Costs Estimate

Prof. Manuel Ventura

Ship Design I

MSc in Marine Engineering and Naval Architecture

Summary

- Ship Acquisition Cost
- Costs in Shipping
  - Operating Costs
  - Voyage Costs

- Annex A. Convenience Flags
  - Panama Registry
  - MAR Registry (Madeira)

Ship Acquisition Cost

Prof. Manuel Ventura

Ship Design I

MSc in Marine Engineering and Naval Archuitecture

Investment

Initial Investment

$$I = Q \cdot (1 + Ka)$$

with:

Q: *Ship* acquisition cost

Ka: Owner's expenses during ship building and acquisition, expressed as percentage of the acquisition cost, generally of about 5 – 15%.

Ship Acquisition Cost

Based in recent statistics the following expression can be used:

$$Q = (C_H + C_E + C_M + C_X) \cdot (1 + Kb)$$

with:

C_H : Hull Steel Cost
C_E : Equipment Cost
C_M : Machinery Cost
C_X : Special Equipment Cost (cranes, cell guides, etc.)
Kb : Profit Margin of the shipyard, in percentage

Hull Steel Cost

$$C_H = k1 \cdot W_S^{\,k2} \cdot Cb^{k3}$$

The coefficients k1, k2, and k3 are characteristic of each ship type, obtained from statistical regression analysis.

	k1	k2	k3
Oil Tankers	2,523	0.8864	-0.2380
Bulk Carriers	2,666	0.8837	-0.2336
Container Carriers	3,167	0.8802	-0.2217
General Cargo	2,925	0.8815	-0.2285

Profit Margin of the Shipyard

This value can be estimated as follows:

1. Estimate the shipbuilding cost of a reference ship (Q_R) by the previous expressions
2. Obtain the actual ship cost from the current market (Q_M)
3. The nominal profit margin can then be obtained by the expression:

$$Kb = \frac{Q_M}{Q_R} - 1$$

If the Kb value is too low or too high, for instance, outside of the interval [-30%, +30%] the cost formulas should be reviewed and updated.

Equipment Cost

$$C_E = k_1 \cdot W_E^{\,k2}$$

The coefficients k1 and k2 are characteristic of each ship type, obtained from statistical regression analysis.

	k1	k2
Oil Tankers	15,955	0.9335
Bulk Carriers	11,966	0.9335
Container Carriers	14,770	0.9313
General Cargo	13,588	0.9313

Machinery Cost

$$C_M = k1 \cdot P_{MCR}^{\ k2}$$

P_{MCR}: Propulsive power [bhp]

The coefficients k1 and k2 are characteristic of the type of propulsive plant:

	k1	k2
Diesel (2 stroke)	19,877	0.620
Diesel (4 stroke)	12,507	0.647
2 x Diesel (2 stroke)	14,141	0.650
Steam Turbine	38,480	0.540

Container Cell Guides Cost

$$C_{CG} = 2500 \cdot W_{CG}^{\ 0.97}$$

W_{CG} – weight of the cell guides [t]

More Detailed Estimates

- When more information about the manufacturing process is known, more detailed and accurate estimates of the cost can be made
- The labor ratios of the shipyards are a measure of their efficiency of the production process

Ship Acquisition Cost (Alternative)

$$Q = C_H + C_E + C_M + GE + S + EC$$

with:

C_H	Cost of hull
C_E	Cost of equipment
C_M	Cost of machinery
GE	General expenses (about 90% labor cost)
S	Profit of the shipyard (about 5% labor cost)
EC	Extra Costs

Each component can be divided into cost of materials or equipments and labor cost:

$$C_i = C_{mat} \sum + C_{labor}$$

Structure of the Labor Costs

General

$$CF_x = Hh_x \cdot m_{Hh}$$

with:

Hhx: number of Man.hours spent

m_{Hh}: unit cost of the Man.hour

20 US$/Hh (Source: ENVC Set. 1999)

Hull Cost

$$C_C = CA_C + CF_C$$

with:

CA_C - Material cost

CF_C - Production cost

$$CA_C = P_C \cdot m_C$$

$$CF_C = Hh_C \cdot m_{hH}$$

with:

P_C Weight of the hull (t)

m_C Unit cost of structural steel (US$/t)
mC = 500 US$/t
(ENVC Set. 1999)

