

25.05.2004
Teuva, Finland

CASE: SUOMEN LÄMPÖPUU OY (Finnish ThermoWood Ltd)

Suomen Lämpöpuu Oy is located in Teuva, Finland. The thermo treatment (drying) process of the wood is carried out in big ovens, where the necessary air circulation is managed by fans. The company has got difficulties to find the suitable lubricant for the fan axle bearings located inside the oven in very hot and demanding conditions. The temperature inside the oven occasionally exceeds 220°C added with the friction heat created by the bearing-axle operation itself. Bearings have in worst cases got broken even on weekly bases. Last winter one of the total 5 axles in the oven lost 3 bearings in 3 weeks.

Different kind of greases with the dropping point over 240°C were tried and tested, but without any significant results. Greases tested were for instance Super Lube Plus PTFE-gel (NLGI-classification: 2, Viscosity 40°C: 365 mm²/s, Dropping point: Doesn't drop), a fully synthetic grease manufactured by Synco Chemical Corporation and Sentinel DSF 3000-grease (NLGI-classification: 1.5; Viscosity: 40°C: 675 mm²/s; Dropping point: Doesn't drop), a fully synthetic grease for extraordinary hot conditions.

On January 29, 2004, in connection of the instalment of another new bearing, we decided to test a grease supplied by RVS-Tec Oy, a mixture of RVS Technology Gel and a fully synthetic grease manufactured by the Swedish grease manufacturer Axel Christiernsson Ab (NLGI-classification: 2; Viscosity 40°C: 480 mm²/s; Dropping point: 280°C).

The temperatures of the wood and the current consumptions of the different fan units and other devices of the establishment (oven) are followed by the monitors of the control room (Picture No: 3.). After a few hours of operation a reduction of 5% was noticed in the current consumption of the engine driving the treated fan. This is significant as only one bearing (the one inside the oven) of the total 4 bearings of the axle/engine line of the fan was treated with RVS-grease-mixture. RVS-mixture was added few times following the normal lubrication program.

After 13.5 weeks on April 30, 2004 the bearing finally got stuck. The useful life time of the bearing had increased 4-5-fold. When the bearing was disassembled, we found that the steel dial ring of the bearing was wrecked and the barrel-like balls (rollers) of the bearing had turned into wrong position thus jammed, which finally stuck the bearing. One could see by mere eyes that a transparent, class-like and very smooth surface structure had been built on the friction zones of the inner and outer circumferences of the bearing (Picture No:1, right side.). It's obvious that the bearing would have lasted much longer still, if not the dial ring was damaged and destroyed.

The treated bearing: 2-row SKF CARB Toroid roller bearing type C2215K (external diameter 130 mm).

Juhani Vainionpää
Managing Director
JMV-Tuote Ay
Hinssinkuja 1
64700 Teuva
FINLAND
Tel: +358 40 550 76 24

Teijo Toivonen
Managing Director
Suomen Lämpöpuu Oy
Horontie 166
FIN-64700 Teuva
FINLAND
Tel: +358 400 219 787

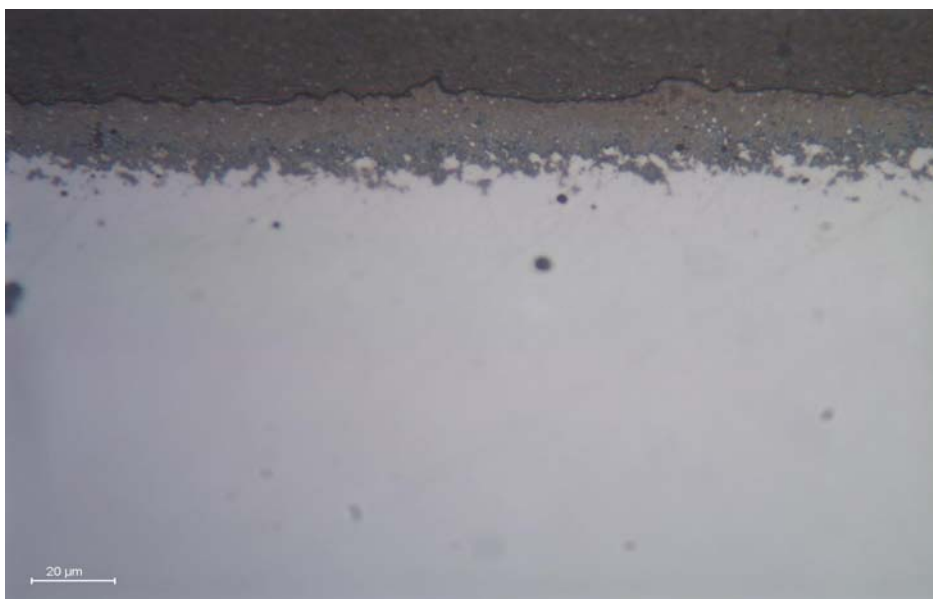
Enclosure: Pictures and related texts:

