

Hydroelectric power plant: Plant revision

- The case study presented in this document displays various trend plots used to monitor shutdown and startup of a hydroelectric turbine during revision
- Hydroelectric power plant
- System Reporter Portable 20Ch with software version 6

The measurements described in this document were performed Friday December 17, 2004, in a modern hydroelectric power station in Kyttehrud, Norway, using a System Reporter Portable 20Ch unit with software version 6.

The measurements are made during shutdown and start-up after rebuilding of the magnetisation equipment and replacing the turbine regulator on a 56 MW Kaplan turbine. All data were collected at the same time for all measuring points and sampled with 1 KHz.

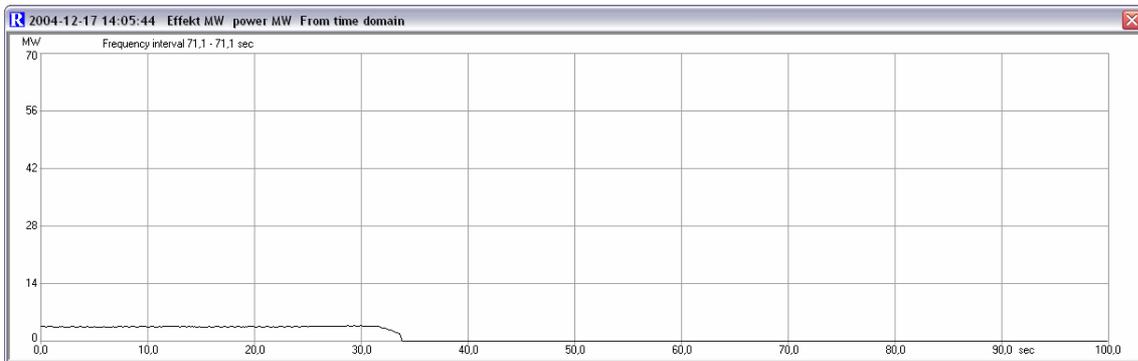


Figure 1. TRIP from 3.6 MW load.

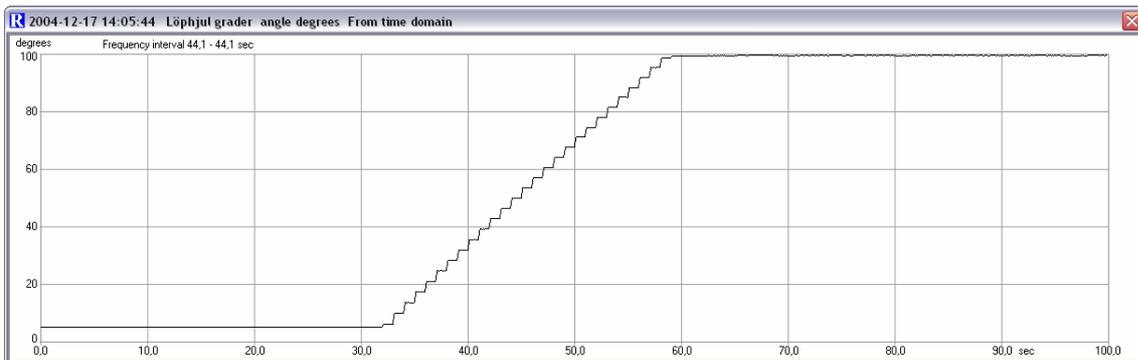


Figure 2. The Runner pitch.

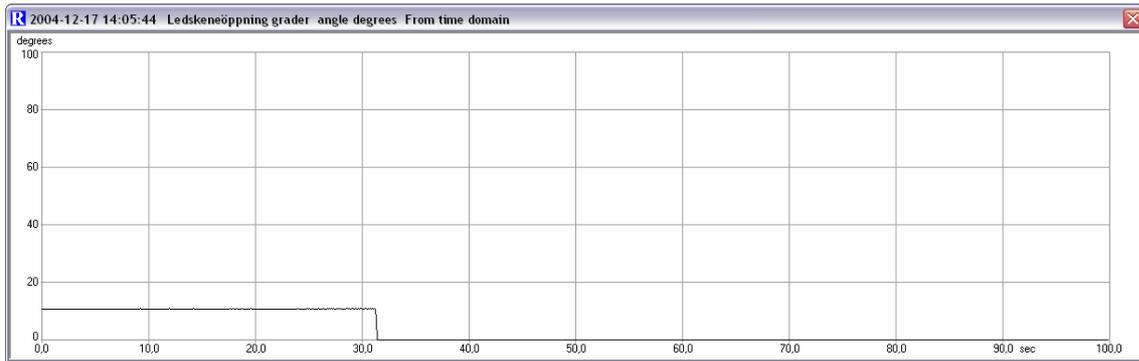


Figure 3. The water inlet vane opening.

