

**AN IDEA FOR SHIPPING SAFETY,
INNOVATION AND HOW IT COULD
IMPROVE THE SAFETY
STANDARDS IN THE INDUSTRY.**

**A TABLET APP FOR EASIER & SAFER
SEAFARING**

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In the first phase of this competition, I presented ideas for reducing paperwork & ensuring right practices are followed with the help of an app in a tablet along with using drones for inspection in enclosed spaces. I would like to thank you for selecting me for my tablet with an app idea.

In this second phase, I would like to give more details on my idea of having tablets with apps & how the same will be used/ implemented for improving safety at sea. I would like to explain what is/might be happening out at sea and further would like to explain, how my idea will be helpful, especially for improving safety in the long-term.

The attached video presentation along with the following piece is to summarise the write-up.

Improving safety by reducing paper work & to make the implementation of checklist, procedures and adherence to the SMS more effectively, we would like to introduce tablets with an app that will result in efficiency and ease to work on board and lead to a safer tomorrow.

This I would like to divide further into parts with examples & how of the idea can be implemented.

- Functionality of the app during navigation/ navigation watch.

- Even after having today's technological advancements at hand, the shipping industry still faces many navigation incidents. In most cases, we blame it on over reliance on equipment, which is true, but further, duty officers are getting diverted from their primary duty which is navigation to completing other tasks at hand such as paperwork.

What kind of paperwork?

- Checklists & logbook entries.

Gist of the above:

While discussing about routine practices with colleagues, friends & with personnel experience, certain observations were made:

- While filling up checklists, many people tend to fill them up blindly only to complete the task at hand. In some cases, the checklists are filled well before/ after than the time it's supposed to be filled.

Checklist are to reduce failure by compensating potential limits of human memory & attention. It is there to ensure consistency & compliance of carrying out a basic job task.

Hence, I would like to ask you, are checklists effective if they are filled at any time other than the right time? Why would anyone do that? Maybe it's a time-

consuming job or there are too many checklists to complete or too many repeated items within multiple checklists.

Checklists shouldn't simply be a box ticking exercise without actually complying to them.

- The other concern is completing logbooks. The reason for maintaining logbooks is to keep a record of all the events which are happening during a watch. Some companies follow a continuous log book system which in my experience is a good system where in a single log book, all the entries are filled then and there and do not require to be filled up after the watch. Yet, most companies still follow the old system of having various log books where some of the entries are repeated in different logbooks, which further increases the work load.

A typical example of what is happening currently: 2350hrs duty officer comes on bridge. He/she gets his/her eyes settled in, familiarize themselves with the current traffic and status of the navigation/ bridge equipment as per watch take over checklist. Once he/she has taken over the watch & if the vessel is going to be approaching a port, the officer might be required to fill up pre-arrival checklist and a pilot card where most of the items in these checklists are repeated i.e. Watch take over/Prior arrival/during arrival/pilot card. If it's a port approach entry, the duty officers are required to fill the bell book (which is a semi continuous log book) including various entries such as all equipment checked as per arrival checklist numbers....., Engines standby, master takes Conn, pilot on board, master pilot exchange, first line ashore, dropped anchor, picked up anchor, all made fast, passing conspicuous objects, passing every buoy (which in some channels are there at an interval of every min) & other relevant entries. With some of these entries the duty officer must also write the GPS pos, Heading of vessel, Gyro & Magnetic Course, Speed & UKC. Then there are other log books such as the compass error logbook, radar log book, security log book, GMDSS log book which are required to be completed and finally there is the deck log book which has entries of weather, courses steered, speed, alterations, checklist complied with; Information that has been already entered in other log books (As you see entries are repeated). The duty officer is expected to fill all the log books (GMDSS, Security, Radar & deck log book) after his/her watch has finished so that he/she is not distracted from their primary task i.e. keeping a good navigational watch after which he/she also requires to carry out fire & security round.

The point I am trying to get to by all of the above, is that the duty officer is so busy filling all of this and not to mention other operational requirements such as paperwork filing / training documents/ replying to emails received from the head office/ charterers/ technicians, etc, to complete during his working hours and to comply with the Work/ Rest hours regulations. I would like to ask you again that does he/she really have time to look out of the window?

