



## Technical Supervision of Investor – KFOR Mission: Lesson Learned

E. Zezulová<sup>1\*</sup>, J. Štoller<sup>1</sup>

<sup>1</sup> *Department of Engineer Technology, University of Defence, Brno, Czech Republic*

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### **Abstract:**

*The article deals with technical supervision of the investor based on KFOR (Kosovo Force) Mission Lesson Learned. Private local construction companies do the majority of constructional works during KFOR mission. In peace time, there is no difference between the content of work of the technical supervision of investor in the Czech Republic and on the mission in Kosovo.*

*The main part of the article describes the supervision of constructional site with focus on the technical supervision of investor. The technical supervision of investor is the main part of the building process. He/she protects investor's interests. There is no doubt that the careful technical supervision of investor may save financial resources and improve quality of building works.*

*Contracted private local construction companies have had experiences with working for EU investors mainly in Germany and Austria. Regardless of their experience, the ignorance of basic knowledge of technical standards was a huge problem.*

### **Keywords:**

*Technical supervision of investor, technical supervisor of investor (TSI) KFOR mission, designer authorial supervision, government building control, regular inspector, private local company.*

## **1. Introduction**

The article is based on the lesson learned of KFOR mission and it identifies the main problems that military engineers have to solve during base building.

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\* *Corresponding author: Department of Engineer Technology, University of Defence, Kounicova 65, CZ-662 10 Brno, Czech Republic, phone: +420 973 443 250, E-mail: [eva.zezulova@unob.cz](mailto:eva.zezulova@unob.cz)*

The major contribution of the article consists in sharing the problems and their solutions with military engineers who are responsible for base building during the foreign missions of the Czech Armed Forces.

Moreover, it is highly probable that Czech troops will be deployed under the command of the European Union battle group (EUBG) in Africa. During the mission mentioned above, Czech engineers were supposed to build one head base and two forward operation bases (FOB). The President of the Czech Republic had a speech during the Annual Commanders Meeting at the Ministry of Defence. He said: "Missions abroad will be the main form of meeting our obligations to the Alliance." In the future, the sphere of the Czech Armed Forces activities will expand to other continents in the framework of the EU Battle Group building.

All these expansions of military activities contain constructing, maintaining or closing down the military bases. These are the main tasks for engineer construction companies.

Monitoring and supervising activities are important preconditions to carry out constructional tasks. In our country, the supervisory activity during construction tasks is called the supervision of construction site. This term cannot be found in any juridical rule. [1]

Supervision of the investor is provided by **the technical supervision of the investor**. Technical supervision of investor protects both investor's and public interests.

**The designer authorial supervision** supervises harmony between the authorized plans and ongoing constructional work. The designer authorial supervision is based on contract between the designer and investor.

**The government building control** is focused on the protection of the public interests and the interests of the natural person and the juridical person.

**The authorized inspector** is a person who supervises the building process during construction works. An investor contracts him and he is a mediator between the investor and the building office. The authorized inspector partly substitutes the building office in the authorization process. The authorized inspector provides, base on the contract, these activities:

- feasibility attest of the building,
- certification for the approval agreement,
- supervision over construction works.

This article deals with the technical supervisor of the investor as an expert of the investor during the building realizations. Technical supervision of investor is beneficial for investor, resources savings and it contributes to the high quality of building.

## 2. The Technical Supervisor of Investor

The person authorized by investor to supervise the works is called technical supervisor of the investor (TSI). The main tasks of the TSI are to protect both investor's and public interests in accordance with the laws during the building process. [2]

The office of the TSI can be represented by:

- a qualified technically educated person with the civil engineering specialization,

- an authorized person (authorized architect, authorized engineer, authorized technician) who passed appropriate exams required by the law.
- In Tab. 1, there is a list of activities that the TSI is qualified to do.

