

SHIBATAFENDERTEAM GROUP

GERMANY | FRANCE | AMERICAS | ASIA | SPAIN

5th MED PORTS 2017. Barcelona.

FOAM FILLED FENDERS

High Quality Fender Systems – Made in Germany

Alvaro Rodero Aristoy

Sales Engineer

26th-27th October 2017



SUMMARY

1. Foam Filled Fenders. What is that?
2. Why FFF? Advantages and applications
3. Foam Filled Fender design
4. Conclusion
5. Project references





1. SFT Foam Filled Fenders. What is that?

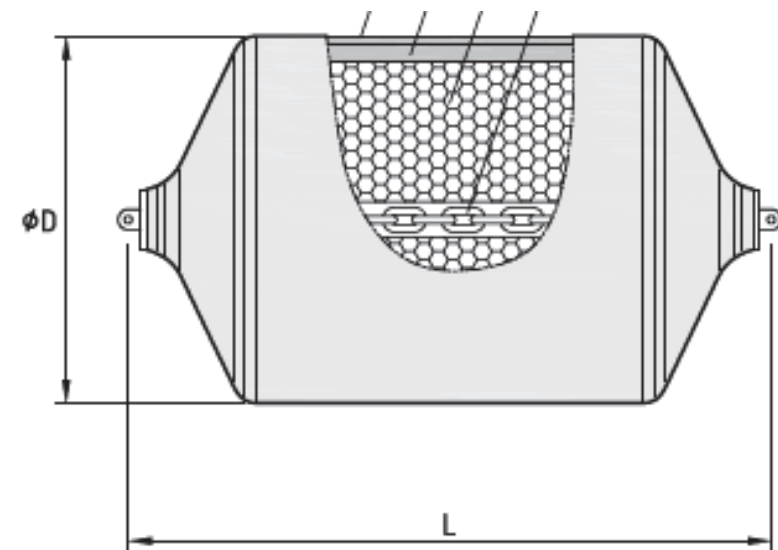
- Fenders systems for dedicated berths.
- Made in Germany and the US from high quality raw materials based on highly engineered design.
- Made from heat laminated 100% closed cell foam core and a tough and thick nylon filament reinforced polyurethane skin.



1. SFT Foam Filled Fenders. What is that?

Types:

- **Ocean Guard**

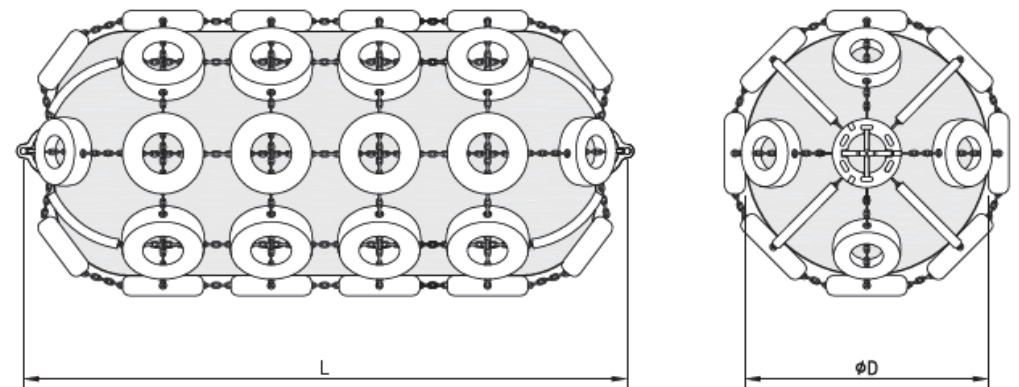




1. SFT Foam Filled Fenders. What is that?

Types:

- **Ocean Cushion**





1. SFT Foam Filled Fenders. What is that?

Types:

- **SSD (Small Standard Duty)**

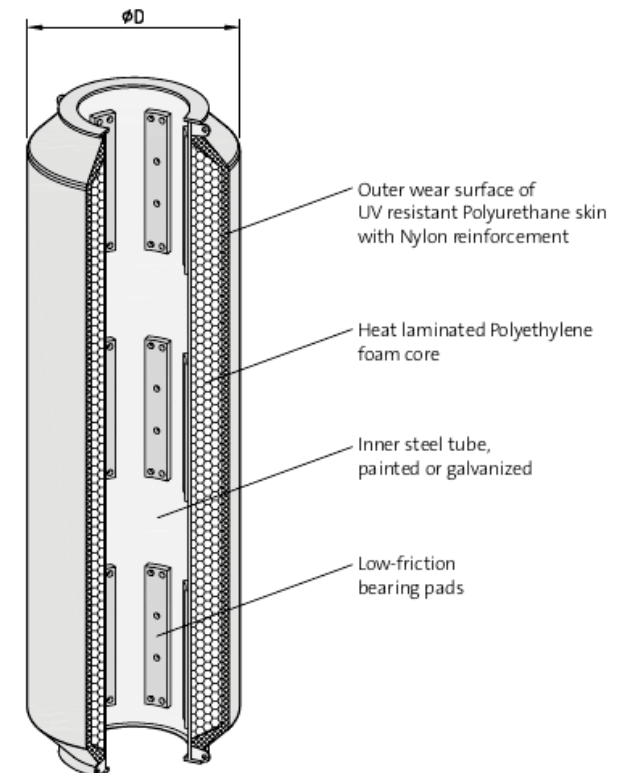




1. SFT Foam Filled Fenders. What is that?

Types:

