16th Congress of IABSE
September 18-21, 2000
Lucerne, Switzerland

Structural Engineering for Meeting
Urban Transprotation Challanges

Risk identification, evaluation and management in international public transportation projects

Biography

Louis WASSMER

has a degree in Civil Engineering and Management studies. He is presently head of Swiss Re Group Product Management for Technical Insurance Lines.

Summary

This paper examines the role of the insurer in complex public transportation projects of an international nature. It describes conventional risk rating techniques for assessing individual engineering disciplines and key exposures to determine relevant loss factors of the given project. Now that complex international projects have greater private sector involvement, risk evaluation techniques must also consider the need for more comprehensive covers for project completion, business interruption and financial exposures.

Keywords

Construction All Risk, Erection All Risk; risk management, privatization, project ownership models, project finance exposure, contingency risks

Risk-related factors in international projects

The growing sophistication of complex public transportation projects involving a number of international parties (including financial institutions and the capital markets) has significantly affected how construction parties approach this more demanding business environment, especially given the comprehensive nature of risk exposure in today's dynamic global markets. For the insurer, this situation poses specific challenges, the inevitability of new risk identification and assessment methods and the need for innovative insurance covers.

What methods do insurers employ to identify and quantify risk? Traditionally, they have implemented extensive loss statistics and rating procedures to identify and quantify intrinsic risks, site factors, contractors' experience profile, natural perils exposure and human error (faulty handling, negligence, incompetence). These exposures are all adequately covered by such general "all risk" insurance policies as Construction All Risk (CAR) and Erection All Risk (EAR), which have been well received as efficient risk transfer vehicles between contractors and their insurers.

When dealing with complex international projects – and public transportation projects fall under this category - these conventional covers are often modified to take into consideration extended design covers, prolonged testing phases and operational conditions. Furthermore, experience shows that the risk aggregate is intensified in these projects where so-called soft factors (e.g. language and cross-cultural differences) can often trigger an event or claim. Other areas where problems may arise include natural perils exposures and the disparity between legal systems. Today, all of these factors are prevalent in typical multinational project configurations, which, for example, might involve a British contractor building a tunnel in France using Eastern European labor and Japanese tunnel boring equipment.

Analyzing key exposures

To rate project risks, underwriters identify risk components according to engineering disciplines and then apply event scenarios to analyze the specific key exposures, thereby establishing the basis for formulating a premium rate. This is known as the so-called first principle rating technique, and a balancing effect for the overall project is achieved when this model is applied to a greater number of project disciplines and event scenarios.

Once an initial rating is established, an attempt is then made to forecast the extreme exposure scenario and to quantify a maximum probable loss (MPL). Generally, these premium

structures and MPL values are further amended in accordance with the cover requirements in the policy. Following this evaluation, the extent of cover may be adjusted according to the requirements of the insured. On the other hand, policy endorsements can be applied by the insurer as a means of limiting extreme exposures characteristically encountered in complex international projects. Moreover, the extent of cover may be augmented according to the requirements of the insured.

In the past, this rating technique was more than adequate for handling the risk requirements of conventional projects, but since it cannot address new forms of financial risk exposure, insurers must also concentrate more closely on financial risk evaluation. This is especially true now that increased private sector involvement places much greater emphasis on the ultimate financial viability of such projects.

The trend towards greater privatization

Since the funding required to meet the substantial capital expenditure required by complex public transportation infrastructure projects is often very high, governments have been increasingly hard pressed to provide the necessary financing for a host of these projects. Coupled with the squeeze on federal budgets and more widespread deregulation, the role of the project owner or principal in large-scale projects has shifted from that of the state to private sector financial institutions, special purpose vehicles (SPVs) or companies established solely for a specific project. This is known generically as the Private Finance Initiative (PFI) and in turn implies that the private sector is playing a greater role in what has been traditionally regarded as public works projects in a strict sense.

Project Finance could well become a powerful changing force in the industry given the global trends for privatization of national infrastructure projects. In view of its comprehensive nature, Project Finance differs from traditional financing arrangements in one key area, i.e. it involves a greater degree of risk for those taking on these contracts since the contractor must, for example, assume additional design, operational and maintenance obligations. This increased risk should, in theory, yield higher returns compared with conventional government-financed projects. With Project Finance schemes, the contractor must now bear the burden for such additional risks as organizational, financial, statutory, and schedule-compliance exposures. The fundamental decision to be made is whether or not the contractor will assume management of this risk (and the returns) or decide to transfer it to companies employing

specialist project mangers and financiers or risk managers such as insurers.

