1st International Seminar on Risk Management for Roads and international workshop on Tsunami, organized by Technical Committee 3.2, PIARC and Ministry of Transport, Vietnam.

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*Venue: Melia Hotel, Hanoi, Vietnam
*Date: April 26 to 28, 2006
*Participants: some 150 (some 50 of them from out of Vietnam, some 100 local)
*Program of the Seminar as attached.

Brief summary of each session

OPENING SESSION
SUMMARY BY HIROYUKI NAKAJIMA

1. Welcome address by Dr.Tran Doan Tho, Vice Minister of Transport of the Socialist Republic of Viet Nam

In his speech he stressed the topic of this seminar drew great attention from the countries of the region including Viet Nam, where they suffer a lot by tropical monsoons, floods, rainstorms and other natural hazards and also expressed that this seminar gives great opportunities for both international and local participants to exchange their information and experiences on the risks for the road sector. He also wished success of the seminar and all the participants to enjoy the stay in Viet Nam.

2. Opening Remarks by Dr. Okahara, Chairman of the TC3.2, PIARC

He expressed thanks to the Ministry of Transport, Vietnam and all the people who were involved in this seminar and workshop for their cooperation and contribution on behalf of PIARC and TC3.2. He briefly introduced the history of the TC3.2 by referring to the working group G2 and C18 (predecessor of

TC3.2) and activities so far including the international survey done by the TC3.2. He also introduced that this seminar would consist of 4 sessions, Introduction of RM techniques, RM of natural hazards, RM of manmade hazards and RM for projects and organizations together with the international workshop on Tsunami. He concluded his opening remarks by expressing his hope that the idea of risk management would be utilized more explicitly and effectively in the road sector worldwide through the activities of TC3.2 and the seminars like this.

3. Keynote Speech Risk Sharing in International Projects; In View of Incomplete Contracts by Prof. Kiyoshi Kobayashi, Kyoto University

Successful international projects depend on the structure of project contract. But in case of infrastructure construction projects contract can't help being an incomplete one. Because there are so many uncertain and complex aspects in the huge infrastructure construction and these uncertainties can't be contained in the contract document.

Incomplete contract do not provide specific responses for all contingencies but importantly provide the rules to cope with contingencies. And two most important rules are the risk sharing one and the variation one.

The authors focus on the GCW form (The Standard Form of Agreement and General Conditions of Government Contract for Works of Building and Civil Engineering Construction: The Central Construction Industry Council of Japan, 1989) and the FIDIC form (Federation International des Ingeniers-Conseils: FIDIC, 1987), which can be regarded as typical examples of incomplete contract forms.

The project risks are classified into two categories: the exogenous risk and the endogenous risk.

Their conclusions are that there is no difference in risk sharing rules for exogenous risks between GCW and FIDIC, but that there is a substantial difference in rules to verify variations depending on the principal's ability to verify.

SESSION 1
INTRODUCTION OF RISK MANAGEMENT TECHNIQUES IN THE ROAD SECTOR
SUMMARY BY MICHEL DONZEL

Introduction

The presentations of Session 1 were related to the different phases of the management process of road networks: planning, design, construction, operation and reconstruction. The objective was to illustrate applications and benefits of Risk Management (RM) Techniques specific to each phase. ISO/IEC Guide 73:2002 defined Risk Management (RM) as “Coordinated activities to direct and control an organization with regard to risk”.

This document summarizes the following presentations:

1. Introduction of RM for Roads, Mr. Roly Frost, New Zealand
2. Introduction of RM for Projects, Mr. Johan Hansen, Sweden
3. Introduction of RM for Highway Systems Security, Mr. Michel Cloutier, Canada
4. PIARC Activities and Results of International Survey, Mr. Hiroyuki Nakajima, Japan
5. RM Toolbox, Japan, Mr. Shinjuro Komata, Japan

The session’s moderator was Mrs. Line Tremblay, Canada.

1. Introduction of RM for Roads, Mr. Roly Frost, New Zealand

This presentation addressed all aspects of RM activities related to road administration.

Many parts of the world are at significant risk of natural and technological (man-made) disaster. New Zealand is a country of approximately 269,000 sq/km set in the Pacific Ocean and as such is vulnerable to a wide range of natural disasters, which are a major source of risk. The country has a range of weather extremes and a topography ranging from sea level to mountains of

over 3,500 meters. The coastline is extensive with deep fiords and glaciers in the south to protected bays in the north. For a country so beautiful to visit and live in, it has many natural hazards such as extreme wet weather events, earthquakes and volcanic eruptions.

Transit New Zealand is a Crown Entity roaring authority managing the state highway network of New Zealand. Transit's approach to RM is to provide and encourage the use of a set of RM tools with the purpose of minimizing unplanned occurrences and maximizing chances of success through greater risk awareness and proactive management. RM has become part of the organization's culture.

The paper discusses Transit's approach to reducing risks and examines in detail specific areas of risk to the transportation system from natural hazards. In particular the paper shows mitigation effects put in place for the following:

a) Lahar Management Risk Process

Mt Ruapehu is an active volcano situated in the centre of the North Island. On Christmas Eve 1953 the crater lake breached creating a Lahar of water, mud, rock and debris to flow down the mountainside. The Lahar struck a railway bridge causing collapse. 151 people died as the majority of the carriages were swept downstream in the Lahar. In 1995/96 the mountain erupted again with ash spread over a wide sector of the North Island. The crater's lake refilling from rain and snow created a situation where water was retained by a relatively unstable dam, creating the probability of a Lahar. The paper discusses the mitigation that has been put in associated with this risk

b) Seismic Risk to Bridges

The paper describes a systematic assessment of the seismic security of approximately 2,500 state highway bridges. The paper highlights the many variables that influence the results of a structural analysis and the significant amount of judgment required both in deciding the input parameters for the analysis and in interpreting the results.

b) Avalanches

An example of best practice gained from visits to Canada and Europe is highlighted in the paper as an example of mitigation measures taken to protect one of New Zealand's most scenic routes from avalanche damage.

