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Presentation Title:

ASSESSING AND MANAGING RISKS IN THE FUTURE MARITIME INDUSTRY:
A "FORMAL SAFETY ASSESSMENT" APPROACH

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ASSESSING AND MANAGING RISKS IN THE FUTURE MARITIME INDUSTRY: *A "FORMAL SAFETY ASSESSMENT" APPROACH*

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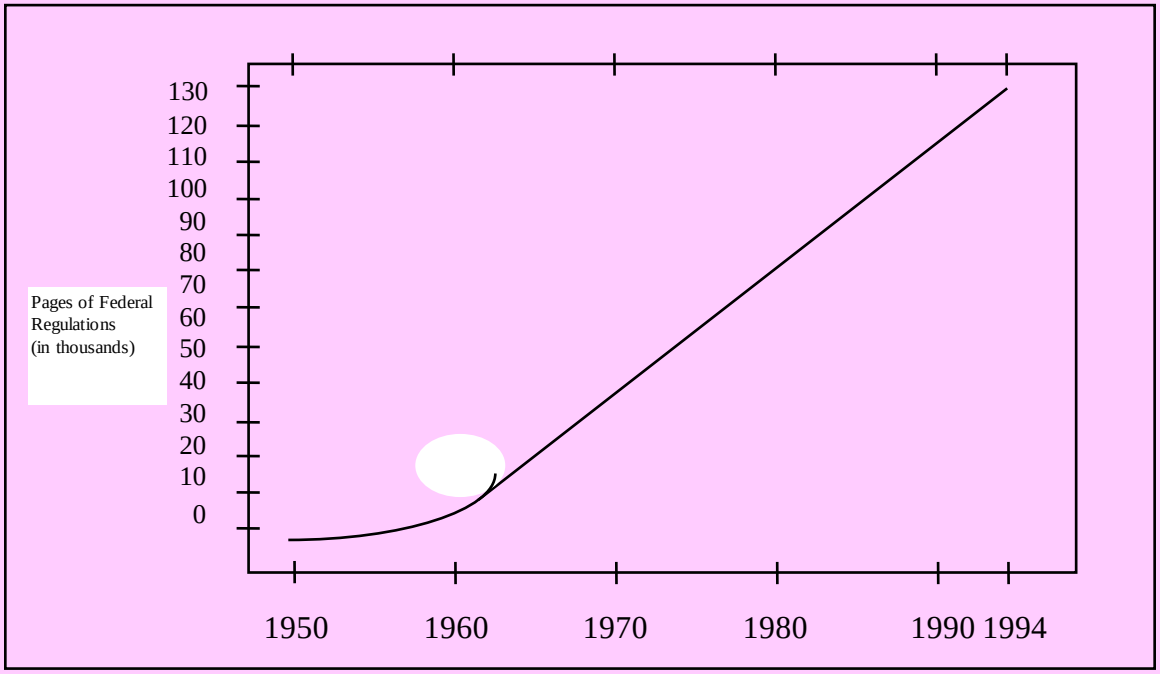
1. INTRODUCTION : Urgent desire for a new concept of Risk Assessment

- Growth of Regulations in terms of the number of pages of the Federal Regulations (USA):



- The cost to taxpayers was estimated at $500 billions per year. $100 billions for EPA alone (1996)

(USCG's Proceeding, Vol.53, No. 2, Apr-Jun 1996, p.9)

Urgent desire for a new concept of Risk Assessment

- **Moving Toward A Risk Management Approach *(Canada)*, *according to the Third Report to the Prime Minister by the Advisory Committee on the Public Service in February 2009:***

  - "The federal Public Service's risk management capacity has declined in recent years. Departments and agencies have moved away from risk management toward risk avoidance through the creation of numerous rules, procedures and reports…This is what has come to be known as the web of rules". (Part III, page 5)

  - "Long ago, before the legislation on human resource management was changed, there were 70,000 rules for managing human resources in the federal government…*When there are too many rules, they become irrelevant, and people can no longer tell essentials apart from non-essentials"* (Auditor General of Canada. May 9, 2006. Part III, page 5)

Urgent desire for a new concept of Risk Assessment

- Over the years the maritime industry has become heavily regulated
- The ever-increasingly on-slaughter and almost continuous review of acts, conventions, protocols, codes, resolutions, guidelines, standards, manuals... "apparently provided unlimited employment to surveyors, lawyers, administrators, diplomats, civil servants and the like"
- At the same time it has continued to be faced with a vast proliferation of risk and with a considerable record of accidents, loss of life and damage to the environment.
- Government regulations have become unreasonably complex. This complexity has been influenced by a combination of many factors, the most notable of which are vague laws, politics and the influence of interest groups.
- Despite their good intentions, some regulations control marginal risks at an exorbitant cost. "*Regulations should be imposed when their societal cost is consistent with their risk reduction potential*"

Urgent desire for a new concept of Risk Assessment

- The benefits of new technology makes the industry pay, not only for the higher cost of investment, but perhaps also for the costs of mental uncertainty, injury, loss of life and environmental pollution.

