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To discuss the future development for Shanghai Xuanrun In Co.,Ltd Chemical Transformation

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TO DISCUSS THE FUTURE DEVELOPMENT FOR SHANGHAI XUANRUN IN CO.,LTD IN CHEMICAL TRANPORTATION

By

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China

A research paper submitted to the World Maritime University in partial fulfillments of the requirements for the award the degree of

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Declaration

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

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

2012-06-09

Supervised by
Professor ZhongBeiHua
World Maritime University

Acknowledgement

First of all, this thesis is written not only for myself to finish the work, but also as a strategy plan for our company's future. So I should thanks my father Capt. Mao Yunzhou to give me the choice to involve in the business daily working which give me a lot of working experience.

Secondly, I should thanks all the teachers from WMU and SMU which teach us a lot and not only limited in the studying. My working cannot leave the strong basis you give to us.

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We will enjoy the time we suffered. We miss the time we spend. We hope the sprit we have and had for long term.

Written by MAO Yuqing(Davy)
2012/5/29

Abstracts

The thesis itself is willing to discuss the vessel capacity development of shanghai Xuanrun shipping company limited.

Before we start to discuss the development of the vessel capacity, we should first analysis the chemical tankers market including their age, flag , capacity and coating. After that we will discuss the charterer market in china and the international. This part will help to decide the voyage route design and also influence the profit analysis.

Also, we should add the new theory into the future tankers design. The efficient , convenient and green tankers will be the trend in next 10 years.

Finally, we should according to the cost structure and the voyage route to calculate the profit and decide whether this item is worth to invest or not. The NPV and IRR will be used to solve the problem.

This thesis is willing to make sure whether invest in the chemical tanker transportation is worthy. So the risk assessment is also important. We should discuss whether the market is over capacity and the debt crisis, war risk and other items should add into account.

This thesis should not only discuss the ShangHai Xuanrun’s future development and should also add the experience of other companies into thinking.

Contents

Chapter 1 Introduction **1**
1.1 Introduction 1
1.2 The history of Chinese's chemical vessel development 1
Chapter 2 Literature review **2**
2.1 Research status 2
2.2 Analysis of ship 4
2.3 Analysis of market 4
2.4 Research Methodology 4
Chapter 3 Ship analysis **5**
3.1 Age analysis 5
3.2 Capacity analysis 7
3.3 Coating analysis 9
3.4 The analysis of china's ship owners 12
Chapter 4 Market analysis **20**
4.1 General cargo analysis 21
4.2 High standard cargo analysis 22
4.3 Market area analysis 27
Chapter 5 New building strategy **31**
5.1 The rules taking effect 31
5.2 Idea of green tanker 33
5.3 Idea of New building 36
Chapter 6 The route design **37**
6.1 The domestic route design 37
6.2 The international route design 43
6.3 The Summary for the voyage route design 48
Chapter 7 Income analysis **49**
7.1 Cost structure 49
7.2 The cost structure for DWT 2000-3000 51
7.3 The cost structure for DWT 12000 54
7.4 The NPV and IRR analysis 59
Chapter 8 Risk assessment **62**
8.1 Freight rate risk 62
8.2 Bunker price risk 64
8.3 The crew management risk 65
8.4 Exchange rate risk 65
Chapter 8 Summary **66**

List of Tables

Table 1: Analysis by her nationality 10
Table 2: Analysis by her coating 10
Table 3: Analysis by her deadweight 10
Table 4: Analysis by her age 11
Table 5: Analysis by her nationality 11
Table 6: Analysis by her coating 11
Table 7: Analysis by her deadweight 12
Table 8: Analysis by her age 12
Table 9: Analysis by her nationality 14
Table 10: Analysis by her coating 14
Table 11: Analysis by her deadweight 15
Table 12: Analysis by her age 15
Table 13: The factory and annual yield for PX 18
Table 14: The import and quantity analysis for PX 19
Table 15: The trend of PX importing 20
Table 16: The high standard charterer analysis 23
Table 17: The EEDI for all type of vessel 29
Table 18: the route plan 1 for the domestic for DWT 2000 33
Table 19: the route plan 2 for the domestic for DWT 2000 34
Table 20: the route plan 3 for the domestic for DWT 2000 35
Table 21: the route plan 1 for the domestic for DWT 12000 37
Table 22: the route plan 1 for the international for DWT 2000 39
Table 23: the complex route design l for DWT 2000 40
Table 24: the route plan 1 for the international for DWT 12000 41
Table 25: the route plan 2 for the international for DWT 12000 42
Table 26: the route plan 3 for the international for DWT 12000 43
Table 27: The cost structure for DWT 2000-3000 47
Table 28: The voyage between Mailiao and Ningbo 50
Table 29: Mailiao – Ningbo – Ulsan – Mailiao – Ningbo 51
Table 30: Tianjin – Davao – Merak – Kandla – Iran – Zhangjiagang 53

List of Figures

Figure 1: The age of the vessel 2
Figure 2: the age of DWT 2000-2500 3
Figure 3: The Deadweight Distribution 4
Figure 4: The new building after 2012 5
Figure 5: The coating of global chemical vessel 7
Figure 6: The coating of new building 8
Figure 7: The trend of PX importing 20
Figure 8: AG to Indian , Singapore and Far East 25
Figure 9: Jubail Top 12 operator shares 2010-2011 25
Figure 10: Jubail exports by commodity 2010-11 26
Figure 11: Jubail 2010-2011 discharge area 26
Figure 12: NYK the summary of emission savings 31
Figure:13: the route plan 1 for the domestic for DWT 2000 34
Figure 14: the route plan 2 for the domestic for DWT 2000 35
Figure 15: the route plan 3 for the domestic for DWT 2000 36
Figure 16: the route plan 1 for the domestic for DWT 12000 37
Figure 17: the route plan 1 for the international for DWT 2000 39
Figure 18: the complex route designl for DWT 2000 40
Figure 19: the route plan 1 for the international for DWT 12000 41
Figure 20: the route plan 2 for the international for DWT 12000 42
Figure 21: the route plan 3 for the international for DWT 12000 43
Figure 22:The NPV and IRR for the DWT 2000-3000 56
Figure 23: Drewry tanker freight rate index 57
Figure 24: Bunker price 58
Figure 25: Exchange rate risk 59

List of Abbreviations

DWT=dead weight

Chapter 1 Introduction

1.1 Introduction

The Shanghai Xuanrun Shipping Company is a shipping company established after 2009 which is focus on the chemical transportation in domestic and international route. The company wants to use the new management theory and modern commercial plan to set up the future strategy.

The main goal of this dissertation is to analyze the high standard of the chemical transportation market and to arrange suitable size of vessel in each route. The commercial management should not only think about the income and cost, but also cash flow management, profit management and cost control. Each company should has its own strategy but not always follow others step.

1.2 The history of Chinese's chemical vessel development

First , we should look back the development of the China's chemical fleet.

China's chemical vessel development should divide into 4 steps.

1.2.1 China didn't enter this area until the China shipping first buy a oil tanker and changed into chemical vessel in 1983. Which show the government's determination to enter this area. During 1980-1999, the launching of "Ninghua402" and "Ninghua410" shows our country is able to design and build the chemical vessels by ourselves.

1.2.2 From 1994 to 2003, with the establishing of Sino-Chem, the chemical vessels development in china enter the second step. In this step , the owner in china still focus on buying the second hand in order to organize their own capacity as soon as possible. And the equipment ,vessel's coat and small deadweight are all limited reasons which only suit to carry easy chemical.

1.2.3 With the BYC and other foreign companies starting the business in china, the owners in China enjoy the best time. Due to the high standard of foreign companies

require, the owners in China start to accept the oil inspection like SIRE, CDI. During these time, the domestic charters also started their own business. Different with the foreign companies focus on the safety and service, the domestic charter choose the vessel only according to owner's price. In this step, the owners started to build their own vessel and NJTC became the second largest chemical owner after Sino-chem.

1.2.4 From 2006 to now shows the 4th step of the developing of Chinese chemical owners. More and more personal investment enter this area and the whole capacity of china exploded during this time. And the class of ZC hasn't really exercised its obligations , which cause some parts of vessel can only sail but not under a safety condition. After 2007, the MSA ban the ZC continue to build vessel.

Chapter 2 Literature Review

Introduction: In this chapter, we should discuss the all the literature I used in the thesis . The thesis we talk about is from ship analysis, market analysis and new building analysis. Also we should use the NPV and IRR to make sure , whether the invest is worth or not.

2.1 Research status

In the Global CT Fleet 31 Jan 2012 has mention all the fleet and their age, flag, coating and deadweight. Also it include the ship owner, operator ,management company and the ship yards. The table can help me to analysis the tanker from their deadweight, coating, flag and age. Due to the capacity and coating is the important for it is symbolize a trend of future tanker development. The age and flag is a limited to control the time and told us which kind of tanker is symbolize the future.

In paper "The EEDI" , the IMO has introduce the rules influence the future tankers development. The EEDI is The Energy Efficiency Design Index which is a product of a broad church united around a single objective ---- the reduce of GHG emissions from ships.

Consider the following simplified EEDI formula:

$$EEDI = \frac{CO_2\ emission}{transport\ work}$$

The EEDI, in establishing a minimum energy efficiency requirement for new ships depending on ship type and size, provides a robust mechanism that may be used to increase the energy efficiency of ships, stepwise, to keep pace with technical developments for many decades to come. It is a non-prescriptive mechanism that leaves the choice of which technologies to use in a ship design to the stakeholders, as long as the required energy-efficiency level is attained, enabling the most cost-efficient solutions to be used. Such technologies have been comprehensively considered in the 2009 IMO GHG Study.

In the paper of "market area analysis", the Drewry report had analysis the Asia, Mid East and European market. It helps to find out the import and output the general cargo like PX and SM.

In the paper of "idea of green tanker", the MR. ZhanYu from CCS has introduce the 25 ways to reduce the CO2 emission. The theory is as a guidance to Chinese ship owner in the future tankers development.

In the paper of "NPV and IRR", Pierre Cariou from WMU has introduced the theory of NPV and IRR.

Net Present Value (NPV)

Money has a time value as an amount of money held now worth more than an equal amount to be held in the future. This is particularly true when considering inflation that significantly reduce the value of money over time. It leads to the distinction between 'real' and 'market' interest rate (Fisher effect) so that:

(1 + Market interest rate) = (1 + Real interest rate) * (1 + Rate of inflation)

To account for these effect and when moving from future to present, future cash flows need to be discounted.

The Net Present Value (NPV) of an investment is then the sum of discounted net cash flows so that:

$$NPV = \sum_{i=1}^{n} \frac{A_i}{(1+r)^i} - C$$

Where: n — project life;

Ai — net cash flows at the end of year i

R — discount rate

C – initial capital expenditure

Internal Rate of Return (IRR)

The Internal Rate of Return (IRR) is derived from NPV. IRR is the discount rate for which NPV is equal to 0. An investment is eligible if the IRR exceeds the interest rate of return you can expect from another investment.

2.2 The analysis of ship

According to the Global CT Fleet 31 Jan 2012, the ship age analysis can help to find out how many ship should be abandon and when to abandon. Age management is a skill to find out when to sell the tanker can bring the maximum profit.

The coating analysis can help to find out which kind of coating is suit for which kind deadweight.

2.3 The analysis of market

With the Drewry report and 2 years working experience, I had collect the recent 10 years resource of the market. This report can tell us the market change and trend of the market.

2.4 Research Methodology

This dissertation will establish a calculation in which the benefits and advantages of different deadweight . For instance, the cost structure and difference route design will

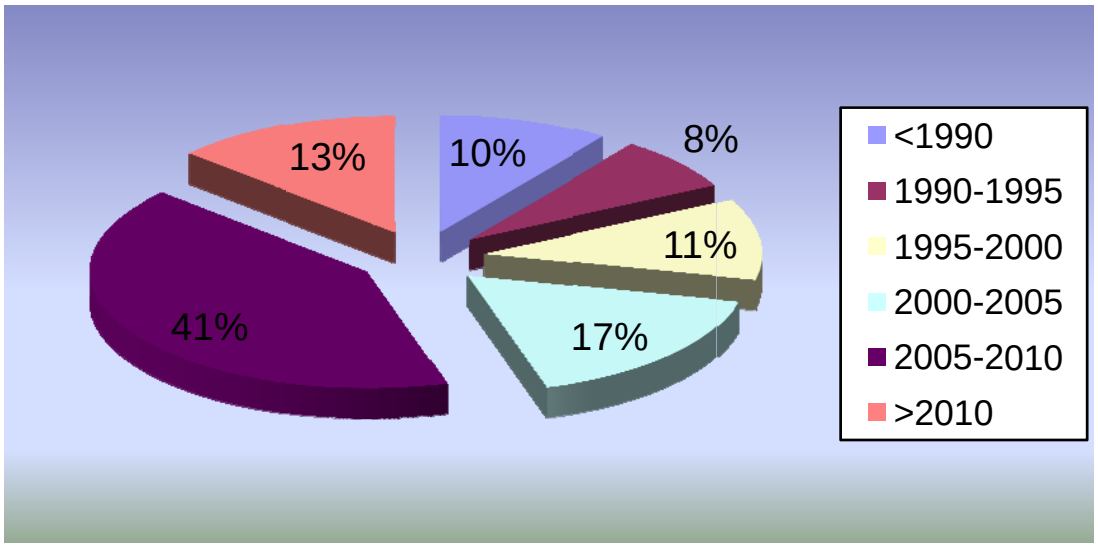
influence the profit. In this paper, two parts of evaluation indicators will be mentioned, namely NPV and IRR which help to find out whether the invest is worthy or not.

