

BELFOR 

TECHNOLOGY SOLUTIONS

**FROM DAMAGE MANAGEMENT TO RESTORATION –
YOUR PARTNER FOLLOWING FIRE AND WATER DAMAGE**



**On-board
expertise
you can
rely on**



The concept of acting as quickly as possible when damage occurs is more applicable in shipping than in any other commercial area. An expert, ‘storm-proof’ restoration partner who comes on board quickly and knows what to do is required in order to avoid longer idle periods, delays and, in the worst case, cargo losses. A partner like BELFOR.

Regardless of whether it is on land or the high seas: our professional services always aim to minimise interruptions to operation.

Suddenly it happens: fire, water, the elements or collisions cause damage to a ship or offshore platform. Each damage case brings its own drama. We are familiar with and understand the situation for owners, shipyards, insurers and surveyors. That is why we offer you solutions tailored to your specific requirements, balancing time and costs, that do not lose sight of maintaining the long-term value of the vessel for the sake of an improvised immediate solution.

Rescue in sight!





At your side worldwide

As a globally active company, BELFOR is on site for you at all times – anywhere that our experts can support you. Over 11,100 highly qualified employees are in action for you worldwide, to master even the biggest challenges in a professional way with know-how and the latest technology. Our Marine division has years of experience with all kinds of ships and many offshore platforms. It is represented by locations on almost every continent. Wherever on the world's oceans your ship is to be found – we will quickly be where you need us!



