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# The weighing container of domestic Chinese trade

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# THE WEIGHING CONTAINER OF DOMESTIC CHINESE TRADE

By

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## *DECLARATION*

I certify that all the material in this research paper that is not my own work has been identified, and that no material is included for which a degree has previously been conferred on me.

The contents of this research paper reflect my own personal views, and are not necessarily endorsed by the University.

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(Date): August 5 2016

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## ABSTRACT

**Title of Dissertation:** **The Weighing Container of Domestic Chinese Trade**

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Since the rise of marine container shipping industry, it has been approximate 60 years. Container weight verification requirement has been considered lasting over 7 years, which became legally effective on July 1, 2016. Obviously, this can solve the problem of container overweight, ensure the safety of international container transportation. This dissertation is a study of the weighing container requirement in Chinese domestic container transport to improve the safety in home trade container transportation.

Chinese domestic container transportation formally started in 1996 which has got magnificent achievements after nearly 20 years of growth and development. However, it is still in the primary development stage compared with the development of the international container transportation. A review of the development of Chinese domestic container transportation is carried on for analyzing the existing problems that retarded its healthy development.

This dissertation forces on the issue of container overweight existing in the Chinese domestic container transportation which includes analysis the hazards, identify the root causes and proposing solutions.



**KEY WORDS:** container overweight, container shipping, domestic Chinese trade.

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| | |
|---|---|
| BM | Bending Moment |
| CSC | International Convention for Safe Containers |
| CPHA | China Port & Harbors Association |
| DSC | Dangerous Goods, Solid Cargoes and Containers Subcommittee |
| EDI | Electronic Data Interchange |
| EDP | Electronic Data Processing |
| GM | Initial Stability Height |
| IAPH | International Association of Ports and Harbors |
| ICS | International Chamber of Shipping |
| IMO | International Maritime Organization |
| ISO | International Organization for Standardization |
| LCL | Less Than Container Load |
| MAIB | Marine Accident Investigation Branch |
| MSC | Maritime Safety Committee |
| QMS | Quality Management System |
| SF | Shear Force |
| SOLAS | Safety of Life at Sea Convention |
| SWL | Safe Working Load |
| UK | United Kingdom |
| VGM | Verified Gross Mass |

| | |
|---|---|
| WSC | World Shipping Council |

# CHAPTER 1

# INTRODUCTION

## 1.1 Container Overweight – A problem for container transportation!

The overloading of containers is a common problem in the supply chain of the container transportation, more seriously, which is very rampant in some geographic trade lines at times (World Shipping Council, 2010). It has been obviously indicated that container overweight has been identified as a contributing factor of the maritime incidents and accidents. For example, the container ship MSC Napoli[1] suffered the structural failure, flooded engine room and grounded in the coast of UK in January 2007 (MAIB, 2008). More other incidents involving mis-declared weight are given in the IMO document DSC17/ INF.5.

Currently, there are certain existing law in the Safety of Life at Sea Convention (SOLAS) Regulation VI/2 and VI/3, claim the shipper of containerized cargo to meet the requirements that providing the gross mass of the container to the ship's master or his representative prior to loading on the ship (SOLAS, 2009). However, the container weight provided by the shipper are often the inaccurate weight, which is the declared weight only, not the actual gross mass of the packed container. The existing requirements in SOLAS cannot effective enforcement. The safety issue of the overweight containers has been concern over years by the industry, insurance and government. The International Maritime Organization (IMO) has also considered mis-declared container weight over 7 years and been urged to established the legal

[1] The MAIB web site gives further information on courses: http://www.gov.UK/government/organisations/marine-accident-investagation-branch.

requirement that verified packed containers' actual weights prior to vessel loading. Thought the effort of the shipping industry and IMO, this requirements of the verification of the gross mass (VGM) of packed containers has been amended in chapter VI, part A, Regulation 2 of the SOLAS and became legally effective on July 1, 2016 (MSC.1/Circ.1548).

The requirements in SOLAS that packed containers' gross mass are verified prior to stowage aboard ship are applicable for the export containers. In other words, it only address the safety issue that container overweight existing in the international container transportation. Truthfully, the container overloaded also is a serious problem that threaten the safety of the shipping industry of the Chinese domestic container transport, effort should be made to defeat the malady existing today. This dissertation uses the opportunity that China as a SOLAS Contracting Government prepare for implementing and enforcing the SOLAS requirements regarding the verification of the gross mass of export packed containers, to focus on the problem of container overweight existing in the Chinese domestic container transport and carries out an in-depth research how to solve this outstanding problem.

## 1.2 Objectives of research

The primary purpose of this research is to show the development of the Chinese domestic container transport and find out the problems that hamper the developing of the home container transport, force on analyzing the harmful of the incorrect container weight and addressing the root causes of container overloading. The subsequent objective will investigate the causes and identify the reasons that why it is difficult to control the issue of the overloaded container, study out the procedures which accords with Chinese national condition.

## 1.3 Methodology

Tons of the preparation work had been done before the dissertation. First, I widely reviewed the relevant literature which including articles and essays from journals, books and the proper IMO documents and circulars, international conventions, and the relational database and information from websites. I also called on the shipping entities, port and shipping freight forwarding company and had an interview with the relevant person who giving lots of useful advice and information during the field study trips. Moreover, I analyzed the statistical figures and obtained the necessary datasets for a qualitative research and reviewed the publications relating to land container transport for abstracting the common means and ideas for tackling the problem of the container overweight.

## 1.4 Structure of dissertation

This dissertation is composed of five chapters. Chapter two reviews the development of Chinese domestic container trade, analyzes the goods structure in different region of China, and highlights the existing problems that hamper the sustained development of the home container trade. Chapter three provides the marine incidents caused by the container overweight, illustrates the harmful influence for the container shipping and discloses the reasons of container overweight existing in the container supply chain. Chapter four mainly concentrates on tackling the problem of mis-decleared container weight - Weighing Container for the Chinese domestic container transport. Finally, the last chapter addresses the overall summaries and conclusions.

# CHAPTER 2

## Development of Chinese domestic container transport

### 2.1 Introductory remarks

In the past 20 years, the Chinese domestic container transport kept in high-speed growth due to supported by the Chinese domestic economy continuing growth. Especially, in the recent years, the Chinese government has established a set of economic strategy for accelerating the development of domestic economy that including the revitalization of Chinese northeast old industrial base, assisting the development of the Chinese western region, promoting the development of the rise of the Chinese central region. In addition, a series of policies and measures was set for coping with the financial crisis which were the implementation of the adjustment of industrial structure, expanding domestic demand and stimulating consumption（Li Yiping, 2009）. In a word, the Chinese domestic container transport is faced with good opportunities for development, which is playing a key role for guaranteeing and promoting the Chinese economy steady and rapid development (Yang Yang, 2012). Therefore, it is required that the domestic container transportation has the high level of development, the sustainable development ability and the development of strong competitiveness.

By far, the shipping is the most energy-efficient means of transporting goods compared to other modes of transport. In addition, the container transportation has many advantages, such as, large capacity, low freight, small cargo damage, etc., which attracts the masses of the cargo owner that adoption of container transport (Elisabeth Gouvernal, Brian Slack, Pierre Franc, 2010). However, following the rapid

development of Chinese domestic container transportation, the problems that retarded the development of domestic container transport grows increasingly. The content of this chapter firstly reviews the development history of Chines domestic container transportation and analyzes the structure of cargo in difference region of China, which for better understanding the problems existing in the domestic container trade. After that, summarizes the problems existing in the development of its history.