Chapter 3 Ship analysis

Introduction: In order to analysis which kind of tanker is suit for the future seaway transportation, this chapter will help you to analysis the tanker from different view. We should discuss the different type tankers, their age and coating. We will also involve the new building tankers. Finally, we will compare the state-business company with the private from their fleet and management.

3.1 Age analysis

3.1.1 The age of the vessel



Source: Global CT Fleet 31 Jan 2012

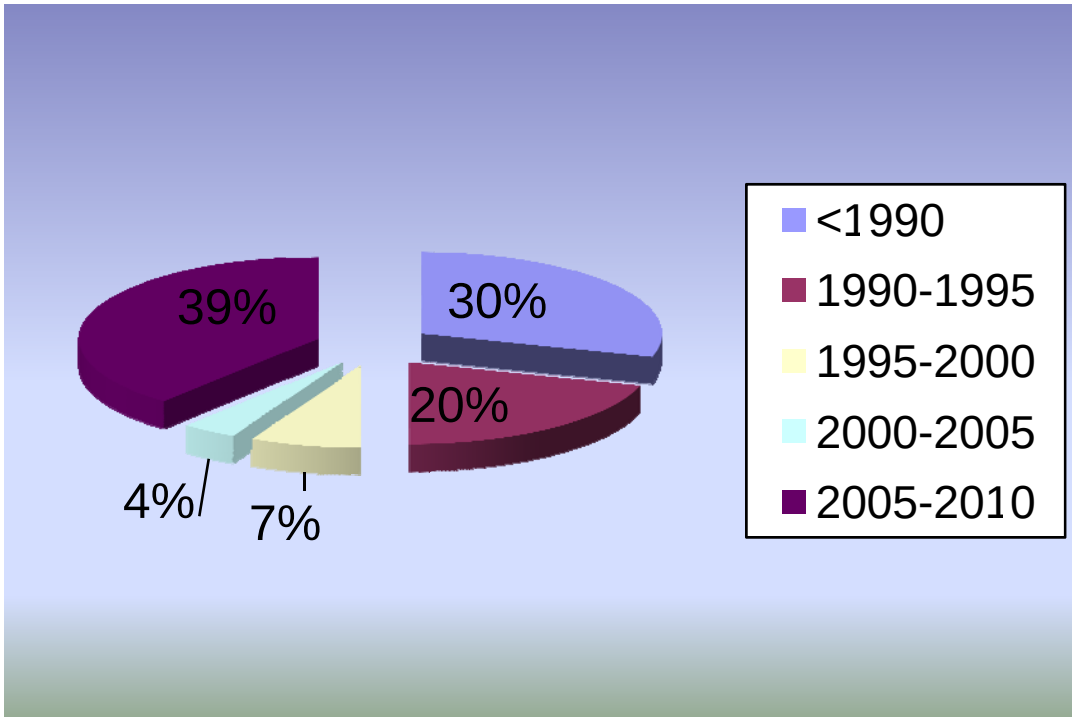
Figure 1: The age of the vessel

The age older than 1990	406	vessels
The age between 1990-1995	304	vessels
The age between 1995-2000	455	vessels
The age between 2000-2005	682	vessels
The age between 2005-2010	1683	vessels

The age younger than 2010 543 vessels

3.1.2 The age of DWT 2000-2500

There are 54 vessels in the world when the DWT between 2000-2500. The oldest is the M/V PSN, which is built by Hakata in Japan in January,1977. The newest is the M/V Kadriye Ana, which is built by Selay in Turkey. The newest vessel in China is the M/V DingHeng 12, which is built in September, 2009.



Source: Global CT Fleet 31 Jan 2012

Figure 2: the age of DWT 2000-2500

The age older than 1990	16	Vessels
The ago between 1990-1995	11	Vessels
The ago between 1995-2000	4	Vessels
The ago between 2000-2005	2	Vessels
The ago between 2005-2010	21	Vessels

According to the deadweight analysis , we find that this kind of deadweight is very popular before 1995. From 1995 to 2005, the ship owner preferred to build larger vessels. With the private capital enter this area, this kind of vessel is re-popular again.

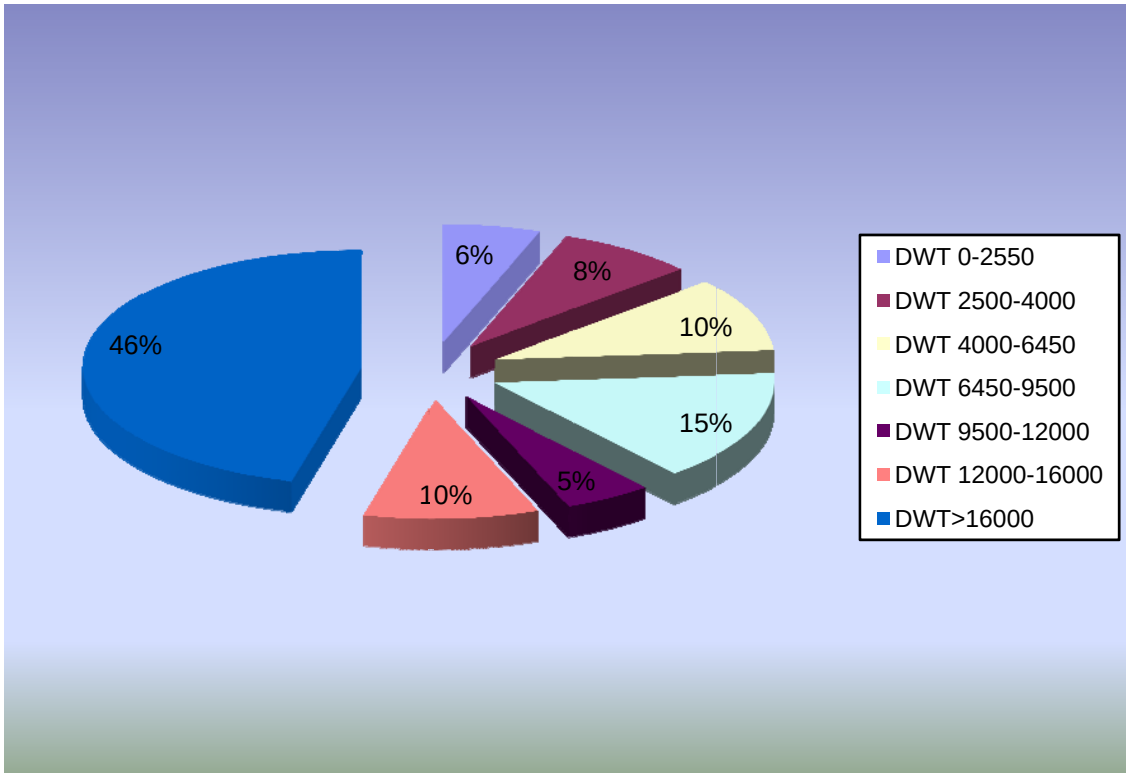
According to the ship report 2012, China ship owner have 11 vessels when the deadweight between 2000-2500. Except the M/V Dong Chuan and M/V Mao You 278, are all built between 2005-2010. The huge rising of the vessel development in this kind of deadweight was devoted a lot by china's private capital.

So this kind of event give us a question, why the deadweight between 2000-2500 will be re-popular again?

3.2 Capacity analysis

3.2.1 The condition of Global chemical capacity

According to the Jan 2012 report, there are 4073 chemical vessels in the world.



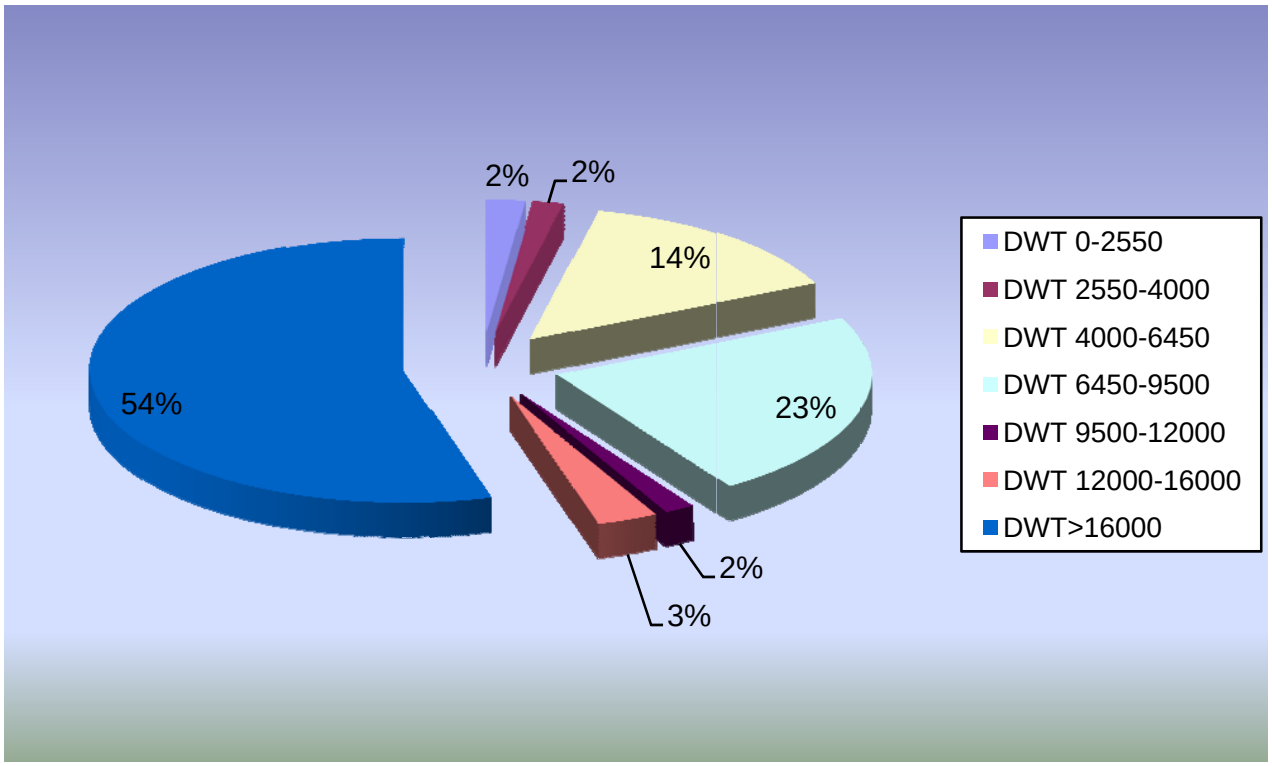
Source: Global CT Fleet 31 Jan 2012

Figure 3: The Deadweight Distribution

The DWT between 0-2550:	231	vessels
The DWT between 2550-4000:	321	vessels
The DWT between 4000-6450:	416	vessels
The DWT between 6450-9500:	619	vessels
The DWT between 9500-12000:	205	vessels
The DWT between 12000-16000:	409	vessels
The DWT over 16000:	1872	vessels

3.2.2 The future development of the world

There will be 255 vessels would delivery after 2012. Only 5 of it is under DWT 3000.



Source: Global CT Fleet 31 Jan 2012

Figure 4: The new building after 2012

The DWT between 0-2550: 5 vessels

The DWT between 2550-4000: 4 vessels

The DWT between 4000-6450: 37 vessels

The DWT between 6450-9500: 58 vessels

The DWT between 9500-12000: 4 vessels

The DWT between 12000-16000: 8 vessels

The DWT over 16000: 139 vessels

3.3 Coating analysis

3.3.1 The coating of Chinese's chemical vessels

(1) Epoxy

As we know the coating of Epoxy is very popular is last 20 years and it's proved a

mature skill in building chemical vessel. The benefit of using Epoxy is that this kind of coating is hard and can use for long term. The ability of anti-water, keep dry and anti-solvent are all important in chemical transportation.

The defect of Epoxy is also obviously. Due to the space between the molecule of Epoxy is to big, which cause the last cargo is easy stored in the coating and cannot wash the tank clean. The problem usually causes cargo pollution which is a high risk for both owner and charterer. This coating would very easy to be damaged by acidic materials.

For these reason, the Epoxy is only suit for the easy chemical which is easy to wash. The cargo like MEG which is sensitive to last 3 cargo should face a big risk.

(2) Zinc

This kind of coating is popular in 15-20 years ago. Due to the poor adaptable of the cargo, it has been obsolete in recent years.

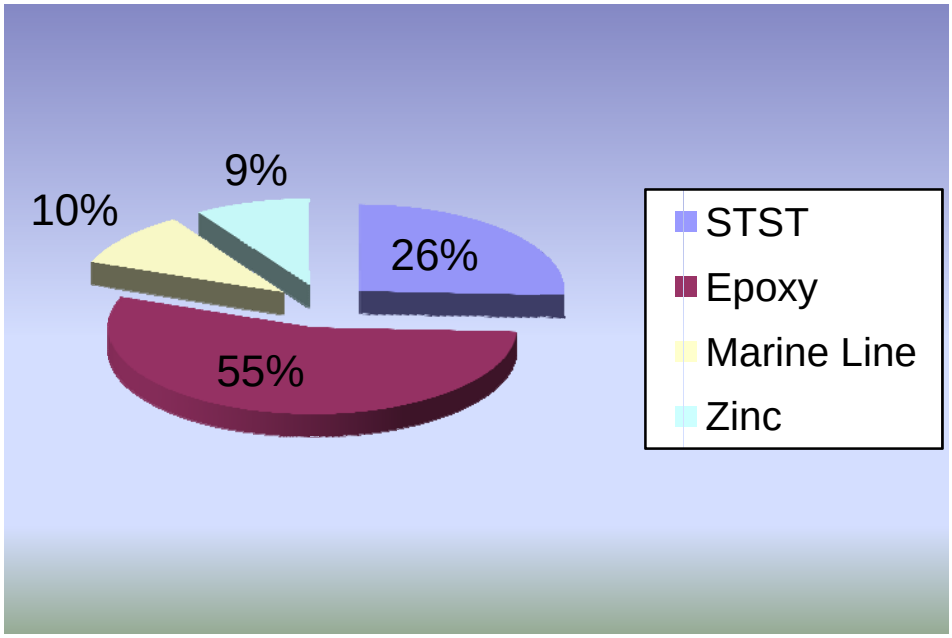
(3) Marine Line

The new kind of coating after Epoxy which is created by American but haven't proved its ability. The marine line like a enamel which can accept heating cargo and more kind of cargo can be accept to carry. But the skill is not mature, and the domestic shipyard had caused many problem. Owner faced the problem of the coating maintainance and 2-3 years should change the coating. This will cause a lot of money and loss of the hire time.

