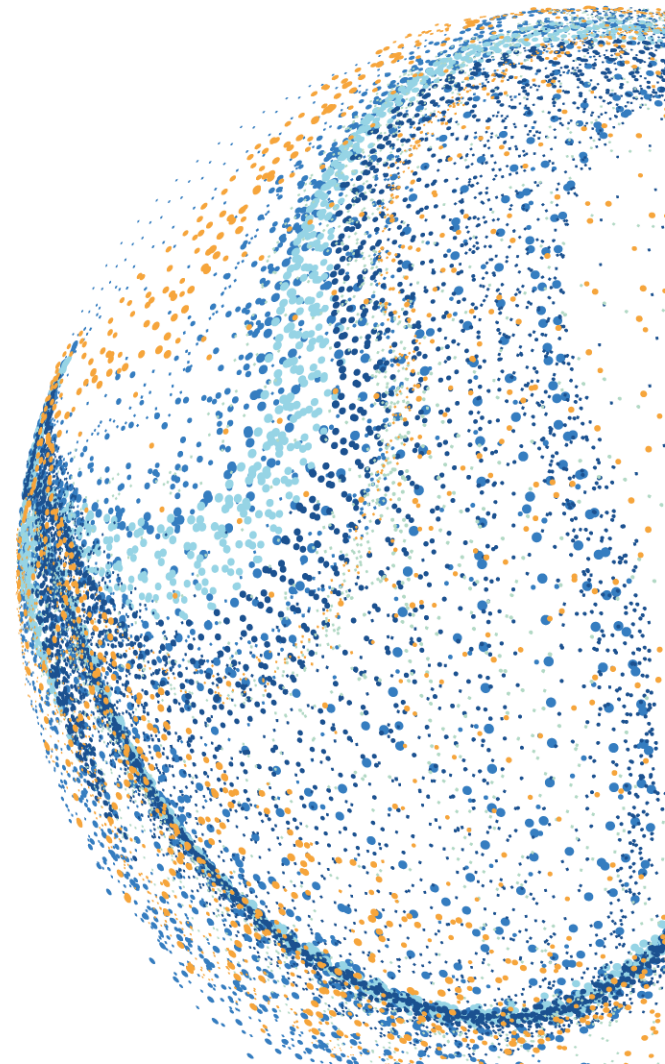
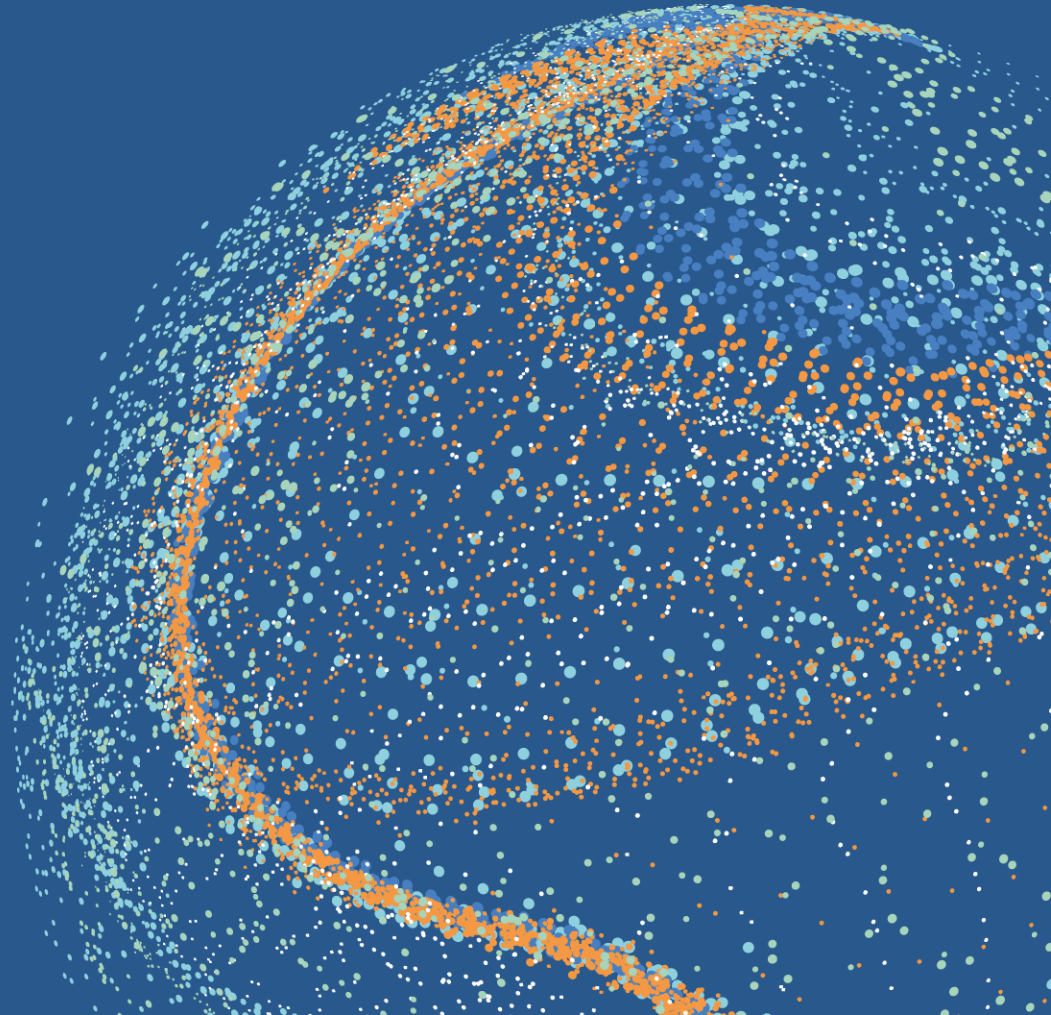


