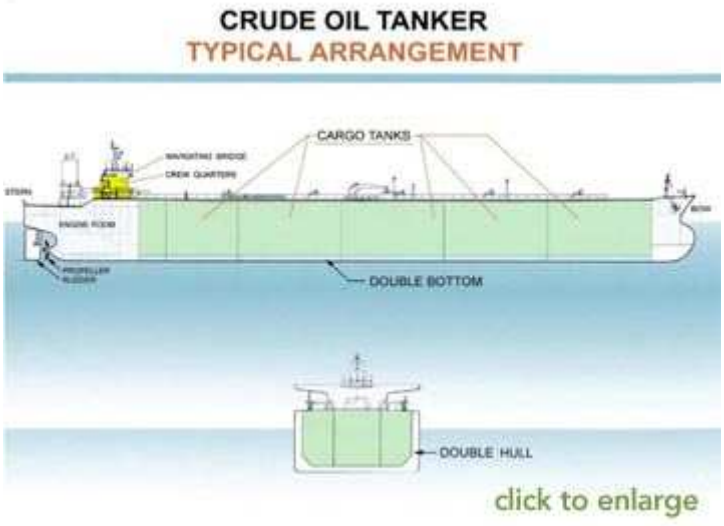
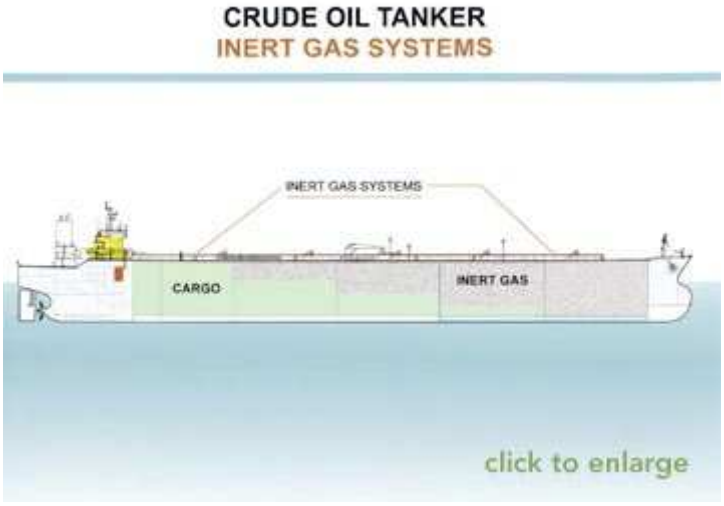
Tanker Industry Today

The modern tanker industry has undergone many changes in the past 50 years. These conscientious and continuous improvements have moved the industry towards safer and more responsible technologies. The following is a summary description of the major modernization milestones:

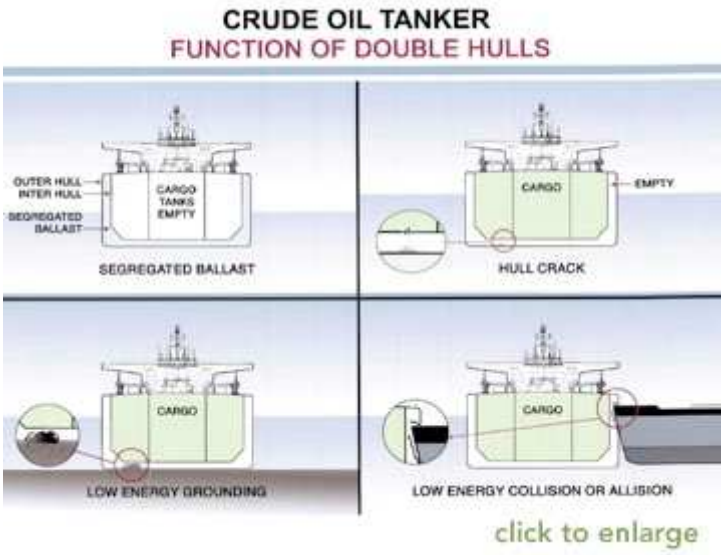


Inert Gas Systems – Today, all tankers are required to have inert gas systems. These systems maintain the cargo tanks in an inert atmosphere. In others words, there is not enough oxygen in the cargo tanks to support combustion. During cargo operations, inert gas is pumped into the cargo tanks. The inert gas is either manufactured by an inert gas generator or is cleaned flue gas from the tankers' boiler. No tanker should be allowed to operate without a properly functioning inert gas system. Tanker explosions have been practically eliminated since inert gas systems have been required.