- Donut Fender

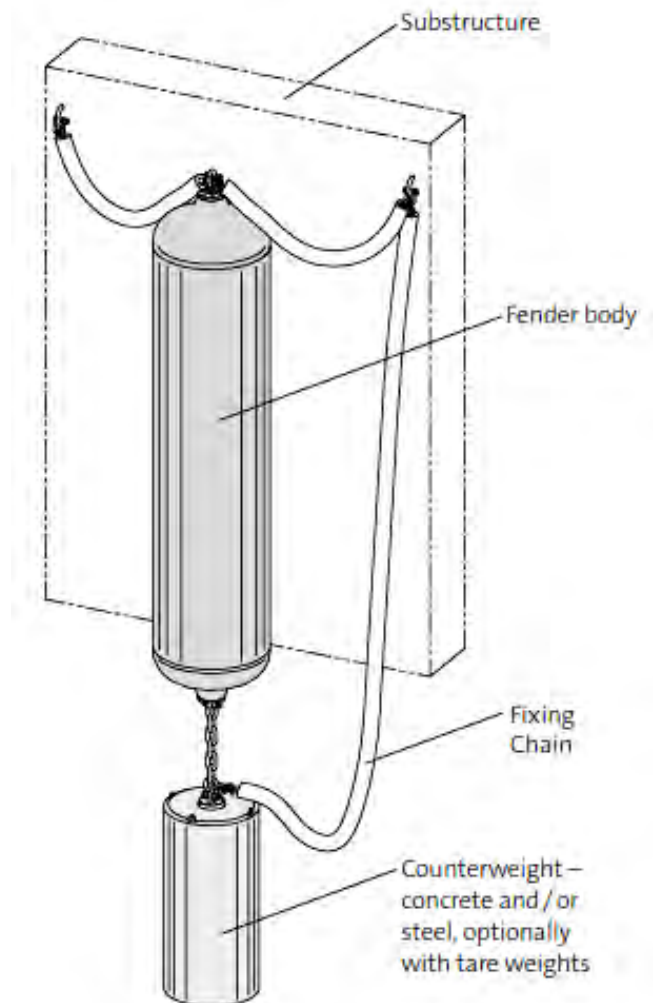




1. SFT Foam Filled Fenders. What is that?

Types:

- **Submarine Foam Fender**

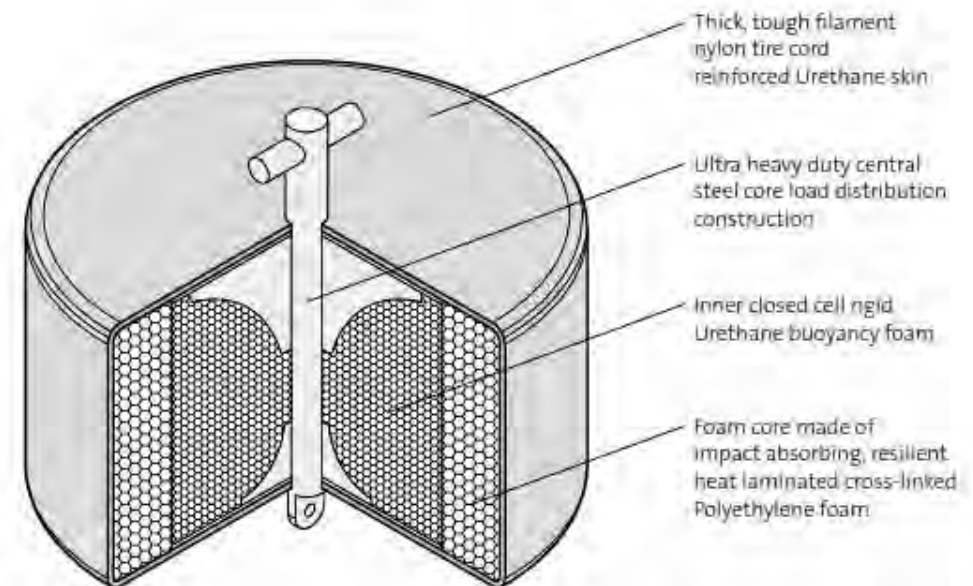




1. SFT Foam Filled Fenders. What is that?

Types:

- Ocean Guard Buoys

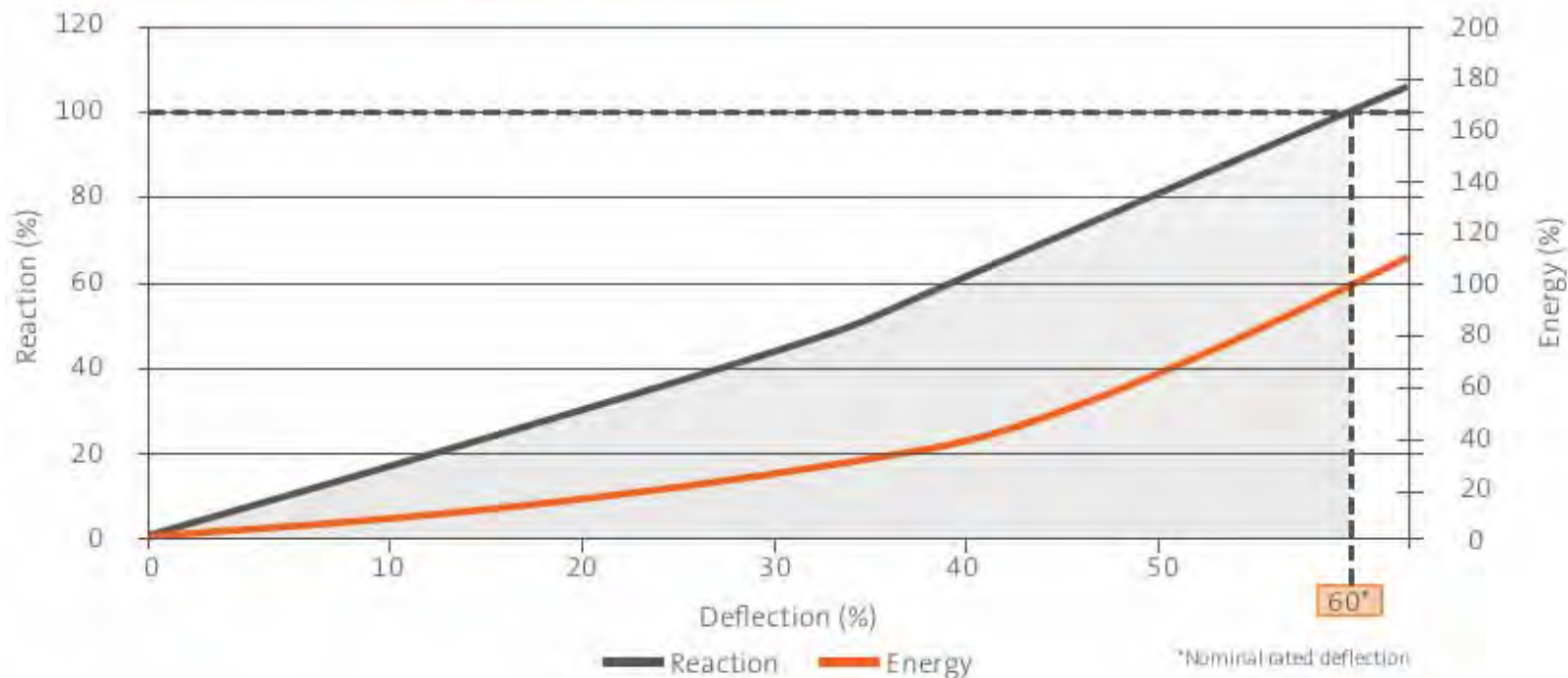




2. Why FFF? Advantages

- Proportional increase of reaction force and energy absorption

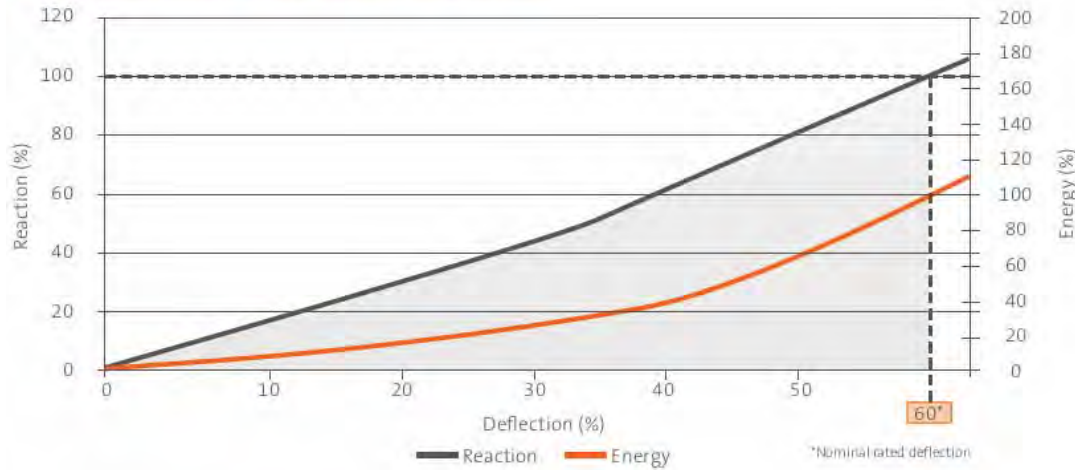
GENERIC PERFORMANCE CURVE OCEAN GUARD FENDERS





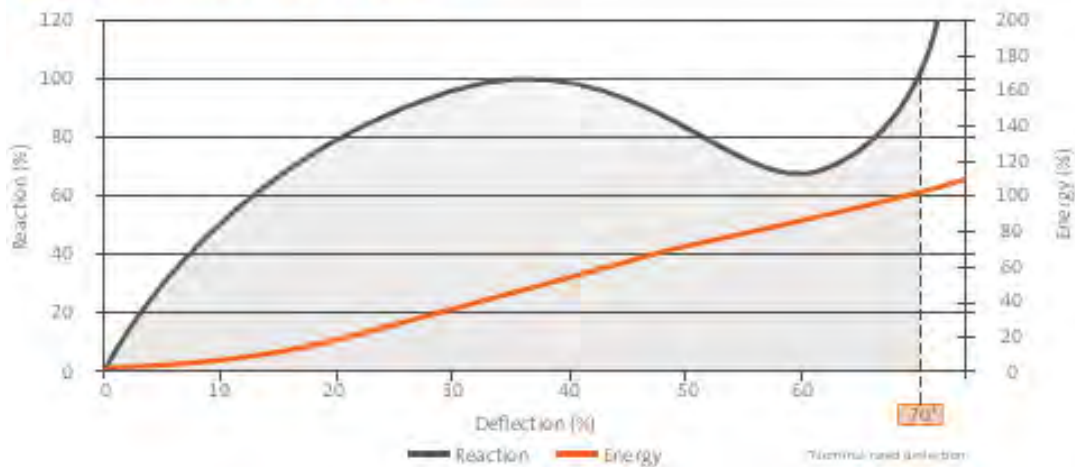
- Foam Filled Fenders:

GENERIC PERFORMANCE CURVE OCEAN GUARD FENDERS



- SPC or CSS Fenders (buckling fenders):

