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The study on Sinochem shipping corporation's fleet expansion

Yunhao Ji

WORLD MARITIME UNIVERSITY
Shanghai, China

The study of Sinochem shipping corporation's fleet expansion

By

JI YUNHAO

Shanghai China

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DECLARATION

I certify that all the material in this dissertation 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 dissertation reflect my own personal views, and are not necessarily endorsed by the University.

(Signature): Ji yunhao
(Date): June 10th 2007

Supervised by
Professor Zong Beihua
Shanghai Maritime University

Assessor
Professor Patrick Donner
World Maritime University, Sweden

Co-Assessor
Professor Wangxuefeng
Shanghai Maritime University

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ABSTRACT

Many of the changes in everyday life that have taken place during the last fifty years have resulted from developments in the chemical industry which in turn has led to a great increase in the maritime transportation of chemicals, specialized containers and trucks, but more importantly, many specialized ships have been designed and constructed to response to the demands. After China joined the World Trade Organization in 2001, the tariffs on chemicals had been cut which affected the chemical industry in China. At the current situation, The chemical industry is the third largest in China, after textiles and machinery, and accounts for 10 per cent of the country's GDP, as well as for between 35 and 40 % of the global demand growth for chemicals. Meanwhile, in order to enlarge the business of chemical industry in China, Chinese government encouraged foreign investment especially in petrochemical.

The contents of the dissertation is base on the analysis of liquid chemicals transportation market in China and the study of Sinochem shipping corporation which is s the largest business for liquid chemical shipping in china.. The analysis would focus on the demand and supply of the market as well as the transportation capability of Sinochem Shipping Corporation. In the end, I will give my own opinion of Sinochem Shipping Corporation's fleet expansion.

The dissertation including six parts: Part one is about the background of the topic. I would introduce the significance and purpose of the dissertation briefly. Besides, the other people's research findings and study methods would be mentioned, either. Part two is focus on the features and requirements of the market. Part three is focus on analysis the demand of Chinese market. Part four is focus on analysis the transportation capability of Sinochem Shipping Corporation to get the reasons why the fleet expanded. In Part five, I would analysis the methods of Sinochem Shipping Corporation's fleet expansion At last chapter, I would try to give a objective

summary the advantages and disadvantages of the expansion consequence.

KEYWORDS: Liquid Chemical Transportation, Time Series Model, Fleet Expansion, Financing

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LIST OF ABBREVIATIONS

COA: Contract of affreightment

GDP: Gross domestic production

IMF: International Monetary Fund

IMO: International Maritime Organization

ISM Code: International Safety Management Code

MARPOL: International Convention for the Prevention of Pollution from Ship

SMC: Safety Management Certificate

WTO: World Trade Organization

The study of Sinochem Shipping Corporation's fleet expansion

Chapter one Main issue of the dissertation and literature review

1.1Background and Main contents of this paper

As the rapid development of the our national economy， demand for liquid chemicals of our country increase dramatically. Nowadays, it has been engendered a kind of market pattern which combined two supply forms which are domestic production and foreign imports. The liquid chemicals market must have tremendous development potential in the future.

Great growth of liquid chemicals market brought immense development opportunity for our liquid chemicals transport industry. According to incomplete statistic, by the end of 2005, ships used in domestic trade of liquid chemical transportation (127 ships with DWT 240356t) increased by 29 units than the numbers in statistic at the end of 2004 which means the DWT increased by 53154t at the same time.

These liquid chemicals vessels play a positive role during the processes to meet our liquid chemicals transportation needs. But on the whole, our liquid chemicals transport fleet still at a relatively rudimentary stage of development. There exists a big gap between them and their foreign craft brothers. Here are some specific manifestations: supply of chemicals shipping power exist a big gap, management level of chemicals shipping enterprises lower than international standards, lower quality and skill level of the crew who works on the chemical vessel, etc.. Therefore, we should encourage and support some powerful domestic liquid chemical shipping

company in its further development, and set up the necessary prerequisites for train the modernized liquid chemical transport fleet in our country.

Sinochem shipping company is one of the important capacities of liquid chemicals in our country. After years of development, the company achieved a remarkable achievement at the expansion of fleet capacity, shipping market operation, and internal management of enterprises. And Sinochem shipping company strives toward the leadership in domestic liquid chemicals transport industry. Therefore, doing research for Sinochem liquid chemicals market and fleet programming are imperative and has great practical significance.

1.2 Research mentality and method

1.2.1. The theoretic frame of analysis of shipping market

Generally, the main target of the analysis of international shipping market is based on the supply and demand, with which, meanwhile integrating the given structure of shipping market judging and forecasting the development tendency as well as the market share in the future. The concrete steps include:

(1) Analyzing the demand of liquid product shipping and concluding the development tendency of the given market in the future.

To analyze the shipping demand, firstly, we need to analyze the environment of the maritime trading industry, which includes the entire state analysis, influence factor analysis, and structure & overall arrangement analysis.

(2) Analyzing the supply and concluding the tendency of the shipping market

The analysis of given supply of the shipping market mainly includes the development process of shipping team, the analysis of the variety of the quantity of the ships, the transporting capacity and the age of the ships. All the above, are closed related, with which, the judgment of the development tendency of the entire shipping

team could be given.

(3)The analysis of the given market's flux and direction

During the courses of given shipping line analysis, firstly, choose the suitable route basing on the statistics data; Secondly, investigate the flux of the past years. Meanwhile, give the judgment of the future development tendency of the shipping market with the statistics of the layout of the given routes and distribution direction.

(4) Analyze the future shipping type of the given market

Analyze the future shipping type of the given market with the trend of supply-market and the flux and direction of the given shipping market, and forecast the developing situation of the future market.

From the analysis above, we can conclude that the analysis of the transportation market is based on the supply and demand of the market, which includes the development of dynamic status of the market supply, the future trend and the anatomy of the factors influencing the balance of the supply and demand.[1]

1.2.2 Mathematical modeling

Time-series forecasting is a forecasting method that uses a set of historical values to predict an outcome. These historic values, often referred to as a "time series", are spaced equally over time and can represent anything from monthly sales data to daily electricity consumption to hourly call volumes. Time-series forecasting assumes that a time series is a combination of a pattern and some random error. The goal is to separate the pattern from the error by understanding the pattern's trend, its long-term increase or decrease, and its seasonality, the change caused by seasonal factors such as fluctuations in use and demand[1]

[1] www.crystalball.com/time - series - forecasting.html

Regression analysis prediction method is based on mathematical statistical theory which needs to identify the relationship between dependent variable and variable interdependence, and then build regression equations for the prediction. Linear regression analysis consists of unitary linear regression analysis and multiple linear regression analysis. Unitary linear regression method means to build a unitary linear model for prediction by analyze the linear relationship between the data of forecasting object and a certain influencing factor.[2]

The so-called portfolio forecast, it means to give different values to a number of single forecasting methods, then creating an integrated prediction model. In combination forecasting, weight selection is very important. A reasonable weight will greatly improve accuracy of this prediction.

Usually, people use those following methods on weight selection: arithmetic average method, standard deviation method, split coefficient method, AHP, the Delphi method, the optimal weighted method, etc.. Both AHP and Delphi method will be affected by man-made factors inevitably because those two ways are given weighted subjectively.

The optimal weighted method has the highest precision, but it also accompany with the computational complexity, is often used linear programming or nonlinear programming, and the weighted might be negative which we get finally. In common practice, it usually can get sub-optimal solution only which have more restrictions in practical application.

Since Bates and Granger first gave out the theory of combined forecasting 60 years

[2] www.stat.yale.edu/Courses/1997-98/101/linreg.htm

ago, the researches of it developed rapidly. The combined models conquer the limitation of single model, efficiently gather the useful information. Thus, it is especially helpful to the complicated economic system without detail information like the analysis of logistic demand.

1.2.3. Fleet planning

Fleet, as the main body of the shipping business, determines the profit and loss of the company. It is the embodiment of the capacity of finance, operating scale, and investment strategy and management level.

Since long ago, people have been doing a lot of researches and discoveries of the scale of shipping team.

Generally, the planning a good shipping team should follow the following principles,

(1) Economic. Minimum the cost and try to reduce it in order to assure benefit.

(2) Market-oriented. The shipping type and the loading capacity should satisfy the route and transporting request, be attractive to the customers and try to inosculate the market requirement.

(3) Flexible. As the variety of the transporting, the shipping team should be of flexibility to get used to the different goods, the adjustment and rearrangement of shipping route.

(4) Constant. The updating of the ships should be constant, and be stable in short terms which would assure the Sustainable development of the shipping team

When making the development planning of the shipping team, we need to consider the various factors, which are generalized as: market demand, the

macro-running-environment of the company, the internal situation and development plan of the company, the technical capacity of the ships, the operating strategy of the ship makers and etc. All the factors above are closed connected influencing the development plans of the shipping teams.

It implies that the planning of a shipping team is a extremely complicated and systematical project with the main target that designing the reasonable scale of the shipping team and the structure of the ship types, which will assure the teams have enough transporting capacity and competence to satisfy the various ports, channels and goods distribution. The basic frame is as followed:

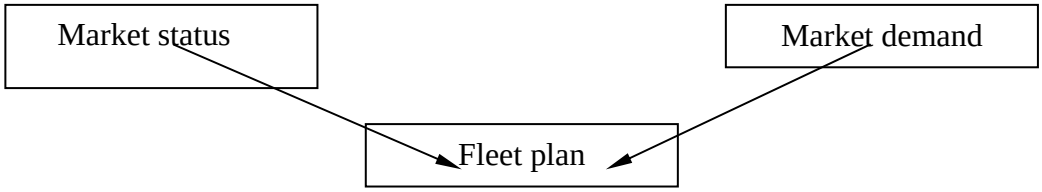


Figure 1-1 the research frame of the fleet scale

1.3 Research framework

Base on the framework we mentioned above, researches in this paper will emphasis on those following problems:

1.3.1Research on demand and supply of liquid chemicals transportation:

From the point of demand and supply of shipping, according to the supply-demand relationship, combine with the structure of given specific shipping liquid chemical market, doing some analysis and judgment on its future market trends and new market pattern might formed for the given liquid chemical shipping market.

1.3.2Research on development and programming of Sinochem Shipping Corporation's fleet:

Based on the transport capacity research on both of Sinochem and its competitors,

and combine with the shipping lines of Sinochem, make a programming for the whole fleet. This programming means that according to some certain principles and methods, make a dynamic and systemic arrangement for vessel’s purchasing, using, updating and management during a certain period, which including: different years Ship fleet composition, the number of varies types of vessels, the number of the vessel which should be eliminated, the type and quantity of vessels should be increased etc..

1.3.3 Research on Development pattern and means of financing:

Based on current ways adapt by a shipping enterprise to develop its liquid chemical fleet and the basic means and means of financing used today, this paper put toward the basic ways and means of financing for Sinochem, which including so many development patterns as from the "ship owner" to "control ship," Financial Innovation, merge ration, etc.

Chapter two Summarize for Liquid Chemicals transport market

2.1 Characteristics and requirements of liquid chemicals transport by vessel

2.1.1 Operating characteristics of liquid chemicals transport by vessel

Because of the specialty of liquid chemicals, in order to pretend chemical reaction between those liquid chemicals and bulkhead during transport, nowadays, increasing chemical vessels adopt coat technology. In practice, people usually choose Zinc silicate coating, epoxy, phonetic resin, etc. Those coats have respective advantages and disadvantages in order to adapt to transportation for different kinds of goods.

As so many categories of chemicals, even all so called cracking of petroleum products also can be classified as diethyl glycol, ethylene glycol, polyethylene, etc. One vessel can't be used in ship same goods forever.

Before loading, the cargo categories which are loaded in the vessel last three times should be indicated. If with serious pollution or have confliction with the next piece of cargo will be loaded on nature, it must not be deployed in the same vessel. Although those goods have consistent nature, is also need to washing.

Washing have strict requirements, and after washing, it have to take a detection of wall in anchorage. After qualified, the vessel can be drove into berth to begin loading. When loading up to one foot, it has to start the purity test. Passing the test can be completed to continue to completion of loading, If not, the vessel have to be drove back to anchorage and re-washing, then come back to take part in "one feet test" again.

Generally, bulk chemical handling usually by pipe. As fatalness of chemicals, nowadays, the ship to ship transfer / handling cargo is almost forbidden. It means that use barge put cargo barge to the shore is not allowed, and it determined that the

vessel is more vulnerable to draught limit of terminal.

Chemical tanker usually within a little tonnage, most of the vessel is in 1000 t to 5000t, and regarding to the handling efficiency, it often fast loading, but need longer time for unloading.

2.1.2 Characteristics of liquid chemical transportation market

Compared with highway and the railway, Marine is the most economic mode for liquid chemicals transportation. Because of its large quantities, lower cost and safety factor, transport liquid chemical goods by marine has take a large share of the market, and in the international market, marine transportation has been quite mature.

In China, most of liquid chemical transportation still at initial stage. But in someplace as Yangtze River Delta, Pearl River Delta water network and some other regions with developed water net, the main mode used in liquid chemical transportation is waterway. Indeed, waterborne transportation also exist some constraining factors (more popular exists in our country):

First is channel condition. Nowadays, both petrochemical products production enterprises and demand enterprises are not all located near by water area. Because of the restriction of Channel condition, the large tonnage can’t pass smoothly, and then bring impact of accessibility of marine transportation;

Second is the situation of port and tank. The facilities in terminal is incomplete, and without relevant handling ability and enough tank capacity, it also affect the choice of marine transportation or not;

Third is because of the vessels used in transportation and shipping companies. Currently, lots of vessels engaged in transportation of liquid chemicals are refitted from general tanker which carried finished oil before. Most of those vessels have

some problems as small tonnage, older age and poor quality of the crew. And meanwhile, lots of individually-run enterprises engaged in this industry, which caused fatal hidden trouble in safety. Those problems above brought a serious impact on the competitiveness ability of marine transportation;

Fourth, the transport volume and times of goods. According to current conditions of marine transportation, the advantages concentrated on those goods which have big volume and low frequency transportation, such as greater demand for ethylene glycol and some other primary chemicals. But recently, elaborated chemicals transportation which with small quantity and higher transport requirements without obvious advantages.

Due to those factors above, it makes marine transportation cannot exert adequately the comparative advantages during competition with highway transportation. In some places with developed water network as Bo Hai Bay, the Yangtze River Delta and Pearl River Delta, the share of marine transportation are still relatively low. For example, in Guangdong Province, the ratio of liquid chemicals carried by highway and marine is only 7:3.

Therefore, the challenge we faced to is how to improve the service quality of marine transportation, and improving the share of marine carrying, try to make the logistics structure more reasonable.

2.2 The development of liquid chemical tanker

2.2.1 History of chemical vessel development in the world

In 1949, United States converted T-2 tanker which called Marine Chemical Transport into a chemicals ship, and put into operation. Since that time, the world liquid chemical shipping gets rapidly development, and up to the present, it has seen go through five-generation. Its characteristics are as follows

First generation: changed the original single bottom tanker into double bottom, and add vertical bulkhead and deep well pump.(Year 1949)

Second Generation: generally used segregating liquid cargo hold with more pumps and pipes. And the use of bulkhead coating becomes more widely to protect hull and the cargo hold. Try to reduce corrosion and rust. (1960')

3rd Generation: adapt to a kind of coating which can loading corrosive goods. And it already has 30% ~ 50% of liquid cargo space using stainless steel or composites materials.