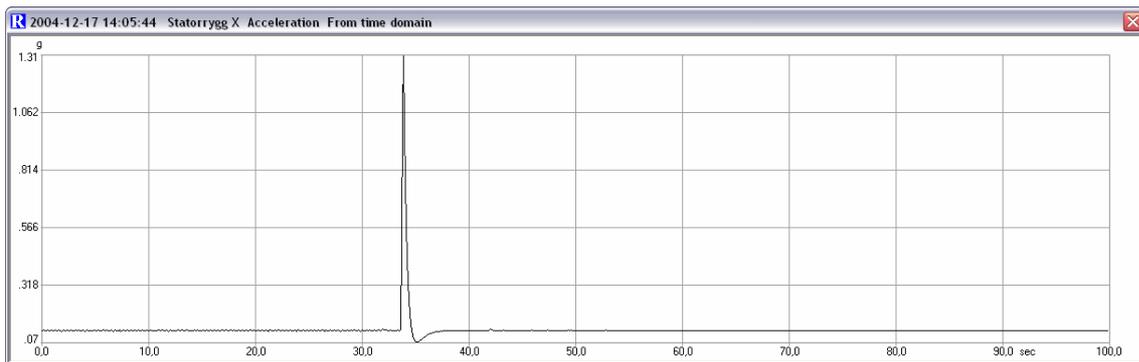


Figure 4. An accelerometer mounted on the stator back registries when the 10 kV magnetisation disconnected.

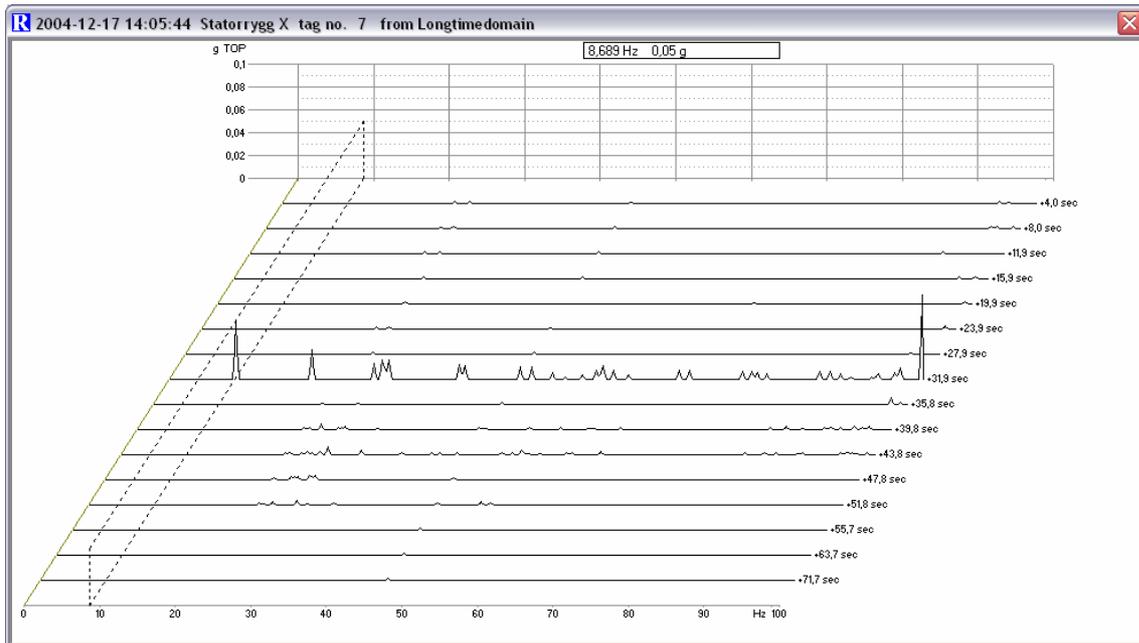


Figure 5. Waterfall spectra from the stator accelerometer every 3 seconds.

