to whether a contractual provision is a **performance specification** — i.e., a specification requiring achievement of a particular performance objective or result and delegating responsibility and risk for design and other execution details to the contractor — or a **design specification** that details, in a prescriptive and mandatory manner, the design or other details that a contractor is required to follow to achieve a particular performance or other result, with explicit or implied responsibility of the owner for the adequacy of that specification.[9]

The collaborative and interactive nature of early contractor involvement (ECI) in the design development, submittal and review processes should serve to significantly minimize potential disputes as to whether a specification was intended to be a performance or design (prescriptive) specification in character, thereby informing assessments to the allocation of design adequacy, performance and other risks.

---

[6] Hatem, *supra* note 2.

[7] Gary S. Brierley & David J. Hatem, *Contractor Submittals for Tunneling Projects,* Tunnel Business Magazine, Mar. 9, 2022.

[8] David J. Hatem, *Early Contractor Involvement: Rethinking and Recalibrating Delivery Methods for Subsurface Projects* (Sept. 2023),

[9] *See Fruin-Colnon Corp. v. Niagara Frontier Transp. Auth.,* 585 N.Y.S. 2d 248 (App. Div. 1992); DAVID J. HATEM & PATRICIA GARY, PUBLIC-PRIVATE PARTNERSHIPS AND DESIGN-BUILD: OPPORTUNITIES AND RISKS FOR CONSULTING ENGINEERS (3d ed. 2020).

Project Delivery Methods

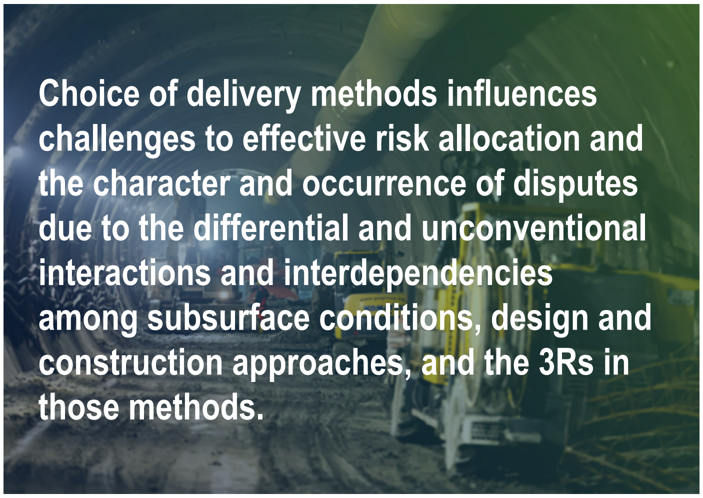
Choice of delivery methods influences challenges to effective risk allocation and the character and occurrence of disputes due to the differential and unconventional interactions and interdependencies among subsurface conditions, design and construction approaches, and the 3Rs in those methods.

Design-Bid Build

In design-bid-build (DBB), disputes are often generated due to the independent and sequential progression of (i) subsurface investigations and evaluations; and (ii) the segregated preparation of permanent works design and reports (containing assumptions as to construction means/methods and their potential influence on subsurface conditions) — all occurring absent any input of the contractor as to permanent works design, pricing, and means/methods planning and prior to the award of the construction contract. This bifurcated (sequential, independent and segregated) progression of subsurface investigations and evaluations, design development and construction means/methods planning in DBB exacerbates the challenges created by the interactions and interdependencies.[10]

Terzaghi cogently explained problems that arise from the non-integrated, dysfunctional and discontinuous roles of design engineers and contractors in subsurface design and construction, most particularly acute and exemplified in the DBB method:

> *In the realm of earthwork and foundation engineering the absence of continuous and well organized contacts between the design department and the [individuals] in charge of the supervision of the construction operations is always objectionable and can even be disastrous. This is due to the fact that boring records always leave a wide margin for interpretation. If the site for a proposed structure is located on a deposit with an erratic patterns of stratification, such as a marginal glacial deposit, the boring records may not disclose a single one of the vital subsoil characteristics, and the real subsoil conditions may be radically different from what the designer believed them to be. Therefore, the design assumptions may be utterly at variance with reality.*
>
> *The consequences of these conditions depend on the qualifications of the personnel engaged in the supervision of the construction operations. If the supervision is in the hands of a construction department it also depends to a large extent on whether or not design and construction departments are on friendly terms with each other. More often than not the two departments despise each other sincerely, because their members have different backgrounds and different mentalities. The construction [workers] blame the design personnel for paying no attention to the construction angle of their projects, but they are blissfully unaware of their own shortcomings. The design engineers claim that the construction [workers] have no conception of the reasoning behind their design, but they forget that the same end in design can be achieved by various means, some of which can be easily realized in the field, whereas others may be almost impracticable. If none of the [individuals] in charge of design has previously been engaged in construction, the design may be unnecessarily awkward from a construction point of view. In any event, the construction [workers] have no incentive to find out whether or not the design assumptions are in accordance with what they experience in the field during construction, and serious discrepancies may pass unnoticed. If conditions are encountered which require local modifications of the original design, the construction engineer may make these changes in accordance with his own judgment, which he believes is sound, although it may be very poor. Important changes of this kind have even been made on the job without indicating the change on the field set of construction damages.*[11]



Choice of delivery methods influences challenges to effective risk allocation and the character and occurrence of disputes due to the differential and unconventional interactions and interdependencies among subsurface conditions, design and construction approaches, and the 3Rs in those methods.

Conventional Design-Build

Conventional design-build (Conventional DB) provides increased opportunities for more timely interactions and integration between the Owner and the DB Team, improved and synchronized alignment as to the subsurface investigations, and the development of design and construction methodological approaches.[12] However, in Conventional DB, additional tensions and sources of dispute typically arise from the following:

- Design-builder is required to commit to a fixed price based on limited (and often disclaimed and/or non-reliant)

---

[10] Hatem & Gary, *supra* note 1; Hatem, *supra* note 2.

[11] K. Terzaghi, Consultants, Clients and Contractors, Journal of the Boston Society of Civil Engineers, Vol 45, No. 1 (January 1958).

[12] Essex, Hatem, & Reilly, *supra* note 1; DOUGLAS GRANSBERG ET AL., GUIDELINES FOR MANAGING GEOTECHNICAL RISKS IN DESIGN-BUILD PROJECTS, NCHRP Project No. 24-44, Transp. Research Board (2018); Hatem, *supra* note 8.

information and in a compressed procurement period, with minimal opportunities for design development, construction methods planning or necessary adjunct/predicate investigations, studies and evaluations.

- Owner approaches to subsurface conditions risk allocation are often imbalanced (i.e., transferring disproportionate risk to the design-builder) and the design-builder may not have an adequate and realistic basis to assess and inform contractual risk undertakings.
- Subsurface investigations typically are incomplete at procurement, and available data, interpretations and evaluations are often disclaimed as to reliance by the Design-builder.
- Scope disputes arise between the owner and design-builder as to whether work is included in the contractual fixed price or constitutes scope added by owner or stakeholder preferences.
- Post-award disputes as to whether the design-builder's design (or other) submittals comply with technical or other Owner requirements.
- Post-award disputes regarding adequacy or suitability of owner-furnished or directed prescriptive designs about which the design-builder may have had no meaningful opportunity for discretion, innovation or other input, and for which the design-builder is contractually responsible for design adequacy, interface and coordination risks and responsibilities.[13]

Early Contractor Involvement (ECI)

ECI approaches pose significant promise and opportunity to manage and mitigate the sources of disputes on subsurface projects. These approaches — such as progressive design-build (PDB) and construction manager/general contractor (CM/GC) — allow for meaningful opportunities for collaborating and the fostering of mutual, contractually-documented understandings as to subsurface conditions risk allocation and project-specific particularization, and the pragmatic, functional understandings of the 3Rs of the respective project participants.[14]

ECI offers a realistic platform to provide an objectively documented basis to inform pricing and risk allocation decisions. At 60+% level of design development on a major subsurface project — i.e., the (minimal) point at which the contractor (in CM/GC) or the design-builder (in PDB) is typically expected to contractually commit to a fixed price and risk allocation terms — the following have transpired:

- The subsurface investigation and data evaluation are complete or substantially complete.
- The permanent works design is substantially complete.
- Sufficient subsurface data is available to adequately inform project alignment and final design development.
- There has been a reasonable and collaborative opportunity to address — in permanent works design and construction means/methods — planning, issues and risks that have been identified in a jointly-developed risk register.
- There is a sufficient basis and understanding to reliably inform the selection, design and implementation of construction means/methods and to consider owner input on these subjects.
- There has been an opportunity for project participants to collaboratively identify and assess relevant risks, especially subsurface conditions risks.
- There is a sufficient basis to identify and define parameters of potential modifications to design and construction approaches due to anticipated and contractually-defined parameters of subsurface conditions variations that may be encountered during construction.
- The contractor has a realistic and reliable basis upon which to plan and price — with appropriate provisional sums, allowances, and contingencies — the permanent works design and construction means/methods and reasonably anticipated modifications.
- There exists an adequate, reasonably informed and realistic basis to negotiate and contract on realistic risk allocation terms.
- An adequate and more refined, particularized contractual basis exists to reduce the occurrence and facilitate the resolution of subsequent differing site condition disputes.
- Due to the collaborative, integrated and synchronized interactions of the project participants during the initial (pre-guaranteed maximum price) design development phase, each participant has both understanding and functional experience in the definition and assignment of their respective 3Rs.

---

[13] David J. Hatem, *Recalibrating and improving design–build on public infrastructure projects* (A.B.A. Forum on Constr. Law, Sept. 2022).

[14] Kumar Bhattarai & David J. Hatem, *Early Contractor Involvement and Observational Method Supported with Artificial Intelligence for Equitable Risk Management* (North American Tunneling (NAT) Conf., June 2024); Hatem, supra note 8.

ECI offers a realistic platform to provide an objectively documented basis to inform pricing and risk allocation decisions.

Project Delivery Methods and the Observational Method

For over 50 years, it has been recognized that on major subsurface projects, the observational method (OM) is an essential adjunct to effective permanent works and construction means/methods design, planning and execution. The OM has been defined as:

> *[A] continuous, managed, integrated, process of design, construction control, monitoring and review that enables previously defined modifications to be incorporated during or after construction as appropriate. All these aspects have to be demonstrably robust. The objective is to achieve greater overall economy without compromising safety.*[15]

There are intrinsic limitations and uncertainties associated with pre-construction subsurface investigations and judgmental evaluations of the data produced. During design development, reasonably probable parameters of variations in encountered subsurface conditions and the potential for design and construction methods modifications should be anticipated, evaluated and included in contingent planning.[16] Final design in subsurface projects is often more realistically considered as a plan that is subject to confirmation and validation and is likely subject to modified approaches due to the interactions of the ground and tunnel structure and construction means/methods, and the assessments of those interactions.

Subsurface (physical and behavioral) conditions encountered during construction may necessitate modifications to planned design and construction approaches. Contracts should anticipate those modifications and provide a framework for risk allocation and cost/time adjustments. The challenges in effective and efficient OM implementation traditionally arise from how those modifications impact adjustments to cost, time and risk allocation contractual and commercial terms, the contractual flexibility of effecting those adjustments and whether adjustments in those terms are warranted (and, if so, on what bases). These implementation challenges have resulted in significant disputes.[17]

Prior to the adoption of ECI approaches, there was recognition that more synchronized, integrated, flexible and adaptative alignment of permanent works design and construction means/methods collaborative interactions among project participants serve to promote OM utilization.

In the last few decades, the design and construction industry has recognized that the traditionally perceived segregated boundaries between permanent works design and construction means/methods considerations may not always need to be absolute and immutable. In addition to the benefits of allowing a contractor the opportunity to provide early input in the development of permanent works design under ECI, there is also recognition that, in appropriate instances, the owner and/or its consulting engineer may have valuable input and thus should have the meaningful opportunity to be involved (to varying and appropriate degrees) in providing recommendations, criteria and standards for the design of construction means/methods.[18]

---

[15] DUNCAN NICHOLSON ET AL., THE OBSERVATIONAL METHOD IN GROUND ENGINEERING PRINCIPLES AND APPLICATIONS (CIRIA REPORT 185) (CIRIA, Oct. 1999). CIRIA is in the process of updating Report 185. See CIRIA, OBSERVATIONAL METHOD GUIDANCE – AN UPDATE TO CIRIA GUIDE REPORT 185 (MAY 2024).

