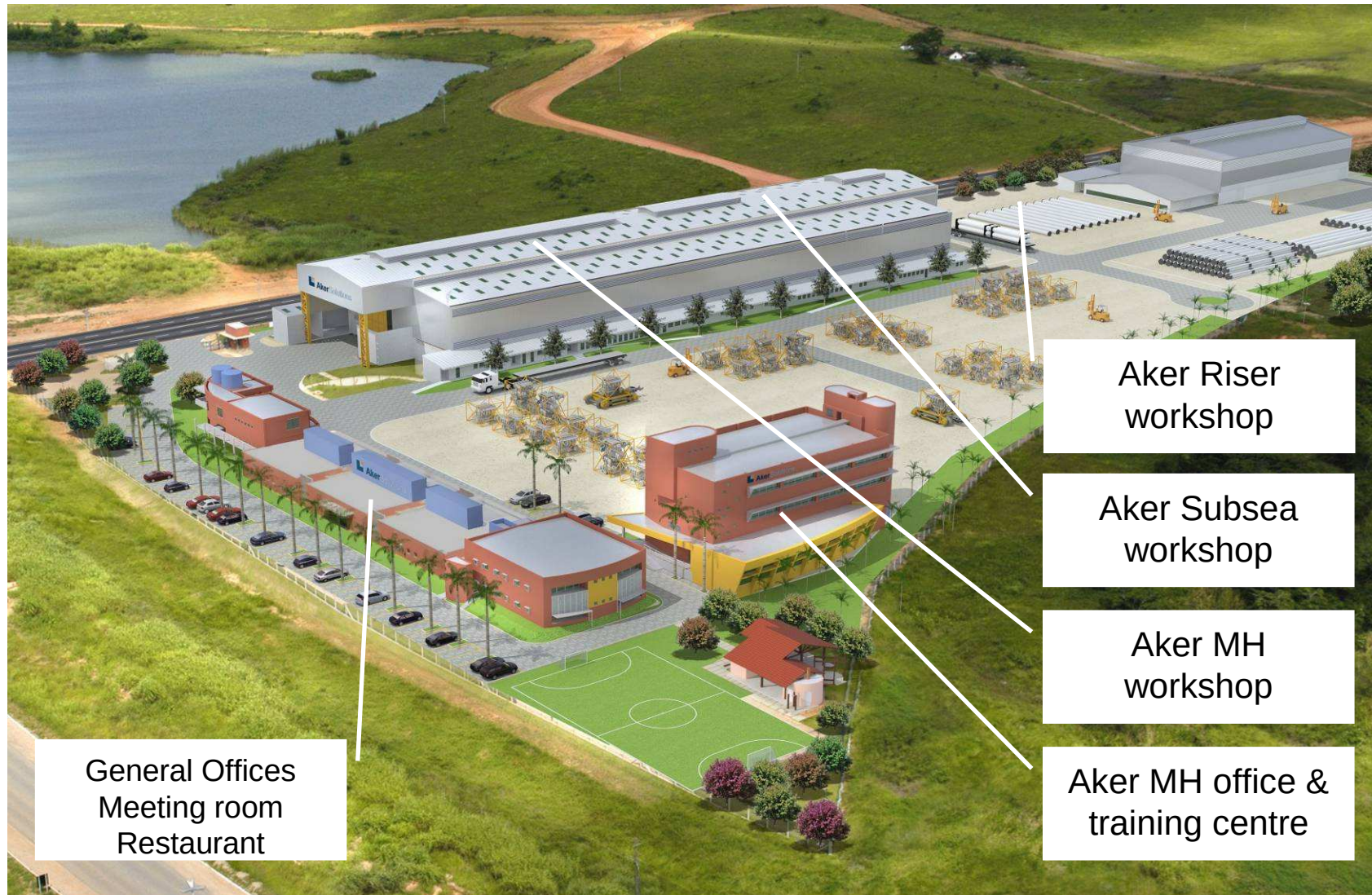


Aker Drilling Riser Brazil

Presenter
Marcelo Coraça
Project Manager
June/2010



Aker Solutions Rio das Ostras



Aker Drilling Riser Brazil

Risers **First Line** for production, tests, services and after market for drilling risers in Brazil with dedicated people for manufacturing, purchasing, quality, engineering and offshore

Man Power 65 employees

Area	Total	42000 m ²
	Workshops	10000 m ²
	Offices	3500 m ²
	Open area	28000 m ²

Investment R\$ 26 millions

Aker Drilling Riser Brazil - Delivered Projects

■ Olinda Star

- water depths up to 1,100 meters.
- 78 riser joints with 50 ft. + 5 pup joints
- Riser joint configuration: Main Pipe - 21" OD x 0.625" wall, with 2 choke and kill lines, 5" OD x 3.75" ID and 1 mud booster line, 5" OD x 4" ID.

■ Lone Star

- water depths up to 2,400 meters.
- 111 riser joints with 75 ft. + 5 pup joints
- Riser joint configuration: Main Pipe - 21" OD x 0.750" to 1" wall, with 2 choke and kill lines, 6.5" OD x 4.5" ID, 1 mud booster line, 5" OD x 4" ID and 2 hydraulic lines 3.5" OD x 3" ID.

Aker Drilling Riser Brazil - Ongoing Projects

■ Gold Star

- water depths up to 2,000 meters.
- 93 riser joints with 75 ft. + 5 pup joints
- Riser joint configuration: Main Pipe - 21" OD x 0.8125" to 1" wall, with 2 choke and kill lines, 6.5" OD x 4.5" ID, 1 mud booster line, 5" OD x 4" ID and 2 hydraulic lines 3.5" OD x 3" ID.

■ Alpha Star

- water depths up to 2,700 meters.
- 123 riser joints with 75 ft. + 5 pup joints
- Riser joint configuration: Main Pipe - 21" OD x 0.8125" to 1" wall, with 2 choke and kill lines, 6.5" OD x 4.5" ID, 1 mud booster line, 5" OD x 4" ID and 2 hydraulic lines 3.5" OD x 3" ID.

Developments Implemented in Brazil

➤ Local Suppliers

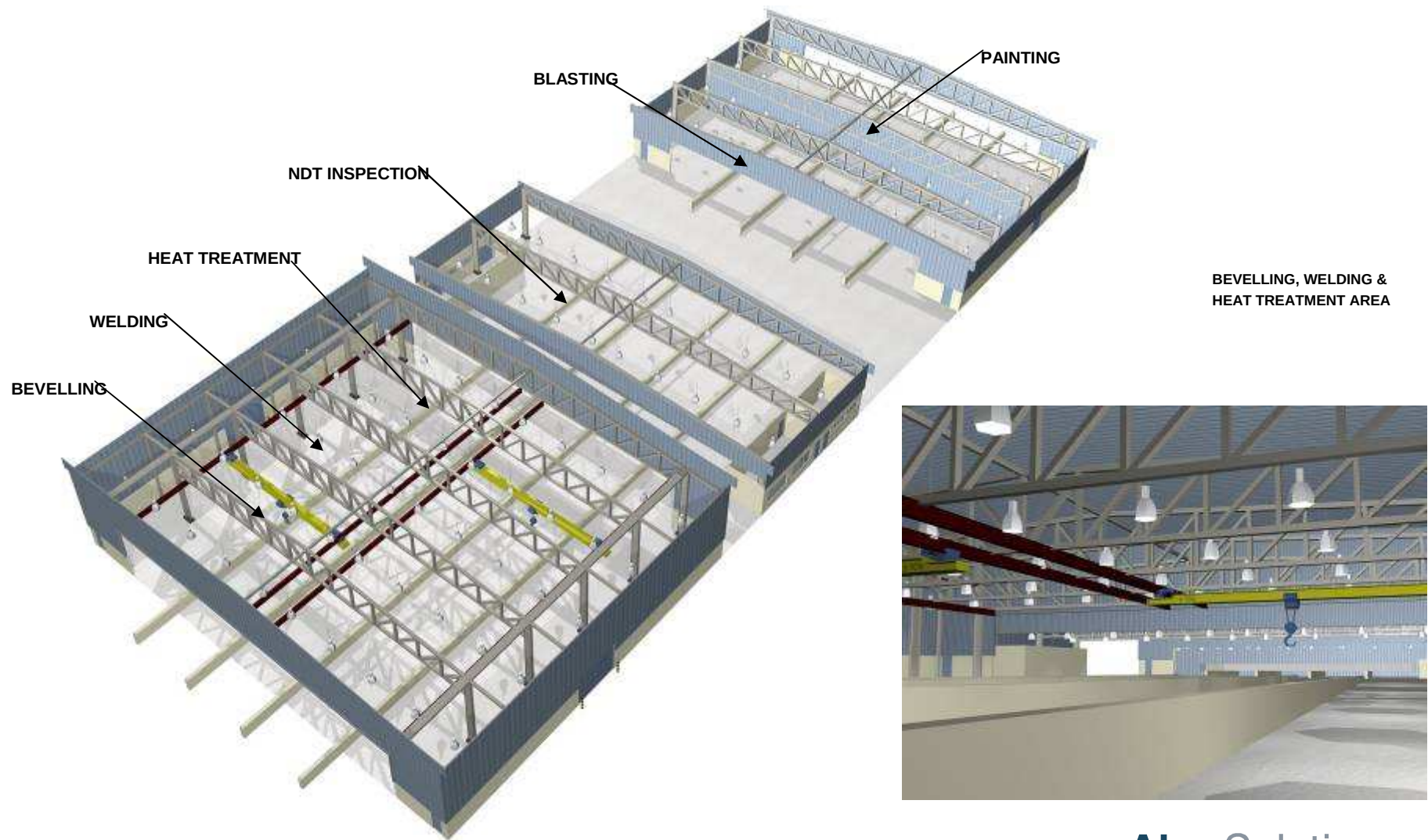
- Pins
- P-lines connectors
- Clip Connectors Machining
- Clamps, Guide-plate, Guide Plate Support
- Seals
- Bolts and Nuts

