Regressive safety practices in the globalised shipping industry

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ABSTRACT
The highly fragmented structure of the globalised shipping industry necessitates a regulatory-driven environment for its basic administration. This is a highly safety-critical industry, but regulatory updates only take place after an accident has taken place, based on a retrospective analysis of incidents and accident investigations. This leads to the goal of avoiding the recurrence of past incidents (and arguably newer occurrences too) through regulatory updates of the instruments of the International Maritime Organisation (IMO). This paper highlights the limitations of such an approach and shows how existing health and safety practices in the shipping industry are inadequate to cope with work environments that are changing rapidly as a result of economic and technological pressures. Paradoxically, while safety requires attention to how workers negotiate risks and uncertainties in everyday practice, in the contemporary shipping industry workers are increasingly denied the opportunities for socialisation, rest and organisational support that make such negotiation possible. As a consequence, interpretations of accidents by ‘experts’ as matters of human error by the crew acquire the status of fact, further compounding the disempowered position of workers. This leads to a general downward spiral in safety practices. The paper draws on an exhaustive review of the relevant literature as well as empirical evidence obtained from interviews. It critiques the current operational definition of safety in the industry and concludes that the progress the shipping industry believes it is making, mainly, at present, through technology integration, is tardy and may even be regressive and counterproductive.

Introduction
Transportation is said to be the fourth cornerstone of globalisation, along with telecommunications, trade liberalisation and international standardisation. In transportation, it is maritime transport that dominates the sector, with an 80% share by volume (Hoffmann & Kumar, 2010; UNCTAD, 2013). The declining cost of marine transportation that facilitates the growth of world trade is increasingly achieved...
through efficient port operations, economies of scale achieved by increasing the size of ships and, importantly, the economic advantages resulting from globalisation. Shipping is today an integrated constituent of global supply chains, so marine transportation is constantly under pressure to contribute to the goals of cost reduction, time compression, reliability, standardisation, just-in-time delivery, information system support, flexibility, and customisation (Morash & Clinton, 1997).

However it must also be appreciated that maritime transport is a safety-critical industry and concerns for human safety and environmentally safe operations co-exist with attention to service quality that includes operational and managerial efficiency. This leads to an emphasis on indicators of service performance, increasingly enabled by technological applications for process efficiency, as well as safety. Shipping produces its service with the ship as its core constituent unit, operating in geographical isolation from management, with a handful of crew and in a high-risk environment.

While globalisation affects how most industries function, the impacts on the shipping industry are especially significant. This is because of the ease with which the owners of ships can register their assets in regulatory havens just by changing the flag the ships fly. This enables the industry to pick and choose between liberalised regulatory regimes to their economic advantage. Today ships fly flags of convenience (FOC) that enable them to benefit from a governing environment that is liberalised in its regulation, and further allow them to be crewed by seafarers of different nationalities. There are typically three key players in the shipping industry: the asset owner (ship owner); the asset user (charterer); and the asset operational manager (ship manager), in addition to the many different sub-contractors they employ. Because each party has a different interest and motivation this results in a ‘split-incentive’ phenomenon in a common enterprise.

