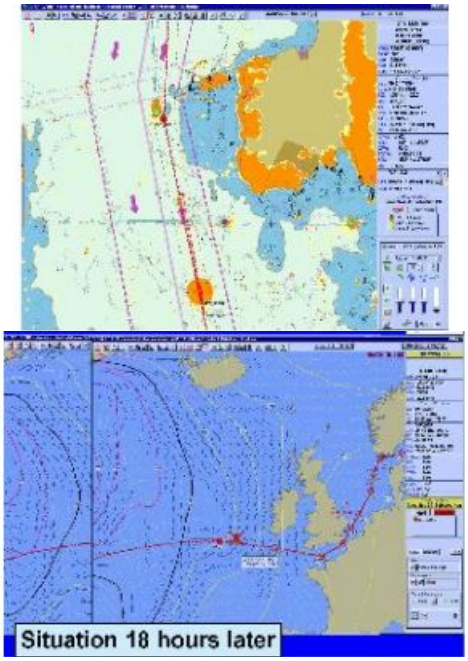
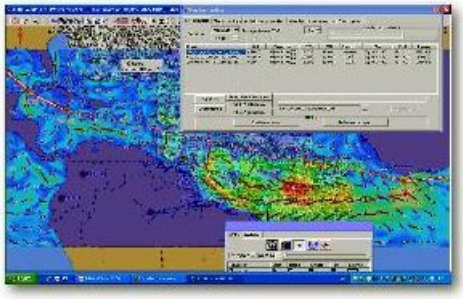
ON THE WAY TO COST SAVINGS AND SAFER NAVIGATION

Paperless Navigation â€“ Better Now Than Later





With the introduction of the amendments to SOLAS regulation V/19 making the carriage of Electronic Chart Display and Information Systems (ECDIS) under SOLAS chapter V Safety of Navigation mandatory, as proposed by NAV 54, the BIG question now is how and when to implement the ECDIS and â€™Paperless Navigationâ€™ on board vessels. Waiting until the last applicable dates may seem to be an obvious choice but obvious choice is not always the best choice. Paperless navigation has proven to save costs (eventually), enhance safety on board and attract quality manpower. Can such factors definitely offset the cost of implementation?

The three most important concerns of a ship owner/ ship manager in terms of priority are the cost of operations, the safety of operations and the retention of crew. These concerns will be discussed in more detail below.

Cost of Operations
The single most important factor for a ship owner/ ship manager is to maintain his competitive edge in the shipping industry that is still recovering from the recession. The most common agenda point during any group discussion is the measures needed to reduce costs of operation. Thus incurring any additional expense that is currently not mandatory will have to be justified with sound logic. Costs can be subdivided into two categories, namely, direct costs and indirect costs.

Direct Costs
With the implementation of ECDIS (paperless navigation), direct costs are known to decrease although it takes time because users have to gain sufficient competence in order to realise the full potential of ECDIS and the tools available in paperless navigation and therefore the benefits. There are elements of the system, for example, Pay as you sail, any chart anywhere anytime, and all charts updated at all times, that will ultimately eliminate the need to maintain worldwide or even regional folios, to send paper NTMs , and for other notifications in analogue form. All these and several other factors collectively have a potential to lower effective costs by as much as 15-20% .

With ENC coverage increasing every day and costs coming down in the very near future, the paperless option will surely be more inexpensive. Add to this the uncertainty factor associated with the analogue products, of connecting the updates and thus increasing the associated risk during inspections by various port authorities who insist upon having latest updated charts and

publications at all times, the paperless option, with the possibility of making data available and updating it at anytime and anywhere, is far more cost effective.

Indirect Costs
And then there are potential savings on the indirect costs, viz., man hours and the possibility of using fuel saving applications, for example, the Voyage Decision Support (VDS) System, which can reduce fuel consumption by as much as 5-6%. Add to this the reduction in the environmental impact and the potential is therefore huge.

On board a tanker on a typical trans-Atlantic route the saving potential during trials over 6 months has been documented to be in the range of USD400,000 per year which is many times more than the expenditure on equipment.

