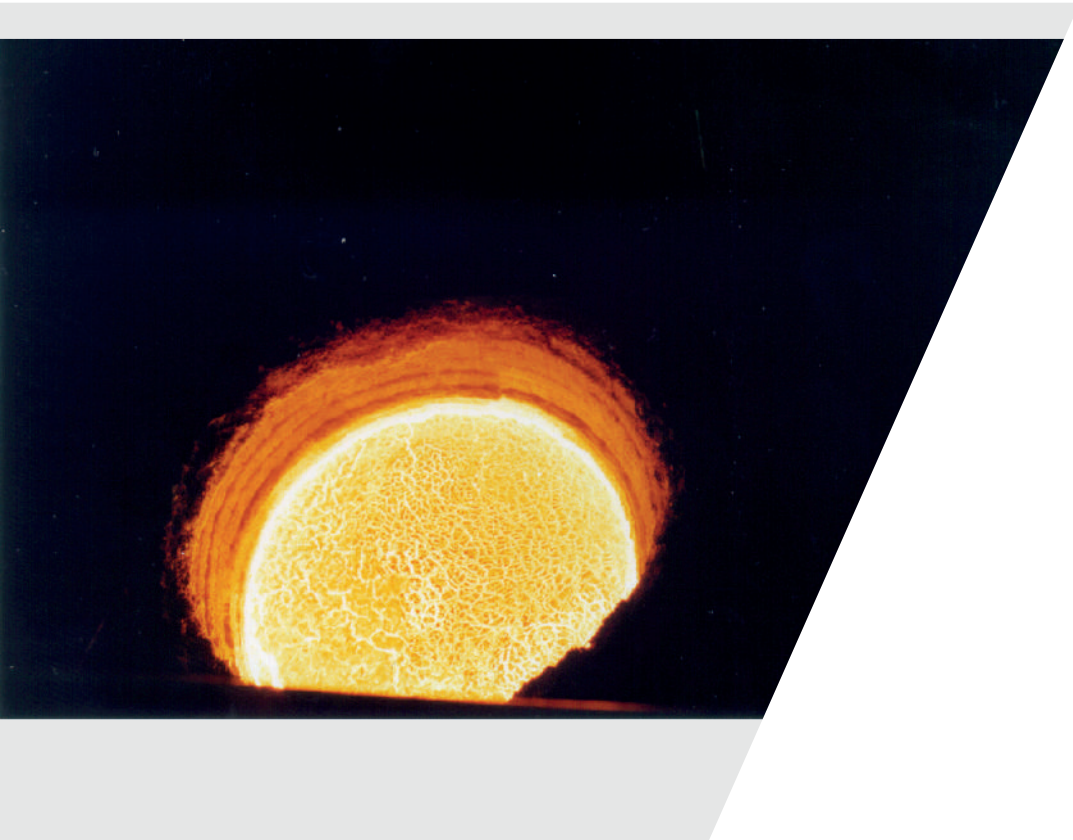


# Expertise in Leaf Spring Steels

Technological Developments and Capabilities



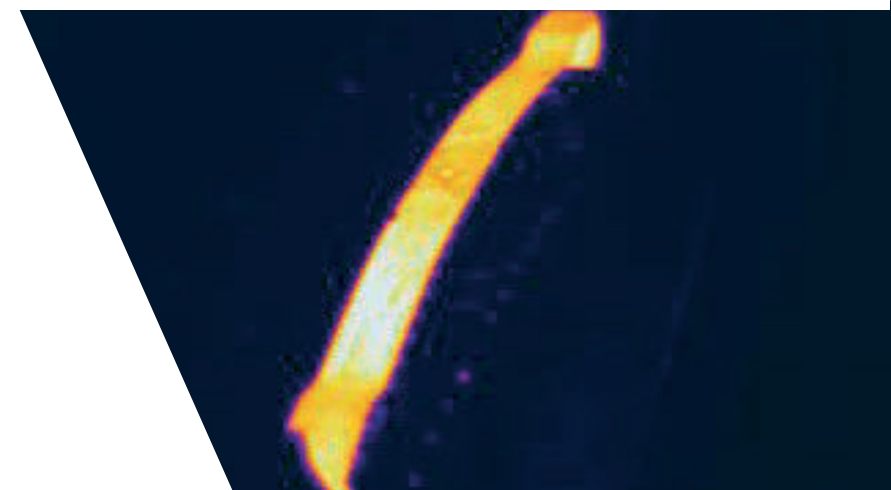
# Who is Sidenor as Spring Steelmarker?