- Although the industry has some control over the level of risk to which it is exposed, reduction of risk often leads to reduction of profits.

- Further, overpaying to reduce one set of risks may introduce offsetting a larger risk of another kind, posing a serious dilemma. Therefore, the industry and regulators are now adopting the ***"weight benefits against risks"*** idea in making decisions (Karaszewski, 1996).

Urgent desire for a new concept of Risk Assessment

- Now, public opinion has become aware of risk potential from many industries in general and from the maritime industry in particular and conscientiously demands for an **innovative solution** of controlling risks related to health, safety and the environment.

- With that awareness, the maritime industry has answered the urgent desire of the society for a change of rule-making decisions and risk control which has led to the new intellectual discipline of risk analysis, the new concept of risk assessment, i.e. **Formal Safety Assessment (FSA).**

2. ABOUT FORMAL SAFETY ASSESSMENT & ITS PURPOSE

- Two main aspects of FSA used in the maritime industry are:

  a) To identify, evaluate, control risks pro-actively, since FSA is designed to anticipate the risks and establish suitable regulatory control before accidents occur.

  b) To assist and improve the rule-making process at national and international levels. This is called **risk-based regulations**.

Definitions

- According to IACS, FSA is “a formal, structured and systematic methodology, currently developed to assist and rationalise rule-making process and to facilitate proactive risk control”

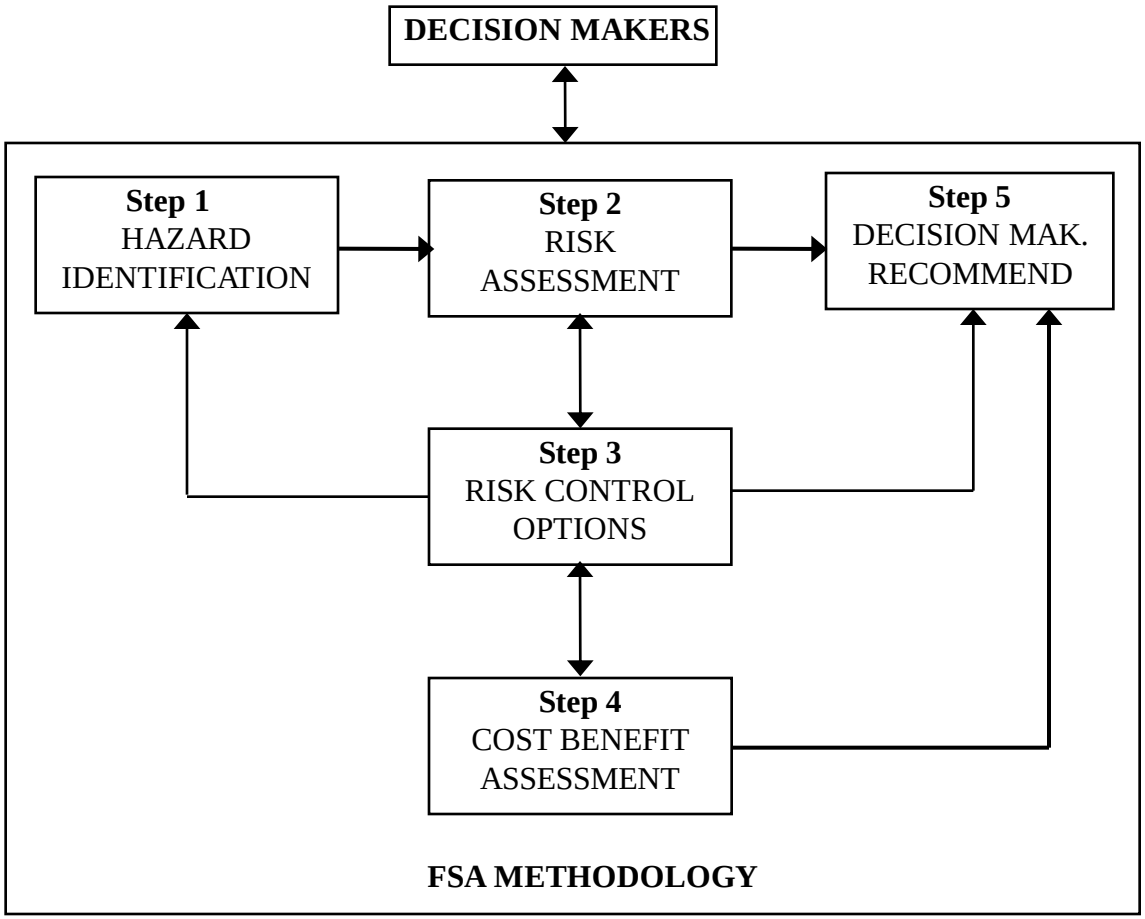
- While the UK Administration defines FSA “is a management tool for the determination of the risks of accidents and the requirements for regulations to minimise the risks. It is a methodology for modelling and decision making based on quantitative and qualitative data”

