

OFFICE COMPLEX IN NEW BELGRADE: CONSTRUCTION CASE

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Summary: *This paper concisely presents construction of an office complex entitled „GTC Square” at Block 41a in New Belgrade. The complex consists of two office buildings, one retail building, entrance plateau and parking. The Employer („GTC”) appointed the Engineer („EC Harris”) and the Contractor („Alpine”). The construction team comprises all participants’ personnel (employer, project manager, architect, structural designer, quantity surveyor, and contractor). The construction procedure (organization, administration, responsibilities, communication, program, planning, inspection, control, supervision, approval, reporting, handover) is duly performed according to sound international practice. The Contractor, where the author was the team member, achieved quality on time schedule and within budget.*

Keywords: *Office building, construction, procedure, project management*

1. INTRODUCTION

Office complexes are important edifices in cities and their architectural designs are adequately presented in books and journals. Construction management cases of office buildings, however, are rarely considered in references.

This paper concisely presents construction of an office complex entitled „GTC Square” at Block 41a in New Belgrade. The author was member of the contractor’s team on „GTC Square” site during the whole construction cycle (2007-2009), from the construction start (contract acquisition) until its end (technical approval and final payment). Successful construction process, which means achieving quality within budget and on time schedule [1], becomes the base of own engineering and management experience.

Belgrade, situated at the confluence of two rivers, the Sava and the Danube, occupies the central position in South East Europe (SEE). Being the junction of two Trans-European transport corridors [2], the Corridor VII (the Danube) and the Corridor X, Belgrade represents the main communication and logistic hub in the Balkan region.

As administrative, economic and cultural center of Serbia, Belgrade provides favorable business environment with educated professionals and skilled workers and with a market

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of over 1.6 million residents. Belgrade real estate market (residential and business) is enlarged after the political changes in 2000. New Belgrade is the most wanted location for office and retail buildings.

Nowadays, the company *Globe Trade Centre* (GTC) [3], established 1994, is one of the leading developers in South East Europe (SEE). In New Belgrade, the GTC subsidiary [4] developed three office complexes: „GTC House” (completed in 2005), „GTC Avenue 19” (2008), and „GTC Square” (2009).

2. „GTC SQUARE” PROJECT

Office complex „*GTC Square*” (GTCS) (Figs. 1 - 2) [5], located at Block 41a in New Belgrade, has direct access to motorways E70 (to Austria) and E75 (to Greece). Situated at the corner of two boulevards, Milutina Milankovića and Bulevar Umetnosti, GTCS is just 10 and/or 15 minutes drive from the city centre / Belgrade International Airport.

The *Employer* (Atlas Centar d.o.o., subsidiary of GTC [3]) appoints his representative the *Engineer* (EC Harris d.o.o., subsidiary of EC Harris [6]) and the *Contractor* (Alpine d.o.o., subsidiary of Alpine Bau GmbH [7]). The contract applied is based on the Conditions of contract for construction FIDIC [8], recommended for building works designed by the Employer, or by his representative the Engineer.

GTCS complex (Fig. 1) [9] consists of three separate buildings (denoted: C, A, B in Fig. 2, observed from left to right), an entrance plateau in front (Fig. 1), and an open parking (Fig. 2) behind the buildings. Retail building (A), with levels U+G, has underground level (U) for technical rooms and shelter, and ground floor (G) for restaurant. Each of two office buildings (C, B), with levels U+G+4, has underground level below lift core, ground floor for retail, and 4 storeys for offices. Buildings “C” and “B” have equivalent design, function and interior organization. Office building (C or B) has open court (atrium), which provides better insolation. Gross living area (GLA) of GTCS complex is ~22165 m² [5]. GTCS office building (C or B) typical floor size is ~2150 m². Office building (C or B) layout dimensions are ~66×48 m, and height is ~21 m above ground.

GTCS project team includes: *Employer* (GTC), *Project Manager* (EC Harris), *Architect* (Slavija biro, with consultants), *Structural Designer* (Alpine), *Quantity Surveyor* (EC Harris), and *Contractor* (Alpine, with subcontractors).

In GTCS complex (author of architecture B. Putniković), office buildings are designed using *shell & core* concept, which splits construction into 2 phases and so accelerates building. *Core* refers to structure, vertical transport, building installations and fire protection. *Shell* relates to façade and also to external space. The building permit and the use permit are obtained for finished and functional “*shell and core building*”. Later in the second phase, according to office and commercial spaces tenants’ requests, interior works (local installations, raised floors, light partitions, suspended ceilings, finishes, interior decoration) are completed.



Fig. 1 - GTC Square (GTCS) [5]



Fig. 2 - GTCS Buildings: C, A, B



Fig. 3 - GTCS Site: Aug. 2007



Fig. 4 - GTCS Site: Sep. 2007



Fig. 5- GTCS Site: Nov. 2007



Fig. 6 - GTCS Site: May 2008

*Note.- Photo in Fig. 2 is generated using „Bing Maps” in 2014, by the author.
Photos in Figs. 3-6 are shot at the GTCS site in 2007-2008, also by the author.*

GTCS *location* ground is almost flat. Existing embankment is at ~75 m a.s.l. (above see level), natural alluvial soil at ~71 m and underground water table at ~71,5 m (centennial water table at 74,0 m). Bearing capacity of embankment (from 71 m to 75 m) is small.