[16] Gary S. Brierley, *Subsurface Investigations and Geotechnical Report Preparation*, in SUBSURFACE CONDITIONS: RISK MANAGEMENT FOR DESIGN AND CONSTRUCTION MANAGEMENT PROFESSIONALS (David J. Hatem ed., 1998) (Wiley, Jan. 1998).

[17] Effective utilization of the OM approach requires clear and mutual understandings in any delivery method of the respective roles, responsibilities and risks of all project participants. The Supreme Court of New South Wales' decision in *Theiss Pty Ltd. & John Holland Pty Ltd. v. Parsons Brinckerhoff Australia Pty Ltd.* (2016) NSWSC 173—which involved a dispute arising out of the OM approach on a DB project – demonstrates the importance of that admonition. This aspect of the *Theiss* decision is discussed in Matthew Graham, Theiss Pty Ltd and John Holland Pty Ltd v. Parsons Brinckerhoff Australia Pty Ltd [2016] NSWSC 173, Kreisson Constr. (Mar. 2016), https://kreisson.com.au/wp-content/uploads/2016/03/Theiss-and-JH-v-Parsons-Brinckerhoff.pdf and BRIAN BURMAN ET AL., LANE COVE TUNNEL COLLAPSE AND SINKHOLE A FORENSIC REVIEW – 3: THE LEGAL AFTERMATH, Australian Geomechanics Journal, 53(4), pp. 51-57 (Dec. 2018). As discussed in this paper, ECI increases the opportunities for more transparent understandings as to roles, responsibilities and risks that enhance OM utilization. The importance of clarity and accountability in the delineation and assignment of design responsibility in the OM approach is addressed in Phil Clark, *Improvements to the Observational Method in New South Wales Road Tunnel Construction*, in GEOTECHNICAL LESSONS LEARNT—BUILDING AND TRANSPORT INFRASTRUCTURE PROJECTS, LECTURE NOTES IN CIVIL ENGINEERING 121, 121-138 (Hadi Khabbaz et al (eds.), Springer, May 2024).

[18] As to the latter, *see* John Reilly, *TBM Procurement and Contract Processes*, TunnelTalk (Apr. 2021), https://www.tunneltalk.com/Discussion-Forum-Apr2021-Continuing-discussion-of-TBM-procurement-processes.php; DAVID J. HATEM & D. CORKUM EDS., MEGAPROJECTS: CHALLENGES AND RECOMMENDED PRACTICES, ¶ 6.4, 520-538 (ACEC, 2010); Don Del Nero et al., *Means and Methods, in* TRENCHLESS TECHNOLOGY: PLANNING, EQUIPMENT & METHODS ¶ 3.4 (Mohammad Najafi, ed., 1st ed., McGraw-Hill, 2012); Don Del Nero, The Means and Methods Dilemma, TUNNEL BUS. MAG., Aug. 1, 2012; Brierley & Hatem, supra note 7; Vincent Tirolo, Jr. & Gary Almeraris, *Suggested and Prescriptive Means and Methods—Are they Really in the Owner's Interest,* in Rapid Excavation and Tunneling Conf.: 2005 Proceedings (John D. Hutton, W. Dave Rogstad, eds., Society for Mining, Metallurgy, and Exploration Inc., 2005).

The intersection and interaction between the OM and contractual approaches in particular project delivery methods have not been extensively examined or analyzed in published materials. However, what emerges from available experience and limited published materials is that, in different respects, both DBB and Conventional DB constrain the opportunities to achieve the benefits of OM utilization. Effective OM utilization requires an adaptative, predictive and flexible approach to contractual risk allocation and commercial pricing to account for potential, reasonably anticipated realistic parameters of design and construction approach modifications due to subsurface conditions encountered during construction.