Picture No: 1. RVS-treated outer circumference of the bearing on the right. The new formed transparent, glass-like and very smooth surface structure can clearly be noticed. A normally lubricated similar kind of outer bearing circumference utilized in similar conditions and similar axle on the left. The differences of the roughness of the surface structures are visible by bare eyes even from the photographed picture.



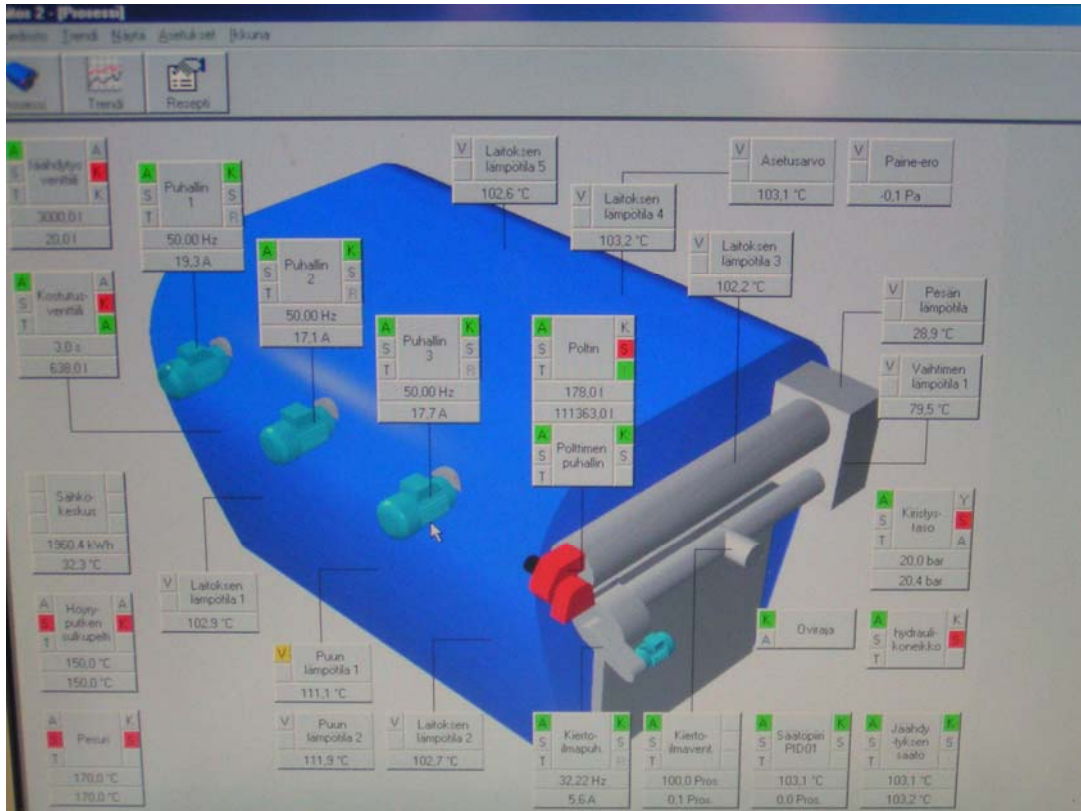
Picture No: 1.

Picture No: 2. A microscopic X-ray picture of a grinded edge of the RVS-treated bearing in Picture No: 1. The darkest area is synthetic plastic into which the metal was cast before grinding the edge. The light grey area is the original metal (bearing steel). The medium grey area is the metal ceramic layer built by RVS Technology and the friction energy. The structure and thickness of the formed layer (about 15 μm) can be clearly seen. The scale down left.



Picture No: 2.

Picture No: 3. The Control Room Monitor of Suomen Lämpöpuu Oy. Wide range of information of the thermo wood treatment-process, such as operative temperatures of different devices, current consumption of fans etc. are monitored and controlled via the monitors. The middlemost fan is the one treated with RVS Technology grease. The current consumption of this particular fan dropped with 5% in few hours time from the treatment from 18,0A to 17,1A, even though only one of the total 4 bearings was treated with the RVS Technology grease.



Picture No: 3.