➤ Welding Procedures

➤ Manufacturing Procedures

➤ 50% Local Content

Layout Riser Building



Manufacturing Phases



Cutting



Bevelling



Pre Heating



Welding



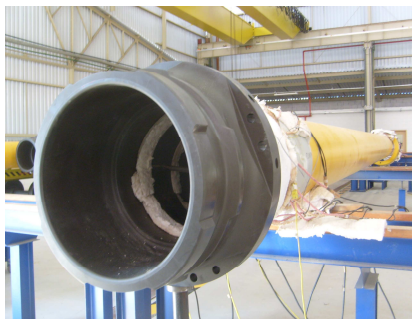
NDT- Dimensional



NDT - Ultrasonic



NDT - Hardness



Heat Treatment



Pressure Test



Painting



Assembly





Riser joints with buoyancy modules and fins. Buoyancy for uplift, reduces the weight of the joint in water. Fins attached for protection of P-lines during tripping. Stacking Rings for allowing horizontal storage.

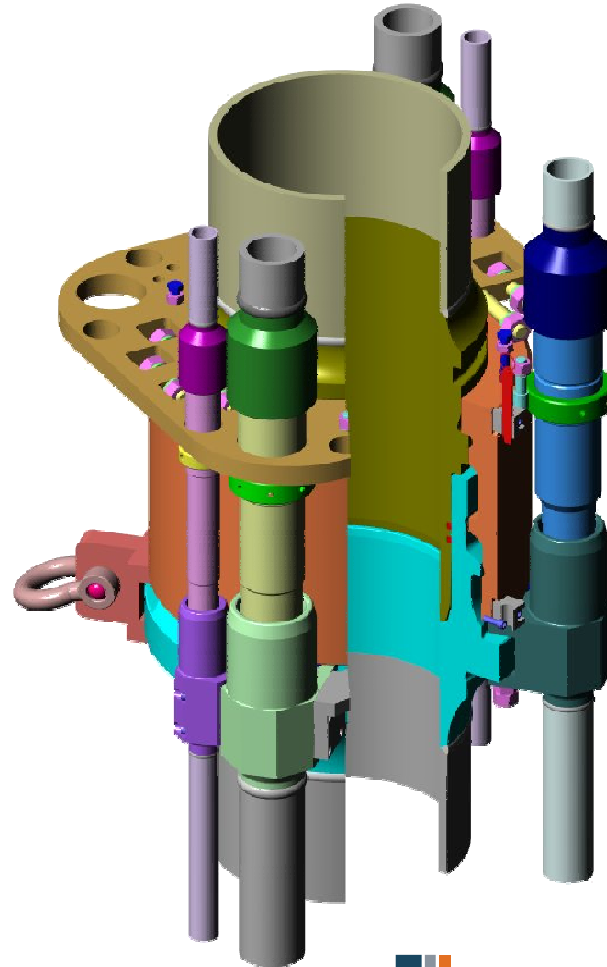


Clip Riser General Characteristics

- **Most Secure Connection: Fully Opened or Closed Positions Only**
- **No Threading, Bolting, or Preloading**
- **Easy Stabbing even with Misalignment**
- **Minimum Maintenance**
- **Very Quick Connections**

CLIP Connector Assembly

- Description
 - Composed of 3 forged elements
 - Locking on 360° by two rows of dogs
 - No pre-stress required to achieve full capacity
- Main Advantages
 - Fast make-up/break-out
 - Robust
 - Safe & Reliable operation



Locking the CLIP Connectors – In less than 11 seconds!



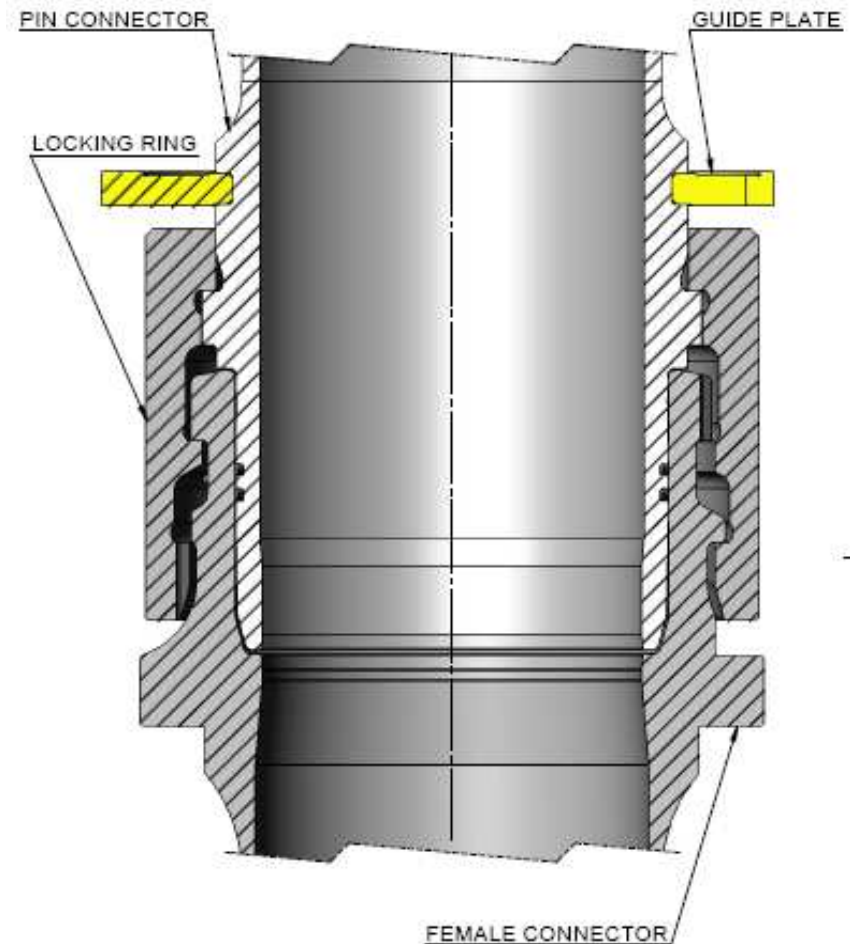
CLIP Connector Assembly

Description

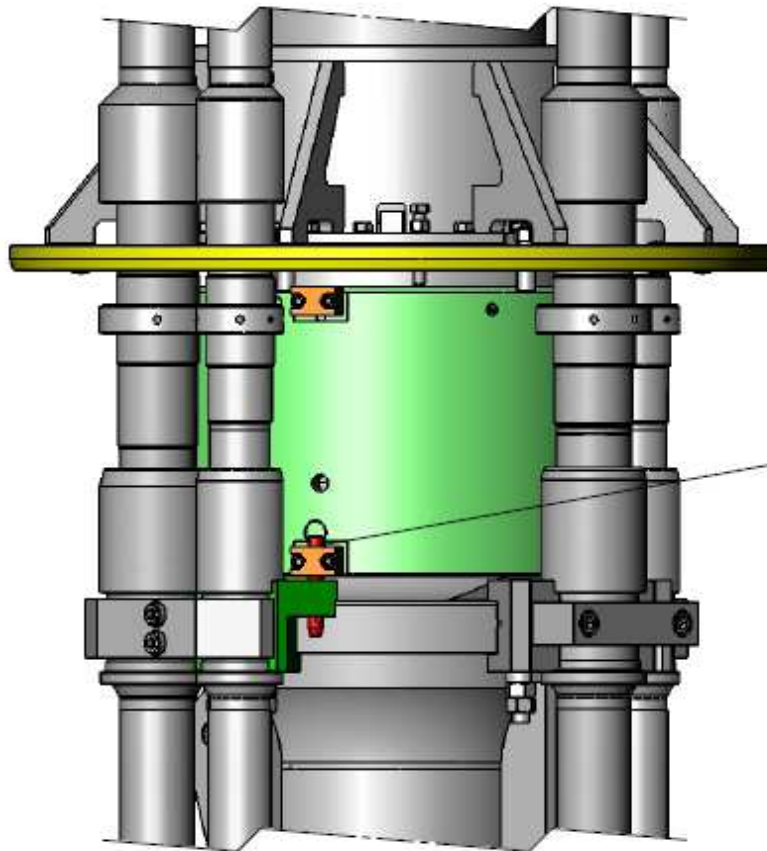
- Connector is a “breach lock” type
- Composed of 3 forged elements
- Locking on 360° by two rows of dogs
- No pre-stress required to achieve full capacity

