

# **New Organisation for Safe and Effective Operation of Cruise Ships**

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## **Introduction**

Traditionally ship's bridges have been characterised by strong hierarchical organisations. The Captain's arrival on the bridge would almost always mean their taking over the conning of the ship. That would also mean that all important decisions on heading and speed were based upon a plan which was only inside the Captain's head. This environment turned the other Bridge Officers into passive bystanders and a team effort into a solo operation. We have also recently experienced a number of high profile accidents where the problems inherent in this type of environment have been highlighted.

In the early 1990's the industry saw the introduction of Bridge Resource Management (BRM) as a solution to stop accidents caused by single point failures, but this has not been the case. The BRM courses focused a lot of attention on developing assertiveness, encouraging Officers to speak up when a senior Officer deviated from the plan. It is easy to discuss about assertiveness in a classroom, and train in a simulator environment, but very hard to implement in real life - unless the Captain is proactively implementing a working environment where speaking up is not only accepted but encouraged.

Even with a culture of challenge well established in an operational environment, there is another problem: if a junior Officer does not know what the operational limits of a route plan or berthing plan are, it's difficult to challenge its execution. The trigger for a challenge should be based upon a perception that the person with the Conn has deviated either from the plan, or from the agreed limits of that plan. Therefore, there must be an agreed Voyage Plan from berth to berth where navigational and speed limits are displayed and highlighted during briefings.

All sectors of the maritime industry face challenges. These challenges tend to be relatively unique for the companies and vessels involved. We have realised that the BRM course alone is not the only answer to improve safety to the level required, and that given the demands of operating a large cruise ship in confined waters we can no longer be dependent upon the talent of a single individual, no matter how skilled that individual may be. There is also a need to effectively and seamlessly integrate visual and instrumental navigation techniques by actively monitoring bridge equipment and sensors. Those changes require that bridge officers must work as a co-ordinated team.

However, for very good reasons it remains vital that only one person is physically giving the orders and executing the plan – so that one person must be both effectively supported, and effectively challenged, by the rest of the team. The means we have identified to provide this support and increase the probability of challenge is to move the Captain from active conning to a monitoring and leadership role.

This new approach is showing the way forward for the cruise industry, and it is a very positive part of the industry's evolution. That said, it became apparent that this progressive approach needed to include one more team member the marine pilot - who had not been involved in our training process. Considering the vital importance of this member's role when entering and leaving harbour, this was something we felt we needed to correct. This is why we are now inviting Marine Pilots to actively participate in the professional development of cruise ship personnel, and as a result becoming fully integrated with the bridge team during their time on board.

It is fully understood that Pilots have limited time between arriving on our ships and assuming their role, during which time they assimilate a great deal of information. It is hoped that by applying this system across all of our ships, the process of preparing and briefing will be made simpler and faster for all concerned. We are also fully aware that we are not alone in wishing to improve navigational safety, and that several Pilot organisations have led the way in introducing new technological solutions, such as dynamic under keel clearance systems, extremely accurate navigation sensors, and route plans with waypoints available on the web. Indeed, safety is the number one priority for all of us in the industry.

The purpose of this paper is to explain how the Bridge Resource Management (BRM) system came into existence on Carnival Corporation ships, how it currently works and how we would like to include Maritime Pilots in that system.

### **New Bridge Organisation**

In 2008 two of Carnival Corporation's operating lines P&O Cruises and Princess Cruises -- introduced the new bridge organisation based on roles rather than ranks. Under this approach, the officers would operate as a coordinated team managing the bridge, with each assigned a role associated with specific functions and tasks. The purpose was to create a more efficient, engaged and resilient organisation where high workloads could be managed and balanced in response to external and internal circumstances, and decisions were analysed by default rather than exception.