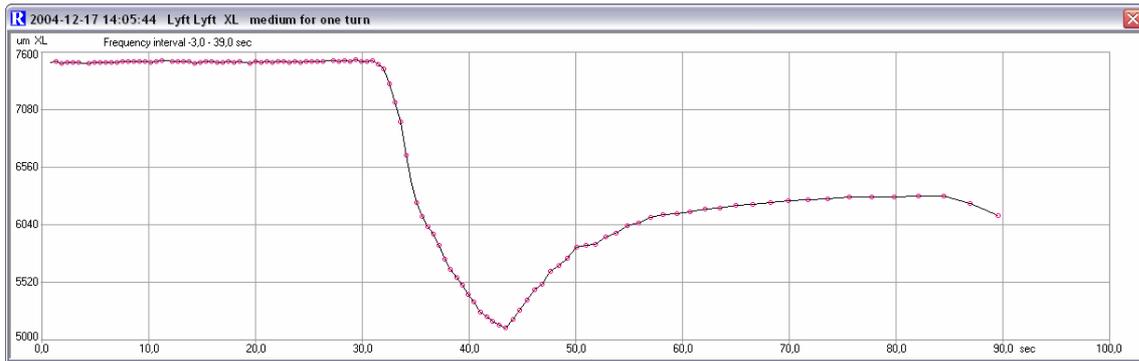


Figure 6. The trust bearing axial displacement during the Trip shows a trust displacement of almost 2 mm.

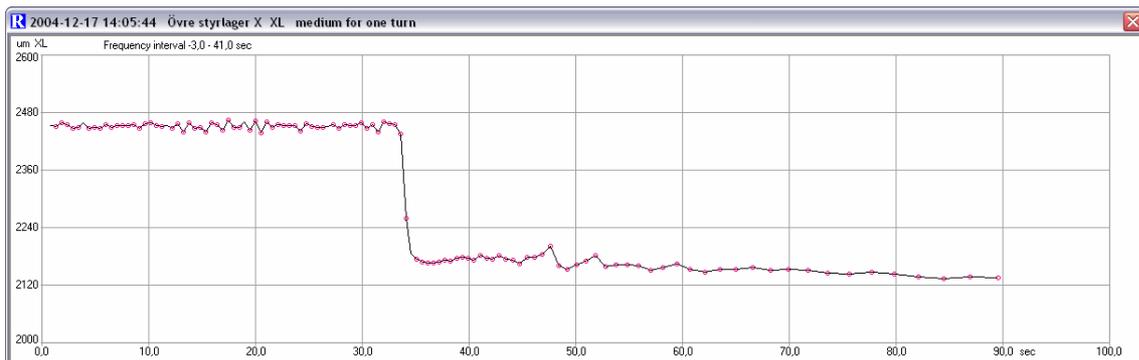


Figure 7. Upper generator trust bearing XL X moved 276 μm when disengaged from the 10 kV magnetisation.

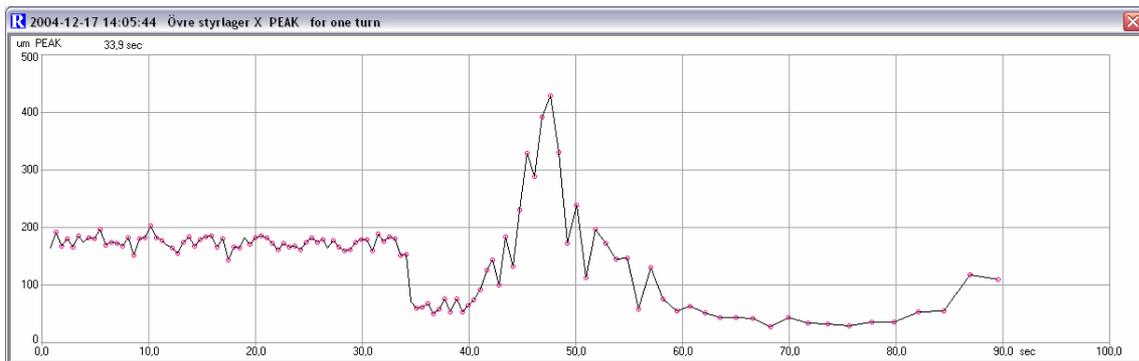


Figure 8. Upper generator trust bearing X - Peak value during shutdown.