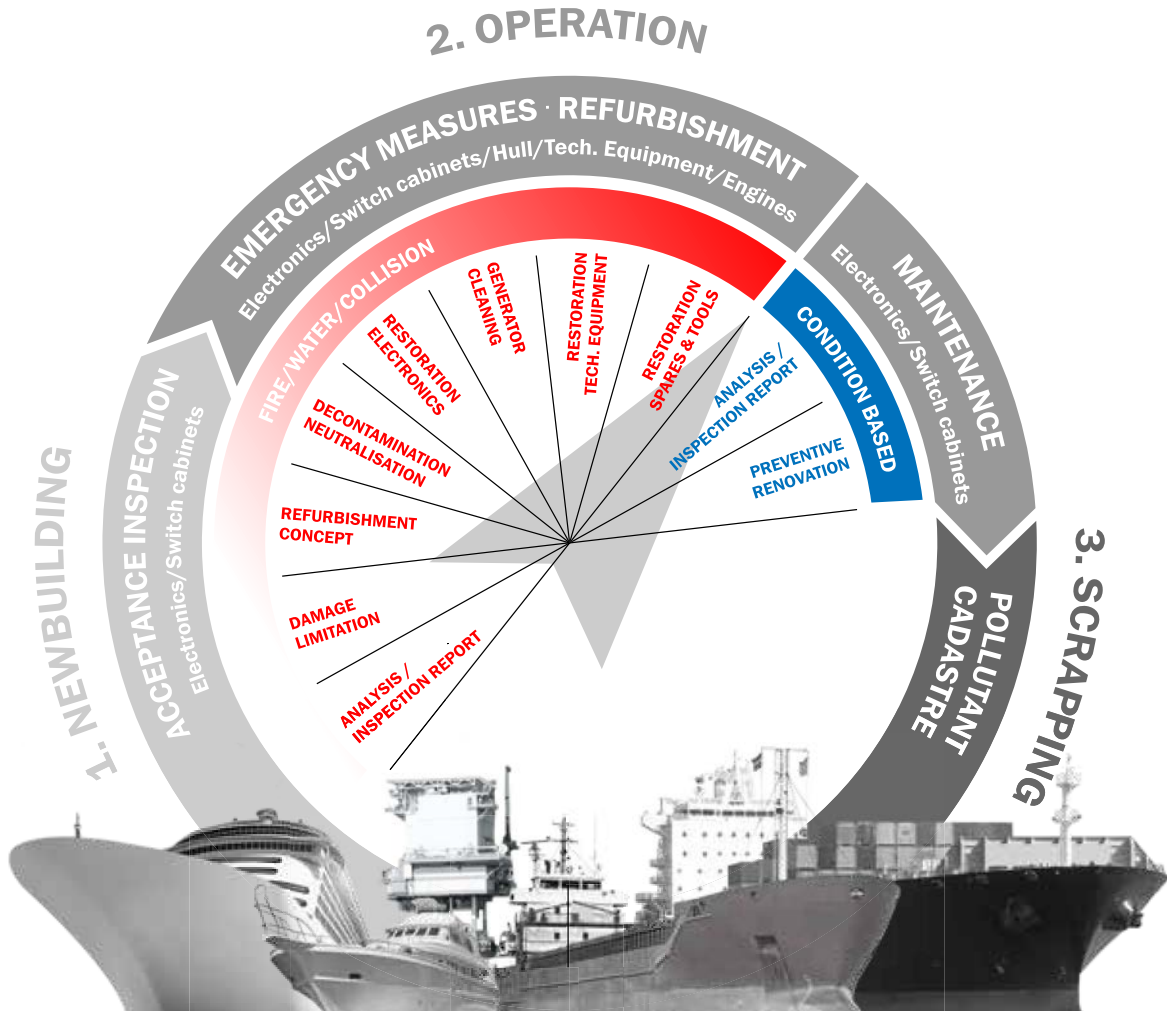
SHIP TYPES

- Freight ships: container ships, tankers, coasters
- Passenger ships: ferries, cruise ships
- Special shipping: trawlers, buoy tenders, rigs and FPSOs
- Navy vessels
- Yachts
- Offshore: supply vessels and work platforms, jack-up rigs





Our marine life cycle and service compass



360° services for your ship

Whether it is a smouldering fire during the construction of a new cruise ship, a storm-related collision of a tropical-fruit freighter, a flooding of an engine room or a burst pipe on the supply platform of an offshore wind farm: we are familiar with and restore virtually all kinds of damage.

Quickly, reliably and expertly. Damage such as fire or assembly errors in the water-bearing pipe network can also sometimes occur in the new-construction phase. Our technical services also include supporting analyses of electronics and control cabinets for ship approval and condition-based maintenance in these areas, in order to ensure smooth operation.

And when the life cycle of a ship is ending, we take action before disassembly and generate an inventory of hazardous materials (IHM) that makes it possible to break up the ship safely.

In this way, we can offer you our services as a committed partner in every phase of a ship's life cycle. Our Marine Service Compass shows all the services at a glance and offers you clear orientation when it comes to preventing, or at the very least minimising, interruptions to operation.

All the subjects of our compass are presented in detail on the following pages.



On course for continuous operation



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We navigate you through any damage



The BELFOR Marine division is available to you 24/7. When we receive your 'SOS call', an experienced project manager will set off immediately in order to be on board your ship as soon as possible. They analyse and prioritise the damage and, following consultation, will immediately implement the necessary emergency measures to minimise or avoid interruptions to operation and subsequent damage. At the same time, they will generally take on coordination of and communication with all those involved in the damage – from the ship's technical crew to the superintendent and surveyor.

'In damage cases, time is the decisive factor. In this area, customers benefit from our expertise in quickly setting the right priorities.'

Lars Wylamowski
Project Manager BELFOR



Extinguishing a fire by no means extinguishes its destructive power

Combustion of plastics can generate hydrogen chloride (HCl), which, in combination with extinguishing water, and particularly intensively with salt water, condenses and leaves visible corrosion on metal surfaces within a few hours. The project manager carries out a quick test on-site to detect HCl and then recommends and implements the required emergency measures.

More precise data is provided by a titration measurement on site or wipe sample, which is analysed in a laboratory. In cases of water damage or damage from extinguishing water, a moisture measurement is generally part of the damage analysis.



DAMAGE ANALYSIS

- Wipe samples to investigate surface impacts in the laboratory
- HCl quick test on-site to detect hydrogen chloride gas
- Titration test to detect and quantify chloride on site
- Moisture measurement



Quick action to put an immediate end to damage

Even though cases of damage can be turbulent, the experienced BELFOR project manager always keeps an eye on the safety of the ship's crew. Firstly, they close off and secure hazardous areas if necessary. Following fire damage, the non-affected areas are closed off to prevent the spread of soot. At the same time, corrosion protection is applied to affected metal surfaces and machine parts. To prevent corrosion from developing, the relative humidity is reduced to below 40% through the installation of dehumidifiers.

