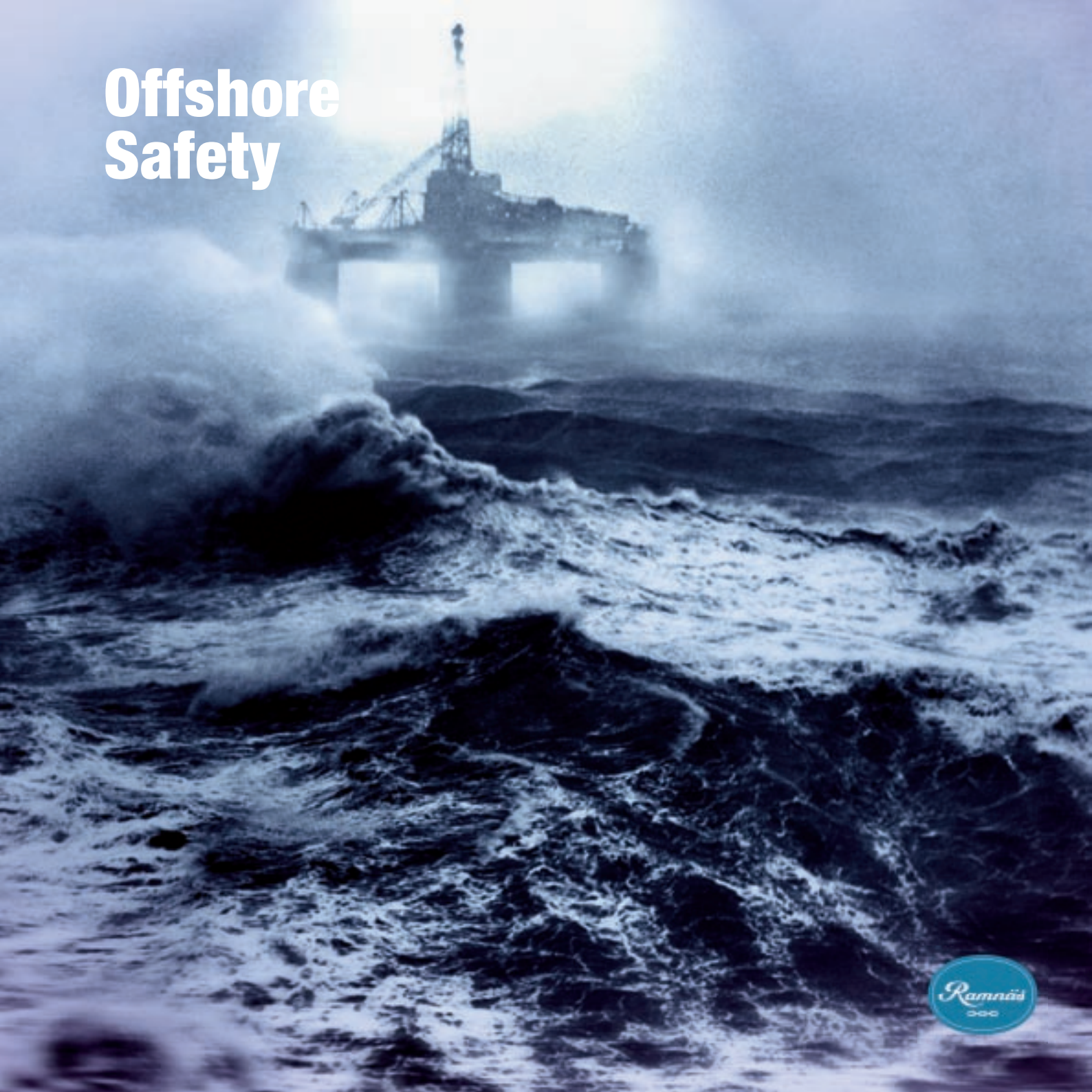


# Offshore Safety





# Ivan cut loose six



*Between 9 and 17 September 2004, Hurricane Ivan reached its frenzied peak along the Gulf of Mexico of the United States.*

