

SKF AUSTRIA USES XRD STRESS ANALYSIS TO MONITOR BEARING QUALITY

SKF is a worldwide synonym for top quality ball and roller bearings. Small size bearings for automotive applications as well as very large ones for industrial use e.g. in wind turbine gearboxes or for main shaft supports are standard products of SKF. Besides perfect dimensional precision, the material and heat treatment, and last but not least the internal stresses of the bearings, contribute all together for long lasting service of bearings under extreme load.

Hard turning has become an important finishing process in the ever lasting competition to reduce manufacturing process costs, compared to the proven grinding of the hardened components. The hard turning operation creates characteristic stresses in the specimen surface, which can be of desired nature, or – if the machining process is not within its limits – are not acceptable.

The objective in general is to guarantee a proper running machining process, so that no defective parts will be produced. To assure this goal, machining processes are optimized before a serial production will start. During the production run, controlling the residual stresses ensures optimal part quality.

Quality control at SKF in Austria made a huge step forward in production efficiency, when a Stresstech XSTRESS 3000 X-ray diffractometer including a special ring stand was installed at the laboratory. Now it is possible for SKF to measure residual stresses after machining or hardening in

the raceway of an outside bearing ring without cutting it. The perfect setup of the hard-turning machine is monitored by taking samples from the production after certain amount of produced bearings.

Key requirements for the new technology were fastness and capability to measure samples in one piece without cutting, which saves the expensive samples for production rather than scrapping them.

The X-ray ring stand is designed to handle bearing rings easily during the residual stress and retained austenite measurements with the XSTRESS 3000. The stand makes it easy to position the measurement point, either on the outer (OD) or inner (ID) surface of the ring, accurately under the collimator. The ring stand includes up and down movement, to which the goniometer head is attached, and rotating X-Y unit.

Bearings to be inspected are fixed on a vice and placed on a X-Y unit for accurate positioning and rotating.



Mrs. Alexandra Kern, senior lab engineer from SKF (right) and Mr. Dominik Dapprich (left) from Stresstech GmbH at SKF.



More stories

- SKF Austria uses XRD stress analysis to monitor bearing quality
- Editorial
- Introducing Adtech Agencies & Services, India
- Space shuttle nose landing gears inspected with Barkhausen Noise
- AST serves customers from new location
- ICBM6 in France in 2007
- Visit us at
- Order your copy

EDITORIAL



World Wind Energy Association (WWEA) predicts that 160 GW of wind power capacity will be installed by 2010. This is more than double of the capacity at the end of 2006. Although the installed capacity currently produces less than 1 % of world-wide electricity use, it accounts for approximately 18 % of electricity use in Denmark, 9 % in Spain, and 7 % in Germany. Wind farms continue to rise in Germany, Spain, United States, India and Denmark. Plans to increase electricity production from wind remarkably have been made also in China among many other new countries.

To fulfill the predicted demand many wind turbine and gear and main shaft manufacturers are fully booked for 2007 and sell their manufacturing capacity long to the future. In this high demand it is important that component production goes smoothly, is efficient and reliable. Quality control needs to be taken care, and preferably nondestructively so that acceptable parts can continue their way to turbines on top of the high towers.

Barkhausen noise is fast and reliable means to control the manufacturing process and inspect the parts on time before the need to scrap the expensive parts. Automatic inspection of even every tooth and flank of different types of gears and other part types has already been developed, as can be seen on our web site.

Lasse Suominen, President of Stresstech Oy

INTRODUCING ADTECH AGENCIES & SERVICES, INDIA

Stresstech has been actively serving India's growing economy through its able representative, M/S Adtech Agencies & Services, already for 17 years.

During the last decade India has opened up its economy to the world. Its economy grew last year at a rate of over 9 % per annum recording one of the top growths in the world. Manufacturing industry, IT, automobile, space and service industries are booming. The expenditure in defense sectors is being increased to protect India's huge land area resources surrounded by open sea.

Adtech Agencies & Services headed by its able CEO Ashim. K. Dasgupta, an Engineer and Management graduate, started to distribute information about Stresstech Oy products for residual stress testing and Barkhausen noise quality

control in India in 1989. Already in 1991 Defense Metallurgical Research Laboratories (DMRL), Hyderabad considered the XRD stress analyzer of that time, X2002 with G1, best compared to the products from the then well reputed companies by placing the order, which became Adtech Agencies & Services' first one.

