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2026 Marine Pilot Exam Final Bibliography

1. Adams, M. R. (2006). Shipboard Bridge Resource Management. East Port, Maine: Nor'Easter Press
ISBN-13 : 978-0977920006

2. Bowditch, N. (2024). The American Practical Navigator. Springfield, VA: National Geospatial
Intelligence Agency.
(https://msi.nga.mil/api/publications/download?key=16693975/SFH00000/Bowditch_Vol_1.pdf&type=view)
Chapters: 6 (ECDIS); 8(Short Range AIDS to Navigation); 36(Tides and Currents) only

3.* Norris, A. (2013). Integrated Bridge Systems Vol.2 ECDIS and Positioning. Published by The Nautical Institute, London, 2010.
Chapter 3, 4, 5, 6, 7, 8 only
ISBN: 978-1906915117

4. Hensen, H. (2022). Tug Use in Port: A Practical Guide (4th Edition). STC Publishing
ISBN-13 : 978-9083124346

5. Hooyer, H. H. (1983). Behavior and Handling of Ships. Centreville, MD: Cornell Maritime Press
ISBN-13 : 978-0870333064

6.* Palmer, Arie (2021). The 1000 Ways Trilogy consisting of Three Articles:
- Thousand Ways to Rig a Ladder
- Thousand Ways Around
- 1000 Combinations Around

These articles are attached at the end of this Bibliography

7. MacElrevey, D. H. & MacElrevey, D. E. (2018). Shiphandling for the Mariner (5th ed). Centreville, MD: Cornell Maritime Press
ISBN-13 : 978-0764354588

8. Publication 1310 Radar Navigation and Maneuvering Board Manual (7th ed.).(2001). Bethesda, MD: National Imagery and Mapping Agency.

- Selected pages: 9-16, 24-27, 35-38, 169-181, 237-238, 367-380

https://msi.nga.mil/api/publications/download?key=16694476/SFH00000/Pub1310.pdf&type=view#page182

9. Rowe, R. W. (2000).The Shiphandler's Guide (2nd ed). London: The Nautical Institute

https://nebula.wsimg.com/a131b301139d7ca083ef2083d4aab7e2?AccessKeyId=F86D0A1E7A0091C2061F&disposition=0&alloworigin=1

10. USCG Navigation Rules: International-Inland, August 2014 Edition. Published by Lighthouse Press.
Part A; Part B; Part C; Part D; Annex II; Annex IV; Annex V PAGES 167-169, 173-175 ONLY

https://www.navcen.uscg.gov/sites/default/files/pdf/navRules/navrules.pdf

11. Slesinger, Jeff (2008).Shiphandling with Tugs. Centerville, MD: Cornell Maritime Press, 2nd edition
ISBN-13 : 978-0870335983

12. House, D. J. (2002).Anchor Practice: A Guide for Industry (1st ed). Livingston, U. K.: Witherby Publishing. IBSN:
Pages 79-86, 88-92, 96-104, 111-112, 153-165, 170-174

13. Lee, G & Parker, J. (2007) Managing Collision Avoidence at Sea ; The Nautical Institute ; ISBN-13: 978-1870077866.
Chapters 3, 4, 5, 6 only

14.* Livingstone, G. & Livingstone, G.(2025) Shiphandling: The Beautiful Game; The Nautical Institute; ISBN: 978-1915488473
Chapters 1-5, 7, 9 only

*new text not previously included on exam

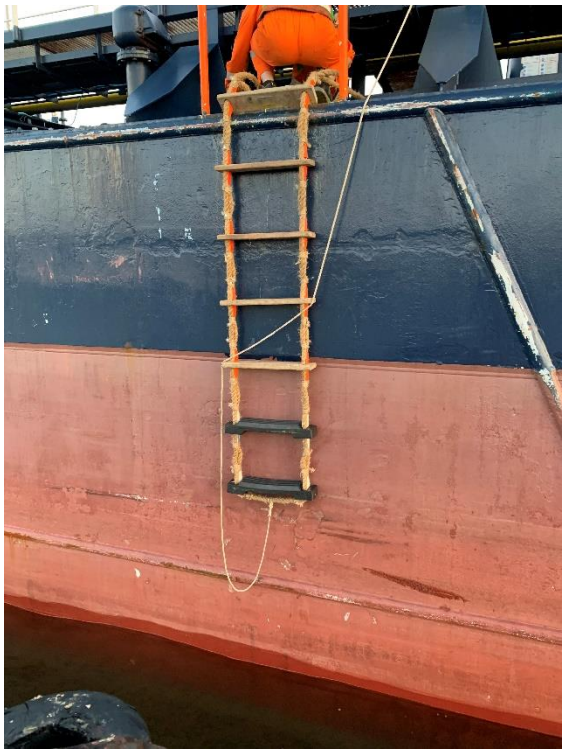
1000 WAYS TO SECURE A PILOT LADDER

and only one way is correct…….

(Version 3 february 2020)

By: Arie Palmers (reg. Pilot)

Content:



2 metres of ladder with at least 4 non compliances

1. Introduction

Dear reader.

My name is Arie Palmers and I am working as a pilot in the Scheldemonden area since 2009. After I got involved in 2 incidents with minor injuries in one week in the spring of 2018, I started wondering whatever might have caused these 2 incidents and therefore I started developing an interest in pilot ladders and the way they are secured.

From that moment on I have been keeping a tally of the non compliant boarding arrangements I see in front of me on a daily basis, and off course I participate in the annual safety campaign, conducted by IMPA each october. The outcome of the campaign is that about 18-20% of the boarding arrangements are non compliant in accordance with:

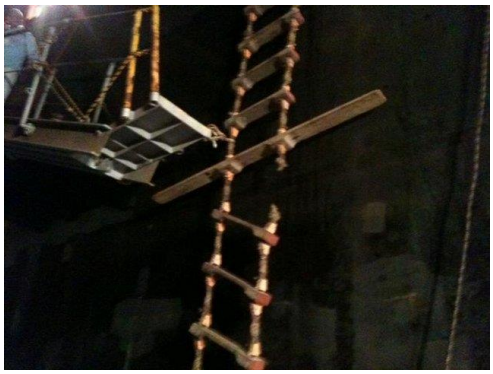
- SOLAS Regulation V/23
- IMO Resolution A.1045(27)
- NEN ISO 799-1(2019)

In my own tally the outcome is even more staggering: 47% of the pilot boarding arrangements I have to encounter are non compliant….What does this difference mean??? That will be work enough ahead for another article…..On a daily basis we see numerous of different ways a pilot ladder is secured, the vast majority of them is non compliant and therefore dangerous for the user. Insurance companies might even deny liability after an incident because you could have known or should have known the arrangement was dangerous. If you still use it, it's on your own behalf….

In the next few chapter's I will discuss the arrangements we see a lot, and explain why they are non compliant. As the title already suggests : 1000 ways to rig a ladder, only on of them is right. Names of the vessels involved, will not be displayed in the article, just out of politeness.. The facebook page "dangerousladders" often displays names and destinations of the vessels involved, mainly to warn our collegues in the port of destination that a present is underway.

I wish you all good readings and please feel free to comment and share. Please keep coming back home vertically and not horizontally!!

Also check facebook: dangerousladders



Broken combination with 3 more non compliances

2. Deck Tongue.

Notorious offender…

A photo explains more than a 1000 words… Here we see an example of a so called deck tongue, installed on one of our regular visitors. Seems like a great and simple solution to install and adjust a pilot ladder, ingenious invention! Unfortunately this system is non compliant and therefore downright dangerous for anyone who might have to use it (pilots, agents, surveyors, crew changes etc etc).

Here we see the decktongue in use holding the ladder, or to put it better, holding one step. Besides all this, the ladder seems rather old and worn. Let's have a look at the regulations to explain why this setup is dangerous.

IMO A.1045(27) states: The side ropes of the pilot ladder should consist of two uncovered ropes not less than 18mm in diameter on each side and should be continuous, with no joints and have a breaking strength of 24 Kilo Newtons per side rope (2.2.1)

ISO799-1(2019) states that each step shall have a strenght of at least 8,8 kN (table A.1 production test).

IMO1045(27) 2.1.1 the securing points etc shall be at least as strong as the sideropes.

After reading this, we find out that each siderope can handle 2400 kilos (4800 together) and that each step can handle a weight of 880 kilos. The strenght of the deck tongue? Don't have the slightest idea….. is it tested and certified?

So we buy a tested ladder that can handle about 5 tonnes on the sideropes, and then we put a step that can carry 880 kilos behind a steel plate…. One touch of the pilot lauch and it's gone, rather inconvenient for the poor guy standing on the ladder at that moment…

Swell, swinging of the ship or the launch lifting the ladder can also have the dangerous result that the ladder comes loose out of this deck tongue and goes overboard….

Besides that, SECURING a ladder is something totally different dan putting it behind a piece of welded steel. We all climb ladders without being secured in any way…. SOLAS and IMO provide the minumum safety rules concerning the ladders, less is absolutely not more in this case..

Notorious offender, and it's not even a pilotladder…

As we say: non compliant as hell….