Main Advantages

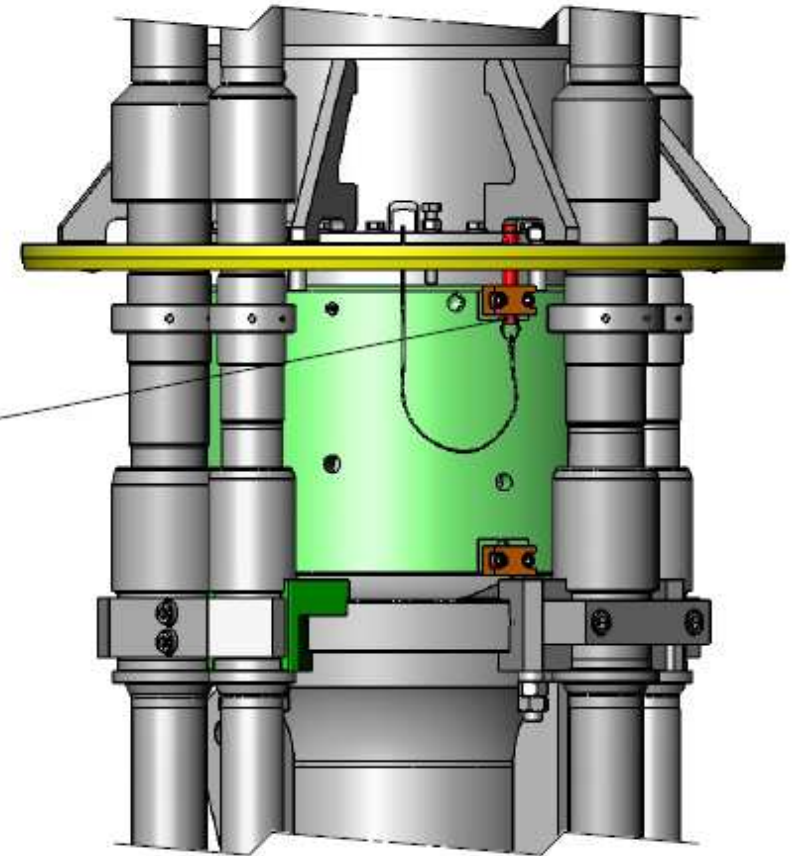
- Fast make-up/break-out
- Robust
- Safe & Reliable operation



CLIP Riser Make -up

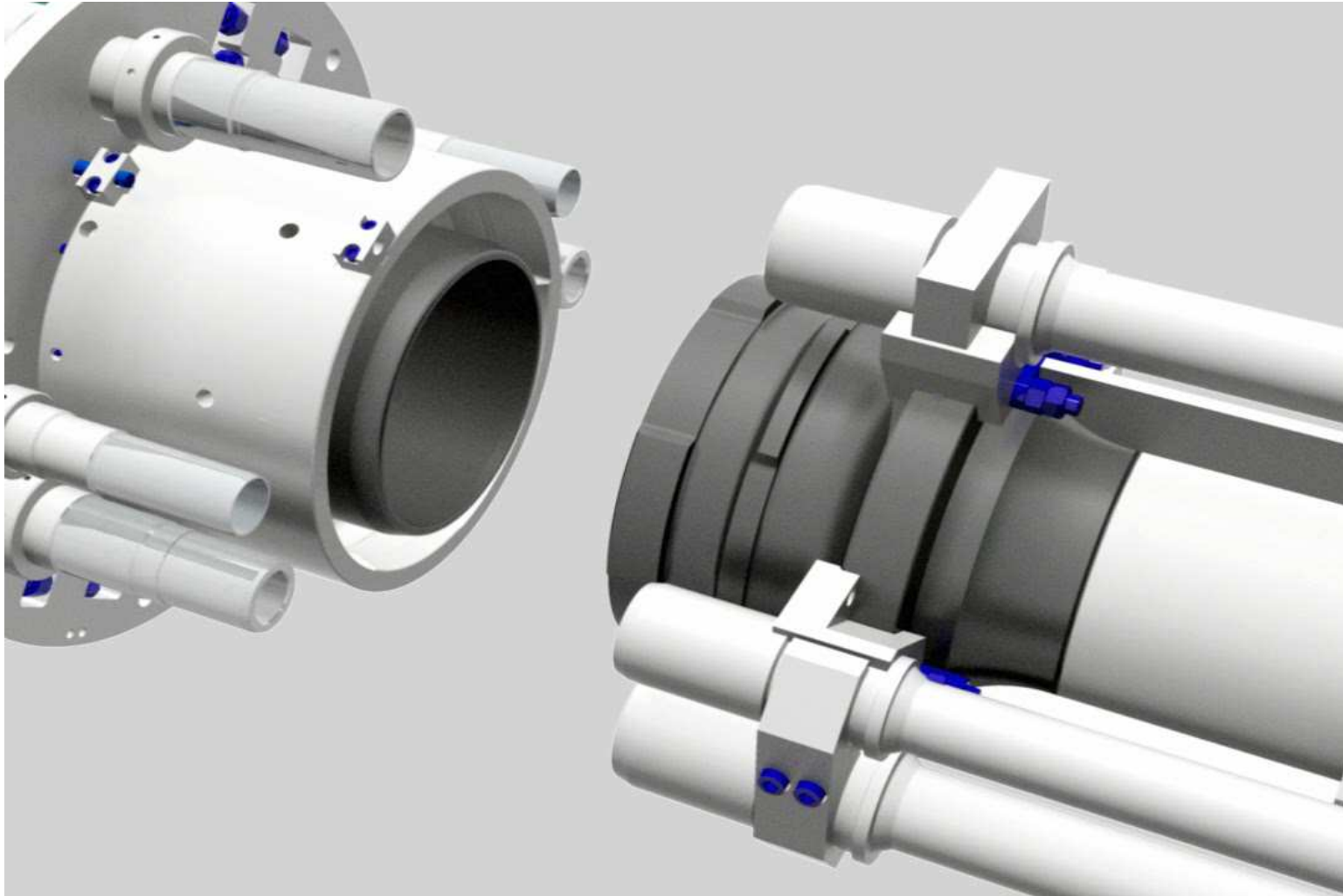


CONNECTOR SHOWN LOCKED
IN LOWER ALIGNMENT BLOCK

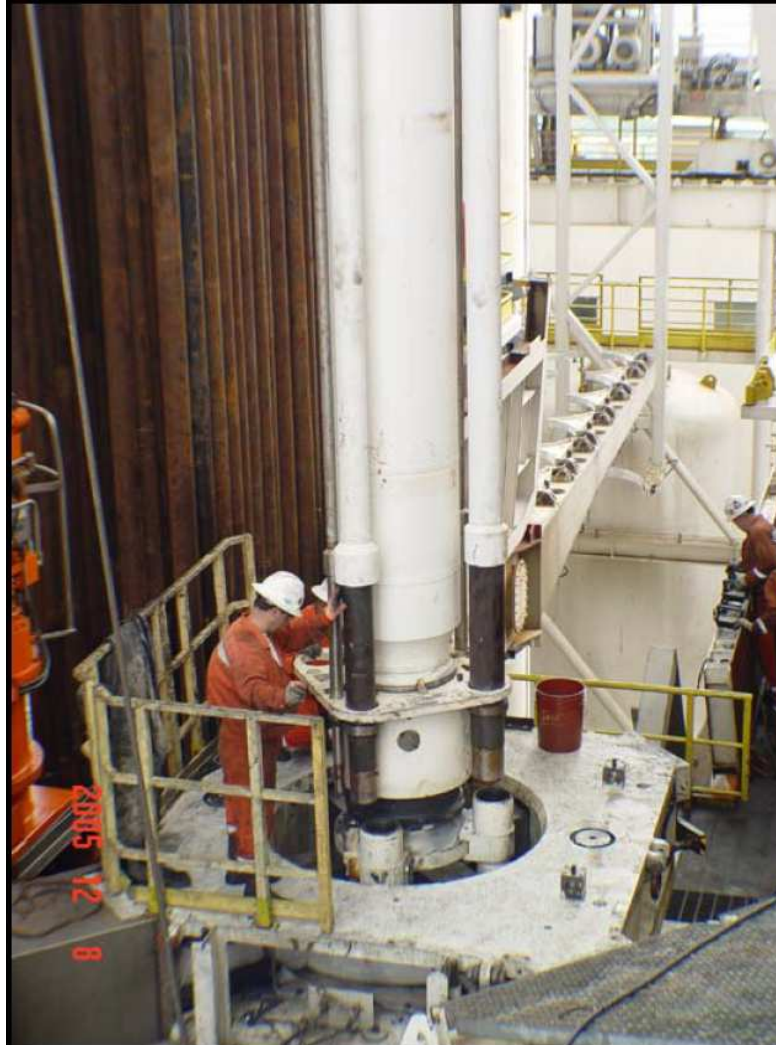


CONNECTOR SHOWN UNLOCKED
IN UPPER ALIGNMENT BLOCK

CLIP Riser 11 Second Make Up



Running CLIP Riser



Make up Tools

CLIP Breechlock

Make-up tool (steel bar)



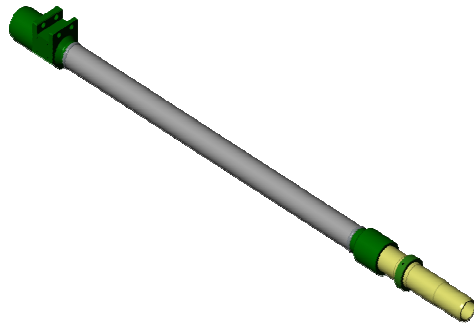
Flanged Riser

Hydraulic Torque wrench

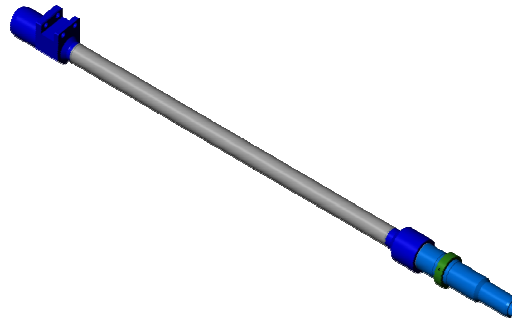


Peripheral Lines

- Peripheral Lines are fitted with Replaceable Subs
- Subs can be replaced in the field with no need of welding

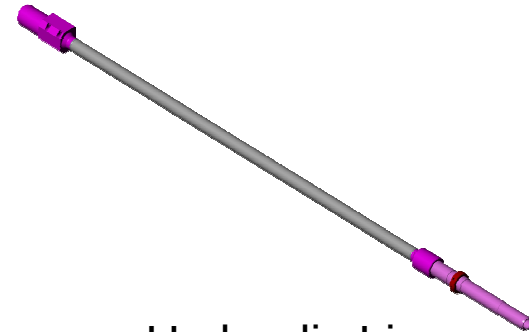


Choke &
Kill Line
4 1/2" ID
x
15,000 PSI W.P.



