



U.S. Department of
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Maritime Administration



Coastal Tank Vessel Market Snapshot, 2011



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Introduction

The double-hulling of coastal tank vessel fleets accelerated over the last 5 years as single-hull vessels built during the 1978-1983 boom period reached their Oil pollution Act of 1990 (OPA-90) phase-out dates.¹ For the period 2007-2011, 58 tank vessels were removed from service while 73 new/rebuilt double-hull tank vessels entered service. As of year-end 2011, the double-hulling of the coastal tank vessel fleets was nearly complete.

Trades

Coastal tank vessel trades are served by crude carriers, product tankers and tank barges (including articulated tug/barge units (ATBs)). Crude carriers serve the Alaska/West coast crude oil trades; product tankers serve the coastal and inter-coastal petroleum products and chemicals trades, and supplement crude carriers in the crude oil trades; and tank barges serve coastal and short-haul inter-coastal petroleum products and chemicals trades (Table 1). Product tankers and tank barges also lighter imported crude oil at U.S. Atlantic and Gulf ports.² Over the last 10 years, domestic tank vessel trades have declined due largely to:

- A 4 percent decline in U.S. consumption of petroleum products;
- A 40 percent decline in Alaska crude oil production which drives domestic crude oil trades; and
- Greater use of petroleum transport alternatives including pipelines and international tankers (imports).

¹ 46 U.S.C. 3703a. (2005).

² Lightering of crude oil generally involves the use of a tank barges or product tankers to carry cargo from a crude carrier to a U.S. port in order to reduce the crude carrier draught. This operation is usually carried out when the loaded draught of the ship is too deep to enter a U.S. port. In 2010, product tankers lightered 2.4 million metric tons, and tank barges lightered 7.9 million metric tons.

Table 1. U.S. Coastal Tank Vessel Trades, 2001-2011

Year	Crude Carriers			Product Tankers			Tank Barges		
	Mil. MTs	Bill. MTMs	Miles	Mil. MTs	Bill. MTMs	Miles	Mil. MTs	Bill. MTMs	Miles
2001	41.9	79.5	1,898	50.6	66.7	1,317	69.3	30.2	435
2002	38.6	71.8	1,860	48.0	68.5	1,428	70.1	32.9	470
2003	41.5	76.2	1,835	45.8	63.9	1,396	70.4	32.5	462
2004	39.7	73.2	1,843	44.6	64.5	1,447	71.7	32.2	449
2005	36.2	64.9	1,791	41.8	59.5	1,423	69.1	29.5	427
2006	30.2	51.0	1,685	38.6	44.7	1,159	72.1	31.1	432
2007	32.4	56.2	1,731	37.2	40.0	1,076	71.3	30.0	421
2008	30.5	52.2	1,712	34.9	35.8	1,027	66.5	27.2	408
2009	28.1	48.7	1,732	32.6	34.8	1,069	64.8	27.3	421
2010	25.2	44.1	1,746	31.8	34.4	1,084	67.1	29.7	443
2011e	24.9	41.2	1,651	32.2	31.2	969	67.2	28.1	419
% GR.	-40.6	-48.2	-13.0	-36.4	-53.2	-26.4	-3.0	-6.9	-3.7

MTs: metric tons; MTMs: metric ton-miles.

e: Estimates.

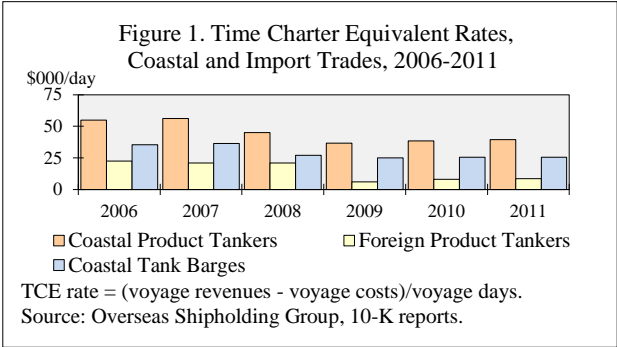
Source: U.S. Army Corps of Engineers, Waterborne Commerce of the United States, detail files.

The coastal crude oil trades (Alaska/U.S. West Coast) are a form of “industrial shipping” in which oil companies control the transportation assets and cargoes. When companies are fairly certain about how much cargo they will need to transport in the future, or if they feel that transport is too great a strategic importance to be left to charters, they purchase vessels. For the Alaska crude oil trades, three oil companies, British Petroleum, Conoco/Phillips and Exxon/Mobile, own the crude oil, the Trans-Alaska Pipeline, and eleven crude carriers which move the oil from the pipeline terminus to West Coast destinations.

