

FENDER INSPECTION – LOOKING FOR SIGNS OF DETERIORATION AND DEGRADATION OF MARINE FENDER SYSTEMS

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Figure 1: Trelleborg fender inspection service

Fender systems are an integral part of the port infrastructure, and their maintenance is important for the safety and efficiency of port operations, protecting both vessels and terminal infrastructure.

A proactive scheduled inspection of marine fenders is crucial to addressing deterioration early on and identifying dangers and repair opportunities before further damage occurs. To assess the fenders correctly, taking a structured approach to a comprehensive assessment can help to optimize efficiency, increase fender durability, reduce the risk of downtime, increase dependability, and prolong the fenders life

The paper will highlight the deterioration factors of marine fenders including natural environmental factors, chemical factors, fatigue factors and external force factors showing typical signs to look out for on rubber, panels, chain anchors, and pads

The paper will then explain how to check for repair opportunities and how to functionally evaluate a marine fender system, with a calculated guide and reporting system which can be used to prioritize monitor, maintenance, and repair actions.

Trelleborg will assist you in developing a proactive, individualized service & maintenance plan based on the application and usage of your fenders to reduce the risk of downtime, increase dependability, and prolong asset life.

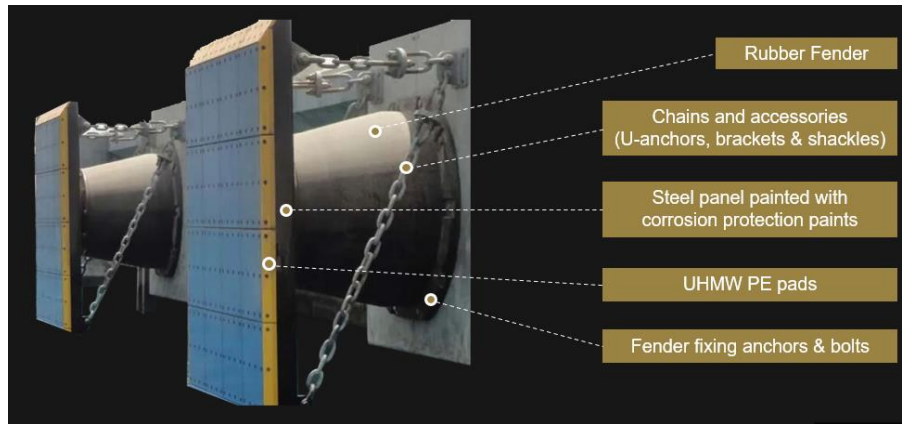


Figure 2: Components to inspect in a modern fender system

Fender failures can occur due to various reasons like fatigue, chemical, and external force factors, and can cause serious problems such as damage to berthing vessels and port infrastructure, operational delays, and safety hazards. The typical degradation and deterioration modes include drop, tear, permanent deformation, missing components, cracks, chipping, separation, wear, ozone cracks, cuts, burns, or damage caused by a variety of factors such as fatigue, chemical, and external force.

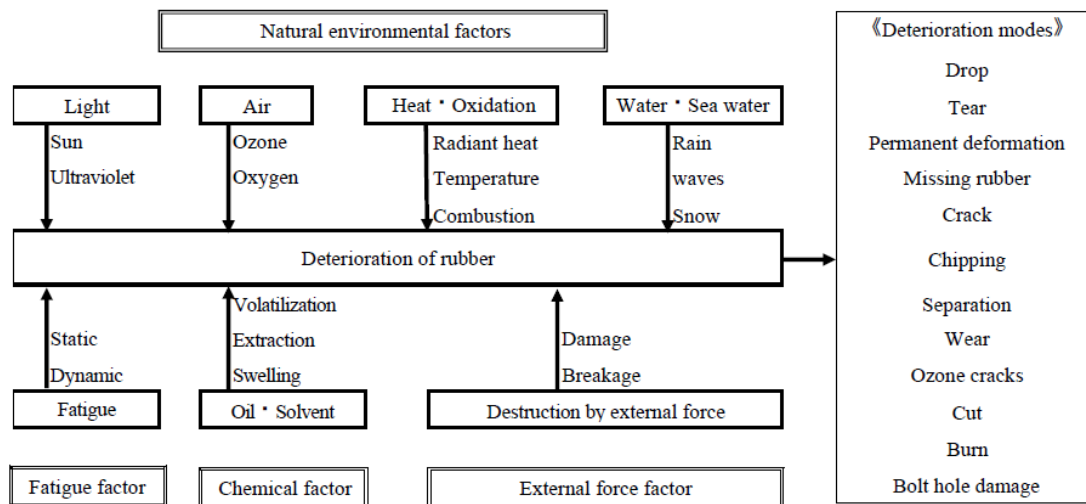


Figure 3: Deterioration phenomenon and factors of rubber



A proactive preventive maintenance schedule is imperative to port operations, reducing the risk of downtime, maximizing fender asset life, increasing fender durability, and improving operational safety.

