



## Standard operational procedures – hopeless hassle or effective tools?

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The second of two articles comparing the safety cultures between shipping and aviation. This Insight focuses on the value of standards, procedures and checklists and their contribution to onboard operational safety.

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## Case study

A shuttle tanker was approaching the loading buoy at an oilfield off the Norwegian coast. It was dark, windy and visibility was reduced by rain showers. The 10 nautical mile passage up to the loading buoy is a critical operation involving precision work.

The bow loading system checklist on the forecastle was completed - even though the officers had to run up and down three decks several times to follow the sequence of required checks.

The officers on the bridge were in deep concentration. One was carefully operating the dynamic positioning system while the other was monitoring and reading checklists. Three A4-size manuals (from 3 different shareholders) were open on the instrument panel, actually covering most of it. Gradually, page by page in the harsh light of a hand held torch, he was able to follow the steps and assist a safe passage up to the buoy.

The manuals, with good intentions, covered a lot - detailed text setting out recommendations; rules and regulations; procedural steps; checklists; and notes of past experiences – buried in fragments of sentences within a sea of words.

I was there watching, I found myself reflecting on a simple question: what is the real purpose of these documents? Do they actually assist the crew to perform a critical operation?

We discussed it the next day during the voyage to the discharge port. I was shown an impressive number of onboard checklists. In general, they were complicated, impractical and difficult to follow. As a result, most of them were rarely used.

**The challenge** The general safety of the shipping industry is impressively good. Nevertheless, safety work must be proactive and based on the continuous assessment and management of risk. From a safety perspective, many existing onboard procedures and checklist systems are fragile and vulnerable.

These systems have grown extensively and become complicated over the years, virtually reducing their practical value. For every single audit or operational occurrence, another paragraph or chapter may be added with the possible consequence of reduced effectiveness.

The industry can often seem to be in a mode where the fact of compliance is seen to be more important than understanding why it is necessary.

**The reason why** As most of us know, human error is a factor. Consequently, safety work today is focused on setting up systems to:

- detect human error

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- handle human error
- prevent such errors from turning into undesired events.

Historically, the quality of such systems has been poor. When a captain made a mistake and the vessel went aground, that was the end of the story. However, the shipping industry has been blessed with qualified and experienced mariners - competent individuals have compensated for vulnerable systems. The number of incidents has been within *acceptable* limits.

Today this status is changing. The first-hand knowledge and skills of seamen are different, based less on general experience.

Now we need better systems to compensate.

**Safety barriers** The most important components in these systems are safety barriers:

- Proactive barriers, e.g. a procedure - a step-by-step description of how to proceed in order to avoid errors.
- Reactive barriers, e.g. a checklist - a step-by-step verification that the procedure has been followed. A tool to prevent the development of an error into an incident.
- Human barriers - the strongest and only flexible and intelligent barrier in a safety system.

Which tools can optimise the safety efficiency of the crew?

The active use of Crew Resource Management (CRM) is definitely one of them. Another is an effective procedure and checklist system. A procedure to describe the desired steps of operational behavior and a checklist to verify that they are done.

The crucial factor with procedures and checklists however, is their practical use. If they are not used, they are of no value.

## Procedures and standards

### History

The first prototype of Boeing's model 299, the later prestigious B-17 Flying Fortress, crashed shortly after take-off on one of its early test flights, killing two and seriously injuring the other three on board. At the controls were two US Army Air Corps test pilots with Boeing's Chief Test Pilot, a Boeing mechanic and a representative from the engine manufacturer also on board. Regardless of all this expertise in the cockpit, they nevertheless made a terrible mistake - they forgot to manually disengage the gust locks prior to departure. These locks held the flight controls in place while the aircraft was parked and impacted the maneuverability of the aircraft after take-off.

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Amidst the tragedy was a lesson to be learned for the industry. It was not a case of the plane being too sophisticated for man to handle – there were just too many things for the human brain to remember. Tools were needed to compensate, and so the development and use of checklists and procedure systems were born in the airline industry. This was Wright Field, Dayton, Ohio, 30 October 1935. Their safety value has not since been questioned.

## Procedures and checklists

*Airline experience* Airliners are operated according to a set of efficient, simple and user-friendly procedures supported by checklists for critical items. The procedures state what to do. The checklist controls what has been done.

Procedures and checklists also support the team philosophy. One pilot is reading the checklist, the other is responding and maneuvering the controls - this is practical CRM. An airline pilot will not move an aircraft an inch without these checks. They have great respect among their users.

*Parallels at sea* I frequently hear statements from ship operators like, “We have the checklists, the problem is that the guys don’t use them”. I have also had the opportunity to visit ships and have seen bridges with walls covered in checklists and procedures. Yet still they are viewed with some scepticism among mariners.

