

of incidents, are the most cost effective ways to deal with risks. This, however, does not exclude consequence reducing measures in emergency management.

It will be advised that TIEMS put its main focus on emergency risk assessments and risk reductions through reducing the probability of occurrence of an emergency incident in its approach to deal with international emergency management.

When this is said, it is emphasised that TIEMS will cover and deal with all areas of global emergency management through its global program, but will encourage more international work and focus in the mentioned areas as TIEMS contribution to global emergency risk reduction, and TIEMS will introduce this in TIEMS Sponsorship Program as described below.

TIEMS Sponsorship Program

TIEMS got its first sponsor during the 2003 annual conference in Provence, Det norske Veritas, which has its logo on TIEMS WEB-site and link to the company's own WEB-site. Since then several sponsors has joined TIEMS, and have contributed well to the success of the society. TIEMS is in process of developing an attractive Sponsor and Sponsorship program consisting of an offering to potential sponsor of four levels of benefits, each with a specific price tag, and a Sponsorship Program which outline TIEMS international emergency management focus.

With a successful Sponsor program, TIEMS should be able to build up funds, which again can be used to help those from development countries that need financial support to participate in TIEMS events. Every year TIEMS has quite a few request for financial help, and it is always sad not to be able to help those that need it most.

Another area will be a student sponsorship program, to help and encourage students for better education in global emergency management, with emphasis on M.Sc. and Ph.D. thesis with focus on emergency risk assessments and reduction of the probability of emergency incident occurrence.

With larger funds available, TIEMS can also consider initiating emergency management technology transfer programs for developing countries, also with emphasis on measures for reduction of emergency incident occurrence and emergency risk assessments in the regions.

In order to deal with this subject professionally, TIEMS will form a working group that will propose a Sponsor Program and suggest building up funds in the society for a Global Sponsorship Program to help promote global emergency management where needed, as described above.

TIEMS Chapters

It was an important step for TIEMS, when establishing the first National TIEMS Chapter in Korea during the TIEMS Korean workshop 12th – 13th February this year. It was fulfilling the goal the TIEMS Board set forward in Waterloo, Canada in 2002, about TIEMS globalisation.

Step number two is as important as the first, showing that the success is continuing for the society. At the time of writing up this paper, the second TIEMS Chapter is planned established during TIEMS Russian workshop 20th – 22nd April this year, and a report on this will be put forward during TIEMS annual conference in Australia.

During the annual conference in Australia, both an Australian and North American Chapter will also be discussed and hopefully be established.

If all the other planned workshops this year are arranged as planned, and TIEMS is successful in establishing TIEMS Chapters in these regions, TIEMS should have Chapters in Korea, Russia, Australia, Germany, Croatia, UK, The Czech Republic and North America, a total of 8 Chapters, at the end of this year.

All details how to operate a TIEMS Chapter is not fully decided, and a close dialogue between TIEMS Russian, Korean and Australian Chapter Boards and TIEMS International Board is necessary, and this will form the operational environment for TIEMS Chapters and will be a model for the coming chapters to be established.

Conclusions

The steps taken this year in TIEMS by establishing a TIEMS Korean and Russian Chapter as well as planning of establishment 6 more Chapters before the end of this year are important steps in the globalisation of TIEMS. It will form a model for later Regional/National TIEMS Chapters, and initiate a rapid global growth for the organisation. The vision of TIEMS globalisation was put forward 2 years ago and the 8 TIEMS Chapters established or under planning this year shows that TIEMS globalisation is well under way. I am very grateful and optimistic and full of hope for TIEMS future. TIEMS has an international role to fill with its non-political mission in a world full of challenges to deal with industrial accidents, business continuities, natural catastrophes, terrorist threats and spreading of new diseases. The global structure with TIEMS chapters, will contribute to TIEMS fulfilling its international role.

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His specialisations are international marketing and business development, emergency and risk management, chemical hazard communication and project management. He has been doing consultancy work amongst others for the World Bank/International Finance Corporation and

NATO, and has been project manager of several international research and development projects for software development in risk and emergency management.

He took the initiative to establish TIEMS (The International Emergency Management Society) in 1993, and was the International Vice President of TIEMS since its establishment until 2002, when he took over as TIEMS President.

He has published numerous papers internationally on emergency and risk management.

INFORMATION MODELING APPROACH IN EMERGENCY MANAGEMENT

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Keywords: decision support systems, environmental emergency situations, intelligence technologies

Abstract

The emergency situations caused as natural, so and anthropogenesis reason, including terrorism, SARS problem became to be often in our lives. The typical particularity of the studies, presented in report, is a system approach to considered to problem, under which is researched whole cycle information handling, as from input flow and finishing decision making. We have named this approach "Information Modeling Method". The last achievements of development of knowledge based system (the artificial intelligence systems, expert systems), decision making computer methods have set the problem making the systems, allowing reduce the consequences of the miscellaneous of the sort emergency situation, integrate the experience a decision making, management and undertaking action in condition emergency situation.

In paper are considered methodological issues of the information technology usage with using the Knowledge Based Systems, Data Mining, KDD (Knowledge Discovery in Databases) technologies for development multidisciplinary integrated methods, algorithms for the efficient use of large information volumes.

In paper are considered methods of the emergency management system development, founded on knowledge for use in emergency situation. Specifics proposed methodologies is concluded in multidisciplinary approach to creation intellectual decision support system allowing get the efficient methods for exhibits in the field of emergency management, characterized greater volume to analyzed information, poor formalized procedure of the inference for decision making and difficulty of the use of the traditional multicriterial optimization methods. The emergency situations, which in recently create the most problems: terrorism, floods etc require the developments existing methods decision making and management.

Introduction

The emergency situations caused as natural, so and anthropogenesis reason, including terrorism, SARS problem became to be often in our lives. The typical particularity of the studies, presented, is a system approach to considered to problem, under which is researched whole cycle information handling, as from input flow and finishing decision making. We have named this approach "Information Modeling Method" (Gelovani, 1980). The last achievements of development of knowledge based system (the artificial intelligence systems, expert systems), decision making computer methods have set the problem making the systems, allowing reduce the consequences of

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the miscellaneous of the sort emergency situation, integrate the experience a decision making, management and undertaking action in condition emergency situation (Gelovani, 2001).

Usage of a system approach for data mining with interdisciplinary integrated methods, algorithms and information technologies allows effectively to use large amounts of information and knowledge bases with allowance for of last achievements of computer science, vehicle of databases and knowledge, computer networks both computer modeling and decision making. Other issue is a development and application of an intelligence decision support system in emergency situations with use of modern information technology. In the report there is attempt of a classification of the functional characteristics emergency of objects from the point of view of possibility of a formalizing and organization of processes of purchase of knowledge (Britkov, 2003).

In report are considered methodological issues of the use the system approach with using the Knowledge Based Systems, Data Mining, KDD (Knowledge Discovery in Databases) technologies for development multidisciplinary integrated methods, algorithms for the efficient use of large information volumes.

Using promoted analytical methods in the field of mining the knowledge from raw dates, (data mining), possible, raise capacity, shorten the expenses and enlarge efficiency of the system of the observation for natural ambience.

They are considered the usage of data mining technologies in World ocean information problem. Some data mining algorithms are stated on example of the "PolyAnalyst" software system (Arseniev, 1997). They are analyzed from point of view of their applicability to different types and volumes of the oceanography data.

Other considered problem is an using of the system approach in problem of the development of technology and methods to system integration heterogeneous processes and information analysis for the operative decisions support in emergency situation with the usage of the intellectual methods and computer modeling.

As an example of this approach we consider the APEC project, which can be done by building an enlarged set of risk management decision support tools for evaluation and mitigation of the consequences of terrorism attack and to demonstrate and develop skills among participants with new technologies in Geographical Information Systems, simulation and modeling of hazards and risks, and collaboration using high band-width video-teleconferencing.

The methods of the decision making system development founded on knowledge for use in emergency situation. Specifics proposed methodologies is concluded in multidisciplinary approach to creation intellectual decision support system (Britkov, 1988), allowing get the efficient methods for exhibits in the field of emergency management, characterized greater volume to analyzed information, poor formalized procedure of the inference for decision making and difficulty of the use the traditional multicriterial methods to optimization. The emergency situations, which in recently create the most problems: terrorism, high water and floods require the developments existing methods decision making and management.

Considered in given report methodology can be considered as continuation effort on system integration of the computer products and verbal methods on new modern level. The methods have big importance to system integration, which will allow uniting the efforts developer different systems. On-persisting efficient systems appear then, when there is possibility to integrate for decision appearing problems of the subsystem, created in miscellaneous time, different specialist, on different programme base. In this case the systems, founded on knowledge of the miscellaneous

of the people and different scientific discipline. Herewith, as a result of using the system approach, appear the multidisciplinary knowledge, and in the same way as in traditional scientific world appears the problem of the general use the different languages of the descriptions, differing methods of the decision of the problems etc. (Britkov, 1991).

The Group, which presents the author, has a significant length of service of the work in the main area of the informatics, in accordance with decision making, processing the greater volumes to bad outline information, methods of the making the intellectual information systems, study of the processes of the natural ambience. They were designed row of the applied systems in this area. In monographs is considered problem to integrations different aspect buildings decision support system in row of the application domains.

The methods have great importance to system integration, which allow uniting the efforts a different systems developer. On-persisting efficient systems appear then, when there is possibility to integrate for decision appearing problems of the subsystem, created in miscellaneous time, different specialist in the field of informatics, decision-making, hydrology, economy, social sciences, and transport, on different programmed base. In this case the systems, founded on knowledge of the miscellaneous of the people and different scientific discipline. Herewith as a result of using the system approach, appear the междисциплинарные of the knowledge, and in the same way as in traditional scientific world appears the problem of the general use the different languages of the descriptions, different methods of the decision of the problems etc.

Methodological Problems of Information Modeling in Emergency Management

One of the very important problems for emergency management is to increase the capacity by building an enlarged set of risk-management decision support tools and procedures for standardized evaluation and mitigation of the consequences. The first point is emphasize:

- 1) the use of a Geographic Information System to create a notional port city with air, rail and marine transportation facilities and demonstrate the notional relative proximity of critical infrastructure;
- 2) identification of hazard simulation and modeling tools to both superpose damage footprints across critical infrastructure and demonstrate potential consequences to the community;
- 3) demonstration and econometric model evaluation of alternative mitigation and causal chain intervention strategies that are proposed by various economies. To facilitate collaboration among a maximal number of economies, high bandwidth video teleconferencing with streaming video will be used to minimize transportation costs of participants and mutually demonstrate web-accessible mapping, simulation and modeling techniques currently used by various economies.

The task is to assemble a web-accessible toolbox of hazard models and decision support simulations with using of GIS notional port communities with critical infrastructure and cross-linked hazards.

It is very important to develop econometric models that can be used as decision-support tools in evaluating the relative merit of alternative strategies of mitigation, response and recovery from various types of terrorist attacks.

Next feature for this case study is collaboration over a high-bandwidth video-teleconference system. As an overall objective, analysis tools and procedures would be exportable and adaptable for mutual use by any individual economy in assessing their own economy's vulnerabilities,

conducting their own terrorist attack consequence mitigation program and increasing the abilities of their own communities to survive and recover from terrorist attack. A list would also be compiled of sources for GIS hazard mapping products and video-telecommunication sites among the various economies, encouraging mutual assistance and continued collaboration (Britkov, 2002).

Artificial Intelligence Methods in Emergency Management

The key factor in emergency management emergency management is an operative taking the efficient decisions. However natural longing to improve the processes a decision making quite often comes across on enormous volume and complex structure data, requiring processing in emergency situations.

