

THE RISK ASSESSMENT AND EFFECTIVE ON THE IMPROVING THE PRODUCTIVITY IN EGYPTIAN CONTAINER TERMINAL

HANY MAHMOUD ABD EL-ALL & AHMED SHAHEEN

Maritime Collage, Arab Academy for Science and Technology, Alexandria, Egypt

ABSTRACT

Sea transportation of container freight plays an important role in national and international trade. It has grown rapidly over the last decades and is expected to grow even further throughout the next decades, nowadays the largest container vessels can carry up to 17.000 containers and the largest container ports can handle up to 20 million containers a year. Consequently, Individuals and organizations, manage risk every day, both consciously and unconsciously. The need to do so systematically and explicitly is a matter of transparency, accountability and credibility. Risk is something that may happen in the future. Risk management involves the analysis of scenarios about future events, their likelihood, impact and acceptability to stakeholders, the paper spot the light on the Risk Management for port by showing the risk assessment criteria and structuring, risk assessment stages and the dynamic risk assessment and how its effective on the Improving the Productivity of the Egyptian ports.

KEYWORDS: Risk Assessment Stages, Egyptian, Container Terminal

INTRODUCTION

The safe operation of ports and terminals depends on a broad range of critical operations and activities that are undertaken on a regular basis. The execution of these critical operations and activities can create hazards that, if not properly addressed, can have disastrous consequences. The risks associated with these hazards should evaluate carefully to establish cost-effective and efficient prevention and mitigation measures. The goal of these prevention and mitigation measures must be to reduce risks to an acceptable level. Risk management is an essential element playing most important role in ensuring the effective operation and management of the seaports and terminals and, as a part of the RM, the process of risk evaluation is its main core.

Moreover Become a subject of competitive port in particular of the topics that received the attention of port operators and authorities, especially after the growing role of ports in foreign trade operations of the States, which resulted in his excellence as influential in the economies of countries and their development. Became the competing ports in the context of a world governed by global economies are intertwined, and through mergers and alliances and control Mergers / Acquisition /Alliances. This prompted the authorities and port operators, to consider a restructuring of its competitiveness, and to match the variables surrounding the management and operation of ports on the local, regional and international levels. Therefore, the port has become a competitive threat to an external institution and authorities working port, developed states are racing to compete and win the largest share of the market, while developing countries are still preparing for the restructuring of its ports in the context of building its economy.

The Risk management is one of the major factors that help to raise the level of productivity of the port by raising the level of Performance at the port and consequently in turn increase the productivity of the port leading to increased competitive advantage of the Port.

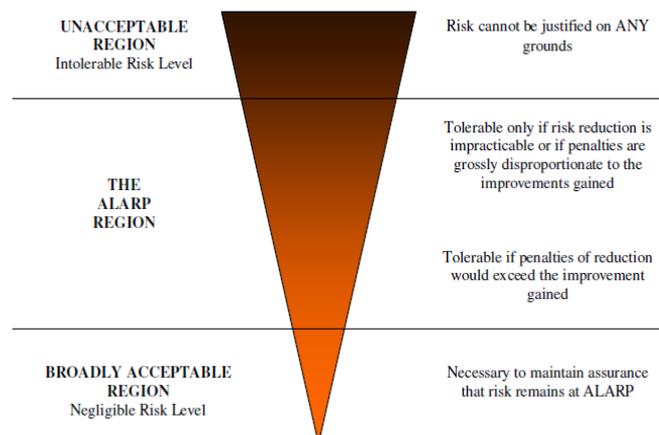
Risk Assessment

The provision of harbors and port facilities; or even marine services by port authorities, must abide by the Code's well-developed principles of formal risk assessment and safety management systems. The approved national standards should state that all harbor authorities should base their policies, and procedures relating to marine operations on a formal assessment of hazards and risks. It is the duty of regional councils to undertake the harbor risk assessments of marine operations that lay the foundation to the port safety management system.

