Contractual Issues of Underground Works

The case of complex and uncertain geotechnical conditions.
Limitations of the Portuguese law and the implementation of the new EU public procurement directives

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AGENDA

• Why?

• Particularities of the underground works

• Modification of public contracts. Additional works: Portuguese law (PCC) and case law from Court of Auditors

• Transposition of the new public procurement directives. New legal framework: Special Modified Works?

• Resume
WHY?

• **Legislation** and **contractual conditions** are a very important *tool* that all geotechnical engineers should “know by heart”, specially if they are facing some difficult situation in the front face of a tunnel.

• GT2 of CPT “Engineering & Law: Contractual Practices”


• ... so that there is a new legislative solution that (i) meets the objectives of the new European Directives on Public Procurement; that (ii) is tailored to the best construction practices of this type of underground works with high complexity and uncertainty; and thus (iii) allows better risk management (in particular, the geotechnical risk) and that (iv) will probably lead to best value for money and increased safety of these complex geotechnical public works.
Revision of the Portuguese Public Contracts Code within the Transposition of the New EU Public Procurement Directives
PARTICULARITIES OF THE UNDERGROUND WORKS

• **Dependence on the behaviour of the ground materials**, that cannot be precisely known in the design phase

• **Uncertainty**, resulting from several causes with highlight to the **geotechnical**, due to the nature of the subsurface soil conditions, geological and hydro-geological conditions, heterogeneity, previous conditions of over consolidation, depth and extent of the work, ...
PARTICULARITIES OF THE UNDERGROUND WORKS

- **Tunnel design** is more than a determination of the structural adequacy of component parts - it must meet practical construction requirements to secure economy and safety in a range of ground conditions.

- When an underground structure is built a **redistribution of the natural initial stresses** takes place. Due to this redistribution, the underground structure will be subjected to a certain level of stresses and hence loads that influences adjacent structures.
PARTICULARITIES OF THE UNDERGROUND WORKS

• **Best contractual practices** in countries with great tradition in this type of complex geotechnical works promote the **adequacy of the construction methods** initially planned to the **real ground conditions and behaviour** found at tunnel face.

• For instance, by using the **observational method** (as set out in Chapter 2.7 of the Eurocode 7: Geotechnical design) in which the **design is reviewed during construction**.

• Therefore, it’s recommended the use of **flexible legislative solutions** adapted to this reality, which follow the best construction practices, and allow a **better management of the geotechnical risk allocation**.
PARTICULARITIES OF THE UNDERGROUND WORKS

• ITA has already prepared guidelines and recommendations on contractual aspects of conventional tunnelling (WG19) and contractual framework checklist for subsurface construction contracts (WG3), that resumes the **state of art for contractual purposes** on sub-surface projects.

• It’s clear that the project should take into account the most probable conditions and also other unfavourable conditions that might occur during construction. Therefore, the **design should be done for different scenarios** and design options should be modified to be adapted to the real soil conditions.

• A **fast response to real ground conditions** is only possible if **allowed by the contract**, that should include such provisions.
PARTICULARITIES OF THE UNDERGROUND WORKS

• For the purpose of construction method modifications on site, the information gained during execution both on the ground properties and on the structural behaviour shall be introduced into the current process of design and execution.

• Observation is therefore one of the fundamental principles of conventional tunnelling construction method and the process of validation of the assumptions in the project must be one of the routine activities included in the project management plan.

• The implementation of a formal risk management procedure in subsurface projects is highly encouraged... All parties involved in the project should participate in this process to manage and mitigate identified risks (ITA Contractual Framework Checklist, 2011).
Additional Works

< 50%

+ works

Errors and Omissions

Σ < 50%

• have become necessary, through unforeseen circumstances

a) Aspects or nonconforming data with reality;
b) Technical conditions that are considered not feasible;
c) Strictly necessary for full implementation of the contract.

