

**Oil Tankers - Hull Structure**

# Contents – Oil tankers

1. Introduction
2. Hull structural breakdown – function of hull elements:
  - Side, bottom, deck, transverse bulkhead, longitudinal bulkhead, web frames including relevant hull damages for all structural elements
3. Case

# Characteristics for Oil tankers

Any  
proposals?

- High number of tanks – good capability of survival
- Low freeboard, green seas on deck
- Pollution / public attention / fire explosion hazards
- Fatigue
- Liquid cargo – sloshing in wide tanks and stability aspect
- Hull inspection environment
- Fully utilizes BM limits hogging/sagging (double hull tankers)

## Size categories of tankers

<b>Oil Tankers</b>	
<b>Type</b>	<b>DWT</b>
ULCC	320,000+
VLCC	200 - 320,000
Suezmax	120 - 200,000
Aframax	75 - 120,000
Panamax	55 - 70,000
Products	10 - 50,000

Source: INTERTANKO

## Size categories of tankers

### **Panamax (55 - 75,000 dwt):**

- Max size tanker able to transit the Panama Canal
- L(max): 274.3 m
- B(max): 32.3 m
- Typical vessel: 60,000 dwt, L=228,6m, B=32,2m, T=12,6m

Age distribution



### **Aframax (75 – 120,000 dwt):**

- AFRA= Average Freight Rate Assessment
- Traditionally employed on a wide variety of short and medium-haul crude oil trades
- Biggest tanker in US ports is 100,000 dwt
- Typical vessel: 100,000 dwt, L=253,0m, B=44,2m, T=11,6m

Source: INTERTANKO

Age distribution



# Size categories of tankers



## Suezmax (120 – 200,000 dwt):

- Notation is soon to become redundant as the project of deepening the Suez Canal to 18,9m is completed
- Typical vessel: 150,000 dwt, L=274,0m, B=50,0m, T=14,5m

Age distribution



## VLCC (200 – 320,000 dwt):

- Were prompted by the rapid growth in global oil consumption during the 60's and the 1967 closing of the Suez canal
- Today the most effective way of transporting large volumes of oil over relatively long distances
- Typical vessel: 280,000 dwt, L=335,0m, B=57,0m, T=21,0m

Source: INTERTANKO

Age distribution

## Size categories of tankers

### ULCC (320,000+ dwt):

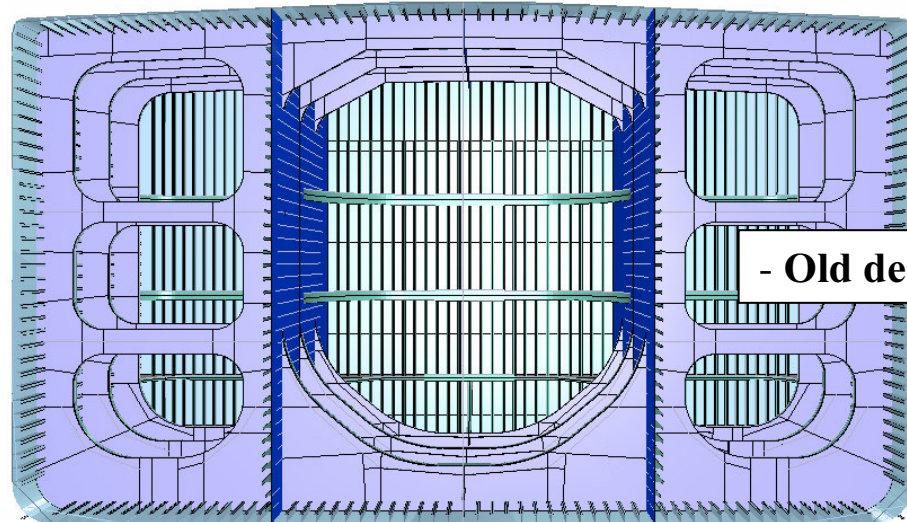
- Most ships of this type built in the mid to late 70's
- Ordered to take advantage of the economies of scale in a buoyant market
- Less than 40 of these ships remaining
- Rather inflexible, may enter very few ports
- Typical vessel: 410,000 dwt, L=377,0m, B=68,0m, T=23,0m