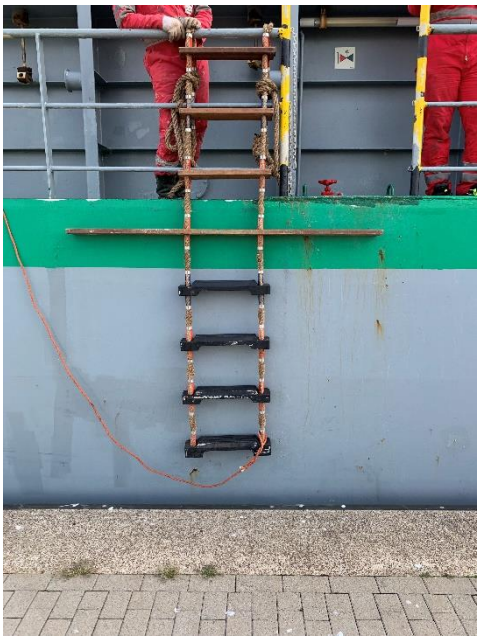
3. Bulwark setup

Notorious offender with bulwark setup

It's not even a pilot ladder (at least 6 non compliances)

Another easy way to prepare a ladder: throw it over the railing, tie the sideropes together with a piece of rope you found on deck and you have the ladder ready in a jiffy!!The ladder is not a pilot ladder, something to get into in another article..

We have already seen that the ladder has to be secured to strongpoints on deck, well…a railing is not a deck, seems easy peasy and yet it goes wrong time after time, why? Maybe it looks easier to rig it this way.



This setup makes you have to stumble sideways to reach the entrance

We have already seen that the ropes of the ladder can handle almost 5 tonnes on each side, just a question for the reader: are you sure the railing can handle 5 tonnes? We have all seen beaten up and damaged railings in our career, who of you hasn't stepped on a railing piece of steel, and it gave way? We'll never be able to find out who spotwelded the railing in a far away shipyard many years ago

For sure a railing can't handle 2 times 5 tonnes.

Conclusion: 'securing'a ladder on a piece of railing is non compliant and therefore dangerous..if it's non compliant, it's dangerous…don't use it!

Have them secure the ladder to strongpoints on deck and don't forget to report them.

Sideway shuffle again..how strong is the railing?

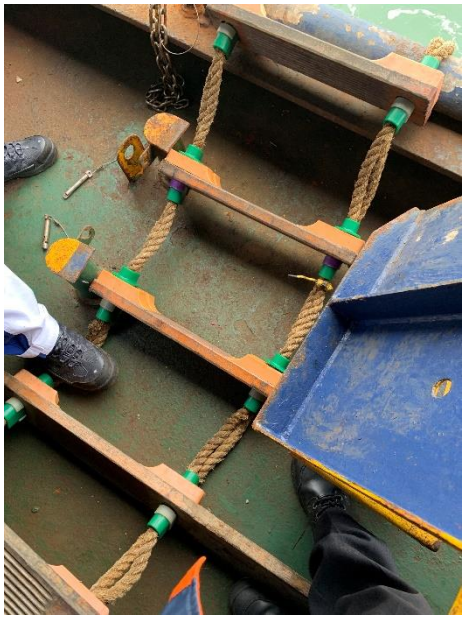
4. Platform placed over the securing area of the ladder

Always a surprise when you lift the lid

Having a platform built over the securing area of the pilot ladder is absolutely not illegal, it can even improve te acces: no debri or other tripping hazards.

BUT, 99 out of 100 times, when you lift the lid, there's a surprise underneath: a steel bar (wich we'll discuss later) a deck tongue or just nothing to hold the arrangement in place.

Looks like a safe acces



so the 3cm piece of steel is the only thing between life or death..

Basically, whenever you encounter a platform over the ladder, just ask them to lift it because you want to check the way of securing. As we have seen in the last photo, there was no securing at all!

A nice and swift way for the crew to install, and it can be a swift way for you to get down to the deck level of the pilot boat.

Secured to strongpoints on deck? No..

Secured to strongpoints? No..

Secured? No..

Again it's non compliant and therefore dangerous, don't use it. Have them secure it to strongpoints on deck and don't forget to report the vessel.

Instead of getting down the ladder you'll be walking the plank…

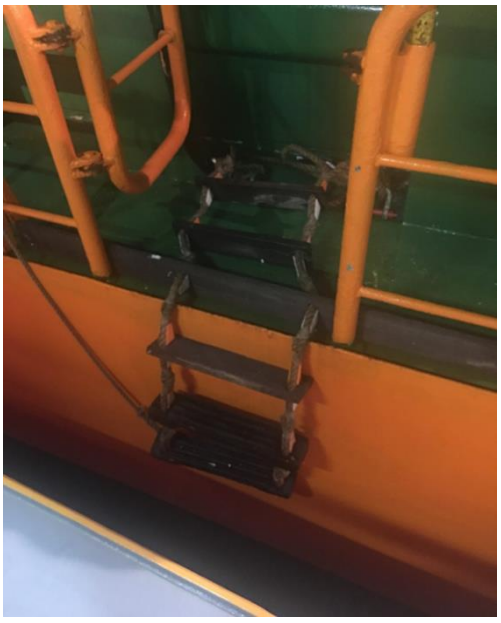
5. Spreader

spreader used for secured the ladder behind a very thin piece of railing

A spreader is a great invention to prevent a pilot ladder from twisting. Without a spreader you might look at the horizon instead of the ship's side all of a sudden. How to get back in a good position when something like that happens? Therefore every ladder with more than 5 steps must have a spreader (IMO A.1045(27) rule 2.1.4).

That is what a spreader is made for and not for keeping a ladder secured to strongpoints on deck.

As we know from an earlier statement in the article, steps can handle 880kilos and sideropes 2400 kilos each. That's the main reason you can and will not secure it this way. On touch of the pilot boat and the ladder will be damaged beyond repair, as will be the poor soul standing on the ladder…



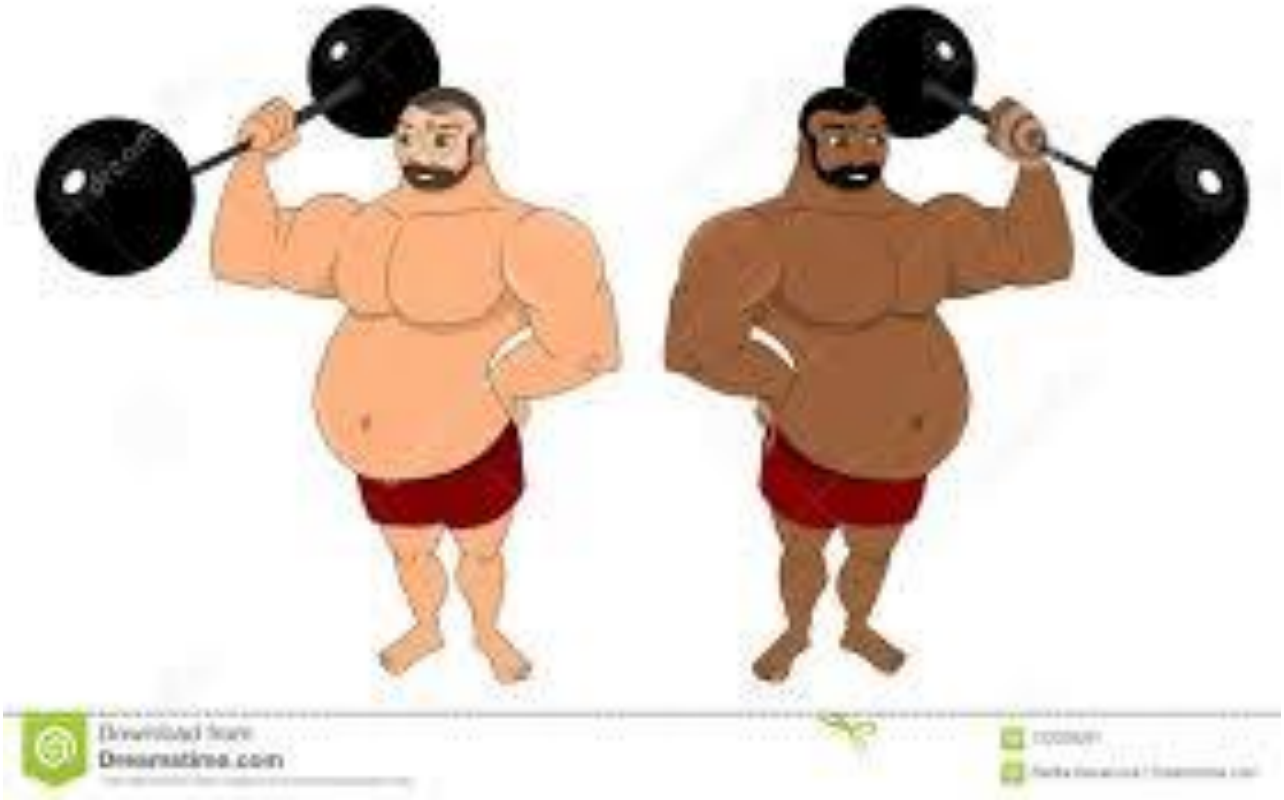
Again a spreader as a securing method

6. Human force

I feel very lucky i've never ran into this method, but at least 2 of my collegues have. Let's just assume you have to board a vessel, the ladder has to be lowered a bit, wich goes rather rapidly and before you know it you look up, see a smiling face and thumbs up " ready mr. pilot!!"

The you start climbing, what might be a real Jacob's ladder, you reach the top and 2 quite overweight guys stand on the sideropes on deck… horrible

They must have read the instructions wrong. The instructions clearly state: the ladder has to be secured to strongpoints on deck and not to strong men on deck. After this case the vessel was reported, captain was angry, not with the guys on deck but with the pilot for reporting his vessel..



7. Combinations

non compliant combination

Solas 23 clearly states (3.3.1): a pilot ladder requiring a climb of not less than 1,5 m and not more than 9 m above the surface of the water etc.etc.

Why 1,5 m? Well wait and see where you want to grab with a pilot ladder on a low freeboard of the vessel you have to climb onto… 3 steps over the side and nothing to hold on to.

