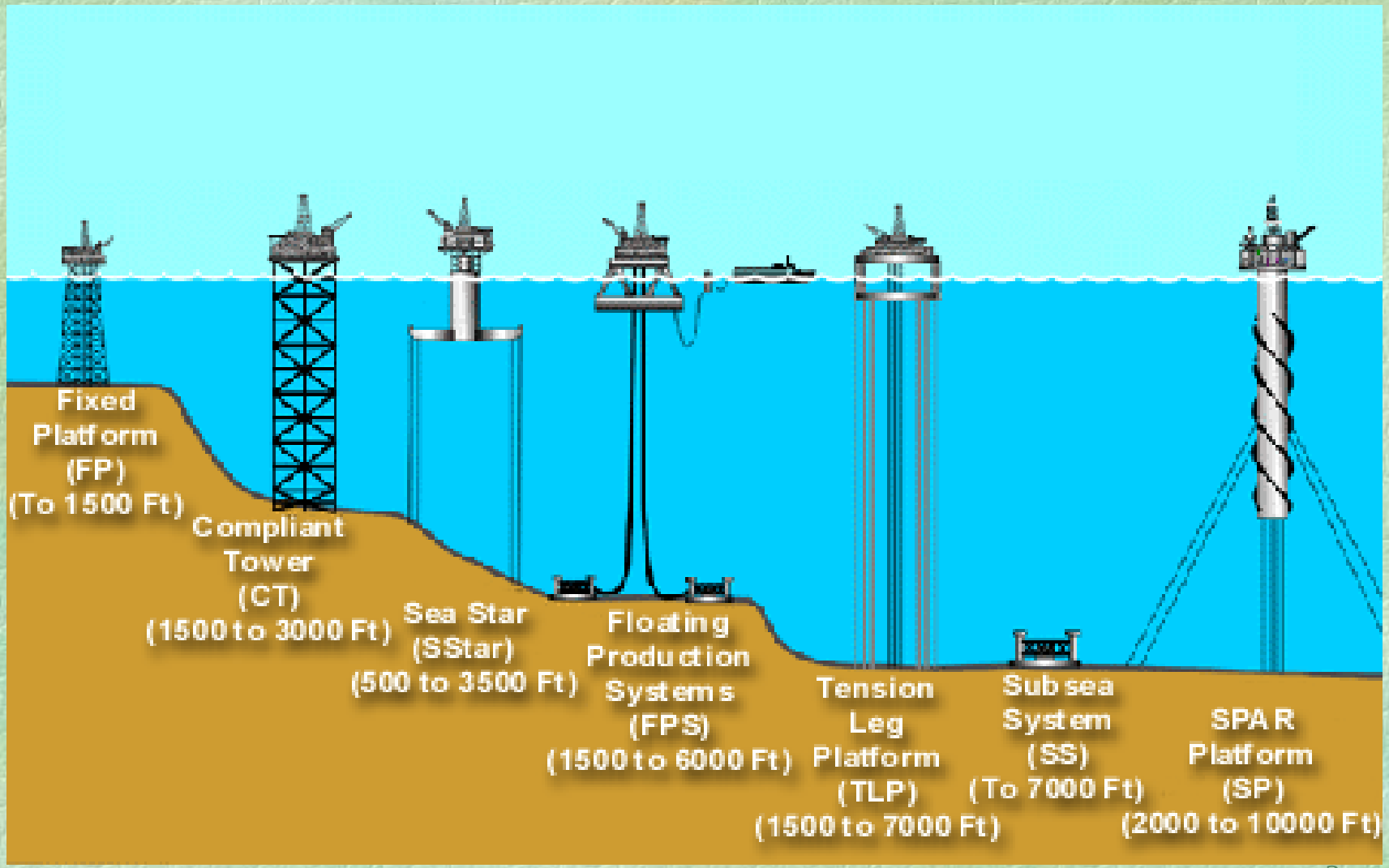
Offshore Structure Brief Introduction

Offshore Structure Definition

Definition By Configuration	Bottom-founded Offshore Structure	Fixed Structure	Fixed Jacket Platform
			Gravity Base Structure
			Jack-up
		Compliant Structure	Articulated Platforms
			Compliant Tower
			Guyed Tower
	Floating Offshore Structure		Semi-submersible
			Spar
			Drillship
			Tension Leg Platform
			Mini TLP
			FPSO
Definition by Function			Drilling Structure
			Production Structure
			Storage Structure