Include additional works to the contract for complex geotechnical works, especially the construction of tunnels.
PORTUGUESE PUBLIC CONTRACTS LEGISLATION: EVOLUTION 2008 → 2012
JURISPRUDENCE FROM COURT OF AUDITORS

Is the high-court in Portugal responsible for reviewing the legal issues on public expenditure and delivering judgement on those accounts relating to general accounts of the State

- Assumption: the + work must be exceptional, due to unforeseen circumstances

- "... Hence it does not appear any unforeseeable circumstances, which excludes the subsumption of such additional work to article 370 (+ work), paragraph 1, of the CCP ...“ (from sentence n.º9 / 2012, 3rd Section, Case N. 6JRF / 2011)

- "Errors and omissions are always omissions, deficiencies or imperfections of solution elements of the work for reasons attributable to the parties of the contract (for one or both parties); They assume, therefore, a causal link to one of the parties of the contract or both ... “ (Case n.º2 / 2013, 3rd Section, Case N. 5JRF/2012)
MODIFICATION OF CONTRACTS. ADDITIONAL WORKS

Special characteristics of unpredictability

T+ 2012

EO 2008

T+ 2008

EO 2012

Limit amount of original contract

Observational Method, An Error?
When uncertainty is certain, what’s the right thing to do?
NEW LEGAL FRAMEWORK: SPECIAL MODIFIED WORKS?

• Article 72º 1.a) of New EU Directive 2014/24/UE

“Where the modifications [of contracts during their term], irrespective of their monetary value, have been provided for in the initial procurement documents in clear, precise and unequivocal review clauses, which may include price revision clauses, or options [i.e. project by scenarios]. Such clauses shall state the scope and nature of possible modifications or options as well as the conditions under which they may be used “

• Article 132º of existing Regulation 701-H/20

Special Technical Assistance (STA) on tunnel projects... the construction phase should entail a special technical assistance to be provided by the designer... to make the analysis of the real geological conditions... and the assessment of the results provided by monitoring of the work... to adapt the project to the real underground conditions. "

OPPORTUNITY ! SPECIAL MODIFIED WORKS (SMW)?

• New rule for the revised Portuguese Public Contracts Code (PCC)

Special Modified Works (SMW) are obtained from modifications to the construction method on site as a consequence of the information obtained during excavation, for a different scenario, and can result in additional or less works (considering the baseline construction plan which was based on the most probable scenario for the expected ground conditions).

• SMW should only be applied when the modifications are realized within a Special Technical Assistance provided to the owner of the works, according to the current Portuguese Legislation (Regulation 701-H)
TRANSPOSITION OF THE NEW DIRECTIVES

OPPORTUNITY ! SPECIAL MODIFIED WORKS (SMW)?
OPPORTUNITY ! SPECIAL MODIFIED WORKS (SMW)?

• More flexibility during construction requires accurate preparation:

**Preparation of the tender**
- Appropriate Site investigation
- Geotechnical Baseline Report
- Differing Site Conditions
- Design for several scenarios
- Revision by experts
- Balanced risk allocation

**Execution / Construction phase**
- Special Technical Assistance
- Monitoring
- Special Modified Works (SMW)
- Formal risk management procedures
- Site supervision specialists
- Dispute Resolution Board

Design – bid – build contracts
The current Portuguese legislation does not respond properly to the best construction methods for underground works, specially in complex geotechnical conditions with unforeseen circumstances.

The lack of flexibility of the legislation, and of the court of auditors, collides with the necessary flexibility of the observational method, that is founded on the adjustment of techniques according to the conditions encountered in the front face of excavation.

This leads to "defensive design procedures" that uses the worst case scenarios for the baseline project instead of the most probable scenario, and increase the cost of the project and the litigation associated.

Moreover, the owners may seek a "turnkey contract" solution with a fixed price and end date, which lead to an unfair allocation of risk, specially due to the uncertain geotechnical conditions, that will inevitably cause costly conflicts and disputes.
• BUT with a **more rigorous preparation** and **high contractual flexibility**, using the state of art guidelines on contractual aspects for underground structures (in particular for tunnels) given by ITA recommendations and other standard contract conditions (FIDIC, SIA ...)

• **Balanced risk allocation** and effective management of underground projects, essential for the **successful completion of the works**, on the right schedule and at a fair price

• This will only be possible if the legislator understands the particularities of the subsurface environment and underground works and take the **opportunity of the revision** that is on course to introduce the necessary **adjustments to the Portuguese Public Contract Law** for this particular complex geotechnical structures (**design for different scenarios, Special Modified Works, Risk management procedures,**...)

**RESUME**

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