Why 9 m? To make something clear: this has nothing to do with the lenght of the ladder, but only with the distance from the watersurface to the deck entry point >> more than 9m? Combination..

If you drop down from distances over 9 m there is a significant risk of severe injuries or even death when you fall down. It's all about the acceleration..(FUBAR)

We have seen that I wrote in the above picture the set up was non compliant, but why? Looks allright or not?

To start with, the ladder is tied to the gangway. Both ladder and gangway have to be secured to the hull independantly, and not together… You see the ladder is not attached tot he hull this way.

Ok. Suppose they have sorted this issue and you start climbing. You reach the platform and there's nothing to hold on to. On both sides of the platform there have to be hand hold stanchions (and horizontal ropes) so you can safely transfer from the ladder tot he platform.

IMO A.1045(27)

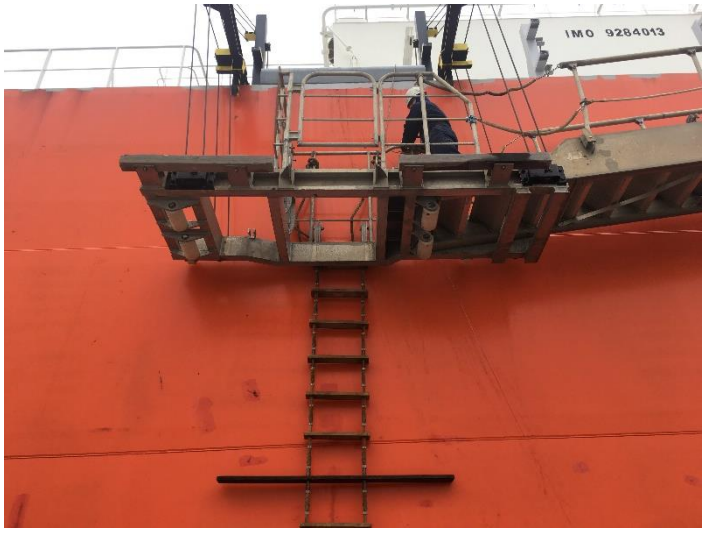
3.2 angle of the gangway under 45 degrees

3.3 lower platform horizontal and secured tot he ship's side. At least 5 m above the water

3.5 stanchions and rigid handrails

3.6 ladder adjacant tot he platform, maximum distance 0,2m, secured tot he ships side

8. Embarkation platforms



Another name often used for this platform is “trapdoor system”. Another wonderful invention to rig a ladder, at least a number of people must have thought it would be a great system. The problem is however, the more risk on non compliancies, the more there will be.. (Keep It Stupid Simple).

Ok, let’s go tot he “rulebook” to see what’s wrong with this setup…

IMO A.1045(27) 3.7 is the most important one in this case. It tells us the ladder has to “extend above the lower platform tot he height of the handrail and remain in alignment with and against the ship’s side..

We have already seen that the ladder has to be secured to strongpoints on deck, not the case here

Also we saw that the ladder and platform have to be secured tot he ship’s hull, not the case here.

More often than not the platform has to be adjusted in height to make a safe approach of the pilot boat possible. This always happens in a jiffy which means, the winch is not mechanically secured and the system is not secured tot he ships hull..all that is keeping you alive are the steel wires..

The ladder is attached under the platform, and we know now this is not correct. Whenever you reach the top of the ladder, you have to lean back, grab some pieces of steel and drag yourself through the gap (750x750mm) in the platform.. during rain this system works as a nice shower aswell: water collected on the platform and gangway will find it’s way down throught the gap.

Here are a lot of reasons why someone climbing this setup can fall back down into the water or onto the pilot boat. And yes it happens every year again, with severe injuries or worse. It’s inconvenient, slippery and dangerous, reject and abort.

So the ladder has to run through the platform, must be secured to the already mentioned strongpoints, and had to rest firmly against the ship’s hull aswell, all not the case here.

I would love to show a compliant embarkation platform system, but in over 10 years of pilotage I have come across the most sickening phantasies in construction but never ever a compliant one, sorry dear reader..

9. Pilot ladder winch reel

Non compliant (by design)pilot ladder winch

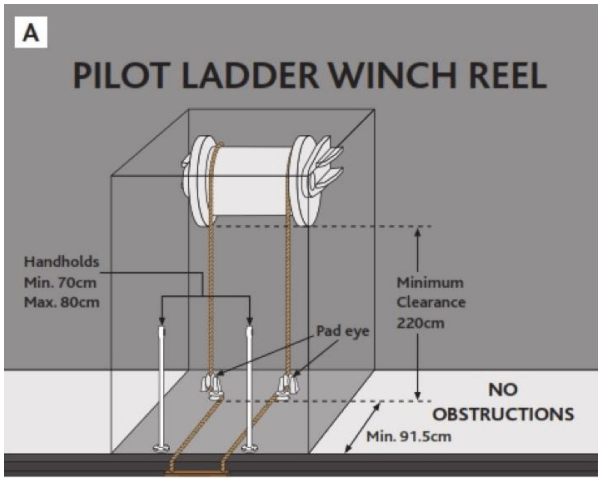
First the “IMO-rulebook”again…

7.1.1 Postion of the winch must provide unobstructed access to the ship. Here we see it’s not the case: if you keep climbing you’ll end up on top of the winch..

7.1.2 Point of access may be a ship’s side opening, accomodation ladder or a single section of pilot ladder. In this set up you have to step sideways to the deck and in another section of this article we have already seen this is not allowed. What if, due to the freeboard a spreader is obstructing your unobstructed access??

7.1.3 The access position and area should be clear of obstructions. Therefore the winch has to be placed basically out of your way

And the most important rule I want to stress on in this part is rule 7.4.2: the pilot ladder should be secured to a strongpoint independant of the pilot ladder winch reel AND 7.4.3: the ladder should be secured at deck level inside the ship’s opening or, when located on the ship’s upper deck, at a distance of not less then 915mm horizontally from the ship’s side inwards.



section of the pilot ladder poster

Here we see a part of the well known pilot ladder poster, it makes the rule clear. Suppose the ladder is secured tot he deck at the opening? This is a risk for someone climbing: when he reaches in, he can grab hold of a part of the ladder on the other side of the securing and fall down.. it has happened to one of my collegues overhere, he wasn't able to work for over 6 months and gained a few kilos in weight only due to the nuts and bolts keeping his foot together. You'll understand the 915 mm makes sense. Haven't met anyone yet with arms longer than 915mm.

Also the system is secured in more ways: the ladder is secured to strongpoints, the winch is on the brake and (7.5.6)a mechanical device or locking pin should also be utilized to lock powered winch reels.

Again we see: the more difficult, the more non compliances.

Non compliant (by design) pilot ladder winch reel, spreader obstructing emtrance after the sideway dive

In this final picture in this section we can clearly see the spreader is obstructing your safe access tot he ship, and again you have to stumble side ways.

Conclusion in this section: RTFM, or look at the poster

Non compliant: not secured on deck and deck level

10. Shackles (why and why not)

Check the condition of the sideropes

On the photo we see that the shackles have been used often to keep the ladder in place. The photo shows really well what effect the steel shackles have on the manilla ropes: twisted and beaten up…just wonder if this ladder will pass the 30-month compulsary strenght test (ISO799-1/2019 10.4, for iso certified vessels).Shackles are an easy way for the crew to keep a ladder in place, but is it actually securing the sideropes??? No it's not..when weight is put on the ladder, the ladder will move freelly under the shackles until the next chocks and step has reached the shackles.

Basically the ladder will be held in place solely by step and chocks. Let's think back a moment, we have seen that each siderope can handle 2400 kilos and that a step can handle 880 kilos.

If or when the pilot lauch hits the ladder, it will be ripped to pieces..880 kilos instead of 4800 kilos.

So we see that the shackles ruin the sideropes and that the force is put tot he steps and not the sideropes. Why still use this setup would be an genuine question. The answer is simple: IMO allows it:

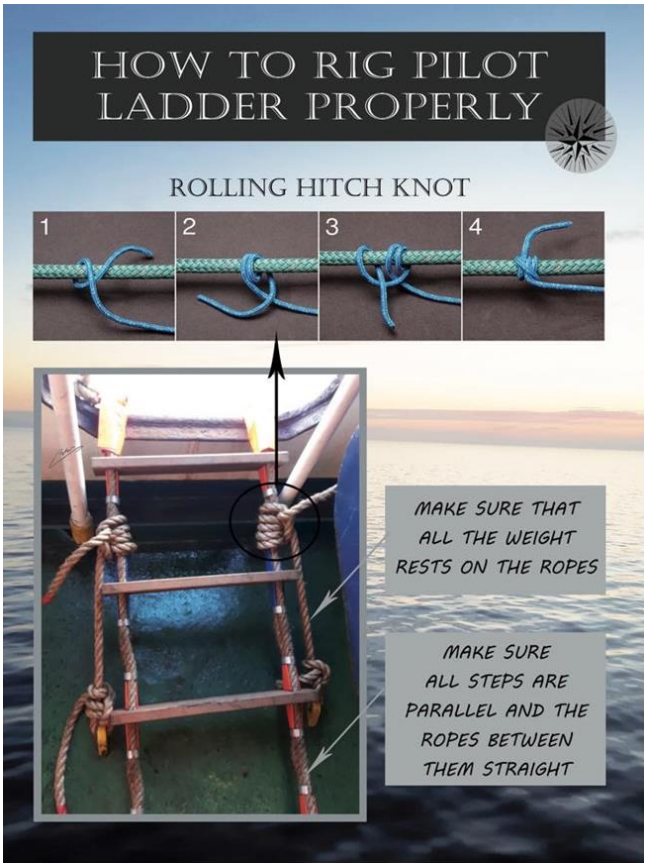
IMO A.1045(27): 2.1.1 the securing strong points,**shackles**, and securing ropes should be at least as strong as the sideropes specified etc etc.