Relation Between Unit & Water Depth



Relation Between Unit & Water Depth

Determination Factors of Offshore Structure Size & Configuration

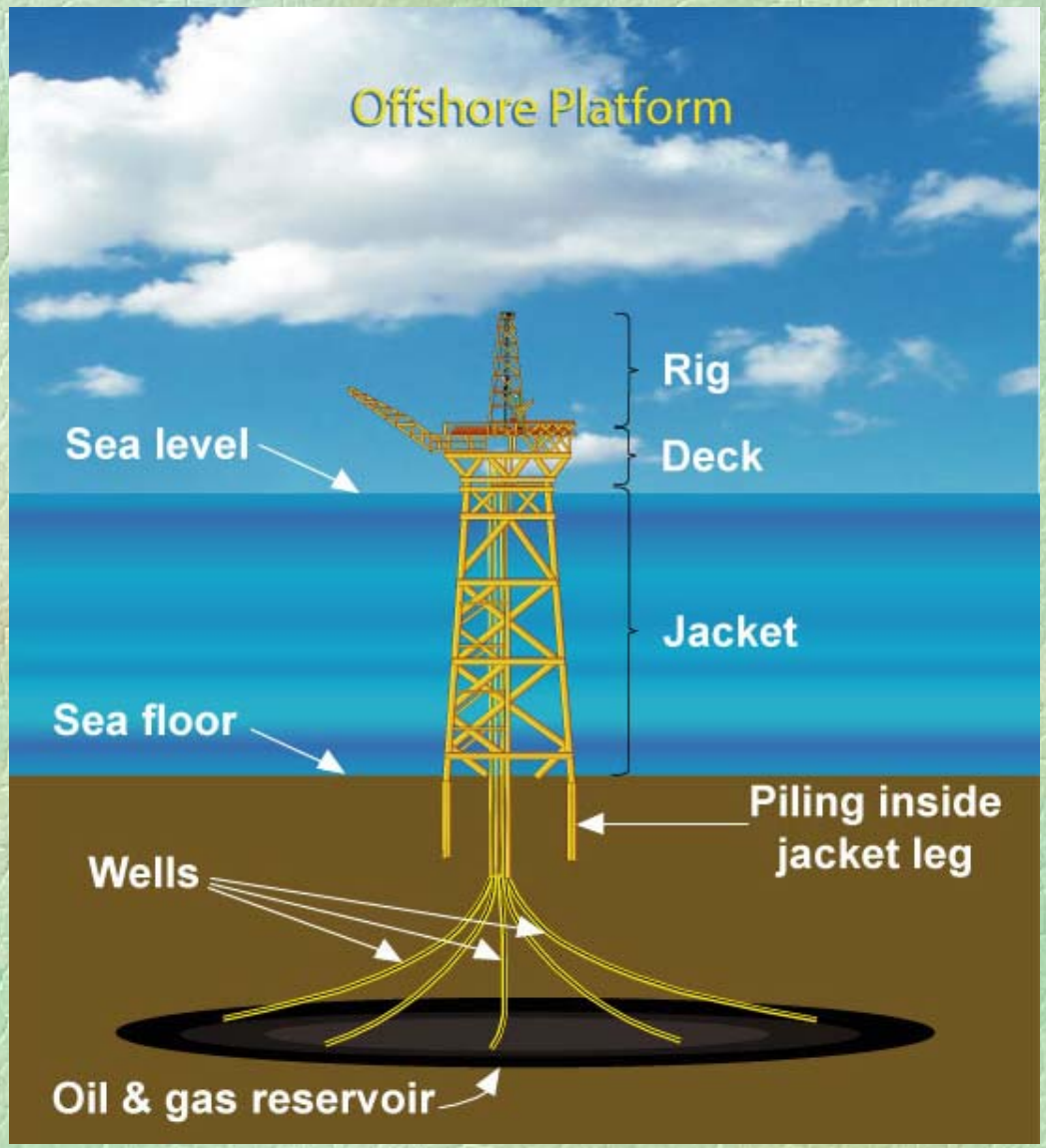
- Function
- Water Depth
- Environment
- Site Condition
- Management philosophy
- Financial Factor
- Rules, regulations and the national law.

Comparison Between Bottom Structure & Floating Structure

Table 1.2 Bottom-founded vs. floating structures

Function	Bottom-Supported	Floating
Payload support	Foundation-bearing capacity	Buoyancy
Well access	"rigid" conduits (conductors) surface wellheads and controls	"dynamic" risers subsea wellheads subsea or surface controls
Environmental loads	Resisted by strength of structure and foundation, compliant structure inertia	Resisted by vessel inertia and stability, mooring strength
Construction	Tubular space frame: fabrication yards	Plate and frame displacement hull: ship yards
Installation	Barge (dry) transport and launch, upend, piled foundations	Wet or dry transport, towing to site and attachment to pre-installed moorings
Regulatory and design practices	Oil industry practices and government petroleum regulations	Oil industry practices, government petroleum regulations and Coast Guard & International Maritime regulations

