

SHIBATA**FENDER**TEAM

▶ | on the safe side

SHIBATAFENDERTEAM GROUP

GERMANY | FRANCE | AMERICAS | ASIA | SPAIN

MAINTENANCE OF FENDER SYSTEMS – HOW TO PREVENT FAILURES/DAMAGES

7th Black Sea Ports and Shipping 2018, Pierre Enjalbal
21st-23rd May 2018

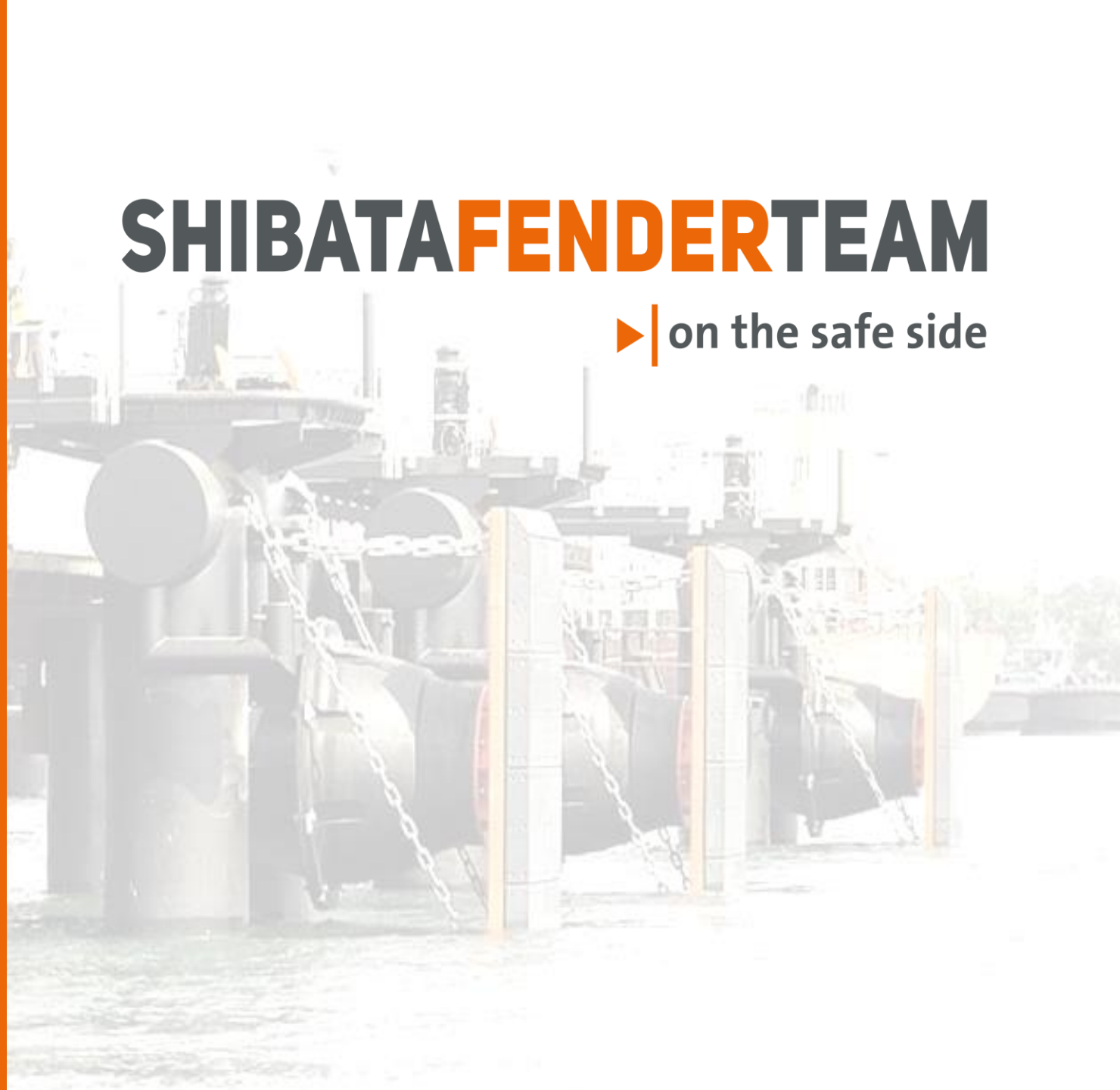


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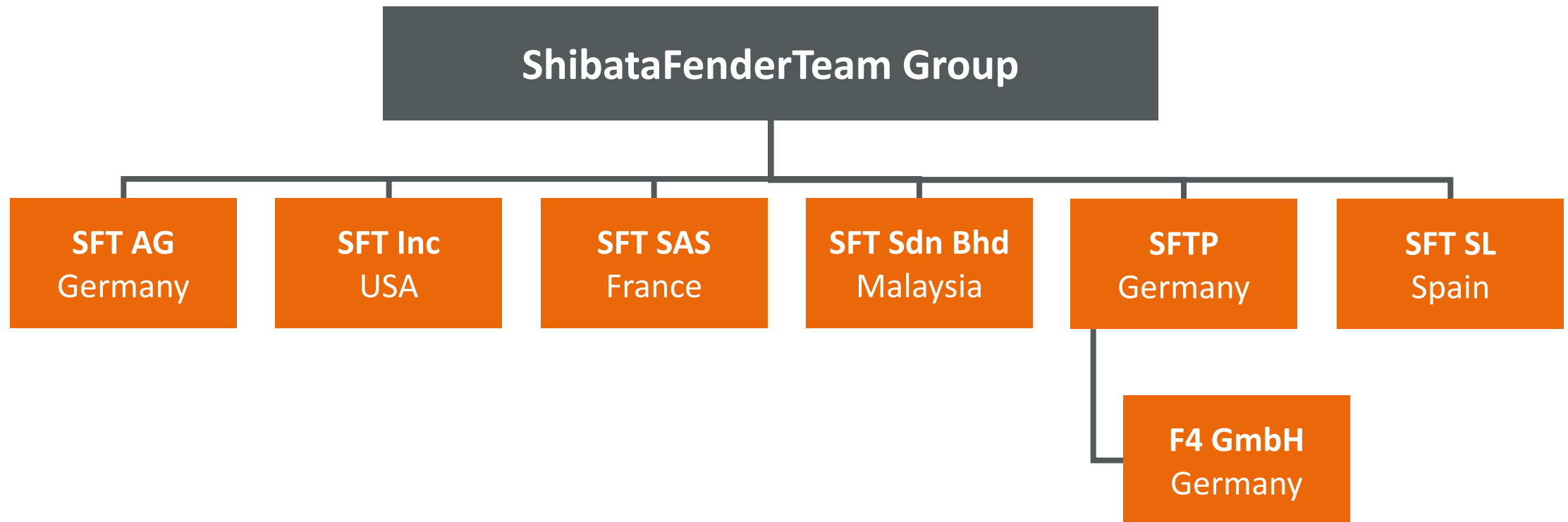
PART 1: COMPANY PRESENTATION

- ▶ Organizational Structure
- ▶ ShibataFenderTeam Group
- ▶ SFT Worldwide
- ▶ Our Strengths
- ▶ Products Areas

PART 2: FENDER INVESTMENT & OPERATION CONSIDERATION

PART 3: FENDER MAINTENANCE

ORGANIZATIONAL STRUCTURE.



SHIBATAFENDERTEAM GROUP.



HEADQUARTERS: Hamburg, Germany



OFFICES:

Washington, DC, USA

Paris, France

Kuala Lumpur, Malaysia

Valencia, Spain (since October 1st, 2017)



PRODUCTION:

Rubber fender production in Japan and Malaysia


Steel fabrication facilities in Germany


Foam Filled Fender production in Germany and the USA

SHIBATAFENDERTEAM GROUP.