The paper also details the application of RM to vulnerable parts of the network, both in terms of the asset and the operation. It discusses the responsibility placed on the road authority in providing a roading system that builds a better New Zealand within a sustained funding environment.

2. Introduction of RM for Projects, Mr. Johan Hansen, Sweden

RM for projects involves the components planning, design and construction of the management process for road networks. The operational aspects have to be considered in the phases planning and design. Sweden has guidelines for RM in the following sub areas: balanced scorecard, project, network management, internal safety, and crisis management.

The RM process consists of the following steps: risk identification, risk evaluation, and execution of measures. Risk identification and evaluation includes the aspects of time, cost, function, property (owned by the project or external), human (staff, road user, and third party), intangible assets (image, human resources, etc), and environment. The risk evaluation is based on a matrix considering the probability and the consequences of the risks. Evaluating risk, all aspects mentioned before need to be considered and balanced.

As a case study of RM for projects, the Southern Link in Stockholm has been presented. Based on this example, the interfaces of RM with the project sponsor, the project management, the product, and external stakeholders has been illustrated.

Concluding this presentation, a checklist for project RM has been provided:

- Decide on a plan for the project's RM

- For larger projects appoint a coordinator for RM
- Best qualified to deal with the risk should undertake it
- Project's top 10 ranking risks delivered to the next phase with suggestions for measures
- Requirements in the contract for the contractor's own RM
- Perform risk analysis based on the 2 perspectives
    - Contractor phase
    - Road using phase
- During construction always prioritize safety, working environment, and environment along time-cost-function
- Keep the analysis up to date

The key conclusion is that that RM needs active support from management to be successful.

3. Introduction of RM for Highway Systems Security, Mr. Michel Cloutier, Canada

This presentation was focused on the operation of road networks. It dealt with RM principles related to Highway Systems Security.

Following the terrorist events of September 2001 matters related to Highway Systems Security have become increasingly important over the last few years as the level of awareness has, itself, become more widespread. Therefore many organizations have become increasingly involved in this area of expertise and several methodologies and approaches were developed to assist responsible authorities in the assessment of vulnerabilities of their infrastructure and the identification of critical assets.

The presentation consisted in a summary of critical documents. It appeared that they have all been elaborated in North America. Even if most of the other countries in the world are exposed to terrorism actions too, the level of awareness seems not to be the same. The identified targets for terrorism are:

- Public transportation
  Automobiles, trucks, buses, trains, subways, aviation, ships, etc.

- Infrastructures
  Highways and roads, bridges, tunnels, etc.

Based on the “Blue Ribbon Panel Document” the speaker gave a definition of risk and an overview of the RM principles related to the Highway Systems Security:

- Risk is the product of Occurrence, Vulnerability and Importance:
  R = O x V x I
- RM principles related to the Highway Systems Security:
  - Identify critical assets
  - Assess vulnerability/consequences
  - Identify countermeasures
  - Estimate countermeasures costs
  - Implement and review emergency plans

An extensive bibliography is available in the documentation of the seminar.

4. PIARC Activities and Results of International Survey, Mr. Hiroyuki Nakajima, Japan

This presentation provided first in depths information about the World Road Association PIARC and its activities. It then focused on the activities of the Technical Committee 3.2 Risk Management for Roads. In a third part, the results of the International Survey regarding the establishment and use of RM procedures amongst its member countries conducted in 2005 were presented.

PIARC is a non-profit association founded in 1909 to promote international cooperation related to roads and road transport. Today 109 countries are member of the association. The vision of PIARC is to be the world’s leading forum for the exchange of knowledge on roads and road transport policy as well as practices within an integrated sustainable transport context. Its mission is to serve all members by being a leading international forum, disseminating best practice, and promoting efficient tools for decision making with special emphasis on developing countries and countries in transition.

A World Road Congress takes place every four years. In-between these

Congresses a Strategic Plan guides the PIARC activities. For the 2004-2007 period, four strategic themes overarch the work of 18 Technical Committees and the Committee of Terminology. The Technical Committee 3.2 (TC 3.2) works with 3 other committees on the strategic theme Safety and Road operations. The Terms of Reference for TC 3.2 are:

- Introduce RM techniques in the road sector
- Introduce RM for mega-projects
- Improve highway systems security

By April 04, 2006, PIARC TC3.2 had received 25 answers of their first International Survey from 23 countries (2 answers from Canada and Norway). The results of the survey are summarized below.

a) General

The percentage of the countries, which use RM in the organization's decision-making system, is 76% (19/25), 53% have RM policies or guidelines (13/25), and 60% have general models for RM (15/25). Canada (New Brunswick), Italy, Norway (Eastern Region), Romania, and Switzerland have RM policies or guidelines, but they don't have general models for RM. Argentina, Finland, Mexico, Netherlands, Norway (Region Midt), Quebec, and USA have general models for RM, but they don't have RM policies or guidelines.