Hhc: Number of man.hours necessary

$$Hh_C = y \cdot P_C^{\,x}$$

mHh: Unit cost of Man.hour (12 US$/hH)

Prices of Shipbuilding Steel

Type of Product	[US$/t]
Average (plates + stiffeners)	800
Plates (MS)	
Stiffeners (MS)	
Plates (HTS)	
Stiffeners (HTS)	

Source: World Steel Review 2008

Equipment Cost

$$C_E = P_E^{0.95}.m_E + CF_E$$

with:

P_E Equipment weight (t)

m_E Unit cost of the equipment (US$/t)
= 1,000 US$/t (outfitting)
= 3,500 US$/t (deck machinery)

CF_E Installation cost of the equipment (US$)

$$CF_E = Hh_E \cdot m_{hH}$$

$$Hh_E = Z \cdot L \cdot B^{1/2}$$

with:

Z Coefficient
Z = 350 (non-sophisticated ships)

L Length of ship

B Breadth of ship

Machinery Cost

$$C_M = 1.6 \cdot (P_B/100)^{0.82} \cdot m_M + CF_M$$

with:

- P_B Propulsive power (MCR) [kW]
- mM Unit cost of the machinery [US$/kW]
- CF_M Installation and alignment cost of the machinery [US$]

Type of Propulsive Machinery	Unit Cost [US$/kW]
Slow-speed Diesel (incl. shaft line and propeller)	350 450
Medium-speed Diesel (incl. shaft line)	335
Fast-speed Diesel	

Machinery Cost

Installation of the Propulsive Machinery

$$CF_M = Hh_M \cdot m_{hH}$$

$$Hh_M = 1600 \cdot (P_B/100)^{0.6} \cdot k$$

with:

P_B: *Propulsive Power (KW)*

K = 1 (Diesel engines, aft)

Typical Prices of New Ships (1998-2005)

Tabla 1.- Precios de Nuevas construcciones en MUS$

	1998	1999	2000	2001	2002	2003	2004 (dic)	2005 (dic)
Petroleros								
VLCC (300.000 tpm)	72/76	68/69	72/77	70/75	63/68	74/77	107/110	120/120
Suezmax (150.000 tpm)	44/48	42/45	46/53	46/49	43/45	51/52	68/71	69/71
Aframax (110.000 tpm)	34/38	33/37	38/42	36/40	34/37	40/42	58/59	58/59
Panamax (70.000 tpm)	30/31	28/31	33/36	32/36	31/32	35/38	47/48	49/50
Handy (47.000 tpm)	26/29	25/26	28/30	26/30	26/27	31/32	40/40	43/43
Graneleros								
Capesize (170.000 tpm)	33/39	33/35	36/41	36/39	35/37	47/48	63/64	59/59
Panamax (75.000 tpm)	20/24	20/22	22/24	20/23	20/22	26/27	36/36	35/36
Handymax (51.000 tpm)	18/21	18/20	20/21	18/20	18/19	23/24	30/30	30/31
Handy (30.000 tpm)	14/17	14/16	15/17	14/16	14/15	18/22	23/27	25/28
Portacontenedores								
1.000 TEU	18/19	17/18	17/18	15/18	15/16	18/19	22/22	23/ 23
3.500 TEU	40/42	36/37	39/42	36/41	33/34	40/43	52/52	52/53
6.500 TEU	-	-	67/73	70/72	60/64	71/73	91/92	91/94
Gaseros								
LNG (138.000 m³)	190	165	173	165	150	153/155	180/185	205/205
LPG (78.000 m-)	58	56	60	60	58	63	81/83	89/90
Ro-Ro								
1.200-1.300				19/19	18/19	22/22	33/33	33/33
2.300-2.700				31/31	31/31	33/33	46/46	48/50

Fuentes: Lloyd's - Fairplay, Clarkson, LSE

INGENIERIA NAVAL febrero 2006

Mill.US$

19

Typical Prices of New Ships (2009)

	Type of Ship	DW [t]	Price [US Mill]
Bulkcarriers	Handymax	56,000	30.5
	Panamax	76,000	35.5
	Capesize	180,000	56.0
Tankers	Products	47,000	36.0
	Aframax	110,000	51.0
	Suezmax	150,000	61.0
	VLCC	300,000	98.0

Source: Fearnleys 2009/week 46

Ship Demolition Value

Mean age, tonnage and scrap price per scrapping location (1978–2007)

