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New protocol paves way for better maintenance

An industry-wide consortium has launched a new data protocol – Shipdex – to smooth information flow between equipment user and manufacturer as well as ensuring more effective maintenance of onboard machinery

Shipowners and management companies are faced with increasingly large volumes of information that have to be effectively stored and managed.

This is in part a consequence of increasingly onerous regulatory requirements, including those of the International Safety Management Code, Tanker Management and Self Assessment, Marpol and related environmental compliance standards. It is also in part due to wider adoption by ship operating and management companies of enterprise resource planning (ERP) systems intended to manage fleets more efficiently, and thus boost profitability. The future outlook is for this burden to increase.

Data management affects all aspects of routine operations, but is particularly crucial for computerised maintenance, parts procurements and quality management systems, where incomplete or inaccurate data can significantly reduce the effectiveness of software to streamline the very processes that

they were designed to improve.

Consider that a typical vessel will have parts sourced from between 80-100 manufacturers; there could be 700-900 machinery systems, some comprising up to 1,000 or more individual components. It normally takes between two and four months for all this information to be manually imported to a maintenance database, and there is no guarantee that the data is accurate and complete (*MEC*, November/December 2007).

The problem of automating the process has long been recognised, and in spite of various attempts to develop an agreed standard, including a tentative effort by the European Community Shipowners' Association around the turn of the decade, none can really be described as successful to date.

One reason is that, historically, there has been no agreed way for recording and collating technical information stored in equipment manuals – whether parts inventory or maintenance procedures. While Solas Chapter 12 stipulates that certain manuals have to be kept on board, it does not provide any guidance as to how they should be updated and maintained in light of changes to equipment specification. Neither, does it consider how missing or obsolete manuals should be replaced.

This has recently been picked up by IMO, which wants owners and managers to better appreciate the importance of crews



It can take up to four months for information on hundreds of ship components to be manually imported to a maintenance database

having access to up-to-date, accurate and user-friendly shipboard technical operating and maintenance manuals, particularly for safety critical marine equipment. To that end, it has incorporated the need for greater standardisation in manuals as part of its drive for goal based standards.

However, for shipowner Grimaldi Compagnia di Navigazione, headquartered in Naples, Italy, and Cyprus-based Intership Navigation Co Ltd, which together own and operate close to 200 vessels, the problem was more of a pragmatic one. Entering the data from numerous technical manuals into their onboard maintenance systems entailed a considerable degree of repetition that they felt was unnecessary and, more to the point, avoidable if only the right technical framework was in place.

In 2006 the two companies entered into a dialogue with their key suppliers with a view to developing a data standard that would eliminate the drudgery (and potential risks) of manual

Lloyds TSB online service aims to improve cash management

Lloyds TSB has launched a new online service which could benefit hundreds of UK businesses within the shipping sector, providing real time access to some of the most competitive deposit and foreign exchange rates on the international markets.

Helen Woolcomb, head of e-solutions for financial market sales at Lloyds TSB Corporate Markets, says: "Many businesses in the shipping sector do not take full advantage of the opportunities presented by foreign exchange and the money markets because traditional offline solutions can be too time intensive and therefore are pushed to the bottom of the priority pile."

Despite the huge advances in online corporate

banking services in recent years, Lloyds TSB's own research suggests that one in three businesses which could benefit are still missing out on e-trading opportunities. The bank's new online service – called MarketsLink – is designed to encourage more finance departments to use their company's cash more efficiently and in the process potentially add thousands of pounds to the bottom line each year.

MarketsLink is the first online trading tool from a UK bank to feature the Reuters' Electronic Trading product (v3.3) and Lloyds TSB says it also becomes the first bank to offer an auto-rollover facility for money market trades on the system.

data entry. Managing director of Intership Navigation, Captain Adami, says: "The idea was to take advantage of the latest technology to make not only our own lives easier but those of our suppliers and everyone involved in the supply chain."

Director of maintenance engineering and cost control at Grimaldi Group Naples, Dr Giancarlo Coletta, says: "From the outset we realised it had to be a standard that would be open to everyone and that could be built upon and expanded in the future. However, the challenge was that it also had to be compatible with existing industry standards, including ASD S1000D, ATA, AECMA and ISO."

