All India Maritime Pilots' Association

ISSUE VIII | All India Maritime Pilots' Association

FEBRUARY 2021

AIMPA
Safety & Securtiy

All India Maritime Pilots' Association

INDEX

All India Maritime Pilots' Association

From The President's desk

Capt. Gajanan Karanjikar

President- AIMPA

Dear Readers,

Maritime pilots working at Indian port facilities form the core or our Journal's readership. AIMPA has a forum on social media where these pilots share their views and concerns on matters like safety, best practice and, (as is normal!), the terms of their employment.

While AIMPA is not a forum where port-specific campaigns to improve employment terms would be publicised, it is accepted that conditions and terms of employment play a very important role in a port facility achieving and maintaining pilotage services of the desired high standards of safety and competence. Absent which, that facility would face a constant turnover of pilots and other key personnel. A lack of continuity in service would mean the depth of experience of the port's pilots, tug handlers, pilot boat crew, traffic controllers and so on - would be shallow. This is not conducive to maintaining a consistently high safety level of ship movements as well as other aspects of marine operations. Bearing this in mind it is our intent to help convey through our Journal, from time to time, suggestions to stakeholders in India's port facilities and its maritime administration to note and for them to act upon.

What prompted me to convey this through my Desk was being privy recently to a bout of spirited opinions and suggestions posted on the AIMPA (pilot's) social media group. The posts suggested they were concerned with the need to improve certain conditions in their workplaces. Be they a matter of:

- pay and job security - mainly due to pilots perceived a lack of esteem or appreciation by the facility's management. Leaving it all to 'market forces' was not a good way to go as is increasingly being done. Mainly as a result of the direction that Indian Government policy has taken for increasing its maritime trade.
- the lack of a mechanism to ensure port facility operators / managers / owners listen to the concerns of their pilots when they express doubtson the reliability and efficacy of the tugs provided (or lack of sufficient number of tugs – plain and simple!); of unsuitable or unfit pilot transfer craft, poorly designed and maintained jetties – especially for purposes of personnel transfer to and from shore; lack of or poor maintenance of navigation aids; ensuring depths at berths and channels are as they are declared to be; not involving pilots when planning expansion of jetties, wharves, basins and breakwaters; personnel manning port traffic control and/or the local VTS/VTMS personnel not having the desired basic knowledge and competence. And more!

Our readers, and not restricted to pilots alone, are requested to write to AIMPA with their views for improving on the matters I have mentioned and on any other aspects that they feel should also be addressed. All with the view to improve the standard of the marine operations and port infrastructure at Indian ports.

Best wishes,

Capt Gajanan Karanjikar
President- AIMPA
All India Maritime Pilots Association
Email:aimpaofficial@gmail.com

PILOT PERSONALITY OF THE MONTH

Capt Mirza M. Baig

Capt. Mirza M. Baig joined Mumbai Port Trust in 2005 after sailing for 17 years. He then moved on to take various assignments at Dubai Drydocks, Port of Salalah and at Dhamra Port in Odisha where he is at present. The pilotage assignments that he undertook at these places ranged from docking ULCCs to oil rigs, berthing of E-class container vessels to the passenger vessel Queen Mary-2.

He is of the view that pilotage is both art and science. And that your skill set enhances, if you remain mindful that each vessel offers new learnings. The experience you get at a greenfield port is quite different from that at a century old port. At a greenfield port, variances in tidal predictions, current patterns, siltation etc. throw new challenges every day. The challenges increase further when geomorphological changes by way of port expansion occur, and which do so fairly regularly at such ports. The learnings you receive in coping with such challenges, cannot be acquired from textbooks.

Capt. Baig feels that the gratitude and admiration that one receives from a ship's bridge team is far more satisfying and rewarding than any other duties a pilot may also perform. That feeling of accomplishment, after doing a good job of a pilotage act, is hard to express. At the same time a pilot's job involves night shifts, extended shifts and unpredictable work schedules. These disrupt one's body's internal timing mechanism and may impair performance. Hence fatigue management is very essential to minimise the risk associated with it.

His suggestion to new pilots is that they inculcate the habit of pursuing continuous professional development. This will help keep them abreast of changes in our industry and in adapting to them, leading to their growth and the betterment of the service they provide.

Frank Kowalski
Managing Director at Safehaven Marine.

PILOT BOATS, A DESIGNER AND BUILDERS PERSPECTIVE

Background

Safehaven Marine build a range of vessels for many different operational roles such as patrol, survey, crew transfer to name a few. What makes Safehaven Marine unique is that we specialize in pilot boats with models from 11.5-18m and 80% of our production is dedicated to just this area. We have supplied over 50 pilot craft all around the world over the last 17 years and this has allowed us to amass a great deal of experience in this very specialized area of boat design and engineering. A pilot boat has to endure quite possibly the toughest and most challenging of operational roles. Coming alongside a ship at night in a gale with 5m+ waves and transferring a pilot aboard has to be the most demanding sea borne operation a coxswain can undertake. For the vessel to survive what is in effect a controlled collision many times daily certainly imposes unique forces and stresses on a hulls structure, and the vessels structural design and engineering needs to be capable of withstanding theses forces day in and day out, reliably for many years.

As managing director at Safehaven Marine for some 25 years, I am also the designer of Safehaven's craft and responsible for the naval architecture. When I was a young man I skippered my own Commercial boat offshore in Ireland, and I guess the years doing this gave me a fine understanding and respect for the sea, and an appreciation of what the term 'good seakeeping' meant having been caught out many times in bad weather. I'm also lucky that I have a couple of local pilot boats that Safe haven built at my home port of Cork Harbour, and am good friends with many of the pilots and crew there. As such I've been able to experience first-hand over the last 17 years what a pilot boat does and how the pilots and crew operate. Having watched with bated breath pilots climb up ships ladders and seen the skill of the coxswain's coming alongside in rough conditions I've developed the utmost respect for the pilots and crew. But also these experiences have helped me understand better the requirements of a pilot boat, and has allowed me to continuously refine design elements of my pilot boats over the years.

Specialised design considerations for pilot boats

A pilot boat due to its specialised operational role has some unique requirements beyond that of normal Comercial craft and workboats:

Extra strong construction.

A pilot boat hull has to be able to withstand what is in effect a 'controlled collision' many times daily, and in heavy seas these collisions can be pretty severe at times. We do not use cored structures, at least not on our pilot boats, as whilst a cored structure is certainly very strong, the outer shell is by necessity much thinner than on a solid laminate, so just by the nature of a pilot boats work the more durable solid laminate is probably preferable, even though there is a weight penalty. Also a solid laminate is much easier to repair should the pilot boat suffer damage, especially in geographical regions where repair facilities may be limited. That said we do use cored structures for some areas and components in the superstructure, such as the roof which are not subject to impact stresses and for some internal fit out structures to reduce weight.

An 'all weather' pilot boat obviously has to be very strongly constructed to withstand the slamming loads that a hulls bottom can be subjected to, as will be the case with all boats that operate in heavy seas. However in addition a pilot boat is subjected to unique side impact loadings on the hull especially at the pilot boarding area, and this specific area along with the transom quarter needs to be heavily reinforced. We use transverse framing at close 500mm centres which creates a pretty strong structure overall, but we also add additional reinforcement at these areas. Having the hull primarily transversely framed rather than longditudly in my opinion is probably preferable, at least on a pilot boat hull, as the transverse framing is better able to withstand side impact loadings.

Wide side decks and slightly angled cabin sides are preferable to prevent the pilot or crew member from becoming trapped or injured when the pilot boat rolls towards the ship during boarding manoeuvres in heavy weather. Although a common MO is for the pilot to access the ships ladder from seaward there will be times when this is not possible, so it's best to ensure by design that there is enough space to walk or shelter on the boarding side without there being a risk of getting crushed, no matter the pilot boats angle of heel in extremis. Some 600mm is a good width for the side decks and the actual area where the pilot boards should be quite spacious so he and the crew have plenty of space to manoeuvre themselves. The grab rail should allow the pilot to reach out and take hold of the ships robe ladder whilst still holding on to the safety rail to steady himself. Sometimes an extra safety rail can be incorporated forward of the boarding area if the push pit rail cannot be reached easily from here.

The deck should incorporate a good high grip, non-slip surface. The boarding area and side decks should be well illuminated with LED lights on the cabin side low down to illuminate the walkway, we have found that only actual 'under water' type lights survive here due to the harsh environment.

Larger and durable fendering

Over the years we have used many different fendering systems but whatever type and material is used for fendering it needs to be much bigger than on a typical work boat. As standard we nowadays use a polyurethane fender incorporating a 150x150mm 'D' section hollow fender at the deck edge, the size we use on our 12-15m size pilot craft. We also incorporate a slightly smaller lower run above the waterline and multiple diagonals along the side which provides good all round protection for the boat.

In our experience there are two areas of the pilot boat that receive the most wear, these being the shoulders right at the boarding point where the pilot boat is continuously pressed against the ship whilst holding station for the pilot to transfer and the transom quarters, as these often impact as the pilot boat pulls away from the ship. At the shoulders we use a much larger section of fender of polyurethane material nowadays with a size of 300x300mm.

