

IMIA Short Paper

(Provided by Michael Spencer, Zurich London - June 2008)

The Tunnel Code of Practice for Risk Management – 5 Years On

The Code of Practice for the Risk Management of Tunnel Works has been around now, in some form or other, for in excess of 5 years the international version was presented to the IMIA conference in Moscow. Over that period there has been considerable debate on the Code, and in particular the role of the Insurance industry in the conception and delivery of the code.

The situation today

The Code is being used as standard practice in the UK. It is now available in several languages French, Spanish, German, Russian, Chinese and our industry partners such as ITA (The international Tunnelling Association) FIDIC (Federation Internationale des Ingenieurs Conseils) have accepted that it has provided a useful role in promoting better project management in the tunnelling industry. The code has been published on the STUFA in Germany. It is recommended practice in Hong Kong and has been largely adopted in Singapore.

In the rest of the world it has been used to a greater or lesser extent mainly on extremely large projects for example in Australia, Canada, the USA, Turkey, China.

It is one of the most downloaded papers on the IMIA website.

There are very few, if any projects that have been completed since the introduction of the code, so it could be said that undertaking a retrospective at this stage might be a little premature.

On the other hand, many tunnel projects have progressed from the design to construction phase and have been looking for material damage and third party cover from insurers. The first question is has the code helped insurers assess these projects and therefore helped the tunnelling industry to find adequate insurance?

The introduction of the code will have become successful if it increases the insurability of tunnel projects, this will bring more insurers into the tunnel insurance market, will in turn increase competition between insurers and should lead to better terms and conditions for the tunnelling industry

The key advantage of the code is that it has provided structure and clarity regarding the attitude to risk that insurers expect from clients, designers and contractors, and the risk management approach that insurers are willing to take on.

Reaction from industry

Contractors

From a practical point of view organisations with sound risk management measures in place, have found it relatively easy to provide the information required by insurers to comply with the requirements of the code by merely collating the relevant data. The situation for projects with little or no risk management in place has proved to be more difficult as the information is not set out in a structured fashion as proposed by the code.

Clients

The Code recommends greater involvement from clients in the risk management process. They are the eventual owners of the asset and are involved in the entire lifecycle of the project. Sometimes clients are not very expert in this type of project; in this case the code asks that they appoint an experienced representative to help them.

The greatest resistance to the code has often come from clients who want to simplify the procurement process and delegate all risks to the other stakeholders in the process this has proved to increase risks for insurers as is discussed elsewhere in this paper.

Fundamental Elements of the Code

The core elements of the code are threefold,

1. The creation of robust framework for the procurement of tunnels
2. The creation and operation of a 'Risk Register' that addresses all the major risks of the project including those requiring insurance. It is important to address all the relevant risks and the mere creation of a 'Risk Register' does not mean compliance with the code.
3. Monitoring, management and mitigation of risks through the design, procurement and construction phases of a project.

Insurers are increasingly meeting project teams ahead of arranging the insurance program, to gain an understanding of both the project and the attitudes to risk and risk management within the project structure.

The creation of a 'Risk Register' should not be regarded as an administrative exercise, it needs to be a comprehensive document that adequately addresses all of the risks concerned and the actions to reduce risk to acceptable levels. To make sure this is a comprehensive tool the Register' includes input from all of the stakeholders involved in a project including the clients, designers, contractors, third party property owners.

In practical terms this leads to a risk assessment exercise where all stakeholders contribute to the project from their own perspective, and highlight the risks that they are worried about. Then custody and responsibility for these collated individual risks be appropriately assigned to the relevant parties. By allocating responsibility for individual risks, you introduce accountability and ownership into the process of managing the risk. Incentives can be included for Individuals and organisations to deliver against their allocated risks, for example, by making progress payments subject to production of suitable and effective risk mitigation plans.

One aspect of the code that often causes confusion, is how to apply it to a project that includes tunnels but yet is not exclusively a tunnel project, for example, a hydro-electric power generation project. When the code is examined in detail, the word 'tunnel' is mentioned very few times, with the code being more a best-practice guide as far as risk management is concerned. Therefore it seems logical that if part of a project is adopting the principles of the code, then really the whole project should be seeking to work within the same risk management framework.

Ground Conditions

One area of the code that has been subject of debate relates to managing ground conditions. The code has as a basic premise that clients are often best placed to manage some of the risks passed on to their consultants and contractors. This is especially true of those clients who have many years of experience in dealing with the ground in their locality. If a client is not aware of the ground conditions the code has as a basic premise they will invest in adequate ground investigation to allow tenderers to quote with full knowledge of the ground risk. If the client does not want to invest in ground investigation each tenderer will have to carry out the works for his own account which could increase the overall costs of bidding and dissuade the numbers of bidders and therefore the competition by contractors for the project.

Ground conditions can have a profound effect on tunnel projects. If a client passes total responsibility to a contractor and some unforeseen ground conditions are encountered, the construction method envisaged at tender stage may become unsuitable and the whole economic sustainability of the process can break down. All too frequently, the contractor will bear responsibility for the ground conditions, which means they will bear responsibility to engineer and construct a solution. If this revised solution becomes cost prohibitive, then another element of the project may be compromised to accommodate a more economical solution. Unfortunately such changes often leave a lasting impact on the overall quality and safety of the project, and invariably lead to longer-term problems.