All officers get instructions of not doing any paperwork during a navigation watch, but he/she uses their own judgement and try to complete these tasks during his/her watch, so the work does not get piled up and they can rest after their stipulated working time. On an average, an officer works for about 10-12 hours per day. So just to per se he/she puts in extra time after their watches to fill up logbooks, while referring to the work schedule of a second officer who is following the instructions of no paperwork during his watch. He/she hands over the watch by 0405hrs and then start filling log books, which in normal conditions will take them about 20-30 mins. Once that is done, they go to take a fire/security round which again takes 15-20 mins or sometimes more depending on size of ships. Till all this is completed its almost 0500 hrs. Now they will want to have some snacks/call home/ watch a small movie let's say just for about 30mins & then go to sleep after which his duty schedule is again at 12 but mostly, he might be called at 1030hrs for some work where the person will get less than 5 hrs of sleep. All of us have read recent studies that less than 6 hrs of continuous rest is not good. So, having all this in the officer's mind he/she will try to fill logbooks during the watch behind the curtains, where the extra pair of eyes are not looking out of the window. Which may lead to an incident. Also if checklists which are not filled up diligently, it can lead to failure in existing barriers to prevent an incident from happening.

In addition, when the vessel is passing through heavy traffic, in congested waters & pilotage, the duty officer has additional tasks to carry out, especially when passing a buoy or a conspicuous object. These sometimes are passed by every minute for which he/she must rush behind in the chart room as not all ships have adequate lighting for night time. He/she needs to compare positions on ECDIS/ charts regularly (even though the ECDIS is recording the past track). Why? So that he/she can have all the entries for vetting/ port state purposes.

The above is one of the examples of what is mostly happening out at sea & it can have other variations that are similar to this situation. It's like having a devil lurking around for something to happen or a barrier removed from the Swiss cheese. We have already tried to overcome these barriers by increasing the number of lookouts, having BNWAS system. But do we have extra lookouts all the time? In open sea like I explained above, if the duty officer goes behind the curtain one set of lookout eyes are less. Even whilst vessel is under pilotage the lookout might just come and tell the duty officer who is busy in writing down information in the bell book and might not be able to relay the proper/ adequate information to the pilot or master.

So for improving the safety my idea would be to utilise the technology and creating an application, where we develop and set a standard program that can be installed on a tablet/iPad and provide it to the navigating officer. This Tablet/iPad can have carryon case on it so it easy to carry around.



This will not only help the navigating officers but also the whole shipboard organization. This can have endless combinations with lots of possibilities and solutions; which will help us cut paper work as well as could give ease in working on board.

For example, one duty officer starting his/her watch at 0000, can take over the tablet from the previous duty officer or, each duty officer could have separate tablets. Once he/she logs in (which can also be considered as start of work hour in work/ rest hours i.e. like having an online work and rest software), he will automatically be suggested with watch take over checklist. There can be reminders and warnings after few minutes if the checklist is not updated. The software will have a lock for not manipulating the time so we will also know the checklist is filled up diligently. To ensure this, we can also introduce photographic evidence with time stamp as part of the program. During the watch, all entries such as, hourly readings, (if in standby mode) pilot on board timings, anchoring, passing buoy/bridge etc. and all the other relevant entries can be entered in the tablet. Furthermore, normal entries can be automatically suggested to reduce typing, Compass error, radar performance etc can also be a part of the program. This will be used as continuous log book. In addition, with help of this program the GPS Position, speed, heading and UKC inputs can automatically come in front of the entry so that duty officer doesn't spend looking down writing in bell book and losing his concentration off his primary task, which is navigating the ship safely. This program will bring ease to the duty officer, helping him overcome obstacles of not running behind the curtains or looking down to write a piece of information. This way by the end of the watch, the duty officer isn't unaware, filling up log books and will not lose attention from navigation. He/she will not need to make duplicate entries and easily hand over the watch using watch hand over checklist.

Navigation is only the starting point of helping the improvement of safety onboard, and all other departments/ areas in addition to the bridge team can benefit from this application. While adding that with the help of today's technology already available

onboard and on shore; the ship owners, vetting inspectors, port states, Insurance companies, etc. can also benefit from this application.

