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# Comparative analysis between the ports in Valparaiso and San Antonio

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COMPARATIVE ANALYSIS BETWEEN THE PORTS IN VALPARAISO  
AND SAN ANTONIO

BY

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CHILE

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1991

**"COMPARATIVE ANALYSIS BETWEEN THE PORTS OF  
VALPARAISO AND SAN ANTONIO"**

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Thank God for giving me life, a family and friendship.

## INTRODUCTION

The Republic of Chile which is located on the southwest coast of South America is characterized by its long and narrow strip of land. In the east it is separated from Argentina by the Andes Mountains, in the southern part limited by the South Pole, on the north its border is with Peru and on the west its border is projected through the Pacific Ocean to the rest of the world.

Therefore, the geographical location, hostile nature and ethnic composition of the country's population, created very special geopolitical features both for its territory and population.

Consequently, during the history of the country, the government has legislated different laws and regulations with the objective to create a legal framework capable of established the necessary conditions to permit the whole development of the country.

On the other hand, the adequate development and economic growth of the country has to be performed through aggressive changes in policies with the objective to create some comparative advantages. The purpose of this changes is to allow national exports to reach the international market with competitive prices and adequated quality.

Moreover, Chile is no longer an island thanks to the internationalization of business and commerce.

The boundaries of most countries in the world are open to commerce.

Because of its location Chile depended on shipping and port industries to transport more than 140 different export products to reach international markets.

Efficient, reliable, cheap and scheduled shipping and ports services are among others the key to succeed in the international trade adventure.

The objective of this work is to analyze how all those components have been helping the national economic growth and how the ports in Valparaiso and San Antonio helped such adventure.

Therefore, a comparative analysis of them give a complete picture of their functions, activities, services and how they can be improved in the future. Of course a SWOT analysis is provided to help in that issue. Finally, the paper provides a consecutive number of conclusions and recommendations which the author hope to facilitate further improvements in shipping and port industry in Chile with the help of a macro and expert point of view.



1.0. BACKGROUND

1.1. GLOBAL AND REGIONAL ECONOMICS IN SOUTH AMERICA

GENERAL ASPECT OF THE WORLD ECONOMY, DURING THE LAST DECADE

Some of the most important features of international economy during this decade have been both its rapid growth and the increase of transboundary financial activities.

Firstly, despite heavy external debts in the majority of the developing countries it is possible to see a high increase in investments as well as in the production of services and products there.

During the last decades the production of manufactured products in developed countries grew sharply. Which also means, an increase in the trade of raw materials and middle manufactured products coming from the least industrialized areas of the globe. Secondly, because of the rise in restrictions of traffic, the capital is circulating more and more through international frontiers.

Mainly, trade has been increasing between areas such as Europe, the United States, the Far East and after the 70's to the New Industrialized Countries so called NICs. Where new intercommunications systems are being developed

as help for traders who are asking for more business and reliability.

Further, it is possible to appreciate an extraordinary increase in multilateral agreements, trying to become more and more international and leave the old forms of bilateralism, which has proved to be not a very successful tool for achieve regional development (ALALC).

Nevertheless, with the opening of the Eastern countries a new enormous market has begun to improve the condition for a real international new economic order.

#### OVERVIEW OF THE SOUTH AMERICAN ECONOMY

On the other hand, South America as been left behind, both because of loss of its strategic importance, for the USA and Europe and because of the political differences with prevailing military governments in most of the South American countries during the last two decades.

The 1980's were really a very difficult period of time for all the South American economies due to huge foreign debts, unstable political regimes, lack of appropriate macroeconomic policies related with exports, poor development on their industrial sectors and

°  
economies mainly relying on raw materials exports. However, perhaps the most important reason was lack of spirit of entrepreneurship and competitiveness, shown in most of the different sectors of the Latin American economies.

In the 1990's things look slightly better; many countries changed their economic policies for other closer to the market economy, influenced by permanent advice from the International Monetary Fund, as well as, the good example given for the healthiness of the Chilean economy and its successfully full free market economy, where the result of new changes can be appreciated on different aspects of the industry, social and labor systems.

#### SUMMARY OF THE CHILEAN ECONOMY DURING THE LAST TWO DECADES

Until the beginning of the 70's, the Chilean economic system or policies were mainly connected with semi-centralized model but ruled under capitalistic regulations. That is why there was a claim for nationalization of the main natural resources lying in foreign hands, like the great mining (approximate us 80 % of Chilean exports, at that time ).

The earlier 70's were really very hard time for the Chilean economy. In the beginning of the period, a government lead by the Popular Union was ruling the country with a centralized policy which turned most of the private investments and properties to social ownership. During this time, private properties were taken and given to the people, against the normal cultural behavior of the Chilean population.

Some of the most important features of the social structure of the country are its huge middle class, which means that more than 60 % of the population<sup>1</sup> belongs to this social layer mainly composed of professionals and employees. For that reason, most of the mentality of the Chilean population was opposed to centralized systems and of course this was a contradiction to the largest democratic tradition in South America.

During the last year (1973), of the government mentioned above, the inflation reached the devastating figure of 750 %, leaving its traditional 20 % and of course, the whole industrial sector completely stagnate.

From 1973, the country was ruled by a military government, with the principal aim of taking off the country from the bottom where it was located, and put it in a better and honorable future position on the globe, but all of this immersed in a new constitutional order.

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<sup>1</sup> Study done by the National Statistics Institute of Chile

From 1974 to 1978 several systems were applied trying to control the inflation rate and incrementing economic growth. However, most of them were not very successful until 1978, when the economy was opened to external trade (imports and exports). Again in 1981, it was necessary to restructure the economic system leaving the external recipies and developing an ingenious one, which showed its first success in 1983 reaching a normal (20 %) inflation rate and average rate of growth of 7.5 % until 1990.

Nevertheless, export oriented policies were the solution the government used when they decided to turn the country's economy more aggressive and active<sup>2</sup>.

However, every process became difficult after so many years with an enclosed economic mentality.

From that, to reach a regional trade integration has been a very hard task and still is a chimera trying to grow. Trade liberalization started in 1973, created the same mechanism to decrease customs tariff rates until reaching a uniform 10 % and to withdraw all those different subsidies to exports in 1979<sup>3</sup>.

But, one of the major problems was the exchange rate

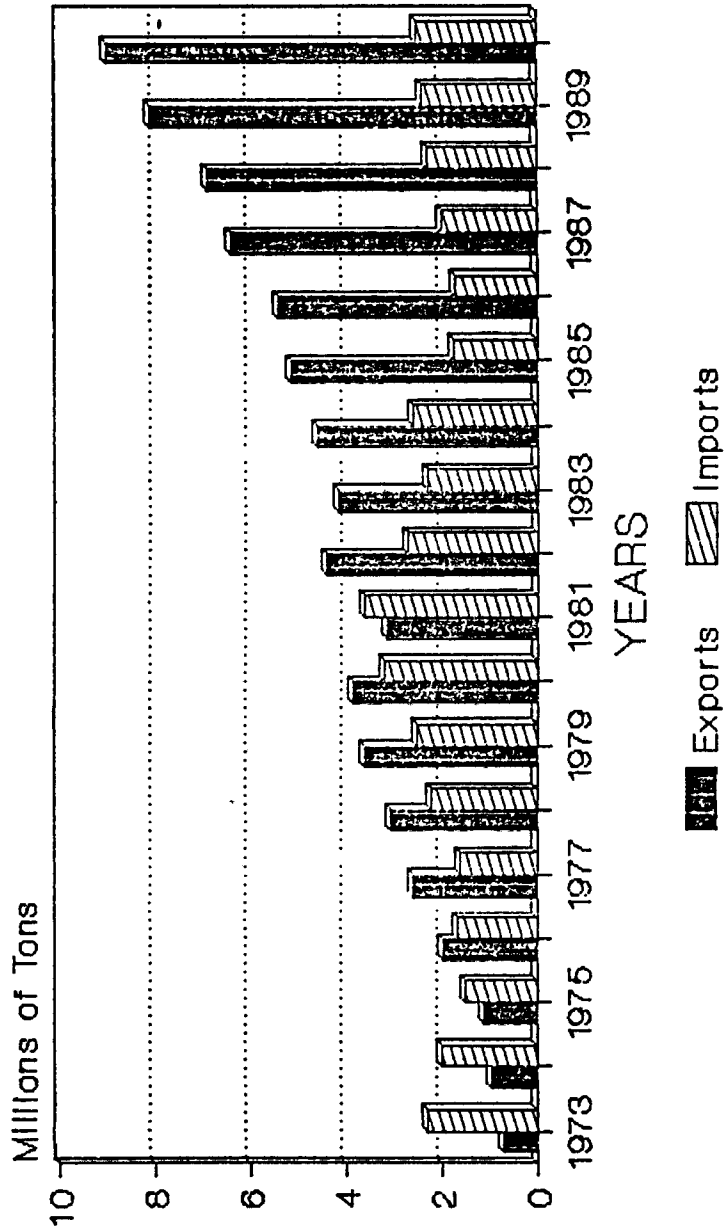
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<sup>2</sup> See graph 1.1. Exports and Imports (Emporchi)

<sup>3</sup> See graph 1.2. with export and import by sea

GRAPH 1.1.

# EXPORTS AND IMPORTS EMPORCHI THROUGHPUT



Source: EMPORCHI

system, which started with a mixed rate from all those utilized before to different issues (export dollar, import dollar, etc.). From 1976 to 1979 a daily rate of devaluation was settled until it reached in 1978 a fixed dollar. It must be remembered that these years were specially difficult because of international recession and the huge internal inflation rate.

The main hope was putted on a open economy system, this was surely not the most favorable time to do so.

Nevertheless, the economy was open to the international trade in 1978, permitting private banks to borrow abroad.

Although, the work had been done, the mentality of the people and the innocence of the government permitted both uncontrolled international loans and the artificial economic boom. This was mainly due to the fixed foreign exchange rate, which made imports extremely cheap, and the increase of the international interest rate from 6 to 16% .

For those reasons there was created an enormous foreign debt which had to be assumed by public accounts ending in a crushdown in 1981, when the authorities liberalized the foreign currency market.

This enturn created a parallel market causing permanent devaluation compared with the internal rate of inflation and the international LIBOR rate. All these factors made a very hard lesson for all those whose funds

where involved but creating as well very good incentive to exporters who saw how their revenues were increasing, thus being in better position to improve their comparative advantages with other producers in the international market.

Currently, more than 140 different products are exported. Copper products fell from 80 to 40 % of their shares in total, which went from manufactured articles, such as electric household goods and textile to fisheries.

From the factors indicated it is possible to conclude the importance of a port system to the Chilean economy<sup>4</sup> and why there is a need for port facilities.

As well is important to pointed, both infrastructure and superstructure have to be modern, versatile, capable and effective, as a tool to create comparative advantages for Chilean exports on the international arena.

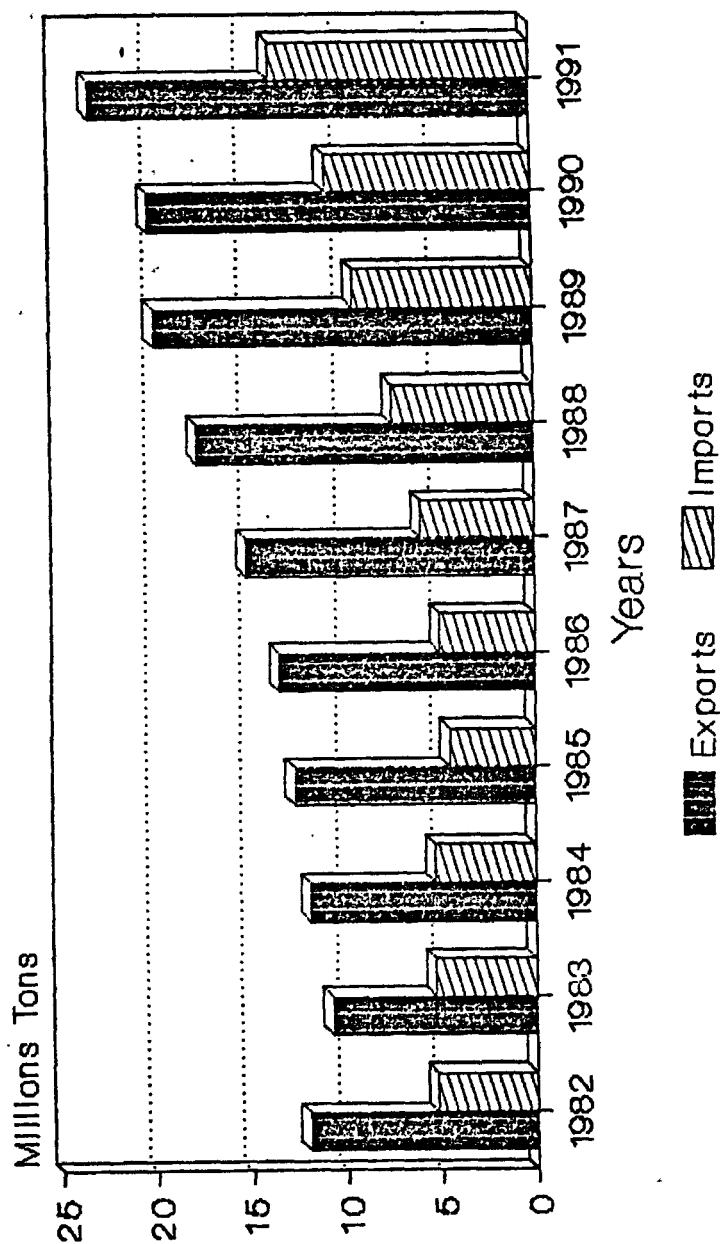
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<sup>4</sup> See graph 1.3. with Total Trade and Share of trade



GRAPH 1.2.

# EXPORTS & IMPORTS BY SEA



Source: DGTM

REGIONAL SHARE OF THE GROSS NATIONAL PRODUCT

GNP share by region (%)

Population by region (%)

1970	1988	REGION	1970	1988
2.5	3.2	I	1.96	2.63
4.3	5.4	II	2.83	2.94
1.9	2.1	III	1.72	1.54
1.6	2.1	IV	3.82	3.72
11.2	10.2	V	10.82	10.61
49.2	41.5	MR	35.51	39.41
5.4	5.9	VI	5.47	4.97
3.6	4.0	VII	6.95	6.40
9.4	9.7	VIII	14.13	12.87
3.1	3.2	IX	6.76	6.03
4.6	4.7	X	8.38	7.13
0.5	0.5	XI	0.57	0.60
2.7	2.8	XII	1.01	1.18
100.0	100.0		100.0	100.0

Source : Chilean Central Bank

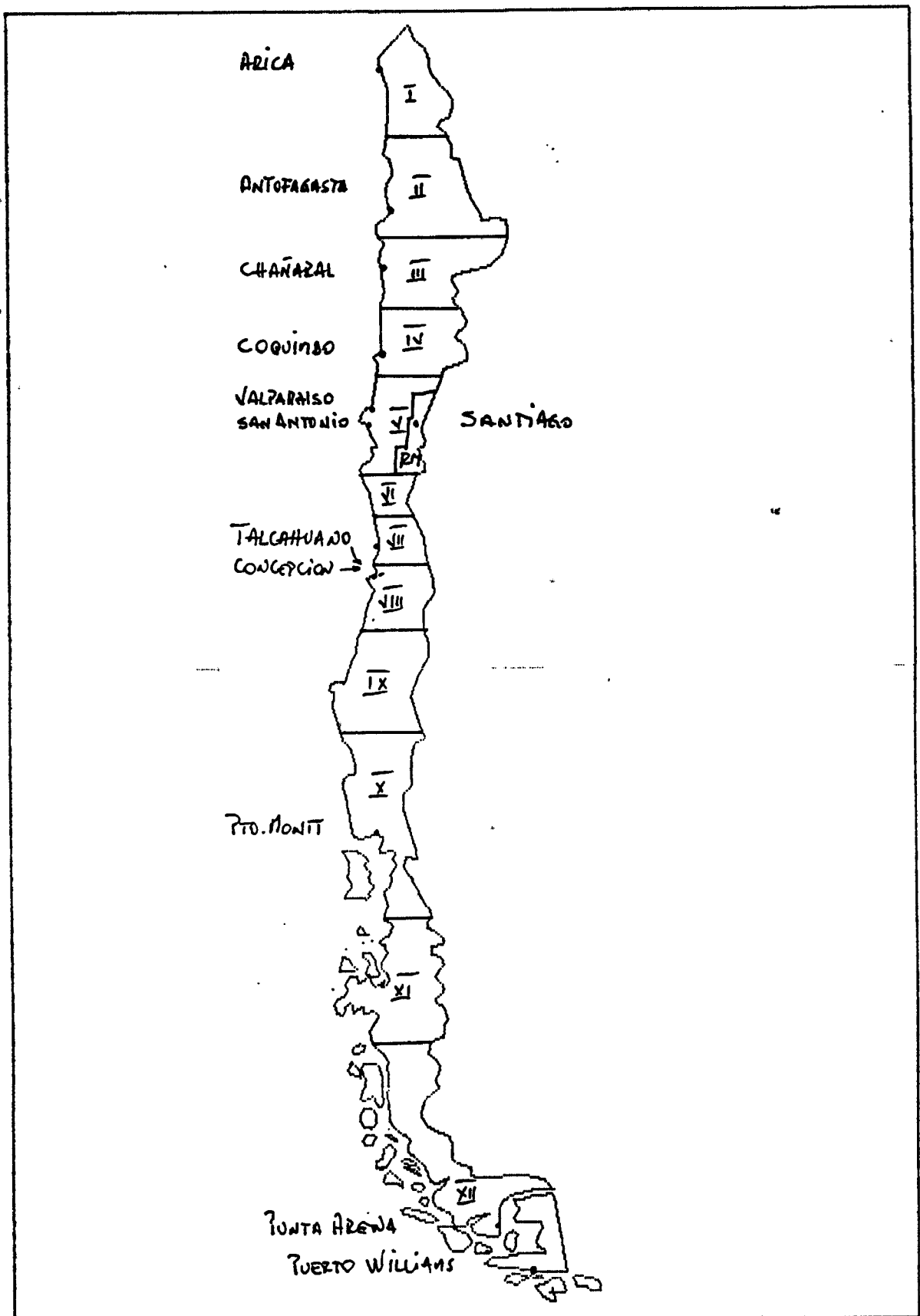
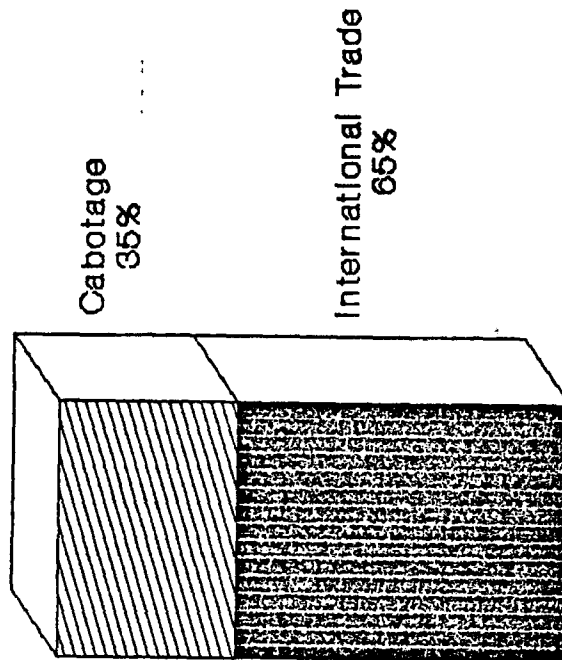


Figure 1 MAP OF CHILE WITH REGIONAL DIVISION

GRAPH 1.3.

# Total Trade Share of trade



Data 1990

Source : DGTM

## 1.2. LEGAL FRAMEWORK

To create a propitious and harmonic environment with the economic policy changes, it was also very important to formulate an adequate legal framework<sup>2</sup>, capable of stimulating those changes expected, and supporting all regulations with a modern and new constitutional order. Some of those laws are the following :

### LAW OF COMMERCE AND SHIPPING

This legal instrument decreeted in 1811, was a pioneer regulation both for the country and for South America. The object of this law was to create a regulatory frame, capable of controlling and promoting the business and shipping industries, creating in Chile the first national known cargo preference scheme. The legislation preserved the cabotage cargoes to the incipient national merchant fleet.