Double Hulls –

Since 1990, the United States and International regulations have required all new ships to be designed with a double hull. A double hull is essentially a hull within a hull. The cargo is carried inside the inner hull. The space between the inner and outer hull varies by ship size from 7 to 10 feet or more. If an accident should occur (i.e., grounding, stranding, collision or striking a submerged object), the space between the hulls can absorb the energy of the accident and assist in preventing petroleum from entering the water. No cargo can be loaded in the space between the hulls.



Segregated Ballast – Once cargo has been discharged, all tankers, must load ballast (for weight stabilization) into their tanks. This ballast is required for safety reasons when the tanker is at sea. The double hull area provides a perfect place for ballast. Ballast in this space is called segregated ballast because it does not come in contact with any of the cargo. Therefore, when discharged, petroleum is not inadvertently discharged into the sea.

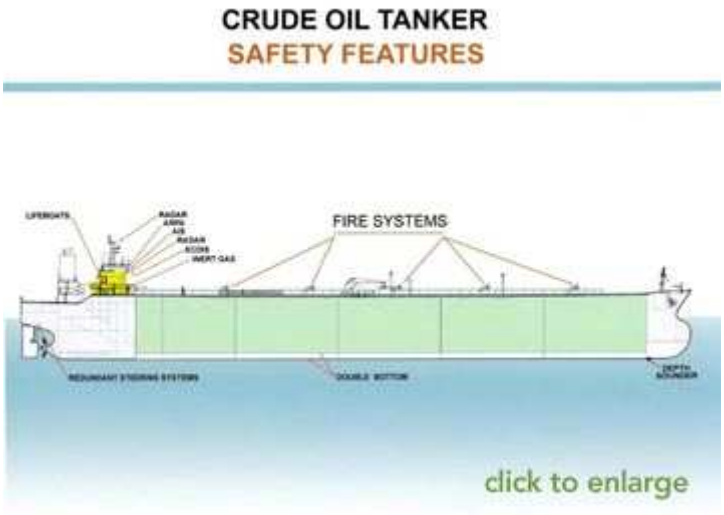
Redundant Steering Systems – In 1978, the tanker Amoco Cadiz lost her steering off the coast of France, grounding and causing a massive oil spill. The major cause of this tragedy was the loss of steering because the steering system was a single system. Today, tankers have redundant steering systems and accidents like the Amoco Cadiz can not occur.

Communications – Worldwide satellite communications have made it possible for ships to communicate with home offices, authorities and charterers. The most fundamental impact of modern satellite communications enables the vessel Captain to reach appropriate parties during a shipboard emergency. The Captain can get immediate, expert assistance with his decision-making process. Secondly, it is now possible for two ships to talk to each other when they are in proximity of each other. This communication opportunity prevents misunderstanding as to each ship's intentions.

Electronic Navigation Equipment – In the late 1960s, ships relied on sextants for determining their position. However, at the same time, military navigation systems were being released for commercial use. The adaptation was implemented very quickly and today we have very accurate navigation systems safely guiding the ships across the ocean and into port.

Global Positioning Satellite Systems (GPS) – Based on satellite technology, GPS provides a very accurate ship position with minimal delay. Electronic Charts – The presentation of a navigating chart (map) in electronic format, when coupled with GPS, provides the position of the ship on the chart. This allows the ship officers to know the ship's position relative to shipping lanes and the surrounding geography.