The fourth generation : larger tonnage (about 40000 t), separate cabin more closely, better adapt to varies of chemicals, one pump and one pipe , greater proportion of stainless steel liquid cargo space(70%). The first ship of the 4th generation chemical vessel was built by South Korea in 1985.

5th generation: In 1992 Stolt-Nielsen Company ordered four chemical tanker with 30000 DWT to Kleven dockyard. Main characteristics : Shallow water, a depth of 10 m design; Full-mainly stainless steel-type cargo space, 39 cargo hold 23 of them are the stainless steel type. The remainder are zinc silicate coating; the use of deck space laden (IMO Ⅰ), which allocated two stainless steel-deck cargo hold; Phosphate or methanol and other chemicals, even oil and other liquid bulk cargo can be loaded.

2.2.2History of Domestic chemicals vessel development

In November 1983, Shanghai Maritime Bureau bought a chemical tanker with 3860t DWT from the Japan, which created a period for Chinese coastal chemicals transportation. Till now, our country have already designed and built a group of chemical vessels. But that almost smaller size, only 6 chemical vessels with 46000 tons which is build by Dalian ship building factory for Malaysia ship owner has a large size. Currently, Chinese fleet almost has no multi-purpose chemical tanker with

large tonnage, and North America to the Far East, Europe to the Far East. Chemicals operating shipping routes monopoly by several major chemicals ship owners. This is not match with the title of great shipping country, and is bad for our chemical foreign trade.[3]

As China's entry into the World Trade Organization, the relationship between China and the world getting closer and closer, and China's trade in chemicals will be a larger increase. According to this situation, our chemicals fleet should also be expanded. This is obvious good news for both shipping industry and the shipbuilding industry in China. Therefore, we should seize the opportunity to accelerate chemical tanker construction and transportation development, to the country's economic construction and services.

2.3 Summarize of domestic and international transportation of liquid chemicals on the market

2.3.1 The status of international chemical shipping

According to the statistics made by British consulting firm called Drewry till the end of April 2006, Global liquid chemicals ship sum to 831, with total DWT of 55.61 million tons. From the situation of liquid chemical fleet, scale of liquid chemicals fleet keep steadily expanding from 2001 to 2004. It is noteworthy that a large number of new vessels were put into operation from year of 2005 with an increase rate nearly 50%. Meanwhile, increased rate of DWT is as high as 117.9%, which indicates trend of chemical vessels development is younger and larger. [4]

Table 2 - 1 World liquid chemical tanker fleet (showed on the attached table A-1)

Source: China Ship News

[3] http://www.oceansatlas.org/unatlas/uses/transportation_telecomm/maritime_trans/shipworld/tanker_pas/chem/chem.htm

Table 2 - 2 liquid chemicals fleet situation in past years (compared with the data of every April in past years)

year	number/ship	Growth rate / %	DWT/10000t	Growth rate/%
2001	1 618	/	2 312	/
2002	1 662	2.7	2 411	4.3
2003	1 739	4.6	2490	3.3
2004	1 778	2.2	2 531	1.6
2005	1 891	6.4	2552	0.8
2006	2 831	49.7	5 561	117.9

Source: China Ship News

In addition, Table 2 - 1 and Table 2 – 2 shows that the large liquid chemicals vessels which over 30000 tons take higher proportion as 66% in the entire fleet. And basically, vessels with greater DWT take higher proportion, and those vessels with DWT over 30000 tons taken 40%. We can see that the large size chemical tanker which with DWT over 40000 tons will become the mainstream in future development.

Table 2 - 3 different DWT Ship proportion

Ship size/t	DWT/10000t	proportion/%
1 000～5 000	174.5	3.14
5 000～10 000	497.3	8.94
10 000～20 000	774.2	13.92
20 000～30 000	467.4	8.41
30 000～40 000	1 442.0	25.93
40 000+	2 205.6	39.66
Total	5 561.0	100

Source: China Ship News

[4] China ship news

Table 2- 4 compared Top 10 chemicals shipping companies in the world with China's major chemicals shipping companies (according to DWT of ship)

Shipping company	Registration state	DWT ／10000t	volume／ship	Average age ／year
Odf JeU	Norway	176.8	56	14
Stolt-Nielsen	Norway	157.1	65	15
OMI	U.S.A	99.8	25	3
JO Tanker	Norway	71.1	27	13
IMC	Singapore	67.4	15	4
Overseas	U.S.A	62.4	14	6
Sovcomflot	Russia	61.7	13	5
Blstad	U.S.A	58.3	16	16
Novorossiysk	Russia	58.2	14	8
Laurin	U.S.A	57.4	15	13
Sinochem shipping	China	10	19	
Nanjing tanker		7.6	13	
Haisheng shipping		3.3	4	

Source: China Ship News

The table 2 - 4 indicates that the world's chemical shipping companies mainly concentrated in Norway, USA and Russia, who control the world’s chemical market, and their shipping average age is relatively low.

So, the conclusion is the trend of chemical shipping development is larger and younger. However, we should note that there have been a massive influx of new shipping from 2005, but the demand for chemicals can’t have a tremendous increase, as well as the transportation capacity, all of which may lead to oversupply of capacity.

2.3.2 The Status of China’s liquid chemical Shipping

(1) Small-scale enterprises

In China, liquid chemical transport enterprises generally have small scale and small shipping. They are mainly located in the Yangtze River Delta and coastal areas, of which the overall transport capacity is very limited. By the end of 2005, the total number of liquid chemical shipping for domestic coastal inter provincial transportation is 127 (dwt total 240 356 t), 29 ships more than the end of 2004 (dwt total 53 154t). In 2005, the growth of chemical shipping transportation capacity accelerated, and chemical vessels (including dual-use chemicals and oil shipping) are nearly 30% more than other years, in which 20 ones (dwt 28 228t) were completed (including completed at the end of 2004 and enterd the market in 2005) in 2005. Until the end of 2005, the average age of chemical tankers is 12.7 a (considering the factors of dwt, the average age is 12 a), reduced 1.2 a than that of 2004 (compared with 2003, decreased 1.4 a). Known from the table 2 - 4, compared with 10 large liquid chemicals shipping companies of the world, China’s liquid chemical shipping corporation’s fleets are smaller in scale and ship models, with an average dwt of below 100,000 t in total and less than 6 t of each, while the number of l0 large liquid chemicals shipping companies are close to 900,000 t and 14,500 t.

(2) The increasing demand for enterprises’ chemical shipping

With the rapid development of China's economy and the increase of demand for chemical products, the world famous petrochemical groups, such as BASF, Shell and BP will launch business in China, while Exxon Mobil Group and Dow Chemical Company have prepared to open in 2008, which suggests a prediction that China's chemical transportation demand will rising rapidly in the next period of time.

(3) Profiles about main liquid chemical shipping companies

So far, the scale of China's own chemical transporting fleets is relatively small. Sinochem shipping company, the holding subsidiary of China International (Holdings) Ltd, Founded in 1994, is the largest liquid chemical transporting vessels operating entity in China now. It is mainly engaged in liquid chemical cargo transport

and ship management business of long and near foreign international and domestic coastal routes, having rich experience in liquid chemical shipping operating and management, and owning a professional management team. At present, the company has 19 specialized liquid chemicals ships of 1 000~14 000t DWT in type of IMOII and IMOIII, of which the total DWT is over 100,000 t, whose routes across the Europe, the Americas, the Middle East and the Indian Ocean. And there are another 12 chemical ships in building.

Nanjing tanker was a profession company which engaged in in the transport of oil and its products. This company established in October 1975, owned 13 vessels of chemical tankers with total DWT is 76000 tons. Haisheng shipping owns 4 chemical tanker with dwt 3500 ~ 8000 tons (total DWT 33,000 tons). In addition, Nanjing yangyang dongyi, the COSCO Dalian also have several chemical tankers respectively.

2.3.3 liquid chemicals Transport Development Strategy for china

(1)Integration terminal facilities, and improve the efficiency of the ship in terminal

The time of liquid chemicals vessels stay in terminal almost take 30% of its entire operation time. But for liner, this time only take up 16%. Here we can see the deficiencies of chemical vessel in this aspect. If it can achieve level as liner shipping company, the rewarding rate of investment by chemicals shipping company may be doubled. Generally, when chemicals vessel is under construction, it has to consider how to improve efficiency in terminal, but some piers and shore facilities did not take this point into account. If given an option exclusive to the construction of the pier or shore cans network, it can ensure the desired efficiency.

(2) Set up liquid chemical tanker fleet

Accompany with recovery with Global chemicals industry, but the International Convention on the ship pollution (MARPOL) annex II to the chemicals, vegetable oil

and oil products in the re-classification for chemicals will ship fleet trade prospects change, The reason is that at present oil and oil products vessels can transport chemicals can also use the product tanker transport, Once the amendment is passed, the chemical tanker market and the product tanker market may be affected.

After amendment getting effect, from beginning of 2007, the vessels which can carries Type II / Type III chemicals before (with total DWT 5700000 tons)may withdraw from the market or change its purpose. That might cause further demand for new ships. A large number of new ships were put into operation since year of 2005 is the best evidence. In addition, IMO adopted the convention about phase-out of single-hull oil tankers in 2003 increased demand of chemical vessels for a large extent.

However, the establishment of the chemical tanker fleet needs huge investments, each advanced liquid chemicals vessels cost up to 80 million U.S. dollars. In order to provide global cross-border trade services, we must have a certain number of vessels. For aims to become an international liquid chemical shipping enterprise considering the special attributes of chemical transportation and financing difficulties of ship, the more feasible option is to seek ship lease or joint venture.

(3) Requirement for operating vessels

Because that chemicals freight than refined oil, and its have relatively strong freight, then when Chinese shipping companies make an order on product oil tanker building, it can ask for it can be used as chemical tanker at the same time. That means it can loading some chemicals under IMOIII class at the same time, and then enhances operational efficiency of the vessel.

(4)Build liquid chemical products routes

Some important operating Shipping routes such as North America to the Far East, Europe to the Far East were monopoly by several major chemical shipping

companies, is very bad for China's foreign chemical trade development. Therefore, it is necessary to create our own liquid chemical products routes to enlarge and strengthen our liquid chemicals transport industry.

2.4 Summary for this chapter

With the development of industrial technology, the chemical industry has trends of large size, high efficiency, continuous working and flowing production. Demand for bulk liquid ship transportation generated by the chemicals bulk trade flows.

Compared with other solid bulk, Chemical transportation is relatively unique mode of transport, which is unfamiliar with people. From the point of the nature of Liquid bulk chemicals, most of them are dangerous goods and inflammable, explosive, corrosive. During transportation, the chemicals usually show itself as liquid state (including something like LNG which show itself as gaseous substances under room temperature), the density will changes with if temperature will be changes. In transport and cargo handling operations, there are more high level of requirements for temperature and pressure. So in operation, there are some special problems as coating, the purity test, and constraint of handling time. Uniqueness of liquid bulks determined the small market of liquid bulks transportation, and ship owners and cargo owners are relative concentrated.

Chemical vessels used in current international markets with trend of larger and younger. But in china, liquid chemicals transport enterprises generally with smaller scale, also owned smaller vessels. However, as more and more large foreign companies set up offices in China consignors, and the demand for chemicals is increased by improvement of people's living standard indirectly, the volume of cargo of China shows growth trend. Although domestic liquid chemicals shipping industry develop rapidly in recent years, most of shipping enterprises engaged in the liquid chemicals transportation are relatively small size, also with smaller tonnage and poor security. In a word, it hardly meets the rapid growth of demand for chemical

logistics.

Chapter three The status quo of Sinochem shipping corporation

3.1 The brief introduction of Sinochem shipping

Sinochem Shipping is a subsidiary of Sinochem International corporation. Founded in 1994, it is now the largest business for liquid chemical shipping at home. It mainly deals in far-and near-sea international navigation routes and liquid chemical transport and ship management along the coastline of China. It has rich experience in ship operation and management for liquid chemicals and boasts a professional management team.

3.1.1 Organizational structure of the company

Sinochem shipping including the three independent subsidiaries: Hainan Sinochem Shipping Ltd., which founded in 1994. Currently, it is the largest liquid chemicals shipping business entities in our country.

Shanghai Aoxing shipping management Ltd, which is formed by a single vessel called Ao Xing. Meanwhile, it is also a ship management company which joint ventures with Stoltchem ship management (shanghai) Ltd. And in September 2005, Shanghai Sinochem – Stolt shipping Ltd which is a joint-stock company by Hainan Sinochem and and Stlot ship management has been established officially. As one of the five Chinese-foreign joint ventures shipping companies which is qualified by the Ministry of communications to transport chemicals among Chinese domestic termianls (CDT). The organizational structure of this company is show as figure below.

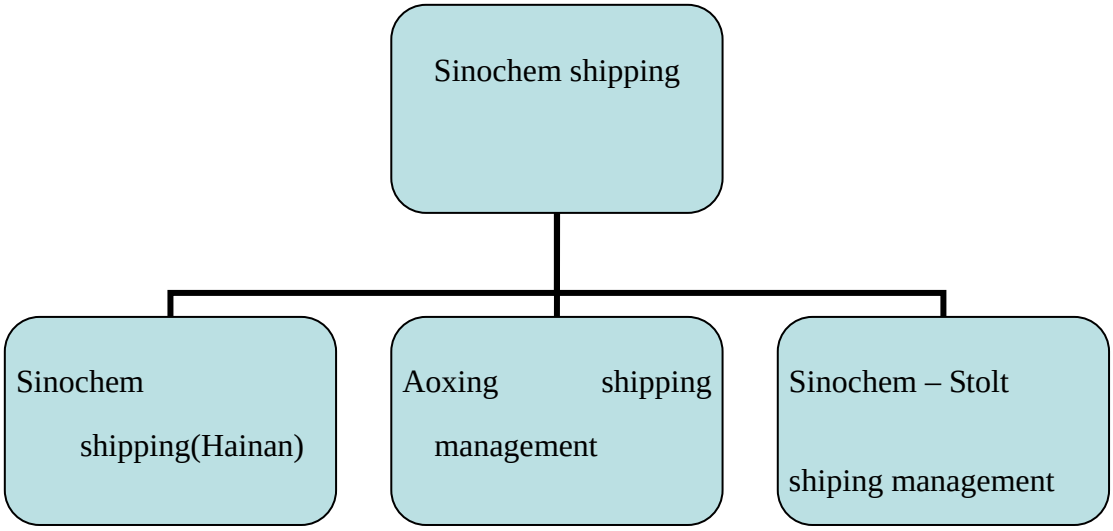


Figure 3-1 the organization structure of Sinochem Shipping Corporation

Source: http://www.Sinochemintl.com/

3.1.2 Scale of the fleet

Currently the company has 25 DWT 1000-14000 IMO II and III professional liquid chemical ships, with a total shipping capacity of over 100，000 DWT; And another 12 ships are still under construction. During its long years of business, it has built a close cooperative relationship with big petrochemical corporations at home and abroad; it has undertaken the transport of various kinds of finished oil products, liquid chemicals, acids, animal and plant oil, edible oil and other special products, with its navigation routes covering Europe, America, Middle East and the Indian Ocean.