(4) Stainless steel

The Stainless steel however is the best coating for the chemical vessels for it can accept acidic materials and alkaline substance. The fitness of cargo is the best in all the coating. The stainless steel can divide into several kinds like 304L, 316L, LDSS and others. Though the price of building would be very high , the maintainance can be much more easy and the long-term return is respectable.

3.3.2 The coating analysis



Source: Global CT Fleet 31 Jan 2012

Figure 5: The coating of global chemical vessel

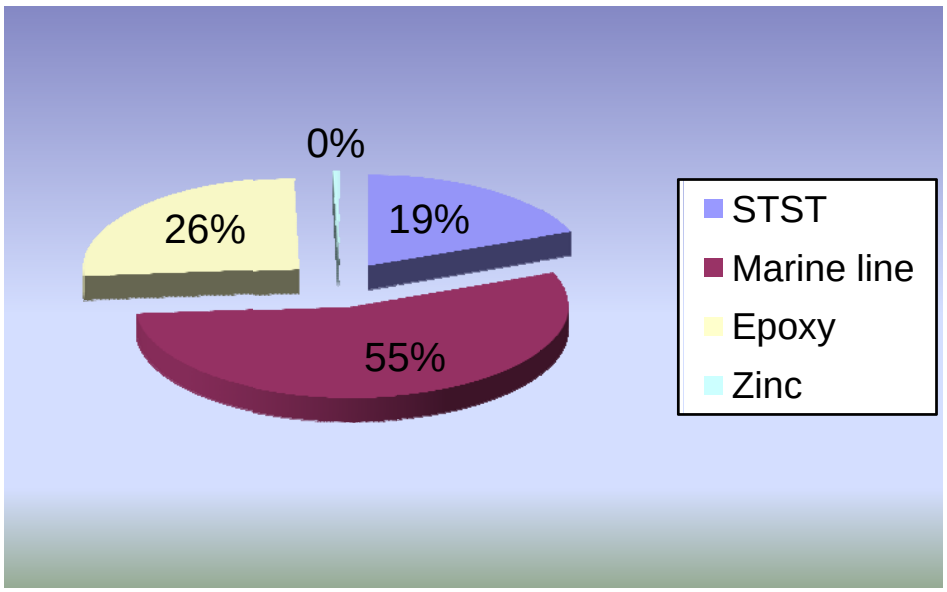
The coating of global chemical vessel:

Stainless steel: 1123 vessels

Epoxy: 2392 vessels

Marine line: 447 vessels

Zinc: 392 vessels



Source: Global CT Fleet 31 Jan 2012

Figure 6: The coating of new building

The coating of new building

Stainless steel: 49 vessels

Epoxy: 141 vessels

Marine line: 64 vessels

Zinc: 1 vessels

3.4 The analysis for the china's ship owners

Though the china's chemical transportation develop very late as to the European countries, the domestic ship owners show a amazing acceptability. Like the other market and china's developing tradition, the state-owned business always played as the pioneers. The Sino-Chem and NJTC were the outstanding pioneers in this market.

3.4.1 The introduce of the state-owned business

Sino-Chem international corporation

The Sino-Chem international corporation is the biggest chemical transportation companies in china. It is independent from the Sino-Chem Group in 1998 and played as the biggest chemical ship owner and the trader.

The fleet list of Sino-Chem was composed by 3 type of flags which are flag China, HongKong and Flag for convenience.

3.4.1.1 Analysis by her nationality:

Table 1: Analysis by her nationality

Nationality	Tanker		Deadweight(tonnage)		Capacity(M3)	
China	21	46.67%	104718	25.72%	117012	26.25%
HongKong	19	42.22%	219794	53.97%	239476	53.73%

Flag for convenience	5	11.11%	82705	20.31%	89241	20.02%
Total	45		407217		445729	

Source: company data base

3.4.1.2 Analysis by her coating:

Table 2: Analysis by her coating

Coating	Tanker		Deadweight(tonnage)		Capacity(M3)	
Stainless steel	24	53.33%	199327	48.95%	213356	47.87%
Epoxy & Marine line	21	46.67%	207890	51.05%	232373	52.13%
	45		407217		445729	

Source: company data base

3.4.1.3 Analysis by her deadweight:

Table 3: Analysis by her deadweight

Deadweight	Tanker		Deadweight(tonnage)		Capacity(M3)	
2000	1	2.22%	2772	0.68%	2781	0.62%
3000	20	44.44%	70388	17.29%	80388	18.04%
5000	2	4.44%	12352	3.03%	13303	2.98%
8-9000	3	6.67%	26027	6.39%	26662	5.98%
12000	11	24.44%	143354	35.2%	156940	35.21%
16000	2	4.44%	35554	8.73%	42506	9.54%
19000	6	13.33%	116770	28.68%	123149	27.63%
Total:	45		407217		445729	

Source: company data base

3.4.1.4 Analysis by her age:

Table 4: Analysis by her age:

Years	Tanker	Deadweight(tonnage)	Capacity(M3)

1990-1999	10	22.22%	117603	28.88%	124307	27.89%
2000-2006	7	15.56%	37779	9.28%	42325	9.5%
2007-2009	24	53.33%	224402	55.11%	251147	56.35%
2010-2011	4	8.89%	27433	6.74%	27950	6.27%
	45		407217		445729	

Source: company data base

3.4.2 NJTC

NJTC is a subcompany from the Sino-trans. His main services are the oil transportation and also include the chemical transportation. Unlike Sino-chem, the NJTC is never relationship to the cargo trade market which showed as the NJTC is the pure ship owner. As the policy required, the NJTC is focus on the crude oil transportation which is his core business and chemical tanker only played a little part of his full fleet list.

3.4.2.1 Analysis by her nationality:

Table 5: Analysis by her nationality

Nationality	Tanker		Deadweight(tonnage)		Capacity(M3)	
China	15	100%	87472.23	100%	91387.7	100%
Total	15		87472.23		91387.7	

Source: company data base

3.4.2.2 Analysis by her coating:

Table 6: Analysis by her coating

Coating	Tanker		Deadweight(tonnage)		Capacity(M3)	
Stainless steel	9	60%	43710.5	49.87%	43051.2	47.1 %
Epoxy	4	26.67%	37173.73	42.5%	41723.9	45.65%

Zinc	2	13.33%	6588	7.5%	6612	7.23%
	15		87472.23		91387.7	

Source: company data base

3.4.2.3 Analysis by her deadweight:

Table 7: Analysis by her deadweight

Deadweight	Tanker		Deadweight(tonnage)		Capacity(M3)	
2000	1	6.67%	2499	2.85%	2472	2.7%
3000	5	33.33%	17264	19.7%	21988.6	24.06%
4000	1	6.67%	4263.2	4.87%	3822	4.18%
6000	6	40%	38552.03	44.07%	37727.1	41.3%
12000	2	13.33%	24894	28.45%	29200	32%
Total:	15		87472.23		91387.7	

Source: company data base

3.4.2.4 Analysis by her age:

Table 8: Analysis by her age

Years	Tanker		Deadweight(tonnage)		Capacity(M3)	
1990-1999	7	46.67%	46260.73	52.88%	50808.5	55.6%
2000-2006	2	13.33%	7731.2	8.8%	7682	8.4%
2007-2009	2	6.7%	7208	8.24%	7694	8.4%
2010-2011	4	33.33%	26272.3	39%	25203.2	27.58%
	15		87472.23		91387.7	

Source: company data base

3.4.3 The SWOT analysis for the state-owned business

Strength

(1) Sino-Chem

The Sino-chem has establish a whole supply chain and the seaway transportation is only one part of it. The Sino-Chem has the ability to choose any step to earn menoy. As the trader, he can also choose which tanker can be used. He also has the ability to control the freight market in China and south-east Asia.

(2) NJTC

The NJTC is strong in his background and the VLCC is her core business. As the pure transportation company, NJTC built a strong relationship with many domestic charterers. Due to all of her tanker flag China, many domestic transportation can be controlled by him.

Weakness

(1) Sino-Chem

The Sino-chem is weak in his fix cost control. Over 53.33% of his new tankers were built when the market was in his peak. High building price limited his future development.

(2) NJTC

The NJTC is not focus on chemical transportation and haven’t developed too much in recent 10 years. Except the fleet of deadweight 6450, other tankers would be abandoned in 3-4 years.

Opportunity

China is still a developing country. A lot of requirements haven’t been excavated. Due to the chemical factory is that kind of manufacture need much water, they are always built near the water. So the factories cannot exist in west-china. The requirement is still like a gold ore.

Threaten

The china shipping and COSCO's poor performance in recent years show all the problem that state-owned business faced. All the decision should meet the masters' requirement. All the strategies should be re-discussed by many times. Spend too much money on the "face" work. Each department only think about themselves, only take care about their own budget and never think over others.

3.4.4 The introduce of the private business

After 2002, many managers left Sino-Chem and started their only business. During 2002-2007, the private economy want to share a part of the whole cake. Like Shanghai DingHeng and other companies in Zhoushan develop very fast.

Shanghai DingHeng shipping company limited

It was established in 2002 with no tanker, no money but only a well skilled team. After bareboat a tanker called JIANXIN 32, it started its dream from 2002-2007.

3.4.4.1 Analysis by her nationality:

Table 9: Analysis by her nationality

Nationality	Tanker		Deadweight(tonnage)		Capacity(M3)	
China	10	100%	30547	100%	32708	100%
Total	10		30547		32708	

Source: company data base

3.4.4.2 Analysis by her coating:

Table 10: Analysis by her coating

Coating	Tanker		Deadweight(tonnage)		Capacity(M3)	
Stainless steel	4	40%	8912	29.17%	9434	28.8%

Epoxy	1	10%	1788	5.85%	1950	5.96%
Zinc	5	50%	19847	64.97%	21324	65.2%
	10		30547		32708	

Source: company data base

3.4.4.3 Analysis by her deadweight:

Table 11: Analysis by her deadweight

Deadweight	Tanker		Deadweight(tonnage)		Capacity(M3)	
2000	5	6.67%	10700	35%	11384	34.8%
4000	5	33.33%	19847	65%	21324	65.2%
Total:	1510		30547		32708	

Source: company data base

3.4.4.4 Analysis by her age:

Table 12: Analysis by her age

Years	Tanker		Deadweight(tonnage)		Capacity(M3)	
2000-2006	4	40%	9892	32.38%	10501	32.1%
2007-2009	5	50%	16757	54.85%	15495	47.37%
2010-2011	1	10%	3898	12.76%	4051	12.38%
	10		30547		32708	

Source: company data base

3.4.4.5 SWOT analysis for Shanghai DingHeng shipping Co.,ltd

Strength

The low building price can make her has a strong challenge in the freight market. A well skilled team can make him to pass the major inspection more easily. The quick decision of future development.

Weakness

The poor ship condition is the most weakness. Due to the low building price and also the poor supervise from the class ZC cause many equipments cannot meet the daily working requirement. The tankers are not the future requirement.

Opportunity

The huge market still allows to correct the mistake. Even the cost will be very high.

Threaten

Many private ship owners face the problem of the useless of the tanker even only 5 years after building. They should spend a huge amount of money in future maintenance.

3.4.5 Compare the state-business and private ship owners:

A problem never can be ignore is the cash flow. Nowadays, all the ship owners face the problem of cash flow but the state-business only think little about it. The state-business has a completely system to control the business and management process. The private ship owner is a personal decision company which will follow the market but never think about the future. To control the cost is the strength of the private company but the cost is sacrifice of equipment , safety and fitness.

Summary

Summary1: Analysis for the ship's deadweight which show us that the larger vessel is the trend. In the new building in 2012, we could know that in order to get better profit the small deadweight has been abandoned by most of the owners. The owners prefer DWT 4000-9500 to carry the high standard cargo. The DWT over 16000 also is accepted by many owners for its high return and less fix cost.

Summary 2: Analysis the report of the coating

(1) We could find that the coating of Zinc will be obsoleted by the market due to his poor fitness.

(2) Epoxy is always the most popular used coating in chemical vessel due to his cheap price , proven technique and his fitness.

(3) Though Marine line is the new technique and has not been proved his safety and fitness, many owners choose it focus on his future and updated maintainance skill.

(4) The small deadweight will choose stainless steel for the vessel can carry high standard cargo , though the building price will be very high, the return is also considerable.

Summary 3: How to combine the strength of state-business and private company is the successor should consider about.

(1) A well skilled team can control the management and business process.
(2) A serious but easy system and process.
(3) Health discussing process.
(4) Cash flow control.
(5) Focus on the maintenance.
(6) Service control.
(7) Quality control.
(8) Sustainable development.