This sentence is the only permission in the IMO regulations for using shackles over ropes, with the result we have seen on the photo. Different countries (New Zealand, UK etc) have already declared shackles non compliant… have you rigged a ladder with shackles? Ok no pilot for you!

A lot of stress on the chocks and steps

11. Correct way of rigging a ladder

After all the don'ts finally a do…. What is the best practice to secure the ladder to strongpoints on deck?



This is it…nothing to it,simple and safe!

We saw in the previous section that the securing ropes must at least have the same strenght as the sideropes and that makes sense doesn't it? 4800 kilos secured by a rope of 4800 kilos strenght (IMO A.1045(27) 2.1.1: …..securing ropes should be at least as strong as the side ropes >>24KN

The rolling hitch knot.

The better ladder manufacturers supply securing ropes with every ladder they provide. Use these ropes. Don't use some random piece of rope you have found in the bosun's shop or strops or what else.

It's an easy to do knot, every able seaman knows how to tie this knot

No stress on the steps

No stress on the chocks

Sideropes will not be destroyed by the shackles

The ladder will last longer and therefore save money tot he shipping company…..

12. Epilogue

I hope you have enjoyed reading this article and maybe you've seen some practices used on your own ship. Don't hesitate to step forward and change it to a compliant system.

You want to be safe, so does the pilot boarding your vessel. You can be sure: I don't want to die climbing a ladder as unfortunately happens again and again. People get hurt or die.

I have promised my loved ones to come back home vertically and not horizontally.

But..be aware, there are off course more non compliant ways to secure a pilot ladder..brackets, steel wires etc etc etc.

For now stay safe and godspeed!!!!

Arie Palmers

Registered pilot

1000 stanchions around….

Which ones are correct and which ones are killers?

No stanchions provided…

Good day everyone! It seems quite ludicrous to write an article on something as simple and basic as stanchions, but (here's the but…) looking at numerous incident reports over the past few years, it proved to be the root cause of quite a lot of accidents with even fatal outcomes in some cases. Stanchions therefore are an often-overlooked part of a pilot transfer arrangement and therefore I want to give them more attention in this article. Of course, I hope that ship crews as well as pilots and everyone else who uses pilot transfer arrangements to board or disembark will have a proper check at the stanchions provided and if necessary improve them to be up to regulations…

To know if the stanchions provided are made/installed in accordance with the regulations, of course we need to get into the different 'rulebooks' we have on stanchions. So, let's start with the holy grail of pilot transfer regulations: SOLAS ch.V reg 23….

In rule 2 (general) it is stated that all arrangements used for pilot transfer shall efficiently fulfil their purpose of enabling pilots to embark and disembark safely etc etc. This is a very general statement of course, on which we shall go a bit more in depth further down this article. What we can conclude from this rule is that when a pilot falls down, it is a violation of rule 2: When you fall down, it is not safe… easy peasy…

Rule 4 of the same regulation mentions access to deck, well here we come a bit closer to the famous stanchions I guess: …… adequate handholds shall be provided. Again, a bit general, but also here we can conclude: if a pilot falls down, they are quite obviously not adequate.

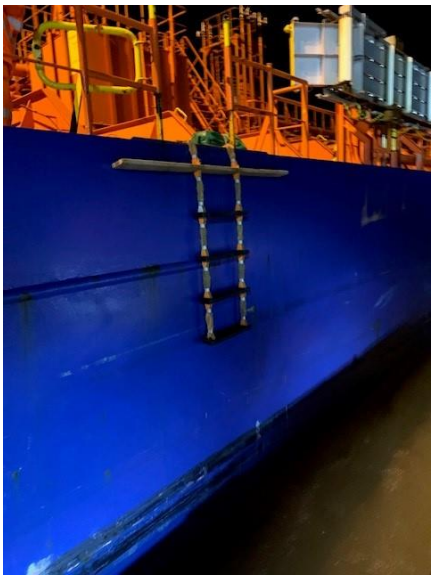
This is basically all that is mentioned on stanchions in international law, for further details on this topic we'll now have a look at the IMO resolution on pilot transfer arrangements laid down in IMO A.1045(27) adopted in July 2012.

Again no stanchions present…

In rule one (general) this resolution states “ship designers are encouraged to consider all aspects of pilot transfer arrangements at an early stage in design……. “ In the few photos earlier in the article we can clearly see that the stanchions were designed nor placed. Basically, this means the pilot transfer arrangement has not been designed in accordance with regulations, but of course it is nevertheless class approved. I have told this before and I will keep repeating this: whenever a pilot is confronted with a pilot transfer arrangement that is to be considered ‘non-compliant by design’, it means the entire chain of design, construction, classification, surveys, vetting and flag state inspections have failed, resulting into a dangerous setup.

Rule 5 of the resolution mentions some more details on stanchions:

- 0.7-0.8m apart. Makes sense: people do not have arms of endless lengths
- 1.2m above deck or bulwark. Makes sense as well, you need a stanchion of this length to prevent falling down
- Minimum diameter 32mm. Also makes sense: when they are too thin, you can’t get a firm grip and your hands might slip
- Each stanchion to be rigidly secured at or near the base and at a higher point, also nice when a stanchion doesn’t break when you put weight on it…



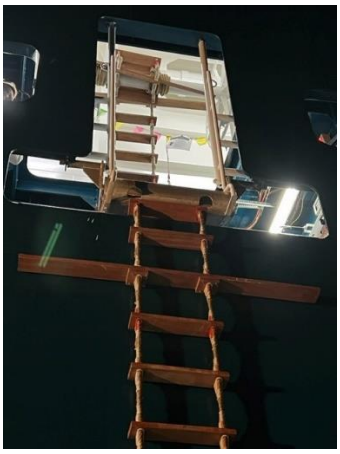
Again, no stanchions, seems like a trend…

We now know a bit more on some regulations on stanchions and despite the fact it is really not rocket science…basically we're talking about 2 steel pipes, that's it, still it keeps going wrong with sometimes fatal outcomes. There is a minimum diameter of 32 mm and no max diameter. That's a bit strange but one might assume that no one will be that ignorant to develop and install stanchions with a thickness making it impossible to have a firm grip!

No firm grip, slipping hazard..

The vessel in the above photo is a newbuild. All signed of and approved by class. I wonder if the class inspector actually inspects the vessel thoroughly or is he/she due to the immense work pressure that is put on class inspectors during the final stage of a newbuild process, confined in the office with 3 laptops, 2 computers and various telephones… working hard to sign of the lot? Looking at the minimum diameter of a stanchion on which we just read something, it seems ok: the diameter is more then 32mm.. thanks for nothing on this one.

Is it safe? No, it is not safe and therefore non-compliant. Actions taken by the writer of this article were to contact class/psc and owner of the vessel. Together with the owner of the vessel we worked out a solution and now the setup is safe to use. Basically, a waste of time and money when you have to do the job twice. Root cause is obviously that in the design face the rules on pilot transfer arrangements were overlooked or in best case scenario read diagonally and fast.



All's well that ends well

Despite the good outcome of this case, and many others were some people, let's call them 'strange people on a mission', have assisted to correct wrong set-ups, basically people doing other people's jobs…

Well now, regarding the thickness of the stanchions, shouldn't there be a maximum diameter anywhere in the rules to prevent silly designs like the above one?

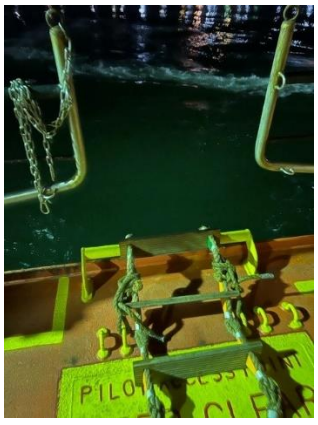
Yes there is!!

ISO799-3:2021 mentions in rule 8.3 the following on stanchions:

"Each access at the head of a pilot ladder shall have 2 handholds or handhold stanchions fitted. They shall not be less than 0.7m or more than 0.8m apart. Each stanchion or handhold should be rigidly secured to the ship's structure at or near it's base and at a higher point, should be round and not less than 32mm and not more than 36mm in diameter and should extend not less than 1.2m above the position it is secured to the ship's structure."

Finally, a rule that says it all, when a stanchion is installed in accordance with the above-mentioned rule, it is safe to use. It is also fool proof in my opinion: seems impossible to make a violation following this rule. This again proves that you have to write down every single detail and leave nothing open because otherwise eventually someone will find a way to do it wrong, as we have seen earlier in this article.

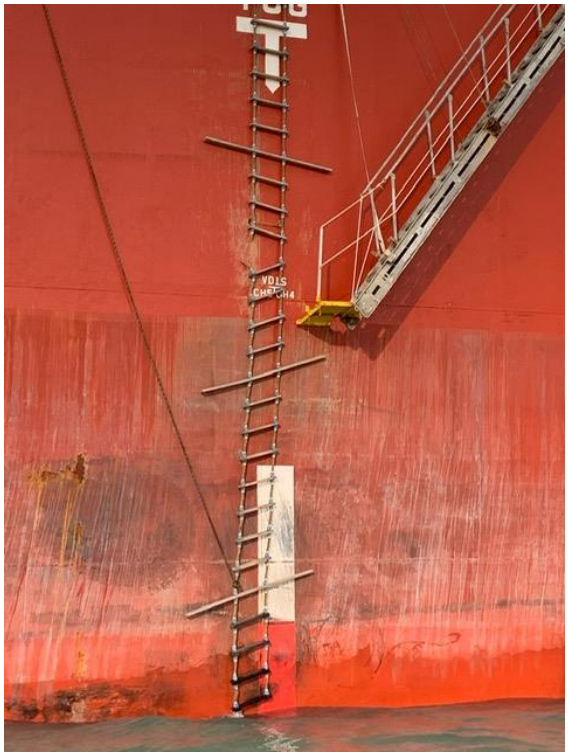
A fully compliant setup in all aspects (mv Cellus and Timbus)



Why does it seem so difficult???

