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ROLE OF HUMAN ELEMENT

Just Culture – Essential for Safety

Submitted by the United Kingdom

SUMMARY

Executive summary:	This document provides information and conclusions about the significant safety and business advantages of developing and embedding a truly effective just culture across the maritime industry. It originates from a major Human Element research programme commissioned by the United Kingdom and published in "The Human Element – a guide to human behaviour in the shipping industry". It further recommends that the Organization, via the Joint MSC/MEPC Human Element Working Group takes appropriate action to develop guidelines for the development of just culture and promotes its adoption by the shipping industry.
Strategic direction:	5.4
High-level action:	5.4.1
Planned output:	5.4.1.1
Action to be taken:	Paragraph 33
Related document:	MSC 87/17/INF.10

Background/Introduction

1 Major advances in design and construction of ships and ships' equipment have made significant improvements in safety. However, accidents, including major disasters, continue to occur at a high rate.

2 Analysis shows that accidents and incidents attributable to technical failures alone are very rare. Almost all accidents and incidents are attributable to the "human element", either through:

a) direct human error in the course of operations;

b) by failing to deal effectively with incidents once they arise; and

c) or latent human element issues – problems hidden within the overall system, often resulting from actions and decisions taken many years previously,

e.g., design of equipment, weaknesses in the Safety Management System (SMS), inadequate training, recruitment and manning or policies and practices designed to meet certain commercial requirements.

3 As almost all accidents can be attributed to human element issues, it follows that only by correctly addressing the complexity of human and organizational factors – the "human element" – will we make significant improvements to the accident rate and take advantage of the substantial commercial, economic and environmental benefits that this will bring.

4 During 2009/2010, the United Kingdom commissioned major research into a wide range of human element issues affecting the global maritime industry which culminated with the publication of "The Human Element – a guide to human behaviour in the shipping industry". One aspect of this research was the effect of various cultural influences on maritime safety. Drawing on evidence from the maritime and a range of other safety critical industries, the research demonstrated the immense contribution a truly effective Just Culture can have on improving maritime safety, and hence the business success of those organizations which have a fully understood, trusted and embedded Just Culture.

Understanding the Problem

5 In order to reduce the accident rate, we need a deep and thorough understanding of:

a) why accidents happen;

b) what really causes them; and

c) how a Just Culture can help to prevent them.

6 It is normal for all people, including experts, to make mistakes, every day. It is in noticing the difference between the behaviour we want and the behaviour we get that we are able to learn and refine our decisions and actions. The real problem in safety-critical industries like seafaring is that some mistakes have such serious consequences that they need to be caught before they have a chance to develop into disasters. Most of the time, seafarers catch their own (and each other's) mistakes quite successfully. However, sometimes they do not and because of the nature of what they do, the results can be very serious.

What kinds of mistakes do we make?

7 There are three main sorts of activity in which we make mistakes:

a) skill-based activity – where we are well practised in what we do. Here, because we can work without thinking too much about it, we can find ourselves doing something familiar (e.g., operating a well-used panel switch) when we should be doing something else (e.g., operating a less frequently used, but adjacent, panel switch). Or else, we can suffer a memory lapse (e.g., we suddenly forget what we were going to do next);

b) rule-based activity – where we have more conscious involvement with the task, and need to apply rules and procedures to what we are seeing and doing. Here, we can make a mistake by failing to apply a rule correctly, or at all (e.g., assuming that give-way vessels will always give way, or not realizing we ourselves are the give-way vessel); and

c) knowledge-based activity – where we must have even more conscious involvement with our task (e.g., where we are attending a fire and must make decisions in novel circumstances). Here, the kinds of mistakes we make are often to do with the way we make sense of the situation. Decisions based on wrong interpretations of complicated or ambiguous information are usually the result of insufficient training or experience, or bad communications.