70% af all marine insurance claims are related to navigational incidents, which again add to indirect costs in the form of additional premiums, call money etc. Enhanced safety thus also means lower costs.

Safety of Operations
70% af all marine insurance claims are related to navigational incidents. According to a Formal Safety Assesment (FSA) study conducted by Det Norsk Veritas (DNV) on behalf of the IMO, ECDIS has a risk reducing effect on grounding and collission related risks of around 36%. This is also in line with previous research in the industry.

In the majority of incidents/accidents, the investigations reveal that it is not the competence of officers that is responsible but the loss of ‘situational awareness', which can at times be as seemingly harmless as receiving a phone call during a critical situation. ECDIS is the only equipment on the bridge that has an overall view of all navigational sensors and that can supplement navigating officer's situational awareness.

It is like having an additional navigational watch at all times, monitoring the safety of navigation constantly but particularly against two major risks, namely, the risk of grounding and the risk of collision. A common apprehension amongst managers is that once introduced to ECDIS and e-navigation the mariner on the bridge will not maintain a proper lookout and will also no longer look at the paper chart.

A few years ago I was introduced to someone with the title captain at a party. I assumed that he was a sea captain but after a while I realised he was actually an airline pilot. After an interesting conversation and comparing notes on the mode of navigation at sea and that on aircrafts, he told me that paper charts are history in the aviation industry. This happened 4 years ago. And we in the shipping industry are still debating on this matter.

If airlines, that have the highest safety record statistically (% of incidents) among all modes of transportation, can do this, then why cannot the maritime industry? The maritime industry has always been known to be a laggard in adapting to technology and has always had a reactive rather than proactive attitude.

In shipping we need to work towards a ‘zero defect' work culture as even being as accurate as 99.9% can have disastrous outcomes similar to ‘50 newborn babies dropped at birth by doctors every day' or ‘2 unsafe plane landings per day at O'Hara Airport'.And we definitely do not want similar disastrous outcomes in our business.

Retention of Crew
The greatest challenge today for a ship owner/manager is to find and retain quality manpower on board vessels. To change the image of shipping from a low technology industry to a high technology industry and thus to motivate young talent to consider shipping as a career option, electronic navigation can play a great role. Given the choice, a young navigating officer today will definitely opt for an ECDIS equipped vessel. Of all the factors responsible for human error the main factor during a survey has been stated as ‘fatigue'. With the use of ECDIS, the navigation planning and chart correction related workload is reduced by as much as 60%.

Availability of various tools for voyage planning and management make that the hours of work can be completed in minutes, besides making it well organised. Tools and technology such as these are essential in making work on the navigation bridge at par with that elsewhere.

Thus, we can easily conclude that with regard to all three major concerns of ship owners, equipping a ship with an ECDIS now, makes sense.

Contributions of MARIS
In addition to cost savings by using digital data as a substitute for analogue data, thus requiring no physical logistics involved and no more paper products, Maritime Information Systems (MARIS) has developed an application called Maritime Digital Services (MDS) which helps navigators to manage all their voyage charts and publications and the updates to these charts and publications directly from the server. These are sent out as push data once the user is subscribed and the data and the updates are also available on demand 24/7, thus doing away with the need for any manual intervention and thus the possibility of any interruption or delays. This application will soon be available through the UKHO with a number of additional functions, such as eNavigator [1].

Another application that has futuristic possibilities is VDS (Voyage Decision Support) defined as an electronic tool based on MARIS ECDIS and designed to plan and execute the voyage and document and analyse the results. It has five essential elements, viz., voyage planning & optimisation (weather routing), active seakeeping (ship manoeuvring, trim and stability optimisation, heavy weather navigation), regulations (MARPOL / Environment-related procedures, ballast water management, SOLAS), commercial element and post-voyage reporting (Vessel / fleet performance analysis, fleet management &

communication). This application has been on trial on 3 different vessels and has been able to achieve more than 5.2% reduction in fuel consumption. VDS is expected to be commercially available in first quarter of 2011. The obvious inhibiting factors such as additional expense is quickly overcome by the cost saving potential and pay back periods which can be as short as 6 months.