## 2.2 The stages of the Chinese domestic container trade development

Chinese domestic container transport has 60 years history since 1956 when it appeared. It is earlier 16 years than the international container shipping in China stated in 1972. However, the domestic container trade in China has not established the unified standard in many aspects which have formed in the international container shipping. Those problems may be addressed from the history of the Chinese domestic container development.

### 2.2.1 The first stage: a trial of using the container (1956-1973)

In May 1, 1956, the containers first appeared in China which were 2.5 ton boxes and combined transport of waterway and railway. The Ministry of Railways and the Ministry of transportation of China draw up "The instruction of the water and land transport", the plan of combined transportation miscarried after it had been on trial for only two months due to the imbalance of supply, the high empty rate and the equipment could not meet the requirements (Cheng Zhilin, 2007).

In 1972, the development of international container transportation caused the attention of the relevant departments, traffic department of the original Waterway Bureau borrowed 297 railway boxes which were 3 tons and put into use for the three routes of

Shanghai-Dalian, Nanjing-Nantong-Dalian, and Shanghai-Nantong. In this trial operation, the container was used as group transport for port to port transportation which can free used by the cargo owner. The goods were unpacking and packing in the port and the freight of the goods shipping was calculated according to weight and grade of the cargo (Liao Yuan, 2010).

This attempt failed also because of the difficulties in coordination of different modes of transport, there were many reasons, such as, lack of funds, underdeveloped productivity, high cost, small market space, no adequate and stable the supply of suitable containers, and low level of China's national economic development, etc.

### 2.2.2 The second stage: the initial development of container transport (1973 - 1990)

In 1973, the Water Transport Bureau and the Water Transportation Research Institute of the Ministry of Transport first developed the 5 tons of water and land transport all steel container in China. The first batch of 56 containers were used in route of Shashi-Wuhan which was the first route opened on the Yangtze River in April 1976, as following, the containers came into service in the route of Shanghai-Wuhan, Yichang-Wuhan, Huangshi-Wuhan and Yichang-Shashi. In 1977, the Guangzhou Maritime Bureau developed 2 tons of container and put into the Southern China coastal cargo ship transport.

In 1979, the Ministry of Transportation investment in the construction of the national standard 5 tons of steel container and put 1000 ones into the northern coastal passenger liner. At the same time, the Yangtze River Waterway Bureau had transformed the two 800 ton barges to special container barges and serviced for the Yangtze River container

transport.

In 1980s, the container transport has different levels of development both in the coastal and the Yangtze River. Coastal container transport is mainly the passenger-container line which carried out loading and unloading in general wharf and the type of container primarily was 5 tons container and 2 tons container. The Yangtze River container transport was operated by the special container barge, however which was forced to discontinue due to the reason of the source and the capital, price and management system. In 1986-1989, there were a total of 17 domestic container routes, container water transport volume and port throughput had increased 5% per year on average (Yang Yang, 2012). During this period, the Ministry of Transportation developed the standard of domestic coastal and water container shipping and port loading and unloading charges according to the requirements of the development of transport which regulated the behavior of all the transport links to the charges and partly promoted the development of domestic waterway container transportation. But due to the consignor bear ability was limited, demand not flourishing and the main resources focus on the international container transport, this stage of the domestic coastal and water container transportation was stagnant which included the development speed, mode of transport and the scale.

### 2.2.3 The third stage: Wandering stage (1990 - 1996)

In view of the problems existing in the development of domestic waterway container transport, the Ministry of Transportation held the domestic waterway container transport work conference in November 1990 in Wenzhou, which suggested developing the container line with advantages and collecting funds in many ways. For example, it can collect manufacturing containers fund to withdraw from the higher

tariffs and collect the payment from the consignor for using the containers. Moreover, it can supply the funds for manufacturing and repairing containers though expanding the charter business and implement a variety of services. These measures developing from this meeting play a certain role in promoting the domestic water container transport. However, the domestic water container transport was still lingering because of unable to grasp the market development direction.

Furthermore, the domestic water container transport encountered the stern challenge from the road and air transport, which led to the diversion of the source of water transport tourists, directly impacted the development of the passenger-container liner. Many shipping enterprises began to gradually withdrawal line or reduce the capacity of investment because they endured heavy financial losses and the whole benefits declined, which was a mortal blow to the waterway container transportation. The passenger-container line only remained three route, Dalian-Tianjin, Dalian-Yantai, Dalian-Shanghai. Container transport stopped developing, even came into the shrinking stage.

Domestic waterway container transport did not have obvious breakthrough in the speed of development, mode of transport and the scale in this stage.

### 2.2.4 The fourth stage: Rapid developing stage (1997 - 2008)

On December 16, 1996, the first container vessel “Feng shun” which loaded international standard container, set sail from Xiamen Port Tongyi terminal and arrived in Shanghai Longwu Harbor Company on December 21. It opened the prelude to the development of domestic container of the port that the standardization of domestic container scheduled route was in service.

In 1996, China's economy achieve a soft landing and the port container transport entered a stage of development. It offered good development condition that countries and regions of the industrial structure adjustment, trade way change and the enterprise reform, strengthen the role of logistics in production and circulation and the demand for domestic container transport service dramatically increased. Furthermore, international container transport market competition was very fierce which led to resources had not been fully utilized, this provided good opportunities and conditions for the development of domestic container transportation. In 1996, the 20 feet and 40 feet international standard containers were first loaded on the vessels serviced the Shanghai-Guangzhou container liner which opened up by the Guangzhou port freight company, it marks the development of domestic container transportation in the face of adversity to find a new way and represented the direction of the domestic container transport development (Liu Hunan, 2008).

By the end of 1996, it provided a rare opportunity for the development of domestic coastal and water container transportation that the adjustment of foreign trade policy, international container the development of overheating and excess capacity, transportation structure changes, etc. It can be augured that the time had ripe for development of domestic trade container shipping. The shipping enterprises have seized the opportunity and make a positive response according to the demand of the market. Such as, Haikou Nanhai Youth Industrial Company researched and designed the “T” type container transport network which based on the Shanghai and connecting the Yangtze River and coastal North and South of China (Liu Tianshun, 2003). Especially, in April 1997, a full container ship of China Shipping Group began to service the route of Guangzhou-Shekou-Xiamen-Shanghai which marked the domestic coastal container transportation into a new period of development.

Since 1997, domestic coastal container transport stepped into a rapid developing period, many shipping companies had entered into this market who only operated the international shipping route before. So the domestic container transportation increased greatly for four consecutive years and domestic container transportation market truly entered into the rapid development of the channel. The throughput of Chinese domestic container increased dramatic from 20 million TEU[2] s in 1997 to 930 million TEUs in 2004, as the Figure 2.1 showing, which grow 7 times in 7 years.