It was expected that countries would develop first RM policies or guidelines and then general models for RM. In reality there are more countries that have general models for RM than countries that have developed RM policies or guidelines.

b) Risk Management for networks

The percentage of countries, which use RM for projects of road networks at the general planning stage is 68% (17/25), 32% have specific RM models for road networks (8/25).

c) Risk Management for project

The percentage of the countries, where RM is used for infrastructure projects, is 80% (20/25). The percentage of countries, which have specific RM models to achieve Total Time-Quality-Budget is 36% (9/25). Further, the percentage of the countries, which have specific RM methods for detailed studies in environment, transportation of dangerous goods, road/tunnel/bridge construction is 68% (17/25).

d) Highways securities

76% of the countries take into account the security aspects during the design stage of a project (19/25). For the planning stage of a network this percentage is 72% (18/25), in the operating stage it is 76% (19/25).

Italy and in Sweden take into account the security aspects during the operating stage of a network, but not during the planning stage. Argentina takes into account the security aspects when planning a network, but not when operating it.

5. RM Toolbox, Japan, Mr. Shinjuro Komata, Japan

The PIARC technical committee on RM for Roads (TC 3.2) is developing a technical toolbox, which is a database of useful technologies for RM in each road management phase, i.e., planning, design, construction, operation (maintenance) and reconstruction. The toolbox is understood to be used as a common property of PIARC. It consists of the inventory sheets and their appendix.

The inventory sheets are prepared to introduce the RM technology used mainly in Japan to developing countries, RM technologies and tools from other countries will be integrated. The inventory sheets aim at assisting budgeting and road management with ready to use RM technologies/tools.

The inventory sheets record the applicability (e.g., effectiveness and cost) of individual technologies/tools of RM and the perspective of technologies/tools

for future use. They are divided into natural hazards management and man-made hazards management. At present 109 inventory sheets are available for natural hazards and 11 for man-made hazards. Additional inventory sheets are being developed.

SESSION 2
RISK MANAGEMENT OF NATURAL HAZARDS
SUMMARY BY JOHAN HANSEN

Climate Change and its impacts on Infrastructures, The GeRiCi Project (tentative). Mr. Hervé Guérard, France.

All the experts through the world are nowadays convinced that Climate Change is taking place.

The conclusion of the ONERC (French National Observatory on Climate Warm-up Effects) report on this subject are clear: "Simulations anticipate a general worsening of large scale extreme weather events in France", and the vulnerability of transport infrastructures has to be studied, When facing an increase of heat waves, floods, storms, etc..

Therefore, the French Ministry for Infrastructure decided to finance a research program about this topic. The GeRiCi project was born and a consortium managed by Scetauroute is managing the project.

The project is scheduled to be completed by the end of 2006 and will help infrastructure owners with:

- Identifying major risk factors
- Determine the vulnerability of the infrastructure components (bridges, pavement, culverts capacity, canopies, sign gantry, etc.), to wind, rain, floods, heat, etc.
- Designing a GIS-based tool for Climate Risks Management and their impact n infrastructures. The tool will be open and adaptable and useful for Infrastructure managers, Operations managers and Regulatory Agencies.

Typical Damages and Risk Management of Expressways Due to Recent Strong Earthquakes in Japan. Prof. Dr. Yoshito Maeda Kyushu Kyoritsu University JAPAN.

On January 17, 1995 the South Hyogo Earthquake caused the worst recorded damage in Japanese history which makes a significant turning point to revise Japan's road structure design. After nearly ten years, there were 63 earthquakes occurred in the vicinity of Japan that caused human casualties. In recent years, earthquake-resistant measures are carried out not only to improve seismic performance of new bridge and road structures but also to retrofit existing old structures. In Japan's expressway network. There are 14100 bridge piers that were designed before 1980 seismic design standard require reinforcement, and currently, approximately 90 % of these have been treated proper retrofit.

In the Mid Niigata earthquake which occurred on October 23, 2004, those bridges that were seismically retrofitted able to perform earthquake-resistance. On the other hand, embankments and excavations were severely damaged.

Prof. Dr Kyoritsu showed how the seismic design concept of expressway structures in Japan and discussed the method and affiance of securing transportation road in damaged expressways.

A Seismic Risk Assessment Tool for existing Roads Networks. Mr. Denis Davi, France.

In comparison with some other European countries like Greece, Italy or Portugal, France seismicity is usually mentioned as low to moderate. Nevertheless, because most structures and facilities where designed and built before new seismic codes were published, the seismic risk is one of the big concerns of the state political authorities.

Initiated in 1997 under the supervision of the Directorate of Roads of the French Ministry of Public Works and Transportations, the SISMOA method was created in order to estimate the vulnerability assessment of the different parts

of bridge structures such as the deck, abutments, piers, foundations..., was tested with success on several seismic critical areas of the French territory, chosen to be representative of certain type of construction as well as social and economical aspects. The purpose at that time was to get a toll able to determinate which bridges should be retrofitted in priority in order to meet seismic requirements.

In 2002 it was decided to extrapolate the method from isolated bridges approach to perform the same kind of analysis on other structures like retaining walls and tunnels and also to deal with other types of seismic induced hazards than code accelerations, such as liquefaction hazard, site effects, landslides, rock fallings etc. From a purely structural engineering issue, SISMOA therefore moved to an issue gathering knowledge and experience from structural engineers, geotechnical engineers as well as seismologists and geographic information systems (GIS) experts and was renamed SISROUTE. In addition to the establishment of retrofit priorities for bridges, the objective became the global risk assessment of a road being cut off for different earthquake scenarios. Currently SISROUTE is at a stage where it is tested and calibrated.

