

Frequency Response Functions for Sandvik CoroBore® 825 XL boring tool

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Frequency Response Functions (FRF) obtained for Sandvik CoroBore® 825 XL mounted at WHN 13-15 TOS VARNSDORF CNC machine at the minimum extension of the spindle adaptor. Tool set to bore a hole with a diameter $\varnothing \approx 733\text{mm}$.

The tool was excited with modal hammer consecutively in the direction of accelerometer A18, A21, A22, A29. Responses were measured using 15 accelerometers mounted as on Fig. 1. 40 hammer impacts for each direction were performed. FRF was calculated using H3 estimator from NI LabView Sound & Vibration toolkit. Obvious disruptions in data (“peaks” resulting from the CNC control systems and drive, electromagnetic interference etc.) were removed.

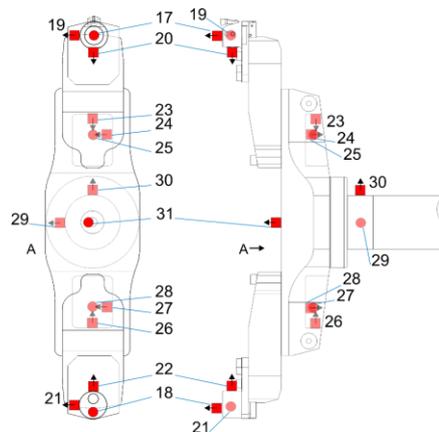


Figure 1. Scheme of the Sandvik CoroBore 825 XL boring tool with marked 1-axis accelerometers positions. Black arrows indicate the positive direction of measured accelerations. Accelerometers marked with a lighter color are covered by the object. Tool scheme based on [1].

Measurement equipment:

Modal hammer – PCB 086C03 – $\pm 2224\text{N}$

Accelerometers – DJB A/120/V – $\pm 75\text{g}$

Modal hammer connected to NI PXI 6221 DAQ card (16-bit ADC) via external IEPE conditioner.

Accelerometers connected to NI PXI 4496 IEPE DAQ card (24-bit ADC).

Sampling frequency 10 kHz

Files:

A18_FRF.txt

A21_FRF.txt

A22_FRF.txt

A29_FRF.txt

File format: Plain text, UTF-8 encoding, data in columns

Columns in each file:

- 1 – frequency
- 2...16 – FRF magnitude [(m/s²)/N] – accelerometers from A18 to A31
- 17...32 – FRF phase [deg] – accelerometers from A18 to A31
- 33...46 – FRF coherence – accelerometers from A18 to A31

Data preview:

