

ADVANTAGES AND DISADVANTAGES OF THE CONTRACTUAL PRACTICE OF THE METRO4 BUDAPEST PROJECT

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1. KEYWORDS

Contractual system, design & build, turnkey project.

2. INTRODUCTION (OBJECTIVE):

The contractual system fundamentally determines the process of project implementation. When selecting the contractual system to be applied for the Budapest M4 Metro Line Project, the decision makers of the Budapest Municipality settled on the use of FIDIC contracts, officially issued by the Association of Hungarian Consulting Engineers and Architects (Hungarian member of FIDIC), also given consideration to the expectations of the EIB providing financial support. On the basis of this decision contracts based on the FIDIC Yellow Book were given priority for the construction works, besides splitting the works into several lots, necessary due to some deficiencies and delays in the preparatory measures for the project, to urge commencement of the works, and to stimulate competition. Since the commencement of actual construction works of the Budapest M4 Metro Line Project in 2006 project completion has reached approximately 80 percent. Completion of the implementation phase is expected by March 2014 so the delay of the programme is almost 100 percent when compared with the originally anticipated completion by 2010. At first sight the actual costs also show dramatic increase.

The media (both tabloids and daily press with increasing tabloid features), which have the most influence on the public, tend to report financial fraud, enormous delays and cost increase in relation with the project, mostly lacking any facts. In the news, apart from seeking scapegoats, mainly the contractual system is blamed. We should, however, attempt to examine the real data and determine the actual causes.

3. METHODS:

The most frequently applied contract types, the solutions offered by FIDIC, and the most common contract forms used in practice are evaluated using the so-called comparative method.

Contract for **Construction** (“Red book”)

Under the usual arrangements for this type of contract, the Contractor constructs the works in accordance with the (detailed) design provided by the Employer, who holds the total responsibility and risk of the accuracy, the faultless the adequacy and the complexity.

Contract for **Design & Build** (“Yellow book”)

It is usually featuring very general technical requirement and the Contractor designs and provides in accordance with the Employer’s requirements, the already completed other works, plant, structures, but can not handle properly the wide range of interface situations.

Contract for **Turn key Projects / Engineering Procurement Construction** (“Silver book”)

Those give the Promoter more technical guarantees but which are often more expensive, as the Contractor takes total responsibility for the design, and the execution of the project, with little involvement of the Employer. (It is similar to the so called “Main Contract” used in the previous era.)

General Contract (Prime Contractor with Subcontractors)

The most common system were in Hungary for complex projects in the past when large construction companies run business with numbers of different technical sections and frequent subcontractors for specialised works. (Do not exist anymore these types of large construction companies on the Hungarian market.)

Split Contracts (“Independent” Contractors) – How many is the optimum?

Splitting the project into a number of separate contract packages is quite complex and it usually takes considerable experience and in-house capacity to coordinate their implementation. Substantial lower cost can however be achieved (or hoped), but responsibility for the technical interfaces between the various components and the risk of delays, cost overruns and poor overall technical performance is carried by the Promoter. (It is familiar, isn’t it?)

The decision requests very serious consideration of the risk division, the cost saving, the in-house capacity to the broader prevalent project management.

4. RESULTS:

The selected contractual system (based on FIDIC Yellow Book, split into several lots) is evaluated using the example of the Budapest M4 Metro Line Project. It can be established that during the public procurement procedures of this project split into numerous lots (22 larger construction contracts and some 30 smaller other contracts directly relating to construction works) more companies were given the possibility to submit tenders than if only one main contractor tender had been issued for the works. Advantages and disadvantages of the selected contractual system are analyzed and summarized.

The major **advantage** for the Investor (Budapest Municipality) was that despite the deficiencies of project preparation measures, construction works could be commenced at several locations concurrently (however as it turned out later this led to a number of

severe consequences that were difficult to manage), which was hoped to allow parallel work activities, to ensure acceleration and completion of the works as soon as possible. (Unfortunately the opposite occurred; the project is being implemented with significant delay.)

In theory, the fixed price of contracts can provide guarantee for the Client to avoid cost increase. The delay of the project and the frequent lack of solution for interface problems, however, gave grounds for contractors claims (which of course the contractors were eager to exploit).

Another advantage of this scheme was that the preparation of construction drawings, related harmonization and permission procedures were not in the scope of duties, responsibilities and risks of the Client. (At the same time finally it did not turn out as actual real advantage since the coordination of the design process and varied availability of drawings led to a vast number of additional (interface) problems due to the 'independent' contracts. It can be certainly stated that the cumbersome and deficient design coordination yields one of the major technical lessons learnt on this project.

