

FEDERAL UNIVERSITY OF RIO GRANDE

OPPORTUNITIES FOR BRAZILIAN SHIPBUILDING

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1

THE BAD NEWS

This is the worst of times for World shipbuilding and therefore a questionable time for any one to want to enter it.

Too many ships

Over capacity of shipyards

Too many orders

Likely delay of deliveries (extended) and significant cancellations

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THE GOOD NEWS

Market is coming back with record orders in China and Korea first half of 2010.

Small niche shipbuilding is not impacted to the same extent as the large ship international market.

Small niche ships tends to be for local operations and it is practical and economic to build locally.

PETROBRAS/TRANSPETRO new shipbuilding/offshore program is a stimulus and base program for Brazilian shipbuilders to build from.

CURRENT WORLD SHIPBUILDING SITUATION

THE HARD TRUTHS

In July 2009 the OECD Council Working Party on Shipbuilding stated “The economic downturn has hit shipbuilding hard. New orders have contracted by up to 90% and cancellations have increased, which is likely to result in significant excess shipbuilding capacity. This outlook is unlikely to improve for some time.”

One outcome of the December 2009 special meeting of OECD Shipbuilding countries Community of European Shipbuilders Association was their statement that it has *“the impression that a wide consensus has been established as to:*

- a. the very difficult state of the global shipping and shipbuilding market, which faces unprecedented challenges*
- b. the presence of substantial overcapacity*
- c. the possibility or even likelihood of extreme price competition or so-called cut-throat-prices.”*

THE HARD TRUTHS (CONTINUED)

However, there has been strong evidence over the last six months that shipbuilding has not escaped the effects of the economic crisis.

This is a very strong indication that the supply of shipping exceeds demand, and this, together with the significant orders already held by shipbuilders has meant that new vessel orders have now virtually dried up.

New orders reported fell from 22.2 million cgt in Q3 2007, and 12.3 million cgt in Q3 2008, to just over 1 million cgt in each of the last quarter of 2008 and the first quarter of 2009, a fall of around 90% from its peak.

Virtually every shipbuilding economy has experienced an almost unprecedented fall in new orders, with some economies having reported no new orders at all in the last 12 months.

GROSS TONNAGE

- The International Gross Tonnage is simply the molded volume, in cubic meters, of the enclosed hull and deckhouse of a ship multiplied by a coefficient;

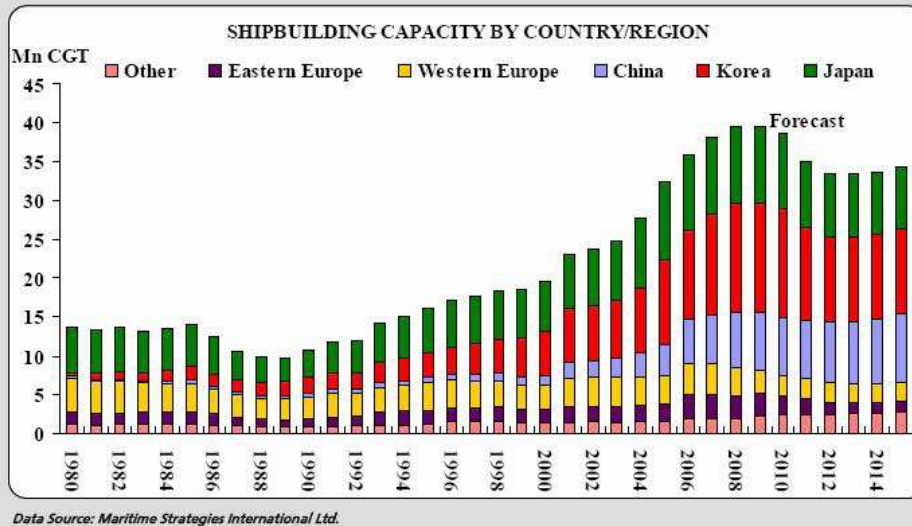
$$GT = K_1 \times V$$

- The coefficient is to convert volume to admeasurement tons (0.35), and to keep the new Gross Tonnage as close to the average of the Gross Tonnage for existing ships as possible.
- The coefficient varies from 0.22 for very small ships to 0.32 for very large ships. Compensated Gross Tons is used in the equation to measure throughput (TP).