Table 3-1 the fleets scale of Sinochem Shipping Corporation

	VESSEL NAME	TYPE OF VSL	FLAG/CLASS	YR BUILT	CGO CAPACITY
1	ZHONGHUA 1	CHEMICAL(IMO III)	CHINA/CCS	Mar-84	8619
2	ZHONGHUA 6	CHEMICAL(IMO II/III)	CHINA/CCS	Mar-91	8666
3	ZHONGHUA 7	CHEMICAL(IMO II)	PANAMA/UK	May-89	8998
4	ZHONGHUA 8	CHEMICAL(IMO III)	CHINA/CCS	Sep-93	1299
5	ZHONGHUA 9	CHEMICAL(IMO III)	HONG KONG/CCS	Mar-94	2504
6	ZHONGHUA 10	CHEMICAL(IMO III)	CHINA/CCS	Oct-96	3924
7	ZHONGHUA 11	CHEMICAL(IMO II)	HONG KONG/CCS	Feb-98	2781
8	SC IRIS	CHEMICAL(IMO III)	HONG KONG/CCS	Apr-01	4419
9	SC ATHINA	CHEMICAL(IMO II/III)	PANAMA/CCS	Jun-96	3921
10	SC VENUS	CHEMICAL(IMO II)	PANAMA/BV	May-01	3938
11	SC GUOJI	CHEMICAL(IMO II)	HONG KONG/KR	Dec-06	13230
12	SC SHAGNHAI	CHEMICAL(IMO II)	HONG KONG/KR	Feb-07	13230
13	SC TIANJIN	CHEMICAL(IMO II)	HONG KONG/KR	Mar-07	13230
14	SC HEBEI	CHEMICAL(IMO II)	HONG KONG/KR	Oct-07	18000
15	LI NING NV SHEN	CHEMICAL(IMO III)	CHINA/CCS	Mar-96	4023
16	YU LAN	CHEMICAL(IMO II)	CHINA/CCS	Sep-06	4033
17	DU JUAN	CHEMICAL(IMO II)	CHINA/CCS	Feb-07	4033
18	MI LAN	CHEMICAL(IMO II)	CHINA/CCS	Jun-07	4033
	VESSEL NAME	TYPE OF VSL	FLAG/CLASS	YR BUILT	CGO CAPACITY
1	BAI YANG	CHEMICAL(IMO II)	CHINA/CCS	Aug-06	4040
2	HONG FENG	CHEMICAL(IMO II)	CHINA/CCS	Jan-07	4040
3	CUI BAI	CHEMICAL(IMO II)	CHINA/CCS	Jun-07	4040
4	CHANG CHUN TENG	CHEMICAL(IMO II)	CHINA/CCS	Jan-07	3817
5	WAN NIAN QING	CHEMICAL(IMO II)	CHINA/CCS	Feb-07	3817
6	ZI LUO LAN	CHEMICAL(IMO II)	CHINA/CCS	Jun-07	3959
7	CAI HONG NV SHEN	CHEMICAL(IMO III)	CHINA/CCS	Jul-00	4401
8	AO XING	CHEMICAL(IMO II)	CHINA/CCS	Jun-98	4020
9	BAO HAI TUN	CHEMICAL(IMO II)	CHINA/CCS	Nov-06	4408

Source: http://www.Sinochemintl.com/

3.2 Current situation of Sinochem

3.2.1 Operational situation

Till the end of 2004, the registered capital of Hainan Zhonghua Merchant Marine Co., Ltd was 24.4 million yuan and its total assets were 40.00153 million yuan. It had a wider increasing range than that of the two years before with the retained profit of 1806300 yuan and the retained profit margin of 2.95%.

In addition, Sinochem and its flag of convenience ship overseas realized a total operating income 203.8264 million Yuan, net profit of 21.566 million Yuan. Because of the operational restriction of the ship with flag-of-convenience ship, portion of the profits get from shipping business reflected in trade company which is a foreign company but wholly owned by Sinochem. Therefore, the actual profit margin of Hainan Sinochem is higher than 2.95%.

3.2.2 Business Achievement

Nowadays, the joint venture-ship management Aoxing shipping management Ltd relying on Stolt, establishes a set of international standards to meet and continue to improve the "safety management systems", and made a ship safety management certificate (SMC), with the operation and management of the tanker tonnage, casual miscellaneous carriers, Chemicals round of the LNG vessels and the ability to have access to China, Panama and other international ship security certificates with management, and access to the DNV ISO 9001-2000 quality management system certification. Ship management achieves the International Safety Management Code (stakeholder), SHELL, BP and other big oil companies and the allocation of the European Chemicals Association (CDI) test.

Sinochem – Stolt shipping Ltd, a joint venture company, was intimated to be set up, which was joined by Hainan shipping company Ltd. and Stolt . As one of the five Chinese-foreign joint ventures approved by ministry of communications ,which have the qualification to engage in Chinese ports chemicals Transport (CDT), Sinochem – Stolt with first-class service become the logistics partners of many famous

international petrochemical enterprises and liquid chemical products, such as Secco Shangahi、BASF Shanghai and Yangzi – BASF Nanjing etc.

3.3 Current Management situation of Sinochem shipping corpaoation

3.3.1 Crew

To the crew members on Chemical ships, it is necessary to understand the basic operation of the ship, such as washing warehouses, heating, and be aware of the properties of chemicals on the Certificate of fitness equipment. This unique mode of operation and a higher risk coefficient with the operation lead to scarce resources of the crew. But the shipping crew of Sinochem shown rare stability and the smaller rate of loss are inseparable with the full humanity of the management. But, in the face of the aging of the crew, the relative lack of new faces, generally low level of education and other issues is the senior management of the company to attract attention, as the company fleet continues to expand, crew shortage problem will gradually appear.

3.3.2 Fleet

For fleet management, firstly, the company has a management team with rich experiences, and they positioned the company, step-by-step to complete the objectives set. They closely around this sub-field of the liquid chemicals logistics services, studying deeply about the characteristics of the inflow and outflow of transnational petrochemical enterprises, domestic petrochemical enterprises liquid chemicals and further enhancement of long term business and domestic, International petrochemical users the proportion of Chinese high-end fields, absolutely leading market position. At the same time, the company's management team continues to do a good job preparing capacity, ship management and route sales, enhances operating systems and processes, the implementation of safety management responsibility for the environmental and social responsibility and operating advantages into actual profit growth.

Meanwhile, against shipping natural conditions, In order to strengthen anti-ship in

bad weather risks, the company will build a ship dynamic computer management information systems and update equipped with advanced navigation and communication equipment. The company is in the process of step-by-step input of funds to construct a highly efficient operation, the advanced management of ship management information systems operation, including maintenance, procurement, crew, the sea services, security quality goods parade, charter, business and other major modules.

3.4 Analysis of Sinochem Shipping Corporation's fleet capacity

3.4.1 Scale

Currently there are 25 tonnages DWT1000 - 14000 IMO Type II and Type III professional solution body chemicals shipping, the total capacity over 100,000 DWT, and another six under construction. In the long-term business with the international and domestic petrochemical many large users to establish a close business relationship, forwarding all finished oil products, liquid chemicals, acids, edible oil, edible oil and other specialty products, services throughout Europe, the Americas, the Middle East and the Indian Ocean.

3.4.2 Ship Size

Under the previous forms of fleet size of the analysis we can be the following form :

(1) According to the IMO Classify:

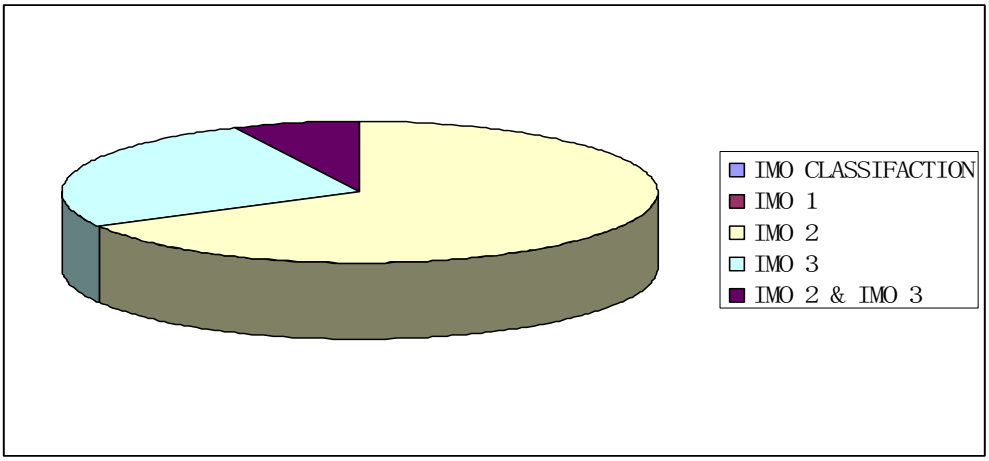
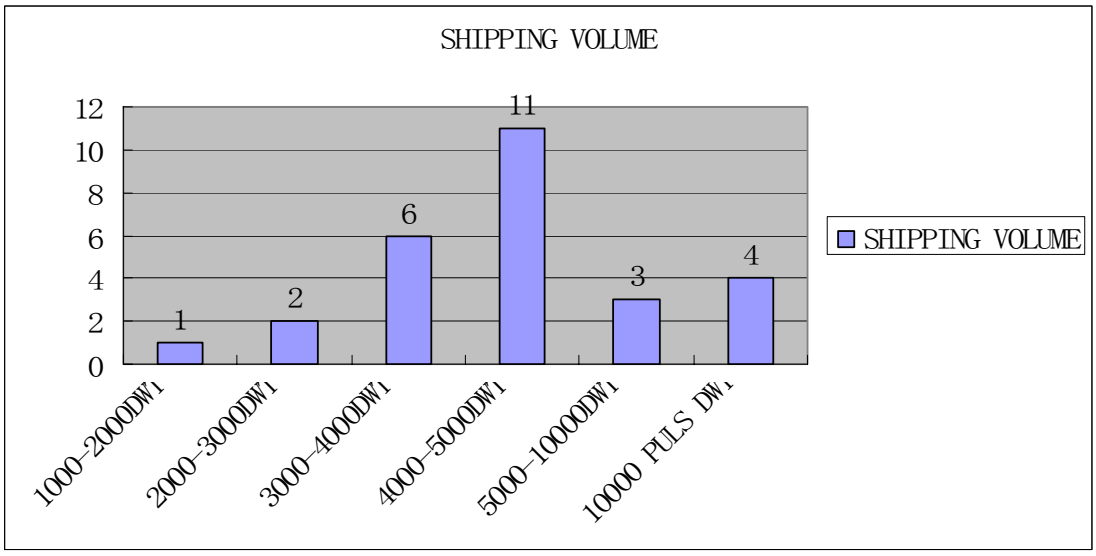


Figure 3-2 the IMO classification of Sinochem Shipping Corporation's fleet

IMO2 vessels are used to transport chemical cargoes which have quite a serious risk to the environment or safety. The need for effective prevention measures to prevent leakage. Meanwhile IMO2 ships delivering goods to account for the proportion of the transport market is also quite high. This note of the development of ship models shipping in connection with a market-oriented.

(2) According to the loading capacity:



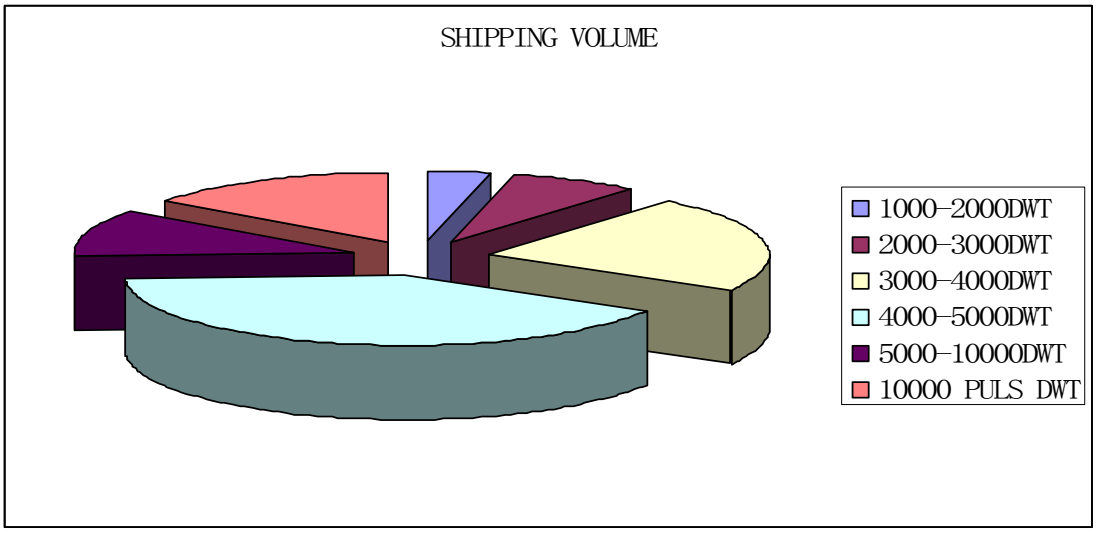
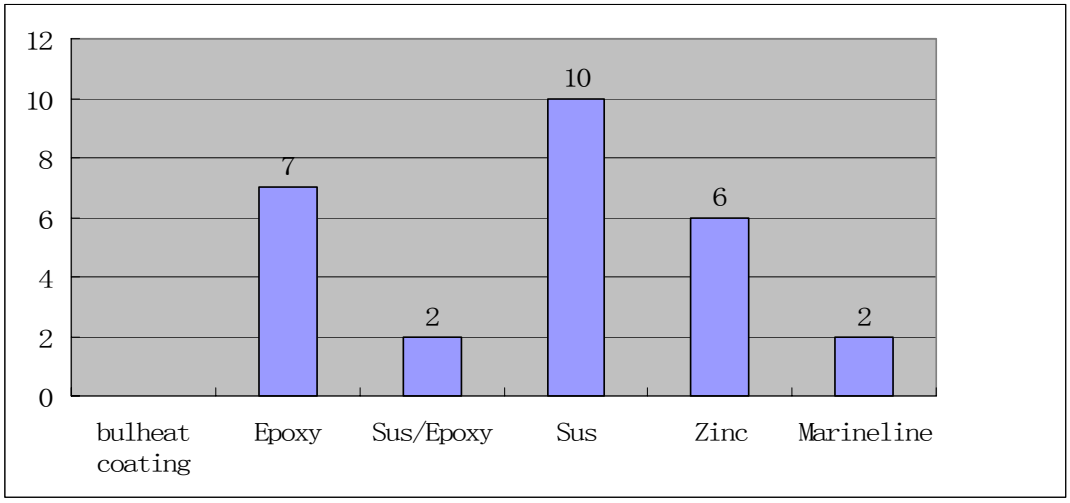


Figure 3–3 the shipping volume classification of Sinochem Shipping Corporation's fleet

From the figure above, most vessels owned by Sinochem are concentrated in the 4000-5000 DWT. The hull its own advantages that could transport cargo single vote can also vote assembled goods transport, with a large degree of flexibility. Meanwhile, 4000-5000DWT ship meet both of domestic trade transportation and foreign trade transportation on Far East area when transport capacity. According to the situation of shipping market, Sinochem can doing flexible deployment of the ship routes and try to reduce the cost which under a premise of maximize the freight. However, we can see that there is lack of vessels which is over 5,000 tons. As the largest chemical shipping company in Asia, the current status is hardly convincing. To enter the Middle East liquid chemicals transport market more smoothly, the new ships with larger size is an inevitable trend.