Fixed Jacket Platform



Fixed Jacket Platform Progression

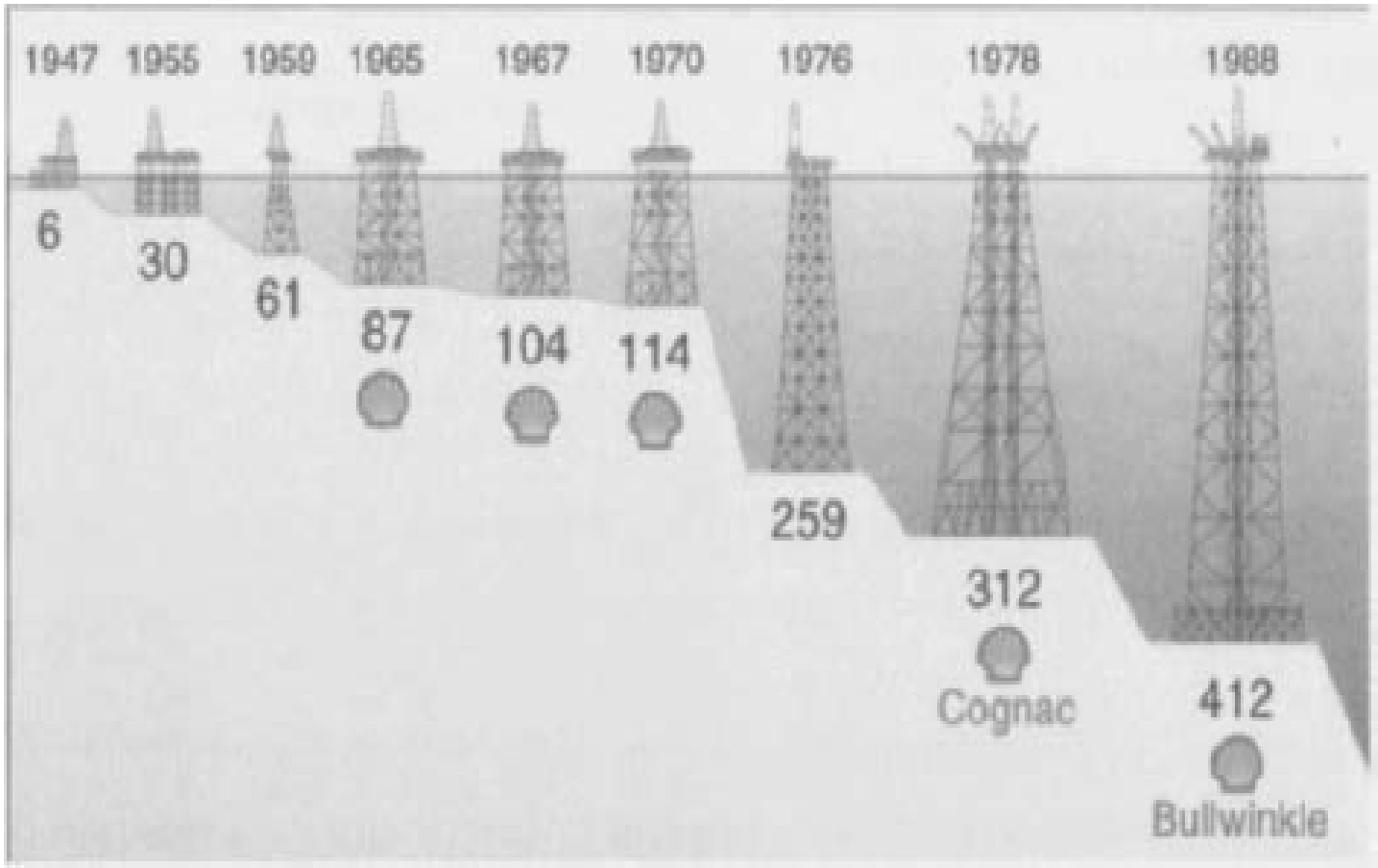
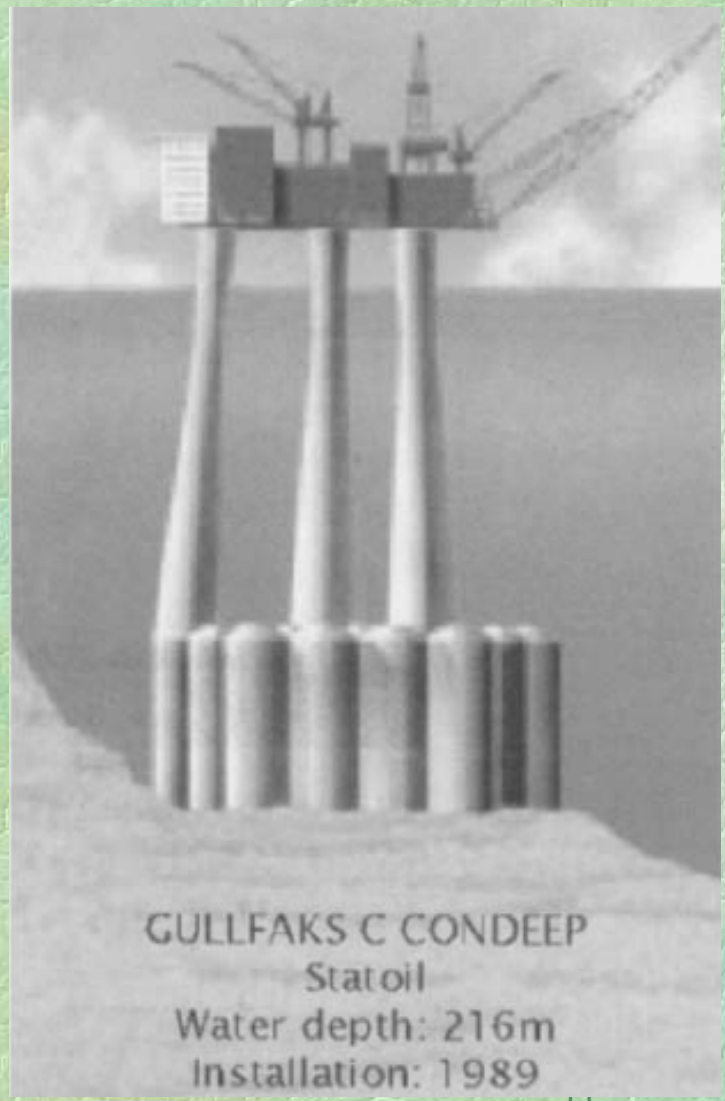