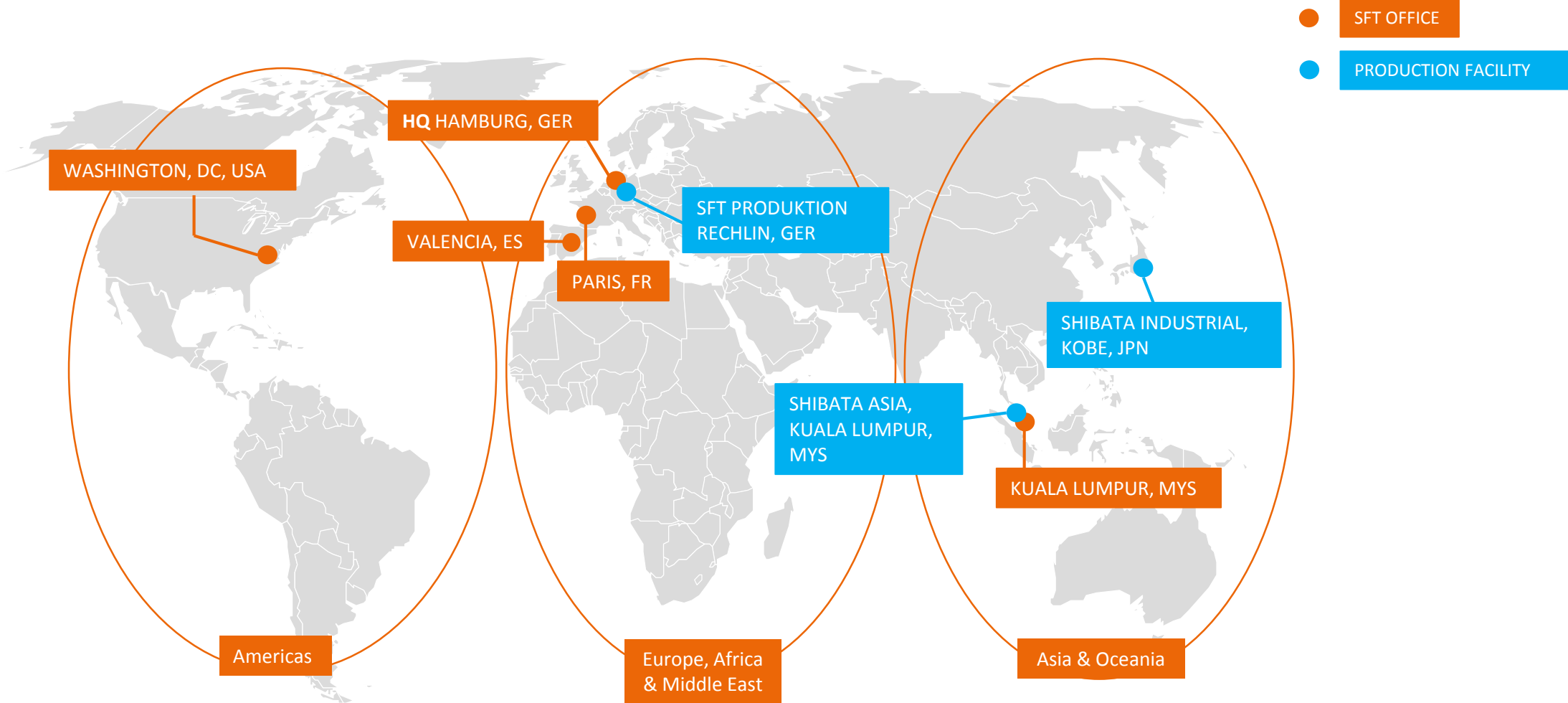
 **TURNOVER:** ~ 50 Million USD annually

 **DELIVERED PROJECTS:** > 4.800 worldwide since 2006 | Group track record since 1961

 **PROJECT SIZES:** > 6 Million USD / project
up to 200 fender systems / project

 **ACHIEVEMENTS:** ISO 9001 / ISO 14001
PIANC Type Approval for standard range

SFT WORLDWIDE.



OUR STRENGTHS.

CUSTOMIZED FENDER SOLUTIONS



ENGINEERING

Application engineering by our in-house sales engineers



MANUFACTURING

Strong focus on producing all major components in-house ensuring highest quality and reliability



TESTING

Products are designed, manufactured and tested in accordance with PIANC 2002, BS 6349, EAU 2012, EC 3, DIN 18800, BS 5950 and AISC



CONSULTING

Detailed and extensive design input and support at an early project stage



AFTER SALES SERVICE

Providing support and assistance during commissioning and throughout the service life of the fender system

PRODUCT AREAS.



- ▶ Fixed Fenders
- ▶ Foam Products
- ▶ Pneumatic Fenders



- ▶ Corner Fenders
- ▶ Rolling Fenders
- ▶ Extruded Fenders

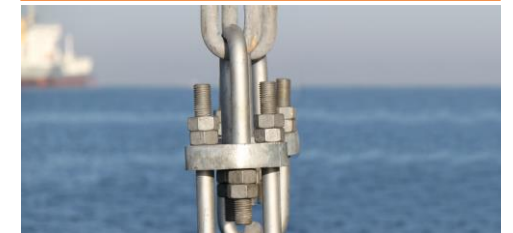


- ▶ Komposite Fenders
- ▶ Tug Boat Fenders
- ▶ Special Solutions

MARINE FENDERS



PE SLIDING PLATES AND FENDERS



ACCESSORIES AND FIXINGS



BOLLARDS

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PART 1: COMPANY PRESENTATION

PART 2: FENDER INVESTMENT & OPERATION CONSIDERATION

▶ Investment

▶ Causes of Fender Damage

▶ Consequences of Fender Damage

PART 3: FENDER MAINTENANCE

INVESTMENT.

