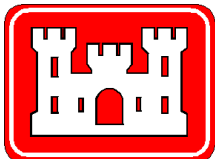




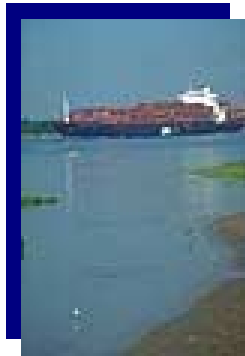
Final Report

SAVANNAH HARBOR EXPANSION PROJECT DEEP-DRAFT CHANNEL IMPROVEMENTS ECONOMIC ANALYSIS: VESSEL FLEET FORECASTS

Part 1: Existing World Fleet
Part 2: Prospective World Fleet



**US Army Corps of Engineers
Savannah District
Savannah, Georgia**



Final

**SAVANNAH HARBOR EXPANSION PROJECT
DEEP-DRAFT CHANNEL IMPROVEMENTS
ECONOMIC ANALYSIS: VESSEL FLEET FORECASTS**

**Part 1: Existing World Fleet
Part 2: Prospective World Fleet**

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SAVANNAH DISTRICT
SAVANNAH, GEORGIA**

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Part 2: PROSPECTIVE WORLD FLEET

None

EXECUTIVE SUMMARY

Part 1: EXISTING WORLD FLEET

This report provides a statistically based description of the existing world fleet of deep-draft self-propelled marine cargo vessels registered and in service as of January 2004 according to *The Clarkson Register*. The world vessel fleets are described in terms of the number and size of vessels by year of new building. For each major vessel category (container, bulk, tanker, chemical, multi-purpose, ro-ro, and gas ships), the average annual size characteristics are computed for length, beam, design draft, and deadweight (dwt) to enable the reader to discern vessel trends. All size characteristics are in metric units (except Table 19).

Emphasis is placed on container vessels in general because of the existing use of Savannah Harbor and Post-Panamax container vessels in particular because of the prospective use of Savannah Harbor. Trends in container vessel new buildings since 1988 indicate that the Post-Panamax category comprises nearly nine percent of the world fleet in terms of number of vessels but one-quarter of the capacity measured by Twenty-Foot Equivalent Units (TEUs). Nearly three-quarters of the existing Post-Panamax fleet of 282 vessels have design drafts 45 feet or greater.

With the exception of the rapid development of Post-Panamax container vessels, most of the world fleet remains stable with regard to new buildings of significantly larger vessels. However, within particular fleets some substitution of larger vessels for smaller vessels is occurring, particularly in the dry bulk and tank sectors. Also, the data indicate that there has been an increase in the number of new buildings in particular fleets such as LNG vessels, with implications for Savannah Harbor.

The new building statistics and trends contained in this report enable the reader to understand the average size characteristics and age distribution of the fleet. These data are precursors to developing a world vessel fleet forecast of new buildings that will contribute to a Savannah Harbor vessel fleet forecast.

Part 1: EXISTING WORLD FLEET

I. INTRODUCTION

According to *The Clarkson Register* (Clarkson's), the present world fleet consists of vessels categorized as Containerships, Tankers, Bulk Carriers, Gas Carriers, Chemical Carriers, Multi-Purpose, Ro-Ro, Reefer, and Offshore Service.¹ The categories are shown in Table 1. Clarkson's universe consists of 25,683 records. Of these, all but four can be identified separately by unique vessel names/numbers. Excluding these four provides 25,679 records for ships in the world fleet. Of these, 3,991 records were excluded from this analysis because they were offshore service vessels (3,813) or had missing measurements (178 vessels). The vessels with missing measurements include 14 containerships, 24 tankers, 71 bulk carriers, 13 gas carriers, 35 chemical carriers, 11 multi-purpose, five ro-ros and four reefers.

The total number of Clarkson's records used for this analysis was 21,688, consisting of 3,188 containerships, 3,393 tankers, 5,659 bulk carriers, 1,133 gas carriers, 2,133 chemical carriers, 3,369 multi-purpose, 1,533 ro-ros, and 1,280 reefers. Table 1 shows the breakdown of containerships, tankers and bulk carriers into subcategories. Containerships were broken down into six size categories: (1) Post-Panamax; (2) Panamax; (3) Sub-Panamax; (4) Handysize; (5) Feedermax; and (6) Feeder. Tankers, other than chemical tankers, were broken down into six size categories: (1) Very Large Crude Carrier (VLCC); (2) Suezmax; (3) Aframax; (4) Panamax; (5) Handysize; and (6) Small. Bulk carriers, excluding combination oil/bulk carriers, were broken down into four size categories: (1) Capesize; (2) Panamax; (3) Handymax; and (4) Handysize.

Trend analyses of the different vessel categories and subcategories were performed based on the year of new building. All measurements drawn from Clarkson's are in metric units (meters and tonnes). The results of this analysis are discussed in the following section.

¹ All references to *The Clarkson Register* (Clarkson's) pertain to the January 2004 issue.

**Table 1. Clarkson's File Summary
(January 2004)**

Category/Subcategory	Ships in the World Fleet		
	Total Quantity	Excluded	Included
Containerships			
Post-Panamax	283	1	282
Panamax	472	2	470
Sub-Panamax	498	4	494
Handysize	915	4	911
Feedermax	587	1	586
Feeder	447	2	445
Total Containerships	3,202	14	3,188
Tankers			
VLCC	439	5	434
Suezmax	315	1	314
Aframax	636	4	632
Panamax	258	2	256
Handysize	1,082	5	1,077
Small	687	7	680
Total Tankers	3,417	24	3,393
Bulk Carriers			
Capesize	623	5	618
Panamax	1,079	24	1,055
Handymax	1,228	22	1,206
Handysize	2,800	20	2,780
Total Bulk Carriers	5,730	71	5,659
Gas Carriers	1,147	14	1,133
Chemical Carriers	2,168	35	2,133
Multi-Purpose	3,380	11	3,369
Ro-Ro	1,538	5	1,533
Reefer	1,284	4	1,280
Offshore Service	3,813	3,813	0
Total Ships	25,679	3,991	21,688
Total Clarkson's Universe	25,683		

Notes:

- 1) Clarkson's Tanker count of 5,586 tankers includes 2,168 chemical carriers.
- 2) Clarkson's Bulk Carrier count of 5,849 ships includes 108 Bulk/Oil carriers and 8 Ore/Oil Carriers that are also included as Tankers.
- 3) Clarkson's Ro-Ro count of 1,635 ships includes 97 also included as multi-purpose ships.

Source: G.E.C., Inc., based on *The Clarkson Register* (January 2004).

II. EXISTING FLEET TRENDS

Each vessel type was sorted by subcategory and by year of new building to compile the number of vessels in service by year of construction. The size characteristics for length overall (LOA), beam, and draft (draught) were compiled for all vessels for each year to compute an annual average. In the same manner, the sum of capacity by year of new building was compiled and used to develop average annual capacity as well as vessel capacity by age. Capacity is expressed as deadweight tonnage (DWT) and Twenty-Foot Equivalent Units (TEU), if applicable.

CONTAINERSHIPS

Size Characteristics and Trends

Tables 2 through 7 present the size trend characteristics for the world container fleet stratified into six subcategories. The tables show the total number of vessels stratified by year of new building. Some outlier years containing very old vessels were omitted, producing small differences between the total numbers of container vessels in tables 2 through 7 compared to Table 1. An example of the smallness of these differences is the 470 Panamax container ships listed in Table 1 compared to 467 listed in Table 3.²

Table 2 shows the year of new building of the Post-Panamax containerships, beginning in 1988. The number of Post-Panamax container vessels built between 1988 and 2004 is 282.³ The Post-Panamax container fleet is relatively young, with nearly 65 percent of the vessels by age, DWT, and TEU capacity constructed after 1999. The average capacity for the entire fleet (282 vessels) is 74,314 DWT and 5,811 TEU. However, vessels constructed in the last two years (2002 and 2003) have exhibited larger DWT and TEU capacities.

The apparent relatively large increase in Post-Panamax container vessel orders in 2001, which was nearly double that of 2000 and about 1.5 times that of 2002 orders, reflects the interest of container carriers (particularly Pacific operators and some Far East Europe routes) in exploiting the strong growth of marine cargos occurring at the end of the last decade with the economies of scale of these vessels (if efficiently utilized). Vessels delivered in 2001 reflect orders placed as much as three years ago. Some of these 2001 deliveries may have been bunched up by lines that sought to defer year 2000 deliveries in the face of the recession and over-capacity that occurred in container shipping about 2000.

Post-Panamax container vessel size characteristics have been relatively stable for the past decade (since 1994). Average annual LOA for new buildings from 1994 onward has been nearly 300 meters (Figure 1). Average beam has been stable at nearly 40 meters (Figure 2). Average draft (draught) has been stable at nearly 14 meters (Figure 3). Average dwt has been nearly 74,000 (Figure 4). Average TEU has been nearly 5,800 (Figure 5).

² The differences between the numbers of container vessels in Table 1 and tables 2 through 7 are as follows: Post-Panamax – no difference; Panamax – 470 versus 467; Sub-Panamax – no difference; Handysize – 911 versus 907; Feedermax – 586 versus 584; and Feeder – 445 versus 444.

³ None of the data presented in this section reflects vessels on order. Only existing vessels already constructed and in service are reflected in the analysis of the existing fleet.

Table 2. Container Post-Panamax Vessel Size Fleet Characteristics
(All vessel size characteristics expressed in metric units)

Build Year	Age	Number of Vessels	Average LOA	Average Beam	Average Draught	Average DWT	Total DWT	Average TEU Capacity	Total TEU Capacity	Percent by Age	Percent by DWT	Percent by TEU
1988	16	5	275.2	39.4	12.6	54,032	270,159	4,340	21,700	1.8%	1.3%	1.3%
1989	15									0.0%	0.0%	0.0%
1990	14									0.0%	0.0%	0.0%
1991	13	1	275.7	37.1	14.0	62,277	62,277	4,427	4,427	0.4%	0.3%	0.3%
1992	12	6	275.2	37.2	13.6	61,256	367,536	4,530	27,178	2.1%	1.8%	1.7%
1993	11									0.0%	0.0%	0.0%
1994	10	3	284.7	37.3	13.2	59,851	179,553	4,445	13,335	1.1%	0.9%	0.8%
1995	9	17	286.1	38.5	13.5	64,170	1,090,885	4,757	80,873	6.0%	5.2%	4.9%
1996	8	21	285.7	40.6	13.7	70,548	1,481,516	5,535	116,239	7.4%	7.1%	7.1%
1997	7	20	290.3	40.5	13.8	73,367	1,467,341	5,565	111,304	7.1%	7.0%	6.8%
1998	6	17	303.5	41.3	13.9	83,823	1,424,998	6,232	105,948	6.0%	6.8%	6.5%
1999	5	14	300.7	40.6	13.6	76,647	1,073,060	6,113	85,576	5.0%	5.1%	5.2%
2000	4	34	289.7	40.8	13.8	73,615	2,502,903	5,855	199,056	12.1%	11.9%	12.1%
2001	3	63	287.0	40.1	13.8	73,437	4,626,552	5,798	365,254	22.3%	22.1%	22.3%
2002	2	45	293.8	40.3	14.1	77,599	3,491,940	6,103	274,649	16.0%	16.7%	16.8%
2003	1	36	300.5	40.6	13.9	81,051	2,917,821	6,478	233,215	12.8%	13.9%	14.2%
Total		282					20,956,541		1,638,754	100.0%	100.0%	100.0%
Average							74,314		5,811			

Source: G.E.C., Inc., based on *The Clarkson Register* (January 2004).

Table 3. Container Panamax Vessel Size Fleet Characteristics
(All vessel size characteristics expressed in metric units)

Build Year	Age	Number of Vessels	Average LOA	Average Beam	Average Draught	Average DWT	Total DWT	Average TEU Capacity	Total TEU Capacity	Percent by Age	Percent by DWT	Percent by TEU
1977	27	3	258.6	32.3	13.1	48,446	145,337	3,077	9,232	0.6%	0.6%	0.5%
1978	26	4	258.5	32.3	13.1	49,935	199,740	3,126	12,505	0.9%	0.8%	0.7%
1979	25	1	258.5	32.3	13.2	50,027	50,027	3,101	3,101	0.2%	0.2%	0.2%
1980	24									0.0%	0.0%	0.0%
1981	23	2	278.7	32.3	13.0	52,540	105,080	3,635	7,270	0.4%	0.4%	0.4%
1982	22	3	257.7	32.3	12.1	42,886	128,657	3,357	10,072	0.6%	0.5%	0.6%
1983	21	3	264.8	32.3	11.8	38,320	114,960	3,023	9,070	0.6%	0.5%	0.5%
1984	20	8	273.3	32.3	12.6	52,935	423,480	3,912	31,294	1.7%	1.7%	1.8%
1985	19	10	275.0	32.3	12.3	53,895	538,952	4,094	40,940	2.1%	2.2%	2.3%
1986	18	20	251.3	32.2	11.9	44,635	892,700	3,138	62,769	4.3%	3.7%	3.5%
1987	17	15	259.8	32.2	11.9	45,224	678,362	3,210	48,144	3.2%	2.8%	2.7%
1988	16	19	270.6	32.3	12.2	49,416	938,907	3,414	64,871	4.1%	3.9%	3.6%
1989	15	12	281.6	32.3	12.7	53,802	645,627	3,792	45,498	2.6%	2.7%	2.6%
1990	14	12	283.2	32.3	13.0	57,657	691,889	3,774	45,284	2.6%	2.9%	2.5%
1991	13	18	266.2	32.2	12.6	53,476	962,562	3,628	65,307	3.9%	4.0%	3.7%
1992	12	20	264.8	32.2	12.4	50,630	1,012,604	3,504	70,071	4.3%	4.2%	3.9%
1993	11	28	271.3	32.2	12.5	53,137	1,487,844	3,736	104,595	6.0%	6.1%	5.9%
1994	10	33	265.1	32.2	12.2	50,501	1,666,543	3,717	122,664	7.1%	6.9%	6.9%
1995	9	27	271.8	32.2	12.4	52,983	1,430,542	3,936	106,280	5.8%	5.9%	6.0%
1996	8	25	266.9	32.2	12.3	52,654	1,316,340	3,785	94,625	5.4%	5.4%	5.3%
1997	7	36	270.4	32.2	12.4	52,760	1,899,377	3,926	141,332	7.7%	7.8%	7.9%
1998	6	39	276.0	32.2	12.5	53,716	2,094,927	3,971	154,882	8.4%	8.6%	8.7%
1999	5	9	275.0	32.2	12.9	59,240	533,160	4,196	37,761	1.9%	2.2%	2.1%
2000	4	24	274.9	32.1	12.9	57,528	1,380,664	4,278	102,665	5.1%	5.7%	5.8%
2001	3	19	253.1	32.2	11.8	48,456	920,655	3,808	72,347	4.1%	3.8%	4.1%
2002	2	43	274.0	32.2	12.7	52,919	2,275,507	4,188	180,100	9.2%	9.4%	10.1%
2003	1	34	264.1	32.2	12.2	50,355	1,712,065	4,018	136,608	7.3%	7.1%	7.7%
Total		467					24,246,508		1,779,287	100.0%	100.0%	100.0%
Average							51,920		3,810			

Source: G.E.C., Inc., based on *The Clarkson Register* (January 2004).

Table 4. Container Sub-Panamax Vessel Size Fleet Characteristics
(All vessel size characteristics expressed in metric units)

Build Year	Age	Number of Vessels	Average LOA	Average Beam	Average Draught	Average DWT	Total DWT	Average TEU Capacity	Total TEU Capacity	Percent by Age	Percent by DWT	Percent by TEU
1970	34	1	247.6	27.5	11.1	31,303	31,303	2,361	2,361	0.2%	0.2%	0.2%
1971	33	2	240.1	30.5	10.7	38,001	76,002	2,128	4,256	0.4%	0.4%	0.3%
1972	32	2	250.6	31.4	12.3	37,238	74,476	2,187	4,374	0.4%	0.4%	0.4%
1973	31	2	256.2	29.8	11.6	33,620	67,240	2,215	4,429	0.4%	0.4%	0.4%
1974	30									0.0%	0.0%	0.0%
1975	29	1	239.3	30.6	12.2	37,129	37,129	2,328	2,328	0.2%	0.2%	0.2%
1976	28	6	246.5	30.5	11.9	38,317	229,899	2,402	14,409	1.2%	1.3%	1.2%
1977	27	7	245.0	31.8	11.1	39,967	279,769	2,555	17,887	1.4%	1.6%	1.5%
1978	26									0.0%	0.0%	0.0%
1979	25	3	243.1	30.6	11.4	36,515	109,546	2,404	7,213	0.6%	0.6%	0.6%
1980	24	26	245.7	31.2	11.0	34,565	898,692	2,542	66,100	5.3%	5.1%	5.4%
1981	23	3	226.8	32.1	11.4	34,191	102,573	2,574	7,722	0.6%	0.6%	0.6%
1982	22	6	222.0	32.3	11.5	36,090	216,537	2,286	13,715	1.2%	1.2%	1.1%
1983	21	16	214.9	32.2	11.5	36,333	581,324	2,293	36,683	3.2%	3.3%	3.0%
1984	20	22	222.1	32.1	11.6	39,722	873,885	2,507	55,149	4.5%	4.9%	4.5%
1985	19	14	225.5	32.2	11.8	40,325	564,553	2,404	33,658	2.8%	3.2%	2.7%
1986	18	15	240.5	32.3	11.9	40,870	613,051	2,703	40,549	3.0%	3.5%	3.3%
1987	17	8	225.9	31.8	11.4	37,051	296,404	2,485	19,883	1.6%	1.7%	1.6%
1988	16	4	239.3	32.2	11.9	42,275	169,099	2,753	11,011	0.8%	1.0%	0.9%
1989	15	11	225.7	32.2	11.9	40,588	446,467	2,598	28,573	2.2%	2.5%	2.3%
1990	14	15	223.2	32.1	11.5	40,623	609,345	2,528	37,916	3.0%	3.5%	3.1%
1991	13	14	234.8	32.2	11.7	41,448	580,269	2,657	37,203	2.8%	3.3%	3.0%
1992	12	7	214.6	32.2	12.0	40,179	281,251	2,538	17,769	1.4%	1.6%	1.5%
1993	11	6	218.5	32.2	12.0	40,588	243,525	2,646	15,873	1.2%	1.4%	1.3%
1994	10	11	199.5	31.4	11.9	36,088	396,966	2,318	25,493	2.2%	2.2%	2.1%
1995	9	15	207.8	31.4	11.6	36,694	550,406	2,426	36,384	3.0%	3.1%	3.0%
1996	8	26	197.3	31.5	11.9	35,366	919,505	2,530	65,785	5.3%	5.2%	5.4%
1997	7	45	196.5	30.4	11.2	32,448	1,460,143	2,431	109,400	9.1%	8.3%	8.9%
1998	6	45	200.6	30.5	11.4	33,022	1,486,006	2,402	108,073	9.1%	8.4%	8.8%
1999	5	18	202.3	30.6	11.2	32,758	589,643	2,375	42,749	3.6%	3.3%	3.5%
2000	4	22	203.0	30.3	11.1	33,219	730,810	2,432	53,498	4.5%	4.1%	4.4%
2001	3	45	204.9	30.2	11.3	33,940	1,527,321	2,499	112,470	9.1%	8.7%	9.2%
2002	2	42	207.2	30.5	11.2	34,275	1,439,537	2,499	104,947	8.5%	8.2%	8.6%
2003	1	34	212.1	30.8	11.5	34,464	1,171,786	2,557	86,935	6.9%	6.6%	7.1%
Total		494					17,654,462		1,224,795	100.0%	100.0%	100.0%
Average							35,738		2,479			

Source: G.E.C., Inc., based on *The Clarkson Register* (January 2004).

Table 5. Container Handysize Vessel Size Fleet Characteristics
(All vessel size characteristics expressed in metric units)

Build Year	Age	Number of Vessels	Average LOA	Average Beam	Average Draught	Average DWT	Total DWT	Average TEU Capacity	Total TEU Capacity	Percent by Age	Percent by DWT	Percent by TEU
1968	36	7	200.5	27.9	10.3	22,945	160,613	1,261	8,825	0.8%	0.8%	0.7%
1969	35	2	213.0	28.8	9.6	22,470	44,940	1,271	2,541	0.2%	0.2%	0.2%
1970	34	2	181.4	27.4	10.6	21,307	42,614	1,060	2,120	0.2%	0.2%	0.2%
1971	33	1	261.0	32.3	12.0	35,737	35,737	1,838	1,838	0.1%	0.2%	0.1%
1972	32	2	229.7	28.6	10.7	28,347	56,694	1,521	3,042	0.2%	0.3%	0.2%
1973	31	3	209.0	28.0	10.7	23,200	69,601	1,519	4,556	0.3%	0.4%	0.4%
1974	30	3	212.7	27.6	10.0	22,474	67,422	1,388	4,163	0.3%	0.3%	0.3%
1975	29	0								0.0%	0.0%	0.0%
1976	28	4	205.9	28.6	10.2	26,232	104,927	1,498	5,993	0.4%	0.5%	0.5%
1977	27	6	203.8	29.5	10.6	23,952	143,713	1,473	8,835	0.7%	0.7%	0.7%
1978	26	16	197.6	27.8	10.4	24,421	390,741	1,411	22,575	1.8%	2.0%	1.8%
1979	25	23	192.4	27.5	10.0	23,052	530,185	1,306	30,037	2.5%	2.7%	2.3%
1980	24	16	203.3	30.0	10.6	26,886	430,181	1,555	24,876	1.8%	2.2%	1.9%
1981	23	9	196.9	29.7	10.6	25,723	231,509	1,469	13,217	1.0%	1.2%	1.0%
1982	22	22	188.0	27.6	10.7	25,881	569,379	1,385	30,476	2.4%	2.9%	2.4%
1983	21	24	184.5	28.2	10.7	26,265	630,355	1,455	34,913	2.6%	3.3%	2.7%
1984	20	19	176.5	28.5	10.5	25,455	483,651	1,421	27,006	2.1%	2.5%	2.1%
1985	19	28	173.6	26.2	9.9	23,550	659,386	1,392	38,963	3.1%	3.4%	3.0%
1986	18	18	174.5	26.8	10.5	25,087	451,572	1,510	27,187	2.0%	2.3%	2.1%
1987	17	13	184.4	26.3	10.3	22,948	298,324	1,512	19,657	1.4%	1.5%	1.5%
1988	16	9	172.7	26.0	9.8	21,303	191,725	1,409	12,685	1.0%	1.0%	1.0%
1989	15	13	176.5	26.9	10.1	23,928	311,059	1,522	19,787	1.4%	1.6%	1.5%
1990	14	32	168.5	26.8	9.6	21,636	692,345	1,343	42,991	3.5%	3.6%	3.4%
1991	13	24	173.0	27.0	9.8	22,557	541,363	1,385	33,242	2.6%	2.8%	2.6%
1992	12	30	164.1	26.0	9.6	19,920	597,588	1,262	37,852	3.3%	3.1%	3.0%
1993	11	51	166.4	25.5	9.4	19,523	995,680	1,385	70,632	5.6%	5.1%	5.5%
1994	10	58	170.5	26.2	9.8	21,773	1,262,815	1,470	85,252	6.4%	6.5%	6.6%
1995	9	51	168.3	25.6	9.4	19,389	988,846	1,411	71,939	5.6%	5.1%	5.6%
1996	8	66	165.3	25.2	9.5	18,893	1,246,970	1,341	88,501	7.3%	6.4%	6.9%
1997	7	78	171.5	26.2	9.3	20,156	1,572,144	1,442	112,472	8.6%	8.1%	8.8%
1998	6	78	172.0	26.2	9.5	19,775	1,542,436	1,402	109,349	8.6%	8.0%	8.5%
1999	5	47	177.9	26.9	9.6	21,352	1,003,535	1,486	69,864	5.2%	5.2%	5.4%
2000	4	45	179.8	26.9	9.6	21,544	969,462	1,538	69,196	5.0%	5.0%	5.4%
2001	3	43	170.5	26.1	9.3	19,755	849,465	1,388	59,686	4.7%	4.4%	4.7%
2002	2	38	166.6	25.7	9.4	19,116	726,405	1,398	53,114	4.2%	3.7%	4.1%
2003	1	26	163.0	25.2	9.3	18,827	489,496	1,367	35,535	2.9%	2.5%	2.8%
Total		907					19,382,878		1,282,917	100.0%	100.0%	100.0%
Average							21,370		1,414			

Source: G.E.C., Inc., based on *The Clarkson Register* (January 2004).