8 There are a number of factors that increase the likelihood of mistakes. Some of these factors operate at an individual level, while others are organizational.

i. Individual influences on mistake-making:

a) inadequate rest or high stress levels – Fatigue and stress reduce attention, concentration and response times;

b) insufficient training and experience – Poor training or lack of experience may result in attempting to do tasks with insufficient knowledge or else a failure to prevent a dangerous situation developing;

c) lack of investment in training and structured experience also contributes to a poor safety culture by sending strong signals to the workforce that they are not valued; and

d) inadequate communications – Successful communication is not simply a matter of transmitting messages clearly. It entails empathy on the part of the messenger to assure the listener's readiness to hear, and active listening on the part of the hearer. Much communication depends on both parties' ability to make sense of the situation they share.

ii. Organizational influences on mistake making:

a) inadequate time – if there is not enough time to get everything done, we look for ways to be more efficient at the expense of thoroughness. We are also likely to experience high workload levels, which increases stress levels and accelerates fatigue;

b) inadequate design – poor design of equipment, user controls and interfaces, or work procedures, increases workload, response times, fatigue and stress levels. It may also promote the invention and use of dangerous short-cuts;

c) inadequate staffing – if the numbers of people fall short of what is required to carry out a task, then workload, fatigue, stress levels and sickness are increased, short-cuts are taken and the safety culture is compromised by demotivation, low morale and absenteeism;

d) management efficiencies (in the form of staff cuts) often result in unsafe working efficiencies (in the form of short-cuts), a decrease in thoroughness and an increase in the number of mistakes, all made worse due to fewer people having less time to prevent those mistakes developing into something worse; and

e) inadequate safety culture – the most influential source of a good safety culture is the seriousness with which senior management approaches it via training, staff investment and the implementation of work processes that accommodate the time that safe practices take.

9 Workforce mistakes increase not just because of the absence of this investment, but also because of the meaning people attach to the absence of the investment by their senior management. Unfortunately, these same factors also increase the likelihood that any mistakes will lead to serious consequences. This is because the factors also interfere with the ability to recover from mistakes once made:

a) for example, the same fatigue that prevents a watchkeeper spotting a collision course can also interfere with their subsequent response to the emergency situation that develops. Often, the factors help a series of mistakes combine to make a bad situation even worse: and

b) for example, a design flaw in an instrument panel made years before might combine with an engineer's tiredness, their preoccupation over difficult personal circumstances, and their insufficient training with the panel to produce the selection of the wrong setting, or an incorrect reading at a critical moment.

10 There has been a great deal of research on human error and catastrophic accidents in several safety-critical industries besides maritime (e.g., nuclear, air, road, rail, defence). A universal finding is that it is combinations of multiple adverse circumstances that create disastrous outcomes. **It is not human mistake-making that is the problem, so much as the existing conditions and history of the organization in which it occurs.**

How can we stop mistakes from becoming disasters?

11 There are two distinct approaches to this question:

a) one is traditional and assumes that the things that happen are in principle predictable and are due to cause and effect; and

b) the other has become much more important recently and assumes that many of the things that happen emerge unpredictably from the behaviour of complex systems.

The traditional view – things happen due to cause and effect

12 This is still the dominant way of thinking about mistakes and accidents in our modern world. It is based on the apparent obviousness of cause and effect. It is possible to look at the mistakes listed for any disaster and interpret them as a complicated series of causes and effects that interacted over time to inevitably result in the catastrophe that happened.

13 In this view, when disaster happens (or when we can imagine it happening), it seems correct to root out and fix (or pre-empt) the causes that might have bad effects. So, accident investigators use *root cause analysis* techniques to discover primary and secondary causes. Meanwhile, organizational safety specialists perform risk assessments to try and avert any dangerous effects of work procedures. The results of accident investigations and corporate due diligence are typically enshrined in rule books and methodology statements that grow bigger every year. The logic of this approach is to get to a point where all the possible sources of error have been eliminated or covered by a rule or procedure that will prevent them from occurring. There are four problems with this approach:

a) efficiency usually wins – Where rules and procedures collide with the need to be efficient due to economic considerations, we find ways to work around them. The more thorough the rules and procedures are, the more efficiencies will be found, subject to the risks perceived;

b) behaviour drifts towards danger – If the efficiencies that we use to meet our schedules and targets do not result in an accident over a long time, the organization may drift – often unnoticed – towards and across safety limits. This is sometimes referred to as complacency. However, labelling it as such and issuing warnings about it is highly unlikely to challenge those of us who, as far as we are concerned, are operating within acceptable levels of risk;

c) mistakes are invisible when they are made – An error is usually only noticed or labelled as such when it has already contributed to catastrophe. Before that, it is simply one of many actions or decisions made as part of the smooth, efficient flow of workplace activity; and

d) accidents keep happening anyway – However explicable accidents are seen to be in terms of causes and effects after they happen; the fact is, nobody saw them as such at the time. Furthermore, despite all we have learned from cause and effect analysis, huge and costly maritime disasters are still occurring at the rate of nearly one a week, not to mention the thousands of accidents in which seafarers lose their fingers, limbs and livelihoods and their employers lose their expertise, reputations and viability.