Scrapping location	Age	GRT	% Total scrapped	Average scrap prices in $/LTD							
				2000	2001	2002	2003	2004	2005	2006	2007
Africa and Middle East	14.1	7312	0.34%	164	164	152	194	371	345	319	n/a
Bangladesh	26.7	31094	16.01%	163	185	166	194	343	389	353	443
China	25	29372	11.98%	137	151	140	183	260	258	247	253
Europe	20.7	5160	3.01%	156	168	135	194	268	338	319	371
India	25.9	16524	33.37%	152	167	147	198	290	371	348	434
North Am. and Pacific	25.5	8615	0.76%	148	259	152	194	268	338	319	n/a
Other Asia	15.9	7927	5.38%	131	150	128	195	261	298	226	245
Pakistan	24.9	26501	3.20%	155	159	141	170	237	263	300	355
South and Centr. America	21.9	11042	0.73%	n/a	168	181	194	268	338	319	400
Turkey	25.9	7034	4.72%	202	158	166	105	202	376	200	400
Unknown	15.3	11320	20.49%	163	166	161	202	241	313	310	362
Average	22	14718	100%	157	172	152	184	274	330	296	363

Note: % to total vessels scrapped in data set, for $/ltd, the year 2007 ends in October

Notes:

ltd = lightship displacement

Source: Knapp et al (2008), "Econometric Analysis of Ship Demolition Market", Marine Policy

Costs in Shipping

Classification of Costs

1. **Operating costs** – the expenses involved in the day-to-day running of the ship - essentially those costs such as crew, stores and maintenance that will be incurred whatever trade the ship is engaged in.
2. **Periodic maintenance costs** – which are incurred when the ship is dry-docked for major repairs, usually at the time of its special survey. In older ships this may involve considerable expenditure, so shipping companies often include a 'dry-docking provision' in their operating costs. Since this is a provision rather than a cash item it is better treated separately from operating costs.
3. **Voyage costs** - variable costs associated with a specific voyage and include such items as fuel, port charges and canal dues.
4. **Capital costs** - depend on the way the ship has been financed. They may take the form of dividends to equity, which are discretionary, or interest and capital payments on debt finance which are not.
5. **Cargo handling costs** – the expenses of loading, stowing and discharging cargo. They are particularly important in the liner trades.

Operating Costs

Operating Costs

Operating costs are the ongoing expenses connected with the daily running of the vessel, but excluding the Fuel Oil which is assumed to be included in the voyage costs.

Operational Costs = Crew +
Supplies and Lub. Oils +
Maintenance and Repair +
Insurance +
Administration

Crew Costs

Includes:

- Basic salaries and wages
- Social insurance
- Repatriation expenses
- Victuals
- Recruitment and training
- Other

Models of crew selection representatives of the current market:

Mod. A: Asian crew (officers, petty-officers and seamen)

Mod. B: North-European crew (European officers, asian petty-officers and seamen)

Mod. C: South-European crew (Portuguese officers, petty-officers and seamen, MAR registry)

Number of Crew Members

The crew complement can be estimated by the expression:

$$N_{CREW} = k1 + k2 \cdot CN / 1,000 + k3 \cdot P_{MCR}^{1/2}$$

with:

CN - *Cubic Number* (Lpp*B*D) P_{MCR} - Propulsive power [hp]

K1, K2 and *K3* - coefficients from the following table:

Ship Type	k1 Mod.A	k1 Mod.B	k1 Mod.C	k2	k3
Oil Tankers	10	9	7	0.05	0.020
Bulk Carriers	11	10	7	0.09	0.018
Container Carriers	12	11	9	0.07	0.018
General Cargo	12	11	10	0.06	0.018
Coastal	8	6	6	0.06	0.018

Crew Costs (1)

The crew costs can be approximated by the expression:

$$C_{CREW} = k1 \cdot N_{CREW}^{0.95}$$

where N is the crew number and k1 is obtained from the table as a function of the ship type and of the type of crew selected

Ship Type	Crew A	Crew B	Crew C
Oil Tankers	34,000	48,000	56,000
Bulk Carriers	30,000	40,000	45,000
Container Carriers	30,000	38,000	41,000
General Cargo	25,000	38,000	41,000
Coastal	25,000	38,000	41,000