The project manager either has chemicals and devices ready for many of the required initial measures, or the BELFOR organisation will soon be able to implement them on-site. In this way, subsequent damage can be reliably avoided.



IMMEDIATE MEASURES

- Securing / blocking off hazardous area
- Stopping corrosion / preservation
- Reducing relative humidity





The inspection report and refurbishment concept show the way

Straight back to full operation

Even while the surrounding conditions are still being stabilised and the development of damage is being contained by initial measures, the BELFOR project manager puts together the inspection report. This is where the results of the damage analysis and the initial measures implemented are documented and recommendations for further action are provided. A restoration and costs plan is created, which includes all the measures following a case of damage.

Everything from decontamination of electronics, machinery, equipment and the hull to subsequent neutralisation of pH values that are too low after fires, and generator cleaning if necessary. If required, cooperation with the constructors of the machinery is also arranged. In close consultation with all stakeholders, it will be decided whether the restoration can take place on board during the journey

One thing is certain: we are available for you anywhere, 24 hours a day, and you do not need to drop anchor for us to be able to work.



DECONTAMINATION / NEUTRALISATION

- **DECONTAMINATION:**
professional removal of soot and toxic hazardous materials after fire damage
- **NEUTRALISATION:**
restoration of a neutral pH value through the implementation of alkaline agents

Switch on again fast!

Freight and passenger ships are just as reliant on functioning electronics as are yachts or rigs.

In this context, control cabinets and electronic systems, such as controls in the engine room and on the bridge, are among the most sensitive and sometimes also the most expensive items on board.

That is why BELFOR uses particularly gentle decontamination processes. These can also be carried out on board: the technical equipment from BELFOR includes numerous mobile devices.

Good to know: through close cooperation with the manufacturers of the electronics to be restored, we ensure that maintenance and warranty agreements remain in place.



ELECTRONICS RESTORATION

DECONTAMINIERUNG ON BORD TROUGH:

- Dry selective process
- Careful vacuuming
- Semi-wet selective process

WET SELECTIVE PROCESS:

- Documentation
- Disassembly of contaminated elements and decontamination in special mobile basin systems
- Drying in mobile vacuum ovens
- Assembly of decontaminated items
- Compliance with international standards and standards Electronics - technical cleanliness

GENERATOR-CLEANING

- in-situ wet process and drying of generators



“ A clean sweep, including equipment, etc.

Tailored restoration solutions for the entire ship

Even technical equipment, spare parts and tools that appear to have survived the fire or water damage on board without problems may have been affected by corrosive or toxic substances, and the speed of corrosion is increased by salty sea air.

The quickest and most effective methods to clean and fully de-rust them on-site are mobile immersion bath systems from BELFOR, which work with ultrasound.

The use of ultrasound also has the benefit of removing even stubborn residue arising from various types of contamination (for example soot, extinguishing agents or mud) from surfaces and cavities in a safe and gentle way.

Following water ingress, for example into insulating layers of walls or the hull of the ship, BELFOR offers professional drying methods that reliably prevent subsequent damage such as mould growth.



We believe we have the right solution for every case of damage. But if we don't – we'll find it! That's a promise!

Martin Schachtschneider
Business Development Manager
BELFOR Germany



RESTORATION

- Technical equipment
- Tools
- Spare parts
- Hull and construction
- Cooperation with the manufacturers of drives, etc.

Circumnavigate potential damages with our condition-based maintenance (CBM)

The conditions on board a ship that sails the world's oceans are anything but ideal for the sensitive electronics and control cabinets. The strain of saline surroundings and major fluctuations in temperature and humidity can potentially negatively affect functionality.

There may also be carbonic contamination from the ship's own machinery. When, at the very latest, irregularities or impacts are noticed by the crew, it is time to call the BELFOR maintenance team.

