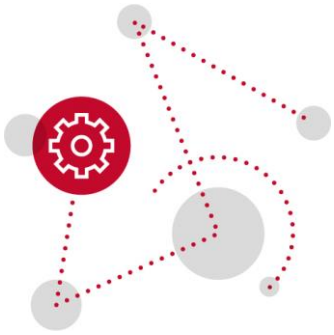
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Construction & Engineering Focus Team

November 2019

First edition of the Conditions of Contract for Underground Works (FIDIC Emerald Book)

Construction & Engineering Focus Team



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1. Introduction

At the World Tunnel Congress on 7 May, the International Federation of Consulting Engineers (FIDIC) and the International Tunneling and Underground Space Association (ITA) launched the first edition of "*Conditions of Contract for Underground Works*" (known as the "**Emerald Book**").

The Emerald Book consolidates the ITA's best practices in **tunnel construction and underground works** and is inspired by the principles in the ITA Contractual Framework Checklist for Subsurface Construction Contracts.

2. Structure

The Emerald Book consists of the **usual sections in FIDIC models**:

- General Conditions
- Guidance for the Preparation of Particular Conditions
- Guidance for the Preparation of Tender Documents
- Forms of Letter of Tender, Letter of Acceptance, Contract Agreement and Dispute Adjudication/Avoidance Agreement.

The Emerald Book is essentially a variant of the **Yellow Book**: most of the provisions are the same, though it is enriched with provisions specifically designed for **underground works**.

3. Main changes

3.1. General principles

The need for **a standard form contract specifically designed for underground works** derives from the following circumstances:

a. The cost and time needed to execute excavation and lining works strictly depend on the **geological**, **geotechnical** and

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hydrological characteristics of the subsurface, which often cannot be assessed with sufficient precision when the contract is entered into.

b. It is, as a general rule, **inefficient** to allocate risks relating to the unforeseeable nature of subsurface conditions **to the contractor** because it can lead to an unsustainable increase in the contract price, greater risk of litigation, or both.

c. The usual, general provisions on price and time adjustments applicable in the case of "**unforeseen/unforeseeable hydrogeological conditions**" are unsatisfactory because both the notion of "unforeseeable conditions" and their consequences (in terms of time, execution and price) are **extremely difficult to determine** with any certainty.

> The Emerald Book - by relying on international best practices from contracts in the sector - addresses the division of liability and the allocation of risks arising from subsurface geological conditions and from the methods of execution of underground works.

3.2. The geotechnical reports and the schedules

The Emerald Book stipulates that the following documents must be prepared at tender stage (and in any case **before the contract is entered into**) and that **they form part of the contract**:

a. **Geotechnical Baseline Report** (**GBR**)**:** This report describes all the different subsurface **physical conditions** that could be encountered during works, the **methods of design and construction** of underground works and the expected behaviour of the subsurface in relation to the use of these methods.[1]

b. **Geotechnical Data Report** (**GDR**)**:** This contains all the geological, geotechnical and hydrogeological information in the employer's possession at the time of receiving bids.[2]

c. Schedule of Baselines: This sets out, in accordance with the GBR, **all the excavation and lining works**, the **envisaged quantity** of each activity or item, and their respective **expected production rates** (expressed in terms of speed or time for completion).[3]

d. **Schedule of Rates and Prices:** This is mainly constituted by the **Bill of Quantities** and sets out the **unit price** of measurable works.

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[1] Sub-Clause 1.1.51.

[2] Sub-Clause 1.1.52.

[3] Sub-Clause 8.2.2. The production rates are provided by the contractor at the tender stage and must correspond to the timing and execution programme set out in the GBR.

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3.3. Measurement of underground works

Sub-Clause 13.8 of the Emerald Book stipulates that **excavation and lining works** must be **measured during execution** and that the price must be determined based on **unit prices**, which are set out in the Bill of Quantities based on the quantities initially estimated in the GBR and in the Schedule of Baselines.

The unit prices are measured based on the **quantity** of, and **time** required for, each kind of work described in the Schedule of Baselines (which itself is based on the GBR) – in this way, account is taken of the different execution costs that arise from the subsurface conditions encountered.

> The risks related to the quantity of each work and to the portion of the works that exceeds the amount set out in the GBR are thus allocated to the employer.

Works different from excavation and lining works are to be remunerated on a **lump-sum basis**.

3.4. Determination of the time for completion

The time for completion for excavation and lining works depends on the measurement and the quantity of each element of the works.[4] The contract contains an **estimated time for completion** calculated based on the excavation and lining works described in the **Schedule of Baselines**, their quantity, and the **production rates** for each work.

The time for completion of the lining and excavation works must then be **reassessed based on the measured quantity** of each work carried out during the execution of works and the production rate for each work set out in the Schedule of Baselines.

3.5. Unforeseeable conditions

The Emerald Book thus envisages a mechanism to 'automatically' determine the price and the time for completion of the excavation and lining works - this reduces the need to refer to uncertain concepts such as the 'unforeseeable nature' of subsurface conditions. For this reason, the Emerald Book stipulates that the general provisions regarding unforeseeable physical conditions **do not generally apply to excavation and lining works**.[5]

However, they do apply when the subsurface conditions encountered in practice exceed the limits of all the conditions set out in the GBR - though this will rarely occur if the documents are carefully prepared.

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[4] Sub-Clause 13.8.3.

[5] Sub-Clause 4.12, para. 3, and Sub-Clause 13.8, para. 3.

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4. Concluding remarks

The Emerald Book arises from the consideration that, **in most cases, a lump-sum price and a fixed execution time are not suitable contractual provisions for underground works.**

Experience shows that similar provisions often fail to grant any real certainty as to costs and time for completion – on the contrary, they often lead to an increase in litigation and thus an even lower degree of certainty.

> The **solutions offered by the Emerald Book** aim to cover the consequences of uncertain subsurface conditions in the best way possible. This is done **by envisaging**:
>
> - **all the physical conditions that may arise** and all the planning and execution methods that may be necessary; and
> - **mechanisms for the 'automatic' determination of the contract price and the time for completion**, which are based on unit prices and conventional production rates and not on uncertain concepts such as the "unforeseeability" of conditions.

We believe the Emerald Book achieves its goal of offering a clear, efficient and balanced distribution of the risks of a given project - a goal that is common to the entire FIDIC suite of contracts. It can thus be used widely, just like FIDIC's other standard form contracts.

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The Focus Team is a constellation of skills in different fields of activity with a focus on construction and engineering.

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