(3) According to the bulkhead coating:



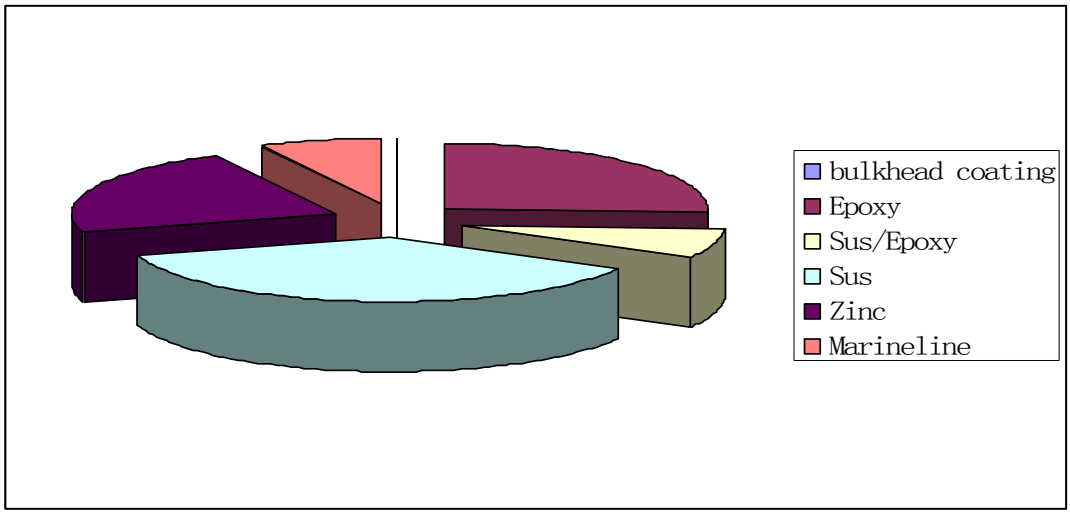


Figure 3-4 the bulkhead coating classification of Sinochem Shipping Corporation's fleet

From the figure above, we can see that coating on vessels of Sinochem is diversified. The advantage for diversified coat is quite flexible which means that ships can carry different cargoes which can be appropriate loaded. But each coating also has its own limitations. For example, zinc coating requirements goods pH maintained at 5.5-11; Acid and not water erosion, If the oil free fatty acid (FFA) more than 2.5% when the coating is not applicable. And alkali - resistant epoxy coating with good, bad acid applied to ethylene glycol plant and animal oils, water and lye. And the inside of stainless steel coated with the coating can not compare with other advantages, stainless steel liquid cargo hold may need to transport the shipment of various goods, shorten the time for inspection and washing ship in the harbor of parking time is shortened, thereby reducing the parking charges. In Sinochem, vessels with stainless steel coating only take small proportion. In order to take a substantial market share in international shipping market, increasing the number of new stainless steel vessels is an urgent task.

(4) Special cargo carriers

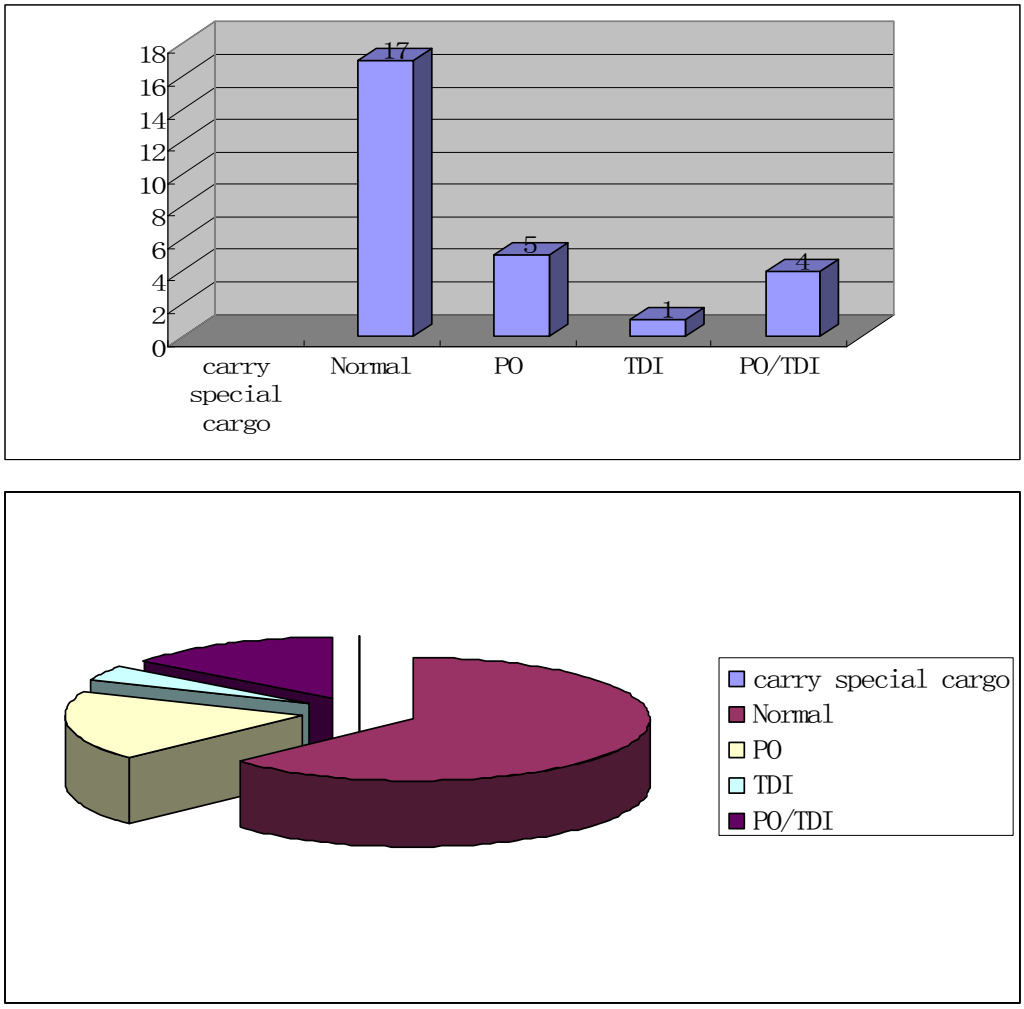


Figure 3-5 the carrying capability of special cargo classification regarding to Sinochem Shipping Corporation's fleet

However, compared with other domestic ship owners, Sinochem has maximum of vessels used in special cargo transportation. But accompany with the transport demand of some certain cargoes as PO, TDI increased continuously, obviously, only satisfied with the current demand is far from enough. Meanwhile, because that less vessels can be used in special cargo transportation which also means of high tariffs, then when the two groups of cargoes has conflict on schedule, ship owner certainly prefer the cargoes with higher tariffs.

3.4.3 Ship's age

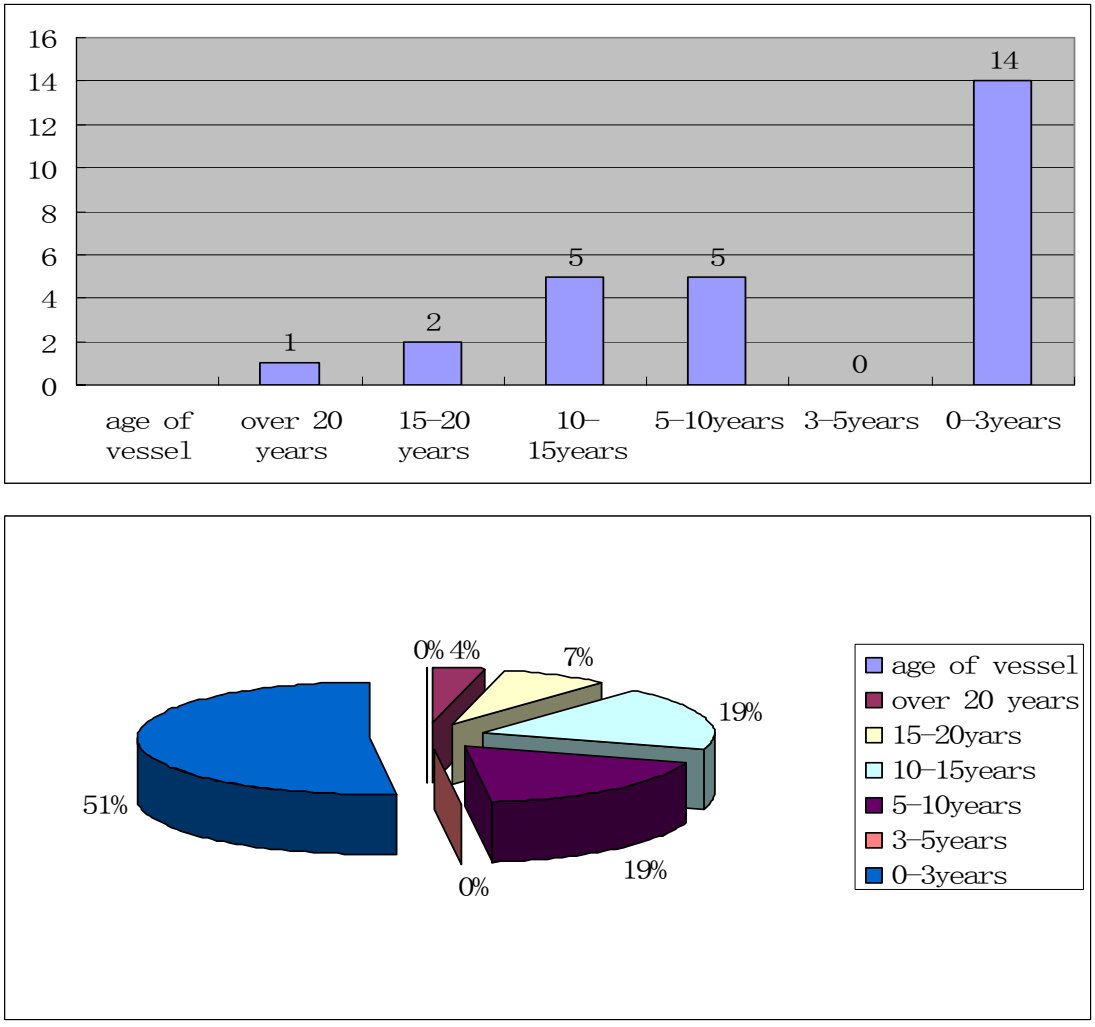


Figure 3-6 the age of vessel classification regarding to Sinochem Shipping Corporation's fleet

From the structure of age of vessels, an exciting situation is that the new vessels are in the majority and even taking over the half of total number. This is due to more and more cargo owners prefer relative stricter examination. In this situation, a new vessel is certainly attractive. At the same time, on some aspects such as speed, handling condition, washing, fitness, the new vessels take incomparable superiority than old vessels. However, elder age of the large ships an inevitable problem. Nowadays, some vessels as zhonghua1, zhonghua7, zhonghua9 with an average age of 15 which

operating in foreign trade shipping. Although there is a group of new vessels with over than 10,000 tons put into operate, for Sinochem, its aim is not only to meet the balanced capacity, but also try to have a qualitative leap when the old ship withdraw from the market.

3.5 Fleet capacity on different routes

3.5.1 Fleet on international trade transporation

Currently, Sinochem has 5 ships operating in foreign shipping trade, which have total DWT to 42,500 tons. Main shipping routes of these 5 ships are: Singapore to China or South Korea; West India to Singapore or Indonesia; Brazil / Argentina to Africa; Brazil / Argentina to Europe and Malaysia / Indonesia to Africa, etc..

3.5.2 Fleet on domestic trade transportation

Before the year 2005, most of vessels in operating is flag-of-convenience ships and mainly operate international routes. From 2005, the shipping company started entering into shipping of domestic trade. Nowadays, Hainan Sinochem takes up 60% of target market in the current high-value liquid chemicals shipping industry and with 21% share of comprehensive market. In forecasting, the company will keep on top in high-value market in further 5 years.

3.6 Summary of this chapter

Sinochem shipping, China's largest company of liquid bulk of the water transport company, is mainly engaged in long, Near foreign international routes and domestic coastal routes of liquid chemicals cargo transport, ship management business. The company is a fleet of ships from the structure, age and distribution routes are reasonable, and have a high-quality contingent of the crew. So which of shipping in the domestic liquid chemicals transport market share of one of the major forefront and the capacity to build ships at the end of 2006 to 2008 have delivered for use, then capacity will be far ahead of domestic competitors. But for one to become Asia's largest chemicals company owner, capacity expansion in order to enter the

international market is the most urgent task. Along with capacity and the expansion of the various management personnel is a problem that deserves our attention and resolved.

Chapter four the prospect on liquid chemical marine transportation market both in China and Middle East

4.1 Mathematics model

4.1.1 Exponential smoothing method

Based on time series forecast method--- exponential smoothing method, which mainly based on the time series forecast method is the smooth forecasting technology. This smooth method may divide into the method of moving average and exponential smoothing method, the latter one is improved and developed by the former; And exponential smooth method may divide into once smooth forecast, twice smooth forecasts and three times smooth forecasts according to the times. When the data and material jumped around with one horizontal line, should use once smoothing forecast model; When the data and material assumes to grow (or drop) with the tendency of sustaining linearity, should use twice exponential smoothing method; But if when the data and material assumes to grow (or drop) with the tendency of continually curve, should use three times exponential smoothing model.

Three times exponential smoothing model:

$$Y_{t+T} = a_t + b_t + c_t T^2 \qquad (4\text{-}1)$$

then:

$$a_t = 3S_t^{(1)} - 3S_t^{(2)} + S_t^{(3)} \qquad (4\text{-}2)$$

$$b_t = \frac{\alpha}{2(1-\alpha)^2}\left[(6-5\alpha)S_t^{(1)} - 2(5-4\alpha)S_t^{(2)} + (4-3\alpha)S_t^{(3)}\right] \qquad (4\text{-}3)$$

$$c_t = \frac{\alpha^2}{2(1-\alpha)^2}\left[S_t^{(1)} - 2S_t^{(2)} + S_t^{(3)}\right] \qquad (4\text{-}4)$$

$$S_t^{(1)} = \alpha X_t + (1-\alpha)S_{t-1}^{(1)} \qquad (4\text{-}5)$$

$$S_t^{(2)} = \alpha S_t^{(1)} + (1-\alpha)S_{t-1}^{(2)} \qquad (4\text{-}6)$$

$$S_t^{(3)} = \alpha S_t^{(2)} + (1-\alpha)S_{t-1}^{(3)} \qquad (4\text{-}7)$$

Among these formula: Y_{t+T} is (t+T) issue of forecast value， a_t 、 b_t 、 c_t are smoothing factors，T is forecast in advance time，$S_t^{(1)}$ 、$S_t^{(2)}$ 、$S_t^{(3)}$ are respectively first

second third times exponential forecast values of t time，X_t is actual observed value of t time，α is weight coefficient, and usually use α=0.01~0.30.Through anglicizing the historical data, we use α=0.10 due to the data of increased tons has sudden fluctuation. α=0.10 can eliminate the influence irregular of change.