- And finally, IMO concludes that FSA “is a rational and systematic process for assessing the risks associated with shipping activity and for evaluating the costs and benefits of IMO’s options for reducing these risks”

Purpose, according to the IMO

- *FSA is aimed at enhancing maritime safety including protection of life, health, the marine environment and property, by using risk and cost-benefit assessment.*
- *It can be used as a tool to help in evaluation of new safety regulations or in making a comparison between existing and possibly improved regulations, with a view to achieving a balance between the various technical and operational issues, including the human element, and between maritime safety and costs.*
- *It is consistent with the current IMO decision-making process and provides a basis for making decision in accordance with the objectives.*

3. FSA METHODOLOGY



Flow Chart of the Formal Safety Assessment

(*Source*: MSC/Circ.1023-MEPC/Circ.392 ANNEX, 2002, 15)

FSA Methodology

- **Step 1. Identification of Hazards**- To identify a list of hazards which can contribute to the accidents by screening these hazards using a combination of available data or judgement.

- **Step 2. Risk Analysis**- To assess the risk associated with those hazards by investigating in details the causes and consequences of those more important scenarios identified in step1. Different types of risk (ie. risks to people, the environment or property) should be addressed/measured as appropriate to the problem under consideration.

FSA Methodology

- **Step 3. Risk Control Options (RCOs)**- To propose effective and practical RCOs comprising the following four stages:

  - focusing on risk areas needing control
  - identifying potential risk control measures (RCMs)
  - evaluating the effectiveness of the RCMs in reducing risk by re-evaluating step2, and
  - grouping RCMs into practical regulatory options

  Step 3 aims at creating risk control options that address both existing risks and risks introduced by new technology or new methods of operation and management.

FSA Methodology

- **Step 4. Cost-Benefit Assessment-** To identify and compare benefits and costs associated with the implementation of each RCO suggested in step 3. It is important for the decision-making of legislation and regulations which reflect the balance between economy and safety in the most effective undertaking, determining the economic costs and benefits of each option in Net Present Value (NPV) terms.

- **Step 5. Recommendation for Decision-Making-** To define the recommendations which should be presented to the relevant decision makers. The recommendations would be based upon the comparison and ranking of hazards and their underlying causes; the comparison of RCOs as a function of associated costs and benefits; and the identification of those RCOs which keep risks as low as reasonably practical (ALARP).

4. APPLICATION & EFFECT OF FSA

- FSA as being undertaken by IMO, is the application of risk assessment principles.

- It consists of two principal approaches: **risk control through standards**, and **risk control through analysis and management.**

➢ **The first approach** is being studied at the IMO to develop suitable safety standards, so-called risk-based regulations by providing a comparison between existing and possible improved regulations for the purpose of making a more balanced, proactive and cost effective legislation.

New safety regulations would be based on the consideration of:

Application & Effect Of FSA

- a comprehensive decision-making process involving many parties with a wide range of relevant expertise,
- the socio-economic balance among all countries including all aspects of risks, benefits, costs and investments,
- change from a prescriptive to a goal-setting approach, ie. emphasising the operator's responsibility for safety,
- representation of 'best practice' of risk management,
- any information used to be transparent and open to scrutiny, and
- incorporation of human element issues within the FSA framework.

Application & Effect Of FSA

- **The second approach** using these assessment methodologies is of value to risk managers and decision makers in formulating a safety management system throughout a ship's life cycle (design, construction, operation, maintenance, disposal).

  In order to have comprehensive results from FSA, the following considerations should be obtained:

  - The whole industry must share the data and information collection about hazards that could contribute to the marine incidents/accidents.