The larger fender here significantly softens and absorbs the boarding impacts achieves two other purposes. The first is that by incorporating a large, and correspondingly, inevitably heavier fender only where it is most needed, it allows the boats weight to be kept lower. The second advantage of this being that the difference in size between the two fenders creates a gap for the pilots boarding ladder to sit as the pilot boat lays alongside.

Avoiding getting the ships rope ladder getting caught is probably the greatest challenge during boarding, and represents one of the biggest risks for the pilot as he boards. Having this gap also almost eliminates the risk of the pilot getting his foot crushed between the pilot boat and ships side, as where he is standing and boarding from, there is always a gap that cannot be closed.

There are however many other excellent fender systems available on the market and sometimes the client will have a preference, and we sometimes incorporate these systems, the pre-requisites of any fender system being that it is very tough and durable, capable of absorbing boarding impacts and can relatively easily be replaced at venerable areas such as the shoulders and transom quarters if it gets damaged.

Above, Safehaven's Sacrificial shoulder fender and the gap it creates for the ships pilot boarding ladder

The gap is created in front of the larger shoulder fender which is approx 1.5m long and behind. Pilots choose their own preference whether to board forward or aft depending on sea state but in heavy weather aft would be preferable. As this large fender suffers the most abuse and damage, we make this section easily replaceable and call it our 'sacrificial shoulder fender'. We also often add an additional run of fender that wraps around the transom quarters below the main fender as this is the other area most prone to impacts and damage.

Recovering a pilot from the water

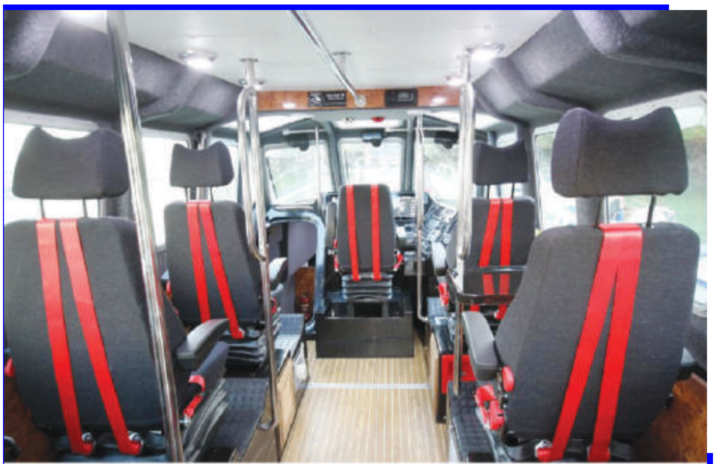
An efficient means of man over board recovery, we've incorporated many different systems over the years:
swing out Davits on the superstructure side deploying a life ring or Jason's cradle work well, but we developed our own MOB recovery system mounted on the transom many years ago and have continuously refined it over the years. Incorporating a platform that is folded back out of the way when not in use but can quickly be lowered to the waterline or underwater some 400mm, it can then also be accessed by a crewman by ladder to assist an injured or unconscious pilot on to it. We have also incorporated a prop guard at times, although the preferred MO is to approach the casualty from the bow and transfer by lifeline or Mate saver to the stern with the engines in neutral. Any recovery system should be quick and easy to deploy, we've tried to keep it simple and of manual operation not depending on hydraulics or electrics, as being pretty exposed to the elements such systems require maintenance and at the moment of crisis unless serviced and checked regularly could fail, but we do powered versions as well that incorporate a manual backup. Any manual system should not be too hard to raise by hand and be capable of being operated by a

Above and below photos show the MOB recovery system in use with the casualty being drawn by life ring or boat hook to the platform, then being lifted to deck level.

Other important design considerations. Good visibility from the helm to both port and st/bd to be able clearly see the point of touch at the shoulders, so one can perfectly judge the manoeuvre as one comes alongside without having to guess distances. Good visibility overhead towards the ships deck allows the coxswain to observe the pilot on the ladder especially on high side ships. A central helm position is ideal as it allows the coxswain the same level of visibility to the boarding area from either port or starboard boarding's, and have the same overhead view. This gives the coxswain equal confidence regardless of the side of approach.

Above, the central helm position on our pilot boats gives the coxswain coxswain control of the vessel whether boarding from the port or St/bd side.

A tapered beam at the deck, where the transom has less beam than the forward shoulder's can be preferable, although not always as it can depend on other design aspects, (our sacrificial fender naturally creates this taper as well). Incorporating a taper allows the keel to become offset from parallel to the ship as the helm is turned to break away, the offset forces a wedge or water to push the pilot boat away as it becomes parallel at the deck edge to the ship and helps reduce the chance of the pilot boat becoming 'stuck' alongside. Quick responsive steering. On our pilot boat designs we use extra-large rudders that were commissioned as our own special rudder design, cast in NIAB. Probably 30-40% larger than the norm which does result in a slight drag penalty, but the advantage of these large rudders enables the boat to have its course altered very strongly with just half a turn of lock on the wheel, so really at speeds above 9kts you never have to 'spin' the wheel, and as one comes alongside only one hand is needed on the wheel with the other controlling the throttles, this gives the coxswain great control of the boat at this critical moment. It's difficult to quantify steering empirically but as example our pilot 48 can alter its course 180 degrees at a speed of 25kts in 8 seconds, which is a pretty tight turning circle. Suspension seating for all crew and pilots is a must, and the seats should have armrests at least and preferably a lap seat belt as in heavy weather one can be accidently thrown from the seat by an unexpected wave encounter. There needs to be multiple grab rails so that one can pass through the cabin with each no more than an arm's reach from the next, and you really can't have too many. A Hadrian rail is also essential for traversing around the cabin safely, especially so in heavy weather.



Every different boats hull design will tend to want to lie at a different ideal angle when holding station pressed alongside a ship as the pilot prepares to embark or depart, this area as well as being well illuminated can benefit from having yellow or some other easily distinguishable mark at the ideal boarding point, so the pilot can see where he needs to ideally step to as he disembarks the ladder to the pilot boat. A lot of discussion has been made to having forward or aft angled front windows over the years, both have their pros and cons. Forward angled windows have the advantage of clearing water more easily and tend to suffer from reflected helm instrumentation lighting to a lesser extent, although this much depends on the helm design and its proximity to the windows so this is not always the case, and dimming of all helm lights can mitigate against this to a large extent. Lastly the actual glass area in m2 per window tends to be less compared to aft angled windows which have a more extreme aft rake, less glass area inevitably makes for a stronger window which directly leads to the main advantage of aft angled windows, that being the much reduced loadings on the window glass from a boarding sea. If a big breaking sea comes over the bow green solid water can impact the windows with tremendous force, if the windows are angled aft the pressure of water is deflected and greatly reduces the loadings on the glass and superstructure. However this needs to be put into context, it is only a 'surf' type of breaking wave of 4-5m+ that is of concern here, as typical breaking seas offshore tend to result in only spray and aerated water impacting the windows, whereas a plunging breaker can dump several tons of solid water onto the foredeck if it breaks right over the bow. So unless the pilot boat has to operate in waters where there is a bar or strong tidal influence and big waves are prevalent, it's not such a relevant factor.

Above, a big breaking sea coming over the bow makes one appreciate the need for very strong windows. Below, a large lump of solid water running along the deck, a cubic meter of water weighing 1 ton travelling at 25kts…..

Pilot boarding ladders

This seems to be quite a controversial subject, with some pilots preferring them and some preferring to board from the deck. Of the 50 pilot boats we have built, some 25% have had pilot boarding ladders incorporated, with the majority not incorporating them. Geographical regions appear to have a bearing with some regions using them and others not. From my understanding, and bearing in mind I'm not a pilot, the main advantage of the high level ladder is firstly that the climb up the ships rope ladder can be reduced, and obviously the less time spent on this ladder exposed to the elements is preferable. Secondly, the ships rope ladder can be kept above the plot boats deck thereby lessening the likelihood of the ladder becoming trapped between the pilot boats deck fender and the ships side, as the pilot boat moves vertically up and down as the waves or swell passes along the ship. As the platforms tend to be at a height of between 1- 2m above the deck, this means, in theory, that swells of up to 2m will not cause a correctly deployed ladder to become trapped. Another advantage is that as the pilot boat surges forward and aft when boarding in a following sea, the ladder can be pulled into position by the crewman.

Above two Interceptor 42 Pilot boats for different ports and countries, one operating without a plot boarding ladder and one with. Below, one of our designs of pilot boarding ladder with the platform 1.1m above deck.

Above, another design with a platform 1.8m above deck with a hinged outer platform and handrail.

The main disadvantage at least as I see it is that pilot boats motions are very greatly amplified by being 1-2m above the deck, and the small platform is inevitably a much more precarious a platform to be standing on compared to the larger and more spacious pilot boats deck. Another disadvantage is that the ladders platform has to be a certain distance away from the ships side to allow the pilot to step easily across the gap between the platform and ladder. Too far away and it's difficult to reach easily or safely, but if the platform is to close, then there is the risk that in heavy weather as the pilot boat or ship rolls the ladder can impact the ships side damaging the ladder, or possibly injuring the pilot. Finding the right compromise can be challenging, especially as one has to factor belting or other such protrusions that some ships can have along their side. Adjustable platforms which can have their platform's set at a distance to suit the prevailing conditions can be a good albeit more expensive solution. It goes without saying that any platform as well as all other aspects of a pilot boats engineering needs to be extremely well designed and built, as well as being easy and straight forward to maintain over the years.