According to the statistics of the China Port & Harbors Association (CPHA), the annual average growth rate of the Chinese domestic container trade throughput was 48.1%, over twice as much as that the foreign trade container throughput with 23.9% from 1997 to 2004.

| Year | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 |
|---|---|---|---|---|---|---|---|---|
| Domestic container trade throughput | 20 | 66 | 180 | 300 | 425 | 637 | 821 | 930 |
| Percentage of domestic container throughput | 1.86 | 5.0 | 11.10 | 13.23 | 15.47 | 17.12 | 16.87 | 17.06 |

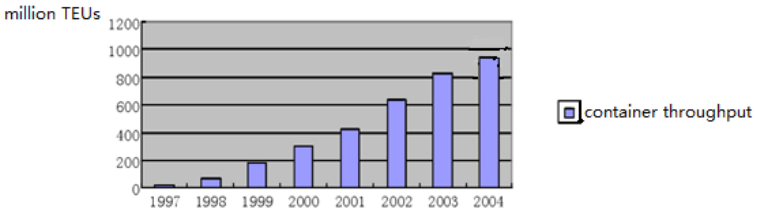


**Figure 2.1 Chinese domestic container trade throughput from 1997 - 2004**

**Source: China Port & Harbours Association, 2005**

### 2.2.5 The fifth stage: Integrate and upgrade (2008 - Nowadays)

The throughput of Chinese domestic container trade maintain the development at an

[2] The TEU (Twenty Equivalent Unit) is the measurement unit used in ports and the liner shipping sector to count containers measuring 6.1 x 2.4 x 2.6 m. A forty foot container is counted as 2 TEUs.

annual growth rate approximately 20% for nearly 10 years from 2003 to 2012, it was showed in Figure 2.2, compared with the foreign trade container throughput. It was retarded that the development speed of the Chinese domestic container transportation due to the effect of the global economic crisis in 2008. Chinese economy also is experiencing a shift from rapid growth to medium growth. Furthermore, the technology of "bulk cargo containerize" breakthrough encountered new bottlenecks, which mainly focus on coal and grain transportation. The new supply of goods for the Chinese domestic container trade of is relatively short, therefore, the development of domestic container trade will enter a steady growth (Liu Lirao, 2012).

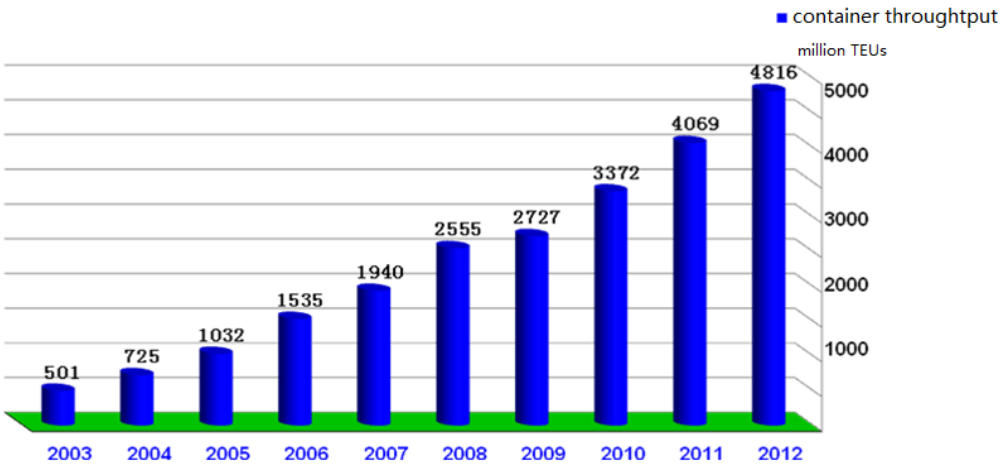


**Figure 2.2 Chinese domestic container throughput of the main ports from 2003 to 2012**
**Source : China Ports & Harbours Association, 2013**

The shipping market of the Chinese domestic container trade was deeply influenced by the long-term sustained downturn of the international shipping market. The 5000TEU, even 8000TEU container ships were throw in the home trade market from the international shipping market, which accelerating the excess capacity and lead to the imbalance of supply and demand (Liu Hunan, 2013). In order to lighten the pressure of operation, shipping companies adopted various forms of cooperation and alliance, such as establishing freight coordination mechanism, exchanging shipping space and shipping line cooperation business, etc. In case of insufficient supply source

and market downturn, Chinese domestic container shipping market continued to weaken in 2015, part of the shipping companies keep on carrying good as the shipping freight price lower than the cost. What's worse, some shipping company were declared bankrupt and a large number of containers and goods detained or sold, which serious harm to the ship company and the interests of the customers, also harm the healthy development of the industry as a whole (China Ports & Harbors Association, 2016). Currently, it may be an effective solution that the container shipping company seek assets integration active or passive, when a variety of coordination and cooperation mechanism between the companies negative. Following the size and scale of the traffic system, shipping lines should seek to extend their influence in the system, including the ports and inland transport links (Notteboom and Rodrigue, 2009)

### 2.3 The main region and cargo structure of Chinese domestic container transportation

Chinese domestic container transportation is mainly concentrated in the coastal areas of China. According to 2005 statistics, it was approximate 90% that cargo throughput of Chinese coastal port trade accounted for the total domestic cargo throughput. After nearly 10 years of development, Chinese coastal formed four main regions: First, the sector of Bohai Bay, which included Tianjin, Dalian, Yingkou, Qingdao, Yantai, etc. Second, Yangtze River Delta, Shanghai and Ningbo was the center of this region which extended into the Yangtze River. Third, the Pearl River Delta, Guangzhou, Shenzhen as the main body. Fourth, Fujian region, including the Quanzhou area, etc. (Liu Lirao, 2012).

As the domestic cargo flowing in the four sections, It formed mainly three trade lines that the North of China to the South, the North to the North East China and the South China to East China. In recent years, along with the development of the western region

of China and the gradual formation of the Yangtze River economic belt, the supply of inland areas is gradually increasing. The detailed analysis of the three main line of the trade of goods:

### 2.3.1 The North of China to the South

At present, the main cargo that carried by container in the North of China are the chemical products, minerals, building materials, glass, electrical products, paper, pulp, food category and wine, etc. By contrary, the cargo of China South are the high value-added products, such as, electronics, decoration, furniture and daily necessities, etc. So the goods between North and South of China has the characters that strong seasonal, supply imbalance and capacity ups and downs largely. For example, the building materials from the South of China normally less transport to the North of China because of the winter longer with the rain and snow, the domestic container transport are greatly influenced by seasonal.

Furthermore, the genetically modified food, especially genetically modified corn and soy is pouring in the Chinese market from the America, which has impacted the traditional mode of grain transportation from North to South , and has posed a challenge not only to the security of Chinese gain but also the future supply of goods for the Chinese domestic container trade. Plus, the cheap coal import from Vietnam, the Philippines and other neighboring countries also has influenced the Chinese traditional coal transportation mode from West to East and from North to South. The goods supply of the domestic container trade is being eroded (China Ports & Harbors Association, 2016).

### 2.3.2 The East of China to the North

The goods supply market of East China concentrated in Shanghai, including Zhejiang, Jiangsu and Fujian, which rich in goods and is further to the depth of the Yangtze River. The goods transported by container ship from the East China to South China and the North China mainly are the paper products, electrical products, display tube, chemical and electrical products and advanced building materials, and so on. It accounted for a considerable proportion of the goods that the light industry, chemical industry, and textile and garment industry in the Yangtze River Delta region. The goods from the East China not only meet the needs the import port and region, but also transported into the Northeast and North China's vast hinterland by the sea-rail transportation.