Practically, the database execute the function to memories, access of the user to vault data provides only extraction of the small part from preliminary stored information in response to clearly assigned questions. But, when we have an enormous flow to information, we will get up the task greatly reasonable to use this information to extract hidden in data knowledge for the reason optimize control a process emergency management. This task can be not solved only power of the person on the strength of gigantic volume of given economic inefficacy of such decision. Besides, not always got analyst results are objective since people follow some considerations, a priori beliefs about under study subject that is reflected on objectivity got result (Britkov, 2003).

The methods "data mining" allow reducing the quip of the problem. Using promoted analytical methods in the field of mining the knowledge from source, "damp", data, many organizations enlarge profit, raise power, shorten the expenses and enlarge complacency a client. They already are actively used at analysis market, marketing, forecast of the stock quoting and other business-applications. But in the first place these methods today must interest the commercial enterprises, unfolding projects on base information vault given (Data Warehousing).

The correlations of the volume and speeds to memories and define possible use the artificial intelligence, systems KDD (Knowledge Discovery in Databases) - a systems of the extraction of the knowledge from database.

Using the systems KDD requires the known art of the director of the exploratory tasks since their decision finally must match with logic his intuitive analysis. The Key to successful using the methods KDD serves not simply choice one or several algorithms KDD, but skill of the analyst. Data Mining does not exclude need of the knowledge of specifics of the application domain and understanding themselves data or analytical methods.

Knowledge discovery in databases is an analytical process of the study of the person of the big volume to information with attraction of the facilities of the automatic study given for the reason finding hidden in structure data or dependencies. It is expected full or partial absence of the a priori beliefs about nature of the hidden structures and dependencies. KDD includes the preliminary comprehension and incomplete wording of the task (in term target variable), transformation given to available to automated analysis format and their preprocessing, finding facility automatic study given (data mining) hidden structures or dependencies, approbation of the discovered models on new, not used for building of the models data and interpreting the person of the discovered models. Data mining ("development given") - a study and finding "machine" (algorithm, facility of the artificial intelligence) in damp given hidden structures or dependencies, which:

- earlier were not known,
- not trivial,
- practically useful,
- available to interpreting the person.

As a whole technology data mining it is enough exactly defines as a process of the finding in damp given earlier unknown, nontrivial, practically useful and available interpreting the knowledge required for decision making in different sphere of emergency management Any cognition presents itself modeling of emergency situations. The Model - artificially created system, in which is reflected resemblance of the structure and functions with system-original. Exist two types of the models: prediction and descriptive. The First use one set given with the known result for building of the models, which obviously predict the results for the other set data, but the second describe the dependencies in existing data. The revealed model will not be able to pretend on absolute knowledge, but will give the analyst certain advantage already fact of the finding itself to alternative statistical significant model.

The task of the models building it is possible to divide into two important sub ranges. First, this tasks to categorizations - a referring the new object to some class from their ensemble on base already available given about the other object of these classes. The other sub range form the tasks of the forecast of some unceasing numeric parameter.

One of the key issues of information modeling approach is system integration of all possible relevant tools and systems, including GDIN (The Global Disaster Information Network) is a public-private partnership with the primary objective of getting the *Right Information, to the Right People, On Time* in order to make the Right Decision, so as to help mitigate and effectively respond to the toll of natural and man-made disasters around the world.

Safety as Result to Information Supply

We are considering the system approach using in problem of the development of the facilities, technology and methods of the provision to information safety with standpoint of the information supply of support decision making.

The modern stage to information revolution is the volumes characterized by grandiose increasing prestored computer information. All more important and responsible decisions is taken on base of computer information and information technology. From that to what information will have an access people, depends what decisions they will take.

This creates the ensemble of the problems and does the real threat to information safety in the sense of dangers to account incomplete, unauthentic, undue information. Consideration to information safety with this view does the necessary decision of the following problems:

Ensuring the operation free information market. The Restriction of the spreading to information gives the broad possibilities manipulation human behaviour. Presenting to information under determined by forshortening allows the owner information flow to bias the people to profitable him action. Consequently, it is necessary in every way to stop the possibility to monopolizing the media. As typical particularity of the modern period follows to select the Internet huge role, which allows most democratically and independently create the information facility. Thence possible draw a conclusion that all-round Internet expansion is one of the ways of the increase level to information safety.

The improvement of the processes decision making on base of the information systems and information systems. The improvement technology computer support of the whole cycle information handling. Filtering to source information, improvement of the methods to integrations and aggregation of information. The development of the methods of the check to information on validity, wholeness, consistency and urgency (Gelovani, 2003).

The danger of the information technology using in row of the branches to human activity such as stock market. At the last years repeatedly appeared financial and crises ("Asiatic influenza", Russian default and others), as well as sharp collapses on stock market (the crisis dot.com companies). There is much hypotheses, than is caused these crises. From point of view of the authors one of the main reasons crisis - information technologies. By means of exchanges and actions are defined main of the direction of the development production. Is it herewith expected that on exchange occur the casual processes (in mathematical sense of this word), as a result of adding which is realized population mean of the necessary direction and values (the velocities of the motion in this direction) of the development the most perspective technology. The fantastic facilities appeared at the last years to communications, became the available achievements financial mathematicians, intellectual computer systems. Since scientifically technical achievements practically alike for all, all brokers, get same information on result of the sale, armed one and same methods, take the decisions. As a result we got so named positive feedback, and occurs the collapses. If all passengers of the steamship will leave on one board, steamship will turn.

The development of the systems meta data, as method of the decision of the problem of the increasing the volumes to information. One of the directions of преодоления problems of the processing and analysis of the greater volumes to information is an use to technologies of the creation and conduct of the systems meta data (data about data). This allows on the first stage to select the most efficient information. Herewith appears nontrivial problem to categorizations and structurization of information on many criteria. In a sense herewith appears the problem of the creation knowledgebase about database. The important element of this structure is a features Internet specification data.

The information danger and safety as a result of accumulations to information on activities of the people and their vital activity. As a result of active informatization in computer is accumulated big volume to personal information: about bank activity, in telephone company and other organization. This information on the one hand can be used at investigation of the crimes. On the other hand enough in a complicated way provide its security and safety. Appears the possibility of the use to this information malicious penetrator against client.

Increasing level of safety to account of the use the intellectual facilities of the processing greater array to information. Principles of modeling of the process information handling are developed For this for the reason making the full technological cycle of support of the taking the operative decisions for problems, described greater volume to analysed information and limited length of time for production of the decisions. Use the system approach for development interdisciplinary integrated methods, algorithm and information technology allows effectively to use the greater amounts to information and knowledgebase with using the device database and knowledges, technology Data Mining, KDD (Knowledge Discovery in Databases). Dares the problem to system integration of the systems of the processing and analysis to information for support of the taking the operative decisions in emergency situation, as well as technology of the information collection and its analysis, on the one hand, and methods of the use these result at decision making, integrations with knowledges about changes of investigation object, account newly entering information, mathematical modeling of the dynamic processes and semantic modeling to technologies of the analysis of the alternative scenarios and studies of the influence to input information on come to a conclusion.

For decision of those problems was made attempt to realize the development of the functional description object considered application domain and their relationships on base multiagent approach at modeling of the processes of support decision making.

The developing methods and technologies are approved in working group on information safety of the World Federation of Scientist (World Laboratory) (Gelovani, 2003).

Conclusion

Information modeling approach in emergency management means of the analysis and submission of the information, inclusion in program systems of the statistical analysis, classification and recognition, methods of an artificial intelligence for the analysis and interpretation of results of processing is necessary. There is basis to expect that the further development of geo information systems will occur just in this direction. The Intelligence tools expect rendering a researcher in finding of the hidden knowledge in data. The result models possible to use both for prediction of future importance, and for description of the current condition. The result of the using the methods of the finding of the new knowledge can reveal itself in broad spectrum, however, systems, realizing algorithms of the mining the knowledge from given can not completely change the analyst, which well understand the application domain, data themselves, the general nature used analytical methods and possess the ability to interpret the got results.

As display researches put within the framework of development universal emergency management systems, have not the shelf solutions on the majority of the considered problems. The existing methodologies of designing and creation of the integrated intelligence systems are calculated on much more formalized objects, which one are not unique and envision duplicating.

Conclusion about necessity of constant methodological tracking of development of the project, acceptance both implementation of the "soft" solutions and floppy approaches from here follows, which one will allow to accept new technological and system solutions appearing during existence of the project.

For usage of extended possibilities of data management systems, means of the analysis and submission of the information, inclusion in program systems of the statistical analysis, classification and recognition, methods of an artificial intelligence for the analysis and interpretation of results of processing is necessary. There is basis to expect that the further development of geo information systems will occur just in this direction.

The development of the modern tools of the analysis environmental information and use geographic information intellectual systems is bound with expansion of the spectrum of the taken into account problems in the first place, comprising of the first queue need forecasting of the development technical and software programs, which can be used for analysis environmental situations. For this necessary use the extended possibilities managerial system data, facilities of the analysis and presentations to information, cut-in in systems of the programs of the statistical analysis, categorization and recognitions, methods of the artificial intelligence for analysis and interpretation result processing. There is basis to expect that the most further development will come of one sides by spreading universal tools and Internet , but on the other hand use the knowledge-based tools for the processing and analysis of environmental data.

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THE NEW RISK REALITY

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Utility Market activities in DNV

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MANAGING RISK



:DNV Objective

Safeguarding life, property
and the environment



AMBITION

To be the leading independent,
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MANAGING RISK

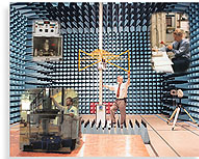


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:DNV Facts & Figures

5.800 employees in in 100 countries

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Extensive R&D with labs in N, NL, SP and US

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MANAGING RISK



:addressing a new risk agenda

- No tolerance for failure to manage risk
- Maximisation of business performance
- Continual focus on cost
- Transparent triple-line reporting: financial, environmental, social
- Managing business risks while meeting multiple stakeholder expectations
- Focus on ethics
- From "big-bang" events to sneaking danger

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:the new risk reality – what have changed

Risk = expected value of the conditional probability of the event occurring * the consequence of the event given that it has occurred

- ⊙ from local to global
- ⊙ from micro to macro
- ⊙ from financial to integral

• From calculative to subjective



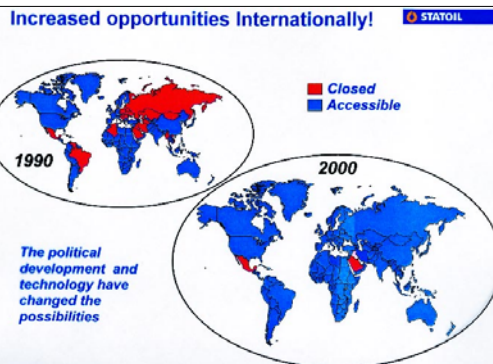
:trends

- ◉ More people live in countries with elected democratic governments than at any other time in history.
- ◉ Democracies benefit from an informed public, non-governmental organizations (NGOs) that are free to organize, and an open media.
- ◉ Many NGOs focus on making business and government activities more transparent to the public and more accountable to laws.
- ◉ Global business operations are scrutinized by NGOs that are well-organized, media savvy, and active as shareholders.



Source: World Resources Institute

:from local to global



NGOs

- ◉ # more than doubled since 1985
- ◉ Globally about 10% of foreign aid
- ◉ competition!
- ◉ credibility?

CNN.com.



:from micro to macro



MANAGING RISK



:from legal to societal



'We have learned that for some decisions, your [public] approval is as important as the opinion of experts or the official consent of authorities'

Shell's Brent Spar Dossier

MANAGING RISK



:from months to generations



- ⊙ Seal limbs
- ⊙ Asbestos
- ⊙ Tobacco
- ⊙ Climate change

- ⊙ Mobile phones (??)
- ⊙ Biotechnology (??)



:from loosing money to loosing face



WHY DO IT?