Since 1991 many reputed business organizations both in public and private sectors, and defense, such as metallurgical laboratories, educational institutes, auto component manufacturers, have joined the DMRL as Stresstech Group product users. This list of customers has steadily become longer. To name a few, Stresstech's customers are also IIT Kharapur, National Metallurgical Laboratory Jamshedpur, Welding Research Institute Trichy, Railway Design and Standard Organisation Lucknow, Bharat Heavy Electricals Nagpur and its research wing at Hyderabad, BARC. Mumbai, NFC Hyderabad, GTRE Bangalore, IGCAR Kalpakkam, Bharat Forge Ltd Pune, CPRI Bangalore, HAL Helicopter Division Bangalore, Bajaj Auto Ltd Pune, and Autotech Industries Chennai. Many organizations have shown their full faith on quality products of Stresstech Oy Finland by placing repeated orders.

Adtech Agencies and Services with its own Stresscan 500 and Rollscan 300 instruments and factory trained engineers regularly attends to many private industries like Larsen & Toubro, Hindalco, Alstom Projects, Cummins India, DCM Engineering, Tata Cummins Jamshedpur and many others with services related to stress evaluation.

With support from Stresstech Oy, Adtech carries out installation, commissioning and after sales services of all Stresstech products sold in India besides selling them.



An engineer from Adtech evaluating residual stress on CI engine blocks at customer's place with Stresscan 500.

SPACE SHUTTLE NOSE LANDING GEARS INSPECTED WITH BARKHAUSEN NOISE

Nondestructive Barkhausen inspection can reveal damage that can not be verified as easily and conveniently with any other method. This was clearly seen in an inspection case performed at Kennedy Space Center on Space Shuttle Endeavour nose landing gear in February 2006.

Barkhausen inspection team including Mr. Robert M Fix from AST was invited to inspect an area on the orbiter Endeavour nose landing gear that had been accidentally contacted with the support hardware during maintenance. Endeavour is on the launch schedule for 2007.

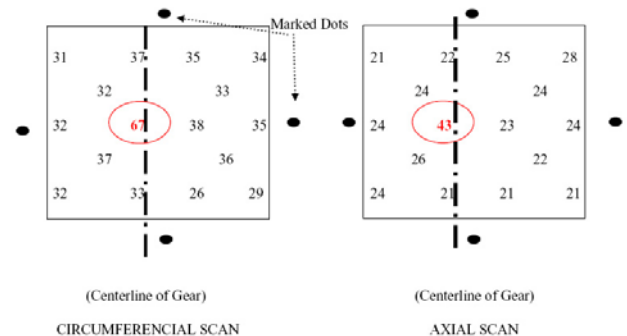
Visual inspection of the contacted area that had been stripped from paint and primer prior the Barkhausen inspection did not reveal any outward damage to the surface of the piston. Molds made of this area were reported to have been inspected with no physical damage detected.

Barkhausen inspections were performed across the area. The signals generated from the surface in axial and circumferential directions were mapped as close as possible using the centerline dots as reference points (figure).

The results of the Barkhausen inspection revealed an area approximately 1/8 inch in diameter that generated signals that exceeded twice the average signal generated across the 1 inch by 1 inch tested area. The location is along the centerline of the gear and reported to coincide with to the area that was displayed the damaged paint. Such signal increase is an indication of a loss of desirable compressive stresses and/or microstructural softening. Such loss of compression and or decrease in hardness can be attributed to a smearing or cold working of the 300M at point of hardware contact.

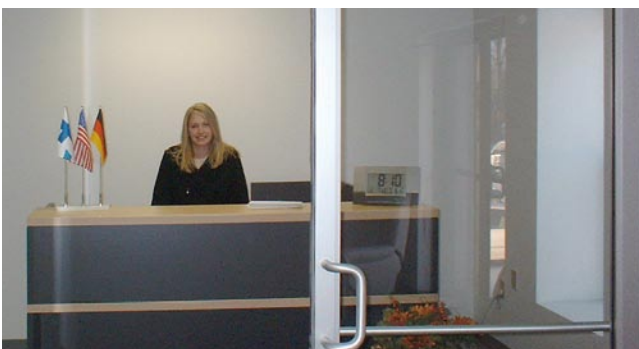
It is known that an area of superficial contact damage can be restored to a condition of greater residual compressive stress by local shot- or roto-peening processes. After the roto-peening rescanning using the Rollscan can determine, if the surface was returned to the condition it had prior to the incident.