### 2.3.3 The South of China to the East and the North

The goods of the South are manifold and high value than that of the North of China, which included the interior wall tiles, floor tiles, high-grade scrap metal, chemical and other basic building materials and part of ceramic sanitary ware, furniture, sugar, rubber, daily general merchandise, household appliances, seafood, anti-season fruits and vegetables, timber, starch and other goods. Among them, goods of the Pearl River Delta region are mainly mechanical and electrical products, beverage and food etc. The ceramic tile mainly concentrated in the Foshan and Quanzhou of the Pearl River Delta region.

## 2.4 The problems existing in the Chinese domestic container trade

The history of the Chinese domestic container trade is earlier many years than that of the International container trade in China. However, the course of which history has changed more frequently than that of the International container trade. In the past decade, there was a great advancement in the Chinese domestic container trade, which

still exits many problems retarding the development. Those problems embodies some aspects that includes state policy and rules, market management, transport organization, infrastructure, transport list and technique equipment, etc.

### 2.4.1 Chinese domestic container overweight

Container overweight seem to be a common problem in the container shipping, which also is a malady in the domestic container trade. Although the container home trade has achieved a great achievement in recent years, the problem of container overweight is existing in the domestic container trade transport. It has seriously affect the normal production and operation and has been identified the contribute factor of marine accident. Ministry of Transportation also pay attention to the issue of container overweight and draw up the document "The Notice about Prohibited to Transport, Load and Unload Overweight Containers" in 2008. However, it was not implemented demanding due to many reasons, such as the enforcement not common standard, the imperfect supervision and punishment mechanism, etc. So the container overweight still exit and threat to port and shipping safety.

The container overweight or incorrect declaration of a container's weight comes about that the shipper attempt to cut down the shipping costs through reducing the weight in its shipping document. Certainly, the container overweight may also was triggered sometimes that the shippers estimate a container's weight simply or not added the tare weight of container or dunnage when calculations.

Chinese shipping Industry experts believe that approximately 20% of containers are overweight in the Chinese domestic container trade market at any given time. The Container Branch of the China Ports & Harbor Association carried out an investigation in the Shanghai Longwu Harbor Company in July, 2010 for the overweight container

in the domestic container trade. The company loaded and unloaded the domestic trade containers 53494 TEUs in June. The overweight containers were 5639 TEUs, which accounted for 10.5% of the total containers in June. According to the staff of the company to reflect that overweight containers accounted for approximately 20% of the total containers handled monthly on average (China Ports & Harbor Association, 2013).

### 2.4.2 Lack the standard domestic container trade operation

The Chinese domestic container trade doesn't establish the standard shipping document and operation process. It has retarded the development of the home container trade that the simple, changeable operation. The shipping documents management of the home container trade only base on its own development, which not only decrease the operating efficiency, but also increase operating costs. Domestic container trade is different from foreign container transport trade, which container import and export of foreign trade must go through the customs system, so the port system must meet the requirements of the customs system, the unity of the national customs system promote foreign trade shipping documents unified (Liu Lirao, 2012).

### 2.4.3 The rate of domestic container load and unload lower

The loading / unloading rate of the Chinese domestic container is lower than that international trade container, which retarded the development of the home container transport. The handling guidance charge for the foreign trade container is RMB 425.5 yuan/TEU and that of domestic trade container is 220 yuan / TEU under the normal same handling cost and service, which was promulgated by the Ministry of Transport of China and not changed more than ten years. However, the price of oil, electricity and labor costs have doubled than that of ten years ago. The loading and unloading rate of domestic container should to be improved to adapt to the cost of handling,

which is better for the domestic container trade sustainable and long-term development (China Ports & Harbors Association, 2013).

## 2.5 Concluding remarks

The above is an overview of the development of the Chinese domestic container transportation. In recent twenty years, the home container trade had got the great achievement. The growth rate was bigger than that of the international container transportation since 2009. However, the global economic crisis worse hit the development of the home container trade, many shipping company was suffering the dangerous of bankrupt, such as the Nan Qing container liner co., LTD closed down in August 26, 2015 which has occupied 40.7% of the total domestic container transport traffic volume and operated more than one hundred ships when during the peak period (Liu Hunan, 2016). Integrate and upgrade may be the new development tendency of the home container trade. The ship large-scale trend of domestic container trade is more and more obvious and the shipping company also make use of complementary advantages, resource sharing between them for facing the fierce competition of the domestic trade container market. Furthermore, the multimodal transport is another new develop direction of the domestic, the multimodal transport waterway, railway, highway is making full use of the door to door transportation advantage with the continuous development of high-speed rail network. Domestic waterway container transportation operator do not content to provide a single water transportation, but direction to the comprehensive logistics service.

In 2013, President Xi Jinping of China proposed the strategic idea of the "New Silk Road Economic Belt" and "21st century Marine Silk Road", emphasizes the relevant countries to build mutually beneficial and common development. The construction of “one Belt one Road” promote the coordination mechanism, establish a unified the

entire transport to facilitate customs clearance, cross-dressing, multimodal transport of the organic link, gradually form compatible with the standard rules of transportation, transport facilitation (China Ports & Harbors Association, 2016). This supply a good opportunity for the development of the domestic container trade. It is also a good opportunity to tackle the existing issues in the domestic container trade for promoting the upgrade. As mention above, the container overweight is a more troublesome problem than other issues for development of domestic container trade, which is also the concentrated point for the dissertation.

# CHAPTER 3

## Container overweight harm and root cause analysis in Chinese domestic container transportation

### 3.1 Introductory remarks

The most general container overweight is known as the actual container weight exceeds the declared weight by the shipper. Container overweight is a problem that exists continuously in shipping industry, which may bring tons of unexpected dangers. There is no reliable official statistics that reliably reveals how many containers are overweight in Chinese domestic container trade. However, the container overweight has been addressed as the contribute factor in several cases. Related survey showed that the overweight or incorrectly declared weights account for more than 10% of the total containers on board a ship, even the actual weight reaches 6.7 times of the declared weight (World Shipping Council, 2010). The chapter mainly forces on the issue of the container overweight, explains which harm for the Chinese domestic container shipping and analyzes the root causes.

### 3.2 The examples of incidents involving contributing caused factor of container overweight

The Chinese domestic container trade has enjoyed remarkable growth over the last 20 years. Certainly, there were also many cases during the past 20 years were triggered by different reasons. Some cases which had been addressed the container overweight as the contributed factor normally every year. Initially, it is more significant safety issue that container overweight effect on shore, such as port facility and road transport than on ship. In recent years, following the container ship becoming larger and larger in the Chinese domestic container trade market, the harm of the container overweight

become more obviously, even the 8000TEU container ship has been put into the container home trade market (Liu Hunan, 2015). Following, it is intended to give some illustrative examples of the significant safety issues that container overweight may give rise to on shore and on ships.

Case 1. On August 6, 1993, the serious accident occurred in Nantong port due to the container overweight when container loading. The Tong Zhou Harbor Company responsible for carrying out loading operation for the vessel "Su Lin", and the loading crane on ship was out of control because the actual weight was much bigger than the declared weight, which directly caused the deaths of two stevedores (Containerize, 1993).

Case 2. On November 2, 2003, a container truck rolled over when turning around in the Guangzhou port container terminal, which lead to the drivers seriously injured and the practice driver minor injured. The main cause of the accident was the overweight containers, the truck carried two 20 feet containers, and one 20 feet container was refilled steel 31 tons but the lashing was not firm, another container also very heavy with 43.5 tons. The actual weight of the two 20 feet containers were bigger than the declared weight by shipper (Wu Huairen, 2008).