- Functions of the app to facilitate normal work on deck/ engine room/ galley:

With today's SMS, we have checklists/permits & procedures to be followed throughout the ship. Are they being filled up diligently? Are tool box talks carried for every job? Are basic but critical PMS jobs such as checking FFA & LSA equipment carried out properly?

Today we are promoting safety and people are aware of a good safety culture. But there are still cases where crew members by-pass these known hazards for saving time on completion of the job at hand. Certain people may have the tendency to take short cuts, considering a simple human tendency.

Examples:

- Completing working aloft checklist after the work has been carried out.
- Completing Enclosed space permits after enclosed space entry has been carried out. I remember someone telling me that as a cadet he had to fill 146 enclosed space permits in one day for all the previous pending entries & this is something which happened in 2016.)
- Falsifying entries of maintenance carried out since he/she forgot to complete a certain procedure or was under time constrain.

Here, we will certainly find many examples but with the help of this app we can make sure that checklist and documents is being completed correctly and not falsified.

Other features such as:

- I. Regular maintenance such as PMS.
 - To keep the ship in good operational condition, vessels have a planned maintenance system (PMS). This system is in place to assure that checks and maintenance are carried as per schedule so that there isn't any breakdown and critical equipment/ machinery are in good operational condition. Still at times the work might be shown completed/carried out without actually doing it and filled up in the PMS, so as to be compliant with the SMS and to pass vetting/ PSC inspections and the watchful eye of the owners. The app is a slightly more advanced version of the already existing E-SMS/ SMS/ PMS where data cannot be manipulated as it is not on paper or on a computer where it is easy to change the dates/ times or there is no monitoring of if the task is actually being carried out.
- Example 1: There are so many injuries, death when people are entering enclosed space. After investigation is carried out, we mostly

find the error is due to the individual; for not taking the pre entry checks seriously. Still enclosed space permits are completed after the entries are carried out. There are different reasons for this situation such as dry dock, where multiple entries are there in a single tank or different tanks in a single day, the permits are filled only to complete the paperwork. This so that the ship owners, vetting inspectors, port states, Insurance companies, etc. do not give a remark. The app can ensure that this is not done any more.

- If there is a plan of entering a tank such as ballast tank no1. The person carrying out the task must choose the appropriate task which is "entering the enclosed space" He/she will first be provided with the standard risk assessment, procedures and checklists to comply with. After he/she has completed the preceding steps, the checklist's initial steps such as opening the space, ventilation & barricade the area will follow. All these steps will be recorded as it is done with date & time which cannot be manipulated. A simple photo can be taken from the app as proof, followed by other procedures. Prior entry checks can be carried out as per the plan. The tool box talk before the entry can be proofed by a simple selfie photo. When the first entry is required the tablet will require to take the photo of the gas meter for evidence purpose. We can have photographic evidence for each stage as well to ensure that the job is being carried out safely. The interval of communication and gas checks can be kept updated with that specific interval with a small buzzer or alarm to further notify the standby person to recheck.

Example 2: As a regular monthly inspection, the fire extinguishers are to be checked. Per se there are 15 extinguishers on deck. It happens that signature on the inspection card might be signed directly for three months, or due to bad weather the inspection card is damaged, and we have no proof if that inspection of that extinguisher is carried out. Other possibilities such as the officer in charge skipped an extinguisher unintentionally but once back in the accommodation fills in the PMS saying that he has carried out inspection of all the extinguishers. Here if my app is used, the person carrying the inspection can have the tablet with him at each extinguisher so that he can just quickly put the check on the app after the inspection is carried out. To make sure it is actually done a simple photo can be taken from the tablet. If an advanced barrier is needed to ensure the person is actually at the location and not completing the checklist sitting inside the accommodation, we can further have QR codes at locations which will ensure that the person carrying the inspection was here. There will also be a set lock down period which will ensure that that all extinguishers cannot be ticked/checked in the app at a single time.

Considering that each inspection might take 3-5 minutes the next extinguisher will be available to tick off after that set time.

