The Shipdex protocol

A missing piece in the digital transformation puzzle of the shipping industry

Shipping's digital transformation is creating an entirely new ecosystem with IoT and big data playing major roles. However, the standardisation, integration, and dissemination of manufacturers' technical documentation into this new ecosystem is a critical step that is still missing, writes Mats Broberg, S1000D information manager at SSPA Sweden.

Major industry sectors are currently transforming their business models using a wide array of new and emerging technologies – and the shipping industry is no exception. Today's ships are increasingly becoming connected hubs of data that is shared, refined, and repurposed, which drives automation and optimisation of services, logistics, and decision models. This creates an entirely new maritime ecosystem, where concepts such as AI, IoT, big data, and digital twins play major roles, and where many manufacturers' and subcontractors' traditional focus on "as designed" and "as built" in the value chain now also needs to include "as operated" and "as maintained". However, there is one missing piece in the puzzle: the standardisation, integration, and dissemination of manufacturers' technical data and maintenance documentation into this new ecosystem.

While manufacturers' technical documentation may not be the most exciting part of the digitalisation of the shipping industry, it is still one of the most crucial – and a fundamental requirement for a truly digitalised industry. There is no widely adopted standard, which is not only a technical integration issue but also a matter of quality. For decades, IMO, IACS, and other organisations have stressed the importance of improving the quality of third-party technical documentation, with regard to language and terminology, information structure, configuration and revision management, and illustrations. In 2000, IACS published its *Guide for the Development of Shipboard Technical Manuals* (IACS Rec. No. 71), which was followed by IMO's *Shipboard Technical Operating and Maintenance Manuals* in 2007 (MSC.1/Circ.1253), among others. And IMO's ISM code, which was adopted as early as 1993 – following the capsizing of the ferry *Herald of Free Enterprise* in March 1987 – contains sections on document control and maintenance of ship and equipment.

In 2004, CHIRP, the UK's Confidential Human Factors Incident Reporting Programme, published the report *Marine Operating & Maintenance Manuals – Are They Good Enough?* In this report, which was based on interviews with manufacturing associations and IACS, as well as significant research into maritime incidents, CHIRP paints a disappointing picture. When analysing data from MAIB (UK Marine Accident Investigation Branch) between 1990 and 2004, CHIRP found 44 incidents where documentation was either lacking, hard to understand, or inadequate. Of these, 22 led to accidents to persons. Another reason for the generally low quality may possibly be traced to the fact that machinery installed on seagoing vessels does not need to comply with the EU's Machinery Directive (2006/42/EC), which sets strong requirements on documentation in its annexes.

Ten years later, in 2014, CHIRP writes in its *Maritime Feedback* newsletter No. 35 that "the industry appears to have made little progress addressing these concerns that have a significant impact on the ability of seafarers to conduct their work in a safe and efficient manner." CHIRP then repeats its recommendations from the 2004 report, which include the importance of a common standard, a simplified vocabulary, a relevant authority verifying the compliance of documentation, and training regimes to familiarise seafarers with the standard.

Enter Shipdex. The Shipdex protocol is based on Issue 2.3 and, for some parts, Issue 4.1 of the S1000D specification – proven over more than 30 years and widely used in the aerospace and defense industry for major platforms, including ships such as the British Type 45 destroyer, where the documentation amounts to the equivalent of 120,000 pages. Today, Shipdex is the only viable solution that provides a non-proprietary standard that can easily be adopted by major manufacturers, a modularisation strategy that integrates excellently into the framework of the digitalisation of the maritime industry, and structured authoring that enforces many of the recommendations and findings of IMO, IACS, and CHIRP. For small manufacturers that often do not have the resources to set up a Shipdex workflow for their technical documentation, rewriting and conversion services as well as expertise and advice are available from consultants.