This fragmentation has led to a regression to a compliance-driven culture as the means of governance for this globalised industry. The International Maritime Organization (IMO) sits at the apex of this process. However the IMO only facilitates the policy agenda. Policies are deliberated and acted upon by the constituent member Flag States and, ultimately, the few open-register flags of convenience with the largest registered tonnages influence the standards that emerge from this process. Furthermore, when it comes to the implementation of these policies by the individual flag states, compromises are made in order to attract and/or retain ship registry. The theory of regulation holds that regulatory politics are dominated by industrial lobbies that campaign for regulations that shield business profits and against those that burden the industry (Wiener, 2004). In this process, pressures to mandate advancements in safety practices are heavily weighed against the economic logic of minimising the costs and maximising the returns for each partnering entity. This results in a situation where progress is slow, incremental and very fragmented. There is no concerted effort to take collective responsibility for safety or drive improvements holistically, despite the fact that technological integration is bringing major changes. Accident and incident analysis still remains the most important tool for enabling lessons to be learned to prevent the repetition of accidents, although this is based on questionable methods for investigating and analysing accidents.
Ship management companies also take advantage of globalisation in their recruitment practices, typically engaging the services of specialist crewing agents who offer competitive services by recruiting labour from the new labour supply countries (Progoulaki & Roe, 2011). They further intensify the use of this global labour force through reduced and multicultural crewing and extended working hours, taking advantage of the weak labour rights and lower wage levels that prevail in these source countries. Such ‘low road globalisation’ practices, fuelled by constant economic pressures, severely undermine seafarers’ capability to negotiate to minimise the risks associated with the hazardous environments in which they have to work. These ‘organisational factors’, typical of the industry, are overlooked as root causes of accidents and incidents that compromise seafarers’ safety and, when accidents occur, it is usually the seafarers who are held directly to blame. This in turn triggers corrective actions that do not address the root causes of the problem, so that potentially unsafe practices persist and may even escalate. Thus, a downward spiral in safety practices is brought into being, perpetuated by the liberalised environment that subtracts regulation from workplaces. However this is also linked to tight, and sometimes competing, systems of regulation that drive workers ever harder, further compromising their position.

**Methodology**

The research strategy adopted for the study on which this paper is based was a literature review covering the maritime domain and that of other safety-critical industries, supplemented by qualitative semi-structured interviews with a purposefully-selected sample of shipping professionals. This strategy was adopted because, as Sharma (2008) points out, the literature within the maritime industry is scant and there is a lack of research on the topic. The maritime industry has not generated or retained researchers over time and, as a result, there have been few opportunities to study ship management in general or shipping services management in particular. Heuristics and rules of thumb remain the most common means of driving advances in this industry, rather than any scientific approach based on proper research (Bhardwaj, 2013).

For an exhaustive literature review a snowball strategy was adopted, achieved by following up on references in the studies that were initially retrieved. This literature was analysed by re-reading the texts, summarising and tabulating the key ideas, concepts and interpretations. The need to supplement this information with interviews was clear, both to obtain essential information and to access participants’ views (Opdenakker, 2006). Face-to-face interviews were supplemented by email communication. The semi-structured interviews were informed by thematic guides and carried out in confidence (Denzin & Lincoln, 2007).

Six interviews were carried out in Chennai and Mumbai in India. Two of these interviewees (Investigator 1 & 2) were actively engaged in accident/incident investigations on behalf of insurance companies, Flag States and P&I clubs¹. Two were shore-side managers (Shore Manager 1 & 2) of shipping companies with responsibility

¹ A P&I Club is a mutual insurance association that provides cover for its members who are typically ship-owners and ship-operators for risks not usually covered by marine insurers, like third party liabilities, environmental pollution etc. Unlike a marine insurance company which is answerable to its share-holders, a P&I club is only responsible to its members and runs as a non-profit business.
for risk management and designated persons. The final two were shipboard staff (Seafarer 1 & 2) in the senior shipboard management functions of Master and Chief Engineer, interviewed while they were on leave. All six interviewees had extensive experience of handling ships of a variety of registrations. The rationale for this choice was to obtain a good breadth and depth of insights into this critical area of shipping operations.

**The limitations of a regulatory-driven approach**

In a compliance-driven culture any new regulation tends to get enacted only after there has been an accident, and shipping policy is rife which such examples; indeed, almost every new regulation can be easily linked to a major accident that caused it to be enacted. This approach is reactive and based on retrospective analysis. Whatever is not regulated is not controlled. There are thus large areas in which the logic of low-cost operation prevails, uncontrolled, with outright compromises to safety. This is an industry that in the main remains in the background, with no direct interface with the general public, except in the cruise sector. It therefore receives little public attention and is largely impervious to societal opinion and pressure. Thus shipping companies remain free to act in their own self-serving interests. The regulation-driven approach also creates a ‘command and control’ environment where corporate goals are met through manipulation of regulations and the regulators. This in turn generates secrecy: a ‘siege mentality’ sets in, in which safety issues, records and performance are not made transparent either internally or externally and no genuine lessons are learnt. Seafarer 2 comments:

*The shore based management, in order to meet short term objectives of notional compliance, put excessive focus on low-frequency incidents by addressing trivial issues (like missing lifebuoy, slips, trips and burns) whilst shying away from any real safety concerns that could have serious consequences. This actually creates a false sense of safety and major issues are buried under the carpet.*

This seafarer is a worker at the cutting edge of ship operations, and his comment highlights the wide chasm that exists between him and his managers on shore, who are responsible for providing him with support but who, instead of caring for his safety, seem to be driven by commercial motives.

Investigator 1 makes a similar point, saying:

*Yes, the trivial matters are obvious to the naked eye of any inspector or superintendent. But the culture has to change and that can happen only when the commercial pressures become less.*

Safety is not regarded as a core function, but is separated from these and treated as an additional cost. This can easily lead to a situation where the main aim becomes the protection of the company rather than the employee. It can also lead to a false sense of complacency, with a failure to recognise the damaging costs to the company, in terms of reputation and indirect consequences, in the event that an accident does occur, consequences which no claim of regulatory compliance on paper would exonerate.
The limitations of accident/incident analysis

This situation is exacerbated still further by the fact that the regulations that drive the industry are based on accident/incidence analysis techniques that lack rigour and depth. Barnett, Gatfield and Pekcan (2006) suggest that this analysis is relatively immature in the maritime world, where little scientific analysis has been undertaken to identify the trends and patterns. Even less analysis has been attempted to assess the significance and frequency of organisational factors, such as the incidence of commercial pressure, or the effects of organisational culture on the classification of causal factors as ‘human errors’ by operational workers. Macrae (2009) notes that accidents have traditionally been viewed as individual cognitive or behavioural issues caused merely by ignorance or carelessness. In reviewing the evidence, the same author reports that studies have consistently estimated that 80% of marine accidents are caused by human factors and laments the lack of recognition of the influence of the organisational context in shaping errors. Schroder-Hinrechs et al. (2012) also critically review the focus of maritime accident investigations and conclude that organisational factors do not receive sufficient attention.

This was further substantiated by the interviews:

**Interviewer:** It is a common perception that people physically closest to the incident are responsible for the occurrence of the incident, which may not be true. Are the investigators aware of this fact and do they exercise due caution while conducting the investigation?

**Investigator 1:** I agree to some extent. In any accident or incident the person closest has a better view of what went wrong, though he or she might not have actually committed the mistake which led to the accident.

**Interviewer:** Who are the people that carry out accident investigation? Are they always qualified or do they have too much experience in the domain, leading to hindsight bias?

**Investigator 2:** The personnel in good survey companies who conduct investigations are qualified as Marine Casualty Investigators and they possess the required technical skills and also possess due knowledge of legalities. Experience of Casualty Investigators is gained by repeated similar cases and the final output, which is the survey report, is usually vetted in-house before it is released. If the investigator approaches each case as a new one then the possibility of hindsight bias would be eliminated.