Barkhausen inspection method has become the most important method to test goodness of landing gears both of civil and military aircrafts. Especially in testing landing gear cylinders through chrome coating is the BN inspection unbeatable.



Mr. Robert M. Fix inspecting the nose landing gear of the Space Shuttle Endeavour (above). Barkhausen noise readings on the tested area (below).

AST SERVES CUSTOMERS FROM NEW LOCATION



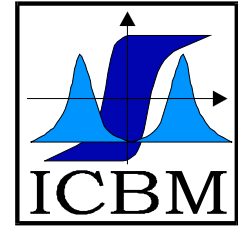
The new address of AST since November 2006 is:

American Stress Technologies, Inc.
 840 Watercrest Way
 Cheswick, PA 15024, USA
 Tel.+1-724-410 1030, Fax +1-724-410 1031
 info@ASTresstech.com

Mrs. Kimberly Novosel welcomes visitors at the reception desk of the American Stress Technologies, Inc. in Cheswick.

ICBM6 IN FRANCE IN 2007

6th International Conference on Barkhausen Noise and Micromagnetic Testing will be held on July 9-10, 2007 at the University of Valenciennes, Valenciennes, France and is hosted by the Institut des Sciences et Techniques-University of Valenciennes and coorganized by SNFA (SNFA is a company of SKF Group) and Stresstech.



ICBM is a conference for experts in research and development, manufacturing and quality management.

Conference Topics:

State of the Art
Industrial applications: aerospace, automotive, gas & oil, steel
Trends in development
Process innovations and the outlook



The ICBM venue ISTV in Valenciennes.

The widespread acceptance of the BNA inspection method by the aerospace and the automotive industries is reflected in numerous new publications, reports and specifications. The program of the conference will include both papers and posters covering the industrial applications as well as the physical phenomenon of the Barkhausen Noise Analysis.

The conference language is English.

More information: www.icbmconference.org or
Andrzej Wojtas Ph.D.
Tel./fax + 31 (0)15 262 1663, Mobile: +31 (0)65 324 0331
icbm@icbmconference.org

VISIT US AT

[SAE World Congress & Exhibition](#) on April 16-19, 2007 in Detroit, Michigan, USA
[CONTROL](#) trade fair, on May 8-11, 2007 in Sinsheim, Germany
[MFN's 10th International Shot Peening Workshop & Trade Show](#) on May 15-17, 2007 in Clearwater Beach Resort, Florida, USA
[Aeromat 2007](#) on June 26-27, 2007 in Baltimore, Maryland, USA
[EMO Hannover 2007](#) on September 17-22, 2007 in Hannover, Germany

[Materials Science & Technology 2007 Exhibition](#) on September 18-19, 2007 in Detroit, Michigan, USA
[Quality Expo](#) on September 18-20, 2007 in Rosemont, Illinois, USA
[Gear Expo](#) on October 7-10, 2007 in Detroit, Michigan, USA
[MFN's 7th Asian Shot Peening Workshop & Trade Show](#), November 12-14, 2007, Singapore
[FVA Infotagung](#) on November 13-14, 2007 in Würzburg, Germany

ORDER YOUR COPY

Stresstech Group Customer Newsletter is published 1-2 times per year by Stresstech Oy.

To receive your own copy of this Newsletter, submit us your contact information. Fill in the **Contact Form** found in www.stresstechgroup.com, Stresstech Oy, Contact us, and select the *Please send me the Stresstech Group Customer Newsletter* and the mailing format. Alternatively send your order and contact information by email to info@stresstech.fi with a note of the mailing format: pdf by email or on paper by mail.

To be removed from the mailing list, select the corresponding choice on the Contact Form, or send us email of your wish.

Stresstech Group Customer Newsletter
published by

Stresstech Oy
Tikkutehtaantie 1, 40800 VAAJAKOSKI, Finland
Tel. +358-14-333 000, Fax: +358-14-333 0099
info@stresstech.fi
www.stresstechgroup.com

We welcome your ideas and comments.
Please use the contact information above.