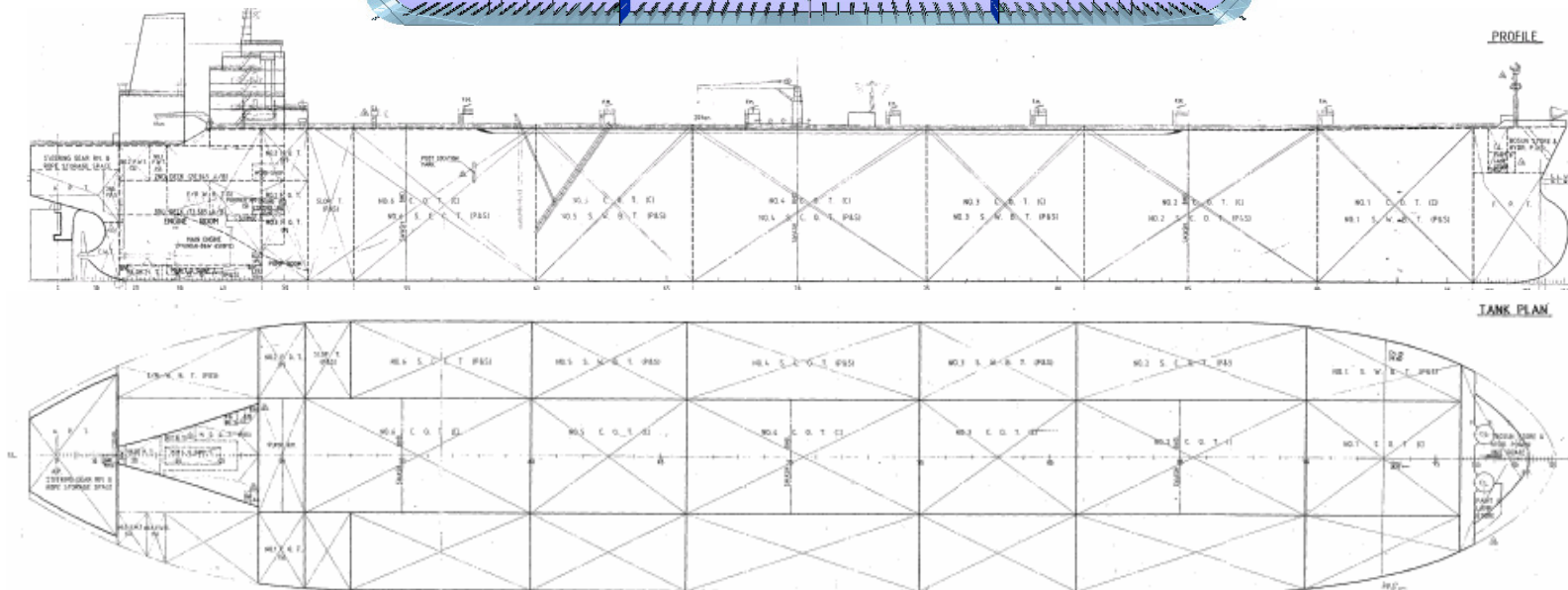
Source: INTERTANKO

# Single Skin Oil Tanker

Ship data:  
L = 310m  
B = 56m  
D = 31,4m  
284,497 DWT



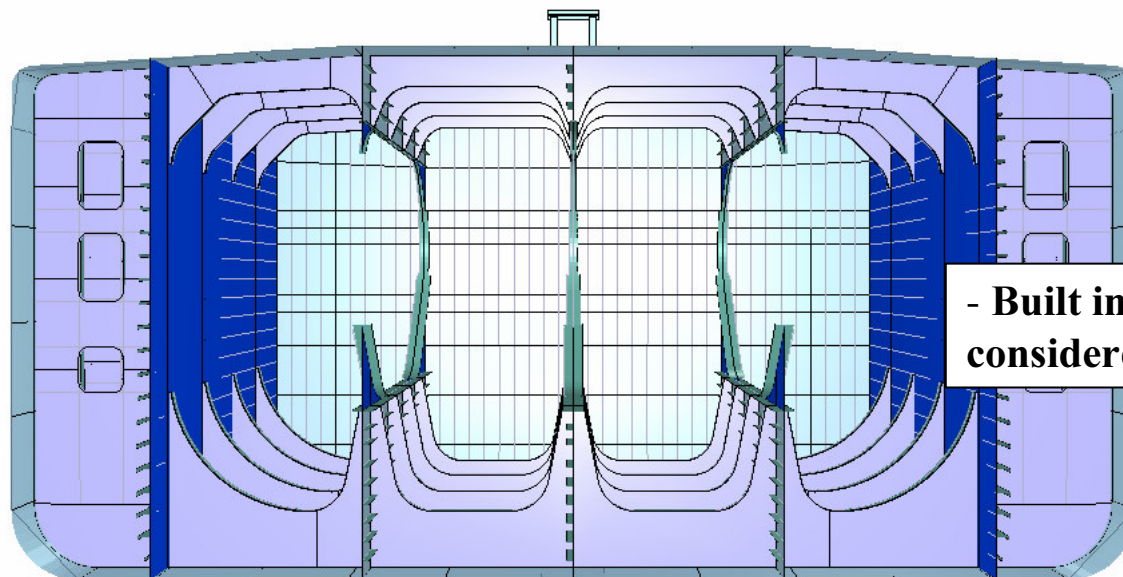
- Old design, build up to 1993



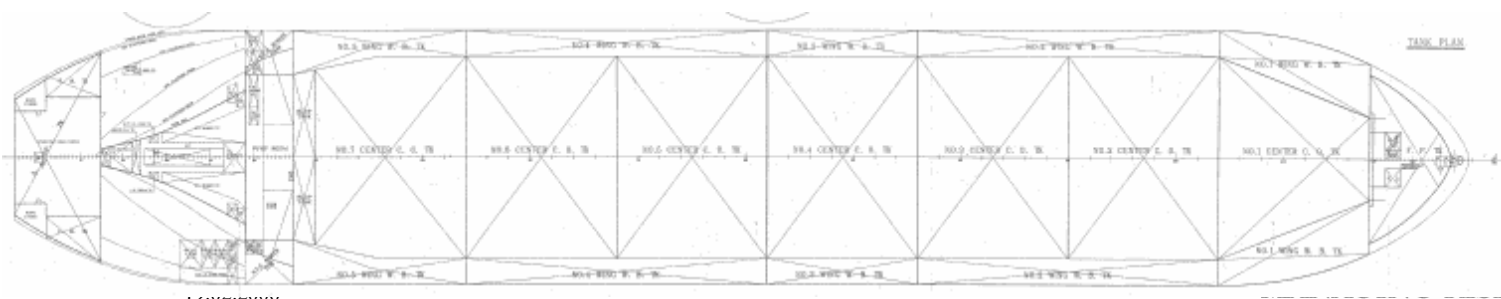