Good seakeeping and stability

Good seakeeping and stability is clearly a very important factor for a pilot boat. The term good seakeeping can be best interpreted as 'The vessel should inspire a sense of confidence and safety in her crew and should always behave in a predictable controllable manor, no matter the course or sea state'

Within the almost infinite number or interpretations for hull design that exist, some of which will excel on some headings to a sea state and be less good on other courses, the best designs will be those that achieve a compromise or balance, so that they run well on all courses. The overriding factor is that the boat meets the above interpretation of inspiring a sense of confidence and safety.

A Pilot 38 & 48 coxswain's having confidence in their boats seakeeping as they encounter large breaking seas during sea trials at the entrance to Cork Harbour, on the South coast of Ireland where Safehaven Marine are based.

Without taking into account variations on a boats beam in relation to its size (length to beam ratio), which obviously plays a big part in the hulls stability probably the single most important factor that influences how a fast monohull design, of typical proportions behaves in heavy weather is its centre of gravity. In heavy weather a low VCG is what you want or the boat or the boat will be 'tender' and prone to yawning or broaching, and everything that can be done in the boat's design to keep its CG as low as possible will result in a safer boat when big seas are encountered.

All our pilot boat designs are inherently 'self-righting' achieved by a combination of a low VCG and the buoyancy of the superstructure. This means that once the point of vanishing stability of the hull has been passed, the superstructure comes into play to add an extra righting force when it impacts the water beyond 100 degrees of heel. How far the self-righting capabilities are taken depends on the area of operation of the pilot boat to an extent. For absolute full self-righting as in a SAR craft the boat pretty much has to be like a submarine so that no significant amount of water can enter the hull when inverted, and that everything inside the boat, including its crew stays in its position when upside down, however this does result in some design compromises (windows need to be fixed etc).

Above, an Interceptor 48 pilot undergoing a self-righting recovery test by being pulled over gradually to an inverted position by a crane to ensure she recovers to an upright condition simulating a capsize scenario.

Above and below, the kind of heavily breaking 'surf' waves that if encountered beam on at the worst moment as they are plunging could potentially cause the vessel to be capsized.

However as a minimum the windows, doors and hatches should be strong and watertight enough, and cabin strength sufficient so that as the superstructure is slammed into the water, nothing breaks. It is a pretty rare occurrence for waves capable of rolling over completely a well-designed pilot craft of over 12m to be encountered, mostly one could expect a hard knockdown to 90 degrees at which point the cabin buoyancy stops a full roll over, and it is really only the type of 'surf' wave that might be encountered crossing a bar or in shoaling waters, or waters subject to fast tidal flows that represent such a danger, so the requirement for absolute self-righting very much depends on the sea states that might prevail at a port. That said 'inherently' self-righting is a desirable feature for a pilot boat as the sea can be an unpredictable environment, and interactions that can occur to a pilot boat whilst alongside a ship can be unpredictable as well, as there can be many different factors in play and in influence at any one moment.

All photos courtesy of Safehaven Marines sea trial archive.

SAFEHAVEN MARINE

Safehaven Marine. Ireland. +353 86 8054582
E-mail: info@safehavenmarine.com : www.safehavenmarine.com

SHARING MENTAL MODELS IN CONFINED WATERS

Antonio Di Lieto – Hans Hederström – Peter Listrup – Ravi Nijjer


Antonio Di Lieto


Hans Hederström


Peter Listrup


Ravi Nijjer

"This article first appeared in Seaways, the journal of The Nautical Institute"

Bridge Resource Management is founded on **sharing mental models**.

What does this mean whennavigating and manoeuvring in confined waters?

Is the level of information exchanged on the bridge detailed enough to enable unambiguous and timely challenge and response?

Accidents in confined waters are often the result of intentions and actions not challenged in due time, despite all formal Bridge Resource Management tools being applied. So, what is missing?

The argument of this paper is that anew concept**to plancritical navigational elements**is required for navigation and manoeuvring in confined waters.

The idea is that defining **critical navigational elements**(i.e. cross track distance, speed, rate of turn, drift angle etc.) **in terms of an interval of values** – rather than single values – may remove the **ambiguity** to challenge who is conning the vessel.

Critical navigational elements need to be **controllable** and **observable through monitoring** by the bridge team, and are determined by:

- an interval of **planned**values that represent the normality of operations. If everything goes according to plan, none of the planned values would have been exceeded.
- **no go**area/values that cannot be exceeded (i.e. non-navigable waters, breakwaters, speeds beyond or below which it is impossible to control the vessel). If the no go value is exceeded, then the ship is either aground, has had an allision or collision.
- the**reserve** that is the difference between planned values/areas and no go values/areas.It represents the **safety margin** available for a specific critical element. The reserve can be used intentionally, in order to reasonably adapt to unplanned situations (i.e. traffic,changes in environmental conditions etc.) or not intentionally because of conning errors.

In order to clarify this concept, let us consider the example in the figure 1, where the reserve is used intentionally. Indeed, the reserve can and should be used as soon as the person conning believes it is reasonable to do so. This could happen to avoid impeding the passage of a ship constrained by her draft. In figure 1 ship "A" is leaving the planned corridor as a result of an alteration of course to starboard. The person conning is making the bridge team aware of his/her intention to use the reserve by using the **thinking aloud** technique. Such technique is based on verbalising the intention (of the person conning), the motivation behind an action before its execution and its expected outcome. In this way the elements are given for either confirmation or for a challenge made by other team members.

With reference to ship A, an example of thinking aloud could be:

- Plan: *"I intend to alter course to starboard"*
- Reason: *"to avoid impeding the passage of ship "B" which is constrained by her draft"*
- Outcome: *"I will navigate outside the planned corridor with a Cross Track Distance not more than 200m right of the track"*

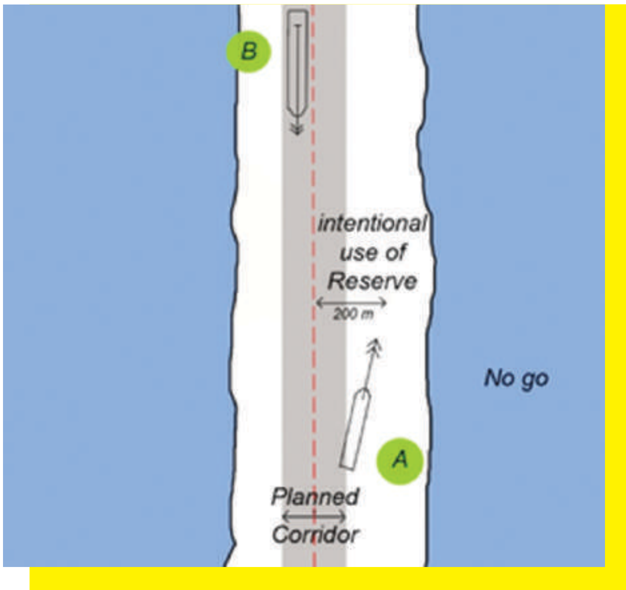


Figure 1

Another example of reasonable use of the reserve is the necessity to slow down the speed over ground when approaching another vessel at a difficult bend in a tidal river (figure 2). Vessel "1" with the tidal stream against her may need to slow down to 3 knots until vessel "2" has passed clear. If the reduction of speed over ground is outside the interval of planned values – say between 5 to 6 knots – such reduction would certainly be considered a reasonable use of the reserve.

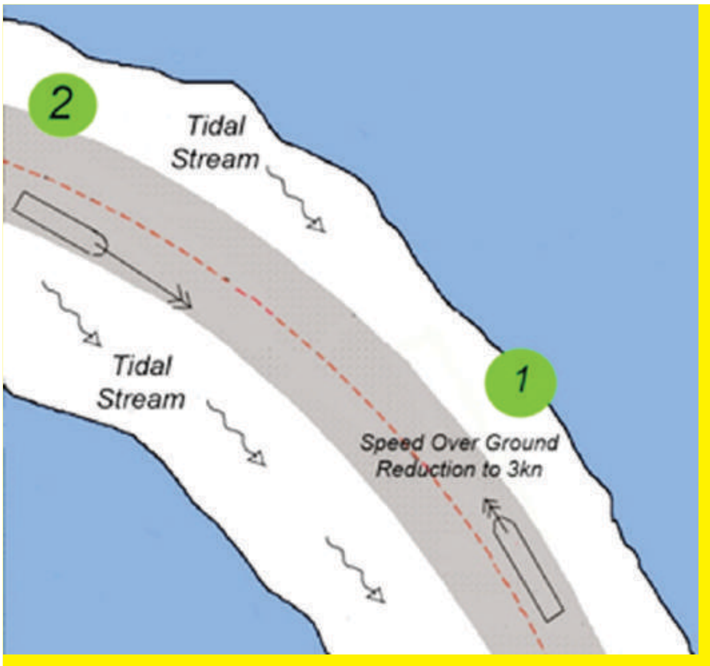


Figure 2

This last example shows that reserves are not only of a spatial nature. Also the drift angle can be defined by an interval of planned (normal) values and by an extreme value, which – once exceeded – causes unacceptable swept path in a narrow channel. In other words, all drift angle values outside the normal interval and still within the extreme ones, make up a safety margin to use only under abnormal or emergency conditions.