Boost Line

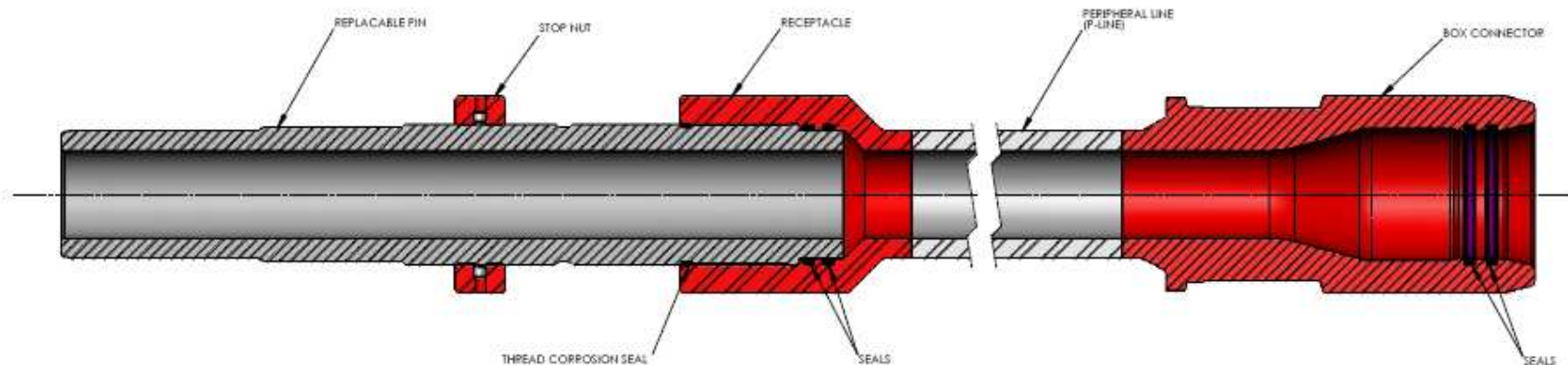
4" ID
x
5,000 psi W.P.



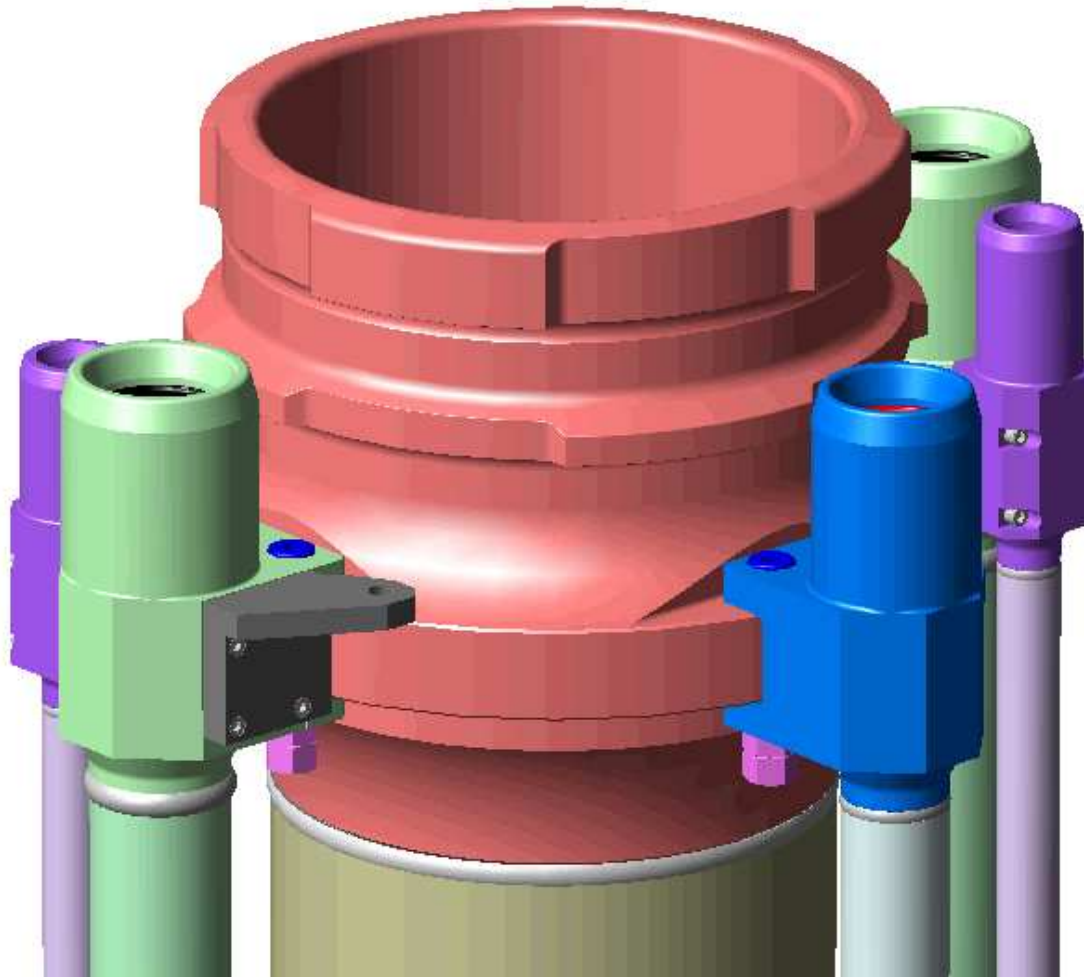
Hydraulic Line
2 each
1.875" ID
x
5,000 psi W.P.

Peripheral Lines

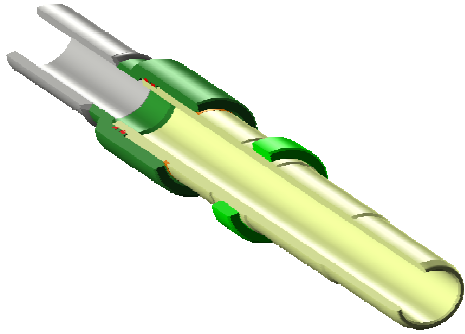
- Peripheral Lines are fitted with Replaceable Pins
- Pins can be replaced in the field with no need of welding



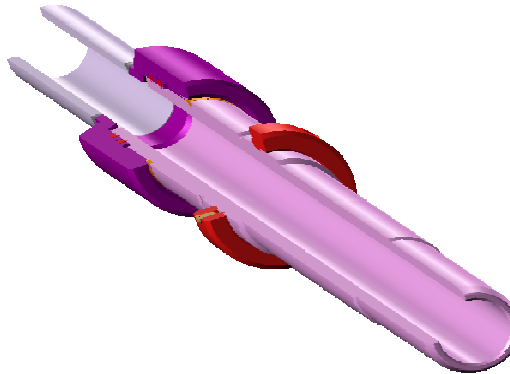
Replaceable Peripheral Lines



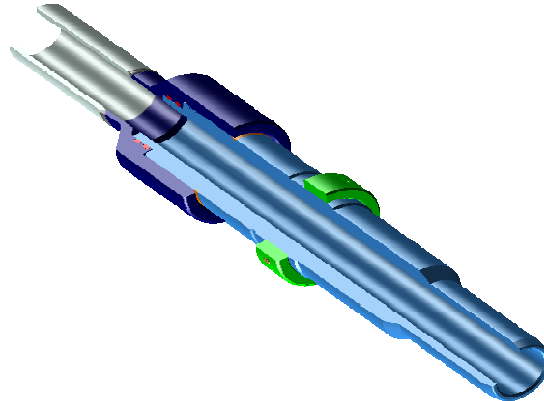
Field Replaceable Peripheral Line Saver Subs