Case 3. On July 20, 2012, a container truck was found overweight in S232 Hengshan bridge of Changzhou city. This is a five-axis heavy tractor trailers with license plate number Sue CJ6671 / Sue C9L08[3], which was carried out an on-site investigation by the law enforcement personnel. The total weight of the truck and container was up to 69.25 tons after the inspection, which overweight rate was 30%, belong to the serious

[3] The web site gives further information on courses: http://www.wjdj.gov.cn/document26701.aspx

overload. Luckily, it was found timely and not caused some accident. Law enforcement officials give the related knowledge education to the driver, and fined 4000 yuan according to related regulations (Wu Jin network, 2012).

Case 4. On March 7, 2016, a container gantry crane collapsed suddenly into the Yangtze river when it was loading container onto the container vessel "China shipping 16" [4] at the container wharf of the Huang Shi port. The pedestal of the gantry crane was still on the shore, however, the arm of the gantry crane had fallen into the container ship "China shipping 16", which broke the containers loaded on the ship and the deck of the ship also was damaged. It also lead to the diver' arm fracture who operated the gantry crane (China water transport net, 2016).

Case 5. On September 20, 2000, the container vessel "Sue Lin Li 18" suffered the serious casualty and almost capsized when loaded container in Shanghai container terminal due to the container overweight, tons of actual weight of container significant different the declared weight (Tan Yong, 2008).

### 3.3 The harm of the container overweight

The overloaded container has brought much trouble to the container transportation, which impacts the whole modern containerized supply chain, such as the road transport, the port facility and the ship.

#### 3.3.1 The harm of the container overweight in road transport

The most of the truck transporting the overweight container belong to the category of overloaded vehicles. It has great impact on the vehicle's safety performance when

[4] The web site gives further information on courses: http://www.ihuangshi.com/shishi/6642.html

carrying the overweight containers which can cause vehicles is difficult to control. Especially, the overweight container is easy to break away from the container truck due to the large centrifugal force in the process of vehicles turning around, which may cause traffic accidents and bring great threat to the highway traffic. Furthermore, the vehicle carrying overweight container will damage to roads and bridges (Tan Yong, 2008).

### 3.3.2 The harm of the container overweight in port facility

In the port, the overweight container maybe excess the safe working load (SWL) of the port crane, result in equipment damage, side capsize, container broken and other safety accidents. The gantry crane and other large-scale port machinery maybe withstand heavy goods, however, the capability of the wheel crane and other mobile machinery is very limited, and the overweight box will bring tons of potential safety problems and endangering the safety of the operation personnel (Wu Huairen, 2008).

Plus, the container overloading will bring the hidden trouble of the mechanical wear and tear. It will make the metal parts easy to fatigue, greatly reduce safety factor of the mechanical and the service life if the bridge crane, gantry crane, crane truck often carry out the overload operation. It poses a great hidden danger and harm to production safety.

Furthermore, the container in the yard is often the heavy containers on top of the light containers, which is better for the fast shipping load. If the heavy container is overweight too much, the container stacks will be easy to collapse due to the higher center of gravity, bring great safety hidden trouble to yard.

### 3.3.3 The harm of the container overweight in ship

The container overloading may cause damage to the ship structure, impact the ship's stability, strength, draft, loading capacity, etc., which may bring serious hidden trouble to the safety of navigation. In the voyage, the container overweight may lead to the incorrect vessel stowage decisions, the common role of overweight container and the winds and waves could cause hull fracture, cargo loss, even ship collapse.

#### 3.3.3.1 Container overweight may cause ship structure damage

The containers are loaded on the ship in cargo hold or on deck as row by row, one row including many ties, some even up to 9 ties. So, the total weight of one row must be less than the allowance stack load of the ship. If the actual container weight is far more than the declared weight, such excess weights may impose unsafe stresses on the tank tops and hatch covers. (Wang Nannan, Xi Bin, Liu Chenglai, 2015).

#### 3.3.3.2 Container overweight may impact the ship stability, shearing force (SF) and bonding moment (BM)

At present, the trends of the container ship development that towards a bigger ship size. More than 20000 TEU container ship has operated in the international container shipping market and the 8000TEU container ship has also been throw into the Chinese domestic container trade market. Following the container ship becoming bigger, the quantity of container loading on deck become more, even the amount of ship deck box reached 50% of the total container loaded on ship. If the stowage without real knowing of the weight of the container and much more overloaded containers are loaded on the deck, which will increase the height of the center of gravity of the ship, and then will decrease the stability. The incorrected declared weight provided by shipper will lead

to the computer cannot accurately calculate the ship's stability with improper stowage conditions, bending moment and shear force. These important safety navigation parameter error could endanger personnel, cargo and ship safety. On modern container vessels, if the excess weight on hatch covers is not accounted for, the deck cargo lashing configuration as determined by the on-board software may prove to be insufficient，it maybe cause cargo loss, Figure 3.1 illustrated the incorrect declared container weight causes cargo loss accounts for nearly 15%. The ship sails on the sea with low GM is very dangers, it maybe collapse if encounter the bad weather (Liu Shaoqing, 2014). Plus, if shear force and bending moment is too large, the hull plate will be distorted and cause internal injuries, and long-term sailing under the abnormal condition, will break the ship.

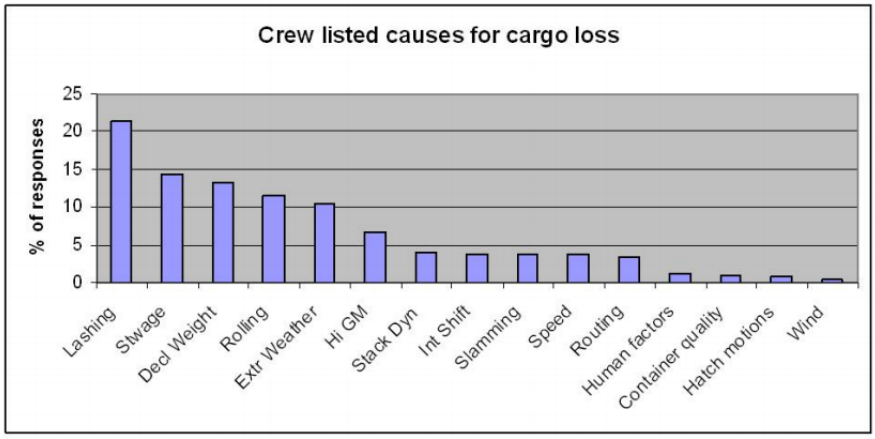


**Figure 3.1 Crew listed causes cargo loss**

**Source: Lasing@sea, Report NO. 19717-20-TM, September 2009**

## 3.4 The root cause of the container overweight in Chinese domestic container transportation

The reasons lead to the container overloading are very complicated, which exists in the whole of the container transportation supply chain. The container shipping market fierce competition which happened between the shipper, ship owner and port. Also, there is a source competition between water transport, roads and railways. The

container overweight has been an acquiescence "hidden rules" in the industry.