These systems, which set out the regional council's and each port company's policies and procedures, shall be made available to the Maritime Safety Authority as they should be the base for every regional council's statutory powers including those of harbor masters to regulate marine operations. It is of paramount importance that such systems incorporate a systemic approach to formally monitor and review the effectiveness of the system, and deal with preparedness for emergencies. (NZ, PMSC, 2011) Individuals and organizations, manage risk every day, both consciously and unconsciously. The need to do so systematically and explicitly is a matter of transparency, accountability and credibility. Risk is something that may happen in the future. Risk management involves the analysis of scenarios about future events, their likelihood, impact and acceptability to stakeholders. The process involved for risk management comprises five steps:

- Identify risks/hazards
- Assess risks
- Specify risk control options
- Make a decision
- Take actions

The aim of risk management is to reduce the risk factor to 'as low as reasonable practicable' ('ALARP') – the ALARP Principle – shown below



Source: Cattle water Harbour Commissioners Port Marine Safety Code (2009)

Figure 1

It is recognized that much of the content, particularly in terms of risk assessment of marine operations relating to port undertakings and harbor management and maintenance obligations must be contributed by port companies. Port companies are obliged to undertake a port risk assessment as a subset of the harbour risk assessment. The harbor master shall coordinate the integration of the port risk assessments into the harbour risk assessment.

A positive, analytical approach needed in the harbour risk assessment to be not only consider past events and accidents, but to also examine potential dangers and the means of avoiding or managing them. A documented system of records of accidents and incidents should be created to support future cycles of risk assessment. Every risk assessment shall be complemented by a harbour safety plan that describes how the risks that have been identified are going to be managed /controlled and by whom.

Once a hazard is identified, frequency and consequence data can be added, the result is risk.

Risk is a Combination of

- The frequency (likelihood, probability or chance) of a hazard realisation;
- The consequence (severity or impact) of the hazard reaching its potential.

In practice, hazards will normally have a range of consequences and associated probabilities.

In some quarters risk is viewed as a simple product of frequency and consequence, which is misinformed. The relationship between frequency and consequence is different across the range of possible accidents and their outcomes.

There are two types of risk assessment undertaken - qualitative and quantitative.

The quantitative approach requires vast amounts of incident data across different sites and requires significant resources to establish a numerical evaluation of the level of risk. Techniques such as fault and event trees are used for quantification. It is used mostly in the nuclear and chemical industries and sometimes at offshore installations to demonstrate compliance with a prescribed safety margin or level of safety (the “safety case”). It is relatively expensive. The qualitative approach uses risk in a comparative way to identify if one activity carries higher risk than another. In a port and harbour risk assessment, the application of risk in a carefully thought out comparative way allows identification of activities which result in higher levels of risk, without the need to determine the absolute value of the risk. This alone dramatically reduces the cost of the assessment and can provide the key information needed to establish safety priority and thus inform the initiation of a safety management system. It is beneficial for a regional council or port company to adopt this approach as it provides answers to determine the priority of risk control within the harbour or port. This allows a Port and Harbour Safety Management System to be introduced in manageable stages, concentrating first on those defences, which control higher risks.

Risk Assessment Criteria and Structuring

This section introduces the risk criteria needed to undertake a port or harbour risk assessment consistently and provides advice on structuring the risk assessment.

Port and Harbour Risk Assessment Criteria

The risk assessment criteria have been laid out in this section for guidance and to provide a consistent framework.

They are recommended because they provide a consistency of standard for all ports and harbours. However, consideration should be given to modification of one scale should circumstances at a particular harbour or port demonstrate the need.

Frequency Criteria

When the frequency component of risk is considered, there is a choice between basing the scale on a per-movement basis or a simple per-annum basis. Where ports or harbours have a larger number of movements, a per-movement scale can be considered as this provides a simple set of criteria for reporting safety performance once the safety management system is established. There is risk assessment and safety management software available which can swap between a per-movement and a per-annum frequency scale at any stage.

Consequence Criteria a Cross Four Categories

Experience of applying risk assessment to navigation in ports, harbours and across marine operations generally has shown that the use of four categories of risk provides significant benefit, especially when a risk matrix approach is used. These are:

- Risks to People
- Risks to Property
- Risks to Environment
- Risks to Harbour Stakeholders.

With regard to the harbour stakeholder category, this reflects the impact on the wider interests of the harbour and its stakeholders. Thus, for example, the potential loss of trade from an incident is taken into account. Following a major grounding in any harbour, it is likely that loss of trade will occur for a considerable period of time due to complete or partial closure. In marginal trading locations, this can move the balance towards permanent closure.