- ⊙ Reputation
- ⊙ Brand
- ⊙ Trust
- ⊙ Credibility
- ⊙ Integrity
- ⊙ Customer loyalty
- ⊙ Social & environmental responsibility



:from calculative to subjective

- ⊙ Consequences might no longer be quantifiable.
- ⊙ Risk might no longer be calculated.
- ⊙ Risk perceptions are not simply determined by individual characteristics but are bound up with social and cultural contexts.
- ⊙ Risks exist in the knowledge about it and might change. Risks are open to social constructions and definitions.



"I am horrified that a scientific study which took so much time and analysis to prepare should be overturned in a few hours by a group of terrorists appealing not to reason, but to ignorance and emotional blackmail"

British Nobel prize winner



MANAGING RISK **DNV**

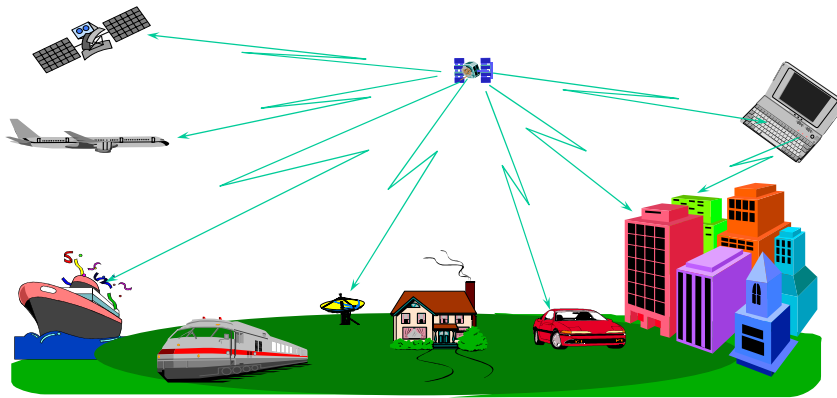
:how to face the new risk reality ...

- ⊙ Broaden view to cover the triple-bottom-line
- ⊙ In the 'show me' world, be
 - pro-active and honest
 - open and transparent
 - co-operative and sensitive
- ⊙ 'Dialogue-Decide-Deliver'
is better and less costly than
'Decide-Announce-Defend'
- ⊙ Refine your management systems to face threats and realise opportunities!



MANAGING RISK **DNV**

:managing risk of information, systems & software



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:main retailer food risk issues:



Consumer trust and responsiveness is influenced by:

- Store work processes
- Consumer shopping experiences
- Product quality and safety

Main management issues

- Supplier food safety management systems
- Supplier attitude, knowledge and policies
- Balance between price and "quality"
- Evaluation, selection and monitoring of suppliers
- Product safety and information
- In store food safety handling
- Consumer shopping experiences is essential to develop and maintain consumer trust
- Compliance to regulations and handling of regulators
- Product information and traceability
- Recall management



: managing risk in the utility industry

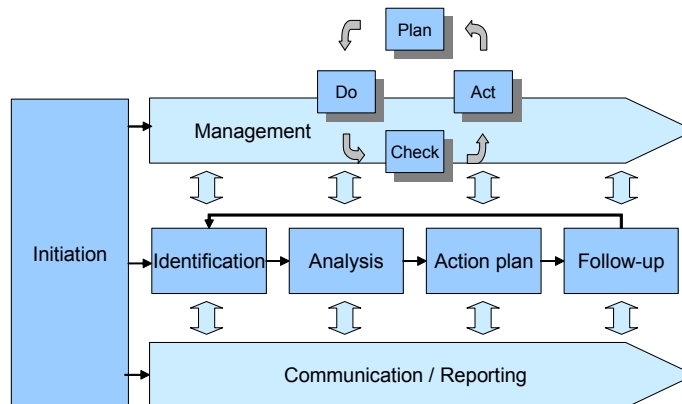
- Huge society consequences in case of disturbance
- High focus from regulators and the political environment
- Deregulated (or in transition) market
- Rapidly changes in ownership and merging of companies across borders
- Deregulation forces cost cutting
- Political focus on “renewable energy and ”green power” .The renewable energy market has more than doubled in few year (5-7 years) and increase rapidly, several program on the issues within EU and other bodies
- Larger and fewer companies



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:the management of the new risk reality



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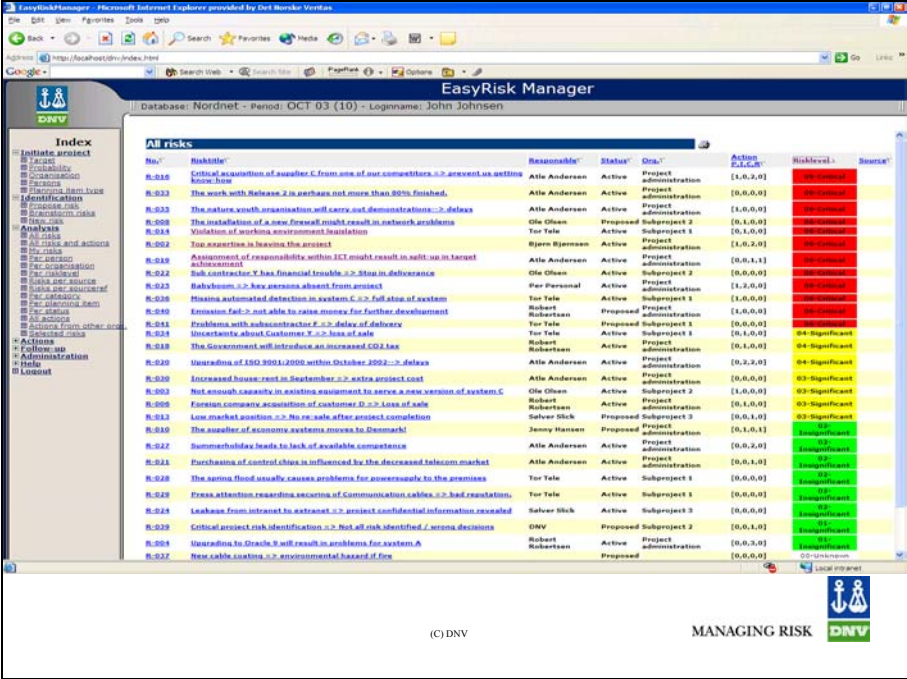
EasyRisk Manager

A powerful tool in Manage Risk

Control your risk!

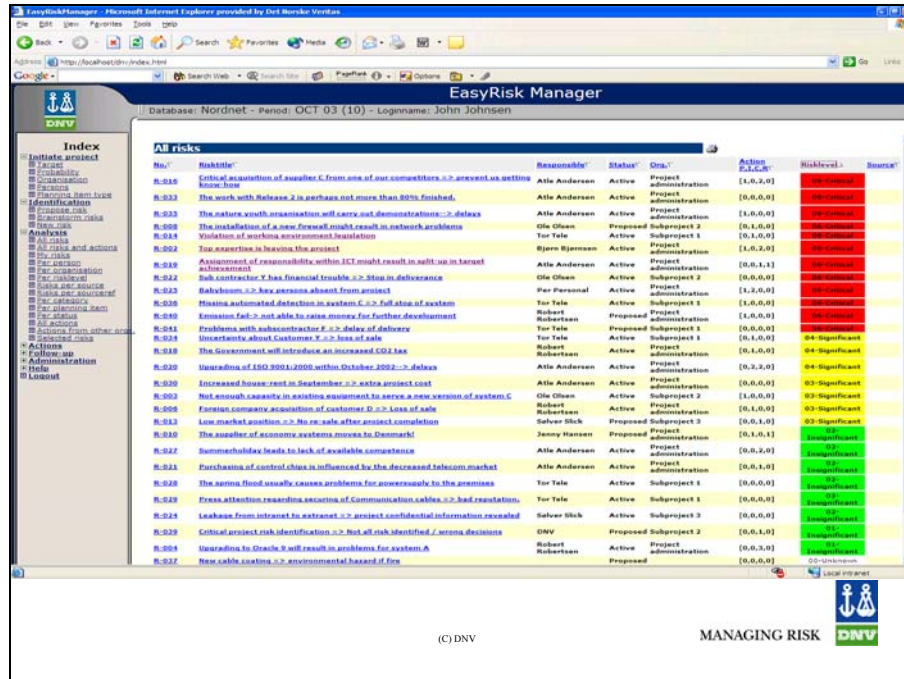
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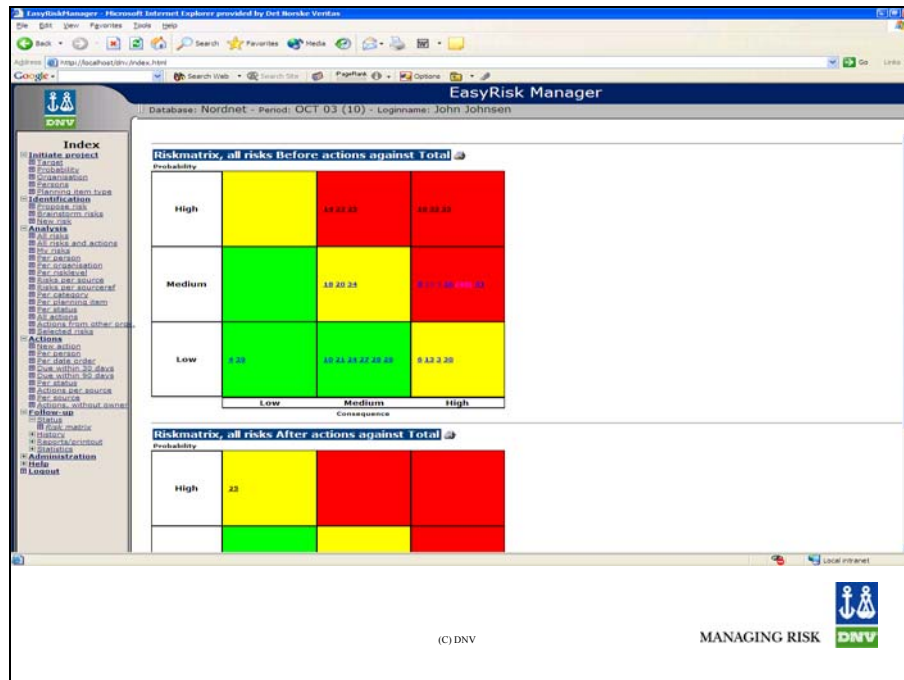
The screenshot shows the EasyRisk Manager web application interface. The browser address bar indicates the URL is https://localhost:8080/index.html. The application header shows the database name 'Nordnet', the period 'OCT 03 (10)', and the login name 'John Johnsen'. A left-hand navigation menu includes sections like 'Index', 'Initiate project', 'Probability', 'Forecast', 'Identification', 'Analysis', 'Action', and 'Logout'. The main content area is titled 'All risks' and displays a table with the following columns: No., Risktitle, Responsible, Status, Org., Action, Risklevel, and Source. The table lists 27 risk items (R-016 to R-027) with varying risk levels and statuses.