Figure 1.1 Progression of fixed platforms in the GOM – depths in meters (Courtesy Shell)

Fixed Platform

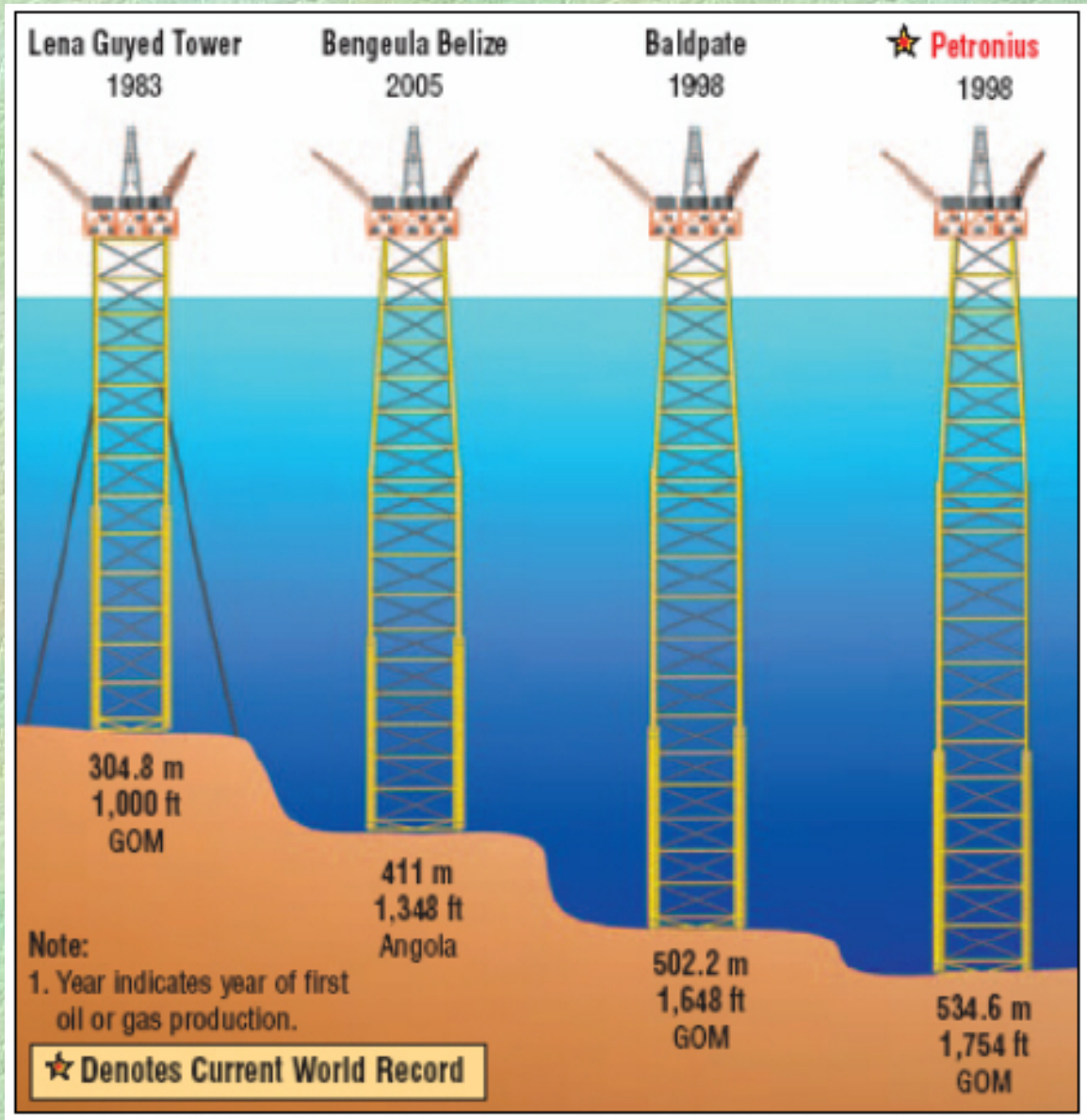
Fixed Platform Topside Module Under Transportation