And in similar ways will be used for other PMS jobs/ tasks.

In a case of an accident such as fire onboard; the P & I club can easily get evidence if the fire fighting equipment was being maintained properly.

II. Work and rest hours

- Many times, after authorities/company head offices have asked seafarers not to manipulate work hour entries, it's still being observed. Some reasons are commonly known such as 'because the senior officer told us', 'increases the load of paperwork' or 'senior officers have changed it the system without the seafarer knowing it'. This is tough obstacle to pass through but with my app we may able to stop the manipulation part.

Example: In the app itself there will be a work rest program. For people such as the duty officers and duty engineer's automatic entries can come in the work and rest hour sheet once they log into their ids when they take over and sign out after handing over. Other crew members will be able to fill their work and rest hours in the app on daily basis. All crew members won't be necessary to have a tablet, but we can have one in the common places such as the mess room. This will give access to easily complete every individuals' work and rest sheet also the tablet being handy no one must fight over a single computer where they have to sit and fill up the same. Further if we want to make this easier, we can have a secondary app which one can install on their own smart device (today each and every one has one) & with their own ids they can update it on regular basis. For this part we will only need additional network system to allow personnel devices to sync their update data with the ships servers.

III. Drills

- Drill reports can be entered & updated on the app as the drill progresses. Common entries will be suggested to complete the entries quickly. On the side suggestions column & checklist for that specific drill will be a part to ensure all steps are taken and not missed. If the master is holding the tablet, he can ensure drill is carried out as per the requirements or the officer making the entries can relay the message to the master. Simple photos can be clicked of the drill from the tablet for evidence purpose. Further, because of the app, falsifying and manipulating time and date won't occur. If there is actual scenario, then the app can be immediately toggled to ongoing incident. The same

above features will be available but in addition will have communication tab which will also be able to send the initial message of the situation to relevant parties.

The other advantage of using the app is that the duty officer who is expected to keep the log of what is happening and also in charge of the navigation watch will not be distracted much by running behind the curtains to keep writing down (as said above distraction from navigation watch)

IV. Trainings

- Various trainings such as new joiners training, ranked based training etc are carried on-board. Such trainings are sometimes completed by the officer who is in-charge of training & is filled up by quickly ticking without the actual trainee knowing that info. The app will help us here to ensure that the training checklist is completed by the person receiving the training. How? The selfie camera of tablet will be active clicking a picture after few minutes to save it as evidence of training carried out.

V. Toolbox talk

- Prior every job a tool box talk is required to be conducted. But some people are unavailable and are not there during the meeting. With the app we can verify that meeting is carried out as per requirements. A simple proof such as a selfie can be a part of evidence or a time stamp when all required crew members log into the app/ task at the same time. Challenges are expected in this phase such as some members who will be joining the job after certain time. They will be briefed when he comes to work by the leader and a second selfie, time stamp can be a part of evidence.

VI. Hand over/take over

- At times handing over is not carried efficiently. It happens that in some cases the relievers meet at the gangway. Old hand over notes are passed down which are not correctly updated and still have old information. The app will be able to organise the notes. Basic information about the ship, its present run, charterers information etc can be updated from vessels information section. The information as per rank and duties can be added up with rank specified training sheet, this will allow the person to get familiarized. On-going communication of any work or maintenance can be automatically be attached from emails (if chosen to link the communication part with the app & have separate mailbox for different ranks). This might not be necessary part in the app but can be added if the companies want to monitor if the

handing over/taking over has been carried out as per their standards stated in the SMS.

VII. Garbage record book/ Oil record book

- Both garbage & oil record book will be available in digital form. Some companies have already started using digital record book but here it will be available at the palm of your hands.

Example 1: When any garbage waste needs to be thrown. The quantity and kind garbage can be selected. Since the tablet is connected to the ship system it will tell from geographic location if the garbage can be thrown overboard or not.(for this we will need to synchronise with other products which are already there in the market) so that it is assured we are complying with MARPOL regulations. Once the garbage is discharged, the time and place are automatically registered with the pre-decided quantity. The advantage of this is that entries won't be falsified with the actual time and location once it is carried out.

