



Workhorse tankers

Chris Nutton looks at the development of T2 tankers, ships that are still held in high esteem by the men who served on them.

In 1938, the US Government reached an agreement with the Standard Oil Company of New Jersey to build 12 fast fleet tankers. The Government would meet the extra cost of fitting out the tankers to fleet refuelling standards provided the Standard Oil Co agreed to keep the ships operating for 20 years under the US flag. Contracts were placed with four yards, Bethlehem, Federal, Newport News and Sun Shipbuilding, to build the twin-screw turbine-powered tankers, which were capable of 16.5 knots fully laden and 18 knots light. These vessels were the forerunners of what became 'the workhorse of the tanker world' – the T2.

When America entered World War II in December 1941, the demand for tanker production sharply increased. Shipping losses from U-boat attacks were heavy, especially along the lightly protected coasts of the Gulf of Mexico and the South American oil ports. Allied losses began to steadily mount. Between January and March 1941, Britain alone had lost a total of 22 oil tankers to enemy action. There was now an urgent demand for new ships to enter service. As the records show,

Britain lost 717 ships in 1941 with a total gross tonnage of 2,824,056, along with 8,848 officers and seamen. The figures for 1942 show losses of 646 British ships with a gross registered tonnage of 3,559,923 plus 8,000 personnel. The Battle of the Atlantic was reaching its peak and men and ships were urgently needed. Spurred into action by these heavy losses, the US Maritime Commission placed an immediate order for 72 tankers in addition to the 12 already built.

T2 BUILDERS

The new tankers, designated T2-SE-A1, were based on a standard design which had previously been privately produced for Standard Oil by Sun Shipbuilding. Between 1942 and 1945, 481 ships of the T2 classification were built and the work was shared by four yards: Alabama Drydock & Shipbuilding Company of Mobile, Alabama, the Kaiser Company's Swan Island Yard at Portland, Oregon, the Marinship Corporation of Sausalito, California, and the Sun Shipbuilding & Drydock Company of Chester, Pennsylvania. The T2 tanker's propulsion was originally intended to be steam turbine but the machine tools necessary for the

Tankers in profile – a comparison in size



These scale silhouettes show how tankers have grown over the years. When built, T2 tankers had a length of 160m overall, breadth of 21m, draught of 9m and deadweight of 16,613 tonnes.



One of the largest tankers in the world today, the ultra large crude carrier Jahre Viking has an overall length of 458.5m, breadth of 68.8m, draught of 24.6m and deadweight of 564,763 tonnes.

Profiles courtesy of INTERTANKO

number 86, in only 33 days. Her keel was laid down on 14 May 1945 and by the end of the fourth day more than 2,750 tons of steel had been erected. At the end of the first week she was 34 per cent complete. 13 days from keel laying, building work was 50 per cent complete and 12 per cent of the vessel's fitting out was finished. *Huntington Hills* was launched after just 28 days on the stocks and was moved to the fitting out berth from where she sailed five days later on 17 June for sea trials. These incredible construction times will probably never be either equalled or bettered.

BUILD PROBLEMS

In January 1943, an incident happened after the launch of Kaiser Company's first T2, *Schenectady*, at their Swan Island yard. *Schenectady* had just completed her sea trials and was lying at the fitting out berth. Shortly before midnight on 16 January, a loud report was heard and a split appeared across her deck and down both sides of the vessel. She subsequently hogged and sank with a 10ft gap in the main deck.

For some time there had been criticism of the all-welded construction of T2 tankers and their dry-cargo equivalent, the Liberty ships. Critics felt justified, as this was not an isolated incident. On 8 March 1943 the Liberty ship *J. L. M. Curry* broke in two in a gale off Iceland. While three weeks later another T2 tanker, *Eso Manhattan*, broke in two on leaving New York harbour in a force two north-easterly with slight swell.