### 3.4.1 The shippers' deliberate overloading of containers

Most of cargo owner are driven by the profit and reduction the unit freight cost thought the container overloading. It is very common that the cargo owner or the forwarder report the declared weight less than the actual weight of the container intended. Seriously, the owner transfer the heavy good into one 20' container and make two copies of packing list for this packed container with another empty container. Then, the two containers are carried in the same container truck, so that the weight of the two containers are equal by the staff of the yard gate for weighing container simply. So the Yard container information system display the each weight of the container is half of the total weight. Finally, the overloaded container are easily carried into the yard and waiting for loading onto the ship, and the empty container will be put forward after the cargo owner apply for shutting out (Liu Hunan, 2008). Plus, the forwarders, shipping lines and port sometimes turn a deaf ear to the problem of container overweight due to pursuit of interests and get more goods in the fierce competition market.

About the cargo owner attitude to the container overweight, a senior forwarder was interviewed said:

"*The cargo owner is robust stand about the container overweight. You know, the freight are charging as per box, if the cargo owner put the overloaded container before us, which has shown their attitudes. First, they need our help to deliver the overweight goods to the ship though any operation in secret without increase any cost. Second, is to ensure the safety of the goods in transit*". When said at this point, he was reluctant. "*In accordance with requirements of the maritime conventions, the forwarder should fulfill their obligation that providing sufficient and appropriate goods' information*

*prior to loading and disclosed the goods weight to the ship. In fact, we are struggling, you know, overweight and risk is symbiotic, what we can do our best is revealing some related information to the ship and look for ways to solve this problem together. Recently, the shipping market downturn and goods is hard to find, so the carrier have to submit to the shipper and toleration towards the container overweight."*

### 3.4.2 The carrier less scrupulous about overweight container

The real intention of carrier is that don't permit the overweight container loading onto the ship. However, in order to "live" in the fierce competition market, the carrier relax to control the overloaded container for attracting more customers (Liu Shaoqing, 2014). Most of carrier allowed the overweight container loaded onto the ship after the shipper pay the additional fee for the overweight. So the fact that a shipper may find another carrier or port facility that may be less attentive or scrupulous about overloaded containers if the carrier intention to control the overweight container.

An experienced captain of service for the Chinese domestic container transportation bluntly said: "*Now the shipping situation is not good, we must find a way to hunt for goods, even overweight container cargo. And past experience tells us that overweight container always can find a carrier willing to receive, if the shipper has been refused by some shipper for that*". In the face of overweight goods, the master continue said: "*As a captain, I certainly won't permit the ship approach to the sea under overload condition, which for the safety of the seafarers, ship and cargo. I will monitor the draft of the ship as the scale of limiting overweight box aboard the ship, try our best to maximum meet customer requirements that the overweight containers have been sealed will not be open and LCL again before arriving the destination".*

### 3.4.3 The port facility loose the control of the overweight container

The port facility providing the domestic container trade service pay less attention to the overweight containers, some port even make use of the container overloading as a means in the market competition. The Chinese Ministry of Transport has established the Notice about Prohibited to Transport, Load and Unload Overweight Containers, which formulates that the shipper or forwarder responsible for the overweight container, the port facility don't assume any responsible for that. Therefore, most of the port facility permit the overweight container entering the yard and loaded onto the ship under the condition that receiving the "additional fee" for the overloaded container from the shipper (Liu Hunan, 2013).

Furthermore, some port facility lack of the appropriate scales and operation standard, it is practically impossible to weigh the containers. Some terminals equipped with facilities for weighing, but, are not strict with all domestic trade container weighing in order to accelerate the container flow into the yard and meet the requirements of the shipping line.

In addition, port facilities may be unwilling to establish mandatory container weighing regulation if they fear that such requirements may cause diversion of cargo to nearby competitive port facilities that do not have such requirements (World Shipping Council, 2010). So the overweight containers are easy to found in the yard. Mr. Wang in Qingdao terminal said: "*As a gantry crane driver, I almost encounter the overweight containers every day, the declared weight is 24 tons, but the actual weight maybe over 34 tons. You know, the overweight container is like a 'time bomb' for us, it is easy to cause the gantry crane imbalance and lose control if the gross mass of the container exceed the allowable lifting weigh of the crane*".

### 3.4.4 The lack of effective supervision and management mechanism

The Chinese Ministry of Transportation has established the relevant regulations for the domestic container trade which also include the overweight container management. However, it is lack of overlook in practice and the corresponding laws and regulations is not sound.

A master of the domestic container trade blame for the department of Commodity Inspection. He said: "*The department of Commodity Inspection is the legal authority that the comprehensive understanding of goods stuffed in containers, has the power that final rules the weight of the containers. Containers only through the inspection of commodity can be transported to the port and have the qualification for loading onto the ship. Thus, the Commodity Inspection will surely know the actual weight of the containers. However, it often happy that the declared weight of container is incorrect, some existing the large difference with the actual weight*". He added said: "*The department of Commodity Inspection cannot carry out the transparent and fair inspection for the container, so the incorrect declared container weights from shipper will continue to be used for vessel stowage planning operation*". The master indignant said: "*Why are there so many overweight box? I think there is a link of profits between them. It is a 'grey area' that no one like to manage it and no one dare to manage it. They don't care the safety of the seafarers*".

### 3.4.5 The structure of the goods foster the container overweight

As introduced in Chapter 2.3, the goods of Chinese domestic container transport has the characters that high specific weight and low value-added in some trade lines. Such as the goods from North to South of China, the goods in Yangtze River, are mainly the grain, building materials, ore, coal and other bulk commodities. Figure 3.2 shows the

value of goods. These high specific weight, low value goods have no special requirements for loading and unloading, but the bear ability for the freight is very low, which lead to the cargo owner reduce the freight cost though stuffing more goods to unit container.

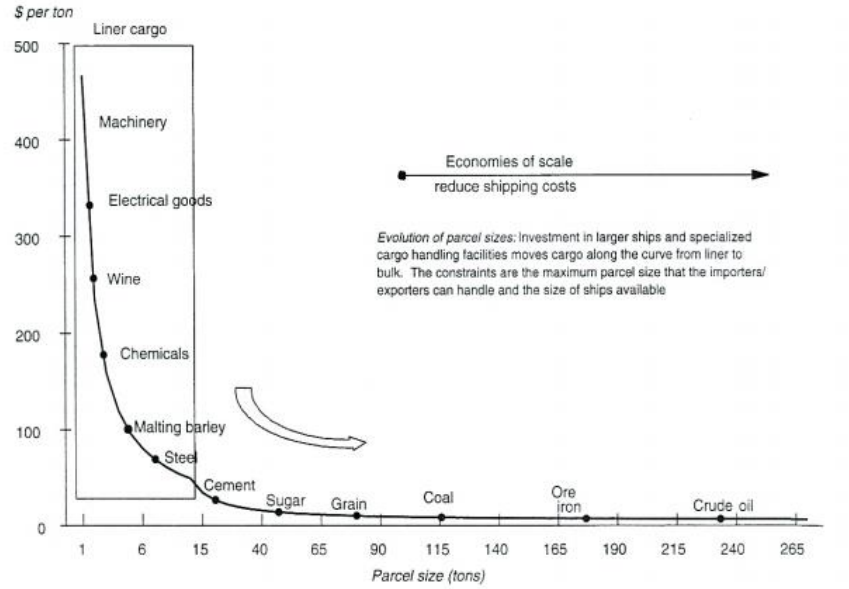


**Figure 3.2 Value of cargos**

**Source: Maritime Economic (1997)**

## 3.5 Concluding remarks

Contextually, the container overweight has been identified as a contributory factor to the safety incidents and accidents, which can and do present a risk to workers on shore and on board ship, to ships, to road safety problems and to the environment, etc. As previously mentioned, it is very common that the declared weight from the shipper is incorrect. There are many aspects lead to the container overweight, which includes the shipper, forward, carrier, port facility and ships. A part of ports and shipping company cannot hold back the problem of container overweight though self-help efforts or cooperation, because it is difficult to cover all the supply chain and to fundamentally

solve the problem.