# Single bottom with side ballast tanks

Ship data:  
L = 236m  
B = 42m  
D = 19,2m  
88,950 DWT

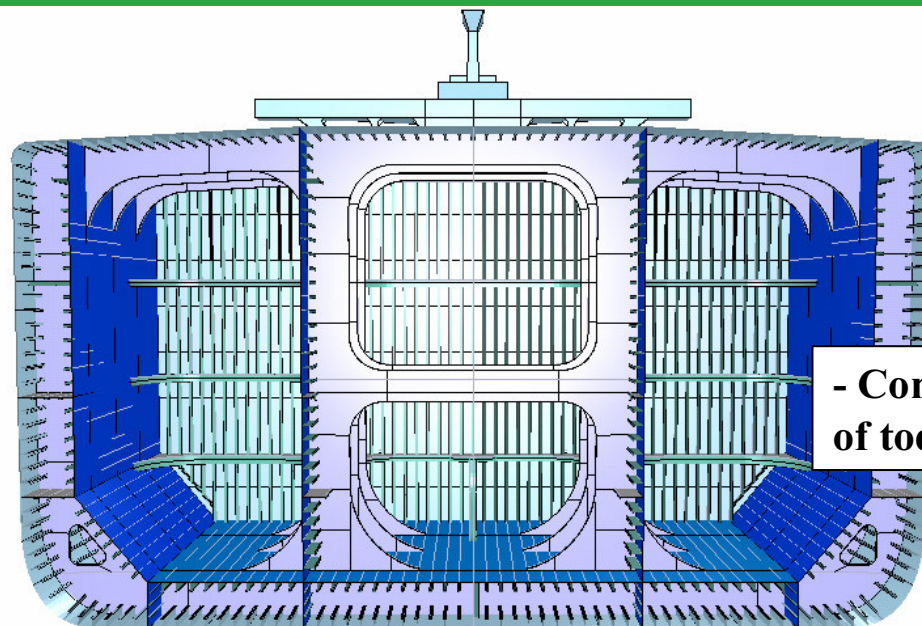


- Built in the 80's,  
considered as 'single skin'

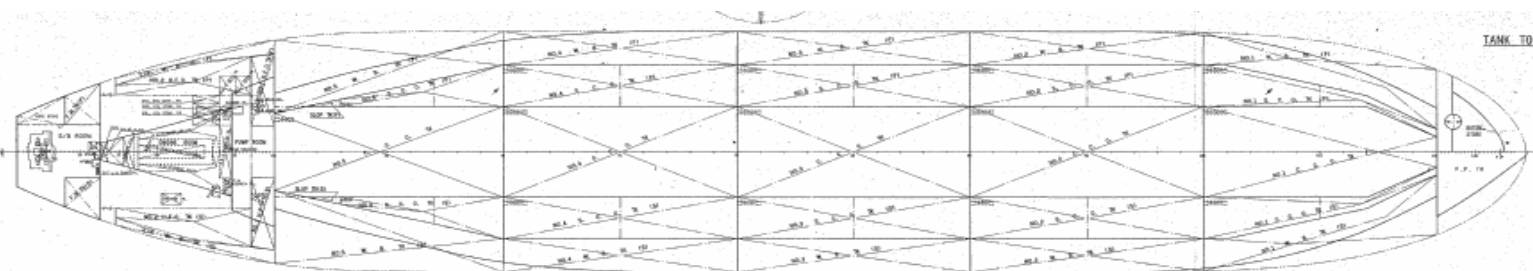
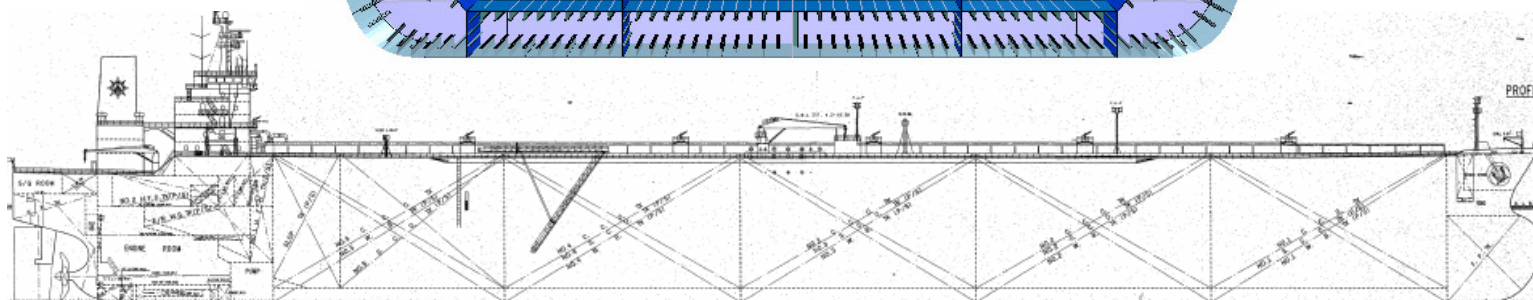