Evolved by the two partners, Shipdex provides a platform and software independent structured framework for managing equipment inventories, maintenance procedures and parts catalogues. In essence, it will facilitate the electronic exchange of information currently supplied by various manufacturers in the form of technical manuals.

In order to cover the complete supply chain, the two owners formed a working group and enlisted the support of several leading equipment manufacturers, including Alfa Laval, the MacGregor Group, MAN Diesel also Yanmar in Japan. It also contracted Spectec to provide IT expertise.

The Shipdex protocol draws heavily from the ASD S1000D international specification for technical publications using a common source database, which is the standard for data exchange and technical publication production used in the aviation industry, both commercial and military. Notably, this standard has been also adopted by several European and Nato navies for data exchange in the marine military sector. It was chosen as a reference for the simple reason that it is well established, fully tested and field proven standard that deals with the kinds of data that needed to be included in Shipdex.

It is up to individual equipment manufacturers how they break down a complex product into discrete components, which are then denoted as nodes within the overall product dataset. For each node they generate self-contained data modules that describe the component and its operation, list relevant maintenance tasks, and incorporate an illustrated parts guide showing all the spare parts. When these nodes are combined, they produce a structural representation of the equipment.

While information in the data module is formatted as XML, it can contain references to external data objects, eg, Microsoft Word and Adobe PDF documents, images and technical illustrations and multimedia assets. Significantly, one data module can contain

references to other data modules.

Manufacturers are then able to archive all the generated data modules inside their (logical and/or physical) Common Source Data Base (CSDB) for a better data management. All individual data modules (which are, in effect, small standalone databases), together with all referenced information objects related to the product and contained within the delivery scope of the contract between manufacturer and end user, are included into a delivery package built according to rules defined by Shipdex.

Since the data modules are XML-based, it is a relatively straightforward process to

Key elements stored in the ShipDex data structure

equipment list

IMO part number
SFI / other functional code*
name of equipment
type and model
maker code
maker name
serial number
technical description

equipment spares

part number
description
quantity installed – UOM
quantity installed – value
equivalent to PN
recommended onboard spares
Marpol Annex VI (yes/no)
*customer number**
additional information
graphic
replace part number
replaced by part number

maintenance tasks

title
task ID
maintenance class (eg, inspection, overhaul)
job description
periodicity – UOM
periodicity – value
total duration (hours)
support equipment required
manpower skill
manpower category
manpower count
safety precautions
recommended spares
work cards

italics indicate optional items
**asterisks indicate customer supplied items*

transform and display the information into different formats suited to screen or printer, or possibly, in the future, even mobile devices. It can also be imported into maintenance management systems, either planned and condition based.

Captain Adami explains: "Shipdex exists only as a data exchange protocol. It is not a tool for monitoring equipment, and therefore it does not specify when a maintenance task has to be carried out. The timing is still determined by equipment running hours or, in the case of a condition-based maintenance system, by a trigger condition being met."

So how will Shipdex benefit owners? For a start, it should obviate the onerous task of re-keying data on equipment supplied by manufacturers, especially when it comes to developing maintenance systems for a fleet of newbuilds with similar but not identical equipment on board. It will also make it easier for those maintenance procedures to be kept up-to-date.

In the future it is hoped the process will be automated further by allowing procedures to be modified, replaced or discontinued based on a service letter or bulletin issued by the manufacturer in a Shipdex compliant data module.

Another idea being considered for the future is allowing two-way sharing of information between the equipment end-user and manufacturer. In a simple example this might be the IMO number of the ship on which the supplied equipment is installed, or the functional position of the equipment. A more interesting application, however, would be for users to send usage feedback to the manufacturer, allowing better ongoing quality control and providing a valuable resource for product development.

As a participant in the project, MacGregor cites that providing the customer with up-to-date information about spare parts – among other things – will improve the quality of spare parts orders. "Lead times can be reduced and this will result in increased sales," said Björn Stenwall, sales and marketing director of MacGregor's service division. He hopes that the protocol will also foster closer and stronger relationships with owners through greater communication, and a better understating of product use by specific customers.

It should be remembered that, unlike S1000D, Shipdex is not a standard, setting out how electronic versions of technical manuals should be compiled; it is an exchange protocol designed to allow data structured in a particular format to be easily transferred from one party to another. However, bearing in mind the marine industry currently lacks a common standard for technical manuals, it may well become one, given time. **MEC**