COMPENSATED GROSS TONS

- The concept of Compensated Gross Tonnage was developed from the need to have a basic measurement that could take into account the differences in ship type, complexity in design and construction, and size.
- The Compensated Gross tonnage Coefficients (CGTC) have been developed internationally and accepted by the OECD. The coefficients are for commercial ships and are provided in a number of the references. The OECD reference is
- <http://www.oecd.org/dataoecd/59/49/37655301.pdf>

World shipbuilding capacity to 2015



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9

SHIPBUILDING MARKETS

Markets Segments by Ship Type

VOLUME

- Bulk Carriers
- General Cargo
- Tankers

INTERMEDIATE

- Container Ships
- RO RO Ships
- Chemical Tankers
- Ferries
- Reefer Ships

NICHE

- Passenger /Cruise Ships
- Car Carrier
- LPG Carrier
- Oil/Bulk/Ore
- LNG Carrier

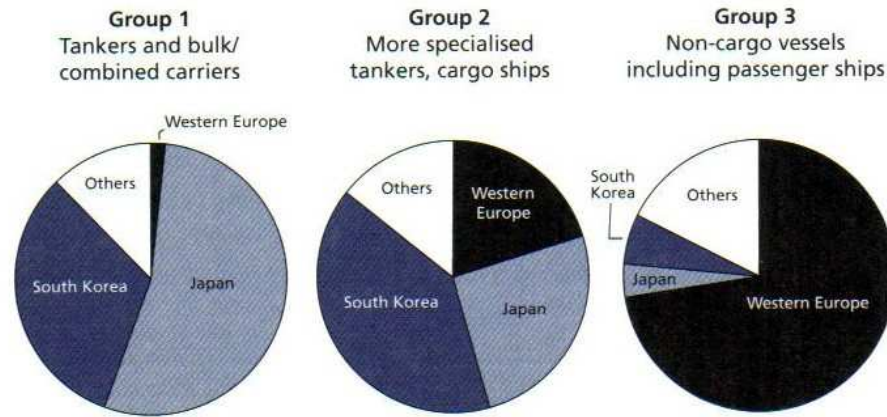
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MARKET SEGMENT BY COUNTRIES

Dominant Countries Vary with the Market Segment



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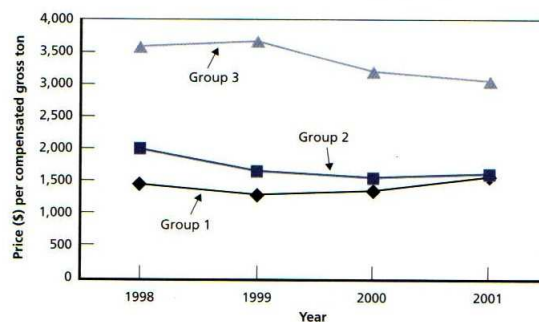
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AVERAGE PRICE V COMPLEXITY

Average Price of Commercial Ships by Complexity Group, 1998–2001

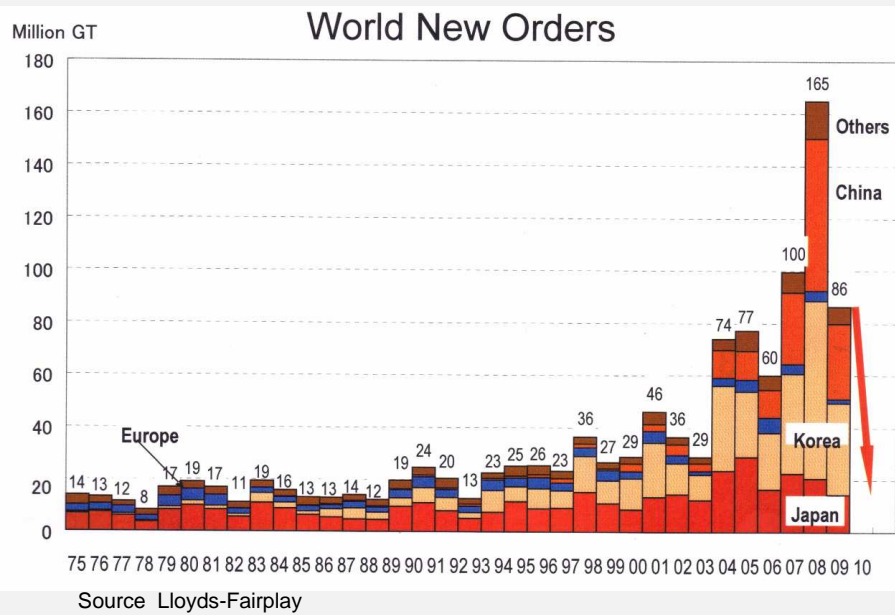
Ship Type	1998		1999		2000		2001	
	Number	\$/CGT	Number	\$/CGT	Number	\$/CGT	Number	\$/CGT
Group 1	229	1,476	439	1,297	411	1,367	299	1,577
Group 2	318	1,984	319	1,662	478	1,553	598	1,613
Group 3	169	3,569	166	3,650	129	3,184	99	3,052