- ▶ Fenders are a high capital investment
 - Optimize, protect and extend the design life of quay / jetty
- ▶ Construction / Refurbishment of ports is a cost-intensive project
 - Needs careful planning and longterm decisions
- ▶ Fender systems need maintenance
 - Even more in harsh & corrosive environments
 - Responsibility of end-user / operator of port or terminal
- ▶ Considerations at initial project planning stage :
 - Cost of quay being out of service vs. cost of maintenance and spares
 - Damage liability claims to vessels from ship owners
 - Cost to repair damage

CAUSES OF FENDER DAMAGE.

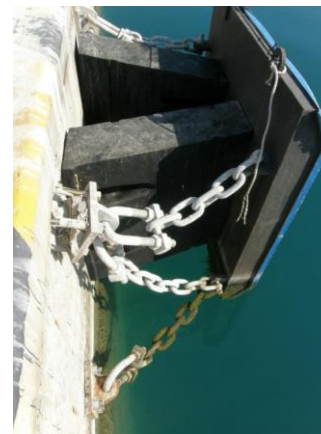
- ▶ Wrong design and low quality of materials
- ▶ Insufficient or no maintenance
- ▶ Excessive berthing energies due to incorrect berthing / initial design
- ▶ Berthing accidents
- ▶ Incorrect installation



after
floating
crane
collision



after ship collision



after ship collision

CONSEQUENCES OF FENDER DAMAGE.

- ▶ Unsafe berthing of vessels
- ▶ Potential damages to ships and quay structures
- ▶ Due to one fender damaged, potential damage to other fenders

-> Fender manufacturer and supplier should be available for after sales service and maintenance plans



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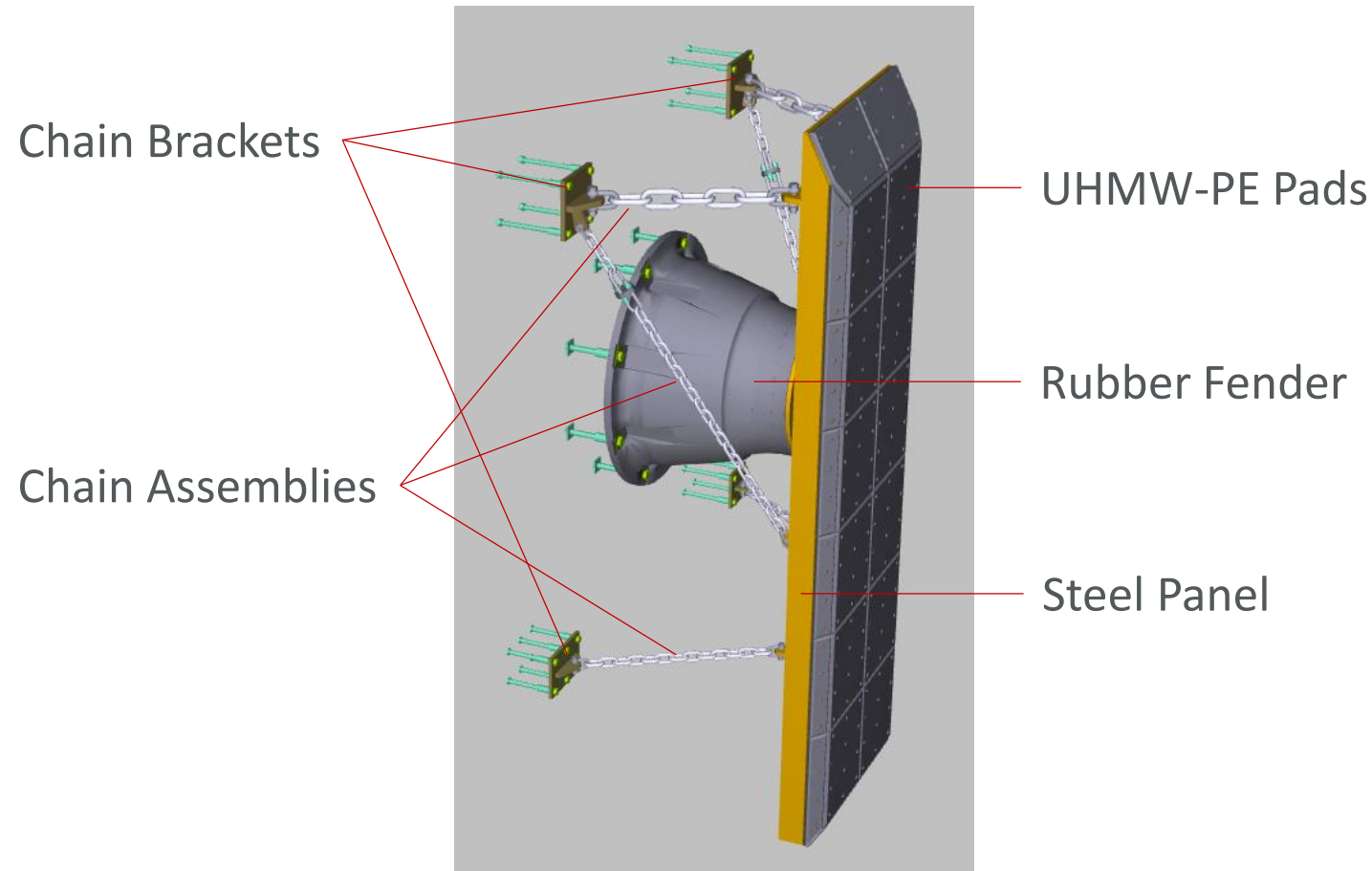
PART 1: COMPANY PRESENTATION