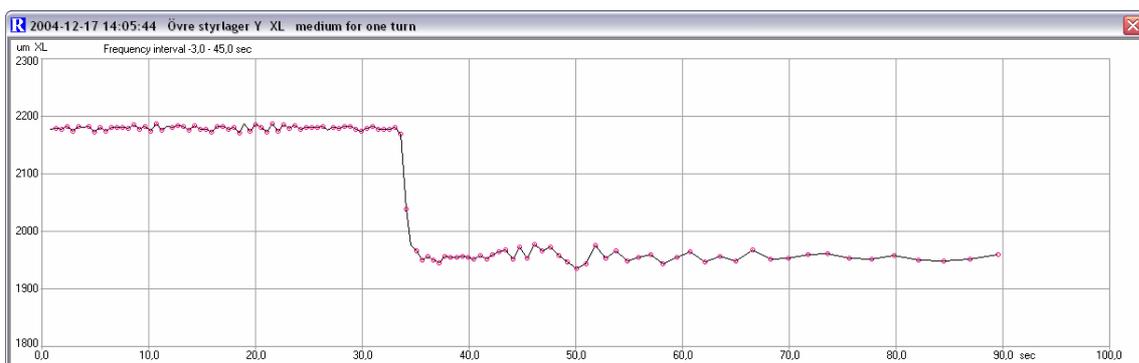


Figure 9. Upper generator trust bearing XL Y moved 223 μm when disengaged from the 10 kV magnetisation.

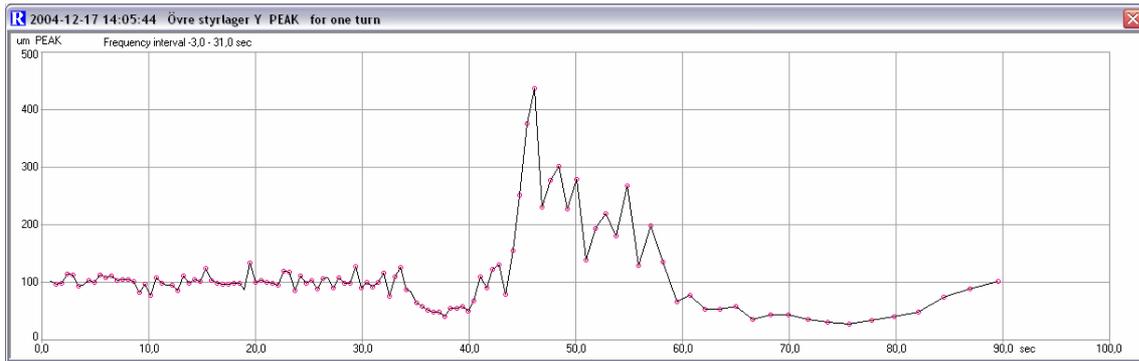


Figure 10. Upper generator trust bearing Y - Peak value during shutdown.

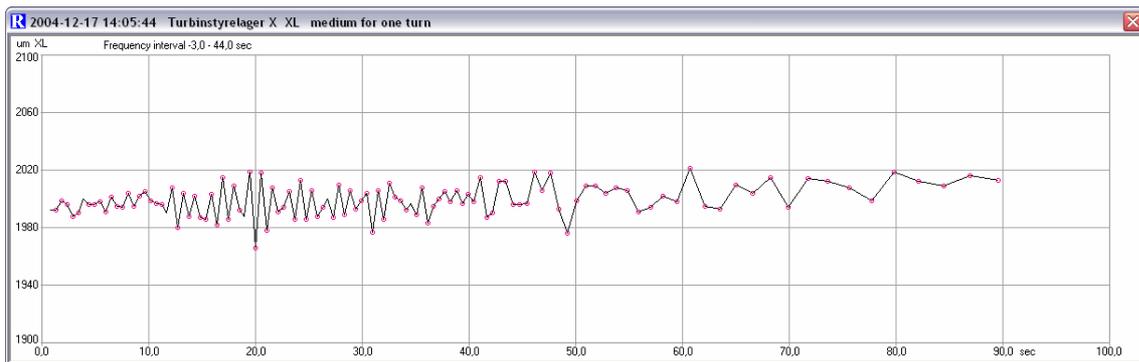


Figure 11. Turbine guide bearing XL X.