Furthermore, the garbage management officer won't need to run up the bridge it to check and note down the position of the ship.

Example 2: Similarly, the feature can be utilized for completing oil record book. Prior any discharge responsible officer/engineer can confirm from the system if they can do it or not. Time/ date and position will not be changeable. Engineers won't require to bring a huge list of time and dates just before arrival to port or before vetting to complete entries in the log book.

Master can counter sign from his tablet/computer and lock the entries.

VIII. Inventory

- Example: The medical officers are replaced as per their contract. Once a new medical officer joins, he/she will take a medical inventory. He/she might find certain medicine missing or expired as previous officer did not check due to various reasons. A new order can only be available in the next port. Managing a medical inventory is difficult. You cannot become a pharmacist in 2 weeks training. Medicine are a very important requirement and if we have an accident onboard or someone falls sick who do we hold responsible for not having certain medicine onboard. All companies have a shore-based doctor. The app can maintain the inventory of medicines in an organised manner. Like the pharmacist on land can scan the bar codes and keep their inventory updated. The app will give an advance warning if a medicine is due for expiry. It will be able to give correct advice for the appropriate treatment. The shore doctor can also be able to monitor the inventory. (As a cadet I have personally experienced the medical officer giving wrong medicine for more than 3 days to a patient)

Inventories of other supplies/provisions can be monitored using the app.

IX. E-SMS

- Most of the companies have already got their SMS in digital format. The only disadvantage is that it will be available on the limited amount of desktop computers on the ship. While computers allow a variety of operations such as saving the latest checklist from SMS and then print it. The app will limit the possibilities of any changes carried on the computer and make the E-SMS available on the tablets as well; easy to refer and comply.

X. Synchronisation/verification/updates & cloud service

- With a digital system there is always a fear of losing data. The tablets will be synching with the ship's server at certain intervals where the data backup is saved. With tablets getting synchronised a specific job/ongoing work can be continued from a different tablet. Masters who are over all in charge of the vessels can monitor every activity from his tablet and where he is required to sign or give the go ahead can do it from his tablet, Crew member won't be required to run around the ship to get required signatures. If the ship has internet network setup this can be taken a step forward where data will be uploaded on a cloud service and companies too can keep check if everything is operating correctly also use it for their own analysis/performance.

XI. App (Application) itself

- The app will be provided with a lock down in the tablet for not installing any third-party apps to ensure the device is not used for other purposes. We can divide the app in different apps for easy access and reducing load on a single app. The division can be as per above examples.

The above are just some of viewpoints and an insight into the functions of the app. With increasing load of paperwork and regulations it has become hard for seafarers to complete task and paperwork. With the ease of technology, we can make the tasks simpler, so the person doesn't have the burden to complete the task and paperwork and try to take his/her own shortcuts putting them/someone else/ the ship/ the environment at risk.

➤ **What the app can provide.**

The SMS is built on the guidelines and undermining all rules and regulation such as ISM/SOLAS/MARPOL/CODE OF SAFE WORKING PRACTICE.

- This app is not just for checklist it is for full implementation of the SMS and ensure that the tasks are being completed by the guidance of the SMS.
- Any task which is required to be done once selected such as an enclosed space inspection, manifold connection, mooring stations, maintenance on machinery & so on. The app will automatically provide with the regulations/checklist and procedures to follow. Even a manual for the task can easily be obtained from the tablet itself giving it ease to access rather than carrying huge bundle of booklet or reading it over a soft copy which is on a desktop.
- The app will record the time/date & other info related automatically which will ensure that data is not manipulated. This means that crew "Do as they say"
- As explained in the example the log book entries will be completed as per requirement in digital form. Allowing completing them with all correct and required entries assuring the person to concentrate on the task at hand. The problem of bad handwriting will be avoided. We will be able to read what entries are made.
- Evidence will be easily attached by simply taking a selfie/photo with a date & time stamp from the tablet itself.
- The tablet may be used as VDR on the move recording critical job task.
- Location based tasks can be proved by taking a picture or having QR codes laminated at different locations. Such as night rounds fire/security patrol. The simple scan of QR code of location will be proof that the person has checked the place at this time and date. It won't be just written on a piece of paper without knowing if it was carried out or not.
- Tablets with the carry case of the size of 7inch can easily be carried. Such as iPad mini.
- Cases of which are intrinsically safe are also available to enable to carry on deck such as tankers.
- This will also enable us to save environment by reducing use of paper also available (average 5-6 rims are used every month).
- Past records/logs will be easily accessible for easy reference & won't require to trace back the paper trails.
- Valuable time will be saved and be used for completing tasks than rather completing loads of paper work.