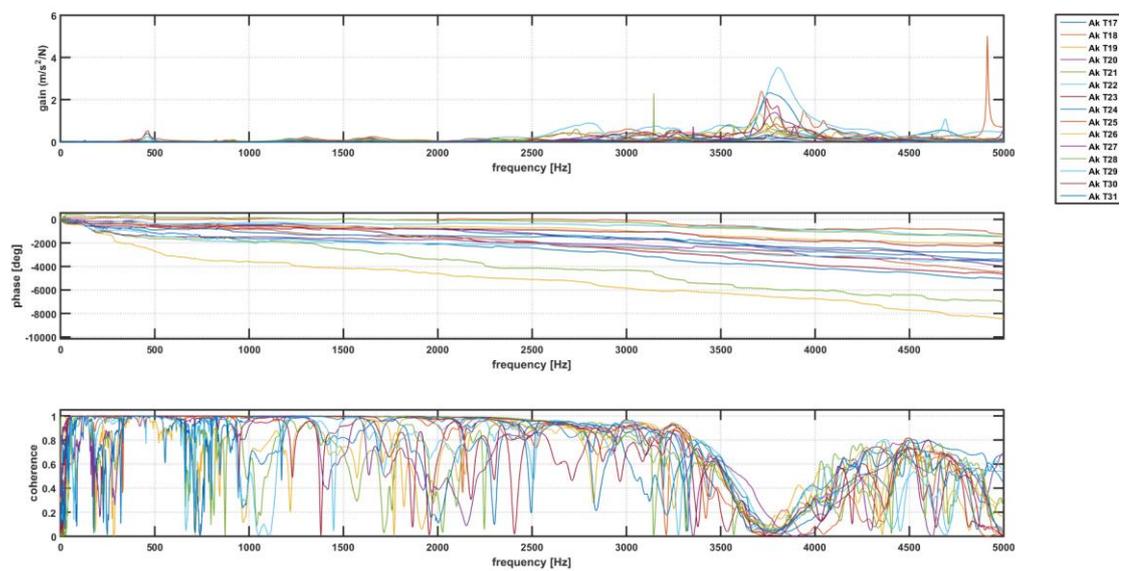


Figure 2. Data preview for A18_FRF_full

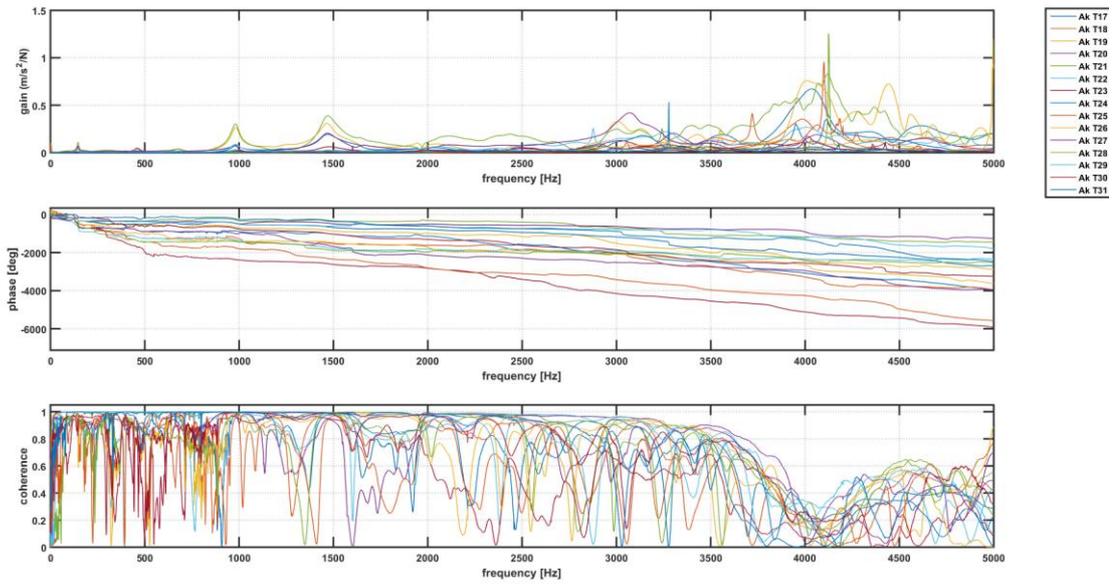


Figure 3. Data preview for A21_FRF_full

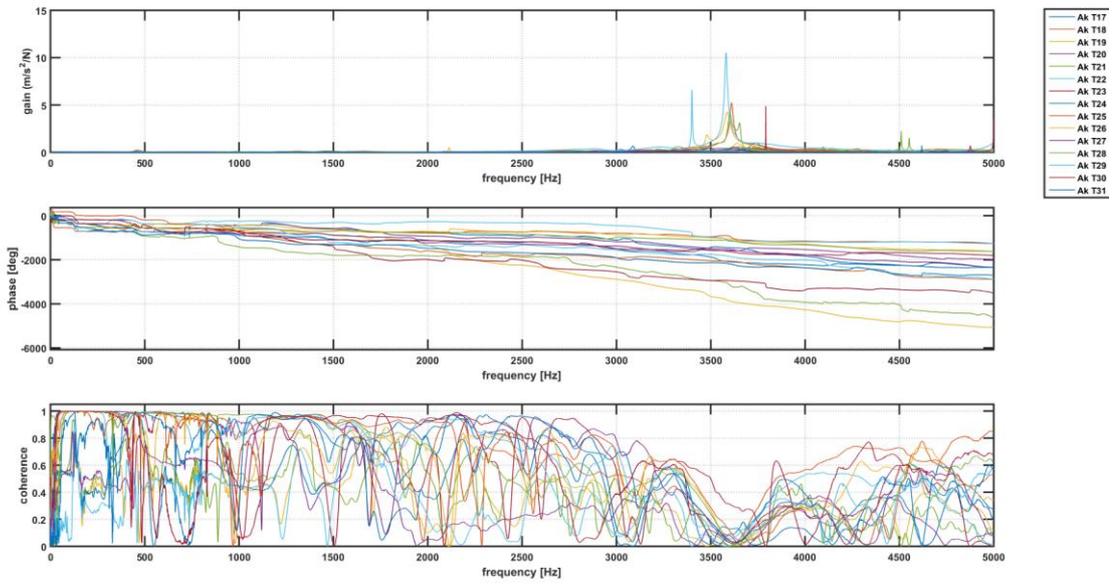


Figure 4. Data preview for A22_FRF_full

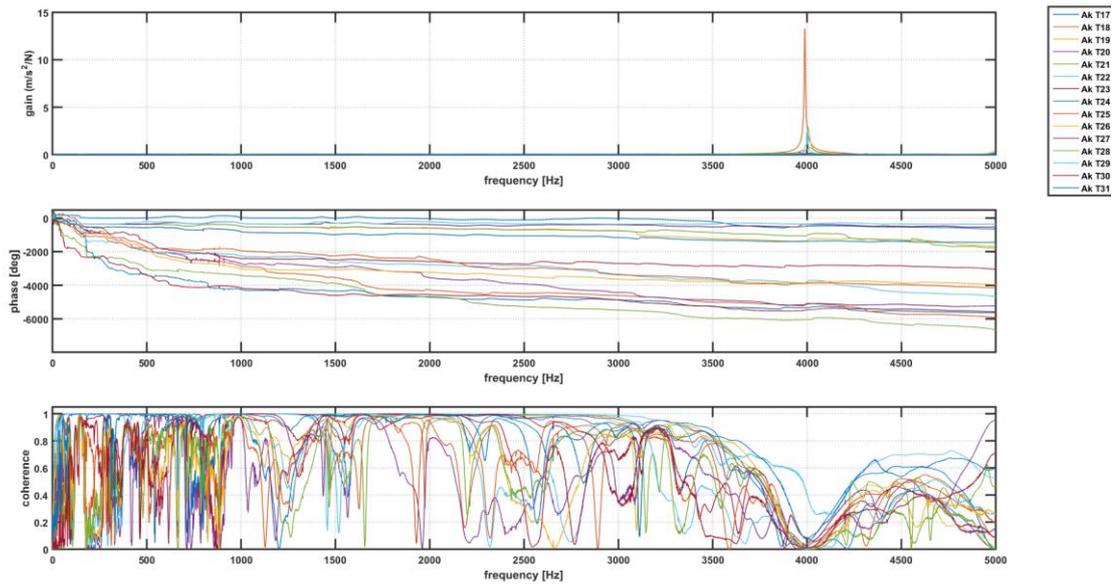


Figure 4. Data preview for A29_FRF_full

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Experimental investigations on the WHN 13-15 TOS VARNSDORF table milling and boring CNC machine were performed thanks to cooperation with the PHS HYDROTOR Inc. in Tuchola, Poland

References:

- 1 - Sandvik CoroBore® 825 Fine boring tools for high-precision boring,
https://www.sandvik.coromant.com/en-gb/products/corobore_825_826_xl/pages/assortment.aspx, Accessed 2017-12-10.