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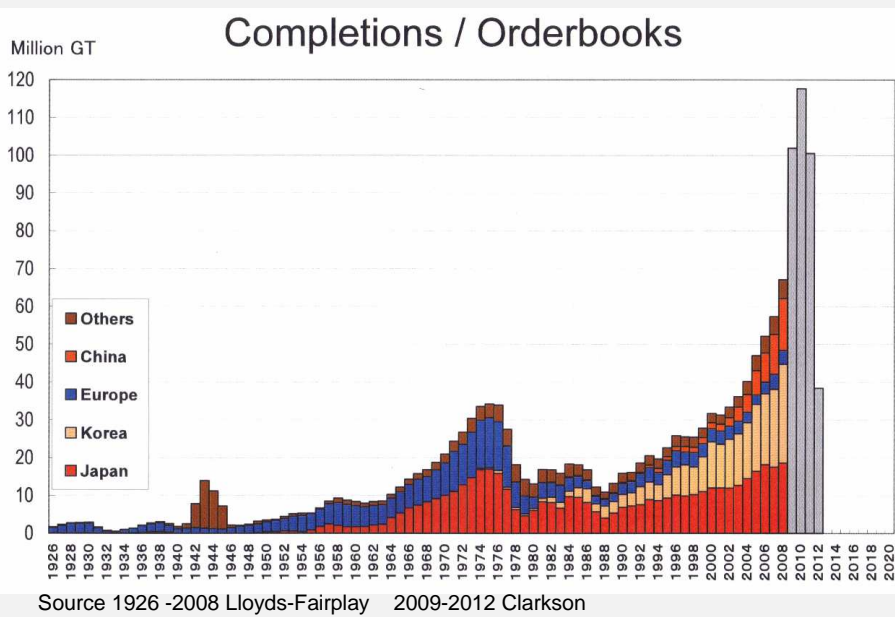
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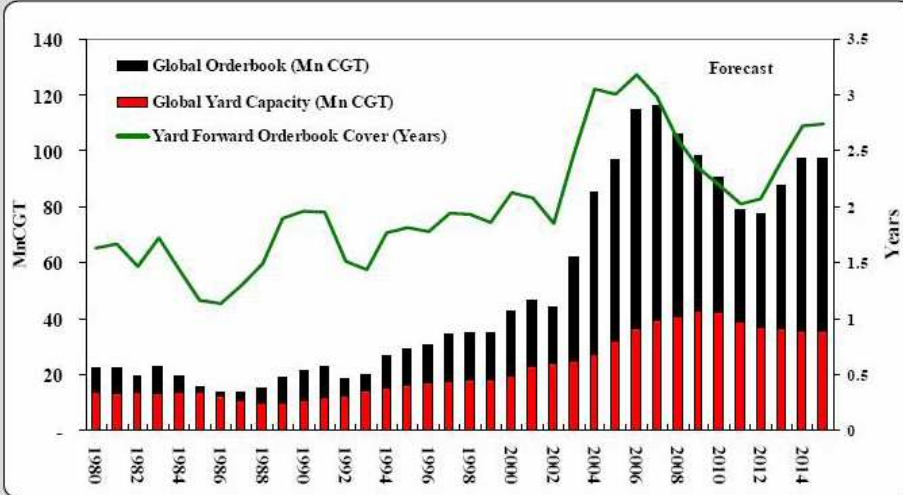


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Global Orderbook & Forward Yard Cover



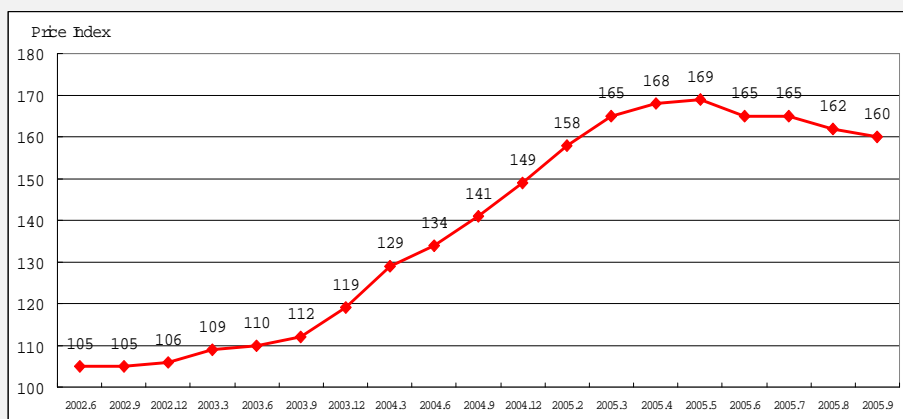
Source: Maritime Strategies International Ltd