Development of Road Slope Management Systems Focusing on an Evaluation of Optimum Maintenance and Repair.
Prof. Dr. Hiroyasu Ohtsu, Japan.

Generally, infrastructure asset management is not concerned with the execution of repair work as the primary countermeasure. A number of infrastructure management systems have existed for several decades, such as pavement and bridge management systems. However, in consideration of road slopes, current infrastructure asset management systems are quite limited. Furthermore, considering long-term performance of the road slope, it is supposed to be affected by performance detoriation of remedial works such as ground anchor systems.

Using expected life cycle cost, LCC, as the judging criterion and taking into account the performance detoriation process, this study aims to propose a new evaluation methodology associated with the development of optimum

maintenance/repair plans for road slope based on road infrastructure asset management concept assuming rainfall as the natural hazard event. Finally, by applying the proposed method for a given slope adjacent to a highway, results show that the proposed method is very effective to comprehensively determine the optimum interval for cleaning the groundwater system based on the evaluated LCC to restore its performance.

One Example of Road Tunnel Route Modification caused by landslide. Mr. Kazunori Fujisawa, Japan.

Road structures, in particular tunnels and bridges, cannot tolerate even slightly displacement caused by landslides. If the proposed new route has a potential for landslide and if it's difficult to control the movement by countermeasures, it is suitable to avoid the landslide.

However, mass rock creeps do not show an ordinary landslide landform and are difficult to be found out. In some roads, the routes had to be changed after their completion.

To prevent the damage by landslides, the risk of landslide should be identified at initial stage of landslide displacement and the routes should be changed.

It is essential to monitor deformations of road structures and conduct appropriate field inspections to minimize the risk.

This paper shows the typical example to change the tunnel route to mitigate the damage caused by landslide.

Recent Damages on Roads from Natural Disasters and Proactive and Prevent Measures to Mitigate the Damages in Vietnam. Prof. Nguyen Xuan Dao, Viet Nam.

Natural disasters (typhoon – strong rain – Flooding) always bring great difficulties to Vietnam. This report concentrates to present main data of tropical climate conditions in Vietnam with rainy season and tropical hurricane, of the size of road network, of the losses in transport sector every year by

natural disasters.

Proposals for setting up some necessary policies in national level and sector level would make the community and road users awaken to these problems. Proactive technologies (Landslide protection, concrete pavement continuous reinforces, ...) were presented as prevent measures to mitigate damages of transport infrastructures in Vietnam under hard condition of natural disaster.

SESSION 3
RISK MANAGEMENT OF MANMADE HAZARDS
SUMMARY BY GUNNAR LOTSBERG

Emergency respond guidebook, Mr. Michel Cloutier, Canutec, Canada

The guide book started as a Canadian project. The first edition of North American Emergency Response Guidebook in 1996 was the result of an International collaboration effort among Canada, the United States and Mexico. The main purpose was to improve hazard communication among the three countries by harmonizing emergency response recommendations to transport incidents. A new edition has been edited every 4 years. 150 new materials were entered in 2000. The guidebook has been translated into many new languages. In addition there is an Internet version.

In 2004 the national numbers for Canada and USA were deleted and substituted with UN 12th and UN 13th editions. European Intervention Respond Cards were reviewed in this edition (ERIC-cards) and new shipping names were added. The complete database can be downloaded from the web-page and installed on a PC. It's free to use for everybody.

Website: http://www.canutec.gc.ca
The web-page contains: CANUTEC brochure, registration information, statistics, articles written by advisors, chemical spill related links etc.

Traffic management plan in snowfall situations, Mr. Miguel Angel Rodrigues Jara, Spain

The weather related problems in the latest years have led to various problems on the road network in Spain: closed roads, trapped vehicles, accidents with injured people and casualties and economic losses. Such incidences have induced the Traffic Control Centre in Valladolid to start a study for developing a traffic management plan for weather incidences and centred on the issue of winter viability.

The final objective is to guarantee the viability of the road network, reducing

the effects of any weather problems. It is therefore necessary to know where, when and how to act efficiently making use of the intelligent transport systems available. The plan will identify and deal with the two phases existent in every weather incident: the alert phase and the action phase, defining the organisms involved in the problem resolution and how the information should be exchanged efficiently.

Information to users is given by means of variable message signs. Actions during bad weather conditions can be like:

- Reduction of maximum speed limit to 100, 80 or 60 km/h
- Overtaking heavy vehicles prohibited
- Overtaking cars prohibited
- Trucks and articulated vehicles prohibited

The number of fatalities was reduced by 40-50% after introduction of this system. (2005–2006).

Risk management in road transport and measures, Mr. Doan Van Tien, vice chairman of Vietnam Road Administration

The road transport in Vietnam develops very fast in order to cope with requirements of the national growth in terms of domestic movements of goods and people and cross border movements as well. The negative aspect is the increasing number of traffic accidents and environmental impacts. The average accident rate is 12.5 deaths per 10 000 vehicles which is a high level in the region.

About 30-40 lives are lost on the roads every day and in addition there are a high number of injured persons. The road administration has a priority list of concrete measures. Enhancement of the road user's compliance with traffic rules has first priority because bad user behaviour is the main cause of most accidents. In addition there is need for completion of the legal system and better coordination among relevant ministries.

In addition to air pollution, the road transport also damages the environment

by causing noises and emissions that effects life because many houses are located close to the main roads. Control of the use of land along the roads has to change. A survey in 2005 at five toll collection station showed that the concentration of breathable dust is 4-6 times higher than the existing sanitation standard. The road administration will propose several new measures to reduce the problem.