*Cities were smashed, families lost their loved ones. The ocean boiled as Ivan reached wind speeds of 270 km an hour.*

*Six oil rigs were torn from their moorings and tossed helplessly about on the mountainous waves, out of control and a potential danger to others on the high seas. And Ivan is just one of many powerful visitors to the area.*

## Safety means no compromise on quality

Ivan is just one of many weather-related weather risks that an oil rig or platform has to face down. The weather in its turn represents just one risk area among many. Running a professional, business-like and safe operation far out to sea is a true test of the toughest working conditions. Compromising on quality can lead to total catastrophe, in terms of both human life and the environment.

### The platform's lifeline

It's all a matter of standing firm even in the face of howling winds and heaving seas. The anchorage system is the platform's lifeline. The old adage that no chain is stronger than its weakest link is the most telling truth in our business. Not even Ivan can tear apart a Ramnäs link.

We know that Ramnäs has a good reputation the world over. A discerning offshore industry would never subscribe to that view if there weren't good reason for doing so.

Our quality chain begins in the steel-works that manufacture and supply the high-grade steel we require. It is here we develop the alloys and the characteristics for our 4+ and 4++ and the forthcoming Grade 5 steel.

Dedication to quality cannot have any weak links either. You can read more about this vital aspect on the last spread. We go further than the official certification and regulation requirements.

### Strength in practice

When the Dolphin rig was due for modification in anticipation of new drilling contracts, analysis indicated the need for a 12-length anchoring system. However, by choosing the stronger Grade 4+ chain from Ramnäs, it was possible to retain 8 lengths.

### 35% longer service life

It's not Ivan that's the biggest problem out at sea. It's corrosion, time and material fatigue. Tests show that Ramnäs stud-link chains have up to 35% more fatigue resistance and thus correspondingly longer service life than studless chains.

Ramnäs products have to match the rig owner's calculations perfectly as regards to safety, quality, service and lifecycle economy.

### Did you know that...

- Ramnäs has delivered more than 250,000 tons of chain, in use today the world over.
- Ramnäs Bruk started operating back in 1590 and has been manufacturing chains since 1876.

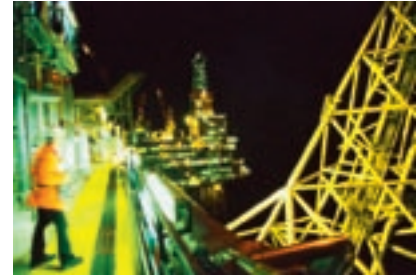






# Troll B proved what we already knew

*After 12 years in operation, the Troll B platform off Norway's coast was subjected to meticulous inspection of its moorings. Troll B uses stud-link chains from Ramnäs. Not a single stud had come loose on the chain. Not a single crack could be seen. That's what we mean by quality and economy.*



## Why choose stud-link chains?

There are many reasons for choosing stud-link chains. By tradition, studless chains are used on permanent platforms and stud-link chains are employed on rigs where the chain is often reeled in and out. Studless chains are lighter, but it is sometimes necessary to have more weight in order to give the platform the appropriate characteristics.

### Stronger and longer-lasting

There are other important reasons for choosing Ramnäs stud-link chains. The expanding link gives the chain other valuable characteristics. It withstands higher loads and does not deform. It distributes and reduces tension, which in turn reduces wear and fatigue.

The result is longer lifetime.

### Controlled expansion

The big difference between Ramnäs stud-link chains and those made by other manufacturers is that we have developed a method whereby we fully control stud expansion, that is to say the stud's attachment in the link. This results in sealed joints that do not corrode, and the stud remains homogeneous and serves as an active part of the tension distribution mechanism.



You'll see the huge difference if you suspend a Ramnäs link beside another stud-link. Strike the stud with a hammer. Listen to the sound and you'll understand. If you don't have the opportunity to try this experiment yourself, visit [www.ramnas.com](http://www.ramnas.com) to hear the difference online.