14 In fact, each of these four problems are aspects of hindsight – the illusion that the world is completely predictable. It is a useful tool for historical investigators, but of no value whatsoever to anyone who is at the point of a decision. This is because when we are required to decide or act, we do not yet know the significance of our decision. Only history will tell us – or others – if our decision will be interpreted as a mistake. At the moment of our decision, we can only be guided by the sense we can make of our situation (based on our training, experience, and immersion in our organizational culture) and the risks we are willing to take.

15 Cause and effect analysis makes sense of history with the benefit of hindsight. It allows feedback to be gathered about the effectiveness of people's actions and to learn from those that can be re-classified as mistakes. However, when it comes to helping people in the live, real-time environment of the workplace, it is less than adequate, and may actually be a hindrance. This is because a rule created to prevent the repeat of a past mistake is rooted in the circumstances that generated that mistake. If those circumstances are rare or do not occur again, the rule may be seen simply as an additional piece of bureaucracy that must be worked round in the interests of efficiency.

The modern, enlightened view – things happen due to complex system behaviour

16 If the world is not completely predictable as a series of causes and effects, how can it be understood sufficiently well to stop serious mistakes in their tracks? Doing so requires a shift of view – driven by a number of observations about the way in which the world has changed in recent years (see annex 1). This shift of view emphasizes the world as a complex system of interacting, circular relationships. This is also known as systems thinking. It is out of these interactions that behaviour – both good and bad – emerges. This systems view brings into focus a number of important points relating to humans and the organizations they create:

a) Humans create safety

In the systems view, people are not seen as sources of error so much as the creators of safety (see annex 2). This view recognizes that there will always be gaps in any system because designers and rule makers cannot envisage all situations and contingencies. This means that human

operators must be given some degree of freedom to cope with the unexpected. In turn, this increases the need for the human operator to identify and manage the risks that arise;

b) Organizations are actually organic

In the systems view, organizations are not static, and safety emerges continuously from the overall behaviour of an organization's interacting components – including its people. Many forces, such as political or economic concerns, can cause an organization to drift away from safety. A good safety record can promote complacency, allowing risks to grow unseen. Perhaps the most common threat to safety is when change in one part of an organization's functioning unwittingly disturbs functioning in some other part of the organization;

c) Organizations create the behaviour they get

In the systems view, organizations are seen as operating within a commercial framework including shareholders, unions, financial institutions, competitors, suppliers, and so on. They also operate within a legal, regulatory and political framework – several such frameworks if they operate in multiple countries. Other influences include the range of social and demographic factors that contribute to the educational levels of new recruits, and the difficulties of recruiting, motivating and retaining staff. There is also the behaviour of the public, and the incidence of crime, terrorism, vandalism and piracy and much else besides. Last, but not least, the technology provided by an organization also produces its own influences on the role, ability and expectations of its users, as well as the entire organizational culture; and

d) Organizations get the behaviour they deserve

This is because any given organization (system) is capable of generating a range of outputs, all of which emerge from the interaction of its parts. In a healthy organization, most of these outputs will be relevant and beneficial to the organization. Sometimes, the emergent behaviour may seem surprisingly beneficial, e.g., when someone discovers a new and highly efficient way to accomplish an important objective. Sometimes, however, at the other extreme, the behaviour that emerges will turn out to be adverse, e.g., when an accident happens. In every case, the behaviour that emerges from an organization is always within the range of its own natural variability. Both highly beneficial and highly adverse behaviour should be expected: they are two sides of the same coin.

Protecting organizations from things that happen

17 Rules and procedures are designed to limit system variability. If they are followed, they may help to avert accidents up to a point, but they also prevent beneficially novel behaviour from emerging too. As maritime organizations, their people and their technologies become more complex and more tightly bound together with each other, the potential for unpredictable adverse behaviour with devastating knock-on effects also increases. At the same time, the increasing number of rules demanded by the traditional cause-and-effect view not only becomes less and less effective, but also becomes counter-productive as people search for more efficient ways through the bureaucracy.