The commercial and risk allocation implications of those modifications in DBB typically are borne by the owner. Conversely, in Conventional DB, that risk typically is borne by the design-builder. The risks in both delivery methods typically are defined and allocated at contract formation — with risk allocation and pricing somewhat inflexibly established — and consequently, in terms less receptive to and tolerant of variation adjustments warranted by those modifications. ECI approaches provide the opportunity for more flexible contractual risk allocation approaches.

DBB, Conventional DB and the OM

Both DBB and Conventional DB contractual pricing and risk allocation approaches have been noted to constrain the utilization of OM.[19] In significant part, those methods lack the requisite collaborative framework that allows for more flexible, receptive and adaptative contractual approaches to validate during construction planned design and construction means/methods approaches, and anticipate any required modifications due to reasonably anticipated probable parameters of variations in encountered subsurface conditions.

As previously discussed, both DBB and Conventional DB — while distinct delivery methods — are based on commercial and contractual structures that result in intolerances, inflexibility in and resistance to modifications in planned design and construction approaches. As has been observed:

> *In the design-bid-build contracts, there is typically a separation between the designer and the contractor, which may create obstacles to modifying the design during construction and, consequently, a barrier to the use of the observational method. Similar problems may arise in a design-and-build contract if the client keeps the right to approve all modifications of the design and has no incentives to do so. This separation can lead to disputes and confrontation between the actors involved. This must be avoided when implementing the observational method, where high-quality communication and cooperation are essential.*[20]

Specific to DBB, receptivity to the OM is confronted by constraints. As stated by Powderham and O’Brien:

> *Under a conventional [DBB] contract, a contractor bids on a project based on a fixed design specified in the contract documents and on the premise that it will be built as designed. The introduction of the OM within such a contract immediately presents commercial risks from the need to allow design changes during construction. Such risks tend to fall predominantly upon the contractor who can consequently be exposed to the double disadvantage of less return but more ownership of the design. Risk allocation is reasonably well defined in a conventional [DBB] contract where most of the design risk is taken by the client and most of the construction risk is carried by the contractor.*[21]

The integration and synchronization of design and construction in Conventional DB somewhat improves opportunities for OM utilization:

> *Design-and-construct contracts are intrinsically more amenable than other forms to inclusion of the OM. They allow a contractor to team up with a consultant at the time of tender and to offer the client a more effective solution.*[22]

However, regarding Conventional DB, CIRIA Report 185 further states:

> *Design-and-construct forms of contract are not without problems. More often than not the client’s adviser has prepared the feasibility study and produced an outline design for the purpose of seeking tenders. That adviser — who quite properly has an influence in assessing the lenders — might not have the wisdom, knowledge and experience to assess objectively a tender that contains an OM solution. Consequently, the tender is likely to be unsuccessful. The adviser could also have an auditing role and, therefore, possibly restrict the design process.*
>
> *The real problem for a contractor who wishes to pursue the OM in a design-and-construct environment arises when the client has strict approval requirements on the contractor’s design or an independent check is required. The client, having accepted an offer for a lump-sum price and off-loaded the risk, has no incentive to help the contractor through a prompt or sympathetic*

---

[19] ALAN POWDERHAM & ANTHONY O’BRIEN, THE OBSERVATIONAL METHOD IN CIVIL ENGINEERING: MINIMISING RISK, MAXIMISING ECONOMY ¶ 14.2.1 (2021).

[20] Tidlund, *supra* note 1; Diane Mather & Alex Gomes, *The Observational Method in Tunnelling, Australian Tunnelling Society*, Sep. 30, 2021, https://www.ats.org.au/2021/09/30/the-observational-method-in-tunnelling/.

[21] POWDERHAM & O’BRIEN, *supra* note 18, at 327-29.

[22] Nicholson, *supra* note 14, at 96, ¶ 6.2.1.4.