Summary 4: larger tanker will be the trend in the world but the small deadweight tanker built a little in last 3 years and many charterer face the lack of the small deadweight tanker. The larger tanker prefer the Epoxy and Marine line as his coating and small tankers prefer the stainless. Finally , to combine the state-business and the management of private company will be the trend and key point in future.

Chapter 4 Market analysis

Introduction: This chapter is help to analysis the market from two parts. And this chapter will help to design the voyage route. We should find out whether the market is

worthy to invest or not.

4.1 General cargo analysis

This part should introduce 2 groups. One is to the easy chemical market another one is to the high standard cargo. The different requirement and different quantity allowed us to divide the market.

First, we should also introduce the general standard cargo. In general, this kind of cargo include the chemical raw material like PX, SM,OX and others. The down-stream product result the requirement of PX,SM,OX and etc.

The main cargo introduce

PX: P-XYLENE is the raw material of PTA. The PTA is use to create terylene. The PTA's requirement will result the import of PX.

PX is colorless and smell like toluene. It can damage to one's eye and nervous centralis.

In general, charterer will choose the tanker which coating is Epoxy and Marine line. Also stainless steel can be accepted, but only a little part of ship owners will let huge deadweight tanker with stainless steel to carry such cargo for the low freight.

SM: Styrene is kind of aromatic hydrocarbon. And it is the raw material of resin. Like the PX, SM always choose tanker which coating is Epoxy and Marine line. Some small parcel will also choose stainless steel. But unlike the PX, SM is difficult in tank washing due to it will polymerize when store long time. Most charterer will not accept SM as his last cargo for it will damage to their goods.

The domestic PX manufacture

Before 2002, the limited of PTA production caused the PX factory not develop very

fast. After 2005 , the National Development and Reform Commission decide to plan for this area. From 2003 to 2007 , the yield of PX from 256.2 million tonnage to 750 million tonnage. 60% of the total yield is transfer according to the tankers.

Table 13: The factory and annual yield for PX

Domestic factory	Annual yield(million tonnage)	Seaway Transfer(million tonnage)	Percent(%)
SPC	108	20	18.5%
ZRCC	53	41	77%
JLPEC	70	50	71.4%
YPC	90	60	66.66%
CNPC	100	0	0
LD CHEM	80	70	87.5%
FJPEC	100	65	60%
FUJIA	100	80	80%
GPC	102	45	44.11%

Source: company data base

The importing countries analysis for PX

According to the data statistics in February 2012, Japan is the biggest importing country for the PX. The detail as below:

Table 14: The import and quantity analysis for PX

Importing country	Quantity(MT)	FOB Price(USD)	Percent(%)
Japan	151147	1573	33.4%
S.Korea	111202	1570	24.57%
America	44747	1536	9.8%
Taiwan	31327	1614	6.9%
Tailand	25263	1567	5.58%

Iran	20067	1559	4.43%
Kuwait	19935	1497	4.4%
Netherlands	9852	1524	2.17%
Israel	9855	1520	2.17%
Indonesia	9528	1475	2.1%
Saudi Arabia	4999	1600	1.1%
Turkey	5102	1560	1.1%
Malaysia	4753	1500	1%
Portugal	4759	1410	1%
Total	452536	1560	

Source: company data base

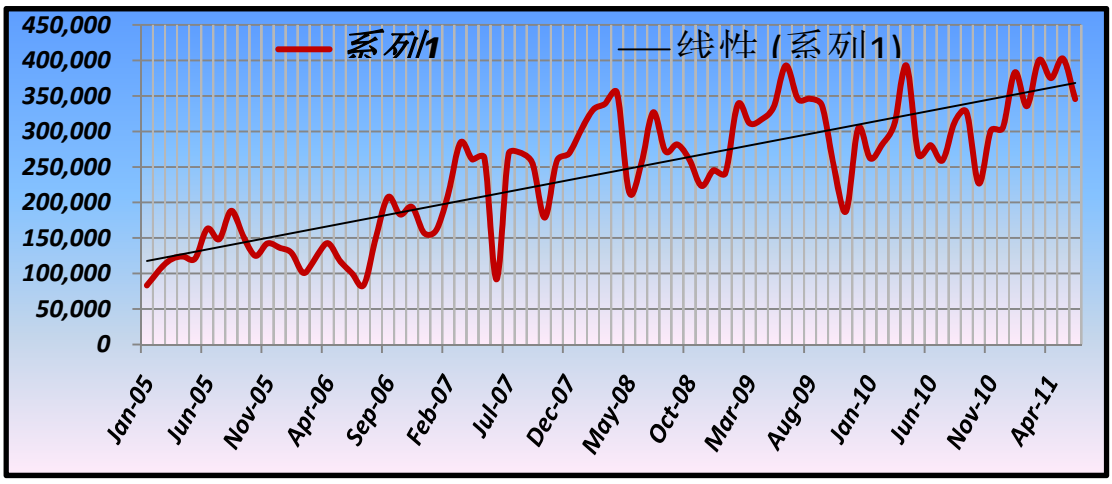
The trend of the PX importing

Table 15: The trend of PX importing

2005		2006		2007	
Jan-05	83,193	Feb-06	100,715	Jan-07	161,000
Feb-05	104,203	Mar-06	122,189	Feb-07	212,300
Mar-05	120,024	Apr-06	142,700	Mar-07	284,168
Apr-05	123,854	May-06	118,107	Apr-07	260,505
May-05	121,077	Jun-06	100,494	May-07	262,793
Jun-05	162,929	Jul-06	84,029	Jun-07	91,729
Jul-05	148,343	Aug-06	151,037	Jul-07	268,400
Aug-05	188,302	Sep-06	207,551	Aug-07	269,900
Sep-05	152,328	Oct-06	183,135	Sep-07	254,400
Oct-05	124,923	Nov-06	193,456	Oct-07	178,700
Nov-05	142,375	Dec-06	156,897	Nov-07	258,500
Dec-05	136,371			Dec-07	268,600

2008		2009		2010	
Jan-08	301,300	Jan-09	241,700	Jan-10	262,035
Feb-08	330,300	Feb-09	337,680	Feb-10	281,900
Mar-08	338,800	Mar-09	311,394	Mar-10	310,200
Apr-08	354,300	Apr-09	317,029	Apr-10	392,782
May-08	214,900	May-09	334,804	May-10	267,530
Jun-08	253,700	Jun-09	392,861	Jun-10	280,700
Jul-08	327,000	Jul-09	345,888	Jul-10	259,300
Aug-08	272,300	Aug-09	346,160	Aug-10	313,200
Sep-08	281,622	Sep-09	336,410	Sep-10	326,700
Oct-08	260,339	Oct-09	249,213	Oct-10	226,843
Nov-08	223,324	Nov-09	187,746	Nov-10	300,827
Dec-08	245,398	Dec-09	304,363	Dec-10	305,200
2011					
Jan-11	383,255				
Feb-11	335,592				
Mar-11	400,324				
Apr-11	375,041				
May-11	402,440				
Jun-11	345,673				

Source: company data base



Source: company data base

Figure 7: The trend of PX importing

4.2 High standard cargo analysis

4.2.1 High standard cargo

First we should introduce the high standard cargo. Many high standard cargo are control by foreign companies like BYC, Bayco, Dow and Subic and many others. This kind of companies is very focus on his cargo safety when transport. So most of this kind of companies need the oil inspection when choosing the vessel. But many domestic companies cannot pass the oil inspection. Only 20% of the owners can do the CDI,BP or SIRE inspection. This condition cause few vessels can be used by the foreign companies and the freight market is very high.

4.2.2 The high standard charterer:

(1) BYC---The BYC is composed by Basf and Sinopec. The Basf is the first company enter the Chinese market. BYC has a big factory in Nanjin and built in 2001. In 2005, the factory start his machine and which expand in 2009. His raw material is naphtha from Dalian and secondary product include BA, DMF , N-BA and other derive products.

Main product: BA, DMF, N-BA, Tol

Main route: Nanjin --- South China

Quantity: 1000-2500MT/voyage

Annual output: 160000-18000MT

Oil inspection require: CDI

(2) Lucite International--- The Lucite is the biggest MMA manufacturer in the world. The factory was built in 2005 in Shanghai, Caojing.

Main product: MMA

Main route: Caojing---Zhangjiagang---Zhenjiang

Quantity: 1000-1600MT/in lump sum

Annual output: 100000MT

Oil inspection require: CDI

(3) HMC--- The HMC is invest by MRC the biggest chemical manufacturer in Japan. A few backload from South China to Mid China. The most important for all the owners can pass oil inspection.

(4) Main product: MMA

Main route: Huizhou---Jiangyin---Zhenjiang

Quantity: 2000MT/voyage

Annual output: 66000MT

Oil inspection require: CDI

(5) Exxonmobil--- The biggest crude oil and DINP manufacturer in the world. The highest vessel using level in the world. The Exxonmobil has his own inspection system and few owner can adopted by their group.

Main product: DINP

Main route: Zhenjiang---Taizhou---Tianjin, Xiaohudao---Xiamen

Quantity: 1300---1500MT/in lump sum

Annual output: 54000MT

Oil inspection require: Exxonmobil inspection

Table 16: The high standard charterer analysis

Charterer	Start date	Main product	Annual output (ton) (2011 年)	Quantity (ton)	Oil inspection require
Lucite	2005	MMA	100,000	1,000 - 1,500	CDI
BYC	2005	BA,NBA,DMF	180,000	1,000 - 2,500	CDI
HMC	2007	MMA	66,000	1,000 - 2,000	SHELL
Exxonmobil	2009	Dinp	54,000	1,500	MAJOR
BP	2010	Acetic acid	240,000	1,500 - 3,000	BP
Secco	2005	SM,TOL,Acrylon	600,000	2,000 - 3,000	BP
Dow	2009	SM,TOL,Acrylon	18,000	1,500	CDI
Subic	2010	MEG	200,000	2,000 - 4,000	CDI
Sinopec	2007	MEG,SM	650,000	2,000 - 3,000	SHELL
celanese	2007	Acetic acid, BA	550,000	2,000 - 4,000	CDI
Dpm	2010	PO,MEG	450,000	2,000 - 3,000	CDI

Source: company data base

4.3 Market area analysis

The global chemical industry continued his strong developing which promote the development of maritime chemicals trade. The average annual growth rate for chemical is 4.5% in the world since 2000 which grows much more quick than the global maritime trade as 3.52%. In 2003, the global maritime chemicals trade is over 130 million tonnage. And to 2010, the global maritime chemicals trade has increased to 163 million tonnage. In 2015, the whole quality will be to 181 million tonnage. It is still a sunshine market even compared with other trade.

1.3.1 The European market

The annul maritime trade in European is about 9 million tonnage and it is very steady in recent years which would not fluctuate in nearly 10 years.

In European, over 60 percent of chemicals transportation is by river and Mediterranean. The strength in geography , many big oil company like BASF, BP and

DOW all built a lot of chemical factory in European.

1.3.2 The Middle East market

The Middle East is gradually developed into the raw material of intermediate product production base. With the strength of resource and combine with the advanced technology, the Middle East's oil product market develop very fast in recent 10 years. Over 70-80 percents of their goods are output to the south-east and north-east Asia (Mainly to China). In 2010, a factory wtih 14 million tonnage annul yield was put in use. Over half of it will transfer to the consumercountry by sea.

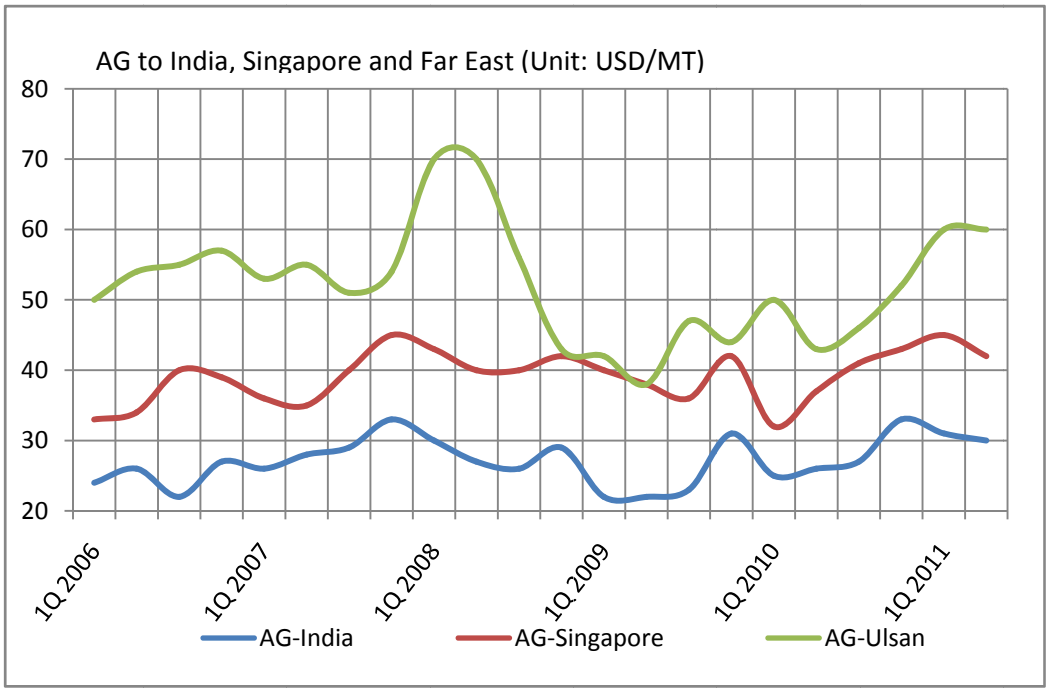
The frequently military exercise and pirate affect cause this area become the most dangerous sailing area in the world. But this is not the main problem. The P & I club will refuse continue to serve for the ship owners who carry the cargo from Iran in July of 2012. This policy ban many ship owners stop doing business with the Iran's charterer. Only China and India ship owners still have willing to continue this business. Because the high risk cause the high return. The freight market is double when compared with the same time last year.

