

Ship navigation conference

Digital Ship organised a conference at Norshipping about how to make best use of navigation technology. Unsurprisingly the one thing everybody agreed on was importance of training. By Anders Bergstrom and Karl Jeffery

THE KEYNOTE SPEAKER was Kjell Rein, vice president, safety and quality, Kristian Gerhard Jebsen Skipsrederi (KGJS), one of the largest shipping companies in Norway.

Mr Rein explained how the electronic chart systems onboard really benefit the owners in their operations. "New technology gives us new possibilities," he said.

"Shipping companies use the new technology because it is an aid to navigation, reduces the risk of grounding, reduces routing work for navigators and to attract new and young navigators. It may reduce risk; it may attract a new generation of navigators.

"However it may fail, be misused, be trusted too much. Maybe it is better (safer) to wait until it is no longer new."

Mr Rein said that the shipping industry is changing very quickly, and younger seafarers are far more comfortable with computers.

KGJS has three divisions: Gearbulk, Cement

and Tank, with 114 vessels in total. The Gearbulk division has 55 open hatch vessels with gantry cranes, 5 general cargo / liquid pitch, 4 totally enclosed vessels for forest products and 2 sugar vessels (total 66).

The Cement division has 23 pneumatic cement carriers (1700 to 29000 dwt)

The Tank division has 12 OBOs of 110,000 to 121,000 dwt, including 3 coastal tankers, 4 bitumen tankers and 6 chemical and gas carriers.

39 vessels have type approved electronic chart systems. 21 vessels have dual type approved electronic chart systems. 14 have possibilities for track steering directly from the electronic chart systems.

3 vessels have non-type approved electronic chart systems (any other equipment that can display electronic charts).

C-MAP real time chart updating has been implemented on 10 vessels.

The ChartCo Chart Manager has been implemented on 60 vessels for updating paper charts, with a plan to start soon with corrections for ENC and ARCS on 3 vessels.

Jebsens receives Primar

ENC updates, UKHO ENCs and ARCS updates, AWT weather data, NIMA chart corrections, UKHO chart corrections and digital light list, Lloyds List shipping news and TeamTalk satellite news over ChartCo.

Type approved / non type approved

All the above vessels except four are using commercial vector charts, he said.

In Mr Rein's view, these are generally the best charts currently available.

Legally, ships are only allowed to rely on charts from government hydrographic offices, so the main method of navigation is still government paper charts.

However the KGJS is looking for possibilities for using electronic charts as the main (rather than secondary) method for navigation, which, unless the rules change, will mean moving from commercial vector charts to hydrographic office charts (ENCs), which cost considerably more.

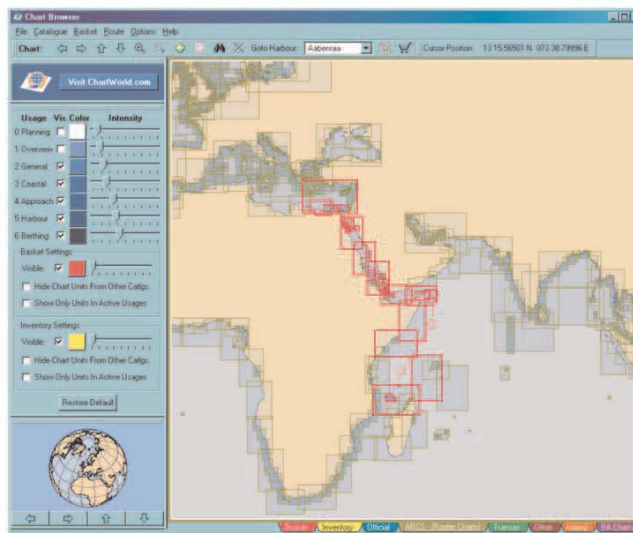
So far, ENCs have proved unpopular with the shipmasters, who found them too complex to handle.



Kjell Rein, VP safety and quality, Kristian Gerhard Jebsen Skipsrederi

Optimize your ENC, ARCS and BA Chart portfolio using our new and ground-breaking ChartBrowser!

Fully compatible with  Marine Press Of Canada



WWW.CHARTWORLD.COM

Costs

The electronic chart installations cost \$40,000 each - for 42 vessels is a total of \$1,680,000. The commercial electronic charts cost \$5000 per year on 42 vessels, total \$210,000.

This means that the total to fit electronic charts on 42 vessels was \$1,890,000.

This compares to the \$11,262,000 cost of one grounding in 1999.

There are additional costs - the systems require supervision from nautical personnel on shore, and skilled and interested personnel onboard.

Navigation policy

Mr Rein was sceptical about the belief of many regulators saying that shipowners only install equipment when forced to. Shipowners will install new equipment if they see a benefit to it, he said.

"We can see the benefit of electronic chart systems and we put it in," he said.

KGJS's electronic chart policy is that all new vessels from 2000 will have an integrated bridge with a dual type approved electronic chart display system. There is a program for retrofit of electronic chart systems on existing ships.

All deck officers for a ship with electronic charts are sent on an IMO model course to learn how to use them.