No.	Risktitle	Responsible	Status	Org.	Action	Risklevel	Source
R-016	Critical acquisition of supplier C from one of our competitors => prevent us getting	Alle Andersen	Active	Project	administration	1,0,2,0	High Critical
R-017	The work with Release 2 is perhaps not more than 80% finished.	Alle Andersen	Active	Project	administration	0,0,0,0	High Critical
R-018	The nature, youth orientation will carry out demonstration => delays	Alle Andersen	Active	Project	administration	1,0,0,0	High Critical
R-019	The installation of a new firewall might result in network problems	Ole Olsen	Proposed	Subproject 1		0,0,0,0	High Critical
R-020	Violation of work environment legislation	Tor Tele	Active	Subproject 1		0,1,0,0	High Critical
R-021	Too expensive in leaving the project	Ejvind Rasmussen	Active	Project	administration	1,0,2,0	High Critical
R-022	Assignment of responsibility within ICT might result in split-up in target achievement	Alle Andersen	Active	Project	administration	0,0,1,1	High Critical
R-023	Subcontractor Y has financial trouble => Stop in deliverance	Ole Olsen	Active	Subproject 2		0,0,0,0	High Critical
R-024	Subcontractor Z has persons absent from project	Per Personal	Active	Project	administration	1,3,0,0	High Critical
R-025	Missing automated detection in system C => full stop of system	Tor Tele	Active	Subproject 1		1,0,0,0	High Critical
R-026	Emission fail => not able to raise money for further development	Robert Robertsen	Proposed	Project	administration	1,0,0,0	High Critical
R-027	Problems with subcontractor F => delay of delivery	Tor Tele	Proposed	Subproject 1		0,0,0,0	High Critical
R-028	Uncertainty about Customer X => loss of sale	Tor Tele	Active	Subproject 1		0,1,0,0	04-Significant
R-029	The Government will introduce an increased CO2 tax	Robert Robertsen	Active	Project	administration	0,1,0,0	04-Significant
R-030	Uncertainty of ISO 9001:2000 within October 2002 => delays	Alle Andersen	Active	Project	administration	0,3,2,0	04-Significant
R-031	Increased house rent in September => extra project cost	Alle Andersen	Active	Project	administration	0,0,0,0	03-Significant
R-032	Not enough capacity in existing equipment to serve a new version of system C	Ole Olsen	Active	Subproject 2		1,0,0,0	03-Significant
R-033	Forecast complex acquisition of customer D => loss of sale	Robert Robertsen	Active	Project	administration	0,1,0,0	03-Significant
R-034	Low market position => No new sale after project completion	Salver Skjåk	Proposed	Subproject 3		0,0,1,0	03-Significant
R-035	The weather of economic systems moves to Denmark!	Jenny Hansen	Proposed	Project	administration	0,1,0,1	02-Significant
R-036	Summerholiday leads to lack of available competence	Alle Andersen	Active	Project	administration	0,0,2,0	02-Significant
R-037	Purchasing of control chips is influenced by the decreased telecom market	Alle Andersen	Active	Project	administration	0,0,1,0	02-Significant
R-038	The storm flood usually causes problems for powercables to the premises	Tor Tele	Active	Subproject 1		0,0,0,0	02-Significant
R-039	Press attention regarding security of communication cables => bad reputation	Tor Tele	Active	Subproject 1		0,0,0,0	02-Significant
R-040	Leakage from internet to external => project confidential information revealed	Salver Skjåk	Active	Subproject 3		0,0,0,0	02-Significant
R-041	Critical project risk identification => Not all risk identified / wrong decisions	DNV	Proposed	Subproject 2		0,0,1,0	02-Significant
R-042	Uncertainty to Oracle X will result in problems for system A	Robert Robertsen	Active	Project	administration	0,0,3,0	02-Significant
R-043	New cable contains => environmental hazard if fire	Robert Robertsen	Proposed	Project	administration	0,0,0,0	02-Significant



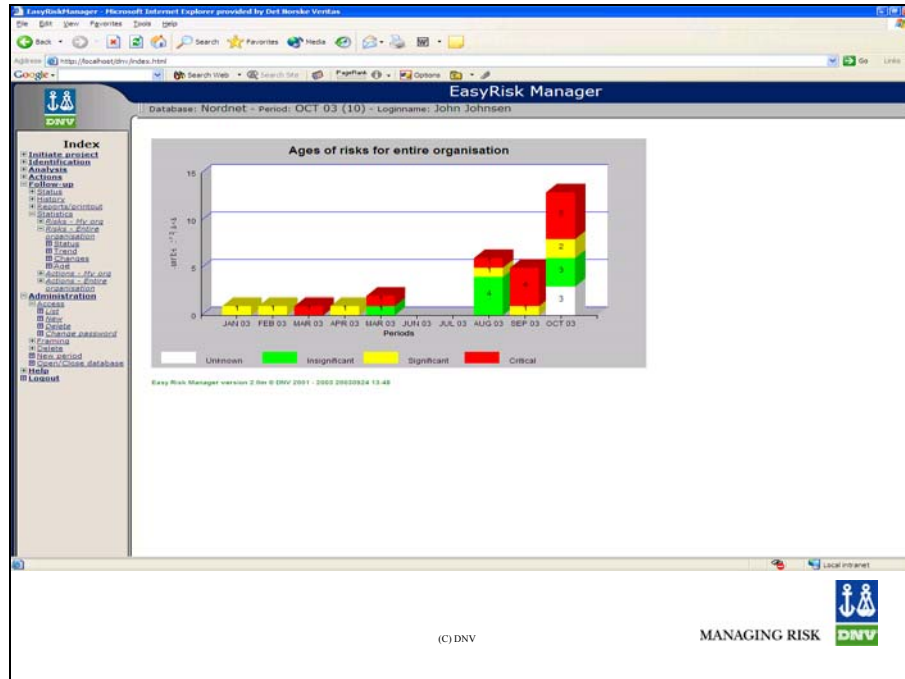
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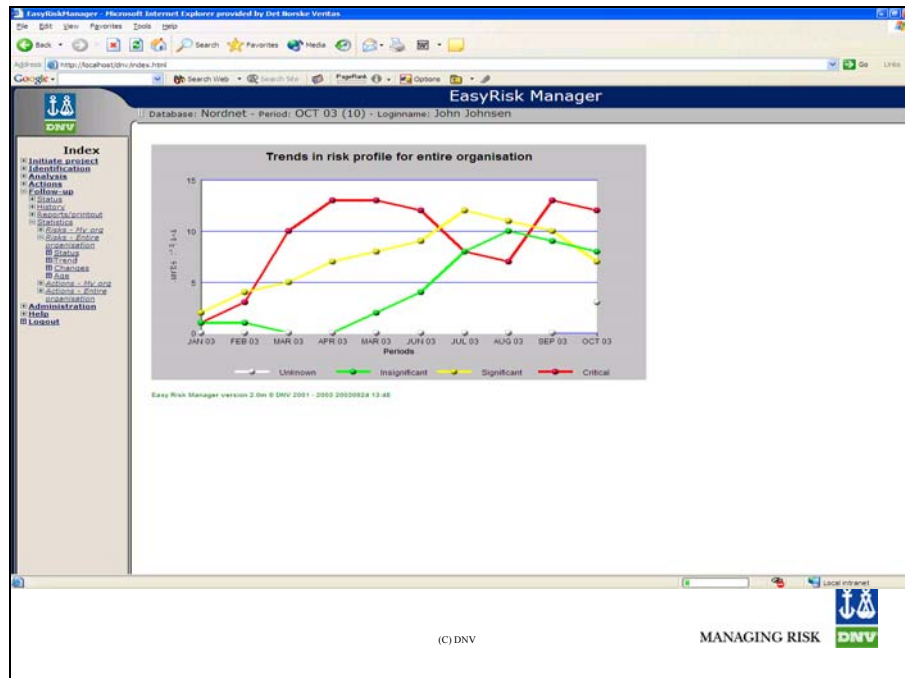
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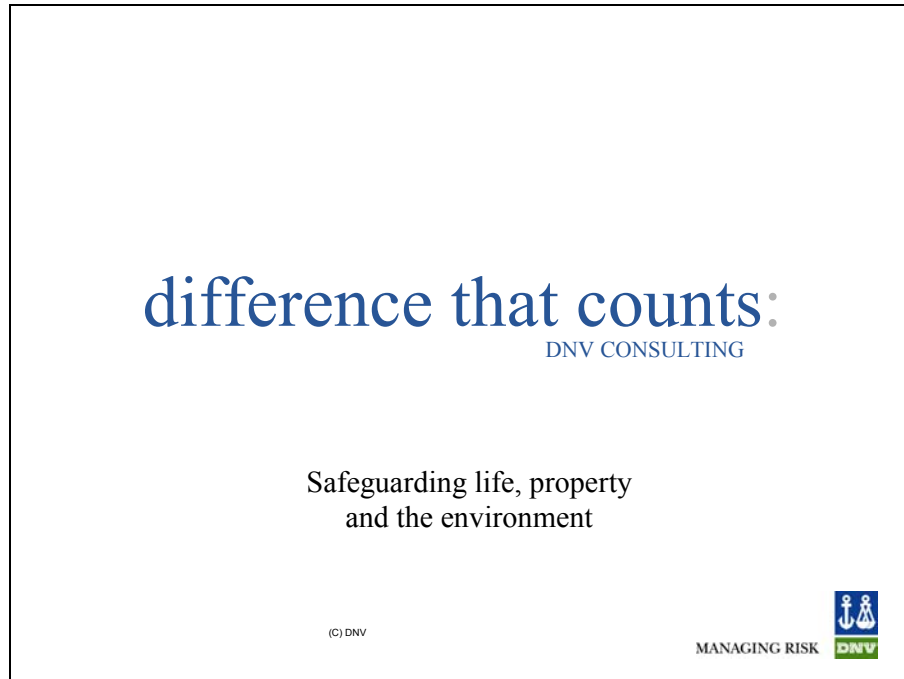
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MANAGING RISK 



Presenter Biography

Øistein is a Principal Consultant and held the position as of Utility Market activities in DNV. Øistein graduated from the Royal Norwegian Naval Academy in 1989. He worked in the Navy until 1997, mainly within safety and risk operational areas. In 1997 he joined the Norwegian Civil Emergency Planning Directorate (CEPD). In CEPD he worked within the field of Crises Management and Contingency planning. He has conducted several projects within both national and international bodies. In DNV he works mainly with aspects related to operational and business risk.

EMERGENCY MANAGERS ARE MANAGING DIFFERENTLY – RELUCTANTLY OR NOT

Len Foster

Chairman – Country Fire Authority Victoria

Chief Executive Officer – Australasian Fire Authorities Council

The proposed topics to be presented at this international conference clearly illustrate the awareness of the need for a paradigm shift in emergency management which, because of the environment in which we work, have never been more urgent. As a manager, I know from experience that the implementation of the theory into practice is often very difficult. “Old habits die hard” and there still remains considerable resistance to move from the old paradigm of insular, para-military style management, to the new. The culture of emergency services is still steeped in tradition and is not always susceptible to change.

There are several examples that spring to mind but probably the best to illustrate my point is the emergency services commitment to command and control and multi-agency management.

I have heard many experts over the years from around the world talk of a total commitment to modern multi-agency command and control management. In Australia I believe that there are examples of success, but equally there are examples of significant failure. One significant failure was the major bushfires in the Australian Capital Territory this year. A small community of about 300,000 people was over-run by bushfire in its rural/urban interface resulting in 4 deaths, 500 homes lost and the consequent impact on the production and amenity of a city. The inevitable inquiries that followed this catastrophic event have resulted in a realization that our multi-agency co-ordination procedures failure, parochial attitudes were taken by individual emergency services and we had not practiced activities that we should have practiced, and there was no clear role definition. I should stress that during the same year there were some notable successes in managing similar major fires in NSW and Victoria.

It is important to find out why it has worked in some places and not others. I truly believe that the emergency services find it difficult to change practice or organizational structure unless there are significant forces, or what I like to call “drivers”, at work. In Australia as recently as 10 years ago we were insular in our approach. Fire, police and other emergency services in the various states operated separately in silos. We did not talk effectively to each other and there was certainly a level of parochialism which led to the maintaining of a status quo and our planning was more reactive than strategic. There is no question we wasted resources, we wasted planning and we really didn't have a state, and certainly not a national view in the way in which we handled the significant events.

Things have changed, because in my view there have been several significant “drivers” at work that forced us to change.

The first driver – professional common sense

Emergency service managers are generally well trained and, when faced with a catastrophic event, will work together to achieve the best outcome. Often the solutions created by the occurrence of the catastrophic event will be sustained. In Australia a second force has been at work where a

series of state and territory governments have employed managers from outside of the emergency services to bring about change. The appointment of new agency heads who have not been constrained by the old paradigms have assisted this process.