- **SIDENOR** might be the reference in leaf spring performance
- It is thinking in the next generation of truck suspensions
- **SIDENOR** certainly can be a **key partner** for the future:
  - Experience
  - Knowledge
  - Capabilities
  - Determination

# Experience

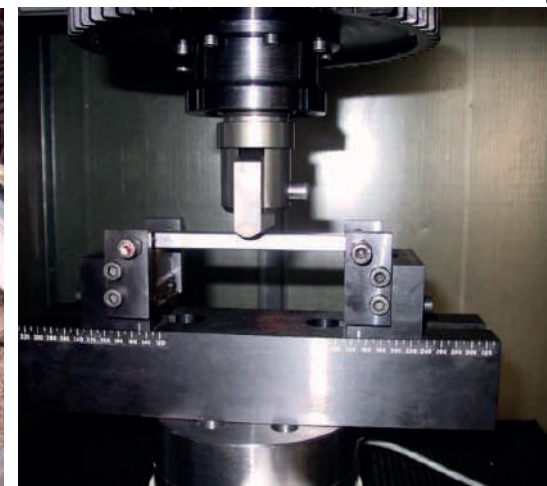
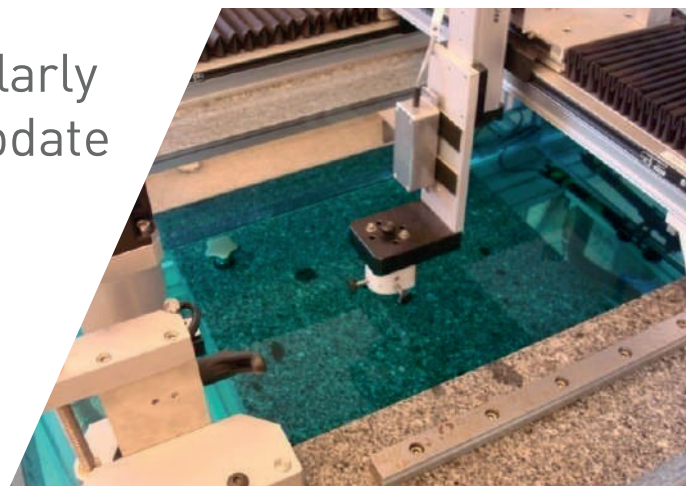
- **SIDENOR** has been producing flat bars (profiles A, B and C EN10092) for leaf springs for **more than 20 years**
- It is a **reference supplier** for the market leaders among the European leaf spring makers
- Its experts dominate its own **manufacturing processes** and also its customers processes





# Knowledge

- **SIDENOR** has a **Research & Development Centre** unique among its direct competitors
- No other steelmaker **can control its own products** by fatigue testing, off-line ultrasound testing or **SEM**
- Its R&D division participates regularly in European funded projects to update to **the latest technological and metallurgical developments**