Basically, we have covered what there is to say on single pilot ladders. Whenever the distance from the water to the pilot entry point exceeds 9m, a combination shall be rigged. On the platform of the gangway leading to the pilot ladder, 2 stanchions must be installed as well.

In the photo above we can clearly see the outboard stanchion plus protective ropes have been forgotten for some reason… quite scary when you're on a moving 60x60cm platform and there is nothing to hold on to or prevent you from tipping over the side. Normally the inside stanchion is not installed as per regulations. Upon asking the crew, they told me that some pilots demand the inboard stanchion to be removed… This again proves the fact that we are our own worst enemies, you just need it to transfer yourself from the ladder to the gangway and vice versa, it's there for a reason.

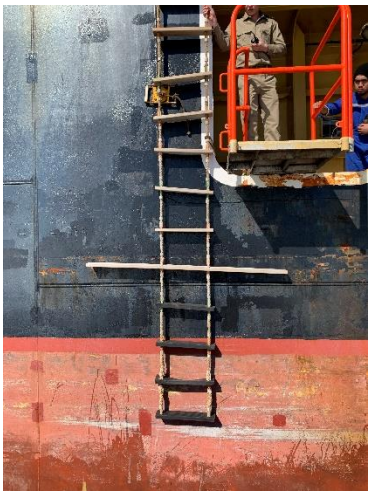


See? Inboard stanchion missing…. Ow and this ladder

snapped when the pilot tried to climb up… did I mention

the badly rigged retrieval line as well as the ladder

being uncertified and therefore illegal?



Correct stanchions

Ladder incorrectly secured at the hull

Also, for ships fitted with a side-door (pilot-door) where the ladder runs down from a higher deck, a platform must be fitted. Luckily I haven't seen a lot of errors with this type of set-up (platform wise I mean).

I hope this article has brought some clearness in the haziness called stanchions, 6 pages of text and photos on a pair of steel pipes basically. Please have a proper look at the stanchions when you want to board or disembark, it might save your life.

Pleas stay safe and keep coming home vertical and not horizontal

No stanchions again..

Looks a bit creepy even

Kind regards,

Arie Palmers

Registered Pilot

1000 COMBINATIONS AROUND

Which one is correct?

By: Arie Palmers (reg. pilot)

1. Introduction
2. When to rig a combination or single pilot ladder
3. Combination arrangement
4. Embarkation platform
5. Epilogue

Nc embarkation platform with cut off ladder

1. Introduction.

Dear reader,

Before you, you see my third article on pilot boarding arrangements. After my two previous articles ('1000 ways to secure a pilot ladder' and '1000 ladders around', I have received a lot of feedback and also questions to get deeper into the matter of combinations and embarkation platforms.

Since the last two articles were published a lot has happened, more and more shipping companies as well as pilot associations worldwide are getting more aware of pilot boarding safety issues and the way to get pilot boarding arrangements safe and compliant. As you might know, sometimes it is a very easy fix.

Concerning embarkation platforms… to get them compliant it often takes more effort: some constructional features must be changed; class agencies will have to approve etc. etc. but the costs to get it right will not be that high.. In this next article I would like to show you the rights and wrongs of these pilot boarding arrangements and what can be done to make them compliant as easy as possible.

In the next chapters we will also, as in the previous articles, get into the rules and I'll try to explain as good as possible what is correct and what is not correct, of course illustrated with pictures out of my own database and from the database of facebook's "dangerousladders".

In this article names of shipping companies/ships and manufacturers will only be displayed for educational purposes, it's not my goal to favor or bash around any company.

Hope you will enjoy reading this article!!

Non-compliant embarkation platform(courtesy of #dangerousladders)

2. When to rig a combination or a single pilot ladder?

Some vessels present themselves with a single rigged pilot ladder and some vessels present themselves with a combination, or embarkation platform. Of course, there is a reason for these two different types of pilot boarding arrangements and in this chapter, I will explain why these two arrangements exist.

In SOLAS ch. V reg. 23 it is stated when to rig a normal pilot ladder and when to rig a combination:

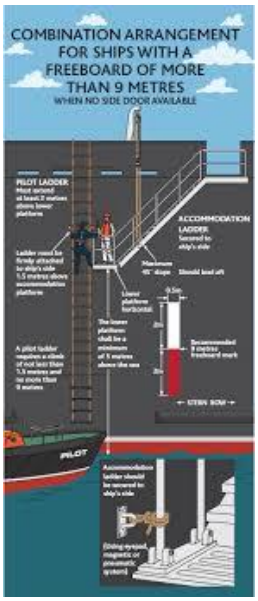
3.3.1: a pilot ladder requiring a climb of not less than 1.5m and not more than 9m above the surface of the water…….

3.3.2: an accommodation ladder in conjunction with the pilot ladder (i.e. a combination arrangement) or other equally safe and convenient means, whenever the distance from the surface of the water to the point of access to the ship is more than 9m.
These simple rules tell us when the distance from the water to the pilot entry point is under 9 m you can rig a single pilot ladder and when the distance is more, a combination must be used…

Non-compliant pba

In this photo of a pilot ladder, you can basically see in one glimpse that in this case the vessel should have rigged a combination rather than a single pilot ladder or should have increased its draught. Wonder why? Let me explain. Right next to the rigged pilot ladder you can see a white and red figure displayed on the hull. This is what we call the pilot mark. My good friend and co-author, deepsea pilot Kevin Vallance has written an interesting article on the origins of the pilot mark, you can find it online by following this next link: https://www.marine-pilots.com/article/13336 .

Basically, this pilot mark displays exactly where the nine-meter mark is on this vessel. Exactly at the dividing line between the upper and lower half's of the pilot mark is the point of 9 meters above the water surface. Again, this has nothing to do with freeboard: maximum climb from water level to entry point shall not exceed nine meters. Unfortunately, in the well-known pilot ladder poster this has been displayed incorrectly as you can see in the photo below which is a small piece of the pilot ladder poster



In this part of the pilot ladder poster there is mentioned that the maximum climb shall not exceed 9 meters, which is not correct as we know now. This would mean that when a pilot boat for example requests the ladder to be rigged at a height of 8 m above the water, you would be allowed to climb an additional 9 meters on top of that. Again, can't repeat is often enough, maximum height for a single pilot ladder shall not exceed more than 9 meters from water surface to pilot access point. It all has to do with the acceleration should you fall from the ladder, after all we climb unsecured, so this must be correct!! When you drop to the earth your acceleration will be 9,81 m/s2 until you have reached maximum velocity. In the table below you will find some examples of falling from different heights and I assumed the weight of the person falling of 80 kg.

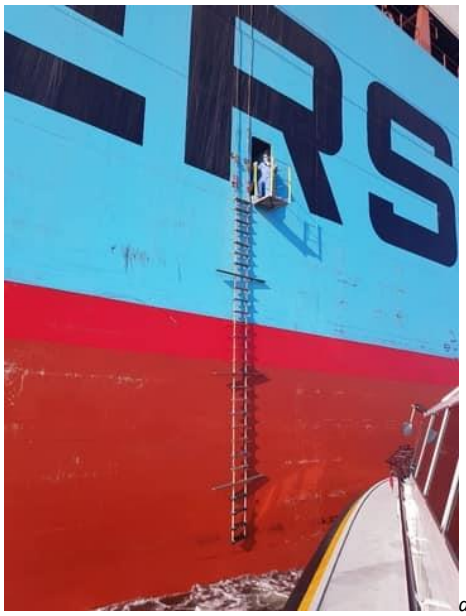
Heights in m	Speed in km/h
1	15,94
2	22,54
3	27,61
4	31,88
5	35,64
6	39,04
7	42,17
8	45,08
9	47,81
10	50,4
15	61,73
20	71,28

This table shows exactly what will happen to you, dropping from different heights, even dropping from a height of only 3 meters can really ruin your day, but as starting point scientists concluded that should you fall from a height of more than 9 meters you will most surely sustain fatal injuries. Again the 9 m is vital! Falling from lesser heights can cause very serious injuries but you should be able to survive as they state.

Back to the pilot mark. We know already that the separation of the white and red indicate the 9 meter mark, some vessels and shipbuilders however still seem to think the pilot mark is merely an indication for the pilot boat where the ladder is situated, but as we know now this is not the case.

In the photo above we see a pilot mark that has been put at the wrong position, probably someone thought is was a good idea to have one here, maybe because it looks good. This vessel, looking at her draught and height from keel to deck, it doesn't even need to have one.

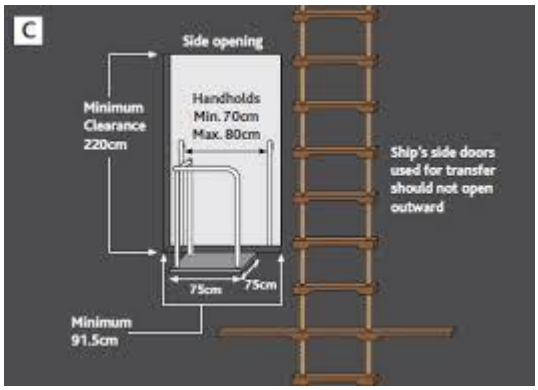
Having a pilot mark displayed on the correct position of the ship is a very good asset and the approaching pilot launch can very easily asses whether the single pilot ladder is the correct pba or a combination should have been rigged.