The International Ship-safety Management (ISM) Code mandates analysis of any reported incidents or near-misses. It encourages organisations to learn lessons by analysing the underlying causal factors in any given case so that similar incidents may be prevented in the future. Here, it follows Heinrich (1931) who theorised that the underlying causes of incidents which result in near-miss occurrences and those which unfortunately lead to more serious consequences, such as fatalities and injuries, are similar. Therefore, analysing the causes of near-miss occurrences and actual accidents have equally significant benefits. However, even at the level of incident reporting, findings reveal that such analysis is notably ineffective in the shipping context.
Research shows that the companies, in an effort to comply with the requirements, do give directions for root-cause analysis of incidents, but a closer look at the procedures directing questions for conduct of such root-cause analysis on board reveal that these questions are confined to pinning down the negligence only of the on-board staff (Bhattacharya, 2012). Key underlying concerns which made incident reporting in the industry so inadequate include weak employment practices, the absence of trade union support and lack of organisational trust. The employees’ fear of losing their jobs, for example, results in considerable under-reporting and this reflects deeper social issues and organisational weaknesses in the shipping industry. This is corroborated in the 2001 annual report from the Maritime Accident Investigating Branch (MAIB) UK, which, in summarising its analysis, highlighted the reasons that seafarers routinely fail to report accidents or near misses. According to this report, a main reason is that, regardless of the nature of incidents, they fear that they will be blamed for reporting them. The report concludes that ‘throughout the industry, mariners are genuinely frightened that if they were known to be reporting safety deficiencies, they would almost certainly lose their jobs’ (MAIB, 2001:9).

It is widely believed in the shipping industry that ‘human factors’ account for 80% of the root causes of all accidents. This notion is ingrained so firmly in the industry that any challenge to the argument is dismissed as whimsical. For example a study by Baker and McCafferty (2005) who reviewed accident databases from the USA, UK, Canada, Australia and Norway, concluded that human error ‘continues’ to be the dominant factor in maritime accidents and drew the following conclusions: first, while the total number of accidents is declining, human error continues to be the dominant factor in 80 to 85% of maritime accidents; second, failures of situational awareness and situation assessment overwhelmingly dominate; and third, human fatigue and task omission seem closely related to failures of situational awareness. However a deeper analysis of their study shows that, whilst it includes a group of root causes classified as ‘management’, this refers almost entirely to on-board management factors and not to the organisational influence of the way the business is managed more broadly.

Barnett et al. (2006) investigated cases of collision in reduced visibility involving experienced professionals, and confirmed that organisational culture plays an important part in reinforcing the appropriate behaviour required on board. If the organisation’s own shore-based management team pays only ‘lip-service’ to its own operating policies by failing to implement them on the vessel and, at the same time, tacitly accepts or rewards deviant behaviour (not reducing speed in restricted visibility was a matter of routine), then the individual officers on board will adopt a similar cultural attitude. Simply sending the ‘offenders’ to remedial training would not resolve the root cause of this type of violation. Bhattachary (2009) found that managers largely subscribe to the ‘human error’ theory that attributes the main cause of workplace accidents and incidents to workers behaving irrationally, wrongly applying the rules or just being unmotivated. As a result, corrective actions are directed at tackling seafarers’ behaviour rather than addressing the root causes of accidents. Shore Manager 2 attests, by implication, to the futility of current practices, whereby increasing amounts of paperwork are generated that actually increase the administrative burdens of the
crew on-board and hampers their ability to negotiate safety in the everyday work environment. He reflects:

*Root cause identification is a complex matter which requires much more effort and study to prevent recurrence, rather than corrective action which is only temporary, by introducing more check lists etc. for the crew to follow. The identification of root cause requires more input from other stakeholders.*

Investigator 2 adds:

*I am not sure if the trends are being analysed by management companies but they are surely being done by P & I clubs and the same is declared in their annual reports. Mostly they show ‘human failure’ as the cause of most of the incidents and accidents, which is a pity.*

Seafarer 1 confirms this picture, lamenting that:

*The remedial action being taken by management companies is then to display safety posters on board the vessel which are produced by the P&I Clubs.*

Such misdirected remedial actions, aimed at the seafarer in the name of progress, actually end up exacerbating the situation by over-burdening seafarers with mundane administrative procedures, extra paperwork and panoptic oversight from the shore management. This hinders the development of mutual trust and widens the gap between the ship-based workers and shore management. Meanwhile, the root causes continue and worsen, resulting in a progressive deterioration of the entire shipping industry environment.