GENERIC PERFORMANCE CURVE SPC FENDERS





2. Why FFF? Advantages

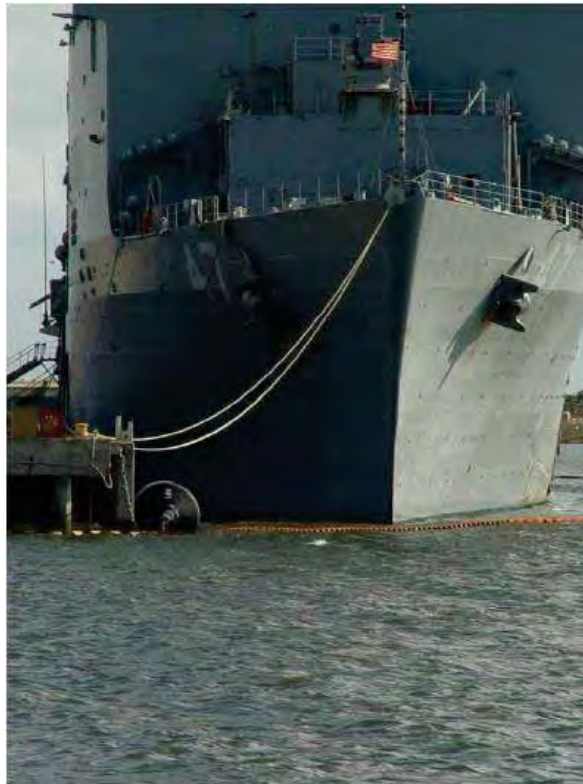
1. Extremely robust and durable
2. No performance loss and unsinkable even if damaged
3. Small skin damages can easily be repaired on site
4. Hull conforming capabilities
5. Non-marking skin
6. Low maintenance
7. Low friction





2. Why FFF? Typical Applications

- Navy vessel berths and cruise terminals due to low hull pressure, non-marking Polyurethane skin and hull adjustment capabilities