In this scheme it was a **disadvantage** that despite the large number of contracts competition was still limited since some contractors have been awarded two or three, and in one case even five contracts. At the same time in the case of contracts with higher value, in order to be on the safe side, such tender criteria were specified that could be met only by a very small group of companies (mainly by 'domestic' companies with multinational background, or companies with significant foreign share). Therefore competition could not really be achieved and no significant savings were realized in the tender prices when compared to the previous Engineer's estimates.

Severe consequences were raised due to the fact that the management of the vast number of interfaces created an almost impossible task for the Client (Investor) and the Engineer, actually responsible for contracts coordination.

The efficient management of extremely complex contract interfaces would have required a project management organization with ample staff, extensive experience in professional matters, international business, legal affairs and project implementation. Due to the misinterpreted expectation to economize the management staff these conditions were not provided at all in the initial phase and were only partly ensured with the progress of the construction works.

Continuous implementation of a mature concept was out of the question due to the unprecedented fluctuation of the management body of the Client (six Executive Directors and eight Project Directors have been employed in the project). Moreover, the contractual and working relationship between the Client and the Engineer was also rather burdened. Consequently, project management could not operate without problems, which resulted in frequent delays in the decision making process, and in inconsistent, sometimes conflicting resolutions. The lack of uniform, consistent and definite project management system also contributed to the situation where the defects, deficiencies, unfulfilled liabilities, delays by the contractors could not be managed (counteracted) most efficiently.

The various conflicts raised among the contractors led to a high number of claims (in many cases though without entitlement), which generated increase of costs and also resulted in significant delays in project implementation.

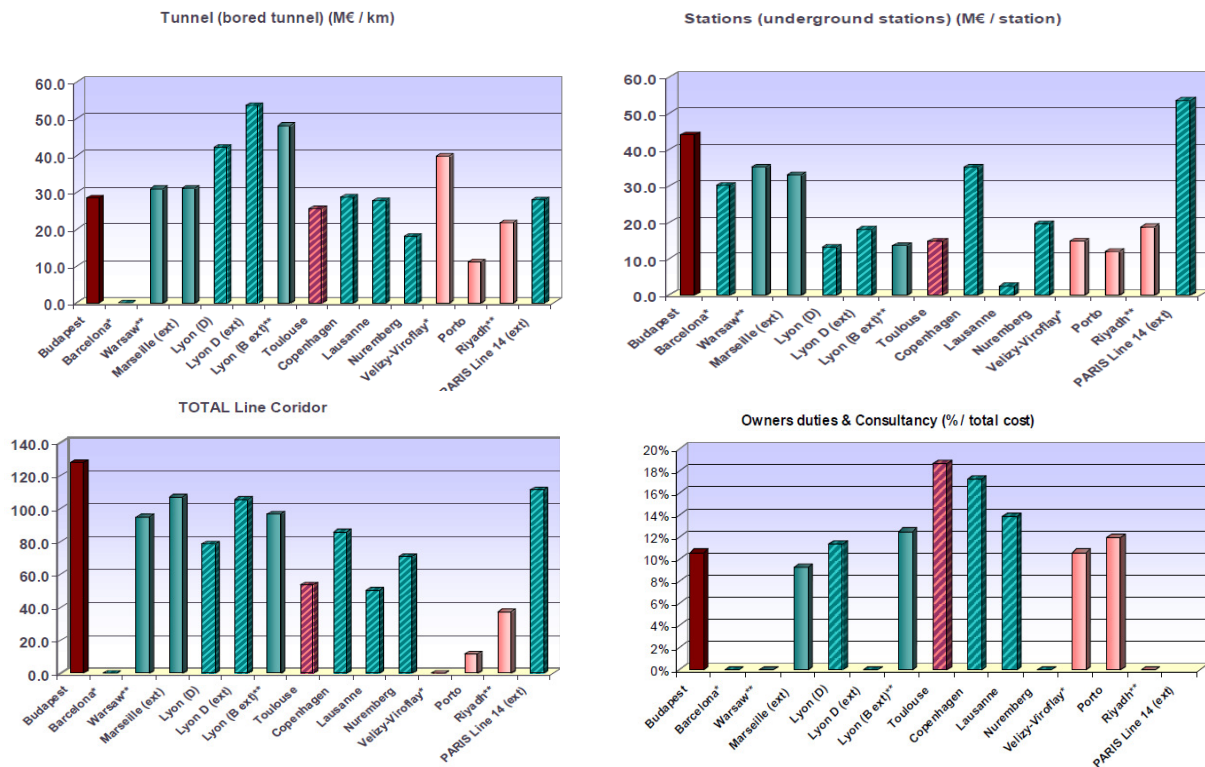
5. CONCLUSION:

In case of an especially important project of high value, public interest, implemented using public funds, it is absolutely normal to expect that the project is completed within the set budget, and by the anticipated deadline. Of course this requires that the design drawings are based on professional and realistic grounds, the (financial, material, legal and personal) conditions of implementation are ensure on time, and the Client and the contractors provide sufficient staff for the implementation.