Risk Assessment Stages

The aim of a risk assessment is to define and minimize the risks that have to be managed. Risk assessment techniques are fundamentally the same for large and small ports, but the execution and detail will differ considerably. A risk assessment will typically involve five stages:

- **Problem Identification, Scoping and Risk Assessment Design (Information Gathering)**

Anybody undertaking a risk assessment has to start by taking stock of the organization, its culture, policies, procedures and priorities, and assessing the existing safety management structure. One approach is to use this stage to inform consultation with those working in and using the port, and others; another is to do that consultation as part of this first stage. This stage and a full consultation exercise are not alternatives.

- **Hazard Identification**

Any list of hazards will include those already known (for example from incident records) and the existing defense mechanism/safety management system relating to them. The collective process needs to identify new hazards which may have been ignored, created by new trade or changes in marine operations or overlooked in the past. A hazard may occur as

a result of one or more events taking place, for example a vessel may ground because a pilot did not board at the usual place and the vessel proceeded further inbound than planned. A harbor authority manages these events and minimizes their opportunity for occurrence by use of control measures and risk mitigation measures.

Within the process of hazard identification and risk assessment, ports should

- Take due regard of the link between
 - The port authority
 - Terminal operators
 - Vessel operators
- **Risk Analysis**

Hazards need to be prioritized. A method, which combines an assessment of the likelihood of a hazardous incident and its potential consequences, should be in use. This is likely to be a matter of judgment best taken by those with professional responsibility for managing the harbor. A further round of consultation can gather the assessments of others on that judgment. The frequency of incidents can be established in part using historical data identified in the first stage of the work. It can be determined using a qualitative scale or on a per-shipping movement basis, or a combination of the two. There are a number of software tools now available to help in this process and to assist in the subsequently developed safety management system. The likelihood of a hazardous incident and its potential consequences can often be determined with reference to historical data. However, it should be borne in mind that following an incident the risk of it re-occurring should be reduced by management action. Therefore, any assessment of frequency and consequence is likely to rely to a certain extent upon the judgment of the assessors or others capable of making such a qualified estimate. Historical data alone will not provide a true assessment of the risk of the current operations, nor will it necessarily reveal an extremely remote event.

Risks and the impact of identified outcomes must be normally assessed against four criteria; the consequence to

- Life (public safety)
- The environment
- Port and port user operations (business, reputation etc) and
- Port and shipping infrastructure (damage)

Such an approach not only assesses the impact of hazards on port safety, but also their impact on other important areas of the port infrastructure. It may be appropriate to divide the harbour into several different areas for this process.

- **Assessment of Existing Risk Control Measures**

Risk assessment necessarily includes a review of existing hazards and their associated risk control measures. As a result, new risk control measures (or changes to existing risk control measures) may be identified for consideration, both where there are gaps in existing procedures and where risk controls need to be enhanced.

Some control measures might also be relaxed so that resources can be re-designated to meet a new priority. Care should be taken to ensure that any new hazards created as a result are themselves identified and managed. The overall risk

exposure of the organization itself will be identified during this stage and will allow recommendations to be made to enhance safety.

- **Identification of New Risk Control Measures**

All final decisions about risk control methods should take into account relevant legislation, which establishes minimum standards. Human factors should consider. The aim is reduce risks as low as reasonably practicable. There is a preferred hierarchy of risk control principles -

- **Eliminate Risks:** By avoiding a hazardous procedure, or substituting a less dangerous one;
- **Combat Risks:** By taking protective measures to prevent risk;
- **Minimize Risk:** By suitable systems of working.

If a range of procedures is available, the relative costs need to be weighed against the degree of control provided, both in the short and long term.(PMSC, 2011)

Dynamic Risk Assessment

Dynamic risk assessment (DRA) is used to evaluate the situation, tasks and person at risk when carrying out any form of activity – whether routine or unusual.

This process helps an individual to effectively assess a situation, as it is unfolding.

The person can continuously assess the circumstances and adjust his or her response to meet the risk presented moment by moment.

Examples of using DRA to deal with the unexpected might include.

- When handling a major incident;
- If an obstruction occurs in a navigation channel;
- Navigation of vessels in particularly poor visibility
- Equipment failure (either on board a vessel or ashore)
- A combination of the above

It is essential that the generic risk assessment for the project describe clearly, who is responsible for the subsequent DRA. Monitoring that dynamic risk assessments are taking place.