Table 6. Container Feedermax Vessel Size Fleet Characteristics
(All vessel size characteristics expressed in metric units)

Build Year	Age	Number of Vessels	Average LOA	Average Beam	Average Draught	Average DWT	Total DWT	Average TEU Capacity	Total TEU Capacity	Percent by Age	Percent by DWT	Percent by TEU	
1970	34	3	191.8	27.5	10.5	Ta	64,362	868	2,604	0.5%	1.1%	0.6%	
1971	33	6	175.4	24.2	9.7		16,653	99,917	810	4,862	1.0%	1.7%	1.2%
1972	32	3	170.8	23.5	8.9		18,287	54,861	897	2,692	0.5%	0.9%	0.6%
1973	31	3	145.9	19.4	8.6		12,087	36,261	536	1,608	0.5%	0.6%	0.4%
1974	30	1	170.8	22.9	9.4		21,834	21,834	978	978	0.2%	0.4%	0.2%
1975	29	2	153.1	22.2	9.0		16,541	33,081	680	1,360	0.3%	0.5%	0.3%
1976	28	5	154.8	22.9	8.9		15,035	75,173	781	3,904	0.9%	1.2%	0.9%
1977	27	4	163.1	23.9	9.3		14,872	59,486	733	2,931	0.7%	1.0%	0.7%
1978	26	13	153.0	23.0	8.9		14,449	187,840	816	10,606	2.2%	3.1%	2.6%
1979	25	14	160.0	23.9	9.0		16,769	234,763	787	11,014	2.4%	3.9%	2.7%
1980	24	9	130.3	20.9	7.5		9,812	88,310	586	5,278	1.5%	1.5%	1.3%
1981	23	9	126.8	20.7	7.6		9,512	85,608	582	5,239	1.5%	1.4%	1.3%
1982	22	16	137.6	21.0	7.9		11,524	184,377	647	10,357	2.7%	3.1%	2.5%
1983	21	22	142.6	21.7	8.0		11,645	256,197	665	14,640	3.8%	4.3%	3.5%
1984	20	19	140.1	21.7	8.1		11,761	223,458	707	13,429	3.3%	3.7%	3.2%
1985	19	16	141.5	21.9	8.2		12,149	194,390	707	11,307	2.7%	3.2%	2.7%
1986	18	9	144.5	22.3	8.4		12,639	113,750	790	7,110	1.5%	1.9%	1.7%
1987	17	5	149.3	22.3	8.3		13,041	65,205	758	3,788	0.9%	1.1%	0.9%
1988	16	7	151.5	22.8	8.4		12,410	86,872	777	5,437	1.2%	1.4%	1.3%
1989	15	9	145.4	22.4	8.1		12,214	109,925	716	6,446	1.5%	1.8%	1.6%
1990	14	8	142.6	22.3	7.7		10,610	84,881	767	6,133	1.4%	1.4%	1.5%
1991	13	9	147.8	23.4	8.1		11,443	102,988	806	7,257	1.5%	1.7%	1.8%
1992	12	18	136.2	21.6	7.7		10,125	182,243	772	13,902	3.1%	3.0%	3.4%
1993	11	11	119.7	19.5	7.4		7,940	87,341	624	6,865	1.9%	1.5%	1.7%
1994	10	27	129.9	20.8	7.4		9,453	255,236	650	17,551	4.6%	4.2%	4.2%
1995	9	39	123.2	20.1	7.3		8,690	338,898	637	24,832	6.7%	5.6%	6.0%
1996	8	42	127.8	20.6	7.5		9,517	399,702	732	30,731	7.2%	6.6%	7.4%
1997	7	54	128.6	20.8	7.5		9,594	518,093	718	38,768	9.2%	8.6%	9.4%
1998	6	61	125.5	20.2	7.4		8,795	536,493	681	41,522	10.4%	8.9%	10.0%
1999	5	30	125.7	20.3	7.5		8,428	252,838	697	20,908	5.1%	4.2%	5.0%
2000	4	27	124.5	19.9	7.3		8,416	227,222	688	18,584	4.6%	3.8%	4.5%
2001	3	15	134.2	21.8	8.0		10,247	153,704	780	11,693	2.6%	2.6%	2.8%
2002	2	33	133.2	20.8	7.6		9,312	307,300	756	24,945	5.7%	5.1%	6.0%
2003	1	35	128.4	20.4	7.3		8,540	298,886	712	24,907	6.0%	5.0%	6.0%
Total		584						6,021,495		414,188	100.0%	100.0%	100.0%
Average								10,311		709			

Source: G.E.C., Inc., based on *The Clarkson Register* (January 2004).

Table 7. Container Feeder Vessel Size Fleet Characteristics
(All vessel size characteristics expressed in metric units)

Build Year	Age	Number of Vessels	Average LOA	Average Beam	Average Draught	Average DWT	Total DWT	Average TEU Capacity	Total TEU Capacity	Percent by Age	Percent by DWT	Percent by TEU
1968	36	1	89.7	12.8	5.7	3,405	3,405	111	111	0.2%	0.1%	0.1%
1969	35	5	91.0	14.0	4.8	2,939	14,695	146	728	1.1%	0.6%	0.5%
1970	34	18	92.9	15.5	5.2	3,603	64,845	192	3,457	4.1%	2.7%	2.5%
1971	33	12	105.1	16.8	6.0	5,094	61,127	243	2,910	2.7%	2.6%	2.1%
1972	32	9	97.5	15.6	5.6	4,143	37,285	194	1,743	2.0%	1.6%	1.3%
1973	31	10	104.9	16.3	6.2	5,246	52,455	239	2,394	2.3%	2.2%	1.7%
1974	30	10	103.6	16.2	6.1	4,251	42,509	205	2,052	2.3%	1.8%	1.5%
1975	29	18	100.1	16.6	5.7	4,469	80,433	244	4,393	4.1%	3.4%	3.2%
1976	28	16	102.9	16.4	6.0	4,883	78,125	251	4,019	3.6%	3.3%	2.9%
1977	27	24	102.4	16.6	5.8	4,929	118,294	258	6,186	5.4%	5.0%	4.5%
1978	26	20	104.7	17.0	6.1	5,512	110,230	286	5,718	4.5%	4.7%	4.2%
1979	25	20	108.2	17.2	6.1	5,774	115,476	319	6,385	4.5%	4.9%	4.6%
1980	24	14	113.7	17.2	6.6	5,932	83,045	353	4,947	3.2%	3.5%	3.6%
1981	23	12	111.6	17.4	6.6	6,389	76,669	365	4,374	2.7%	3.2%	3.2%
1982	22	20	113.6	18.6	6.7	6,873	137,459	370	7,400	4.5%	5.8%	5.4%
1983	21	15	114.9	18.4	6.6	6,429	96,442	356	5,341	3.4%	4.1%	3.9%
1984	20	9	109.3	19.1	6.6	6,675	60,075	351	3,157	2.0%	2.5%	2.3%
1985	19	17	115.8	19.7	6.7	7,085	120,438	381	6,477	3.8%	5.1%	4.7%
1986	18	5	130.1	19.8	7.3	7,793	38,964	452	2,258	1.1%	1.6%	1.6%
1987	17	3	112.6	17.9	5.9	5,171	15,513	308	924	0.7%	0.7%	0.7%
1988	16	8	100.1	16.6	5.7	4,161	33,288	249	1,991	1.8%	1.4%	1.4%
1989	15	5	121.1	18.3	6.6	6,057	30,286	386	1,929	1.1%	1.3%	1.4%
1990	14	5	114.1	18.1	6.7	6,621	33,107	353	1,766	1.1%	1.4%	1.3%
1991	13	20	99.9	16.3	5.8	4,644	92,873	296	5,926	4.5%	3.9%	4.3%
1992	12	4	113.2	17.5	6.4	6,260	25,039	377	1,507	0.9%	1.1%	1.1%
1993	11	9	109.6	17.7	6.3	6,012	54,110	368	3,311	2.0%	2.3%	2.4%
1994	10	17	102.4	16.8	6.2	5,325	90,527	318	5,408	3.8%	3.8%	3.9%
1995	9	25	104.0	17.1	6.0	5,220	130,497	344	8,593	5.6%	5.5%	6.3%
1996	8	26	107.5	17.5	6.3	6,040	157,032	393	10,210	5.9%	6.6%	7.4%
1997	7	25	101.7	17.1	5.9	4,865	121,635	340	8,494	5.6%	5.1%	6.2%
1998	6	24	97.3	16.0	5.3	4,225	101,406	284	6,807	5.4%	4.3%	5.0%
1999	5	10	93.4	16.6	5.1	4,144	41,441	296	2,956	2.3%	1.8%	2.2%
2000	4	5	107.1	17.2	6.4	5,680	28,398	416	2,082	1.1%	1.2%	1.5%
2001	3	3	112.3	18.7	6.6	6,229	18,688	468	1,405	0.7%	0.8%	1.0%
Total		444					2365811		137359	100.0%	100.0%	100.0%
Average							5,328		309			

Source: G.E.C., Inc., based on *The Clarkson Register* (January 2004).

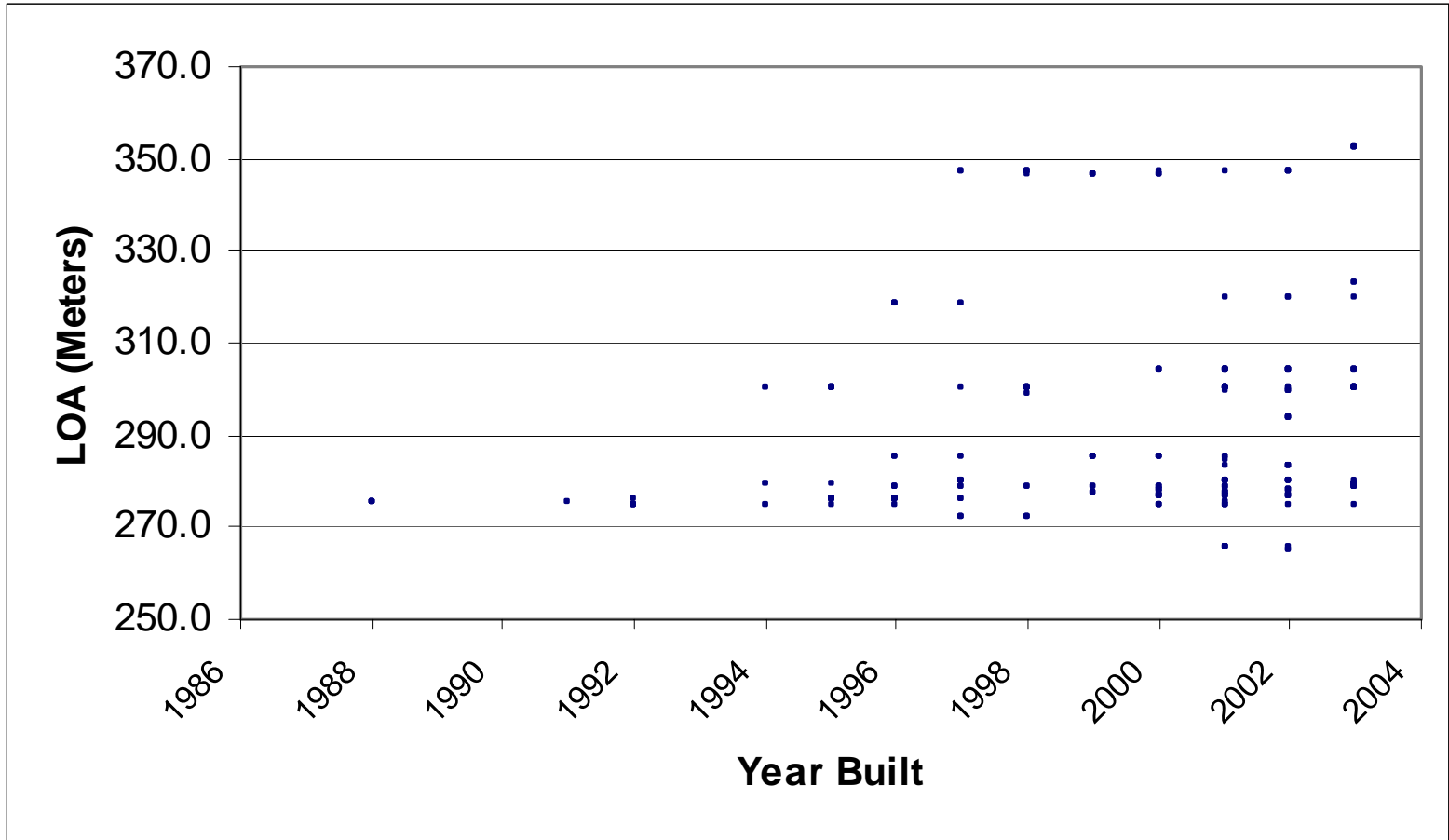


Figure 1. LOA of New Buildings of Post-Panamax Container Vessels, by Year Built

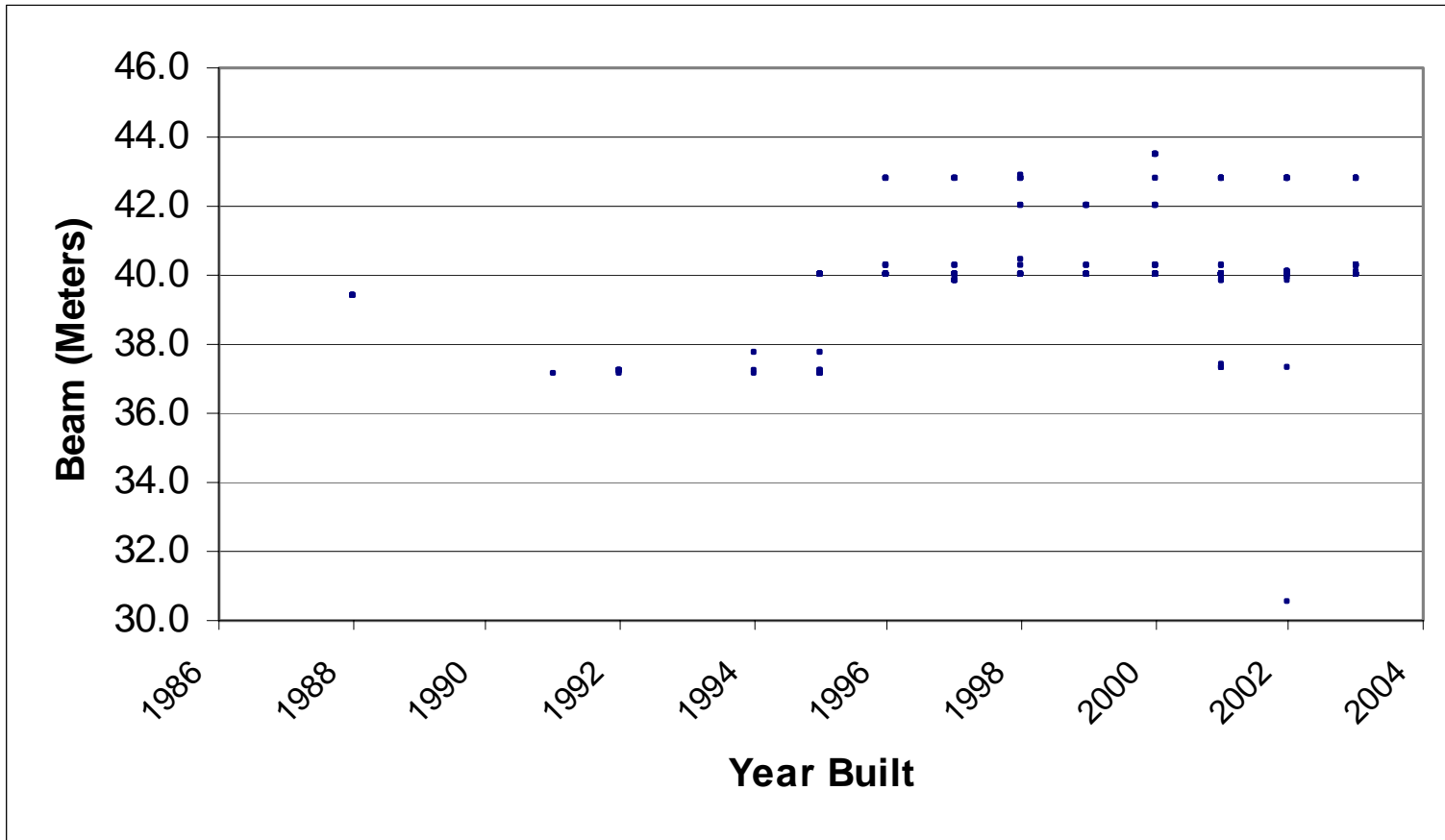


Figure 2. Beam of New Buildings of Post-Panamax Container Vessels, by Year Built

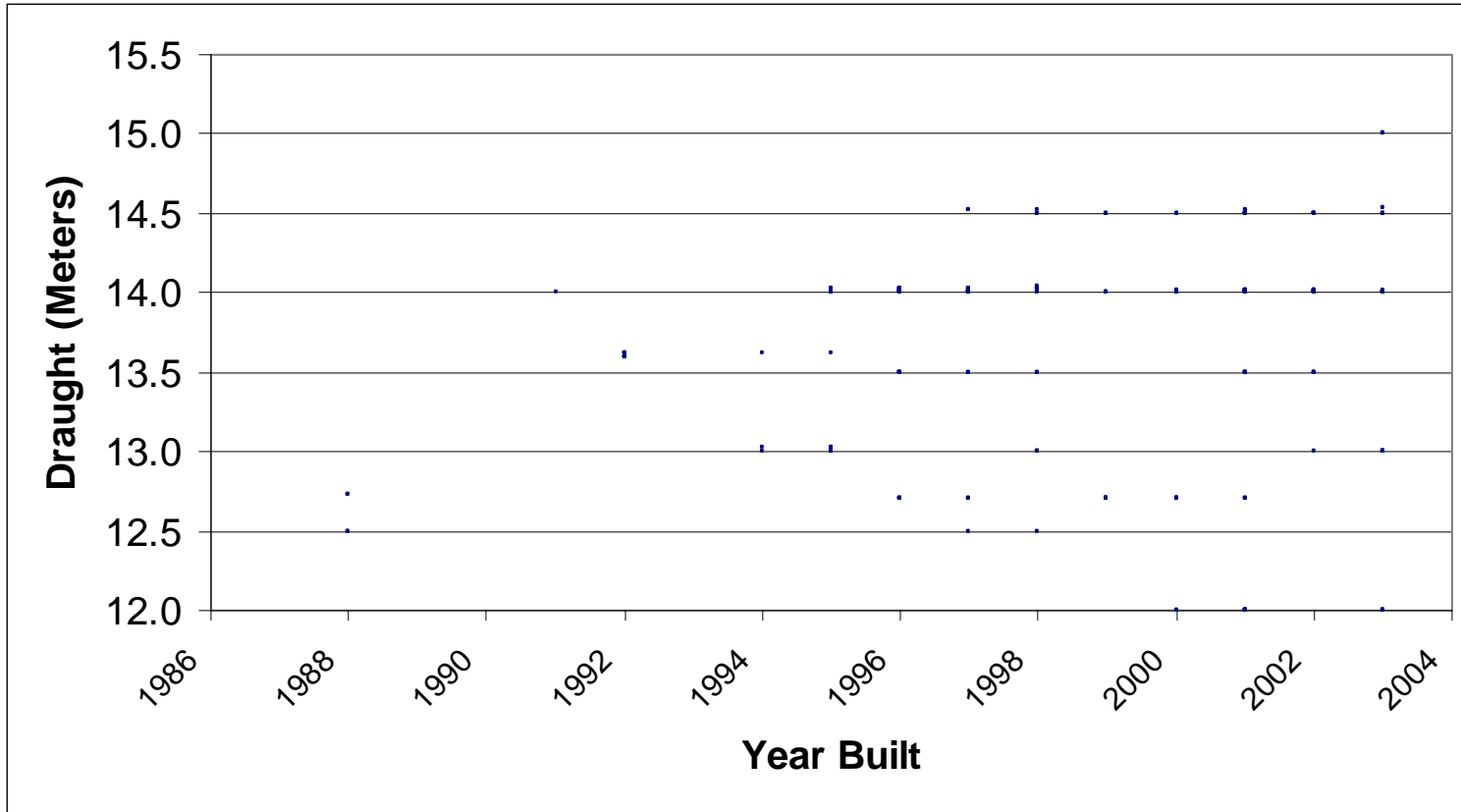


Figure 3. Draught of New Buildings of Post-Panamax Container Vessels, by Year Built

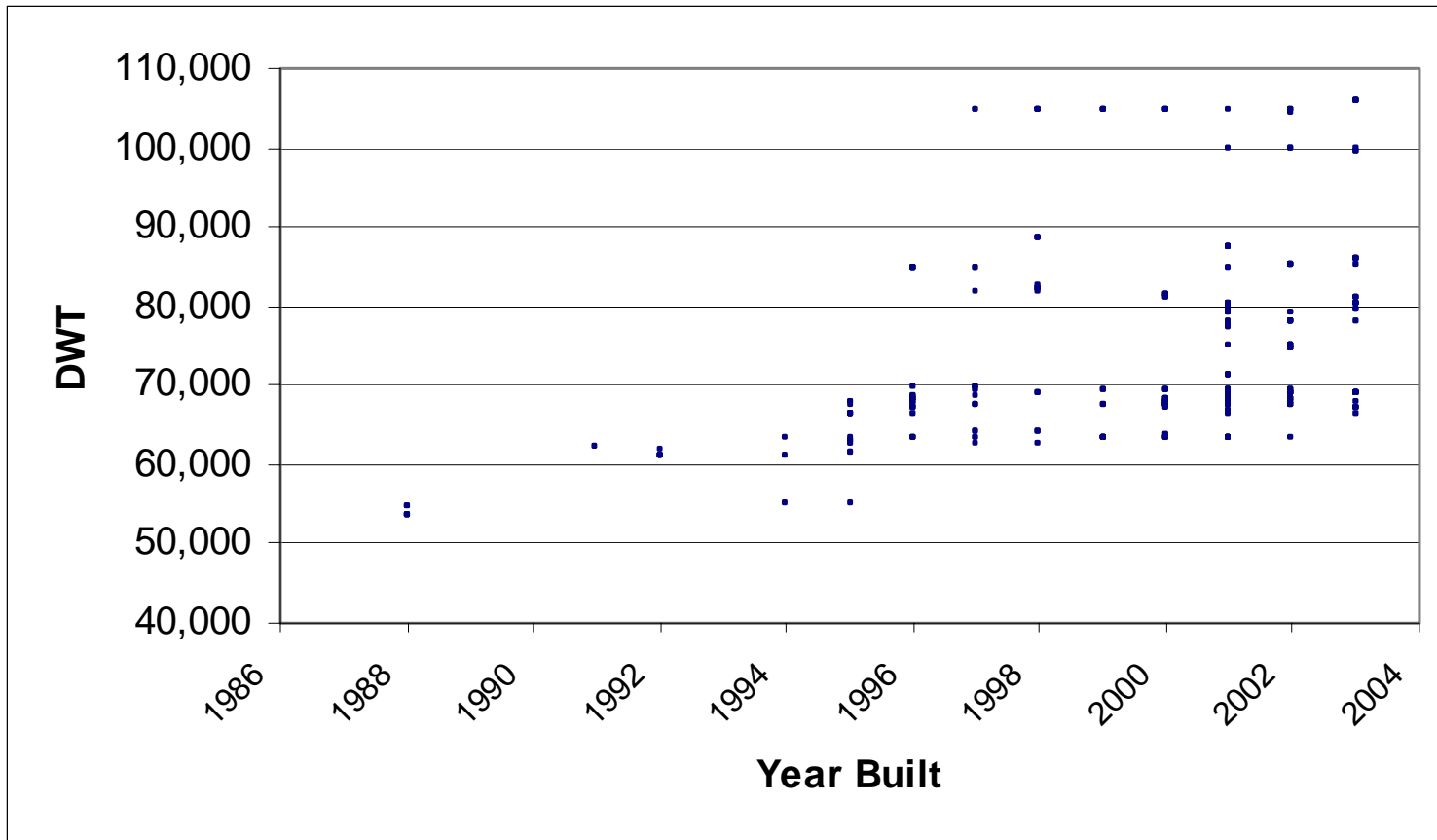


Figure 4. DWT of New Buildings of Post-Panamax Container Vessels, by Year Built

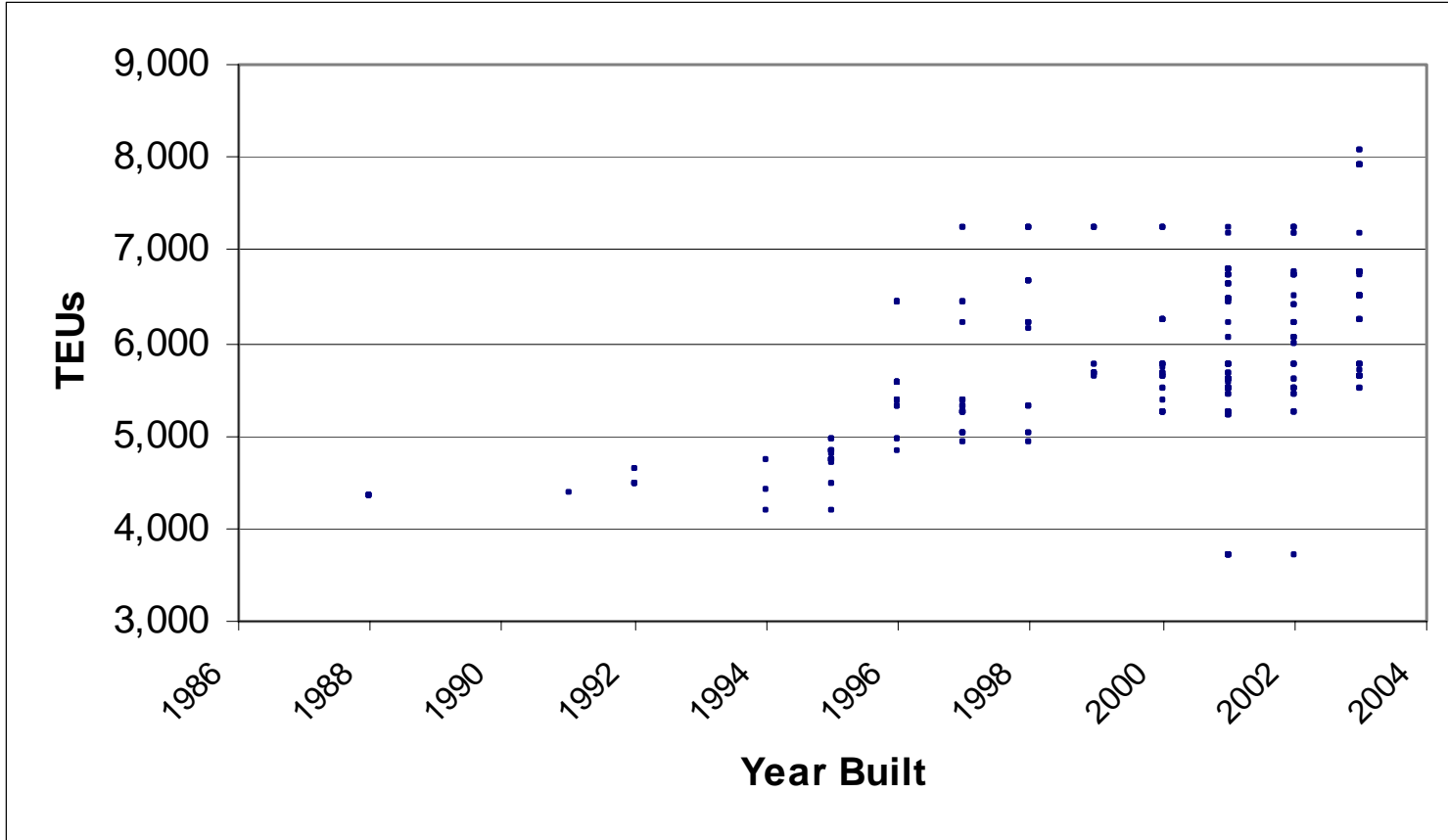


Figure 5. TEUs of New Buildings of Post-Panamax Container Vessels, by Year Built

The ensuing container ship tables (tables 3 through 7) are for the more developed fleet strata with regard to longevity of the new building trends. For example, Table 3 shows that size characteristics of the Panamax container fleet with respect to average annual new building dimensions have been stable for LOA, beam, and draft. DWT and TEU capacities have also been similar for the time series. Compared to the Post-Panamax container ships, the Panamax vessels are more diverse with respect to age. Approximately 25 percent of the Panamax container vessels by age were constructed after 1999, which accounts for a similar percentage of DWT and TEU capacity of the world fleet. If a normal life cycle for vessels is assumed to average 20 to 25 years, a mature fleet would be replaced at average annual rates of four to five percent of capacity, ignoring growth in volume of trade or shifts in vessel size deployment. The recent surge in post-1999 Panamax container vessel new buildings is in contrast to the expected average new buildings of 16 to 20 percent of the fleet compared to the observed 25 percent of the fleet constructed after 1999.

