# 基於運送人及持有人簽章之可轉讓電子載貨證券
# Negotiable Electronic Bills of Lading Based on Both Electronic Signatures of the Carrier and the Holder

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## 摘 要

載貨證券之簽發，要滿足下列三項功能：(1)貨物收據；(2)海上貨物運送契約之證明；(3)物權證書。載貨證券對銀行而言可以是種擔保，也給其持有人賣出海上運送中貨物的權利。紙本載貨證券近年來備受批評，主要有三方面：寄送費時、易遭偽造、高處理成本。電子載貨證券的概念普遍受到海運相關業界的歡迎。然而，單單提供電子文件，並無法達到電子載貨證券的第三種功能(作為物權證書)。本文中，我們提出一可轉讓電子載貨證券的簡單機制。此一機制基於運送人及持有人的電子簽章。電子載貨證券的每筆轉讓交易必須由原持有人電子簽章，之後並由運送人電子簽章。運送人必須維護一登記系統以追蹤其發行的載貨證券。此一機制可適用目前之電子商務法律機制。另外，我們也探討了貨物交付程序及責任等問題。

**關鍵詞**：電子載貨證券、物權證書、登記系統、偽造、電子文件。

## Abstract

A bill of lading serves the following functions: (1) a receipt for goods; (2) an evidence of a contract of carriage; and (3) a document of title to the goods. It can represent as security to banks and entitles its holder to sell the goods while in transit. Bills of lading in paper form have been criticized these years for the following reasons: It is time-consuming, costly, and open to fraud. The concept of electronic bills of lading has been welcome by many parties involved in the carriage of goods by sea. The third function of bills of lading, as a document of title, is not easily fulfilled in providing mere electronic documents. In this paper, we devise a simple scheme for negotiable electronic bills of lading. The scheme is based on both electronic signatures of the carrier and the holder of the bill. A transaction of electronic bills of lading must be fulfilled by the electronic signature of the original holder and then electronically singed by the carrier. The carrier also maintains a registry system to track electronic bills of lading issued. This scheme can work with current legal framework of electronic commerce. The delivery process and the liability issue are also addressed.

**Key Words:** electronic bills of lading, document of title, registry system, fraud, electronic documents.

## 1. Introduction

Bills of lading [7] are important in international trade. A bill of lading serves the following functions [5]: (1) a receipt for goods; (2) an evidence of a contract of carriage; and (3) a document of title to the goods. It can represent as security to banks and entitles its holder to sell the goods while in transit.

Bills of lading in paper form have been criticized these years for the following reasons [24]: It is time-consuming, costly, and open to fraud. The concept of electronic bills of lading [1, 4, 6, 12, 14, 15, 23] has been welcome by many parties involved in the carriage of goods by sea. In 1990 Comité Maritime International (CMI) first proposes rules for electronic bills of lading [2, 3, 11, 13], of which the underlying technology is mainly based on Electronic Data Interchange (EDI) and Value-Added Network (VAN).

In these years Internet has become the largest public computer network on the planet. Many companies are actively doing business on Internet. Electronic commerce has become part of our daily life. Legislation of electronic commerce is also in fast pace globally. The United Nations Commission on International Trade Law (UNCITRAL) is actively leading the harmonization of laws on EDI [19] and electronic commerce, such as UNCITRAL Model Law on Electronic Commerce [20] and UNCITRAL Model Law on Electronic Signatures [22]. These model laws provide a framework that gives legal power to electronic documents. Taiwan is also drafting the law of

electronic signatures [8].

The third function of bills of lading, as a document of title, is not easily fulfilled in providing mere electronic documents. For example, shippers can sell goods in transit to several buyers by sending one electronic document to each buyer. UNCITRAL is also working on negotiable documents and there are generally two approaches to solve this problem [21, p.11]: (1) a registry system where transactions would be recorded and managed through a central authority; and (2) a cryptography system that ensures the singularity and the authenticity of relevant data messages. The latter approach is still unavailable in the state of the art. The former approach can also be classified into two categories [12, p.233]: (1) the document depository system and (2) the notification to carrier system. An example of the first category is the Bill of Lading for Europe (Bolero) system [21, paras. 75-86]; the CMI rule is an example of the second category.