Gravity Base Platform



Compliant Tower

Guyed Tower


Lena Guyed Tower
1983
Bengeula Belize
2005
Baldpate
1998
Petronius
1998
304.8 m
1,000 ft
GOM
411 m
1,348 ft
Angola
502.2 m
1,648 ft
GOM
534.6 m
1,754 ft
GOM
Note:
1. Year indicates year of first oil or gas production.
Denotes Current World Record

Jack-up Main Components

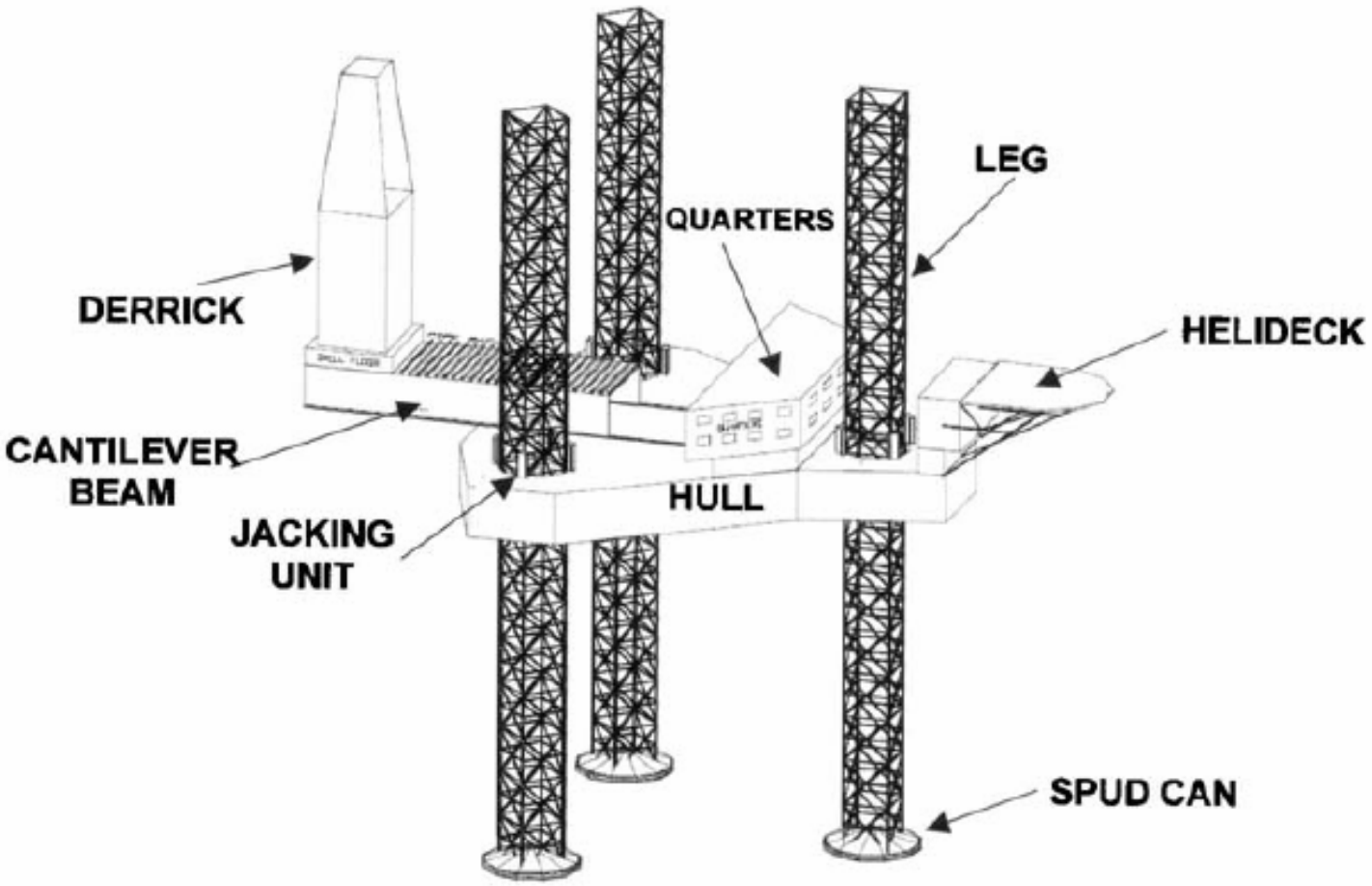
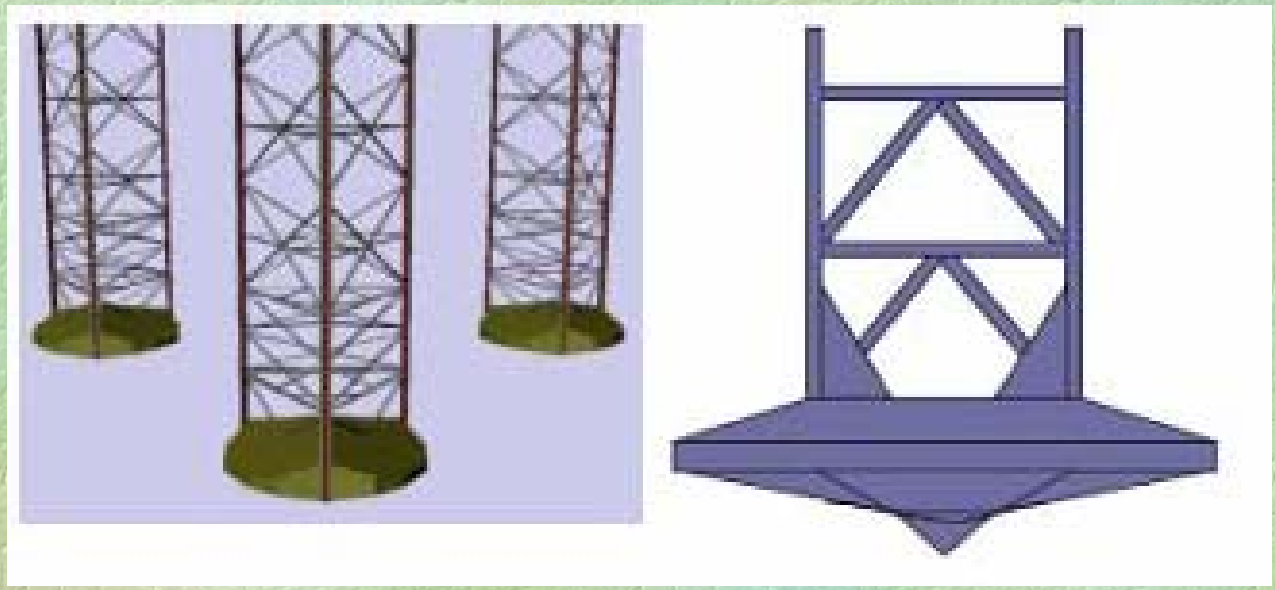
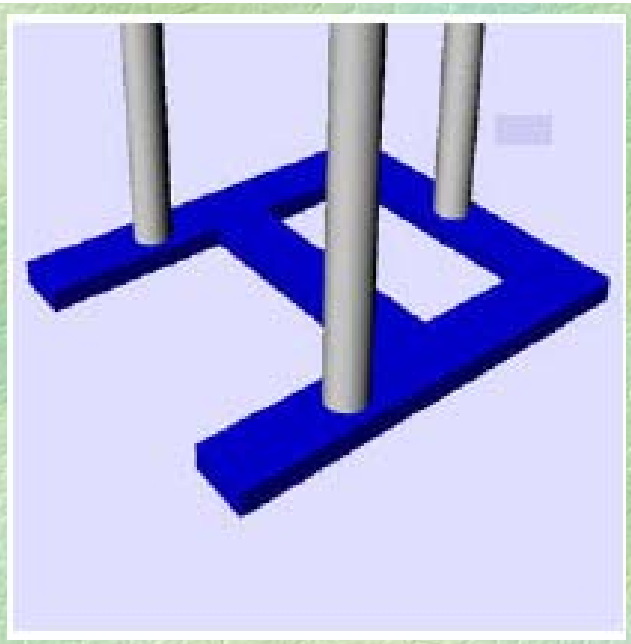


Figure 6.1 A jack-up drilling unit with spud cans

- Main Hull
- Leg & Foot
- Cantilever
- Drill Floor & Derrick
- Quarters
- Helideck