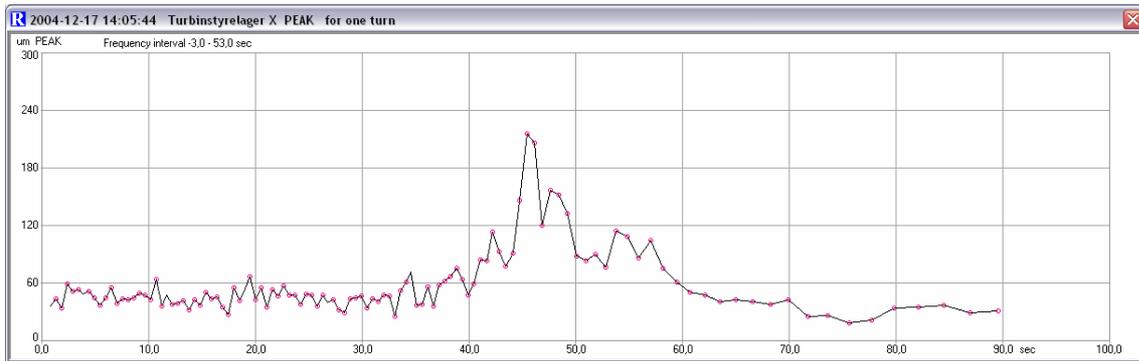


Figure 12. Turbine guide bearing X - Peak during shutdown.

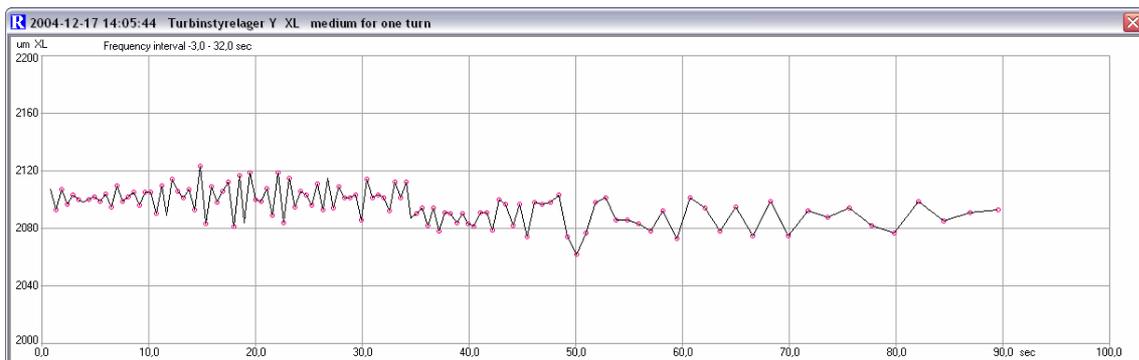


Figure 13. Turbine guide bearing XL Y.

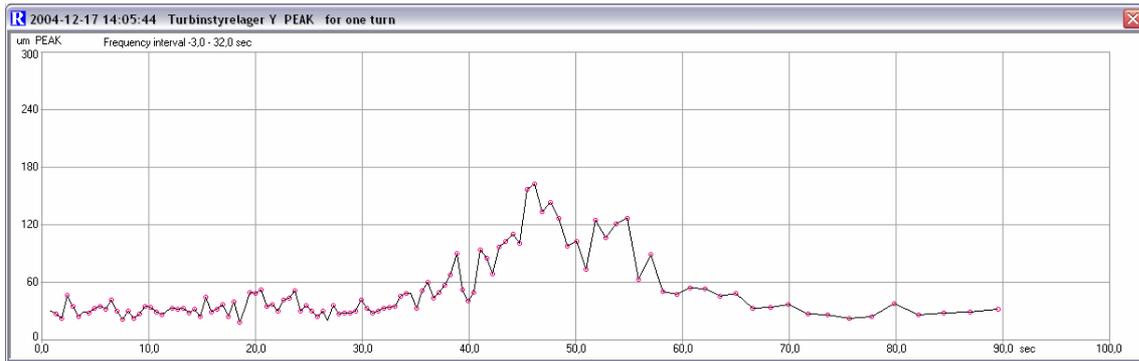


Figure 14. Turbine guide bearing Y – Peak during shutdown.