Towards safer mooring



The danger of mooring operations





Over 220 mooring-related incidents were reported to the Australian Maritime Safety Authority between 2010 and 2014...

...with **22 percent** of these resulting in injury



Between 2020 and 2021, the number of accidents reported in Rotterdam **increased from 122 to 144** - most of them involving mooring operations.



53% of mooring accidents are caused by
snap back

- Loss Prevention Department – UK P&I Club

1 in 7 of mooring accidents resulting in **death**.

- Loss Prevention Department – UK P&I Club

Video Holmes Solutions

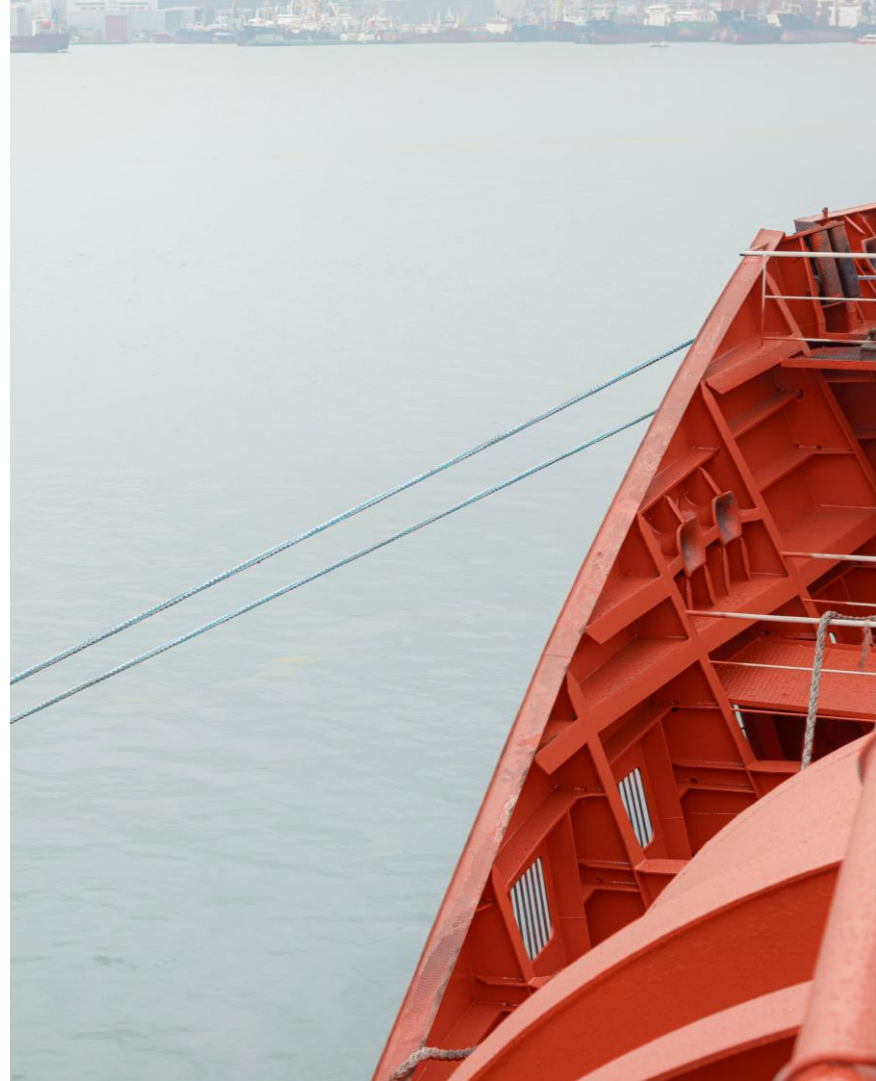
Illustrating the dangers of Snap Back



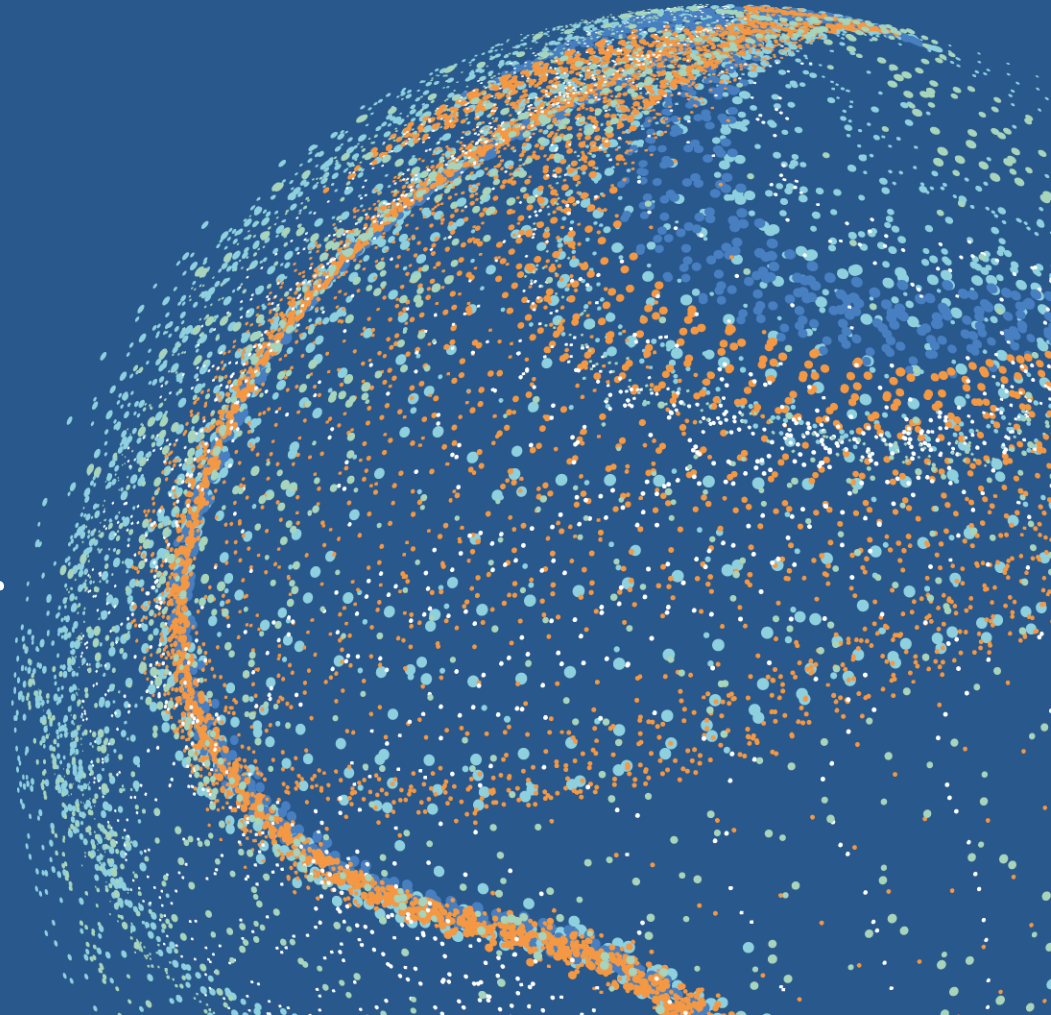
Why are snap-backs happening?