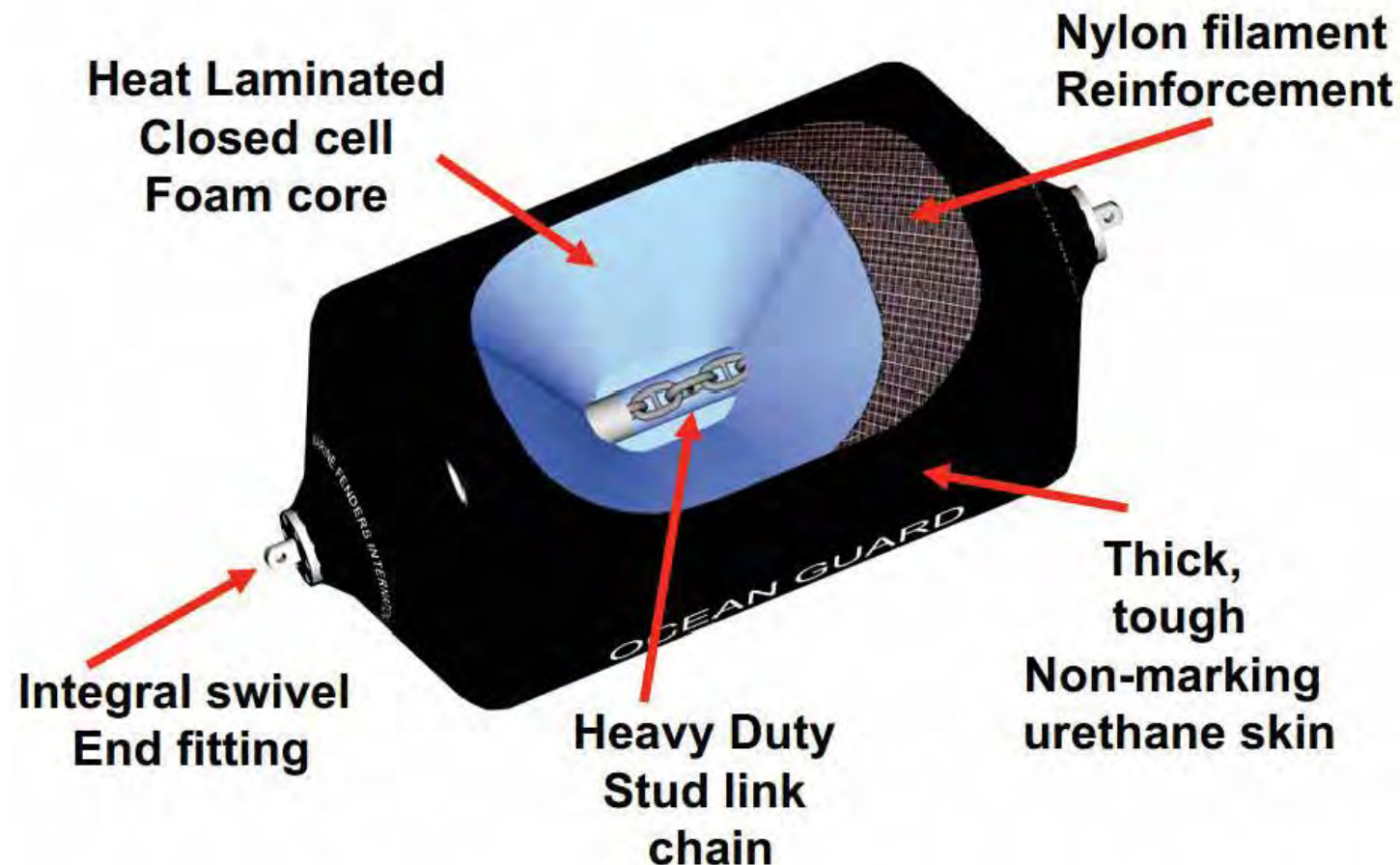
2. Why FFF? Typical Applications

- Ship-to-ship operations





3. FFF design



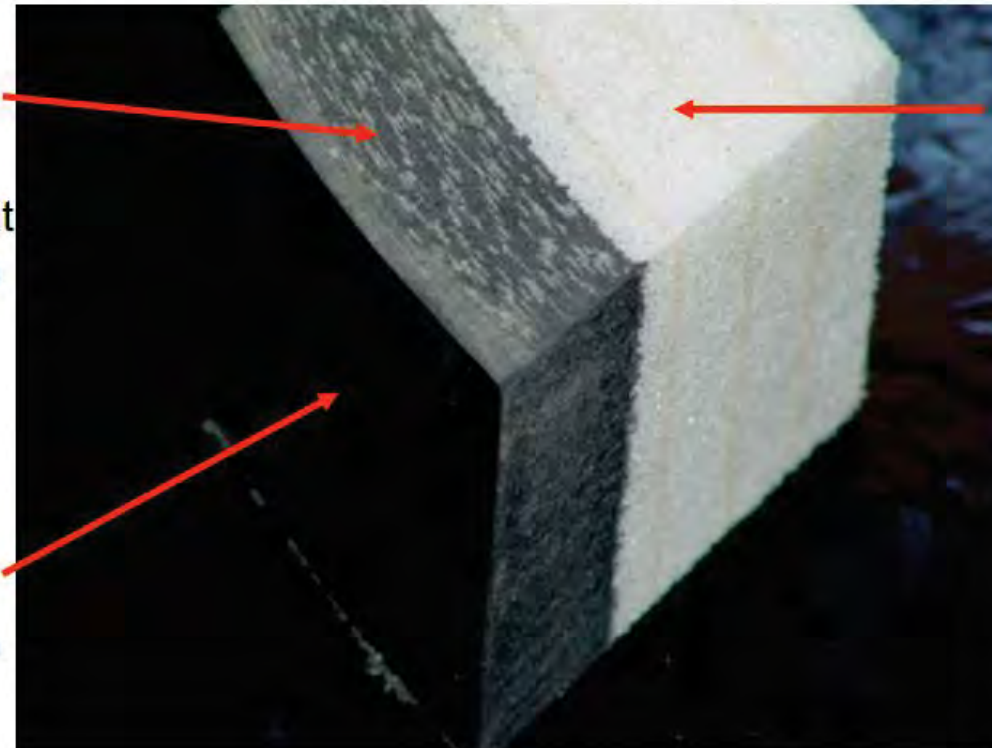


3. FFF design

URETHANE SKIN AND ENERGY ABSORBING FOAM CORE CONSTRUCTION

Continuous
Nylon
Filament
Tire cord
Reinforcement
Urethane skin

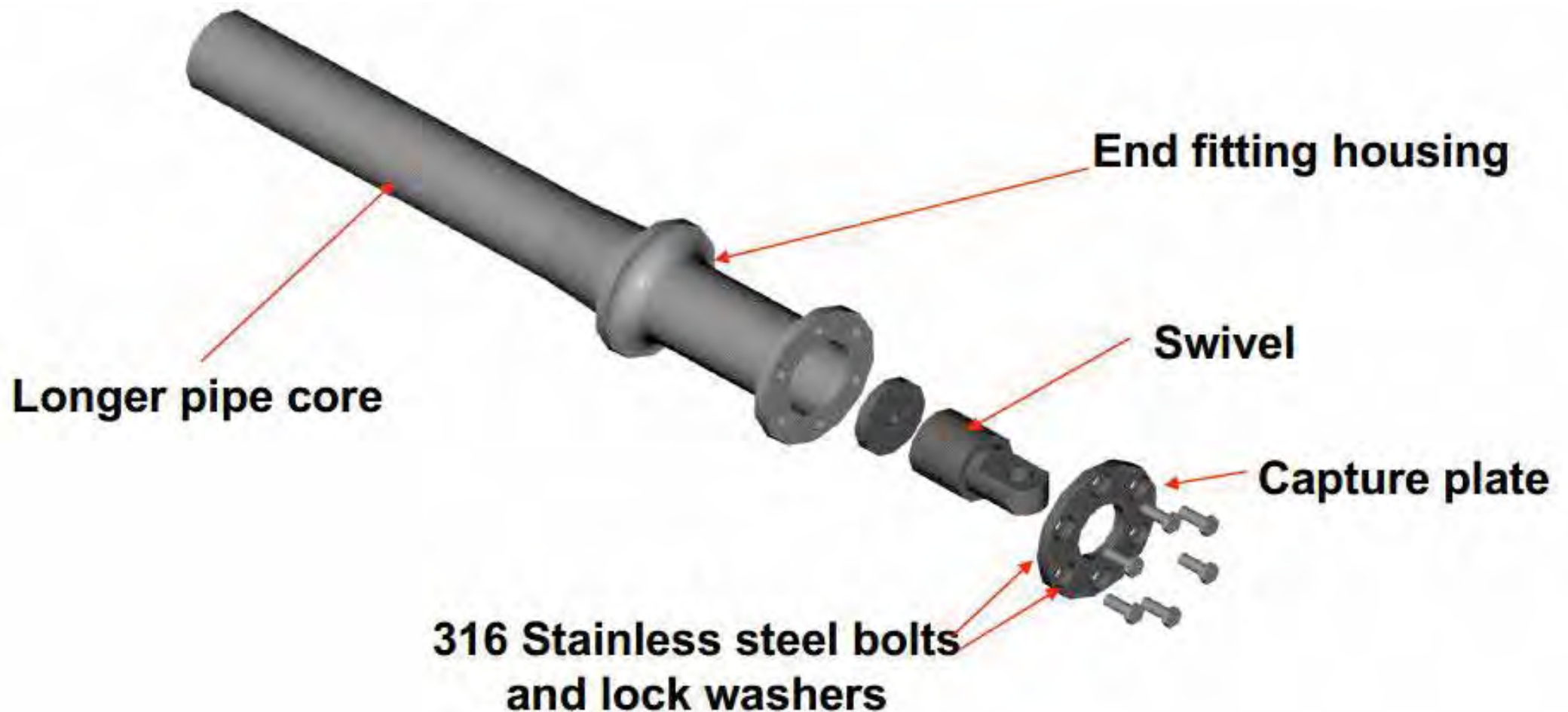
Outer wear
Surface of
UV resistant
Urethane skin