> *approval system. The client's approval consultant or an external checker has even less interest.*[23]

Commenting on Conventional DB, Powderham and O'Brien note similar limitations in facilitating OM utilization:

> *[DB] forms of contract offer greater potential to adopt the OM where design and construction are inherently more closely inter-related and the contractor has significant ownership of the design. However, intense time pressures (especially during tender phases) and fragmentation of design effort within an adversarial environment may often inhibit the adoption of the OM. Stakeholder approval, especially of the client, may be difficult to achieve. Implementation of the OM requires greater effort by the designer and the contractor, and it may not be in the commercialinterests of either party to pursue the OM unless there is an appropriate financial incentive.*[24]

ECI and the OM

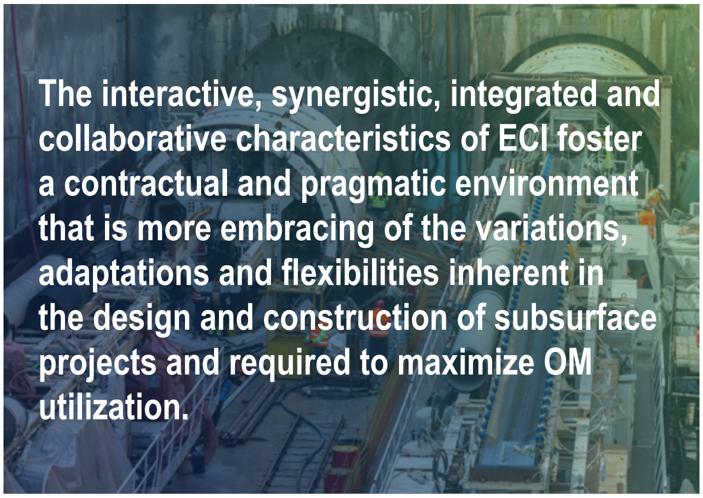
The interactive, synergistic, integrated and collaborative characteristics of ECI foster a contractual and pragmatic environment that is more embracing of the variations, adaptations and flexibilities inherent in the design and construction of subsurface projects and required to maximize OM utilization.

ECI facilitates and promotes utilization of the OM

ECI approaches also facilitate the planning for potential permanent works design and construction methods modifications through contractual contingency, allowance and provisional terms that address risk allocation and commercial aspects of those modifications.

ECI approaches allow for significantly more opportunities and contractual planning to anticipate and provide for risk allocation and pricing adjustments due to design and construction modifications attributed to certain parameters of reasonably anticipated variations in subsurface conditions encountered during construction.

The timely collaboration between the owner and contractor in (a) subsurface investigations and evaluations; (b) permanent works design development; (c) construction means/methods planning; and (d) anticipating and contractually addressing reasonable parameters of potential modifications in design and construction approaches (and commercial implications) due to defined parameters of variations in encountered subsurface conditions, should improve mutual alignment as to risk allocation and minimize the risk of ensuing disputes traditionally experienced in both DBB and Conventional DB.



The interactive, synergistic, integrated and collaborative characteristics of ECI foster a contractual and pragmatic environment that is more embracing of the variations, adaptations and flexibilities inherent in the design and construction of subsurface projects and required to maximize OM utilization.

ECI and Dispute Mitigation

The collaboration inherent in ECI approaches should reduce the risk of disputes on subsurface projects in important respects:

- Potential disputes involving scope growth, Owner preferences and management of stakeholder input in design and construction methods, can be identified and resolved in a more managed, timely, integrated and collaborative manner during early phases in ECI.
- More informed Owner decision making during design development as to project scope, cost, schedule considerations and risk allocation among all project participants.

ECI approaches are not a panacea and realistically will not eliminate all sources of disputes on subsurface projects. There is much to learn and experience in contractual terms and actual project experience in the execution of ECI approaches. The processes, protocols and guidelines for prudent ECI implementation have yet to be defined in the industry for heavy civil and major subsurface projects. Realistically, there will be implementation challenges, corresponding improvements and prudent corrective measures. That said, the promise of ECI is encouraging on numerous fronts, including dispute avoidance.