Other losses at the time included the July 1943-built Liberty ship *John P. Gaines*. She broke in two off the Aleutians on 24 November. *Valery Chkalov*, ex-Alexander Baranoff, built April 1943 and on loan to the USSR, broke in two during heavy weather in the north Pacific on 12 December. Less serious splits were found

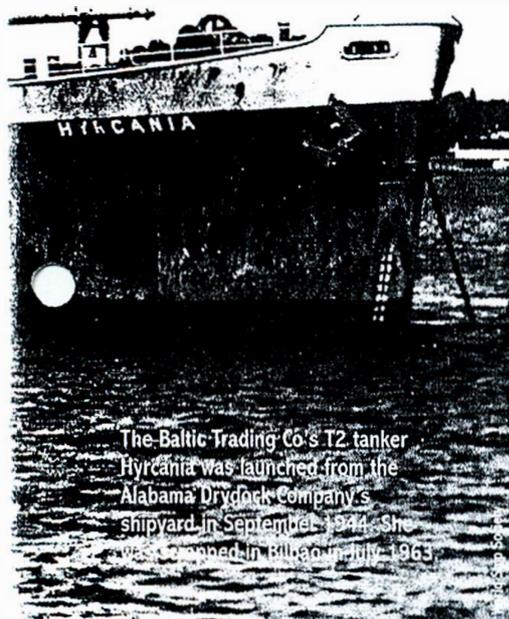
in the hull of Liberty ship *Henry Wynkoop*. Public awareness was drawn to the *Schenectady* incident in particular because it seemed to occur for no apparent reason. An enquiry by the American Bureau of Shipping concluded that the break in *Schenectady* had been caused by locked-in stresses due to defective welding, and that stricter controls of welding quality would remedy the fault.

It was only in 1947, after further losses, that a board of investigation established by the American Government reached a conclusion in direct contrast to that reached in 1943. The board found that the locked-in stresses did not cause the failure in the plates. The failures were caused by notches in the steel. When an adverse combination of notches occurred the ship was unable to withstand the bending movements of normal service and the plates cracked.

Following the report, the American Bureau of Shipping recommended that all T2 tankers should be fitted with two steel straps rivetted to the hull. These were fitted port and starboard between tanks 3 to 8, similar to hoops around a barrel. Each strap was 191ft long and 12.5ins wide. In addition, two straps 15in wide, were then rivetted along the decks on the port and starboard sides.

T2 TANKERS IN THE BRITISH FLEET

Of the 481 T2 tankers built, 18 were lost at sea, 16 were transferred to the US Navy and the remainder sold or returned to original owners. In 1947, 51 T2 tankers were purchase by the UK to fly under the red ensign. By far the largest number went to the Anglo Saxon Petroleum Company (Shell) who renamed 19 ships with their usual Shell names beginning with 'T'. The British Tanker Company took ten, the Esso Group nine, Standard Vacuum Company