It is unlikely that DRAs will be formally recorded, so there will be less evidence that the process is in fact taking place. Nevertheless, during monitoring and inspection exercises, it should be possible to demonstrate that it occurs. For example, discussions with persons recorded as being competent to carry out dynamic risk assessments should elicit examples of on-going work and decisions which reflect (amongst other things) how health and safety considerations have been included in their thinking. Over time, some of these dynamic assessments will lead to a review and revision of the planned / formal risk assessment, and there will be evidence of this. Managers can question staff about the health and safety implications of developments at any time, and make a brief note that they have done so. Routine team or individual

progress meetings, or meetings to discuss the effectiveness of performance could also be used for this purpose. There may also be examples of individuals reaching the limits of their competence, and asking for the work to stop until they have more training, information, assistance or resource – which should result in a review of the original assessment. (A guide to good practice on port marine operations-2009)

IMPROVING THE PRODUCTIVITY OF MARINE CONTAINER TERMINAL

The Performance of Container Terminal

The basic function of the container terminal is the transport and storage containers. In accordance with that, terminal operators are concerned with maximizing operational productivity, the container is handling at the berth and in the marshalling yards, and mobilizing and effectively utilizing available with on ground area. The maritime CT (container terminal) defined as a facility, which enables the transshipment of intermodal transport units or containers between various modes of transport. The focus is always on the seaside, where sea transport represents the primary service of the system. In other words, a maritime CT is a place where containers leave and enter by different means of transport, such as vessels, trains and trucks; the terminal is hence the basic intermodal node in the logistics network and for this reason, all operations involved in the flow of containers have to optimize. The container trade, the container ships capacity and container terminals are in rapidly growth. In addition, given the trend towards large container ships, and the pressure on the port operations is higher than ever before which made the need to Increase the efficiency of the terminal operations is more important. The efficiency of a maritime CT mostly depends on the smooth and efficient handling of containers. The handling systems and the automation level are the basic elements of productivity. (Bielli, 2005)

There is a direct container handling productivity of the functions of a container terminal, including the ratio of the number and movement of container quay cranes, yard equipment and use, and productivity of workers who work in the waterside, land, and gate operations. Efficient use of available land area related to the number of containers stored in a specific area of the station. Better use of the land area usually reduces operational access to the container, that is, the land use of space and access is associated inversely related to container. The challenge is to define access to container on land use based on the operational objectives of the station and the unique physical characteristics. Terminal operators, only can control some of them a range of factors, which influences the productivity of container terminal. (DOWD, 1990)

The Main Impacts on Productivity

At present, there are a variety types of CTs around the world differing in shape layout, handling technology, automation level and process organization. CTs also differ between regions, countries and very often within certain countries, a typical CT consists of three subsystems: a berth, container yard and delivery zone thus, they consist of several components, which have different impacts on the productivity of the entire system as follows:

- A vast number of different berths with specialized berth cranes of different types.
- Leading and driving lanes for trucks, with different length and position
- Transshipment zones with several loading tracks under gantry cranes.
- Loading/discharging tracks, capable of accommodating an entire train, which differ in length and position on the terminal

- Storage areas with different shapes, technology and static capacity
- Check in/out gates or entry points (Beškovnik, 2008)

The layout of a certain terminal has a very strong impact on the infrastructure and superstructure of different subsystems and on the entire system because it determines the position of subsystems, connections between them and technology to be used the layout of a terminal depends on different elements

- Available local space (The inland side and the seaside)
- Rail and road regional and local networks
- Quantities of maritime and continental cargo flows
- Technical concept of using the superstructure of the terminal
- Number of inland and CTs in the surroundings

(The flagship journal of international shipping and port research, 1990)

Improving the Productivity of the Marine Container Terminal

The most important problem in a modern CT is the coordination between the loadings and discharging operations of the vessels and the containers storage in the yard and the transfer it from and to the gates, Road transport is also important for systems which represent the entrance point for the hinterland. In addition, the waiting and stopping time at terminals need to be short, in order not to prolong the total times of transport / transit. This requires the employment of fast and sophisticated technologies, with high capacity and a low cost per move as well as of skilled workers, moreover the uses of new technologies requests more direct financial investments but the impact on productivity is definitely greater. Efforts to improve productivity in marine CTs must balance the needs of the many factors that affect the terminal; improvements within the terminal must be accomplish without adding to the total cost of transportation the question of improving terminal productivity (Alessandri, 2009).