The artificial road accident rate prediction along Ayer Hitam-Batu Pahat, Johor, Malaysia Road Civil, Mrs. Munzilah Binti Md. Rohani, Kolej University Teknologi Tun Hussein Onn, Malaysia

Deaths and injuries from road accidents have reached epidemic proportions in Malaysia. A variety approaches has been employed to study the relationship between the geometric design of the road and accident trend. The purpose of the ongoing study is to predict the accident rate along a 29 km long 4-lane road with many access points and variations in geometry. The road has been rebuilt from a 2 lane road and there is no barrier between the two directions. The Hitam-Batu Pahat road was chosen because it has one of the highest accidents rates in the country. The accident rate per year is varying between 10 and 50 accidents per km road. Two types of geometric data have been collected:

1. Number of access points (both sides of the road)
2. Type of road shoulder (width and paved/unpaved)

The accident data contains information about:

a. Type of accident
b. Accident location
c. Type of accident vehicles
d. Cause of accident
e. Number of accidents per week

SESSION 4
RISK MANAGEMENT FOR PROJECTS AND ORGANIZATIONS
SUMMARY BY LINE TREMBLAY

Introduction

The session 4 is about the integration of risk management in organization and, more specifically in projects. Risk Management becomes a way to improve the capacity to face disasters and provide the knowledge and tools to mitigate the consequences of disasters.

The following presentations were made during this session.

1. Civil Protection Risk Management and Assessment: Ms. Line Tremblay, Canada-Québec.
2. Risk Management in the planning process for a long Subsea Road Tunnel in Norway: Mr. Gunnar Lotsberg, Norway.
3. Review of best Practices in the use of public private partnership for the development of local roads: Mr. Hatem Chahbani, United Kingdom (paper only).
4. South East Asian Community Access Program (SEACAP) – a new approach: Mr. David Salter, Canada.
5. The national training program on rural Road Management. The achievements and lessons learnt: Dr. Do Huan, Vietnam.

The moderator was Mr. Michel Cloutier, Canada.

1. Civil Protection Risk Management and Assessment: Ms. Line Tremblay, Canada-Québec.

This presentation is about the integration of risk management process in an organization.

The province of Quebec has faced many challenge disasters like Ice storm in 1998 and torrential rains in 1996. The Civil Protection Act was adopted by the government of Quebec to improve the management of risks. The basis of the

act has 4 dimensions: prevention, preparedness, response and recovery. Risk management became an obligation for many ministries and departments of government of Quebec.

But, it's not only an obligation. It is also a good way to improve processes. For example, it leads to focus energy and resources on priorities, it provides tools and methods for identifying, assessing and managing risks and it leads the organization to manage risks instead of resorting to simple crisis management.

The risk management process used is a classic one with 7 steps: establish the context, identify risks, analyse risks, evaluate risks, treat risks, monitor and review, communicate and consult. These steps were broken down into 3: objectives, risks and controls.

The objectives were related to the specific context of risk management in Quebec. For example, the Ministry of Transportation has the responsibility to keep the road network operational. During a disaster, the Ministry is also responsible to supply the means of transportation which is not a day to day responsibility.

The second step was related to risks. The Ministry has identified 61 risks in a vast area: natural, technological, social, transportation, operation continuity, insufficient equipment and resources, communication and non-compliance. These risks were classed in a map depending on their consequences and the probability they can occur. 37 of them have serious consequences and a high probability to happen. Most of them are natural risks.

The next step was to identify the controls to face these risks. In many cases, existing control measures in place in the Ministry make it possible to reduce exposure to risks. But, it other cases, new control measures are necessary. For natural and man-made risks, it appears that the best control measures are vigilance, training and documentation.

Implement risk management process in an organization is not an easy task because we are not working with facts, we are working with probabilities. In

this project, it is important to bring together experts in disaster management from many departments who have vast experience and to focus on consequences more than on probabilities. Also, before starting, make sure the task force understands risk management process. Risk management is a continuous project.

In conclusion, risk management process provided a way to share risk knowledge on a rigorous manner instead of an intuitive process.

2. Risk Management in the planning process for a 14 km Subsea Road Tunnel in Norway: Mr. Gunnar Lotsberg, Norway.

The Solbakk Tunnel is located in the Ryfast area in the North of Norway. The tunnel is constructed in one single tube with two-way traffic. The deepest point is 285 m under sea level.

Safety equipments put into place in the tunnel were:

- Emergency walkways.
- Cross connection the emergency gallery every 250 m.
- 24 m long lay-bus every 250 m.
- Turning niches for heavy vehicles every 1000 m.
- Traffic signals every 1000 m.
- Safety and evacuation lighting.
- Automatic fire ventilation programs.
- Emergency telephones every 250 m.
- Fire extinguishers every 125 m.
- Radio communication for the fire brigade, police and ambulances in addition to ordinary broadcasting programmes.
- Video monitoring system.
- Automatic speed monitoring.

During the planification step, a risk analysis was done in the perspective to mitigate or avoid the consequences.

- What can go wrong?
- How often ca it happen?

- How bad can things go?
- What is acceptable risk?
- What can we do?
- Identification of hazards?
- Estimate frequencies.
- Analyse consequences.
- Acceptance criteria.
- Identify risk reduction measures.

Basis on the historical datas[1], estimation for the year 2010 were made.

During the planification of the Ryfest Project, many scenarios were tested to verify the efficiency of the safety measures. In all risks in tunnel, a fire is a constant preoccupation.