18 Recent research into the resilience of some safety-critical organizations has revealed some of the reasons why the more successful ones have far fewer accidents than they should. Here are three reasons with particular relevance for the maritime industry:

a) expertise must be developed, retained and exploited. In the face of pressure for greater efficiencies, people at all organizational levels work hard to understand the routes to failure and to develop alternative strategies, while all the time creating and maintaining whatever safety margins they can. Central to their success is the depth of their expertise. It permits them to read complex situations, project into the future, and to follow timely and effective courses of action. Organizations that fail to invest in developing such expertise, or that fail to protect their experts from the legal and corporate consequences that flow from the decisions they took in good faith, will ultimately fail economically. The experts will leave as soon as they perceive the risk to them is too great. For example, one reason why it has become increasingly common for masters to get shore jobs as soon as they are qualified is to avoid potentially serious criminal charges should they make a mistake;

b) organizations must pay attention to their "fault lines". Assessment of the risks of operational error or adverse events often miss the point that the real risk to safety critical operations is in the interfaces – the natural fault lines – between an organization's different parts. These include the "fault lines" between training and practice; managers and operators; designers and users; shipowners and crews; officers and ratings; efficiency and thoroughness. Focusing on the real risks is one challenge. Another, is knowing how these risks are changing over time and, in particular, how far the organization is drifting towards dangerous levels of behaviour. Many maritime organizations collect data on accidents and near misses. However, most then analyse this data for "missing" rules rather than to optimize interfaces or detect and correct dangerous drift; and

c) decision making must be based on systems thinking. All safety-critical industries are formed of different organizations which must interface successfully. In the maritime industry, these include shipbuilders, shipowners and managers, Masters and crews, port authorities, flags, insurance clubs and so on. In the absence of applied systems thinking, organizational decisions are taken that are locally optimized (i.e. too narrowly focused on a small part of the problem) at the expense of global effectiveness. There are countless examples of this in the maritime industry – mostly driven by apparent opportunities to save money in the immediate future.

19 It is clear that it is normal for us to make mistakes. It is also clear that wider organizational factors play a huge part in helping to create our behaviour – including our mistakes. These twin realizations have allowed a new approach to safety management to emerge in recent years. **The key insight has hinged on the need for safety critical organizations to shift from a blame culture to a "Just Culture".**

Towards a Just Culture

20 A "Just Culture" is founded on two principles, which apply simultaneously to ***everyone*** in the organization:

a) human error is inevitable and the organizations' policies, processes and interfaces must be continually monitored and improved to accommodate those errors; and

b) individuals should be accountable for their actions if they knowingly violate safety procedures or policies.

21 Achieving both of these two principles is enormously challenging. The first principle requires a reporting system and culture that people can trust enough to make the necessary disclosures. Their trust develops out of the way the second principle is implemented – specifically from the way in which the organization defines, investigates and attributes accountability for whatever its staff disclose.

How should accountability be assessed?

22 *Honest mistake or negligence*? – For the purposes of assessing accountability, many professions try to discriminate between mistakes which are "honest" (e.g., due to lack of training or experience) or "negligent" (e.g., due to lack of diligence or attention). Unfortunately, there is a problem with "negligence" since, as we have seen, there are many organizational reasons for an experienced person's deliberate rule-breaking or distraction at a critical moment. In the end, the line between the two turns on who draws it – and for what reason.

23 *Legal accountability* – A major problem in examining an incident in terms of its historical chain of presumed causes and effects is that the story often suffers from the powerful effects of hindsight bias. This bias results in the following:

a) causality is oversimplified;

b) the "obviousness" of the outcome is overestimated;

c) the role of rule violations is overestimated; and

d) the relevance of information used (or not used) by people before the incident is overestimated.

24 When a legal approach is used to investigate "negligence" cases, the outcome is almost never "just", and safety usually suffers. The prosecution tends to fashion selected evidence into a simply understood story that is focused on the defendant, who ends up as an organizational scapegoat. This outcome produces fear and mistrust, discourages further safety reporting and drives unsafe behaviour underground. Criminalizing honestly made professional error is entirely counter-productive.

25 *Organic accountability* – Accountability in a "just culture" is assessed by investigating how actions and decisions made sense to each involved person at all levels of the organization at the time of the incident, and what changes the organization could consider to prevent them from contributing to a mistake again. Reporting is supported by debriefing programmes to help cope with trauma. Investigations are conducted by expert practitioners who have deep knowledge of the technical demands of the incident and are schooled in hindsight bias. Techniques such as "substitution" may be used, in which experts can mentally place themselves in the incident to decide what they would have reasonably done. The different perspectives may then be assembled into a "mosaic" to form a rich picture of the incident. Note, however, that no one had this picture at the time of the incident, and it is only useful to help consider what systemic changes might be necessary.