To address this, Trelleborg offers a Comprehensive Fender Inspection Service:

Fender Inspection: Our experts examine & document the condition of the fenders on-site to ensure accuracy.

Data Evaluation: In line with international standards, fender systems are evaluated for deterioration and damages.

Grading Classification: A fender grading system is used to classify the fenders based on its damage rate & deterioration mode.

Analytical Report: The findings are presented, and recommendations are made as to whether the deteriorations should be monitored further, repaired, or replaced. The remaining service life of the fender is also evaluated.

Our experts will thoroughly inspect the various components of your system, including the rubber, fender panels, accessories, bolts, steel plate, and resin pad and provide you with comprehensive assessment.

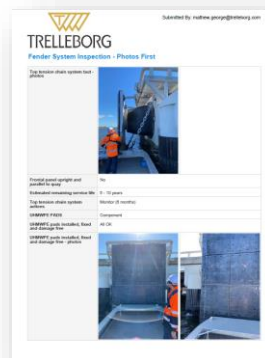


Figure 4: Report example

A matrix report is also provided which outlines specific actions that need to be taken, along with their corresponding time frames. By providing such detailed information, port operators can effectively budget their resources. Additionally, the report includes recommendations on the remaining lifespan of the fenders, which can aid in future maintenance planning.

Fender System Inspection										TRELLEBORG	
Project Information		Inspection Details		Inspection Results		Inspection Status		Inspection Date		Inspection Location	
Project ID	Project Name	Inspection No.	Inspection Date	Inspection Status	Inspection Date	Inspection Status	Inspection Date	Inspection Status	Inspection Date	Inspection Status	Inspection Date
1	A	1	2019-01-01	Completed	2019-01-01	Completed	2019-01-01	Completed	2019-01-01	Completed	2019-01-01
2	B	2	2019-01-02	In Progress	2019-01-02	In Progress	2019-01-02	In Progress	2019-01-02	In Progress	2019-01-02
3	C	3	2019-01-03	Not Started	2019-01-03	Not Started	2019-01-03	Not Started	2019-01-03	Not Started	2019-01-03

Figure 5: Matrix report

Scheduled inspections are designed to detect any potential fender deteriorations or degradations by identifying early maintenance and repair opportunities, maximizing fender life, and reducing the risk of interruption to port operations.

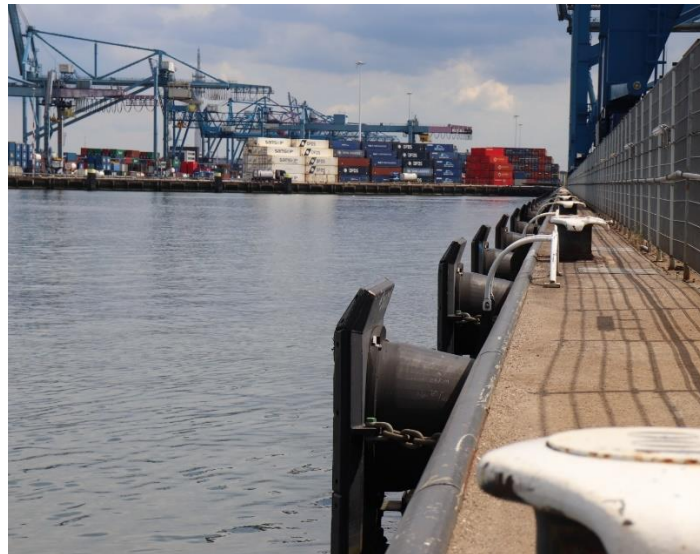


Figure 6: Exceptional fender condition in the bustling Eemhaven port of Rotterdam, installed 20 years ago – A testament to the scheduled maintenance efforts over the years

References:

- CDIT Library No. 2 (2019) “Guidelines for Maintenance of Rubber Fender systems”
URL: <http://www.cdit.or.jp>
- PIANC (2002) “Guidelines for the Design of Fender System”