Although the ban on export of Alaska crude oil was removed in 1996, no Alaska crude oil has been exported over the last 10 years, which reflects the fact that distances (ocean transport costs) to Asian countries are more than twice those to West Coast refineries. U.S.-flag tankers must be used in either case.

For petroleum products, average hauls in coastal trades are much shorter than those in import trades. For example, Rotterdam to New York, a major import trade, is about 3,400 nautical miles, while Houston to Port Everglades, a major coastal trade, is only 1,010 nautical miles. While daily charter rates for U.S.-flag tank vessels in the coastal trades are much higher than those for international tankers in the import trades, when voyage days are taken into account, voyage costs (charter rate x voyage days) in the coastal trades are more in line with those in the import trades.

Because domestic and foreign petroleum products are substitutes, charter rates for domestic and international product tankers tend to move in the same direction over time (Figure 1).¹ Oil companies can ship petroleum products from U.S. Gulf refineries on U.S.-flag tank vessels or from foreign refineries (Caribbean and Europe) on international tankers. If domestic charter rates increase relative to international rates, domestic long-haul trades tend to decline and vice versa. That is, domestic carriers must keep their voyage charter costs (charter rate x voyage days) in line with those in U.S. import trades, or accept lower trade volumes.



¹ For the period 2006 to 2011, the correlation coefficient for coastal product tanker charter rates and those of similar international tankers was 0.91. A coefficient can range from 0 to 1 with 0 being no correlation and 1 being perfect correlation.

Fleets

Over the last five years, coastal tank barge deadweight capacity increased by 31 percent, while product tanker capacity declined by 33 percent (Table 2).¹ The increase in tank-barge capacity contributed to a substitution of tank barges for product tankers in coastal and lightering trades.

As of year-end 2011, 7 tank vessels (2 crude carriers, 3 product tankers and 2 tank barges) were scheduled for delivery over the next 3 years. The orders will replace 4 non-double-hull product tankers, and perhaps other 25+ year old double-hull tank vessels that face high dry dock costs and inadequate charter rates.

Table 2. Coastal Tank Vessel Fleets and Orders, 2006, 2011 (DWT in Thousands)

Type	2006 Fleet		2011 Fleet		2011 DH*		On Order	
	No.	DWT	No.	DWT	No.	DWT	No.	DWT
Tank Barges	110	1,997	140	2,620	140	2,620	2	90
Tankers	58	4,644	43	3,206	39	3,011	5	373
Crude	15	2,450	11	1,730	11	1,730	2	230
Product	43	2,194	32	1,476	28	1,280	3	143
Total	168	6,641	183	5,826	179	5,631	7	463

* DH-Double-hull.

Sources: Tankers – Clarkson Research Studies; Tank Barges – U.S. Army Corps of Engineers, Marine Log, and American Bureau of Shipping.

A decline in the domestic product tanker fleet does not necessarily mean a decline in petroleum transport services. There are alternatives for domestic product tanker services which include pipeline services, international tanker services (imports), and tank barge services. In 2011, for example, pipelines moved 917 million barrels in the U.S. Gulf/East Coast petroleum product trades, or roughly the lay-down capacity of

¹ Deadweight (DWT) is the total weight in metric tons a ship can carry when immersed to its load line.

97 product tankers¹. Over the next year, the Colonial Pipeline Company will add about 64 million barrels of capacity to its U.S. Gulf/East Coast pipelines, or the lay-down capacity of about 7 product tankers.

Furthermore, new tank vessels are more productive than those they replace because they require less maintenance and dry-docking time than older vessels and have 2-3 times more pumping capacity (less load/discharge time) than older vessels. Also, new ATBs (articulated tug/barge units) are faster and more seaworthy than traditional tug/barge units.² In 2010, product tankers less than 10 years old accounted for 75 percent of fleet capacity, but 86 percent of fleet ton-miles. Likewise, tank barges less than 10 years old accounted for 67 percent of fleet capacity, but 72 percent of the fleet ton-miles (Table 4).

Table 4. Tank Vessel Shares of DWT and Ton-Miles by Age, 2010*

Fleet/ Age	Percent of DWT Capacity	Percent of Ton-Miles
Tank Barges	100	100
<10 Years	67	72
>=10 Years	33	28
Prod. Tankers	100	100
<10 Years	75	86
>= 10 Years	25	14
Crude Carriers	100	100
<10 Years	71	72
>=10 Years	29	28

* Excludes vessels that operated part of the year.

Source: U.S. Army Corps of Engineers, Waterborne Commerce of the United States, detailed files.

¹ A 325,000 barrel product tanker can make about 29 U.S. Gulf/East coast (North Carolina) voyages per year at 325,000 barrels per voyage, or 9.5 million barrels (29 x 325,000 barrels) per year.

