

---

## An Internationalized Approach to European Perspectives for the Safety and Security in Port Industry

---

Chlomoudis C. I.<sup>1</sup>, Kostagiolas P.A.<sup>2</sup>

### **Abstract**

*The increased internationalized competition as well as the evolvement of the transport industry as a whole, has a significant effect on quality and safety management for the ports around the world and more specifically in Europe. Quality is a complex and subjective concept, incorporating at any given time the expressed and implied needs of all those involved. Over the last two decades, new security and safety risks have been introduced by the European Union for the ports in Europe. These include new safety and security regulations for environmental as well as for other important aspects of the port operations. This paper explores ideas involved in quality and safety EU policies through a qualitative review of the literature. The qualitative analysis aims at a. to investigate contemporary issues for quality and safety/security systems integration within European port industry and b. to provide evidence for the interrelation and integration of quality and safety/security standards. Furthermore, benefits and pitfalls of the different quality and safety approaches are discussed while further study directions are provided.*

**Keywords:** quality, safety, security, environmental management, port industry, E.U

### **1. Introduction**

The increased internationalized competition as well as the evolvement of the transport industry as a whole, has a significant effect on quality and safety management for the ports around the world and more specifically in Europe. Ports provide a major contribution to the sustainable growth of the communities in which they are established (Chlomoudis, 2005). They have been consistently identified as key links in the logistic chains between producers and the markets. At the same time however, safety/security related concerns have also been increasing and are becoming sources of local and regional disputes. It has now become necessary to take a proactive approach aiming to identify risks and then to control them. This has to be undertaken in a way that constantly identify risks within all port process. In the operation of ports, this has never been more important due to the very serious implications of maritime accidents (Darbra & Casal, 2004). This paper explores through a qualitative review of the literature, ideas involved in quality, security and

---

<sup>1</sup> Professor, Department of Maritime Studies, University of Piraeus, Address: 40 Karaoli and Dimitriou Str., 18532 Piraeus, Greece, Email address: [chlom@unipi.gr](mailto:chlom@unipi.gr), Phone: +302104142548

<sup>2</sup> Lecturer, Department of Archive & Library Sciences, Ionian University  
Address 72 Ioannou Theotokis str., 49100 Corfu, Greece, Email address: [pkostagiolas@ionio.gr](mailto:pkostagiolas@ionio.gr),  
Phone: +302661087402, Fax: +302661087433

safety. The analysis aims at a. exploring issues for quality and safety/security systems integration within European port industry and b. providing evidence based on the Greek experience.

## **2. Background Information: Bridging Safety–Security–Quality**

Among the myriad omnibus and/or special initiatives, standards, and regulations within maritime industry, only a relative small number have attained a high degree of recognition. Some of them are voluntary while others are compulsory. The omnibus or not character relates to whether they are specific for a particular sector or they are multi-sectoral in nature. A significant issue for the implementation of every safety approach is the identification and management of hazards and the associated risks. In fact, hazard and risk identification is required by all international standards and shall be performed for every system implementation (Li & Wonham, 2001). Such analyses however is quite complex and often not all risk factors are identified. Moreover, different safety/security systems aim at different risk categories. This however is introducing variability in the usefulness of particular safety systems development and implementation. In the majority of applications a reactive approach is adopted, often as ad-hoc response to serious hazards arises from historical information and current issues.

Quality is a multidimensional concept which is directly related to specific organizational goals. Quality should be looked upon as a never ending upward spiral. Nowadays, the quality approaches within the port industry ought to encompass the requirements that are generated by different interested parties for safety and security (Lopez & Poole, 1998; Chlomoudis et. al. 2005). Safety and security are becoming increasingly important to the extent that they may be considered to be synonymous or entirely integrated to concepts such as the “quality” (Celik, 2009). Accidental losses of property, income, life and health represent serious potential financial and non financial risks to ports. The different ports however, are mostly affected by distinct risk categories due to the uniqueness of each port environment, as well as the variability of the impact associated with each risk for each port. Moreover, distinct safety approaches are mostly related with one or more of the different risk categories of the Table 1.