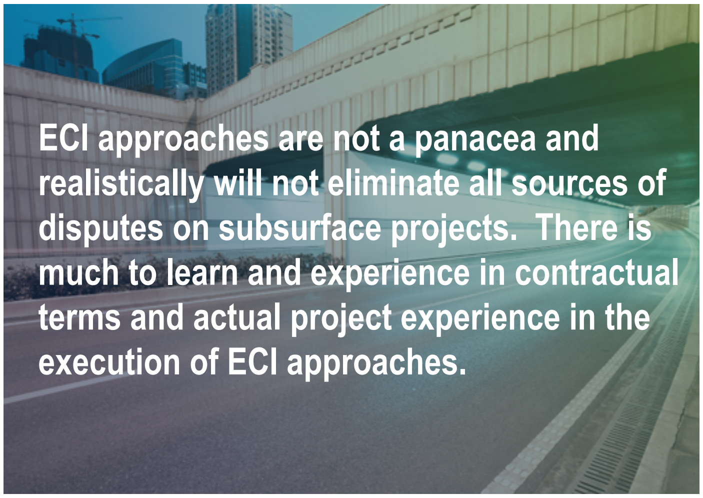
Conclusion

The underground design and construction industry is experiencing more diversity and experimentation — and learning — as to the optional approaches for delivery of major subsurface

---

[23] *Id*

[24] POWDERHAM & O'BRIEN, *supra* note 18, at 329, ¶ 14.2.2. *See also,* Jason Le Masurier, *The Observational Method: A Systemic Approach to Managing Construction Project Uncertainties* (Int'l Conf. on Systems Thinking in Management (ICSTM-2002), Apr. 2002); Alan Powderham, *The Observational Method—Learning from Projects* (Int'l Conf. on Case Histories in Geotechnical Eng., Apr. 2004).



> **ECI approaches are not a panacea and realistically will not eliminate all sources of disputes on subsurface projects. There is much to learn and experience in contractual terms and actual project experience in the execution of ECI approaches.**

projects. The result of this process — predictably based on experience and the complexities of risk variables — is that there is no “silver bullet” or panacea that will solve, in any idealized conception, all the immense challenges and risks posed by those projects. That said, for the reasons addressed in this paper, ECI presents significant opportunities that should be given a fair chance to develop and improve.

ECI approaches are relatively new in major subsurface projects. In the last two years, ECI approaches have increasingly been explored and implemented on several major subsurface projects in North America. Presently, while media and other subjective and anecdotal experiences have been reported, there are no published or otherwise reliable and objective reported results or evaluations of ECI on those projects.[25]

ECI approaches on subsurface projects involve factors and considerations qualitatively different from ECI approaches on other projects.

At the Fox Conference on January 7, 2025, the author proposed the formation of a committee to gather data to reliably and objectively capture and study project experience in ECI utilization on major subsurface and other heavy civil infrastructure projects. The Underground Construction Association is especially suited and qualified to undertake such a disciplined study, embracing diversified input from Owners, Contractors, Engineers and the insurance and surety industry.[26]

For over fifty years, the design and construction underground industry has been exceptional and exemplary in thought leadership and initiatives to improve procurement and contract practices on subsurface projects.[27] The proposed formation of an UCA study would be a timely and valuable furtherance of that tradition.

---

[25] John Reilly & David J. Hatem, *Alternative Contracting and Delivery of Complex Megaprojects—Challenges and Opportunities* (UCA George A. Fox Conf., Jan. 7, 2025) (unpublished conference paper) (on file with author).

[26] Hatem, *supra* note 12.

[27] Hatem, *supra* note 12.

Author

David J. Hatem is a nationally recognized attorney whose practice specializes in representing engineers and architects and advising professional liability insurance underwriters on project-specific insurance matters. David teaches Legal Aspects of Civil Engineering at Northeastern University Graduate School of Engineering and has continuously served as counsel for the American Council of Engineering Companies of Massachusetts (ACEC/MA) since 1988.

Most recently, he was a member of the writing committee for Geotechnical Baseline Reports Suggested Guidelines, ASCE Manuals and Reports on Engineering Practice No. 154 (R. Essex, 2022); and served as a legal reviewer/resource for Geotechnical Baseline Reports: A Guide to Good Practice (CIRIA C807, 2023).

David J. Hatem, PC
Partner
dhatem@mgmlaw.com