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SHIPBUILDING PRICE TRENDS

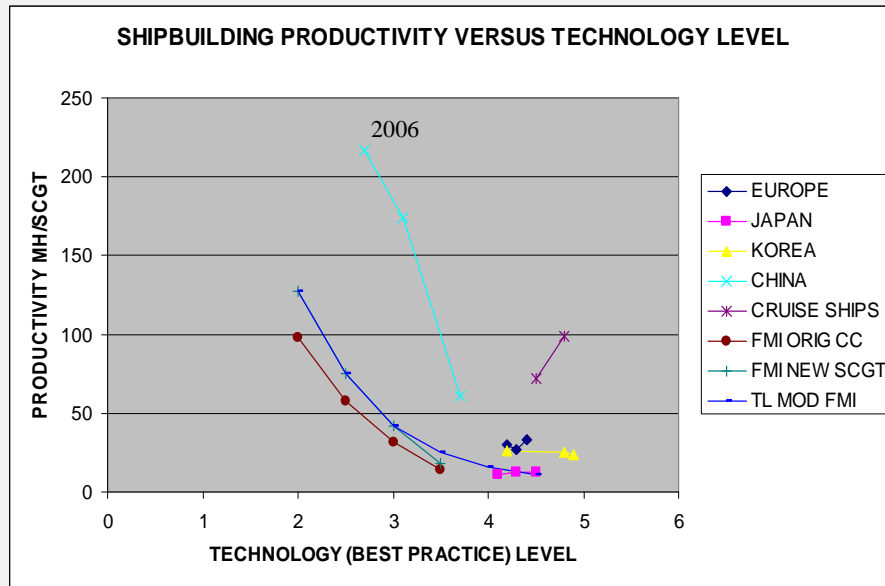


Source : Clarkson Research Studies

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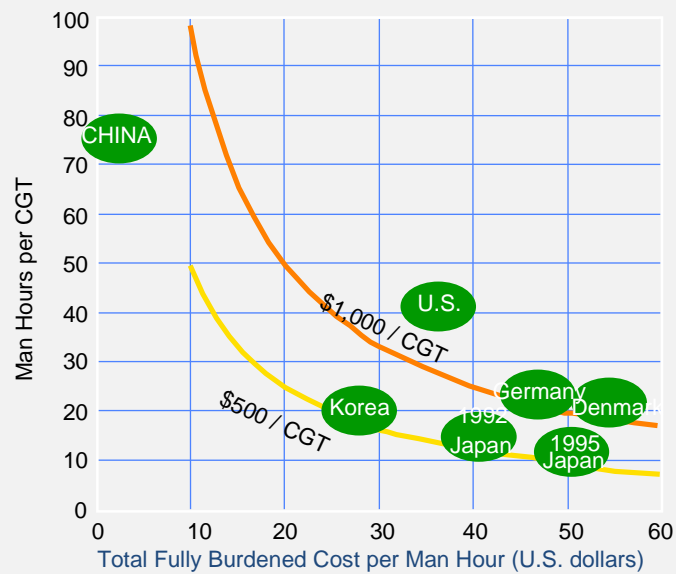


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CONSTANT COST CURVE & COMPETITIVENESS



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CURRENT BRAZILIAN SHIPBUILDING SITUATION

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TOTAL BRAZILIAN SHIPBUILDING CAPACITY