*Tab. 1 Activities that the TSI is qualified to do:*

<b>Stages of the building process</b>	<b>Activities</b>
Preparatory tasks	<ul style="list-style-type: none"> <li>• acquaint oneself with the document of building realizations, in particular with plans, contract and content of building permission,</li> <li>• hand in construction site to contractors and provide the record into the constructional journal,</li> <li>• deliver the fundamental directional and altitudinal layout of the constructions to the contractor,</li> <li>• participate in the construction site survey before launching construction tasks,</li> </ul>
Construction process	<ul style="list-style-type: none"> <li>• monitor that the building permission and the government building control are kept during building realization,</li> <li>• update continuously civil engineer plans according to the reality and record documents of the parts of the construction site which have been finished,</li> <li>• discuss attachments and project changes which do not rise overall cost of the construction, do not extend construction time and do not reduce the constructional characteristics,</li> <li>• inform the investor about all serious circumstances without delay,</li> <li>• check the factual and price accuracy and completeness of the invoice documents and the vendor invoices, their accord with the contract and approve the invoices and present them to the investor for remittance,</li> <li>• check the parts of the construction site that will be hidden and record the observation results into the constructional journal,</li> <li>• according to contracts, hand over works prepared to be progressed by other contractors,</li> <li>• cooperate with designer’s officials providing authorial supervision over delivered work on construction site and plans,</li> <li>• cooperate with the designer and contractors in taking steps to remove shortfalls in the plans,</li> <li>• observe whether contractors accomplish agreed tests, check the results of these tests and require certificates which prove the quality of building process,</li> <li>• check keeping the building and assembling journals in</li> </ul>

	<p>accordance with conditions stated in the contract,</p> <ul style="list-style-type: none"> <li>• inform on archaeological findings,</li> <li>• in cooperation with contractor's workers, take actions to avert or reduce damage in case of natural disasters,</li> <li>• check if contractor follows plans (time schedule), provisions of contract, point out shortfalls and prepare documents for possible sanctions,</li> <li>• check proper storage of the materials, machines and constructions,</li> <li>• prepare documents for the final evaluation (rating) of the structure,</li> <li>• prepare all documents needed to hand over/take over the structure (construction) or its part,</li> </ul>
Finishing work	<ul style="list-style-type: none"> <li>• participate in the hand over/take over process</li> <li>• check the contractor's documents, which are presented by the contractor during the hand over/take over of the finished construction,</li> <li>• control if defected and not finished works discovered during the hand over/take over were fixed in agreed dates,</li> <li>• participate in the approbation process of the building/construction,</li> <li>• inspect that the contractor clean out the construction site,</li> <li>• cooperate with responsible geodetic engineers (public notice No. 200/ 1994 code.).</li> </ul>

### 3. The Execution of Supervisory Activity

The method of the supervision completely depends on the investor's decision. The person acting as the TSI has to be empowered by the investor. There are usually two forms of empowering:

- signing the work contract,
- the TSI is performed by a commissioned employee of the investor (based on the labor contract).

In both cases the list and content of the works, methodology of the supervision and revision outputs have to be developed.

There are two ways how the TSI may execute his/her duty:

- permanent supervision,
- temporary supervision.

During the permanent supervision, the TSI is present at the construction site every day during the working hours. This way is useful in case of great investment actions. Permanent attendance of the supervision guarantees smooth building process. The TSI is able to find and resolve shortfalls immediately.

The temporary supervision is used mainly for the small buildings. The TSI is present at the construction site in the terms appointed in the work contract concluded with the investor.

#### **4. The Lessons Learned from KFOR Mission**

On the territory of the Czech Republic, private commercial construction companies do constructional works for the Czech Armed Forces. These constructional works have to be managed by a civil engineer with an authorisation valid in the Czech Republic.

Private local construction companies did the majority constructional works during KFOR mission. There is not any difference between the content of work of TSI in peacetime in the Czech Republic and on the mission in Kosovo

The private local construction companies had experiences with the work in EU, mainly in Germany and Austria. Regardless of their experiences, the ignorance of their basic knowledge of constructional standards, technology and overall foundations was a serious problem.

This ignorance was the reason that the TSI very often became a site manager. He/she had to “dictate” the technology of constructional works plus supervise all procedures and techniques. If the TSI had to manage more than one building action, he/she was under the time pressure due to coordination more constructional works at one time and usually at different locations.

A typical example was the situation when the TSI turned to be a site manager during constructing of a multi-functional hall. It was necessary to construct a ferroconcrete plate reinforced by two KARI meshes and to transport the hall structure from Gazalla Line camp to Šajkovac camp.

During ongoing construction works, the TSI realised that contractor had no knowledge about basic technological procedures.