**How globalisation affects accident/incident investigation**

Guttal (2007), among many others, has argued that globalisation is a form of capitalist expansion that integrates local and national economies into a global, unregulated market. Although economic in its structure, globalisation is equally a political phenomenon, shaped by negotiations and interactions between nation states, the institutions of transnational capital and international institutions. Its main driving forces are the institutions of global capitalism, but it also needs the firm hand of states to create enabling environments for it to take root. Globalisation is legitimated by liberal democracy, which facilitates the establishment of the neoliberal national and international policies that permit globalisation to flourish, and which, in the shipping context, allow the ship operators to hire cheap crew from various crew supplying nations. The neoliberal concept of ‘freedom’ is tied to the notion of ‘free markets’ in which people are ‘free’ so long as they submit to the dictates of deregulated free markets. The ‘race to the bottom’ hypothesis argues that, in their competition to attract mobile capital, states must converge to the lowest common denominator. In conjunction with the effect of competitiveness, this provides an ideal ground for downward harmonisation in the shipping industry, impacting all aspects of business operations that derive from the over-worked, fatigued and isolated crew on board the ships (DeSombre, 2008).

Shore Manager 1 describes the impact of the additional cost pressures created by these developments on ship management:

*Nowadays there are so many stakeholders and the profit margin in any venture has not changed but due to many stakeholders everyone is getting only a*
portion of the pie and so there is an attitude of cost cutting rather than cost optimisation.

The recruitment of cheap (and therefore inexperienced and poorly trained) crew compounds the pressures on ship management and the related health risks. Shore Manager 2 comments:

*The problem of sub-standard crew and their over reliance on technology has been a source of concern. The present day crew has lost touch with the axiom 'lead, log and lookout'.*

The responses from the investigators shed light on how the accident/incident investigation can be marred by the split-incentive phenomenon and the outsourcing of crewing to third parties by the ship owners, leading to a lack of transparency:

**Investigator 1:** There is a problem here with the advent of the ship management company concept. If the information which the surveyor is seeking is hidden from him then the surveyor is not to be blamed.

**Investigator 2:** Unfortunately, it is normally the case with ship management companies who try to shield information as much as possible but provide it only when legal intervention comes in. So I would go to the extent to say that there has to be absolute transparency from all so that the end result can be fruitful in the interest of shipping.

Protecting the interests of business produces a kind of myopia whereby ship managers and their crewing agents tend to hide information. This leads to a situation where there is no concerted effort, no interest and no sense of ownership by managers of the collective aims of achieving long-term and well-organised improvements. In addition, the forces of globalisation play a part in severely limiting the drive to get to the root causes of accidents/incidents.

**Causes constructed rather than objectively looked for?**

Error investigations can have differing objectives and purposes depending on the investigator's perspective. Sanders and Neville (1991) confirm that what is deemed to be the cause of an accident depends on the purpose of the inquiry. Thus the causes of the accident may be constructed rather than objectively sought for. This is evident from the interview with Investigator 1, who states that:

*Norally the Flag State [Port State] carries out the investigation to fix responsibility into aspects leading to [the accident/incident] such as human error, navigational error and incorrect ISM procedures being followed, leading to punishment of the seafarers by either withdrawal of their Certificate of competency, or arrest.*

However some accident / incident investigations are commissioned by vessel owners, management companies and, more often, by hull and machinery underwriters with a sole view to establishing the apportionment of liability towards hull and machinery damage of vessels involved in the accident / incident in question. Similar investigations are carried out to establish the final settlement of the eventual claims of the vessel owners towards hull and machinery damages.

This highlights the very limited objectives that are applied when investigations are conducted in the shipping industry. Strauch (2004) argues that the objective of an error...
investigation should be to avoid recurrence, or even occurrence, by identifying the antecedents to the incident and eliminating or reducing their influences in the system. However, in practice economic logic prevails. In the words of Seafarer 2:

*The objective is mainly commercial for apportionment of cost through apportionment of blame.*