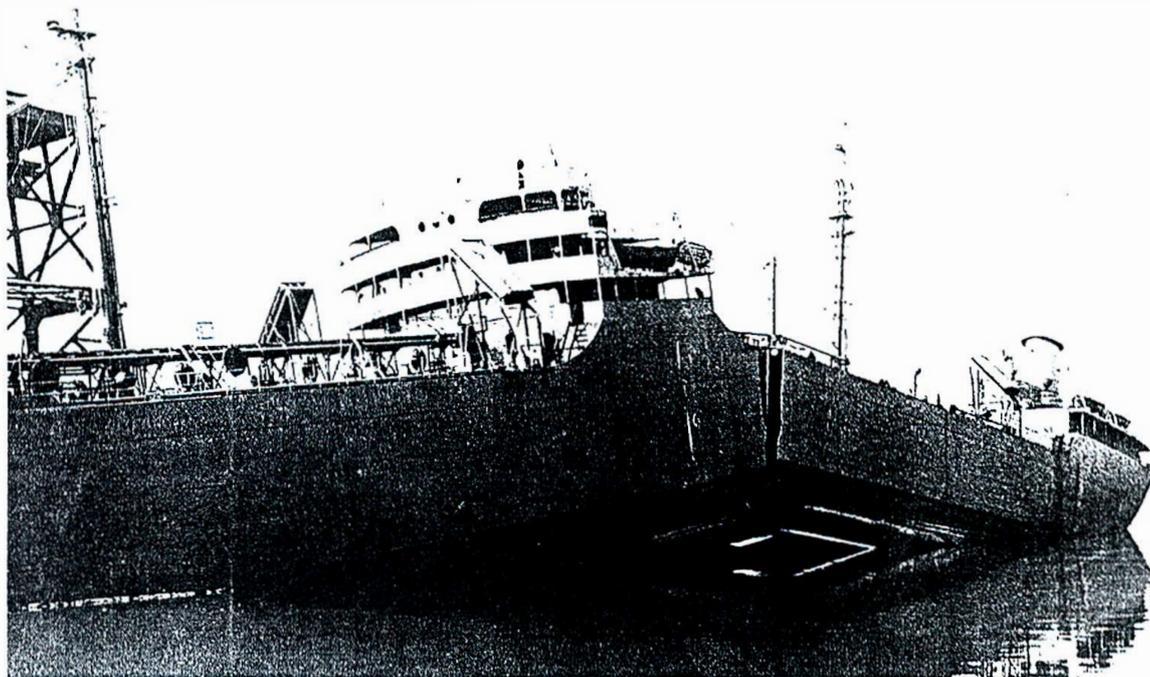


The Baltic Trading Co's T2 tanker *Hyrcania* was launched from the Alabama Drydock Company's shipyard in September 1944. She was scrapped in Billings in July 1963.

production of gears were so scarce that the decision was made to utilise turbo-electric propulsion.

The shipbuilders responded to the ever mounting wartime shipping losses. A world construction record was set by the Marinship yard when they built the T2-SE-A1 tanker *Huntington Hills*, yard

RIGHT: *Schenectady*, the first T2 built by the Kaiser shipyard, broke in two at her berth just after returning from trials in 1943.



four, with the balance going to various smaller shipping companies.

Although the size of new tankers being built after the war began to increase, the T2 remained a handy sized vessel for use the world over. Its deadweight capacity of 16,600 tons and draft of 30ft gave it access where depth of water prohibited its larger sisters gaining entry. A number of T2 tankers was used to lighten larger tankers on both the river Ems and the River Plate.

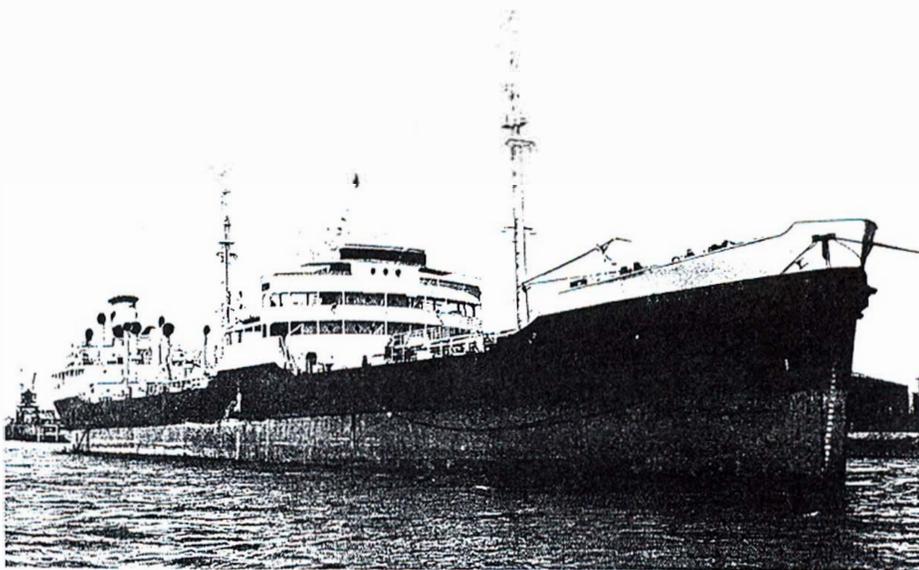
MIDSHIP SECTIONS REPLACED

In the mid-1950s, most T2 tankers were approaching their very stringent third survey. Owners could face the possible cost of extensive structural refits to maintain the vessels to their existing classification standards or could sell them on and build replacement vessels. However, one alternative offered to owners was to replace the complete midship cargo section with a newly constructed section. This was used to increase the cargo capacity to somewhere in the region of 17,000-21,000dwt.