Implementation of the Budapest Metro 4 Line, Stage I will take double time than anticipated at the start of the project. It also results in some increase in the costs; however, the extent of the increase is far below that of the completion time. Additional other effects also lead to cost increase but in order to allow realistic evaluation such effects should be assessed on the basis of the actual causes.

In fact would the Budapest Metro 4 Line be completed as the most expensive project with the longest completion time when compared to international practice?

Cost of various projects in international practice



Average cost of the Budapest Metro 4 Line compared with international projects of similar technical scope
(Comparative price of 2009)

City	Line	Length (km)	Station	Cost (million EUR)	Completion time (year)	Average cost (million EUR/km)
Amsterdam	Line 52	9,8	8	3100	2002-2017 (15)	316
Paris	Line 14 (M)	0,9	1	257	2002-2003 (2)	285
Vienna	U1 (M)	4,9	6	860	2009-2015 (6)	176
London	JLE (M)	16	11	2674	1993-1999 (6)	167
Marseille	Line 1 (M)	2	4	332	2004-2009 (5)	166
Warsaw	Line 2	6,1	7	952	2009-2013 (4)	156
Athens	Line 2-3	12	20	1714	1992-2000 (8)	143
Berlin	U55 Line	1,8	3	253	1995-2009 (4)	140
Barcelona	Line 9	50	52	6390	2002-2014 (12)	128
Budapest	M4	7,4	10	913	2006-2014 (8)	123
Rome	C Line	34	39	3188	2006-2015 (9)	94
Bucharest	M5 Line	9	14	806	2010-2015 (5)	89
Helsinki	LV Line	13,9	7	714	2009-2014 (5)	51
Madrid	Line 12 (M)	40,7	28	1550	1999-2003 (4)	38
Mallorca	PDM Line	8,3	9	295	2005-2007 (3)	36

Is the enormous delay due to the contractual system applied? Should only the contractual system be blamed or are there other factors to be considered? Is the cost increase also caused by the „faulty” contracts? What are the major causes? This is the most important question to learn our lesson.

Well, the major causes of project delay should not be sought in the contractual system, even if it also contributed to raising some problems. However, the main causes existed already before the contract signing:

- Careful preparation of the professional aspects of the project was overshadowed by political conflicts. The lack of essential transport development programs, to be based on professional and social agreements, and the legal and administrative regulations predetermined the heavily burdened future of the project (cumbersome and prolonged land acquisition, obtainment of permissions, intervention of NGOs, conflicting interest of district municipalities etc.)
- The intent to accelerate the project, which was politically motivated and without professional grounds, implied the possibility of several problems, and finally indeed raised them.
- In some cases the Client could not obtain the construction area or permissions. Despite the contracts were signed, therefore offering a good chance for the contractors to submit claims (against the Client).
- The sequence of contract signing did not match that justified by professional considerations so in several cases delays occurred almost automatically, which again led to claims.
- The construction design of this complex project was completed in several lots, which allowed for built-in weaknesses, and unavoidably resulted in having to order necessary technical variations. This of course led to cost increase.
- The delay of tunnelling works reached such an extent (for the less part due to reasons not attributable to the contractor, and for the most part due to his own fault) that it wrecked the complex time schedule of the entire project. Re-harmonization of the schedule proved to be a practically impossible task. And this situation again led to extension of time and additional cost.

Project implementation was crucially influenced by these factors, and not by the problems relating to the contractual system alone.

Life has given the answer to the question as to whether it is more practical, economical and altogether more beneficial for the Client to let the works to only one „main contractor” or to split the project into several lots. The system of splitting the project into almost „infinite” number of lots creates an ambiguous situation that is difficult to follow, and the control or efficient management of the system becomes almost impossible. At the same time having only one „main contractor” contract is obviously more expensive and involves higher risks (see Athens Olympics Metro Project, which was completed in double time than anticipated in 2004 for the Olympic Games, despite one „main contractor” contract. As for the costs, no information is leaked but this project significantly contributed to the current situation of Greece.).

In the case of a project program representing clear investment concepts, gaining extensive social support, a limited number (max. 3-5) of contracts could be more successfully managed after careful project preparation and thoughtful design measures. This alternative tends to be the most efficient solution in terms of cost optimization and risk sharing, however, it can be stated that there is no solution that has only advantages.

6. ACKNOWLEDGEMENTS

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