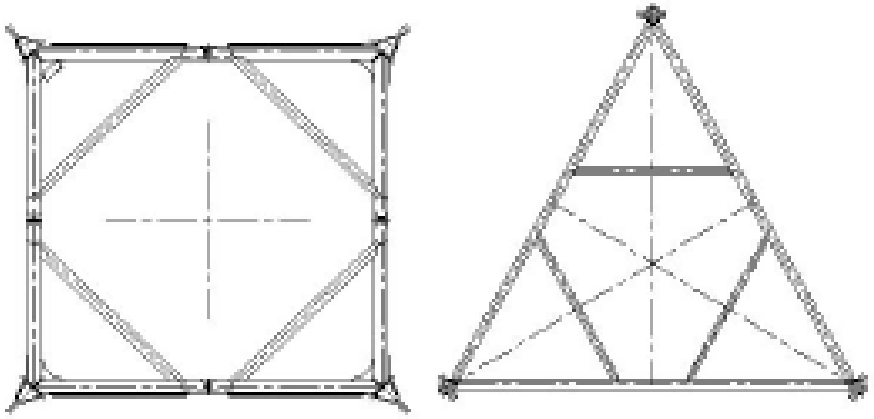
Mat Footing Vs Spud Can





Cylindrical Leg Vs Truss Leg

4-Chorded Leg Vs 3-Chorded Leg



4-Chorded Leg
(Radial Pinions)

3-Chorded Leg
(Opposed Pinions)