Choke & Kill



Hydraulic



Boost

CLIP Riser Hydraulic Running Tool

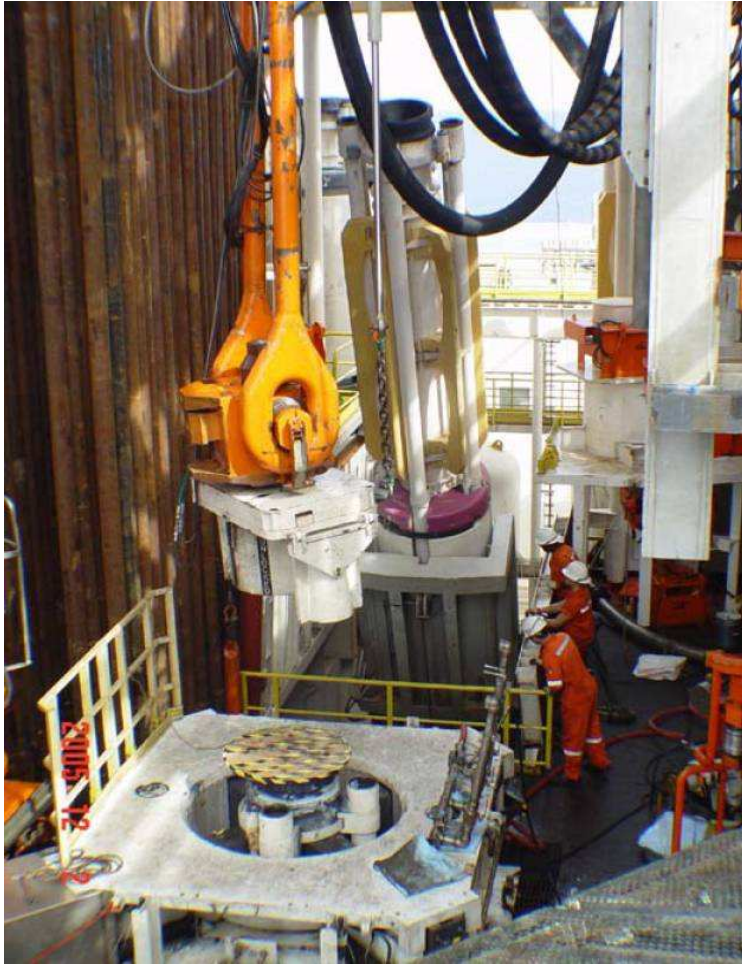
Picks up and delivers Riser joints from/to vertical set- back in-chute. Allows also for horizontal pick-up from trolley.



Riser Hydraulic Running Tool – Ready for Riser handling



CLIP Riser Hydraulic Running Tool



Landing CLIP Riser In Spider



CLIP Riser Stored Vertically



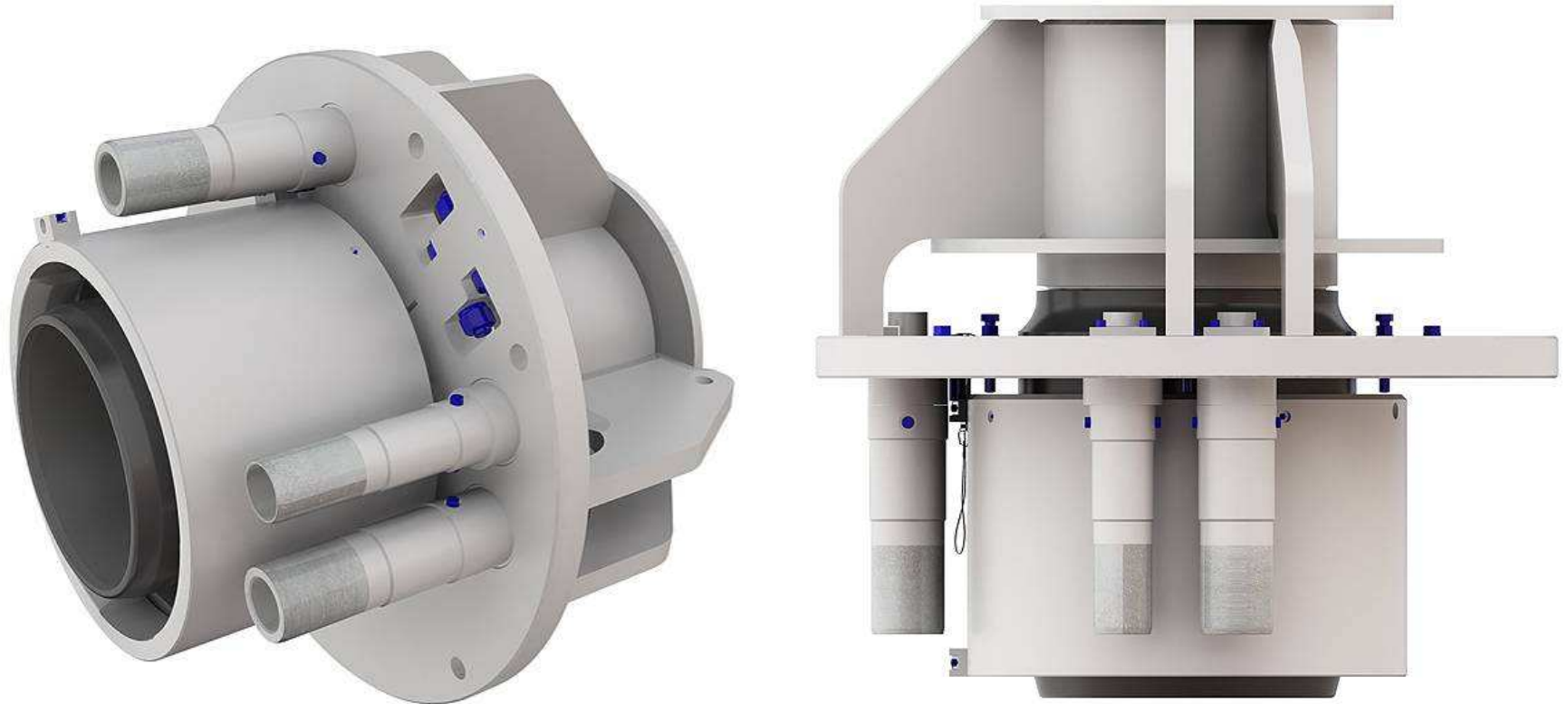
CLIP Riser Bay Handling tool – Single pick-up capacity