The Sub-Panamax container fleet displayed in Table 4 also reflects a surge in new building after 1999, and nearly 30 percent of the vessels in the fleet were constructed after 1999. Nearly 30 percent of the Sub-Panamax container fleet capacity (DWT/TEU) is less than four years old.

Conversely, tables 5, 6, and 7 show a more stable rate of new building of smaller container vessels in the Handysize, Feedermax, and Feeder size categories. For example, nearly 17 percent of the Handysize container vessels were constructed after 1999, suggesting a normal rate of replenishment consistent with vessel life spans of 20 to 25 years. For Feedermax vessels, nearly 19 percent of the fleet was constructed after 1999. For Feeder vessels, only 9.5 percent of the fleet was constructed after 1999, suggesting that there is a cascading effect of shifting larger vessels (Feedermax or Handysize) into some of the services provided by Feeder size container vessels.

Tables 8, 9, and 10 summarize the world container fleet trends for all subcategories by age, DWT, and TEU capacity, with year 2003 representing “100 percent.” As can be seen in Table 8, through 1999 only 36.9 percent of the existing Post-Panamax container ship fleet had been built compared to 74.3 percent of the Panamax, 71.1 percent of Sub-Panamax, 83.2 percent of the Handysize, 81.2 percent of the Feedermax, and 98.2 percent of the Feeder. Tables 9 and 10 show a similar relation for world fleet capacity trends after 1999 for these categories of vessels.

The trend toward new buildings of larger Post-Panamax container vessels has had a fundamental impact on the capacity of the world fleet. Table 10 indicates the world container fleet consists of 3,178 vessels with an aggregate of 6.48 million TEU of carrying capacity. The Post-Panamax vessels comprise 8.9 percent of the fleet and 25.3 percent of the TEU carrying capacity of the world fleet. Nearly half of this capacity has been added since 1999. Panamax container vessels comprise 14.7 percent of the fleet and 27.5 percent of the TEU carrying capacity of the world fleet. Over half of the world fleet TEU carrying capacity is accounted for by Panamax and Post-Panamax container vessels. Nearly one-quarter of the world fleet TEU carrying capacity is not capable of transiting the Panama Canal.

Table 8. World Container Fleet by Age
(All vessel size characteristics expressed in metric units)

Build Year	Age	Feeder % by Age	Feeder Cumulative	Feedermax % by Age	Feedermax Cumulative	Handysize % by Age	Handysize Cumulative	Sub-Panamax % by Age	Sub-Panamax Cumulative	Panamax % by Age	Panamax Cumulative	Post-Panamax % by Age	Post-Panamax Cumulative
1968	36	0.2%	0.2%		0.0%	0.8%	0.8%		0.0%		0.0%		0.0%
1969	35	1.1%	1.4%		0.0%	0.2%	1.0%		0.0%		0.0%		0.0%
1970	34	4.1%	5.4%	0.5%	0.5%	0.2%	1.2%	0.2%	0.2%		0.0%		0.0%
1971	33	2.7%	8.1%	1.0%	1.5%	0.1%	1.3%	0.4%	0.6%		0.0%		0.0%
1972	32	2.0%	10.1%	0.5%	2.1%	0.2%	1.5%	0.4%	1.0%		0.0%		0.0%
1973	31	2.3%	12.4%	0.5%	2.6%	0.3%	1.9%	0.4%	1.4%		0.0%		0.0%
1974	30	2.3%	14.6%	0.2%	2.7%	0.3%	2.2%	0.0%	1.4%		0.0%		0.0%
1975	29	4.1%	18.7%	0.3%	3.1%	0.0%	2.2%	0.2%	1.6%		0.0%		0.0%
1976	28	3.6%	22.3%	0.9%	3.9%	0.4%	2.6%	1.2%	2.8%		0.0%		0.0%
1977	27	5.4%	27.7%	0.7%	4.6%	0.7%	3.3%	1.4%	4.3%	0.6%	0.6%		0.0%
1978	26	4.5%	32.2%	2.2%	6.8%	1.8%	5.1%	0.0%	4.3%	0.9%	1.5%		0.0%
1979	25	4.5%	36.7%	2.4%	9.2%	2.5%	7.6%	0.6%	4.9%	0.2%	1.7%		0.0%
1980	24	3.2%	39.9%	1.5%	10.8%	1.8%	9.4%	5.3%	10.1%	0.0%	1.7%		0.0%
1981	23	2.7%	42.6%	1.5%	12.3%	1.0%	10.4%	0.6%	10.7%	0.4%	2.1%		0.0%
1982	22	4.5%	47.1%	2.7%	15.1%	2.4%	12.8%	1.2%	11.9%	0.6%	2.8%		0.0%
1983	21	3.4%	50.5%	3.8%	18.8%	2.6%	15.4%	3.2%	15.2%	0.6%	3.4%		0.0%
1984	20	2.0%	52.5%	3.3%	22.1%	2.1%	17.5%	4.5%	19.6%	1.7%	5.1%		0.0%
1985	19	3.8%	56.3%	2.7%	24.8%	3.1%	20.6%	2.8%	22.5%	2.1%	7.3%		0.0%
1986	18	1.1%	57.4%	1.5%	26.4%	2.0%	22.6%	3.0%	25.5%	4.3%	11.6%		0.0%
1987	17	0.7%	58.1%	0.9%	27.2%	1.4%	24.0%	1.6%	27.1%	3.2%	14.8%		0.0%
1988	16	1.8%	59.9%	1.2%	28.4%	1.0%	25.0%	0.8%	27.9%	4.1%	18.8%	1.8%	1.8%
1989	15	1.1%	61.0%	1.5%	30.0%	1.4%	26.5%	2.2%	30.2%	2.6%	21.4%	0.0%	1.8%
1990	14	1.1%	62.2%	1.4%	31.3%	3.5%	30.0%	3.0%	33.2%	2.6%	24.0%	0.0%	1.8%
1991	13	4.5%	66.7%	1.5%	32.9%	2.6%	32.6%	2.8%	36.0%	3.9%	27.8%	0.4%	2.1%
1992	12	0.9%	67.6%	3.1%	36.0%	3.3%	35.9%	1.4%	37.4%	4.3%	32.1%	2.1%	4.3%
1993	11	2.0%	69.6%	1.9%	37.8%	5.6%	41.6%	1.2%	38.7%	6.0%	38.1%	0.0%	4.3%
1994	10	3.8%	73.4%	4.6%	42.5%	6.4%	48.0%	2.2%	40.9%	7.1%	45.2%	1.1%	5.3%
1995	9	5.6%	79.1%	6.7%	49.1%	5.6%	53.6%	3.0%	43.9%	5.8%	51.0%	6.0%	11.3%
1996	8	5.9%	84.9%	7.2%	56.3%	7.3%	60.9%	5.3%	49.2%	5.4%	56.3%	7.4%	18.8%
1997	7	5.6%	90.5%	9.2%	65.6%	8.6%	69.5%	9.1%	58.3%	7.7%	64.0%	7.1%	25.9%
1998	6	5.4%	95.9%	10.4%	76.0%	8.6%	78.1%	9.1%	67.4%	8.4%	72.4%	6.0%	31.9%
1999	5	2.3%	98.2%	5.1%	81.2%	5.2%	83.2%	3.6%	71.1%	1.9%	74.3%	5.0%	36.9%
2000	4	1.1%	99.3%	4.6%	85.8%	5.0%	88.2%	4.5%	75.5%	5.1%	79.4%	12.1%	48.9%
2001	3	0.7%	100.0%	2.6%	88.4%	4.7%	92.9%	9.1%	84.6%	4.1%	83.5%	22.3%	71.3%
2002	2		100.0%	5.7%	94.0%	4.2%	97.1%	8.5%	93.1%	9.2%	92.7%	16.0%	87.2%
2003	1		100.0%	6.0%	100.0%	2.9%	100.0%	6.9%	100.0%	7.3%	100.0%	12.8%	100.0%
Total		100.0%		100.0%		100.0%		100.0%		100.0%		100.0%	

Source: G.E.C., Inc., based on *The Clarkson Register* (January 2004).

**Table 9. World Container Fleet Capacity by DWT
(All vessel size characteristics expressed in metric units)**

Build Year	Age	Feeder % by DWT	Feeder Cumulative	Feedermax % by DWT	Feedermax Cumulative	Handysize % by DWT	Handysize Cumulative	Sub-Panamax % by DWT	Sub-Panamax Cumulative	Panamax % by DWT	Panamax Cumulative	Post-Panamax % by DWT	Post-Panamax Cumulative
1968	36	0.1%	0.1%		0.0%	0.8%	0.8%		0.0%		0.0%		0.0%
1969	35	0.6%	0.8%		0.0%	0.2%	1.1%		0.0%		0.0%		0.0%
1970	34	2.7%	3.5%	1.1%	1.1%	0.2%	1.3%	0.2%	0.2%		0.0%		0.0%
1971	33	2.6%	6.1%	1.7%	2.7%	0.2%	1.5%	0.4%	0.6%		0.0%		0.0%
1972	32	1.6%	7.7%	0.9%	3.6%	0.3%	1.8%	0.4%	1.0%		0.0%		0.0%
1973	31	2.2%	9.9%	0.6%	4.2%	0.4%	2.1%	0.4%	1.4%		0.0%		0.0%
1974	30	1.8%	11.7%	0.4%	4.6%	0.3%	2.5%	0.0%	1.4%		0.0%		0.0%
1975	29	3.4%	15.1%	0.5%	5.2%	0.0%	2.5%	0.2%	1.6%		0.0%		0.0%
1976	28	3.3%	18.4%	1.2%	6.4%	0.5%	3.0%	1.3%	2.9%		0.0%		0.0%
1977	27	5.0%	23.4%	1.0%	7.4%	0.7%	3.7%	1.6%	4.5%	0.6%	0.6%		0.0%
1978	26	4.7%	28.0%	3.1%	10.5%	2.0%	5.8%	0.0%	4.5%	0.8%	1.4%		0.0%
1979	25	4.9%	32.9%	3.9%	14.4%	2.7%	8.5%	0.6%	5.1%	0.2%	1.6%		0.0%
1980	24	3.5%	36.4%	1.5%	15.9%	2.2%	10.7%	5.1%	10.2%	0.0%	1.6%		0.0%
1981	23	3.2%	39.7%	1.4%	17.3%	1.2%	11.9%	0.6%	10.8%	0.4%	2.1%		0.0%
1982	22	5.8%	45.5%	3.1%	20.4%	2.9%	14.8%	1.2%	12.0%	0.5%	2.6%		0.0%
1983	21	4.1%	49.6%	4.3%	24.6%	3.3%	18.1%	3.3%	15.3%	0.5%	3.1%		0.0%
1984	20	2.5%	52.1%	3.7%	28.3%	2.5%	20.6%	4.9%	20.3%	1.7%	4.8%		0.0%
1985	19	5.1%	57.2%	3.2%	31.6%	3.4%	24.0%	3.2%	23.5%	2.2%	7.0%		0.0%
1986	18	1.6%	58.8%	1.9%	33.4%	2.3%	26.3%	3.5%	26.9%	3.7%	10.7%		0.0%
1987	17	0.7%	59.5%	1.1%	34.5%	1.5%	27.9%	1.7%	28.6%	2.8%	13.5%		0.0%
1988	16	1.4%	60.9%	1.4%	36.0%	1.0%	28.9%	1.0%	29.6%	3.9%	17.4%	1.3%	1.3%
1989	15	1.3%	62.2%	1.8%	37.8%	1.6%	30.5%	2.5%	32.1%	2.7%	20.1%	0.0%	1.3%
1990	14	1.4%	63.6%	1.4%	39.2%	3.6%	34.0%	3.5%	35.6%	2.9%	22.9%	0.0%	1.3%
1991	13	3.9%	67.5%	1.7%	40.9%	2.8%	36.8%	3.3%	38.8%	4.0%	26.9%	0.3%	1.6%
1992	12	1.1%	68.6%	3.0%	43.9%	3.1%	39.9%	1.6%	40.4%	4.2%	31.1%	1.8%	3.3%
1993	11	2.3%	70.9%	1.5%	45.4%	5.1%	45.0%	1.4%	41.8%	6.1%	37.2%	0.0%	3.3%
1994	10	3.8%	74.7%	4.2%	49.6%	6.5%	51.6%	2.2%	44.1%	6.9%	44.1%	0.9%	4.2%
1995	9	5.5%	80.2%	5.6%	55.3%	5.1%	56.7%	3.1%	47.2%	5.9%	50.0%	5.2%	9.4%
1996	8	6.6%	86.8%	6.6%	61.9%	6.4%	63.1%	5.2%	52.4%	5.4%	55.4%	7.1%	16.5%
1997	7	5.1%	92.0%	8.6%	70.5%	8.1%	71.2%	8.3%	60.7%	7.8%	63.2%	7.0%	23.5%
1998	6	4.3%	96.3%	8.9%	79.4%	8.0%	79.2%	8.4%	69.1%	8.6%	71.9%	6.8%	30.3%
1999	5	1.8%	98.0%	4.2%	83.6%	5.2%	84.3%	3.3%	72.4%	2.2%	74.1%	5.1%	35.4%
2000	4	1.2%	99.2%	3.8%	87.4%	5.0%	89.3%	4.1%	76.6%	5.7%	79.8%	11.9%	47.3%
2001	3	0.8%	100.0%	2.6%	89.9%	4.4%	93.7%	8.7%	85.2%	3.8%	83.6%	22.1%	69.4%
2002	2		100.0%	5.1%	95.0%	3.7%	97.5%	8.2%	93.4%	9.4%	92.9%	16.7%	86.1%
2003	1		100.0%	5.0%	100.0%	2.5%	100.0%	6.6%	100.0%	7.1%	100.0%	13.9%	100.0%
Total		100.0%		100.0%		100.0%		100.0%		100.0%		100.0%	

Source: G.E.C., Inc., based on *The Clarkson Register* (January 2004).

Table 10. Number of Container Vessels and TEU Capacity of the World Fleet

Vessel Type	Number of Vessels	TEU Capacity	Percent of Vessels	Percent of TEU Capacity
Post-Panamax	282	1,638,754	8.9	25.3
Panamax	467	1,779,287	14.7	27.5
Sub-Panamax	494	1,224,795	15.5	18.9
Handysize	907	1,282,917	28.5	19.8
Feedermax	584	414,188	18.4	6.4
Feeder	444	137,359	14.0	2.1
Total	3,178	6,477,300	100.0	100.0

Source: Tables 2 through 6.

Trends in container vessel new buildings for the categories (Post-Panamax, Panamax, Sub-Panamax, Handysize, Feedermax, and Feeder) are shown for the period 1988 (beginning with the first Post-Panamax vessels) through 2003 in figures 6, 7, and 8 for annual number of new buildings, dwt, and TEUs, respectively. The annual number of container vessels delivered increased sharply toward the latter part of the last decade, but culminated in a steep decline in 1999. Since 1999, the annual number of large vessels (Panamax and Post-Panamax) has comprised nearly one-half of all deliveries.

The annual capacity trends in container vessel new buildings are shown in figures 7 and 8 for dwt and TEUs, respectively. Beginning in 2000, the dwt and TEUs for large vessels (Panamax and Post-Panamax) have comprised two-thirds to three-quarters of annual new capacity to the industry.

Comparative Analysis

Cellular (container) vessels are particularly important to Savannah Harbor with respect to the share of largest present and prospective sailing drafts. Although Savannah Harbor has bulk cargo and some deeper-draft bulk vessels, most of the large vessels calling the Harbor and nearly all the growth in large vessel calls is attributable to the container fleet. The bulk cargo sector is relatively mature with respect to growth of cargo volume and size of vessels. It is the container fleet that is expected to continue to display the most growth in the volume of cargo, which (other things being equal) translates into vessel calls.

A comparative analysis was conducted for each subregistry of container ship. The ship measurements of LOA, beam, and draft and the capacity measurements of DWT and TEU were compared based on the build year of the ships. The container vessel categories are defined in Table 11.

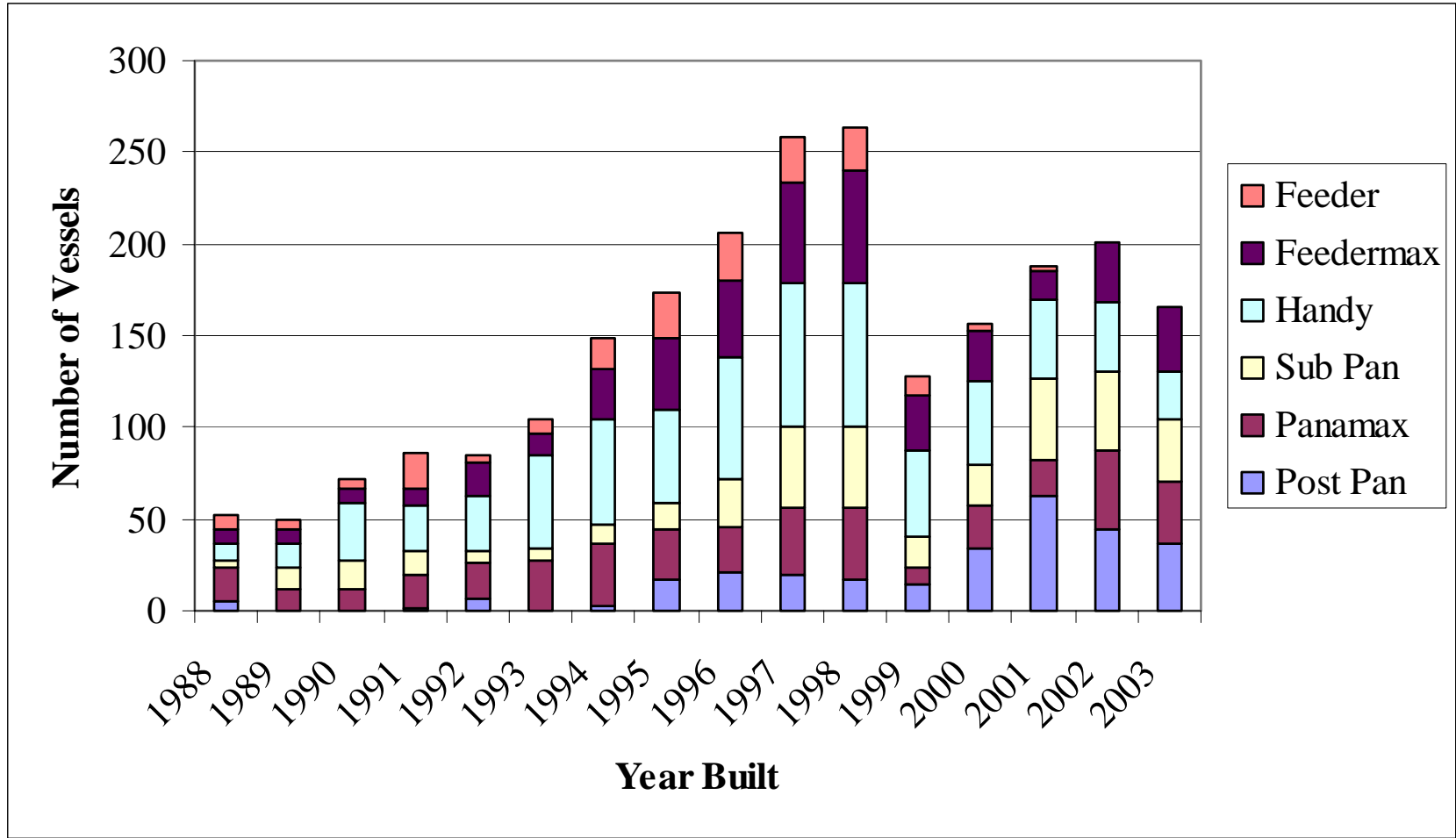


Figure 6. Number of New Buildings of Container Vessels, by Vessel Category, by Year Built

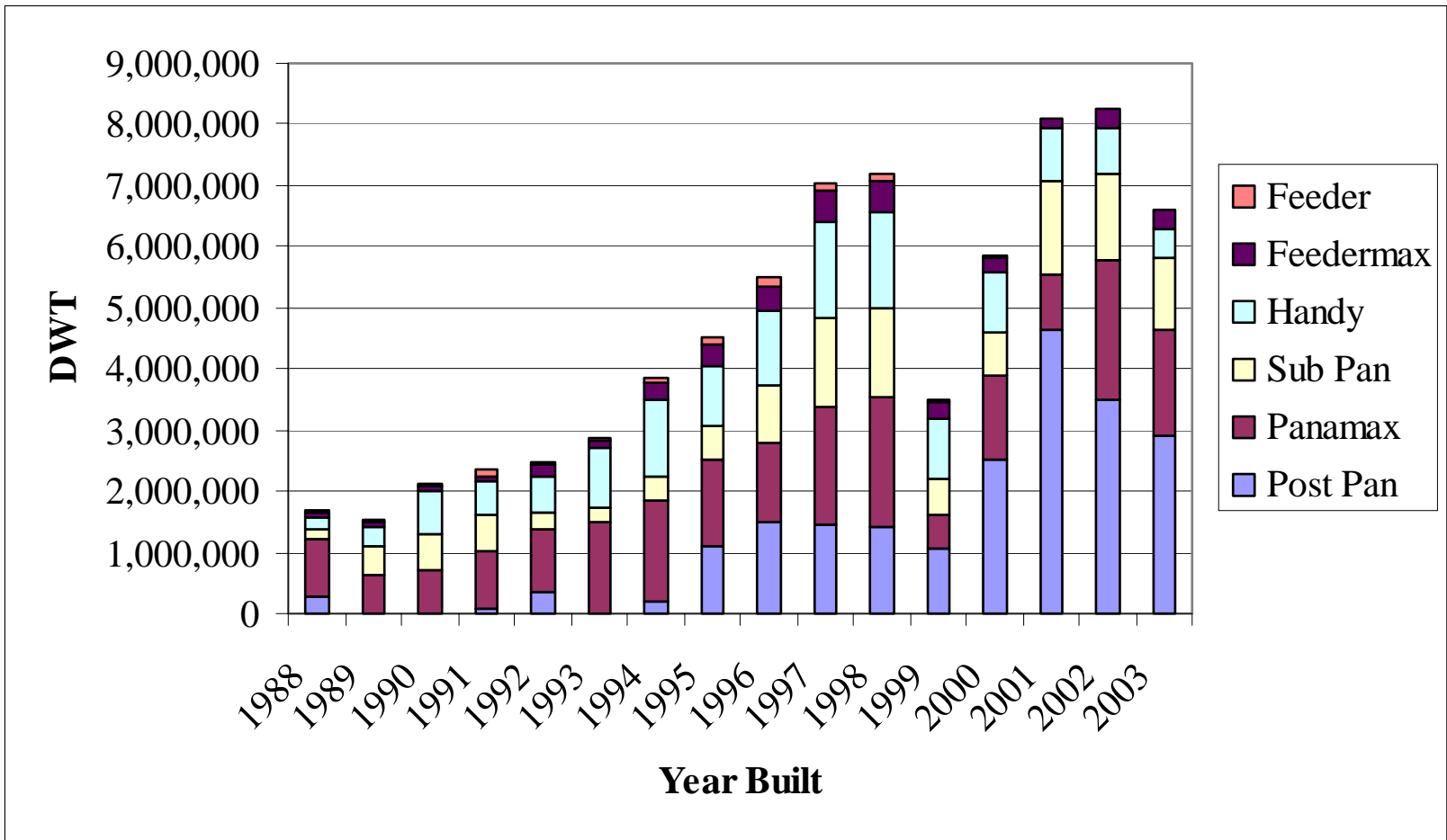


Figure 7. DWT of New Buildings of Container Vessels, by Vessel Category, by Year Built