**Table 1: Risk Categories and Risk Factors in Port Industry (adopted from Chlomoudis et al, 2010)**

Risk category	Risk factor
Human	ship collisions, contact, stranding, grounding, foundering, sinking, capsized list, navigation error, pilotage error, failure of ships master and/or personnel to correctly follow pilots directions, poor maintenance, cargo handling and storage, passenger traffic
machinery/technical	damage to equipment, fire/explosion, machinery failure, structural failure, industrial risks
Environment	marine pollution such as ships emissions, dredging, oil spills, chemical contaminants, ballast waters, ship breaking /salvage activities, air toxics, noise pollution and climate change, alien species
Security	war, terrorist and illicit actions such as intrusion, theft, smuggling, vandalism, illegal immigration, blockade
Natural	earthquakes, volcanic eruptions, hurricane, strong winds, heavy swell and sea, floods, heavy rain

### **3. A method for studying Quality/Safety/Security standards for the European ports**

The pathway to quality and safety is not unique due to a number of different issues, including ethnographic as well as other groups of factors such as political, economic, social, and technological. Contemporary approaches within the port industry ought to encompass internal factors as well as the requirements that are generated by the different interested parties. The available approaches based on prevention, seem to have been strained to the limits of their performance, and still the results need to be evaluated (Thai, 2009). Quality need to be custom-made and extend beyond one standard or one approach (Tyrinopoulos & Aifantopoulou, 2008). For research purposes the various international approaches can be divided into principles and standards in the lines of McIntosh et. al. (2003). The principles are a set of values that underpin behaviour, and so by their very nature are non-specific and often included in conventions.

For example, in 1998 the International Labour Organisation (ILO) issued the not binding Declaration on Fundamental Principles and Rights at Work. Similar in nature are the guidelines by the Organisation for Economic Co-operation and Development (OECD) for multinational enterprises which have been firstly established in 1976 and revised in 2000 in order to include all of the core ILO labour Conventions. European Union conventions (e.g. 2001/96/EC) include safety in maritime transport through the reduction of shipping accidents involving bulk carriers. The high number of bulk carrier accidents is mainly caused due to the improper loading and unloading at bulk carriers terminals. The EU considers the above mention problem as a quality problem (Cherdvong et al, 2008 ). Finally, European Sea Ports Organization (ESPO) published an environmental code of practice for EU ports (ESPO, 2005).

For our analysis we further separate the quality/safety/security standards into those characterized by processes, performance, foundation, and certification. The process standards are defined through specific set of requirements that a port should follow in order to develop a quality/safety/security management system. Over the last two decades, national and international organisations have developed and introduced various generic approaches that pertain to the implementation of process-oriented management systems, quality, security and safety assurance ISO or EN standards, Total Quality Management programmes and various accreditation models. For example the Social Accountability 8000 (SA8000) standard, is a global multi-sectoral standard assuring that workers' rights are being respected. An alternative approach is the Accountability 1000S (AA1000S) which was established in 1999 by the Institute of Social and Ethical Accountability (AccountAbility). AA1000S is a process based compatible to ISO 9000 and ISO 14000 standard. Port specific quality initiatives in Europe include the cases of the port of Valencia, with the port specific quality management system referred to as MARCA and the Port of Nantes/ Saint – Nazaire with its continuous improvement program for port services (UNCTAD, 1998).

**Table 2: Categorization of safety approaches for the port industry (adopted from Chlomoudis et al, 2010)**

Safety Approaches	Standard Category				
	Principle	Processes	Performance	Foundation	Certification
ILO Conventions	√			√	
OECD guidelines	√			√	
OHSAS 18001		√			√
SA 8000	√	√		√	√
AA1000S		√		√	√
COM 2001/96/EC	√			√	
ISO 9000		√	√		√
ISO 14001		√			√
PERS		√			√
ISO 28000		√	√		√
ISO/PAS 20858		√	√		
ISPS code	√	√			√

Performance standards are based on groups of qualitative and/or quantitative measures. In this case, evaluation is taking place through criteria that cover the full range of the stakeholder views. These include port choice behaviour, customer satisfaction surveys, and SERVQUAL applications (Ugboma et al, 2007; Pantouvakis et al, 2008; Thai, 2009). Indeed, the standards are based on a number of “carefully” chosen measurements that are aligned with its mission and strategies, and they may provide an indicative picture of quality, safety and security levels. Due to the diverse situation of ports throughout Europe, an omnibus criteria setting for all

ports in Europe may be proven to be a potentially controversial exercise (ESPO, 2005). The foundation standards set the foundations for a novel or emerging safety/security issue, describing what constitutes best practice in an emerging area. These may include approaches for a number of security threats including ozone-related human health impacts associated with port equipment emissions and emissions from large marine diesel engines on ships.