### CUSTOMS ORDINANCES, 1811, 1864

This regulation was also one of the first decreeted by the Chilean authorities. The objective was to order

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<sup>2</sup> Laws related only with maritime economic issues

national issues connected with customs dues collection on international trades, and to control the protective measures taken by the government.

**LAW No. 12,041**

The Law 12,041 was legislated in 1956. Its purpose was to establish an adequate legal framework, which ensured a real protective instrument. The objective was to promote the growth of the merchant marine industry, grant it with a cargo preference scheme and tax exemption.

**DECREE WITH FORCE OF LAW No. 290**

This regulation was settled by the presidential office in 1960, with the objectives to improve the condition of national ports and create an executive organ which would manage, promote, maintain them adequately, and propound new port facilities for the future. Always looking for modern, efficient, technologies.

DECREE OF LAW No. 466

The Law No. 466 was promulgated in 1974, and its main aim was to renewed and reinforce the prior legislation related with the protection of the shipping industry.

This law gave the shipping industry a legal framework on matters related with exemption on taxation, cargo preference scheme, industrial compulsory renewal fund, ship acquisition, and reduction of exigenciés over participation of foreign partners on the ownership of Chilean shipping corporations.

Most of the newly incorporated protective measures were established to try to help the shipping industry development in the country.

DECREE OF LAW No. 2,222

The Law No. 2,222 is the Navigation Law of the country and was published in 1978. This regulation came to replace the old Navigation Act of 1878. The newly legislation was granted as the principal general legal instrument which gave the main shipping concept definitions used by both authorities and users.

This specialized legislation granted the General Maritime Directorate as technical authority on safety and security shipping matters and the Ministry of Transport as authority on shipping business matters.

Furthermore, some general aspects of this regulation are the following :

- registry and nationality of ships,
- general aspects on navigational issues like pilotage services,
- ownership of vessels and people related with her representation,
- manning of ships,
- discipline and safety on board,
- naval reserve,
- navigational risk,
- marine pollution,
- and war ship participation.

Finally, the Law No. 2,222 is a syllabus for any other regulation related to maritime issues and constitutes the most important legal tools for marine and shipping affairs.

**DECREE OF LAW No. 3,059, 1979**

The Decree No. 3,059 was published in 1979. This regulation drew up most of the protective measures given by the Law No. 12,041 and the Decree No.466.

Some of the measures were among others the following



- change from the tax exemption condition,
- termination of the renewal of material funds,
- cargo preference scheme; object of retaliation concept,
- cargo preference scheme remains the same only if freight rates of national companies are lower or the same level as international competitors,
- settlement of a high level commission to make the law active, specially concerning the retaliation concept (preference abroad, national preference; liberalization abroad, national market open to them).

This regulation was severely criticized by some Latin American partners because of its concept of trade liberalization and industry disprotection, but nowadays after 11 years most of them are changing to the Chilean model.

#### DECREE OF LAW No. 2,200

The Decree No. 2,200 was legislated in 1978 and its main subject was to established the new legal labor frame for the whole country.

This regulation made no difference between workers

(mining, seafarers, stevedores, etc.) the only differentiation was made according to their type of contracts which were divided in permanent, temporal, and sporadic.

Another very interesting feature of this regulation was the articles which made the choice of union association absolutely free and declare the obligation for workers to enter a union as a prerequisite to be accepted by a company unconstitutional. At the same time a new concept of collective bargaining was settled.

This regulation is the head legislation for all other regulations related with the matter.

#### LAW No. 18,032

The law No. 18,032 was published in 1981 and is a subsidiary legislation of the Decree No. 2,200 but specially related with docker personnel.

This law prohibited the cartelization of relative union and opened the enclosed docker registry to anybody fit to perform the job.

#### LAW No. 18,042

The law No. 18,042 was published in 1981, its matter was the establishment of the National Port Corporation,

which is the substitute of the former Chilean Ports Enterprise (Emporchi).

The new entity comprises 10 Regional Port Corporations, which controlled 19 different ports, technically controlled from the central office and the board of directors consisting of representatives from the regional corporations.

#### CODE OF COMMERCE, Book III

This code was elaborated and finally published in 1987 regulating all the international commerce matters. This regulation incorporates many of the concepts and principles established by the Hamburg Rules.

#### 1.3. CHANGES IN POLICIES.

Some of the transformations in regulations analyzed before help in other types of changes within the maritime industry given more flexibility and reliability. Some of these will be described more detailed.

A. LABOR SYSTEM.

Until 1973, the whole labor system was characterized by strong union power in most of the labor fields, which made any attempt demanding the economical field.

Moreover, the increasing union federations created a very difficult environment. To obtain more development and flexibility in the maritime industry for instance was entirely impossible.

Furthermore, the association of workers to unions, according to the old system was compulsory in all the main labor fields. Some of them reached the extreme point where the right of selection was reserved to the unions for new job applicants.

After 1978, a new system was introduced, liberalizing actual regulations related with unions, making the choice of application free and given the right of election to companies according to work performance and applicant skills. Another very important feature of the new system was that regulation was applicable to all workers (a new concept which include professionals, employees, technical workers and non-technical workers), the regulation assumed that all people were workers but with different levels of professional education.

However, differences between them were defined

according ranked scales, but wages level were leaved to be accorded between employee and employer as well is adjust by the market forces. Of course always under the National Labor Directorate supervision.

Furthermore, the regulation mentioned above also restricted or better say prohibit all type of federation or association of unions of the same field.

Moreover, companies which have branches a long the country, could not form a national union. On the other hand, was accepted to have several unions on the same company, which is very common but keeping at least a minimum of 25 associates.

From that, is feasible to derived the lesser power of unions. Furthermore, a very interesting feature of this regulation it is the new concept of collective bargain, where the workers (associated or not) formed a task group to negotiated with the company with professionalism and realism.

In general, jobs were classified on permanent, temporary and casual. Those divisions must be established in the contract signed by both parties.

#### LABOR CHANGES ON MARITIME INDUSTRY.

Chile defined the role of its ports from the point of view of its exports oriented policy. For that reviewed its port labor policy, were detected many inflexibilities

and factors which were been doing more expensive the whole port operations.

Before the application of Law 18,042 and 18,032 prior explained, the ports were controlled by 15 port labor unions. The high power of unions in issues like quantity of workers for task or job, as well on determination of their salaries, created a sort of monopoly in this area. From that all the requirements were higher than real needs. As well as possible saw work licenses titular whom often subcontract their job two or three time to non trained or informal workers. All of that created a multiplier factor, not bad in terms of labor making attitude. But, very inefficient and expensive both, for port users and to the final consumers as well.

ECLA published some statistics prior to 1981 (when the new regulation was settled) indicated what 3,200 dock workers were employed between 400 to 600 days per annum<sup>e</sup> with a salary of more than US \$ 2,000 per month, which was for those years four times higher than the master's wage. Figures like that tell us how difficult was try to change salaries and work system. For example before 1981, the cost of load pine trunks aboard a ship was more than the total costs involved in growing those trees.

After 1981, a new system was introduced given to

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<sup>e</sup> Study done by The Chilean Maritime Chamber

each of the formal dock workers an aggregate of compensation. The average amount delivered to dockers was US\$ 9,000, which means a total of US \$ 40 million compensatory scheme. These payments were settled down for resignation to their monopoly of cargo handling and for the opening of the dock job to everybody fitted to do the work. From that, the cancellation of dock workers registry, but still keeping some sort of privilege of work, which was completely liberalized in 1985.

After 1981, the port work was performed by private stevedoring companies, which contracted part of the old and better trained labor forces (former licensed dock workers). On the table named Analysis of throughput and cost per unit on page 32, should be appreciated the effect of the new regulation from the port efficiency point of view. On the other hand, important issues like: salaries, work stability, social benefit, etc. took, may be too much time to be solved, with a high social cost and political loss.

Until now, new regulations have been working for 10 years showing its flexibility and cost saving effect.

Currently, most of those old dock workers have been transformed into well trained port technicians. The reason why they are better adapted to any future social and technological change.

## B. THE PORT SYSTEM

The history of Chilean ports, shows us that the major problems involved concerning the improvement of port performance indicators are not the lack of modern technology or monetary resources for new investment. But, an irresponsible administration and over dimensioned dock labor force could be the reason.

Going back to the Chilean port history. Because the agricultural oriented mind of our Spanish conquestors, made it very difficult to turn to other more realistic thinking. Furthermore, undoubted Chile has a very important and old maritime commitment and tradition as more than 95% of the Chilean national trade is made through maritime routes, and has more than 4,400 kilometers of coast line.

However, most of the bigger ports were constructed after the 30's. All of them were administrated by the Service of Ports Exploitation, under the Ministry of Economics until 1960.

A very important feature of the port sector is its high investment costs. Which exist, because of the difficult topographic land characteristics. Therefore, there are not many sheltered harbors to built safely ports.

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<sup>7</sup> According data from The Chilean Central Bank



Most of the Chilean ports are open to the ocean and are consequently seriously affected by the heavy swell caused by the predominant south-west winds, which originate on the high pressure center of the Pacific Ocean.

On the other hand, to have an oceanic port ensured most of the time a very good depth. In turn this, represents an intensive capital investment when providing enough protection at least to those vessels berthed on the wharf.

Moreover, the geologic fault of the Nazca Plate, often produces a high level of seismic activities, which have destroyed many port infrastructures during this century, comprising a huge investment from the national budget.

For instance, in May 1960, the port of Puerto Montt was completely destroyed by both an earthquake and by a Tsunami. Other more recent examples of natural disasters, were in 1965, 1971 and 1985, and during this last year the port of Valparaiso was affected by a quake which damaged 30 % of its infrastructure. Moreover, San Antonio was affected by the same quake, in which more than 50 % of its facilities were completely destroyed including fallen down berths, quays, cranes, and warehouses.

Of course, the Chilean Port Enterprise has always had the challenge to make new investments, ingenious use

of the technology, improve ports' efficiency, but most of the time working against the hostile nature, lack of resources and political insolation.

Nevertheless, those adverse situations have influenced the Chilean people's character and personality.

However, returning to the history of the Chilean ports, in 1960 The Port Enterprise of Chile (hereinafter Emporchi), was created. Its mission was to give ports services to the costumers through the exploitation, administration and conservation of the existing ports, and construct new port facilities according with the future needs. Unfortunately, just some months after, an earthquake completely destroyed Valdivia and Puerto Montt and left others severely damage.

Emporchi, began its work by building new facilities, rebuilding those affected by the quake and renewing the cargo handling equipment. As a matter of fact, Emporchi owned only general cargo and universal terminals. Others terminals such as oil terminals, gas terminals, dry bulk terminals (salt, coal, iron ore, copper concentrate), liquid and chemical bulk terminals, etc., were owned and managed by private or semi-private companies.

At the end of 60's, Emporchi was technically well organized and equipped, but with an excessive labor force and inadequate pricing policy.

Moreover, the Emporchi personnel were responsible

for performing all the jobs done between the ship rail to the port gate. The work on board the vessel was delivered to be done exclusively by the stevedore unions.

At the beginning of 70's the enterprise was inefficient, and most of the main ports were run with excessive costs for the state (losses). Another interesting feature was the high congestion, principally in Valparaiso and San Antonio which reached 95 % of the berth occupancy rate.

As a result, the waiting time for ships queuing for berths increased to 3 or 4 weeks, which originated an increase on the freight rate by a surcharge of congestion. The reasons for that were several, but among the most important were : the labor system, the swift system, the port tariffs, and of course the excessive power of the union threaded with strikes.

According, to a study done by the enterprise in those years, the port of Valparaiso was not able to handle so many ships. This context, rose the imperative requisite to construct more facilities and berthing points. The quantity was calculated according to the study which indicated 18 berths (to that year, only 10 berths were available in Valparaiso).

In 1974, a pilot system of three swifts was introduced by the maritime authority in three pilot ports. With the purpose of improving port efficiency and diminishing waiting time for ships anchorage in the

harbor.

Furthermore, Emporchi decided to make the same changes in its internal organization and labor force, which took place between 1974 and 1980. As a result of that, the enterprise improved its former organization, became more rational in its services, and reduced the personnel.

After those measures the cost-efficiency of the company was improved. For instance, one of the services which was reduced was the maintenance division. Subcontracting private companies to performed some jobs for them. Those companies, gave better services because of their specialized work, and because they were less costly and permitted a better record of utilization and efficiency of the equipment.

In 1975, the Chilean government established a social market economy which was export oriented. However, for that reason the importance of having efficient ports increased further.

In 1980, the work in the ports was divided as the following:

Work performed by members of stevedore unions :  
Loading and discharging operations inside the ship  
until lifted or dropped the cargo unit with the

crane hook. Stevedore unions supply personnel to performed the job.

**Work performed by Emporchi :**

All those different operations were necessary to transfer the cargo from the crane hook (after the ship rail), until to the process of delivery of merchandise to the consignees or receivers. Of course, in those operations are included both short and long term warehousing.

Moreover, the general characteristic was a highly monopolized sector as far as labor and operations were concerned.

Nevertheless, the scenery was characterized by the following features :

**Regarding stevedore labor force :**

Excessively expensive labor costs,  
labor system absolutely inflexible,  
enclosed labor force, and  
completely unrealistic tariffs compared  
with the national situation.

**Regarding the work performed by the Port**

**Enterprise of Chile :**

Inexact tariff system,

cross subsidies between ports,  
lack of competition,  
passive port management, and  
completely uncoordinated work and planning  
process between ports and the surrounding  
community.

In 1981, the government implemented the Law No. 18,042 whereby, the private sector was permitted involvement in some of the port operations.

On the other hand, the Emporchi was transformed in to a holding group. This group owned ten ports and each of them formed an autonomous corporate port enterprise.

However, the Board of Directors of the Holding company was the organ which approved issues like reinvestment and new constructions. Another interesting feature of the Board was that some representatives from the user side were included.

In the same year, the Law No. 18,032 was settled and published by the government. That regulation established ( as mentioned in the prior section ) the abolition of the dock workers' registries, and opened them to anyone fitted to do the work.

Although, the new regulation seemed to be against the workers, it concord with the National Constitution, which established the right of freedom of work choice among the national citizens. This right is a holy right specially created for workers to maintain their real job

freedom.

Currently, after 10 years of running this system, the balance seems to be positive<sup>o</sup>. Ports are working 24 hours non-stop without holidays or no working days.

This, ensures a very efficient system with lower costs per unit mobilized; reasonable waiting time for ships; and more attractive and safer business for owners; as a result of the less waiting and service time, ports are theoretically located on the northern part of the Panama Canal; better ship reallocation, as a result of the less waiting time; lower freight rate for exporters; National products are now more competitive on the international market; workers are paid according to their work; there is more flexibility to move the workers from one job to another; reduction on labor force has given more probability to obtain a permanent contract, but keeping all its advantages.

Actually, the Chilean ports are serving more ships than during the 70's. The cargo turnaround is also higher. The labor force has been reduced to half, but, they are more efficient as a result of the improved training scheme, salary and social security. Most of them are now port technicians which in turn is more reliable for users.

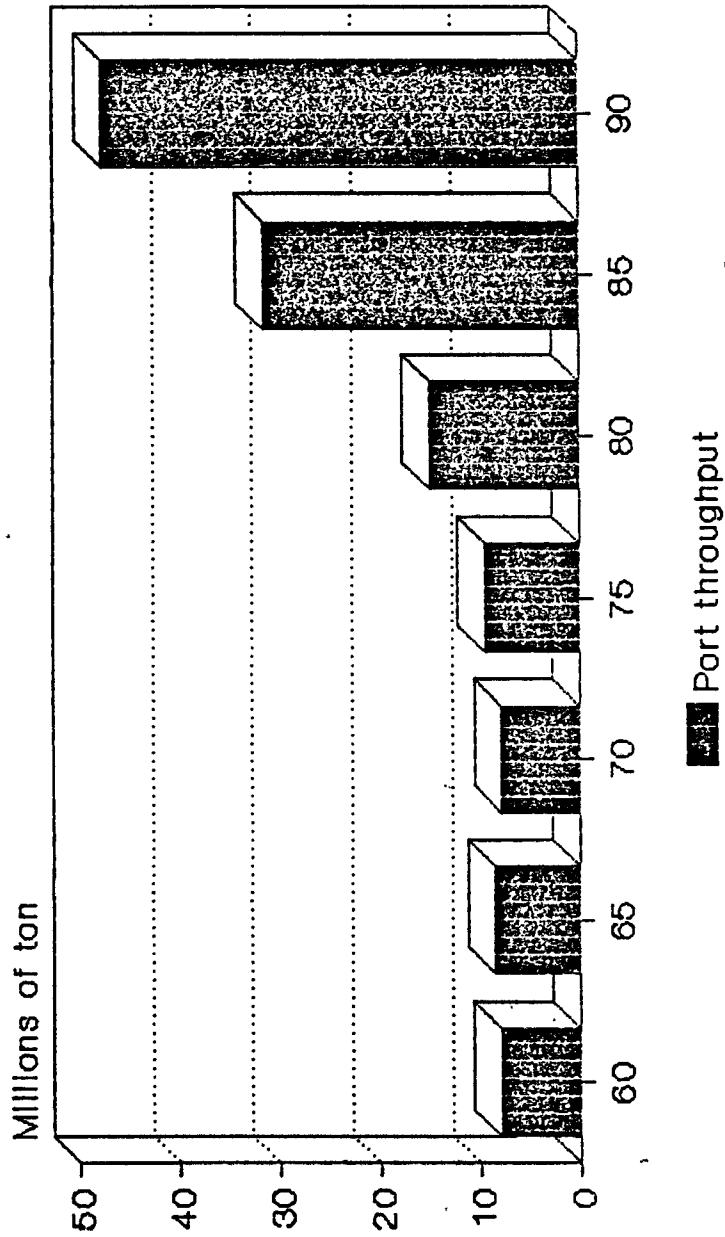
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<sup>o</sup> See graph 1.4. of Cargo Throughput Historic relation and graph 1.5. with cabotage cargo share

GRAPH 1.4.

# CARGO THROUGHPUT

## Historic Relation

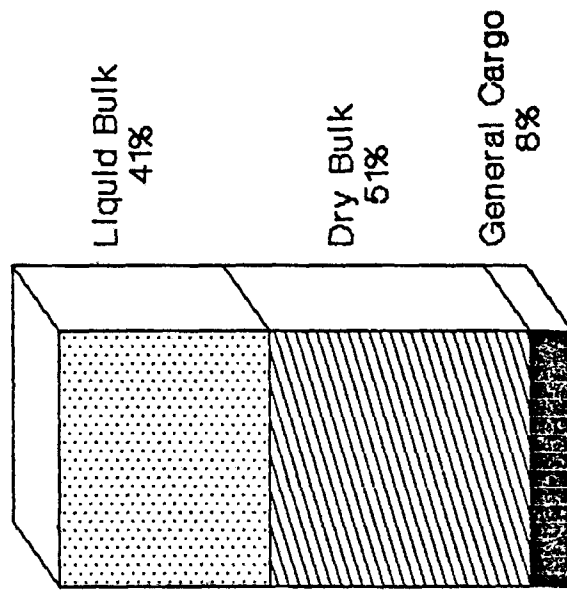


Source : D.G.T.M.



GRAPH 1.5.

# Cabotage Composition of trade



Data 1990

Source: DGTM

After the implementation of the new system, the saving for the country has been enormous. For example, the project for the construction of other port facilities (because of the prior congestion) was not necessary to be executed, permitting a saving of more than US \$ 500 million. On the other hand, the reduction in costs meant a saving tool for the users of US \$ 41 million per year.

Despite the above, any new law is perfect, therefore some changes should be introduced in the near future.

ANALYSIS OF THROUGHPUT AND COST PER UNIT. ( 1980 and 1987)

TYPE OF CARGO	UNIT	THROUGHPUT per day per vessel		COST per UNIT ( US \$ )	
		1980	1987	1980	1987
Copper cathode	Ton	2,280	4,500	9.00	5.50
Fish meal	Ton	1,000	1,900	16.00	9.20
Fruit (apples)	Box	46,000	140,000	0.62	0.23
Wood pulp	Ton	1,900	5,600	8.00	2.50
Lumber	Cm	2,800	6,000	6.00	2.98
Timber	Cm	2,500	5,500	6.20	3.00

(Source : Maritime Chamber of Chile, Transport Seminar, Concepcion, 1987)

### C. SHIPPING INDUSTRY.

Although, Chile was discovered on behalf of the Spanish Kingdom in 1536, by the Spanish General Don Diego de Almagro, the discovery was made from the north by land and no maritime adventure took place before 1586, the year when the first known vessel arrived to the place where the Port of Valparaiso is located today.