To illustrate, for many years there has been a reluctance to adopt a national incident command system (ICS). This reluctance has been based on a belief that existing systems met agency needs. The multi-agency response to incidents, however, has aided in the breakdown of parochial walls to the point where modern managers have embraced ICS and would deny that there was ever opposition to such a system in the past.

My first driver, professional common sense supported by managers who have brought a new perspective to the industry, may seem superficial and yet it has been a fundamental step in emergency management thinking.

The second driver – community expectations

Historically, elements of the emergency services have regarded their professionalism and commitment to be above public scrutiny and accountability. In keeping with an Australian public sector-wide swing, there is no question now that the emergency services are scrutinized and held accountable. Indeed, even isolated and relatively minor incidents can impact, negatively, on the way in which the community perceives that professionalism.

Talk back radio, Freedom of Information (FOI) requests and even legal action against emergency services, support this proposition. Very few people in Australia, for example, would ever have envisaged that fire-fighters would be sued at common law for professional negligence. The public want to know why we are doing the things we do, how we are doing them, and if we have failed, how we will rectify the problems.

What the community is really saying to us in the emergency services is – “we respect you, you are still highly regarded, but don’t make a mistake” – even more importantly “be open with us and tell us the truth when there has been a mistake”.

These changing community expectations are a very significant driver for change and improvement. I can best illustrate this by giving some examples:

In 1983 my agency, the CFA in Victoria, had the responsibility of managing one of the most catastrophic fires in Victoria, 210000 ha, which resulted in 47 deaths, 2,600 homes destroyed, and huge media coverage. A coronial inquiry into those fires followed, with evidence taken from 4 people during a four and a half hour period – by today’s standards a relatively limited level of scrutiny.

In contrast, fourteen years later in 1997, the CFA had the responsibility of managing a much more benign fire of only about 700 acres. This resulted in little environmental damage in a scrubby forest. But, alas, 5 volunteer fire-fighters died in quite horrific circumstances. The resulting coronial inquiry into this incident lasted 100 days, heard evidence from 175 witnesses, incurred legal costs of over \$9m and led to 308 findings. What emerged from that incident was a range of political and legal consequences which fundamentally changed the way that the CFA did its business.

Furthermore, this Inquiry has had national implications for the 308 findings of the Linton Coronial Inquiry went to the heart of the CFA’s ability to implement multi-agency incident command systems between two fire agencies involved at that particular fire. It also led to the need to provide

recognized competency-based training for 50,000 fire-fighters – an added cost of \$100m over five years.

Similarly, scrutiny surrounded the 2003-2004 fire season when huge campaign fires involving about 10,000 fire-fighters over a 6 month period swept across 3 states, NSW, Victoria and the ACT. These fires resulted in 2 major coronial inquiries, 2 extensive parliamentary inquiries by state governments, 1 joint parliamentary inquiry by our Federal Government and an inquiry by the Council of Australian Governments. Once again, 10 years ago, the thought of our emergency services being questioned about incident command systems, use of aircraft, competency of fire-fighting decisions and community involvement to such an extensive degree, would have been a rarity.

Today we function in a much more complex environment in which public scrutiny of the emergency services is unlikely to diminish. It is thus certain that community expectations will continue to drive our organizations to change.

The third driver – emerging legal pressures

As already indicated, emergency service personnel have come under increasing scrutiny through coronial inquiries, common law action and occupational health & safety legislation across Australia. There is no question that the changing legal environment has accelerated the need for emergency services to review their work practices. A notable example is the training provided to both career fire-fighters and volunteers. Long and expensive coronial inquiries have reinforced the need for national training competencies, audited implementation strategies and ongoing effective skills maintenance training. Thankfully, it is no longer possible in Australia for volunteer-based fire agencies to differentiate between volunteers and paid personnel in respect to training.

The common law, or the law of negligence, has also been fertile ground for driving change. Fire agencies and individual fire-fighters are now being sued, not only for negligence, but also more specifically for professional negligence. This is prevalent in the US and UK but the trend is now noticeable within Australia. For example, fire-fighters and their employer were sued for £45m for a major fire in the Digital Corporation's headquarters in the UK, when it was alleged that they had acted negligently.

To state the obvious, this is a dramatic stimulus for assessing accountability for organizational structures and the way in which we do business.

There are several legal opinions within Australia that have begun to define both the rural and urban firegrounds as 'workplaces' under OH&S legislation. This interpretation is, and will continue to be, subject to vigorous debate now and in the future. It is hard to accept that a wildfire, with all of its variables, spread over in some cases 100's of kilometres, to be a workplace. With such thinking, however, comes the knowledge that emergency service employers face onerous, legally-based responsibilities to ensure that their emergency service personnel are protected by appropriate work and safety protocols.

In general, we have become a much more litigious society and without doubt the emergency services are no longer immune to legal scrutiny.

The legal consequences of the actions that we now take are very clearly directing us to more appropriate incident control arrangements, pre-arranged multi-agency activities, and more importantly, the way in which we deal with our people.

The fourth driver – the media

In Australia the media have been responsible for more change in emergency services than any other driver. Not surprisingly, all emergency service managers are exposed to TV, radio, every medium of the press and the Internet. This exposure is not always witnessed in times of success, but certainly in times of perceived failure. 'Fire' and 'Catastrophe' bring with them extremely powerful and highly emotive images, fodder upon which the media feeds and which mesmerize the community. And naturally, if the community is mesmerized, so too are the decision-makers.

In the past it was enough to prepare a press release and let the experts "get on with it". Such an approach is totally inappropriate today.

While we cannot fight the media 'machine'. We must, as emergency services take the philosophical change to work with the media, to ensure that the media can act on our behalf to effectively communicate to the community that we are striving to achieve. The media, particularly a well informed and involved media, can become a very powerful ally and a significant driver not only in creating change, but in assisting us in the successful implementation of change.

The fifth driver – the trend towards community empowerment

Historically, emergency services assumed a paternalistic stance in their role as 'protector' of the community. This led naturally to a further assumption of the community as the passive recipient of service. Over the last few years, however, there have been sufficient events in Australia, and now scientific evidence to suggest that this verges on arrogance.

A very important change driver for us has been the recognition that the community is an essential partner in the way in which we provide service. An informed community involved in planning and in assisting response and recovery with emergency services agencies, is much more likely to minimize the impact of emergencies, than a community passively waiting for protection.

Generating community participation involves many challenges, but the rewards can be great. Community engagement can help organization to capture the knowledge and energy of local people and use it to develop and implement effective solutions to meet the needs of local communities. The solutions can be tailored to the specific needs of the local community.

It is becoming more widely recognized that policies and strategies are more effective when the community seeks a sense of ownership and supports their implementation. Community participation, for example, has been a guiding principle for the Country Fire Authority's wildfire safety programs such as Community Fireguard where tens of thousands of people have been involved in partnership with the fire service in protecting their local neighbourhoods.

Recent evidence compiled in The Esplin Inquiry demonstrates that engaging and empowering the community, both before, during and after an incident, can have significantly positive consequences. To illustrate the point, the very large campaign fires in eastern Australian 2003/04 impacted potentially on literally 100's of communities. This presented an impossible management task for the relevant emergency service agencies, but in NSW and Victoria efforts were greatly assisted by the high levels of community education, community information and consequently, community empowerment within these regions. The emergency service agencies who had accepted the new paradigm shift had the support of communities who were prepared, safe, and, as a consequence, suffered no loss of life and negligible damage during some of the worst fires for 50 years in Australia.

In stark contrast, however, the coronial inquiry into the Australian Capital of Canberra fires in the same year indicated that the vast majority of residents had a limited understanding of the risks

facing both themselves and their property, and no information in terms of evacuation or protection procedures. The chaos that ensued, resulted in 4 deaths, in millions of dollars worth of damage and an enraged community who had no sense of empowerment, or indeed any sense that they should be empowered. As a result of agency structure, accountabilities and managers have all changed as a result.

The sixth driver – a changing workforce & roles

Australia has a large geographical diversity, with vastly differing climatic and environmental conditions, and a relatively low population (approximately 20 million). Emergency services are highly dependent on volunteers, indeed there is no substitute to this resource. The fire services alone have some 350,000 volunteer fire-fighters.

Often the community perception is that volunteers are not as professional as paid staff. This is an enormous misconception. In Australia today, as a result of many of the drivers that I have already mentioned, must have the knowledge base, training competencies, protective equipment and infrastructure according to the risk that they face. One of the most important drivers in Australia is the recognition that there is no viable substitute for volunteers, and that good volunteerism is not cheap. Governments throughout Australia are now recognized the benefit of providing adequate resources to those agencies managing volunteers and that specially-tailored programs need to be developed to support them.

One of the peripheral advantages of volunteer emergency service personnel is that they come from and are part of the community, and if agencies accept the need for community engagement, volunteerism are one of the very best means available to meet that objective.

The recognition and support of volunteers within our system is a very significant driver for us to be prepared to handle the events that we do inevitably in Australia.

The seventh driver - the drive towards economies of scale

The recognition that individual emergency service agencies can achieve huge benefits in 'collective' activity has resulted in the emergence of successful peak bodies, both within Australia and in many overseas countries.

The development of the Australasian Fire Authorities Council (AFAC) in 1993, as a national peak body for fire, has certainly assisted in the breakdown of parochial attitudes across agencies and given recognition to the huge economies of scale available. As an industry we are moving beyond the 'silos' toward a national perspective. AFAC has matured over the years to become a centre of policy formulation and co-operation at a national level. On an annual basis more than 600 fire practitioners come together in a variety of working parties and committees to discuss a diversity of key strategic and operational issues affecting all aspects of the emergency services. A high level of consensus is achieved, information exchange occurs on a daily basis and as a consequence, wasteful duplication and inappropriate use of resources are reduced.

There are some notable examples to demonstrate the point. In 2003/04 alone the national approach has resulted in a \$100m commonwealth government sponsored fire research program. This will extend over a seven year period and involve all Australian fire agencies and many tertiary institutions in the development of research across a wide range of technical and social issues of significance to emergency services now and in the future. In addition, relevant AFAC agencies have created a private company called the National Aerial Fire-fighting Centre to carry out tendering, procurement and allocation of high capacity fire-fighting aircraft for use around Australia, based on analysis of risk and need.

Both of these initiatives have resulted from the recognition that no agency or state could achieve the same results individually. Economic imperatives have been a significant driver for change.

Conclusion

In conclusion, over the last decade, Australian emergency services have changed dramatically, embracing a more professional, more holistic and more strategic emergency management approach. We still have more changes to make and many more challenges in the future are yet to confront us, but if we are at least cognizant of the “drivers” for change and prepared to address them, then we can achieve the successes we seek.

SHIRE OF YARRA RANGES: COMMUNITY RISK BASED EMERGENCY MANAGEMENT PLAN

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Shire of Yarra Ranges' Emergency and Safety Planning Unit

Keywords: Community Risk Emergency Management Plan

Abstract

In 1986 the State of Victoria, Australia, enacted legislation requiring each local government to form and administer a Municipal Emergency Management Planning Committee (comprising of stakeholders including emergency services and the community) chartered to devise a Municipal Emergency Management Plan. A need to undertake a comprehensive all hazards approach to emergency management was motivated by State and National Governments in the notification that disaster relief funding may be affected if the municipality had not adopted a risk management process. In keeping with the Shire of Yarra Range's philosophy of empowering its community with its role in emergency management and to meet State and National Government requirements, the Shire embarked upon a strategy titled the Community Risk Based Emergency Management Plan. The plan involved extensive community consultation including telesurveys, face to face interviews, the media and targeted community group participation to explore the community's perception of the risks that impacts upon it. The results were then analysed and prioritised according to the Australian/New Zealand Standards of Risk Management AS/NZS 4360:1999 involving identification of the risks and prioritisation according to likelihood and consequence factors. Treatment plans were then compiled for high and extreme risks followed by specific action plans assigning the responsible agencies involved and time frames. The Shire's plan has been targeted as a case study to educate other emergency management professionals on a national scale.