➤ **How do we implement it aboard.**

- Most of the ships/ companies have E-SMS and internet onboard this will be easy to carry out the transition phase.
- Change is always hard for any human being at the beginning but feels at ease if the job is getting easier with the change.
Example 1- It was hard for many people to change from paper charts to ECDIS. Especially the change-over phase where the second officer required to make passage plan on both paper charts and ECDIS. But once the changeover was completed passage planning has become easier.
Example 2- When smart phones/ mobile phones were released, no one felt the need of one. But today everyone has one.
- Developing such an app with today's technology, advancements & resources already available it won't be difficult. With right investors & programmers the app can be made. After linking the equipment such as GPS, gyro, log input and linking it with our app we can carry out trials so as to get it in force in the year 2020.
- We can offer companies to use the standardised app so as to reduce the insurance coverage of a company 'if they use such a app' & set the company as low risk.
- The standard app can be added with other requirements from the company as per their SMS.

➤ **Encouraging best practice.**

- The tablet with the app will not only encourage best practice but also ensure best practices are followed.
- With the features and possibilities in the app we will be able to ensure regulations and guidance from SOLAS, COSWP, ISM(SMS), MLC (work and rest hours) etc are not just paper work but being put to a proper use.
- No more need to tick of boxes from checklist and compromise on safety.
- The tablet will be a single platform with positive results.
- In the future we will be able to analyse after gathering data on how different ships need to operate in different situations & are not able to comply, we will be able to look deeper on how we could improve specific areas. Newer safety barriers can be created once we find the flaws.
Example. Per se after using the app we find out in some fleet vessels are not able to complete tasks because of their busy voyage schedule & unable to comply with required documentation, HSEQ requirements & other issues. We will be able to analyse the cause 'maybe time constrain'. Then we can improve that area by applying newer working methods or increasing a crew member/decreasing a work load of rank so as to tackle the remainder task.

BEST PRACTICE BEING FOLLOWED

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SAFER CREW

=

SAFER SHIPS

=

SAFER SEAS

➤ **Resolving safety issues that are not presently dealt with another device.**

- The current model i.e. E-SMS, Paper SMS doesn't consider the fact on cross checks if any task is actually being done.
- This tablet once in the hands of the modern seafarers can ensure that people are doing their job and not manipulating data/paperwork to comply with regulations and just trying to pass inspections/ vetting

➤ **Making the idea work:**

- As stated, change is difficult, but when something is making sure that safety is being followed and reducing time of extra paperwork after the job is completed, it can help in easily managing the shipboard operation.
- For easy implementation, we can start this with the club "which is catering to most of the worlds gross tonnage" to allow ship owners with a "low risk profile", i.e. if this system is placed onboard their ship. As this device is a prima facia evidence to anything happening on board the ship; when things do go wrong it can act as proof if jobs were done properly before insurance compensation is given.
- We are not just trying to improve safety at sea; we are trying to ensure that safety is improved out at sea so that modern seafarer comes back to his family in healthy condition.

Sailors are at sea not to do desk jobs. As they say boring voyage is the safest voyage. Let's keep our sailors safe and send them home in healthy condition.

We reckon, with the right people and proper guidance, this idea could change the industry for the good, making it safer and more efficient.

This idea of having a tablet with apps, can have more than we can imagine. It's just a matter of putting it out there. The modern seafarer will remain safer with this powerful device in their hands.

Certain aspects the idea might be cleared by questions and I would be happy to answer them.

Thank you very much for taking interest in my ideas and would appreciate your feedback on the same.

Awaiting your kind response.

To a safer tomorrow

By Pranav Pralin Fadnavis along with Arnav Pralin Fadnavis