THE RISK ASSESSMENT AND EFFECTIVE ON THE IMPROVING THE PRODUCTIVITY IN EGYPTIAN CONTAINER TERMINAL

Risk Assessment approach improves the Productivity and creates immense value for container terminals. Risk Assessment has to be an essential part of Strategic Management of terminals for managing the Industrial unit safely and efficiently in light of the emerging global business scenario. One of the important factors in terms of optimizing the operation is the way value at risk involved in the task handled. Thus, it becomes important to have a proper risk management strategy in place to tackle the value at risk in an industrial unit. The aim of the research is to delve into the level of risk management exercise undertaken and to study the imperatives thereon. Risk management is an integrated process of describing specific areas of risk, developing a comprehensive plan, integrating the plan and conducting ongoing evaluation. The risk assessment is the process of identifying risk, assessing risk, and taking steps to reduce risk to an acceptable level. This guide provides a foundation for the development of an effective risk management program,

Moreover, the risk management is mainly effective in the development of the national economy, the working environment is consider one of the basics of sustainable development which determinants affecting the productivity of the

port. Working through unsafe ways, that leads to many risks and by applying the risk management on port workers, it is found that the safety of the workers is contributing effectively in increasing and improving the quality of production.

The preservation and promotion of worker safety through accident prevention, control on it, and eliminating of factors, risks and professional conditions harmful to workers during the work, which helps workers in the ports of the practice of life socially and economically productive and contributing positively to the sustainable development. in the other hand, the maintain and care about machines and equipment used in the container terminal are consider second element of the reasons for increased productivity by making continuous maintenance and periodic follow-up safely during working hours will increase the life span and thus increase productivity.

CONCLUSIONS

- The risk management is the process of learning that peoples take to build a risk assessment and management skills have become risk management strategy and, instead an integral part of an important tactics of the company during these days
- RM key element plays critical roles to ensure the effective operation and management of sea ports and container terminals, as part of RM the process of risk assessment is the main goal.
- Container terminals is the significance of the assets, due to an unstable and complex environment there is a need to improve the risk assessment and preventive measures and priorities for improving logistics infrastructure
- The main problem that the port managers and auditors facing are the lack of appropriate methodology and evaluation techniques to support risk management
- Safety considered as a critical measure for success of any industrial enterprise. There is a threat to the reputation of the port, but also the possibility of penalties and fines, and the erosion of shareholder value, closing the factory, and in some cases even if the mortality safety accident to happen
- Ports which are not able to comply with the safety procedures in an effective manner are at risk to lose the competitive advantage
- Risk Management encourages partners to increase their investment in terms of productivity have a positive effect for increasing productivity

RECOMMENDATIONS

- Risk management to be applied to all processes in container terminals. To take corrective and preventive actions in the earlier stages to defeat a variety of problems
- Ports must have a system and thinking about the strategy to use the information available and making check lists to recover all types of disasters, they will be able to achieve the most effective results to counter the threat which leads to a higher rate of safety, which provides a safe environment to assist in the productivity of the port
- Ports have to achieve adequate planning for natural disasters and apply risk management effectively to a various types of threats, for that we recommend to encourage ports stakeholders to use existing forums to discuss all the

risks and include Port Authority, representatives from local emergency administration office, Maritime Administration, the ship and the facility owner / operators.

- To help ensure that the ports have sufficient understanding of resource recovery from maritime disasters, we recommend that the Minister of the Ministry of Transport to direct the Director of the Maritime Administration to improve a communications strategy to inform the ports of marine resources available for recovery efforts.
- Every organization has a mission. And risk management plays a critical role in protecting the assets of the institution, and therefore it is there mission,
- Awareness of risk management reduces a risk and helps the development of ports and increase productivity
- Training to Risk management is the process of teaching the individual skills needed to build a risk assessment and management, and has become an integral part of strategic ports in recent years
- The vision of safety needs to be developed at the top level.
- The risk management system for container terminals Egyptian needs to be implemented.
- There should be training courses to be held regularly to improve the skills of workers dealing with dangerous goods in accordance with ILO organization.

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