This option was put forward by the chief naval architect of the Maryland Ship Building and Dry Dock Company of Baltimore and was based on the assumption that an owner required at least a further 12 years service from the vessel. A T2 tanker engaged mostly in the 'clean' oil trade would require an expensive renewal of bulkheads and tank pipe line systems with possible replacement of keel, deck and shell plating. By building and inserting a new midship section, none of these expenses would be incurred.

Compared with the cost of a new building, three T2 tankers could be modified for the cost of building one new tanker of comparable size. The new section was built and launched whilst the ship was still in service. The benefit of this was that the vessel was only out of commission for a short time. The joining operation was undertaken in a series of drydockings. First the bow was cut away and joined to the new midship section which was then joined to the aft machinery section. This sequence of assembly ensured no stability problems arose as neither the bow nor after section was ever floated alone. The entire conversion and fitting out operation could be done in seven to eight weeks.

This new section was designed to rectify the known weaknesses of the original hull and obviate the necessity for side and deck straps. Tank arrangements included provision for the carriage of various cargoes by connecting the tanks in groups. Because of the increased carrying capacity, the pumps were upgraded to enable the ship to discharge in under 12 hours, the same time as before the rebuild. One of the successes in justifying these conversions was retention of the vessel's 30ft draught.

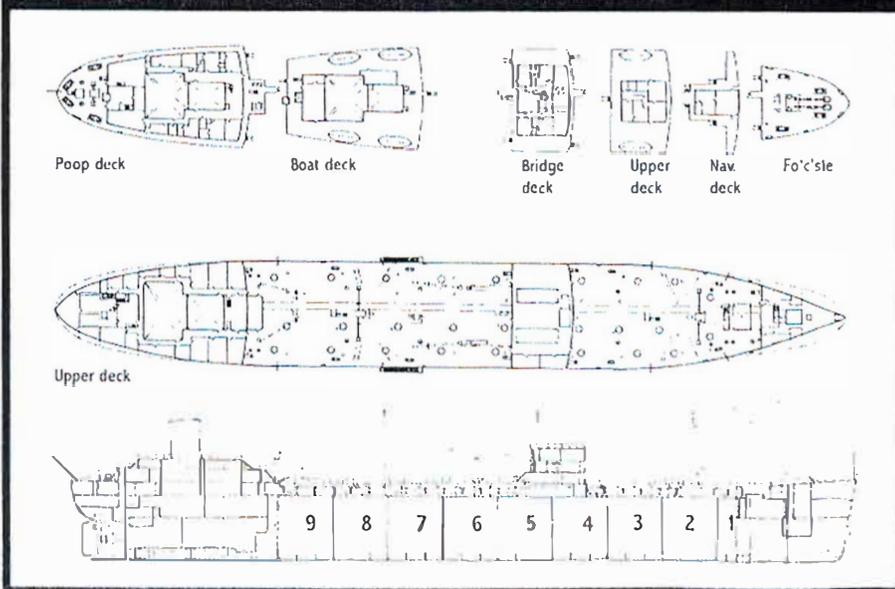


ABOVE: Built as Fort Cheswell, J. A. Billmeir & Co's Stanwell was renamed Landbreeze when sold to Norway for use as an power plant. Further names changes were Panargy, Sirod and, finally, Capistrano.

T2 tankers – technical specification and plans

The T2's turbine engine produced power for a generator which was connected to an electric motor driving a single shaft. Three manufacturers making these sets were: G.E.C. in Massachusetts, Elliot Company of Pennsylvania and Westinghouse Electric & Manufacturing of Pittsburgh. The turbo-electric engines produced shaft horsepower of 6,000 rising to a maximum of 7,240 producing a speed of 14.5 to 15 knots from a single screw. Length between perpendiculars was 503ft and an overall length of 523ft 6in with a loaded draught of 30 ft 1.25in. Gross tonnage was 10,448, net 6,150 with a gross displacement of 21,880 tons and deadweight tonnage of 16,613. They were of all welded construction.