From 1586 to 1810 (Conquer and Colonial period), the shipping industry was mainly developed in (Viceroyalty of Perú) from where all trade was lead.

However, the principal activities of the XVI century in the region were the many discoveries and nautical experiences (in one of the worst and most hostile climates for shipping in the world) for instance the discovery of New Zealand and Australia by Pilot Juan Fernandez who also found a way to better combat the prevailing winds and currents, which resulted in the fact, the trip between Callao and Valparaiso was reduced from 90 days to only 30 days.

After this period of Independence, the national shipping industry grew up as there was a need to keep the established trade and to protect their national vessels from the Spanish fleet (from 1810 to 1860).

The period between 1810 to 1860 was characterized by a merchant fleet, mainly consisting of a coastal fleet, because of the promotional laws, of the first cargo

reservation scheme (for cabotage) and the economical deregulation related with no taxes to national shipowner.

But, unfortunately during this period most of the Chilean fleet was destroyed by the Spanish Navy.

After 1860, with the Spanish defeated, the Strait of Magallanes was opened to the trade between the "new" Republics and Europe, which was the reason why Valparaiso rose as a prominent commercial center for the entire region. At the same time a new regulation was settled, permitting organized corporations to a legal entities.

Regardless, many British businessman arrived in Chile to start with commerce, helped by the favorable commercial and shipping regulations. After that, the main trading routes were open, such as California, Australia, Great Britain, Itsmo of Panama (railway crossing) and Europe, trading with nitrate, mining products and grains, as well as a passenger services.

Nevertheless, the first Shipping Company to cover the route was the Pacific Steam Navigation Company thanks to the creative idea of the well known American engineer Williams Wheelwright. In 1872 the first national company "Compañia Sud Americana de Vapores" was created.

From 1872 to 1879, the merchant marine fleet increased a great deal principally, because of the growing trade and the promotional laws written by the government of Santiago. Again between 1879 and 1882, the war against Peru and Bolivia destroyed 70 % of the

fleet.

Between 1882 and 1970, there was a recovery period for the national fleet but without any exceptional growth rate, except between 1884 to 1962 when the net tonnage increased twice, which is nothing for almost 80 years.

But many are the reasons for the slow growth rate. For instance the opening of the Panama Canal left to Valparaiso in an eccentric position regarding the new main maritime traffic; misuse of market opportunities as national merchant marine development actions (like the transport of nitrate, copper, forestall products, iron and coal, etc.); increasing presence of more powerful flags on Pacific traffic routes (among the others : U.K., USA, Germany, Norway, Denmark, Sweden, Netherlands, Italy); the government gave priority to the agricultural and mining issues, postponed marine task (ports, merchant marine and fisheries); and economic policies closed to international trade.

From 1963 the marine industry evolution was promissory due to the increased cabotage derived from the earthquakes in the 1960's in the southern part of the country and the encouragement of the government to strengthen the state-owned enterprises.

After that most of the fleet was renovated with a French offer of 8 new ships (1959 to 1964).

But on the other hand, the main highway (3,100 km. in length, from south to north) called the Pan-Americana

was inaugurated in 1967. After that, the strong coastal fleet started to see how the trade was vanished.

Most of the trade naturally change to land transport (the new road network) against most of the normal trends in the world mainly because the quality of the roads, the reduced time spend, door-to-door services, reliable services, fewer losses, and surprisingly cheaper transport costs on non-massive shipments.

In 1974, more precisely the 21st of May 1974, the Decree No. 466, was dictated with the purpose of renewing the Law 12,041 and strengthens some other matters pertaining to it.

Some of the matters affected by the new regulation were as the follows :

Liberalization on tax payment;

Increase of the foreign capital share on the so called Chilean companies, from 25 % to 49 % ;

Increment of the Acquisition Special Fund apart from 25 % of the profits, to 35 % of them.

Nevertheless, between 1974 to 1979, the Chilean fleet increase the tonnage in 82 percent, showing that real effort were given to this important sector of the economy.\*

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\*see graph 1.6.,1.7.,1.8., with National Fleet, Fleet Composition and Type of Flag in 1990

o

Despite these incentives, in 1979 a new regulation was implemented. The Decree No. 3,059 lifted all the special treatments to the shipping industry and provided them with exactly the same rules used for the whole national economy, which was a total economic deregulation. The shipping industry was released of the following special concessions : special acquisition fund; tax exemption scheme; and cargo preference scheme to national ships.

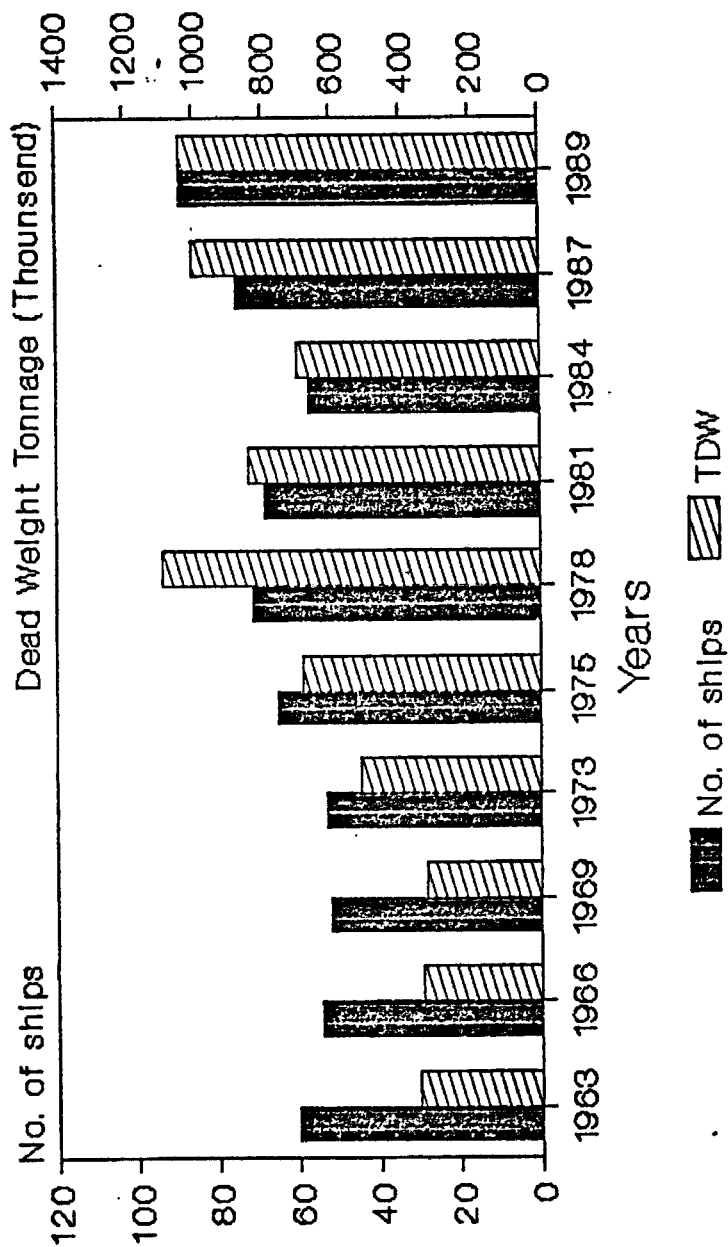
As a result, many of the companies changed flags on its ships, creating one ship companies both in Liberia and Panama. This context resulted in the fact that most of these vessels were manned with less costly crews and Chilean seafarers who had left.

The reason for introducing such legislation was to harmonize the whole economy with the same legal framework. Moreover, to try to release the heavy charges to the final consumers, as well as to reduce the freight rate, which should bring more competitive prices to the Chilean exports on the international market.

Another, very important fact was the change of the foreign exchange policy, from a fixed or frozen US \$ value to a floating one. However, the impact on the maritime transport was principally : an increase on the sea transport as a result of the better prices for the Chilean exports, a decrease of imports because of its great costs, and lower crewing costs.

GRAPH 1.6.

# Total National Fleet Historic Relation



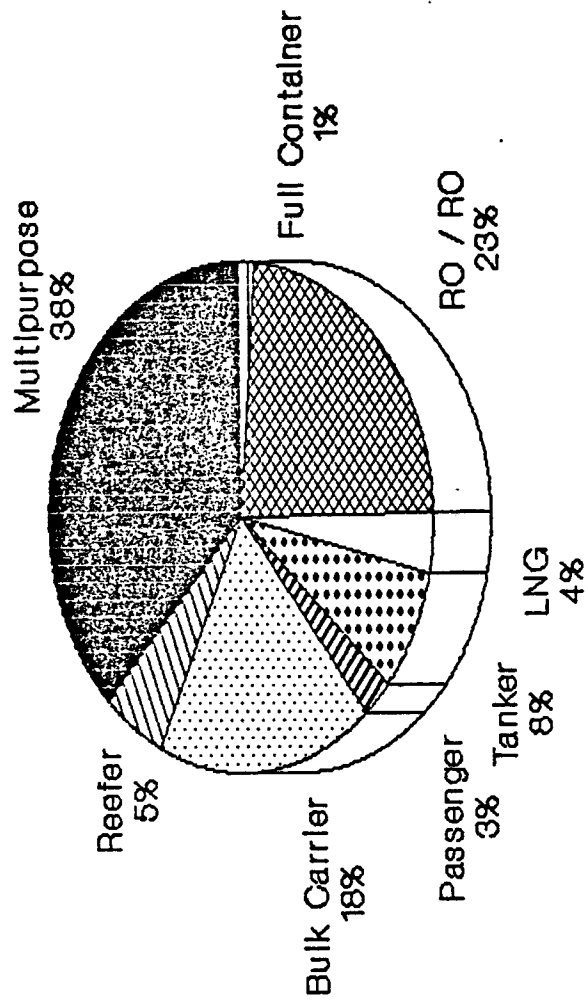
Source: Chilean Shipowners Association



GRAPH 1.7.

# Fleet Composition

## Type of vessels

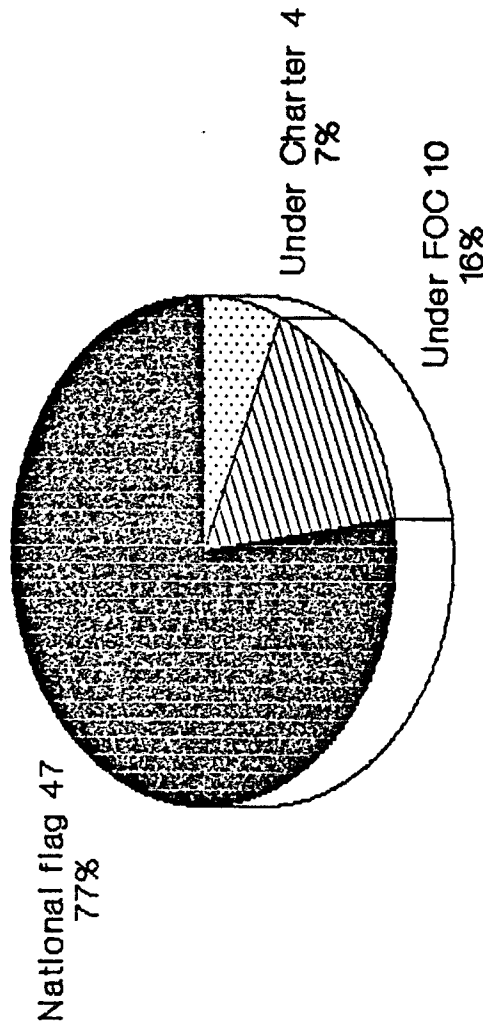


Source : D.G.T.M.

GRAPH 1.8.

# Chilean Fleet 1990

## Type of flags



Ships over 300 TRG.

Source : D.G.T.M.

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In 1982, after the modification of the foreign exchange system, the crew costs turned down again. But, now in favor of the national seafarers who were contracted to manning vessels both flying national and open registries flags.

After 1985, the legal frame established left to the Chilean merchant marine totally without protection but without disadvantages respect of their foreign competitors. During the last years is possible to see a recovery of the national shipping industry.

Definitely, the Chilean experience after the economic deregulation of the shipping industry confirm what an adequate, modern and stable economic policy follow by macroeconomic variables accord to the international markets, represent a undoubted a favorable conditions to the shipping development.

(see graph 1.7 with Total National Fleet)

#### 1.4. NATIONAL APPRAISAL OF THE INVESTMENT SYSTEM

From the origin of the Republic until 1978 Chile was a country with a political and administrative structure founded in provinces and ruled in a centralized way through the central government from the capital city of Santiago. After 1978 the government made a radical change establishing a Republic with regional system of government. To obtain the latter, the country was

decentralized and deconcentrated, transferring parts of the functions of the central executive power to regional administrations (Intendencias) and creating regional councils granted with political power on local issues.

Until this period of time all the projects were superficially evaluated and sometimes the decision to authorize them was quite political and subjective.

At the same time and for that reason the always scarce resources were not efficiently utilized.

On the other hand projects were evaluated on their private profit meaning and not on their social cost-benefit analysis.

After this transcendental reform was concluded (starting in 1974 with a first step) a new model how to evaluate a project was created. The system was established to those projects with regard to state-owned organizations and enterprises, on a national basis.

Nowadays, the system has been working for 12 years showing its advantages and disadvantages.

Among others, the objectives of the new procedure were to create a flow from the bottom to the top; to listen to the creative needs and plans of experts within companies and administrations; to establish a technical and adequate tool to the middle level management to

develop its companies; to turn public companies more efficient; to lose less time waiting for the bureaucratic and slow machinery of a centralized system; to force the people of the country to do research and look by themselves for the solution of their problems, with creativity and realism; to put in practice a modern technique able to evaluate the whole project in the best practicable and suitable way; to give priority to the project according to its social and economic profitability; to develop a methodology which ensures that all projects of the government concern must be evaluated before being put into practice; to create a mechanism that permitted the creation of a "National Investment Program"; to rationalize public investments (State's investment).

#### NATIONAL INVESTMENT SYSTEM, DESCRIPTION

The national investment system was organized to work on a national, regional and municipal basis as well, as in public enterprises or state-owned organizations.

For instance if the project is related with housing, the project appraisal belongs to the local Municipality. But, if the housing plan is governmental it is of national concern and must be evaluated through the Ministry of Housing and Urbanism.

On the other hand, the projects developed by public enterprises and entities, such as the Electrical Power Co., the National Railway Co., the Ferries and Transport Company, the Chilean Telephone Enterprise, and Chilean Port Enterprise, follow the same way of evaluation as that of the Ministry, but mostly within their own entities.

Both the concept of "from bottom to top", and the importance and impact to the other related entities must always be remembered.

The system was followed given a series of steps which had to be followed similarly by all organizations.

If they follow this procedure, they will be permitted to use the so called project "Basic Statistical Investment System" which was established from the National Project Bank. That Bank is physically located in the different regions and nationally at the National Planning Office (ODEPLAN) in Santiago.

Each project must be evaluated following the different levels of profile, prefeasibility, feasibility to finally be approved and financed.

For a better understanding, the steps to be observed by each project are the following:

- Initiate project investment studies,
- Fulfill schedule of basic statistics of investment
- Regional planning office to introduce them to the project's bank for regional and municipal design
- ODEPLAN to introduce all ministries and public enterp. and entities, projects into the data bank
- National and regional planning offices will give, their opinion on the economic and social feasibility to each of them
- After being authorized, the projects are presented to the National Budget Directorate to whom they will apply for finance
- The smaller projects which are on the regions will be approved by the Regional Planning Offices, after which they should apply for financing
- In subsequent years, all the financed projects will be in execution according to there own schedules.

As all these projects arise as a need from the same type of catastrophe or emergency, they are treated as a special case in a faster way and approved by their respective ministry.

## FUNDING SOURCES

### Sectorial fund

This funding source manages all the resources assigned to the ministries by the Budget Directorate, according to the projects presented by them and approved by all instances, plus an emergency budget.

### State enterprise resources

This division corresponds to the resources belonging to enterprises through their own exercise or reserves, and all of those obtained from loans.

### Regional Development National Fund

Here it is possible to find resources to finance smaller projects, which are presented by the regions and monitored by them. Resources are assigned by the Budget Directorate with the objective of less bureaucracy and more flexibility.

### Social Presidential Fund

This is a special fund assigned for purposes of developing the least protected or extremely poor sectors. Further, it should be used in catastrophes or national emergencies.

But, really most of this fund is formed if an emergency occurs and the parliament authorizes its use.

Most of the money which in the fund will be



reassigned for the National Budget Directorate, from Ministry resources.

#### Municipal Funds

These type of resources correspond to all of those which are collected by municipalities through : patents, franchaicing, municipal taxes, car circulation licenses, municipal taxes and levis.

On the other hand, as an example, for larger projects they have to apply for external finance (international loan). Therefore, they will follow the same procedure explained before. But, now the project through the N.B.D., is going to reach the external finance source execute it. Another difference, is that the loan should be repaid with resources produced by the same entity i.e. most projects presented by the Chilean Port Enterprise.

Finally, it must be said that through this system, many projects have been evaluated. After so many years of operation the advantages are visible but a lot of bureaucratic involment of the government authorities still remain. It is good to control the correct use of the resources as well because sometimes they contribute very interesting technical suggestions to enrich the design of the project. But, on the other hand sometimes

some important projects like the port projects lie on the same desks for too long. Perhaps because of the amount of money involved but when they are approved the technology is over or the market is unfavorable, which increase costs.

Nevertheless, with the politicians and not the technocrats included in the process of appraisal, the danger of losing part of the effort made, increases with the political subjective involvement.

## 2.0. MARITIME ECONOMICS

### 2.1. IMPACT OF DEREGULATION IN SHIPPING IN THE WEST COAST FREIGHT RATE

Most maritime economists have agreed that freight rates should be established because of the interaction of the market forces, namely supply and demand by sea transport, which are derived from the demand and supply for specific cargoes. But as a result of the cartelization of carriers, freight rates could be determined on a monopolistic basis by them.

In this section it is feasible to see how freight rates can be affected after deregulation of shipping activities.

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In 1983, most countries in the world were faced with a recession period<sup>10</sup> and at the same time a depression in the shipping industry affected the world fleet.

Such kind of environment influenced indeed some government decisions. Nevertheless, many states decided to protect their own fleets. Therefore, they took some protective measures to try to reverse or at least reduce the negative market influences.

Furthermore, for instance countries like Indonesia, Bangladesh, Tanzania, etc. dictated decrees and Laws related with cargo preference schemes. On the other hand, South American countries continued with their protective laws and bilateral agreements as a way to diminish negative impacts on their fragile economies.

Not only countries were affected but also the very safe liner market was struck because of the intrusion of tramp vessels looking for employment in the liner scenery.

Moreover, the apparition of the state-owned fleets like the highly subsidized Soviet and the East Germany, made the whole environment more difficult and competitive.

The South American protective laws were very much helped by conference agreements, because of the general

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<sup>10</sup> According to World Bank sources .

interest of the conference members in share Latin American cargo reservation schemes. Most of those countries truly believe in conferences skill to annul competition from outsiders.

Despite of prior facts, the Chilean authorities introduced in 1981, an economic deregulation of the shipping industry leaving them to the volatile market conditions. That deregulation, helped by the new economical and labor policies which reduced operational costs and the weakness of the conferences because of the market conditions. Permitted, to Chilean owners not gain market share. But, at least to keep its prior share.

After the implementation of such kind of law, the Chilean shipping industrial sector lost its shelter.

Therefore, the national shipping industry left to be immune to the market diseases.

Nevertheless, Chilean owners took advantages of the new conditions, reflagging some of their ships, and benefitted from the flags of conveniences.

Moreover, most of the companies in the country readequate their fleets, and diversified them to other more profitable and safer fleet composition.

However, many organizational changes were established within most shipping companies, among other things by renewing staff, applying modern strategic management theories, and strengthens corporate marketing

strategies.

Of course, after those changes the corporations were in a better technical and commercial position to fight competition on the international markets.

Finally, after the prior analysis it is possible to understand how the market forces pushed down freight rates specifically on the west coast of South America.

Unfortunately, the Chilean decision was not followed by others in the region and as a result other fleets of the continent which were not strong enough to resist the lower freight rates result severely damage.

After the regulation, shippers, exporters and owners were free to choose among the different ships and services provided. Moreover, now they are free to select any flag or owner nationality according to his convenience.