Perhaps the most damaging restriction of all in investigations into the cause of accidents is the practice of restricting the scope of these investigations to causes that are located on board the ship itself, failing to extend the inquiry into the overarching forces of poor organisational support and on-shore managerial practices. Responsibility for this approach lies in the liability and insurance regime that covers the ‘negligence of seafarers clause’ in insurance policies that is admissible for insurance pay-outs. Many insurance conditions explicitly exclude the possibility of compensation for management errors. For example, one set of insurance conditions relating to ‘particular average’ damage to vessel’ states:

6.2 *This insurance covers loss of or damage to the subject-matter insured caused by 6.2.3 negligence of Master, officers, crew or pilots provided such loss or damage has not resulted from want of due diligence by the Assured, Owners or Managers.*

(Institute Time Clauses – Hulls, 1983)

The existence of such clauses severely restricts the enquiry process, putting pressure on investigators not to search any deeper than the human error that can be detected among those on board, with an implicit requirement that no cause is attributed to onshore management, which would result in insurance benefits being forfeited.

The investigators were particularly quizzed on this aspect and Investigator 1 reflected thus:

*The mandate is to establish the most probable cause leading to the accident / incident. The process generally is confined to interviews of all crew members or, as required, collection of all documents such as log books etc. The voice data recorder download is collected on a disc, electronic navigation chart screen-shots are all collected. The process of interviews may take more than a day, depending on the gravity of the accident. Every effort is made to collect all relevant data as another visit to the ship may not be possible. Then a thorough study is done of data from the voice data recorder and what is needful is extracted and then the report is drafted and then the apportionment is done.*

When confronted with the same suggestion, Investigator 2, however, gave a very measured response:

*Whilst I would agree with the same, I would like to comment this is not always true. We as Marine Surveyors may not mention all the observations in the survey report but the same [reporting of root causes that extend to the management on shore] is done through a personal and confidential letter addressed to the Underwriters. However, whether that information is really being used for the end purpose as envisaged in this question is not known to me.*

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2 ‘Particular average’ refers to a partial loss caused by a peril insured against and which is not a general average loss (Marine Insurance Act 1906).
In situations involving the integration of technology, matters become even more difficult because of the unscientific integration of technology into work processes in the shipping industry. Lutzhoft and Dekker (2002) analysed one case, the grounding of the Royal Majesty, from the perspective of the crew, with the aim of understanding the role of automation in shaping the crews’ assessments and actions. Using the ‘local rationality’ principle, which states that ‘people do reasonable things given their knowledge, their goals, and their limited resources’ they converted the search for human failures into a hunt for human sense-making, asking why the action or assessment of crew members made sense to people at that time and place, and trying to understand why they did what they did. They suggest that accidents are the result of multiple factors that may all seem necessary individually, but when combined jointly are sufficient to lead to the accident. According to these authors, focusing on a single point of failure, as was done in the official accident report on Royal Majesty, critically misses the typical pattern of evolution, build-up, and escalation that lies at the heart of problems related to human-automation interaction. Lutzhoft and Dekker conclude that research shows that humans are not only poor monitors of automated systems, but also tend to rely on warning systems rather than manual checks.

Shore Manager 2 makes a similar point when he comments:

Being fully qualified and competent does assist but there is a factor called ‘environment’ under which the individual is functioning and that sometimes clouds the decision-making process.

Seafarer 1 extends this analysis to encompass the pressures faced by over-stretched crew in modern conditions:

There is also reduction in manning to be blamed, to a larger extent, as one is left to carry out multi-tasking; and also the commercial pressures of today are far more and more complex than in yester years.

Automation is often introduced because it promises quantitative improvements: it is claimed that it will reduce human error and workload and increase efficiency. But, as demonstrated by the Royal Majesty accident, as well as by numerous other research results (NSTB, 1997; MCA, 2006), automation has qualitative consequences for human work and safety, and does not simply replace human work with machine work. Assigning ‘human error’ as the cause of accidents is found to be not only convenient from the point of view of liability and insurance but also because it allows owners and managers to ignore the catastrophic potential of some of the technology in use. This makes it possible to avoid considering the conclusion that if we cannot engineer safe systems then perhaps we should not build them.