The ships had nine tank sets with numbers 2-9 having a main centre tank and wing tanks to port and starboard whilst tank number 1 was smaller and consisted of two wing tanks only. A small dry cargo space of 15,200 cubic feet was located above this tank. The capacity of each centre tank was 391,500 gallons and the wing tanks 165,000 gallons. Total gallonage was 5,930,000 (141,200 barrels) equivalent to 16,613 tons deadweight. To discharge cargo there were two pumprooms, a main one aft and a smaller one forward. The main pumproom contained three large pumps connected to motors in the engine room each with a capacity of 2,000 gallons per minute, two smaller pumps of 400 gallons per minute and one of 700 gallons per minute. In the forward pumproom there was a pump of 700 gallons per minute and a smaller one of 300 gallons per minute. This combination of pumps gave a theoretical discharge time of less than 12 hours. The ships had a cruising range of 12,600 miles and normally carried a crew of 44. T2 tankers were easily recognisable by their large, round porthole style bridge windows and distinctive 'hat' on top of the funnel.



RIGHT: Originally Bryce Canyon. San Leonardo was Turbinellus in her Shell days.

By the end of the 1950s, T2s were being converted, extended and adapted in ways which would have been unimaginable to the original designers. Midship sections were cut out and larger sections fitted, centre castle accommodation was cut away and everything moved aft. The vessels were converted into bulk carriers, trailer ships, chemical carriers, container ships, liquified gas carriers, wine tankers, Great Lakers and one even became a whale factory ship. Norway purchased a number of T2s in 1959 to use as floating power plants when a water shortage threatened to disrupt the country's hydro-electric supplies.

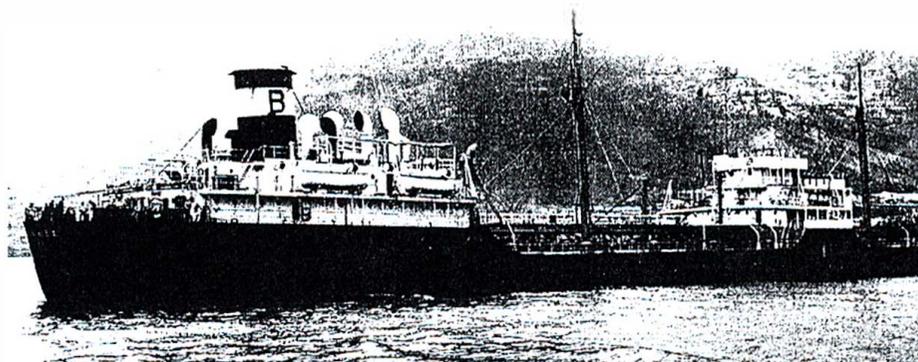
FLEET SOLD FOR SCRAP

By 1950, the largest British fleet of T2 tankers owned by Shell were all 15 years or more old and were all laid up either on the river Blackwater or in Lough Swilly. A decision was then taken to sell them to the British Iron and Steel Corporation for scrap. The conclusion of this sale more or

less marked the demise of the T2 tanker from the British flag.

T2 tankers were popular with British seamen as the vessels offered American standards of accommodation which were far ahead of those found in British-built ships of the period. Despite the initial problems with the T2s' all welded construction, these tankers were responsible

for moving a significant tonnage of the world's post-war oil supplies. Built as an emergency wartime vessel, the T2 tanker has gone down in history as a remarkable design. Its prefabricated construction proved that ships could be mass produced in times of great need. Indeed, the success of the T2 is a tribute to the men and women who designed and built them. ⚓