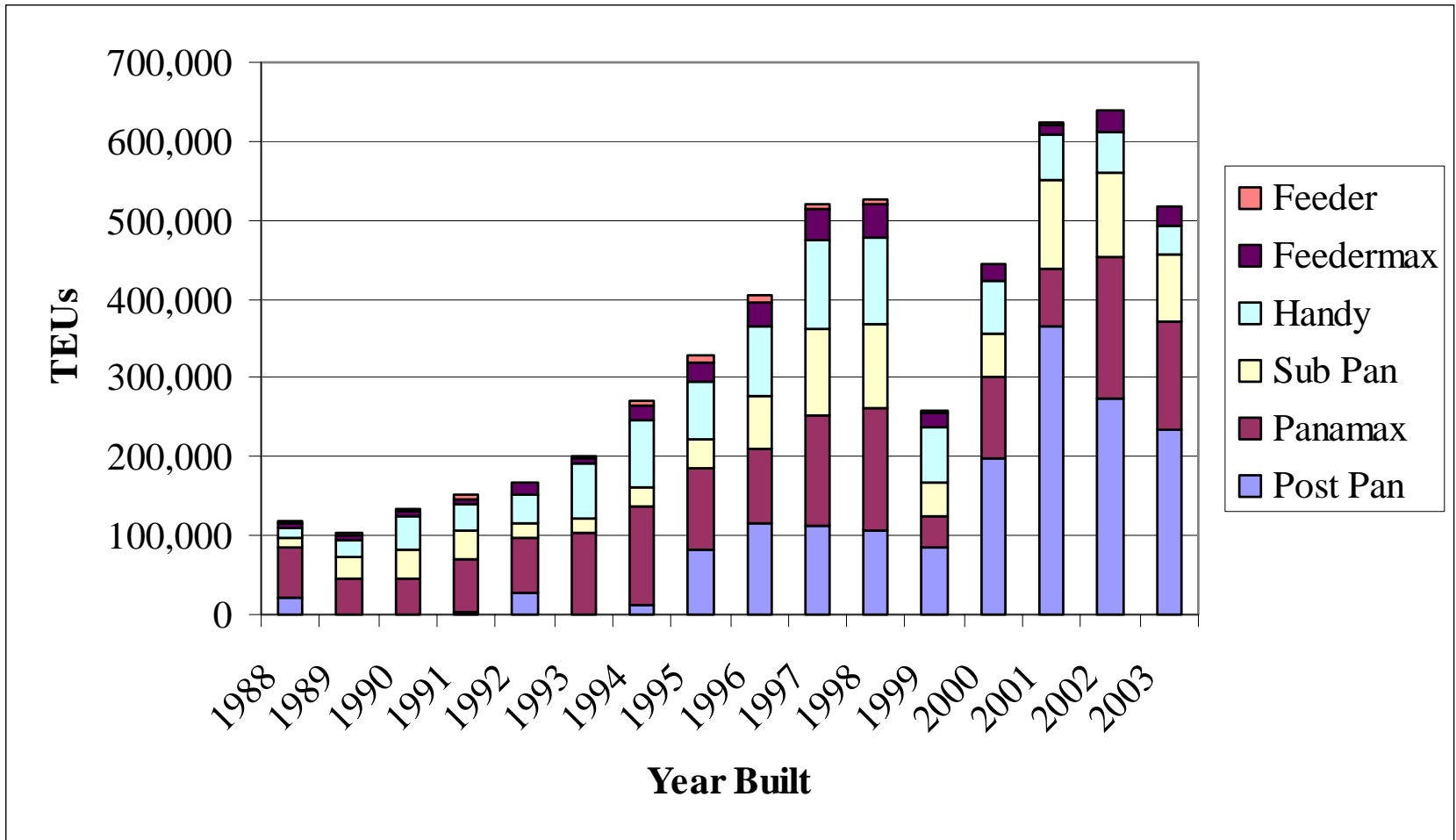


Figure 8. TEUs of New Buildings of Container Vessels, by Vessel Category, by Year Built

Table 11. Definition of Container Ship Subregistries

Subregistry	Length	Beam	Design Draft	DWT	TEU Capacity
Post -Panamax	300	>32.27	14.0	>62,000	>4400
Panamax	280	<32.27	12.2	<62,000	3000 - 4400
Sub-Panamax	200	30.5	11.5	35,000	2000 - 3000
Handysize	170	26.0	9.5	20,000	1000 - 2000
Feedermax	130	20.5	7.5	10,000	500 - 1000
Feeder	110	18.0	6.5	6,000	100 - 500

Note: All vessel size characteristics expressed in metric units.

Source: G.E.C., Inc. based on *The Clarkson Register* (January 2004).

The capacity and the size measurements of ships in most subregistries have been increasing. Table 12 shows the age of the containership fleet. The year the oldest ship in the subregistry was built and the median year built for ships in each subregistry indicate that larger ships are becoming a larger portion of the containership fleet.

Table 12. Age of the World Containership Fleet

Subregistry	Year Built of Oldest Ship	Median Year Built
Post-Panamax	1988	2001
Panamax	1977	1995
Sub-Panamax	1970	1997
Handysize	1962	1995
Feedermax	1962	1983

Source: G.E.C., Inc., based on *The Clarkson Register* (January 2004).

Table 13 compares TEU capacity of the entire active fleet, ships built during the past three years, and ships on order. Capacity and size measurements are not available for all ships on order. Ships built during the past three years provide the most appropriate grouping for comparison with ships on order.

Table 14 compares the deadweight capacity of the entire active fleet, ships built during the past three years, and ships on order.

Table 15 compares the LOA of the entire active fleet, ships built during the past three years, and ships on order.

Table 16 compares the beam (width) of the entire active fleet, ships built during the past three years, and ships on order. Beam size is the major constraint on ships using the Panama Canal, which explains the large increase in average beam size between Panamax container ships and Post-Panamax container ships. As ships were designed that were too large for the Panama Canal, their beam increased significantly from the 32.27-meter Panama Canal limit.

Table 13. Container Ship Average TEU Capacity

Subregistry	Active Fleet	Ships Built 2001 - 2003	Ordered Ships
Post-Panamax	5,811	6,063	7,034*
Panamax	3,810	4,052	4,157*
Sub-Panamax	2,479	2,515	2,579
Handysize	1,413	1,386	1,410
Feedermax	708	741	791

*Clear distinctions between Post-Panamax and Panamax vessels on order based on beam are not always possible because of missing data, therefore less robust criterion such as DWT was used.

Source: G.E.C., Inc., based on *The Clarkson Register* (January 2004).

**Table 14. Container Ship Average Deadweight Capacity
(tonnes)**

Subregistry	Active Fleet	Ships Built 2001 - 2003	Ordered Ships
Post-Panamax	74,314	76,641	86,937*
Panamax	51,919	51,127	51,989*
Sub-Panamax	35,737	34,203	34,727
Handysize	21,343	19,302	18,807
Feedermax	10,297	9,155	10,133

Note: All vessel size characteristics expressed in metric units.

*Clear distinctions between Post Panamax and Panamax vessels on order based on beam are not always possible, therefore less robust criterion such as DWT was used.

Source: G.E.C., Inc., based on *The Clarkson Register* (January 2004).

**Table 15. Container Ship Average Length Overall
(meters)**

Subregistry	Active Fleet	Ships Built 2001 - 2003	Ordered Ships
Post-Panamax	291.4	292.5	311.2*
Panamax	268.9	266.4	261.5*
Sub-Panamax	213.8	207.7	211.7
Handysize	174.8	167.3	159.4
Feedermax	133.9	131.4	131.2

Note: All vessel size characteristics expressed in metric units.

*Clear distinctions between Post-Panamax and Panamax vessels on order based on beam are not always possible, therefore less robust criterion such as DWT was used.

Source: G.E.C., Inc., based on *The Clarkson Register* (January 2004).

**Table 16. Container Ship Average Beam
(meters)**

Subregistry	Active Fleet	Ships Built 2001 - 2003	Ordered Ships
Post-Panamax	40.2	40.3	42.1*
Panamax	32.2	32.2	32.2*
Sub-Panamax	31.1	30.5	30.2
Handysize	26.5	25.7	24.7
Feedermax	21.1	20.8	22.5

*Clear distinctions between Post-Panamax and Panamax vessels on order based on beam are not always possible, therefore less robust criterion such as DWT was used.

Source: G.E.C., Inc., based on *The Clarkson Register* (January 2004).

Table 17 compares the draught (draft) of the entire active fleet, ships built during the past three years, and ships on order.

**Table 17. Container Ship Average Draught/Depth
(meters)**

Subregistry	Active Fleet	Ships Built 2001 - 2003	Ordered Ships
Post-Panamax	13.8	13.9	14.0*
Panamax	12.4	12.3	11.9*
Sub-Panamax	11.5	11.3	11.4
Handysize	9.7	9.3	9.4
Feedermax	7.7	7.5	7.8

*Clear distinctions between Post-Panamax and Panamax vessels on order based on beam are not always possible, therefore less robust criterion such as DWT was used.

Source: G.E.C., Inc., based on *The Clarkson Register* (January 2004).

Table 18 displays the world container fleet size characteristics for LOA, beam, draft, DWT, and TEU capacity, showing for each size category (Post-Panamax, Panamax, Sub-Panamax, Handysize, Feedermax, and Feeder) the average, median, minimum, and maximum values. For Post-Panamax container ships, the average size in meters is 291 LOA, 40.2 beam, and 13.8 draft with 74,314 DWT and 5,811 TEU capacity. The average Panamax container ship size in meters is 268.9 LOA, 32.2 beam, and 12.4 draft with 51,920 DWT and 3,810 TEU capacity.

Table 19 shows the frequency distribution of the design drafts (in feet) for Post-Panamax vessels built from 1988 through 2003 and vessels on order (2004-2007) for which design draft data are reported. The median design draft is 45.00 to 45.99 feet. The four vessels with design drafts of 49.00 to 49.99 feet are Maersk vessels constructed in 1998 and 1999. The paucity of design drafts for Post-Panamax vessels on order does not permit a generalization at this time with respect to a shift in drafts of new buildings. However, the limited sample of new building design drafts exceeding 45.99 feet is quite substantial compared to the total number of Post-Panamax vessels on order for which design drafts are provided.⁴

BULK SHIPS

Tables 20 through 23 show the size and trend characteristics for (dry) bulk vessels for the subcategories of Capesize, Panamax, Handymax, and Handysize. In terms of vessel ages, there are strong trends for expansion of the fleet in all categories except for Handysize. Since 1999, nearly 20 percent of the Capesize bulk vessels have been built, as well as 21 percent of the Panamax bulk vessels, 22 percent of the Handymax, and less than eight percent of the Handysize.

⁴ Of the existing Post-Panamax vessels (1988-2003), 59 have design drafts exceeding 45.99 feet, which is nearly 21 percent of the fleet (282 vessels). Of the 73 Post-Panamax vessels on order for which there are design drafts, 42 have a design draft of more than 45.99 feet, which is approximately 58 percent of the fleet with known design drafts.

**Table 18. World Container Fleet Size Characteristics
(All vessel size characteristics expressed in metric units)**

Subcategory/ Values	Build Year	LOA	Beam	Draught	DWT	TEU Capacity
Post-Panamax						
Average		291.4	40.2	13.8	74,314	5,811
Median	2001	280.0	40.0	14.0	69,000	5,652
Minimum	1988	265.1	30.5	12.0	53,613	3,700
Maximum	2003	352.6	43.5	15.0	105,750	8,063
Panamax						
Average		268.9	32.2	12.4	51,920	3,810
Median	1995	270.0	32.2	12.5	50,792	3,802
Minimum	1977	208.2	29.0	10.1	30,825	3,000
Maximum	2003	294.1	33.3	13.7	67,680	4,890
Sub-Panamax						
Average		213.8	31.1	11.5	35,738	2,479
Median	1997	208.2	32.2	11.5	34,600	2,480
Minimum	1970	174.36	16.6	9.8	22,639	2,000
Maximum	2003	272.3	32.6	13	53,726	2,987
Handysize						
Average		174.8	26.5	9.7	21,344	1,413
Median	1995	172.2	27.0	9.8	21,465	1,388
Minimum	1962	140.5	20.8	6.5	10,282	1,000
Maximum	2003	269	35	12.03	36,022	1,998
Feedermax						
Average		133.9	21.1	7.7	10,298	709
Median	1996	133.2	20.9	7.7	9,678	700
Minimum	1970	99.5	16.2	5.3	4,336	500
Maximum	2003	219.6	29.0	11.0	29,213	980
Feeder						
Average		105.1	17.1	6.1	5,321	309
Median	1983	106.0	16.9	6.2	5,183	326
Minimum	1962	61.5	10.5	3.5	1,049	100
Maximum	2001	148.7	24.0	8.6	11,067	495

Source: G.E.C., Inc., based on *The Clarkson Register* (January 2004).

Table 19. Post –Panamax Container Vessel Design Drafts

Design Draft Range (feet)	Number of Vessels Built (1988-2003)	Number of Vessels on Order (2004-2007)
No data	0	153
39.00 – 39.99	10	0
40.00 – 40.99	0	0
41.00 – 41.99	25	6
42.00 – 42.99	18	6
43.00 – 43.99	0	0
44.00 – 44.99	27	8
45.00 – 45.99	143	12
46.00 – 46.99	12	10
47.00 – 47.99	43	23
48.00 – 48.99	0	0
49.00 – 49.99	4	8
Sum	282	226

Source: G.E.C., Inc., based on *The Clarkson Register* (January 2004).

Table 20. Bulk Capesize Vessel Size Fleet Characteristics
(All vessel size characteristics expressed in metric units)

Build Year	Age	Number of Vessels	Average LOA	Average Beam	Average Draught	Average DWT	Total DWT	Percent by Age	Percent by DWT
1973	31	2	282.1	41.8	17.1	138,877	277,753	0.3%	0.3%
1974	30								
1975	29	3	263.7	37.4	16.1	111,800	335,399	0.5%	0.3%
1976	28	5	261.9	41.7	16.8	129,140	645,698	0.8%	0.7%
1977	27	2	286.2	35.5	13.2	102,606	205,212	0.3%	0.2%
1978	26	3	267.9	35.4	13.4	93,048	279,143	0.5%	0.3%
1979	25	4	263.3	35.8	13.3	89,496	357,985	0.6%	0.4%
1980	24	2	263.8	43.0	15.3	137,285	274,569	0.3%	0.3%
1981	23	27	269.1	43.0	16.5	137,414	3,710,183	4.4%	3.8%
1982	22	29	274.1	43.4	16.6	143,453	4,160,147	4.7%	4.2%
1983	21	11	277.7	43.8	17.1	153,481	1,688,296	1.8%	1.7%
1984	20	16	283.2	45.5	16.2	152,397	2,438,351	2.6%	2.5%
1985	19	20	288.5	46.9	17.5	174,009	3,480,181	3.2%	3.6%
1986	18	27	291.9	46.9	17.6	179,645	4,850,417	4.4%	5.0%
1987	17	17	284.2	46.7	17.5	171,251	2,911,269	2.8%	3.0%
1988	16	8	302.3	48.9	18.1	198,730	1,589,838	1.3%	1.6%
1989	15	15	290.9	46.5	17.7	176,992	2,654,886	2.4%	2.7%
1990	14	37	279.0	44.6	17.1	158,668	5,870,711	6.0%	6.0%
1991	13	16	276.1	44.2	17.3	158,246	2,531,942	2.6%	2.6%
1992	12	18	277.5	44.6	17.4	161,642	2,909,558	2.9%	3.0%
1993	11	29	275.7	44.1	17.1	153,560	4,453,249	4.7%	4.5%
1994	10	28	274.7	43.8	17.3	153,791	4,306,150	4.5%	4.4%
1995	9	40	271.3	43.5	16.8	145,968	5,838,706	6.5%	6.0%
1996	8	49	282.5	44.5	17.3	162,826	7,978,479	7.9%	8.1%
1997	7	44	285.9	45.6	17.3	169,978	7,479,033	7.1%	7.6%
1998	6	14	279.7	45.1	17.0	158,257	2,215,597	2.3%	2.3%
1999	5	26	285.1	44.7	16.6	165,766	4,309,909	4.2%	4.4%
2000	4	40	274.7	44.2	16.4	151,569	6,062,772	6.5%	6.2%
2001	3	33	283.8	45.1	17.0	164,302	5,421,952	5.3%	5.5%
2002	2	24	284.1	45.2	16.8	166,364	3,992,728	3.9%	4.1%
2003	1	29	280.1	44.4	17.0	162,192	4,703,573	4.7%	4.8%
Total		618					97,933,686	100.0%	100.0%
Average							158,468.7		

Source: G.E.C., Inc., based on *The Clarkson Register* (January 2004).

Table 21. Bulk Panamax Vessel Size Fleet Characteristics
(All vessel size characteristics expressed in metric units)

Build Year	Age	Number of Vessels	Average LOA	Average Beam	Average Draught	Average DWT	Total DWT	Percent by Age	Percent by DWT
1968	36	2	251.46	32.06	14.26	77,210	154,420	0.2%	0.2%
1969	35								
1970	34								
1971	33	1	304.80	32.00	8.52	60,079	60,079	0.1%	0.1%
1972	32								
1973	31	2	234.06	32.21	13.56	70,920	141,840	0.2%	0.2%
1974	30	2	224.75	32.23	12.72	62,378	124,755	0.2%	0.2%
1975	29	5	226.48	32.05	13.60	66,812	334,059	0.5%	0.4%
1976	28	10	233.05	32.21	12.79	65,447	654,466	0.9%	0.9%
1977	27	16	231.12	32.20	13.04	65,569	1,049,110	1.5%	1.4%
1978	26	11	234.40	32.21	12.48	64,182	705,997	1.0%	1.0%
1979	25	8	238.13	32.17	12.78	66,245	529,961	0.8%	0.7%
1980	24	14	236.95	32.15	12.39	64,393	901,506	1.3%	1.2%
1981	23	53	230.39	32.29	12.79	65,327	3,462,327	5.0%	4.7%
1982	22	61	228.70	32.34	12.98	65,648	4,004,544	5.8%	5.4%
1983	21	49	230.91	32.42	13.01	66,607	3,263,746	4.6%	4.4%
1984	20	55	231.02	32.34	12.99	66,937	3,681,535	5.2%	5.0%
1985	19	17	230.59	32.24	13.06	66,822	1,135,980	1.6%	1.5%
1986	18	22	227.46	32.22	13.01	66,502	1,463,050	2.1%	2.0%
1987	17	28	227.06	32.62	12.93	66,684	1,867,159	2.7%	2.5%
1988	16	15	225.95	32.65	13.17	68,967	1,034,499	1.4%	1.4%
1989	15	33	226.64	32.23	13.15	68,342	2,255,296	3.1%	3.0%
1990	14	29	226.41	32.21	13.11	69,483	2,014,995	2.7%	2.7%
1991	13	15	228.43	32.23	13.35	69,488	1,042,319	1.4%	1.4%
1992	12	5	225.83	32.22	13.40	69,359	346,793	0.5%	0.5%
1993	11	33	224.88	32.23	13.25	70,573	2,328,898	3.1%	3.1%
1994	10	57	225.13	32.29	13.25	70,434	4,014,735	5.4%	5.4%
1995	9	55	224.86	32.24	13.64	71,666	3,941,616	5.2%	5.3%
1996	8	44	224.88	32.23	13.53	71,952	3,165,885	4.2%	4.3%
1997	7	73	224.71	32.23	13.19	72,282	5,276,591	6.9%	7.1%
1998	6	58	225.32	32.87	13.20	73,574	4,267,279	5.5%	5.7%
1999	5	60	225.31	32.31	13.43	73,911	4,434,672	5.7%	6.0%
2000	4	49	224.88	32.52	13.59	74,416	3,646,382	4.6%	4.9%
2001	3	102	224.51	32.32	13.67	74,591	7,608,288	9.7%	10.2%
2002	2	54	225.49	32.38	13.70	74,949	4,047,225	5.1%	5.5%
2003	1	17	225.22	31.97	13.87	76,127	1,294,167	1.6%	1.7%
Total		1055					74,254,174	100.0%	100.0%
Average							70,383		

Source: G.E.C., Inc., based on *The Clarkson Register* (January 2004).

Table 22. Bulk Handymax Vessel Size Fleet Characteristics
 (All vessel size characteristics expressed in metric units)

Build Year	Age	Number of Vessels	Average LOA	Average Beam	Average Draught	Average DWT	Total DWT	Percent by Age	Percent by DWT
1964	40	1	214.2	27.4	11.7	42,845	42,845	0.1%	0.1%
1966	38	2	224.5	30.8	12.0	52,246	104,492	0.2%	0.2%
1967	37	1	203.8	27.3	11.5	40,083	40,083	0.1%	0.1%
1968	36	2	210.7	28.5	12.1	47,801	95,601	0.2%	0.2%
1969	35	1	201.6	29.0	11.6	44,941	44,941	0.1%	0.1%
1970	34	1	215.5	29.4	11.9	47,043	47,043	0.1%	0.1%
1971	33								
1972	32	2	227.8	30.7	10.0	44,576	89,152	0.2%	0.2%
1973	31	2	200.7	29.7	12.1	47,616	95,232	0.2%	0.2%
1974	30	2	221.9	29.5	12.3	52,845	105,690	0.2%	0.2%
1975	29	7	209.8	28.7	12.1	48,570	339,991	0.6%	0.6%
1976	28	11	196.5	29.1	12.0	45,929	505,224	0.9%	0.9%
1977	27	16	196.9	30.1	12.0	45,189	723,031	1.3%	1.3%
1978	26	22	192.4	31.0	11.8	45,552	1,002,139	1.8%	1.8%
1979	25	10	199.7	30.8	11.9	46,911	469,112	0.8%	0.8%
1980	24	8	213.2	30.8	12.2	51,001	408,008	0.7%	0.7%
1981	23	10	195.0	31.3	11.6	44,768	447,677	0.8%	0.8%
1982	22	36	199.3	30.9	11.5	45,951	1,654,248	3.0%	3.0%
1983	21	33	197.1	30.9	11.4	45,240	1,492,931	2.7%	2.7%
1984	20	65	190.1	30.6	11.3	43,442	2,823,742	5.4%	5.0%
1985	19	91	189.3	30.4	11.4	43,239	3,934,740	7.5%	7.0%
1986	18	57	193.4	30.7	11.4	44,428	2,532,392	4.7%	4.5%
1987	17	23	192.8	30.9	11.4	44,937	1,033,544	1.9%	1.8%
1988	16	13	200.7	31.8	11.3	44,455	577,910	1.1%	1.0%
1989	15	25	196.6	31.3	11.1	44,405	1,110,127	2.1%	2.0%
1990	14	27	193.6	31.3	11.2	44,895	1,212,162	2.2%	2.2%
1991	13	31	192.7	31.3	11.2	44,727	1,386,544	2.6%	2.5%
1992	12	15	190.1	30.7	11.5	44,421	666,313	1.2%	1.2%
1993	11	9	199.0	31.4	11.7	47,640	428,757	0.7%	0.8%
1994	10	59	189.8	30.8	11.4	45,009	2,655,545	4.9%	4.7%
1995	9	78	189.8	30.8	11.4	45,131	3,520,204	6.5%	6.3%
1996	8	89	191.5	31.2	11.4	46,036	4,097,239	7.4%	7.3%
1997	7	74	190.8	31.2	11.5	46,488	3,440,125	6.1%	6.1%
1998	6	74	188.6	31.1	11.5	46,419	3,434,970	6.1%	6.1%
1999	5	39	188.6	31.4	11.5	47,592	1,856,086	3.2%	3.3%
2000	4	36	187.8	31.4	11.8	47,809	1,721,138	3.0%	3.1%
2001	3	93	189.7	32.0	11.8	50,152	4,664,126	7.7%	8.3%
2002	2	85	190.2	32.1	11.9	50,416	4,285,384	7.0%	7.7%
2003	1	56	190.1	32.1	11.9	51,491	2,883,474	4.6%	5.2%
Total		1,206					55,971,962	100.0%	100.0%
Average							46,411		

Source: G.E.C., Inc., based on *The Clarkson Register* (January 2004).