The company has implemented bridge team management courses for all deck officers. It has made increased focus on passage planning. It has improved pilot / OOW relation. It is gradually introducing electronic chart systems as an aid to navigation.

Investments in new navigation technology onboard ship must be supervised by shore staff, who need to make onboard audits, he said.

"We have basic training ashore, and on the job training onboard," he said. "We fol-

"After one year we cancelled the ENC charts on request from the masters," he said. "There is too much administration and problems related to handling and updating."

However Jebsens is optimistic that this will improve, he said.

The company hopes to have one vessel shortly running paperless, using ENCs and ARCS (UKHO raster charts), and will use the Maris e-mail system for updates.

Groundings and collisions

The company had one grounding in 1997 and a vessel collision with a berth in 1999.

The collision with a berth cost \$11,262,000, the berth had to be completely rebuilt.

"The long term cost to our reputation with the shipper cannot be calculated," he said.

"Some of these groundings have heavy cost attached and also created damages to our reputation," he said.

On nearly all of the groundings the company has had, there has been a pilot onboard.

"The causes of the groundings were that the pilot did not know the vessel's position, the OOW / master did not know the vessel's position or did not correct the pilot's mistake in time.

"Most likely most of these groundings would have been avoided if the vessels had an electronic chart system."

NAVIGATION

low up training during seminars."

"We want to develop our methods and procedures for electronic navigation in close co-operation with our navigators onboard."

Regulation

A general problem with electronic charts is the lack of competency and lack of agreement between regulators, he said.

"There is too much people saying "do not use this for navigation." There is too much focus on problems (computer crashes etc)."

"There are problems of pilots bringing their own electronic chart systems and not using vessels corrected charts."

Bjorn Holta, Norway

The conference continued with experience learned from accidents presented by Bjorn Holta from the Norwegian Maritime Directorate (NMD).

The NMD uses an extensive database to investigate accidents so that ongoing efforts to introduce new technologies and standards can be feed with important information on how to avoid mistakes already made.

Mr Holta reminded us that even if the industry develops the equipment the rules are still set by the authorities.

Examples of how accident investigations have effected the development of technology is without doubt the "Sleipner" accident that affected both the radar performance standard as well as the Integrated Navigation System (INS) standard.

Mr Holta touched on the area of official and non-official charts and made it clear that anything else than officially distributed electronic charts for ECDIS (ENCs) would not be accepted in Norway.

However Mr Holta said he saw AIS as a large benefit, although raised the issue that it isn't very helpful when only using the minimum keyboard and display (MKD) required by the regulations.

The problems reported when using a minimum keyboard and display set up is a strong reason behind Norwegian efforts to make ECDIS mandatory, he said.

IMO is currently addressing the issue of AIS performance standards, he said.

Margareta Lützhöft

Margareta Lützhöft, Swedish National Road and Transport Research Institute I (VTI) talked about the need to strengthen co-operation between the users, manufacturers and authorities with shipboard navigation equipment.

She stressed the importance of technology supporting the seafarers, when the reality is too often the other way around.

Seafarers have told Ms Lützhöft about times when the ship's symbol on an electronic chart display showed that the ship was turning, but the rate of turn indicator (and view out of the window) showed that the ship wasn't turning, leaving seafarers wondering which one to trust. This kind of thing can quickly lead to seafarers completely distrusting their electronic tools.

On the other extreme, seafarers can trust an electronic chart system far too quickly - an electronic chart screen can be very seducing, even if there is a cheap GPS feeding position data into it.

She suggested that it might be possible to somehow design navigation technology so it looks less seducing.

Trackpilots can be particularly dangerous because they can discourage a captain from deviating from a route due to a critical situation that arises. After any deviation, they don't recalculate, but expect the captain to continue on the same route as before.

Technology is also very dumb, in that it doesn't know what will happen if certain routes are followed, as a human would.

Navigation technology can take away the easiest work that navigators do, so they don't have to concentrate so much, but when something serious happens, they have a much harder task because more things escalate. It ought to be possible to smooth out the workload somehow, she said.

Ms Lützhöft said that asking masters how they thought equipment should be designed was not necessarily the best approach, since they are not design professionals.

"The manufacturers say, I asked 10 masters and I got 12 answers," she said.

"We should not give mariners design responsibility. We should be a professional to integrate between the needs of the masters and the technology."

However mariners do need to be involved in the design process.

"We need to involve the mariners and it's very hard. We need to watch them work," she said.

Seafarers are often the kind of people who will take on hard work without complaining, which makes it very hard for an observer to work out how difficult their task is, or how close they are to breaking point.

Knut-Svein Ording, DNV

Knut-Svein Ording, head of section for nautical safety and communication systems from Det Norske Veritas (DNV) started off with showing a serious grounding from a Norwegian navy ship.

Mr Ording himself used to command this specific ship in the navy, luckily not at the occasion of the accident.

"Collisions, grounding and contact damages account for approx 50 per cent of accidents at sea - the majority of these accidents are related to failure in the navigation bridge system," he said.