1.3.3 The Asia market

The China, Japan, South Korea , Singapore and Indonesia are all developing very fast in chemical market. Especially in china, as a huge country , the annual yield increases over 10 percent.

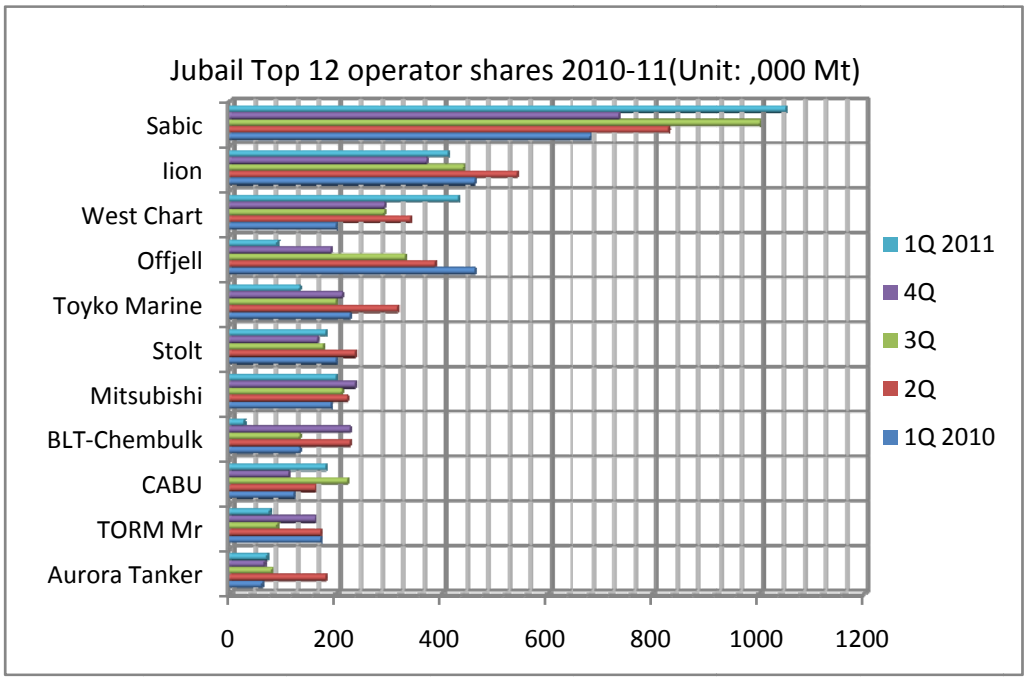
The Taiwan is also an huge chemical market for Formosa developed over 50 years. As the agreement between China and Taiwan, along the tanker which flag is China or Taiwan can to the cargo transportation between two sides. Which was add the Taiwan as a special domestic transportation. Due to the other Asia ship owner like Japan and South Korea was banned from this place. The freight market increase very fast in recent 2 month.

The Middle East to the Far East is the main line in Asian chemical transportation. In this line include a lot of major ship owners like: STOLT, TOKYO MARINE, JO TANKER, etc.



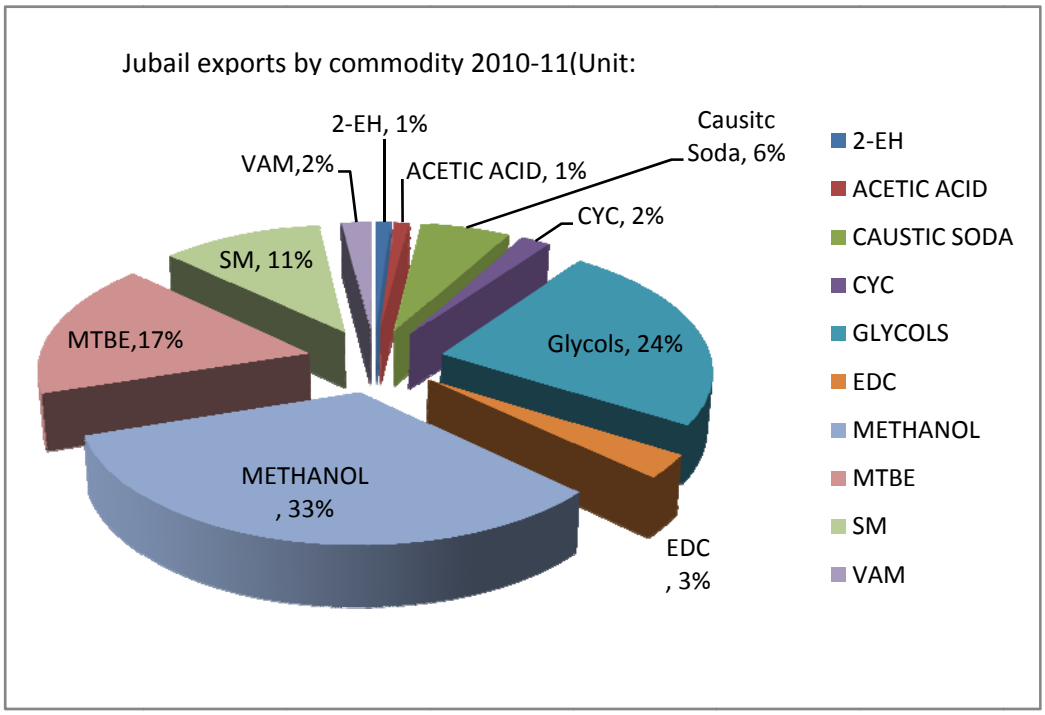
Source: Drewry annual report

Figure 8: AG to Indian , Singapore and Far East



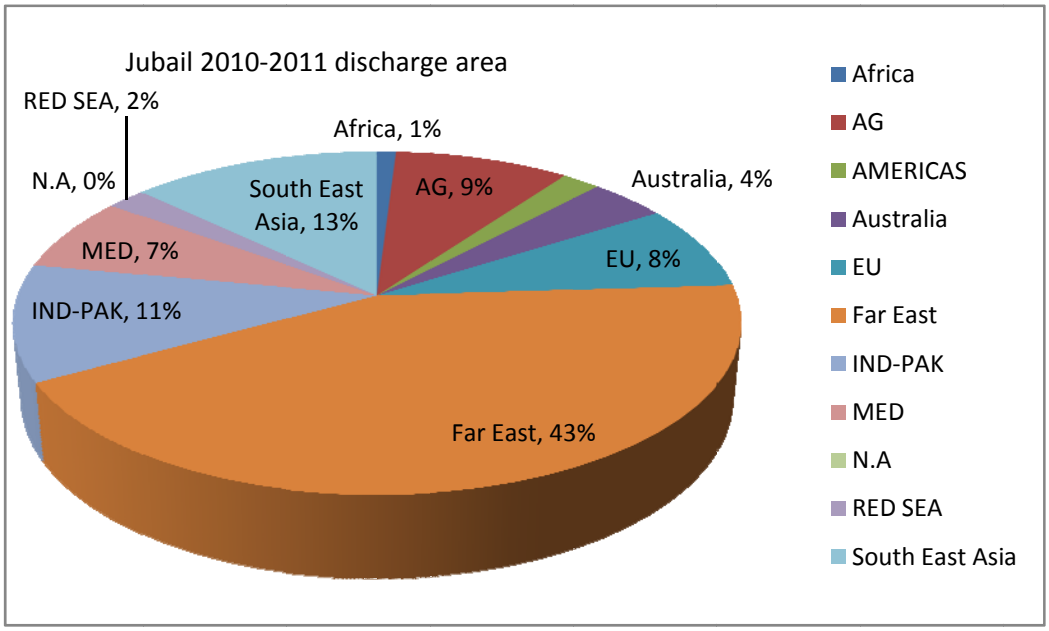
Source: Drewry annual report

Figure 9: Jubail Top 12 operator shares 2010-2011



Source: Drewry annual report

Figure 10: Jubail exports by commodity 2010-11



Source: Drewry annual report

Figure 11: Jubail 2010-2011 discharge area

Summary

Summary 1: The domestic oil product factory develop very fast from 2003 to now, but the quality of PX cannot compared with Japan , S.Koera and Taiwan. China should still import a large amount of PX from other countries and with the development of west china, the requirement will be larger and larger.

Unlike the high stand cargo, the low level of transporting PX only need low quality of coating. Epoxy is enough to transport this kind of cargo.

Summary 2: The high standard faced lack of small deadweight and suitable tanker to use. Even this kind of cargo develop very fast in recent years but how to transport is the problem they faced.

Summary 3: The chemical market will spend his golden time in next 10 years. It is still an opportunity to invest in this area.

Chapter 5 New building strategy

Introduction: This chapter is help to solve which kind of tanker to use in the future and which parts are more focused from now on.

5.1 The rules taking effect

Mandatory measures to reduce emissions of greenhouse gases from international shipping were adopted by parties to MARPOL Annex VI represented in the Marine Environment Protection Committee. The amendments to MARPOL Annex VI Regulations for the prevention of air pollution from ships, add a new chapter 4 to Annex VI on Regulation on energy efficiency for ships to make mandatory the Energy Efficiency Design Index (EEDI), for the new ships and the Ship Energy Efficiency Management Plan (SEEMP) for all ships.

5.1.1 The EEDI

The EEDI is The Energy Efficiency Design Index which is a product of a broad church united around a single objective ---- the reduce of GHG emissions from ships. Consider the following simplified EEDI formula:

$$EEDI = \frac{CO_2\ emission}{transport\ work}$$

The EEDI, in establishing a minimum energy efficiency requirement for new ships depending on ship type and size, provides a robust mechanism that may be used to increase the energy efficiency of ships, stepwise, to keep pace with technical developments for many decades to come. It is a non-prescriptive mechanism that leaves the choice of which technologies to use in a ship design to the stakeholders, as long as the required energy-efficiency level is attained, enabling the most cost-efficient solutions to be used. Such technologies have been comprehensively considered in the 2009 IMO GHG Study.

Table 17: The EEDI for all type of vessel

Ship type	Deadweight	0 step(2013.1.1 -2014.12.31)	1 step(2015.1.1 -2019.12.31)	2 step(2020.1.1 -2024.12.31)	3 step(after 2025.1.1)
Bulk carrier	Over 20000 DWT	0	10 %	20 %	30 %
	10000-20000 DWT	Not applicable	0-10 %	0-20 %	0-30 %
Gas carrier	Over 10000 DWT	0	10 %	20 %	30 %
	2000-10000DWT	Not applicable	0-10 %	0-20 %	0-30 %
Tanker	Over 20000 DWT	0	10 %	20 %	30 %
	4000-20000	Not	0-10 %	0-20 %	0-30 %

	DWT	applicable			
Container	Over 15000 DWT	0	10 %	20 %	30 %
	10000-15000 DWT	Not applicable	0-10 %	0-20 %	0-30 %
General cargo	Over 15000 DWT	0	10 %	15 %	30 %
	3000-15000 DWT	Not applicable	0-10 %	0-15 %	0-30 %
Refrigerated carrier	Over 5000 DWT	0	10 %	15 %	30 %
	3000-5000 DWT	Not applicable	0-10 %	0-15 %	0-30 %
Combined ship	Over 20000 DWT	0	10 %	20 %	30 %
	4000-20000 DWT	Not applicable	0-10 %	0-20 %	0-30 %

Source: CCS report

The further planning of IMO

(1) According to the EEDI and SEEMP to control the CO2 emissions

(2) Discussing the MBM --- Market based Measures

5.2 Idea of green tanker

The class should set a system to define the green tanker. As a safety and quality control department, the class should control the design of new building. Some green technology should be added and push into actually used.

As today's definition, the green tanker is described as the tanker can reduce her CO2

emissions. There are 25 ways to reduce the CO2 emission:

(1) Voyage optimization (reduce the ballast time)

(2) The steam turbine generator operation optimization

(3) Deceleration sailing (when the same to increase the loading and discharging rate)

(4) Engine monitoring

(5) Efficient propulsion system

(6) Draft optimization

(7) Frequency conversion technology

(8) Propeller optimization

(9) Reduce the auxiliary power

(10) Simulating the propeller (haven't been proved whether will reduce the propulsion efficient)

(11) Best weather route (According to the weather to design the route)

(12) Gas membrane to reduce the friction (usually will pressure the air into the bottom of the ship from stem which can help to produce a gas membrane can help to reduce the friction)

(13) Hull surface optimization (like swimming athletes wear shark outfit, the coating will help to reduce the friction)

(14) Kite ship (it is seemed like a dream but it will come true. We can fly a kite when downwind and it works like a sails)

(15) Gas fuel (it would be the best way to reduce the CO2 emissions. Many main engine suppliers are busy designing the engine which can use two kind of fuel include the bunker and gas)

(16) Engine electronic control

(17) Lighting system

(18) Auxiliary engine can use fuel cells

(19) Deceleration sailing (to build more tanker which I think is a bad idea)

(20) Windsurfing equipment

(21) Waste heat recovery (which is good to tanker for it can warm the crew when in winter and can also help to heat cargo)

(22) Waste gas boiler equipment

(23) Shore electricity

(24) The sun board batteries

(25) Wind power device

A Japanese ship owner has designed such kind of tanker which use many kind of such ways to reduce the CO2 emissions. Finally , they calculate that they can reduce 70% CO2 emission in theory.

