

THE ROLE OF CERN IN THE LARGE CONSTRUCTION CONTRACTS FOR LHC CIVIL WORKS

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Abstract

The contracts for the civil engineering construction of the LHC are based upon the standard FIDIC (Fédération Internationale des Ingénieurs Conseils) document entitled "Conditions of Contract for Works of Civil Engineering Construction". FIDIC is a reputable supra-national and world-wide Federation of Consulting Engineers focused on the definition and regulation of the role of many parties involved with the International Construction Industry. An overview of FIDIC's and other Organizations', such as the World Bank, standard documents is presented. The difference between standard Contract documents and standard Bidding documents is pointed out. In view of CERN's status as an intergovernmental Organization, the original FIDIC standard documents needed to be adapted. The modifications are identified and explained. A concise definition of the role of each party concerned by the LHC construction Contracts, i.e. the Contractor, the Engineer and the Client (CERN), is made. Finally, a brief cost-benefit analysis on this particularly contract drafting exercise is presented along with some preliminary conclusions and an outline of foreseen difficulties with the Contract management.

1. INTRODUCTION

The civil engineering works for the LHC Project are divided into three main packages, plus one additional package for the injection tunnel TI8. Package 1 consists of all new underground and surface structures to be constructed on Swiss territory at Point 1. Identically, Package 2 consists of all new underground and surface structures to be constructed on French territory at Point 5. Unlike packages 1 and 2, package 3 is geographically spread around the LEP and SPS rings and consists of all underground and surface structures to be constructed that are not located at either Point 1 or 5.

The design and construction supervision of the new works was awarded in three separate packages, each one to a different multinational joint venture of engineering companies. For the design and construction supervision purposes, Injection Tunnel TI8 is an integral part of package 3. Package 1 is currently being designed by a joint venture between Electricité de France and Knight Piésold of the United Kingdom. Package 2 was awarded to a joint venture of Gibb (United Kingdom), SGI (Switzerland) and Geoconsult (Austria), and package 3 to a joint venture of Brown & Root of the United Kingdom and Intecsa of Spain.

Similarly, the construction contracts of the new works are to be awarded in three separate packages to different international contracting consortia as follows: Package 1 to Teerag Asdag of Austria, Baresel of Germany and Locher of Switzerland; package 2 to the Spanish/Italian joint venture comprising Dragados and Seli; and package 3, excluding Injection Tunnel TI8, to the Anglo-French consortium of Taylor Woodrow, Amec and Spie Batignolles. The construction contract for Injection tunnel TI8 will be placed on the Swiss market only.

2. TYPES OF CONSTRUCTION CONTRACTS

One of the critical factors for the success of the procurement and subsequent management of large construction projects is the *Contract strategy*, i.e., the type of Contract to adopt. Knowing that CERN's past experience in this field was not entirely successful and given CERN's characteristics in terms of organization and work procedures, we were able to identify several potential weaknesses in CERN that could undermine our position as Employer (client). It was obvious that this potential weakness should be removed from the Contract.

The Contract is a document that defines the 'Scope of Services' and is composed by two interdependent parts: (i) the Legal and Commercial Section, entitled the Form of Contract, and (ii) the Technical Section. The Technical Section is where the 'Scope of Services' or the 'Product' is fully described in terms of layout, specifications, requirements, planning and risks. In the Form of Contract are stated the Contract management rules, the role and interfaces of each party and where is allocated the inherent Contract risk.

Several types of Contracts are commonly used in the construction industry: (i) Cost-plus Contracts, which contractors are reimbursed for the direct construction costs plus an agreed profit premium (usually a percentage of the direct construction costs); (ii) Re-measurement Contracts, based on a Bill of Quantities and a series of unit rates; (iii) Alliance Contracts, based on performance and goals in order to make the contractor an active and interested party in the overall success of the project, and (iv) Turn-key Contracts in which the total contract price is a lump sum.

These different types of Contracts are associated with different contract risks. In a Cost-plus Contract, the employer bears almost all the Contract risk. In a Re-measurement Contract, contractors assume the part of the risk associated with the organization, methods and means of the construction activity/process. In an Alliance Contract, contractors assume not only the risk associated with the Re-measurement Contracts, but also the risks attached to the failure of the project's pre-set objectives and goals. In a Turn-key Contract, the contractor bears almost all the Contract risk. This means that from Contract type (i) to type (iv), the inherent contract risk is decreasing on the Employer side and therefore increasing on the Contractor's side.