Fundamentally, solving the problem of container overloading is knowing the actual weight of a container, which would enable the ship master and port facility operator to knowledgeably address the several container weight issues and requirements. Thus, the one of the best measurer is weighing the container and obtain the accurate gross mass prior to be loaded aboard the ship. However, the supply chain is a dynamic and complex system which include tons of different companies for working in succession to produce, transport and deliver goods. In order to ensure the smooth flow of cargo, an intact weighing system must be established. In the next chapter will introduce a proposal of the weighing container system.

# CHAPTER 4

## The proposal of tackling the Chinese domestic container mis-declaration weight - Weighing Container

### 4.1 Introductory remarks

Obviously, it is one of the best effective method to address the issue of container overweight in Chinese domestic container trade that weighing all packed containers before vessel loading. By doing that, the ship can make reasonable stowage plan according to the real container weight information, improving the safety of navigation. Plus, the practice that the shipper intentionally stuff more cargo in a container to save freight costs will be effectively curbed, it is good to the shipping company because controlling the overweight container can increase the total containers of shipment and paly a positive role to promote the healthy development of shipping industry.

This chapter will give the useful guidance for implement the weigh packed container, which consults some counties' guidelines on Container gross mass verification, such as United Kingdom, Denmark and are also united in the present situation of Chinese domestic container development.

### 4.2 Purpose the proposal of weighing container

The proposal is intended to give some effect means to ensure the safety of the workers both shore-side and onboard ships, to improve the safety of the ship, the safety of cargo and the overall safety of the Chinese domestic container shipping. Ultimately, to improve the administrative ability of the Chinese Ports Management Department and accelerate the sustained development of the Chinese domestic container transport.

Furthermore, in order to effectively control the container overweight, weighing the packed container should be a legal requirement, or become a part of the government regulatory requirements. The Chinese Ministry of Transportation should establish the guidelines for the weighing function and supply the best practices.

## 4.3 Main principles of the proposal

*The shipper* should supply and document the accurate gross mass of the packed containers to the master or his representative and the terminal representative prior to loading onto the ship, which must be sufficiently in advance to be used in preparing the ships stowage plan. *The carrier* is responsible for the supervision and the packed containers that have not the actual weight information should not be loaded on to the ship. *Container terminal* is responsible for fixing the weighing equipment in the gate and to provide certain services for weighing.

## 4.4 Methods for obtaining the actual weight of a packed container

It is not a technically difficult thing that requirement the actual weight of a packed container. There are two methods recommended used to require the weight of the containers, the main method called Weighing Method is weighing the container after sealed, and the subordinate method called Calculating Method is weighing all packages and cargo items and adding together.

### 4.4.1 The main method - Weighing Method

The Weighing Method should be adopted as the main method, because the method is more convenient, accurate and more economic in the view of shipping practice. It is recommended that the container are weighted after sealed and carried out by the port and terminal for the whole container weighting when the goods enter the port. The

reasons including: First, the shipper can change the content of the container at will before the container was sealed, so the operation of weighing container is meaningful only after the container was sealed and the gross weight unchanged. Plus, container weighing require weighing equipment such as scale, and other auxiliary equipment such as crane, etc., in general, it is very difficult and impractical for the enormous amount of different shippers of containerized cargo in the different place of China to install the weighting equipment's at their container stuffing locations. However, it is easy and efficient to weight the container by the weight scales located in the "in-gates" of the port facility, because all containers must pass through the port facility, named the "choke points", to be loaded onto the ships (DSC 17/7/..). Moreover, knowing the actual container weight is better to improve the safety of container handling for port facility and the vessel stow plan. So it is practical that the port facility offer the commercial service for the shipper and the shipper should bear the fee for weighing container and delegate this duty to the port facility.

#### 4.4.1.1 The requirement of the domestic container port facility related to weighting system

All Chinese domestic container port facility should build the weighting equipment in the "in-gates" and install the container weight and Domestic Trade Container Data Monitor System (CDMS) in accordance with the common standard. The weighting system should be installed sufficient according the scale of the port and be provided with the ability of storing and sending the container data to the system of monitoring the domestic container.

The port facility should pass the acceptance check carried out by the Local Ports Management Department and obtain the port operating license after installing the weighting system. The port facility cannot be permitted to undertake the domestic container operation unless meeting the requirements of the weighting system common

standard.

#### 4.4.1.2 The common standard of the weighting system for the domestic container port facility

1. The weighting system must comply with the China common standard for weighbridge, which should pass though the quality checking and meet the applicable accuracy standards carried out by the Local Weighting System Quality Control Authority and get the Qualification License.

The Chinese domestic container terminal normally adopt static truck scale as the metering facilities according to GB/T 15561-2008 and JJG 539-1997 "digital indicator scale" regulation, which weighting scope is 60 to 100 tons. A certain number of static truck scales should be installed in the “in-gates” of the terminal for carrying out the staying-time measurement. In order to decrease the time of weighing container, the more advanced measurement technology can be adopt which is the dynamic electronic truck scale. The scale which can measure the weight of the container truck without a stop and in the slow speed measurement, has been applied in the Singapore port container terminal. Plus, the scale’s measuring speed is fast and the accuracy also reach 3% to 5% and satisfy the measurement requirements.

2. The manager of the port facility should draw up the management institution for the domestic container weighting system which should include the following sections:

a) The instruction of operation and the procedure for maintenance, testing and calibration.

b) The structure chart for weighting system administrator including the staff, rank and connection ways, etc.

c) The emergency procedure for the malfunction

d) The program for storing the container data at least three years

e) The manage program for the container data sending system, make sure the system stable work within 7 X 24 hours and send the container data to Monitor Center though Internet.

3. The container data sending system should comply with the following terms:

a) Automatic send the container data correctly and timely to the Domestic Trade Container Data Monitor System (CDMS)

b) The Ports Management Department can print out the container gross mess data from the CDMS which were send after the weighting system have continuous worked 25 hours.

c) The container weight that picked up in random by the Ports Management Department from the CDMS should keep the same with that stored in the port weighting system.

d) The container data that send to the CDMS successful should be marked, and the lose ones should be resend in next period.

e) The container data should include the following items: container number, container weight, container Seal number

#### 4.4.1.3 Two attentive points for the weighting system

The container weighting system should establish a database for storing the vehicle's registered weight. When the container weighted together with the vehicle, the weighting system can deduct the vehicle's registered weight from the total weight automatically. It should be attentive that the fuel tank of the vehicle will cause the weight deviation, which should be deduct appropriately.

When two twenty-feet packed containers on the same vehicle are to be weighted, the gross mass of the container should be obtained by weighting each container separately. It should not be allowed that weighting the two container together and dividing average by the two container simply, which would not get the accurate weight for each container.

### 4.4.2 The subordinate method - Calculating Method

The shipper can get the gross mass of the container through weighting the contents of the packed container separately which includes cargo items, all packages, dunnage, pallets and lasing material, then plus the tare mass of the container. China Ministry of Transport should responsible for establishing the common criterion for implementing the calculating method. If the shipper want to adopt the Calculating method, must be approved by the China local authority designed by the Ministry of Transport.