Back to the main argument of this article, this planning methodology aims to remove the ambiguity to challenge the team member conning the vessel. At the same time it is allowing the necessary flexibility any ship handler needs to manoeuvre without being constrained by unrealistically strict parameters.

Let us consider an example of unintended use of the reserve a shown in figure 3.

Figure 3

When the ship is in position 1, the Cross Track Distance (measured from the conning position) is right of track and the entire ship is within the **Planned Corridor**, without using the reserve. When the ship in position 2, the Cross Track Distance is zero (conning position on track), but the stern is on the edge of the planned corridor. When the ship is in position 3, the Cross Track Distance is only slightly left of track but the ship's port quarter is well within the reserve, with not so much space left before crossing the safety contour and entering the No Go Area with the stern.

In principle, critical elements planned according to this concept, can be used as baseline not only for thinking aloud, but also for **challenge and response**.

Before turning, the person conning would expressed his/her intentions as follows:

- *Plan: "I intend to turn keeping the conning position right of track"*
- *Reason: "Because I want to keep the port quarter within the planned corridor"*
- *Outcome: "The Cross Track Distance will be between 0 and 40m right of track"*

Now let us assume that the ship is drifting into position 2 due to an unexpected current and the person conning is not promptly acting on it. As soon as it is apparent that the Cross Track Distance will move left of track, any other team member should intervene by **probing** – *"What is your intention?"* – and/or **alerting** – *"The Cross Track Distance is now zero and the port quarter is going outside the corridor"*.However, if probing and alerting does not satisfy the team member who has concerns, then the challenge needs to be expressed using words which raise attention such as *"I suggest" or "I recommend"*. The following expression would constitute an **outcome based challenge**:

"I recommend to bring the conning position right of track as initially planned".

It is important to understand that the challenge needs to focus on the outcome rather than on the specific action to control the ship. This is in order to avoid that the person conning is psychologically anchored to specific instructions given by the person challenging, especially if he/she has more authority to do so within the team. In this case if the challenge included specific instructions it couldlead to a situation where the person with the conn waits for the next one. This could mean a 'de facto' but not formal taking over of the conn.

Moreover, to avoid distractions and keep the level of communication essential on the bridge – especially during critical navigational phases, any challenge should be timely and triggered by the intended/potential use of the reserve. This is particularly useful during manoeuvres to berth/unberth the ship. For example, a critical element during an approach to a berth could be the ship's heading. An interval between two headings – rather than a single heading value – would define the interval of reasonable angles of approach to the berth. An example of this situation is shown in figure 4.

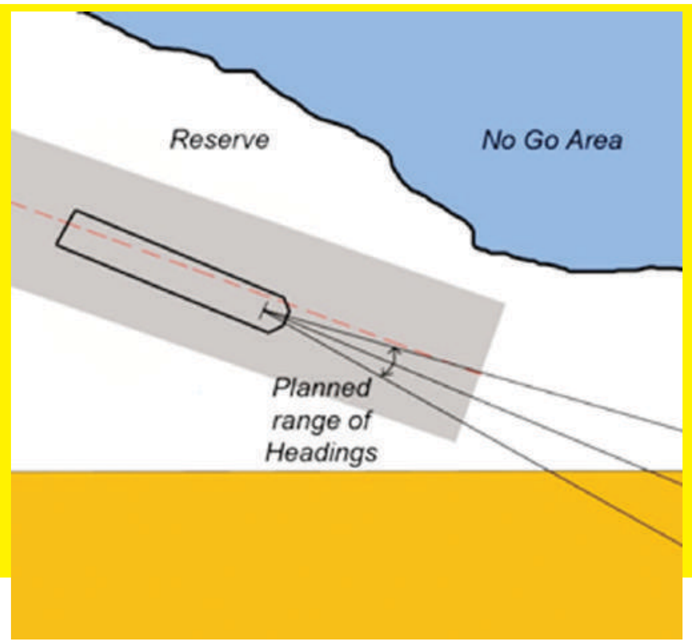


Figure 4

If the heading is outsidethe interval of planned values, suggesting to adjust the ship's heading may be more convenient than suggesting how to specifically achieve the end result. If the outcome based challenge is carried out in due time, it may be possible to let the shiphandlergive orders as independently as possible.

In conclusion, the conceptpresented in this article aims to share detailed mental models and achieve **essential**, **timely**, and **unambiguous** challenges and responses between bridge team members.By no means is the concept meant to constrain shiphandling within fixed limits. On the contrary, the interval of planned values (rather than single values) as well as any reasonable use of the reserve allows the necessary flexibility and discretion to handle a vessel in confined waters.

For this concept to work effectively though, critical navigational elements should beplanned, agreed and shared in due time before navigating in confined waters. The analysis of real world data from ships sensors, as well as high fidelity simulators are essential tools to define the critical elements of a challenging manoeuvre to such a level of detail. However, it is also important to keep the number of critical elements as low as possible. Applying the concept of the interval of values to all possible navigational elements in confined waters may defeat the overall aim of the concept itself, which is the prevention of accidents caused by intentions and/or actions not challenged in due time, or not challenged at all.

In conclusion, the concept addresses the concerns raised by safety investigators around the world. A recent accident report of the Canadian Transport Safety Board maintained that *"the absence of a detailed, mutually agreed-upon passage plan deprives bridge team members of the means to effectively monitor a vessel's progress, compromising the principles of Bridge Resource Management".*

Transportation Safety Board of Canada (TSB) 2012 – Marine Investigation Report M12W0207 – Striking of Terminal Bulk Carrier Cape Apricot, Roberts Bank, British Columbia

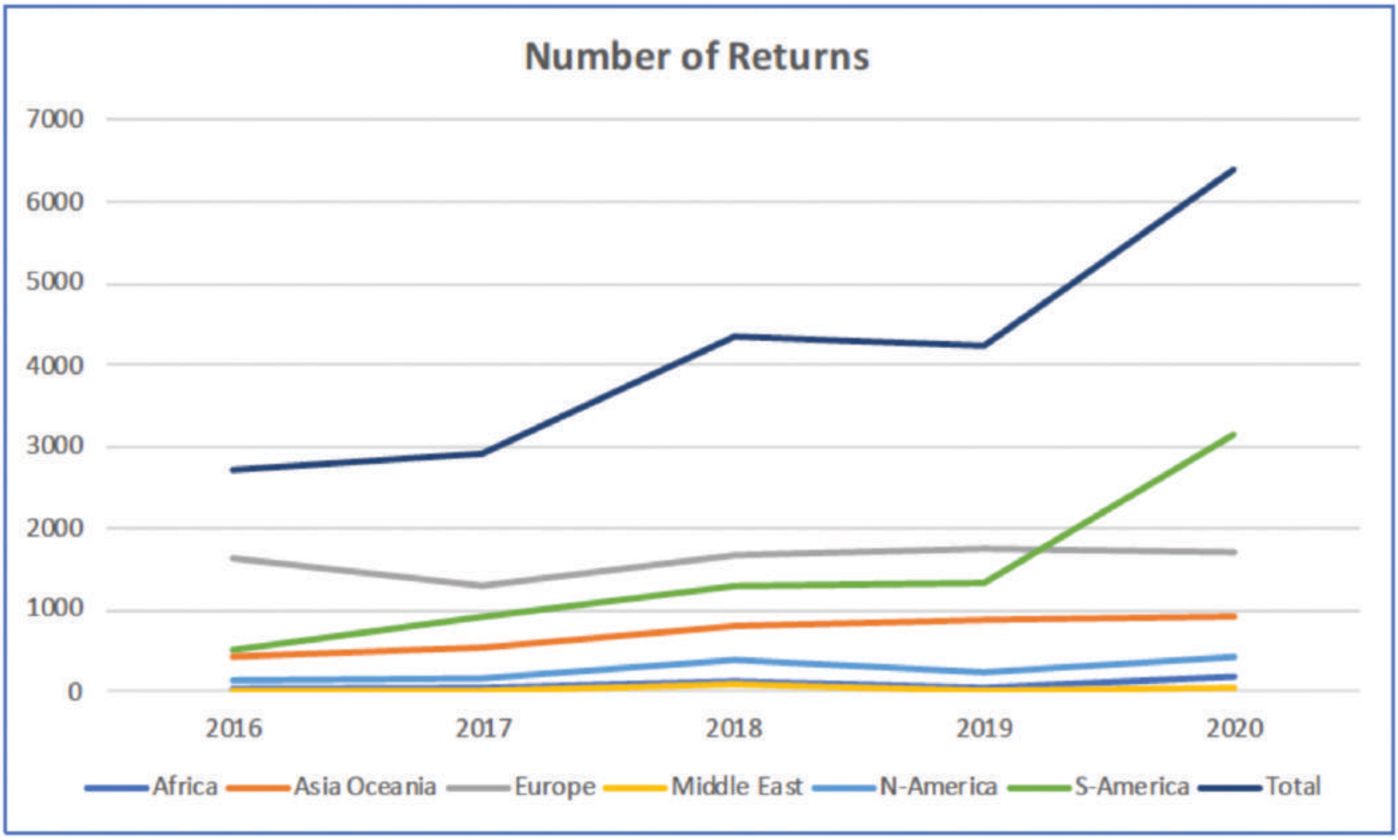
IMPA SAFETY CAMPAIGN COMPARISON 2016-2020

Herman Broers

The following analysis has been made using data from the IMPA Safety Campaign on pilot ladders from 2016 until 2020. The data has been retrieved from the IMPA site and is published with permission from IMPA.