Table 23. Bulk Handysize Vessel Size Fleet Characteristics
(All vessel size characteristics expressed in metric units)

Build Year	Age	Number of Vessels	Average LOA	Average Beam	Average Draught	Average DWT	Total DWT	Percent by Age	Percent by DWT
1967	37	21	180.9	22.7	9.6	24,664	517,937	0.8%	0.7%
1968	36	19	172.2	22.0	9.3	21,788	413,980	0.7%	0.6%
1969	35	23	162.6	22.6	9.6	21,677	498,560	0.9%	0.7%
1970	34	23	165.9	23.1	9.7	22,344	513,923	0.9%	0.7%
1971	33	28	174.4	24.0	10.2	26,503	742,085	1.0%	1.0%
1972	32	28	173.5	23.6	9.9	25,483	713,536	1.0%	1.0%
1973	31	30	179.3	23.5	9.9	26,156	784,694	1.1%	1.1%
1974	30	51	166.2	23.6	9.6	23,892	1,218,468	1.9%	1.7%
1975	29	73	161.8	23.0	9.6	22,514	1,643,500	2.7%	2.3%
1976	28	102	163.3	23.1	9.7	22,936	2,339,471	3.8%	3.2%
1977	27	226	169.1	24.5	10.1	26,334	5,951,496	8.4%	8.3%
1978	26	165	167.3	24.0	10.0	24,927	4,112,933	6.1%	5.7%
1979	25	89	171.7	24.2	10.0	25,586	2,277,158	3.3%	3.2%
1980	24	94	170.6	24.6	10.0	25,782	2,423,496	3.5%	3.4%
1981	23	133	172.1	24.4	10.1	26,388	3,509,596	4.9%	4.9%
1982	22	126	174.8	25.2	10.3	28,613	3,605,250	4.7%	5.0%
1983	21	126	176.9	25.4	10.3	29,603	3,730,038	4.7%	5.2%
1984	20	220	175.8	26.0	10.4	30,553	6,721,603	8.1%	9.3%
1985	19	197	174.1	26.1	10.2	29,595	5,830,306	7.3%	8.1%
1986	18	96	172.2	25.9	10.1	28,594	2,745,005	3.6%	3.8%
1987	17	44	180.3	25.5	10.1	29,721	1,307,745	1.6%	1.8%
1988	16	12	166.1	23.3	9.6	24,764	297,173	0.4%	0.4%
1989	15	29	168.3	25.7	9.5	26,764	776,148	1.1%	1.1%
1990	14	30	172.1	26.3	9.7	27,938	838,141	1.1%	1.2%
1991	13	22	165.9	25.7	9.4	25,535	561,772	0.8%	0.8%
1992	12	29	167.3	25.6	9.6	25,519	740,037	1.1%	1.0%
1993	11	29	165.8	25.3	9.4	25,188	730,449	1.1%	1.0%
1994	10	35	164.8	26.3	9.4	26,234	918,204	1.3%	1.3%
1995	9	79	164.3	26.0	9.5	25,828	2,040,403	2.9%	2.8%
1996	8	84	165.0	25.5	9.6	25,522	2,143,864	3.1%	3.0%
1997	7	98	164.9	25.6	9.6	25,402	2,489,384	3.6%	3.5%
1998	6	74	162.7	25.4	9.5	24,777	1,833,526	2.7%	2.5%
1999	5	64	163.2	25.6	9.7	26,108	1,670,903	2.4%	2.3%
2000	4	47	165.4	25.4	9.7	26,690	1,254,411	1.7%	1.7%
2001	3	58	162.9	25.5	9.6	25,811	1,497,062	2.1%	2.1%
2002	2	56	167.8	26.1	9.6	27,392	1,533,954	2.1%	2.1%
2003	1	44	167.7	25.8	9.7	27,422	1,206,586	1.6%	1.7%
Total		2,704					72,132,797	100.0%	100.0%
Average							26,676		

Source: G.E.C., Inc., based on *The Clarkson Register* (January 2004).

Tables 24 and 25 show the cumulative world bulk fleet categories for vessels by age and DWT capacity. The data indicate that nearly 40 percent of the Capesize, Panamax, and Handymax vessels were built before 1993 compared to nearly 75 percent of the Handysize vessels. The age and DWT distributions by year are very similar (tables 24 and 25).

Table 24. World Bulk Fleet by Age

Build Year	Age	Handysize % by Age	Handysize Cumulative	Handymax % by Age	Handymax Cumulative	Panamax % by Age	Panamax Cumulative	Capesize % by Age	Capesize Cumulative
1964	40		0.0%	0.1%	0.1%		0.0%		0.0%
1966	38		0.0%	0.2%	0.2%		0.0%		0.0%
1967	37	0.8%	0.8%	0.1%	0.3%		0.0%		0.0%
1968	36	0.7%	1.5%	0.2%	0.5%	0.2%	0.2%		0.0%
1969	35	0.9%	2.3%	0.1%	0.6%		0.2%		0.0%
1970	34	0.9%	3.2%	0.1%	0.7%		0.2%		0.0%
1971	34	1.0%	4.2%		0.7%	0.1%	0.3%		0.0%
1972	32	1.0%	5.3%	0.2%	0.8%		0.3%		0.0%
1973	31	1.1%	6.4%	0.2%	1.0%	0.2%	0.5%	0.3%	0.3%
1974	30	1.9%	8.2%	0.2%	1.2%	0.2%	0.7%		0.3%
1975	29	2.7%	10.9%	0.6%	1.7%	0.5%	1.1%	0.5%	0.8%
1976	28	3.8%	14.7%	0.9%	2.7%	0.9%	2.1%	0.8%	1.6%
1977	27	8.4%	23.1%	1.3%	4.0%	1.5%	3.6%	0.3%	1.9%
1978	26	6.1%	29.2%	1.8%	5.8%	1.0%	4.6%	0.5%	2.4%
1979	25	3.3%	32.5%	0.8%	6.6%	0.8%	5.4%	0.6%	3.1%
1980	24	3.5%	35.9%	0.7%	7.3%	1.3%	6.7%	0.3%	3.4%
1981	23	4.9%	40.9%	0.8%	8.1%	5.0%	11.8%	4.4%	7.8%
1982	22	4.7%	45.5%	3.0%	11.1%	5.8%	17.5%	4.7%	12.5%
1983	21	4.7%	50.2%	2.7%	13.8%	4.6%	22.2%	1.8%	14.2%
1984	20	8.1%	58.3%	5.4%	19.2%	5.2%	27.4%	2.6%	16.8%
1985	19	7.3%	65.6%	7.5%	26.8%	1.6%	29.0%	3.2%	20.1%
1986	18	3.6%	69.2%	4.7%	31.5%	2.1%	31.1%	4.4%	24.4%
1987	17	1.6%	70.8%	1.9%	33.4%	2.7%	33.7%	2.8%	27.2%
1988	16	0.4%	71.2%	1.1%	34.5%	1.4%	35.2%	1.3%	28.5%
1989	15	1.1%	72.3%	2.1%	36.6%	3.1%	38.3%	2.4%	30.9%
1990	14	1.1%	73.4%	2.2%	38.8%	2.7%	41.0%	6.0%	36.9%
1991	13	0.8%	74.2%	2.6%	41.4%	1.4%	42.5%	2.6%	39.5%
1992	12	1.1%	75.3%	1.2%	42.6%	0.5%	42.9%	2.9%	42.4%
1993	11	1.1%	76.4%	0.7%	43.4%	3.1%	46.1%	4.7%	47.1%
1994	10	1.3%	77.7%	4.9%	48.3%	5.4%	51.5%	4.5%	51.6%
1995	9	2.9%	80.6%	6.5%	54.7%	5.2%	56.7%	6.5%	58.1%
1996	8	3.1%	83.7%	7.4%	62.1%	4.2%	60.9%	7.9%	66.0%
1997	7	3.6%	87.3%	6.1%	68.2%	6.9%	67.8%	7.1%	73.1%
1998	6	2.7%	90.1%	6.1%	74.4%	5.5%	73.3%	2.3%	75.4%
1999	5	2.4%	92.4%	3.2%	77.6%	5.7%	79.0%	4.2%	79.6%
2000	4	1.7%	94.2%	3.0%	80.6%	4.6%	83.6%	6.5%	86.1%
2001	3	2.1%	96.3%	7.7%	88.3%	9.7%	93.3%	5.3%	91.4%
2002	2	2.1%	98.4%	7.0%	95.4%	5.1%	98.4%	3.9%	95.3%
2003	1	1.6%	100.0%	4.6%	100.0%	1.6%	100.0%	4.7%	100.0%
Total		100.0%		100.0%		100.0%		100.0%	
Average									

Source: G.E.C., Inc., based on *The Clarkson Register* (January 2004).

Table 25. World Bulk Fleet Capacity by DWT

Build Year	Age	Handysize % by DWT	Handysize Cumulative	Handymax % by DWT	Handymax Cumulative	Panamax % by DWT	Panamax Cumulative	Capesize % by DWT	Capesize Cumulative
1964	40		0.0%	0.1%	0.1%		0.0%		0.0%
1966	38		0.0%	0.2%	0.3%		0.0%		0.0%
1967	37	0.7%	0.7%	0.1%	0.3%		0.0%		0.0%
1968	36	0.6%	1.3%	0.2%	0.5%	0.2%	0.2%		0.0%
1969	35	0.7%	2.0%	0.1%	0.6%		0.2%		0.0%
1970	34	0.7%	2.7%	0.1%	0.7%		0.2%		0.0%
1971	34	1.0%	3.7%		0.7%	0.1%	0.3%		0.0%
1972	32	1.0%	4.7%	0.2%	0.8%		0.3%		0.0%
1973	31	1.1%	5.8%	0.2%	1.0%	0.2%	0.5%	0.3%	0.3%
1974	30	1.7%	7.5%	0.2%	1.2%	0.2%	0.6%		0.3%
1975	29	2.3%	9.8%	0.6%	1.8%	0.4%	1.1%	0.3%	0.6%
1976	28	3.2%	13.0%	0.9%	2.7%	0.9%	2.0%	0.7%	1.3%
1977	27	8.3%	21.3%	1.3%	4.0%	1.4%	3.4%	0.2%	1.5%
1978	26	5.7%	27.0%	1.8%	5.8%	1.0%	4.3%	0.3%	1.8%
1979	25	3.2%	30.1%	0.8%	6.6%	0.7%	5.1%	0.4%	2.1%
1980	24	3.4%	33.5%	0.7%	7.3%	1.2%	6.3%	0.3%	2.4%
1981	23	4.9%	38.3%	0.8%	8.1%	4.7%	10.9%	3.8%	6.2%
1982	22	5.0%	43.3%	3.0%	11.1%	5.4%	16.3%	4.2%	10.5%
1983	21	5.2%	48.5%	2.7%	13.8%	4.4%	20.7%	1.7%	12.2%
1984	20	9.3%	57.8%	5.0%	18.8%	5.0%	25.7%	2.5%	14.7%
1985	19	8.1%	65.9%	7.0%	25.8%	1.5%	27.2%	3.6%	18.2%
1986	18	3.8%	69.7%	4.5%	30.4%	2.0%	29.2%	5.0%	23.2%
1987	17	1.8%	71.5%	1.8%	32.2%	2.5%	31.7%	3.0%	26.2%
1988	16	0.4%	71.9%	1.0%	33.2%	1.4%	33.1%	1.6%	27.8%
1989	15	1.1%	73.0%	2.0%	35.2%	3.0%	36.1%	2.7%	30.5%
1990	14	1.2%	74.2%	2.2%	37.4%	2.7%	38.8%	6.0%	36.5%
1991	13	0.8%	75.0%	2.5%	39.9%	1.4%	40.2%	2.6%	39.1%
1992	12	1.0%	76.0%	1.2%	41.1%	0.5%	40.7%	3.0%	42.0%
1993	11	1.0%	77.0%	0.8%	41.8%	3.1%	43.8%	4.5%	46.6%
1994	10	1.3%	78.3%	4.7%	46.6%	5.4%	49.3%	4.4%	51.0%
1995	9	2.8%	81.1%	6.3%	52.9%	5.3%	54.6%	6.0%	56.9%
1996	8	3.0%	84.1%	7.3%	60.2%	4.3%	58.8%	8.1%	65.1%
1997	7	3.5%	87.5%	6.1%	66.3%	7.1%	65.9%	7.6%	72.7%
1998	6	2.5%	90.1%	6.1%	72.5%	5.7%	71.7%	2.3%	75.0%
1999	5	2.3%	92.4%	3.3%	75.8%	6.0%	77.6%	4.4%	79.4%
2000	4	1.7%	94.1%	3.1%	78.9%	4.9%	82.6%	6.2%	85.6%
2001	3	2.1%	96.2%	8.3%	87.2%	10.2%	92.8%	5.5%	91.1%
2002	2	2.1%	98.3%	7.7%	94.8%	5.5%	98.3%	4.1%	95.2%
2003	1	1.7%	100.0%	5.2%	100.0%	1.7%	100.0%	4.8%	100.0%
Total		100.0%		100.0%		100.0%		100.0%	
Average									

Source: G.E.C., Inc., based on *The Clarkson Register* (January 2004).

Table 26 shows the number and DWT capacity for the world bulk fleet categories. Capesize vessels, exceeding Panamax constraints, account for nearly 11 percent of total bulk vessels and nearly one-third of the world bulk fleet carrying capacity. Conversely, the smallest vessels, Handysize, account for nearly one-half of the total number of bulk vessels in the world fleet but only one-quarter of total world fleet carrying (DWT) capacity.

Table 26.
Number of Bulk Vessels and DWT
Capacity of the World Fleet

Vessel Type	Number of Vessels	DWT Capacity	Percent of Vessels	Percent of DWT Capacity
Capesize	618	97,933,686	11.1	32.6
Panamax	1,055	74,254,174	18.9	24.7
Handymax	1,206	55,971,962	21.6	18.6
Handysize	2,704	72,132,797	48.4	24.0
Total	5,583	300,292,619	100.0	100.0

Source: Tables 20 through 24.

TANKER SHIPS

The size characteristics and trends for the world tanker fleet categorized as Very Large Crude Carrier (VLCC), Suezmax, Aframax, Panamax, Handysize, and Small vessels are shown in tables 27 through 32. The fleet is mature with respect to the size characteristics of the vessels. The oversupply of crude carrying capacity reflected in the dearth of new buildings in the early 1980s has been corrected, and a recent round of new buildings has occurred starting in 1999.

Tables 33 and 34 show the cumulative world bulk fleet categories for vessels by age and DWT capacity. The influx of new buildings in the crude sector is obvious. Nearly 40 percent of the existing VLCC fleet was constructed after 1998, compared to nearly 30 percent for the Suezmax and Aframax categories. In contrast, approximately 20 percent of the existing Panamax tanker fleet was constructed after 1998, and nearly 10 percent of the Handysize and Small vessel categories were constructed after 1998.

Table 35 shows the number and DWT capacity for the world bulk fleet subcategories. VLCC vessels constitute 13 percent of the total world tanker fleet but account for over 40 percent of the total carrying capacity. Conversely, small tankers comprise nearly 20 percent of the total world fleet tanker vessels but only 1.2 percent of the total fleet carrying capacity. The world tanker fleet as shown in Table 34 divides along Panamax vessel size lines. Typically, Panamax vessels are for limited sectors of the crude trade or refined products movements. Panamax size tankers are usually regarded as too small for efficient deployment in the crude sector and too large for efficient deployment in the refined products sector. Vessels below the Panamax threshold are used for refined products such as gasoline and chemicals (Clarkson's has a set of vessels designated as chemical carriers that are analyzed separately). Vessels larger than Panamax are devoted to the crude sector. Although there was a dearth of Panamax tanker vessel new buildings in the mid to late 1990s (refer to Table 33), this sector has seen a spate of new buildings after 1998 that probably reflects specialty (refined) products movements.

Table 27. Tanker VLCC Vessel Size Fleet Characteristics
(All vessel size characteristics expressed in metric units)

Build Year	Age	Number of Vessels	Average LOA	Average Beam	Average Draught	Average DWT	Total DWT	Percent by Age	Percent by DWT
1973	31	1	339.6	53.6	22.8	284,824	284,824	0.2%	0.2%
1974	30	1	337.1	54.6	21.1	273,206	273,206	0.2%	0.2%
1975	29	2	327.0	52.3	20.9	252,917	505,833	0.5%	0.4%
1976	28	8	342.1	55.5	21.1	287,152	2,297,213	1.8%	1.8%
1977	27	3	335.4	55.0	21.3	283,914	851,742	0.7%	0.7%
1978	26							0.0%	0.0%
1979	25	6	363.3	61.6	22.5	365,548	2,193,287	1.4%	1.7%
1980	24	1	340.5	65.0	23.2	360,717	360,717	0.2%	0.3%
1981	23	3	332.7	58.0	20.9	281,107	843,320	0.7%	0.7%
1982	22	1	336.0	60.0	20.6	294,739	294,739	0.2%	0.2%
1983	21	2	341.1	58.7	21.7	308,825	617,650	0.5%	0.5%
1984	20	1	315.5	54.5	19.7	255,987	255,987	0.2%	0.2%
1985	19	2	320.0	57.0	19.4	248,936	497,871	0.5%	0.4%
1986	18	12	323.6	56.6	20.1	262,933	3,155,194	2.8%	2.5%
1987	17	8	321.7	56.0	20.1	260,890	2,087,121	1.8%	1.7%
1988	16	11	324.3	57.0	19.9	260,570	2,866,269	2.5%	2.3%
1989	15	16	323.7	56.8	20.3	269,877	4,318,037	3.7%	3.4%
1990	14	13	325.1	56.7	19.9	267,265	3,474,446	3.0%	2.8%
1991	13	18	326.1	57.2	20.2	270,426	4,867,673	4.1%	3.9%
1992	12	26	326.9	57.6	20.4	273,134	7,101,486	6.0%	5.6%
1993	11	39	330.7	57.8	20.8	282,388	11,013,140	9.0%	8.7%
1994	10	20	331.7	58.1	21.3	289,172	5,783,447	4.6%	4.6%
1995	9	26	330.8	57.3	21.2	287,636	7,478,534	6.0%	5.9%
1996	8	23	332.9	57.8	21.6	291,740	6,710,019	5.3%	5.3%
1997	7	10	333.7	57.6	22.1	298,514	2,985,137	2.3%	2.4%
1998	6	13	332.4	58.5	21.9	302,563	3,933,320	3.0%	3.1%
1999	5	30	332.4	58.7	21.6	299,450	8,983,487	6.9%	7.1%
2000	4	41	332.2	58.9	21.6	299,070	12,261,864	9.4%	9.7%
2001	3	26	332.4	59.7	21.5	300,236	7,806,141	6.0%	6.2%
2002	2	39	336.4	59.8	22.0	315,028	12,286,089	9.0%	9.7%
2003	1	32	333.9	59.5	21.7	309,658	9,909,059	7.4%	7.8%
Total		434					126,296,852	100.0%	100.0%
Average							291,007		

Source: G.E.C., Inc., based on *The Clarkson Register* (January 2004).

Table 28. Tanker Suezmax Vessel Size Fleet Characteristics
(All vessel size characteristics expressed in metric units)

Build Year	Age	Number of Vessels	Average LOA	Average Beam	Average Draught	Average DWT	Total DWT	Percent by Age	Percent by DWT
1974	30	5	265.2	41.9	16.9	130,811	654,054	1.6%	1.4%
1975	29	2	272.5	41.3	16.7	131,012	262,024	0.6%	0.6%
1976	28	5	282.1	44.9	16.4	145,267	726,337	1.6%	1.6%
1977	27	4	276.2	43.4	16.2	134,456	537,824	1.3%	1.2%
1978	26	6	275.0	44.2	17.4	147,331	883,984	1.9%	1.9%
1979	25	4	273.2	44.1	16.9	144,462	577,846	1.3%	1.2%
1980	24	5	285.7	46.1	15.9	145,675	728,375	1.6%	1.6%
1981	23	2	290.3	44.8	16.0	140,178	280,355	0.6%	0.6%
1982	22	6	272.3	48.6	16.0	146,886	881,318	1.9%	1.9%
1983	21	4	262.1	41.7	15.9	128,458	513,833	1.3%	1.1%
1984	20	4	277.9	46.1	15.5	137,369	549,476	1.3%	1.2%
1985	19	0						0.0%	
1986	18	3	271.7	45.3	16.9	146,956	440,867	1.0%	0.9%
1987	17	5	269.3	45.6	16.6	139,685	698,425	1.6%	1.5%
1988	16	8	267.0	46.0	16.2	139,436	1,115,488	2.5%	2.4%
1989	15	12	266.8	44.4	16.4	142,323	1,707,879	3.8%	3.7%
1990	14	9	271.9	45.3	16.7	145,920	1,313,277	2.9%	2.8%
1991	13	26	277.6	45.4	16.9	154,363	4,013,446	8.3%	8.6%
1992	12	30	273.9	45.8	16.7	148,975	4,469,260	9.6%	9.6%
1993	11	13	269.1	45.4	16.4	143,544	1,866,078	4.1%	4.0%
1994	10	9	275.0	46.2	16.9	149,616	1,346,545	2.9%	2.9%
1995	9	8	270.0	45.1	16.4	141,245	1,129,960	2.5%	2.4%
1996	8	9	273.1	46.1	16.5	146,333	1,316,994	2.9%	2.8%
1997	7	11	270.9	45.3	16.8	144,123	1,585,354	3.5%	3.4%
1998	6	21	271.4	46.9	16.3	148,541	3,119,352	6.7%	6.7%
1999	5	16	271.5	46.9	16.3	147,913	2,366,614	5.1%	5.1%
2000	4	22	273.1	47.5	16.6	151,562	3,334,363	7.0%	7.2%
2001	3	16	274.1	48.0	16.8	155,954	2,495,260	5.1%	5.4%
2002	2	24	273.9	48.5	16.6	156,634	3,759,227	7.6%	8.1%
2003	1	25	271.8	47.7	16.1	154,209	3,855,222	8.0%	8.3%
Total		314					46,529,037	100.0%	100.0%
Average							148,182		

Source: G.E.C., Inc., based on *The Clarkson Register* (January 2004).

Table 29. Tanker Aframax Vessel Size Fleet Characteristics
(All vessel size characteristics expressed in metric units)

Build Year	Age	Number of Vessels	Average LOA	Average Beam	Average Draught	Average DWT	Total DWT	Percent by Age	Percent by DWT
1972	32	1	268.5	39.0	14.2	96,711	96,711	0.2%	0.2%
1973	31	1	274.0	32.2	14.5	91,393	91,393	0.2%	0.1%
1974	30	4	238.8	39.6	14.0	89,792	359,166	0.6%	0.6%
1975	29	6	241.4	39.3	14.2	91,760	550,557	0.9%	0.9%
1976	28	8	245.4	39.1	15.0	94,293	754,340	1.3%	1.2%
1977	27	4	263.6	34.2	14.8	90,890	363,559	0.6%	0.6%
1978	26	3	266.2	37.0	15.2	101,955	305,865	0.5%	0.5%
1979	25	11	243.1	42.3	14.1	96,148	1,057,626	1.7%	1.7%
1980	24	23	241.6	41.8	13.2	89,755	2,064,363	3.6%	3.3%
1981	23	23	241.5	41.0	13.5	90,579	2,083,309	3.6%	3.3%
1982	22	8	244.0	40.8	13.4	89,439	715,511	1.3%	1.1%
1983	21	9	249.5	38.3	13.4	86,464	778,173	1.4%	1.3%
1984	20	3	259.0	39.4	14.7	105,432	316,296	0.5%	0.5%
1985	19	18	243.2	40.7	13.3	89,965	1,619,376	2.8%	2.6%
1986	18	25	238.4	41.5	14.0	93,489	2,337,225	4.0%	3.8%
1987	17	22	239.1	39.4	13.8	91,377	2,010,303	3.5%	3.2%
1988	16	16	237.8	39.8	13.9	95,910	1,534,561	2.5%	2.5%
1989	15	17	236.7	40.6	13.9	93,463	1,588,876	2.7%	2.6%
1990	14	27	239.1	40.0	14.4	95,779	2,586,032	4.3%	4.2%
1991	13	27	241.7	41.4	14.0	97,884	2,642,863	4.3%	4.2%
1992	12	39	241.8	41.1	14.2	97,951	3,820,095	6.2%	6.1%
1993	11	30	243.5	41.7	13.7	96,130	2,883,899	4.7%	4.6%
1994	10	23	243.1	41.2	13.9	95,941	2,206,648	3.6%	3.5%
1995	9	14	239.2	41.9	14.0	95,108	1,331,506	2.2%	2.1%
1996	8	18	243.2	42.2	14.2	99,732	1,795,173	2.8%	2.9%
1997	7	21	244.8	42.2	14.3	103,229	2,167,816	3.3%	3.5%
1998	6	34	244.8	42.3	14.2	101,368	3,446,499	5.4%	5.5%
1999	5	52	244.6	42.2	14.4	103,698	5,392,284	8.2%	8.7%
2000	4	22	244.9	42.6	14.1	103,245	2,271,389	3.5%	3.6%
2001	3	15	245.7	42.3	14.3	102,710	1,540,653	2.4%	2.5%
2002	2	36	244.4	42.2	14.5	105,141	3,785,086	5.7%	6.1%
2003	1	72	245.1	42.5	14.5	107,425	7,734,632	11.4%	12.4%
Total		632					62,231,785	100.0%	100.0%
Average							98,468		

Source: G.E.C., Inc., based on *The Clarkson Register* (January 2004).