PART 2: FENDER INVESTMENT & OPERATION CONSIDERATION

PART 3: FENDER MAINTENANCE

- ▶ **Typical Fender Details and Damage**
- ▶ **Examples of Typical Damages**
- ▶ **Consequences of Missing Maintenance**
- ▶ **Prevent Damages**
- ▶ **References**

TYPICAL FENDER DETAILS AND DAMAGE.



- ▶ Rubber Fender
 - cracked
- ▶ Chains Assemblies
 - corroded, broken
- ▶ Chain Brackets
 - corroded, broken
- ▶ Steel panel
 - corroded
- ▶ UHMW-PE Pads
 - worn, loose, missing
- ▶ Anchors
 - Concrete breakout due to overloading

EXAMPLES OF TYPICAL DAMAGES.



NO MAINTENANCE FOR 10 YEARS



GONE TOO FAR

EXAMPLES OF TYPICAL DAMAGES.

RUBBER FENDER

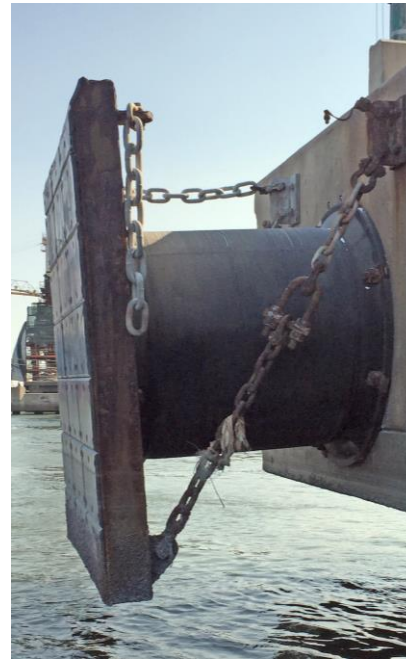
- ▶ Surfaces cracks due to surface contamination over time resulting in total failure
- ▶ Total failure due to excessive berthing forces or accident
- ▶ Wrong designs – inverted fender



EXAMPLES OF TYPICAL DAMAGES.

CHAIN ASSEMBLIES

- ▶ Shackles and Tensioners corroded
- ▶ Chain Links corroded
- ▶ Total Chain Failure due to corrosion or excessive berthing forces / accidents



EXAMPLES OF TYPICAL DAMAGES.

CHAIN BRACKETS

- ▶ Plates corroded
- ▶ Anchors Bolts / Studs / Nuts corroded



EXAMPLES OF TYPICAL DAMAGES.

STEEL PANEL

- ▶ Steel plates corroded
- ▶ Chain Lugs corroded
- ▶ Marine growth



CONSEQUENCES OF MISSING MAINTENANCE.