In this paper, we devise a simple scheme for negotiable electronic bills of lading. The scheme is based on both electronic signatures of the carrier and the holder of the bill. A transaction of electronic bills of lading must be fulfilled by the electronic signature of the original holder and then electronically singed by the carrier. The carrier also maintains a registry system to track electronic bills of lading issued. This scheme can work with current legal framework of electronic commerce. The delivery process and the liability issue are also addressed.

## 2. Related Work

The underlying technology of the CMI rules for electronic bills of lading [11] is mainly the use of EDI messages. The carrier transmits a receipt message to the shipper's electronic address. This message contains a Private Key to be used in subsequent transmissions. The Private Key allows the holder to transfer the ownership in the goods. The workflow of a transfer in brief is as follows: (1) The holder sends a message to the carrier for a transfer to new holder; (2) the carrier cancels the current Private Key and issues a new Private Key to the new holder. The CMI rule makes no provision for authentication of electronic bills, and for authentication purpose, should adopt a public key system [12, p.237].

The Bolero system [21, paras. 75-86] became operational in 1999. It uses digital signatures in all messages transmitted [10]. It also adopts part of the CMI rules for electronic bills of lading, such as transfer of ownership, switch to paper for contracts of sale, etc. One of the key components of the Bolero system is a registry for Bolero Bills of Lading. The Bolero Rulebook [9] sets forth the legal relationships among all parties involved. The liability of Bolero International Ltd. is subject to the following limitations and conditions [21, para.84]: (1) message errors: up to the limit of US$ 100,000 per user per occurrence; (2) loss and damage due to unreliable services: up to the limit of US$1,000,000 per user.

A recent case on misdelivery against forged bill of lading [16, 17] clearly urges that the carrier should be responsible for the loss due to forged bills of lading. The shipowner treated the bill of lading as an original, but it was in fact a forgery. This case extends the liabilities of a shipowner for delivering without production of an original bill of lading [18].

Instead of restricting to negotiable bills of lading, UNCITRAL is working on more general scope: negotiable documents [21]. This is well known to be a difficult task. It may take years when the issues such as third-party central registry are drafted in the model law.

## 3. The Scheme

In this section, we devise a simple scheme for negotiable electronic bills of lading. There are two decisions to be made in the design of the scheme:

(1) Who should act as the registry system: a third-party central registry or the carrier?
(2) Which technology should be used: Private Key or electronic signatures?

Our decision to the first issue is that the carrier should act as the registry system. This is the simplest solution and is also adopted in the CMI rules, where the carrier should be responsible for sending messages and confirmation. In contrast, adopting a third-party registry system may need further legislation or regulation, which addresses the allocation of the liability for systems breakdown or failures as in the Bolero system. Considering also the recent case in misdelivery against forged bills of lading [16, 17], a carrier should be more carefully in maintaining a registry system. The safer and simpler approach may be running this system under its control.

Our decision to the second issue is that electronic signatures are the best to be used in a public network such as Internet. The Private Keys adopted in CMI can only work well in a closed network where every parties agree on the CMI rules. On the other hand, recent advances on legal framework of electronic commerce have made the adoption of electronic signatures more promising in the near future.

Based on these two decisions, we devise a simple scheme for negotiable electronic bills of lading. Our scheme partly follows the workflow

of a transfer of electronic bills of lading in the CMI rules. Instead of using Private Keys and data messages in the workflow, we adopt electronic signatures and documents. The workflow of a transfer in brief is as follows:

1. The holder sends a document signed with his/her electronic signature to the carrier for a transfer to new holder; and
2. The carrier forwards this document and signed with his/her electronic signature to the new holder.

As in the CMI rules, this workflow can be extended with additional confirmation or notification messages being sent to guarantee that all parties involved in a transaction are well informed about what is going on.

The new holder obtains an electronic document signed both by the original holder and the carrier. The new holder can trust this electronic document by verifying both signatures on the electronic document received. All transfers of the bill are thus recorded in this electronic document, signed by the carrier, the shipper, and all subsequent holders except the new holder. The transmission of these documents and additional messages can be through any communication protocol or application, such as E-mail, World Wide Web, or File Transfer Protocol (FTP), etc.