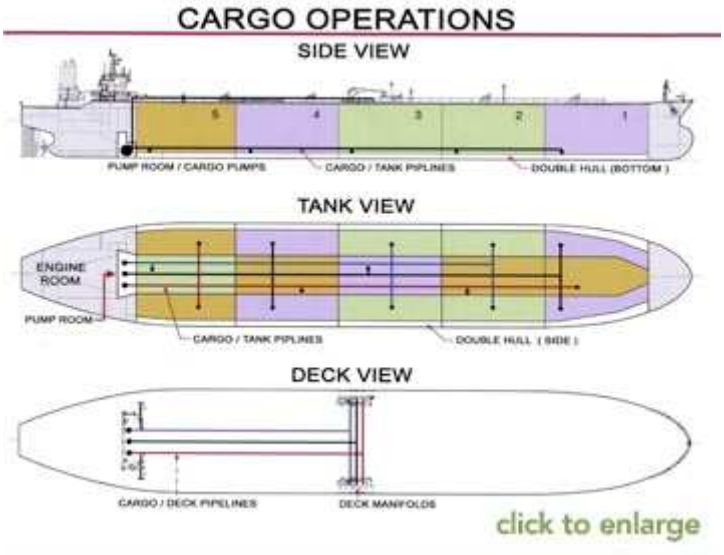
Radar and Collision Avoidance Equipment – Developments in electronic technologies have led to the Automatic Position and Collision Avoidance Systems. These systems allow ship's officers to generate quick, accurate information on another ship in their vicinity. This helps to determine courses and speed when avoiding other vessels.



Automatic Information System (AIS) – The AIS system recently required on all vessels is used to electronically identify other ship on radar. AIS enhances the communication process because the identity of other vessels is no longer a guess. Therefore, when navigational maneuvers are necessary, the ships involved can clearly discuss the matter before either ship executes any maneuver.

Single House Design – The S.S. Sansinena was designed as a two house tanker (i.e., two living spaces with the navigating bridge separate from the engine room). The twin house design was very common prior to the 1980s. It was thought the navigating officers had to be as forward as possible to safely navigate the tanker. However, with the development of radar and other navigation systems, this old idea was soon abandoned and all tankers today are built with the navigating, engine room, and living area in a single house at the stern of the tanker. This change provided additional safety to the onboard personnel and also eliminated ignition sources on the deck of the tanker.

Closed Cargo Loading and Discharge Operations – Prior to the requirement for inert gas, when tankers loaded or discharged cargo, the open venting method was used. The open venting method meant that the hatch covers were open, allowing petroleum vapor to vent on the deck thus creating a dangerous situation. Open venting was allowed because there was not a reliable cargo measurement system. Inert gas required the loading and discharge venting system to be closed and, therefore, reliable cargo measurement systems were developed and accepted by industry as an accurate measure of cargo.



Crude Oil Washing – Crude Oil Washing is a process to assist in the control of hydrocarbon being discharged to the sea. When the tanker is being discharged, the crude oil cargo is pumped through a fixed cleaning system that washes the cargo tanks with crude and controls clingage, wax, etc.

Emergency Towing Systems – Another lesson in the Amoco Cadiz incident was an inadequate towing system on board the tanker. In the Amoco Cadiz case, once the tug boat was on scene, it had difficulty connecting to the Amoco Cadiz and when connected to the tanker, the connection point would not support the tug pulling forces causing the tug to disconnect. Today, all tankers have specific towing structures and have emergency towing equipment.

International Safety Code (ISM Code) – The ISM Code was developed by the International Maritime Organization (IMO), the international authority of maritime safety and an arm of the United Nations. The ISM code was designed to provide a clear link between the shore and sea staff in order to improve safety and preserve the marine environment from ship pollution. A key aspect of the ISM Code requires companies to have a verifiable safety management system in place. The code expects commitment from the executives of the shipping company and assigns responsibility to remedy deficiencies. Extensive audit requirements must be met, after which an ISM Certificate is issued. If, at any time, the ship is not in compliance with its certificate, it will not be allowed to leave the port.

Standards of Training, Certification and Watch Keeping – Amended in 1995 (STCW 95), this is also an IMO regulation and all seagoing personnel around the world, including U.S. personnel, must meet the regulations requirements. STCW 95 sets forth set competencies for each position aboard a ship. An individual seeking a position must be able to demonstrate they have the skills to serve in the specific position. STCW 95 was a major departure from the former certification schemes as they only required certain sea experience and the passage of a written test.