# Double Hull – Two Longitudinal Bulkheads

Ship data:  
L = 320m  
B = 58m  
D = 26,8m  
298,731 DWT

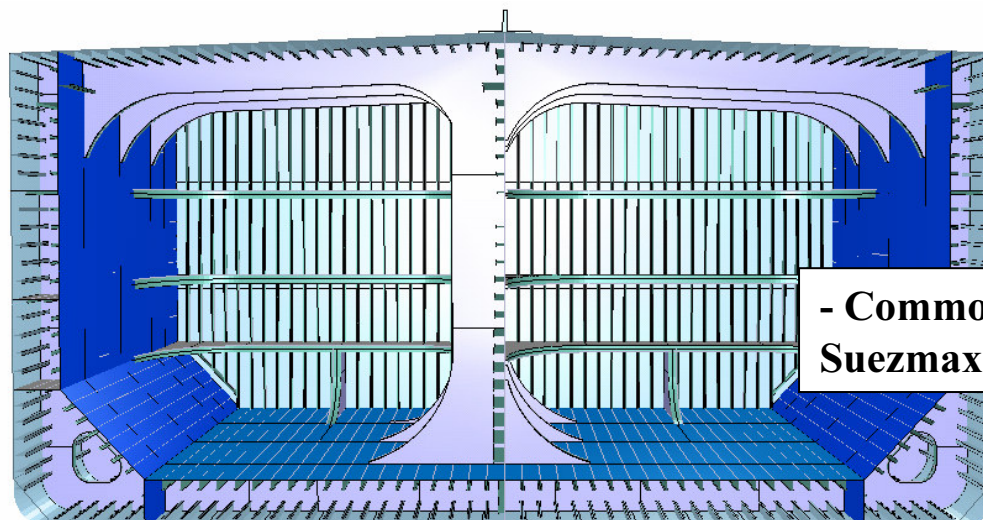


- Common VLCC design  
of today

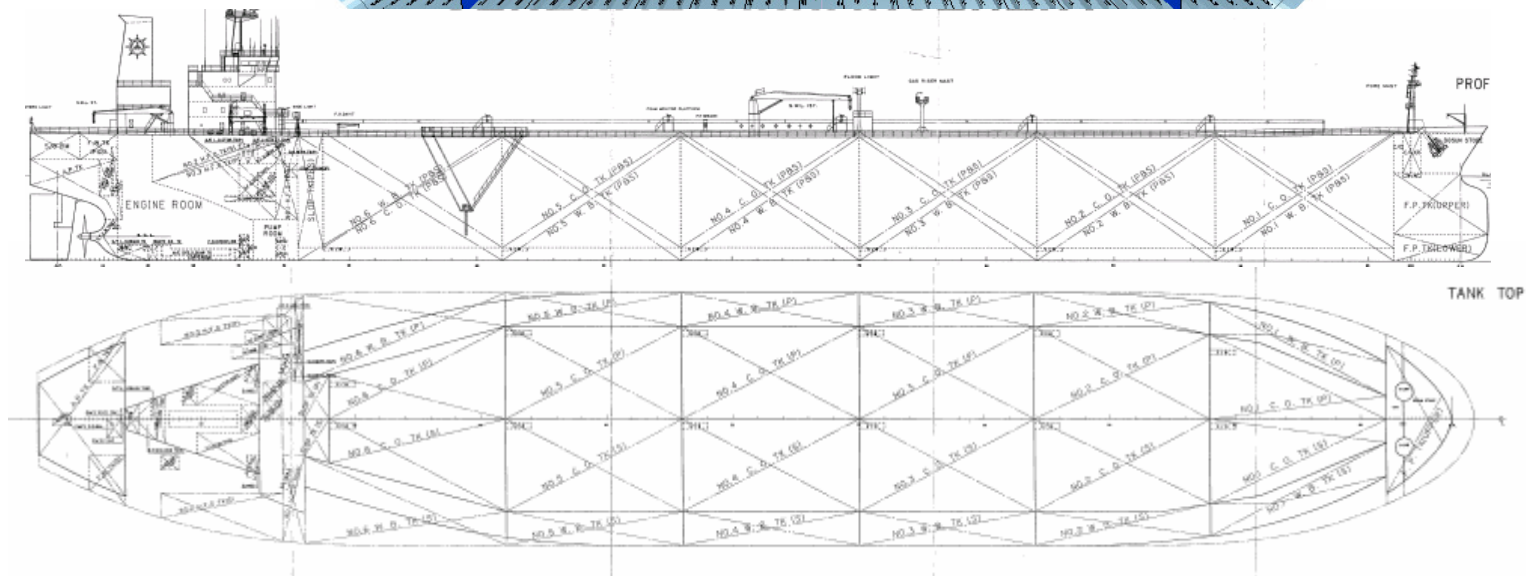