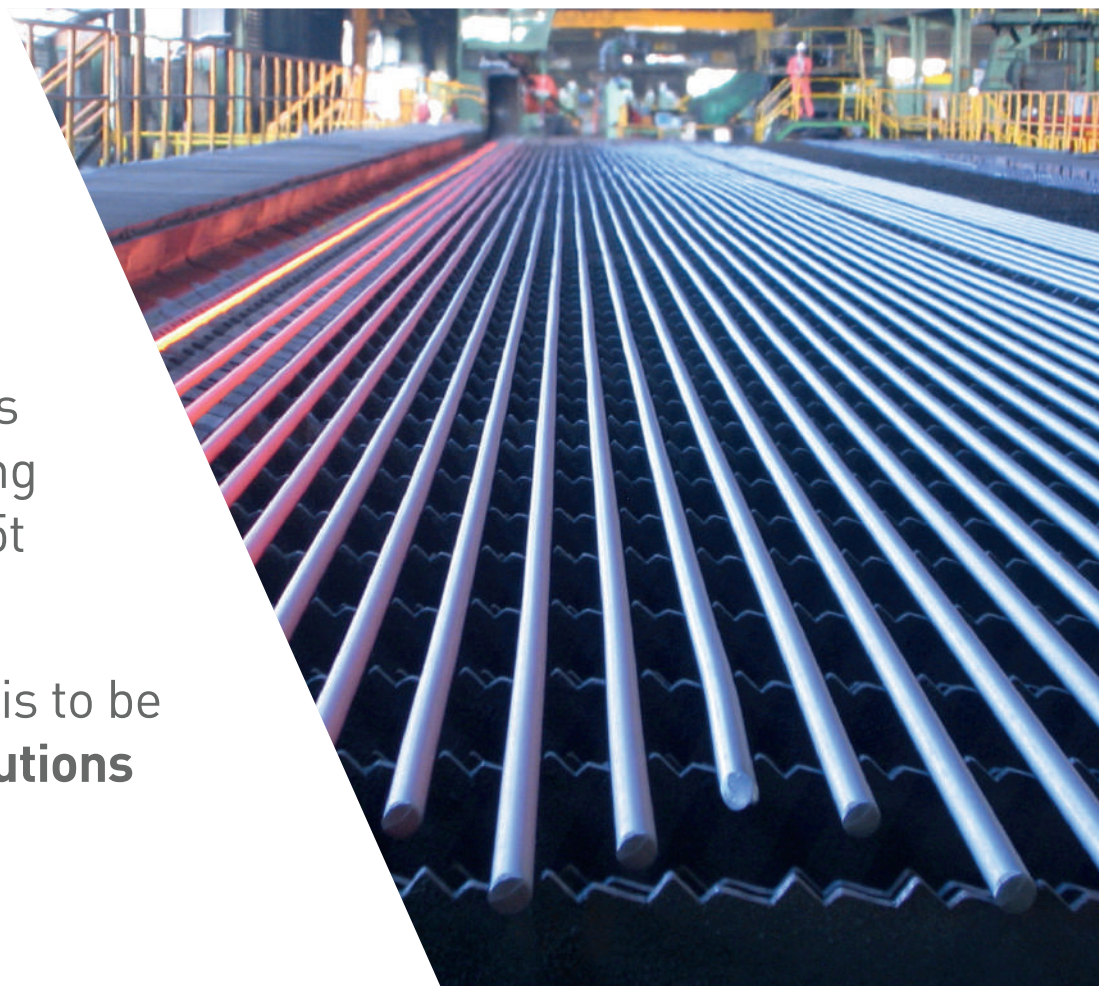
# Capabilities

- **SIDENOR** has a **modern steel shop** in Basauri (year 2000, revamped in 2013) and a new flat mill (2008) in Azkoitia
- Thickness: 5-62,5 mm; width: 50-140 mm
- **SIDENOR** yearly capacity of these products is over 60.000 t



# Determination

- **SIDENOR** is committed to become the worldwide **reference steelmaker** for the leaf spring market
- During the last 15 years a great effort has been done to **optimize** own manufacturing processes and develop new products (7,5t monoleaf spring)... and it goes on
- **SIDENOR** is a steel supplier, but the aim is to be your partner to offer you **customized solutions**





**SIDENOR** products



Same testing conditions,  
heat treatment, hot rolling  
batch, leaf geometry, etc. to