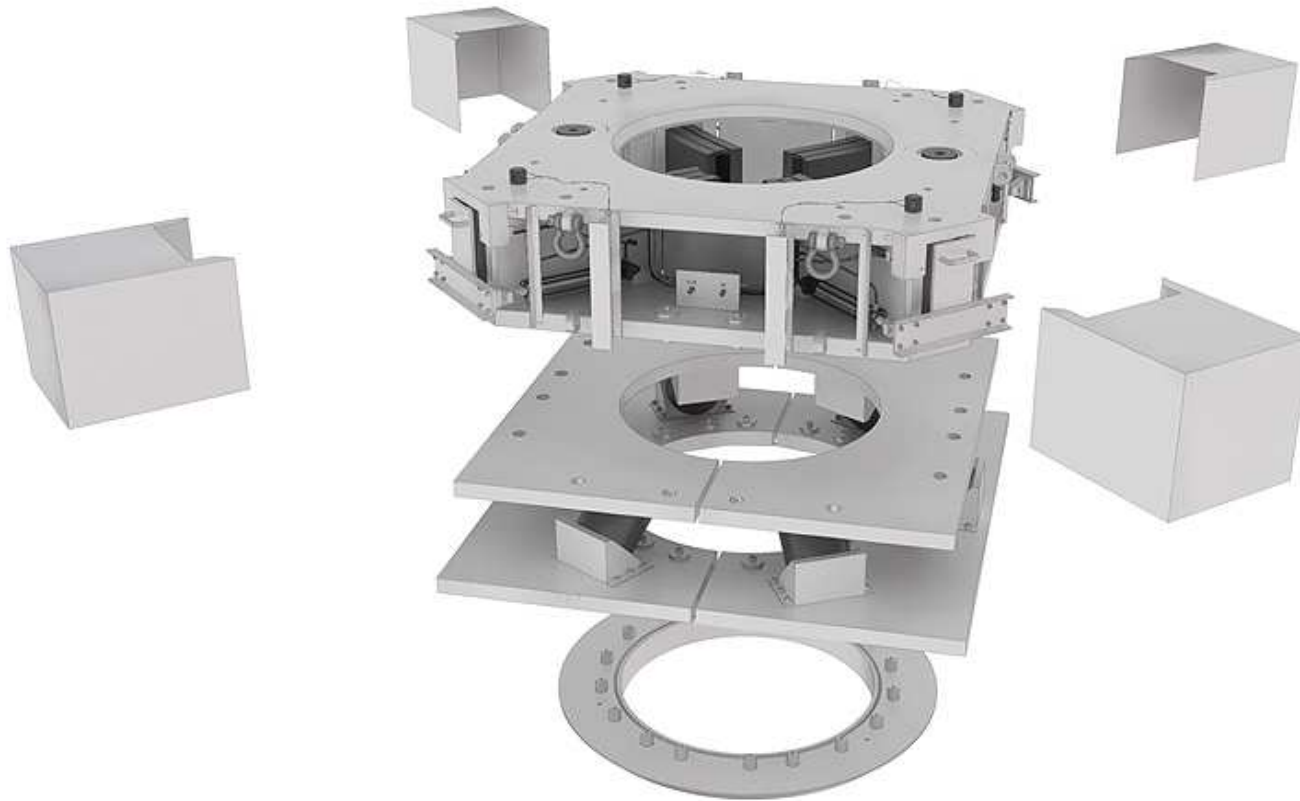
Vertical Handling of the CLIP Riser



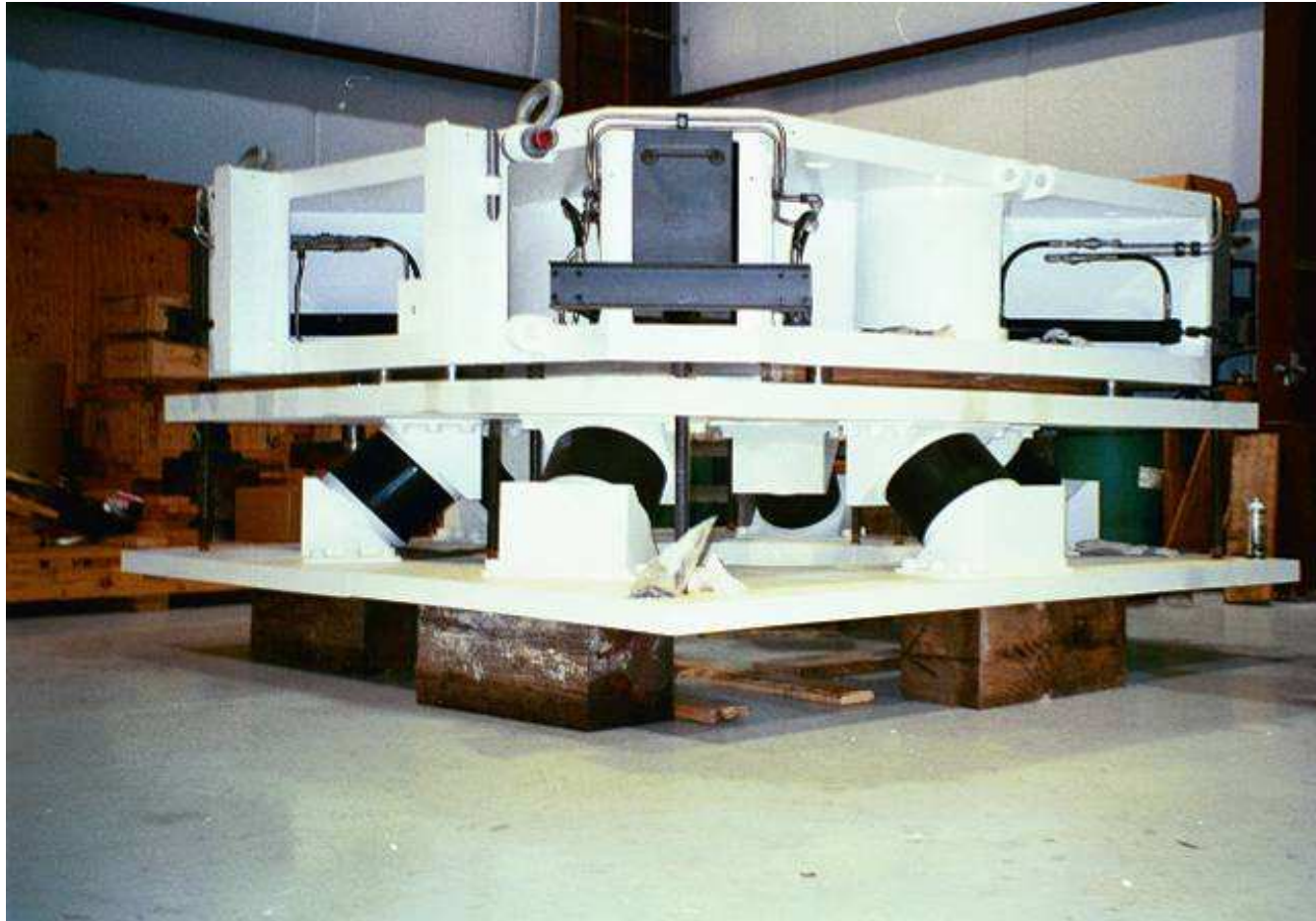
CLIP Riser Test Tool



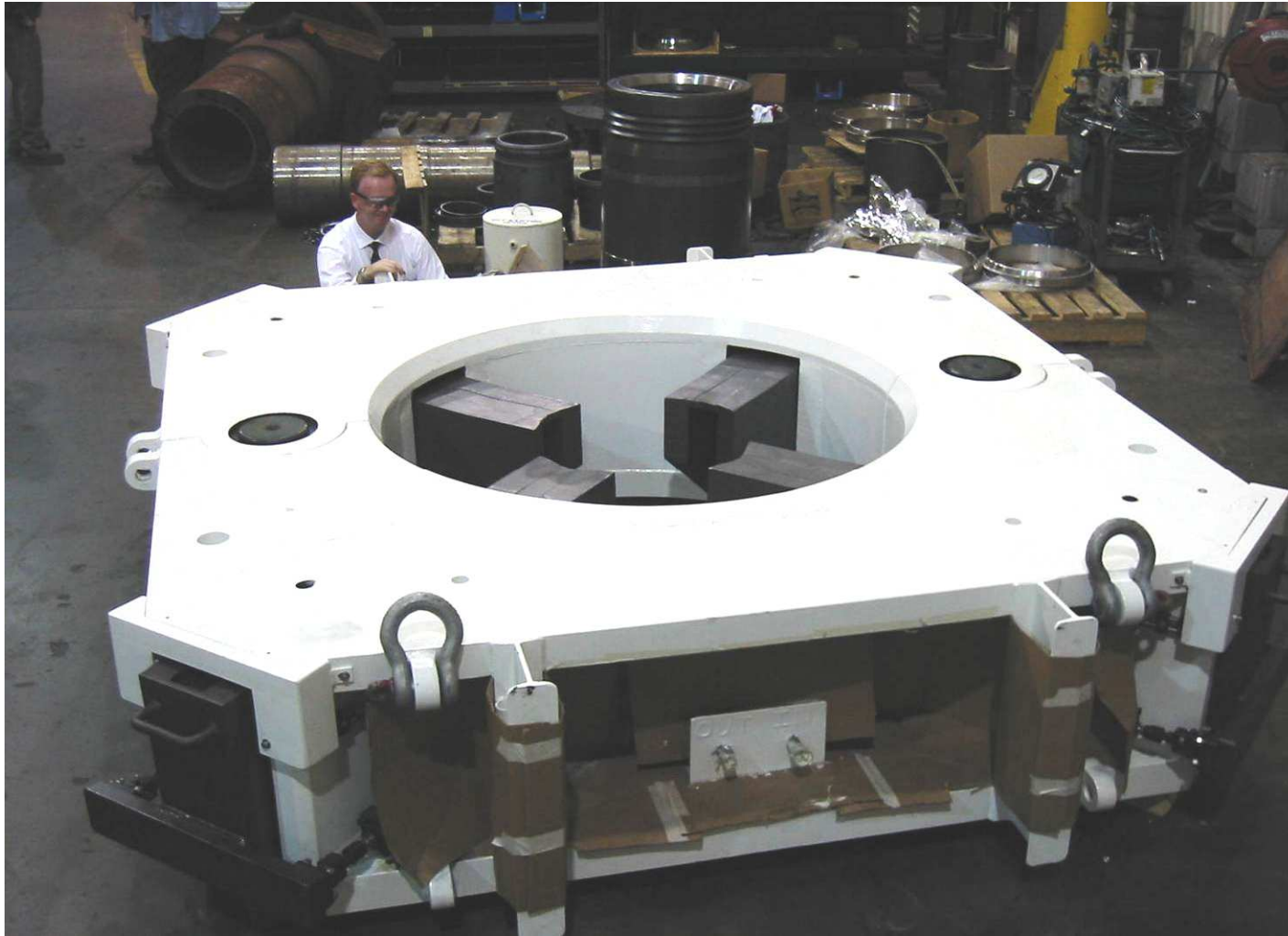
CLIP Riser Spider, Gimbal and Load Plate