Introduction

In the State of Victoria, Australia, legislation in the form of the Emergency Management Act 1986 was enacted with the objective to "ensure that [prevention, response and recovery] are organised within a structure which facilitates planning, preparedness, operational co-ordination and community participation." (Section 4A) The Act sets out emergency management responsibilities at State, Regional and Municipal levels.

In accordance with Section 21 of that Act each municipal council is required to form a Municipal Emergency Management Planning Committee (MEMPC) for the purpose of formulating, monitoring and reviewing a Municipal Emergency Management Plan (MEMP) in relation to the prevention of, response to and recovery from emergencies within the municipality. The MEMP

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must contain provisions identifying resources & must specify how the resources are to be used in emergencies. The municipality accepts responsibilities for management of municipal resources and the co-ordination of community support to counter the effects of an emergency.

On the 14th of October, 1998 the then Minister for Police and Emergency Services, Hon. Bill McGrath MLA, wrote to all municipal mayors advising “of changes to the conditions for financial assistance provided to councils by the State under the Commonwealth/State Natural Disaster Relief Arrangements.” The letter continued “In brief, financial assistance towards costs of a second and subsequent emergency would be conditional upon the council demonstrating that a structured risk management approach had been applied to the hazard/source of risk associated with the emergency.”

In addition to response and recovery responsibilities the Victorian State Emergency Service (VicSES, a State agency) is vested with the task of providing advice and training to assist municipalities in developing their emergency management plan. VicSES are also charged with the responsibility to audit Municipal Emergency Management Plans.

Further guidelines for emergency management practitioners and other interested parties are provided in the Emergency Management Manual Victoria which is issued by the Co-ordinator in Chief of Emergency Management, the State Minister for Police and Emergency Services. The following agencies are involved in the Shire of Yarra Ranges Municipal Emergency Management Planning Committee:

Agencies/Organisations (Municipal Emergency Management Planning Committee)

Shire of Yarra Ranges

Department of Natural Resources & Environment

(A State Authority responsible for managing Crown Land)

Country Fire Authority

(A State Authority predominantly volunteer based rural fire fighting service)

Department of Human Services

(A State Organisation dealing with the welfare of the community)

Australian Red Cross

Yarra Valley Broadcasters Inc

(A local Radio Station)

Mountain District Radio

(A Local Radio Station)

Victoria Police

(The State Police Agency)

TXU

(A regional Electricity Utility)

VicSES

(A State Agency for Emergency Planning Response and Recovery)

Metropolitan Ambulance

(A Metropolitan based service)

Telstra

(A State Agency for Telecommunications)

Centrelink

(A State Agency for welfare support)

Melbourne Water

(Responsible for water catchment and supply)

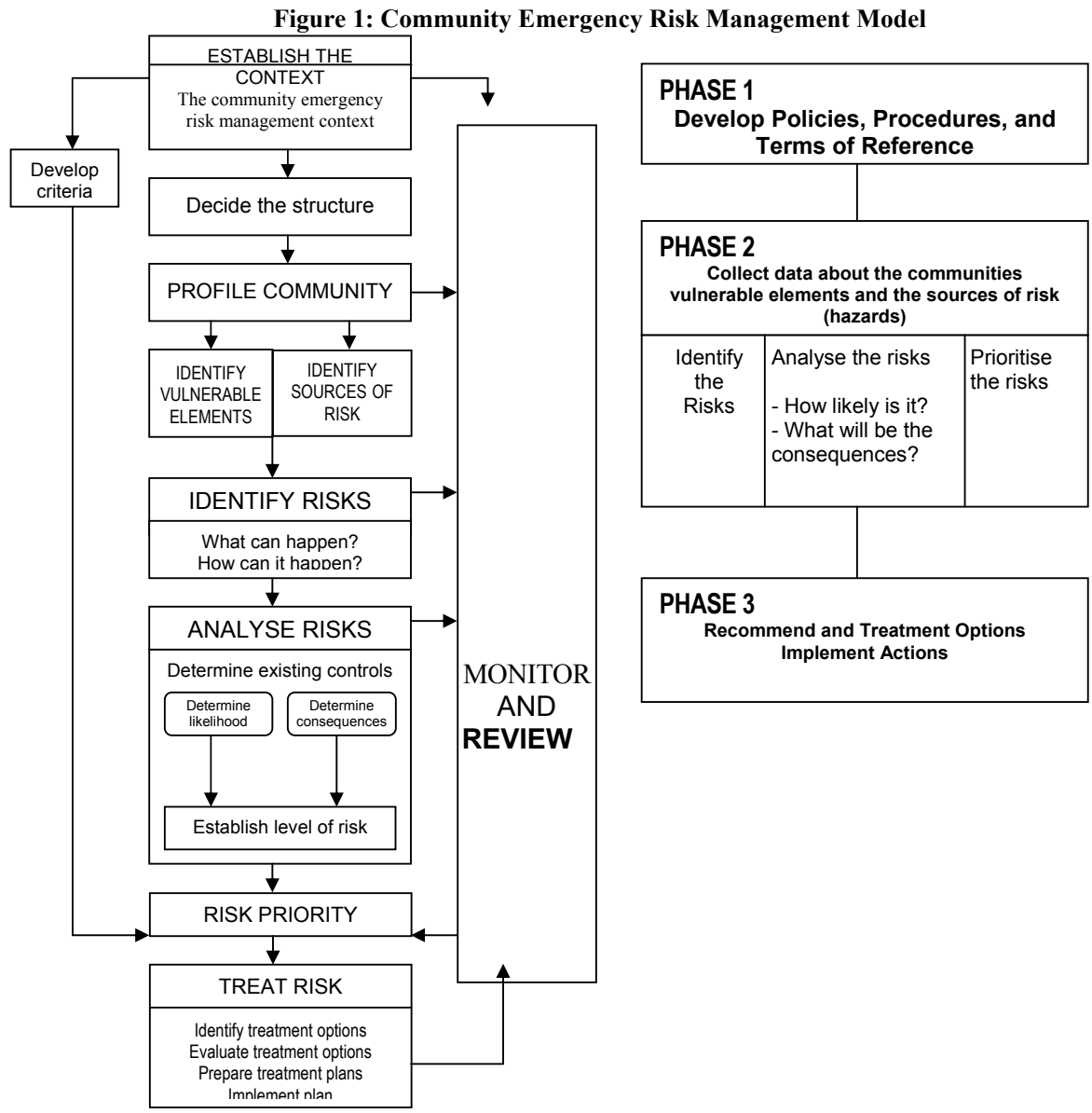
Others, as required

The Shire of Yarra Ranges Community Risk Based Emergency Management Plan has been modelled against the Australian and New Zealand Standards for Risk Management AS/NZS 4360:1999 and the Victoria State Emergency Service Community Emergency Risk Management Model (Risk Management and Municipal Emergency Management Planning 1998 p.vi)., creating a

transparent process and auditable trail in recording the identification, analysis, evaluation and treatment and decision making. This process relies on community consultation and the Shire recognises that the completed plan will be available to the community. With the integration of 'risk management' into Municipal Emergency Management Plans, (MEMP) the Shire of Yarra Ranges fulfils the recently revised funding requirement under the Commonwealth/State Natural Disaster Relief Arrangements.

Community Emergency Risk Management Model

The Victoria State Emergency Service provided a model for the development of the Community Risk Based Emergency Management Plan as a three phase process (Figure 1).



APPLICATION OF THE COMMUNITY RISK MANAGEMENT MODEL BY THE SHIRE OF YARRA RANGES

PHASE 1

Development of Policies, Procedures and Terms of Reference.

The Shire of Yarra Range identified all key stakeholders and established reference group comprising all key stakeholders and developed key goals. This process was highlighted as a Key Result Area in the Shire Corporate Plan and resources were allocated to undertake the process. Policies and procedures are in accordance with the Emergency Management Act 1986, Emergency Management Manual Victoria and the Australian and New Zealand Standards on Risk Management AS/NZS 4360:1999.

Terms Of Reference

The Terms of Reference established by the working group for the project was to draft a holistic Emergency Management Plan for the Shire of Yarra Ranges that covers prevention, preparedness, response and recovery and is based on risk management principles, to consult with the community and other agencies in the preparation of the plan and to report to Council via the MEMPC.

Context Statement

The context statement has been recognised as a key component as it provides the structure and parameters to ensure a focussed reference for the process. After much deliberation the working party established the following context:

To create a safer community, the Shire of Yarra Ranges will work in partnership with the community, agencies and other stakeholders in order to create a holistic community risk based emergency management plan which will address risks that may affect the community, property and the environment.

The objective will be achieved by identifying analysing, evaluating risks and recommending treatment options based on Standard AS/NZ 4360:1999 and is underpinned by the Emergency Management Act 1986. The Shire of Yarra Ranges recognises that the risk based emergency management planning process may lead to suggested risk treatments that may effect or be an effect of social, political, economic and/or environmental aspects of the community and that risk treatment recommendations may be affected by the reality of political and financial constraints.

The Shire also recognises that risks which are assessed as extreme or high need to be reviewed to consider treatments which may reduce the risk to an acceptable level.

The community risk based emergency management planning process relies on community consultation and the Shire recognises that the completed plan will be available to the community.

PHASE 2

Investigation, Information Gathering and Analysis Phase

This phase includes profiling the community to identify vulnerable elements of the community and to identify sources of risk.

Demography

The Shire of Yarra Ranges is located on metropolitan Melbourne's eastern fringe. With an area of almost 2,500 square kilometres the Shire is the largest of any metropolitan or fringe Council in the State. The Shire has a population currently estimated to be 141,170 people. In terms of population it is the seventh largest municipality in the metropolitan area and the eighth largest in the State in terms of population. While considered as an "urban" council for funding purposes the Shire balances a mixture of both urban and rural communities. Approximately 80% of the Shire's population lives in the 10% of the Shire that is classed as urban, while the remaining population is unevenly dispersed throughout the remaining area. There are over 50 suburbs, townships, small communities and rural areas within the Shire. Population growth is expected to remain constant over the foreseeable future, with a projected growth rate of approximately 0.1% per annum over the next 20 years.

Topography

The Shire of Yarra Ranges can be divided into three zones, the undulating country to the west with suburban development, the forested hills to the east and the valley of the Yarra River, which runs east to west and is surrounded by farmlands. There are four major water reserves in the mountainous areas which supply drinking water for the Shire and metropolitan Melbourne: the Silvan Reservoir in the Dandenong Ranges, Maroondah Reservoir above Healesville, the smaller O'Shannassy Reservoir north-east of Warburton and the Upper Yarra Reservoir further east again.

The majority of the suburban areas are found in the western part of the Shire around Mooroolbark, Montrose and Lilydale. The Dandenong Ranges are moderately populated, especially, the Belgrave-Upwey area. Even though much of these hills are heavily wooded approximately one third of the Dandenong Ranges is given over to forest parks, the remainder being zoned for residential or agricultural purposes. Forested mountainous areas also stretch from the surrounds of Healesville in the north-central part of the Shire across almost the entire eastern section. This forms part of the Great Dividing Range. The highest point is Snowy Hill at 1380m above sea level and is located at the northern most point of the Shire. The other major geographical feature of the Shire is the Yarra River, which flows along the eastern part of the Shire and runs through the Melbourne CBD into Port Phillip Bay.

There are 1116 kilometres of sealed roads and 838 kilometres of unsealed roads crossing the Shire. Approximately 60 road bridges providing major links to townships throughout the Shire. Many of the bridges carry essential services such as water and communication cables. Electricity is supplied to all residences with natural gas covering the majority of residences.

Unique Natural Environment

The Shire of Yarra Ranges contains some of the most environmentally significant areas in the State which are a significant factor in attracting residents and tourists. The mountainous landscapes and the Yarra River valley, contain significant areas of remnant native vegetation, much of which is botanically and zoologically significant and forms an important habitat for wildlife. Council has recognised that the physical diversity of the Shire, in particular the mountainous terrain and large floodplains, also creates challenges in developing and maintaining the infrastructure and in servicing the residents to the desired levels.