In this scheme, the carrier can track every transfer of bills of lading. Since the carrier also signed the document for the transfer, it is also the carrier's responsibility to maintain a registry system to track these transfers. For carriers that issue electronic bills of lading, they already maintain a database for electronic bills of lading issued by them. It may be an easy job to extend this database with the tracking functionality needed for negotiable bills of lading issued. Due to advances in information technology, electronic bills of lading do not greatly increase the workload of carriers; instead, the introduction of electronic bills of lading will cut the processing cost of paper bills of lading.

Finally, to guarantee that transfers of these electronic bills of lading follow this scheme, the following clause should be added to the carrier's terms and conditions of bills of lading: "The transfer of this bill of lading must be co-signed by the carrier if the transfer is undertaken by electronic means."

## 4. Delivery Process and Exemption Clause

We partly follow the delivery process stated in the CMI Rule [11] Article 9. The use of Private Key is replaced with electronic bills of lading. The delivery process consists of two steps:

1. The carrier notifies the holder of the place and date of intended delivery of the goods. The holder then nominates a consignee and to give adequate delivery instructions to the carrier with verification by sending the electronic bill of lading.
2. The carrier delivers the goods to the consignee upon production of proper identification in accordance with the delivery instructions specified in Step 1.

We also adopt the exemption clause in the CMI Rule Article 9 (c): "The carrier shall be under no liability for misdelivery if it can prove that it exercised reasonable care to ascertain that the party who claimed to be the consignee was in fact that party."

This exemption clause does not cover delivery of goods against forged bills of lading and should remain effective. Note that Court of Appeal [17, p.212] held that delivery obtained by fraud should not be covered in any exemption clause: "… it was not a construction which should be adopted, involving as it did excuse from performing an obligation of such fundamental importance."

## 5. Legislation and Liability Issues

The carrier acts as the central registry in the proposed scheme. A transaction of electronic bills of lading must be fulfilled by the electronic signature of the original holder and then electronically singed by the carrier. Since the scheme is merely based on both electronic signatures of the carrier and the original holder of the bill, it can work with current legal framework of electronic commerce, which provides legal power to electronic documents signed with electronic signatures.

Laws regarding to bills of lading already charge the carrier's responsibility for maintaining the integrity of bills of lading and the delivery of goods against original bills of lading. A third-party central registry system may not help much to reduce the carrier's liability on these issues. A third-party central registry system, such as Bolero system, may also limit their liability on the loss of failed operations on electronic bills of lading. Carriers operate their own registry system can get more control on this issue. Our scheme does not add more responsibility to carriers — It is already their responsibility. Our scheme just extends this responsibility to electronic medium.

Note that the original holder of a bill also has the responsibility to ensure that the bill he/she holds does not transfer to more than one party. The new holder retains the right to sue the original holder of the bill if this rule is violated. This is an additional protection when things go

wrong in the carrier part, which fails to maintain the singularity property of the bill in the registry system.

Although using electronic bills of lading does reduce risks in using paper bills of lading, it does not guarantee that misdelivery of goods will never happen. There are two occasions where things can go wrong: (1) fraudulent computer records and (2) forged identification. The carrier may be liable on the misdelivery of goods in the former occasion; however, it is not liable in the latter occasion. The exemption clause in Section 4 does cover the latter occasion.

The case report [16, p.837] states: "… it was the shipowner who controlled the form, signature and issue of his bill; if one of two innocent people must suffer for the fraud of a third, it is better that the loss falls on the shipowner, …" Following this reasoning, the carrier should not be charged the liability in misdelivery due to forged identification. The carrier cannot control the form of personal identification, and it is the holder who should give adequate delivery instructions to the carrier.

## 6. Conclusions

We have devised a simple scheme for negotiable electronic bills of lading. A transaction of electronic bills of lading must be fulfilled by the electronic signature of the original holder of the bill and then electronically singed by the carrier. A carrier also maintains a registry system to track electronic bills of lading issued. This scheme can work with current legal framework of electronic commerce. Carriers operate their own registry system can get more control on the liability issue.

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