To mitigate the risks, it is important to review all possible risk reduction measures: make a detailed description of each measure, analyse their advantages and disadvantages, and make an assessment of their cost effectiveness.

There are 2 kinds of measures: to reduce the probability of an accident (lighting, maintenance, speed limits …) and to mitigate the consequences of an accident (emergency action plan, communication systems, evacuation procedures …).

The results from the risk analysis were:

- The probability for a severe accident with fire is very low.
- A on tube tunnel is acceptable because of the low traffic volume.
- Recommended risk reduction measures:
- Education training of emergency personnel.
- Audio marking of emergency exits.
- Restricting the transport of dangerous good.

[1] Vehicles per days, accidents number and fires.

3. Review of best Practices in the use of public private partnership for the development of local roads: Mr. Hatem Chahbani, United Kingdom (paper only).

The review aims to cover the following topics:

- Summary of global best practice common to countries with successfully implemented PPP transactions in the road sector, with a primary focus on the fiscal policies in place and the share of responsibilities between central and local governments;
- Recommendations as to the consequences of application of those policies.

The review was carried out over a simple of countries selected to be representative of a wide variety of PPP experience around the world to allow drawing conclusions that are applicable to a broad context of PPP initiation as well as governmental organisations. Consequently, the sample was selected to permit wide variations over the following three key parameters, expected to play major catalyst roles in the delivery of PPP transactions at the local level, to allow the stydy of their impacts:

- Common vs. Civil Law countries;
- State vs. Federal government structure;
- Well established vs. infant structures in the process of implementing PPPs.

The resulting sample was organised in two categories. A first category (Group A) representing the most successful PPP experiences and includes variations among the first and second criteria above. The countries selected were:

- Australia;
- Hungary;
- Netherlands;
- Portugal; and
- UK.

To this regard, a definition of what is a successful PPP experience at the local level was established.

The second category (Group B) included countries at the early stages of implementing PPPs with a mixture of failing and successful experiences. The following set of countries were selected to be representative of this category, where local authorities have already been involved in the process with no clear rules of decentralisation and share of responsibilities, and where PPP legislation still to be improved:

- Croatia;
- Czech Republic;
- Romania.

The review involved a desk research and interviews with key government agencies in charge of promoting PPPs as well as with major stakeholders. The review was geared towards understanding the specific reasons and measures behind success or failure of road PPP transactions. In particular, the following aspects were the main focus:

- the government structure and levels of decentralisation;
- the PPP legislation in place;
- the country regional fiscal policy;
- the risk allocation, procurement process and funding methods;
- the procurer's experience with PPP transactions and level of use of advisors' expertise;
- the technical and financial viability of the approved schemes; and
- the country's credit rating.

Management practices of local governments' debt levels were also among the aspects considered during the review with the aim of providing answers to the following questions:

How, and what extent municipal borrowing contributes to the State debt?, what are the rules for taking on debt for a PPP within a local authority? and who has overall control of that debt level?

What fiscal tools are available to local authorities and what freedom do they

have to use them with/without prior state approval?

How does the state monitor and manage the local debt levels? i.e. how local spend/borrowing levels are defined within the states PSBR levels?

The review was then completed with an understanding of how the arrangements between central and local Governments in relation to the above questions have contributed to the success and pitfalls of PPP transactions.

4. South East Asian Community Access Program (SEACAP) – a new approach: Mr. David Salter, Canada.

Dependable access to social and economic opportunities is essential for reducing poverty and accelerating growth. Efficient and affordable transport is a necessary pre-condition for rural communities to access these opportunities. It facilitates trade and integration, is crucial for advances in agriculture, and is fundamental to human development, including the delivery of health and education services to poor women and men. Improved access is directly linked to improve to standard of living in rural communities.

DFID's role in the transport sector is to influence regional policy and achieve sustainable poverty reduction, pro-poor growth and contribute to the effectively addressing gender related issues. Within the framework of the Global Transport Knowledge Partnership, DFID is funding SEACAP and working actively with other development partners, including the Asian Development Bank and the World Bank, and forging close links with recipient governments.

SEACAP is a poverty-targeted transport initiative, aimed at improving sustainable access focused on the needs of poor women and men in rural communities, with projects currently in Vietnam, Cambodia and Laos PDR. The programme's goal is to identify and support the uptake of low cost, sustainable solutions for rural access. Fundamental to the approach is maximising the use of local resources, which include labour, materials and most importantly ingenuity. To do this, the programme provides funding for applied research, its dissemination to implementing agencies and support to help them adopt improved techniques and approaches. This programme has now expanded to

twenty-four projects within the three countries. The individual projects demonstrate best practice responses to local demands and in combination create a comprehensive multi-level approach with high expectation of the results being mainstreamed into national practice.

In both man-made and natural disasters, re-establishing access to affected communities is often one of the highest priorities. SEACAP will be carrying out work that will help to provide the knowledge and tools to mitigate dangerous and costly slope failures on roadways in hilly and mountainous terrains. SEACAP's work in appropriate road technologies has influenced work in Afghanistan through the National Emergency Employment Program, where after the man-made disaster of decades of violent conflict, the reconstruction of the rural road network has been the principle means of establishing year round access, productive rural infrastructure, generating employment and kick starting local economies. SEACAP has also influenced work in the Tsunami reconstruction in Sri Lanka, where rubble from the disaster has been used as a roadbase building material in reconstruction access roads.