Attached to the Contract risk is the Contract flexibility, i.e., the capacity to accommodate changes to the 'Scope of Services'. From the employer's point of view, more risk means also more flexibility. For instance, although a Turn-key Contract is extremely appealing from the 'Project Finance' point of view (more and more investors, both private and institutional, impose this type of contract in order to minimize the risks and fix the costs) is in fact a disaster when the employer introduces significant changes to the 'Scope of Services'.

Since it was impossible to fully define the 'Scope of Services' for the LHC project and CERN would like to retain some flexibility to accommodate inevitable modifications, it was decided to adopt a Re-measurement type of Contract.

Several models for the Form of Contract, i.e., the legal and commercial terms of reference, are available for Re-measurement Contracts. Almost all Governments in Europe (World) use or have a model Form of Contract for this. The models are usually elaborated by associations of Consulting Engineers. One of these associations is FIDIC (Fédération Internationale des Ingénieurs Conseils), which is a reputable supra-national and world-wide Federation of Consulting Engineers focused in the definition and regulation of the role of many parties involved with the International Construction Industry. One of FIDIC's documents is the 'Conditions of Contract for Works of Civil Engineering Construction'[1], which is a model Form of Contract for civil engineering Re-measurement Contracts.

Given the fact that (i) FIDIC is internationally known; (ii) FIDIC's Form of Contract is widely used, and (iii) it is tested and tuned by years of experience, it was decided to adopt, as far

as possible (see §3), this model of Form of Contract. In addition, other Organizations, Institutions and even Governments use this model in their construction Contracts, particularly in large international Calls for Tenders.

The World Bank, for instance, imposes the use of their 'Standard Bidding Documents' [2] in the procurement of civil engineering works for all financed projects. This Standard Bidding Documents includes not only a model for the Contract, both Form of Contract and Technical Section, but also all other bidding and/or non-contractual documents such as Invitation for Bids, Instructions to Bidders, etc. In the 'Standard Bidding Documents' the World Bank adopts the FIDIC's model Form of Contract.

3. MODIFICATIONS INTRODUCED TO FIDIC STANDARD DOCUMENTS

Several parties were involved in the preparation of the construction Contracts: Civil Engineering, Purchasing Services and Legal Services groups, assisted by the Civil Engineering Consultants mentioned in §1 and Norton Rose a large British legal consultant specialized in construction law.

Given Norton Rose's large experience in contract drafting and dispute resolution, complemented also with the civil engineering (CE) consultants experience in construction management, it was decided to modify FIDIC's standard model of the Form of Contract in order to allocate more risk, and therefore responsibility, to contractor's role, reducing consequently the Employer's risk and liability (eliminating also the already mentioned potential weakness), and keeping the same level of flexibility. These modifications are, for instance: (i) A first instance dispute resolution mechanism will be included in the Contract. A panel of three Adjudicators (independent experts engineers experienced in dispute resolution) will provide a binding first instance decision on all eventual disputes that might occur between Contractor and Employer during the Contract. Any appeal (i.e., lawsuits) from this decision will only be possible after the completion of the works; (ii) The Contractor will bear some of the risk attached to 'unforeseen ground conditions', which is always a source of disputes (valid only for package 2; no agreement was reached for packages 1 and 3); (iii) The Contractor will become also responsible for the accuracy of the Bill of Quantities; (iv) CERN will have the power to terminate anytime the contract; (v) The defects liability period will be extended from two to ten years.

As a direct result of CERN's status as an intergovernmental Organization and its internal purchasing and administrative rules, an additional modification needed to be introduced. This basically impacted the overall spirit of FIDIC document and had to do with the role of each party to the Contract. FIDIC's standard documents provide the 'Engineer' (Consultant's construction manager, responsible for the whole site supervision) with the power of not only instructing any necessary variations to the works, but also evaluate and certify contractor's invoices. In other words, committing funds of the Employer. Since this procedure conflicts with CERN's rules, it was necessary to considerably reduce the powers of the 'Engineer' under the Contract increasing accordingly the Employer's role (see §4).

On one hand, the modifications introduced to the FIDIC Form of Contract will reduce CERN's risk and liability. On the other hand, however, it may increase CERN's exposure due to the fact that: (i) there is very little (no) experience with this type of Form of Contract and therefore no legal precedents to judge potential claims, and (ii) CERN will have a position of power that could be considered 'abuse of dominant position' that would, therefore, undermine the whole spirit of the Contract. Furthermore, given the Bidding procedures (Form of Contract included in the Bidding documents) this is considered an 'adherent' Contract', i.e., the Contractor has no possibility to discuss the contract clauses. Either he takes it or leaves it. This emphasizes the 'dominant position' characteristic.