Table 30. Tanker Panamax Vessel Size Fleet Characteristics
 (All vessel size characteristics expressed in metric units)

Build Year	Age	Number of Vessels	Average LOA	Average Beam	Average Draught	Average DWT	Total DWT	Percent by Age	Percent by DWT
1965	39	1	236.1	32.4	12.7	64,719	64,719	0.4%	0.4%
1972	32	1	246.9	32.0	13.3	71,340	71,340	0.4%	0.4%
1973	31								
1974	30	2	242.6	34.9	13.0	72,840	145,679	0.8%	0.8%
1975	29	1	232.0	36.1	14.7	77,102	77,102	0.4%	0.4%
1976	28	2	210.0	32.2	13.4	60,882	121,763	0.8%	0.7%
1977	27								
1978	26	4	220.1	35.5	12.2	64,356	257,425	1.6%	1.5%
1979	25	2	226.9	37.2	12.2	68,294	136,588	0.8%	0.8%
1980	24	12	218.7	35.6	12.6	65,789	789,465	4.7%	4.5%
1981	23	33	231.6	32.3	13.3	67,802	2,237,451	12.9%	12.8%
1982	22	19	232.7	32.2	13.0	66,463	1,262,789	7.4%	7.2%
1983	21	20	233.0	32.4	13.2	66,950	1,338,999	7.8%	7.7%
1984	20	17	229.6	32.4	13.2	65,721	1,117,263	6.6%	6.4%
1985	19	18	235.2	32.2	13.8	71,061	1,279,106	7.0%	7.3%
1986	18	8	227.7	32.6	13.6	68,836	550,684	3.1%	3.2%
1987	17	6	229.0	32.8	12.8	64,548	387,290	2.3%	2.2%
1988	16	6	227.9	33.9	12.9	70,312	421,869	2.3%	2.4%
1989	15	5	228.9	32.2	13.3	66,110	330,551	2.0%	1.9%
1990	14	7	229.7	32.2	13.5	67,463	472,244	2.7%	2.7%
1991	13	3	232.3	32.2	13.6	69,193	207,580	1.2%	1.2%
1992	12	10	228.9	32.2	13.4	69,482	694,822	3.9%	4.0%
1993	11	14	228.7	32.9	13.5	68,637	960,918	5.5%	5.5%
1994	10	3	233.3	32.2	13.1	64,042	192,127	1.2%	1.1%
1995	9	2	228.1	34.1	13.6	69,246	138,492	0.8%	0.8%
1996	8	2	232.1	34.1	13.1	68,511	137,022	0.8%	0.8%
1997	7	1	235.9	36.0	11.6	69,999	69,999	0.4%	0.4%
1998	6	1	221.3	38.0	13.0	74,024	74,024	0.4%	0.4%
1999	5	9	226.6	34.7	13.0	70,305	632,747	3.5%	3.6%
2000	4	14	227.8	32.8	13.2	69,187	968,620	5.5%	5.5%
2001	3	4	228.4	34.2	12.8	69,578	278,311	1.6%	1.6%
2002	2	9	228.1	33.1	13.4	70,166	631,493	3.5%	3.6%
2003	1	20	228.3	32.2	13.4	70,698	1,413,957	7.8%	8.1%
Total		256					17,462,439	100.0%	100.0%
Average							68,213		

Source: G.E.C., Inc., based on *The Clarkson Register* (January 2004).

Table 31. Tanker Handysize Vessel Size Fleet Characteristics
(All vessel size characteristics expressed in metric units)

Build Year	Age	Number of Vessels	Average LOA	Average Beam	Average Draught	Average DWT	Total DWT	Percent by Age	Percent by DWT
1970	34	9	168.8	24.8	9.5	24,601	221,409	0.9%	0.6%
1971	33	15	155.9	21.4	8.7	18,013	270,202	1.4%	0.8%
1972	32	5	181.6	24.9	10.7	32,250	161,251	0.5%	0.5%
1973	31	16	171.2	23.2	9.6	24,200	387,192	1.5%	1.1%
1974	30	20	162.3	22.8	9.5	21,863	437,260	1.9%	1.3%
1975	29	50	166.6	23.9	9.9	24,381	1,219,030	4.8%	3.6%
1976	28	52	175.5	25.9	10.6	30,116	1,566,021	5.0%	4.6%
1977	27	46	175.9	25.6	10.6	30,533	1,404,526	4.4%	4.1%
1978	26	26	177.7	25.6	10.8	30,559	794,527	2.5%	2.3%
1979	25	28	173.0	26.6	9.7	30,020	840,573	2.7%	2.5%
1980	24	33	175.2	26.5	9.9	29,994	989,818	3.2%	2.9%
1981	23	53	181.0	28.5	10.7	35,679	1,890,976	5.1%	5.5%
1982	22	77	176.8	28.0	10.5	34,090	2,624,942	7.4%	7.7%
1983	21	45	179.5	27.7	10.6	33,024	1,486,073	4.3%	4.3%
1984	20	33	180.7	28.1	10.9	36,067	1,190,195	3.2%	3.5%
1985	19	34	172.4	26.7	10.4	30,691	1,043,484	3.3%	3.0%
1986	18	35	174.8	27.1	10.6	31,218	1,092,634	3.4%	3.2%
1987	17	32	178.2	28.5	10.6	33,732	1,079,430	3.1%	3.1%
1988	16	35	176.3	28.3	11.0	34,600	1,211,014	3.4%	3.5%
1989	15	33	181.8	29.0	11.4	37,462	1,236,244	3.2%	3.6%
1990	14	21	178.9	28.3	11.0	33,071	694,482	2.0%	2.0%
1991	13	26	178.0	29.1	11.1	37,857	984,293	2.5%	2.9%
1992	12	30	183.1	30.0	11.6	40,216	1,206,480	2.9%	3.5%
1993	11	34	176.6	28.7	10.4	32,569	1,107,329	3.3%	3.2%
1994	10	27	172.0	27.7	10.3	31,694	855,745	2.6%	2.5%
1995	9	32	162.9	25.8	10.1	27,916	893,313	3.1%	2.6%
1996	8	35	169.2	27.8	10.9	33,981	1,189,323	3.4%	3.5%
1997	7	9	178.6	30.9	11.3	40,499	364,495	0.9%	1.1%
1998	6	23	172.9	29.5	10.2	33,903	779,758	2.2%	2.3%
1999	5	33	175.7	30.2	11.1	38,388	1,266,788	3.2%	3.7%
2000	4	19	176.4	30.2	11.4	39,158	743,998	1.8%	2.2%
2001	3	15	176.2	29.1	11.0	36,241	543,608	1.4%	1.6%
2002	2	24	176.6	30.1	11.1	37,643	903,431	2.3%	2.6%
2003	1	35	183.4	32.1	12.0	45,466	1,591,315	3.4%	4.6%
Total		1,040					34,271,159	100.0%	100.0%
Average							32,953		

Source: G.E.C., Inc., based on *The Clarkson Register* (January 2004).

Table 32. Tanker Small Vessel Size Fleet Characteristics
(All vessel size characteristics expressed in metric units)

Build Year	Age	Number of Vessels	Average LOA	Average Beam	Average Draught	Average DWT	Total DWT	Percent by Age	Percent by DWT
1965	39	2	112.3	15.3	6.7	5,315	10,630	0.3%	0.3%
1966	38	3	111.6	15.5	6.3	5,603	16,808	0.5%	0.5%
1967	37	6	103.0	14.0	5.5	4,692	28,150	0.9%	0.8%
1968	36	7	95.8	13.3	5.6	4,179	29,251	1.1%	0.8%
1969	35	14	106.4	15.1	6.1	5,426	75,961	2.1%	2.1%
1970	34	11	105.6	15.3	6.3	4,843	53,277	1.7%	1.5%
1971	33	24	98.7	14.3	6.0	4,663	111,903	3.6%	3.1%
1972	32	13	106.7	15.2	6.8	5,925	77,031	2.0%	2.1%
1973	31	20	105.7	15.2	6.3	5,540	110,795	3.0%	3.1%
1974	30	30	107.7	15.6	6.3	5,641	169,234	4.5%	4.7%
1975	29	20	108.5	15.8	6.4	5,634	112,678	3.0%	3.1%
1976	28	14	113.7	16.4	6.1	5,769	80,762	2.1%	2.2%
1977	27	13	101.7	15.2	5.9	5,157	67,035	2.0%	1.9%
1978	26	18	106.6	15.9	6.5	5,827	104,878	2.7%	2.9%
1979	25	22	107.6	16.2	6.3	5,469	120,316	3.3%	3.3%
1980	24	27	95.5	15.2	5.9	4,747	128,169	4.1%	3.6%
1981	23	26	99.6	15.1	6.2	4,950	128,704	3.9%	3.6%
1982	22	20	101.6	15.7	6.3	5,330	106,598	3.0%	3.0%
1983	21	21	98.8	14.6	6.1	4,558	95,719	3.2%	2.7%
1984	20	14	112.7	16.1	6.0	5,517	77,237	2.1%	2.1%
1985	19	20	105.6	15.6	6.1	5,140	102,808	3.0%	2.8%
1986	18	16	107.9	16.1	6.5	5,503	88,045	2.4%	2.4%
1987	17	12	120.0	15.8	5.1	5,497	65,964	1.8%	1.8%
1988	16	12	116.6	16.1	6.0	6,104	73,242	1.8%	2.0%
1989	15	16	106.1	15.4	5.9	5,325	85,195	2.4%	2.4%
1990	14	19	94.7	15.3	6.0	4,928	93,626	2.9%	2.6%
1991	13	23	97.5	14.9	6.0	4,708	108,285	3.5%	3.0%
1992	12	20	99.6	16.1	5.9	5,239	104,788	3.0%	2.9%
1993	11	27	104.5	16.1	6.4	5,586	150,832	4.1%	4.2%
1994	10	25	100.5	16.7	6.1	5,929	148,220	3.8%	4.1%
1995	9	33	100.4	16.5	6.2	5,955	196,524	5.0%	5.4%
1996	8	11	102.4	17.3	6.6	6,686	73,542	1.7%	2.0%
1997	7	18	100.3	16.2	5.9	5,203	93,659	2.7%	2.6%
1998	6	15	101.3	15.9	6.1	5,349	80,234	2.3%	2.2%
1999	5	18	107.0	17.2	6.3	6,202	111,642	2.7%	3.1%
2000	4	8	121.3	16.7	5.9	7,008	56,067	1.2%	1.6%
2001	3	11	112.5	16.8	6.0	6,748	74,231	1.7%	2.1%
2002	2	12	114.7	16.2	5.4	5,601	67,209	1.8%	1.9%
2003	1	21	115.4	16.5	5.9	6,115	128,405	3.2%	3.6%
Total		662					3,607,654	100.0%	100.0%
Average							5,450		

Source: G.E.C., Inc., based on *The Clarkson Register* (January 2004).

Table 33. World Tanker Fleet by Age
(All vessel size characteristics expressed in metric units)

Build Year	Age	Small % by Age	Small Cumulative	Handysize % by Age	Handysize Cumulative	Panamax % by Age	Panamax Cumulative	Aframax % by Age	Aframax Cumulative	Suezmax % by Age	Suezmax Cumulative	VLCC % by Age	VLCC Cumulative
1965	39	0.3%	0.3%	0.2%	0.2%		0.0%		0.0%		0.0%		0.0%
1966	38	0.5%	0.8%	0.3%	0.5%		0.0%		0.0%		0.0%		0.0%
1967	37	0.9%	1.7%	0.4%	0.8%		0.0%		0.0%		0.0%		0.0%
1968	36	1.1%	2.7%	0.6%	1.4%		0.0%		0.0%		0.0%		0.0%
1969	35	2.1%	4.8%	0.5%	1.9%		0.0%		0.0%		0.0%		0.0%
1970	34	1.7%	6.5%	0.8%	2.7%		0.0%		0.0%		0.0%		0.0%
1971	33	3.6%	10.1%	1.4%	4.2%		0.0%		0.0%		0.0%		0.0%
1972	32	2.0%	12.1%	0.5%	4.6%	0.4%	0.4%	0.2%	0.2%		0.0%		0.0%
1973	31	3.0%	15.1%	1.5%	6.1%		0.4%	0.2%	0.3%		0.0%	0.2%	0.2%
1974	30	4.5%	19.6%	1.9%	8.0%	0.8%	1.2%	0.6%	0.9%	1.6%	1.6%	0.2%	0.5%
1975	29	3.0%	22.7%	4.7%	12.7%	0.4%	1.6%	0.9%	1.9%	0.6%	2.2%	0.5%	0.9%
1976	28	2.1%	24.8%	4.9%	17.6%	0.8%	2.3%	1.3%	3.2%	1.6%	3.8%	1.8%	2.8%
1977	27	2.0%	26.7%	4.3%	22.0%		2.3%	0.6%	3.8%	1.3%	5.1%	0.7%	3.5%
1978	26	2.7%	29.5%	2.5%	24.4%	1.6%	3.9%	0.5%	4.3%	1.9%	7.0%	0.0%	3.5%
1979	25	3.3%	32.8%	2.6%	27.1%	0.8%	4.7%	1.7%	6.0%	1.3%	8.3%	1.4%	4.8%
1980	24	4.1%	36.9%	3.1%	30.2%	4.7%	9.4%	3.6%	9.7%	1.6%	9.9%	0.2%	5.1%
1981	23	3.9%	40.8%	5.0%	35.2%	12.9%	22.3%	3.6%	13.3%	0.6%	10.5%	0.7%	5.8%
1982	22	3.0%	43.8%	7.3%	42.5%	7.4%	29.7%	1.3%	14.6%	1.9%	12.4%	0.2%	6.0%
1983	21	3.2%	47.0%	4.2%	46.7%	7.8%	37.5%	1.4%	16.0%	1.3%	13.7%	0.5%	6.5%
1984	20	2.1%	49.1%	3.1%	49.8%	6.6%	44.1%	0.5%	16.5%	1.3%	15.0%	0.2%	6.7%
1985	19	3.0%	52.1%	3.2%	53.0%	7.0%	51.2%	2.8%	19.3%		15.0%	0.5%	7.1%
1986	18	2.4%	54.5%	3.3%	56.3%	3.1%	54.3%	4.0%	23.3%	1.0%	15.9%	2.8%	9.9%
1987	17	1.8%	56.3%	3.0%	59.3%	2.3%	56.6%	3.5%	26.7%	1.6%	17.5%	1.8%	11.8%
1988	16	1.8%	58.2%	3.3%	62.6%	2.3%	59.0%	2.5%	29.3%	2.5%	20.1%	2.5%	14.3%
1989	15	2.4%	60.6%	3.1%	65.8%	2.0%	60.9%	2.7%	32.0%	3.8%	23.9%	3.7%	18.0%
1990	14	2.9%	63.4%	2.0%	67.7%	2.7%	63.7%	4.3%	36.2%	2.9%	26.8%	3.0%	21.0%
1991	13	3.5%	66.9%	2.5%	70.2%	1.2%	64.8%	4.3%	40.5%	8.3%	35.0%	4.1%	25.1%
1992	12	3.0%	69.9%	2.8%	73.0%	3.9%	68.8%	6.2%	46.7%	9.6%	44.6%	6.0%	31.1%
1993	11	4.1%	74.0%	3.2%	76.2%	5.5%	74.2%	4.7%	51.4%	4.1%	48.7%	9.0%	40.1%
1994	10	3.8%	77.8%	2.5%	78.8%	1.2%	75.4%	3.6%	55.1%	2.9%	51.6%	4.6%	44.7%
1995	9	5.0%	82.8%	3.0%	81.8%	0.8%	76.2%	2.2%	57.3%	2.5%	54.1%	6.0%	50.7%
1996	8	1.7%	84.4%	3.3%	85.1%	0.8%	77.0%	2.8%	60.1%	2.9%	57.0%	5.3%	56.0%
1997	7	2.7%	87.2%	0.8%	85.9%	0.4%	77.3%	3.3%	63.4%	3.5%	60.5%	2.3%	58.3%
1998	6	2.3%	89.4%	2.2%	88.1%	0.4%	77.7%	5.4%	68.8%	6.7%	67.2%	3.0%	61.3%
1999	5	2.7%	92.1%	3.1%	91.2%	3.5%	81.3%	8.2%	77.1%	5.1%	72.3%	6.9%	68.2%
2000	4	1.2%	93.4%	1.8%	93.0%	5.5%	86.7%	3.5%	80.5%	7.0%	79.3%	9.4%	77.6%
2001	3	1.7%	95.0%	1.4%	94.4%	1.6%	88.3%	2.4%	82.9%	5.1%	84.4%	6.0%	83.6%
2002	2	1.8%	96.8%	2.3%	96.7%	3.5%	91.8%	5.7%	88.6%	7.6%	92.0%	9.0%	92.6%
2003	1	3.2%	100.0%	3.3%	100.0%	7.8%	99.6%	11.4%	100.0%	8.0%	100.0%	7.4%	100.0%
Total		100.0%		100.0%		100.0%		100.0%		100.0%		100.0%	

Source: G.E.C., Inc., based on *The Clarkson Register* (January 2004).

Table 34. World Tanker Fleet Capacity by DWT
(All vessel size characteristics expressed in metric units)

Build Year	Age	Small % by DWT	Small Cumulative	Handysize % by DWT	Handysize Cumulative	Panamax % by DWT	Panamax Cumulative	Aframax % by DWT	Aframax Cumulative	Suezmax % by DWT	Suezmax Cumulative	VLCC % by DWT	VLCC Cumulative
1965	39	0.3%	0.3%	0.1%	0.1%		0.0%		0.0%		0.0%		0.0%
1966	38	0.5%	0.8%	0.1%	0.2%		0.0%		0.0%		0.0%		0.0%
1967	37	0.8%	1.5%	0.2%	0.4%		0.0%		0.0%		0.0%		0.0%
1968	36	0.8%	2.4%	0.4%	0.8%		0.0%		0.0%		0.0%		0.0%
1969	35	2.1%	4.5%	0.3%	1.1%		0.0%		0.0%		0.0%		0.0%
1970	34	1.5%	5.9%	0.6%	1.7%		0.0%		0.0%		0.0%		0.0%
1971	33	3.1%	9.0%	0.8%	2.5%		0.0%		0.0%		0.0%		0.0%
1972	32	2.1%	11.2%	0.5%	3.0%	0.4%	0.4%	0.2%	0.2%		0.0%		0.0%
1973	31	3.1%	14.2%	1.1%	4.1%		0.4%	0.1%	0.3%		0.0%	0.2%	0.2%
1974	30	4.7%	18.9%	1.3%	5.4%	0.8%	1.2%	0.6%	0.9%	1.4%	1.4%	0.2%	0.4%
1975	29	3.1%	22.1%	3.5%	8.9%	0.4%	1.7%	0.9%	1.8%	0.6%	2.0%	0.4%	0.8%
1976	28	2.2%	24.3%	4.5%	13.4%	0.7%	2.4%	1.2%	3.0%	1.6%	3.5%	1.8%	2.7%
1977	27	1.9%	26.2%	4.1%	17.5%		2.4%	0.6%	3.6%	1.2%	4.7%	0.7%	3.3%
1978	26	2.9%	29.1%	2.3%	19.8%	1.5%	3.9%	0.5%	4.1%	1.9%	6.6%	0.0%	3.3%
1979	25	3.3%	32.4%	2.4%	22.2%	0.8%	4.6%	1.7%	5.8%	1.2%	7.8%	1.7%	5.1%
1980	24	3.6%	35.9%	2.9%	25.0%	4.5%	9.2%	3.3%	9.1%	1.6%	9.4%	0.3%	5.4%
1981	23	3.6%	39.5%	5.5%	30.5%	12.8%	22.0%	3.3%	12.4%	0.6%	10.0%	0.7%	6.0%
1982	22	3.0%	42.5%	7.6%	38.1%	7.2%	29.2%	1.1%	13.6%	1.9%	11.9%	0.2%	6.3%
1983	21	2.7%	45.1%	4.3%	42.4%	7.7%	36.9%	1.3%	14.8%	1.1%	13.0%	0.5%	6.7%
1984	20	2.1%	47.3%	3.4%	45.8%	6.4%	43.3%	0.5%	15.3%	1.2%	14.2%	0.2%	7.0%
1985	19	2.8%	50.1%	3.0%	48.8%	7.3%	50.6%	2.6%	17.9%		14.2%	0.4%	7.3%
1986	18	2.4%	52.6%	3.2%	52.0%	3.2%	53.7%	3.8%	21.7%	0.9%	15.1%	2.5%	9.8%
1987	17	1.8%	54.4%	3.1%	55.1%	2.2%	56.0%	3.2%	24.9%	1.5%	16.6%	1.7%	11.5%
1988	16	2.0%	56.4%	3.5%	58.6%	2.4%	58.4%	2.5%	27.4%	2.4%	19.0%	2.3%	13.8%
1989	15	2.4%	58.8%	3.6%	62.1%	1.9%	60.3%	2.6%	29.9%	3.7%	22.7%	3.4%	17.2%
1990	14	2.6%	61.4%	2.0%	64.1%	2.7%	63.0%	4.2%	34.1%	2.8%	25.5%	2.8%	19.9%
1991	13	3.0%	64.4%	2.8%	67.0%	1.2%	64.2%	4.2%	38.3%	8.6%	34.1%	3.9%	23.8%
1992	12	2.9%	67.3%	3.5%	70.5%	4.0%	68.1%	6.1%	44.5%	9.6%	43.7%	5.6%	29.4%
1993	11	4.2%	71.5%	3.2%	73.7%	5.5%	73.6%	4.6%	49.1%	4.0%	47.8%	8.7%	38.1%
1994	10	4.1%	75.6%	2.5%	76.1%	1.1%	74.7%	3.5%	52.7%	2.9%	50.6%	4.6%	42.7%
1995	9	5.4%	81.0%	2.6%	78.7%	0.8%	75.5%	2.1%	54.8%	2.4%	53.1%	5.9%	48.6%
1996	8	2.0%	83.1%	3.4%	82.1%	0.8%	76.3%	2.9%	57.7%	2.8%	55.9%	5.3%	53.9%
1997	7	2.6%	85.6%	1.1%	83.2%	0.4%	76.7%	3.5%	61.2%	3.4%	59.3%	2.4%	56.3%
1998	6	2.2%	87.9%	2.2%	85.4%	0.4%	77.2%	5.5%	66.7%	6.7%	66.0%	3.1%	59.4%
1999	5	3.1%	91.0%	3.7%	89.1%	3.6%	80.8%	8.7%	75.4%	5.1%	71.1%	7.1%	66.5%
2000	4	1.6%	92.5%	2.1%	91.2%	5.5%	86.3%	3.6%	79.0%	7.2%	78.3%	9.7%	76.2%
2001	3	2.1%	94.6%	1.6%	92.8%	1.6%	87.9%	2.5%	81.5%	5.4%	83.6%	6.2%	82.4%
2002	2	1.9%	96.4%	2.6%	95.4%	3.6%	91.5%	6.1%	87.6%	8.1%	91.7%	9.7%	92.2%
2003	1	3.6%	100.0%	4.6%	100.0%	8.1%	99.6%	12.4%	100.0%	8.3%	100.0%	7.8%	100.0%
Total		100.0%		100.0%		100.0%		100.0%		100.0%		100.0%	

Source: G.E.C., Inc., based on *The Clarkson Register* (January 2004).

Table 35. Number of Liquid Bulk Vessels and DWT Capacity of the World Fleet

Vessel Type	Number of Vessels	DWT Capacity	Percent of Vessels	Percent of DWT Capacity
VLCC	434	12,6296,852	13.0	43.5
Suezmax	314	46,529,037	9.4	16.0
Aframax	632	62,231,785	18.9	21.4
Panamax	256	17,462,439	7.7	6.0
Handysize	1,040	34,271,159	31.2	11.8
Small	662	3,607,654	19.8	1.2
Total	3,338	290,398,926	100.0	100.0

Source: Tables 27 through 32.

CHEMICAL SHIPS

Size and trend characteristics for the chemical ships are shown in Table 36. These are predominantly small vessels equipped as a specialty sector apart from conventional liquid (tank) bulk ships. Many of the chemical vessels operate as parcel tankers carrying an assortment of different chemical substances in segmented tanks. The average DWT of the world fleet is nearly 15,000 tonnes, although new buildings since the mid-1990s have exceeded the average. Since 1994, the number of new buildings accounts for nearly 40 percent of the fleet and 55 percent of the DWT carrying capacity.

MULTI-PURPOSE SHIPS

Size and trend characteristics for multi-purpose ships commonly denoted as “general cargo” vessels are shown in Table 37. As the dimensions indicate, these are small vessels, with an average DWT of nearly 10,000 tonnes. Although the fleet was severely impacted by the shift to containerization in the 1960s and early 1970s, there has been a steady rate of vessel new buildings in the past decade.

RO-RO SHIPS

Size and trend characteristics for ro-ro ships (excluding pure car carriers) and pure car carrier (PCC) vessels are shown in tables 38 and 39. These are primarily smaller vessels, similar in scope to “multi-purpose,” with an overall average DWT of nearly 10,000 tonnes. There has been a steady but slow rate of replacement of the fleet from the perspective of annual new buildings. New buildings since 1998 have been larger than the average in size and DWT, primarily because of new capacity for the Pure Car Carrier (PCC) fleet.