Elastic potential energy

- Elongation is one of the most important characteristics of a rope. A rope's elongation is governed by its design, construction and the materials used.
- Elongation is extremely important to compensate for the different movements of a vessel during mooring operations.
- When a rope elongates, it behaves like a rubber band, and will store energy in the form of elastic potential energy. The more tension is applied to the rope, the higher is that potential energy.
- If a heavily loaded rope snaps, that potential energy will be released in the form of heat and kinetic energy, and the broken section would travel on a random trajectory at high velocity.
- This phenomenon is often referred to as Snap-Back, and the combination of high speed and randomness makes it extremely dangerous.



Development of Timm's SBA™ - Snap Back Arrestor



How does the SBA™ work?

- The SBA is located at the core of Timm's 12 strands ropes.
- The basic principle behind the SBA™ is the difference in elongation between the main rope and the SBA™ element.
- The SBA is non-load-bearing during normal operation.
- In the event of rope breakage, thanks to its higher elongation, the SBA™ will absorb part of the energy released resulting in a significant reduction of snap back.
- The method for securing the SBA™ core to the ends (mooring eyes) has been specially developed for this application.
- If load is still applied after the breakage of the rope strands, the SBA™ will start to bear the load and elongate before breaking itself. However, it is not capable of sustaining high loads and will therefore release much less energy when it breaks.



Development process of the SBA™

A long and winding road...

- **Extensive development and testing**

- 7 years of development, many discarded designs, countless prototypes and thousands of tests.

- **Verified and tested by class society**

- Tested and verified through an extensive testing and qualification program, in accordance with *DNVGL-RP-A203 Technology qualification*. This ensures a systematic approach, with all possible failure modes being identified, verified and documented.

- **Tested in real-life operation**

- Tested on a tug vessel to replicate real life operation. Comparison between SBA™ and non-SBA ropes.

- **A field proven technology – continuously monitored**

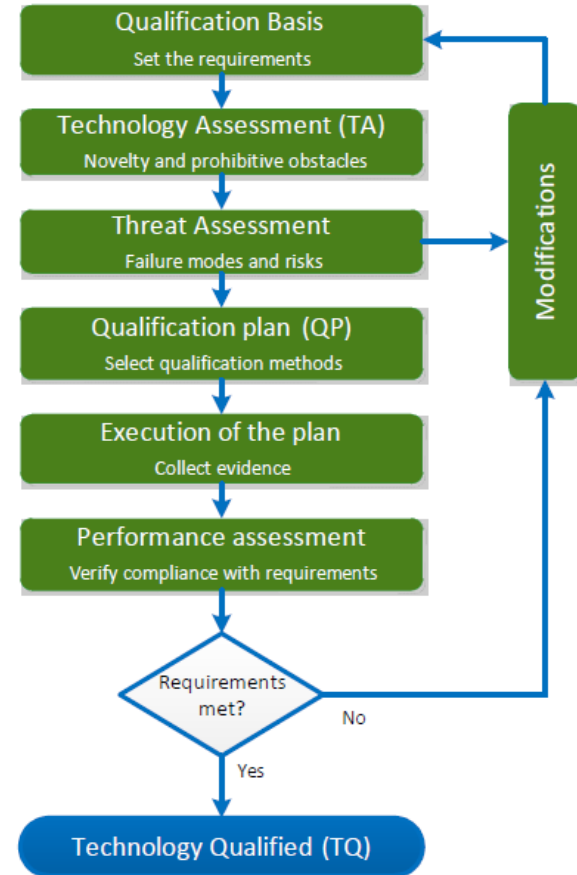
- Over 10,000 SBA™ ropes have been sold since the introduction of the Snap Back Arrestor.
- New and used ropes are continuously tested in our R&D facility to monitor the performance of the SBA™.

DNV RP-A203 Process

Technology Qualification

*“The objective of this recommended practice (RP) is to provide a **systematic approach to technology qualification** in a manner that ensures traceability throughout the process, from the determination of functions, targets and expectations to relevant failure modes, qualification activities and evidence.*

*Its aim is to ensure that **the failure modes and the qualification activities are relevant and complete**. This, in turn, should **improve confidence in novel technology**, and improve the likelihood of its commercialization.”*



Demonstration of the SBA™

Reduction of the snap-back effect



Conclusion

Safety is paramount

- Vessel mooring remains a dangerous operation and severe incidents still happen today.
- Rope and equipment manufacturers must come with solutions to improve the safety of port workers and seafarers.
- New technologies claiming to improve safety must be tested and proven. Timm's SBA™ may look like a simple solution, but it has mobilized many resources over a long development period.
- Unreliable, unproven, “safer” products can create a false sense of security and lead to accidents. In addition to the risk to human life, this is potentially detrimental to our industry.





Wilhelmsen