They will be ready for action quickly and flexibly, perform analysis on-site using modern techniques and implement preventive measures before electronics or equipment suffer damage.



MAINTENANCE

- Thermography process for analysis
- Decontamination measures
- Preventive measures
- Documentation
- Adherence to STD-001E and ISM standards



Maintenance for greater safety

Inventory of hazardous materials (IHM) – in line with legal regulations

Both the IMO with the HKC and the EU with the SRR require documentation of hazardous substances on board. That applies to new and existing ships, but with different time periods depending on which flag the ship sails.

However, the EU regulations set a deadline of the end of 2020, and some ports are even ahead of that schedule.

The inventory of hazardous materials also has to be created or updated before ships are disassembled, i.e. potentially hazardous materials that pose a risk to the health and safety of people or to the environment are located, identified and quantified.

This ensures a professional and environmentally appropriate recycling process.

- Our IHM document is in line with the Hong Kong Convention, Resolution MEPC.269 (68) and the EU Ship Recycling Regulation (SRR).



SCRAPPING

Generation of an IHM

- Collection of information and documentation
- Visual inspection and taking of samples on board
- Laboratory analysis
- Development of the recycling-related IHM



Whatever happens: with us, you are prepared for any damage

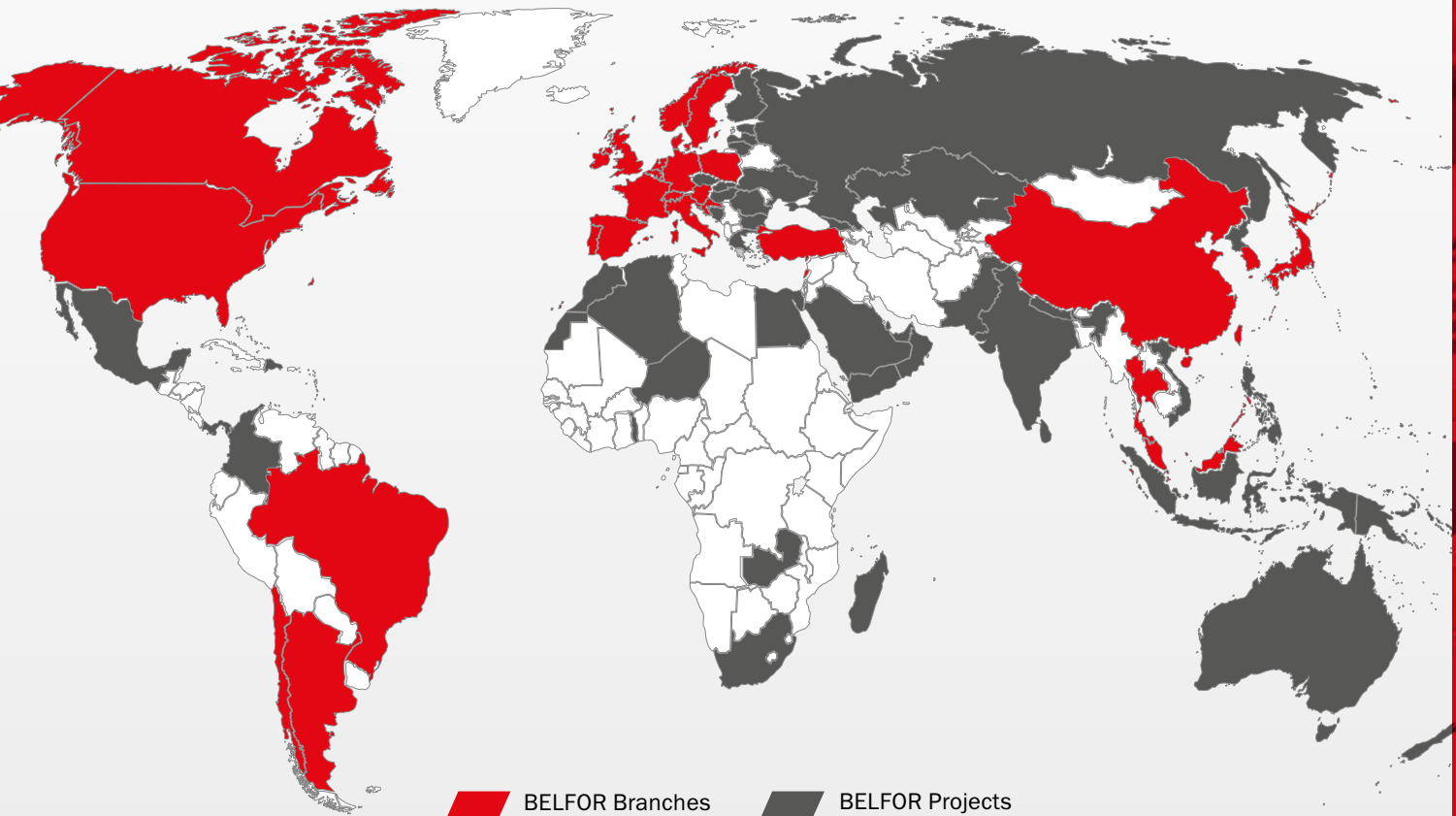
Whether it is major industrial damage, a burst pipe in a private building, work to be done after natural disasters or rescuing documents, machines and systems: quickly and correctly evaluating an emergency situation requires a lot of specialist knowledge and even more experience. You can count on BELFOR for both.

