

# **Safety management – Added value for tunnelling projects**

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## **ABSTRACT**

It is indisputable that tunnelling is one of the fields with the highest potential of risks and dangers in the entire building and construction industry.

Thus exists a wide range of experiences, studies, guidelines and acts referring to the safety topic. However, this applies to a large extent only to the operating phase of tunnels. There is still a lack of generally accepted and detailed rules, standards and measurements for safety at the construction phase of tunnelling projects.

Thereby, a sophisticated safety management which spans all project phases can help to reduce time consumption and cost as well as it can lead to a higher level of safety on construction sites. Consequently a deliberate safety conception can significantly contribute to the added value of a tunnelling project.

## **FACTS THAT LOWER THE SAFETY LEVEL**

Experiences show, that many of the pressure groups which are involved in tunnelling project are not enough sensibilised for safety aspects during the construction phase.

The following aspects are responsible for a relatively low level of safety on tunnelling construction sites:

- Constructors often delegate the entire responsibility for safety at construction sites to their contractors. However, the contractor's safety standards and safety concepts are not rated in the offer evaluation process.
- The planning agencies employed by the constructors creating highly specified and professional bidding documents for the construction work but they often use obsolete, incomplete or not reasonable copied text fragments for the safety part of those documents.
- Construction companies suffer from severe competitive pressure in the tunnelling market and since the construction work is highly specified those companies tend to and sometimes they are even forced to save cost in the less specified area of safety.
- Local Emergency services which are planned to take over the rescue work in case of emergency are often involved to late in the planning process. It frequently happens that the tunnel construction already has been started when detailed rescue plans are going to be designed. Thus often the necessary equipment is not available, the personnel are not skilled and rescue operations are not trained.

- The responsible controlling institutions often do not have the necessary human resources to supervise and control building sites in an appropriate way. Moreover the lack of detailed regulations for safety on tunnel construction sites limits their opportunity to exert influence on safety concepts.

Most of above named problems can be lead back to the intention of every single pressure group to save cost, time and avoid responsibility for safety processes.

## **QUESTIONS THAT NEED TO BE ASKED**

For project where no severe emergency cases occur it is indisputable that some pressure groups are able to save some money and time. However what happens in the case of?

- How much does it cost to replace a TBM an excavator?
- How much costs downtime caused by destruction or safety scarcities?
- How much does it cost to rebuild the infrastructure in the aftermath of an emergency case?
- How much does it cost to have a delay in finishing the project?
- How much time and money is necessary to correct scarcities in the safety concept afterwards?
- How much time do pressure groups have to spend in the aftermath of an emergency case to work off the situation?
- How much time do pressure groups have to spend to redesign and argue their safety concepts if they abstain from certain safety equipment or training?
- What judicially consequence can be expected and how much time and money will those consequences consume?
- What will a severe emergency case mean to the reputation of the single pressure groups?
- Etc.

This short abridgement of questions which need to be asked in advance of the construction phase show that a sophisticated and well realized safety concept definitely has a strong impact on the added value of tunnelling projects because safety concepts which are carried by all pressure groups and which are designed through all project phases definitely reduce risk for people, facilities and infrastructure. Moreover the money and time which needs to be spend for such a safety concept will certainly be less than for the damage caused by severe emergency cases.

## WHAT NEEDS TO BE DONE

Besides the task of the responsible institutions to close the gap of missing obligatory regulations, standards, measurements and law pressure group can increase the effectiveness and efficiency as well as the level of safety on construction sites by implementing a different approach.

- All pressure group must improve their communication and collaboration in the early project phases.
- Constructors need to take over responsibility for safety on construction sites by valuing advanced safety standards and concepts of potential contractors in the offer evaluation process.
- Planning agencies need to support contractors by defining obligatory and detailed safety requirements which need to be fulfilled by their contractors.
- Controlling institutions need to review the used safety concept as a whole as well as it is necessary to help implement minimum technical requirements and standards for safety equipment and training modules for construction workers and rescue teams.
- Etc.

In the end the target must be to create a coherent and complementary safety concept were all parts of the concept are harmonized an all measurements mesh.

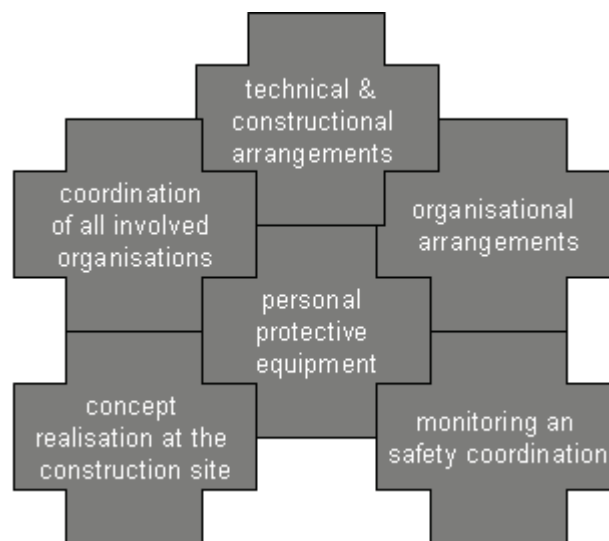


Figure 1: Mesh of measurements to achieve a complementary safety concept

## **SUMMARY**

A coherent and complementary safety concept driven by all in the tunnelling project involved organisations which spans a project from early conception phases until the operating phase reduces time and cost of belated corrections and negotiations as well as it increases the level of safety for personnel and infrastructure. Safety on tunnel constructions sites is safety for tunnelling projects.