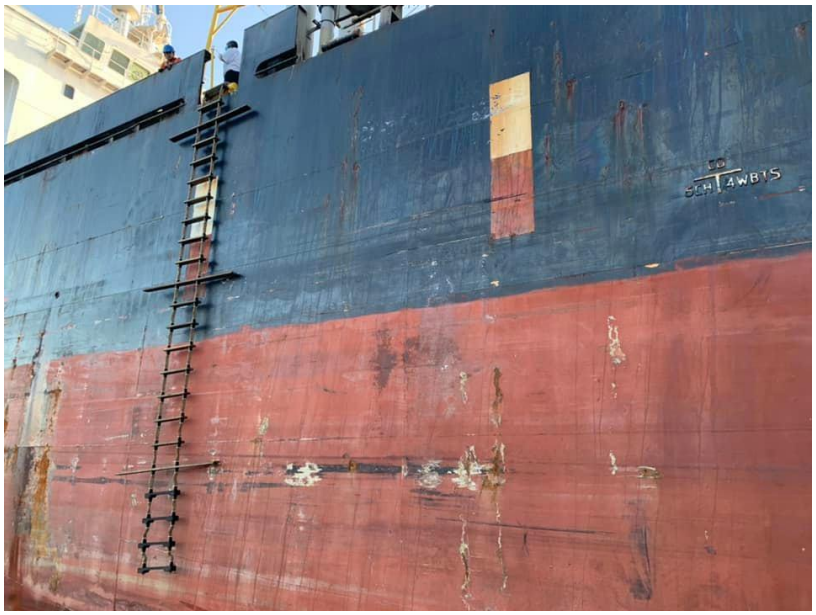


distance water- pilot door exceeds 9m

In the photo on the previous page we see a vessel which has at least a distance from the water surface to the pilot door of 11m, presenting itself with a single pilot ladder. We have seen this is an absolute no go. The ladder on its own already has a length of approximately 9,6 meters at least plus the requested rigging height above the water to get the pilot tender alongside safely, which is 2 meters in the region where I work. Vessels fitted with a pilot door usually have no means to rig a combination. What the vessel should have done, was ballasting till an acceptable height of the pilot door above the water has been obtained, meaning: less than 9 meters.

On top of that we know from one of my previous articles that the ladder has to be secured to the ships hull at 1.5 meters above the platform (SOLAS ch.V V reg 23 3.3.2.1), which has been done as you can see but also (there's always a but…) the ladder should run 2 meters past the platform (IMO A.1045 3.6: …… and should extend at least 2 m above the lower platform.) and that's not the case here. The drawing below, which is a section of the pilot ladder poster shows how this setup should be done correctly.

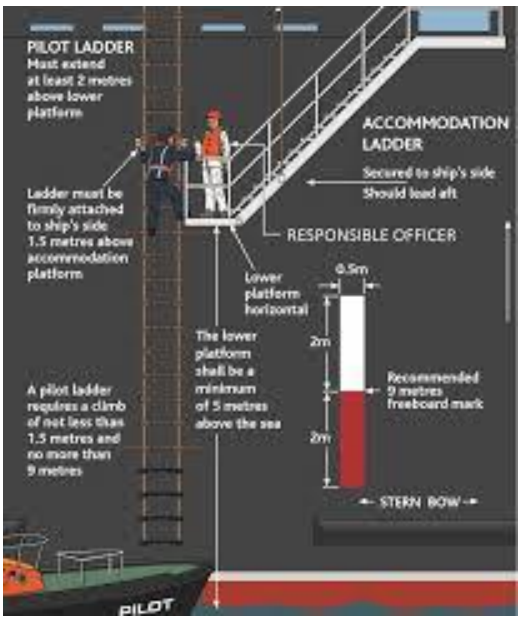




Another incorrectly positioned pilot mark

3. Combination arrangement

In the previous chapter we have seen when a single pilot ladder can be rigged and when a combination must be rigged. In another section of this article, we'll discuss a different type of combination: the embarkation platform. In this section we'll focus on the so-called standard combination arrangement.



Section of the pilot ladder poster

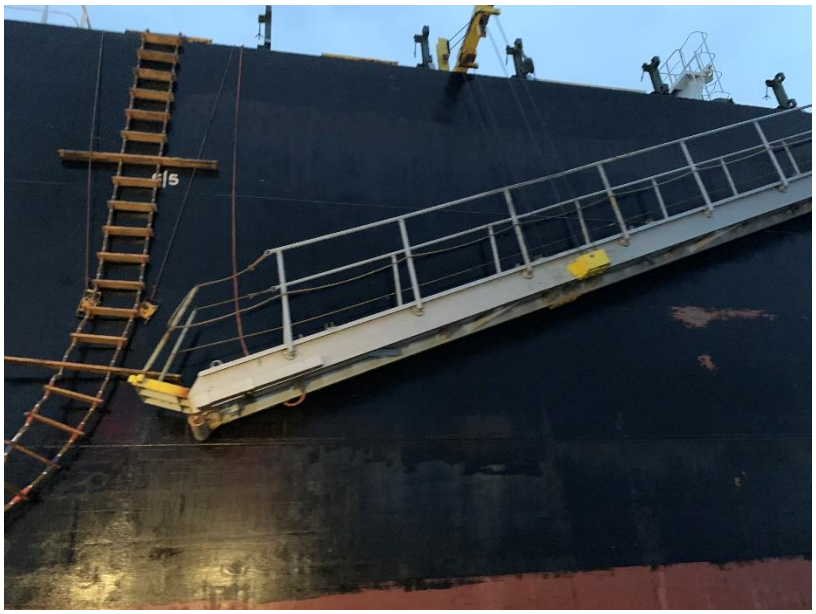
Here we again see a part of the pilot ladder poster, showing us a drawing of how the combination should be rigged. Some pilots demand a guy to assist on the platform, as is displayed on the poster, but since this poster and IMO A. 1045(27) are recommendations, it is not mandatory for any crewmember to stand on the platform. Looking at the picture we can see the assisting responsible officer is wearing a life jacket but is not secured in any way by means of a safety harness. Dangerous practice to stand on a small platform (width at least 600 mm, same as the accommodation ladder: IMO A.1045(27) 3.2) without being secured, especially in adverse weather conditions… And as far as I am concerned, he could hamper the stepping over from ladder to platform. Anyway, I suppose the color of his coveralls is optional and free of choice…….

We can also see the pilot on the ladder stepping upwards from the ladder to the platform, again a bad practice, he should only have to step sideways.

As we have seen there are some mistakes in the poster: the climbing sentence printed above the pilot launch is wrong…

SOLAS V ch 23 also tells us requirements in how to rig a combination. In the previous chapter we already saw some regulations passing by 3.3.1 and 3.3.2)

3.3.2.1 tells us that the pilot ladder and manropes (manropes only on request of the pilot 7.1.1!!) must be secured at a point 1.5 m above the lower platform. Without thses securing methods, the ladder can swing free and off course that is a dangerous practice.
3.3.2 tells us the platform also must be secured to the ship's side



Non-compliant combination

This photo shows us a few wrongs in this combination: the ladder is not secured 1.5 m above the platform but at about 60cm. You might think: so what?? Who cares?? Well I do of course. When the ladder has been secured at a point to close to the platform, it will obstruct your access to the ship. Worst cases would be losing your grip an falling back to the pilot launch (seriously injured) or into the water (seriously injured and wet).

The horizontal distance from the pilot ladder to the platform looks all right. Of course there is a rule for that as well. IMO A. 1045(27) tells us: the horizontal distance between the pilot ladder and the lower platform should be between 0,1 and 0,2 m. Well, this makes sense: just a small sideway step from ladder to platform, after all we are no acrobats. Big distances from ladder to platform can easily again result in an accident.

Furthermore, we can see in the photo that the platform is not horizontal. IMO A. 1045(27) tells us the platform should be in a horizontal position (makes sense doesn't it) and secured to the ships side when in use. The lower platform should be at a minimum of 5m above sea level. This is done so that the combination and pilot launch will never touch. Bigger heights may be required by the pilot boat.

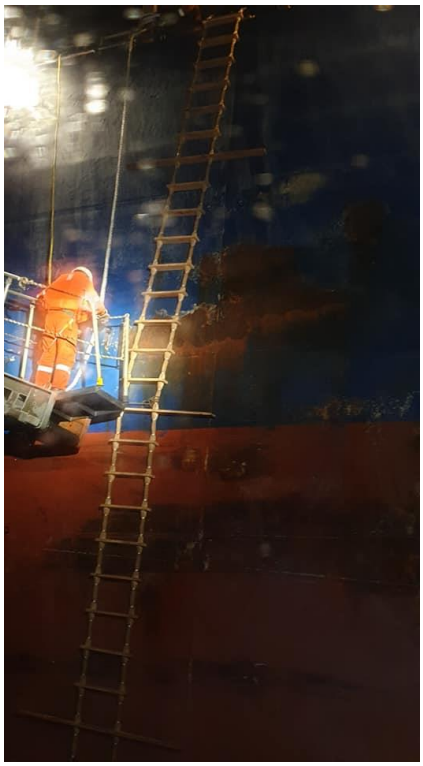
In the first photo on the next page we can clearly see a badly rigged combination:

- platform not horizontal
- platform not secured to the ship's hull
- ladder not secured to the ships hull at 1,5 m above the platform
- retrieval line not rigged properly (we have discussed this in a previous article: retrieval line is optional but when used it must be rigged at or above the bottom spreader and lead forward so it can never get caught to the pilot launch)
- we can also see it is a way to big step from pilot ladder to the platform, this photo shows very well why the distance from ladder to platform must be 0,1-0,2 m

Non-compliant combination

The direction of the combination is also important. SOLAS ch.V reg 23: 3.3.2 …..The accommodation ladder shall be sited leading aft. No why is that?? Suppose anything goes wrong with this combination, for example the wires would break. Should the pilot boat be situated under this combination, the broken combination would end up on top of pilot boat and the people on it.