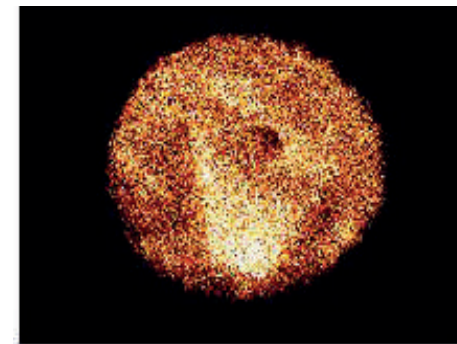
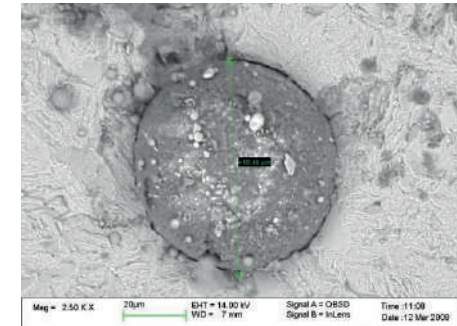
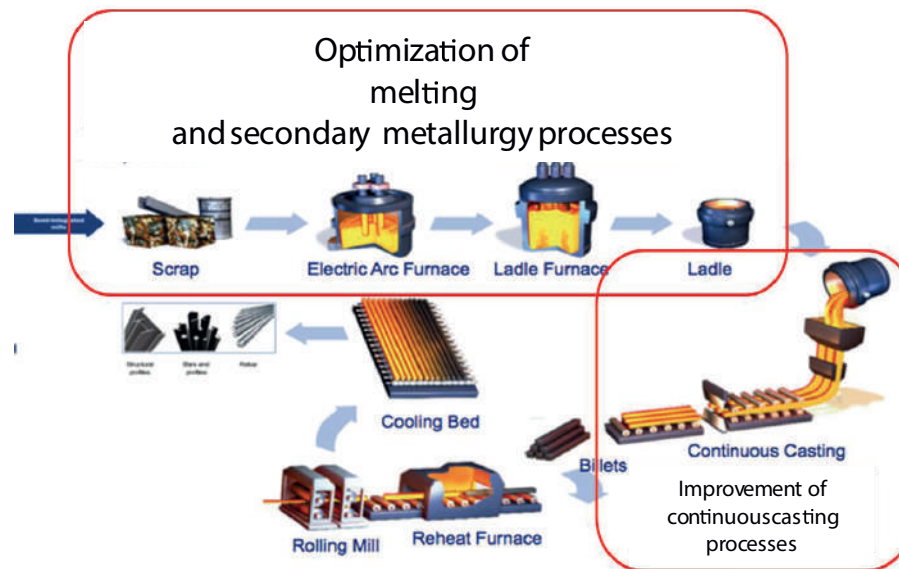


According to these  
evaluations, fatigue  
behavior of the SIDENOR  
flat bars is the benchmark

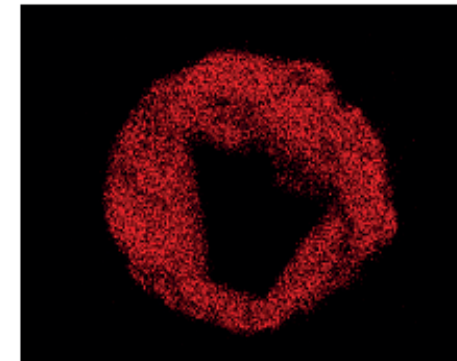


# Analysis of fatigue failures

All the broken tested parts are analyzed by electron microscopy (SEM + EDS) and correcting actions are implemented in the steel manufacturing process



