



The Indian Journal for Research in Law and Management

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Editor-in-Chief – Dr. Muktai Deb Chavan; Publisher – Alden Vas; ISSN: 2583-9896

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SHIPPING CONTRACTS AND DIGITALIZATION: NAVIGATING THE MODERN GLOBAL SUPPLY CHAIN

~ Rudrakshi Gupta

INTRODUCTION

Before, if we had to ship goods from one country to another, it would involve a lot of paperwork like contracts, insurance documents, invoices, bills of lading and custom documents.

However, today most of this can be done digitally without any need of physical paper. International Maritime Organization (IMO) tells us how previously the shipping involved exchanging of information between various authorities and stakeholders, involving a totally paper based system. But with the introduction of Electronic Data Interchange (EDI), the approach has changed from a paper-based to digital information exchange. Since January 1, 2024 use of Single Window for data exchange has become mandatory to exchange and reuse same information, during the call at ports. It was done to streamline the ship-related process and improve efficiency.¹ UNCITRAL Model Law on Electronic Commerce identifies 3 principles: Non-discrimination, technological neutrality and functional equivalence. It specifically refers to traditional requirements of writing, original, signature and record and the question arose whether electronic documents can perform the same function as paper ones.²

PAPER TO DIGITAL SHIPPING

¹International Mar. Org. (IMO), *Facilitation (FAL) - Enhancing the Free Flow of Trade by Ship*, (last visited on 26th Sept, 2026),

<https://www.imo.org/en/mediacentre/hottopics/pages/free-flow-of-trade-by-ship.aspx>

²U.N. Commission on International Trade L. (UNCITRAL), *UNCITRAL Model Law on Electronic Commerce (1996) with Additional Article 5 bis as Adopted in 1998*, (last visited on 26th Sept, 2026),

https://uncitral.un.org/en/texts/ecommerce/modellaw/electronic_commerce

Traditionally, bills of lading were done in physical form using paper which required physical signatures. Information was manually prepared and exchanged and documents were physically transferred between parties.³ Later on, with the introduction of EDI, this changed from physical paper form to electronic form. Now, records are prepared and information is exchanged electronically, with digital signatures.⁴ This has resulted in reduced administrative burden and paperwork, faster and timely information exchange, and easy sharing of information.⁵ However, digitalization does not mean the authenticity can be compromised. Transfer of documents involves transfer of rights, and thus it is necessary to ensure that every document which has been electronically shared is authentic and verified.⁶

ELECTRONIC BILLS OF LADING

A bill of lading serves as evidence which can be used for contract of carriage of goods by sea. In appropriate circumstances, it represents/controls the rights associated with the goods and acts as a receipt acknowledging that goods have been transferred.⁷ A paper bill was a physical document showing actual possession, whereas, electronic bill establishes control, access or view the document digitally, having no physical form means the person cannot always control it. Therefore, it becomes important that digitalization has some mechanism to perform the function of possession.⁸ To address this problem, the UNCITRAL's MLETR was introduced. MLETR, 2017, provides the legal framework for electronically transferable records and bills of lading fall under MLETR's transferable documents. MLETR uses

³ Niels-Philip Abdellatif, *An Ethereum Bill of Lading Under the UNCITRAL MLETR*, 27 Maastricht J. Eur. & Compar. L. 250, 252 (2020), (last visited on 26th Sept, 2026), <https://journals.sagepub.com/doi/10.1177/1023263X20904316>

⁴ U.N. Commission on International Trade L., *UNCITRAL Model Law on Electronic Signatures* (2001), (last visited on 26th Sept, 2026), https://uncitral.un.org/en/texts/ecommerce/modellaw/electronic_signatures

⁵ International Mar. Org. (IMO), *Facilitation (FAL) - Enhancing the Free Flow of Trade by Ship*, (last visited on 26th Sept, 2026), <https://www.imo.org/en/mediacentre/hottopics/pages/free-flow-of-trade-by-ship.aspx>

⁶ U.N. Commission on International Trade L., *UNCITRAL Model Law on Electronic Transferable Records* (2017), (last visited on 27th Sept, 2026), https://uncitral.un.org/en/texts/ecommerce/modellaw/electronic_transferable_records

⁷ Niels-Philip Abdellatif, *An Ethereum Bill of Lading Under the UNCITRAL MLETR*, 27 Maastricht J. Eur. & Compar. L. 250, 251–52 (2020), (last visited on 27th Sept, 2026), <https://journals.sagepub.com/doi/10.1177/1023263X20904316>

⁸ Id. at 252-53.

principle of functional equivalence instead of requiring electronic documents to reproduce paper documents.⁹