² Articulated tug/barge units (ATBs) are 10,000+ DWT tank barges with hinge-like connections between the tug and the barge that increases the stability, speed and maneuverability of the tug barge unit compared to traditional units.

Another factor that has contributed to the productivity of new tank barges is the tendency to deploy them in longer trades (Table 5). In 2010, tank barges that were less than 10 years old, accounted for 63 percent of overall tank barge shipments in trades under 500 miles, but 70 percent of the shipments in trades of 500 miles or more. Assuming 3 port days and 10 knots, a fully-employed tank barge is about 42 percent more productive in a 500-mile trade than in a 250-mile trade.¹

Table 5. Tank Barge Traffic by Age of Vessel and Route Miles, 2010
(Million Metric Tons)

Age/Miles	>= 500 mi.	< 500 mi.	Total
<10 Years	13.4	28.9	42.3
>= 10 Years	5.7	16.8	22.5
Total	19.1	45.7	64.9

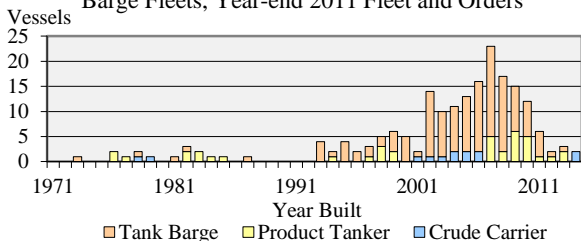
Source: U.S. Army Corps of Engineers, Waterborne Commerce of the United States, detailed files.

The increase in tank-vessel deliveries over the last 10 years was due largely to OPA-90 double-hulling requirements and a 2004-2007 increase in charter rates (Figure 2). For the period 2004-2007, the time charter equivalent (TCE) rate for a 45,000 DWT double-hull product tanker increased by 58 percent to \$56,100 per day, while the TCE rate for a 30,000 DWT double-hull ATB increased by 59 percent to \$36,400 per day (Table 6). The 2007 rates, if sustained, would have resulted in a 10 percent return on investment for new product tankers and a 12 percent return on investment for new ATBs.²

¹ A 30,000 DWT tank barge generates 735 million ton-miles per year on a 500 mile route (49 voyages x 30,000 metric tons x 500 miles), while the same barge generates 518 million ton-miles per year on a 250 mile route (69 voyages x 30,000 metric tons x 250).

² The rate-of-return estimates are based on a 25-year asset life, new-build prices of \$110 million and \$65 million for a product tanker and ATB, and daily operating costs of \$22,000 and \$13,000 for the vessels.

Figure 2. Age Profiles for Tanker and Tank Barge Fleets, Year-end 2011 Fleet and Orders



Sources: Tankers – Clarkson Research Studies; Tank Barges – U.S. Army Corps of Engineers, Marine Log, and American Bureau of Shipping.

Table 6. Time Charter Equivalent (TCE) Rates, Coastal ATBs and Product Tankers, 2004-2010 *
(\$000/Day)

Year/ Quarter	Foreign	Domestic	
	Tanker 45,000 DWT	ATB 30,000 DWT	Tanker 45,000 DWT
2004	25.8	22.9	35.5
2005	25.3	30.6	48.7
2006	22.5	35.3	54.8
2007	21.0	36.4	56.1
2008	20.8	27.1	45.0
2009	5.9	24.9	36.7
2010	7.6	25.4	38.4
2011	8.6	25.4	39.3

*TCE rate = (voyage revenues-voyage costs)/voyage days.

Source: Overseas Shipholding Group, 10-Q reports.

However, product tankers and ATBs are typically delivered 2-4 years after the shipbuilding contract date, and tank vessel charter rates can fall significantly before new vessels are delivered. By 2011, charter rates were down 30 percent from 4 years earlier. At 2011 rates, the return on investment in new

tank vessels was 2-3 percent which could be attained with less risk in high grade securities.¹

Conclusion

The tank vessel building boom of the last decade is winding down. Over the last 10 years, 137 new/rebuilt double-hull tank vessels entered service. The surge in tank vessel deliveries over the last 10 years was due largely to OPA-90 double-hulling requirements and a 2004-2007 increase in charter rates. As of year-end 2011, the double-hulling process was nearly complete, and charter rates were down significantly from four years earlier. Seven tank vessels are scheduled for delivery over the next 3 years. The orders will replace 4 non-double-hull product tankers, and perhaps other 25+ year old double-hull tank vessels that face high dry dock costs and inadequate charter rates. At 2011 rates, investment in new double-hull tank vessels, though risky, would generate a return no better than that for high grade securities.

¹ By 2011, prices for coastal product tankers and ATBs had increased to \$140 million and \$85 million, respectively.

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