Supplies and Lub. Oils

- Cost of supplies (excluding spare parts) and lubricating oils can be estimated by the expression:

$$C_{SUP} = k1.N + k2.(Lpp.B.T)^{0.25} + k3.P_{MCR}^{0.7} \quad [US\$/year]$$

The coefficients k1, k2 and k3 depend on the type of ship and type of propulsion plant, in accordance to the following table:

k1	3,500
k2 (tankers)	5,000
k2 (dry cargo)	4,000
k3 (Diesel engine, 2 stroke)	200
k3 (Diesel engine, 4 stroke)	250
k3 (steam turbine)	150

Maintenance and Repair

- Costs associated with routine maintenance, including spares

$$C_{M\&R} = k1.C_0 + k2.\ P^{0.66}_{MCR} \qquad [US\$/year]$$

C_0: cost of the ship
P_{MCR}: propulsive power [hp]
k1, k2: coefficients that depend on the type of propulsion plant, in accordance to the following table:

k1	0,0035
k2 (Diesel engine, 2 stroke)	105
k2 (Diesel engine, 4 stroke)	125
k2 (steam turbine)	75

Insurance Costs

- The total insurance cost including risks of navigation and war, can be estimated by the expression:

$$C_{INS} = k1.Vs + k2.GT \qquad [US\$/year]$$

The coefficients k1, and k2 depend on the ship type and size, in accordance to the following table:

	k1	k2
Tankers DW < 20,000	0.019	12.00
Tankers 20,000 < DW < 80,000	0.013	5.50
Tankers DW > 80,000	0.008	2.75
Dry Cargo DW < 20,000	0.010	11.50
Dry Cargo 20,000 < DW < 80,000	0.008	5.00
Dry Cargo DW > 80,000	0.006	2.50

Administration Costs

- The administration costs depend from the management structure of the ship Owner, the size of the fleet and even from the accounting criteria adopted
- In the absence of data specific to a given Owner, it is a good practice to assume the administrative costs as if the management is made through outsourcing the technical management to others

	C_{ADM} [US%/year]
Tankers	150,000
Dry Cargo	120,000
Coastal Ships	70,000

Docking Costs

- The average cost of the required statutory dockings can be estimated as a fraction of the ship initial cost C_0, and distributed annually

$$C_{DOCK} = k1.C_0 \qquad \text{[US\$/year]}$$

The coefficient k1 depends on the ship type, in accordance to the following table:

	k1
Tankers and Bulk-carriers	0,005
Cargo liners	0,006
Coastal Ships	0,004

Daily Costs

- The value of the daily operation costs is a common way of expressing the freight
- It can be computed by the expression:

$$C_{DAY} = \frac{C_{CREW} + C_{SUP} + C_{M\&R} + C_{INS} + C_{ADM} + C_{DOCK}}{365 - OH} \quad \text{[US\$/day]}$$

Voyage Costs

Voyage Costs

- Variable costs associated to a specific voyage

$$C_{VOY} = C_{FO} + C_{PD} + C_{TP} + CD$$

with:

C_{FO} – fuel costs for main and auxiliary machinery
C_{PD} – port and light dues
C_{TP} – tug and pilotage costs
CD – canal dues

Typical FO Consumptions (1)

Type of Propulsive Plant	Specific Consumption [kg/kW.h]
1. Diesel Engines	
Slow speed (2 stroke)	0.170
Medium-speed (2 stroke)	0.180
Medium-speed (4 stroke)	0.200
Fast speed (4 stroke)	0.220
2. Steam Plants (oil)	
Steam non-reheated, up to 2 pre-heaters	0.280
Steam non-reheated, with 5 pre-heaters	0.260
Steam reheated	0.240
3. Steam Plants (coal)	0.410

Typical FO Consumptions (2)

Type of Propulsive Plant	Specific Consumption [kg/kW.h]
4. Gas Turbines	
Non-regenerative Cycle	0.340
Regenerative Cycle	0.285
STAG Cycle	0.250
5. Electric Power Plants	
Diesel	0.250
Steam (normal)	0.310
Turbo-Generators	0.360

Average Fuel Oil Prices

Type of Fuel Oil		[US$/t]
Heavy Fuel Oil	(HFO 380 CST)	424.00
Heavy Fuel Oil	(HFO 180 CST)	444.00
Marine Diesel Oil	(MDO)	546.00
Marine Gas Oil	(MGO)	584.00

Source: *Prices in Rotterdam (www.bunkerindex.com, February 2010)*

Capital Costs

Capital costs may appear in the cashflow in 3 ways:

- the initial purchase
- cash payments to banks or equity investors who put up the capital to purchase the vessel
- cash received from the sale of the vessel

Cargo Handling Costs

Cargo Handling Costs

$$C_{CH} = C_{LOAD} + C_{DISC} + C_{CLM}$$

with:

- C_{LOAD} – cargo loading charges
- C_{DISC} – cargo discharge costs
- C_{CLM} - allowance for cargo claims

Information about charge/discharge rates can be generally obtained from the Internet sites of the ports.