What are the aims and benefits of a "just culture"?

26 "Just Culture" programmes have been initiated in many safety-critical organizations, including maritime organizations, a number of aviation authorities and the health sector. These programmes usually describe a journey or ladder, together with supporting tools designed to change the safety attitudes of the entire workforce. The journey is typically depicted as moving through a number of organizational approaches to safety. This may start with the "pathological" stage, where people do not really care about safety at all and expect someone to get fired if there is an accident. At the end of the journey is the "generative" stage, where people actively seek information, and failures lead to far reaching reforms. The following benefits of a "just culture" are anticipated:

a) increased reporting of unsafe incidents and accidents – including trends that indicate future problems developing;

b) increased trust between all levels of the workforce – which accelerates the organization's journey towards greater safety maturity;

c) decreased actual numbers of adverse incidents and accidents; and

d) decreased operational costs – due to safer behaviour, higher workforce motivation and morale, and increased productivity.

What are the problems in developing a "Just Culture"?

27 The journey to a "just culture" involves some difficult challenges. Research carried out in several safety-critical industries shows that a central task is designing an incident-reporting system and integrating it with a process for assessing individual accountability across the whole organization. The new reporting system may be quite different from any existing incident reporting system.

28 Another key task is the design of a series of easy-to-use diagnostic and reflective tools. These help the workforce – at all organizational levels – understand where they are in the journey, together with the nature of the gaps between their current attitudes and behaviours and those they need to acquire. Tools are also needed to support the acquisition of the required behaviours. For example, it should be aimed at improving the following:

a) operator and manager behaviour;

b) safe working;

c) supervisory behaviour;

d) rule-breaking;

e) situation awareness;

f) understanding and assessing personal risk;

g) making change last;

h) seeing yourself as others see you; and

i) understanding own organizational culture.

29 It is no accident that the same qualities that make us human are also the main focus of enlightened organizations' recognition that their employees need to work together equitably within a culture that is judged to be "just" by all.

30 Further details can be found in the annexes about:

a) Annex 1 – How is the world different now?

b) Annex 2 – Where is safety – in people or in rules?

c) Annex 3 – Steps towards a just culture; and

d) Annex 4 – The safety culture ladder.

Conclusion

31 The conclusion of the research carried out by the United Kingdom is that a Just Culture is the essential component underpinning safety and business success:

- Business success depends on managing risks effectively
  - to manage risks you need an effective safety culture
    - to have an effective safety culture you need an effective learning culture
      - for an effective learning culture you need an effective reporting culture
        - which cannot exist without an **effective Just Culture**.

32 The United Kingdom therefore recommends that the Committee request the Joint MSC/MEPC Human Element Working Group to consider the information provided with the following aims:

a) recognize clearly and unequivocally the safety and business benefits of a just culture;

b) develop guidelines for the development and implementation of an effective just culture;

c) develop an action plan for the development and adoption of a just culture; and

d) encourage and motivate all organizations to develop and adopt a just culture.

Action requested of the Committee

33 The Committee is invited to consider the results and conclusions of the United Kingdom's research and the recommendation contained in paragraph 32 and take action as appropriate.

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ANNEX 1

HOW IS THE WORLD DIFFERENT NOW?

- Recent developments in our increasingly globalized world – such as the world of shipping – emphasize the need to see it more as a complex system of interacting, circular relationships rather than a linear sequence of causes and effects. What developments have produced this changed view?

- Rapid technological change – Technology is changing too fast for managers and engineers to keep up. This is affecting all parts of the maritime industry, e.g., bridge automation and navigation systems, real-time global tracking and management of vessels by their land-based owners, and high-tech vessel design and operation (e.g., LNG tankers).

- New ways to fail – Digital technologies create new kinds of failure and new kinds of accident. The traditional safety engineering approach of using redundancy to minimize risks does not work with (e.g.,) computer systems where redundancy adds complexity and thereby actually increases risk.

- Bigger disasters – The scale and expense of modern systems means that the human and financial harm resulting from accidents is becoming less acceptable. Learning from experience is not tolerable, and the emphasis must be on preventing even a single accident.

- More complexity – The development of highly complex systems frequently means that no one person understands the whole system or has complete control of it. Furthermore, the circumstances of their use can never be completely specified and the resulting variability of performance is unavoidable.