False assumptions in incident-free scenarios

Because problems only become visible when an accident occurs, there is a general perception that just before the accident everything was perfectly normal. The belief is that in normal cases working practices are entirely orderly. This renders invisible the reality that the seafarer as an operator may be engaged in a continuous process of constructing workable alignments in situations where malfunctions and deficiencies abound. Those in charge are, in effect, making a judgement call in which failure is
contained within ‘acceptable’ bounds. In complex systems, there are ‘latent pathogens’ that are normally tolerated but may be ‘awakened’ by a specific situation and then combine to lead to an accident. The seafaring culture of ‘making everything work’ is a potent ground for harbouring such latent pathogens. Thus failure is redefined and abnormality becomes the new normal. The need for the seafarer to cope with abnormalities is taken as normal and evolving practices then get built on this ‘new normal’ that may then become fixed in new rule-making practices. Evolving practices become formalised in operating rules which in time are further recapitulated and reified in updated formal codes of practice. It is not appreciated that the evolution of such operating practices has resulted from the practical contextual normalisation that seafarers cope with in their daily practice, and from the steady accumulation of contrived empirical experiences (Wynne, 1988).

In technology-integrated scenarios such normalisation fragments the overall social nature of technology-related practices while evolving new informal practical rules for its operation. This makes it difficult, if not impossible, to develop a holistic understanding of technology applications in their full sociological context. Technologies are evaluated in terms of their external effects or risks alone, but not by the relationships that may be intrinsic to them. As science becomes an increasingly important economic resource in industrial competition, the rush to exploit scientific knowledge in the form of commercial technologies reduces the availability of time and the possibility of social analysis in pilot phases. Thus, wider systemic problems may only become apparent during the commercial lifetime of the technologies.

**Discussion**

The general principle adopted in accident/incidence investigation is to find the cause, in order to provide an explanation for what happened and what went wrong and take remedial action. In particular, maritime accident investigation often adopts legalistic approaches which make it difficult to acknowledge the complexity of factors involved in an accident, factors that might be more indirect than direct. Furthermore, in the technology-integrated scenarios of today, complex socio-technical systems defy the time-honoured investigation methods and familiar ways of thinking, such as the limited way of ascribing ‘resultant’ outcomes through cause-effect analysis, where non-linear ‘emergent’ outcomes accounting may be more appropriate (Schroder-Hinrechs et al., 2012). In the meantime, accident investigation is constrained by the principles of ‘What you look for is what you find, and what you find is what you fix’ (Hollnagel, 2008). Macrae (2009) points out that learning from past accidents presents particular challenges because the sequence of events leading to any given accident often appears unique to each specific case. The lessons drawn then become equally specific and cannot be generalised to other circumstances and situations. Havold (2000) too has suggested that to learn from past accidents we need to generalise from them, drawing systematic, and widely applicable insights into their causes, and mapping causal patterns across several layers of analysis.

One explanation for these multiple failures in the investigation process lies in the perception of safety itself that underlies them. This rests on the goal of merely
sustaining accident-/incidence-free conditions and creating an environment that then satisfies itself with finding immediate or direct causes of any given incident/accident. An alternative approach involves a concept of safety that focuses on everyday work, with the aim of making things go right and facilitating performance adjustment to succeed. If this approach were to be adopted, then the effort would shift consciously from mere avoidance of things going wrong to ensuring things go right. This calls for deeper insights into latent organisational factors, man-machine interfaces and human factors engineering and requires that such issues are brought out and addressed in all stages of the design of technical procedures and of the work environment. Such is the approach adopted in other safety-critical industry environments, like the offshore oil and gas sector, as Seafarer 1 points out: 

_I have experienced working in the offshore oil and gas sector where safety standards are very high and I do note that shipping industry has not yet evolved to thinking that safety is not just avoidance of incidents/accidents, but making sure that everything goes right, every time. The over-riding factor is certainly commercial expediency._