New project modeling

Some example of new project modeling include the following:

- BOT (Build, Operate, Transfer or Build, Own, Transfer)
- BOO (Build, Own, Operate)
- BOOT (Build, Own, Operate, Transfer)

Essentially, project financing of this nature means that investors and lenders evaluate the project's assets and revenue strength for repayment rather than other sources of security such as government guarantees of the assets of the project sponsors.

Although BOT type projects now have conventional insurance products to meet their needs, the parameters of the required cover are continually being stretched by the involvement of financial institutions and capital markets which constitute the driving factor in this specific financing framework. In conjunction with increased competition between contractors and suppliers, contracts are being awarded on the ability to provide enhanced efficiencies and guarantees which often translate into more pronounced risk and the need for covers of a corresponding range. Insurers are now confronted with such diverse attendant factors as changing laws and statutes, unforeseen ground conditions, possible latent soil contamination, design modifications in addition to cover requirements for increased costs of working, loss of profits and contingency risks.

The primary risk factor associated with many of these projects is related to on-time completion of the contract works. The reasons why projects may be delayed or fail to be completed altogether can be attributed to technological failures, cost overruns, force majeure events, intervention of licensing authorities and noncompliant construction work or failure to satisfy performance requirements. Sponsors demand warranties from suppliers to ensure compliance, thus enabling them to provide completion guarantees to the banks. Engineering insurers are increasingly approached with requests to cover various types of contingency risks, such as:

- Force majeure (FM)
- Liquidated damages (LD)
- Penalties
- Cost overruns

Exposures of this nature tend to complicate how exposure is quantified, compelling insurers to establish cover on a more empirical basis rather than substantiated loss statistics or so-called “burning costs”.

Successful project underwriting necessitates the prudent assessment of all legal, financial and technical risks. The goal should be to minimize them by appropriately sharing the residual risks between the parties concerned (sponsors, lenders, suppliers, purchasers, local governments) and the insurance market. It is common practice for insurers to request that a legal and technical survey be made of all relevant contract documents, preferably by an independent body. Costs for these surveys must be assumed by the insured unless coverage is effected, in which case insurers will bear the costs.

The rationale behind insurance per se is to smooth cash flows, eliminate risk-associated uncertainties and sustain shareholder value. The greater complexity of insurance needs is satisfied by the structure of an alternative risk and financing pyramid which comprises different tiers of conventional insurance contracts ranging from captive transactions, to multiyear deals and ultimately to such hybrid instruments as multiline or multiple trigger products.

The anatomy of project risk

In terms of the actual project, the construction phase is highly critical. During this period, substantial own and borrowed funds are spent without the project generating any cash flow and in which its technical and economic viability cannot yet be ascertained. Generally, the sponsors assume direct or indirect liability in the form of a completion guarantee until final handover of the project.

Construction risk routinely constitutes the major uncertainty in project financing. In particular, it includes delays in completion, i.e. due to cost overruns, intervention by licensing authorities as well as noncompliance of the construction work or with performance specifications.

Operating risk commences with completion of the commissioning phase and must be precisely distinguished from the completion risk in a contractual agreement. It essentially includes technical faults and operating defects resulting in nondelivery or nonperformance to the purchaser.

Both of these risks are influenced by development risk. Growing competitive pressure means the introduction of an ever increasing number of technological solutions which

have not yet been fully developed and tested, thus aggravating completion and operating risks.

Commercial risks primarily involve the risk of supply and sales as well as the associated price and currency risks. Inadequately secured buying and selling prices in addition to disparities arising between the financing currency and the currency providing the revenues are typical sources of deficits.

Political risks are particularly difficult to quantify. They need not always take the form of direct state intervention, including expropriation in extreme cases. Such problems as strikes and temporary civil commotion usually remain manageable and can be compensated. Prolonged civil strife or the overthrow of the government in the host country, however, are virtually impossible to control.

Does insurance add value to this whole process? The answer is clearly yes if the project has the right fundamentals; this being the case, insurance covers can be structured to overcome significant barriers, minimize commitment for funded reserves and contingencies in bids, and substantially affect cost of financing.

Risk management

In a broad sense, risk management may be defined as the process of making and implementing decisions designed to attenuate the adverse effect of traditional accidental losses in addition to financial and market exposures faced by a company or organization. Making these decisions requires the risk management professional to observe specific, relevant procedures.