The system builds on an airline industry concept by introducing Navigator and Co-Navigator roles. The Navigator, who is conning the ship, is required to communicate intentions to the Co-Navigator, who should have prior experience in the Navigator role. The Co-Navigator's tasks include monitoring, cross-checking and supporting the Navigator. When the demands of the situation increase, also the manning will increase, as they are further supported by an Operations Director,

who must be a senior person, normally the Captain or Staff Captain. The role of the Operations Director is to maintain an overview of the operation and provide guidance as required. There is also an Administrator to manage alarms and internal communications. A Helmsman and a lookout complete the team.

The Navigator role is usually the most junior qualified Officer of the team and the Operations Director the most senior, but this can be changed as circumstances require. Each Officer regardless of rank has a stated responsibility to speak up if the vessel is about to come outside agreed limits in the voyage plan or should they have any other concern. This represents a significant change in bridge management, and it has proven to be extremely effective in improving the overall operation and, most importantly, reinforcing safety as the highest priority.

This role-based bridge organization does not in any way diminish the authority and responsibility of the Captain, who as Operations Director maintains full oversight of the bridge and assigns Officers to particular roles based on their competence and experience with the upcoming operation. The role of the Operations Director is to monitor the operation and supervise and provide guidance as appropriate whilst always retaining the option to step in and take the Conn if required. As the Navigator is frequently comparatively junior, this early, mentored responsibility has already produced a general increase in ship-handling confidence amongst our young Officers. Also, as it is the Navigator who is stating intended course of actions and executing them, and since both the Co-Navigator and Operations Director are senior in rank, those actions are far more likely to be challenged than if the responsibilities were reversed.

## Communications

In addition to the Organisational changes, we have introduced new ways of communicating intentions and orders to both reduce confusion and to encourage challenges. The first of these is described as “Thinking Aloud.” It is used by the person with the conn, Pilot/Navigator, to verbalise the plan, reasons and expected outcome. For example:

**Plan:** “I plan to start the turn one cable early...”  
**Reason:** “As we have a following current ...”  
**Outcome:** “So that we should end up on track as the turn completes.”

The Co-Navigator then checks if this is safe and if so, agrees to the suggested change of plan. This method not only encourages challenges, but also helps build a shared mental picture between team members.

The second change to how we communicate is the use of the “Closed Loop” method. This is used to ensure that orders and vital information are correctly received and understood. The communication is between two persons, following is an example of an order using this method:

**Pilot/Navigator:** “Helmsman, come starboard to 030°, rate of turn 10°/min.”  
**Helmsman:** “Starboard to 030°, rate of turn 10°/min.”  
**Pilot/Navigator:** “Yes.”

After completing the turn the helmsman may communicate the following:

**Helmsman:** “Course 030° on.”  
**Pilot/Navigator:** “Thank you.”

The ‘Closed loop’ system may be familiar to some, as it resembles the practice traditionally used by traffic controllers in the aviation industry and some naval vessels. The repetition by the person receiving the order (the “Receiver”) informs the person giving that order (the “Transmitter”) that it has been correctly heard. The confirmation from the Transmitter reassures the Receiver that they have understood the order.

## **Implementation**

This fundamental change in professional culture had to be introduced in several stages, starting with the development of new bridge procedures for normal as well as abnormal and emergency operations. Officers needed to know why this change was needed and how it worked, so an extensive training curriculum has been developed that covers the roles-based approach. This training includes insight on human performance, and its limitations, to explain the rationale for instituting the new procedures and bridge organisation. The process of implementing these changes across our fleet is now nearing completion, and we think that the end result of this transformation has been to move our whole approach to operations towards a higher level of safety, with our Officers making effective use of both the new structure and our constantly evolving bridge technology.

In order to consolidate this change ten Captains have been taken out of rotations and trained to become instructors and employed as Fleet Captains going around the fleet to first help Captains with the implementation and now making sure that operations are carried out as intended.

Furthermore, an annual Proficiency, Training and Assessment (PTA) programme has been introduced for all officers who have completed the all required training. The PTA includes two days of evidence based training and two and a half days of proficiency assessment, where a minimum standard must be achieved, if not, further training will be required.