Heat
laminated
Polyethylene
foam
Core



3. FFF design





FOAM CORE HEAT LAMINATION PROCESS

- Heat lamination process: homogeneous one piece core.
- No adhesives which can break down over time.
- Not allowed the use of chip or granulated foam, nor scrap of foam.
- No gaps with the lamination process.
- SFT use 2 meters wide sheets, other competitors use 150 mm wide strips.





HEAT LAMINATION



- Latest in foam bonding and fusion technology
- Provides a bond that is stronger than the foam itself.
- This process ensures years of quality service and performance.
- Adhesives experience bond failure in a short period.



LOW QUALITY HEAT LAMINATION



Fender failure – foam width in narrow 6 inch strips
Poor to non heat lamination of foam core



ADHESIVE LAMINATION



Inferior Non laminated foam disc construction



REINFORCED URETHANE SKIN

- SFT FFF: non marking nylon filament tire cord reinforced urethane skin
- Filament reinforcing wraps distributed in the inner 80% to 90% of the coating thickness.
- The outer 10% to 20% of elastomer have no filament.
- The elastomer and filaments applied in a continuous manner to assure adhesion.

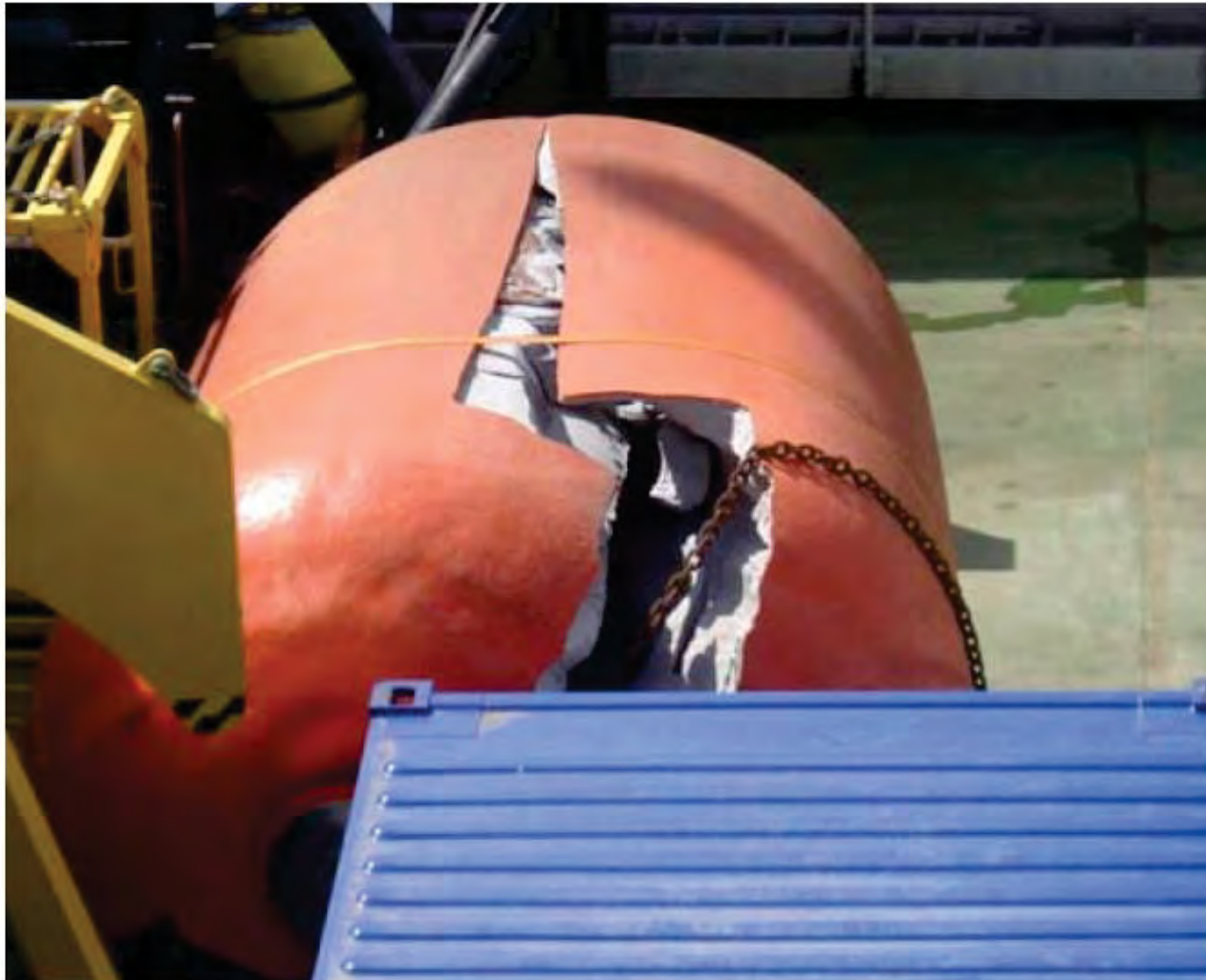




SHIBATA**FENDER**TEAM

▶ on the safe side

NON REINFORCED SKIN





SHIBATA**FENDER**TEAM

▶ on the safe side

THIN NON REINFORCED SKIN





SHIBATA**FENDER**TEAM

▶ on the safe side

NON REINFORCED THIN SKIN PAD EYE END FITTINGS





SHIBATA**FENDER**TEAM

▶ on the safe side

THRU PIPE END FITTING AND NON REINFORCED SKIN





SHIBATA**FENDER**TEAM

▶ on the safe side

OCEAN GUARD™ NETLESS FOAM FILLED FENDERS



Integral swivel end fittings internally connected with heavy duty stud-link chain