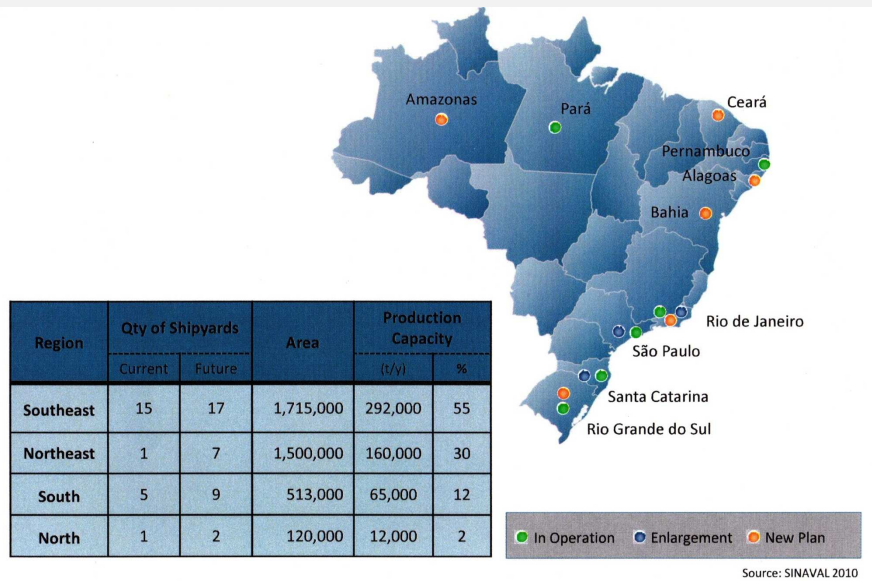
No. of Shipyards in Brazil (most representative)	22
Steel fabrication capacity	570,000 ton/year
Total area	4.7 million m ²
Drydock and floating drydock	19
Slipway	22
Outfitting quay	43

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CURRENT AND NEAR FUTURE BRAZILIAN SHIPYARDS

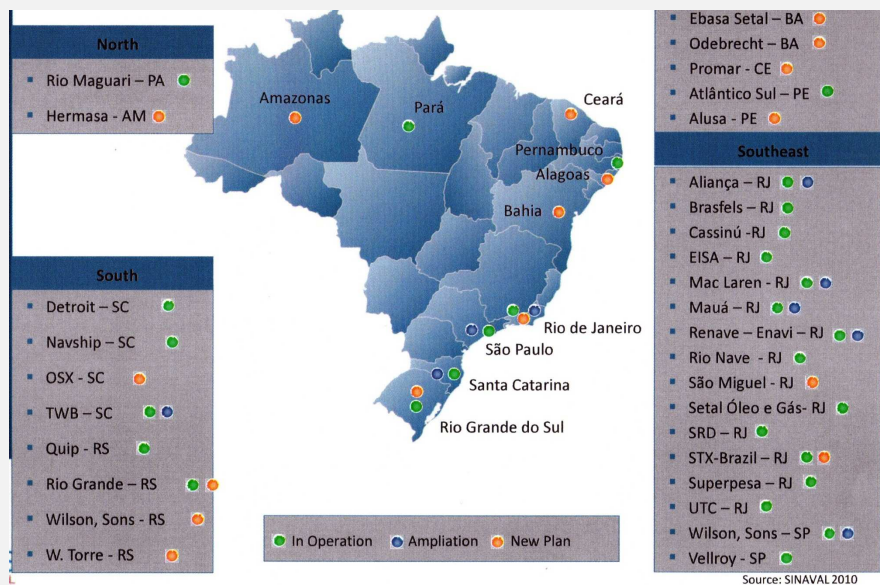


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BRAZILIAN SHIPYARDS BY REGION



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BRAZILIAN SHIPYARD PRODUCTS

Ships



Demand	Qty	% Local Content
Promef I	23	65
Promef II	26	70
EBN	19	ND
Other orders	10	ND
Total	78	-

Supply Boats – Prorefam



Demand	Qty	% Local Content
Prorefam 1st Lot	24	60
Prorefam Other Lots	122	60
Total	146	60

Source:
SINAVAL 2010

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BRAZILIAN SHIPYARD PRODUCTS (CONTINUED)

Drilling Rigs



Demand	Qty	%LC
1st Lot Delivery in 2012	12	0
Other Lots* Delivery between 2013-17	28	-
Total	40	-

* 14 ships and 14 semi-submersible units with Brazilian companies' operation.

