

Model for dealing with geotechnical uncertainty: FIDIC Emerald Book for underground works

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Introduction

Key provisions

Tendering for Emerald Book projects

Comment

Introduction

As in many other civil law jurisdictions, the allocation of risk for unforeseen ground conditions is not specifically addressed under Swiss law. As a result, parties negotiating Swiss contracts for projects involving significant geotechnical uncertainty, such as tunnelling and other underground works, should carefully address the allocation of risk for ground conditions.

The International Federation of Consulting Engineers (FIDIC) 2019 Conditions of Contract for Underground Works (Emerald Book) is a new standard form specifically for underground works that is the result of a lengthy collaboration between FIDIC and the International Tunnelling and Underground Space Association (ITA). The Emerald Book contains several features aimed at addressing geotechnical uncertainty, including geotechnical baseline reports (GBRs) and mechanisms to adjust the time for completion and contract price.

The Emerald Book is not the first standard form contract geared towards tunnelling projects. For example, the Swiss Society of Engineers and Architects Norm 118/198 (General Conditions for Underground Construction) is often used for tunnelling projects in Switzerland. However, there was no version of the widely used FIDIC Conditions of Contract suitable for tunnelling projects before the Emerald Book. Instead, parties often used other FIDIC or New Engineering Contract standard forms, modified with reference to the recommendations, guidelines and checklists published by the ITA.

Key provisions

The Emerald Book is essentially a modified version of the 2017 Conditions of Contract for Plant and Design Build (the Yellow Book), with special provisions to address the allocation of risk for subsurface physical conditions. Its most notable features are the introduction of GBRs and mechanisms to adjust the time for completion and contract price (in which the information contained in GBRs plays a role).

GBR

A GBR is a document that must be included in tender documents and a final contract. It describes the subsurface physical conditions and corresponding ground reactions. However, it is meant to include more than simply geotechnical data (which should be set out in a separate document (ie, a geotechnical data report)). A GBR is meant to be a careful and thorough analysis of the known and potential ground conditions and possible ground behaviour in light of the intended construction method. A contractor is deemed to have based its tender proposals on the information contained in a GBR, even if such information is contradicted by other data made available thereto.

A GBR also sets out the allocation of risk between parties for subsurface physical conditions, as employers will be responsible for any time or cost-related effects of the subsurface physical conditions differing from those described in the GBR. Subsurface conditions outside the scope of those defined in a GBR are deemed 'unforeseeable' for the purpose of Sub-clause 4.12 of the Emerald Book; employers are responsible for any time or cost-related effects of unforeseeable conditions.

Adjustable time for completion and contract price

The other notable feature of the Emerald Book is that it includes a mechanism for adjusting the time for completion and contract price based on the actual ground conditions encountered during an excavation, even though the conditions remain within the scope of those defined in the GBR.

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However, the mechanism applies only to the extent that the actual ground conditions affect the quantities of the excavation and lining works set out in the schedule of baselines.

The schedule of baselines is another new feature of the Emerald Book, which sets out the quantities for excavations and lining works items, as well as contractors' production rates for these items, including for each excavation zone.

According to Sub-clause 13.8 of the Emerald Book, excavation and lining works are subject to measurement, contrary to all other underground works which are deemed to be covered by the accepted contract amount. The measurement of the excavation and lining works, which must be performed by the contractor and agreed or determined by the engineer, then serves as the basis for adjustments to the time for completion or contract price.

Engineers must reassess the time allowed in a completion schedule or programme by applying the contractor's production rates set out in the schedule of baselines to the measured quantity of each completed excavation and lining works item. Based on this reassessment, the engineer must then determine whether the time for completion will be affected, based on the logic links identified in the completion schedule or the programme, and adjust the time for completion accordingly. Adjusting the time for completion goes both ways: while the time for completion may be extended in case of ground conditions less favourable than those anticipated in the GBR, it could also be reduced if conditions prove to be more favourable.

Engineers must also adjust the contract price by applying the appropriate rate from the bill of quantities to the as-built quantities of the different excavation and lining works items.

Claims and dispute resolution

Like the contracts included in the 2017 FIDIC suite of contracts, the Emerald Book includes detailed provisions concerning claim submissions and dispute resolution. Both employer and contractor claims must be submitted to the engineer within specified time periods. Disputed claims are subject to a multi-step resolution process, beginning with a standing dispute adjudication board (DAB), appointed at the outset of the project, and continuing to International Chamber of Commerce arbitration if the DAB's decision is not accepted.

Tendering for Emerald Book projects

Given the amount of information to be compiled and agreed in a GBR and schedule of baselines as part of a tender process – and the potential consequences for the final time for completion and contract price – tenders for a project subject to the Emerald Book may require more care than those under other standard form contracts.

FIDIC and the ITA have recognised this by including in the Emerald Book roughly 20 pages of guidance on preparing tender documents and annexes.

Using the Emerald Book and GBRs will significantly increase an employer's costs and the time required to prepare the tender. Not only will they have to carry out extensive site investigations, they must also analyse the results of the investigation and determine the range of possible ground behaviour and potential impact on the project. When assessing a tender under the Emerald Book, an employer should also look beyond the overall tender price and carefully consider the contractor's proposed production rates, as they could have a significant impact on the time for completion.

On the contractor's side, they will have to carry out extensive preparatory work (eg, determining production rates for each excavation zone) before knowing whether their tender proposal will be accepted. For this reason, FIDIC advises employers to consider remunerating tenderers for the preparation of tender proposals. Yet, depending on the size of the project and the employer's resources, this may be unfeasible.

Comment

While the tunnelling industry has eagerly anticipated the release of the new Emerald Book, it remains to be seen how quickly it will be put to use and for which types of project. Parties to contracts for tunnelling and underground works have long adapted standard forms to address the specificities of work that involves significant geotechnical uncertainty and may be reluctant to move away from the bespoke contracts that they have developed over time. Their reluctance may be increased by the considerable changes in the 2017 FIDIC suite of contracts, on which the Emerald Book is based and with which the industry may take time to become comfortable. However, FIDIC's close collaboration with the ITA in developing the Emerald Book, its reflection of best practice in the industry and the extensive guidance provided for its implementation all suggest that it will be well received among industry players that regularly work on projects with complex geotechnical aspects.

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