4.1.2 Based on influence factor forecast method- Linear regression

Linear regression attempts to model the relationship between two variables by fitting a linear equation to observed data. One variable is considered to be an explanatory variable, and the other is considered to be a dependent variable. The simple linear regression equation is also called the least squares regression equation. It tells you the amount of variance accounted for by one variable in predicting another variable. It has an equation of the following form:

$$Y = a + bX \qquad (4-8)$$

where X is the explanatory variable and Y is the dependent variable. The slope of the line is b, and a is the intercept (the value of y when x = 0).

Such forecast method through analyzing historical data, promulgates the domestic trade marine transportation volume is correlated with economical variable of quantitative relation, which use it to forecast future cargo volume. As is known, there are many factors to influence domestic trade marine transport volume, such as the development level of national economy, the development of economic centre, the development of shipping technique, the development level of international trade and other uncertain factors. As space is limited, This article simplifies it, only consider the GDP as the primary factor to influence the volume of domestic trade marine transportation.

4.1.3 The combination forecast model

Combination forecast has been demonstrated to be a successful technique for enhanced forecast accuracy of economic and financial variables. There are different kinds of combination of forecast. Hereinafter, I will apply a combination forecast method that is called Variance – Covariance combination forecast which the equation as follows:

$$Y = Y_1*(1/S_1) / (1/S_1+1/S_2) + Y_2*（1/S_2）/（1/S_1+1/S_2） \quad (4\text{-}9)$$

In this equation: Y – the results of combination forecast, Y_1 – the results of smooth forecast, Y_2 – linear forecast results, S_1 – the mean square deviation of smooth forecast, S_2 – the mean square deviation of liner forecast.

4.2 The analysis and forecast of liquid chemical transport volume from China domestic trade

4.2.1 The analysis of China domestic trade market

In the future years, the development of liquid chemical market has large space to increase. The liquid chemical industry which will develop main origin to two parts: the muti - national petrochemical enterprise newly entries this project, as well as the extension project of China petroleum, China petrochemical.

With these petrochemical projects invested by multinational corporation go to produce, which largely increase the demand of the liquid chemical marine transportation from domestic trade. In the future three years, with the large-scale petrochemical installment of BASF Shanghai, SECCO Shanghai, BAYER Shanghai, BP Nanjing, CNOOCSHELL etc going to produce, which will lead the increase of producing and transport demand and further will enlarge the market scare of liquid chemical marine transportation.

The market increase also comes from China petroleum, China petrochemical and other domestic companies. The domestic petrochemical enterprise on the one hand grows according to the domestic market need, carries on improving existing

installment is for the purpose of improving the international competition ability the technological transformations; On the other hand they must act according to the market industry structure and layout structure, then investing the projects approaching the market and the resources area, in order to advance the base construction of our country large-scale petrochemical. YPC, Yanshan petrochemical, Qiru petrochemical, Jinglin petrochemical, Jinshan petrochemical Shanghai, and Maoming petrochemical etc all have the ethylene or other chemical products expansion project in construction. According to some data from Shanghai shipping exchange institute, in 2005, the amount of our country liquid chemical marine transportation is approximately more than 6 million tons, estimated will approach 13 milion tons in 2010, which defiantly show the fast growth trend.

4.2.2 The forecast of transport demand from China domestic trade

Exponential smoothing method：

First we show the amount of China liquid chemical marine transport regarding domestic trade from 1998 to 2007.

Table 4-1 China liquid chemical marine transport volume from domestic trade

Year	1998	1999	2000	2001	2002
Volume	1560000	1890000	2370000	2830000	3120000
Year	2003	2004	2005	2006	2007
Volume	4530000	4990000	6900000	10710000	11460000

Source: Shanghai shipping exchange

Then according to Formula 4-1, 4-2, 4-4, 4-5, 4-7 through EXCEL get:

Table 4-2 The computations process and forecast value of three times exponential smooth

Year	Volume	$S_t^{(1)}$	$S_t^{(2)}$	$S_t^{(3)}$	a_t	b_t	c_t	Y_{t+1}
	1940000	1940000	1940000	1940000				
1998	1560000	1598000	1632200	1662980	1560380	-4581.11	-21.1111	
1999	1890000	1860800	1837940	1820444	1889024	3765.111	33.11111	1555778
2000	2370000	2319080	2270966	2225913.8	2370255.8	6045.3	18.9	1892822
2001	2830000	2778908	2728113.8	2677893.8	2830276.4	5774.944	3.544444	2376320
2002	3120000	3085891	3050113.1	3012891.2	3120224.3	3645.445	-8.915	2836055
2003	4530000	4385589	4252041.5	4128126.5	4528769.2	17038.65	59.46029	3123861
2004	4990000	4929559	4861807.2	4788439.1	4991694.3	6245.23	-34.6687	4545867
2005	6900000	6702956	6518841	6345800.8	6898145.4	22986.61	68.36222	4997905
2006	1.1E+07	10309296	9930250.1	9571805.2	10708942	46821.22	127.1637	6921200
2007	1.1E+07	11344930	11203462	11040296	11464700	10763.01	-133.936	10755890
								11475329

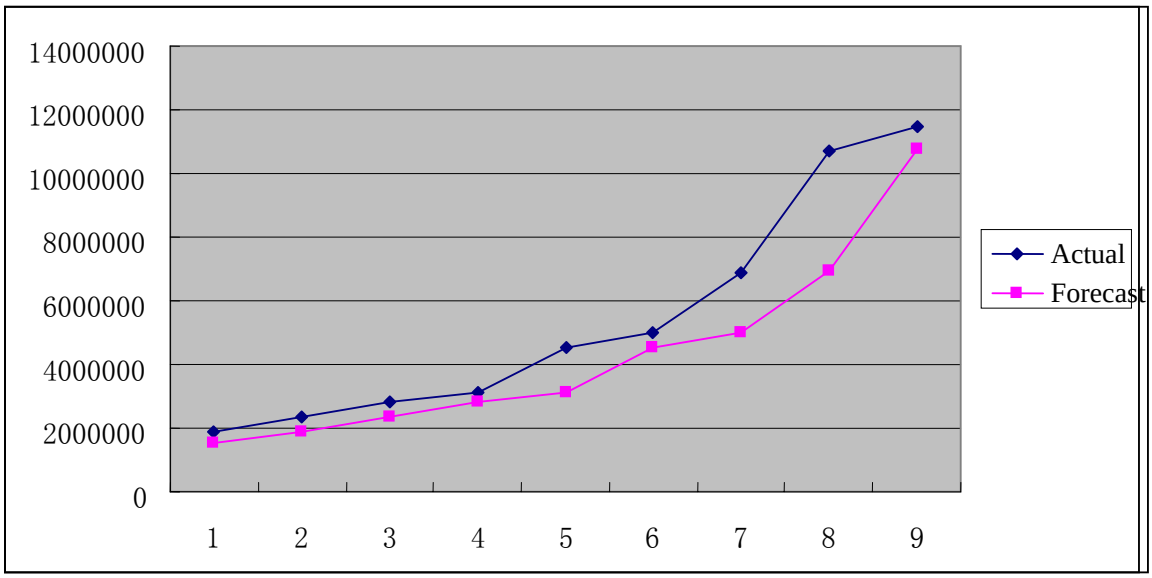


Figure 4-1 the comparison between real value and forecast value

Finally obtains the equation is ： $Y_1(2007+T)=11464700+10763.01T-133.936T^2$

Y_1 2008 = 11475329

Y_1 2009 = 11485690.28

Y_1 2010 = 11495783.61

Linear regression：

First lists all previous years domestic GDP index with the liquid chemical domestic trade marine transportation amount which corresponds:

Table 4-3 all previous years domestic GDP index and liquid chemical domestic trade marine transportation amount

Year	GDP（hundred million)	DOMESTIC TRANSPORT
1998	4287.407	1560000
1999	4593.527	1890000
2000	4979.384	2370000
2001	5392.672	2830000
2002	5883.406	3120000
2003	6471.746	4530000

2004	7125.393	4990000
2005	7830.807	6900000
2006	8574.733	10710000
2007	9346.459	11460000

Source: the statistics of IMF

Carrie on the correlation between GDP and the liquid chemical domestic trade marine transportation amount by EXCEL to examine

:

Table 4-4 the correlation examination result between GDP and liquid chemical domestic trade marine transportation amount

	GDP	DOMESTIC TRANSPORT
GDP	1	
DOMESTIC TRANSPORT	0.968025325	1

According to the above examination result, the GDP and liquid chemical domestic trade marine transportation amount have a higher correlation.

Though the table 4-3, after linear regression computation by EXCEL, get:

Table 4-5 the computation process and results of linear regression

SUMMARY OUTPUT					
Return statistics					
Multiple R	0.96802533				
R Square	0.93707303				
Adjusted R Square	0.92920716				
Standard error	950345.462				
Forecast value	10				
Variance analysis					
	df	SS	MS	F	Significance F
Regression analysis	1	1.076E+14	1.076E+14	119.1315	4.39988E-06

Residual error	8	7.225E+12	9.032E+11		
total	9	1.148E+14			
	Coefficients	Standard error	t Stat	P-value	Lower 95%
Intercept	-7838729.1	1217254.3	-6.439681	0.0002	-10645722.4
X Variable 1	1996.52981	182.92055	10.914738	4.4E-06	1574.714267

RESIDUAL OUTPUT			
Forecast value	Forecast Y	Residual error	Standard residual error
1	721206.797	838793.2	0.9361591
2	1332384.5	557615.5	0.6223427
3	2102759.5	267240.5	0.2982614
4	2927901.31	-97901.31	-0.109266
5	3907666.37	-787666.4	-0.879098
6	5082304.72	-552304.7	-0.616415
7	6387330.44	-1397330	-1.559531
8	7795710.51	-895710.5	-0.999683
9	9280980.94	1429019.1	1.5948975
10	10821754.9	638245.09	0.7123317

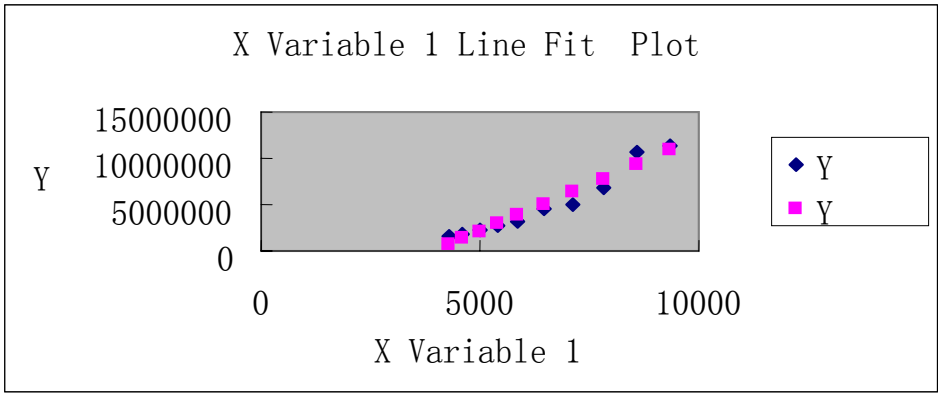


Figure 4-2 the results of linear regression

Finally this linear equation is：

Y= 1996.52981X – 7838729.1,X is GDP index, use linear regression by EXCEL and IMF previous GDP index, get the forecast of China GDP

Table 4-6 the forecast value of China GDP

Year	2008	2009	2010
Forecast GDP(hundred million)	9889.756	10554.152	11218.547

After use equation Y_2=1996.52981X_2-7838729.1 get：

$Y_2$2008= 11906464ton

Y_2 2009= 13232950ton

Y_2 2010= 14559434ton

Combination forecast:

According to the Forum 4-9 then use Excel get the f_1 = 0.57866 = $(1/S_1)$ / ($1/S_1+1/S_2$); f_2 = 0.42134 =（$1/S_2$）/（$1/S_1+1/S_2$）.

Finally the results of combination is：

Y2008 = 11656984.3 ton

Y2009 = 12211884.24 ton

Y2010 = 12786622.3 ton

Then through EXCEL for test

Table 4-7 The results of Combination forecast

Real value	Exponential smoothing	Linear regression	Combination forecast
1560000		721206.797	
1890000	1555778	1332384.5	1461652.928
2370000	1892822	2102759.5	1981277.493
2830000	2376320	2927901.31	2608724.391
3120000	2836055	3907666.37	3287569.914
4530000	3123861	5082304.72	3949035.66
4990000	4545867	6387330.44	5321752.951

6900000	4997905	7795710.51	6176738.064
10710000	6921200	9280980.94	7915474.9
11460000	10755890	10821754.9	10783641.65

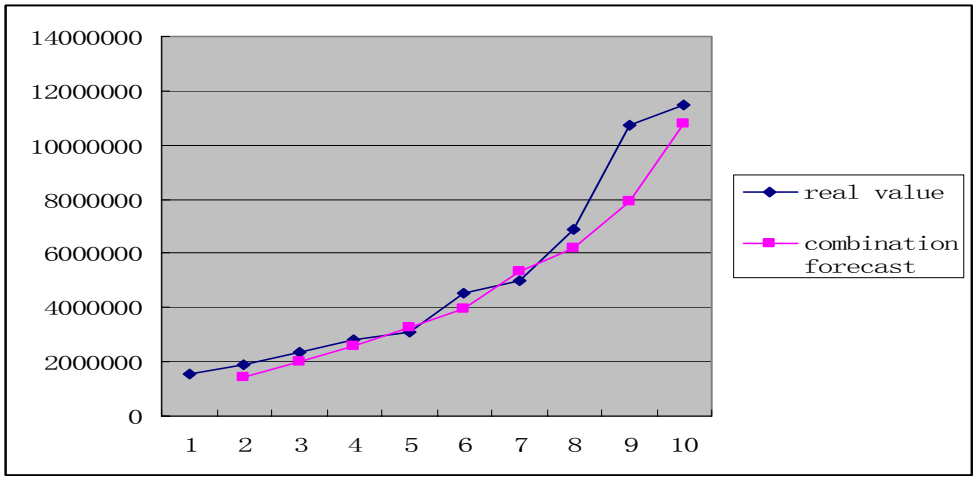


Figure 4-3 the comparison between real value and combination forecast value

Through the chart we can find the reliability of combination forecast. Because smooth forecast and linear regression are separately suitable for short – term forecast and middle – term forecast, and combination forecast unifies these two characteristics means more accurate than use them separately.

4.3 The analysis and forecast of liquid chemical marine transportation demand from Middle East

4.3.1 The analysis of Middle East marine transportation demand

The abundant petroleum natural resources enable the Middle East to have their comparable competitive advantages over the world. In recent years, the Middle East used the inexpensive raw materials of petrochemical, introduced and used now the world most advanced craft technology and the management pattern to construct a large quantity of extroversions large-scale petrochemical installment, then vigorously produced the large amount petrochemical products such as: aromatic hydro carbon, the polyethylene, the glycol and the methyl alcohol. These large amount

petrochemical products mainly for the Asian market, with the continue growth of producing capability, Asian countries, especially China will increase the marine transportation demand due to the chemical trades between these two regions.