END FITTING SAG SHORT END FITTING



Fender end fitting movement – due to short end fittings
Cannot support fender weight



SHIBATA**FENDER**TEAM

▶ on the safe side

END FITTING SAG AND FAILURE SHORT END FITTING





SHIBATA**FENDER**TEAM

▶ on the safe side

**END FITTING SAG AND FAILURE
SHORT END FITTING
FENDER WILL NOT SWIVEL**





4. Conclusion

- Foam Filled Fenders should be used when:
 - High energy absorption is requested with low hull pressures
 - Marks on the hull of the vessels are not desired (cruise terminals, navy terminals...)
 - Large tides and vessels with beltings
 - Ship-to-ship operations
 - Proportional E/R increase required



4. Conclusion

- Specifications should required:
 - Heat-laminating process for foam with wide sheets
 - Reinforced urethany skin with nylon filament tire cords (min. thickness)
 - Internal swivel end fittings connected with heavy duty stud-link chain and pull thru stopper
 - Required skin thickness test and performance test



5. Project references

OCEAN GUARD™ NETLESS FOAM FILLED FENDERS



CONSTRUCTED TO US NAVY SPECIFICATIONS.



SHIBATA**FENDER**TEAM

▶ on the safe side



US Navy Norfolk

Ø3050 x L 6100mm

Ocean Guard Netless Foam Filled Fender



SHIBATA**FENDER**TEAM