World Ship Society

T2 tankers transferred to the British fleet in 1947

Vessel name	Previous name	Builder	Built/broken up	Vessel name	Previous name	Builder	Built/broken up
Anglo-Saxon fleet (Shell)				Esso London	Champion's Hill	Sun Shipbuilding Co	1944/1958
Tagelus	Ackia	Alabama Drydock	1945/1961	Esso Manchester	Santiago	Sun Shipbuilding Co	1944/1963
Tectarius	Cahawba	Alabama Drydock	1944/1961	Esso Purfleet	Ridgefield	Sun Shipbuilding Co	1944/1963
Tectus	Crow King	Alabama Drydock	1945/1961	Esso Cardiff	Halls of Motezuma	Kaiser Company	1945/1965
Tenagodus	Horse Shoe	Alabama Drydock	1944/1951	Esso Fawley	Turkey Island	Sun Shipbuilding Co	1944/1963
Thalamus	Fort Raleigh	Kaiser Company	1945/1961	Cleveland Petroleum Company			
Thallepus	Chaco Canyon	Kaiser Company	1945/1961	Cleveland	Forbes Road	Kaiser Company	1944/ - (6)
Thamastus	White Sands	Kaiser Company	1945/1961	Oriental Trade & Transport Company			
Thelonicus	Palo Duro	Alabama Drydock	1944/1962	Stanvac Mabila	La Mesa	Sun Shipbuilding Co	1944/1962
Theodoxus	Modoc Point	Kaiser Company	1945/1962	Stanvac Melbourne	Cobble Hill	Sun Shipbuilding Co	1945/1960
Tomocyclus	Capitol Reef	Kaiser Company	1944/1961	Stanvac Shanghai	Turner's Gap	Sun Shipbuilding Co	1945/1963
Tomogerus	Swan Island	Kaiser Company	1944/1961	Stanvac Sydney	Valverde	Sun Shipbuilding Co	1944/1962
Tribulus	Stones River	Kaiser Company	1945/1961	Baltic Trading Company			
Trigonosemus	Tuolumne Meadows	Kaiser Company	1944/1961	Hyrkania	Chatterton Hill	Alabama Drydock	1944/1963
Trochiscus	Fort Matanzas	Kaiser Company	1944/1960	Zeitoun	Mobile Bay	Alabama Drydock	1945/1970
Trochurus	Council Crest	Kaiser Company	1945/1962	J. A. Billmeir & Company			
Thelidomus (1)	Bandelier	Kaiser Company	1945/1961	Stanmore	Fort Jupiter	Sun Shipbuilding Co	1945/1960
Theobaldius (1)	Silver Creek	Kaiser Company	1945/1961	Stanwell	Fort Chester	Sun Shipbuilding Co	1945/1967
Turbinellus (2)	Bryce Canyon	Kaiser Company	1944/1961	Hunting & Son			
Tresus (3)	Laurel Hill	Kaiser Company	1944/1961	Edenfield	Verendrye	Kaiser Company	1944/1983
Anglo-Iranian (BP)				Oilfield	Hovenweep	Kaiser Company	1944/1978
Beecher Island	- (4)	Alabama Drydock	1944/1959	Evan Thomas, Radcliffe & Company			
Chisholm Trial	-	Kaiser Company	1945/1962	Llanishen	Rye Cove	Sun Shipbuilding Co	1945/1963
Cottonwood Creek	-	Alabama Drydock	1944/1970 (5)	Stevinson, Hardy & Company			
El Morro	-	Kaiser Company	1944/1959	Francine Clore	Fort Winnebago	Kaiser Company	1944/1963
Fort Frederica	-	Kaiser Company	1945/1959	Moller Line			
Fort Stevens	-	Alabama Drydock	1944/1959	Gladys Moller	Orchard Knob	Sun Shipbuilding Co	1945/1962
Mesa Verde	-	Kaiser Company	1944/1961	Notes: Newhall Hills, due to enter service in 1947, was involved in a collision that year. Her forward section caught fire and broke off and the stern section was towed to the Tyne where a new forepart was fitted. She entered service in 1948 as Afghanistan. References: (1) Dutch flagged 1954-61; (2) sold to Eagle Oil in 1949, renamed San Leonardo; (3) sold to Eagle Oil in 1949, renamed San Leopoldo; (4) when these tankers were taken over in 1947, Anglo-Iranian retained the vessels' original names rather than the company's 'British' prefixed name; (5) wrecked; (6) sold to Italian navy as Sterope in 1959.			
Red Bank	-	Alabama Drydock	1944/1960				
Rogue River	-	Alabama Drydock	1944/1977				
Smoky Hill	-	Kaiser Company	1944/1965				
Esso Petroleum Company							
Esso Bristol	Sandy Creek	Sun Shipbuilding Co	1944/1963				
Esso Birmingham	Mauvilla	Sun Shipbuilding Co	1944/1963				
Esso Glasgow	Wauhatchie	Sun Shipbuilding Co	1944/1971				