Wires can break and situated leading aft; the dropping combination will move away from the pilot launch instead of on top of it. Should you be on the combination should it break…. Well good luck…. Injuries will occur of course….or worse…



Non-compliant combination (courtesy of #dangerousladders)

This photo is a good example of hat will happen when the ladder is tied to the platform: the ladder is not firmly against the ship's hull; steps are not horizontal, and the combination can swing free. The guy working on the combination when this photo was taken, doesn't wearing a life jacket or safety harness, tells us something about the safety culture on this vessel. SOLAS ch V reg 23 tells us in 2.2: personal engaged in in rigging and operating any mechanical equipment shall be instructed in the safe procedures etc etc…

As from 2012 when IMO A.1045(27) came into force, the maximum slope of the accommodation ladder was decreased from 55 degrees (IMO A.899) to a maximum of 45 degrees. To me this seems obvious: the steeper it gets, the harder it gets, and will lead to an increased risk of slipping away.

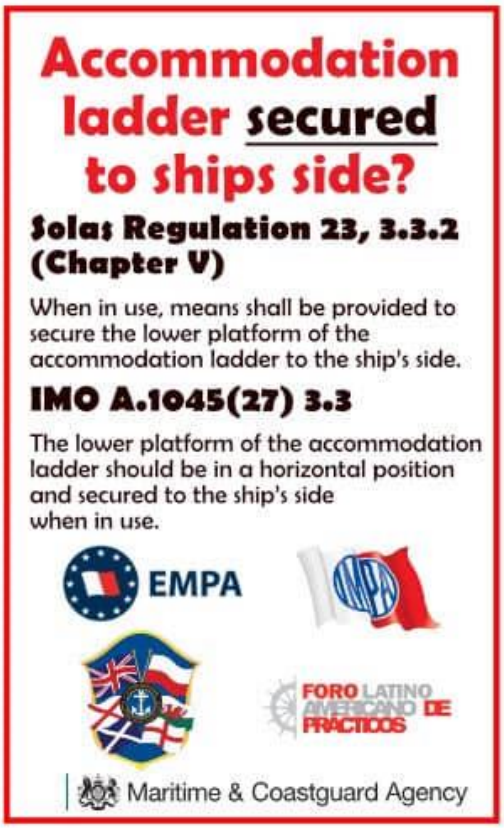
To be able to transfer yourself safely from the ladder to the platform you need stanchion to be able to grab during this step over, as stated in IMO A.1045(27) in rule 3.5: the ladder and platform should be equipped on both sides with stanchions and rigid handrails, but if hand ropes are used, they should be tight and properly secured. The vertical space between the handrail or hand rope and the stingers of the ladder should be securely fenced.

Of course you need fencing when you get on to at platform 60x60 cm dimensions, imagine the ship rolling and pitching due to swell and you would be there without anything to hold on to, again a dangerous practice, but very often we see at least one stanchion is missing. Solutions is to just tell the vessel and come back for round 2 about ten minutes later. I have told before that a lot of non-compliances are very easy fixes and can all be sorted within a few minutes. Even though of course it is rather silly not to put stanchion, what were they thinking?

Non-compliant combination, (courtesy of #dangerousladders)

This photo shows no stanchions on the platform, how to cross over? At least it will be very hard to reach the platform in this case: platform is in front of the ladder and that will make getting onto this platform nearly impossible. Also ladder and platform are not independently of each other secured to the hull, and as you can see on the photo the ladder is not firmly against the ship's hull as required.

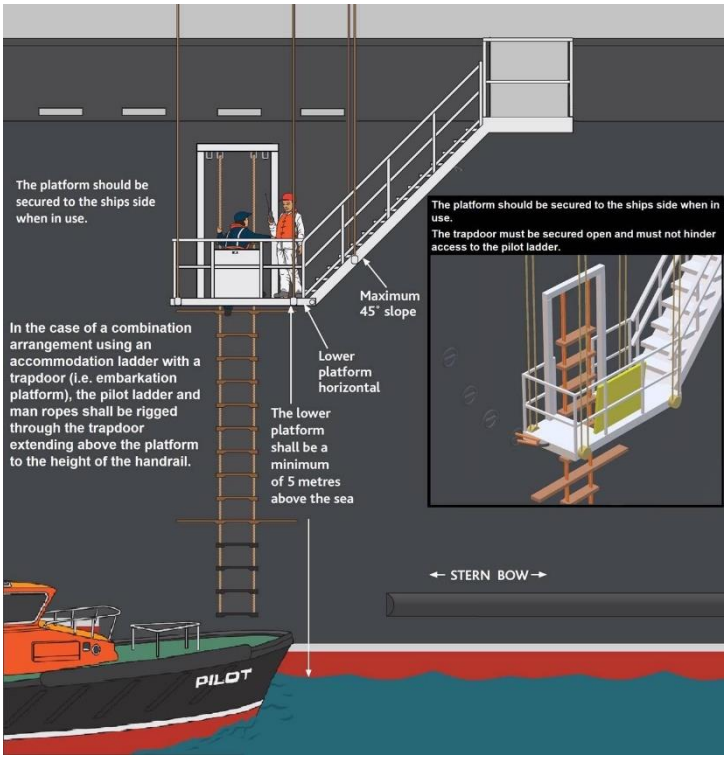
In my opinion ask them to get it sorted and come back after 10 minutes..



4. Embarkation platform

Another version of a combination arrangement we see quite often on bigger vessels, mostly container vessels, is a so-called embarkation platform (aka trapdoor).

Rather recently a drawing popped up on the #dangerousladder page showing how a compliant embarkation platform should be rigged:



We see on this image the ladder has been rigged through the trapdoor fitted in the platform and is resting firmly against the ships hull. The ladder runs up past the platform to the height of the handrail. This way the guy climbing the ladder will have an unobstructed climb and once he reaches the platform, all he has to do is step sideways. A safe way to board the vessel imho.

Rules concerning these pba's have been in force since at least 1979:

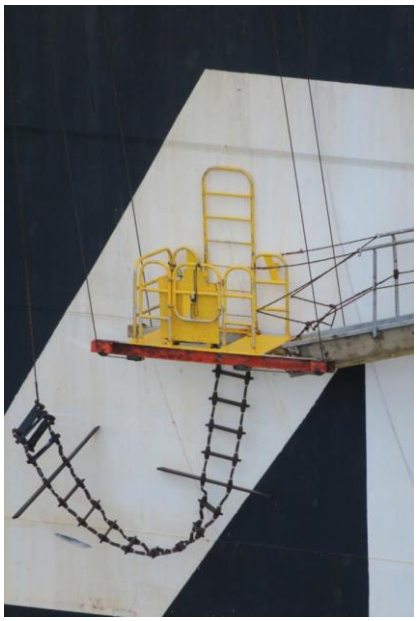
SOLAS ch. V reg. 23, 3.3.2.1: ….In the case of a combination arrangement using an accommodation ladder with a trapdoor in the bottom platform (i.e. embarkation platform), the pilot ladder and manropes shall be rigged through the trapdoor extending above the platform to the height of the handrail.

Mind you : manropes are optional and shall only be rigged on request of the pilot (SOLAS ch.V reg. 23 7.1.1)

A lot of vessels do not comply with these regulations and refer themselves as being built before 2012; 2012 was the year SOLAS ch.V reg. 23 first came into force. Basically what they are saying is: we don't have to be safe… because of some grandfather clause..

SOLAS ch.V reg. 23 clearly states in 2.1: All arrangements used for pilot transfer shall efficiently fulfil their purpose of enabling pilots to embark and disembark safely… seems quite easy to me that when people get will hurt or worse using non-compliant embarkation platforms, they don't really follow

this rule, but… yes yes grandfather clause.. SOLAS ch.5 reg. 23 was preceded by resolution MSC 99(73) (renumbering reg.17 as reg.23) which came into force July 2002. This rule states the same in 2.1, no changes have been made, well that makes things a bit easier.



Non-compliant embarkation platform

To understand that quite a lot of vessels are not complying with the rules, we must get into some regulations, not the most exiting stuff to read, but to get clear understanding of the situation, it is necessary to do so……. Better get out the reading glasses now!!

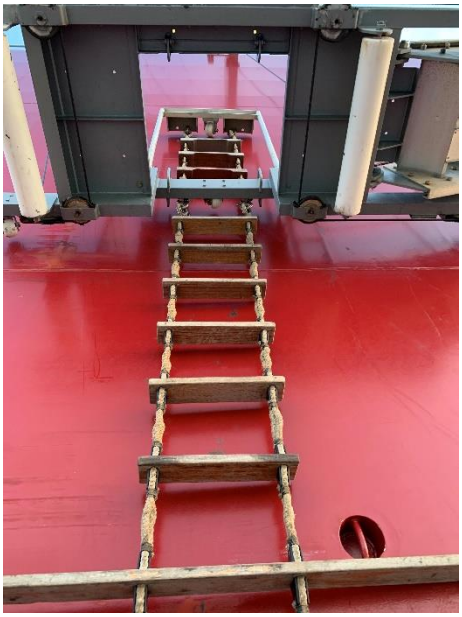
IMO A.1045(27) states in 3.7: The trapdoor should open upwards and be secured either flat on the embarkation platform or against the rails at the aft end of the outboard side and should not form part of the handholds.