The most advanced ECDIS of MARIS comes with an option of having a radar picture overlay, which gives a sure cross check with GPS position. Having all the information from the ARPA (Automatic Radar Plotting Aid), for example, Target Data, CPA (Closest Point of Approach), TCPA (Time to Closest Point of Approach) and from AIS, for example, vessel name, destination, etc, on top of the nautical chart gives a far superior decisionmaking support. And then there are advanced route check functions, for example, under keel clearance on each leg , which act to minimise the human error factor. Automatic transfer of all route planning information to the passage plan, which includes features such as squat calculation, that can then be used to generate a passage plan report and printed for records as well as for reference.

By integrating all bridge sensors mandatory and even those non mandatory, for example, AIS, NAVTEX, etc, the comprehensive information available on the ECDIS station enhances the situational awareness on the navigational bridge considerably. Smart alarm management ensures ECDIS keeping an alert watch over the risk development and alerting the navigating officer well in time.

Users of ECDIS and MDS based navigation have been able to achieve as much as 60% savings in man hours used on routine navigational tasks such as passage planning, execution and chart and publication updates. Moreover, with applications such as MDS and VDS running together with ECDIS, the much required hi-tech flip is given to the maritime industry, which is critical in attracting and retaining young and fresh talent in the industry.

Outlook
The opinion that over-reliance on electronic navigation can dilute or distract prudent practices sounds outdated if one looks at the enhanced intensity of navigational operations in most ports of the world. Fatigue has been cited as the ‘number one' concern of mariners in two different studies [2],[3]. It was also the most frequently mentioned problem in a recent industry survey [4]. In this study on critical vessel casualties and personnel injuries, it was found that fatigue contributed to 16% of the vessel casualties and 33% of the injuries. (A ‘critical' vessel casualty was defined as a vessel casualty in which there was significant damage to the vessel or property, or in which the safety of the crew was at risk). Substantial savings in man hours on navigational tasks in paperless navigation and thus reduction in fatigue can be considered a major argument in favor of electronic navigation. Paperless navigation is reality and is closer than we can imagine it to be.

Moore's law implies that the pace of change is getting much faster than in the past as is its adaption. This law also applies to paperless navigation, for the sheer reason of its usefulness to the industry.

The early adapters of paperless navigation are now in a comfortable position in terms of enjoying all the benefits offered by this option, for example, cost savings, safer navigation and ships and a happy and committed sailing staff as well as being fully compliant with the coming regulations regarding mandatory ECDIS on board.

Such companies are paving the way for a major shift in the thought process of reluctant and ‘sitting on the fence' type of players. Lately we see a lot of interest from companies often considered orthodox rushing to implement ECDIS based navigation on board their vessels.
One realisation that perhaps has kick started this outcome is the major issue of training and the associated issue of ‘change management'. Training is not only required for the sailing staff but also for the managers and the office staff to amend the International Safety Management (ISM) manuals to address the various aspects of electronic/paperless navigation, for example,emergency procedures, purchase of electronic charts and publications, etc. Implementing training for these electronic tools and applications at the initial stages of a navigational career will ensure smooth and seamless adaptation of paperless navigation on board vessels.

Thus happy (and safe) sailings with ECDIS on board.

Further Reading

[1] http://thefutureofnavigation.com/enav_products.aspx
[2] Marine Transportation Research Board [MTRB], 1976. Human Error in Merchant Marine Safety, Washington, DC, National Academy of Science. AD/A-028 371.
[3] National Research Council [NRC],1990. Crew Size and Maritime Safety. Washington, DC: National Academy Press.
[4] McCallum, M.C., Raby, M., and Rothblum, A.M., 1996. Procedures for Investigating and Reporting Human Factors and Fatigue Contributions to Marine Casualties. Washington, D.C., US Dept. of Transportation, US Coast Guard Report No. CG-D-09-97. AD-A323392