The process of risk management has several connotations depending on the context and application. In a financial sense, it could entail employing adequate forward contracts, futures and options to hedge foreign exchange risk. In a corporate environment, it is focused primarily on protecting the balance sheet. In insurance applications, it concentrates not only on the identification and investigation of physical risk transfer, but also on more intricate risk financing schemes. The risk management process eventually provides the necessary basis for a company to decide on the extent of risk it is prepared to retain or that which must be transferred or financed. To address these specific needs, it is not uncommon for major insurers/reinsurers to have multidisciplinary risk management staffs dedicated to other fields such as environmental and natural perils, industries, petrochemicals, climatology, pharmaceuticals, economics and risk financing just to mention a few.

A risk management concept must be customized to the specific requirements of the principal and contractor, and the project as such. It must be handled by a team of risk managers who have the necessary expertise in identifying and managing risk. Systems can then be implemented to designate the party or parties bearing the risks before the actual project commences.

Identifying loss exposures - the initial step in risk management as a decision-making process - requires examination of values exposed to loss, methods for identifying loss exposure and corporate objectives which must be established through the company's risk management programs. The exposures to accidental loss or nonperformance which are of major importance for a company are those interfering most directly with its basic objectives. A sound risk management program should therefore reflect a company's objectives with respect to profit, growth, performance, service and operations continuity.

Examining the feasibility of alternative risk management techniques - the second step in the process - involves exploring how various risk control and financing techniques can be employed for particular exposures. Risk control techniques include exposure avoidance and the prevention, reduction and segregation of loss exposures. This process can be illustrated by a tunnel project in Southeast Asia in which loss events were effectively reduced by having a full-time tunneling and risk management expert on site. As an independent source, this specialist provided a neutral evaluation of the project risk exposure on an ongoing basis throughout the duration of the project. His participation in the project led to a highly beneficial situation for the principal, contractors and insurers.

The third step in risk management is to select and implement optimal risk management techniques. They are prioritized primarily according to financial criteria or other objectives such as sustainability or legal and specific environmental concerns.

The final step in risk management involves the monitoring process. This is best achieved by setting standards of acceptable risk management performance, comparing actual results with these standards, and correcting substandard performance.

Continuous monitoring of the critical risks assessed in the initial project phase, observation of possible alterations in the risk landscape and prompt notification of critical developments or possible loss events enable all parties involved in a project to either prevent or mitigate loss. This is particularly important if cover for business interruption is in place.

This point is illustrated by a toll road project which had to be operational by a specific date for handling high traffic demands expected at a major international sports event. Since the project completion date was fixed and non-negotiable, the principal opted for Delay in Startup (DSU) and Business Interruption (BI) covers for the completed sections of the contract. The construction schedule was extremely tight and called for the construction and erection of up to 50 prefabricated bridge deck units a week for almost a year.

An in-depth analysis of the project's risk parameters revealed the need for additionally monitoring the production and construction schedule and risk. A specialist was contracted to permanently monitor, review and report on project progress and provide recommendations regarding project delay exposure. All parties involved in the project benefited from these ongoing progress updates and would have been in the position to expediently assess any delay claim had it arisen. Fortunately, this was an excellent project and was completed on schedule without major incident. Given this backdrop, however, it would have been substantially easier to expedite settlement had an event occurred, thereby alleviating any potential cash flow problems which could have been encountered.

This example clearly shows the value of a prompt identification of the critical risks associated with a project. It enables the parties concerned to implement adequate measures well ahead of any critical developments.

Several methods can be employed to deal with risk, including, among others:

- Remove risk so that it no longer poses a threat
- Reduce risk by taking certain preventive actions
- Implement contingency measures to mitigate risk
- Assume risk if consequences are acceptable
- Transfer risk to a third party, e.g. insurers
- Risk financing

It may be suitable to utilize one or a combination of the above in individual contracts. Once the method of dealing with the risk is identified, it can be defined in an overall risk landscape, monitored and supervised throughout the project life.

Within the highly complex and diverse project finance environment for complex international projects, insurers and reinsurers offer the expertise and resources for identifying, quantifying and managing potential risks, since risk management is, after all, their business. All parties involved in large and complex projects should utilize their partners in insurance as risk consultants and solution providers and include

them in the project partnership as early as possible to obtain the maximum benefit for the project.
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