It is of course because of the controlled expansion that the stud remains in place year after year, which inspection of the Troll B showed.

"Ramnäs manufactures and supplies the best chains in existence," says Hans B Lie, Technical Manager, Marine Operations, Hydro in Norway, which owns Troll B.

### 5-year warranty

We are proud of the quality and service life of our stud-link chains. From the very beginning, complaints over defective products have been conspicuous by their virtual absence, which is why we issue a five-year warranty on all our stud-link chains.







# 250.000 tons without failure

*Quality is a way of life. It applies to all of us who work at Ramnäs. And that's the way it's always been. We know how important our product is for our customers, we know there are no margins for compromise. Virtually all manufacturers meet the set certification requirements. We, however, set our sights higher.*

### From customer contact to delivery

For our customers, quality and service are the most crucial criteria. We are keen to participate early in the process and are happy to provide estimates, calculations and expertise on material grades, designs and characteristics.

### Hot Bend Test

Before we accept the steel in the production system, we carry out what is known as a “Hot Bend Test”, which is a highly demanding bending test whose aim is to optimise weld and seam integrity.



During the production process, which includes heat treatment and single or double hardening, several tests are carried out involving techniques such as ultrasonic inspection and magnetic particle examination to check for hairline cracks and cavities. Each and every link is subjected to a load test. Every measurement is logged, and the test history of every link can thus be monitored and traced back to source.



## Certification is not enough

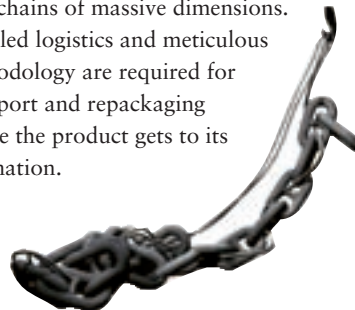
### We like to be thorough

We have extremely close cooperation with the certification companies and we always meet the set requirements. But we go further. We want to feel absolutely certain that we’ve done everything we possibly can to ensure you have the best possible chain.

### Supplying a couple of kilometres of chain is a project in its own right

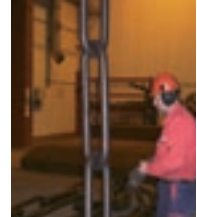
It’s one thing to manufacture the chain. It’s quite another to transport it to an installation site at the other end of the world.

We may be talking about kilometre-long chains of massive dimensions. Detailed logistics and meticulous methodology are required for transport and repackaging before the product gets to its destination.



### Standard or special?

We supply standard chains between 70 and 165 mm, in studless or stud-link form. There is also a range of accessories for this chain type. We are also perfectly happy to develop special solutions as regards to both design and material. Do by all means exploit our expertise and draw on our extensive experience to create the optimum solution for your needs.



### Chains in the future

There is constant development in the area of steel grades, design and production. Ramnäs looks to the future and carries out a wide variety of tests and trials. We have excellent contacts with the entire offshore industry and are quick to pick up on every change in the industry as it changes focus towards deep-water sources, for instance.



## **Ramnäs Bruk's history**

Iron was processed at Ramnäs already back in 1590, but it was not until the end of the 1700s that iron chain developed as a serious competitor to rope and hemp. 1876 saw the start of chain production in Ramnäs, with the main focus on anchor chains for the growing shipping sector.

Today, most chain production is designated for the offshore industry.

## **A small and flexible organisation**

Ramnäs Bruk has a small, slim, efficient and fast-acting organisation that quickly adjusts to each incoming brief. The employees' dedication to the product and to the customers' needs, and the internal effort we invest in Health, Safety and Environmental, is reflected in the product's quality and safety. The same focus is evident in our production plant.

Every single customer is important to us, every single job represents a long-term relationship and a commitment that is founded on quality in deep trust.