So, the shipping users were free to choose their own interest, there were changes from the liner sector to the tramp market.

However, the customers were free to leave the traditional liner, for instance in the case of reefer cargoes they changed to tramps but established their own chartering organizations avoiding intermediaries.

The lower freight rates were a result of the deregulation although the market which lost its

protection (liner market) had lower the freight rate.

But the tramp sector raised its rates because of the increase in demand on this market, producing a balance on the average rate.

Another, very interesting trend was that the people of the industry were expecting a cartelization of Chilean owners. But, that was not so, because of the competition between them and also because they were very busy looking at how to diversify and reorganize their companies to the new requirements of the less protected environment.

In the freight rate tables ( page 62 ), it is possible to see how the different rates change after the deregulation.

As an example, for Chilean fruit exporters the quality of the services and the time when the grapes specifically reach the market are factor of paramount importance. Principally, because from the beginning of the season to the end of it, the grape box loss US \$ 1 per day on the US market. The local producers try to reach the market earlier, creating an over-lapping period during which the over-supply generates price changes.

One of the factors which determines the higher freight rates on the reefer market are both the quality of services and the speed needed to reach the other end on time. That explains the difference and why the rates

of reefers increased after the deregulation.

Furthermore, another example is related with forest exports on bulk carriers and specialized ships. In this case the shippers obtain more freedom to choose their carriers and load according with their own planning.

Some of those features are : to reduce inventory costs; to bargain with carriers; to come to a agreement possible with other importers on how to make harmonic use of the vessel, to reducing freight; to obtain reduction on rates because of volume and periodic shipment and to reach the international market with competitive prices.

Currently, most of the bulk, neo bulk and reefer cargo shippers and producer are using the free market to avoid the adverse variable of the distance to improve their operational costs, and export their products in better and cheaper conditions.

Lastly, the country as a whole has benefitted from this set of laws, because of the employment multiplier factor, the increase of national exports, the confidence in the Chilean products, and the international contracts reached in time among the other things. Of course, all those improvements on the international commerce in Chile obliged the ports to increase their activities, to offer new services, and to improve the ports performance indicators with creativity, efficiency and ingenious.

**FREIGHT REVENUE FROM EXTERNAL TRADE IN CHILE**

(US\$ Million)

YEARS			
CARGO TYPE	1986	1987	1990
GENERAL CARGO			
EXPORT		207	365
IMPORT		195	317
REFFER CARGO			
EXPORT	172	194	381
IMPORT	1.9	2.1	2.9
DRY BULK			
EXPORT	112	136	223
IMPORT	14	20	36



**UNITED STATES IMPORTS FROM VARIOUS ORIGINS :**

**(SAMPLE WITH 20 COMMODITIES EXPORT FROM CHILE)**

**Average Freight Rate per Ton**

AREA OF ORIGIN CARGO MODE YEAR	CHILE		WEST COAST SOUTH AMERICA	EAST COAST SOUTH AMERICA
	INCL. COPPER	EXCL. COPPER		
<b>DRY CARGO</b>				
BY LINER 1986	39	56	41	76
1978	52	57	50	63
BY TRAMP 1986	34	34	33	78
1978	13	13	15	56
BULK BY 1986	33	33		
TRAMP 1978	12	10		
<b>REFFER CARGO</b>				
BY LINER 1986	270	-	331	361
1978	264	-	259	295
BY TRAMP 1986	228	-	229	262
1978	272	-	272	N/A

Source : World Bank, discussion paper No. 64

## 2.2. DEMAND AND SUPPLY FOR MARITIME TRANSPORT

### DEMAND BY SEAPORTS

The demand by seaports can be established by the quality of the performance in a seaport, from the ship's point of view and from the commodities' point of view, in other words from the point of view of the owners and owners' clients.

Nevertheless, special requirements concerning demand could be an exigency from each customer to the port in particular (different for coastal, transit, and feeder ports).

Further, the demand for ports should be related to the ports ability and adequate marketing policies i.e. how to be able to capture more and new clients to whom new and innovative services are offered.

#### FROM THE SHIP'S POINT OF VIEW :

Most of the requirements of the owners are related to technical issues connected with nautical or marine matters like :

maximum draught, current, turn basins, maximum length, port allowances, breath, cranes' air clearance, water supply, bunkering supply, port dues, as well as faster possible discharging and loading to reduce costs and accomplish time schedules, ensure position of cargo, closed port location from the main routes.

Referring to container terminals : it is necessary to avoid waiting time, keep sailing schedules, satisfy or ensure berth to the arrival of vessels, not to cutting time for containers, be able to solve future technologic exigencies imposed by, for instance over-panamax (over beam).

Conros' vessels, represent an existing trouble to container terminals because of their different cargo handling technology but on the other hand it is necessary for them to keep services and container traffic as a way to keep the container flow on that specific port.

Different kind of ships call at the current terminals which means many types of gantry cranes and container handling equipment are serving global port facilities.

One of the main requests from the ship's point of view, is of course the quantity of cargo flow.

Therefore, some of the biggest ports are offering attractive rates of services to attend feeder ships or give feeder services as well as to all the ships which can not affront their own service lines.

#### FROM COMMODITIES' POINT OF VIEW :

Shippers, exporters, consignors, and importers, all of them, are looking for :

Good sailing and arrival frequency with maximum range of destination and origin possible;

Experience, skill, flexibility and reliability  
in cargo handling;  
Better possible connection with national or  
international hinterland ( very important);  
Ability to accept new tasks, which among others  
mean, that shipping line will keep their vessel  
frequency.

Concerning prices, is also possible to mention costs  
as important components of the prices which affect  
demand, from the point of view of importers and exporters  
as follows :

Cost of sea transport,  
Cost of inland or hinterland transport and  
Cost of port services.

From that, as well is important to see the meaning  
of the inland transport costs on the total cost  
structure to a given route. That, sometime is a useful  
tool to incline the balance from one to other ports of  
call.

Moreover, those elements show us, how competition  
between ports is affected,- most of the time by sources  
out of their control. This is the case when mainly  
considering interland or hinterland transport, which  
could represent either a comparative advantage or

disadvantage. It is also possible find, some incredible government policies which with the aim of helping foreign trade, destroy their own trade through national ports, i.e. the same regulations related with favorable taxation to truckers on international trades.

#### Supply of sea transport.

To talk about sea transport supply, could be so demanding because of the permanent development and technological circumstances, which are changing quickly and given a new structure to sea transport supply.

Despite the previous paragraph, the current supply is given by the main trades that are in practice today and can be grouped as follows :

- Liquid and dry bulk cargoes, which include oil carriers, product carriers, chemical carriers, and bulk carriers in general with a 66.5 % of the total world trade,
- General types of cargoes, here it is possible find multideck vessels, multipurpose ships, containers ships, with 14 % of the world trade,
- Special trades, which include RO/RO's, general cargo carriers, unitized cargo

- ° carriers, reefers, barges carriers, with 12.4 % of the global trade,
- Passenger ships, which 1.6 % of the global trade and
- Other types of ships, with 5.5 % of the global trade

(Source : ISL, Bremen, Yearbook 1990.)

However, the quantity of supply varies according to the demand for the carriage of cargoes or as well as the level of the freight rate to the corresponding trade.

Furthermore, the supply could change the conditions on the laid up tonnage, broken up tonnage and on new shipbuilding orders. In the following graphs it is possible to see some of those effects during the few years.

## 2.3. PORT DEVELOPMENTS. INVESTMENT, PLANNING AND ORGANIZATION - DIFFICULT BALANCE

### 2.3.1. THE NEED FOR A NATIONAL PLAN

The need for a national plan includes :

National Port Planning

Port Master Planning

Port Project Planning

## **National Port Planning:**

**To define the role of ports some of the following aspects should be included:**

- How the hinterland and region can be served in their International connection and clients , and forecast new traffic according to actual or future commodities.
- Analysis of the interland transport network (road and rail link system).
- Help in generating trade and industrial growth in the port region.
- Capture new traffic both for new cargoes or for transshipment.
- Provide areas for storage transshipment commodities.
- Analyze needs for infrastructure either, the so called marine and landward ones.
- Define the land use and financial policies for ports.
- Special attention must be paid to the future and forecasts made what will happen in the next 20 years trying to allocate all possible problems in order to increase the traffic.
- If any industrial planning process exist and after analyzing future changes how those can affect our facilities.
- Are the quantity of ports enough ?

- Is the technology currently in use sufficient or is there a need to modernize the methods.
- Quality and quantity of repair facilities.

#### PORT MASTER PLANNING

On the basis of national port planning this plan gives long term pattern of development for a port without specifying the time at which any one step in this development will take place.

#### PORT PROJECT PLANNING

This plan must be consistent with the master plan and it must be seen as one step in its implementation.

### 2.3.2. ROLE OF PORTS IN THE DEVELOPMENT OF A TERRITORY

Historically, ports have played an important role in the development of the world. It is also possible to visualize how they have help to push a faster growth in all of these regions close to them either at sea or at rivers.

In the present economy, ports are located on the basis of prosperity. It is difficult to think of a major



interaction trade of goods without them. Because, the historical meaning of the interchange of cultures, knowledge and technology, play an enormous role in social and economic growing of a region, where the ports are located.

Furthermore, it is possible to establish that for all the societies that have a port, the gates of success lean on their own hands and commitments.

Further, a port is only a tool in the future development of a community or a region, because good management, marketing policy, willingness to succeed, investment, customers, good geographical location, and labor forces, are among the other features, showing some of the way to ensure future success.

Nowadays, ports are not only a place for inspiration of artists, traders, owners and underwriters because they are part of the whole transport chain and furthermore they are part of the logistic system.

On the other hand, ports are places where production and consumption appear together because of its proper nature.

Related with the function of them, a port could be defined as a place of distribution, entreport, commerce, industry and services. This means that commodities are handled, received or delivered only because an extra value is added as to merchandize. This has been a very important fact in products or services of modern plants

all over the world.

#### A. PORT BOUNDARIES

It is really hard to define port boundaries because the impact of ports are extended to their around.

Therefore, is difficult to establish the physical lines where the port economic influence finish. For this reason is better to talk about separated areas which can be designated by different names, as the following :

Agglomeration around the port,  
Region of the port and  
Hinterland of the port.

##### A.1. AGGLOMERATION AROUND THE PORT

That area appear as an answer of the immediate need of the port, such as services, financial support, maintenance, sport facilities, supply of ship's stores, related industries, shipping offices, agents, tugboat companies, authorities, etc.

That is the beginning of the city which will rise next to the port facilities.

## A.2. REGION OF THE PORT

The region of the port area is an area in which it is possible to perceive the social impact of the port and the people related with port activities.

## A.3. HINTERLAND OF THE PORT

This is the most difficult concept to define because in general terms it is the geographical area used as the bridge to reach the best market possible for the port's production or to receive the material required for production. Therefore, there is use for the excellent network or road and railway system, which exists in most modern ports, which is a vital component of the logistic concept.

Sometimes the same national hinterland could be shared between ports belonging either to the same country or to a different one, where the measurement of the proper port's impact is deluded.

All these aspects must be taken in to account to establish both local or national policies.

Nowadays it is quite rare to find an economy which does not take in to consideration the theory of systems.

Moreover, when today the world is complete

interactive and interdependent, like was analyzed earlier in this project.

How to calculate the product, impact or effect of the port to both the entire national and regional economy, is also a difficult task, mainly because its known multiplier factors or effects which have an impact on the area.

## B. CLASSIFICATION OF PORTS

Different kind of categorization can be made if are taken into account as reference :

Ownership,  
organization,  
function or service and  
geographical nature.

### B.1. OWNERSHIP :

Ownership of the Chilean ports can be divided in three extreme categories

Government owned,  
Private owned and  
also any degree of joint venture.

**B.2. ORGANIZATIONAL :**

Landlord ports,  
tool ports and  
operational or service ports.

<b>OWNERSHIP TYPE \</b>	<b>INFRASTRUCTURE</b>	<b>SUPERSTRUCTURE</b>	<b>LABOR</b>
<b>LANDLORD</b>	<b>Government</b>	<b>Private</b>	<b>Private</b>
<b>TOOL</b>	<b>Government</b>	<b>Government</b>	<b>Private</b>
<b>SERVICE</b>	<b>Government</b>	<b>Government</b>	<b>Government</b>

**B.3. FUNCTION OR SERVICES :**

Universal ports, and  
specialized ports.

**B.4. GEOGRAPHICAL NATURE :**

River ports,  
oceanic ports and  
offshore terminals.

### C. NEW TREND IN PORT AREAS

Since the early 70's North West European ports have been changing with the purpose of industrializing their ports. Today it is possible to see refineries and bigger industrial parks located in areas around ports.

However, during the last decade some of ports tried to look at different ways to create comparative advantages in their own ports, which originated an enormous increase in the quantity of calls to those ports and from that an increase in competition between them.

Some of the characteristics of those trends have been huge investments, rationalization of costs, diversification of port services. One of the most meaningful changes, is that nowadays the port waits for the vessel and not the other way around, which was standard procedure before.

Until now in most of the South American ports, the trend is to keep the old practices, which is the reason why the level of port inefficiency is high with the exception pointed out before in this work.

Furthermore, some of the functional features which appear as a trend in the modern ports should be clarified.

Function :

Delivery and reception,  
short and long storage function,  
coordination center and  
free zone, free trade or industrial  
zone.

C.1. DELIVERY AND RECEPTION

In most of the ports, the advent of containerization, made such an impact, that some or a great part of loose general cargoes which used to be carried in small shipments. Nowadays fill LCL's containers, in the so called container freight stations ( CFS ) and more and more those commodities are carried on specialized ships.

Thus, reception and delivery must be fast, efficient and with an adequate control system, able to reach the market under the new concept of "just in time" ( JIT ), in accordance with the consignee's or consignor's instructions.

However, the job must be done with responsibility and high efficiency, trying to avoid waiting time, pilferage, fraud, etc. using the general concept so as to prevent bottlenecks in the transport chain.

Finally it must be denoted, that reception and

delivery is the contact face between costumers and the port.

### C.2. SHORT TERM STORAGE.

Short term storage, both in shed or yard, constitute a sort of transit way for commodities. But, either should be carefully planned and controlled, because it is a way to give shelter storage for cargoes which have been cleared by customs authorities, stuffed for export purposes, and sometimes specially pretreated.

Talking about goals of earning money. Surely that is not a way to obtain profits But should be a form of loss port prestige because loses, damages, waiting time or in general bad service.

Therefore, is possible to establish that this type of services are not good source of revenues but surely is source of possible losses. That point must be taken into account for both port's planners and managers.

### C.3. LONG TERM STORAGE

Sometimes the work is not only carried out by out port warehouse companies but also by some port operating companies who give the service for with free zone purposes or for special commodities, whose owners want to pretreat them or avoid stock keeping or prior payment of



•  
customs dues.

But, this also is a very good way from the port's point of view to add value to those commodities and count them under the port effort to the final worth of those products.

#### C.4. DISTRIBUTION AND COORDINATION CENTER

This is a new issue on port developments, for example: some ports in North West Europe, are mainly as reception and delivery centers but only for some companies or special commodities. Therefore cargoes such as oil, products, grain or fruit, should constitute as specialized terminal. Other products such as electronics, cars, cars in their component parts, paper pulp, etc., can be received and distributed by those newly developed centers.

However, they should be coordinate and act as head dealers, sending small shipments to smaller branches of the big cargo owning companies i.e. Toyota who sends huge shipments to Europe (Bremenhaven) where they arrive to centers where cars can be unwaxed, fit with accessories and sent direct to local dealers. Sometimes, for longer distances cars are loaded in double stack railway wagons and reach for instance Italy in only 17 hours at a good and adequate intermodal freight rate. Likewise, other examples as electronic equipment can also be used to

o  
illustrate the use of so called COORDINATION CENTER.

#### C.5. FREE PORT AND FREE ZONE

According to its function it is possible to define three different types of free zones.

##### FREE TRADE ZONE :

In this kind of area the trade is characterized by free customs dues conditions and among other storage, package and inspection of goods could be included.

They may be located in or close to the port, but inside so called "primary customs zone".

##### INDUSTRIAL FREE ZONE :

In areas like that, the settlement of industries is encouraged because of favorable taxation schemes, no customs dues, cheaper labor costs and other special conditions. The above gives its users comparative advantages compared with other industries in the rest of the country. Under "normal conditions" the location of these zones depend on the purpose of its establishment.

#### C.6. ENVIRONMENTAL CONCERN

The issue of environmental protection is a very

tough and important issue, mainly because not everybody in the world is worried to the same extent about the matter, possible solutions, and the huge expenses involved in those matters. Until now, nobody knows how expensive environmental protection measures will be in the future. Nevertheless, the increasing concern on this question all over the world, has developed in very interesting ways. Today the common people are worried about conserving the nature around them and the significance of that in their own future life on the planet.

Nowadays, the question of keeping a clean environment, is growing more and more in importance, and children are educated from early age. They will create a new conscience within their own homes which is going to permit the newly born of a new very interesting behavior, such as, how to live and which is the role of nature in our own future lives.

However, the impact of this subject on the port and shipping industry investments means increase of capital and some of the operating costs as well, because of the new considerations which must be taken in account before developing any new facilities. In other words, this represents new technologies and equipment which are more environmentally friendly. For instance, when looking for same extension or land reclamation, one should consider,

among others, green areas control, soil removal or sea bottom sediment removal control, avoidance of changes on the environmental habitat of species, etc.. However, all these factors are costly in terms of money.

### 2.3.3. AGGRESSIVE PORT MARKETING POLICY. OTHER CONTEST ?

In most trades and places of the world, competition between ports increased during the last 20 years. As result port planners must use their own ingenious researching to increase the turnover of commodities in their ports.

So, marketing policies are becoming a more important issue for modern ports, i.e. looking for new and more attractive services for customers, showing flexibility and creativity of respective planning offices.

However, an aggressive marketing plan should be part of the integral port planning process, which could feed future ports, either superstructure and infrastructure developments.

As far as ports client are concerned, they can generally speaking be divided in two groups : shippers and shipping lines. Currently, some planners prefer to talk about the attraction of commodities because of their implicit nature to bring shipping lines with them. All of this means, hard work for sellers and marketing

makers, by forecasting different trades planning some courses of actions to "lift cargoes" to others, and by offering comparative advantages to our ports.

#### 2.4. NEW CHALLENGE : PRIVATE OR PUBLIC INVESTMENTS ?.

The port industry of today is much different than it was before, mainly, because of old customs and, as pointed out before, because vessels wait for ports and not, ports waiting and fighting between them for vessels.

For instance, nowadays clients push the dealers for new products. At the same time the dealer press the industrial sector for new shipments, by vessels under customers' or shippers' precise requests and therefore shipowner have specific requirements for determined ports.

All this means that ports must be ready to react before any advent related with future technologies.

However, some constraints appear connected with the responsibility of ports, in future investments and also concerning flexibility and efficiency. Some countries have been analyzing these sort of details and finally reached decisions regarding privatization or private investment matters.

However, the decision to privatize ports is a

matter of top national port policy according to the political approach of the country and represents both advantages and disadvantages.

Generally speaking, the reason behind that, is because governments want to avoid commitments in further investments and also because they believe that private means efficiency.

Currently, for instance one of the most efficient and modern ports in the world as the port of Singapore, is owned and managed by the state which is just the contrary to the statement established in the prior paragraph. Despite of that, it should be kept in mind, that privatization is not a tool to avoid our own responsibility in the appropriate management and efficient organization of our ports. On the contrary this could be very dangerous without an adequate conscience of future projections and effects.

Privatization is commonly seen as a way to leave the economy in private hands and thus avoiding government participation, reducing public sector financial responsibilities and using those funds for others needs in order to achieve better productivity and efficiency, and to rationalize government regulations and port labor forces.

It is also true that the meaning of privatization is different in every country and in every port as well.

The present situation of private investments in Chile can be seen on the corresponding table with the share on port operations between private companies and the government.

Nevertheless, the figure represent only an example, according with the Chilean thoughts, mind and political circumstances, which made the changes successful, but may not be successfully implemented in other countries.

In other words the Chilean model does not mean the remedy for other Latin American partners with similar difficulties.

## 2.5. WHY USE A COMMON CRITERIA IN PORT PERFORMANCE

### INDICATORS ?

#### INTRODUCTION

Some of the problems in port management and planning are that they are only one part of the whole transport chain, therefore, ports as such are sophisticated and complex systems. As was mentioned before, the logistic principle makes the role of ports on the total transport chain more and more exigent and complex.