**Table 3: Interrelation of safety approaches, standard types and risk categories (adopted from Chlomoudis et al, 2010)**

Safety Approaches	Risk category				
	Human	Machinery/technical	Environment	Security	Natural
ILO Conventions	√				
OECD guidelines	√				
OHSAS 18001	√				
SA 8000	√				
AA1000S	√		√		
COM 2001/96/EC		√	√		
ISO 9001	√	√	√	√	√
ISO 14001			√		
PERS			√		
ISO 28000				√	
ISO/PAS 20858		√		√	
ISPS code		√		√	

The certification standards establish a system which certifies compliance through a third party audit. The ISO 9000 series of standards create the basis on which a port can certify a quality management system. This standard is compatible and can be integrated with other certification standards for safety (e.g. ISO 14001) and security (ISO 28000). Environmental issues in particular are addressed by the Port Environmental Review System (PERS) which is formulated to be flexible and is considered as a step towards ISO 14001 (Cherdvong et al 2008; Darbra et al, 2009). Port security including considerations regarding smuggling, asylum seekers, illegal immigrants, sabotage, theft and pilferage of cargo is addressed by ISO 28000 and the ISO/PAS 20858 standard. It should be noted however that this particular standardization document, being a Publicly Available Specification (PAS), it has not matured to a homophonous decision as an ISO standard but it has been accepted by at least the 2/3 members of the committee casting a vote. The ISO/PAS 20858 is designed to assure that the requirements of ISPS code are met through appropriate security practices that can be verified by an outside auditor. Hence, the ISO/PAS 20858 is ISO 9001 compatible and establishes a framework assisting the development of a security plan as required by ISPS code and drafting a Port Facility Security Plan (PFSP).

In the analysis twelve distinct safety principles and/or standards have been discussed and presented in the Table 2. In columns 2 to 6 the distinct standard types are provided. It is rather clear however that the various approaches and standards may belong to more than one of the standard categories, i.e. principles, foundation standards, process standards, performance standards, and certification standards. The distinct safety approaches are interrelated to the different risk categories of the table in the slide. In the first column of Table 3 the different standards are shown while in columns 2 to 6 the different risk factor categories are provided. For each of the distinct safety standards of the first column, information about the nature of the standard is provided through its association with the distinct risk categories. For example, the PERS environmental standard, is a process standard and its application lead to certification while it focuses in environmental risks. Similarly, OHSAS 18001 is a voluntary, process based standard that may lead to certification and deals with working accidents. As can be noted from the table the most general in scope standard is the ISO 9001 covering all the risk categories. Although the ISO 9001 is widely acceptable, the omnibus nature of its requirements introduces variability and a high level of specialization is required if all risk categories need to be addressed in detail. Hence, in many cases is employed together with other more specialized international standards for safety/security in ports. Recently the ISO 9001 standard has been investigated in the literature (e.g. Celik, 2009) together with the International Safety Management Code for Safe Operation of Ships and Pollution Prevention (ISM code) in order to create an Integrated Quality and Safety Management System (IQSMS).

#### **4. The Greek experience**

In Greece, the adoption of quality and safety standards has increased considerably. In 2009 we have conducted a survey in order to record the quality and safety systems implementation in the Greek ports. In Greece, the EU legislation (2001/96/EC) has been the main force for port quality and safety dispersion. Indeed, the EU legislation requires implementation of ISO 9001 in bulk carrier terminals. At the time of the research, four mainland ports (Volos, Kavala, Elefsina, Thessaloniki) have implemented and certified ISO 9001 quality management systems; while Piraeus and Thessaloniki have both accredited the PERS environmental standard. In fact, these two ports belong into the ecoports network and were among the first who actually implemented the PERS standard. From the ports included in the research, the majority has or was going to accredit more than one international quality and safety systems. Indeed, the port of Piraeus plan to implement PERS, ISO 14001 & EMAS together with ISO 9001. The environmental concerns seem to be the prevalent and hence the Greek port organizations included in this research, are accrediting environmental management systems through international standards. Facing the problems in Greek ports, in the consolidated organizational daily routines, is indeed a challenge. One may further argue that the various groups of

interested parties in Greece, both within the port community and outside of it, do not immediately prioritize quality and safety initiatives in the same way.