Bibliography (1)

- ✓ d'Almeida, Jorge (2009), "Arquitectura Naval – O Dimensionamento do Navios", Prime Books.
- ✓ Benford, Harry (1965), "Fundamentals of Ship Design Economics", Lecture Notes, University of Michigan. (CD-ROM#42)
- Benford, Harry (1967), "Practical Application of Economics to Merchant Ship Design", Marine Technology, January 1967.
- ✓ Benford, Harry (1968), " General Cargo Ship Economics and Design", University of Michigan. (CD-ROM#51)
- Benford, H. (1970), "Measures of Merit for Ship Design", Marine Technology, October 1970.
- Branch, Alan Edward (2007), "Elements of Shipping", 8th Edition, Routledge.
- Buxton, I. (1987), "Engineering Economics and Ship Design", 3rd Edition, British Maritime Technology, Wellsend.

Bibliography (2)

- ✓ Chou, C-C and Chang, P-L. (2001), "Modeling and Analysis of Labor Cost Estimation for Shipbuilding – The Case of China Shipbuilding Corporation", Journal of Ship Production, Vol. 17, No. 2, SNAME (CD-ROM#51)
- Evans, J.J. & Marlow, P.B. (1990), "Quantitative Methods in Maritime Economics", 2Ed, Fairplay Publications, London.
- Fisher, K.W. (1997), "Economic Optimisation Procedures in Preliminary Ship Design", Naval Architect, April 1997, pp. 293-317.
- ✓ Gentle, N.F. and Perkins, R.J. (1982), "An Estimate of Operating Costs for Bulk, Ro-Ro and Container Ships", Bureau of Transport Economics, Canberra.
- ✓ Hunt, Everett C. and Butman, Boris S. (1995), "Marine Engineering Economics and Cost Analysis", Cornell Maritime Press.
- ✓ Liker, J. K. and Lamb, T. (2002), "What is Lean Ship Construction and Repair?", Journal of Ship Production, Vol.18, No.3, SNAME (CD-ROM#51)

Bibliography (3)

- Magirou, Evangelos F.; Psaraftis, Harilaos N. and Christodoulakis, Nikolaos M. (1992), "Quantitative Methods In Shipping: A Survey of Current Use and Future Trends", Report No. E115, Center for Economic Research, Athens University of Economics and Business. (CD-ROM#70)
- Mistree, F.; Smith, W. F. ; Bras, B. A. ; Allen, J. K. and Muster, D. (1990), "Decision-Based Design: A Contemporary Paradigm for Ship Design", SNAME Transactions, 1990. (CD-ROM#51)
- Mulligan, Robert F. (2008), "A Simple Model for Estimating Newbuilding Costs", Maritime Economics & Logistics 10, pp.310-321 (September 2008)
- Rashwan, Ahmad M. (2005), "Estimation of Ship Production Man-Hours", Alexandria Engineering Journal, Vol.44, No.4, pp.527-533. (CD-ROM#69)
- Ross, J. M., (2004), "A Practical Approach for Ship Construction Cost Estimating", COMPIT'04, Siguënza, May 2004.

Bibliography (4)

- Stopford, Martin. (2009), "Maritime Economics", 3rd Edition, Routledge.
- Veenstra, Albert W. and Ludema, Marcel W. (2006), "The Relationship Between Design And Economic Performance Of Ships", Maritime Policy & Management, Vol.33, No.2 May 2006, pp.159-171. (CD-ROM#70)
- Watson, D.G.M. and Gilfillan, A.W. (1977), "Some Ship Design Methods", Naval Architect, July 1977, pp. 279-324.
- Watson, D.G.M. (1998), "Practical Ship Design", Vol.I, Elsevier.