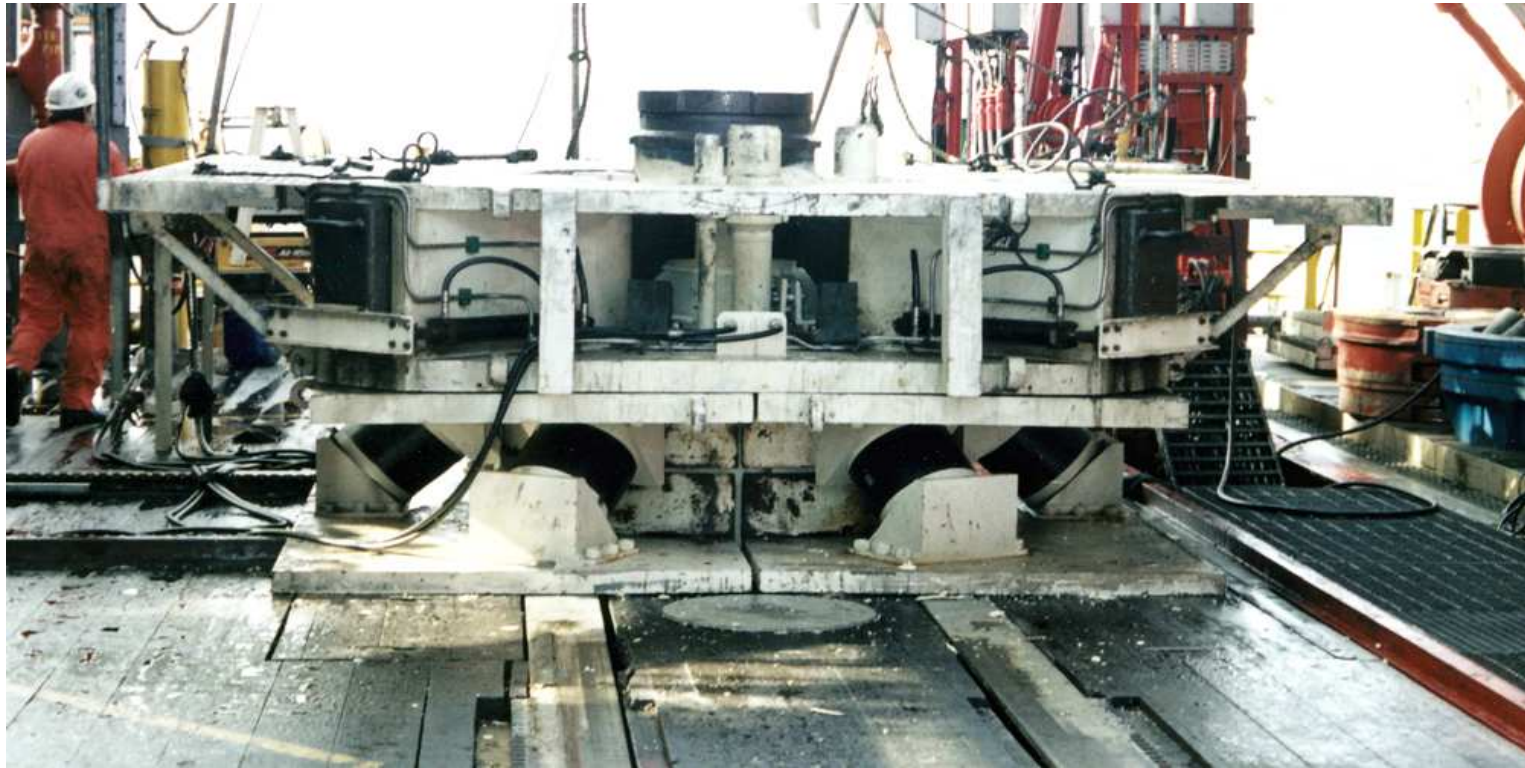
Spider and Gimbal



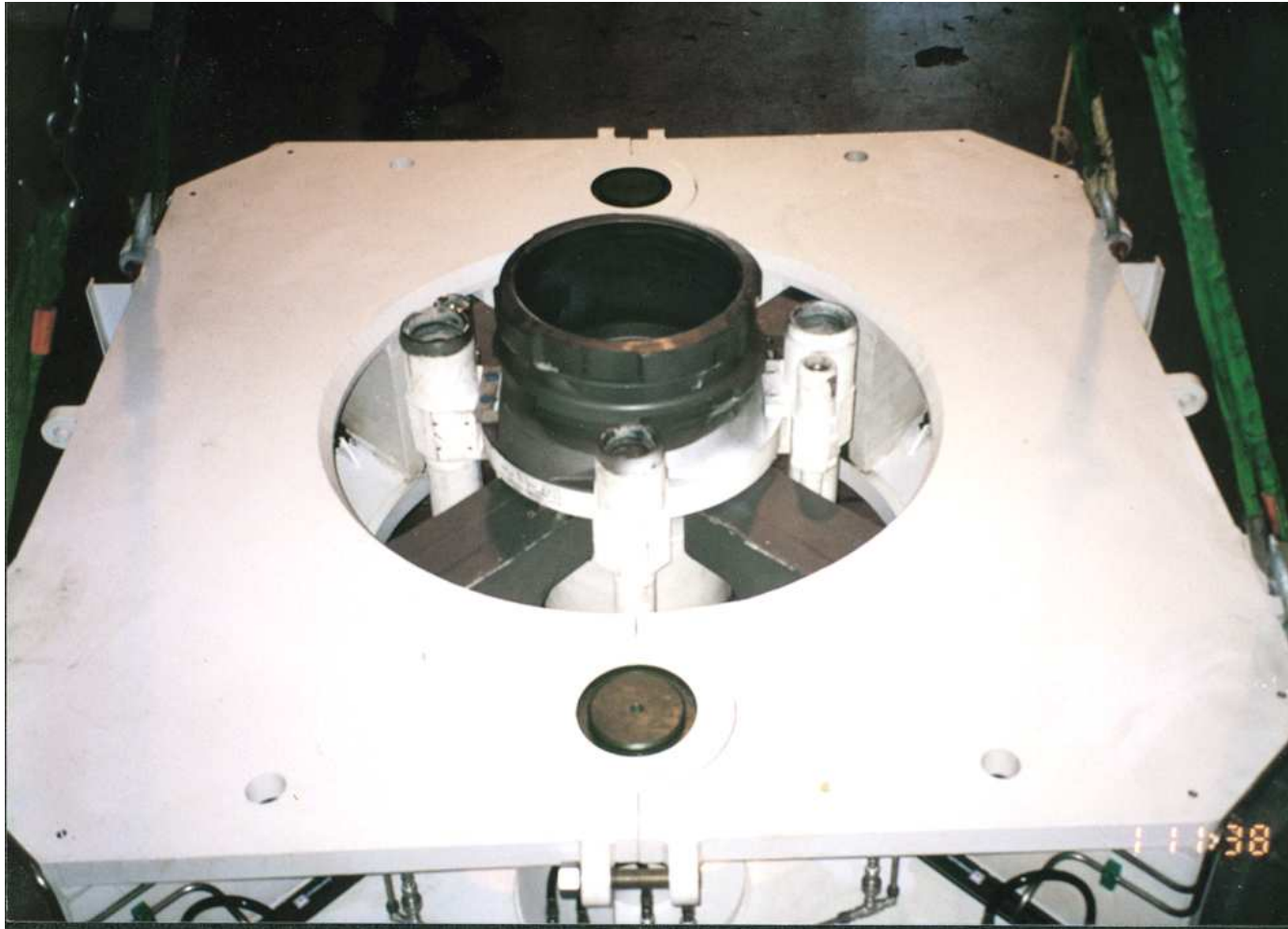
Spider with Rams Extended



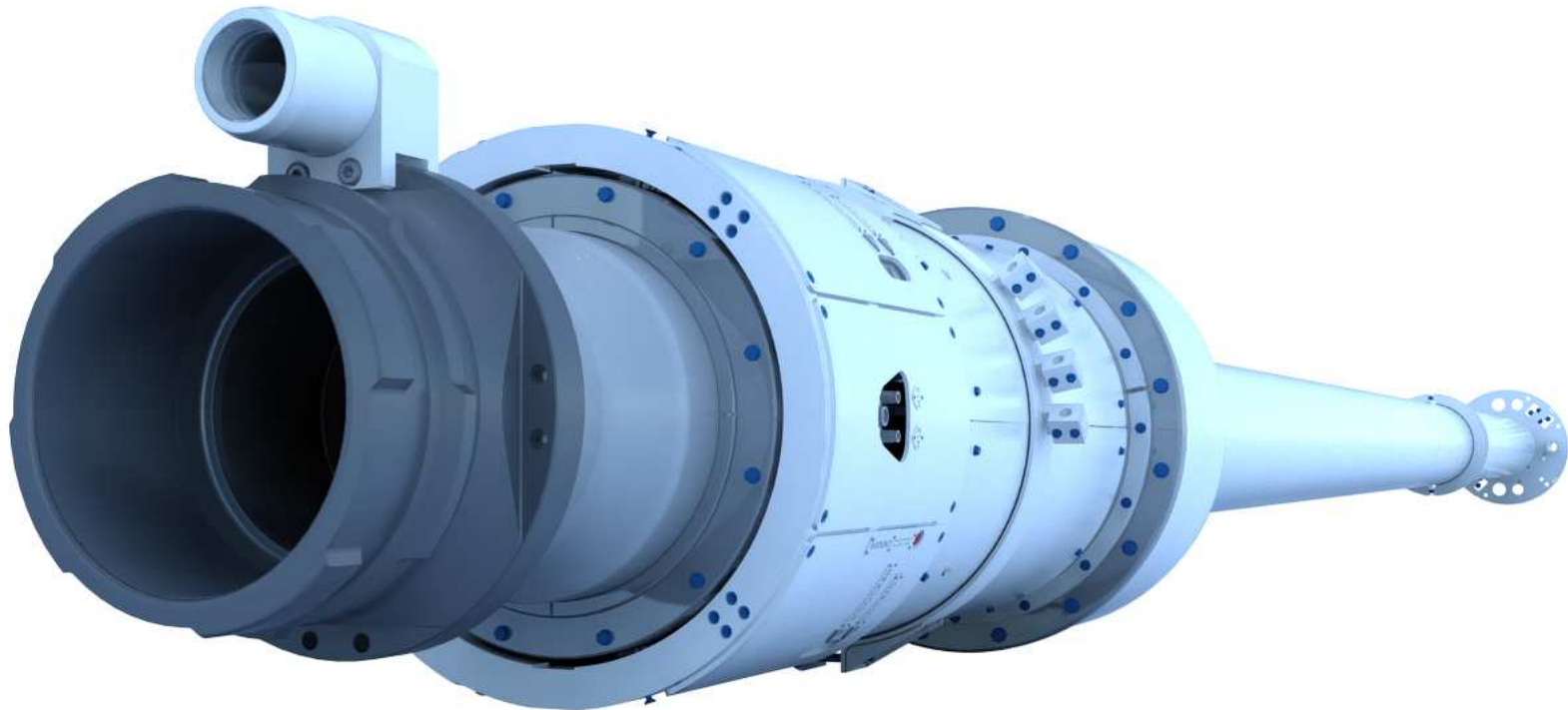
Spider & Gimbal Assembly



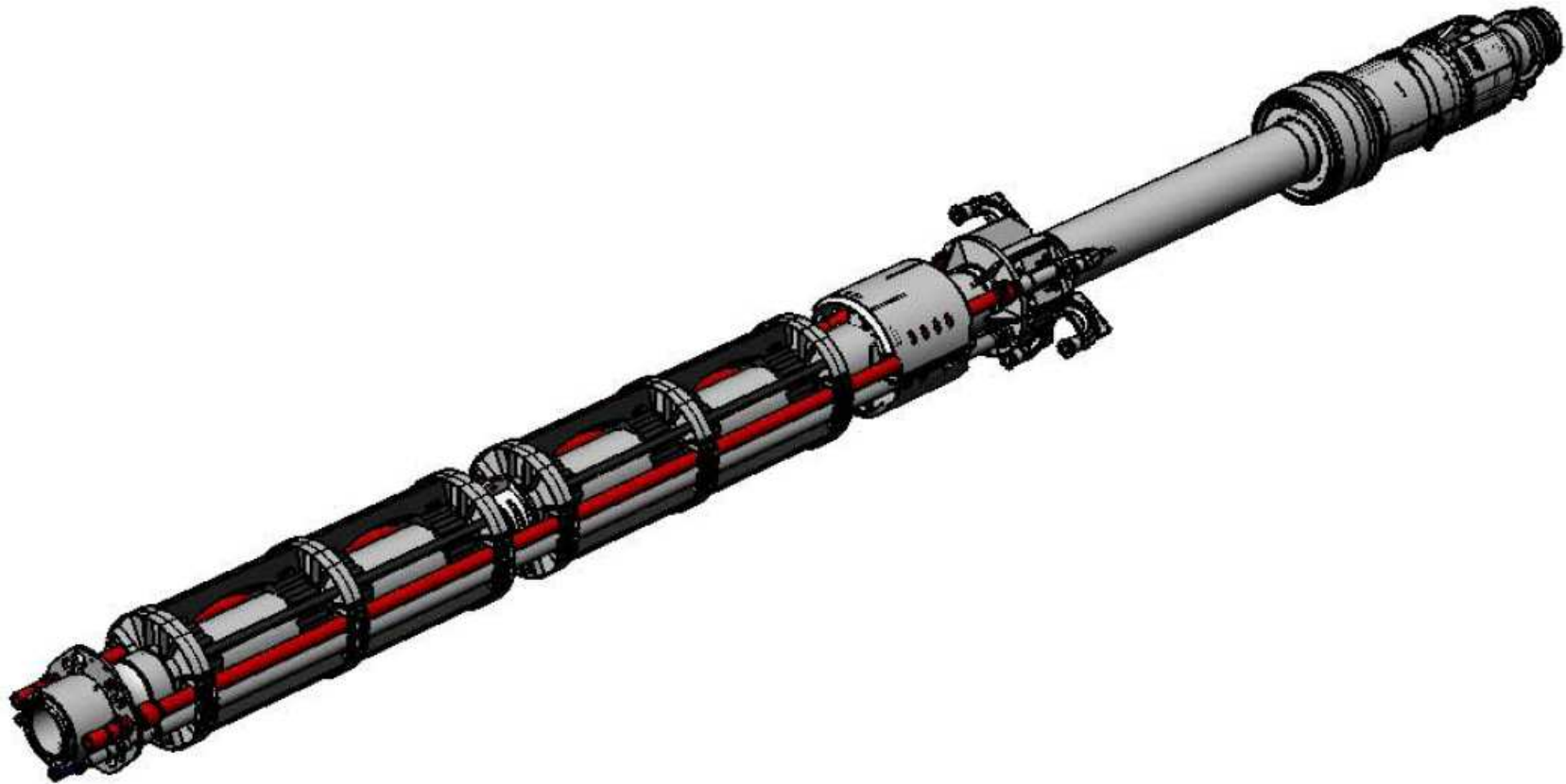
CLIP Riser Landed in Spider



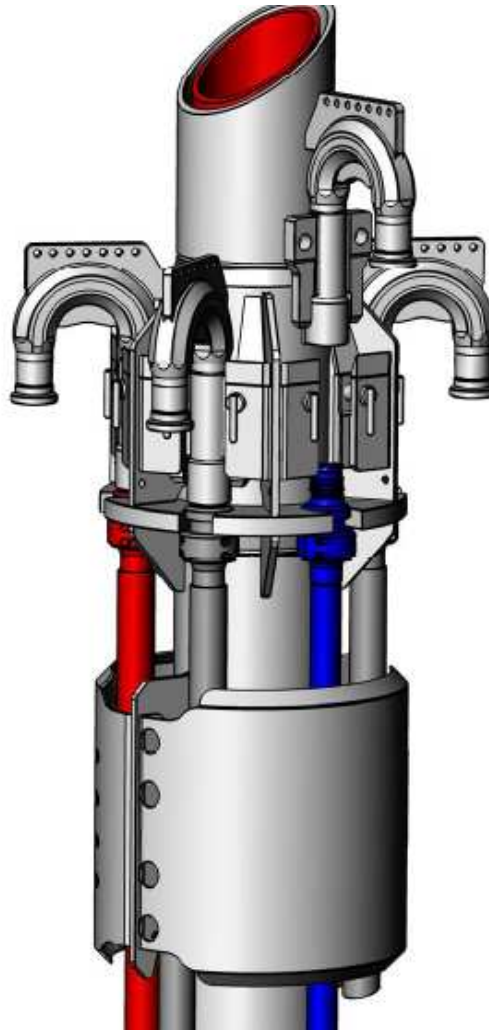
CLIP Riser Telescopic Joint