Non compliant embarkation platform

In the photo above, you can clearly see that the trapdoor opens the wrong way. Basically you are hanging at this trapdoor which has been secured with 2 small metal pins..

Let's continue with IMO A.1045(27) 3.7: …. And the pilot ladder should extend above the lower platform to the height of the handrail and remain in alignment with and against the ship's side. We can clearly see on the photo that the ladder does not run to the height of the handrails. It has been put under the platform, hanging at the beam. Why is this dangerous? When you reach the top of the ladder, you have to lean back and grab some pieces of steel (slippery when wet) on the upward side of the platform (in this case even the trapdoor itself) then you have to pull yourself on your arms up through the gap (whilst loosing grip with your feet) turning sideways as you attempt this and get your body onto the platform.. all of this 5-7 meters above the surface of the water in all possible weather… going down on this particular setup, I had to sit on the platform with my feet through the gap, hold on to pieces of steel with my hands and lower myself through the gap until I felt the fist step of the pilot ladder… sounds lovely doesn't it??

Also because the ladder is hanging under the beam, it is not resting firmly against the ship's hull and basically moves all over the place.



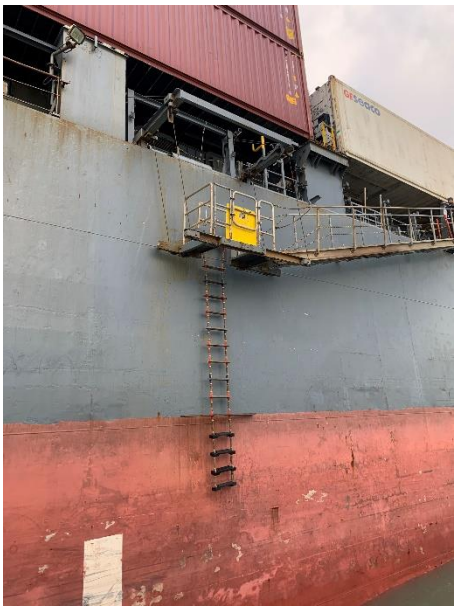
Non complaint embarkation platform

In the setup above it seems like the ladder is running through the trapdoor as required, but look closely: it's 2 pieces of ladder…one is hanging under the beam and the other 3 steps above the platform are between top railing and bottom beam. Again a very unsafe practice!!

Back to some rules:

IMO A.1045(27) was preceded by IMO A. 889(21) from 1999 until 2012 and states in 3.7: if a trapdoor is fitted in the lower platform to allow access from and to the pilot ladder, the aperture should not be less than 750mm x 750mm. in this case the platform should also be fenced as specified in par 3.5 (stanchions and handrails etc (ap)) **and the pilot ladder should extend above the lower platform to the height of the handrail.**

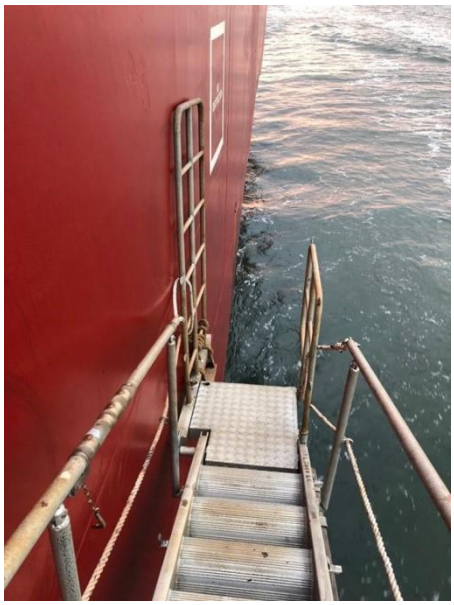
So even in 1999 they concluded that the ladder had to go through the gap to the height of the handrail but wait… it will get even worse when we go back a little bit further in time….



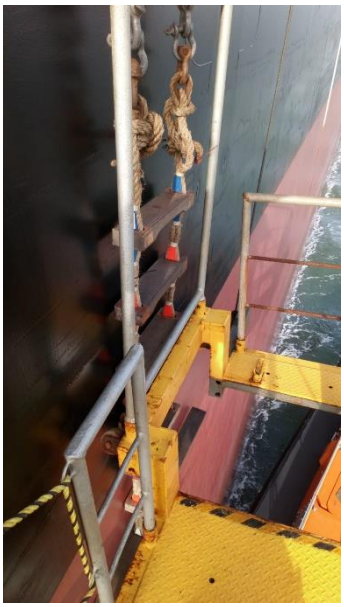
And another one…it's like a pest…

In 1979 IMO A.426 came into force and stated in rule number 9: if a trapdoor is fitted in the lower platform the aperture should be not less than 750mm x 750mm. in this case the after part of the lower platform should also be fenced as in paragraph 6 (stanchions and handrails (ap)) and **the pilot ladder should extend above the lower platform to the height of the handrail.**

So after having looked at the regulations that have been in force even since 1979, we can conclude that 41 years of regulations regarding embarkation platforms have not resulted yet in compliant pilot boarding arrangements. We can now also conclude that vessels referring to the 2012 grandfather clause basically are full of bullocks to put it as politely as I possibly can…. When most of us were still playing with our toy cars, the rules were simple already simple….



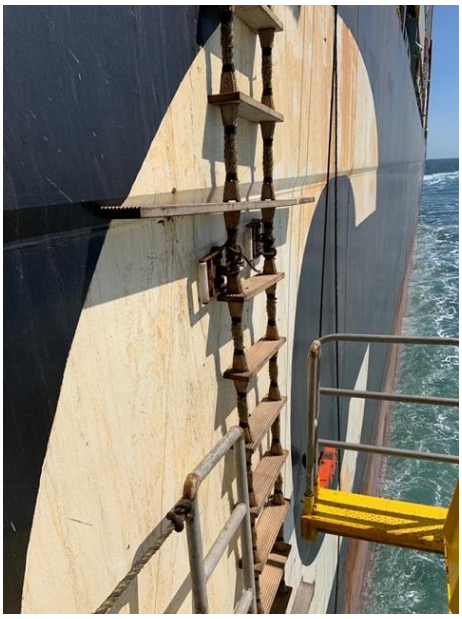
Some hybrid between combination and embarkation platform, non-compliant.



Ok, last one..(courtesy of k. vallance)

By reading all text above you might get the feeling it's a rather disastrous: dangerous pilot boarding arrangements, people dying on them, on bad photo after another, but luckily it is not all misery now!

One of the leading companies, shall not reveal their name, but main office in Geneva, and the vessels are black (lol) has taken serious steps to modify each vessel in their fleet that still has a non-compliant embarkation platform. This is a big task and will take some time.



A good one!! (courtesy of kees koppejan)

Here we see a modified embarkation platform. The beams are gone, and the ladder runs through the trapdoor, is secured 1,5 m above the platform. The ladder is running even up to the deck where it has been secured to strongpoints. This is not the typical 'trapdoor'system but seems more like a hybrid between standard combination and embarkation platform. Imho this is a lot safer than securing the ladder to the embarkation platform itself: the wires of the embarkation platform don't have to deal with strong forces should the pilot launch hit the ladder. Rules concerning embarkation

platforms are not clear on this matter. Nowhere it is mentioned how and where the ladder must be secured. This also is the case with a single pilot ladder; no rule is explaining how and where the ladder must be secured. Only in IMO A.1045 ch 7 , that deals with pilot ladder winch reels, it has been mentioned that the ladder should be secured to strongpoints on deck. In my opinion a serious omission in the regulations. Basically all rules concerning pilot boarding arrangements need a full and thorough revision without escape clauses. Rules need to be made simple and clear and not multi interpretable!

Compliant!(courtesy of #dangerous ladders)

The photo above again shows a compliant embarkation platform. The ladder in this case runs through the trapdoor to the height of the handrails. We also see that the ladder is firmly attached to the ship's hull. This is a safe way of boarding a vessel: when you reach the platform, all you must do is take a small step sideways, very nice to see. Manropes also have been rigged, but we know they are optional and to be rigged on request of the pilot.

More and more companies are following to ban the non-complaint embarkation platforms by changing them in correct ones, a big task lies ahead of most companies. Some companies (will not reveal their name) still show a stubborn behavior and refuse to change their systems. All they say is: class approved…. We know class approved doesn't mean compliant in accordance with IMO and SOLAS regulations.

Also a lot of pilot just keep climbing them without making remarks and of course as long as we keep climbing, they'll keep coming and captain's then wonder why some pilots complain: mr. pilot you are the first one to complain…

Luckily a lot of pilot associations are also publishing letters, memo's and articles concerning non-compliant embarkation platforms:

http://www.americanpilots.org/APA_Request%20-%20dangerous%20trapdoors.pdf

https://insurancemarinenews.com/insurance-marine-news/pilots-death-leads-to-demands-that-imo-crack-down-on-dangerous-ladders/

https://www.marine-pilots.com/article/15291

5. Epilogue

After reading this article I can only hope you are more aware about the do's and don't concerning combinations and embarkation platforms.

Basically this article was only about a few rules from SOLAS ch V reg 23: rule 3 in total and IMO A.1045(27) rule 3 in total. Of course all the rules I have mentioned in previous articles are applicable to these systems but as you saw the focus was on these few simple rules this time. As I have stated before, the rules must be revised to make them easier and more understandable, because everything that can be misinterpreted, will be..

I am looking forward to your remarks and feed back on this article, please do not hesitate to contact me, should you have any!

For now please stay safe and have a good watch!

Kind regards

Arie Palmers (reg. pilot)