In recent years, Take Saudi Arabia, Iran and Qatar as the head example, Middle East petrochemical industry is developing rapidly. The ethylene of Middle East total output were 643,000 tons in 1980, increase to 10.8 million tons in 2004, estimated will amount to 20.47 tons in 2008. According to forecast, the 50% producing growth of world ethylene will be from Middle East, thus it will cause the fast growth of ship transport demand in the future several years. The fast development of Middle East petrochemical industry definitely will bring the enormous development opportunities for the international liquid chemical marine transportation.

In 2005, Middle East's petrochemical product and the plastic output increase to 4,000 ten thousand tons/years, the export of total quantity amounts reach to 3,000 ten thousand tons/years, the product exports to 70 countries over the world, and surpassed US to become the biggest export place of petrochemical product and the plastic. Statistics have indicated that at present, the Middle East petrochemical product flows into the Asian country, approximately composes of the total export quantity 50%, and another 25% exports will flow into the European market, and the rest 25% will export to world’s other countries and area. According to the Middle East in 2004 the ethylene, producing 0.8 million tons, which exported to Asian countries is almost equivalent to China's current ethylene production capacity. It is estimated that in 2010, Middle East will export to Asian the ethylene products which can reach 12.50 million tons. At present, including India, Vietnam, the ASEAN countries have astonishing pace of development, these countries are following China's economic development footsteps, the demand for Middle East liquid chemicals, will soar. Hence, it is expected that the Asian region is the main flow of Middle East petrochemical products exports, and this is the main driving forces of Middle East liquid chemicals capacity needs.

4.3.2 The forecast of Middle East marine transport demand

Led by the rapid development of petrochemical industry, shipping demand for these products will get great development opportunities. Ethylene total capacities from the Middle East in 1980 are 643,000 tons, in 1993 with 3.95 million tons, in 1997 for 5.88 million tons and in 2001 reach to 8.77 million tons in 2002, get 9.8 million tons, in 2003 9.93 million tons and in 2004 up to 1,080 million tons. In 2005, the Middle East exports of petrochemical products and plastics are up to 30 million tons. From 2004 to 2007, the Middle East will be added ethylene production capacity more than 9 million tons, at least 65 ~ 75% ethylene expansion can be used for the production of polyethylene. To 2008, the Middle East ethylene production capacity will reach 2.047 million tons, of which Saudi Arabia will occupy 8.88 million tons / year, Iran will occupy 6.41 million tons / year, and other countries (Qatar, the UAE, and Kuwait) will account for 5.18 million tons / year.

Unit: million ton

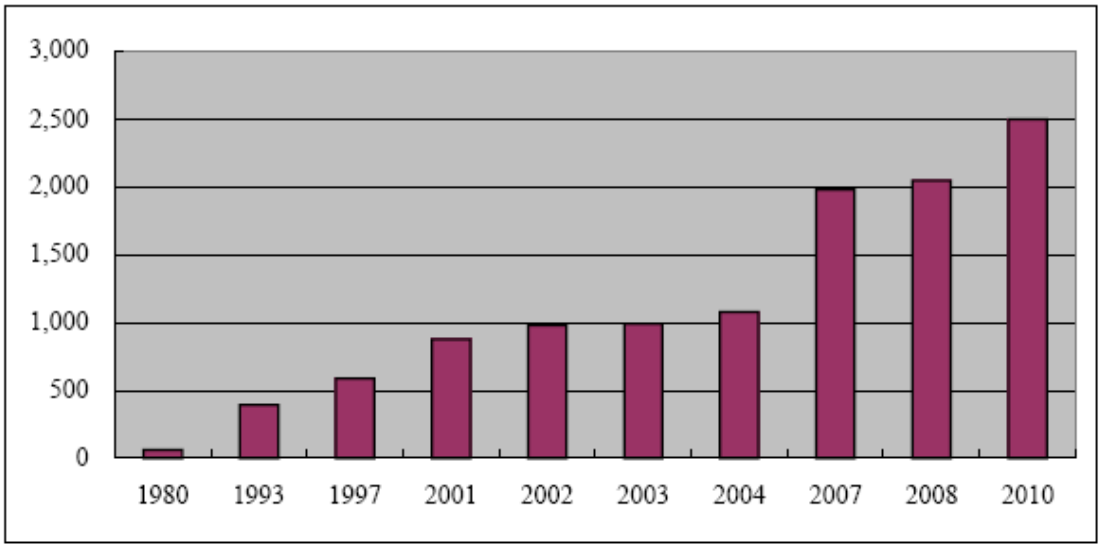


Figure 4-4 the forecast of liquid chemical marine transportation demand from Middle East market

Source: the statistics of Middle East forum

4.4 Summary of this chapter

By using combination forecasting model, we found that the volume of domestic trade growing fast as an inevitable trend, through foreign authority and showed that the forecast volume of transport demand in the Middle East also increase steadily. Under such situation, for Sinochem shipping, a company want to be the most powerful chemical shipowner , definitely need to re-plan the supply of transport capacity on such two routes.

Chapter five The reasons of Sinochem shipping corporation's fleet expansion

5.1 The analysis of Sinochem Shipping Corporation's market share

Sinochem shipping is always the biggest shipowner of liquid chemical transportation in China. Before 2005, most vessels were flag of convenience, mainly operated at international routes. Since 2005，Sinochem shipping has shifted his business to domestic trade transportation. At present, Sinochem shipping retains 60% market share of China liquid chemical seaway transportation high market, 21% of composite market. It is estimated that coming 5 years, Sinochem shipping will continue to retain the leader role in this high market.

5.2 The transportation capacity shortage

5.2.1 The transportation capacity shortage in China domestic trade market

The analysis of transport supply from domestic trade

From the aspect of transport supply, as a result of the needs to transport liquid chemical continue growing fast especially in domestic market, the vessel which can undertake to transport the fine chemical is relative insufficiency, but which can achieve the requirements from transnational petrochemical enterprise and the domestic large-scale petrochemical enterprise is more limited. According to synthesis reckoning, till the end of 2007, the market demand of high end liquid chemical industry transportation is approximately 60 vessels, Transports the question of insufficient transport capacity will still be prominent even in quite a long period.

The analysis of Sinochem shipping transportation capacity in domestic trade market

The multinational corporation and the domestic large-scale petrochemical enterprise, are the main customers of chemical water transportation in domestic trade, and also is the most main origin of increased transportation amounts, company set them as the main goal market. The key demands of these customers are the guarantee of

transportation quality. To guarantee the high grade transportation service, first needs to obtain the transportation permit which the country issued, next must have the rich chemical industry transportation experience and the good brand, establishes the strict quality control system and the strict execution, Simultaneously also needs the support from more expensive transportation fleet(Stainless steel hull). Therefore, this market in aspects and so on brand, management technology as well as fund investment has restricted the new entrant.

According to reckoning, to 2009, domestic trade high end goal customer may demand approximately for close 700 ten thousand tons. According to 3,000-5,000 ton level ships equivalent computation, if each ship annual mean undertakes to transport the quantity is approximately 12 ten thousand tons, namely the ships demand are approximately 58.Therefore, It is estimated that future several years later, the demand of domestic trade high end market goal customer will grow surpasses 10%,The company market share goal is maintains about 50%~60%.Still according to 3,000 – 5,000 ton vessels equivalent computation, in order to transport 385 ten thousand tons per year, Sinochem shipping need to supply 32 vessels of 3,000 – 5,000 tons to meet the requirements from such market.

Unit: ten thousand tons

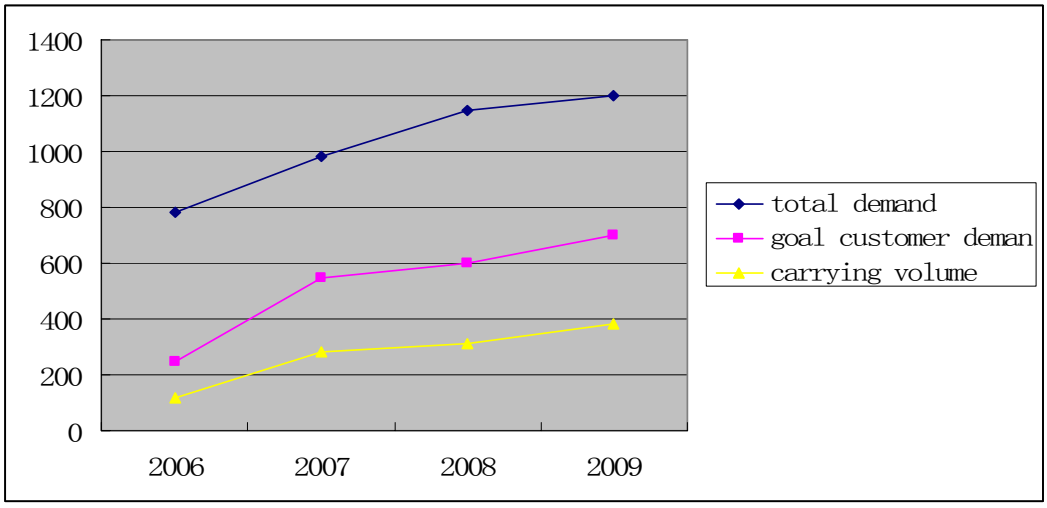


Figure 5-1 the market analysis of domestic trade high end market goal customer

Source: interior report of investigation of Sinochem Shipping Corporation

The company at present is the leader of the domestic liquid chemical water transportation with a high market share, with more and more new-building ships start to transport in succession from 2006 to 2008, the transport capacity by far will be in the leading role compare to these domestic competitors. The company in 2004 and 2005 has already made part preparation for the domestic trade market, which support the company succeeded to obtain the domestic trade transportation contract from part of high end customer since 2005 to 2008.The company through enhances the long term contract to lock this goal market, shifts by the market goods primarily service pattern to the contract goods, which make the company reduce the management risk, simultaneously has also obtained the reasonable transportation charges, and leads the international business by the domestic trade service, forms internationally business and internal transportation service coexisting, supplementing.

5.2.2 The marine capacity shortage in Middle East market

The analysis of transport supply from Middle East market

In the liquid chemical marine transportation market of Middle East, some operators already controlled by large-scale petrochemical enterprises, and also others are the independence third party shipping companies, but it is estimated that 65.2% marine transport market share needs are satisfied through the independent third party shipping company. At present the transport supply of the Middle East marine transportation market is basically in balance, but along with IMO new rule implementation, chemical tanker especially the single hull vessel will increase the demolition amounts, which possibly causes single hull vessel to be compelled to withdraw from the market, and also causes the supply of transport capacity in reduction. On the other hand, facing fast growing demand, although each large shipping company sped up new vessel building steps in abundance, because the shipbuilding cycle must continue generally two to three years, transports capacity in short-term is difficulty to obtain the fast supplement, and will cause the added transport capacity unable to follow the day by day fast growing market demands. Moreover the world shipping industry even focus more on the petroleum chemical

industry transportation security and part old aged vessel demolition will speed up steadily which causes the liquid chemical marine transportation capacity in tense even such difficult situation will difficult to alleviate in the short-term. Above factors will cause the transport capacity growth to be lower than the demand rate of rise in the near future, It is estimated that Middle East liquid chemical marine transportation market will face such transport capacity shortage which will exist in the long time.

According to international independent oil tanker shipowner association statistics, the Middle East existing transport capacity for 240 ten thousand tonnages per year can approximately satisfy the market requirement, but along with the increase of petrochemical producing ability and the exports volume, some old aged vessel quitted from this market, the estimate transport capacity will be short of approximately 300 ten thousand tonnage.

The analysis of Sinochem shipping transport capacity in Middle East market

At present, the transport capacity of Sinochem shipping in the international liquid chemical marine transportation market is few, and the influence is limited. But some large-scale petrochemical companies from Middle East have had many years trade cooperation with Sinochem shipping, meanwhile based on Sinochem shipping operated successfully in liquid chemical marine transportation market of domestic trade, these large-scale Middle East petrochemical companies will be the latent idea customer after Sinochem shipping entering the liquid chemical marine transportation market of Middle East. On the other hand, in the last few years，the Sinochem shipping has had the good cooperation continuously with domestic and the international liquid chemical trader as well as the vegetable oil and the refined oil trading company, had the quite stable customer and source of cargo in Southeast Asia, far east and the coastal area, all which make Sinochem shipping gained lots of rich experience from the international level.

According to reckoning, to 2009, the Middle East market goal customer demand is approximately 2,400 ten thousand tons. According to 10,000-20,000 ton level ships equivalent computation, if each three ships annual mean undertakes to transport the quantity is approximately 20 ten thousand tons, namely the ships demand are approximately 360,but in such market there are still 30,000 – 40,000 ton level vessels.

Therefore, It is estimated that future several years later, The Middle East market goal customer demand will grow surpasses 12%, the goal customer of Sinochem shipping will maintain the market share nearly about 3%. This meant the company needed to put in 700,000 tons approximately transportation capacity in the Middle East to meet the requirements, still according to each three ships annual mean transport approximately 20 ten thousand tons cargo, Sinochem shipping need to nearly 10 10,00 to 20,000 ton vessels to Middle East market.

Unit: Million tons

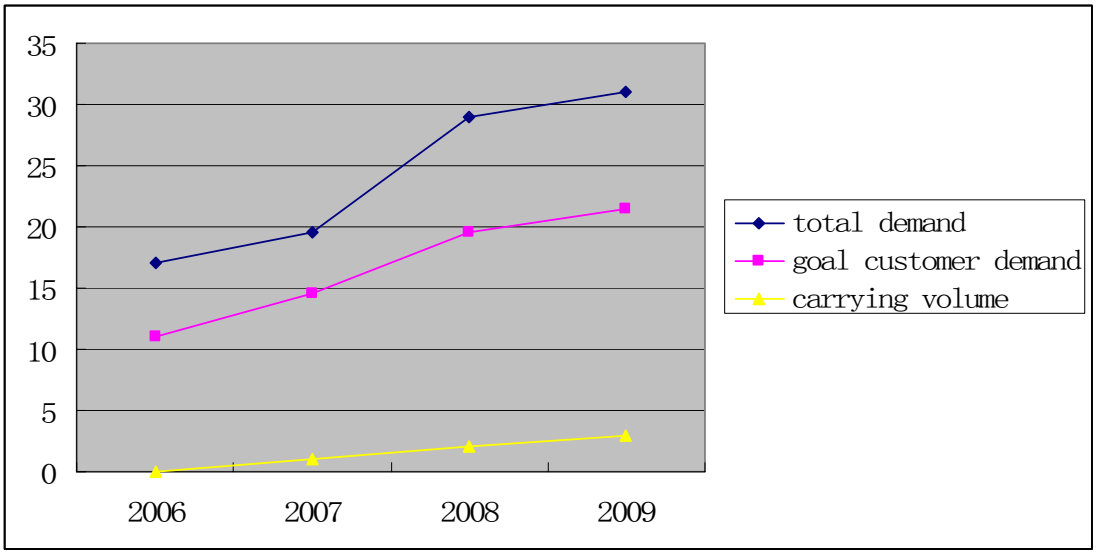


Figure 5-2 the analysis of Middle East market goal customer demand

Source: interior report of investigation of Sinochem shipping

As the most history and the biggest scale chemical trade enterprise in China, Sinochem shipping is continuously maintaining the good cooperation with Middle

East petrochemical enterprises. At present, the company had already launched to develop the corresponding work of Middle East market, and had already carried on substantive contact with Iran Petrochemical Corporation and the Saudi Arabian basic industry corporation. Both sides will carry on the deeper step service cooperation in the liquid chemical distribution which will create win-win aspect.