Therefore, the importance of having an efficient port system is the very basis of a successfully logistic organization. Moreover, the efficiency of port

systems have to be controlled and monitored all the time with the objective to detect bottlenecks and problems, and of course solve them on time to avoid stops in the cargo flow to and from the port.

Furthermore, the need for a reliable tool to detect for instance increased cargo throughput and the need for personnel training, has to be known on time.

On the other hand, users of ports need a standard system to evaluate the efficiency and performance of such system, using for that purpose the same and comprehensive language.

As an answer to this matter, many ports have developed different types of the so called port performance indicators but finally UNCTAD elaborated a standard classification and definition of them.

A comprehensive standardization of port performance indicators gives a valuable instrument on how to improve the management information system, which is the basis for deciding about new investments or changing in policies.

#### PORT PERFORMANCE INDICATORS

As was pointed out before, the port performance indicators are a necessary tool to keep the permanent evaluation of port efficiency or needs.

The port performance indicators can be divided in



two different types of classification as the following

- physical performance indicators,
- and financial performance indicators

**A. Physical performance indicators**

The Physical performance indicators are those which represent physical movements of cargoes and ships, per annum, month, day, hour, or shift.

**A.1. Berth occupancy rate**

The berth occupancy rate represents a percentage of the total berth occupancy related to the total available time of this berth and represents the real time during which the berth was occupied by vessels working or not.

$$\begin{array}{l} \text{BERTH} \\ \text{OCCUPANCY} \\ \text{RATE} \end{array} = \frac{\text{Total hours of occupancy} * 100}{\text{Total time berth disp.} * \text{No. of berths}}$$

**A.2. Berth throughput**

The berth throughput indicator is a figure which represents the total cargo moved or cargo throughput of one berth and can be given on the basis of meter of quay, and per time.

It is recommended to calculate this indicator for each type of commodity. In the case of containers the term used to be calculated in TEUs.

#### **A.3. Ships turnaround time**

This indicator is one of the most complete physical indicators and represents the total time spent by ships at a port and includes waiting time, pilotage time, berthing time, loading and discharging operations, clearance time, etc. In other words, it represents the total time employed by ships from seaboy to seaboy after cargo transference operations.

#### **A.4. Ship productivity**

This indicator represents the quantity of tons transferred by a ship during a shift, per hour, or per day, including or excluding waiting time.

#### **A.5. Cargo handling productivity**

This indicator represents the volume of cargo transferred on a terminal on basis of man per hour or gang per hour. Such indicator has to be calculated to different cargoes separately.

## B. Financial indicators

The financial indicators are expressed on monetary units over time, weight, etc. and most of them are calculated to keep good costs control.

### B.1. Ship control calculation

These calculations show the contribution figure for a given ship. After some calls have to be calculated on the average costs. This is a good way to know the cost per ton or commodity unit on given cargoes loaded or discharged and to permitted good resources allocation.

### B.2. Contribution figures

These indicators are calculated deducting the total cost obtained from ship calculations from the total revenue paid by a particular user.

Nowadays, most of the bigger ports around the world have established costs control offices to keep close monitoring of them, which are very reliable tools to control port efficiency, port costs and last but not least port profits.

2.6. MANAGEMENT INFORMATION SYSTEM FOR PORTS, A REAL NEED  
TO ESTABLISHED AN ADEQUATE ELECTRONIC DATA  
INTERCHANGE NETWORK.

2.6.1. INTRODUCTION

Nowadays, ports developments have increased in speed all around the world. Principally , because of the better knowledge on ports and logistic matters (concept of Just In Time, called JIT), and because of the increasing competition among the different ports and within ports as well.

Consequently, port investments are capital intensive because of the technology, port equipment, huge engineering work, etc..Furthermore, a port has to invest in bigger projects every five or ten years, because of technological changes in ports, ship design, cargo handling systems, increase on the environmental concern and new needs of clients.

Accordingly, port managers have to take into account all those considerations before making a decisions, on how to use the always scarce resources of his company in the best possible way.

The best decision is not only based on the best available technology, but also based on the analysis of new and large amounts of information. That could partially be the difference between good and bad

decision maker.

Therefore, the management information system use is of a paramount importance. Moreover, an integrated electronic data interchange should increase the port efficiency keeping its administration informed about the needs and the new requirements to improve their services. In other word it is a way how to improve the port services and the most important features, to keep a smooth cargo flow trough it.

Currently, around the world most ports authorities and the port's users have their own electronic data system already established, but not yet connected between them.

On the one hand, there is a national and international increase in demand for the standardization and facilitation procedures on how to reduce paper work.

But on the other hand, the ports and customs authorities look worried because of the apparent loss of power of their entities. However, these is no reason for alarm because it is a way to reduce bureaucracy, paper work and loss of time in order to increase efficiency (see table of objectives for the creation of such a system). As in the case of Singapore government and port incomes increase because of better control and the easier and smooth clearance procedures. Furthermore, the reduction in cost for a final manufactured merchandise is

around 7 % of its final cost of production, which shows by itself the convenience of the introduction of such a system.

Moreover, the procedure of interconnecting all these systems already operating in Chile, is technically possible with the actual technology used in many countries.

Many different levels of interchange systems could be introduced such as :

- i) Electronic Data Interchange System among authorities like the following :

Port authorities, customs services, immigration authorities, police departments, coast guards, health and environmental authorities, agricultural sanitary authorities, maritime traffic control, local fire brigade, emergency response organisms, etc.

- ii) EDI, could be utilized among user such as :

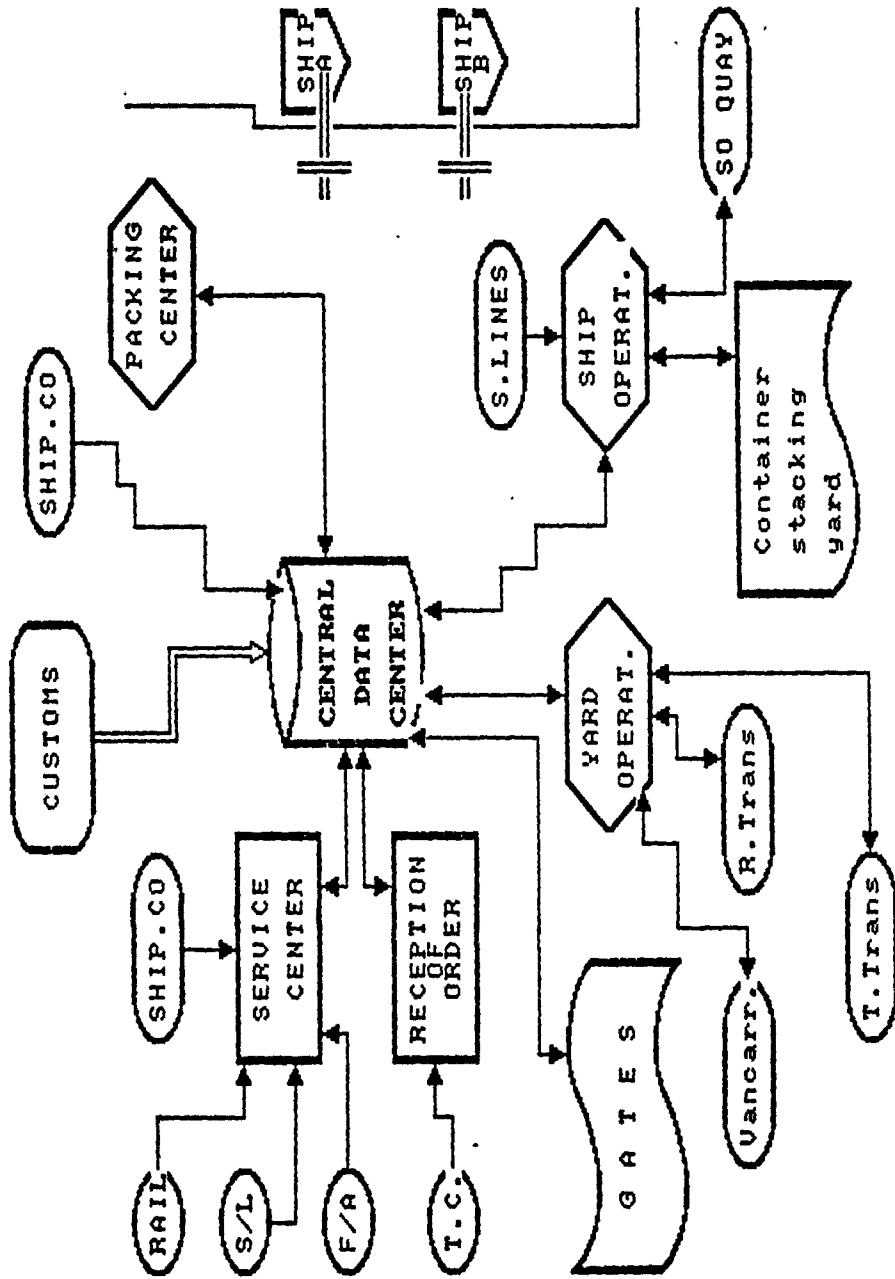
Shipping agents, shipping companies, pilots services, shiphandlers, tugboat companies, bunkering companies, mooring companies, ports operators, stevedoring companies, shippers, freight forwarding agencies, trucks companies, railway companies, etc.

iii) EDI, developed for specific company needs.

For instance, within the ports, a system to automatized yard and quay operations (containers inventory, automate cranes, AVG's, and stradlecarriers operations). Another example should be an integrated system to maritime Traffic control, among pilots, tugboats, coast guards, etc.

GRAPH 2.1.

ELECTRONIC DATA INTERCHANGE, CONTAINER FLOW INFORMATION



Source :BLG; Bremenhaven



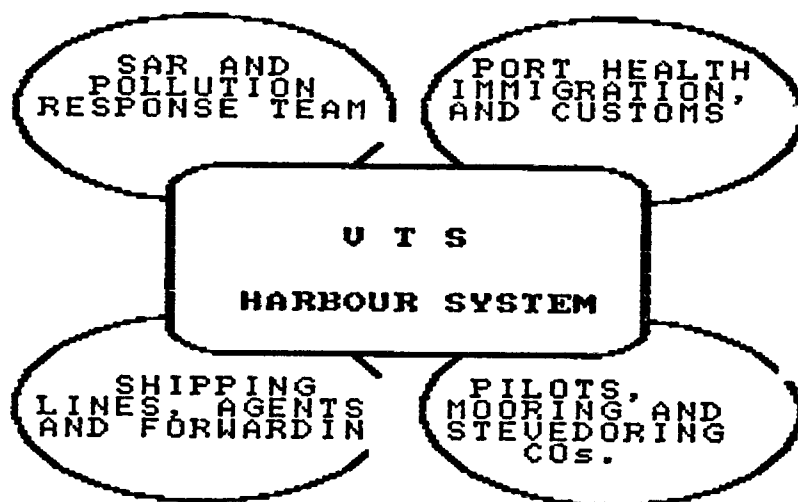
OBJECTIVE FOR AN INTEGRATED INFORMATION SYSTEM :

COST OBJECTIVE	DOCUMENTAT. OBJECTIVE	DISPOSITIO OBJECTIVE	CONTROL OBJECTIVE	FLEXIBILIT OBJECTIVE
To mini- mize costs for per- sonnel	To collect once and immediately data at the point of origin	To ratio- nalize the operation- al pre- planning	To reduce manual control procedure	Guarantee quick changes of collecting data
To minimize documentat ion	To minimize use of doc- uments	To make maximum use to existing capacities		To "design the system in general already for future extensions
To mini- mize collection of data	To standardize documents	To minimized time and human errors		
To realize an econom- ic computer system	To guaran- tee immediate information about con- tainer data			

Source : ISL, Bremen.

Finally, the introduction of an electronic data information system is a compulsory and recommended tool for modern decision makers, and an interchange data information network represents an integrated process of data flow which gives a mechanism to perform company and port related costs and efficiency.

### ORGANISMS INVOLVED IN A UTS ELECTRONIC DATA INTERCHANGE



### 3.0. ANALYSIS OF THE PORTS IN VALPARAISO AND SAN ANTONIO

#### 3.2. PORT OF VALPARAISO :

##### 3.2.1. INTRODUCTION :

###### Location

The port of Valparaiso is located in the Southwestern part of South America, on the central part of Chile, in Latitude 33 degrees 01 minute 25 second South and Longitude 71 degrees 37 minutes West.

###### Time

Chile normally uses GMT minus 4 hours, but from the second Saturday of October to the second Saturday of March, clocks are advanced 1 hour, which means GMT minus 3 hours. For communications purposes it does not matter because GMT is used for ETA.

###### Brief History

The history of Valparaiso started in 1536, when the fleet supporting the Spanish expedition of Don Diego de Almagro, arrived at the so called Quintin Bay at that time. In 1912 the first National Port Service under the general direction of the Ministry of Finance was created. In the same year the work on the construction of the

breakwater started. However all the port facilities were not finished until 1930.

In 1960 the Port Enterprise of Chile was born as an autonomous organism which began to operate the port facilities.

#### Tides

The tidal range is 0.7 meters.

#### Density :

The water density in the port is 1,025 m., but could decrease during the winter to 1023 m., because of waters flow produced by rains and discharge in the basin.

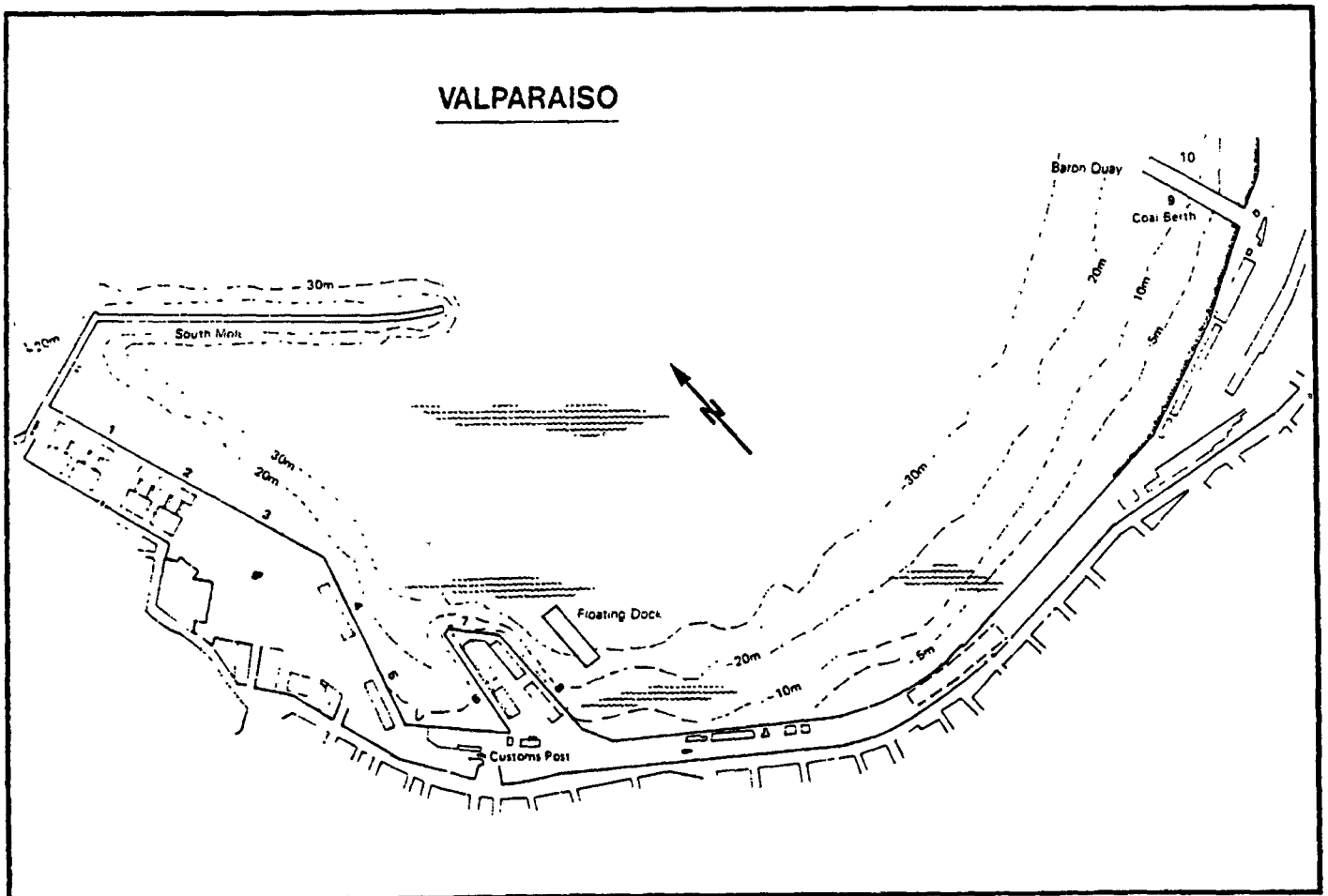
#### Climatological aspects

The prevailing winds come from the southwest in the spring and summer and can be very strong. During the winter time southwestern winds are soft but storms can take place with northwestern gales. Twice a day it is possible obtain reliable weather reports from the Playa Ancha Radio, either by HF, VHF, Navtex or facsimile. For special requirements can be given at any time and updated each 4 hours. Warning are sent when problems appear.

### Other details

Because of economics and new labor policies established by the government, the private role is more active and the port administration is a model of efficiency in Latin America, which permits to owners to reduce ships time of trip in more than 8 days, compared with the same route before 1980.

### 3.2.2. PORT SKETCH :



3.2.3. MAJOR COMMODITIES :

INTERNATIONAL TRADE : (1,000 of Tons)

TYPE OF CARGOES	1980		1985		1990	
	IMP.	EXP.	IMP.	EXP.	IMP.	EXP.
GENERAL CARGO	722	203	517	372	1,833	868
DRY BULK	222	172	4	45	79	29
LIQUID BULK	I/N.A.		67	7	773	87
REEFER	83	235	29	523	42	948
CONTAINERS (TEUs)	38,399		61,328		130,753	

Source : DGTM, compiled by R. García B.

CABOTAGE :

TYPE OF CARGOES	1980		1985		1990	
	DISCH	LOAD	DISCH	LOAD	DISCH	LOAD
GENERAL CARGO	123		22	89	28	81
DRY BULK	154		81	-	12	-
LIQUID BULK	-		-	-	4	31

Source : DGTM, compiled by R. García B.

In 1990 Valparaiso moved 130,000 containers (TEU and FEU), which means 56.6 % of total movements in the country.

**3.2.4.º ANALYSIS OF TYPE AND NUMBER OF SHIPS VISITING  
THE PORT**

**NUMBER OF SHIPS**

YEAR	1983	1984	1985	1986	1987	1988	1989	1990
SHIPS	947	867	813	896	917	1003	984	1098

Source : DGTM, compiled by R. García B.

**TYPES AND SIZES**

TYPE OF SHIPS	SIZE	
	DWT	CAPACITY
MPC	37,933	1,900 TEUs
MULTIPURPOSE	22,328	-
RO / RO	12,000	2,600 Cars
TANKERS	40,000	1,500,000 Cf
PASSENGER	15,521	1,877 Bth.
LPG	25,000	1,117,403 Cf
REEFERS	12,974	675,000 Cf
BARGES	7,970	291,000 Cf
FISHERING FACTORY	3,500	-

MAXIMUM SIZE :

TYPE OF SHIP	DRAUGHT	LOA
TANKERS	10.0	180
MPC & MULTIP.	10.0	210
PASSENGERS	10.0	210

NOTE :

Draught, for MPC and passengers cruisers will increase during the current year.

PORT TIME ALLOCATION

TIME TYPE	WAITING TIME	PILOTAGE TIME	WORKING TIME	DELAY TIME
MPC	1 - 3	1.0	16	1 - 3
MULTIPURPOSE	1 - 3	1.0	8 - 16	1 - 3
RD / RD	1 - 3	1.0	16 - 24	1 - 3
TANKERS	0 - 1	1.5	8 - 24	1 - 3
PASSENGER SHIPS	0	1.0	12	0



PORT CHARGES ACCORDING TO TARIFFS IN 1991

Simulation for 150 TEU's (loaded), in an out

Vessel type Multipurpose

Gross Tonnage : 13,913

Dead Weight Tonnage : 22,555

Length Over All : 179

Breath : 26

Draft : 9

Cargo Handling US\$ 6,697

Quay transference US\$ 5,497

Port Dues

LOA \* USD 0.75 \* Hour = US\$ 1,552.5

Towage Charges US\$ 2,600

Pilotage US\$ 184

TOTAL PORT COST US\$ 16,530

3.2.6. HOW THE PORT IS MANAGED, OWNED AND OPERATED.

Ownership

The Port of Valparaiso is an regional Port Corporation, which was created to improve its commercialization and provide infrastructure and superstructure, according with the users needs.