Our Local Economy

There are over 6,300 businesses in the Yarra Ranges employing over 28,200 people. Economic activity in the Shire is based on tourism, manufacturing industries (in the metropolitan suburbs) and rural industries - particularly agriculture (including horticulture, floriculture and viticulture), and forestry and timber milling. By any standards the highly intensive agriculture of the primary producers within the Shire contributes significantly to the State's rural output and economy. The

Shire and in particular the 'Yarra Valley' is being promoted and is gaining local and international acceptance as an area for the production of fine food and wine. Its reputation as a food region is approaching that of Gippsland and King Island and it can hold its own with any rural wine producing area.

Over 3 million tourists visit the Shire each year (over 9,000 each day). They are attracted to the unique landscape and environment, the vineyards and wineries of the Yarra Valley and the townships and gardens of the Dandenong Ranges. Major tourist attractions include the Healesville Sanctuary, Puffing Billy Railway, larger wineries and the reservoir parks and National Parks managed by Parks Victoria. The growing cultural tourism market is catered for with the festivals and diversity offered by several of the Shire's communities. Short break visits (bed & breakfast) are increasing and the focus is now on encouraging longer stays and expanded tours to the Shire.

History of Disasters/Emergencies

The Shire of Yarra Ranges has a long history of naturally occurring emergencies including bushfire, floods, storms and landslide. Other include light plane crashes, road accidents on major highways, and outbreaks of infectious disease. The impact of these emergencies, particularly bushfires, have included loss of life and serious injury, loss of property including homes, disruption to whole communities, devastation of the natural environment and long-term rehabilitation of affected communities.

The Dandenong Ranges is recognised as one of the most bushfire prone areas in the world due to its mountainous topography, highly flammable native vegetation and climatic patterns that combine to create severe fire hazard conditions almost every year. Another factor that makes this area particularly hazardous is the combination of forest/urban environments and the number of residents and tourists. "Black Friday" in 1939 was the most disastrous bushfire ever recorded in Victoria. At Woods Point the whole town was destroyed totalling 143 houses. In Warburton, 16 men were killed, 20 houses were lost and every sawmill in the area was burnt to the ground. The second most destructive fire in Victoria was "Ash Wednesday" in 1983 when at Belgrave Heights and Upper Beaconsfield, 21 people died including 11 CFA volunteers. Approximately 300 houses were destroyed and 1800 Ha of bushland and pastures burnt out. In Warburton 13 houses were destroyed along with 41,000 Ha of forest. (Murray et al, 1995 p.228)

Major floods of the Yarra River occurred in 1891, 1904, 1909, 1923 and 1934 (the worst ever recorded). The 1934 peaks were used to determine the flood plain along the Yarra River. Minor flooding in Yarra Glen and along the Watts River at Healesville occurs on an almost annual basis. Launching Place and areas at Warburton are also susceptible to minor flooding. In Lilydale, flood mitigation works have reduced the flood prone areas adjacent to Brushy Creek and Olinda Creek. Heavy rainfall has also caused landslip events in unstable soil areas in the Shire, particularly on steep slopes around Warburton.

There is a history of significant landslips within the Shire of Yarra Ranges. The type of landslips that have occurred in the Shire include falling boulders, debris flows, slow long-term earth movements, small landslips up to the size of a residential block and large landslips involving an entire hillside. Some landslips move relatively frequently whereas others have not moved for hundreds, perhaps thousands of years. The Montrose landslip of August, 1891, involved the movement of 30,000 cubic metres of earth and rock. Damage was recorded over 1.4 kilometres and the estimated speed of the debris flow was up to 40 kilometres an hour. In comparison the 1997 Thredbo landslip displaced 2,000 cubic metres of liquefied soil (Shire of Yarra Ranges – Geotechnical Survey Report, Coffey Geosciences Pty Ltd 1999 p.18)

Storms of considerable severity (including windstorms and hail storms) have occurred throughout the Shire. These events have resulted in property damage and minor flooding. The State Emergency Service and local resources have effectively responded to these events in the past.

The Shire of Yarra Ranges has four state highways and numerous arterial roads. The traffic is a mixture of light vehicles (local and tourist), heavy vehicles (logging and other trucks), and buses (both school and tourist). In 2000 the Shire gained the unenviable reputation for the highest road toll of 26 fatalities in the State of Victoria (Source: Victoria Police statistics).

In response to growing concern the Shire has adopted a further initiative with the community in devising the Community Road Safety Strategy and the appointment of a dedicated Road Safety Officer position.

Given the combination of the Shire's topography, the history of natural disasters, the socio demographic trends in the communities, the Shire faces arguably more potential natural disasters than most other municipalities throughout the State. In addition, there is an increasing incidence of vulnerable populations and social hazards in the community, therefore, the Shire has responded to the importance in the development of the Shire of Yarra Ranges Community Risk Based Emergency Management Plan and made it a priority activity.

The hazard identification workshop

The Shire of Yarra Ranges conducted the first step of this phase in September 1999 when it held a workshop with local stakeholders and experts from all emergency services, service and support organisations, and the Shire. The purpose of this workshop was to discuss the community's vulnerable elements and identify the sources of risk.

These risks became the source data for the community consultation phase. Given the importance of emergency management to the Shire community, it was decided to design a cost effective methodology which would not just identify the information required but also raise the awareness and level of discussion within the community.

The goals of the process were to ensure the community had a range of options to contribute to the process, engage the community and to elicit the required information with some statistical rigour.

Key questions were designed which would clarify & enhance on the hazards already identified. The information required included identification and rating of likelihood of risks occurring, identification and rating of the consequences of these events, preventative and protective actions being undertaken and awareness and take up of existing mitigation activities. This was developed into a core questionnaire which could be adapted to suit different surveying processes.

Community Consultation Process

The underlying philosophy of the consultation was based on good will assurances and opportunity, the need to have statistical rigour and to ensure that information was sought by location & age to enable correlation with risk. There was a strong need to include a range of opportunities for participation to ensure consultation was broad, acceptable and would generate public discussion through good public relations and press coverage for the process. Above all there was a strong commitment to encourage a sense of ownership of the process within the community. The quantitative (statistical rigour) information included four cost effective methods to maximise the coverage across the Shire.

The telesurvey of 777 residents, conducted in March/April 2000 by a market research company, was designed to statistically indicate the total Shire view of these issues. The information was also broken

down by the four main geographical areas and by age. Four geographical areas were selected as the risks in each of those areas are somewhat different. The two age groups were chosen to see if older persons perceive the issues differently. Additional information such as breaking down the information by both age and area will enable targeting of treatments in due course on a more meaningful basis.

Face to face interviews of 424 residents took place largely on Saturday mornings in March 2000 at shopping precincts in all of the Shire's townships. They were conducted by Year 12 students from 13 of the 15 Secondary Schools in the Shire. Every township was involved with the numbers of interviews conducted weighted depending on the population. The interviews further involved the community through providing residents with an opportunity to participate on a face to face basis in their own township and an opportunity for younger residents in the Shire to participate in this process and to gain valuable work practice and life skills. It also had the by-product of engaging much larger sections of the community ie schools, the students' friends and parents and was important to achieve the awareness raising goal. Students were rewarded for their efforts with movie tickets and certificates of participation signed by the Mayor.

Volunteer Community groups play a vital part in the life of the community. **Surveying a sample of community groups** provided another method of participation and another perspective. 112 groups were surveyed and 47 responded. These groups represented all aspects of community life and were selected from all geographical areas of the Shire. This took place in March/April 2000.

To provide a final method of participation to the process the questionnaire was printed in **local newspapers**. 33 persons responded but it had the more important purpose of again providing information about the process and the awareness of the issues and process.

Risk Analysis

The objective of risk analysis is to separate the acceptable minor risks from the major risks and to provide data to assist in the evaluation and treatment of risks. A qualitative analysis was used to determine the level of each risk. Risks were identified from the responses received during the community consultation and the risks currently recognised within Shire of Yarra Ranges Municipal Emergency Management Plan. All risks were then assessed against the Australian and New Zealand Standard for Risk Management AS/NZS 4360:1999, by applying risk criteria of likelihood (Table 1) and consequences (Table 2) or impact to a qualitative risk analysis matrix.

Risk Criteria

The Municipal Emergency Management Planning Committee developed specific measures under the categories of likelihood and consequence that were relevant to the risk environments.

Table 1: Measure of Likelihood

Level	Descriptor	Description of Event
A	Almost Certain	The event is expected to occur in most circumstances (daily/weekly) – 100% probability of occurrence High level of known incidents (records/experiences) Strong likelihood or re-occurring, with high opportunities/means to re-occur
B	Likely	The event will probably occur in most circumstances (monthly) – 50% probability of occurrence Regular incidents known (recorded/experienced) Considerable opportunity, means to occur
C	Moderate	The event should occur at some time (over 12 months) – 10% probability of occurrence Few infrequent, random occurrences (recorded/experienced) Some opportunity or means to occur
D	Unlikely	The event could occur at some time (2-5 years) < 2% probability of occurrence No known incidents recorded or experienced Little opportunity, mean or reason to occur
E	Rare	The event may occur only in exceptional circumstances (10 years) < 0.1% probability of occurrence Highly unheard of Almost no opportunity to occur

Table 2: Measure of Consequence

Level	Descriptor	Description of Impacts			
		Areas of Impact			
		People	Financial	Property	Environment
5	Catastrophic	<ul style="list-style-type: none"> Many injuries, fatalities and widespread medical attention required. Community impact severe and lasting, not functioning without support. 	<ul style="list-style-type: none"> Huge \$ loss - >\$100m at National level, Significant/ongoing \$ assistance required 	<ul style="list-style-type: none"> Extensive physical damage requiring extended external assistance 	<ul style="list-style-type: none"> Environmental disaster – significant environmental impact/permanent damage EMA involvement Major threat to many species and habitats
4	Major	<ul style="list-style-type: none"> Extensive injuries, hospitalisation, possible fatalities, long term disability General and widespread impact on community functioning 	<ul style="list-style-type: none"> Major \$ loss > \$10 m at State level, financial assistance required 	<ul style="list-style-type: none"> Significant physical damage requiring external assistance 	<ul style="list-style-type: none"> Some environmental impact long-term, requires help outside site DISPLAN involvement Threat to individual species or habitat
3	Moderate	<ul style="list-style-type: none"> Medical treatment, but no fatalities Normal community functioning with some inconvenience 24-48 hours 	<ul style="list-style-type: none"> Significant financial loss > \$1million at Regional level 	<ul style="list-style-type: none"> Localised physical damage which is rectified in a routine fashion 	<ul style="list-style-type: none"> Some environmental impact short-term, requires outside help EPA involvement
2	Low	<ul style="list-style-type: none"> Minor injuries, no fatalities, first aid treatment required Some community disruption for duration less than 24 hours 	<ul style="list-style-type: none"> Some financial \$ loss < \$100,000 at local level 	<ul style="list-style-type: none"> Some physical damage 	<ul style="list-style-type: none"> Small impact on environment, on site release contained immediately Major clean up of local area required
1	Insignificant	<ul style="list-style-type: none"> No injuries or fatalities, little or no personal support required 	<ul style="list-style-type: none"> Little or no financial loss < \$10,000 	<ul style="list-style-type: none"> Inconsequential or no physical damage, short 	<ul style="list-style-type: none"> No measurable impact on environment Minor on-site clean

		• Little or no disruption to community		duration	up required
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Through the risk analysis matrix, hazards were ranked into categories of Extreme (Immediate action required), High (Senior management attention needed), Moderate (Management Responsibility must be specified) and Low (Manage by routine procedures). The sources of risk for the extreme and high risks ranged from: Natural risks such as bushfire, landslip, floods; Human Behaviour risks such as robbery, assaults and drugs; Environmental risks such as water or air pollution, Technological risks such as hazardous materials; and Infrastructure risks such as road or aircraft accidents.