- ▶ Safety Risks
- ▶ Damage to Fenders
- ▶ Damage to Berth Structure
- ▶ Damage to Vessels
- ▶ Increased Operational Costs
- ▶ Increased Berth Interruptions
- ▶ No Warranty
- ▶ Shorter Service Life

COMPANY INSIGHT

COMMUNICATING SAFETY

PORTS AND THE SHIPPING INDUSTRY SHOULD BE AWARE, THAT WHEN FENDERS FAIL OR DO NOT WORK PROPERLY DUE TO INCORRECT DESIGNS OR A WRONG SAFETY FACTOR, THE RISK OF ACCIDENTS DURING THE BERTHING PROCESS AND THE RESULTING COSTS TO THE PORT IN TERMS OF REPAIR AND DOWNTIME ARE TREMENDOUS. THESE RISKS ARE BY NO MEANS WORTH SAVING ON SAFETY.



PREVENT DAMAGES.

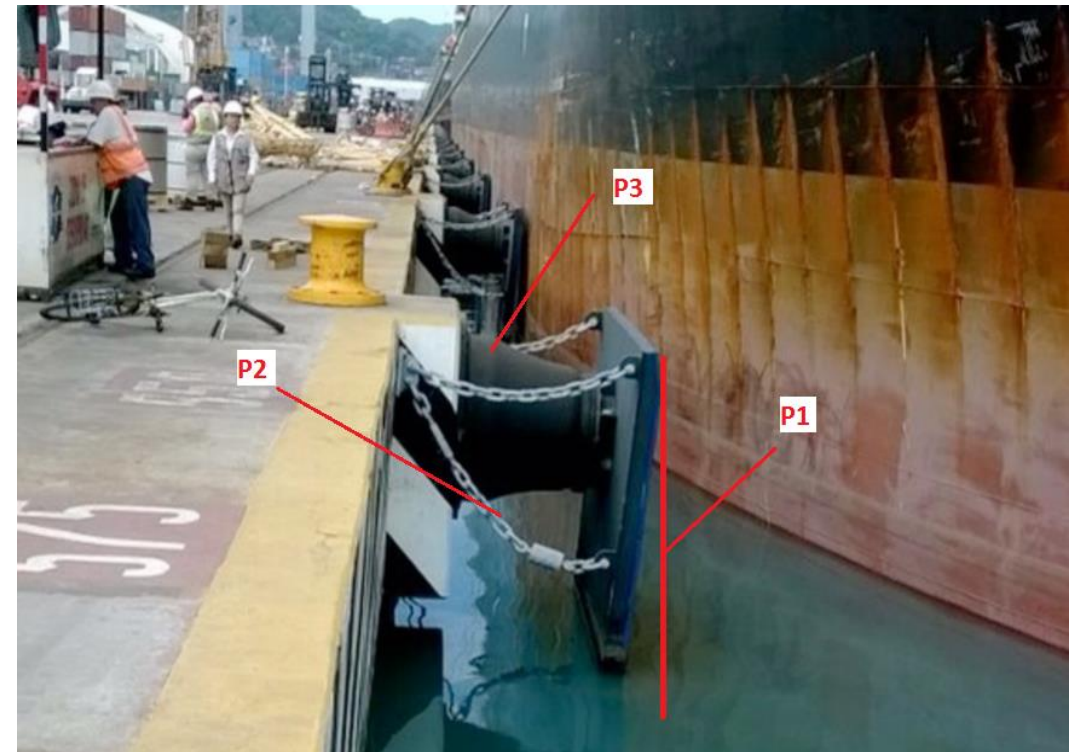
BEFORE ORDERING – PROJECT PLANNING

- ▶ Correctly specify the technical requirements under the environmental conditions on site
- ▶ Allow for maintenance of the fender system after hand-over
- ▶ Allow for training of staff to maintain fender systems
- ▶ Allow for suitable spares holding
- ▶ Order spares with the main contract, it is much cheaper in the long term

PREVENT DAMAGES.