Table 36. Chemical Vessel Size Fleet Characteristics
(All vessel size characteristics expressed in metric units)

Build Year	Age	Number of Vessels	Average LOA	Average Beam	Average Draught	Average DWT	Total DWT	Percent by Age	Percent by DWT
1961	43	1	68.8	10.2	4.6	1,603	1,603	0.0%	0.0%
1963	41	2	76.9	10.6	4.7	2,028	4,056	0.1%	0.0%
1964	40	5	73.9	10.4	4.4	1,766	8,832	0.2%	0.0%
1965	39	5	75.5	10.9	4.6	2,020	10,099	0.2%	0.0%
1967	37	4	107.4	14.9	6.3	5,256	21,022	0.2%	0.1%
1968	36	22	80.2	12.0	4.8	3,428	75,419	1.0%	0.2%
1969	35	22	80.0	11.8	5.0	2,423	53,299	1.0%	0.2%
1970	34	21	88.5	13.1	5.6	3,562	74,804	1.0%	0.2%
1971	33	14	102.6	16.0	6.2	6,825	95,551	0.7%	0.3%
1972	32	17	93.6	13.8	5.8	5,022	85,368	0.8%	0.3%
1973	31	21	102.0	15.0	6.3	6,170	129,565	1.0%	0.4%
1974	30	33	98.2	14.6	6.2	5,840	192,708	1.5%	0.6%
1975	29	34	102.7	15.4	6.6	8,363	284,326	1.6%	0.9%
1976	28	43	113.7	17.1	7.2	10,434	448,678	2.0%	1.4%
1977	27	32	112.5	17.1	7.2	11,688	374,028	1.5%	1.2%
1978	26	31	122.5	18.5	7.7	13,127	406,923	1.5%	1.3%
1979	25	34	113.5	17.5	7.2	10,449	355,249	1.6%	1.1%
1980	24	65	118.9	18.5	7.6	12,152	789,908	3.0%	2.4%
1981	23	82	121.5	18.7	7.7	12,808	1,050,266	3.8%	3.2%
1982	22	60	141.7	22.3	9.1	19,256	1,155,349	2.8%	3.6%
1983	21	69	129.6	20.6	8.2	16,235	1,120,192	3.2%	3.4%
1984	20	75	120.8	18.7	7.5	12,194	914,575	3.5%	2.8%
1985	19	87	120.2	19.6	7.8	14,026	1,220,224	4.1%	3.8%
1986	18	58	125.6	20.1	8.0	16,269	943,629	2.7%	2.9%
1987	17	41	121.2	20.1	8.0	17,931	735,179	1.9%	2.3%
1988	16	43	120.7	19.2	7.7	15,285	657,240	2.0%	2.0%
1989	15	39	105.8	16.5	6.7	8,373	326,558	1.8%	1.0%
1990	14	50	101.6	16.3	6.6	8,953	447,634	2.3%	1.4%
1991	13	76	108.3	17.4	6.9	10,175	773,294	3.6%	2.4%
1992	12	79	106.5	17.1	6.9	9,051	715,020	3.7%	2.2%
1993	11	67	104.9	16.2	6.6	8,508	570,028	3.1%	1.8%
1994	10	54	108.6	17.3	6.8	9,068	489,678	2.5%	1.5%
1995	9	44	134.0	21.6	8.5	17,939	789,318	2.1%	2.4%
1996	8	73	137.5	22.9	8.8	20,682	1,509,751	3.4%	4.6%
1997	7	84	135.5	21.9	8.7	18,881	1,585,962	3.9%	4.9%
1998	6	113	133.8	21.8	8.5	18,110	2,046,470	5.3%	6.3%
1999	5	110	139.7	22.4	8.8	19,404	2,134,431	5.2%	6.6%
2000	4	95	143.0	22.6	8.9	21,555	2,047,695	4.5%	6.3%
2001	3	79	144.4	23.0	9.0	21,894	1,729,595	3.7%	5.3%
2002	2	105	148.3	24.1	9.3	23,750	2,493,785	4.9%	7.7%
2003	1	144	151.7	24.7	9.4	25,341	3,649,081	6.8%	11.2%
Total		2,133				477,841	32,516,392	100.0%	100.0%
Average							15,244		

Source: G.E.C., Inc., based on *The Clarkson Register* (January 2004).

Table 37. Multipurpose Vessel Size Fleet Characteristics
(All vessel size characteristics expressed in metric units)

Build Year	Age	Number of Vessels	Average LOA	Average Beam	Average Draught	Average DWT	Total DWT	Percent by Age	Percent by DWT
1965	39	4	154.6	19.8	8.9	13,051	52,205	0.1%	0.2%
1966	38	8	151.2	20.1	8.9	11,582	92,652	0.2%	0.3%
1967	37	5	149.7	20.5	9.3	11,735	58,673	0.1%	0.2%
1968	36	7	135.6	19.3	8.3	11,924	83,470	0.2%	0.3%
1969	35	27	135.8	19.4	8.4	11,592	312,990	0.8%	0.9%
1970	34	33	130.6	18.8	8.3	10,856	358,260	1.0%	1.1%
1971	33	44	130.2	18.7	7.8	10,770	473,864	1.3%	1.4%
1972	32	56	128.5	18.6	8.0	10,430	584,099	1.7%	1.8%
1973	31	52	132.8	19.0	8.2	10,247	532,860	1.6%	1.6%
1974	30	44	130.1	18.5	7.8	10,410	458,045	1.3%	1.4%
1975	29	52	124.6	17.8	7.6	9,217	479,293	1.6%	1.4%
1976	28	88	123.3	18.5	8.0	11,577	1,018,746	2.6%	3.1%
1977	27	177	134.2	19.7	8.3	12,716	2,250,674	5.3%	6.8%
1978	26	168	133.1	19.8	8.3	12,164	2,043,626	5.0%	6.2%
1979	25	172	134.5	19.9	8.3	12,321	2,119,289	5.1%	6.4%
1980	24	119	136.5	19.9	8.4	12,528	1,490,884	3.6%	4.5%
1981	23	116	129.0	19.4	8.1	11,399	1,322,272	3.5%	4.0%
1982	22	97	127.8	19.4	8.1	10,935	1,060,654	2.9%	3.2%
1983	21	142	129.2	19.9	8.0	11,382	1,616,225	4.2%	4.9%
1984	20	127	127.0	20.0	7.8	11,656	1,480,256	3.8%	4.5%
1985	19	155	118.2	18.6	7.4	9,471	1,468,073	4.6%	4.4%
1986	18	88	120.7	18.8	7.6	9,789	861,393	2.6%	2.6%
1987	17	47	125.7	19.2	7.8	10,466	491,920	1.4%	1.5%
1988	16	39	138.7	20.4	8.3	12,284	479,072	1.2%	1.4%
1989	15	64	119.6	18.2	7.2	8,819	564,414	1.9%	1.7%
1990	14	76	114.2	17.8	7.1	7,965	605,310	2.3%	1.8%
1991	13	107	108.8	17.1	6.7	6,996	748,536	3.2%	2.3%
1992	12	80	114.3	18.1	7.0	8,353	668,279	2.4%	2.0%
1993	11	62	104.4	16.2	6.5	6,444	399,524	1.9%	1.2%
1994	10	92	106.4	17.1	6.8	6,990	643,111	2.8%	1.9%
1995	9	105	105.7	17.2	6.8	7,115	747,116	3.1%	2.3%
1996	8	104	107.8	17.0	6.8	7,039	732,056	3.1%	2.2%
1997	7	134	104.6	16.8	6.6	6,707	898,779	4.0%	2.7%
1998	6	147	112.7	17.9	7.1	8,702	1,279,253	4.4%	3.9%
1999	5	123	114.7	17.8	7.1	8,889	1,093,319	3.7%	3.3%
2000	4	164	112.7	17.4	7.0	8,233	1,350,160	4.9%	4.1%
2001	3	93	111.3	16.8	6.7	7,596	706,408	2.8%	2.1%
2002	2	72	123.0	17.7	7.2	10,392	748,255	2.2%	2.3%
2003	1	55	126.4	18.8	7.3	12,560	690,786	1.6%	2.1%
Total		3345					33,064,801	100.0%	100.0%
Average							9,885		

Table 38. Ro-Ro Vessel Size Fleet Characteristics
(All vessel size characteristics expressed in metric units)

Build Year	Age	Number of Vessels	Average LOA	Average Beam	Average Draught	Average DWT	Total DWT	Percent by Age	Percent by DWT
1963	41	1	122.8	18.7	3.4	1,854	1,854	0.1%	0.0%
1964	40	1	75.6	11.7	5.1	2,235	2,235	0.1%	0.0%
1965	39	1	74.0	10.7	3.3	926	926	0.1%	0.0%
1966	38	3	97.5	14.9	5.3	3,490	10,471	0.3%	0.1%
1967	37	2	102.0	16.6	5.8	3,495	6,990	0.2%	0.1%
1968	36	3	101.1	17.0	4.9	3,322	9,965	0.3%	0.1%
1969	35	9	117.3	17.5	5.1	4,312	38,807	0.9%	0.4%
1970	34	12	93.3	15.3	5.2	2,610	31,321	1.2%	0.3%
1971	33	20	101.0	15.8	5.1	2,893	57,864	1.9%	0.6%
1972	32	30	111.3	17.0	5.4	3,786	113,577	2.9%	1.3%
1973	31	22	133.9	19.5	6.0	6,523	143,506	2.1%	1.6%
1974	30	16	117.7	17.4	5.5	4,168	66,685	1.5%	0.7%
1975	29	25	152.3	20.5	6.6	8,547	213,663	2.4%	2.4%
1976	28	26	136.4	21.0	6.4	6,393	166,220	2.5%	1.9%
1977	27	50	135.0	20.1	6.5	6,188	309,390	4.8%	3.5%
1978	26	82	139.2	20.8	6.6	8,787	720,523	7.9%	8.0%
1979	25	102	135.7	21.5	6.4	8,844	902,049	9.9%	10.1%
1980	24	47	138.8	21.1	7.1	8,171	384,024	4.5%	4.3%
1981	23	36	145.5	22.8	7.4	10,335	372,055	3.5%	4.1%
1982	22	20	143.2	23.3	7.1	10,956	219,129	1.9%	2.4%
1983	21	38	137.5	21.4	6.7	10,595	402,600	3.7%	4.5%
1984	20	44	149.3	21.9	7.0	12,385	544,952	4.3%	6.1%
1985	19	38	141.7	21.2	6.9	10,723	407,477	3.7%	4.5%
1986	18	23	133.4	19.7	6.1	6,813	156,704	2.2%	1.7%
1987	17	24	135.4	20.6	6.7	7,822	187,725	2.3%	2.1%
1988	16	23	138.5	21.4	6.4	7,233	166,354	2.2%	1.9%
1989	15	15	130.7	20.7	6.5	7,282	109,223	1.4%	1.2%
1990	14	20	123.6	19.7	6.2	5,676	113,516	1.9%	1.3%
1991	13	29	140.5	22.0	6.4	6,940	201,246	2.8%	2.2%
1992	12	20	151.0	23.6	7.2	11,017	220,349	1.9%	2.5%
1993	11	15	129.8	21.1	6.1	7,243	108,652	1.4%	1.2%
1994	10	9	142.6	22.6	6.5	7,845	70,604	0.9%	0.8%
1995	9	24	135.5	21.5	6.6	7,215	173,169	2.3%	1.9%
1996	8	22	147.8	22.5	6.8	9,644	212,165	2.1%	2.4%
1997	7	24	145.9	23.0	6.6	6,496	155,902	2.3%	1.7%
1998	6	23	160.6	22.6	6.9	10,397	239,134	2.2%	2.7%
1999	5	40	158.4	23.1	6.9	9,170	366,818	3.9%	4.1%
2000	4	30	178.0	24.9	7.6	13,958	418,741	2.9%	4.7%
2001	3	20	197.9	27.2	7.9	14,655	293,093	1.9%	3.3%
2002	2	25	189.0	26.1	7.5	13,565	339,126	2.4%	3.8%
2003	1	21	192.5	26.9	7.6	14,683	308,334	2.0%	3.4%
Total		1,035					8,967,138	100.0%	100.0%
Average							8,664		

Source: G.E.C., Inc. based on *The Clarkson Register* (January 2004).

Table 39. PCC Vessel Size Fleet Characteristics
(All vessel size characteristics expressed in metric units)

Build Year	Age	Number of Vessels	Average LOA	Average Beam	Average Draught	Average DWT	Total DWT	Percent by Age	Percent by DWT
1963	41	1	122.8	18.7	3.4	1,854	1,854	0.1%	0.0%
1964	40	1	75.6	11.7	5.1	2,235	2,235	0.1%	0.0%
1965	39	2	77.9	12.3	4.3	1,538	3,076	0.1%	0.0%
1966	38	3	97.5	14.9	5.3	3,490	10,471	0.2%	0.1%
1967	37	3	100.2	15.9	5.5	2,768	8,305	0.2%	0.1%
1968	36	4	98.7	16.3	5.1	3,291	13,163	0.3%	0.1%
1969	35	9	117.3	17.5	5.1	4,312	38,807	0.6%	0.2%
1970	34	13	93.2	15.4	5.1	2,490	32,375	0.8%	0.2%
1971	33	22	101.4	15.7	5.0	2,776	61,064	1.4%	0.4%
1972	32	31	111.0	17.0	5.3	3,693	114,477	2.0%	0.7%
1973	31	25	136.5	19.6	6.1	6,597	164,933	1.6%	1.1%
1974	30	17	116.2	17.4	5.5	4,000	67,992	1.1%	0.4%
1975	29	26	152.6	20.5	6.6	8,404	218,503	1.7%	1.4%
1976	28	30	138.0	20.9	6.4	6,357	190,706	2.0%	1.2%
1977	27	62	139.9	21.2	6.7	7,136	442,416	4.0%	2.8%
1978	26	105	146.9	22.4	6.9	9,547	1,002,403	6.8%	6.4%
1979	25	109	137.0	21.8	6.5	8,951	975,610	7.1%	6.2%
1980	24	67	148.5	23.0	7.5	9,309	623,698	4.4%	4.0%
1981	23	60	160.0	25.5	7.9	12,297	737,843	3.9%	4.7%
1982	22	42	152.6	24.6	7.6	11,126	467,293	2.7%	3.0%
1983	21	69	148.8	24.2	7.3	11,028	760,955	4.5%	4.8%
1984	20	64	157.6	24.3	7.5	12,798	819,046	4.2%	5.2%
1985	19	71	159.6	25.2	7.9	12,968	920,711	4.6%	5.9%
1986	18	44	156.2	24.8	7.3	10,340	454,981	2.9%	2.9%
1987	17	54	161.1	26.3	7.9	10,993	593,601	3.5%	3.8%
1988	16	40	158.4	25.3	7.4	10,966	438,625	2.6%	2.8%
1989	15	21	130.8	21.1	6.5	6,878	144,433	1.4%	0.9%
1990	14	23	129.5	20.8	6.5	6,729	154,770	1.5%	1.0%
1991	13	33	142.2	22.2	6.5	7,470	246,502	2.2%	1.6%
1992	12	29	157.1	24.9	7.5	11,702	339,346	1.9%	2.2%
1993	11	27	140.3	23.7	6.8	8,508	229,729	1.8%	1.5%
1994	10	25	157.1	26.1	7.7	10,875	271,870	1.6%	1.7%
1995	9	35	149.9	24.4	7.4	10,119	354,170	2.3%	2.3%
1996	8	27	156.3	24.3	7.4	11,485	310,090	1.8%	2.0%
1997	7	36	156.9	25.1	7.3	9,690	348,854	2.3%	2.2%
1998	6	50	173.1	26.6	8.1	14,271	713,525	3.3%	4.5%
1999	5	79	164.7	26.0	7.7	11,727	926,400	5.2%	5.9%
2000	4	64	177.5	27.7	8.5	14,640	936,946	4.2%	6.0%
2001	3	37	187.5	28.0	8.1	14,001	518,048	2.4%	3.3%
2002	2	39	184.6	27.0	7.8	13,748	536,172	2.5%	3.4%
2003	1	34	190.5	28.2	8.1	14,958	508,561	2.2%	3.2%
Total		1,533					15,704,559	100.0%	100.0%
Average							10,244		

Source: G.E.C., Inc. based on *The Clarkson Register* (January 2004).

GAS SHIPS

Size and trend characteristics for gas ships are shown in tables 40 and 41 for LPG and LNG vessels, respectively. There has been a relatively steady rate of new building, with a trend to larger vessels that began in the mid-1990s and has continued since 2000. Since 1999, the gas vessels constructed constitute 12.8 percent of the total world fleet but represent 22.3 percent of the DWT capacity and 23.7 percent of the cubic capacity.

REEFER SHIPS

Size and trend characteristics of refrigerated (reefer) ships are shown in Table 42. For the most part, these are relatively small vessels, with a fleet average DWT of nearly 6,000 tonnes. The fleet has been declining because of heavy inroads by container vessels in break bulk reefer markets. New building trends have been declining, as evidenced by the small numbers of buildings since 1999. Only 1.6 percent of the existing fleet has been constructed in the four years since 1999, and only 12 percent of the existing fleet has been constructed in the decade since 1993.

Table 40. LPG Vessel Size Fleet Characteristics
(All vessel size characteristics expressed in metric units)

Build Year	Age	Number of Vessels	Average LOA	Average Beam	Average Draught	Average DWT	Total DWT	Average Cubic Capacity	Total Cubic Capacity	Percent by Age	Percent by DWT	Percent by Cubic
1965	39	6	57.6	9.7	3.6	1,010	6,061	948	5,686	0.6%	0.1%	0.0%
1966	38	5	54.4	9.3	3.6	702	3,510	750	3,749	0.5%	0.0%	0.0%
1967	37	10	72.4	11.6	4.5	2,102	21,022	2,432	24,321	1.0%	0.2%	0.2%
1968	36	11	73.8	11.6	4.6	2,470	27,170	2,952	32,475	1.1%	0.2%	0.2%
1969	35	7	62.8	10.4	3.9	832	5,825	1,179	8,255	0.7%	0.1%	0.1%
1970	34	17	71.0	11.4	4.0	1,761	29,939	1,520	25,835	1.7%	0.3%	0.2%
1971	33	8	79.8	12.3	5.0	2,455	19,643	2,467	19,733	0.8%	0.2%	0.1%
1972	32	6	89.8	14.0	6.0	4,534	27,205	4,389	26,335	0.6%	0.2%	0.2%
1973	31	17	79.2	12.9	4.9	3,901	66,309	4,737	80,535	1.7%	0.6%	0.6%
1974	30	12	121.2	19.2	6.9	16,211	194,532	22,321	267,846	1.2%	1.7%	1.9%
1975	29	10	86.4	13.3	5.4	3,792	37,920	4,089	40,887	1.0%	0.3%	0.3%
1976	28	22	116.0	17.4	7.0	11,141	245,092	13,759	302,690	2.3%	2.2%	2.1%
1977	27	30	117.6	18.2	7.2	15,197	455,899	20,385	611,548	3.1%	4.1%	4.3%
1978	26	25	126.9	19.1	7.6	16,888	422,205	22,767	569,176	2.6%	3.8%	4.0%
1979	25	48	116.4	18.2	6.8	15,407	739,538	20,807	998,753	4.9%	6.6%	7.0%
1980	24	43	103.5	16.3	6.1	10,874	467,595	14,464	621,934	4.4%	4.2%	4.4%
1981	23	42	98.3	16.0	6.1	6,635	278,654	7,413	311,348	4.3%	2.5%	2.2%
1982	22	37	123.2	19.3	7.7	13,498	499,408	15,950	590,159	3.8%	4.5%	4.1%
1983	21	27	126.6	20.1	7.8	14,791	399,344	18,380	496,260	2.8%	3.6%	3.5%
1984	20	21	117.2	18.4	7.0	10,307	216,444	11,602	243,649	2.2%	1.9%	1.7%
1985	19	25	107.5	17.8	6.8	11,923	298,067	14,486	362,162	2.6%	2.7%	2.5%
1986	18	21	92.2	14.7	5.4	7,495	157,399	10,033	210,689	2.2%	1.4%	1.5%
1987	17	16	106.1	17.0	6.1	7,875	126,002	9,404	150,456	1.6%	1.1%	1.1%
1988	16	9	97.1	14.7	5.1	3,414	30,724	3,449	31,041	0.9%	0.3%	0.2%
1989	15	28	107.5	17.0	6.3	8,254	231,114	8,804	246,501	2.9%	2.1%	1.7%
1990	14	43	117.3	18.6	6.7	12,516	538,185	16,179	695,695	4.4%	4.8%	4.9%
1991	13	54	126.4	19.9	7.2	14,159	764,560	17,316	935,083	5.5%	6.9%	6.6%
1992	12	45	118.9	19.1	7.0	14,359	646,156	19,674	885,331	4.6%	5.8%	6.2%
1993	11	26	134.0	21.2	7.7	18,413	478,748	25,256	656,658	2.7%	4.3%	4.6%
1994	10	16	111.6	18.3	7.0	10,390	166,246	12,199	195,189	1.6%	1.5%	1.4%
1995	9	38	105.4	17.5	5.8	6,919	262,910	8,843	336,042	3.9%	2.4%	2.4%
1996	8	48	109.9	18.2	6.2	8,717	418,399	10,857	521,152	4.9%	3.8%	3.7%
1997	7	28	122.8	19.6	7.2	12,052	337,467	15,039	421,080	2.9%	3.0%	3.0%
1998	6	35	97.5	15.7	5.8	5,344	187,029	5,445	190,572	3.6%	1.7%	1.3%
1999	5	30	117.1	18.5	6.8	10,876	326,276	14,021	420,621	3.1%	2.9%	3.0%
2000	4	30	136.2	21.5	8.0	16,739	502,157	20,788	623,654	3.1%	4.5%	4.4%
2001	3	29	132.0	21.5	7.0	16,104	467,027	23,058	668,692	3.0%	4.2%	4.7%
2002	2	23	132.0	21.0	7.6	14,461	332,609	19,770	454,716	2.4%	3.0%	3.2%
2003	1	25	167.3	26.6	9.4	27,966	699,157	38,357	958,929	2.6%	6.3%	6.7%
Total		973					11,133,547		14,245,437	100.0%	100.0%	100.0%
Average							11,442		14,641			

Source: G.E.C., Inc. based on *The Clarkson Register* (January 2004).

Table 41. LNG Vessel Size Fleet Characteristics
(All vessel size characteristics expressed in metric units)

Build Year	Age	Number of Vessels	Average LOA	Average Beam	Average Draught	Average DWT	Total DWT	Average Cubic Capacity	Total Cubic Capacity	Percent by Age	Percent by DWT	Percent by Cubic
1969	35	3	231.6	32.4	9.6	31,724	95,171	61,333	184,000	2.0%	1.0%	1.1%
1970	34	2	207.9	29.3	8.9	25,345	50,690	40,500	81,000	1.3%	0.5%	0.5%
1971	33	2	210.0	30.5	9.3	26,905	53,809	45,425	90,850	1.3%	0.6%	0.5%
1972	32	1	259.7	34.8	9.5	51,579	51,579	75,060	75,060	0.7%	0.5%	0.4%
1973	31	5	229.5	33.6	9.4	39,415	197,074	61,444	307,219	3.3%	2.0%	1.8%
1974	30	3	234.3	34.6	9.6	41,454	124,361	64,076	192,228	2.0%	1.3%	1.1%
1975	29	6	243.5	33.2	10.1	43,510	261,057	71,271	427,628	3.9%	2.7%	2.4%
1976	28	3	282.3	41.5	12.2	71,650	214,951	124,512	373,537	2.0%	2.2%	2.1%
1977	27	8	283.4	42.7	11.4	71,528	572,225	126,463	1,011,704	5.3%	5.9%	5.8%
1978	26	6	285.7	42.6	11.1	71,448	428,685	127,219	763,315	3.9%	4.4%	4.4%
1979	25	5	285.3	42.8	11.1	72,680	363,401	127,081	635,407	3.3%	3.7%	3.6%
1980	24	5	281.2	42.6	11.3	72,759	363,794	127,838	639,190	3.3%	3.7%	3.7%
1981	23	6	282.0	42.2	11.3	78,230	469,382	129,688	778,130	3.9%	4.8%	4.4%
1982	22	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%	0.0%	0.0%
1983	21	3	282.3	44.5	11.5	68,088	204,265	125,370	376,110	2.0%	2.1%	2.1%
1984	20	4	283.5	43.8	11.3	69,583	278,332	127,050	508,199	2.6%	2.8%	2.9%
1985	19	1	283.0	44.6	10.8	69,846	69,846	125,000	125,000	0.7%	0.7%	0.7%
1986	18	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%	0.0%	0.0%
1987	17	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%	0.0%	0.0%
1988	16	1	71.5	13.5	4.6	1,408	1,408	1,517	1,517	0.7%	0.0%	0.0%
1989	15	3	272.0	47.2	11.4	66,909	200,726	127,608	382,823	2.0%	2.1%	2.2%
1990	14	2	281.0	46.6	11.6	72,842	145,683	132,074	264,147	1.3%	1.5%	1.5%
1991	13	1	272.0	47.2	11.4	66,802	66,802	127,500	127,500	0.7%	0.7%	0.7%
1992	12	1	272.0	47.2	11.4	67,003	67,003	127,452	127,452	0.7%	0.7%	0.7%
1993	11	5	230.4	40.0	10.3	48,235	241,176	90,779	453,893	3.3%	2.5%	2.6%
1994	10	9	277.6	46.0	11.6	70,232	632,088	129,628	1,166,648	5.9%	6.5%	6.7%
1995	9	5	282.7	45.2	11.6	73,467	367,334	134,612	673,059	3.3%	3.8%	3.8%
1996	8	7	267.5	43.8	10.9	65,721	460,048	117,687	823,806	4.6%	4.7%	4.7%
1997	7	6	251.2	40.5	10.4	57,088	342,527	104,008	624,045	3.9%	3.5%	3.6%
1998	6	5	248.3	39.4	10.1	52,387	261,935	98,009	490,044	3.3%	2.7%	2.8%
1999	5	7	285.2	44.6	11.7	74,538	521,766	137,150	960,050	4.6%	5.3%	5.5%
2000	4	12	274.0	43.8	11.4	70,331	843,967	127,026	1,524,307	7.9%	8.6%	8.7%
2001	3	1	297.5	45.8	11.3	71,997	71,997	137,248	137,248	0.7%	0.7%	0.8%
2002	2	10	283.5	45.0	11.8	76,257	762,573	136,921	1,369,212	6.6%	7.8%	7.8%
2003	1	14	266.7	42.0	11.3	70,817	991,435	128,516	1,799,225	9.2%	10.1%	10.3%
Total		152					9,777,090		17,493,553	100.0%	100.0%	100.0%
Average							64,323		115,089			

Source: G.E.C., Inc. based on *The Clarkson Register* (January 2004).