Mr Ording stressed that the definition of ECDIS is being much misused and a large number of the maritime community do not know what actually ECDIS is and it is normally confused with ECS.

Mr Ording used the example of the grounding of the Royal Majesty, where a GPS operated for 17 hours in dead reckoning mode before grounding, as an example of the importance of having control of your equipment even if it is a wonderful electronic chart system.

There was no electronic protocol for making sure the signal from the GPS, warning it was in dead reckoning mode, appeared on the electronic chart screen, he said.

It is important to check the sensors that provide data to your electronic systems, he said.

It is important to not forget to keep optical lookout and not to have the ECDIS draw your attention from the optical view.

Martin Taylor, Kelvin Hughes

Martin Taylor from Kelvin Hughes then brought us to one of the hottest topics of the Norshipping event, S-VDR.

S-VDR was created from the fact that VDR was thought to become too expensive and was therefore not implemented on all types of ships.

Ships which do not have a full voyage data recorder fitted will need to fit a simplified voyage data recorder starting from July 2006 with ships above 20,000 GT and from July 2007 with ships above 3,000 GT.

Both the VDR and the S-VDR is currently becoming more part of the integrated system onboard and this will hopefully lead to the improvement of safety at sea, Mr Taylor said.

Connected to a satcom, a voyage data recorder could help remote diagnostics of problems with radar, GPS, ECDIS and bridge system, he said.

A status unit for the voyage data recorder is fitted in the captain's cabin, and can immediately wake him up and alert him if there is any problem with the shipboard GPS, or loss of power, or any of the voyage data recorder equipment isn't working.

Rune Holst Johnsen, Primar

Rune Holst Johnsen, marketing manager of electronic chart hub Primar Stavanger said that there are discrepancies in testing

houses for official electronic chart display systems (ECDIS), which means that an ECDIS can be "approved" by one body but still not be accepted by another.

Mr Johnsen reiterated the point that for a chart system to be fully type approved (with the label "ECDIS"), it must also be using only official vector charts from hydrographic offices (ENCs).

ECDIS has now been made a carriage requirement in Norway for High Speed Crafts, coming into force between 2006 and 2008.

EU is expected to require ECDIS between 2007 and 2009, and IMO is expected to require ECDIS on all ships between 2008 and 2010, Mr Johnsen said.

Training

Jan T Hansen, director of worldwide customer development and system sales for integrated bridge systems, Sperry Marine, continued on the issue of training and shipowners which do not initially pay for training will eventually pay more.

Mr Hansen said that in his experience, training is often cut away during the procurement process for navigation equipment.

Sperry has developed a training program which can run wherever the students are, rather than requiring them to visit training facilities of a systems manufacturer, he said.

Responding to criticism that manufacturers put so many functions on their equipment that seafarers find it unnecessarily hard to use, Mr Hansen said that shipowners will tend to buy the equipment with the most functions.

"A shipping company says, how come you only have 20 ARPA tracking targets - your competitor has 60. This is the way we are driven.

We are adding features and adding features and no-one is setting the limits."

One navigation equipment vendor said that he is trying to sell equipment and training in a package, and the first question he gets back from shipowners is "how much does it cost without the training."

Delegates told stories about captains who did not even know they had an AIS onboard, and so had no idea what it was transmitting.

There were other examples of captains using AIS just to identify the name of another ship, not to find out where it is.

Gilmour Research award

Troil Marine of Finland was presented with an award on behalf of Finnish oil company Neste Oil, for the shipping company which makes the best use of official ENCs.

The judges were Ole Berg, ex hydrographer of Denmark and ex-chairman of Primar Stavanger advisory board; Dr Andy Norris, chairman IEC Technical Committee 80 (ship navigation displays) and Special Professor of Navigation Technology, Nottingham University (ex technical director of Kelvin Hughes); and Rune Holst Johnsen, marketing manager of Primar Stavanger.



Eric van Troil of Troil Marine accepts the Gilmour Research award from Carl Bennett, analysis partner with Gilmour Research award for the shipping company making best use of official electronic charts, on behalf of Neste Oil

Neste Oil won the award because it has 3 ships which are virtually paperless (navigating entirely on official electronic charts), the first in the world to do so, as far as *Digital Ship* is aware.

Capt Antero Nykänen, master of Finnish tanker "Mastera", has been using ENCs for primary navigation since 2004. 18 ships in Neste fleet use electronic charts.

The vessel sails in the Baltic, North Sea, English Channel, Bay of Biscay and Irish Sea.

The ships keep a small folio of paper charts in case anything really bad happens. "This is hard backup to get m home if Murphy should strike," says Capt Nykänen.

"They have been working very very quietly - training and trying all sorts of solutions," said Eric van Troil, of Neste's chart agent Troil Marine.

"When I've been helping them out, my phone has been ringing day and night - there are distressed people out there.

"Even if it's hard to implement ECDIS, it's worth all the work that goes into it. It makes navigation less stressful." **DS**

Download original presentations from this conference at www.thedigitalship.com/presentations.htm