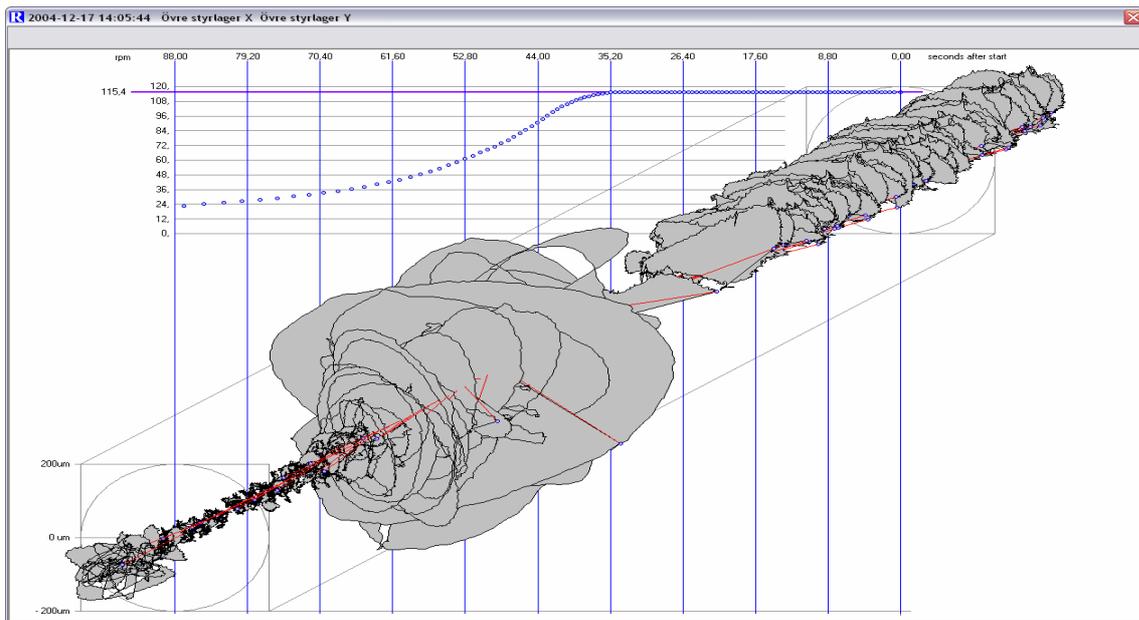


Figure 15. Continius orbit diagram from the upper guide bearing take during the shutdown. The upper blue graph shows the RPM.

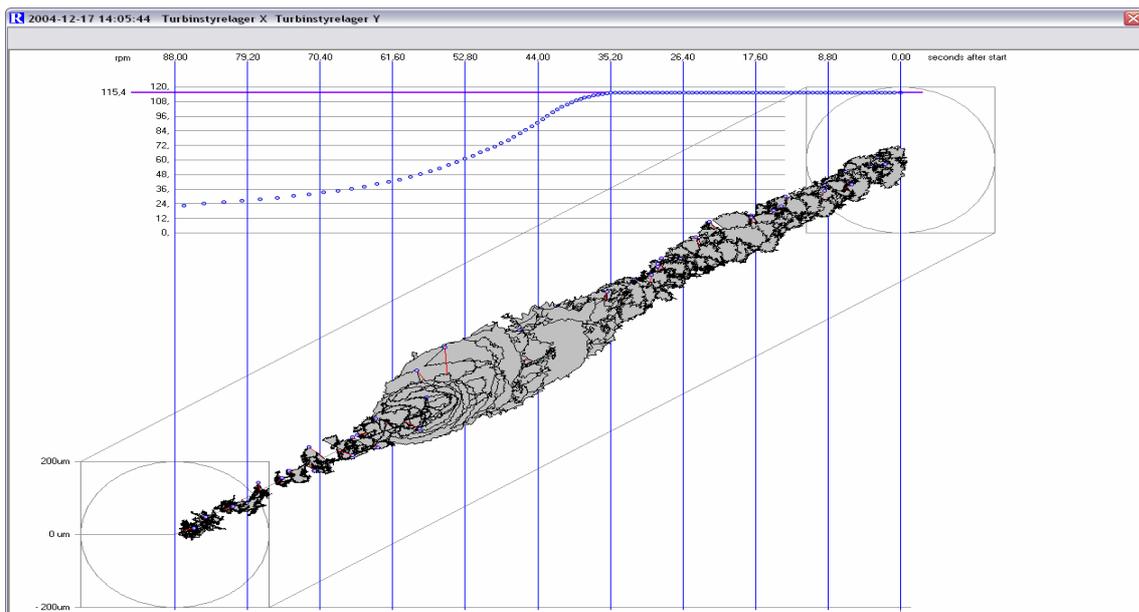


Figure 16. Continius Orbit diagram from the turbine guide bearing taken during the shutdown. The upper blue graph shows the RPM.



Montörvägen 9, S-853 50 Sundsvall, Sweden
telephone: +46-(0)60 61 39 47
facsimile: +46-(0)60 61 39 67
email: info@lagge.se
www: <http://www.lagge.se>
VAT #: 556053695401