1. Number of returned observations

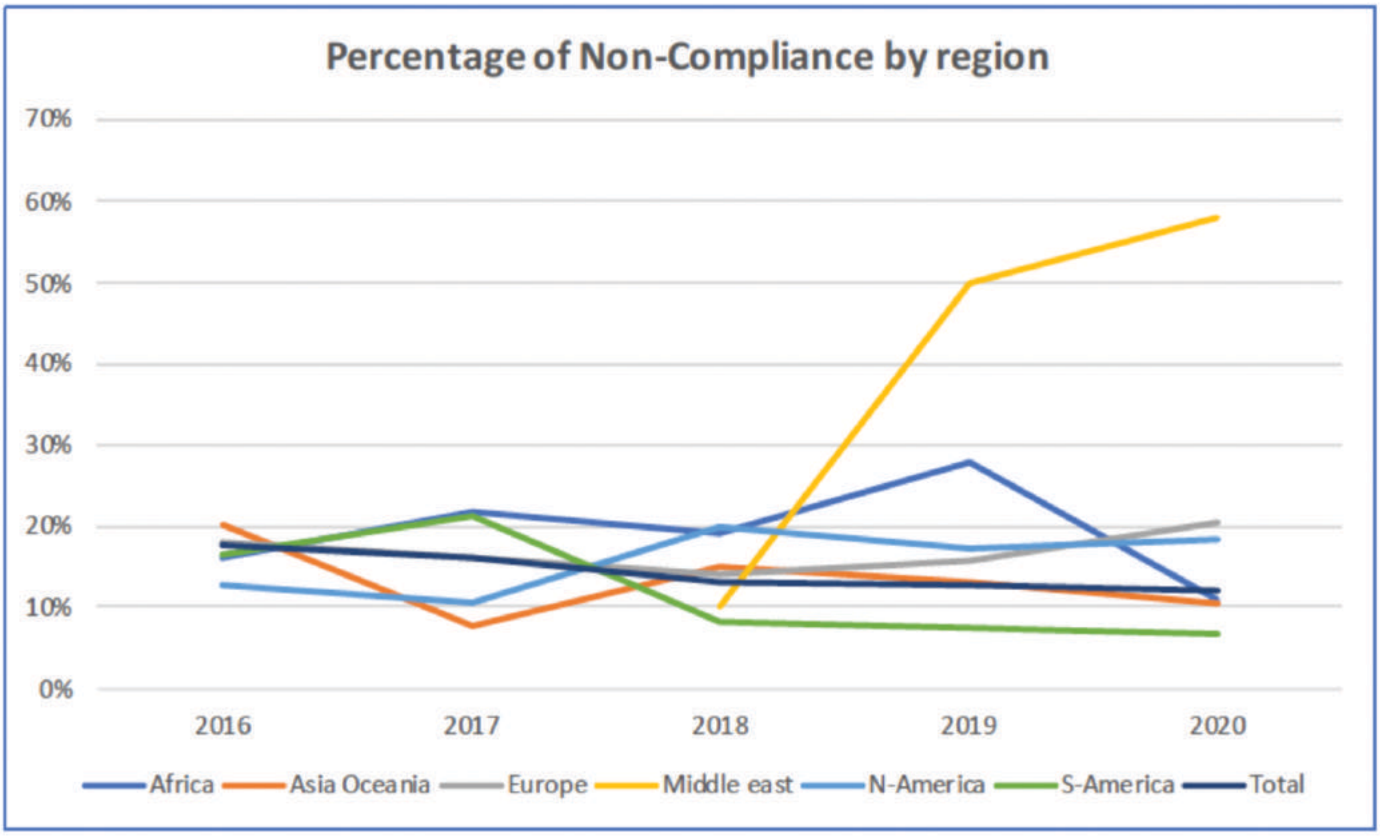
Number of Returns					
Region	2016	2017	2018	2019	2020
Africa	25	55	100	43	173
Asia Oceania	420	515	810	886	912
Europe	1636	1288	1679	1743	1718
Middle East	0	0	79	4	31
N-America	127	160	371	209	415
S-America	501	901	1300	1340	3145
Total	**2709**	**2919**	**4339**	**4225**	**6394**



- The 2020 campaign had a record number of observations (6394) which is 236% compared to the number of observations of 2016.
- The increase of observations in 2020 compared to 2019 has mainly been caused by the number of observations from
  the South American pilots who are now the "leading" contributors to the IMPA safety campaign.

2 . Non-compliance by region

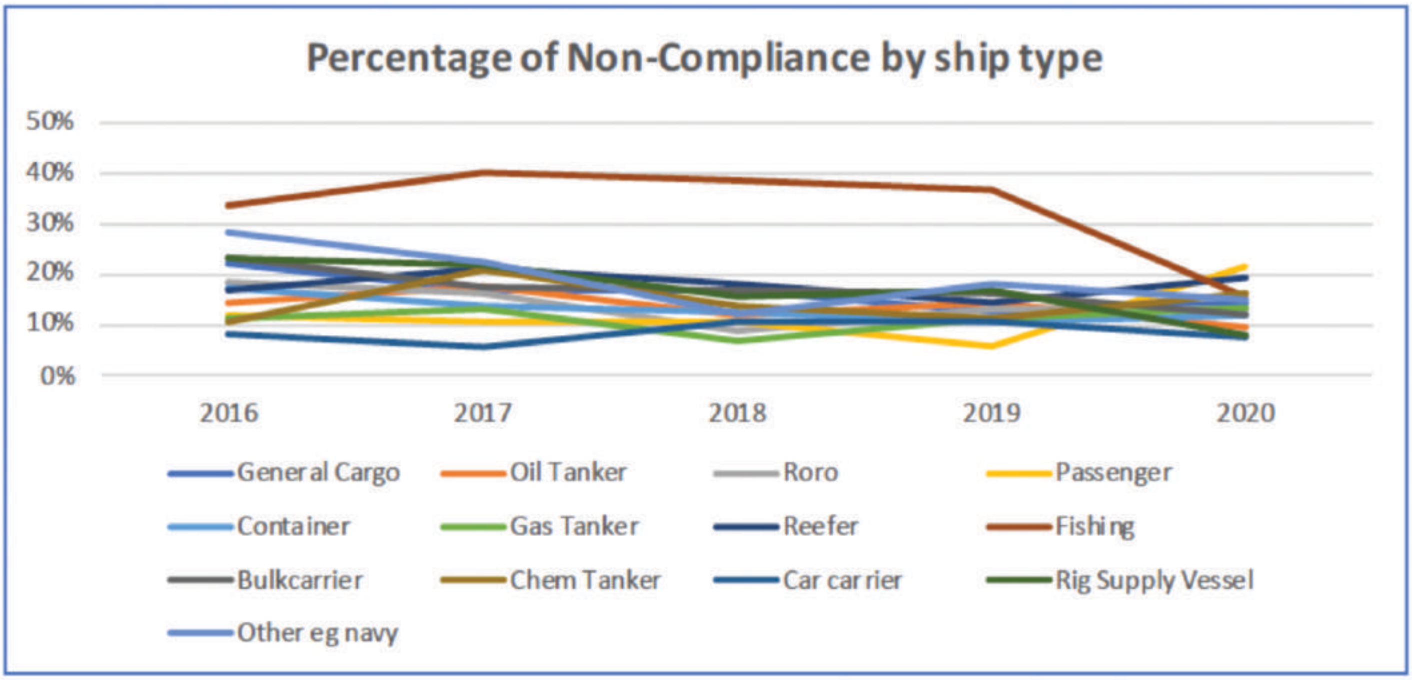
Percentage of Non-Compliance by region					
Region	2016	2017	2018	2019	2020
Africa	16%	22%	19%	28%	11%
Asia Oceania	20%	8%	15%	13%	10%
Europe	18%	16%	14%	16%	20%
Middle east			10%	50%	58%
N-America	13%	11%	20%	17%	19%
S-America	17%	21%	8%	7%	7%
Total	18%	16%	13%	13%	12%



- The percentage of non-compliant ladders in the Middle East and Africa are fluctuating the most in the last two years. The fluctuation in these figures could be influenced by the limited number of observations.
- Given the fact that South America has the highest number of observations, it is noteworthy that the percentage of non-compliant ladders in South America is the lowest of all regions in 2020.
- The good news is that the total percentage of non-compliant ladders has decreased from 18% in 2016 to 12% in 2020, in a clear downward trend.