Platforms – Petrobras



Source:
SINAVAL 2010

Demand	Qty	%LC
P-55 (EAS Hull)	1	-
P-55 (QUIP Process Plant)	-	-
P-56 e P-61 (Brasfels)	2	-
P-57 (Brasfels)	1	-
P-62 (Jurong)	1	-
P-63 (QUIP)	1	-
Plataform (Odebrecht - Bahia)	2	-
FPSO (Engevix Hulls)	8	-
Total	16	-

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BRAZILIAN SHIPYARD PRODUCTS (CONTINUED)

Other Ships



Demand	Qty	%LC
Tankers - PDVSA	10	-
Port Support	18	-
Domestic Navigation	27	-
Container Holders	4	-
Total	59	-

Future Demand Expectation



Demand	Qty	%LC
Pre-Salt	-	-
Promef	60	-
Prorefam	122	-
Total	182	-

Source:
SINAVAL 2010

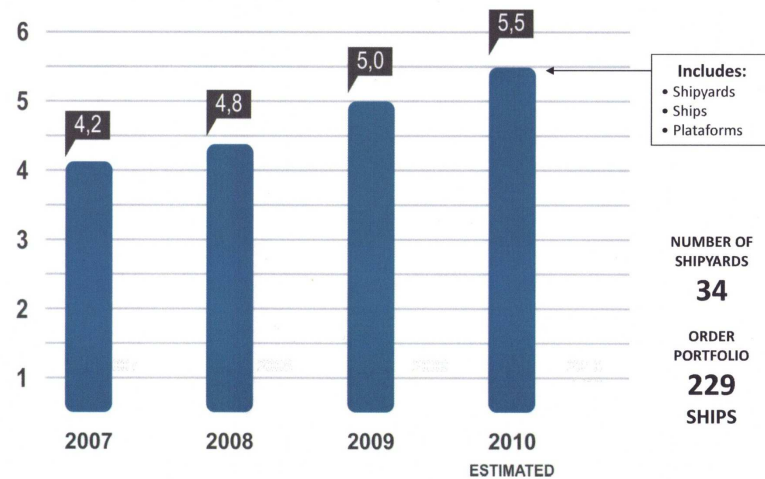
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BRAZILIAN SHIPYARD EARNINGS

Greater Invoicing in US\$ billion



Source:
SINAVAL/Valor Setorial, Ago/2010

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BRAZILIAN SHIPBUILDING OPPORTUNITIES

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BRAZILIAN SHIPBUILDING (Continued)

Fleet Modernization and Expansion Program (PROMEF) to support Petrobras expanding deepwater operations, including a \$5 bn initiative to charter 146 new vessels, including the 42 Tankers, 54 anchor handlers, 64 for supply operations, 18 for collection activities, and 10 tugboats.

In addition, Petrobras aims to contract 40 drilling vessels and semi-submersible platforms by 2017 for deep and ultra-deep waters.

One of many projects linked to the Growth Acceleration Program, PROMEF was designed to quickly create around 40,000 direct jobs and 120,000 indirect jobs.

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BRAZILIAN SHIPBUILDING

The Transpetro energy transportation unit of Brazilian state controlled oil company Petrobras is engaged in a 42 tanker buy.

At the behest of Brazilian Government, Petrobras must use only local shipbuilders to build the ships.

So we have a defacto National Plan but it is introduced through a semi private company.

The yards have teamed with internationally known shipbuilders to respond, but by most accounts, Petrobras/Transpetro will wind up paying around 25 percent above Asian levels for the ships.

BRAZILIAN SHIPBUILDING (Continued)

- However note that even with all the Government support and planning the program is well behind the original schedule.
- A major problem was, as already stated for any emerging shipbuilding industry, Brazil did not and does not have the infrastructure to support the shipbuilding plan. Most of the equipment and even services have to be purchased from outside of the country.

BRAZILIAN SHIPYARD DEMAND

Total Demand

	Demand	Qty
Confirmed Demand	Ships	78
	Supply Boats - Prorefam	146
	Drilling Rigs	40
	Other Ships	59
Future Demand Expectation	Ships and Supply Boats	182