Table 42. Reefer Vessel Size Fleet Characteristics
 (All vessel size characteristics expressed in metric units)

Build Year	Age	Number of Vessels	Average LOA	Average Beam	Average Draught	Average DWT	Total DWT	Percent by Age	Percent by DWT
1965	39	11	92.5	12.9	5.5	2,546	28,003	0.9%	0.4%
1966	38	8	84.9	12.2	5.0	2,060	16,477	0.6%	0.2%
1967	37	16	88.8	12.9	5.4	2,351	37,609	1.3%	0.5%
1968	36	20	93.5	13.4	5.6	2,646	52,927	1.6%	0.7%
1969	35	16	92.4	13.2	5.4	2,588	41,405	1.3%	0.6%
1970	34	18	103.4	14.7	5.9	4,340	78,125	1.5%	1.0%
1971	33	18	118.2	16.7	6.5	6,007	108,134	1.5%	1.4%
1972	32	20	116.4	16.6	6.9	5,662	113,235	1.6%	1.5%
1973	31	31	106.0	15.1	6.4	4,618	143,167	2.5%	1.9%
1974	30	18	93.2	13.6	5.6	3,538	63,688	1.5%	0.8%
1975	29	17	118.6	16.7	6.7	5,761	97,932	1.4%	1.3%
1976	28	21	99.0	14.7	6.1	4,446	93,373	1.7%	1.2%
1977	27	20	102.0	15.3	5.8	4,318	86,365	1.6%	1.2%
1978	26	43	104.3	15.6	6.1	4,598	197,734	3.5%	2.6%
1979	25	85	112.5	16.5	6.6	5,480	465,778	6.9%	6.2%
1980	24	56	106.9	16.1	6.5	4,992	279,528	4.5%	3.7%
1981	23	32	111.9	16.6	6.5	5,693	182,162	2.6%	2.4%
1982	22	51	102.2	15.7	6.2	4,591	234,124	4.1%	3.1%
1983	21	86	115.0	17.3	6.8	5,804	499,143	6.9%	6.7%
1984	20	68	126.0	18.9	7.5	7,454	506,858	5.5%	6.8%
1985	19	50	117.9	18.0	7.2	6,590	329,522	4.0%	4.4%
1986	18	53	118.7	17.6	7.1	6,280	332,820	4.3%	4.4%
1987	17	37	110.8	16.5	6.2	5,087	188,227	3.0%	2.5%
1988	16	46	118.3	17.3	6.5	5,885	270,703	3.7%	3.6%
1989	15	47	119.6	17.8	7.2	6,319	296,983	3.8%	4.0%
1990	14	66	121.6	18.1	7.3	6,884	454,319	5.3%	6.1%
1991	13	53	122.9	18.5	7.5	7,126	377,699	4.3%	5.0%
1992	12	42	135.9	20.2	8.5	9,048	379,998	3.4%	5.1%
1993	11	44	141.6	20.9	8.2	9,112	400,916	3.5%	5.3%
1994	10	27	130.1	19.1	7.6	7,557	204,044	2.2%	2.7%
1995	9	8	111.1	16.2	6.7	4,885	39,080	0.6%	0.5%
1996	8	19	120.7	18.2	7.1	6,217	118,114	1.5%	1.6%
1997	7	25	120.0	18.3	6.9	6,197	154,935	2.0%	2.1%
1998	6	28	134.1	20.1	7.7	8,447	236,505	2.3%	3.2%
1999	5	21	143.3	21.5	8.5	9,689	203,473	1.7%	2.7%
2000	4	11	148.8	22.0	8.3	10,640	117,042	0.9%	1.6%
2001	3	4	134.7	19.4	7.6	7,446	29,785	0.3%	0.4%
2002	2	2	167.0	25.0	9.0	12,316	24,632	0.2%	0.3%
2003	1	2	149.4	20.9	7.7	9,918	19,835	0.2%	0.3%
Total		1,240					7,504,399	100.0%	100.0%
Average							6,052		

Source: G.E.C., Inc., based on *The Clarkson Register* (January 2004).

EXECUTIVE SUMMARY

Part 2: PROSPECTIVE WORLD FLEET

This report provides a statistically based description of the near-term expected new buildings based on orders as of January 2004. The new building orders would be incorporated into the existing world fleet of deep-draft self-propelled marine cargo vessels registered and in service as of January 2004 according to *The Clarkson Register* (January 2004). The prospective new buildings are described in terms of the number and size of vessels by expected year of new building. For each major vessel category (container, bulk, tanker, chemical, multi-purpose, ro-ro and gas ships), the average size characteristics are computed for length, beam, design draft, and deadweight (dwt) to enable the reader to discern the continuation of existing vessel size trends or possible shifts in sizes based on orders for new buildings. All vessel size characteristics are in metric units.

Emphasis is placed on container vessels in general because of the existing use of Savannah Harbor and Post-Panamax container vessels in particular because of the prospective use of Savannah Harbor. Trends in container vessel new buildings after 2003 indicate that the Post-Panamax category will continue to expand, nearly doubling from 282 vessels in 2003 to 508 vessels by 2008 based on existing orders for 226 new ships primarily from 2004 through 2008. The significant share of world container fleet capacity of the existing Post-Panamax fleet (282 vessels) will be substantially increased by the near doubling of the fleet by 2008.

With the exception of the rapid development of Post-Panamax container vessels, most of the world fleet remains stable with regard to orders for new buildings of significantly larger vessels. However, within particular fleets some substitution of larger vessels for smaller vessels is occurring, particularly in the dry bulk and tank sectors. Also, the data indicate that there is a continuation of the increase in the number of new buildings in particular fleets such as LNG vessels, with implications for Savannah Harbor.

The near-term new building statistics and trends for orders contained in this report reflect a comparatively short time frame, generally three years based on the backlog of existing orders and demand for new construction. Although these trends are insufficient to determine the future changes in the world fleet over the life of existing vessels (generally about 25 years), the orders indicate commitments to vessels that can be viewed as extensions of existing trends. Certainly, the large block of Post-Panamax container vessel orders in the period 2004 through 2007 can be viewed from this perspective. Consequently, the existing vessel orders on hand provide indications of the extent of short-term additions and changes in the average size characteristics and age distribution of the fleet. The vessel orders in this report are a good point of departure for developing a world vessel fleet forecast of new buildings that will contribute to a Savannah Harbor vessel fleet forecast.

Part 2: PROSPECTIVE WORLD FLEET

I. INTRODUCTION

Vessels on order provide relatively reliable indications of near-term trends in new buildings subject to the completeness of the prospective vessel characteristics. For a variety of reasons, vessels on order may often lack a full range of physical parameters that the marine planner regards as essential for fleet analyses.¹ Vessel order data often provides only a snapshot and an incomplete portrait of the expected near-term trends for new buildings.

The prospective additions to the world fleet according to *The Clarkson Register* (Clarkson's) consist of orders for vessels categorized as Containerships, Tankers, Bulk Carriers, Gas Carriers, Chemical Carriers, Multi-Purpose, Ro-Ro, Reefer, and Offshore.² The categories are shown in Table 1. The Clarkson's universe of ships on order consists of 2,865 records. Omitting vessels for Offshore Service (160) results in 2,705 records.

The Clarkson's data contained in Table 1 indicate that as of January 2004 there were 655 orders for containerships, 697 orders for tankers, 653 orders for bulk carriers, 90 orders for gas carriers, 320 orders for chemical carriers, 174 orders for multi-purpose carriers, 111 orders for ro-ro vessels, and five orders for refrigerated (reefer) vessels.

Averages of the vessel characteristics for the different categories were developed based on the order data. In some instances the number of observations for particular characteristics such as LOA, beam, and draft are limited in number because of incomplete information. Where there are small numbers of orders for a particular year and/or incomplete information for these vessels with respect to LOA, beam, and draft, there may be no statistics to report in the analysis.

Vessels on order typically span three or four years into the future (for example, 2004 through 2007 or 2008) depending on world demand for new buildings. This is a relatively short time frame compared to an average commercial life of about 25 years for most self-propelled deep-draft marine cargo vessels. Therefore, the characteristics of "vessels on order" should not be regarded as a fleet forecast, but rather as a point of departure for a forecast of the numbers and sizes of new buildings expected to occur over the life cycle of the existing fleets.

¹ For proprietary reasons, not all vessel orders are publicized with regard to specific size characteristics. Also, some "orders" are less than specific, with a prospective purchaser reserving shipyard capacity for a more specific order related to vessel characteristics to be subsequently developed.

² All references to *The Clarkson Register* (Clarkson's) pertain to the January 2004 issue.

**Table 1. Clarkson's File Summary
(January 2004)**

Category	Ships on Order
Containerships	
Post-Panamax	226
Panamax	134
Sub-Panamax	111
Handysize	82
Feedermax and Feeder	102
Total Containerships	655
Tankers	
	697
Bulk Carriers	
	653
Gas Carriers	90
Chemical Carriers	320
Multi-Purpose	174
Ro-Ro	111
Reefer	5
Offshore Service	160
Total Ships	2,865
Total Clarkson's Universe	2,865

Source: G.E.C., Inc., based on *The Clarkson Register* (January 2004).

II. PROSPECTIVE FLEET TRENDS

Each vessel category was sorted by number of orders by year, typically spanning from 2004 through 2007, with some orders for tankers and bulk vessels as well as one Post-Panamax vessel listed as 2008. The average DWT, TEU (when applicable), LOA, beam, and draft were computed based on the number of orders for which this data was supplied in Clarkson's. All vessel statistics drawn from Clarkson's reflect metric units of meters and tonnes.

CONTAINERSHIPS

The 655 containership orders could be clearly stratified for Sub-Panamax (111 vessels), Handysize (82 vessels), and Feedermax/Feeder (102 vessels). Many of the larger vessel orders in the Panamax and Post-Panamax categories lacked beam dimensions, making it difficult to distinguish between the two categories. It appears that most of the Post-Panamax vessels have DWT thresholds over 70,000 tonnes. However, some Post-Panamax vessels were included with DWT less than 70,000 tonnes, which could also apply to Panamax container vessels. For this analysis, it is assumed that container vessels on order with DWT greater than 62,000 are Post-Panamax in the absence of conflicting information such as beam dimensions. Under this assumption, 183 Post-Panamax orders were inferred from the larger container ships.

There are 43 large containerships on order for which only DWT and TEU are available to distinguish between Post-Panamax and Panamax vessels. The DWT for these "indeterminate" vessels range from 62,000 to 68,000 tonnes. The TEU capacities range from 4,992 to 5,700. It is assumed that these vessels are to be Post-Panamax.

Table 2 shows the size characteristics of 226 ordered vessels that have been identified, inferred, or assumed to be Post-Panamax based on beam or DWT. For these vessels, the average DWT is nearly 87,000 tonnes, the average TEU capacity is nearly 7,000, the average LOA is 311 meters, the average beam is 42 meters, and the average (maximum) draft is 14 meters. Excluding the 43 vessels assumed to be Post-Panamax based on DWT results in little change in the fleet average characteristics. For the 183 observed or inferred Post-Panamax container vessel orders, the average DWT is nearly 92,000 tonnes, the average TEU capacity is 7,400, the average LOA is 311 meters, the average beam is 42 meters, and the average (maximum) draft is 14 meters.

The current fleet of Post-Panamax vessels constructed and in service as of January 2004 is 282, with an aggregate of nearly 21 million DWT and 1.638 million TEU carrying capacity. The 226 Post-Panamax containerships currently on order will almost double the carrying capacity of the existing fleet in number of vessels, DWT, and TEU. Even if the 43 orders assumed to be Post-Panamax are excluded, there is still a near doubling of the existing Post-Panamax fleet by 183 vessels, 17.8 million DWT, and 1.4 million TEU carrying capacity.

Table 3 shows the Clarkson's order data for Panamax containerships. There are 134 orders, mostly in the three-year horizon from 2004 through 2006. These vessels would add nearly 7.0 million DWT capacity and 0.6 million TEU capacity. This is a substantial increment to the capacity of the existing Panamax container fleet, which consists of 467 vessels with 24.2 million DWT and 1.8 million TEU carrying capacity.

Table 2. Post-Panamax Container Vessel Orders
(All vessel size characteristics expressed in metric units)

Build Year	Number of Vessels	Average DWT	Average TEU Capacity	Average LOA	Average Beam	Average Draught
2004	49	79,758	6,425	298.36	41.09	14.06
2005	66	82,296	6,569	309.67	41.88	13.85
2006	86	93,364	7,598	324.73	43.03	14.20
2007	24	90,827	7,486	315.61	43.09	13.98
2008	1	99,000	8,100			
Total	226	19,647,850	1,589,578	23,966.1	3,624.4	1,024.8
Average		86,937	7,034	311.2	42.1	14.0

Note: Average values of vessel physical characteristics reflect missing or otherwise incomplete observations in the data set of reported vessel orders.

Source: G.E.C., Inc., based on *The Clarkson Register* (January 2004).

Table 3. Panamax Container Vessel Orders
(All vessel size characteristics expressed in metric units)

Build Year	Number of Vessels	Average DWT	Average TEU Capacity	Average LOA	Average Beam	Average Draught
2004	48	53,587	4,359	263.1	32.2	12.2
2005	44	54,050	4,254	272.6	32.2	12.3
2006	36	48,270	3,820	220.0	32.3	10.5
2007	6	46,417	3,842			
Total	134	6,966,588	556,990	10,459.2	1,386.0	370.0
Average		51,989	4,157	261.5	32.2	11.9

Note: Average values of vessel physical characteristics reflect missing or otherwise incomplete observations in the data set of reported vessel orders.

Source: G.E.C., Inc., based on *The Clarkson Register* (January 2004).

Tables 4 through 6 show the orders for Sub-Panamax, Handysize, and Feedermax/Feeder vessels. There are 111 orders for Sub-Panamax vessels, compared to 494 vessels of this size in the existing world fleet. There are 82 orders for Handysize containerships, compared to 907 in the existing world fleet. There are 102 Feedermax/Feeder orders (nearly all Feedermax), compared to the existing world fleet of 584 Feedermax and 444 Feeder vessels.

Table 7 summarizes the existing and prospective developments in the world container fleet. The existing and prospective vessels are not necessarily additive. Lines will retire some of the older vessels, most notably in the smaller size categories, but not in the relatively new Post-Panamax fleet.

Table 4. Sub-Panamax Container Vessel Orders
(All vessel size characteristics expressed in metric units)

Build Year	Number of Vessels	Average DWT	Average TEU Capacity	Average LOA	Average Beam	Average Draught
2004	36	33,001	2,459	204.8	30.3	11.3
2005	39	34,424	2,576	213.7	30.0	11.7
2006	32	36,726	2,700	221.9	30.2	11.5
2007	4	37,225	2,720		31.5	10.5
Total	111	3,854,745	286,294	12,065.0	1,905.0	443.8
Average		34,727	2,579	211.7	30.2	11.4

Note: Average values of vessel physical characteristics reflect missing or otherwise incomplete observations in the data set of reported vessel orders.

Source: G.E.C., Inc., based on *The Clarkson Register* (January 2004).

Table 5. Handysize Container Vessel Orders
(All vessel size characteristics expressed in metric units)

Build Year	Number of Vessels	Average DWT	Average TEU Capacity	Average LOA	Average Beam	Average Draught
2004	27	18,887	1,380	160.7	24.7	9.3
2005	38	18,731	1,395	157.1	24.7	9.6
2006	14	18,711	1,472			
2007	3	19,500	1,574			
Total	82	1,542,200	115,604	3,505.9	518.9	169.1
Average		18,807	1,410	159.4	24.7	9.4

Note: Average values of vessel physical characteristics reflect missing or otherwise incomplete observations in the data set of reported vessel orders.

Source: G.E.C., Inc., based on *The Clarkson Register* (January 2004).

Table 6. Feedermax Container Vessel Orders
(All vessel size characteristics expressed in metric units)

Build Year	Number of Vessels	Average DWT	Average TEU Capacity	Average LOA	Average Beam	Average Draught
2004	46	10,109	770	128.3	20.4	7.50
2005	40	10,226	823	127.0	24.4	7.60
2006	16	9,973	771	127.0	24.4	7.60
Total	102	1,033,590	80,662	2,558.0	412.0	135.64
Average		10,133	791	127.9	21.7	7.54

Note: Average values of vessel physical characteristics reflect missing or otherwise incomplete observations in the data set of reported vessel orders.

Source: G.E.C., Inc., based on *The Clarkson Register* (January 2004).

**Table 7. Container Vessels in the Existing and Prospective World Fleet
(All vessel size characteristics expressed in metric units)**

Container Vessel Category	Vessels	DWT (000,000)	TEU (000,000)
Post-Panamax Existing	282	20.9	1.6
Post-Panamax Orders	226	19.6	1.6
Panamax Existing	467	24.2	1.8
Panamax Orders	134	7.0	0.6
Sub-Panamax Existing	494	17.7	1.6
Sub-Panamax Orders	111	3.9	0.3
Handysize Existing	907	19.4	1.3
Handysize Orders	82	1.5	0.1
Feedermax/Feeder Existing	1,028	8.4	0.5
Feedermax/Feeder Orders	102	1.0	0.08

Source: G.E.C., Inc., based on *The Clarkson Register* (January 2004).

BULK SHIPS

Table 8 indicates that there are 653 bulk ships on order, with most in the period 2004 through 2006. Most of the vessels on order are Capesize (109 orders) or Panamax (372 orders), along with 125 Handymax and 48 Handysize.

**Table 8. Bulk Vessel Orders
(All vessel size characteristics expressed in metric units)**

Build Year	Number of Vessels	Average DWT	Average LOA	Average Beam	Average Draught
2004	269	68,366	201	31.6	12.3
2005	222	75,249	230	34.2	12.9
2006	127	82,684	227	34.2	12.9
2007	28	86,082	225	33.8	11.5
2008	7	76,214	0	32.3	12.2
Total	653	48,540,277	21,142	7,314.5	2,343.5
Average		74,334	214	32.9	12.5

Note: Average values of vessel physical characteristics reflect missing or otherwise incomplete observations in the data set of reported vessel orders.

Source: G.E.C., Inc., based on *The Clarkson Register* (January 2004).

TANKER SHIPS

Table 9 indicates that there are 697 tanker vessels on order, with most in the period 2004 through 2006. The vessels include all varieties of tankers, from very small product carriers less than 10,000 DWT to Very Large Crude Carrier (VLCC). The orders include 74 VLCC, 80 Suezmax, 158 Aframax, 138 Panamax (primarily products carriers), and 190 Handysize.

Table 9. Tanker Vessel Orders
(All vessel size characteristics expressed in metric units)

Build Year	Number of Vessels	Average DWT	Average LOA	Average Beam	Average Draught
2004	274	91,841	214	36.3	13.2
2005	251	107,067	215	36.8	13.2
2006	140	107,927	208	37.1	13.1
2007	31	99,923			
2008	1	49,700			
Total	697	70,295,376	34,269	8,413.6	2,649.3
Average		100,854	214	36.6	13.2

Note: Average values of vessel physical characteristics reflect missing or otherwise incomplete observations in the data set of reported vessel orders.

Source: G.E.C., Inc., based on *The Clarkson Register* (January 2004).

CHEMICAL SHIPS

Table 10 indicates that there are 226 chemical ships on order. The largest vessel is 47,000 DWT. There are 43 chemical vessels on order that are 40,000 DWT or greater. Nearly 100 of the chemical vessels on order are between 30,000 and 40,000 DWT.

Table 10. Chemical Vessel Orders
(All vessel size characteristics expressed in metric units)

Build Year	Number of Vessels	Average DWT	Average LOA	Average Beam	Average Draught
2004	157	21,823	149	24.7	9.4
2005	109	25,762	164	25.7	10.2
2006	49	28,906	175	27.2	10.4
2007	5	34,780			
Total	320	7,824,516	14,095	2,946.5	972.1
Average		24,452	155	25.2	9.7

Note: Average values of vessel physical characteristics reflect missing or otherwise incomplete observations in the data set of reported vessel orders.

Source: G.E.C., Inc., based on *The Clarkson Register* (January 2004).

MULTI-PURPOSE SHIPS

Table 11 indicates that there are 174 multi-purpose ships on order, with most of the orders in 2004 and 2005. These are primarily small vessels averaging 10,000 DWT.

Table 11. Multi-Purpose Vessel Orders
(All vessel size characteristics expressed in metric units)

Build Year	Number of Vessels	Average DWT	Average LOA	Average Beam	Average Draught
2004	127	10,208	129	19.2	7.1
2005	38	8,942	137	20.1	6.5
2006	7	12,343	178	27.2	10.2
2007	2	7,600			
Total	174	1,737,760	10,929	1,678.6	512.0
Average		9,987	132	19.5	7.1

Note: Average values of vessel physical characteristics reflect missing or otherwise incomplete observations in the data set of reported vessel orders.

Source: G.E.C., Inc., based on *The Clarkson Register* (January 2004).

RO-RO SHIPS

Tables 12 and 13 indicate that there are 111 ro-ro ships on order, consisting of 72 Pure Car Carriers (PCC) and 39 other ro-ro vessels. These vessels are consistent with the existing fleet trend of larger sizes, with an average DWT of nearly 14,000 since 2000. The ro-ro orders have less than Panamax beams and relatively shallow draughts (10 meters for PCC and nearly 7 meters for other ro-ro vessels).

Table 12. Ro-Ro Vessel Orders
(All vessel size characteristics expressed in metric units)

Build Year	Number of Vessels	Average DWT	Average TEU Capacity	Average LOA	Average Beam	Average Draught
2004	22	10,476	598	175.0	24.7	7.1
2005	11	8,788		180.3	25.4	7.4
2006	5	12,950		205.0		
2007	1	18,250		205.0		
Total	39	410,152	1,793	4,516.0	546.4	100.1
Average		10,517	598	180.6	24.8	7.1

Note: Average values of vessel physical characteristics reflect missing or otherwise incomplete observations in the data set of reported vessel orders.

Source: G.E.C., Inc. based on *The Clarkson Register* (January 2004).

Table 13. Pure Car Carrier Vessel Orders
(All vessel size characteristics expressed in metric units)

Build Year	Number of Vessels	Average DWT	Average LOA	Average Beam	Average Draught
2004	23	16,550	193.9	32.3	9.8
2005	28	17,248	194.5	32.3	9.9
2006	17	16,141	180.0	32.2	
2007	4	17,875		32.3	
Total	72	1,209,500	4,645.8	1,064.9	206.5
Average		16,799	193.6	32.3	9.8

Note: Average values of vessel physical characteristics reflect missing or otherwise incomplete observations in the data set of reported vessel orders.

Source: G.E.C., Inc. based on *The Clarkson Register* (January 2004).

GAS SHIPS

Tables 14 and 15 indicate that there are 90 gas ships on order, consisting of 34 LPG and 56 LNG. The LNG vessels on order all have Post-Panamax beams, ranging from 36 to 49 meters. The large vessels range from 50,000 to 78,000 DWT. Of the 90 vessels on order, 20 are less than 25,000 DWT. All other gas vessels on order are a minimum of 45,000 DWT, thus continuing the recent trend toward the construction of larger vessels.

Table 14. LPG Vessel Orders
(All vessel size characteristics expressed in metric units)

Build Year	Number of Vessels	Average DWT	Average Cubic Capacity	Average LOA	Average Beam	Average Draught
2004	18	19,412	26,072	120.3	21.0	8.8
2005	7	31,300	43,200	224.5	36.0	
2006	7	36,586	56,571	224.5	36.0	
2007	2	52,000	83,000			
Total	34	928,620	1,333,690	1531.3	303.4	8.8
Average		27,312	39,226	139.2	23.3	0.0

Note: Average values of vessel physical characteristics reflect missing or otherwise incomplete observations in the data set of reported vessel orders.

Source: G.E.C., Inc. based on *The Clarkson Register* (January 2004).

Table 15. LNG Vessel Orders
(All vessel size characteristics expressed in metric units)

Build Year	Number of Vessels	Average DWT	Average Cubic Capacity	Average LOA	Average Beam	Average Draught
2004	24	69,125	130,200	279.8	43.8	12.1
2005	22	75,618	141,914	278.4	46.1	11.8
2006	10	76,210	141,950	284.5	48.1	11.5
Total	56	4,084,692	7,666,400	6716.5	1134.8	224.5
Average		72,941	136,900	279.9	45.4	11.8

Note: Average values of vessel physical characteristics reflect missing or otherwise incomplete observations in the data set of reported vessel orders.

Source: G.E.C., Inc. based on *The Clarkson Register* (January 2004).