Source: CCS EEDI REPORT

Figure 12: NYK the summary of emission savings

The benefit of green tanker:

(1) Have the author to berth priority

(2) Very few number of PSC inspection to the green tanker

(3) Very low insurance fee to the green tanker

(4) To apply the loans more easily

5.3 Idea of New building

With the bunker price always stand in a high level and the energy-saving, environment protection and the efficient are always the key words to the owners' daily working. And how to build a vessel to meet all these thing should a problem.

5.3.1 Use suitable main engine

During 2004-2008, almost all the owners use the bigger main engine in order to high speed. With the bunker price rising and freight market fluctuant, these vessels would be obsolete in the future. The owners should use science theory to calculate the IRR and equip suitable main engine.

5.3.2 Use new technique engine

Nowadays, almost all the fuel of the vessel are FO and MGO. With the technique of stone natural gas development, the engine can use natural gas come into our eyes. But the problem of supply and the high price of the new engine limited this kind of engine development. 2 million USD added in the basis of traditional engine is not suit small chemical vessels but only deadweight over 19000 can accept this price. But it will be a trend in the future.

5.3.3 Reasonable equipment require.

Except the fuel consumption and the vessel's speed, another way to rise the profit is to equip reasonable equipment. The loading/discharging rate and tank washing efficiency would also effect the voyage performance. How to equip the pump system and the pipe arrangement, tank washing and air-free efficiency should also add into thinking.

5.3.4 Safety

Safety is always the most important. The global and the country is focus on the safety sailing and oil or chemical pollution expecially to the chemical vessels.

5.3.5 Suit for the cargo market

Whatever how advanced the tankers are built, to suit for the cargo market will be the main problem. We should not only focus on the today's requirement but also pay attention on the future. According to the cargo analysis , the demand and supply analysis can give us the answer to build what kind of tanker.

Summary

Summary 1: Assuming adoption this year and entry into force in 2013, the introduction of the EEDI for all new ships will mean that between 45 and 50 million tonnes of CO2 will be removed from the atmosphere annually by 2020, compared with “business as usual” and depending on the growth in world trade. For 2030, the reduction will be between 180 and 240 million tonnes annually from the introduction of the EEDI.

Summary 2: The green tanker will be the trend in the future. Though many ways cannot be achieve nowadays, we still should be responsible for our child and our future.

Chapter 6 The route design

Introduction： This chapter is focus on the route design according to the different kinds of tankers and different charterers. This chapter is help to calculate the income.

6.1 The domestic route design

The domestic route design for DWT 2450

According to the high standard cargo analysis, we find that most high stand cargo is suit for the deadweight between 2000 – 3000.

Hereby, I design some classic domestic route for the all the fleet

6.1.1 The domestic route for DWT 2000

The design speed: 11 mile / hour

The design deadweight: 2450 tonnage

The working deadweight: 2000 tonnage

The Major inspection needed: CDI, BP, SIRE

Plan 1:

Table 18: the route plan 1 for the domestic for DWT 2000

Route:	Nanjin - Dongguan	Huizhou - Jiangyin
Distance:	1094	1030
Design speed:	11	11
Sailing days:	4.14	3.9
Load & discharge	3	3
Price:	290	285
Quantity:	2000	2000
Total freight:	580000	570000

Source: company data base

Total time used: 14.4 days

Average distance in one month: 4425 miles

Average voyages in one month: 4.167 times

Total income in one month: 2395833 RMB

Charterer used: BYC, HMC

The route:

Source: company date base

Figure: 13: the route plan 1 for the domestic for DWT 2000

Plan 2:

Table 19: the route plan 2 for the domestic for DWT 2000

Route:	Taizhou - Tianjin	Lanshan – Wenzhou	Zhoushan – Caojing
Distance:	810	1119	387
Design speed:	11	11	11
Sailing days:	3.07	4.24	1.46
Load & discharge	2.5	3	2
Price:	In lump sum	265	In lump sum
Quantity:	1200 - 1500	2000	1000 - 2000
Total freight:	520000	530000	200000

Source: company data base

Total time used: 16.27 days

Average distance in one month: 4270.436 miles

Average voyages in one month: 5.53 times

Total income in one month: 2304856 RMB

Charterer used: Exxonmobil, HLHS, BYC

The route:

Source: company data base

Figure 14: the route plan 2 for the domestic for DWT 2000

Plan 3

Table 20: the route plan 3 for the domestic for DWT 2000

Route:	Jiangyin - Dongguan	Huizhou - Jiangyin	Caojing-zhenjiang
Distance:	995	1030	451
Design speed:	11	11	11
Sailing days:	3.77	3.9	2
Load & discharge	2.5	3	2
Price:	300	285	In lump sum
Quantity:	2000	2000	1000-1800
Total freight:	600000	570000	360000

Source: company data base

Total time used: 17.17 days

Average distance in one month: 4326.25 miles

Average voyages in one month: 5.24 times

Total income in one month: 2673267 RMB

Charterer used: Subic, HMC, Lucite

The route:

Source: company data base

Figure 15: the route plan 3 for the domestic for DWT 2000

According to the several routes analysis, we can find that the average income is around 2.2 million RMB per month.

6.1.2 The route design for DWT 12000

The design speed: 12 mile / hour

The design deadweight: 12800 tonnage

The working deadweight: 11000 tonnage

The Major inspection needed: CDI, BP, SIRE

Plan 1:

Table 21: the route plan 1 for the domestic for DWT 12000

Route:	Dalian - Ning Bo	Dalian – Ning Bo
Distance:	587	1174
Design speed:	12	12
Sailing days:	2.04	4.08
Load & discharge	4	4
Price:	135	135
Quantity:	10000	10000
Total freight:	1350000	1350000

Source: company data base

Total time used: 14.12 days

Average distance in one month: 3803.86 miles

Average voyages in one month: 4.32 times

Total income in one month: 58321553 RMB

Charterer used: DLFJ

The route:

Source: company data base

Figure 16: the route plan 1 for the domestic for DWT 12000

6.2 The international route design

Unlike the domestic route design, the international route design should obey the international trade rule. As to the china's ship owner , it shows the higher standard of daily working. It ban a lot of domestic ship owners to involve this area. Also the domestic should also compete with the foreign ship owners.

Like the design of domestic route, I also design some international route for all the fleet.

6.2.1 The international route for DWT 2000-3000

Due to the DWT 2000-3000 not suit for long way voyage, we arrange the vessel only sail around the china, Taiwan, South Korea and Japan. Also we can combine the domestic voyage.

Plan 1: Full international route

Table 22: the route plan 1 for the international for DWT 2000

Route:	Mailiao – Ningbo	Mailiao – Ningbo
Distance:	574	1154
Design speed:	11	11
Sailing days:	2.17	4.34
Load & discharge	3	3
Price:	$33	$ 33
Quantity:	2000	2000
Total freight:	66000	$66000

Source: company data base

Total time used:12.51 days

Average distance in one month: 4143.88 miles

Average voyages in one month: 4.8 times

Total income in one month: 316456 USD

Charterer used: FORMOSA

The route:

Source: company data base

Figure 17: the route plan 1 for the international for DWT 2000

Plan 2: Domestic cooperate with international route

Table 23: the complex route designl for DWT 2000

Route:	Nanjin - Dongguan	Mailiao – Ningbo	Nanjin - Dongguan
Distance:	1094	803	1531
Design speed:	11	11	11
Sailing days:	4.14	3.04	5.8
Load & discharge	3	4	3
Price:	290	$ 33	290
Quantity:	2000	2000	2000
Total freight:	580000	$66000	580000

Source: company data base

Total time used: 22.98 days

Average distance in one month: 4549.16 miles

Average voyages in one month: 3.91 times

Total income in one month: 1160000 RMB+107321.1 USD

Charterer used: BYC, FORMOSA

The route:

Source: company data base

Figure 18: the complex route designl for DWT 2000

6.2.2 The international route for DWT 10000-13000

The international route for DWT 10000-13000 is suit to the Whole Asia and Mid-East Area. This type of deadweight can do the long voyage not very far from the mainland. This type of tanker cannot across the Atlantic Ocean.

Plan 1

Table 24: the route plan 1 for the international for DWT 12000

Route:	Mailiao – Ningbo	Mailiao – Ningbo	Mailiao – Ningbo
Distance:	574	1154	1154
Design speed:	11	11	11
Sailing days:	2.17	4.34	4.34
Load & discharge	4	4	4
Price:	$14.5	$14.5	$14.5

Quantity:	11000	11000	11000
Total freight:	$159000	$159000	$159000

Source: company data base

Total time used: 22.85 days

Average distance in one month: 3783.8 miles

Average voyages in one month: 3.93 times

Total income in one month: 626258.2 USD

Charterer used: FORMOSA

The route:

Source: company data base

Figure 19: the route plan 1 for the international for DWT 12000

Plan 2

Table 25: the route plan 2 for the international for DWT 12000

Route:	Mailiao – Ningbo	Ulsan – Mailiao	Mailiao – Ningbo
Distance:	574	1419	574
Design speed:	11	11	11
Sailing days:	2.17	5.37	2.17
Load & discharge	4	4	4
Price:	$14.5	$19	$14.5
Quantity:	11000	8000	11000

Total freight:	$159000	$152000	$159000

Source: company data base

Total time used: 21.71 days

Average distance in one month: 3547.2 miles

Average voyages in one month: 4.14 times

Total income in one month: 649470.3 USD

Charterer used: FORMOSA,SK

The route:

Source: company data base

Figure 20: the route plan 2 for the international for DWT 12000

Plan 3

Table 26: the route plan 3 for the international for DWT 12000

Route:	Tianjin – Davao	Merak – Kandla	Iran – Zhangjiagang
Distance:	2242	4539	7133
Design speed:	13	13	13
Sailing days:	7.19	14.54	22.87
Load & discharge	4	4	4
Price:	$25	$38	$80

Quantity:	10000	11000	11000
Total freight:	$250000	$418000	$880000

Source: company data base

Total time used: 56.6 days

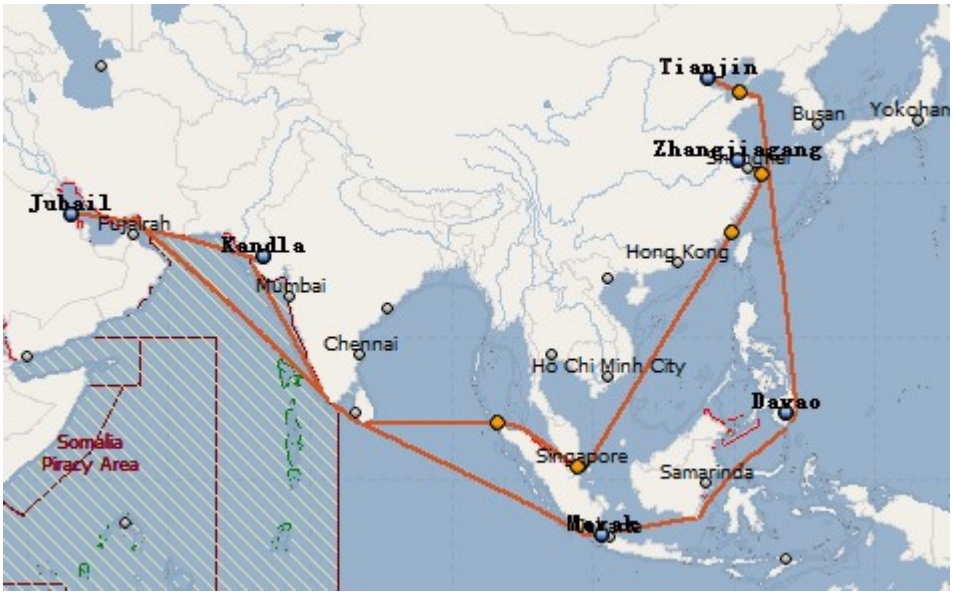
Average distance in one month: 7374.9 miles

Average voyages in one month: 1.59 times

Total income in one month: 701236.7 USD

Charterer used: FORMOSA, Traders

The route:



Source: company data base

Figure 21: the route plan 3 for the international for DWT 12000

PS: Due to the P & I refuse to keep their service for the tanker do the voyage in Iran, the freight has rised to 110USD/tonnage from Iran to China for 10000 tonnage no heating cargo.

6.3 The summary for the voyage route design

Summary 1: The small deadweight tankers show their handiness. There are much cargo,

many charterers. You won't worry about luck of cargo. The only things you should know is how to arrange the voyage and how to combine all the COA you own together.

Summary 2: Compare with the small deadweight tankers, the large size tankers have many limited in domestic not only from the cargo but also from the port and government. The China's ports are not developed very well and always face the port jam. The berth schedule is also easily be changed. Many ports are control by someone. If the ship owner has good relationship with the port manager, you may berth first. As to the big vessel, the government is also not willing to see their entering the anchorage for which need more attention and anti the oil and cargo pollution. Though the larger tanker can get high freight but it also face the high risk.

Summary 3: The average annual income of deadweight 2000 is about 22 million RMB and the average annual income of deadweight 12000 is about 36 million RMB

Summary 4: The Voyage route design should according to the COA or long-term cooperated charterers' contract. Also, to the commercial manager, before we fix the contract, we should calculate the profit of this voyage and should add the back load into account. Later, we will analysis the cost structure and profit analysis.

Chapter 7 Income analysis

Introduction: This chapter is talk about the cost structure and profit analysis. According to the voyage route design to calculate the income and with the cost structure can help to find the profit.

7.1 Cost structure

Introduce: In general, the cost of shipping business can be divided into 4 parts.

7.1.1 The business cost.

(1) The agency fee

(2) Port charges

(3) Commissions.