- More serious knock-on effects – Systems are increasingly tightly linked. This means a disturbance in one part of the system can have rapid, far-ranging and unpredictable ripple effects. It also means that many adverse events cannot be attributed to breakdown of components, but may be the result of unexpected combinations of performance variability that is essentially normal. In this view, adverse events are simply the other side of the coin from equally unexpected but beneficial events.

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ANNEX 2

WHERE IS SAFETY: IN PEOPLE OR IN RULES?

Traditionally, increasing safety rules and procedures seems a reasonable way to increase safety. After all, if safety is enshrined in a framework of rules that is erected around us, this provides a means of recognizing unsafe behaviour and enables consistent training to measurable standards. But the framework also locates safety outside people, shaping their behaviour, constraining it to flow one way rather than another. When reality inevitably pokes through and injures someone, the usual response is to plug the hole with another rule. The ever more detailed lattice creates an ever greater training (and regulation) task, and increases the rigidity of the behaviour it constrains.

By contrast, Morel's recent study of fishing skippers confirmed earlier French Air Force findings about pilots that safety is self-managed. Safety is a component of decision making (and risk taking) that resides inside people as part of their expertise. The study showed that skilled people with clear goals in high-risk situations constantly present themselves (and their colleagues) with new challenges. Their decisions to do so are based on their sense of their own ability to anticipate the real risks, and their confidence in managing surprises. Indeed, part of their decision making is driven by the need to further refine and calibrate their judgment by exposing themselves to risk. Observers of fishing skippers and fighter pilots would readily agree that their behaviour is not overly constrained by prescriptive safety rules. If it were, they could not function.

Morel's analysis underlines safety as an emergent property of a person's task performance as they engage with their environment. Over time, their developing expertise becomes better tuned to the real risks of the job. Of course, it is the case that some external safety guidance must be available. If there were none, people would have to repeatedly and independently invent their own safety goals and standards, leading to inconsistency and avoidable accidents. Potential for an effective compromise between the two positions of constraint-based safety and self-managed safety, lies in the concept of goal-based rules. Here, principles and standards are set, but the means for achieving them is left to the natural human strength of adaptable expertise operating, as it must, in dynamic and uncertain environments.

Sources: Morel (2008) and Earthy & Sherwood Jones (2006)

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ANNEX 3

STEPS TOWARDS A "JUST CULTURE"

Address corporate and legal issues

- Need to obtain unambiguous boardroom commitment
- Need to create indemnity for incident reporters against legal proceedings – this may require changes to existing legislation
- Need to separate reporting system staff from disciplinary staff

Design and integrate reporting system

- Need to identify responsibilities and incident report investigators with domain expertise in safety, operations, management and HR
- Need to create a rapid, efficient reporting process that captures and yields useful information at the right level of detail
- Need to create clear, easily-accessible process that will be used and trusted
- Need to decide if new process will be integrated with current incident-reporting procedure
- Need to create investigative and assessment processes for deciding accountabilities and action

Develop, promote and roll out reporting system

- Need to identify and assign development resources
- Need to identify champion(s) and communications strategy
- Need to educate users
- Need to collect feedback from users
- Need to feed back useful results to users at all organizational levels – including impact on production, efficiency, communication and cost benefits

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ANNEX 4

THE SAFETY CULTURE LADDER

The safety culture ladder is a safety maturity model that was adopted by the oil and gas industry following an OGP (Oil and Gas Producers) meeting in The Hague in 2000. Here are its five stages and their characteristics, starting from the top (most mature).

Level 5: Generative

- Managers know what's happening – the workforce tells them
- Bad news is sought out so failures can be learned from
- People are constantly aware of what could go wrong
- Safety is seen as a profit centre

Level 4: Proactive

- Resources are allocated to anticipate and prevent incidents
- Management is open to bad news, but still focused on statistics
- The workforce is trusted and feels involved in safety

Level 3: Calculative

- There are lots of audits and lots of data to describe things
- The new Safety Management System is assumed to be enough
- People are surprised when incidents still happen
- Bad news is tolerated

Level 2: Reactive

- Safety is taken seriously every time there is an accident
- Managers try to force compliance with rules and procedures
- Many discussions are held to re-classify incidents
- Bad news is kept hidden

Level 1: Pathological

- We leave it to the lawyers or regulators to decide what's OK
- There are bound to be accidents – this is a dangerous business
- If someone is stupid enough to have an accident, sack them
- Bad news is unwelcome – kill the messenger

Source: http://info.ogp.org.uk/HF/ (in March 2010) following work by Hudson & Parker (2002), reproduced with permission