3 . Percentage of non-compliant ladders by ship type

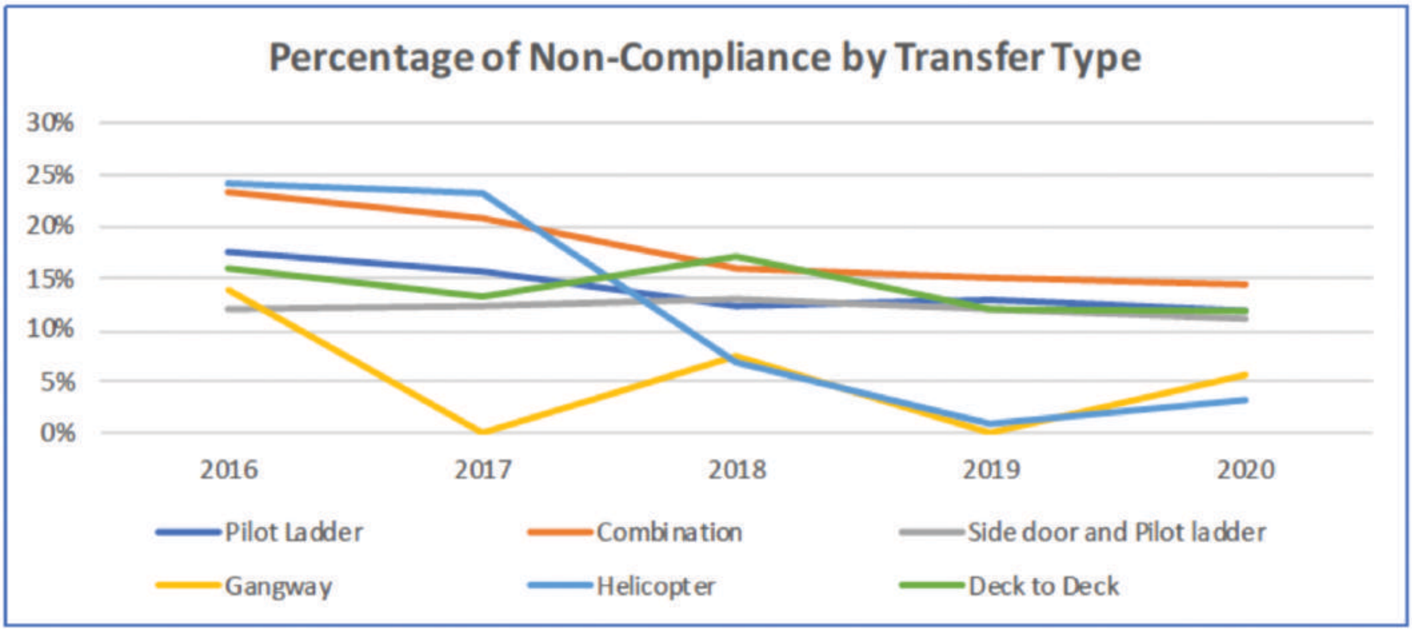
Percentage of Non-Compliance by ship type					
Ship Type	2016	2017	2018	2019	2020
General Cargo	22%	17%	16%	12%	14%
Oil Tanker	14%	17%	12%	14%	9%
Roro	18%	16%	9%	13%	13%
Passenger	12%	11%	11%	6%	21%
Container	17%	14%	12%	10%	12%
Gas Tanker	11%	13%	7%	11%	13%
Reefer	17%	21%	18%	14%	19%
Fishing	33%	40%	38%	37%	15%
Bulkcarrier	23%	17%	17%	16%	12%
Chem Tanker	10%	21%	13%	11%	16%
Car carrier	8%	5%	10%	11%	7%
Rig Supply Vessel	23%	22%	16%	17%	8%
Other eg navy	28%	22%	12%	18%	15%



- From the above data, it is clear that the percentage of non-compliant ladders has decreased the most amongst fishing vessels, a decrease from 33% to 15%.
- The overall spread between categories of ships with non-compliant ladders has narrowed from 25% in 2016 to 14% in 2020.
- The category with the highest percentage of non-compliant ladders in 2020 is "passenger ships". (21%)

4 . Percentage of non-compliance by transfer type

Percentage of Non-Compliance by Transfer Type					
Tranfer type	2016	2017	2018	2019	2020
Pilot Ladder	18%	16%	12%	13%	12%
Combination	23%	21%	16%	15%	14%
Side door and Pilot ladder	12%	12%	13%	12%	11%
Gangway	14%	0%	7%	0%	6%
Helicopter	24%	23%	7%	1%	3%
Deck to Deck	16%	13%	17%	12%	12%

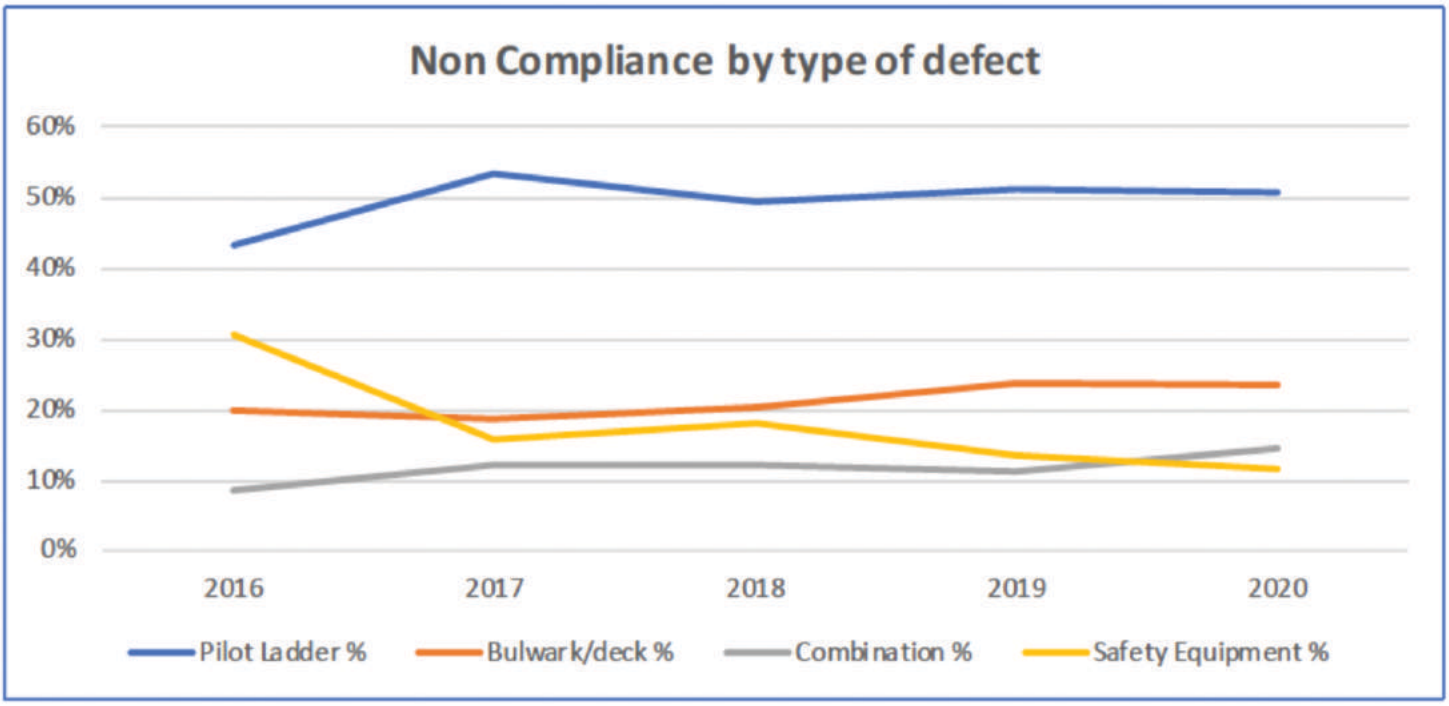


- As is the case with the total percentage of non-compliant ladders, a downward trend of non-compliant ladders can be observed in all transfer types.
- The Combination Ladder as a transfer type still has the highest percentage of observations on non-compliant ladders.
- Side doors, Pilot ladders and Deck-to-Deck systems remain fairly steady over the last few years, when it comes to the percentage of non-compliant observations.

5 . Percentage of non-compliance by type of defect

The following figures show the non-compliant observations by type of defect, as a percentage of the total number of non-compliant observations.