Ground storey building (A) has reinforced concrete structure (columns, walls, slabs) and steel roof structure. Office building (C or B) structural grid is 6×6 m and foundations are on CFA piles. Reinforced concrete (RC) structure is cast in-situ. The monolithic structure elements are vertical (columns and walls) and horizontal (beams and slabs). Inner columns are 40×40 cm, and edge columns 60×60 cm. Thickness of walls varies, from 16 cm to 20 cm. RC walls form vertical core which bears lateral seismic loads. Thickness of slabs is 20 cm. Edge of slabs is stiffened by beams 25/64 cm. RC elements are, according to Serbian codes, made with concrete MB30 and steel RA400/500-2 and MA500/560. Underground structural elements are made of waterproof concrete.

3. CONSTRUCTION MANAGEMENT

GTCS *tender* comprises: the Employer's requirements (preliminaries, form of tender, non-collusion declaration, tender sum analysis), design brief, tender specifications (architecture, structure, water & sewerage, electrical installations, lifts, HVAC /heating, ventilation, and air conditioning/, fire protection, landscaping), and tender drawings.

The *Contractor* (Alpine) has submitted tender return documentation: completed form of tender, non collusion declaration, tender sum analysis, works program, cash flow forecast, organizational chart, construction method statement with site and traffic organization plan, schedule of sub-contractors and extent of sub-contract work, specification of materials and workmanship, contractor's proposals, quality control proposal, proposal for maintenance of health and safety, and proposal for the protection against pollution, nuisance and fire.

The *Employer* (GTC) has accepted tender by the Contractor and the Parties have agreed to accept the *Construction contract* for execution and completion of GTCS on a turn key basis for the contract price. Parts of the contract are FIDIC general conditions [9]. Besides, the Construction contract parts are: form of performance bank guarantee, retention bank guarantee, defects liability bank guarantee, form of advance payment bank, form of collateral warranties, and insurance requirements.

Office complex GTCS is rapidly constructed (Figs. 3-6). New Belgrade Block 41a urban conditions and GTCS design enable construction of buildings in phases. The construction phases are mutually independent. Particular phase latter building does not interfere with the use of already built parts.

GTCS *construction procedure* (organization, administration, responsibilities, communication, program, planning, inspection, control, supervision, approval, reporting,

handover) is duly performed according to sound international practice. This procedure permits an effective control of cost, time and quality.

GTCS construction organization chart displays administration, responsibilities and communication relations. The Contractor appoints the *Site Manager*, who maintains building project as a whole and has jurisdiction over procurement and construction. The Site Manager visits regularly all sub-contractors works and inspects the work quality and checks progress and delivery in relation to the program.

Clear and concise *correspondence* (emails, notes, memorandums, letters, minutes) makes communication easy. The project team uses local computer network on the site for communication among team members.

The Contractor *construction program* shows the critical path and milestones. This program revision is as often as necessary to enable the progress tracking. Milestones and completion date will only be revised if the Engineer undertakes a major re-programming during the course of the project.

During construction, the Contractor produces a rolling, 6-week, detailed *short-term program* and report progress against this on a weekly basis with the Project Manager. The Project team has different *meetings* (commercial, design, site, health and safety, risk review). Meetings are minimized in both duration and frequency. Brief meeting agenda circulates in advance.

Project team meeting typical agenda is: introduction and apologies, contractor's report, design issues, previous minutes and actions, programme, financial review, health and safety, employer feedback, project manager feedback, any other business, next meeting date.

The Contractor provides the Engineer with a written progress report. *Contractor's monthly report* typical agenda is: Design report (planning statement, building regulations, architect report, services report, information and instruction, approvals, design program), Construction report (work in progress, health and safety, quality, staffing and labour), Commercial (procurement, valuation statement variation account, contract issues), Any other items.

On the construction project control of change is very important. *Change Order Proposal* (COP) can be originated by the Contractor, or by the Employer. Typical COP contents next data: initiator, proposed change description, reason for change, overall program effect, designer risk assessment, cost effect. COP is used to manage money movement in relation to the cost plan. In preparing COP the originator's Quantity Surveyor must estimate an impact of potential change on the budget and recommend where and how an additional budget should be found.

Once the COP is raised and cost and time impact agreed, the Project Manager issues the *Change Order* (CO) to sanction the change. The Project Manager is responsible for the CO register identifying all changes/variations issued and instructed.

4. CONCLUSION

Previously presented construction of the office complex “GTC Square” in New Belgrade, where business core and leadership are *foreign* (capital, Developer, Engineer, Contractor, contract by FIDIC, communication in English) but business support and execution are *domestic* (subcontractors, workers, translations in Serbian), illustrates clearly the state of building industry in Serbia these days.

Domestic companies and their professionals can improve their roles in building industry. Adjusting to contemporary market conditions and the appropriate support of the state are necessary preconditions for this improvement.

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ПОСЛОВНИ КОМПЛЕКС НА НОВОМ БЕОГРАДУ: ПРИМЕР ГРАЂЕЊА

Резиме: Овај рад сажето приказује грађење пословног комплекса названог „ГТЦ Сквер“ у Блоку 41а на Новом Београду. Комплекс се састоји од две пословне зграде, једне зграде за трговину, улазног платоа и паркинга. Инвеститор (“ГТЦ”) одабрао је консулманта (“ЕЦ Харис”) и извођача („Алпине“). Градитељски тим чине запослени свих учесника (инвеститор, менаџер пројекта, архитекта, конструктор грађевине, процењивач количина, извођач). Поступак грађења (администрација, организација, одговорност, комуникација, програм, планирање, инспекција, контрола, надзор, одобрење, извештавање, предаја) је у потпуности спроведен према признатој међународној пракси. Извођач, код кога аутор је био члан тима, постигао је квалитет у временском року и у оквиру буџета.

Кључне речи: Пословна зграда, грађење, поступак, управљање пројектом