When a ship’s checklist is used, an officer is typically walking around in the bridge, ticking off items on a sheet of paper before handing it to the master for signature. This difference in practice between air and sea has its reasons. An airline checklist is built by pilots for pilots, for one particular reason - to make them remember important factors which are *dangerous and easy to forget*. They are simple, user-friendly tools to ensure safety, built on a crew concept. There is a correlation between their simplicity and adherence.

I frequently find my colleagues at sea regard checklists and seamanship as opposites - one or the other. Most airline pilots perceive their checklists as systemized and structured airmanship, one and the same. There is a vast difference between those perspectives.

*Standards* If you ask ten airline pilots to define “good airmanship”, you will probably get ten different answers. This is probably the most important reason for establishing procedures in the first place - to standardise understanding and behaviour. The same goes for “good seamanship”, however without the standardisation.

I have two friends, who are both captains, alternating as master on the same vessel along the Norwegian coast. One of them always moors with a single bow spring line on short port calls, adding a little forward power to hold her alongside. The other does the same but with a single stern line. Both argue offensively that the others’ technique is dangerous. The procedure manual on board leaves the issue open.

If we combine this lack of standards with the bridge duties of a first officer, it is complicated. How can you expect an officer to speak up to his master about a deviation if the procedure is not defined and he does not know his master’s intention?

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*The same goes for training. Most training is done on board with different senior officers. Consequently there will be variations rather than a defined common standard.*

**A solution is possible** I recently happened to be involved in a project to improve the operational documentation for shuttle tankers operating in the North Sea basin. The scope was the approach from the 10 NM sector in to the loading buoy, connection and loading, disconnection and reverse back to 10 NM. Traditionally, officers on the bridge had to manage three checklists from the two shipping and one oil companies involved.

We gathered a working group of resource persons from the shipping and oil companies. The goals were to develop something new, simple, efficient and user friendly, without losing their meaning and to build on co-ordination of the resources in the team onboard.

After several months of hard work, testing and training the result was encouraging. An A5-size handbook emerged with simple, sequential procedural steps, supported by checklists for the most critical items, replacing the previous *library*. The handbook has been on test for some months both in training simulators and onboard. The feedback received is encouraging, "This is what we have been waiting for!"

This is not the only answer. It is another step in the right direction and example of the connection between simplicity, ownership and adherence. There can be little doubt that standardised procedures supported by checklists are effective barriers (if used properly) to support safety. Consequently, they must be designed in a way to make those on board trust and use them.

**Conclusion** Many of the factors contributing to operational safety have been defined and known for years and are indisputable. Most of them are also independent of profession and industry, like open teamwork and the loyal use of effective procedures.

In my opinion it is a clear organizational obligation to take this knowledge into consideration and further into everyday operation of ships. We have always tended to point the finger on board when some incident occurs involving a vessel. The reality is that the guys onboard will act in the way they believe is expected and rewarded. That is the organizational impact on human behaviour.

Organisations must utilise the opportunity to enhance safety cultures, onboard and ashore, by rewarding behaviour built on the knowledge that safety is a system. The effect (even on commercial efficiency) will be considerable.

It is time to proceed.

**Gard comment** This is the second Gard Insight article by Jarle Gimmetstad in which he compares safety cultures within the airline and shipping industries to show that each industry can learn from each other. Despite the recent Germanwings tragedy, which has been widely blamed on the deliberate act of a human being, there are definitely safety measures within the airline industry that could enhance safety on board if adopted by shipping. Indeed, the success story illustrated in this article certainly provides food for thought.

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That said, it bears repeating our comments to the first article that the two industries are also very different in many ways, which may go some way to explain why the safety cultures and statistics are dissimilar. It may not be possible to simply copy airline thinking and approach, however, some underlying factors, such as user-friendliness could be easily applied. Some shipping incidents could possibly be avoided by emulating some of the safety barriers put in place in aviation. Although many ship owners already employ best practice, experience shows, from both minor and major incidents, that this is not standard throughout the industry.

We have sometimes seen and read about instances where ship operating companies ashore can overload mariners with documentation. With crew numbers at a minimum, officers in particular can feel they are drowning in complex and extensive onboard procedures. There will always be a need to comply with an ever-increasing number of rules and regulations affecting shipping. There will always be advances in technology and new equipment on board. It is important to try to avoid further paper building up by adding procedures and checklists every time a new safety issue arises. Keeping checklists simple, user friendly and straightforward should be the aim. Ships are not libraries.

The idea of ship and shore collaboration with different stakeholders - including airline competence - in drafting procedures and checklists is attractive. This could ensure common standards and perhaps most importantly *workable* safety solutions on board.

Our thanks to Jarle Gimmestad\* for this interesting two-part Insight.

Questions or comments concerning this Gard Insight article can be e-mailed to the [Gard Editorial Team](#) .

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