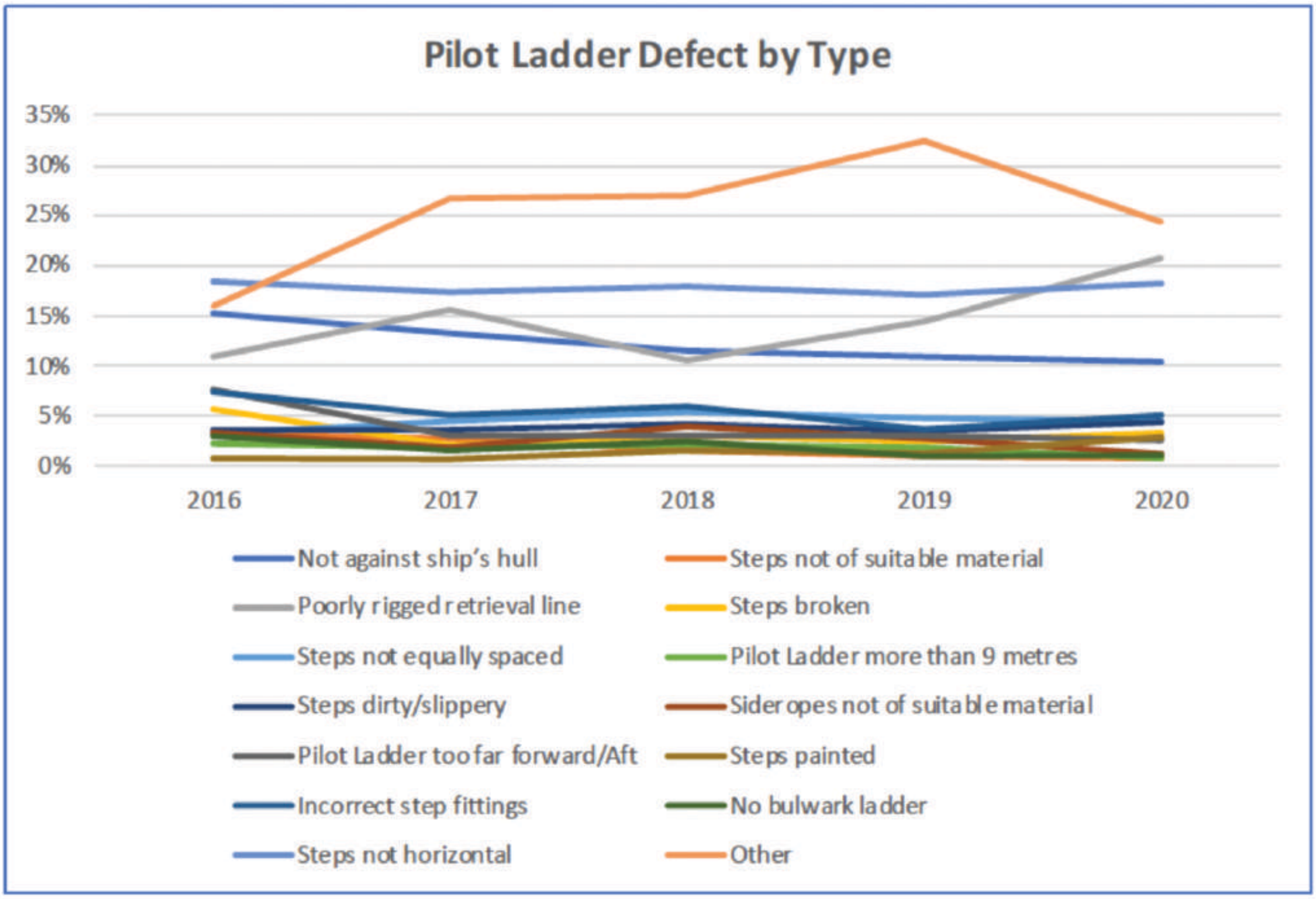
Non Compliance by type of defect					
Type of Defect	2016	2017	2018	2019	2020
Pilot Ladder %	43%	53%	49%	51%	51%
Bulwark/deck %	20%	19%	20%	24%	23%
Combination %	9%	12%	12%	11%	14%
Safety Equipment %	31%	16%	18%	14%	12%
Total	102%	100%	100%	100%	100%



- When looking at the total number of observations, more than half (51%) of them is found in the the category "pilot ladder", which remains almost constant over the last years.
- The percentage non-compliant observations pertaining to "Safety Equipment" has decreased from 31% in 2016 to 12% in 2020.

5a. Pilot ladder defect by type

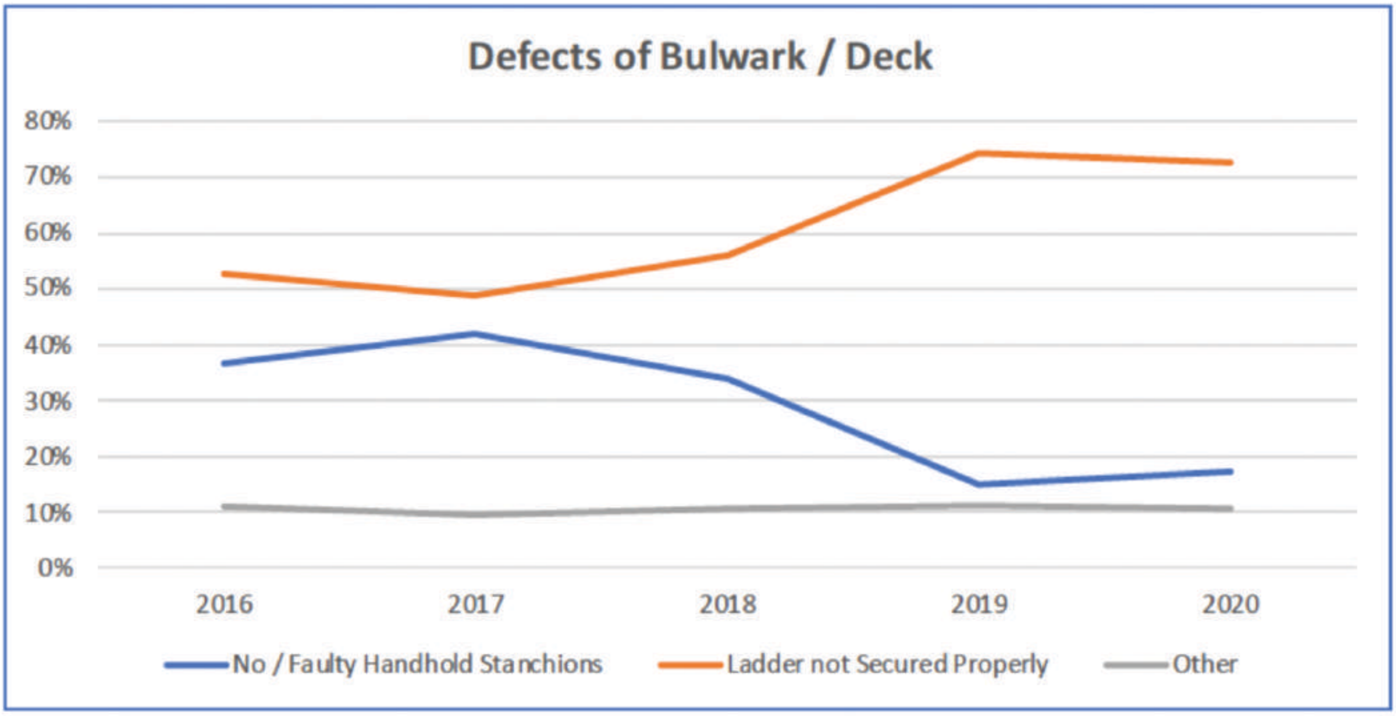
Pilot Ladder Defect by Type					
Type of Defect	2016	2017	2018	2019	2020
Not against ship's hull	15%	13%	12%	11%	10%
Steps not of suitable material	3%	3%	2%	1%	1%
Poorly rigged retrieval line	11%	16%	11%	14%	21%
Steps broken	6%	2%	3%	2%	3%
Steps not equally spaced	3%	5%	5%	5%	4%
Pilot Ladder more than 9 metres	2%	2%	2%	2%	1%
Steps dirty/slippery	4%	4%	4%	3%	4%
Siderópes not of suitable material	3%	2%	4%	3%	1%
Pilot Ladder too far forward/Aft	8%	3%	3%	3%	3%
Steps painted	1%	1%	2%	1%	3%
Incorrect step fittings	7%	5%	6%	4%	5%
No bulwark ladder	3%	2%	2%	1%	1%
Steps not horizontal	18%	17%	18%	17%	18%
Other	16%	27%	27%	32%	24%
Total	100%	100%	100%	100%	100%



- When looking at the non-compliant observations of pilot ladders only, the percentage of poorly rigged retrieval lines shows the biggest upward trend. This may be caused by the increased knowledge among the profession regarding this item.

5b. Defects of bulwark / deck

Defects of Bulwark / Deck					
Type of Defect	2016	2017	2018	2019	2020
No / Faulty Handhold Stanchions	37%	42%	34%	15%	17%
Ladder not Secured Properly	53%	49%	56%	74%	72%
Other	11%	9%	10%	11%	10%
Total	100%	100%	100%	100%	100%