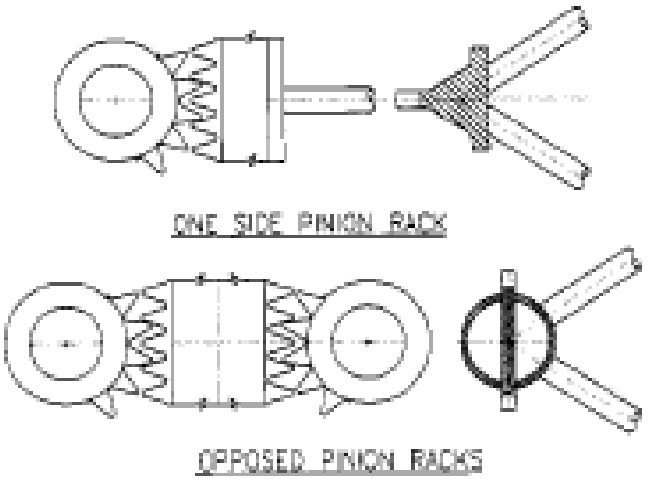


Figure 6.67 Two common types of gear racks

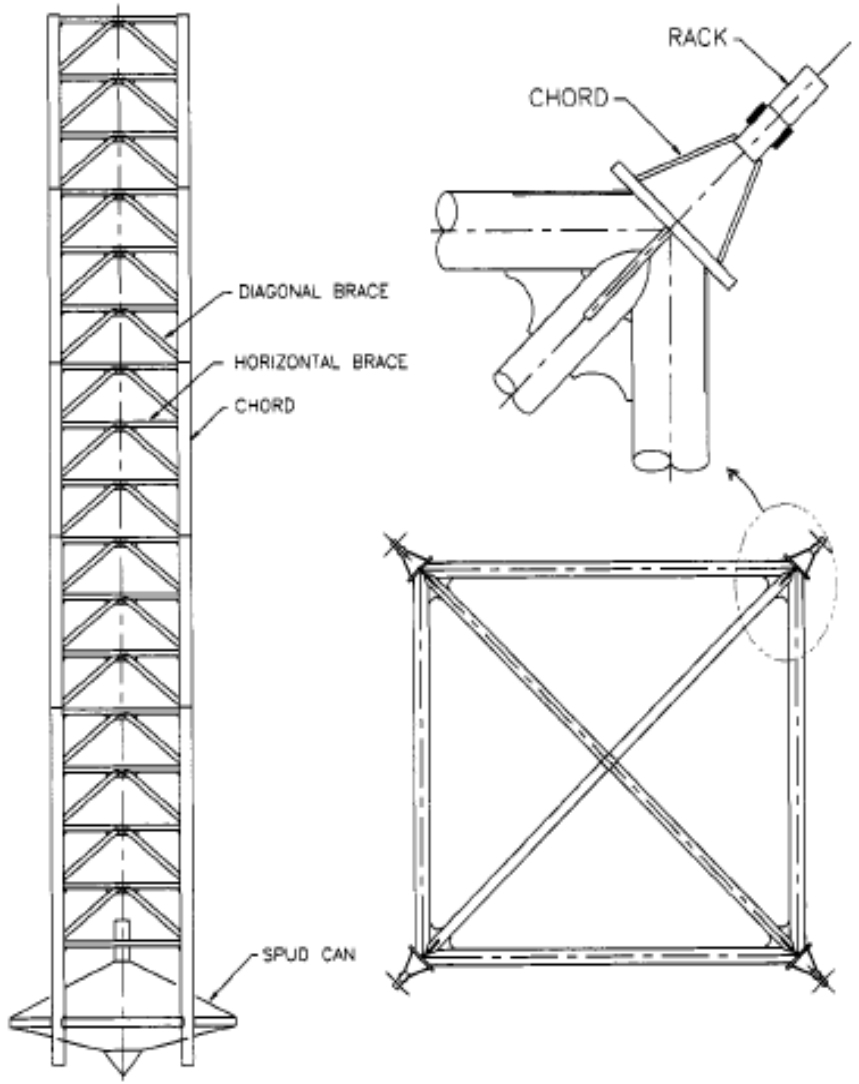
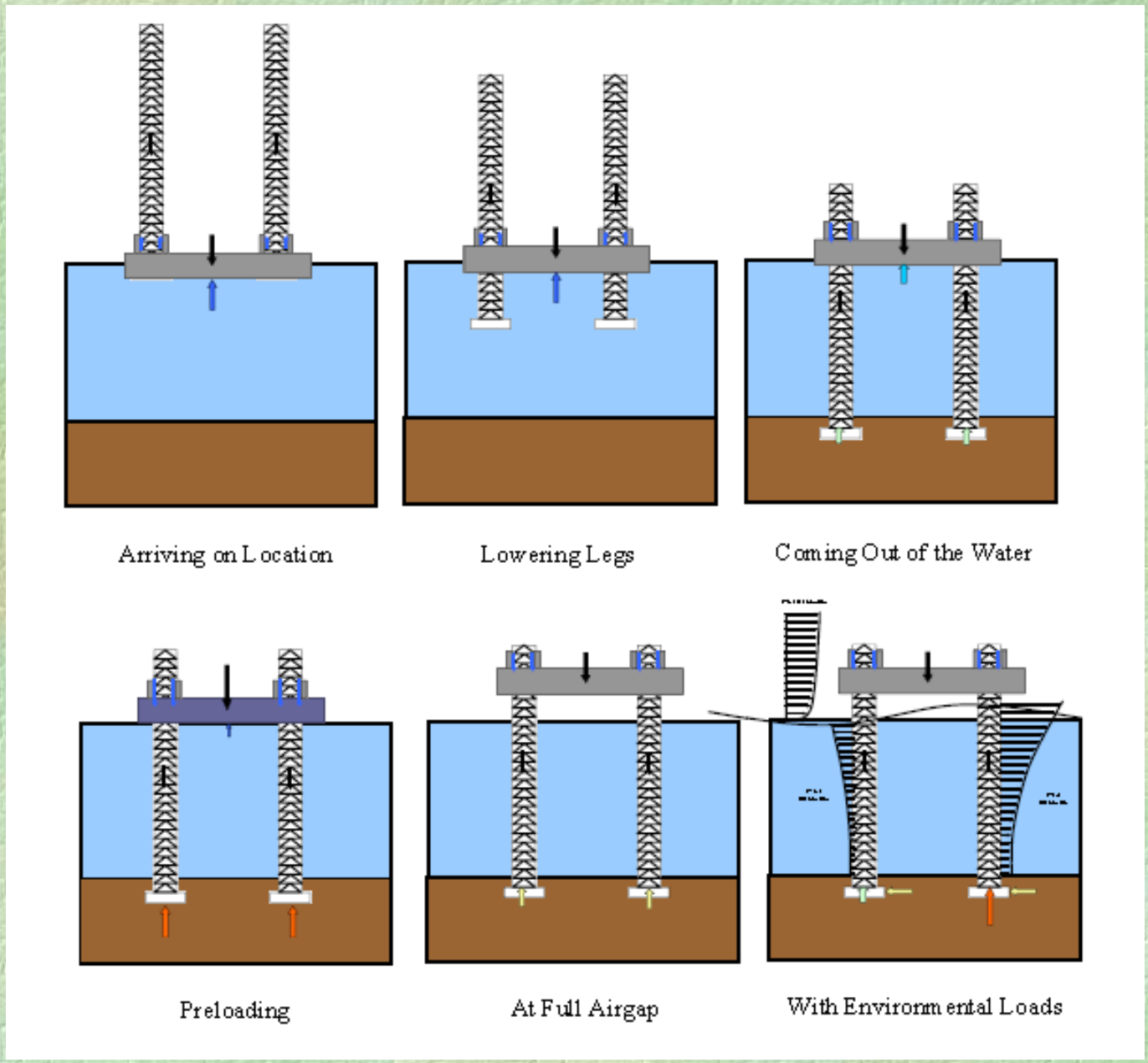


Figure 6.66 Components of a jack-up platform leg

OPERATION OF A JACK UP



Jack-up Drilling Unit

Jack-up Drilling Unit (wet towing)

Jack-up Drilling Unit (dry towing)