(4) Management charges

7.1.2 The technical cost.

(1) The repairing charges

(2) Special surveying sharing

(3) Communication charges

(4) Stores

(5) Spare parts

(6) Lubricating charges

(7) Bunker charges.

7.1.4 The marine cost.

(1) Self – pliotage charges

(2) Major inspection charges

(3) Marine publication fee

(4) Certification & internal vetting

(5) Hull & Machine insurance

(6) P & I insurance

7.1.5 The crewing charges.

(1) Crew salary

(2) Provision Fee

(3) Crew Management Fee

(4) Crew Bouns

(5) Travel, Medical and Certifications

Summary: the commercial manager should know the cost structure and according to it to compare with the freight. Than can decide which route can earn money and which route is the best. This is called as the voyage optimization.

7.2 The cost structure for DWT 2000-3000

7.2.1 The cost structure and the performance for DWT 2000 – 3000

Table 27: The cost structure for DWT 2000-3000

Cost Breakdown	Daily	Monthly	Annual	Monthly(USD)
Technical Cost	15,806.56	482,100.00	5,785,200.00	73,045.45
Marine Cost	1,520.91	46,387.75	556,653.00	7,028.45
Business Cost	3,526.81	107,567.58	1,290,811.00	16,298.12
Crew Salary	7,591.48	231,540.00	2,778,480.00	35,081.82
Management Charges	2,950.08	90,000.00	1,080,000.00	13,910.06
Gross Cost	**31,393.85**	**957,595.33**	**11,491,143.00**	**148,005.66**

Technical Cost	Daily	Monthly	Annual	Monthly(USD)
Repairing Charges	244.65	7,461.92	89,543.04	1,130.59
Special Surveying Sharing	713.11	21,750.00	261,000.00	3,295.45
Communication Charges	17.98	548.42	6,581.04	83.09
Stores	483.36	14,742.33	176,907.96	2,233.69
Spare Parts	183.52	5,597.33	67,167.96	848.08

Lubricating Charges	393.44	12,000.00	144,000.00	1,818.18
Bunker Charges	13,770.49	420,000.00	5,040,000.00	63,636.36
Subs	**15,806.56**	**482,100.00**	**5,785,200.00**	**73,045.45**

Marine Cost	**Daily**	**Monthly**	**Annual**	**Monthly(USD)**
Entertainment Charges	63.88	1,948.33	23,380.00	295.20
Self-Pilotage Charges	227.63	6,942.75	83,313.00	1,051.93
Major Inspection Charges	151.61	4,624.08	55,489.00	700.62
Marine Publication Fee	74.13	2,261.08	27,133.00	342.59
Certification & Internal Vetting	30.98	944.83	11,338.00	143.16
Hull & Machine Insurance	480.87	14,666.67	176,000.00	2,222.22
P & I Insurance	491.80	15,000.00	180,000.00	2,272.73
Subs	**1,520.91**	**46,387.75**	**556,653.00**	**7,028.45**

Business Charges	**Daily**	**Monthly**	**Annual**	**Monthly(USD)**
Agency fee	311.48	9,500.00	114,000.00	1,439.39

Port Charges	1,902.50	58,026.33	696,316.00	8,791.87
Commissions	1,312.83	40,041.25	480,495.00	6,066.86
Subs	**3,526.81**	**107,567.58**	**1,290,811.00**	**16,298.12**

Crewing Charges	**Daily**	**Monthly**	**Annual**	**Monthly(USD)**
Crew Salary	5,901.64	180,000.00	2,160,000.00	27,272.73
Provision Fee	280.00	8,540.00	102,480.00	1,293.94
Crew Management Fee	491.80	15,000.00	180,000.00	2,272.73
Crew Bouns	590.16	18,000.00	216,000.00	2,727.27
Travel, Medical and Certifications	327.87	10,000.00	120,000.00	1,515.15
Subs	**7,591.48**	**231,540.00**	**2,778,480.00**	**35,081.82**

Source: company data base

7.2.2 The profit analysis for DWT 2000 – 3000

According to the voyage route design, the average income for DWT 2000 is about 2.2 million RMB per months. And the average cost for the DWT 2000 is 0.98 million RMB per months.

(1) Income = 2200000 RMB

(2) Cost = 980000 RMB

  (1) Business cost: 107567 RMB

  (2) Bunker cost: 482100 RMB

(3) Days in voyage = 30.5 days

(4) T/C = (Income-business cost-bunker cost)/Days in voyage

= 52797.5 RMB/DAY

= 8380 USD/DAY

7.3 The cost structure for DWT 12000

7.3.1 The cost structure and the performance for DWT 2000 – 3000

Unlike the small deadweight tankers have many COAs, the large size tankers are based on the spot voyage. Usually , the fixed spot like another kind of COA. Hereby, we use the designed voyage to analysis the cost structure and the performance.

Plan 1: The voyage between Mailiao and Ningbo

Table 28: The voyage between Mailiao and Ningbo

Voyage Estimate Report

MT.	**DWT 12,000**	**Date**	**2012/4/21**
Voy No.	**TBN**		
Deparment	**Business Department**		
Name	**Davy Mao**		

Vessel Particular

DWT	Speed(Type/Ballast/Laden)			FO/Type	FO/Sea(Blst/ldn)		FO/Port(Idel/Work)		DO Type	DO Sea	DO/Port(Idel/Work)	
12,000	Full	11.0	10.0	380	14.8	14.4	0.0	0.0	380	0.0	2.0	3.5

Cargo

Account	Cargo Item	Quantity		Freight	Revenue	Add Commision	Brokerage	Freight Tax
	PX	11,000	Mt	14.50	159,500.00	0.00%	2.50%	0.00%
	PX	11,000	Mt	14.50	159,500.00	0.00%	2.50%	0.00%
	PX	11,000	Mt	14.50	159,500.00	0.00%	2.50%	0.00%
			Mt		0.00	0.00%	0.00%	0.00%
Total		11,000	Mt		478,500.00		3,987.50	

Port Rotation **Ttl Duration** 22.87 **Sea:** 10.87 **Port:** 12.0 **Bal:** 0.00 **Ldn:** 0.00

Type	Port Name	Miles/Weather		Kt's	Sea	L/D Rate	Port (Idel/Work)		Port Charges
Ballast	Mailiao	0	0.00%	11.0	0.00		0.0	0.0	0.00
Loading	Mailiao	0	0.00%	11.0	0.00		1.0	1.0	9,523.81
Discharge	Ningbo	574	0.00%	11.0	2.17		1.0	1.0	9,523.81
Loading	Mailiao	574	0.00%	11.0	2.17		1.0	1.0	9,523.81
Discharge	Ningbo	574	0.00%	11.0	2.17		1.0	1.0	9,523.81
Loading	Mailiao	574	0.00%	11.0	2.17		1.0	1.0	9,523.81
Discharge	Ningbo	574	0.00%	11.0	2.17		1.0	1.0	9,523.81
		2,870			10.87		6.0	6.0	57,142.86

Bunker price

	Type	Price
FO	380	750
DO	380	1110

Bunker Charges

	FO/Sea(Ballast/Laden)		FO/Port(Idel/Work)		DO/Sea	DO/Port(Idel/Work)	
Consumption	0.00	160.89	0.00	0.00	0.00	12.00	21.00
Bunker Expense	0.00	120,670.45	0.00	0.00	0.00	13,320.00	23,310.00

Total Bunker Expense 157,300 (FO Cons.) 120,670 (DO Cons) 36,630

Operation Expense

Item	Cost/Per Month	Cost
Broker		3,987.50
Port Charges		57,142.86
Bunker Expense		157,300.45
Crew Charges	407,217.00	49,278.02
Insurance	74,250.00	8,985.12
Marine	23,917.00	2,669.65
Technial	129,000.00	15,610.51
Management	100,000.00	12,101.17
Add Commission		0.00
Freight Tax		0.00
Others		0.00

Total Operation Expense 307,075.28

Result

Total Revenue	478,500.00
Op. Expense	307,075.28
Op. Profit	171,424.72
Total Hire	0.00

Result Plus

Profit Rate	35.83%
Daily Revenue	20,921.50
Daily Expense	13,426.28
Daily Profit	7,495.22
Unit Profit	15.58

Expense Rate

Bunker Exp.	32.87%
Port Charge	11.94%
Dem/Des	0.00%
Hire	0.00%
Others	55.18%

Profit/Loss ***171,424.72***

Source: company data base

Plan 2: Mailiao – Ningbo – Ulsan – Mailiao – Ningbo

Table 29: Mailiao – Ningbo – Ulsan – Mailiao – Ningbo

Voyage Estimate Report

MT.	**DWT 12,000**
Voy No.	**TBN**
Deparment	**Business Department**
Name	**Davy Mao**

Date **2012/4/21**

Vessel Particular

DWT	Speed(Type/Ballast/Laden)			FO/Type	FO/Sea(Blst/ldn)		FO/Port(Idel/Work)		DO Type	DO Sea	DO/Port(Idel/Work)	
12,000	Full	11.0	10.0	380	14.8	14.4	0.0	0.0	380	0.0	2.0	3.5

Cargo

Account	Cargo Item	Quantity		Freight	Revenue	Add Commision	Brokerage	Freight Tax
	PX	11,000	Mt	14.50	159,500.00	0.00%	2.50%	0.00%
	CSS	8,000	Mt	19.00	152,000.00	0.00%	2.50%	0.00%
	PX	11,000	Mt	14.50	159,500.00	0.00%	2.50%	0.00%
			Mt		0.00	0.00%	0.00%	0.00%
Total		11,000	Mt		471,000.00		3,987.50	

Port Rotation

Ttl Duration **21.72** **Sea:** **9.72** **Port:** **12.0** **Bal:** **0.00** **Ldn:** **0.00**

Type	Port Name	Miles/Weather		Kt's	Sea	L/D Rate	Port (Idel/Work)		Port Charges
Ballast	Mailiao	0	0.00%	11.0	0.00		0.0	0.0	0.00
Loading	Mailiao	0	0.00%	11.0	0.00		1.0	1.0	9,523.81
Discharge	Ningbo	574	0.00%	11.0	2.17		1.0	1.0	9,523.81
Loading	Ulsan	412	0.00%	11.0	1.56		1.0	1.0	9,523.81
Discharge	Mailiao	1,007	0.00%	11.0	3.81		1.0	1.0	9,523.81
Loading	Mailiao	0	0.00%	11.0	0.00		1.0	1.0	9,523.81
Discharge	Ningbo	574	0.00%	11.0	2.17		1.0	1.0	9,523.81
		2,567			9.72		6.0	6.0	57,142.86

Bunker price

	Type	Price
FO	380	750
DO	380	1110

Bunker Charges

	FO/Sea(Ballast/Laden)		FO/Port(Idel/Work)		DO/Sea	DO/Port(Idel/Work)	
Consumption	0.00	143.91	0.00	0.00	0.00	12.00	21.00
Bunker Expense	0.00	107,930.68	0.00	0.00	0.00	13,320.00	23,310.00

	Total Bunker Expense	144.561	(FO Cons.)	107.931	(DO Cons)	36.630	

Operation Expense

Item	Cost/Per Month	Cost
Broker		3,987.50
Port Charges		57,142.86
Bunker Expense		144,560.68
Crew Charges	407,217.00	46,805.14
Insurance	74,250.00	8,534.23
Marine	23,917.00	2,535.68
Technial	129,000.00	14,827.14
Management	100,000.00	11,493.91
Add Commission		0.00
Freight Tax		0.00
Others		0.00
Total Operation Expense		289,887.14

Result

Total Revenue	471,000.00
Op. Expense	289,887.14
Op. Profit	181,112.86
Total Hire	0.00

Result Plus

Profit Rate	38.45%
Daily Revenue	21,681.60
Daily Expense	13,344.41
Daily Profit	8,337.19
Unit Profit	16.46

Expense Rate

Bunker Exp.	30.69%
Port Charge	12.13%
Dem/Des	0.00%
Hire	0.00%
Others	57.18%

Profit/Loss ***181,112.86***

Source: company data base

Plan 3: Tianjin – Davao – Merak – Kandla – Iran – Zhangjiagang

Table 30: Tianjin – Davao – Merak – Kandla – Iran – Zhangjiagang

Voyage Estimate Report

MT.	DWT 12,000
Voy No.	TBN
Deparment	Business Department
Name	Davy Mao

Date 2012/4/21

Vessel Particular

DWT	Speed(Type/Ballast/Laden)			FO/Type	FO/Sea(Blst/ldn)		FO/Port(Idel/Work)		DO Type	DO Sea	DO/Port(Idel/Work)	
12,000	Full	13.0	13.0	380	16.0	14.4	0.0	0.0	380	0.0	3.0	4.0

Cargo

Account	Cargo Item	Quantity		Freight	Revenue	Add Commision	Brokerage	Freight Tax
	MOGAS	10,000	Mt	25.00	250,000.00	0.00%	2.50%	0.00%
	CPKO	11,000	Mt	38.00	418,000.00	0.00%	2.50%	0.00%
	SM	11,000	Mt	80.00	880,000.00	0.00%	2.50%	0.00%
			Mt		0.00	0.00%	0.00%	0.00%
Total		10,000	Mt		1,548,000.00		6,250.00	