This difference in understanding the concept of safety itself clouds the accident investigation process, restricting it to a process where the outcomes are severely limited. The current situation is preferred by the managers in the industry not only for this reason but also because it is less complex, less time consuming and produces more tangible and apparently more concrete outputs. Investigator 1 confirms that there are pressures to keep investigations short and simple: ‘most of the times the case is closed due to pressures on fees etc’, with Investigator 2 adding that: 

_Also there is another factor that is more predominant: that is the marine survey companies are severely short of suitably qualified and experienced manpower and they look for tangible results in doing more surveys rather than hang on to one case itself._

It is pertinent to note here that the International Civil Aviation Organisation (ICAO, 1993) has formally adopted Reason's (1993) model of error for its Member States, to facilitate a proper understanding of human factor issues and safety in aviation. Reason's identification of the role of design and managerial factors in the generation of errors has greatly influenced the contemporary treatment of human errors. Hence, it is generally accepted that human error models and taxonomies must include the ergonomic perspective or the ‘systems perspective’ and the organisational perspective. The systems perspective holds that individual humans are rarely the sole cause of an accident but that individuals, machines and the work environment interact in complex relationships. The organisational perspective points to the fallibility of decision makers, supervisors and others in the organisational hierarchy in line with ‘domino theory’ described by Bird (1974), where human errors start with failures originating from the management's attempts to control losses within the organisation (Wiegmann & Shappell, 2003). This perspective remains lacking in the shipping industry.

It must be appreciated that there is a system at work and the seafarer is a part of the wider system, notwithstanding the globalised nature of the industry. Singling out people as the causes in accident/incident investigations will not deliver sustainable
improvements. It should be recognised and appreciated that organisational factors play a significant, arguably key, role in accident causation, especially in situations where little scientific analysis has been undertaken to identify general trends and patterns.

Furthermore, while accident/incident investigation remains an important tool to drive improvements, it is not exhaustive. Fundamental rethinking is called for in the understanding of safety itself, regarding it as something beyond a mere accident-/incidence-free environment but entails developing conditions in which performance is enhanced for success.

Conclusion
The appeal of ‘open registers’ to ship owners lay in the globalisation of employment relations that offer low wages and lower taxes. As a result, the contractual employment of seafarers, their non-existent direct relationship with owners, mixed nationality crewing, and dysfunctional communication with managers produce a situation where no support is available for crew members. A laissez-faire approach is widespread and this has resulted in significant restructuring of the maritime labour market to the detriment of the seafarer. Labour fortunes are undermined by an ideological discourse that upholds profit as a sign of efficiency that will generate the required levels of productivity to sustain economic growth for national development. This is taking place in a context of general tendencies of erosion of labour standards, fragmentation of labour and intensification of working time (Huws, 2010) As Stiglitz (2002) asserts, economic policies that purport to separate efficiency issues from equity treat labour as a commodity and run counter to the interest of workers. ‘Labour market flexibility’ and ‘capital market flexibility’ appear as symmetrical policies but have very asymmetrical consequences – and both serve to enhance the interests of capital at the expense of the welfare of workers.

The shipping industry is characterised by a strongly safety-critical environment that demands efficient crewing and organisational support for the crew to negotiate the risks. But this has also, paradoxically, created an environment where seafarers are left over-burdened, fatigued and isolated, and where their risk negotiation skills and capabilities are seriously undermined. There is a tacit assumption that the command-and-control approach to safety regulation is the only source of accountability and administration in this globalised industry, but this is belied by the reality of poor regulation-making that is itself based on weak accident investigation analysis, lacking deeper insights into organisational or socio-technological factors. Furthermore, the perception of safety itself, as merely sustaining accident-/incidence-free conditions, severely limits progress towards safer working conditions in the industry.

The shipping industry presents a particularly striking example of one which both actively contributes to, and benefits from, globalisation whilst also becoming a victim of circumstances. The general deterioration in its vital safety practices does not just result from the general features of a deregulated economic and organisational environment, but also from a specific system of regulation that creates social and economic conditions in an industry that values efficiency and profit over industrial safety.

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