#### 4.4.2.1 Approval process for shippers wishing to adopt Calculating Method

First, the shipper that wish to adopt the Calculating Method must submit an application for obtaining the approved certificate. However, it is the prerequisite for the shipper is that has Quality Management System (QMS), for example, ISO 9001, ISO 28000, so that the calculate method can be incorporated in it. The application should including the following:

a) The shipper company name and the headquarters address

b) Name of responsible person and the connection ways

c) The place where weighting the container contents

d) The weighting device detailing, including maintenance and calibration procedures

e) The procedure of weighing method to be used

f) The program for keeping the container weight record for three years

g) The certificates copy for the processes as part of the Quality Management System

Second, if the preliminary details are considered satisfactory that supplied by the applicant, China Ministry of Transport, or the approved third party delegated the duty, will carry out an on-site inspection for the weighting measures according to the common criterion for implementing the calculating method. The shipper will be approved by the China Ministry of Transport and award the certificate for the calculating method when all the conditions can meet the requirements of the common criterion. The certificate maybe valid in three years, the shipper should maintain the procedures of the calculating method comply with the requirements of the common criterion throughout the period of time of 3 years.

Third, China Ministry of Transport should create a central database that registered the shipper with successfully becoming authorized to use the calculate method. In the database, every verified shipper has an authorization, unique identification number. The database will be accessible to carriers and port operators for confirming the particular containers that certified weight by calculating method were suspected a discrepancy, as required. Furthermore, the appointed Government department, or the approved third party should audit and supervise the verified shipper, make sure that the approved shipper maintain the process of calculating method as the registry condition and also keep updating as required throughout the period of validity of 3 years. The oversight of the verified shipper can refer the ways that Port State Control inspect the ships. The verified shipper maybe conducted an audit, on-site inspections on a risk basis or any discrepancies. If the verified shopper cannot tackle the problems and correct in time, will suffer a withdrawal of a company's "Calculating Method"

approval by the China Ministry of Transport.

#### 4.4.2.2 The calculate steps of the Calculating Method

The calculating the packed containers is carried out by five-step calculation:

Step 1: weight of the cargo items.

The weight of cargo items should be obtained by adding together the weight of individual cargo items to be shipped, which bases on the reliable information from the suppliers or own. When it comes to the bulk cargos, such as grain, coal, etc. the weight can be obtained via measurements by metering through calibrated filling equipment. As regards the goods, that have the accurate weight permanently and clearly marked on original sealed surfaces, do not need to be weighed again and directly use the accurate mass for calculating method when they are packed into the container.

Step 2: weight of the packaging

Add together the packaging weight which is to be done on the basis of the manufacturer's information or based on shippers' / forwarders' data.

Step 3: weight the dunnage, securing devices and pallets

The weight of pallets, dunnage, packing materials and securing devices is either obtained from the manufacturer or based on shippers' / forwarders' data

Step 4: the tare weight of the empty container.

The shipper should use the tare weight indicated on the container

Step 5: gross mass of the packed container

Adding together the weight values obtained in steps 1 to 4 above, to obtain the gross mass of the packed container.

#### 4.4.2.3 The accuracy of Calculating Method

The shipper should make sure the calculated gross mess of the container as accurate as possible. The weight deviations must exist during established the gross weight container by adding the different weight together, which may be contributed by the weighting equipment used to obtain the weight of the individual components, the humidity of wooden pallets and dunnage and some minor differences in the actual tare weight of containers, etc. Notwithstanding these deviations in the gross mass of the packed container, the shipper must keep the deviations in a considerable range, in practice, which may be approximately ± 5% of the gross mass or 1 ton. The deviations should be considered in the management procedures of the shipper, which should be addressed and documented in the shippers' management system.

### 4.4.3 The containers weight exceeding the maximum gross mass

The container was required that not packed to more than the maximum gross mass indicated on the Safety Approval Plate under the International Convention for Safe Containers (CSC). The container that gross mass exceed its maximum gross mass will be denied loading onto ship. The criteria of the international container maximum gross mass in China is, GB/T1413-1998, the maximum gross mass of the 20' and 40' container is 24000Kg and 30480Kg separately, GB/T1413-2008, the maximum gross mass of the 20' and 40' container is 30480Kg.

### 4.4.4 Eventuality for certain containers received without an actual gross mass

The shipper should responsible for submitting the shipping document that state the verified container gross mass and signed by authorized person to the ship master and terminal representative. However, such situation may take place that certain container delivered by the shipper to port terminal without the required verified gross mass. The container should not to load onto the ship unless the verified gross mass has been supplied. In order to make sure such a container onward move smoothly in the supply chain and used in the preparation of the ship loading plan, the master and the terminal representative may weigh the packed container in the terminal for obtaining the verified gross mass rather than obtaining from the shipper.

### 4.4.5 Empty containers

The empty container don't need to be weighted for obtaining the actual gross mass of the packed containers because the tear weight has visually appeared on the Approval Plate on the door of the container for container identification under the International Organization for Standardization (ISO) standard for container marking. However, the empty container's shippers should make sure that they are empty.

## 4.5 Concluding remarks

According the above analysis, weighing container prior to loading onto the ship can solve the issue of container overweight effectively, which should be a mandatory legal requirement and well performance. The shipper should ensure that the actual weight of the container is declared in the shipping document, which is signed by a person authorized by the shipper. The shipping document must be submitted to the master and to the terminal representative sufficiently in advance to be used in preparing the ships

stowage plan. Furthermore, it need to cooperate between the cargo owner, port facility and the shipping lines for supervising the container overweight. The government also need to assist and guide the home container trade, make sure the sustained and healthy development.

# CHAPTER 5

## SUMMARY and CONCLUSIONS

Although, the Chinese domestic container transportation has achieved the remarkable achievement in the past 20 years, the issue of container overloading will continue to present risks to industry operations, to works, to ships and to the environment. The approach of controlling the container overweight by means of weighing container and obtain the actual weight is still in the conceived stage and not so emphasized by the related government departments. Nevertheless, it is indeed urgent to address the problem when adverse effects are being exposed day-by-day following the large scale ships into the Chinese domestic container trade market.

In the interest of safety, IMO has amended the SOLAS regulation VI/2 for the verification of the gross mass of packed containers which aims at addressing the problem of the overloaded container. Truthfully, it is the further container transport developing trend that the actual weight of the container should be declared to the terminal and the ship's master for correct and well-informed handling and stowage. So the Chinese government should consider ways and means to ensure that the declared weight of the container supplied by the shipper is the actual weight.

In this dissertation, in addition to briefing the development of the Chinese domestic container transportation and the existing problems, the central core is addressed by attempts of drawing up a practical and pragmatic program that can effectively tackle the issue of the container overweight. To this end, the chapters are purposely edited by following a logical system, where the develop stage and the cargo structure of the home container trade are delivered for the purpose of drawing forth the main topic of the

overloaded container; then the adverse effect is practically proven by the incidents and accidents causing or involving the contribute factor of the container overweight; further, reviewing the harmful of the container overloading in the whole of supply chain. Finally, the proposal of weighing container is drawn up for tackling the problem of the container overloaded.

Hopefully, this dissertation can supply some valuable advice or means for controlling the container overweight. Although it maybe not convincing and workable without the available statistical data of the container overloading in the Chinese domestic container transportation.

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