BEFORE INSTALLATION – DESIGN

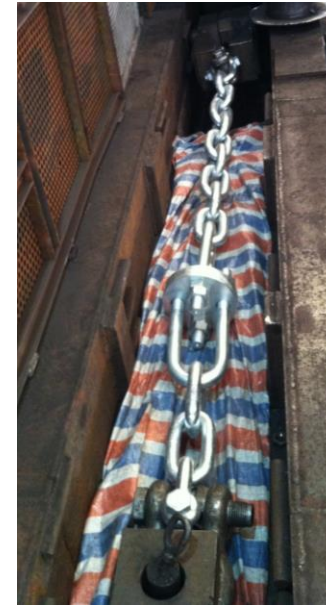
- ▶ A sound design improves the life cycle of the fender system and prevents replacements
- ▶ Apply proper manufacturing procedures and standards with regards to paint protection, testing and quality
- ▶ Choice of materials can improve wear and corrosion resistance
- ▶ Example of incorrect design : unfavorable panel position (P1), chains with incorrect angle (P2), incorrect design of rubber fender (P3)



PREVENT DAMAGES.

BEFORE INSTALLATION – MANUFACTURING

- ▶ Corrosion protection in terms of high quality paint systems
- ▶ Testing of paint system once applied to proof conformity
- ▶ Material verification to ensure correct materials are used
- ▶ Load testing of various components in order to satisfy that the design criteria are met
- ▶ Protection of equipment during transport to site



PREVENT DAMAGES.

DURING INSTALLATION – ON SITE

- ▶ Store all supplied equipment in a suitable storage space
- ▶ For long term storage ensure adequate protection
- ▶ Inspect all painted components prior to installation and where necessary, carry out paint repairs as per manufacturers recommendations
- ▶ Take care that equipment is not damaged when handling during installation
- ▶ Carry out any small paint repairs once installed



PREVENT DAMAGES.

AFTER INSTALLATION – MAINTENANCE

- ▶ Each installation requires an Inspection and Maintenance Program
- ▶ Consult the manufacturer with regards to the recommended activities and intervals
- ▶ Prepare an Inspection Schedule for each berth

MAINTENANCE INSPECTION PERIODS

An Inspection and maintenance programme is needed to identify maintenance, wear and damage as well as the likely causes at an early stage. Three levels of inspection and maintenance are recommended. The table gives average periods for temperate climates. These should be more often in harsh environments such as the tropics. If you are uncertain about any aspect of inspection or maintenance, please consult ShibataFenderTeam.

Inspection and Maintenance Programme	LEVEL 1 Close visual inspection	LEVEL 2 Interim maintenance	LEVEL 3 Major maintenance or overhaul	Notes
Rubber fenders	Every year	4–6 years	15–25 years	1, 2, 8
Steel panels (frames)	Every year	4–6 years	15–25 years	1, 3, 8, 9
Other fender steelwork	Every year	4–6 years	15–25 years	1, 3, 8, 9
Corrosion protection systems	Every year	4–6 years	10–15 years	1, 3, 8, 9
UHMW-PE face pads	Every year		15–25 years	1, 4, 8
Anchors & bolts	Every year	4–6 years	15–25 years	1, 5, 8
Chain, shackles & adjusters	Every year	2–4 years	5–10 years	1, 6, 8
Initial pressure (pneumatic fenders)	Every month	N/A	N/A	7
Valves and end fittings	Every six months	4–6 years	5–10 years	10, 11
Marine growth	Every six months	1–2 years	N/A	12

PREVENT DAMAGES.

AFTER INSTALLATION – MAINTENANCE

- ▶ Each fender system requires a Maintenance Checklist
- ▶ Consult the manufacturer with regards to the recommended activities and intervals
- ▶ Prepare a Maintenance Checklist for each fender system
- ▶ Consider a comprehensive maintenance regime of the fender system after hand-over
- ▶ Allow for training of staff to execute a proper maintenance regime

MAINTENANCE CHECKLIST

It is advisable to prepare a checklist for routine preventative maintenance. The table below is a suggested template for collecting this information.

In the event that fender damage is identified during a maintenance inspection, please contact ShibataFenderTeam for advice.

Port:	Berth Name:
Date:	Time:
Name:	Signature:

GENERAL	
Fender location:	Last inspection date:
General condition: Excellent / Good / Average / Poor / Very Poor	

RUBBER		FENDER PANEL	
Ozone cracks	yes/no (photos, size)	Paint condition, damage	yes/no (photos)
Fixings tight, secure	yes/no (photos)	Dents, bends	yes/no (photos)
Cuts or abrasions	yes/no (photos, size)	Brackets	
Spillages (paint, oil)	none/minor/major	Corrosion, scratches	yes/no (photos)
Marine growth	yes/no (vents blocked?)	Welds, cracks	yes/no (photos)
Tidal operations	yes/no (hydraulic locking?)	Accident damage	yes/no (photos)