5. The national training program on rural Road Management the achievements and lessons learnt: Dr. Do Huan, Vietnam.

SEACAP 11 — The National Training Programme for Rural Road Management — is under the Southeast Asian Community Access Programme funded by DFID. This Programme is a demand-driven programme on rural road management which supports the Rural Transport Project No. 2 (RT2) through training and facilitation activities in 43 out of 64 provinces of Vietnam. This Programme started in November 2004 and completer in April 2006.

The objectives of the programme were:

- To improve the capacity of local authorities in RT2 provinces to manage and maintain their rural road network.
- To support RT2 provinces to put in place suitable systems to manage and maintain their rural road network.

SEACAP 11 beneficiaries are rural transport staff, commune leaders and local

people in 6000 communes, 357 districts and in 43 provinces in Vietnam as well as training staff in transport education and training institutions in Vietnam.

The main activities of SEACAP 11:

- To develop and implement demand-led training programme for rural transport leader staff in districts and communes.
- To develop and implement a series of TOT training workshops for 100 trainers at provincial level and 720 trainers at district level who are capable of conduction and managing the demand-led training courses.
- To monitor and evaluate the progress of the training programmes.
- To carry out activities on awareness improvement and conduct handover training and experience sharing activities.

The main project achievements records:

- 180 person (trainer) times at provincial level attended 6 TOT training workshops.
- 720 key trainers from districts have been trained through 43 TOT training courses.
- More than 12,000 transport staff in 6,000 communes has been trained through demand-led training courses.
- 35 professional instructors in 9 selected transport education/training institutions completed the Handover Training Course where the participants could families the new developed modular training curricula and material as well as upgrade adult TOT techniques and share experiences on the training courses implementation.

The main products of SEACAP 11:

- 7 Curricula for different types of courses for the trainers and rural transport staff.
- 20 modules for rural road maintenance.
- 7 modules for training of the trainers (TOT).
- Master CD which contains all developed modules and supplementary document (Ao format drawings, modules Matrix, Time schedules, course

evaluation forms, etc.)
- Menu-based training/awareness improvement film.
- Web site which includes all curricula, materials and project activities and achievements.

What SEACAP 11 can share?

- Experiences on the competency-based training curriculum and material development.
- Experiences on demand-led training course implementation and monitoring.
- TOT courses design and implementation.
- How to use effectively the developed training material including training modules, drawings and training film.

INTERNATIONAL WORKSHOP ON TSUNAMI
SUMMARY BY AKIRA SASAKI

Presentations in the workshop are as follows;

- Keynote Lecture, `Road Damage and the Lessons from 2004 Indian Ocean Tsunami` by Dr. Shigeki Unjoh, Public Works Research Institute, Japan
- Methodology of Computing Level Fluctuations at Integrated Coastal Zone Management` by Mr. Nguyen The Tiep, Director of Marine Geology and Geography, Vietnam
- Current Status of Indonesian Tsunami Warning System` by Mr.Pariatomono Sukamdo, Ministry for Research and Technology, Republic of Indonesia
- Recent Tsunami Disaster Stricken to Sri Lanka and Recovery` by Prof. Ananda Jayawardane Univ. of Moratuwa, Sri Lanka

Background:

Tsunami is the most destructive and unavoidable natural hazards, threatening lives, property and the sustainable development of many countries. There is an increasingly wide gap between the vulnerability of the poor to tsunami and the efforts to mitigate them. To mitigate the Tsunami damages, a

comprehensive and integrated approach must be adopted including both preventative and responsive measures.

Actions:

National Governments should establish policies for the mitigation of the affects of all natural disasters, including Tsunami, backed by appropriate institutional arrangements. These should include the compilation and free and open exchange of all relevant data, information and expertise.

Recommendations:

In order to reduce the loss of life, injury and damage caused by Tsunami, each country should:

- Adopt comprehensive and integrated Tsunami management strategies based on vulnerable areas, giving full consideration to Tsunami control. Such an integrated strategy should be underpinned as a context of integrated disaster management which is closely related to the policies and practices for land management and the reduction of tsunami damages by all relevant stakeholders. Specific recommendations are:
  - Consideration of both direct and indirect damages, and Tsunami as a major obstacle to implementing secure land use and economic activities and to protect urban poor. The vulnerability of the poor to Tsunami can be mitigated through better planning.
  - Recognition of basic knowledge and continuous monitoring of seismic and oceanographic aspects, as an essential pre-requisite for effective tsunami management.
  - Integration of structural and non-structural measures, supported by the social and economic sciences, such as hazard mapping, zoning, tsunami proofing, tsunami fighting, forecasting and warning, training and rapid response actions.
  - Strengthening of framework of tsunami policy and organization, laws, and legislation regarding preventative measures and emergency management from the viewpoint that tsunami can never be totally eliminated.
  - Promoting information sharing, compilation of necessary data and capacity building for proper maintenance and optimum operation of tsunami control facilities based on the recognition that improper

management of such facilities may aggravate disasters.

- Giving importance to public participation and community based local cooperation in raising awareness regarding the impacts of tsunami through appropriate policies and related activities.

➢ Allocate adequate financial resources to implement the necessary tsunami management projects in accordance with the above recommendations.

➢ Cooperate with neighboring countries and with all relevant intergovernmental and non-governmental programs aimed at mitigating the effects of tsunami, including participation in the network systems.