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### Operation

Valparaiso is landlord, and tool port. Most of the services are given by private companies, with exception of pilotage and partially customs services.

### Finance

The port is able to finance most of the investments but the State gives warranty to obtain international loans with better conditions.

The operational incomes, generated by port dues, services, equipment hire and other, added a very good organization and efficient administration, so it is possible to cover the cost infrastructure and leave profits.

### 3.2.7. PORT PERFORMANCE INDICATORS :

PHYSICAL INDICATORS ( 1990 )	:	
Berth occupancy rate	:	60 %
(avg. 8 berth)		
Berth utilization	:	42 %
No. of mtrs. length per hour	:	5,665,903

Number of merch.vessels arrived : 984  
 Berth throughput : 420,350  
 (average per annum per berth)  
 Ship's turnaround time :  
     Average port (Hours) : 40.2  
     Container ships : 14.5  
 Average cargo per ship : 3,499.5  
 Ship productivity (per hour) : 85.0  
 (Tn/hr)

**CARGO HANDLING INDICATORS (per crane or gang):**

GENERAL CARGO	60 to 70 Tons per hour
DRY BULK	60 Tons per hour (truck)
Salt	46 Tons per hour (rail wagon)
LIQUID BULK	600 to 800 Cm per hour
FRUIT	
Grapes	136/36 Tons per hour
Pears	61 Tons per hour
COPPER	211 tons per hour
CONTAINERS	20 TEU/FEU per hour

Source : EMPORCHI, compiled by R. García B.

•  
**Dwell Time**

The dwell time of the cargo can vary from one hour to one month, depending on the type of cargo.

<b>FINANCIAL INDICATORS</b>	:	
Cost per TEU per shift	:	US \$ 30.0
Contribution from TEU per shift	:	US \$ 10.65

**3.2.8. LABOR AND WORKING HOURS :**

Number of port employees : 350  
Stevedores and docker : 9,605

**Working Hours :**

Chilean ports work in three shifts of 8 hour each one, that means:

1st. Shift	08.00	to	15.30
2nd. Shift	15.30	to	23.00
3rd. Shift	23.00	to	06.30

When her loading or discharging operations are finished, it is permitted to prolong work with the same gangs up to a maximum of 2 hours more than the normal shift.

### Holidays

January 1st. New year; Thursday and Friday of Holy Week (March/April) Easter; May 1st. Labor Day; May 21st. Naval Combat of Iquique; June 29th. St. Peter & St. Paul; August 15th. Ascension of the Virgin Mary; September 11 Day of the National Liberation; September 18, National Day; September 19, Day of The Glories of the Army; October 12th. Discovery of America; November 1st. Day of all Saints; December 8th. Day of Immaculate Concepcion; December 25th. Christmas Day.

The holidays do not affect the efficiency of the port working system.

### Strikes

Strikes are unusual practice.

### 3.2.9. PORT MARKETING POLICY

Port objectives are profit goals to maximize cargo throughput and benefits for the local community but under

the concept of free competition ruling in the economic policies. The excellent position of Valparaiso open to the Pacific Ocean also offers services to the Argentinean hinterland.

### 3.2.10. PORT PRICING POLICY

The port tariffs, are in general terms, calculated by the central Government according to advice from the port and to the port policies on development.

Wharf tariffs are calculated based on a USD rate per meter of length over all of the ship per hour using the berth.

Services and equipment hire are charged according to time or tonnage of cargo upon the service.

Stevedoring and cargo handling charges belong to private stevedoring companies but the port has an extra charge called "Porteo", which is 0.75 USD per tons transferred.

### 3.2.11. PORT SAFETY

There are special area for segregation of dangerous goods, controlled by well-trained and well-equipped personnel.

There are special equipment and trained personal for fire fighting and of course there are special agreements with local fire brigades.

The port does not have port reception facilities to receive mixture from slops tanks, bilges and sewage.

The Port Captain has special regulations related with safety and security in the oil terminal at Salinas.

**Statistics of Safety :**

Ships collision	:	11 %
Grounding	:	4 %
Contact with port facilities	:	15 %
Oil pollution	:	31 %
Others	:	39 %

**3.2.12. MAJOR CONSTRAINTS :**

Valparaiso wharf is open to the ocean, which means that sometimes prevailing southwest winds cause swell within the port. Because of winter storms from the northwest, it is sometimes necessary to close the port for some hours.

During the earthquake of 1985 the port infrastructure was severely affected reducing the maximum weight acceptance for works with heavy equipment over the quay.

Moreover, some of the berths' apron have been reinforced to support new cranes or heavy equipment but other still have floor's resistance limitations.

### 3.2.13. EQUIPMENT AND MACHINERY IN VALPARAISO

TYPE OF EQUIPMENT	EMPORCHI	PRIVATE	TOTAL	C A P A	C I T Y
				No.	TON
Berth cranes	23	1	24	3	35
Mobile cranes	2	8	10	8	50
Containers					
Frontloader	1	11	12	5	36
Forklift	40	203	243	2	12
Tractors	3	14	17	4	8
Chassis	210	37	247	2	30
Rail truck	1		1		75

Source : EMPORCHI, compiled by R. García B.



### 3.2.14. PROJECTED PORT INVESTMENTS

PORTS INVESTMENT (million US \$ )

VALPSO & S. ANTONIO PORT WORKS	T O T A L	Y	E	A	R	S	
INFRASTRUCTURE AND YARDS	43.6	90	91	92	93		
Container Term.	5.6	89	90	91	92	93	
Equipment	16.0	91	93				
Others	11.1	89	90				
TOTAL 1st. Etage	76.3	89	90	91	92	93	
Infrastructure	15.0	93	94	95	96	03	04
New construction	35.2	93	94	95	96	01	04/0 5
Equipment	8.0	08					
Others	10.3	93	03	05			
TOTAL 2nd Etage	68.5	93	96	00	03	05	08
TOTAL EMPORCHI INVESTMENTS	144.9		19 89		20 10		

Source : MINTRANSP, compiled by R. García B.

TOTAL PORT INVESTMENTS ( million US \$ )

VALPSO & SNO PORT WORKS	T O T A L		Y	E	A	R	
Infrastructure and yards	1.7	90					
Equipments	82.2	89	90	91	95	00	10
Others	0.2	90	91				
TOTAL PRIVATE INVESTMENT	84.1		19 89		20 10		
TOTAL PORT INVESTMENTS	229.0		19 89		20 10		

Source : MINTRANSP, compiled by R. Garcia B.

3.2.15. INFRASTRUCTURE AND SUPERSTRUCTURE OF  
VALPARAISO

CHARACTERISTICS OF THE PORT FACILITIES OF VALPARAISO

FEATURES	UNITS	B 1	E 2	R 3	T 4	H 5
Length	Mt.	175	175	260	200	165
Depth	Mt.	-10.0	-10.0	-10.0	-10.5	-9.0

Quay wide	Mt.	12.5	12.5	12.5	12.5	12.5
Cranes	Unit	4	4	3	1	0
Warehouses	Sq.mt	28,100	28,100	8,659	17,318	0
Supporting Yard	Sq.mt	3,130	3,400	12,300	16,500	11,700
Date of con- struction	1922/ 32	1922/ 32	1922/ 32	1922/ 32	1922/ 32	1922/ 32
Air clearance	Mt.	4.91	4.91	4.91	4.91	4.91
Purpose of terminals	Univ. Term.	Univ. Term.	Univ. Term.	Cont. Term.	Univ. Term.	Univ. Term.

Cont.

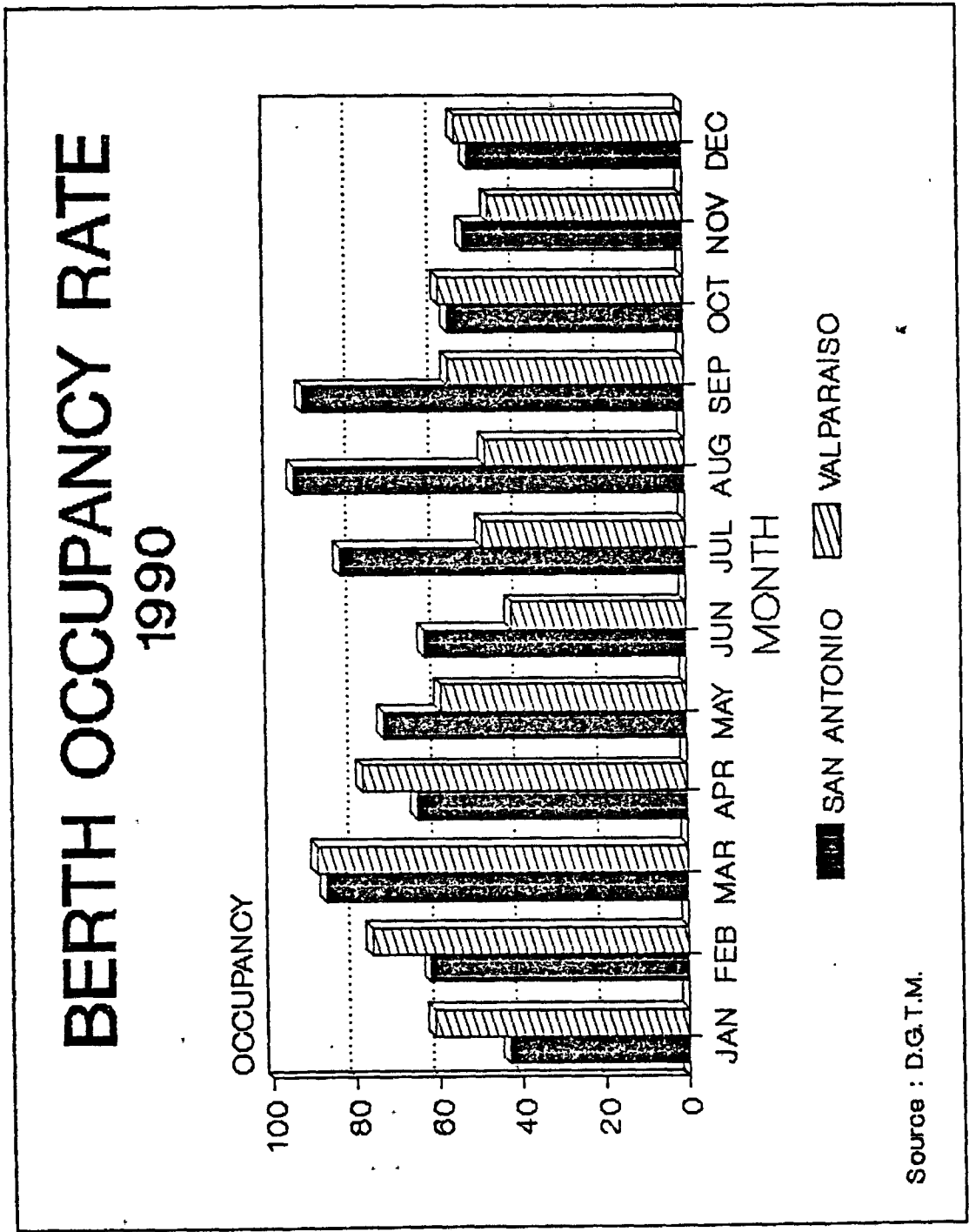
FEATURES	UNITS	B	E	R	T	H
		6	7	8	9	10
Length	Mt.	245	120	240	220	205
Depth	Mt.	-9.0	-9.0	-9.0	-10.0	-9.0
Quay wide	Mt.	12.5	12.5	12.5	15.0	10.0
Cranes	Unit	5	1	8	2	0
Warehouses	Sq.mt	8,500	0	10,000	0	0

Supporting Yard	Sq.mt	0	0	0	0	0
Date of con- struction	1922/ 32	1922/ 32	1922/ 32	1922/ 32	1915/ 20	1915/ 20
Air clearance	Mt.	4.91	4.91	4.91	6.04	6.04
Type of terminal	Univ. Term.	Univ. Term.	Univ. Term.	Univ. Term.	Bulk Term.	Bulk Term.

### 3.2.16. ELECTRONIC DATA INTERCHANGE SYSTEM.

The Electronic Data Information systems used in Valparaiso unfortunately are mainly in house, which means that most of the different parties involved in the sea transport and port operations have their own computer systems. Some of them are connected in line but within their own organizations or enterprises. For instance with national coverage are among the others the informative system of the National Directorate of Customs, the General Maritime Directorate (Maritime Administration and Coast Guard) which is one of the biggest maritime systems in the country, the computerized information system of the Maritime Chamber of Chile, the internal computer system of the Chilean Ports Enterprise, and the local network of the container terminal in Valparaiso.

GRAPH 3.1.



### 3.3. PORT OF SAN ANTONIO :

#### 3.3.1. INTRODUCTION

##### Location

The port of San Antonio is located in the Southwestern part of South America, on the central part of Chile, in Latitude 33 degrees 35 minute South and Longitude 71 degrees 37 minutes West.

##### Time

Chile normally uses GMT minus 4 hours, but from the second Saturday of October to the second Saturday of March, clocks are advanced 1 hour, which means GMT minus 3 hours. For communications purposes it does not matter because is used GMT for ETA.

##### Brief History

The history of San Antonio started in 1590, when the land was delivered to the Portuguese captain Antonio Nuñez de Fonseca.

After of which he ordered the construction of the first warehouses on place.

In 1790, the port was officially established has a "Major port" (export and import) of the country.

But, was not before than 1911, when the government started the construction of the breakwater and after the

others suitable ports facilities. The works were concluded until 1937 only, after of that began to be operated through berthing point. But, continuing with the former system of lighters or barges use for the discharge of the cargoes from ships anchored in the harbor.

The port was operated by the National Port Service under the general direction of the Ministry of Finance. In 1960 was born The Port Enterprise of Chile as an autonomous organism which took control of the port activities.

**Tides :**

The tidal range is 0.7 meters.

**Density :**

The water density in the port is 1025 m. , but could be decrease during the winter time until 1024 m. because of sewage produced by rains and discharge in the basin.

**Climatological aspects:**

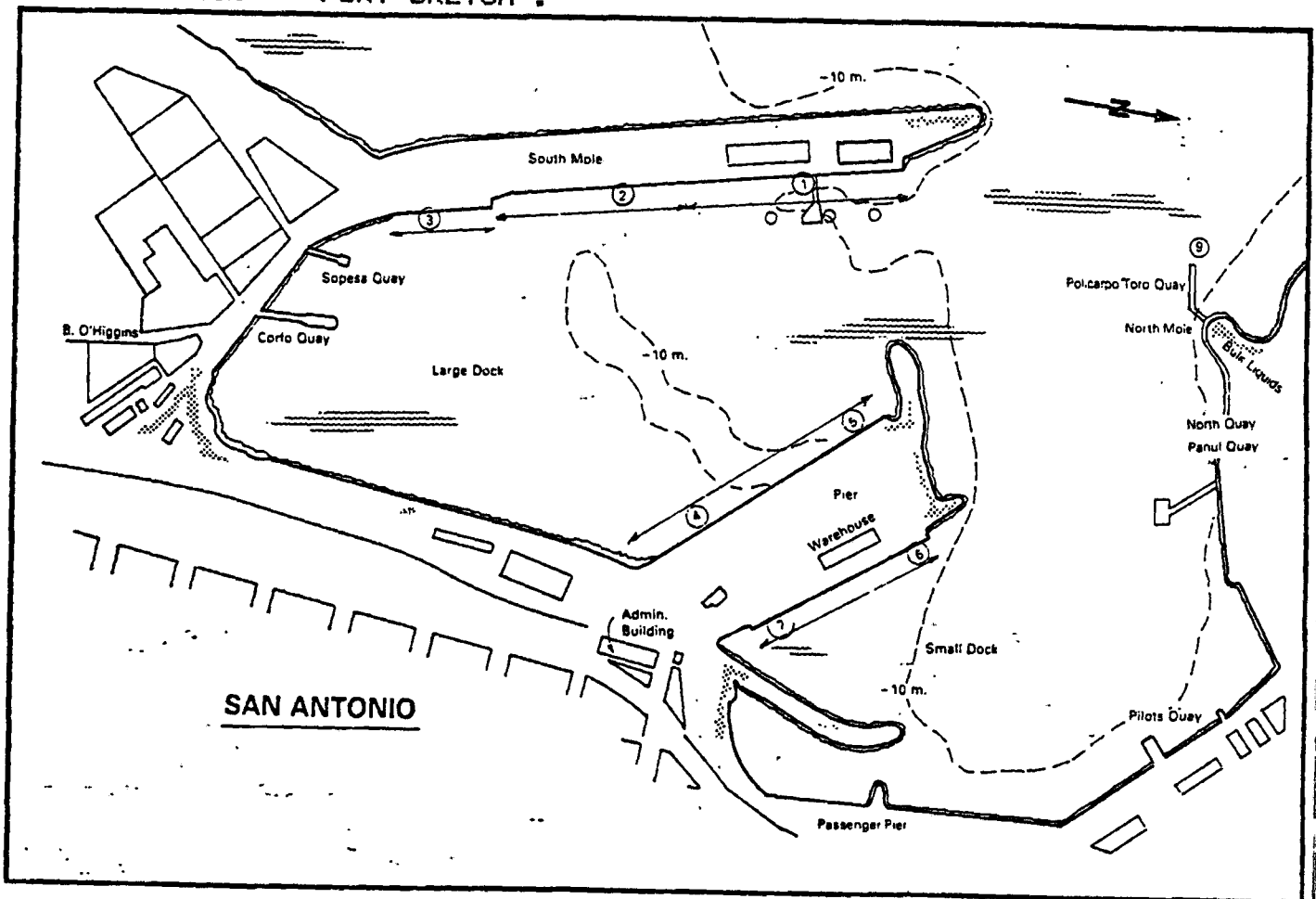
The prevailing winds come from the Southwest in the spring and summer and can be very strong. During winter time Southwestern winds are soft but storms can take place with Northwestern Gales. Twice a day is possible obtain reliable weather report from Playa Ancha Radio or San Antonio Radio, either by HF, VHF, Navtex, or

facsimile. For special requirements and updated each 4 hours. Warning are sendee when problem appear.

**Other details:**

Because of the economics and new labor policies established by the government, the private role is more active and the port administration is a model of efficiency in Latin America, which permits to owners reduce ships time of trip in more than 8 days, compared with the same route before 1980.

**3.3.2. PORT SKETCH :**





3.3.3. MAJOR COMMODITIES :

INTERNATIONAL TRADE

TYPE OF CARGOES	1980		1985		1990	
	IMPORT	EXPORT	IMPORT	EXPORT	IMPORT	EXPORT
GENERAL CARGO	277	183	87	427	263	416
DRY BULK	1,224	294	513	204	510	265
LIQUID BULK			105	2	106	32
REEFER	3	48	1	67	0	139
CONTAINERS (TEUs)	1,430		14,332		23,486	

Source : DGTM, compiled by R. García B.

CABOTAGE

TYPE OF CARGOES	1980		1985		1990	
	DISCH.	LOAD.	DISCH.	LOAD.	DISCH	LOAD
GENERAL CARGO	1		3	8	2	53
DRY BULK	64		110	2	230	25
LIQUID BULK	-		-	-	6	6

Source : DGTM, compiled by R. García B.

In 1990 San Antonio move 24,000 TEUs, which means 10.1 % of total movements in the country.

3.3.4. ANALYSIS OF TYPE AND NUMBER OF SHIPS  
VISITING THE PORT

NUMBER OF SHIPS

YEAR	1983	1984	1985	1986	1987	1988	1989	1990
SHIPS	417	443	407	319	329	346	319	389

Source : DGTM, compiled by R. García B.

TYPES AND SIZES :

TYPE OF SHIP	SIZE	
	DWT	CAPACITY
MPC	37,933	1,900 TEUs
MULTIPURPOSE	22,328	-
RO / RO	11,500	2,600 Cars
TANKERS	40,000	
PASSENGER	-	-
LPG	-	-
REEFERS	12,974	675,000 Cf
BARGES	7,970	291,012 Cf
FISHING FACTORIES		

Source : DGTM, compiled by R. García B.