UHMW-PE FACE PADS		CHAINS			
Original thickness		Weight/tension/shear	W	T	S
Current thickness		Slack	yes/no	yes/no	yes/no
Evenly worn	yes/no (photos)	Diameter loss	yes/no	yes/no	yes/no
Cuts, gouges	yes/no (photos)	Shackle or link wear	yes/no	yes/no	yes/no
Missing pads	yes/no (photos)	Bracket damage	yes/no	yes/no	yes/no
Fixings loose, missing	yes/no (photos)	Split pins fitted	yes/no	yes/no	yes/no

COMMENTS	PHOTOS (file names)

FOLLOW-UP			
Refer to ShibataFenderTeam	yes/no	Warranty issue	yes/no
Date referred		ShibataFenderTeam contact	

PREVENT DAMAGES.

BE ON THE SAFE SIDE AND PARTNER WITH SHIBATAFENDERTEAM

- ▶ We are your project partner during all phases
- ▶ Working with us means:
 - Expert assistance during project planning to achieve a long service life of the fenders
 - Site Assessments to assess condition of fender systems
 - Recommendation on keeping up to date spares holding
 - After Sales Service and customized maintenance plans

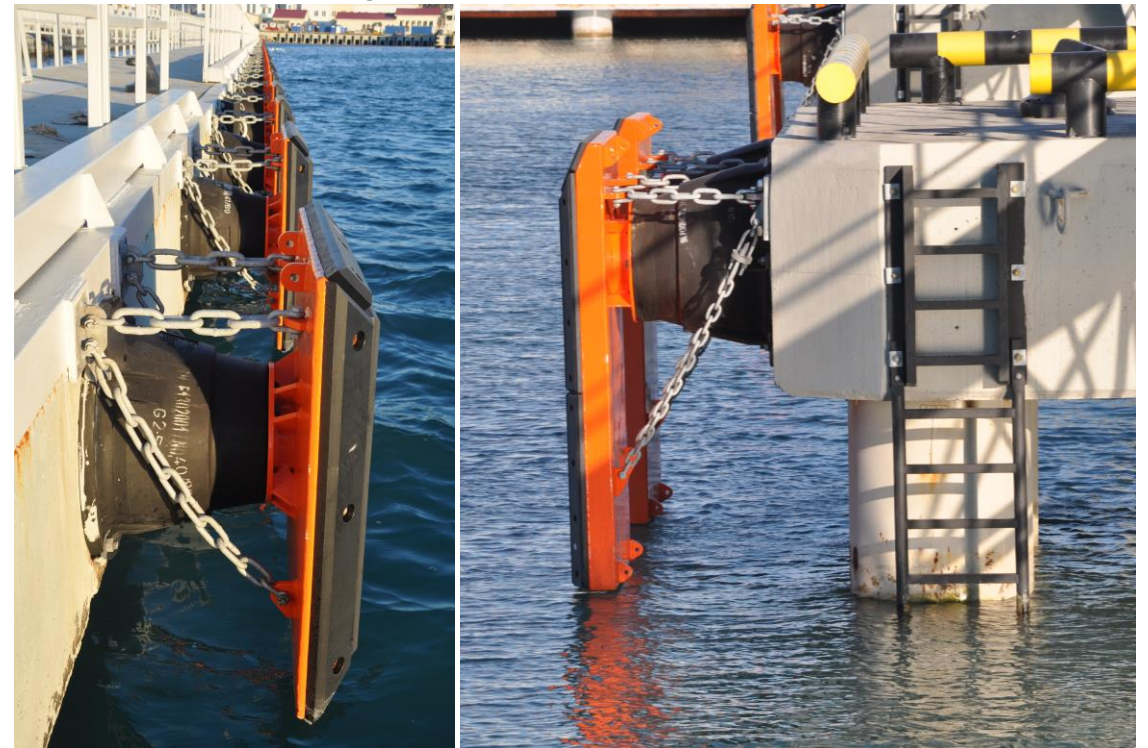


REFERENCES.

Odessa Port, Ukraine – 2010 Special Element Fenders



Sochi Port, Russia - 2013 SPC Cone Fender Systems



REFERENCES.

Novorossiysk, Russia - 2011

CSS Cell Fender System



Turkmenbashi, Turkmenistan - 2018

SPC Cone Fender System



THANK YOU FOR YOUR ATTENTION!

For more information visit us at

booth #20

or

www.shibata-fender.team