CLOSING SESSION

- Closing remarks by Mr. Nguyen Tuong, Deputy Director General of the Department of International Cooperation, Ministry of Transport, Vietnam

- Closing Remarks by Dr. Michio Okahara, Chairman of TC3.2, PIARC

APPENDIX

Proposed Program of Technical Committee 3.2 International Seminar on Risk Management for Roads, Vietnam

Date: April 23-29, 2006

Venue: Melia Hotel, Hanoi, Vietnam

The 1st day (Wednesday, April 26, 2006)

07:30 – 08:20 Registration

Opening Session (Moderator: Dr. Michio Okahara)

OS-1	08:30	Welcome Address, Minister, Ministry of Transport, Vietnam
OS-2	08:45	Opening Remarks, Chairperson of TC 3.2, PIARC
OS-3	09:00	Keynote Speech, Risk Sharing in International Projects: In View of Incomplete Contracts, Prof. Kiyoshi Kobayashi, Kyoto Univ., Japan
09:30	Break	

Session 1: Introduction of Risk Management Techniques in the Road Sector (Moderator: Ms. Line Tremblay)

S1-1	09:45	Introduction of Risk Management for Roads, Mr. Roly Frost, New Zealand
S1-2	10:15	Introduction of Risk Management for Projects, Mr. Johan Hansen, Sweden
S1-3	10:45	Introduction of Risk Management for Highway Systems Security, Mr. Michel Cloutier, Canada
S1-4	11:15	PIARC activities and results of international survey, Mr. Hiroyuki Nakajima, Japan
S1-5	11:35	Risk Management Toolbox, Japan, Mr. Shinjuro Komata, Japan
	11:55	Discussion
	12:15	Lunch

Session 2: Risk Management of Natural Hazards (Moderator: Mr. Hiroyuki Nakajima)

S2-1 13:30 Climate Change and Its impacts on Infrastructures: The GeRiCi Project, Mr. Hervé Guérard, France

S2-2 13:50 Earthquake and Risk Management, Prof. Yoshito Maeda, Kyushu Kyoritsu University, Japan

S2-3 14:10 Seismic Risk Assessment Tool for Road Networks, Mr. Denis Davi, France

14:30 Discussion

14:50 Break

S2-4 15:05 Development of Road Slope Risk Management System Focusing on an Evaluation of Optimum Maintenance and Repair Plan, Prof. Hiroyasu Ohtsu, Kyoto Univ., Japan

S2-5 15:25 One Example of Road Tunnel Route Modification Caused by Landslide, Mr. Kazunori Fujisawa, Public Work Research Institute, Japan

S2-6 15:45 Recent damages on roads from the Natural disasters and proactive and prevent measures to mitigate the damages in Viet Nam, Prof. Dr. Nguyen Xuan Dao, Vietnam

16:05 Discussion

16:25 End of 1st day

17:30 Welcome Dinner (Melia Hotel)

The 2nd day 5 (Thursday, April 27, 2006)

Session 3: Risk Management of Manmade Hazards (Moderator: Mr. Michel Donzel)

S3-1 08:30 Emergency Response Guidebook, Mr. Michel Cloutier, Canada

S3-2 08:50 Traffic Management Plans in Snowfall Situations, Mr. Miguel Angel Rodriguez Jara, Spain

S3-3 09:10 Risk Management in Road Transportation and Measures, Mr. Doan Van Thien, Vice chairman of Vietnam Road Administration

S3-4	09:30	The Artificial Road Accident Rate Prediction along Ayer Hitam-Batu Pahat Johor, Ms. Munzilah Binti, MD., Rohani, Malaysia
	09:50	Discussion
	10:10	Break

Session 4: Risk Management for Projects and Organizations (Moderator: Mr. Michel Cloutier)

S4-1	10:30	Civil Protection Risk Management and Assessment, Ms. Line Tremblay, Canada-Quebec
S4-2	10:50	Risk Management in the Planning Process for a Long Subsea Road Tunnel in Norway, Mr. Gunnar Lotsberg, Norway
S4-4	-----	Review of Best Practices in the Use of Public Private Partnership for the Development of Local Roads, Mr. Hatem Chahbani, UK (without presenter/paper only)
S4-5	11:10	South East Asia Community Access Programme (SEACAP), A New Approach, Mr. David Salter, Canada
S4-6	11:30	The National Training Program on rural Road Management (SEACAP 11). The achievements and lessons learnt, Dr. Do Huan, VietNam
	11:40	Discussion
	12:00	Lunch

International Workshop on Tsunami (jointly organized by PIARC, Ministry of Transport, Viet Nam and Public Work Research Institute, Japan) (Moderator : Mr. Akira Sasaki)

IWT-1	13:40	Keynote Lecture, Dr. Shigeki Unjoh, Public Work Research Institute, Japan
IWT-2	-----	Methodology of computing level fluctuations at Integrated Coastal Zone Management, Plink N.L., Kasharski, Nguyen Hong Lan; Institute for Marine Geology and Geography, Vietnam (without presenter/paper only)
IWT-6	14:10	Current Status of Indonesian Tsunami Warning System, Dr. Pariatmono Sukamdo, Ministry for Research and Technology, Republic of Indonesia

IWT-4	14:40	Recent Tsunami Disaster Stricken to Sri Lanka and Recovery, Prof. Ananda Jayawardane, University of Moratuwa, Sri Lanka
	15:10	Discussion

Closing Session

CS-1	15:30	Closing Remarks by Minister, Ministry of Transport, Vietnam
CS-2	15:45	Closing Remarks by TC 3.2 Chairperson
	16:00	End of 2nd day
	18:00	Farewll Party hosted by the Ministry of Transport of Vietnam

The 3rd day (Friday, April 28, 2006)

Field trip to National Highway No. 5 and Halong Bay