# Double Hull – CL Longitudinal Bulkhead

Ship data:  
L = 264m  
B = 48m  
D = 23,2m  
159,681 DWT

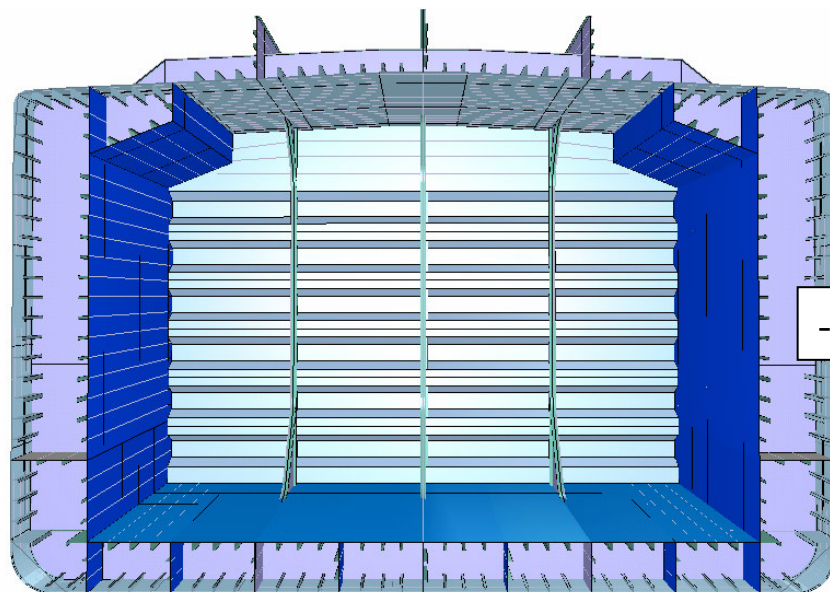


- Common Aframax and Suezmax design of today

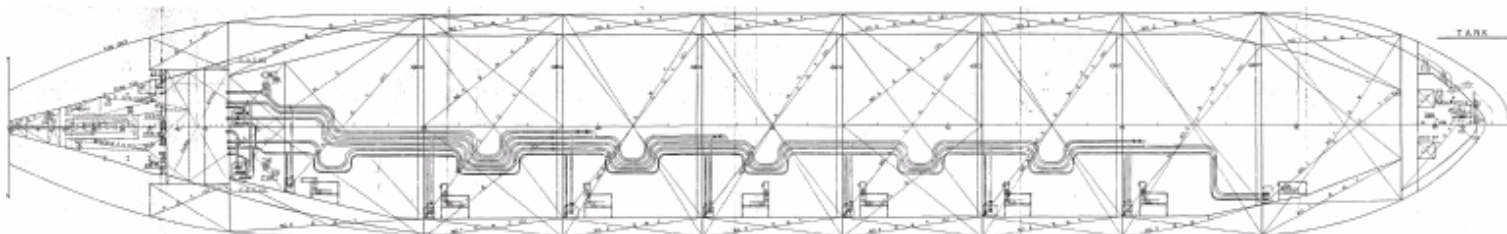
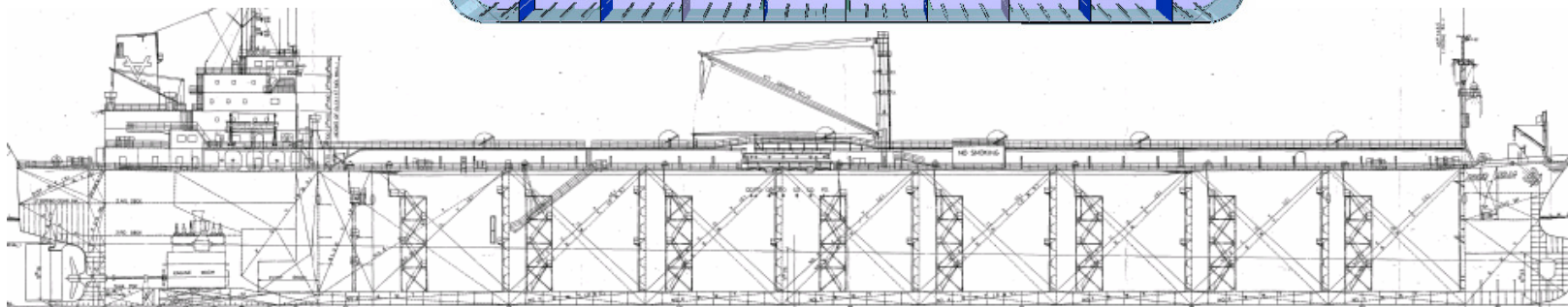