While the adoption of Shipdex has been slow – MAN, Kongsberg Maritime, Yanmar, and Winterthur Gas & Diesel being notable exceptions – this has nothing to do with any technical deficiencies of the protocol, but is largely due to the somewhat difficult question of who should take the lead and set Shipdex as a firm requirement, as several key stakeholders are involved in newbuilding orders – manufacturers and subcontractors, shipyards, ship owners, and classification societies. The jury may still be out on this issue, but it is not an unreasonable viewpoint that the responsibility may lie with one of the two last-mentioned entities.

The Shipdex protocol lays out processes and methods for the production, maintenance, quality assurance, data transfer, and presentation of technical documentation. Enforcing XML (the eXtensible Markup Language), the protocol separates *form* (i.e., layout) from *content*. One of the key concepts of Shipdex is the *data module*, which is a small container of information, such as a task or a description. The data module concept also paves the way for vast possibilities for reuse, where data modules describing certain functions of, for example, an engine can be reused for the documentation of other engines sharing the same functions. Data modules are maintained under configuration and revision control in a CSDB (Common Source Data Base), and technical publications can be generated from the CSDB in a variety of output formats, such as print, PDF, and HTML for desktop, tablet, and mobile devices. Furthermore – and this is a compelling advantage of Shipdex – data can be imported into ships' and ship owners' CMMSs, such as Amos or Sertica, thus enabling maintenance management systems to be a single point of information for an entire ship's technical systems and installations.

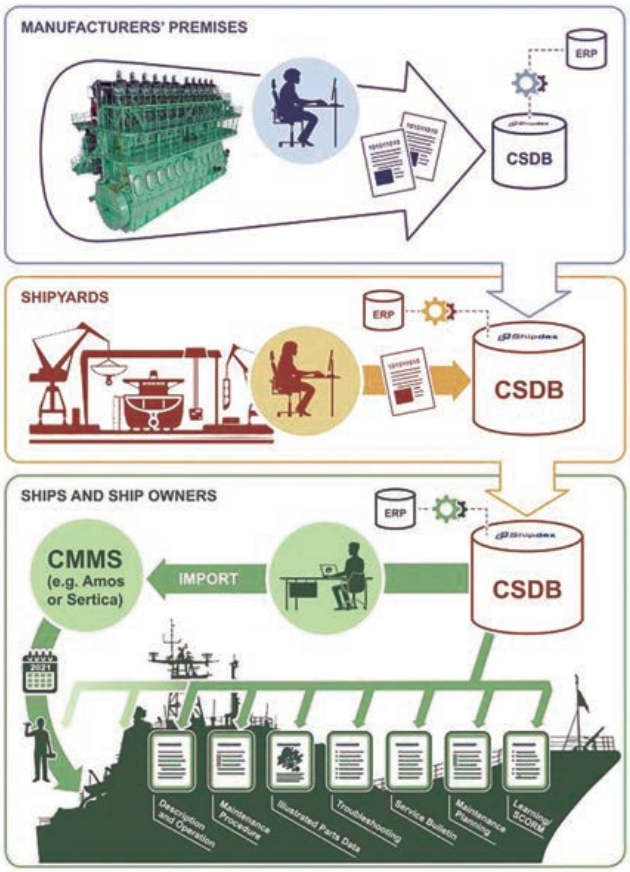
Mats Broberg, S1000D information manager at SSPA Sweden

Shipdex will add considerable value to several different areas of the new maritime ecosystem, and is likely to be a crucial prerequisite for the successful digitalisation of the shipping industry as a whole.

To summarise, some of the advantages of Shipdex include the following:

- Based on S1000D, which is a well-tested concept and technology with more than 30 years of extensive usage
- An open, non-proprietary standard for collaboration and longterm preservation of digital information
- A modular information approach with a strong focus on single-sourcing and reuse
- A hierarchical breakdown of technical information into data modules and information types
- A process of structured authoring that enforces an analytical approach to information
- Complete information lifecycle support – production, maintenance, quality assurance, data transfer, and presentation
- Seamless integration of manufacturers' technical documentation into ships' and shipowners' CMMSs