Links

- www.bunkerworld.com (Fuel Oil Prices)
- www.bunkerindex.com (Fuel Oil Prices)
- www.fairplay.co.uk (Fairplay – registered users)
- www.fearnrsearch.com (Fearnleys)
- www.lloydslist.com
- www.lqm.com (Fuel Oil Prices)
- www.steelpricenews.com (Steel Prices)
- www.clarksons.net (Shipping Intelligence Network)

Annex A. Convenience Flags

Convenience Flags

- A ship with a convenience flag is that with a registry in a country other than the Owner's
- Also designated by open registry, for being open to ships of foreign ship owners
- The main motivations are:
  - Lower registry taxes
  - Lower or no taxes
  - Freedom to employ cheaper labor

Convenience Flags

- The most well known convenience flags are:
  - Panama (www.segumar.com)
  - Liberia (www.liscr.com)
  - Cyprus (www.shipping.gov.cy)
  - Bahamas (www.bahamasmaritime.com)
  - Gibraltar (www.gibmaritime.com)
  - Malta (www.mma.gov.mt)
  - Madeira (www.madeira-management.com /aboutmadeira /shipping.html)

Panama Registry

www.pancanal.com

Panama Registry – Advantages (1)

- **Ownership**
  - Any person or company, irrespective of nationality and place of corporation, is eligible to register ships under the Panamanian flag.
  - There are no income or withholdings taxes payable by non-resident shipping corporations.
- **Minimum Requirements**
  - No minimum tonnage is required for registration.
  - Vessels older than 20 years must pass a special inspection by an authorized Panamanian inspector in order to obtain permanent Registration.

Panama Registry – Advantages (2)

- **Technical Certificates**
  - Ship owners who wish to transfer their vessels to the Panamanian registry are not required to have the vessels re-surveyed, provided the vessels possess valid safety certificates.
  - Provisions are made to accept foreign tonnage certificates at the moment of registration; this obviates the necessity to have the ship dry docked prior to the registration and consequently saves the ship owners considerable expenses.

Panama Registry – Advantages (3)

- **Dual Registry**
  - A foreign vessel, bare boat chartered for a period of two years can be registered in Panama for the same period without losing its previous registration, and the opposite is also permissible, that is, from Panama to the other countries.
  - The "Dual Registry System" represents a great advantage for the Shipping community, especially for the ship owners who, for some reason or other, have no vessels under the open registry. The dual registry may be considered an answer to the problems confronted by the European Ship owners faced with the high cost of operation represented by having vessels flying the flags of most European countries versus those under open registries.
- **Discounts for Fleet Registrations**
  - Discounts for fleet registration are contemplated by Law No. 36 of 1995.

Registo Internacional de Navios da Madeira (MAR)

Registo Internacional de Navios da Madeira (MAR)

- O MAR foi criado em 1989, no âmbito do Centro Internacional de Negócios da Madeira e dotado de um quadro de benefícios fiscais e operacionais
- No MAR estão registados navios de carga geral, cimenteiros, graneleiros, navios de passageiros, petroleiros e químicos, rebocadores, navios de transporte de gás liquefeito, dragas, plataformas petrolíferas e iates.
- No final de 2005, estavam registados no MAR 143 navios de comércio que, no seu conjunto, representavam uma tonelagem bruta de 1.317.814.
- Actualmente, encontram-se registados no MAR 150 navios, dos quais 18 são navios de passageiros, 12 navios tanque, 24 navios de carga/contentores, 32 navios mistos de passageiros e carga, 8 navios graneleiros e 56 navios diversos.

Registo Internacional de Navios da Madeira (MAR)

- Criado pelo DL nº 96/89, de 28 de Março
- Alterado pelos Decretos-Leis
  - No. 393/93, de 23 de Novembro, 5/97, de 9 de Janeiro [estabelece a norma interpretativa do nº 3 do artº 14º do Decreto-Lei nº 96/89], 31/97, de 28 de Janeiro
  - No. 331/99, de 20 de Agosto [declaração de rectificação publicada no DR nº 229-I-A, de 30 de Setembro/99]
- Diplomas conexos:
  - DL nº 250/97, de 23 de Setembro (Zona Franca da Madeira - Extinção do licenciamento - publicitação)
  - Decreto Regulamentar Regional 5/93/M, de 5 de Fevereiro
- Jurisprudência:
  - Parecer da Procuradoria Geral da República nº 4/97 [publicado no DR, II, 20.11.1997] - Registo Internacional de Navios da Madeira - Zona Franca - Off-shore