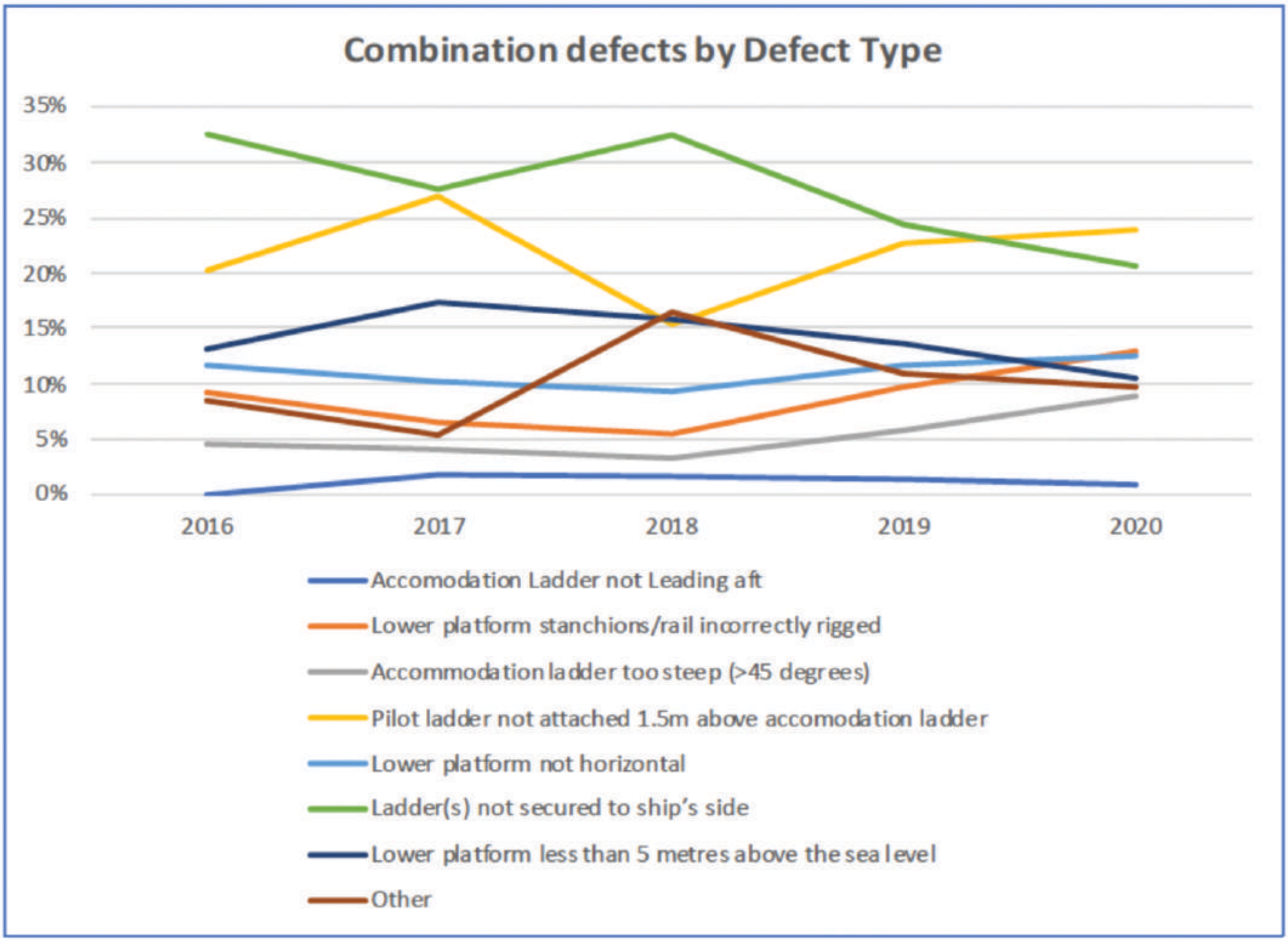
- When looking at the arrangement of pilot ladders on bulwark or deck, it is very clear that in 72% of the observed non compliances, pilots consider them "not properly secured"
- The sharp upward trend of this figure may be caused by the increased awareness of colleagues in this area.

Pilot Ladder not Properly Secured					
Type of Defect	2016	2017	2018	2019	2020
Total observations	2709	2919	4339	4225	6394
Number of observations"pilot ladder not properly secured"	72	57	87	130	183
Percentage of NC observations	2,7%	2,0%	2,0%	3,1%	2,9%

- When we consider the number of observations of not properly secured pilot ladders, it is 2,9% of all observations. The absolute number is rising over the last 5 years, however the percentage compared to the total number of observations remains steady at around 3%.

5c. Combination defects by defect type

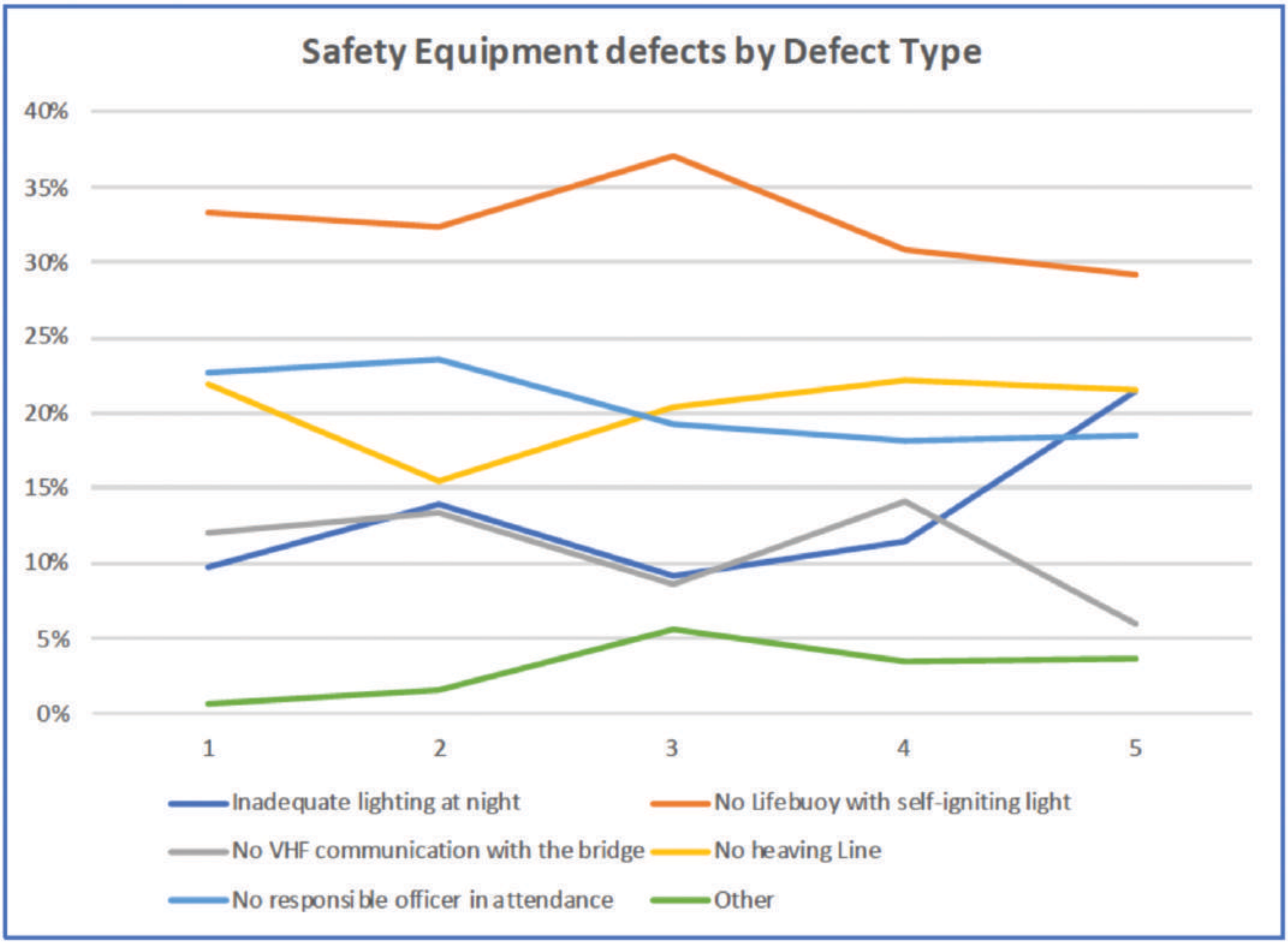
Combination defects by Defect Type					
Type of Defect	**2016**	**2017**	**2018**	**2019**	**2020**
Accomodation Ladder not Leading aft	0%	2%	2%	1%	1%
Lower platform stanchions/rail incorrectly rigged	9%	7%	5%	10%	13%
Accommodation ladder too steep (>45 degrees)	5%	4%	3%	6%	9%
Pilot ladder not attached 1.5m above accomodation ladder	20%	27%	15%	23%	24%
Lower platform not horizontal	12%	10%	9%	12%	13%
Ladder(s) not secured to ship's side	33%	28%	32%	25%	21%
Lower platform less than 5 metres above the sea level	13%	17%	16%	14%	11%
Other	9%	5%	16%	11%	10%
Total	100%	100%	100%	100%	100%



- When looking at non-compliances amongst combination ladders only, the main problems are 1) pilot ladders which are not secured at 1,5 m above the platform (24%) and 2) accommodation ladders which are unsecured to the ship's side (21%).

6. Safety equipment defects by defect type

Safety Equipment defects by Defect Type					
Type of Defect	2016	2017	2018	2019	2020
Inadequate lighting at night	10%	14%	9%	11%	21%
No Lifebuoy with self-igniting light	33%	32%	37%	31%	29%
No VHF communication with the bridge	12%	13%	9%	14%	6%
No heaving Line	22%	15%	20%	22%	21%
No responsible officer in attendance	23%	24%	19%	18%	18%
Other	1%	1%	6%	3%	4%
Total	100%	100%	100%	100%	100%



- When looking at the problems with safety equipment, an increasing percentage of non-compliant observations is found with inadequate lighting at night.
- As mentioned earlier, the overall percentage of non-compliances with regards to safety equipment has decreased sharply over the last 5 years.

December 2020,
Herman Broers

All India Maritime Pilots' Association

AIMPA

Published by: **Bhandarkar Publications**
10, Hammersmith Industrial Premises Sitladevi Temple Road, Mahim, Mumbai - 016.
Tel.: 2444 4248. **Email.:**news@bhandarkarpub.com