Application & Effect Of FSA

- A good system for incident/accident/defect reporting such as that of the aviation industry should be implemented within the maritime organisations. Any defect encountered by one operator can be known by all others
- Expert interviews and expert judgements have an important role in the risk assessment process as they are the source for estimates of hazard frequencies and outcomes.
- Judgements on risk levels and decisions on risk acceptability should be based on the socio-economic balance between parties rather than represent the outcome of a subjective or political decision-making process

Application & Effect Of FSA

- It is also applied to better understand the sources of safety and environmental impact, which then can help the shipping company consider the appropriate actions to deal with other impacts caused by various risks.

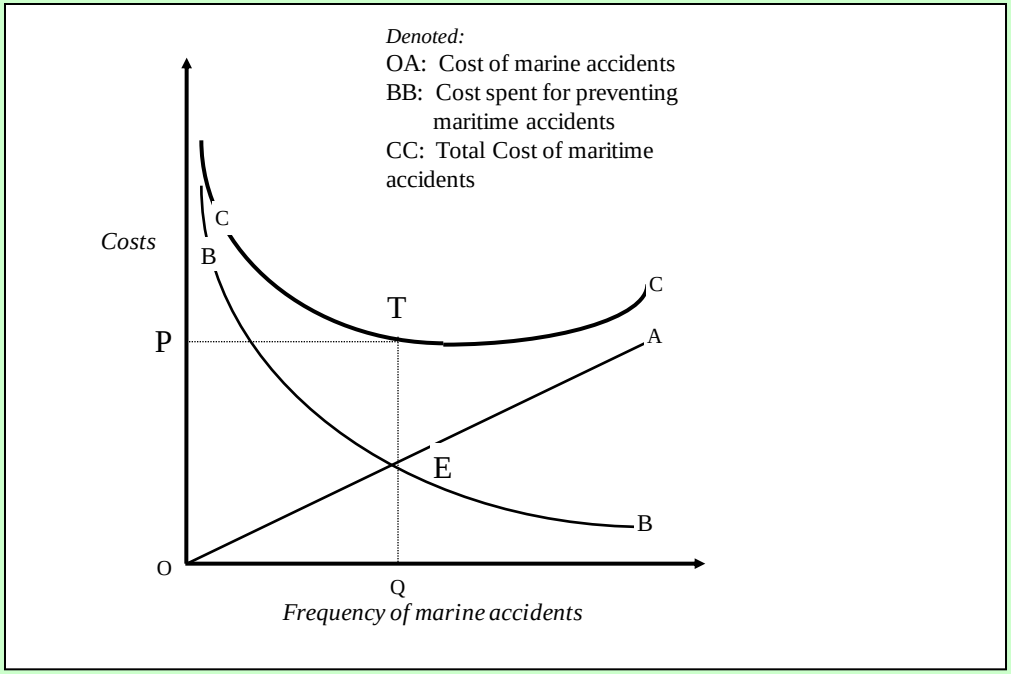
- System design, construction, operation and maintenance as well as the present maritime rules and regulations can be assessed, redesigned and revised by the merit of FSA methodology in order to conform with the new concept of risk assessment and risk management in the maritime industry.

Application & Effect Of FSA

- Because of its logic, and its gaining popularity, risk assessment methodology as ‘Formal Safety Assessment’ being studied and formulated at the IMO will be widely adopted by the maritime industry in the future

5. CONCLUSION: THE EFFECTIVENESS OF ASSESSING & MANAGING MARITIME RISKS

- The final point to prove the effectiveness of risk management is the relationship between **costs** of marine accidents (cost of accidents and cost of accident prevention) and **frequency** of marine accidents from the economic point of view, as illustrated in the following diagram:



Frequency vs. Costs of Marine Accidents

The Effectiveness Of Assessing & Managing Maritime Risk

- There is a strong correlation between economy and risk control measures. It would be far more economical to prevent accidents by using good designs, training and risk assessment within an appropriate safety management system.

- Once safety management is an integral part of the business culture, ie. risk and risk reduction have been defined, the cost needs not be high, and the business performance may subsequently be more efficient and profitable.

The Effectiveness Of Assessing & Managing Maritime Risk

- Safety culture towards risk awareness today seems to be a conditional requirement for the business of organisations whereas the potential applications of the FSA are numerous and essential.

- The United States Coast Guard now intends to use FSA in its near and long term goals of establishing a risk-based approach in determining the safety of all marine systems.

WE ALL HAVE EXPERIENCED WITH…

IMO MISSION: ***"SAFER SHIP - CLEANER OCEANS"***

…AND/OR WITH

CCG'S MOTTO: ***"SAFETY FIRST, SERVICE ALWAYS***

The Effectiveness Of Assessing & Managing Maritime Risk

- Formal Safety Assessment, a key element of a modern approach to safety and risk management, can provide a tool that leads the Future Maritime Industry to the Optimal Expectation.

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