# Double Hull – no CL bulkhead

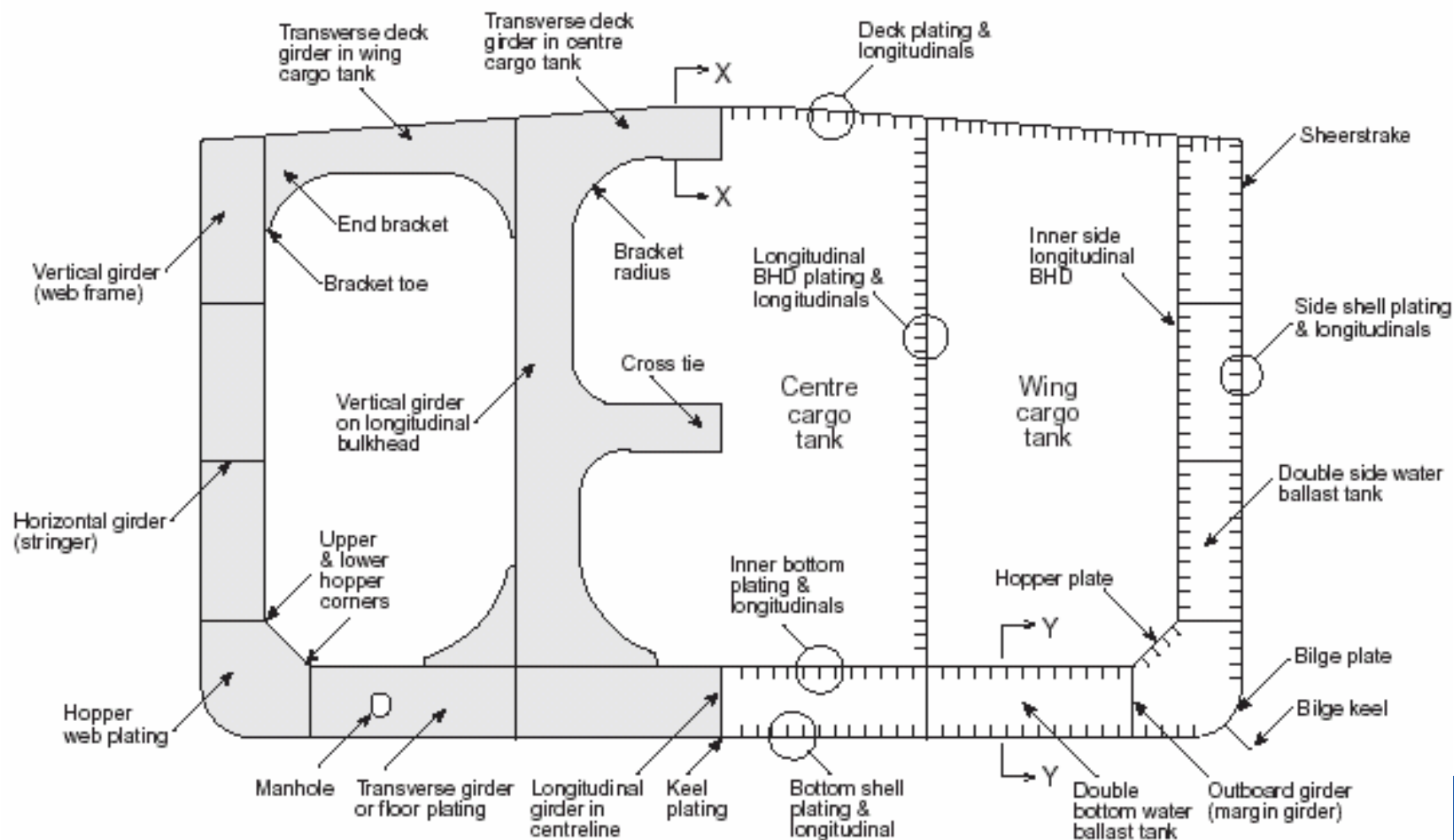
Ship data:  
L = 218m  
B = 32,2m  
D = 19,7m  
63,765 DWT