5.3 The market pressure from other competitors

5.3.1 The competitors from domestic trade transportation market

At present, in the aimed high end liquid chemical transportation market of domestic trade, the company holds 60% about market share and has the quite obvious superiority. Because the high end customer core demand is “Transports with the guarantee of security and quality”, which need to ask the shipowner to obtain the permission of transport regarding to the country issues, the shipowner must provide high grade and high standard ships simultaneously. But such vessels need the fleet which cost high construction fee to support. Regardless of this market is with the government permitted or with the technical investment which all have high standards for the new entrants.

The mainly competitors of Sinochem shipping are Nanjing tanker corporation ,COSCO Dalian, Dongzhan logistics Dalian, Shanghai NORMIC shipping company and so on, The above four companies altogether have 20 ships at present. According to transports capacity investment in the near future, it is estimated that in 2008 the above four companies will have 25 chemical tankers.

5.3.2 The competitors from the Middle East market

In the liquid chemical marine transportation market of Middle East, shipping operators includes one controlled by large-scale petrochemical enterprise, and another is the independently third party shipping company.

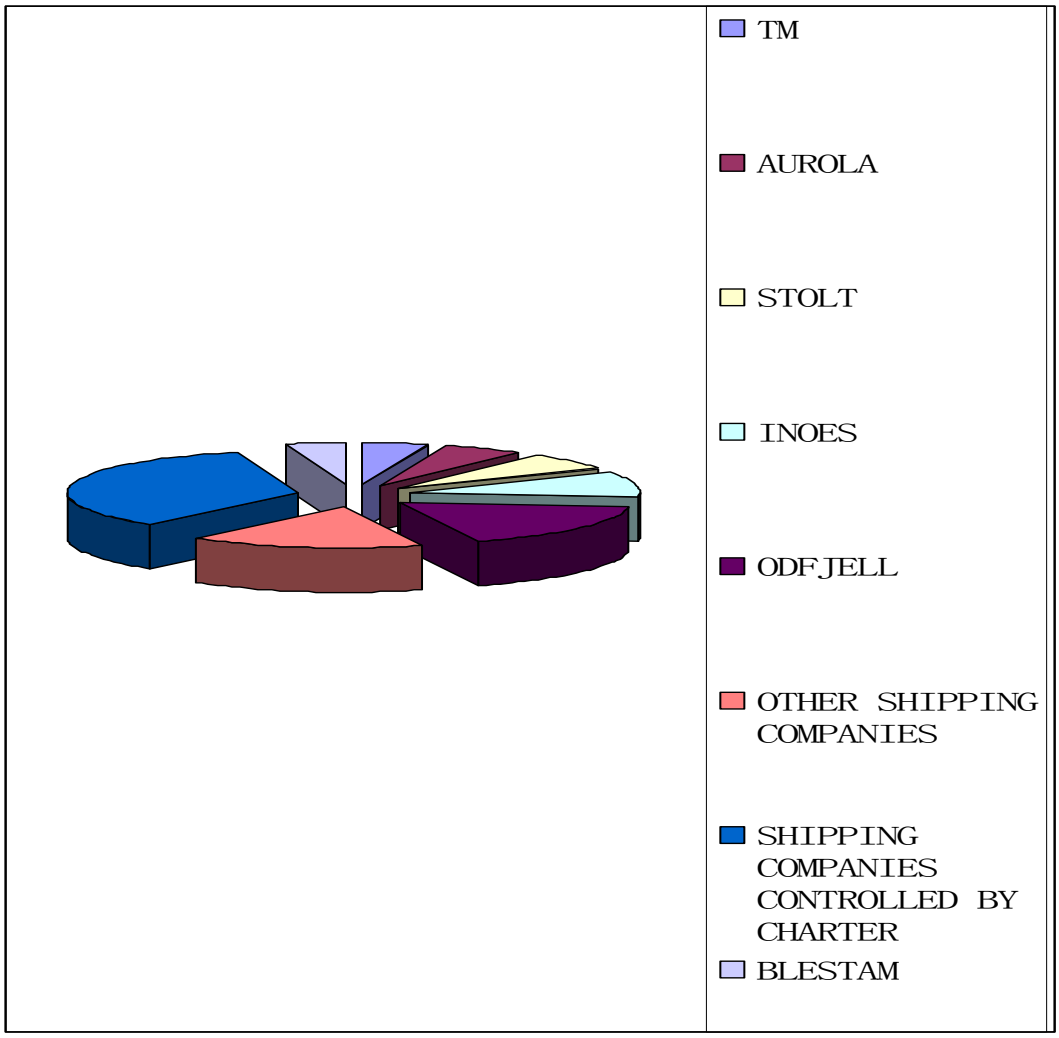


Figure 5.3 the market share of liquid chemical export transportation from Middle East (marine transport).

(1) The large-scale petrochemical enterprise controls transports capacity

Middle East large-scale petrochemical enterprise like SABIC、Iran's petrochemical Company and so on which all have their own shipping company. In addition to owning vessels, these companies also adopted the form of time chart to compensate for the lack of capacity. Large-scale petrochemical enterprises which control the transport capacity nearly occupy the 34.8% market share of entire Middle East liquid chemicals transport, which accounted for 41% liquid chemicals transport market share form Middle East export to Asia.

(2) Independent third party shipping company

Owing to the chemical shipping capacity shortage of the entire Middle East market, 65.2% of liquid chemical marine transport market regarding to exports and 59% of marine transports market from Middle East to Asia all require independent third-party shipping companies to meet. The main independent third-party shipping companies are as follows:

Odfjeu and Iino lines: They are SABIC two long-term cooperation partners, the vessels from such two companies are mainly Stainless Steel. Stolt logistic company: mainly transport the cargos which are fine chemicals. The Orola Oil companies: taking low-cost expansion strategy, the main vessels are 45, 000 DWT, carry methanol for Iran petrochemical.

At the Middle East market with good prospects, large international chemicals tanker owners have also increased a new investment in shipbuilding, in order to get the substantial market share from Middle East.

5.4 Summary of this chapter

After undertaking a situation analysis and prediction of such two routes: domestic trade in China, Middle East export. We clearly found that two routes will be clearly insufficient capacity. And for Sinochem shipping, if they can play their own advantages, increase the transport capacity with targets and scientific plan, Will definitely win new business opportunities.

Chapter six The projects of Sinochem shipping corporation's fleet expansion

6.1 Sinochem shipping corporation 2010 prospects plan

One of the Company's Developmental core strategies of liquid chemical industry physical distribution service is the Development plan of specialized transportation ships. What directly affect the company's Market competition status and ability of healthy continual development is whether the future ship form and Fleet structure is in accordance with the development tendency of market demand. So it is imperative to hold the opportunity to increase the constitutive investment of the vessel used in domestic trade.

On the other hand, the company increases the capacity to Middle East liquid chemical marine transportation market while continuing to maintain the stable growth of domestic transportation market; this is a important way to hold the market opportunity to promote the company's global operation and competing ability.

The company expects the introduction of a series of plans enable the company fleet structure to become more rational and the ship models to get better adjusted to meet the market demand. The series of plans is also of great significance to the company's expanding and upgrading the domestic trade of liquid chemicals shipping and the share of Middle East market as well as promoting the integration of liquid chemicals logistics services strategy.

6.2 Chartering

It is a temporary measure that supplements the transport capacity by chartering the fleet to resolve the insufficient of short-term transport capacity. Its merit is: taking fewer funds and obtains the ships in time; Does not need to raises the large amount fund and repay principal and interest, just needs to pay the rent on time. According to the lease stipulation; Comparing with the purchase ships, it will lower economic loss caused by the leaving ships unused when the market is not booming. Its shortcoming

is: transport business income rate is inferior to the innate ships, the technical performance and running ability not completely satisfied to undertake to the transporting request. But the transport business income rate of chartering usually relates to the quotation and opportunity in the chartering market. If the rent is low and the lease is long when the ship is rented, the chartering transport business income will be fine. If rent the ship by the the method of bareboat chartering, our country crew are enable to be used to further reduces the ships cost and enhances transport business income. Therefore, the developing shipping enterprise not only to take chartering as an essential way to supplement the transport capacity , moreover also it took raises the crew quality, the accumulation management experiences and develops the fund important method, it is one kind of first considered way to make the fleet scale to grow strong. For instance, presently Sinohem shipping has got time chart a 3000DWT chemical tanker---Baohaitun from odfjue & Dongzhan to meet the needs of the COA business between Sinochem shipping and CNOOCSHELL..

6.3 Order new building

The good and bad points of making to order the new ship to expand the fleet scale exactly be opposite with purchasing the old ship. Its merit is: the technical and economical performance is good, the energy consumption is small, the maintenance and repair and examines expenses and so on insurance is low; The ships' each kind of technical transport business parameter designated after the optimization proof, therefore they have high transportation efficiency; The transportation cost is low and the transportation quality is high, they has strong competitive ability and so on. In addition, making to order the new ship is easier to obtain our country government or the financial organ financial subsidy and the loan on favorable terms. If it is in the domestic to make to order new ship, it is also advantageous in promotes our country's ship-building industry development, expands national's employment avenue and so on. The shortcoming of making to order new ship is: The passage fee is expensive; the period from Making to order the ships to the starting of transport business is long; The fund is unable to recycle in that period; The ships

maintenance cost is high, once the ships idle, the economic loss is very high. But, because of the prominent merit of making to order the new ships, some shipping enterprises with abundant funds always prefer making new ships to expand their fleet scale, and at the same time they seek the advantageous fund raising channel and choose appropriate shipyard.

For Sinochem shipping, to meet the demands form previous forecast markets; they prefer ordering new vessels which have some plans to do:

6.3.1 Domestic trade market and Far East route:

Sinochem plan to invest 4.8 hundred million Yuan to build 4 8,000 ton level liquid chemical transportation ships. In September, 2006 makes to order 4,the first sets sail in May, 2008, each later 4 months will set sail a ship, the fourth ship will set sail in May, 2009.

The fund total invests: RMB 120,000 K/ships *4ships =RMB480, 000 K Yuan. After the project of newly making 4 ship domestic trade water transportation implementation, it will increase the yearly average sale income by 16,142 ten thousand Yuan, and the yearly average net profit by 4,652 ten thousand Yuan, the internal returns ratio is 12.4%, the investment recumbent period is 9.3 years.

6.3.2 Middle East market:

Sinochem plan to invest 5.1 hundred million Yuan to construct /to purchase 2 18,000 ton level liquid chemical tanks to use in the Middle East route foreign trade water transportation. In September, 2006 in domestic makes to order 2 18,000 ton levels liquids chemical ship. In the project implementation process, the company will make pay attention on the shift of domestic and foreign ships buying/ building market, If the situation appears that to buying/building ship’s price is lower, project income rate is higher in the overseas, then the company will consider buying/building ships in the overseas. If the company decided to implement the overseas to buying/building ship

plan, they will be strict according to the national related stipulation goes through the correlation examination and approval formalities.

Shipbuilding time plan: In September, 2006 designates the shipyard, signs shipbuilding contract, in the end of 2008 year hands over the first ship. Buying/building ships quantity and the specification: 218,000 ton level IMO II double shell double bottom, energy conservation environmental protection technological advance liquid chemical transportation ships.

The fund total invests: RMB 255,000 K/warships *2warships =RMB510, 000 K Yuan. After the project of buying/building 2 ships for Middle East water transportation implementation, the yearly average sale income will get 11,377 ten thousand Yuan in normal management year.

The yearly average net profit can reach to 2,542 ten thousand Yuan in normal management year, the internal returns ratio 11.1%, investment recumbent period 8.3 years.

6.4 Purchase second – hand vessel

Generally speaking, the prominent merit of purchasing the old ship is:the passage fee is low generally; The ships just need to re-equip slightly then can be used in transport business, can have the investment benefit quickly ; The maintenance cost is low, once ships idle, economic loss relative small. But because they are old ships, a series of shortcomings is inevitable, mainly manifests in: on one hand, as a result of the high energy consumption, the big fuel expense, and in addition the high quota service maintenance, expenses and examination insurance and so on, the economical performance is bad. On the other hand, the main engine power, the speed, transport business rate drops, thus causes the behavior in service to reduce, adapts with difficulty with the specific transport business environment, causes the loading and unloading efficiency to reduce, to anchor the port time to lengthen, the grade of

service is worse than the new sell's. This is one important way for the enterprises, which certainly urgent need ships transport capacity and are expanding the fleet scale to choose.

6.5 Conglomeration and joint venture

Because the competition between shipping enterprises is intense, the fund density degree is high, the management risk is big, many shipowners have big interest in the union management, the union management strategy exists nearly generally in the shipping industry, and moreover it has become a big characteristic in this industry. But as the biggest shipowner in the domestic chemical market, the union management is more actually and became a widespread significance.

6.5.1 Monopolization union management

The typical monopolization union management form is the shipping conference. but regarding to Sinochem, one way is union with Nanjing tanker or COSCO Dalian, another way is to union with Stolt and TOKYO Marine such big owners. This kind of union management may limit the competition in the same industry. This union management foreign repels and attacks the non-trade union shipping merchants, divides the influence in their services, carries on the marine transportation monopoly (source of goods and transportation charges) management, seeks the sudden and huge profits.

6.5.2 Union investment

Actually, the shipping industry is a fund intensity industry, although they can obtain the fund through financing channels as banks and so on, but the burden of repayment loan is very heavy. However in front of the good market opportunity, the enterprise which has a common goal can arrive the same place, invests together, and altogether braves dangers. The shipping enterprise married with the financial industry may obtain loan with preferential benefit; Married with the shipyard may avoid the influence of the ship price undulation in the worldwide, moreover can obtain the

attendance in the payment condition, the technical performance.

6.5.3 Enters the new market jointly

The independent enterprise that wants to enter the new shipping market and face unfamiliar and unpredictable new environment takes big risks. The companies jointly enter the new market with a goal to get help from the rich experience of the cooperation side, enable himself to stand firm in the new market, in order to help in the future development.

6.5.4 Sharing cargo sources

It is well known that Sinotrans is the Chinese biggest freight transportation agent. Its regional companyies grasp a lot of resources. Therefore many overseas carriers who want to enter the Chinese market may make cooperation with Sinotrans as an important method which corners cargo expansion. Presently, in the situation that the source of goods contention intense, union management with the big cargo owner will be able to be extremely advantageous to the shipping enterprise's stable development.

6.6 The risk of Sinochem Shipping Corporation’s fleet expansion

6.6.1 War and political risk

The Middle East is the highest area of war risk in the world , once the war erupts, it will make a huge effect to the shipping market, may especially for Sinochem shipping, Because Sinochem shipping will plan to enter the Middle East market.

6.6.2 Surplus of future transport capacity risk.

Recently several years, along with the development of petrochemical industry and the increase of petrified product import quantity in our country, the transport capacity is seriously short in the domestic liquid chemical seaway transportation market, thus attracted the massive funds to invest into the liquid chemical ship transport market, in the future several years liquid chemical ship transport market possibly will face surplus of transport capacity risk. However, from the overall condition, on the one

hand some strength enterprise are insufficient of transport capacity in our country liquid chemical ship transport market, on the other hand a lot of unsafe low cost chemical tank massively flood the market, this increase the safety factor to the domestic seaway transport without doubt.