For more information, visit www.shipdex.org DS



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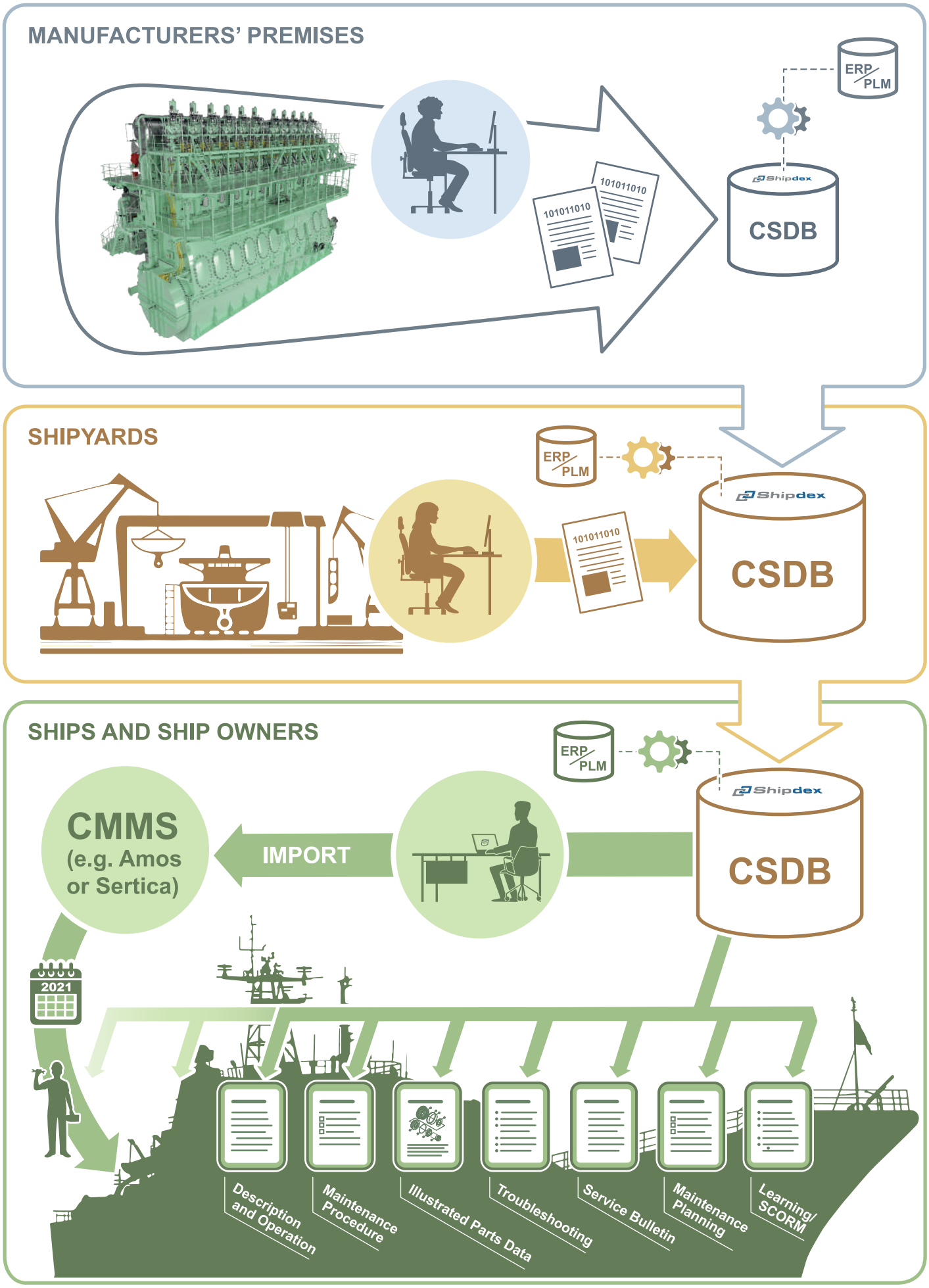

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