One suggestion which is made in the UK version is to widen usage of the Geotechnical Baseline Report (GBR). This is a method used widely in the USA to establish a set of benchmark ground conditions that are understood by both the client and the contractor. This process ensures that a payment mechanism is

put in place for changes in the ground conditions, outside the anticipated conditions, from day one. Use of GBRs encourages risk-sharing between the contractor and the client, a situation that leads to an overall improvement in the risk profile of a project, through a wider and greater understanding of these particular risks. In the ITIG version of the code this idea is proposed through the use of Ground Reference Conditions.

Design and Competency

The role of the designer is critical to the success of any civil engineering project, and tunnelling projects are no exception. The procurement methods currently in vogue often separate the feasibility stage designer and the detailed designer, from the site supervisor. This leads to lots of potential knowledge gaps in the “designer” role which the code hopes to address, by encouraging the transfer of information between designers and on to the people actually carrying out the work on site.

When it comes to the issue of design, the code specifically states “The fundamental objective of the design process is that of achieving a design where the risk of failure or damage to the Tunnel Works or to a Third Party from all reasonably foreseeable causes, and including health and safety considerations, is extremely remote during the construction and design life of the Tunnel Works.”

This surely, is a very uncontroversial ambition. Sadly it was felt that this statement needed to be included as many of the failures of recent years involve design failures, in particular the design of temporary works, involving poor execution and delivery by a workforce that does not have sufficient skills to deliver what’s required or to comprehend the complexity and risks involved of the different phases of the work.

The impact of the code

What has changed since the code has been introduced?

Of course the answer varies by geographical location some countries acceptance of risk is fundamentally greater than others.

Initially the code has had its greatest impact in English speaking countries. With the advent of translations in many of the world’s major languages this is expected to widen the impact of the code worldwide.

There have been two important changes the code has made.

1. The industry is now aware that the insurance industry is not a purely financial mechanism but is also interested in the physical aspects of safety, quality and risk. It also helps communication between insurers and industry and the industry

has accepted insurers have a role to play in the successful realisation of tunnelling projects.

2. The code has made a positive contribution to the industry's perceptions of risk, risk management and the management of risk. Today risk is far more high profile in the tunnelling community and this is very positive. The introduction of the code came at a time when the whole construction industry was entering a period of governance and compliance reviews, with many of the leading contractors embracing "total risk management" type management systems. Total risk management looks at the strategic risks faced by the business and then builds the management systems for the business to accommodate the operational risks they face. The code was merely an extension of these new risk management systems, and in many ways reinforced the message being delivered by the strategists advising the construction industry.

The requirements of the code, in terms of deliverables, have certainly made tunnel projects an easier risk for insurers to undertake. The list of deliverables in the code provides the minimum information necessary to understand a tunnel project in sufficient detail.

The existence of the code however does not negate the fact that tunnels are only to be underwritten by insurers with experienced underwriters and engineers that are able to understand this kind of risk.

Hopes for future Improvement.

The procurement process remains difficult. The adoption of GBRs or Ground Reference Conditions, or their recognition as a valuable tool, has not been universal, and whilst this alone is not necessarily a problem, there are still too many clients who are trying to pass all the ground risk over to the contractors without considering whether they may be better placed and better able to manage that risk. Furthermore, after spending significant sums on ground investigation and analysis, clients often remain unwilling to use this information as part of the contract or even to allow contractors to see the full information during the tender process.

Risk Registers are being used more and more often, the key is making sure these become effective tools not only for identifying risks at the design phase but also for managing them right down the operative at the tunnel face. The role of the insurers risk engineer can help act as a catalyst in making this work in practice.

In the tunnelling industry there have been a lot of initiatives about getting early contractor involvement in the design of heavy civil engineering projects so that the initial designs take into account constructability issues. In the same way during the project development stage there is no doubt that insurers could provide some useful perspectives on the risks associated with construction. All parties benefit from involving insurers early on, as they spend a lot of money looking at causation of failures, and this valuable information needs to be utilised more effectively.

Conclusion, Role of IMIA and Insurance Engineering Associations

The insurance of tunnel projects will remain a difficult area for insurers to be involved in, and an area in which it is foolhardy to take on without full investment in the necessary resources needed in terms of underwriting and engineering of both the physical and commercial risks that are involved.

In the UK where the compliance with the code is highest there have been no major tunnelling losses to date. There continues to be major losses elsewhere even though some aspects of the code have been adopted. It is unrealistic to expect the introduction of the code will eliminate losses.

The Tunnel Code of Practice has helped insurers understand the risks they are taking on whilst at the same time helped our clients in moving forward towards a safer industry. It has been a very interesting experience for all those who have been involved in its creation and promotion around the world. ITIG which is a small group of insurers, reinsurers, engineers and lawyers needs support from IMIA and the member associations in adapting the basic concepts to their own countries and in convincing their own clients that it is in their best interests to also adopt the Code.