Port Rotation

Ttl Duration 56.60 **Sea:** 44.60 **Port:** 12.0 **Bal:** 0.00 **Ldn:** 0.00

Type	Port Name	Miles/Weather		Kt's	Sea	L/D Rate	Port (Idel/Work)		Port Charges
Ballast	Tianjin	0	0.00%	13.0	0.00		0.0	0.0	0.00
Loading	Tianjin	0	0.00%	13.0	0.00		1.0	1.0	15,000.00
Discharge	Davao	2,242	0.00%	13.0	7.19		1.0	1.0	15,000.00
Loading	Merak	1,536	0.00%	13.0	4.92		1.0	1.0	15,000.00
Discharge	Kandla	3,003	0.00%	13.0	9.63		1.0	1.0	15,000.00
Loading	Jubail	1,178	0.00%	13.0	3.78		1.0	1.0	15,000.00
Discharge	Zhangjiagang	5,955	0.00%	13.0	19.09		1.0	1.0	15,000.00
		13,914			44.60		6.0	6.0	90,000.00

Bunker price

	Type	Price
FO	380	750
DO	380	1110

Bunker Charges

	FO/Sea(Ballast/Laden)		FO/Port(Idel/Work)		DO/Sea	DO/Port(Idel/Work)	
Consumption	0.00	713.54	0.00	0.00	0.00	18.00	24.00
Bunker Expense	0.00	535,153.85	0.00	0.00	0.00	19,980.00	26,640.00

Total Bunker Expense 581,774 (FO Cons.) 535,154 (DO Cons) 46,620

Operation Expense

Item	Cost/Per Month	Cost
Broker		**6,250.00**
Port Charges		**90,000.00**
Bunker Expense		**581,773.85**
Crew Charges	**650,000.00**	**194,642.86**
Insurance	**452,250.00**	**135,426.51**
Marine	**23,917.00**	**6,606.20**
Technial	**229,000.00**	**68,574.18**
Management	**150,000.00**	**44,917.58**
Add Commission		**0.00**
Freight Tax		**0.00**
Others		**0.00**

Result

Total Revenue	1,548,000.00
Op. Expense	1,128,191.17
Op. Profit	419,808.83
Total Hire	0.00

Result Plus

Profit Rate	27.12%
Daily Revenue	27,351.68
Daily Expense	19,934.06
Daily Profit	7,417.62
Unit Profit	41.98

Expense Rate

Bunker Exp.	37.58%
Port Charge	5.81%
Dem/Des	0.00%
Hire	0.00%
Others	56.60%

Total Operation Expense	1,128,191.17
Profit/Loss	***419,808.83***

Source: company data base

7.3.2 The profit analysis for DWT 12000

Average Income = 700000 USD

Cost

Business cost: 67223 USD

Bunker cost: 238300 USD

Days in voyage = 30.5 days

T/C = (Income-business cost-bunker cost)/Days in voyage

= 12933 USD/DAY

7.4 The NPV and IRR analysis

Net Present Value (NPV)

Money has a time value as an amount of money held now worth more than an equal amount to be held in the future. This is particularly true when considering inflation that significantly reduce the value of money over time. It leads to the distinction between 'real' and 'market' interest rate (Fisher effect) so that:

(1 + Market interest rate) = (1 + Real interest rate) * (1 + Rate of inflation)

To account for these effect and when moving from future to present, future cash flows need to be discounted.

The Net Present Value (NPV) of an investment is then the sum of discounted net cash flows so that:

$$NPV = \sum_{i=1}^{n} \frac{A_i}{(1+r)^i} - C$$

Where: n — project life;

Ai — net cash flows at the end of year i

R — discount rate

C – initial capital expenditure

A project is accepted (rejected) if its NPV is positive (negative). When positive, it means that your money generate more returns than if you were investing the same amount in a bank account with an interest rate I equal to r. when capital is to be invested several times or induces loan repayment occurs, C refers to principal and interest repayments.

To calculate the discount the cash flows, two ways can be used.

1）If a project generates irregular future cash flows, meaning An only one time in n years' time and for a discount rate equal to r, then its present value (PV) is:

$$PV = \frac{A_n}{(1+r)^n} = A_n(1+r)^{-n}$$

2）If a project generates future cash flows in constant annuity always equal to a constant An during n consecutive years, then three configurations exist:

a) An from year 0 till N, you are then dealing with annuity due (ad)

$$PV_{ad} = A_n + A_n \cdot \frac{1-(1+r)^{-(N-1)}}{r}$$

b) An from year 1 till N, you are then dealing with immediate annuity, (ai)

$$PV_{ai} = A_n \cdot \frac{1-(1+r)^{-N}}{r}$$

c) An from year d till N, you are then dealing with deferred annuity (da)

$$PV_{da} = A_n \cdot \frac{1-(1+r)^{-(N-d)}}{r} \times \frac{1}{(1+r)^d}$$

These formulae are often used to build the amortization table from a loan.

Advantage of NPV method:

i. Does consider time value of money

Disadvantage of NPV method:

i. The discount rate is hard to select. Normally, the London Interbank Offer Rate

(LIBOR) is to be selected.

ii. Another limitation from the NPV is that it can be only used as criteria to compare projects only under specific conditions: projects with similar size and risk.

Internal Rate of Return (IRR)

The Internal Rate of Return (IRR) is derived from NPV. IRR is the discount rate for which NPV is equal to 0. An investment is eligible if the IRR exceeds the interest rate of return you can expect from another investment. We therefore look for IRR = r so that:

$$NPV = \sum_{i=1}^{n} \frac{A_i}{(1+IRR)^i} - C = 0$$

Where: n – project life:

Ai – net cash flows at the end of year I;

R – discount rate;

C – initial capital expenditure.

Two ways of calculating IRR:

i. Calculate the NPV of cash flows using different discount rates. When the zero NPV is bracketed (- and + value), use a linear interpolation to find the discount rate equal to zero (IRR).

ii. Calculate IRR with software (excel spreadsheet for instance).

Advantage of IRR:

i. Closely related to NPV;

ii. Easy to communicate as expressed in %.

Disadvantage of IRR:

i. Closely related to NPV when comparing projects (similar size and risk);

ii. Dose not always provide as much information than NPV

Products carrier - New vessel																			
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Ship purchase/sale	45.0																		2.25
Income/day(RMB)		72,131	75,738	79,524	83,501	87,676	92,059	96,662	101,496	96,421	91,600	87,020	82,669	78,535	74,609	70,878	67,334	63,968	60,769
Earnings p.a.* = REVENUE		25.607	26.887	28.231	29.643	31.125	32.681	34.315	36.031	34.229	32.518	30.892	29.347	27.880	26.486	25.162	23.904	22.708	21.573
Operating costs ($ per day)		32,131	34,380	36,787	39,362	42,117	45,065	48,220	51,595	55,207	59,072	63,207	67,631	72,365	77,431	82,851	88,650	94,856	101,496
Operating cost p.a.		11.728	12.549	13.427	14.367	15.373	16.449	17.600	18.832	20.151	21.561	23.070	24.685	26.413	28.262	30.241	32.357	34.622	37.046
Net Cashflows	-45.0	13.879	14.338	14.804	15.276	15.752	16.232	16.715	17.199	14.079	10.957	7.822	4.662	1.467	-1.776	-5.079	-8.454	-11.914	-13.223
Cumulative cashflows	-45.0	-31.121	-16.783	-1.979	13.296	29.049	45.281	61.996	79.194	93.273	104.230	112.051	116.714	118.180	116.404	111.325	102.872	90.958	77.735
Payback	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Discounted cash flows	-45	13.345	13.256	13.161	13.058	12.947	12.829	12.702	12.567	9.892	7.402	5.081	2.912	0.881	-1.026	-2.820	-4.514	-6.116	-6.527
Discounted cumulative cash flov	-45	-31.655	-18.399	-5.238	7.820	20.767	33.595	46.297	58.864	68.756	76.158	81.238	84.150	85.031	84.006	81.185	76.672	70.556	64.028
NPV**	64.028	64.028																	
IRR	31%	13.345																	
* Trading days per year	355																		
** Discount rate	4%																		

	Shipbuilding	TC p.a	Opex p.a	EBIT	ROI	ROR
Products carrier - New vessel	45	28.85	22.15	4.32	9.60%	18.28%

Figure 22:The NPV and IRR for the DWT 2000-3000

The NPV for Deadweight 2000-3000 is 64 million compare with the ship price of 45 million.

The IRR for Deadweight 2000-3000 is 31%.

The annual net profit is minus after 14 years and it is sensible to sell the tanker after 10 years which can maximum the profit and IRR will be much more higher.

Summary: The IRR is high for the DWT 2000-3000. Though the net profit would be minus after 14 years, it is sensible to choose the tanker on sale. The age management is mature to the shipping companies. How to keep the age and the value become the future companies should face. Due to the IRR is over 31% and even it is not it's best performance, so this kind of tanker is worthy invest.

Chapter 8 Risk assessment

Introduction: To insure the invest safety, the risk assessment is necessary. Especially during the time after 2008, the investors are carefully investing to the ship owners. There are some high risk items should be taken care before making the decision.

8.1 Freight rate risk

Unlike the FFA, the tankers freight rate fluctuate in a small range for it was affected by the rigid demand of crude oil. We would not hope the tankers earn a lot of money like the time between 2005 -2008. We also would not worry about the sudden freight lose cause the business problem. Also the high standard safety requirement causes the freight rate on a sensible range.

The freight market fluctuated about 30% from the top place in 2008 to the bottom in 2009 and the 2010 back to the normal price.

In 2010 – 2011, affected by the European debt crisis, the global economy is slow down his step. Unlike the 2008, the Chinese government used 4000 billion USD to save the economy. Today, they adopted the macroeconomic regulation and control policy. Let the market to solve the problem by themselves.

The European debt crisis also affect the trade market, which also cause the COA charterer cannot decide to choose the type of the tanker regularly. Chemicals/oil transport freight market has wheel polarization serious characteristics. That is high-standard small batch chemicals to the higher unit freight as the characteristic, the raw material of large tonnage loaded the ship goods to the suitable for high tonnage freight rate of the features of the unit.

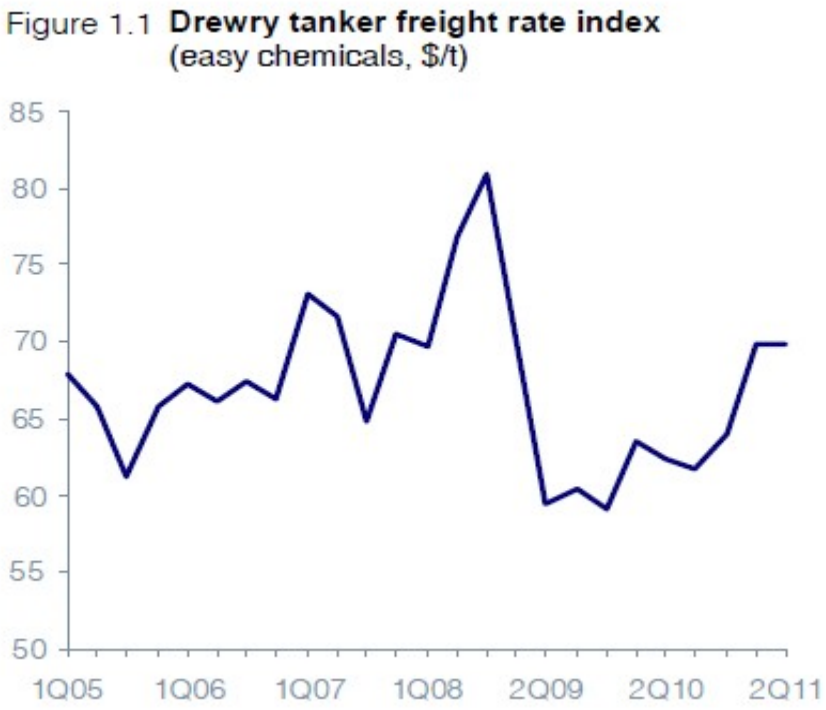


Figure 23: Drewry tanker freight rate index

8.2 Bunker price risk

The oil is still the main kind of fuel nowadays. It is effected by many reasons.

Bunker cost account for 44-50% of the total cost of ship owners. although in the second half of 2011, the international oil prices falling, but domestic product oil still on a high standard due to the policy limited. In the first half of 2012, due to Libya and the Iranian oil embargo, oil has soared to $110 a barrel. At present product oil 180 price stability in the us $780 / mt, compared with 2010 $510 / mt is rising about 52.9%. It is estimated that to 2013, the international oil prices will increase to $130 a barrel. In the future, with the new energy development, will gradually replace the current oil products as fuel to the situation.

Figure 24: Bunker price

8.3 The crew management risk

Due to the golden time between 2005-2008, the crew salary increased too much and cannot be changed any more. Which play the proportion of 30% of the total cost. And the certificate of the captain and chief engineer are easy to get. Which cause there is no C/O and 2/E.

8.4 Exchange rate risk

From 2002 to 2011, the exchange rate of the RMB appreciate again and again when compare with USD dollars. Especially the recent U.S. senator push the RMB appreciation, which cause the domestic labor price appreciation, lowering export competitiveness. The owner of the signed COA contract would face the freight rate loss.

Figure 25: Exchange rate risk

Summary: According to the risk assessment, we find the freight and bunker price is the highest item. But the market we focused on is high standard cargo and the charterer faced lack of small deadweight tanker, I think it is not the main problem from now. The bunker price is still high, but affected by the european crisis, the european countries has decrease their oil demand. It is the main reason that the bunker price fluctant recently.

Chapter 9 Conclusion

After analysis the kind of tankers, the market, new building strategy and profit , we found that the chemical market would in his golden time after 2012. And surely, it will sustain over another 10 years. Due to we cannot live without the chemical. And the developing countries still would face their choice in next 10-20 years.

And today is good time to decide to build new tankers for the price will be very low and ship yards are focus on keep the factory working but not make profit. The ship price will be very competitive in the future.

The investor decide to involve this area is sensible, though high risk faced, this profit is high and would not like the bulk cargo to fluctuate a lot in freight.

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