4. ROLE OF EACH PARTY INVOLVED IN THE CONSTRUCTION CONTRACT

There are three participants to the Construction Contract: the Contractor, the Engineer and the Employer. Briefly, the role of each one of these participants and their interfaces are as follows:

The Contractor shall, with due care and diligence, execute and complete the works, and remedy any defects therein. He shall provide all superintendence, labour, plant, equipment and all other necessary things specified in or reasonable to be inferred from the Contract. Contractor shall take full responsibility for the adequacy, stability and safety of all site operations and methods of construction. The Contractor shall work in strict accordance with the Contract to the satisfaction of the Engineer. He shall comply and adhere strictly to the Engineers instructions except where the Contract expressly provides for instructions to be given by the Employer. During the Contract, the Contractor will not have any interface with other contractors or other CERN groups (to the exception of CE).

The Engineer shall be responsible for the enforcement and proper administration of the contract and shall, with due care and diligence, carry out: (i) the supervision of construction; (ii) the testing and commission of the works; (iii) the periodic and final account of the works, and (iv) the resolution of disputes (first instance). The Engineer shall also be responsible for all communications to the Contractor except where the contract expressly provides for instructions to be given by the Employer. During the Contract, the Engineer will not have any interface with other CERN groups (to the exception of the Civil Engineering Group).

The Employer (Civil Engineering Group) shall be responsible for the Engineer's performance in the enforcement and correct administration of the contract. He shall be responsible for the commitment of the Organizations' funds, i.e., he shall be responsible for the certification and payment of the Contractor's invoices and the issue of variations to the contract. The Employer shall be also responsible for the limitation and eventual management of interfaces between all other CERN groups and the Engineer and/or Contractor.

5. PRELIMINARY COST-BENEFIT ANALYSIS

So far, we had extensive discussions and negotiations with the packages 1, 2, and 3 Contractors concerning changes and/or amendments to the bidding documents which needed to be addressed before the contract signature. At this stage, Contractors already passed the message that they consider the contract unbalanced and they fear that CERN's dominant position may affect the smooth running of the project. In particular, they expressed their apprehension for the reduced role of the Engineer, which is, in the original FIDIC model, an independent, fair and reasonable professional. Since the works did not yet started, conclusions are premature.

The cost of this Contract drafting exercise, taking only into account the professional fees paid to our consultants (i.e., not including the time spent and travelling expenditures of CERN staff) is around 400,000 CHF (about 1.2% of consultants fees and about 0.15% of construction contracts value).

Reasoning in terms of cost-benefit to CERN, one thing is clear: for 400 KCHF, CERN allocated to the contractor more than the traditional risk in Re-measurement Contracts. However, the main issue is to know if the cost of drafting the contract is inferior to the potential cost of claims that we avoid, due to the modifications introduced to FIDIC standard documents. This is something that we will never find out. Since we are, on this paragraph, playing the 'Devil's lawyer', one may also argue that if FIDIC standard documents are good enough for the World Bank, it should also fit CERN's purposes.

Finally, an additional relevant issue is that the Contract is formed, as stated earlier in §2, by several interdependent documents, such as the Form of Contract, the Drawings, the Specifications, the Planning, the Milestones and Penalties, the Bill of Quantities, the Safety Plan and Applicable Safety Legislation, etc. This means that any weakness and/or major changes in one of the above will provide the contractor with a possible bargaining position which we tried to avoid with the modified Form of Contract.

6. CONCLUSIONS

We attempted to provide an overall picture on Construction Contracts in general and LHC Construction Contracts in particular. It should be pointed out that the comments made on risk, suitability and flexibility of the contract should be regarded as a general indication only. Obviously, this highly depends, not only on the specific and individual aspects of each one of the packages, but also on the attitudes, positioning and procedures of the Contract parties.

We should emphasize also that CERN is provided with the necessary tools to accomplish successfully the construction of LHC facilities. Not only have we elaborated a Contract that releases us from part of the traditional risks, but also we will have competent people for Contract administration assisted by a simple and, hopefully, fast dispute resolution mechanism.

Despite the comments made in §2 concerning contract flexibility, it must be mentioned that any modification to the Tender/Contract documents, either in terms of quantities, planning, specifications, interfaces with other contractors, interfaces with existing facilities and/or risk, will have an immediate cost impact. Please note that the only way to avoid problems during construction, therefore the golden rule of the industry, is: Provide the contractor with all the information, specify everything and change nothing.

REFERENCES

- [1] Conditions of Contract for Works of Civil Engineering Construction, FIDIC, Lausanne (1993).
- [2] Standard Bidding Documents, Procurement of Works, World Bank, Washington D.C. (1995).