MAXIMUM SIZE

TYPE OF SHIP	DRAUGHT	LOA
TANKERS	9.0	190
MPC & MULTIP.	9.0	200
BULK CARRIERS	9.0	190

Source : DGTM, compiled by R. Garcia B.

NOTE :

Draught, for MPC and Bulk carriers " will increase during the next four years.

PORT TIME ALLOCATION

TIME TYPE	WAITING TIME	PILOTAGE TIME	WORKING TIME	DELAY TIME
MPC	1 - 3	1	16	1 - 3
MULTIPURPOSE	1 - 3	1	8 - 16	1 - 3
RD / RD	1 - 3	1	16 - 24	1 - 3
TANKERS	0 - 1	1	8 - 24	1 - 2

PORT CHARGES ACCORDING TO TARIFF 1991

Simulation for 150 TEU's (loaded), in an out

Vessel type Multipurpose

Gross Tonnage	:	13913
Deadweight Tonnage	:	22555
Length over all	:	179
Breath	:	26
Draft	:	9

Cargo Handling	US\$	6,697
Quay transference	US\$	5,497
Port Dues		
LOA * USD 0.75 * Hour =	US\$	1,552.5
Towage Charge	US\$	2,600
Pilotage	US\$	184
<b>TOTAL PORT COST</b>	<b>US\$</b>	<b>16,530</b>

3.3.6. HOW PORT IS MANAGED, OWNED AND OPERATED

Ownership

The Port of San Antonio is an Regional Port Corporation, which was created to improve its commercialization and provide infrastructure and super-

structure, according with the users needs.

#### Operation

San Antonio is Landlord, and Tool. Most of the services are given by private companies, with exception of pilotage and partially customs services.

#### Finance

The port is able to finance most of the investments but the State give warranty to obtain international loans with better conditions.

The operational incomes, generated by port dues, services, equipment hire and others, added a very good organization and efficient administration, so it is possible cover the cost infrastructure and leave profits.

#### 3.3.7. PORT PERFORMANCE INDICATORS

Physical indicators ( 1989 )	:	
Berth occupancy rate	:	66 %
(average 3 berth)		
Berth utilization	:	45 %
Number of mtrs. length per		
hour	:	2,678,461
Number of merch.vessels arrived	:	319
Berth throughput		

(average per annum per berth) : 590,450

Ship's turnaround time

Average port : 60.6

Container ships : 16

Average cargo per ship : 5867.5

Ship productivity per hour : 96.8

**PORT PRODUCTIVITY (Per crane or line) :**

GENERAL CARGO	27 Tons per hour
DRY BULK (Wheat) (Salt)	310 Tons per hour (Tr & Rail) 120 Tons per hour
LIQUID BULK	400 to 600 Cm. per hour
FRUIT	
Grapes	40 Tons per hour
Apples	40 Tons per hour
COPPER	102 Tons per hour
CONTAINERS	15 Boxes per hour

**Dwell time**

The dwell time of the cargo can vary from one hours to one Month, depending on the type of cargo.

FINANCIAL INDICATORS :  
Cost per TEU per shift : US\$ 30.0  
Contribution from TEU per shift : US\$ 10.65

3.3.8. LABOR AND WORKING HOURS :

Number of port employees : 150  
Stevedores and docker : 2,773

Working Hours :

Chilean port work in three shifts of 8 hour  
each one, that means:

1st. Shift	08.00	to	15.30
2nd. Shift	15.30	to	23.00
3rd. Shift	23.00	to	06.30

When her loading or discharging operations are finished, it is permitted to prolong the work with the same gangs upon a maximum of 2 hours more than the normal shift.

Holidays:

January 1st. New year; Thursday and Friday of Holy week (March/April) Eastern; May 1st. Labor Day; May 21st. Naval Combat of Iquique; June 29th. St. Peter & St. Paul; August 15th. Assumption of the Virgin Mary; September 11 Day of the

National Liberation; September 18th, National Day; September 19, Day of The Glories of the Army; October 12th. Discovery of America; November 1st. Day of all Saints; December 8th. Day of Immaculate Concepcion; December 25th. Christmas Day.

The holidays do not affect the efficiency on the port work system.

#### Strikes

Strike are unusual practice.

#### 3.3.9. PORT MARKETING POLICY

Port objectives are profit goals to maximize cargo throughput and benefits for the local community but under the concept of free competition ruling in the economic policies. The excellent position of San Antonio open to the Pacific Ocean also offers services to the Argentinean hinterland.

#### 3.3.10. PORT PRICING POLICY

The Port tariffs, are in general terms, calculated by the central Government according to advice from the



port and to the port policies of development.

Wharf tariffs are calculated based on a USD rate per meter of length over all of the ship per hour using the berth.

Services and equipment hire are charged according to time or tonnage of cargo upon the service.

Stevedoring and cargo handling charges belong to private stevedoring companies but the port has an extra charge call "Porteo", which is 0.75 USD per tons transferred.

#### 3.3.11. PORT SAFETY :

There are special area for segregation of dangerous good, controlled by well-trained and well-equipped personnel.

There are special equipment and trained personnel for fire fighting and of course there are special agreement with local fire brigades.

The port does not have port reception facilities to receive mixture from slops tanks, bilges and sewage.

The Port Captain has special regulations related with safety and security in the liquid bulk terminal.

Statistics of Safety :

Ships collision	:	11 %
Grounding	:	4 %
Shocks with port facilities	:	15 %
Oil pollution	:	31 %
Others	:	39 %

3.3.12. MAJOR CONSTRAINS

San Antonio wharf is open to the ocean, which means that sometimes prevailing southwest winds cause swell within the port. Because winter storms from north-west, it is sometimes necessary close the port for some hours.

During the earthquake in 1985 the port infrastructure was severely damaged were three berth were complete destroyed and others seriously affected.

3.3.13. EQUIPMENT AND MACHINERY IN SAN ANTONIO

TYPE OF EQUIPMENT	EMPORCHI	PRIVATE	TOTAL	C A P A No.	C I T Y TON
Berth cranes	10		10	5	7.5
Mobile cranes	1	3	4		50.0
containers					
Frontloaders		4	4		35.0
Forklifts	5	40	40		7.5
Tractors	2	10	12		6
Chassis	2	25	27		30.0
Rail trucks	2				8.0
Dry bulk discharge systems	3	9	12	120 to	200 Tn/hr

3.3.14. INFRASTRUCTURE AND SUPERSTRUCTURE SAN ANTONIO

CHARACTERISTICS OF THE PORT FACILITIES OF SAN ANTONIO

FEATURES	UNITS	B	E	R	T	H
		1	2	3	4	5
Length	Mt.	216	236	150	200	183
Depth	Mt.				-10.0	-9.0
Quay wide	Mt.	20.0	35.0	35.0	35.0	35.0
Cranes	Unit	-	-	-	2	4
Warehouses	Sq.mt	4,270	-	-	0	0
Supporting Yard	Sq.mt	6,720		5,095	32,619	
Date of construction		1918/ 35	1918/ 35	1980/ 83	1971/ 77	1977/ 79
Air clearance	Mt.	4.9	4.9	4.9	4.9	4.9
Type of terminal		Bulk Term.	Univ. Term.	Univ. Term.	Cont. Term.	Univ. Term.

cont.

FEATURES	UNITS	B	E	R	T H
		6	7	C.L.T.	D.B.T.
Length	Mt.	200	120	190	190
Depth	Mt.	-8.0	-7.2	-9.0	-10.0
Quay wide	Mt.	35.0	35.0	0	-
Cranes	Unit	2	3	0	-
Warehouses	Sq.mt	3,750	-	100,000	190,000
Supporting Yard	Sq.mt	3,922	3,459	-	-
Date of con- struction		1911/ 35	1957/ 63	1985	1991
Air clearance	Mt.	4.9	4.6	-	-
Type of Terminal		Univ. Term.	Univ. Term.	Liquid Term.	Dry Bulk Term.

### 3.3.13. ELECTRONIC DATA INTERCHANGE SYSTEM.

The Electronic Data Information systems used in San Antonio unfortunately are mainly in house, which means

that most of the different parties involved in the sea transport and port operations have their own computer system. Some of them are connected in line but within their own organization or enterprises. For instance some with national coverage are among the others the informative system of the local Customs Administration, the General Maritime Directorate (Maritime Administration and Coast Guard) which is one of the biggest maritime systems in the country, the computerized information system of the Maritime Chamber of Chile, the internal computer system of the Chilean Ports Enterprise.

THROUGHPUT PERFORMED BY EMPORCHI ( in 1000 tons)

YEAR	1984	1985	1986	1987	1988	1989	1990
VALPARAISO	1,665	1,860	2,283	2,705	3,004	3,362	3501
SAN ANTONIO	2,343	1,581	1,303	1,453	1,795	1,871	2133

Source : DGTM, compiled by R. Garcia B.

TOTAL THROUGHPUT ON BOTH PORTS : (1,000 of tons)

YEAR	1984	1985	1986	1987	1988	1989	1990
VALPARAISO	1,653	1,751	2,312	2,699	2,934	4,179	4,819
SAN ANTONIO	2,197	1,529	1,233	1,436	1,693	1,739	2,056

Source : DGTM, compiled by R. Garcia B.

SHIPS VISITING THE PORTS :

YEAR	1984	1985	1986	1987	1988	1989	1990
VALPARAISO	867	813	896	917	1,003	984	1,098
SAN ANTONIO	443	407	319	329	346	319	389

Source : DGTM, compiled by R. Garcia B.

#### 4.0. CONCLUSIONS AND RECOMMENDATIONS

##### 4.1.0. CONCLUSIONS

##### 4.1.1. FROM NATIONAL ECONOMY

The Chilean economy has been growing steadily during the last 15 years, but specially during the period between 1983 to 1991 when an average growth rate of 7.5 percent, which has ensured a recovery period after the crisis of 1981-1982. Most of the sectors of the economy show very interesting features particularly with respect to the explosive export growth. The Chilean currency, the peso, has been strengthened with respect to US dollar during the last four years. The monetary authority adopted a floating exchange mechanism creating two parallel markets (firstly, through the financial entities and secondly the so called Parallel Market formed by the market forces and the open free money exchange market).

Last September, Chile signed a commercial agreement with Mexico as part of the future freely commercial interchange between Latin American countries.

Currently, the unemployment rate is 4.3 percent leaving behind the sadness of the 18.9 percent during the period of 1981-1983.

The economic policy of the government is export oriented, which means that most Chilean industries are producing commodities to satisfy the internal demand and to export their excess supply trying to reach the external market with competitive prices, which are



related to their costs and efficient production.

The expectation concerning the promisory Chilean economy will continue. Moreover, when all the other Latin American partners are prepared to adopt the successful economic model, the real future only depends on their own people's commitment and intelligence to exploit their regional and local comparative advantages.

#### 4.1.2. FROM SHIPPING INDUSTRY

During many years of the Chilean history the Chilean shipping industry was protected with laws of different kinds pretending to grant a legal frame capable of permitting a fast and sustainable growth.

After analyzing the industry, the growth seems not to be so high. Moreover, the effect of the law only stayed in the sector not helping to the development of other components of the economy.

From 1979, many things looked different because of the economic deregulation of the Chilean shipping industry, which resulted in many changes, among others the changes in type of vessels and structure of their fleets, reorganization of their companies, use of new management techniques, the implementation of more aggressive marketing policies, and the restructure of their costs components. The companies left their traditional liner services for others more aggressive and riskier. Furthermore, the diversification of their

services with the objective to reduce total risks; the laws permitted exporters and importers to contract their maritime transport anywhere they liked, which in turn opened the boundaries for competition, cheaper and better services, etc.

Currently, after an adjustment period the industry is able to give better services, earn money and support in a better position the virus which can attack a non-protected industry. Surely, the prices of sea transport to and from the west coast of South America are lower than other freight rates in the region because of the increase in competition and possibilities of the parties to bargain and contract freely on the international market.

#### 4.1.3. THE CHILEAN PORT ENTERPRISE ORGANIZATION AND FUNCTIONS

The national Port Enterprise has been changed in its organization but its function is still not clear because, despite the government legislated producing a new law, which is the law 18,042, this regulation has only been working with a mixture of old and new, which shows there is a need for a new harmonic legislation capable of leading the port policy with respect to the ports belonging to the National Port Enterprise, giving as such an adequate and clear policy of the private role of Emporchi's port.

Despite the urgent need for a new legislation, the mixture practice still shows the point and matters which the laws have to include. Because, nowadays the port efficiency in Chile is a good example of its advantages, reducing port investments, impressive reduction of the labor forces, increase of the port cargo throughput, reduction of the ships turnaround time, increase of the productivity per gang, reduction of the gang composition, flexibility on the use of docker forces, and last but not least reduction on prices per unit of cargoes transferred. For instance the port of Valparaiso throughput in 1990 was approximately 4,400,000 Tons per annum with, 1,093 arrivals, 10 berthing points and a 60 percent berth occupancy rate, which is in contrast to 1973 when Valparaiso throughput was approximately 1,500,000 Tons, 400 vessels, 10 berths and a bitter 95 percent berth occupancy rate (enormous congestion).

Finally, to keep these impressive port performances is only possible with high responsibility and commitment in the future both from the Emporchi as such and of course from the government policy.

#### 4.1.4. LABOR LEGISLATION CHANGES

In the past ten years the Chilean labor legislation has shown to be appropriate for the changes made in the economic policy and specially in the

difficult task to improve the national port performance indicators.

Despite the above commentaries, the social costs of the new labor system were high but could be softer with a more spread compensatory scheme reaching other unofficial dockers, such as the temporary or eventual workers the so called "pincheros" and "eventuales".

Currently, port dockers are well trained, most of them changing from customary workers to port technicians because of the training system employed by most of the port stevedoring companies, which was not the case before. Surprisingly the training of workers rose as a need for services asked by the market demand and not as an answer to the government regulations.

#### 4.1.5. THE PORT INDUSTRY

As a result of the deregulation of the national economic activities and specifically of the shipping and port industry the private participation in port activities have increased substantially during the last six years and not only in the ports under the Chilean Port Enterprise administration. Furthermore, the private adventure has been going far from its traditional stevedoring or shipping agent services, building ports facilities to compete with the State owned company or to improve the lack of facilities within of the former,

•

which ensured good and fair competition between them because of the hidden role of the Chilean Port Company to regulate the effectiveness of the free market economy conditions.

Nowadays, there is enough room for development of new private port investments in port facilities or equipment making it possible to use government resources for other needs and ensuring that modern technology will be used by private companies as a means to reduce costs and to be efficient.

Therefore, the government authorities " have established a good and reliable system for foreign investors who want to invest in the Chilean industry. There is a special legal frame to protect their capital and to give them the possibility to draw their investments and profits from the initial investment after an adequate number of years.

#### 4.1.6. MANAGEMENT INFORMATION SYSTEM

Obviously, most of the companies and entities related to the sector have their own computerized system enabling them to perform the job as a Management Information System, which ensures an adequate internal electronic information flow. Others, with a more sophisticated electronic information network are able to transfer information throughout the country. However, there is no integrated electronic information system

working in ports.

#### 4.1.7. INLAND TRANSPORT NETWORK

The inland transport network serving the ports of Valparaiso and San Antonio are good in general terms.

But it is better to describe each one separately.

Valparaiso :

The road network which connects Valparaiso with its hinterland is good but is crowded specially during the weekends and even more so in the summer.

Although, the road between the city-port and its hinterland is quite good, the road traffic coming from the Santiago area has to cross through the city, which creates a real problem specially in the rush hours. Moreover, in the case of the road traffic coming from the Aconcagua valley (where most of the fruit production is) has to cross through 5 or 6 different cities creating a real problem for those communities.

The cargo railway system connecting Valparaiso with its hinterland is not good, because there are many deficiencies, such as bureaucracy, technological obsolescence, general bad and not reliable services, longer distances between cities, which means more transport time, etc.

Despite of that, after the analysis of the transport connections a new railway system should be the solution for a crowded road network, a problem which is going to

increase with the growth of the national economy (production, exports, imports, etc.).

Regardless of the source for the investments needed, the railways have to be constructed. This mode of transport represents the cheapest way everywhere to carry cargo in larger quantities, such as the case of the US privatized railway system. Nowadays, the freight rate to transport a TEU from Valparaiso to Santiago via Railway services is US\$150 and carry the same TEU via truck is US\$250. For Chile this represent a good means of transport, which is disappearing mainly because of a lack of macro analysis of its real possibilities regarding the ports and their function of distribution centers both in the ports and in the inland depots.

Furthermore, with the increasing environmental concern the railways mean an efficient transport mode in term of energy consumption per quantity of cargo moved. Further, the impact of that in the environment is very important.

Finally, it is interesting to note that nowadays the frontiers are no longer a physical barrier where business deals conclude. Moreover, it is possible to project the comparatives advantages of our own ports attracting more and more cargoes through them. It is possible as well to create a land bridge from Valparaiso to Buenos Aires and vice-versa, shortening the distance on the Far East-Argentina route and thus using the Argentinean

connection to the African continent for Chilean cargoes.

#### San Antonio :

The situation of the road network in San Antonio and the links between the highway and the port's gates are. However, there is still a problem on the highways, which have been rebuilt recently, but 40 km. remain with only two lanes which stop the smooth traffic flow. This is a situation which could be improved within the next two years.

The railways system is a great help to the port cargo flow as its share is larger than it is in Valparaiso. In San Antonio the railways are mainly used to transport neo-bulk cargoes such as copper and copper concentrates. In general the connections are good but still deficient to ensure a smooth container flow.

#### 4.1.8. PORT DEVELOPMENTS

Undoubtedly, the Chilean port efficiency has increased tremendously in the last decade. Port performance indicators show that investments do not always solve all the problems in ports. Sometimes a good management model, reorganization of the existing structure, new labor structure and aggressive commitments concerning the national economic policies and ports aims should be the solution in the short run, i.e. "small is beautiful".



Therefore, in the long run and with growing exports and imports, sectors may need some port investments to reach the increased demand of port facilities as a result of the greater sea transport demand.

The investments project to be executed by the Port Enterprise of Chile, Emporchi in the period from 1989 to 1995, mostly represents work to restore the number of facilities after the earthquake in 1985 and does not correspond to development of new facilities with the only exception of the reinforcement of berth's apron and quay surfaces to permit the heavy work of container terminal equipment.

Exactly the same situation affects Valparaiso and San Antonio, where the real new port facilities have been built by private investors, mainly those related with dry and liquid bulk cargoes.

The investments made by Emporchi are not enough to cover the increase on demand, specially as far as container facilities are concern.

For instance, the annual containers throughput of only 250,000 TEUs (projected to the year 2000) using Stradelcarriers or Transtainers, it is necessary to have a container backup yard of 17 hectares dedicated to the terminal which is in contrast to the 12 hectares of the berth number 3 in valparaiso including a road and railways system which would serve the other berth subtracting at least 50 percent of the operational

efficiency. Therefore, the project has to be revised on this point.

Having in mind the conflictive situation that the port in Valparaiso is enclosed by the city and that the mountains end in the port areas have created a very difficult problem to solve.

The case of San Antonio is definitely better than Valparaiso, mainly because there are still many areas where it is possible for instance to develop new container depots, ancillary industries, distribution centers and industrial free zones.

The investments from the private sector are projected to be on the order of US\$85 million for the port region, to the period between 1989 to 2005. Those investments will include among others a new dry terminal in San Antonio, a liquid terminal in San Antonio, and equipment plus others.

#### 4.1.9. NATIONAL PORT PLANNING SYSTEM

The National Port Planning system relies on both the National Investment Appraisal system and on the specific port project under the National Public Works Plan. But there is definitely no National Master Port Plan whereby the objectives and aims of national ports are clearly established.

#### 4.2.0. RECOMMENDATIONS

##### 4.2.1. NATIONAL PORT DEVELOPMENT COMMITTEE

As a result of the national economic policies, the role of Emporchi is now only part of the entire port industry. Therefore, there is a need for a National Port Development Committee (could be part of the National Marine Council) on which the national experts from the government and private industry, may advise the Ministry of Transport on port contingent issues, with the purpose to make the whole industry more dynamic. The call for this committee has to be according with the needs of the industry.

On the other hand, using an integrated national development system is also possible in order to look for other possibilities for port development which is the example of develop a huge port area in Quinteros Bay where the conditions are ideal and thus a whole port complex could be designed avoiding more investments in Valparaiso. Quintero has more possibilities for expansion and natural advantages to reach the Argentinean hinterland among other things, but it is necessary to reach a considerable commitment from both private and governmental sectors on an adventure like that.