Approval by FMM in Dec/2009

FMM – Fundo da Marinha Mercante / Merchant Marine Fund

- ✓ 253 Ships = R\$8,9 Billion;
- ✓ 17 Shipyard = R\$2,3 Billion

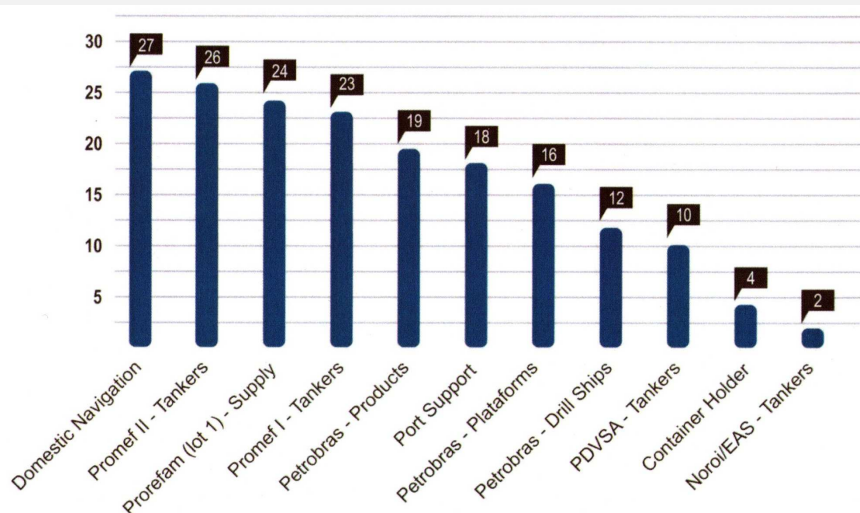
Source:
SINAVAL 2010

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BRAZILIAN SHIPYARD DEMAND (CONTINUED)



Source:
SINAVAL 2010

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BRAZILIAN SHIPYARDS

	Strategic Objectives	Direction
1. Shipbuilding (shipyards)	✓ Immediate and sustained expansion of the capacity	✓ Support investments with scale compatible with the international benchmark (big size)
2. Supply chain of Goods and Services	✓ Enlarge and strengthen the existing productive base ✓ Diversify the productive base and develop segments with more aggregated value	✓ Support sectors with offer bottlenecks ✓ Use existing competences and attract foreign investments with technology transfer ✓ Stimulate production cluster formation using regional vocations

Source:
BNDES, 2009

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33

LATIN AMERICAN SHIPBUILDING TODAY

- Most shipyards and the ships they build are small, typically less than 100 meters and less than 1000 gt.
- However, Brazil with the ambitious TRANSPETRO Tanker fleet rebuilding, has large ship capability.
- Brazil also has significant oil support shipbuilding
- Shipbuilding management, manufacturing techniques and facilities all need to be improved if the shipyards are to become more capable and productive.
- Brazil does not have the shipbuilding infrastructure that is needed to become a major player in the international commercial shipbuilding market.

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BRAZILIAN SHIPBUILDING

- Without significant Government support any attempt to enter commercial shipbuilding market will fail.
- Rather than just throwing money away it is essential that the government of each country develop a National Shipbuilding/Maritime Plan.
- The plan must address how the required professional and trade workers with all the required skills will be developed.
- The plan should include how the shipbuilding companies will acquire the needed skills and experienced people **in the short term**.

DO'S AND DON'TS

- Do not have to be as productive as best shipyards.
- Do have to be as productive as possible within the value corresponding to your Labor Rate in the Competiveness Chart
- Do not underestimate the challenges.
- Do get help from other successful **similar size** shipbuilders.
- Do familiarize yourself with successful shipbuilders processes, equipment and approaches.
- Do not assume old ways will get you to your goal.
- Do recognize that significant change and innovation is needed to succeed.
- Do recognize that a national plan for education and skills training will be essential to future growth and success.

INNOVATION IN SHIPBUILDING

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37

INNOVATION IN SHIPBUILDING



Volkeswerft Shipyard
Germany

Eliminate
the high
cost
traditional
launching

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38

INNOVATION IN SHIPBUILDING (Continued)



Hyundai's
Ground
(Level Land)
Building
Berth

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INNOVATION IN SHIPBUILDING (Continued)



Hyundai's Submersible Barge Launching System

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INNOVATION IN SHIPBUILDING (Continued)