## The Maritime Pilot as Part of the Team

So, with the internal process in place, it now makes sense to look at how best to incorporate Marine Pilots into the system. If the assumptions that were made to require change to our bridge organisation remain true – that modern bridge operations are too complex for even an experienced Captain who is intimately familiar with his ship to handle alone - it makes sense that we cannot reasonably expect Pilots to single-handedly execute those operations even given their extensive knowledge of the local environment. So just as our internal approach has evolved, it is equally important to look at how the Pilot's role fits with this team-based approach.

Some Pilot organisations claim that their members cannot be fully integrated members of the bridge team. This concern is fully understood, as altering the Pilot's traditional role can be seen by some as an increase in risk regardless of the competence of the team they are joining – particularly when that Pilot is no longer expected to actively conn the ship but to supervise the team. This is why there are alternatives from which a Pilot can choose to determine how they interact with the team. Regardless of the method chosen, however, we encourage the use of the new Communication procedures as previously described, to ensure that other team members (and the Helmsman in particular) are not confused by instructions given in an unfamiliar format. This is particularly important if a Pilot takes the Conn.

**Option 1.** This is when the Pilot takes direct control of navigation, which includes the following:

- At the tactical level the Pilot takes the Conn, giving orders regarding engine settings, heading, rate of turn, etc.
- At the strategic level the Pilot makes strategic decisions regarding going outside the track corridor and use available safety margins under abnormal situations.



Pilot with direct control of navigation

**Option 2.** This is if the Pilot takes indirect control of navigation:

- at the tactical level the Pilot delegates the conning decisions and actions to the Navigator who will operate the ship according to the mutually agreed voyage plan. The Pilot supervises, and provides guidance and direction when required.
- At the strategic level the Pilot retains high level decision making to deviate outside the planned operational limits and to use available safety margins in abnormal situations.



Pilot with indirect control of navigation sitting behind the Navigator, Captain sitting behind Co-Navigator.

It is probably obvious that Captains on cruise vessels with a well trained team would prefer Option 2, as that enables the bridge team to remain actively engaged with the Pilot providing an additional layer of safety. To enhance the mutual understanding of such options, we are keen to invite Pilots to contribute to our Bridge Resource Management courses by offering a complimentary attendance for all those engaged in piloting Carnival Corporation's ships.

There is tremendous potential for mutual development and understanding by collaboratively working in high fidelity ship simulators. In our Bridge Resource Management course, there is one day set aside for 'working with pilots' with an Amsterdam pilot taking part in the simulator exercises. It has proven to be very effective.

As a complement to our courses we also have a programme called 'Port & Ship Familiarisation.' This programme consists of workshops and simulator exercises where Bridge teams and Pilots work together focussed on a particular ship (or class of ship) using a given port. Using expertise from the Pilots and Captains, and employing classroom workshops for planning followed by simulator execution, the end result of this is a mutually agreed navigational plan, including operational limits and tug considerations. Feedback indicates that this type of collaborative effort enhances mutual understanding and working relationship.

## Conclusion

Navigating a large cruise ship in confined or restricted waters involves risks that must be managed carefully, so that safe operation is maintained by using all available resources effectively. This is exactly what Carnival's new role based bridge organisation is pursuing.

At CSMART we have considerable experience in Port Pilotage and Cruise ship navigation. This experience tells us, quite clearly, that if we want both professions to evolve together towards a more efficient and safer working relationship, there is great value in putting forth effort into enhancing mutual understanding. We see the Role Based Bridge Organisation as as a step in the right direction.

*"The foundation of all understanding of human life is that no static maintenance of perfection is possible and it matters little how distinguished the past. Advance or decadence are the only choices offered to mankind. The pure conservative is fighting against the essence of things."*

*"Adventure of Ideas," Professor A.N. Whitehead*

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