- Older design

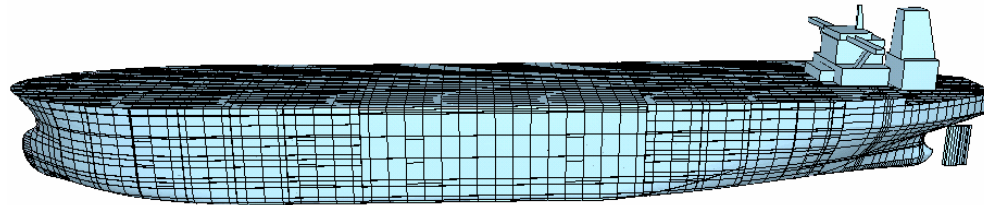


# Nomenclature for a typical double hull oil tanker



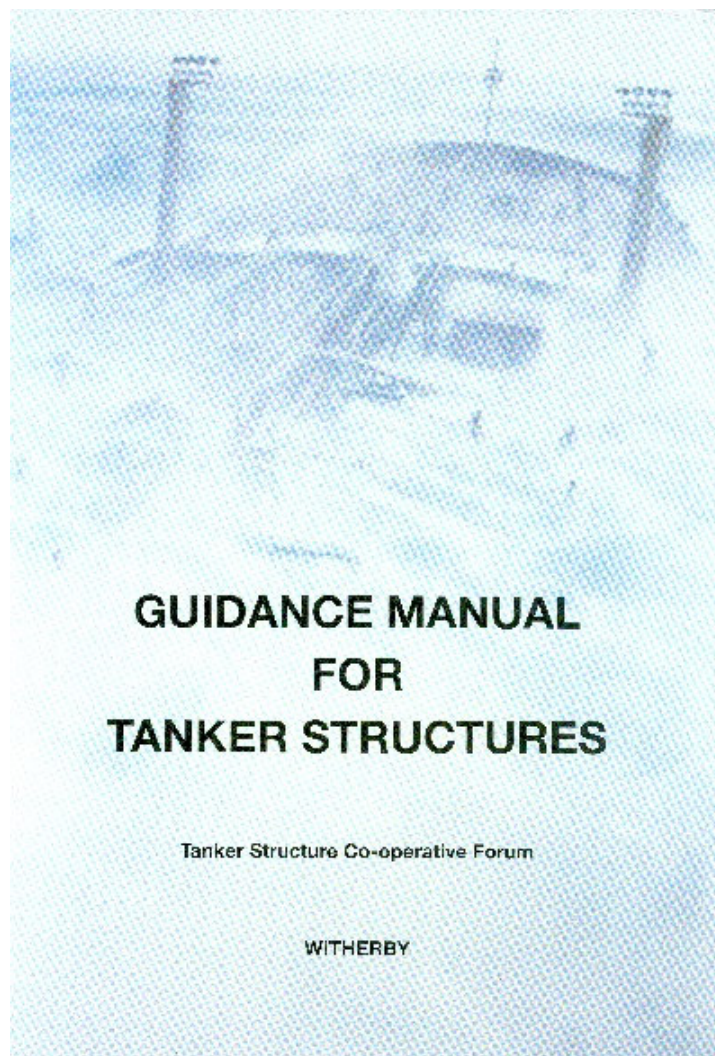
# Structural breakdown of hull

-A vessel's hull can be divided into different hull structural elements



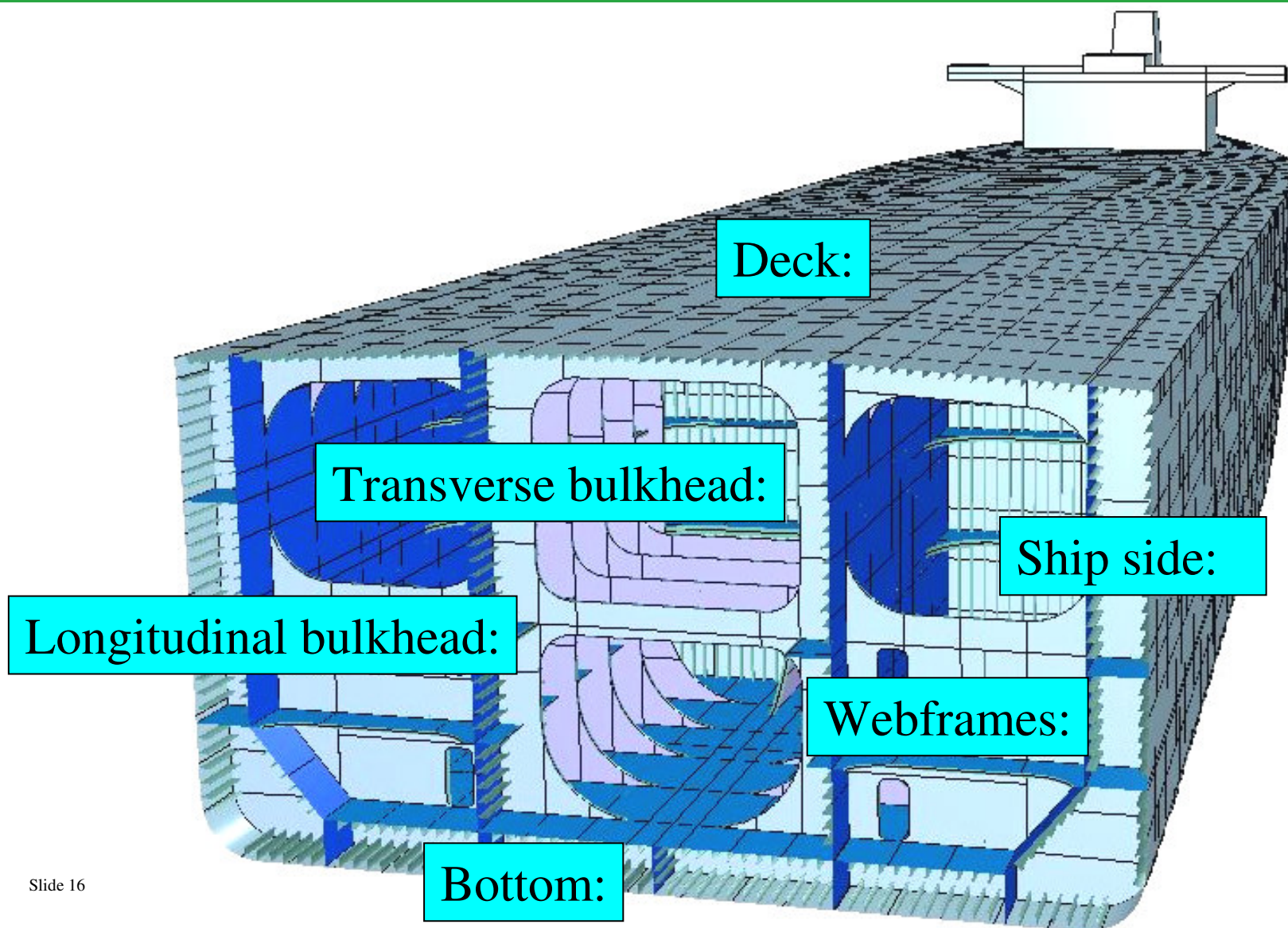
- Each element has its own function contributing to the integrity of the hull
- In order to assess the structure of an oil tanker, one needs to understand the function of each structural element