▶ on the safe side



Naval Weapons Station

Ø2450 x L 4900mm

Ocean Guard Netless Foam Filled Fender





SHIBATA**FENDER**TEAM

▶ on the safe side



US Coast Guard Station
Oxnard, California

Ø915 x L 2500mm
Ocean Guard
Netless Foam Filled Fender
Non-marking urethane skin



SHIBATA**FENDER**TEAM

▶ on the safe side

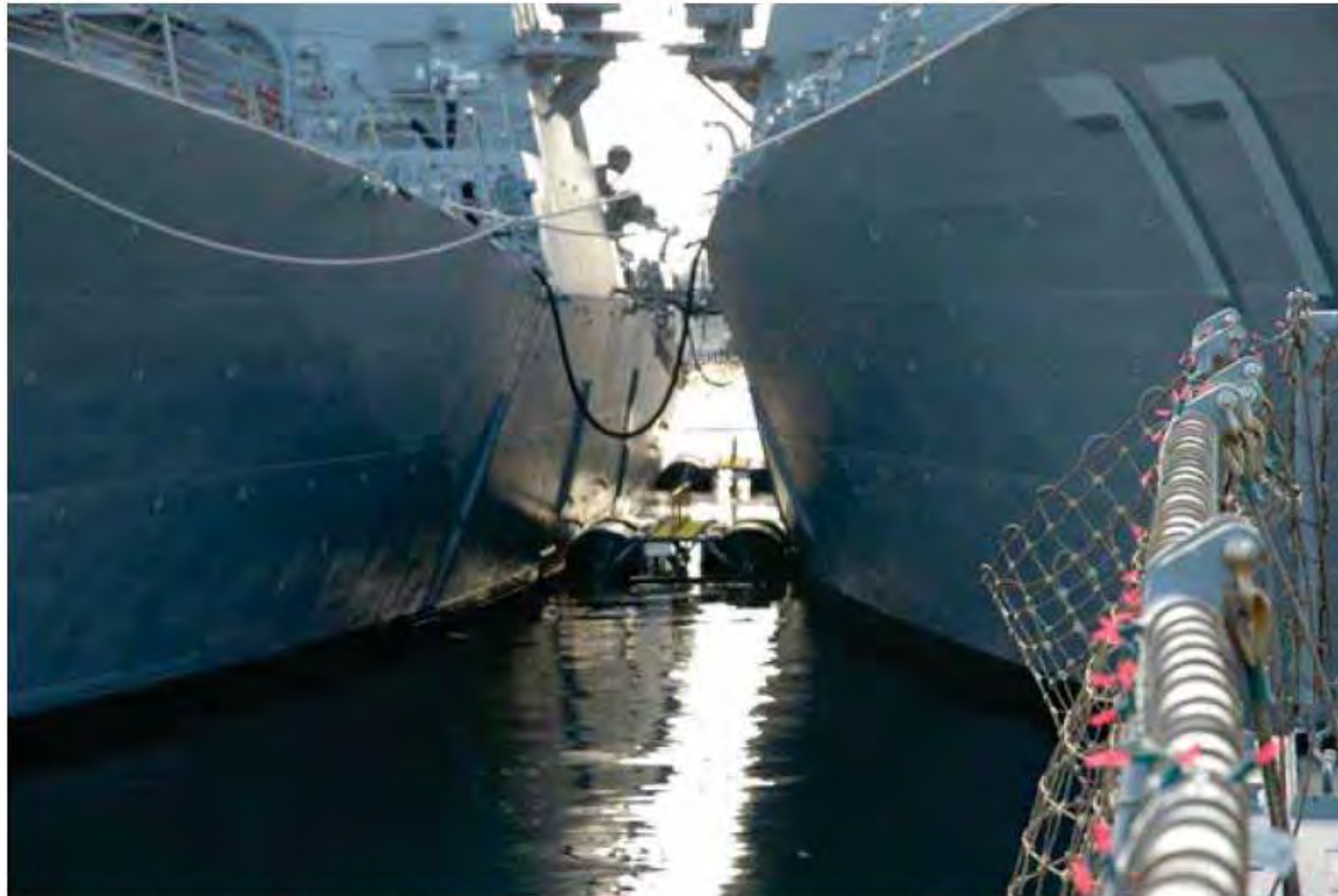


Armada de Chile Ø3050 x L 4900mm
Ocean Guard Netless Foam Filled Fender

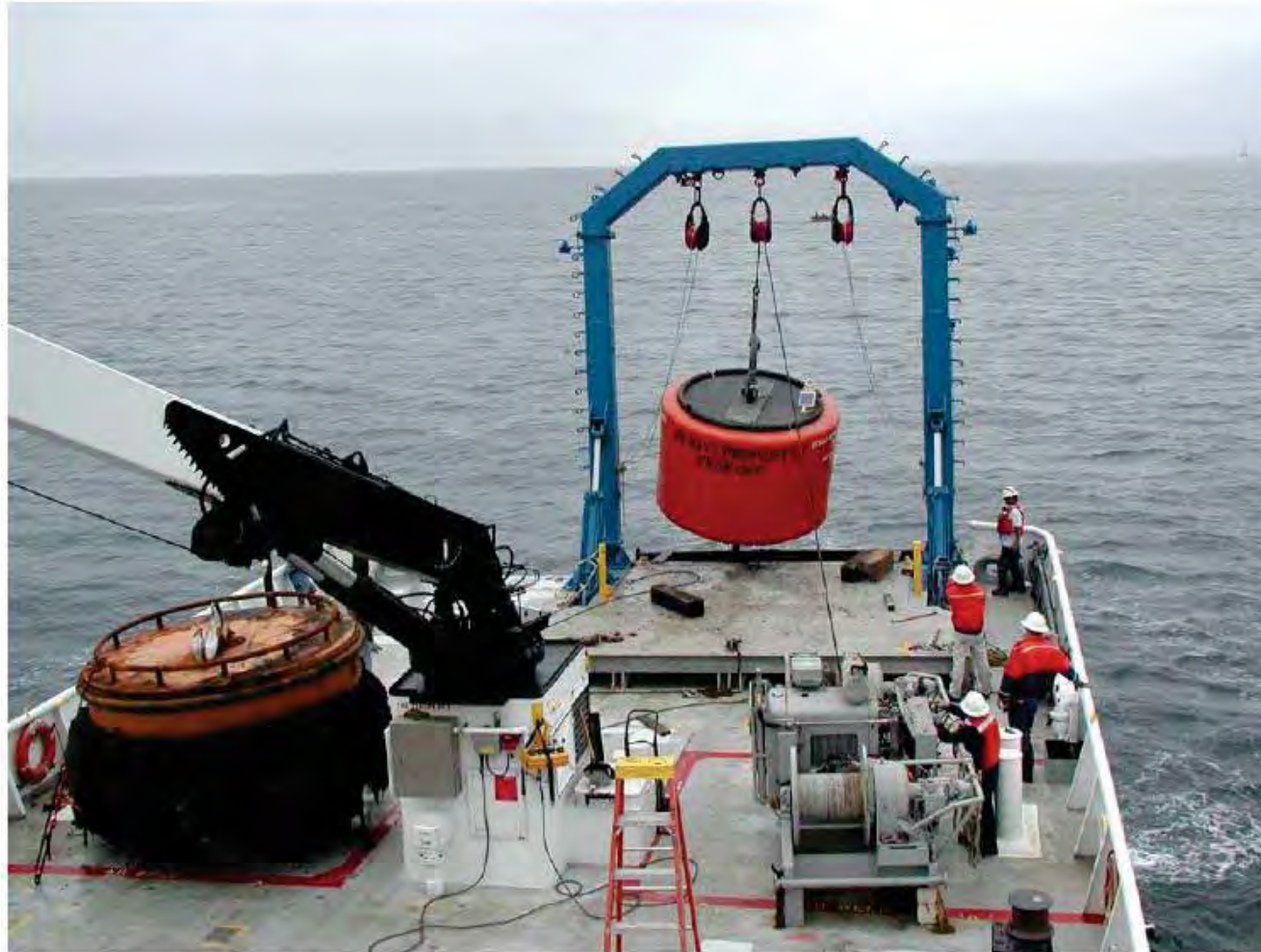


SHIBATA**FENDER**TEAM

▶ on the safe side



Pearl Harbor Hawaii – Ship separator assemblies
4 x Ø1800 x L 3700mm
Ocean Guard Netless Foam Filled Fender
Providing 5000mm standoff.



US Navy Mooring Buoy
San Nicholas Island, California.



SHIBATA**FENDER**TEAM

▶ on the safe side

Container Terminal. Port of Miami, US

66 sets Ø3050 x L 4900mm
Ocean Guard Netless Foam Filled
Fenders





Doha Naval Base, Qatar (contract value: 4.000.000 USD)
177 sets Ø1200 x L 2000mm
111 sets Ø1700 x L 3000mm
76 sets Ø2000 x L 3500mm
Ocean Guard Netless Foam Filled Fenders



SHIBATA**FENDER****TEAM**

▶ | on the safe side

Thank you very much for your attention!

For more information:

<https://www.shibata-fender.team>

Please meet us at booth n°31