Launching Ship on Pneumatic Tubes

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POTENTIAL NICHE MARKET FOR BRAZILIAN SHIPBUILDERS

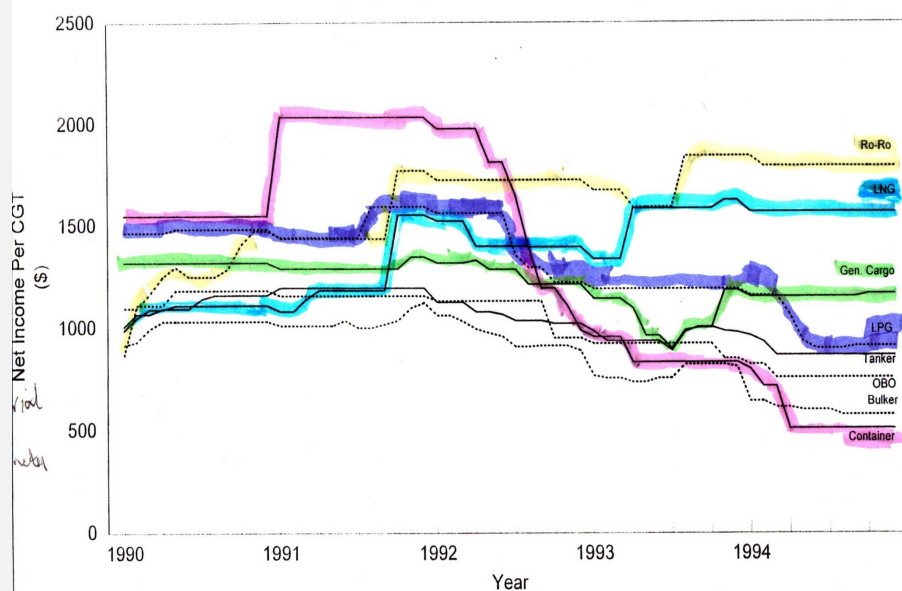
- LNG Carriers
- CNG Carriers
- LPG Carriers
- OPVs
- Offshore Support Vessels
- Ferries
- Tugs
- Coastal dry cargo ships
- Coastal Containerships
- Coastal LPG carriers
- Coastal RO-Ros
- Research Ships
- Fishing Vessels
- Oceangoing Barges
- River Barges

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IMPACT OF COMPETITION ON SHIP PRICES



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43

SUMMARY

Not the best of times to be a shipbuilder in the international market.

Not the best of times to enter international shipbuilding market.

China and Korea dominate market with other countries such as India and Vietnam entering it.

There will probably be a price war for large bulk cargo ships as cancellations increase and deliveries are delayed.

Extended deliveries and cancellations could even result in some shipyards closing

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44

SUMMARY (Continued)

Therefore the opportunities for Brazilian shipbuilders is in the domestic large oil tanker and offshore market and small niche ship market. The international small niche ship market may also be an opportunity if Brazilian shipbuilders can improve their productivity and keep their costs down

REMEMBER THIS IMPORTANT AND ESSENTIAL FACT

If it is desired to have a significant shipbuilding industry it is essential that the country develop a National Shipbuilding Plan.

SUPPORTING SLIDES

TECHNOLOGY (BEST PRACTICE) LEVELS

LEVEL	TECHNOLOGY (BEST PRACTICE)
-------	----------------------------

- | | |
|---|---|
| 1 | Traditional shipbuilding practice (Pre 1960) - move to completely welded ships, combination of blocks and assembly at erection, multiple berths, small cranes (<50t) , most outfitting after launch, and manual operating systems |
| 2 | Improved Traditional shipbuilding practice (1960-65) – modernized facilities, numerical controlled burning machine(s), fewer berths or a building dock used, larger cranes (>50t <250t), some pre-outfitting, computer based lofting, and some computer based operating systems |

TECHNOLOGY (BEST PRACTICE) LEVELS (Cont.)

LEVEL	TECHNOLOGY (BEST PRACTICE)
-------	----------------------------

- | | |
|---|---|
| 3 | First Modern shipbuilding practice (1965-75) – new shipyard with large capacity cranes (>350 t), single dock, covered steel fabrication through block construction shops, large degree of mechanization and extensive use of computers for design and planning |
| 4 | Second Modern shipbuilding practice (1975-85) - very large shipyards, very large building docks, covered building berths, continuous improvement, Grand Block construction, large lift capacity Goliath cranes (>800 t), advanced & zone outfitting with ship virtually complete at launch. |

TECHNOLOGY (BEST PRACTICE) LEVELS (Cont.)

LEVEL TECHNOLOGY (BEST PRACTICE)

- 5 Computer Based shipbuilding practice (1970-95) – developed from level 4 through application of computers enabling integration of operating systems, effective use of CAD, CAPP and CA material planning, improved quality control through mastering dimensional and/or accuracy control and increased automation (robotic welding/ automated pipe shops).
- 6 2000 World Class shipbuilding practice (2000 –present) – refurbished or new shipyard (some completed covered) with material movement by conveyors minimizing crane lifts, large Grand Blocks and even ULTRA Blocks to 3000t, maximum use of robotics for welding and part assembly, innovative solutions to overcome challenges and achieved highest productivity and competitiveness.

TECHNOLOGY BENCHMARK ELEMENTS

- A. Steelwork Production
- B. Outfit Production
- C. Other Pre-erection
- D. Ship Construction & Outfit Installation
- E. Layout & Environment
- F. Amenities – No longer included
- G. Design, Drafting, Production Engineering & Lofting
- H. Organization & Operating Systems