6.6.3 The operation cost enhances risk caused by the crude oil price rise

At present the global crude oil price still in a high level, shipowner's transport business cost still was high. And such situation will not change in near future.

6.6.4 The risk in management and operation caused by scale expansion.

With more vessels operated in the future, there may bring many risks on management level without any doubt.

6.7 Summary of this chapter

The Sinochem shipping corporation’s fleet expansion needs a scientific measurement, chartering, buying second hand ships, building the new ship, even carrying on the cooperation with the more world first-class chemical shipowner, all these are good choices. But based the indiscipline of market, at the same time we can not underestimate the risk caused by the fleet expanding, therefore we need even more scientific style when making policy.

Chapter seven The scheme of Sinochem shipping corporation's fleet expansion projects

7.1 Accumulation of fund

7.1.1 Issue of stocks

After making the investment decision about the construction or purchasing of new ships，some of the listed shipping corporations could raise the funds by issuing new shares on the stock market under certain conditions. For instance, the NOL, Maersk, Haisheng shipping、Ningbo marine,Tianjin marine etc. Sinochem international has issue the stocks already, but how to manage it scientifically is still for us to analysis.

7.1.2 Issue of commercial bond

Presently, there are three main bond markets in the world containing European Bond Market (EBM), American Bond Market (ABM) and Japanese Bond Market (JBM). And the EBM is becoming the hotspot of the international shipping financing in last few years. The major advantages of EBM are including lower financing cost, shorter financing time, wide range of the investor, various currencies for the loans and the flexible arrangement for the date of the repayment. COSCO Group had been successfully issued 50-million dollars European Bond in EBM.

7.1.3 The loans from international Syndicate bank group

During the last few years, the financing mode of large international shipping enterprise groups(ISEG) is transforming from simply commercial bank loan to international Syndicate loans which has the advantages mainly in bigger funding quota, wide selections of the currencies and flexible ways to draw and repay etc. When the ISEGs select to borrow the money from Syndicate they have to be prepared to take the risks from the changes of interest and exchange rate. And that

is where we could use some technical terms to make them fixed to defuse the risks.

7.1.4 Shipyard credit

Essentially, the mode of Shipyard credit is a kind of concession in payment terms committed by some large Shipyard to attract more and bigger shipbuilding orders. For this mode, the installment is the most general choice, and some time the prompt could be 7 or 8 years after the delivery of new ship which means the financial pressure to the shipping enterprises could be largely released. Main while the building capacity of the shipyards could be fully utilized.

7.1.5 Ship renting

Ship renting is another financing mode usually adopted by the international shipping industry. Many shipping enterprises are short at fund and got only little size during their developing phase. So they choose to rent the ships from others and manage them by their selves. This kind of operating mode has the quick payback with less risks and money demands. However, it may also diminish the profits from the venture management.

7.1.6 Financing tenancy

In the case of Financing Tenancy, lessees who play the role of vendee negotiate with the shipyard concerning the type and construction schedule of the ship etc. and the bank or finance institutions act as the lesser that pays for the ship which means the proprietorship as well as the obligation of insurance are belonged to the lesser. The lessees run the management of the ship including the crew recruitment and regularly rent payment etc. When the leasehold is up, the lessee could buy the ship from the lesser under an extremely low price if the repurchase agreement was included in the contract. This mode could efficiently reduce the risk for the lesser. In case of the lessee’s unpunctuality of rent payment, the lesser could revoke the ship. Further more, the Financing Tenancy mode has unique flexibility in tax

arrangement which can effectively reduce the related loss as well as the tax burden of the lessee, in all words reduce the financing cost.

7.1.7 SHIKUMISEN financing mode

This is a unique Japanese Financing mode. The demand of power and row material of Japan is large, and most of them need to be imported which lead to the huge requirement of shipping capacity. In general circumstances, the huge Japanese enterprises intent to sign the staple shipping contracts with foreign shipping companies. Using this contract as the guarantee the shipping companies could easily get the loans from Japanese banks then order the ship from Japanese shipyards. Since the ship is for export, the companies could enjoy the preferential policies for the export credits which cut the price of the ship actually. All the elements mentioned above impulse the ship building industry of Japan.

7.1.8 Classical repurchase mode

Firstly, the shipping enterprise pawns its own ships for fund which could be 80% of the ship prices. Then they rent the ship from the buyers under a favorable price. In this way the enterprises could recover the operating capital quickly, and during this time the proprietorship is belonged to the buyer. When the leasehold is up, the shipping enterprise could redeem the ship from the buyer if the running of the capital is well enough. By doing so the enterprise could acquire the needed fund to purchase new ships, main while the risk for the buyers could be diminished.

Making a compressive view of the international financing market for shipping industry in last few decades, we could find some specific characters. During the mid and late of 60th, the ship constructing was mainly depended on the bargain or credits (shipyard credits) and the ship-owner’s capital. At the same time, governments were also participated actively in order to support the domestic ship constructing industry. After the 70th, lots of commercial bank invested huge amount of capital in the international shipping industry because of blossom of it

and the flourish of the economy. When the time came into the late of 70th and early of 80th, the international shipping market slipped into a low tide which caused mint loss to lots of banks. Capital withdrawing made the shipping financing much harder and the financing term became harsh which increased the burden to the ship-owners. After the 90th, the loans from Syndicate and finance from the bond market became the major financing avenues. After the late of 90th, the modes of financing developed diversified. Financing Tenancy, Issuing new shares and repurchasing became to show their particularly advantages.

7.2 Increasing of crew

Sinochem shipping is intent to priority cultivate 4 or 5 crew agent companies which have the high management standard and faithfulness in order to build up its own official crew group. Main while, the company will use the successful experience of foreign ship manage enterprises as the reference, intensify the professional morality training and organize the regularly workshop as well as the evaluation for the ship-owners.

Sinochem shipping will recruit the crews mainly throw the major agent companies, maintain and develop the preferential policies for the recruitment, expand the recruitment to the trainees and intensify the training strength to form the echeloned back up forces. Main while, Sinochem shipping will carry out various trainings including the pre-mount training program for the management official crews, the training for the marine affairs, mechanical affairs, cargo arrangement, goods purchasing and commercial departments, the training for pre-mount of new ships, onboard training and so on. Specific person will be assigned to follow the training program in order to consummate the educational materials and arrange the regular training workshops.

7.3 Enhancing the administrate intensity

There are three parts in the administration aspect: (1) the construction of

information system; (2) the consummation of manage system for safety; (3) the improvement safety-management system

7.3.1 The construction of information system

Sinochem shipping will invest to establish a set of high efficient and advanced managing system for the ships operating information step by step. This system including several major modes for mechanical affairs, purchasing, crew affairs, marine affairs, safety and quality affairs, cargo arrangement, ship renting, commercial affairs respectively. The information system for ship operating and management could be combined in process and data communication with other operation systems such as the internal financial system, client relationship organization system and data warehouse etc. The information system of ship operation and management could boost the development of current business, increase the efficiency of the operation process, provides the decision support for the management, control the risks to reduce the operation cost and finally establishes the integrated service platform facing the clients.

7.3.2 Consummation of safety-management system

Sinochem shipping has already been established an integrated system for the safety management which is passed the verification of National Marine Affair Administrative Institution. The safety manage system can meet the demand from top-level client and still being perfected. Main while, the company was also established a set of improving programs for the safety-management-system in order to ensure the effectively conducting of every operation decisions, further more, realize the stable and efficient management between bank-bank or onboard-onboard departments.

7.3.3 Improvement to operating mode

(1)The management to ship group

A ship administrate group containing two directors, one for the marine affair

(captain) another for the mechanical fairs (the chief engineer). One group like this take in charge of the fairs concerning to 4~6 ships such as the safety observation, tracking the dynamic information of the ship, analyzing the weather or nautical situation, monitoring the operation state of the mechanical equipment and the maintenance for the ships, supply providing, problem shooting, arranging the land-based technical services, giving onboard directions, examines and trainings, accident treatment, related prevent measures, emergency drilling and treatments.

(2) Monitoring of cargo arrangement

The cargo arrangement department is in charge of cargo distribution, washing and inspection of hold, goods (un)loading, sampling and related storage, prevention of the pollution to the environment by goods, maintenance of the cargo hold coat and stainless steel wall etc. This department is also in charge of the prepare of hold washing guidance for the company, the assessment to the suitability before the arrangement of new cargos, study the character of specific goods and provide related training to the crews; Giving onboard direction, examines, training, cargo accident treatment, correction and prevention services.

(3) Back stage support

Crew department is in charge of equipping the eligible, licensed, healthy crew to the ships, making sure that the crew can get the normal cycling rest and land based training, maintaining the well cooperation with domestic and international crew agent companies, establishing the collaborating mechanism with the well known maritime colleges for the education of specific posts. The purchasing department is in charge of providing the supplies including the equipments, sea maps and related publications promptly to insure that the ships could get enough reserves. The safety and quality department is in charge of monitoring the running situation of the safety management system, organizing the ship-dock examinations including both internal and external and trailing the problems for further improvements.

7.4 Improving the quality of staff.

There are 43 staff members of Sinochem shipping including 34 persons who have the undergraduate degrees which take up 81 percents and 8 persons holding the junior college degree taking up 12 percents. The average age of the staff is 35. The professional backgrounds of the staff are including navigation, ocean shipping, project management, chemical engineering, maritime law, international trade and economics etc. In the land based administrating group, the number of persons who got the experience at sea and holding the professional license is 20 including 12 persons who got the first class ocean capital license and 8 persons with the first class ocean chief engineering.

The company will increase the investment for staff training which is in purpose of open up their concept and establishing the overall scope. For example, the company may offer the employees chances to reenter the campus to receive the MBA or on-job postgraduate courses, or some opportunities to study and communicate with the experienced foreign ship-owner enterprises. Of cause, the professional training will still be emphasized as before.

7.5 Optimizing the organization

Optimizing of the organization is mainly reflected by the fact that Ao Xing a professional ship managing company will take the whole charge of safety production management for all ships of Sinochem shipping, and it will make some necessary adjustment to Sinochem’s organization. There are five departments including Maritime (MAD), Mechanical (MED), Safety and Quality (SQD), Crew (CD) and Cargo Arrangement (CAD) affairs department in this company. The duty of MAD is providing the navigate direction and safety examination to all ships. The MED is in charge of the maintenance of ships, monitoring the mechanical situation and purchasing the equipments. The SQD is in charge of the operation of SQAMS (safety and quality managing system). The CD is in charge of the recruitment and dispatch of crews. Finally, the CAD is in charge of the storage,

stowage and tank washing of the cargos.

7.6 Settlement of the fleet expansion risk

7. 6. 1For the risk of war

Sinochem shipping will plan to provide all the Middle East into operation of ships and personnel for war risk insurance.

7.6.2 For the risk of excess capacity.

Sinochem shipping consider that the liquid chemicals shipping market is lack of capacity of middle - and high-end market Which is describe as the cargo transport may from the factory of large state-owned petrochemical enterprises, Sino-foreign joint ventures or solely foreign-owned enterprises to the consumer or to trade hub transportation market. Actually, such enterprises consider the requirements of environmental safety as always the most important factor to choose their logistics service provider. But in China, which can meet the requirements are rarely, Sinochem shipping is targeted at such market. Sinochem shipping is considered as renowned enterprises of liquid chemicals shipping industry. With more than 10 years of liquid chemicals shipping experience, together with the strong cooperation with internationally renowned enterprises Stolt Nielsen which make him as leader in the domestic liquid chemicals transportation market. In addition, through signing long-term contract with big cargo owner Sinochem shipping ensure the stable income.

7.6.3 For the risk of crude oil price increase

Crude oil price increases will lead to higher costs of operating risk. At present, the global oil prices are still at a high level, the owner of the operating costs remain high. To this end, through contractual arrangements so that fuel prices will eventually be reflected in freight rates, so that the proceeds will not be a big impact.

7.6.4 For the risk of management.

As for the scale expansion which caused management and operating risks. Sinochem shipping currently have a long distance between the requirements of international standards. Although there had been some chemicals fleet management and operating experience, but because of time constraints involved, International shortage of talent staff, there still need for a study and exploration process. In addition to this, Sinochem shipping not only introduce more outstanding international shipping management and operating personnel from the market, but also pay attention to training and development of existing staff, get more help form the cooperation with Stolt Nielsen by raising the level of management.

7.7 The summary of this chapter

The fleet expansion must have scientific feasibility of the program to support, for Sinochem shipping, China's largest chemicals owner, they need to expand in all directions after fleet expansion, management of any one of the lag makes expansion will not implement the scheme smoothly.

Chapter eight Conclusion

This article begins from the supply and demand market analysis of liquid chemical transportation, and has made comprehensively and profound analysis to it. Then it considers that the China domestic trade liquid chemical transportation and Middle East liquid chemical transportation will continue the stable growth, and make the quota description to transportation growth.

This article has also carried on the analysis in its foundation to the Sinochem shipping and the competitors, and also the comprehensive analysis to the Sinochem shipping corporation's fleet expansion. It proposed that the Sinochem shipping expansion's guidance in the future is to adopt many kinds of way to develop the fleet scare. The concrete action includes: While develops own fleet, realizes the approaches from shifting "have the ship" to "control the ship"; Through financial innovation to buy the vessel or build new one; Depends upon technology, management and talented person superiority all which gained from past, then through annexation, joint capital, jointly operated and so on ways to realize ship's property expansion is quite an effective way; Introduces the strategic investor positively, creates the joint venture and so on.

The technical method of this research is feasible and this article applies the research technique will certainly has the influence to the further research and the practice application. The research conclusion will have the reality significance in promoting the Sinochem shipping and China liquid chemical transportation development.

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Attached table:

Table 2 - 1 World liquid chemical tanker fleet

Ship size	1 000～5 000t		5 000～10000t		10000～20000t		20000～30000t		30000～40000t		40000 万 t		total	
	volume	Total DWT	volume	Total DWT	volume	Total DWT	volume	Total DWT	volume	Total DWT	volume	Total DWT		Total DWT
IM0 2	222	70.1	283	213.4	299	454.0	56	137.6	89	315.1	61	276.2	1010	1466.4
IMO 2CPP	18	5.4	8	5.7	4	5.6	1	2.1	7	22.6	O	O	38	41.4
IMO 2／3	66	20.8	122	93.6	81	115.8	43	109.7	49	176．O	17	69.1	378	585．O
IMO 2／3CPP	6	1.4	12	7.6	O	0	O	O	6	22.8	O	O	24	31.8
IM0 3DH	51	20.0	42	29.0	17	23.9	3	8.2	28	97.3	62	289．O	203	467.4
IMO 3DHCPP	7	2.6	22	15.8	19	29.5	13	36.7	132	481.8	225	1032.4	418	1598.8
IMO 3NonDH	79	22.1	89	60.6	32	50.4	18	50.3	4	14.3	10	44.9	232	242.6
IMO 3NonDHCPP	22	5.6	30	20.2	14	19．O	13	36.7	9	31.3	14	62.2	102	175.0
NonIMO	100	26.5	74	51.4	49	76.0	30	86.1	80	280.8	93	431.8	426	952.6
total	571	174.5	682	497.3	515	774.2	177	467.4	404	1442.0	482	2205.6	2831	5561．O

Source: China shipping news