Aluminum Ka1



Calcium Ka1



# New developments

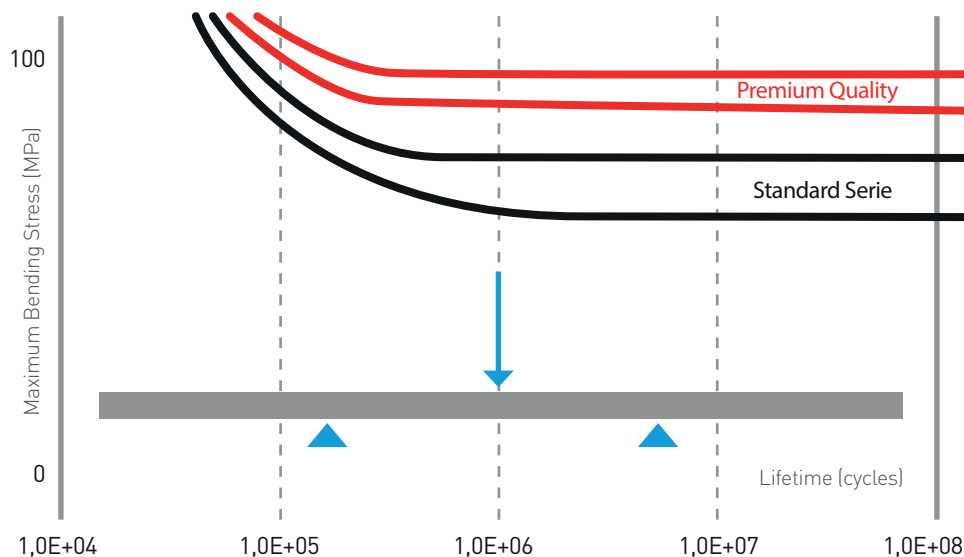
- These capabilities allow **SIDENOR** developing new steel solutions for its customer demands and challenges
- Since 2006 **SIDENOR** is the unique European steelmaker homologated for the 7,5-t monoleaf spring for EURO-6 trucks



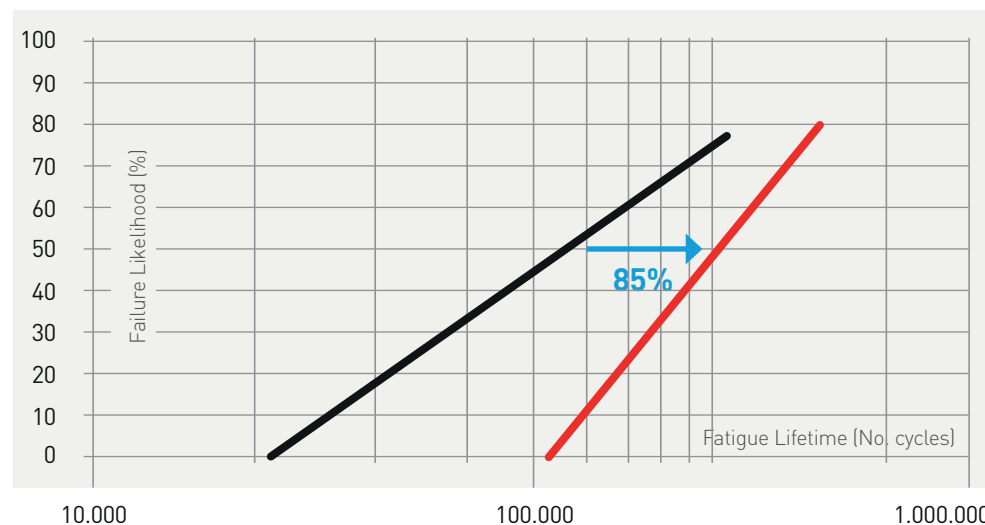
# Knowledge applied to improve the final product

The knowledge of steelmaking and leaf spring processes and product requirements is applied to new high quality products, as **Premium** leaf spring steels

Standard vs. Premium



Standard vs. Premium



# Long term research

In spite of the attained achievements, **SIDENOR** aim is to keep on track of technological leadership and accompany its customers to reach new challenging goals



# Partnership spirit

- **SIDENOR** wishes to become not a simple supplier, but a key partner for its customers in a win-win strategy
- **SIDENOR** know-how is beyond the state-of-the-art of leaf spring steels and the aim is to go further





# Innovation and Reliability built into every solution



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