## **5. Conclusions**

Although many international safety standards have been made available for the port industry over the last two decades, a comprehensive policy should include different standards implemented together and integrated in order to compliment each other. At this point ISO 9001 could be seen as a link and as an integration starting point for the different voluntary and/or mandatory safety approaches for the ports. From a practical viewpoint, the findings provide an indication that safety concerns for environmental management are indeed at the centre of attention; while there seems to be a tendency in favour of ISO 9001 implementation and certification. There are, however, a number of questions that although have been addressed in other sectors they should be addressed specifically for the European ports and may boost quality, safety and security in the near future:

- What is the leadership necessary to steer a quality/safety/security program?
- How staff can be empowered?
- From where should the resources come to establish and maintain a quality/safety/security program?
- What must be done to communicate across stakeholders in order to align perceptions and achieve clear quality/safety/security goals?

Although many opinions on the different approaches toward the assurance and the improvement of quality for various business sectors have been suggested, quality and safety/security has and it will be an aspiration for research.

## **Acknowledgements**

The results for the Greek port industry are also included in a detailed empirical research conducted with the contribution of Dr. Chr. Lampridis.

## **References**

1. Celik, M. (2009). Designing of integrated quality and safety management system (IQSMS) for shipping operations, *Safety Science*, 47 (5), pp.569-577.
2. Cherdvong, S., Nowarat, C., Wenresti, G.,G., and Chanachai L. (2008). Environmental performance evaluation of an industrial port and estate: ISO14001, port state control-derived indicators, *Journal of Cleaner Production* 17, pp.154–161.
3. Chlomoudis, C.I. (2005). *Port Planning in Modern Port Industry*, Jei & Jei,

- Athens.
4. Chlomoudis, C., Kostagiolas P., and Lampridis, C. (2005). Prospective employment of quality awards in the seaport industry: Old solution to contemporary questions. *Proceedings of the International Association of Maritime Economists (IAME) Conference 2005*, July, Limassol, Cyprus.
  5. Chlomoudis, C., Kostagiolas P., and P. Pallis (2010), A study for risk and safety systems implementation in the port industry: a review of the literature, *Proceedings of the International Association of Maritime Economists (IAME) Conference 2010*, September, Spain.
  6. Darbra, R.,M., Pittam, N., Royston, K.,A., Darbra, J.,P., and Journee, H. (2009). Survey on environmental monitoring requirements of European ports, *Journal of Environmental Management* 90( 3), pp.1396-1403.
  7. Darbra, R.M., and Casal, J. (2004). Historical analysis of accidents in seaports. *Safety Science*, Vol. 42: 85–98.
  8. ESPO, 2005, Review of European Performance in Port Environmental Management, [WWW]  
<URL:<http://www.espo.be/downloads/archive/36f31a9e-e902-40c1-85ef-9826324f6d5.pdf>.
  9. Li, K., X., and Wonham, J. (2001). Maritime legislation: new areas for safety of life at sea. *Maritime Policy and Management* 28 (3), pp.331–338.
  10. Lopez, R., C., and Poole, N. (1998). Quality assurance in the maritime port logistics chain: the case of Valencia, Spain, *Supply Chain Management*, 3, pp.33 – 44.
  11. Pantouvakis, A., Chlomoudis, C., and Dimas, A. (2008). Testing the SERVQUAL scale in the passenger port industry: a confirmatory study, *Maritime Policy & Management*, 35(5), pp. 449 – 467.
  12. Thai, V. (2009). Service quality in maritime transport: conceptual model and empirical evidence, *Asia Pacific Journal of Marketing and Logistics* 20 (4), pp. 493-518.
  13. Tyrinopoulos, Y., and Aifantopoulou, G. (2008). A complete methodology for the quality control of passenger services in the public business transport, *European Transport*, 38, pp.1-16.
  14. Ugboma, U., Oguede, I., Ugboma, O., and Nnadi, K.. (2007). Service quality and satisfaction measurements in Nigerian ports: an exploration, *Maritime Policy and Management* 34, pp. 331 – 346.
  15. UNCTAD, (1998). Quality Management: The Port of Nantes/ Saint – Nazaire experience, (NEW YORK: U.S.A: UNCTAD).