##### 4.2.2. NEW NATIONAL PORT POLICY

Within the free market economy model established by the government of Chile, the role of the

individual ports increase in importance as a result of its a higher competitive environment, which demand a better organization and structure to fight against the market environment with aggressive marketing policies and new services. The current Regional Port Corporations are not fitted to respond to this new challenge and as a result, they have to ask the central or National Corporation which reduces its possibilities on the market and its comparative advantages as well.

On the other hand, the local communities are not able to participate in ports issues or at least influence the local port decisions which have to be legislated.

#### 4.2.3. INTEGRATED ELECTRONIC DATA INTERCHANGE

After having analyzed the economic trend in Chile, the shipping and port industry has an obvious necessity to develop an Electronic Data Interchange system capable of reducing the paperwork, increase the capability of customs control on the export and import commodities, increase revenues from customs dues because of better control, make the cargo flow smoother to and from port facilities, improve the performance and use of port facilities because of reduced dwell time and paperwork, reduce the price per unit of cargo moved because of the more efficient system, and more reliable statistic information for the government, port planners, industry and users.

Currently the informative systems and hardware used by the different parties involved in the export and import process should be the very basis for an integrated system of Electronic Data Interchange for ports individually or between them as well.

#### 4.2.4. INDUSTRIAL PORT ZONE

The trend in many countries of the world is the increasing development of industrial zones with customs and partial or total taxes exemptions, which can generate enormous advantages to the national economy not in terms as government revenues but in terms of the multiplier effect of the entire zone and the salaries paid through it. Most of these types of industrial parks are devoted to export purposes or to obtaining semi-processed products needed for the national industry reducing their inventories and production costs.

The Chilean situation is particularly advantageous with respect to other countries because of its cheaper labor forces, its prior experience with free zones and open economy policies.

The areas of Valparaiso, San Antonio and Quintero can provide the infrastructure needed for this objective, specially in the cases of San Antonio and Quintero. However, the latter has not been analyzed in this paper but represents a considerable threat to the port in Valparaiso.

#### 4.2.5. DISTRIBUTION CENTERS

Whetheras, a part of the free zones or isolated, the big advantage of the distribution centers is the reduction on inventory costs. On the other hand the customs dues are paid only when the commodities or goods are delivered to the clients who ask for delivery only when they sell the product, saving money which can be used in other alternative ways and thus reducing money costs.

#### 4.2.6. NATIONAL MASTER PORT PLAN

Under the conditions of a free market economy model the real need for a Master Ports Plan is questionable, but should be included at least in the previously suggested new port legislation.

#### 4.2.7. INTEGRATED INLAND TRANSPORT DEVELOPMENT PROMOTIONAL POLICY

The planning of any kind of inland transport has to be made in harmony with the objective of considering, for instance the port's transport needs and its possibilities to offer its services to the larger hinterland possible. Such is the case of the road and railway system from Valparaiso and San Antonio to Argentina, which has been the target of many discussions and positive commentaries but not many real efforts to improve them. As an example the railway services have

been stopped since the 1980's when an avalanche on the Andes mountains cut the railway.

It is necessary to remember that Chilean ports can offer many comparative advantages for Argentinean exports and imports to and from the Far East or to Pacific Ocean ports. This is specially important in case of a Latin American common market which is not far away. Therefore, Chile has to react and be ready in time for the challenge, and furthermore, with good transport links between both countries it is perfectly possible to do it.

#### 4.2.8. RAILWAY SYSTEM

The Chilean railway system is proud of its historic past and the fact that Chile had the first railway system in South America. Moreover, the special topography of the country made it difficult or at least expensive to develop other highways than the existing highway. Therefore, it is interesting to keep the railway system as an important component of the inland transport system.

The solution could be in the creation of a joint venture with private companies or help them (to the investors) with subsidies as a way to obtain greater interest from private investors. However, this is not in harmony with the national economic policy, but is in accordance with the subsidiary role of the government

given by the National Constitution, as in the case of the sugar industry during the early eighties.

#### 4.2.9.      MARKETING PORT POLICY

The Chilean Port Enterprise in both ports has to increase its effort for improve its market share, therefore a considerable augment on marketing energy has to be done with the objective to annul the growing competition.



**STRENGTHS, WEAKNESS, OPPORTUNITIES, AND THREATS .  
ANALYSIS FOR PORTS OF VALPARAISO AND SAN ANTONIO**

<p style="text-align: center;">\ PORT</p> <p style="text-align: center;">S W O T \</p>	<p style="text-align: center;">VALPARAISO</p>	<p style="text-align: center;">SAN ANTONIO</p>
<p><b>STRONG POINTS</b></p>	<p>Specialization in container handling and fruit products</p> <p>Good natural depth</p> <p>Large quantities of services are offer by the city</p>	<p>Specialization in neo-bulk as copper metallic, dry bulk cargoes and liquid bulk not oil products</p> <p>Availabilities of industrial areas</p> <p>Port and city offer good services and flexibility</p> <p>Good inland transport links with its hinterland</p>

<p><b>WEAK POINTS</b></p>	<p>There is not sufficient areas for industrial expansion</p> <p>Not adequate road links to connect the highway with the port's gates</p> <p>Not cargo information system available</p>	<p>Valparaiso create an effect of magnet for many business</p> <p>Not cargo information system available</p> <p>Area for anchorage of ships waiting not safe enough</p>
<p><b>OPPORTUNITIES</b></p>	<p>Is base port for coastal vessels traffic</p> <p>Excellent location to serve the Argentinean hinterland</p> <p>Many intercontinental sea connection with lines calling to the port</p>	<p>Better intermodal distribution facilities</p> <p>More area for fishing vessels</p> <p>To increase share in the export and import of dry and special liquid bulk</p>

<p><b>THREATS</b></p>	<p><b>Enclosed condition without areas possible to expansion Possibility of new projects in a northern port called Guintero Environmental and urban conditions</b></p>	<p><b>Environmental and urban conditions</b></p>
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## APPENDIX I

### CARGO FORECAST FOR PORTS IN VALPARAISO AND SAN ANTONIO

The cargo forecast represents a difficult task for port planners all around the world and more so in the cases of weak economies such as in Chile.

During the last seven years the Chilean economy have been growing an average of 10 % per annum, as a result of a consistent and stable economic policy.

The different sectors of the economy have grown steadily but with different rates as is normal. As stated before the national growth rate as an average was nearly 10 %, but for purposes of this work a moderate average of 5.5 % for future calculations should be considered.

For purposes of this paper only the industrial and sectorial developments performed in the target hinterland of Valparaiso and San Antonio for obvious reasons will be taken into consideration.

A very important sector as far investments are concerned has been the mining industry, which has captured more than 40 percent of the foreign investors during the last five years. To give an example one of the foreign investment project, EXXON-ESCONDIDA which is in execution and will start production this year. The increase of copper concentrate exports has reached

210,000 tons per year, but according to the project Exxon-Escondida is going to be exported through the new port complex in Ventanas (a port project in development by Chilenergy this year).

The picture of the agrarian and fruit sector as well has very promising. The Chilean fruit export during the last decade increase to an average of 16.4 per annum, during the process of introduction the Chilean fruit into the USA and European markets. Unfortunately, the supply and competition have increased during the last five years. Therefore, despite of the new investment in the sector and the opening of the Japanese market is better to consider a future moderate growth rate of 2.5 % per year. Although, there are some new projects related with increase the fruit's juice export on bulk, which tonnage has not been considered in the prior figure.

The transit cargo from and to the Argentinean hinterland according to the National Planning Office forecast (only through the ports in Valparaiso and San Antonio) will accordingly increase from 11,400 in 1986 to 160,000 tons in 2010.

The wheat import will disappear in the near future because of the agrarian sectorial policy whose incentives result in an enormous increase of the wheat crop that will be enough to reach the national demand. This mainly affects San Antonio as it is a principal port grain handler.

It is possible to see an increase of imported hazardous cargoes both liquid and dry bulk as a result of the sustained industrial growth of the country. San Antonio is better equipped for that type of specialized commodities.

The cabotage cargoes will increase mainly to Punta Arenas (Free Zone) at an average of 3 % per annum as a result of its own economical growth. Other regions of the country will continue using the coastal shipping mostly for bulk or neo-bulk cargoes but not for general cargoes which are carried by road transport.

The average percentage of the export general cargoes has been 8.5 % annually for the purposes of this paper 7.5 % will be used and in the case of import cargoes considering the economic growth rate as marginal propensity to import 5.5 % will be assumed.

See attached Table A and C with cargo forecast and Table B and D with container forecast to the given ports.

TABLE " A "

CARGO THROUGHPUT FORECAST FOR VALPARAISO :

Cargo Year	General Exports	Cargo Imports	Liquid	Reefer Export	Imports	Total
1990	867,998	1,833,305	766,415	947,957	42,853	4,458,528
1991	933,098	1,934,137		971,656		3,838,891
1992	1,003,080	2,040,514		995,947		4,039,542
1993	1,078,311	2,152,743		1,020,846		4,251,900
1994	1,159,185	2,271,143		1,046,367		4,476,695
1995	1,246,123	2,396,056		1,072,526		4,714,706
1996	1,339,583	2,527,839		1,099,339		4,966,762
1997	1,440,051	2,666,871		1,126,823		5,233,745
1998	1,548,055	2,813,548		1,154,994		5,516,597
1999	1,664,159	2,968,294		1,183,868		5,816,321
2000	1,788,971	3,131,550		1,213,465		6,133,986
2001	1,923,144	3,303,785		1,243,802		6,470,731
2002	2,067,380	3,485,493		1,274,897		6,827,770
2003	2,222,433	3,677,195		1,306,769		7,206,398
2004	2,389,116	3,879,441		1,339,438		7,607,995
2005	2,568,300	4,092,810		1,372,924		8,034,034
2006	2,760,922	4,317,915		1,407,247		8,486,084
2007	2,967,991	4,555,400		1,442,429		8,965,820
2008	3,190,591	4,805,947		1,478,489		9,475,027
2009	3,429,885	5,070,274		1,515,452		10,015,611
2010	3,687,126	5,349,139		1,553,338		10,589,604

Source : DGTM and calculated by R. GARCIA BERNAL

TABLE " B "

CONTAINER FORECAST FOR THE PORT IN VALPARAISO

YEARS	CARGO CONTAINERIZED IN TEUs	TEUs IN FEUs	FEUs	TOTAL TEUs
1990	999,482	459,222	71,392	128,794
1991	1,060,877	487,430	75,777	136,706
1992	1,126,130	517,411	80,438	145,114
1993	1,195,490	549,279	85,392	154,052
1994	1,269,221	583,156	90,659	163,553
1995	1,529,715	619,171	109,265	186,662
1996	1,624,317	657,462	116,023	198,205
1997	1,724,907	698,177	123,208	210,480
1998	1,831,874	741,473	130,848	223,532
1999	1,945,630	787,517	138,974	237,413
2000	2,312,645	836,489	165,189	269,750
2001	2,456,657	888,578	175,475	286,548
2002	2,609,850	943,988	186,418	304,416
2003	2,772,826	1,002,937	198,059	323,426
2004	2,946,222	1,065,655	210,444	343,651
2005	3,463,777	1,132,389	247,413	388,961
2006	3,680,995	1,203,402	262,928	413,354
2007	3,912,164	1,278,977	279,440	439,312
2008	4,158,200	1,359,411	297,014	466,941
2009	4,420,083	1,445,027	315,720	496,349
2010	4,698,858	1,536,165	335,633	527,653

Source : DGTM and calculated by R. GARCIA BERNAL



TABLE " C "

CARGO THROUGHPUT FORECAST FOR SAN ANTONIO :

CARGO YEAR	GENERAL EXPORTS	CARGO IMPORTS	LIQUID EXPORTS	IMPORTS	REEFER EXPORTS
1990	415,817	263,258	31,535	106,224	139,104
1991	447,003	277,737	32,166	108,348	142,582
1992	480,529	293,013	32,809	110,515	146,146
1993	516,568	309,128	33,465	112,726	149,800
1994	555,311	326,130	34,134	114,980	153,545
1995	596,959	344,068	34,817	117,280	157,383
1996	641,731	362,991	35,514	119,625	161,318
1997	689,861	382,956	36,224	122,018	165,351
1998	741,600	404,019	36,948	124,458	169,485
1999	797,220	426,240	37,687	126,948	173,722
2000	857,012	449,683	38,441	129,486	178,065
2001	921,288	474,415	39,210	132,076	182,517
2002	990,384	500,508	39,994	134,718	187,079
2003	1,064,663	528,036	40,794	137,412	191,756
2004	1,144,513	557,078	41,610	140,160	196,550
2005	1,230,352	587,717	42,442	142,964	201,464
2006	1,322,628	620,042	43,291	145,823	206,501
2007	1,421,825	654,144	44,157	148,739	211,663
2008	1,528,462	690,122	45,040	151,714	216,955
2009	1,643,096	728,079	45,941	154,748	222,379
2010	1,766,329	768,123	46,859	157,843	227,938

Source : DGTM and calculated by R. GARCIA BERNAL

IMPORTS	DRY EXPORTS	IMPORTS	TOTAL
0	264,654	510,479	1,731,071
0	269,947	510,479	1,788,262
0	275,346	510,479	1,848,837
0	280,853	510,479	1,913,019
0	286,470	510,479	1,981,050
0	292,199	510,479	2,053,186
0	298,043	520,689	2,139,911
0	304,004	531,102	2,231,516
0	310,084	541,724	2,328,319
0	316,286	552,559	2,430,661
0	322,612	563,610	2,538,909
0	329,064	574,882	2,653,452
0	335,645	586,380	2,774,709
0	342,358	598,108	2,903,127
0	349,205	610,070	3,039,186
0	356,189	622,271	3,183,399
0	363,313	634,716	3,336,314
0	370,579	647,411	3,498,518
0	377,991	660,359	3,670,642
0	385,551	673,566	3,853,360
0	393,262	687,038	4,047,392

TABLE " D "

CONTAINER FORECAST FOR SAN ANTONIO

YEAR	CARGO IN TEUs	CARGO CONTAINERIZED IN FEUs	TEUs	FEUs	TOTAL TEUs
1990	203,723	67,908	14,552	4,244	23,040
1991	217,422	72,474	15,530	4,530	24,589
1992	232,062	77,354	16,576	4,835	26,245
1993	247,709	82,570	17,693	5,161	28,015
1994	264,432	88,144	18,888	5,509	29,906
1995	329,359	94,103	23,526	5,881	35,289
1996	351,653	100,472	25,118	6,280	37,677
1997	375,486	107,282	26,820	6,705	40,231
1998	400,967	114,562	28,640	7,160	42,961
1999	428,211	122,346	30,586	7,647	45,880
2000	522,678	130,669	37,334	8,167	53,668
2001	558,281	139,570	39,877	8,723	57,324
2002	596,357	149,089	42,597	9,318	61,233
2003	637,080	159,270	45,506	9,954	65,414
2004	680,636	170,159	48,617	10,635	69,887
2005	818,131	181,807	58,438	11,363	81,164
2006	874,201	194,267	62,443	12,142	86,726
2007	934,186	207,597	66,728	12,975	92,677
2008	998,363	221,858	71,312	13,866	99,044
2009	1,067,029	237,118	76,216	14,820	105,856
2010	1,140,503	253,445	81,465	15,840	113,145

Source : DGTM and calculated by R. GARCIA BERNAL

## APPENDIX II

### OVERVIEW OF THE INLAND TRANSPORT IN CHILE

Inland transport is a matter of paramount importance for the whole transport chain, moreover so when modern transport is no longer separated between modes and the logistic concept of the total transport and distribution of the cargoes are also part of a whole process.

On the other hand, the inland cost component of the total transport cost for carriers or shippers is sometimes decisive when a discharging port has to be chosen.

One of the most common mistakes of port planners in less developed countries is not taking into account the links between ports and hinterland as a proper problem or as a factor which will have an impact directly on their own port facilities.

Therefore, a good road, rail and channels network is vital for the efficiency and costs related to both ports and transport. It is not possible to develop a good and efficient port without considering an adequate inland transport network, as an integral part of the entire national transport system.

It is also important to consider the nature and topographic conditions of the country, as in the case of Chile, with a very long coast line and difficult

geography has to look for a solution within its own particular situation.

The efficient inland transport network ensures a smooth cargo flow to / from the port / hinterland. For instance two years ago in the former Democratic Republic of Germany a FCL TEU from Leipzig to Rostock needed 17 days mainly because of paperwork, excessive control system during its transport and crowded road network. To transport the same container from Bavaria to Hamburg (similar distance) not more than 17 hours<sup>11</sup> was needed.

Coming to the Chilean experience after the construction of the Pan-American Highway (1967) and as previously explained, the coastal sea transport started to be reduced and changed most of the general cargoes to the road transport mode. Despite of the fact, the maritime freight rate still is lower the bureaucracy in the sea transport reduced the interested number of clients, for instance the maritime freight rate to carry a TEU from Valparaiso to Antofagasta is US\$1,200 and the same TEU carried by truck cost US\$1,600 but the first expend 6 days door to door while the second only 36 hours for the same service.

Currently, the cabotage commodities are mostly dry and liquid bulk cargoes from the centers of raw material production to the industrial centers. On the other hand,

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<sup>11</sup> According Institute Logistic of Bremen sources

most of the coastal traffic of general cargo is to carry cargoes to areas where the access of trucks is restricted by topographic conditions. But in general terms the road links are very good, south to north. However, the links from port's gate to the highway is a different thing because most ports are surrounded by cities and the traffic generated by the port has to move through them, which means many problems as traffic congestion increases of risks for the population in the area, environmental pollution and destruction of streets not fitted for heavy traffic.

#### TOTAL ROAD SYSTEM

Road system length                      65,000 Km  
 The Pan-American Highway            7,000 Km

#### ROAD TRAFFIC :

YEARS	1986	1987	1988
MODE OF TRANS.			
CARS	590,719	618,496	669,097
BUSES AND COACHES	21,559	23,487	24,748
LORRIES	220,492	244,447	272,271
MOTOR CYCLES	22,661	23,076	23,606

Source : Dr. h. Blakemore, Latin America review 1991.

The analysis of the railway system is the sad part of the transport history. Although the Chilean railway system founded in 1851 was the pioneer in South America, the Chilean Railways Enterprise (hereinafter called the FFCC) was split in five different subsidiaries who performed the transport tasks all over Chile. Until 1974 the FFCC was subsidized by the central government and accumulated considerable debt. After 1975 a detailed process of reorganization took place, with the aim to find the real need for new investments and the future strategy of the enterprise. In 1979 all governmental subsidies were stopped and the company was divided in five subsidiaries, abolishing all the non profitable services (the so called social services), to try to reduce the debt by selling out all the assets no longer needed.

Currently, the FFCC is waiting for the next step, which could be a partial privatization, but the companies are still heavily in debt and technologically obsolete. Furthermore, the staff has been reduced dramatically in the last six years only keeping enough personnel to ensure an efficient administration.

Some of the general characteristics of the FFCC are

rail distances :

South	4,141 Km
North	2,433 Km

Arica-La Paz	228	Km
Regional Metro of Valparaiso	101	Km
TOTAL	6,893	Km

**Rail equipment :**

<b>Locomotives</b>	<b>302</b>	<b>442,449 Hp.</b>
Electrical	29	
Diesel	172	
Steam	101	

**Transport equipment**

Cargo wagons	6,584	232,374 Tn.
Passenger wag.	338	25,418 Seats
Automotors	17	13,132 Seats

The total cargo split for port has been calculated and organized in the following table.

**CARGO SPLIT : ( % of total cargo using each mode)**

PORT/MODE TYPE OF CARGO		VALPARAISO		SAN ANTONIO	
		TRUCK	RAIL	TRUCK	RAIL
CONTAINERS	FCL	100 %	0 %	100 %	0 %
	LCL	60 %	40 %	40 %	60 %
GENERAL CARGO		100 %	0 %	100 %	0 %
COPPER		80 %	20 %	0 %	100 %
COPPER CONCENTRATE		0 %	0 %	100 %	0 %
FRUIT		100 %	0 %	100 %	0 %
DRY BULK (Other than foodstuff)		100 %	0 %	95 %	5 %
WHEAT and MAIZE		95 %	5 %	45 %	55 %
LIQUID BULK*		95 %	5 %	15 %	85 %

Source : EMPORCHI

\* figured approximated



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