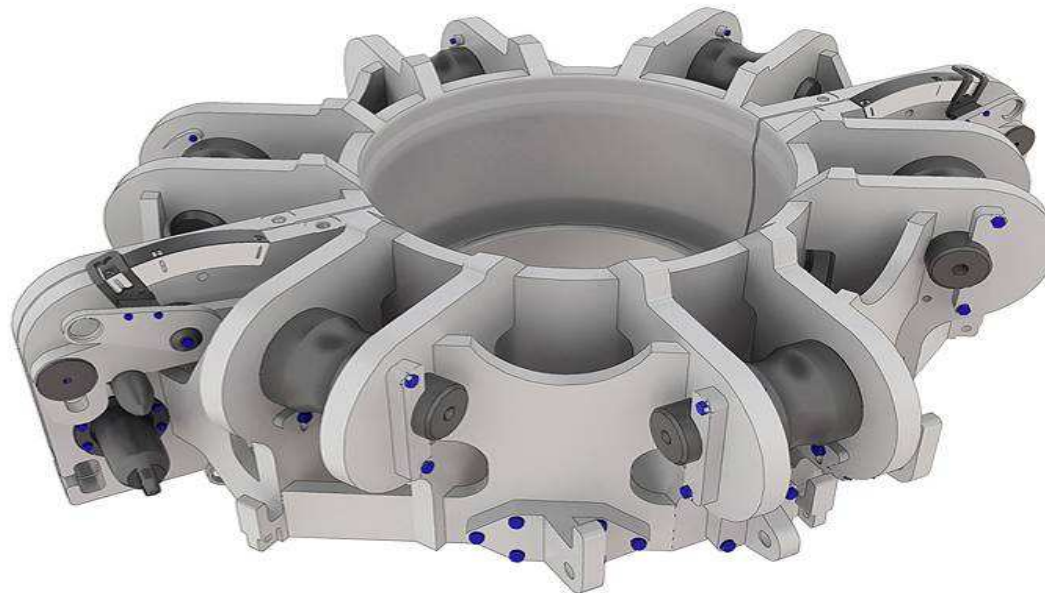
Clip Riser Telescopic joint



Clip Riser Telescopic joint (Goose necks)



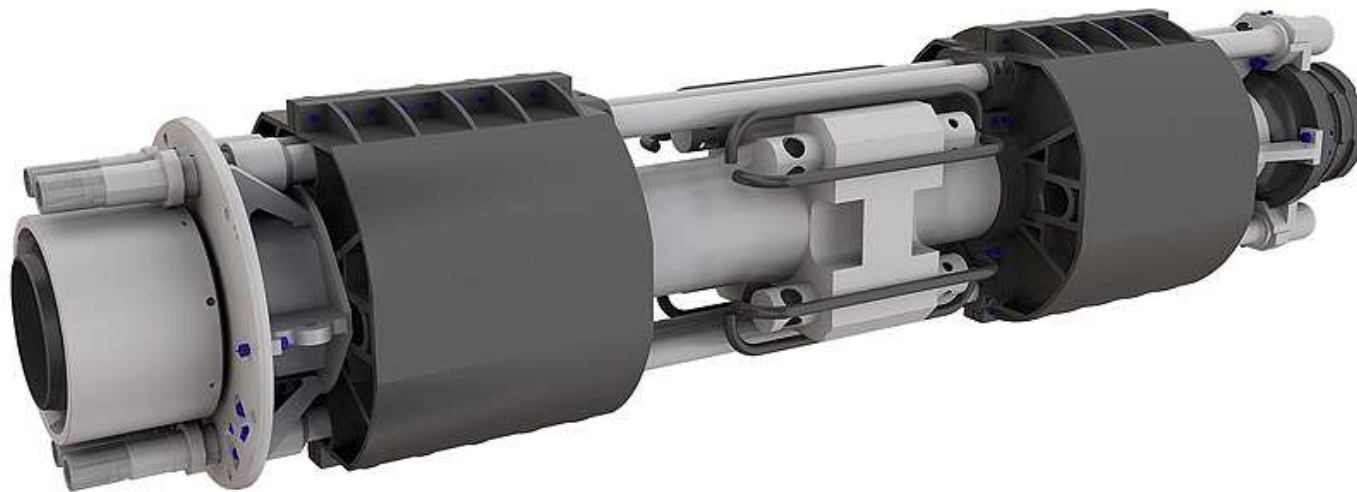
Clip Riser Tension Ring



Clip Riser Termination Adapter



Clip Riser Fill-up valve



The End – Thank you very much for your attention



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