# Damages and repairs



[WWW.witherbys.com](http://WWW.witherbys.com)

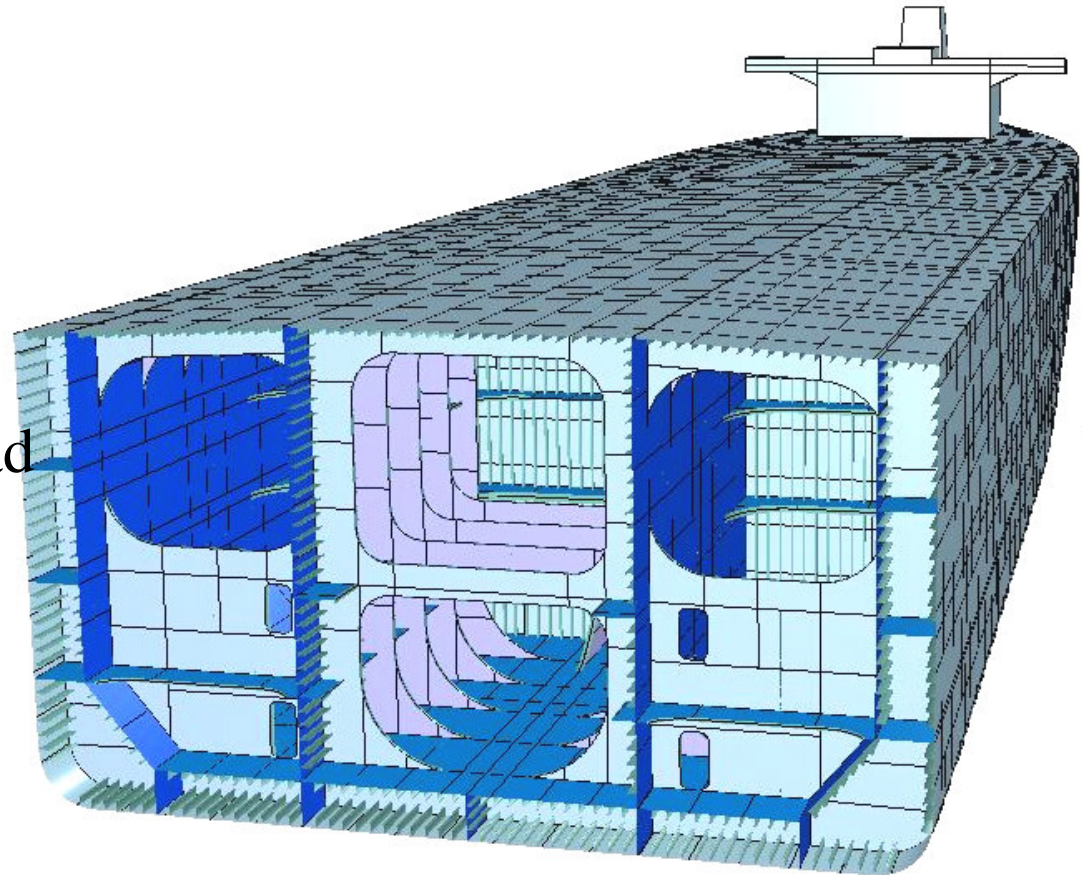
# Function of hull elements





# Hull Structural Breakdown

1. Side
2. Bottom
3. Deck
4. Transverse bulkhead
5. Longitudinal bulkhead
6. Web frames





End of Oil Tanker session