The main question is whether electronic bills of lading can perform the same legal function as paper bills of lading. The functional equivalence answers that, while paper bills of lading give possession, the MLETR uses control which is the functional equivalence of possession. Thus, they do not need to be similar but are actually performing the same function. A reliable method is established to know the person exercising the control of the electronic transferable record. This establishes that while paper bills of lading identify the holder, MLETR's control technique identifies the person entitled to exercise the control over the e-transferable records. However, control is not enough, the e-record must be able to maintain the integrity and remain unaltered and complete. This is necessary because e-information is at a risk of duplication therefore legal system must ensure that the record being controlled is reliable. Bills of lading also refer to the right of transfer; where in a paper bill of lading, physical possession was transferred, in electronic records, transfer of control allows the records to be transferred without physical paper.¹⁰

SMART CONTRACTS & CYBER SECURITY

Not only electronic documents come under digitalization but automated systems that perform contractual actions without human intervention also form part of digitalisation. Smart contracts are executed when predetermined conditions are met. UNCITRAL recognizes the legal issues from automated contracting including attribution of automated outcomes and unexpected outputs in its Model Law on Automated Contracting, 2024.¹¹

Shipping's dependence on connected digital platforms and increased connectivity creates cyber vulnerabilities. IMO identifies information risks such as unauthorised access, alteration

⁹U.N. Commission on International Trade L. (UNCITRAL), *Model Law on Electronic Transferable Records*, arts. 1, 10-11 (2017), (last visited on 27th Sept, 2026),

https://uncitral.un.org/sites/default/files/media-documents/uncitral/en/mletr_ebook_e.pdf

¹⁰ Id. arts. 10-12.

¹¹U.N. Commission on International Trade L. (UNCITRAL), *UNCITRAL Model Law on Automated Contracting* (2024), (last visited on 27th Sept, 2026)

<https://uncitral.un.org/en/mlac?utm>

of information, and compromised systems which affects the confidentiality and integrity and may cause operational, safety or security failures.¹²

CROSS-BORDER ISSUES & INDIA

Traditional transferable documents are increasingly being used electronically, and electronic transferable records are important for trade and transport documents. Different countries may have different legal frameworks for dealing with these e-records. MLETR provides a harmonized legal framework for uniformity, to facilitate the use of e-transferable records both domestically and across borders. It does not determine which country's law applies.¹³

Sections 4 and 5 of Information Technology Act, 2000 deals with legal recognition of electronic records and electronic signatures respectively.¹⁴

Sections 61-63 of Bharatiya Sakshya Adhiniyam, 2023, deal with legal recognition of electronic/digital records and that they cannot be rejected merely because of their electronic/digital nature. It provides framework for their admissibility/evidentiary treatment.¹⁵

India has implemented a Maritime Single Window which enables information to be exchanged/ submitted electronically. It facilitates exchange of information between relevant authorities and ships.¹⁶

CONCLUSION

¹²International Mar. Org. (IMO), *Guidelines on Maritime Cyber Risk Management*, MSC-FAL.1/Circ.3/Rev.3 (2025), (last visited on 27th Sept, 2026),

<https://wwwcdn.imo.org/localresources/en/OurWork/Facilitation/FAL%20related%20nonmandatory%20documents/MSC-FAL.1-Circ.3-Rev.3.pdf>

¹³U.N. Commission on International Trade L., *UNCITRAL Model Law on Electronic Transferable Records* (2017), (last visited on 27th Sept, 2026),

https://uncitral.un.org/en/texts/ecommerce/modellaw/electronic_transferable_records

¹⁴Information Technology Act, No. 21 of 2000, sections 4-5, India Code (2000), (last visited on 27th Sept, 2026) https://www.indiacode.nic.in/bitstream/123456789/13116/1/it_act_2000_updated.pdf

¹⁵Bharatiya Sakshya Adhiniyam, No. 47 of 2023, sections 61-63, India Code (2023), (last visited on 27th Sept, 2026)

<https://indiacode.gov.in/pdf-viewer/9e461245-2c13-4171-9d9d-267425c01e1d/fa0f7526-d871-41f2-a644-2a42952211f5>

¹⁶Ministry of Ports, Shipping & Waterways, Government of India, *Annual Report 2024-25* (2025), (last visited on 27th Sept, 2026)

<https://shipmin.gov.in/sites/default/files/Annual%20Report%202024-25%20-%20English.pdf>

Now, shipping has changed from paper-based system to digital system, changing the traditional possession into control. With digitalization, new challenges have come and to overcome them, reliable systems and a uniform legal framework have been adopted across borders. India has also recognized the need for electronic records/signatures and Maritime Single Window. Thus, it's important to keep pace with new fast moving technology and adapt to it.