For example, the private local construction company had no idea about the building’s layout. It was necessary that the TSI had to do the layout of those buildings by himself. In addition, the TSI had to supervise and manage the following construction works:

- firming the subsoil on the requirement load-bearing capacity (Fig. 1),
- spreading of geotextile,
- laying the double course of the KARI meshes (Fig. 2). The private commercial construction company intended to lay down the first course of the KARI meshes on the gravel bed which would avoid KARI meshes’ functionality. The TSI forced the company to make separating plates, which kept the KARI mesh at correct position.
- constructing the plate boarding,
- laying and firming the concrete (Fig. 3),
- installing wooden boards into concrete plate in order to make dilatation rifts. (The companies did not know what the dilatation rift is).



*Fig. 1 Firming the subsoil*



*Fig. 2 Laying the KARI meshes*



*Fig. 3 Concrete work*



*Fig. 4 Completed multifunctional hall*

The TSI should have cancelled the contract once he learned about contractor's ignorance. However, this did not happen due to the following reasons:

- It was necessary to close down the military base Gazella Line as soon as possible.

- It was assumed that all local private companies would have the same (low) level of knowledge. This assumption was affirmed during subsequent constructional works at military base Šajkovac.
- The workers' diligence corresponded to the Šajkovac military base region.
- It was impossible to perform the tasks mentioned above using own labour forces.
- The construction of the hall is 8 meters high. There were not any soldiers trained (with certificate) to do vertical works (heights).

All works were done according to the contract. The multifunctional hall was built and has fulfilled its function (Fig. 4). In this case, the TSI spent more time to inspect the construction site than he would have spent for the same work in the Czech Republic. As a result of this situation, the TSI was under a time pressure when supervising the other buildings. Building of the heliports for the helicopter units clearly demonstrated this situation.

There were only two engineer squads being able to do a limited quantity of the constructional work. The heavy equipment engineer squad had some constructional machines but they were broken-down. In case of need, it was impossible to relay on these machines. Local contractors' machines were defective too but it had taken only one day before contractors deployed a new one.

For example, spare parts for wheeled loader KN 251 had to be ordered only from the Czech Republic and it took too much time. Nevertheless, constructional works had to continue without any delay to be finished in one month. Primarily, the engineer squads were designated to support "D" company (operated as a part of MNTF – C) and to support CIMIC. Consequently, it was impossible to account on these two engineer squads.

On the mission, the TSI was responsible for:

- Preparation of list of offered constructional works for the selection board which was set up to choose a company for constructional work. He was responsible for listing all constructional works.
- Participation in the selection board (together with a cell responsible for contracts) to choose companies which were offered to bid for constructional works.
- Participation in selection of the company that has met all criteria to be commissioned for the constructional work.
- Participation in contract signing process. Before signing, the contract had to be approved by OSMAP.
- Inspection of the materials delivered at the constructional site, quality of the constructions including the work volume given in the contract.
- Periodical records in the constructional journal. Records contained the date of building works and the extent of building working.
- Accepting constructional works by written record to the constructional journal at the end of the building process.
- Accepting vendor's invoices at the end of the building process.

There is a general rule applied to all military bases being built abroad: “all national law and regulations must be complied with if there is not a stricter local law or regulations”. The main lesson learned is that the knowledge of law and regulations (including the local one) is essential to do any construction work abroad.

## 5. Conclusion

The TSI is a very important person who protects the investor’s interests during the building process.

The TSI’s list of activities is not complete. It always depends on the contract between investor and the person who does the technical supervision. However, from the list it is clear that the TSI has to be well versed in this area.

It is obvious that the soldiers sent on the mission to the positions of the Technical Supervisor of the commander have to have a civil engineering education.

The education together with experience guarantees the mission achievement. The military bases built for the deployed troops abroad are their temporary homes. It is important that these temporary “homes” are built functionally, safely and comfortably. The functional and comfortable military base is the precondition of the successful mission and has a positive impact on troops’ morale.

## References

- [1] Act No. 183/2006 Coll., as amended, building law (Czech act, in Czech).
- [2] LADRA, J. and MIKŠ, L. *Building, authorial and the technical supervision of the investor: practical handbook* (in Czech). Prague : Dashöfer, 2002.
- [3] Zezulová, E. *The economic in the building industry I. The preparation and realization of the buildings* (in Czech). Brno : University of Defence, 2004. 208 p.
- [4] *Public notice No. 498/2006 Coll., as amended, about the authorized inspectors* (in Czech).