PHASE 3

The Decision Making and Treatment Phase

This final phase determined the actions that can be done to prevent, mitigate, accept, avoid or transfer risk, recommendations, appropriate treatment options and then devised implementation actions. Having identified extreme, high and moderate risks the next step was to devise treatment plans. The treatment plans were devised during dedicated planning days with the Municipal Emergency Management Planning Committee members and other interested parties.

A template (Table 3) was utilised for each of these risks providing a treatment plan to address the risk. Specific action plans were then compiled using this information.

Table 3: Risk Template

RISK: BUSHFIRE	RISK RATING EXTREME	ACTION PLAN No: 1 DATE COMPILED: 22/5/00
RISK SUMMARY: Bushfire includes FOREST, GRASS, UNDERSTOREY Seasonal annual event, large area URBAN/FOREST interface, dispersed over the whole municipality. Long history of bushfires in area. Those most vulnerable: Interface residents, specifically Persons who are unable to implement an effective fire Plan eg. frail/aged not limited. Travelling public, persons employed, Emergency Service Workers, Schools/Camps, Frail aged facilities & special accommodation. Other: Stock, general infrastructure, crops		
Can Likelihood be reduced:Yes How: Fuel reduction burning Fire prevention strategy Education – awareness/preparedness Building Regulations Town Planning permit approval TFB/Fire restrictions – Municipal/State Police fire patrols	Can Consequences and /or vulnerability be reduced:Yes How: Fuel reduction burning Fire prevention strategy Education – awareness/preparedness Building Regulations Town Planning permit approval TFB/Fire restrictions – Municipal/State Early warning Effective Fire suppression activities Timely response from Emergency Services & Community Timely & accurate information to the community Integrated Communication systems & networks	
What agency, organisation, group or person has risk management responsibilities for this risk? Country Fire Authority, Department of Natural Resources and Environment & Parks Victoria, Metropolitan Fire & Emergency Services Board, Shire of Yarra Ranges, Residents/Business/Property owners, Utilities & Service Authorities, Department of Education, Victoria Police		
What responsibilities does the Council have to manage this risk? Fire Prevention Strategies – development, implementation & review, (Joint) Community Education, enforcement of Fire related Legislation, Resourcing Emergency Services (response) & general Community (recovery), (Joint) Community information, Emergency Planning and Implementation		
RECOMMENDATIONS: Review Fire Management Strategies – within the next three years or following major fire Continue Education Programs Continue to apply current regulatory controls Continue to support the development of Integrated Fire Management Plan Strategy Continue Training and Exercises for Staff and Agencies		
APPROVAL TO IMPLEMENT RECOMMENDATIONS REQUIRED FROM		
COUNCIL	MEMPC	MFPC
Following approval implementation plan developed & monitored by: MEMPC		Priority & Time Frame for implementation: High Priority. To be implemented by 2003

Completing the Community Consultation Loop

The final initial stage of the process was to ensure appropriate feedback to the stakeholders and in particular the general community. Feedback was provided to the Community by through forwarding Executive Summaries of the draft paper to all Community Groups and Schools involved in the process, advertising in local papers, placing a copy of the draft plan on the Shire's website and placing copies of the document for perusal by the community at the five Shire Service Centres located across the municipality.

Review Process

The Community Risk Based Emergency Management Plan has now been incorporated into the Municipal Emergency Management Plan which has a three year action and review cycle and is audited by the Victorian State Emergency Service. Progress of the treatment actions is monitored by the Municipal Emergency Management Planning Committee at quarterly annual meetings.

Conclusion

The Shire of Yarra Ranges Community Risk Based Emergency Management Plan is an example of the Shire's commitment to a consultation process which involves the community raising its awareness of the risks it faces and enhancing a sense of ownership in the emergency management process. In a document entitled Vision 2020 the Shire identified a number of themes as a future planning reference for the community. One of these themes relates to a safe Shire in the year 2020. The guiding principles of this theme include "that residents and communities need to take a greater personal responsibility for their own safety and need to be provided with the capacity to do so"... "that the Shire has a major role in facilitating local networking between emergency service providers"...and "... that improved communication and education will reduce the risks to individuals and the community." The Community Risk Based Emergency Management Plan has provided a strong foundation to meet this philosophy.

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Authors' Biography

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Steve Donner was employed as the Emergency Management Co-ordinator within the Emergency and Safety Planning unit for the Shire of Yarra Ranges and was the project officer for the Community Risk Based Emergency Management Plan. Steve is now a Senior Consultant (Safety & Emergency) with Worley Safety & Risk Management, holds an Associate Diploma of Applied

Science (Fire Technology) Swinburne University and a Graduate Certificate Disaster Management (Swinburne University) and is a Graduate Member of the Institute of Fire Engineers. He is also a current serving lieutenant with a local volunteer brigade of the Country Fire Authority within the Dandenong Ranges and was previously employed for ten years as a consultant to the fire protection industry on active and passive fire systems.

FROM EMERGENCY MANAGEMENT TO RISK MANAGEMENT

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Keywords: Risk management, quantified approach to risks, relationship between risks and the type and level of response of emergency services, relationship between risks and political processes, cooperation between emergency services, experiences with the method, practical examples and guidelines

Abstract

In recent years, the Dutch have been confronted with several major disasters. These incidents made clear that the Dutch rescue services and government were not fully prepared or able to handle major disasters. It also showed that politicians and the general public did not realise that the rescue services do not have sufficient resources to cope with disasters. These experiences led to the development of a new approach to risks and the way the government prepares for disasters. This method consists of the following components:

- an objective way of describing and quantifying risks;
- a method for calculating the resources required to deal with specific incidents;
- a guideline for calculating the type and level of response of emergency services;
- a multidisciplinary approach to so-called not-covered risks that have to be accepted by politicians;

The new approach is no longer a technical discussion between professionals alone, but a process in which all relevant actors (including politicians) take part. These components have enabled the rescue services not just to deal with disasters, but also to manage risks.

Our presentation during the conference consists of:

1. explanation of the method
2. a description of our experiences using this method
3. an illustration of the application of the method using an example
4. a summary of guidelines for implementing the method in other countries

1.0 Introduction

1.1 The problems

1.1.1 The Dutch emergency and rescue services are not fully prepared for disasters

In recent years, the Dutch have been confronted with several major disasters. For instance:

- Bijlmer (Amsterdam), plane crash
- Volendam, fire in disco
- Enschede, explosion in fireworks factory
- Several serious floods

These events made clear that the Dutch rescue services and government were not fully prepared or able to handle such large disasters. The available capacity was insufficient for dealing with this scale of disaster, there were widespread communication problems between the rescue services, preparation was below professional and legal standards and the general public was unaware of the risks.

It also became obvious that the rescue services all make their own disaster-management policies. This means they all used their own particular methods for making risk assessments, drawing up investment plans and setting priorities. This was a direct result of the way in which rescue services are organized in the Netherlands.

The aforementioned disasters also showed that politicians and the general public did not realise the rescue services do not have enough means or the equipment to deal with all types of disaster. They thought that these disasters could or would not happen in their own backyard. They also thought rescue services would be able to deal with these emergencies.

1.1.2 No objective relationship between risks and the capacity of rescue services

In the Netherlands, there are no rules or regulations for describing the relationship between risks and the type and level of response of rescue services. Discussions on these issues are not based on objective norms. They are often guided by financial targets and are sometimes irrational. It also means that many risks cannot be quantified or formally accepted by the government. It is therefore very difficult to discuss the issues involved with people who live in risk areas.

As a result of the lack of objective rules or regulations, no objective method was available for determining the type and level of response of rescue services. There are no methods for calculating the potential size and effects of specific risks. It is also very difficult to keep the public, other rescue services and politicians informed about them.

1.1.3 Emergency management services not equipped for the social debate

Similarly to many other countries, people in the Netherlands no longer accept disasters as just bad luck. If necessary, they will investigate the causes of disasters themselves and hold the government or rescue services accountable. In recent years, risk and disaster management has had a significant impact on the legal and insurance sector.

This change in society requires politicians and emergency-service managers to be able to deal with their accountability and to participate in the public debate.

At the moment, they are not adequately prepared in this respect. Most of the methods are very technical and cannot easily be explained to the public at large. However, such a debate is needed if we want people and politicians to accept that certain risks cannot be covered by the capacity

available for disaster response.

This means that we do not need more detailed technical rules and regulations. Instead, we need to accept the social and political rules of society. The rescue services also have to learn how to deal with these rules and learn how to influence the public opinion on disasters and risks. Only then can they make politicians accept responsibility for risks that the rescue services cannot cover.

2.0 The method

The method consists of the following components:

- An objective way of describing and quantifying risks;
- A method for calculating the resources required for dealing with specific contingencies;
- A guideline for calculating the type and level of response of emergency services;
- A multidisciplinary approach to the so-called not-covered risks that have to be accepted by politicians

We began by examining the technical aspects of risks. Our goal was to see risks objectively and to be able to compare the risks faced by other regions in the Netherlands and other countries.

- In the first place, we categorised all the risks we have to deal in the Netherlands. For example: air disasters; shipping disasters; road and other accidents on land; nuclear disasters; management of threats to public health; floods, etc.
- We then made a list of the risks we have to deal with in our region of the country (Central and West Brabant). The Dutch government has set up norms for all the potential risks that each different region of the country has to deal with. For example, if there are a lot of rivers in an area, there is a large risk that floods will occur. With less open water, there is less chance that a flood will occur, but if a major city is built along the banks of a large waterway, the risks are greater.
- The government placed the potential risks in 5 categories depending on their seriousness and the normative level of response that would be required to deal with them.
- The local emergency services (police, fire brigade and paramedics) were assigned the task of identifying specific risks affecting their own regions.
- We came to the conclusion that a large number of the risks in our region had to be placed in highest category.
- At this point, however, we still did not know whether or not we would be able to deal with these risks or cope with disasters.
- We then translated risk management requirements into the capacity that initial response teams would have to maintain to be able to cope with any emergency.
- In the calculations we made in this respect, we chose to ignore (for the time being) the political implications of "What risks are acceptable?"

Our final conclusion was that it is not possible to set up a standard for the type and level of response required to deal with any major disaster or emergency.

If you want to be able to cope with every conceivable risk, you will have to build a matching all-round comprehensive emergency-response organisation, which is obviously not feasible.

This brings us to the last step, which we still to take in the Netherlands: the political and social debate "*What should we do with risks? Just accept them? Who is responsible? How should information about risks be communicated to the public?*"

We hope that the debate will not end in a discussion of technicalities and the practicality of

different methods, but that it will be a broadly supported open debate about risk acceptance.

3.0 Conclusions

The techniques that we use in this respect in the Netherlands are new. We have not yet seen (objectively) quantifying the operational performance required for dealing with a given incident and its inclusion in processes in policy plans anywhere else.

Until recently in the Netherlands, there was no link-up between risks, disaster-response strategy, the size of emergency services and government policy and we did not have a multidisciplinary approach to disaster relief. Policy was not based on objective risk management, but largely on incident management. Disasters determined policy.

Acknowledgments

Guidelines from the Dutch government for each component of the method as described.

Biography

Anton van Leeuwen is Head of the Policy Unit of the Regional Fire Brigade in Central and West Brabant and is the secretary of the board of this Fire Brigade. He has a master's degree in Public Administration and a bachelor's degree in Business Administration. His doctoral thesis was on the function of knowledge networks in the field of NBC Terrorism.

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Ron de Milde (chief inspector) is at the moment programme manager Information Communication en Technology at the police in the region Central and West Brabant. Therefore he was 6 years the head of the division Operational Support (command and control room, forensic investigations department). From 1996 till now he is head of the police emergency response team consisting of 24 special trained professional policemen. The team coordinates major incidents with a high political impact.

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