We offer you many other services from a single source – and the right specialists for any kind of damage.

- Restoration of machines and systems
- Restoration of electronics and electrical systems
- Data and document recovery
- Recovery and restoration of stock, inventory, furnishings
- Removal of debris and disposal
- Removal of asbestos and hazardous materials
- Damage restoration in the industrial and commercial sectors
- Special restoration, for example for wind farms, ships or rail vehicles
- Major and complex loss
- Preventive emergency planning, training
- RED ALERT® emergency reaction program

In addition, we take on all project management for you in cases of damage, as well as the coordination of and communication between those who have suffered damages, the surveyors and insurers. In summary: **we take care of it all.**

BELFOR – the world's number 1 in damage restoration



Your global partner in damage restoration

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Binding standards you can rely on



Corporate Social Responsibility

Respect, commitment and integrity are the values that form the core of our company. We have defined them throughout Europe in clear CSR and compliance guidelines. In our cooperative partnership with you, we put our faith in transparency and trust.



Qualitätssicherung und Standards

The BELFOR quality management system is certified. Furthermore, internal BELFOR standards, which mostly go far beyond conventional requirements, apply for all processes.



Forschung und Entwicklung

BELFOR is continuously developing new processes with its own team of engineers and scientists at its Technical Competence Center in Neufahrn, near Munich. They are continually adjusted to new substances and changing requirements.



Schulung von Mitarbeitern

The expertise of our employees is decisive for your trust and the success of our work. That is why BELFOR employees regularly further develop their know-how as part of a fixed training plan.



Clients we served

Insurers

Gard
Norwegian Hull Club
The Swedish Club
Codan
Allianz Global Corporate & Specialty

HDI
Pantaenius
TVM Verzekeringen
EOC
and many more

Shipping Companies

Maersk
Wijnne Barends
Wagenborg
Royal Boskalis
Van Oord
DEME
Jan De Nul
AllSeas
Bourbon
Smit Salvage
Ardent
Yara
Wilhelmsen Ship Management
JR shipping
Blue Star
V.Ships
Jumbo
Subsea 7

Tallink
Princess Cruises
John T. Essberger
Starbulk
Epic Gas
Fugro
Kotug Smit
NSC Shipping
Allianca
Reederei NSB
ALP maritime services
Vroon
Livestock Express
TMS Dry LTD.
Stena Line
Anglo Eastern
and many more

Ship yards

Fincantieri
Damen Shiprepair
VARD
IHC
Oceanco
Royal van Lent

COSCO Shipyard Co. Ltd.
Lisnave
Dubai Drydock World
Niigata Shipbuilding
Blohm + Voss
and many more



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We will be happy to advise you on framework agreements, appropriate measures and plans to make sure you are well prepared for emergencies.

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