

Dataset Concerning the Process Monitoring and Condition Monitoring Data of a Bearing Ring Grinder - Dataset for the Implementation of Condition-based Maintenance and Maintenance Decision-making of a Bearing Ring Grinder

SND-ID: 2022-136-1. **Version:** 1. **DOI:** <https://doi.org/10.5878/s5fj-1x03>

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Version 2: 2023-03-10

DOI: <https://doi.org/10.5878/331q-3p13>

Download data

proc_param/proc_param/process_data.csv (19.34 KB)

quality/quality/measured_quality_param.csv (31.47 KB)

quality/quality/quality_disposition.csv (4.65 KB)

test_1.zip (2.17 GB)

test_2.zip (2.22 GB)

test_3.zip (2.17 GB)

test_4.zip (2.18 GB)

test_5.zip (5.53 GB)

test_6.zip (2.57 GB)

test_7.zip (2.16 GB)

Associated documentation

lib.zip (907 bytes)

readme_data_description.pdf (433.74 KB)

Download all files

2022-136-1-1.zip (~19.01 GB)

Citation

Ahmer, M., , & . (2022) Dataset Concerning the Process Monitoring and Condition Monitoring Data of a Bearing Ring Grinder - Dataset for the Implementation of Condition-based Maintenance and Maintenance Decision-making of a Bearing Ring Grinder (Version 1) [Data set]. Luleå University of Technology. Available at: <https://doi.org/10.5878/s5fj-1x03>

Creator/Principal investigator(s)

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Description

In the article (Ahmer, M., Sandin, F., Marklund, P. et al., 2022), we have investigated the effective use of sensors in a bearing ring grinder for failure classification in the condition-based maintenance context. The proposed methodology combines domain knowledge of process monitoring and condition monitoring to successfully achieve failure mode prediction with high accuracy using only a few key sensors. This enables manufacturing equipment to take advantage of advanced data processing and machine learning techniques.

The grinding machine is of type SGB55 from Lidköping Machine Tools and is used to produce functional raceway surface of inner rings of type SKF-6210 deep groove ball bearing. Additional sensors like vibration, acoustic emission, force, and temperature sensors are installed to monitor machine condition while producing bearing components under different operating conditions. Data is sampled from sensors as well as the machine's numerical controller during operation. Selected parts are measured for the produced quality.

Ahmer, M., Sandin, F., Marklund, P., Gustafsson, M., & Berglund, K. (2022). Failure mode classification for condition-based maintenance in a bearing ring grinding machine. In *The International Journal of Advanced Manufacturing Technology* (Vol. 122, pp. 1479-1495).

<https://doi.org/10.1007/s00170-022-09930-6>

The files are of three categories and are grouped in zipped folders. The pdf file named "readme_data_description.pdf" describes the content of the files in the folders. The "lib" includes the information on libraries to read the .tdms Data Files in Matlab or Python.

The raw time-domain sensors signal data are grouped in seven main folders named after each test run e.g. "test_1"... "test_7". Each test includes seven dressing cycles named e.g. "dresscyc_1"... "dresscyc_7". Each dressing cycle includes .tdms files for fifteen rings for their individual grinding cycle. The column description for both "Analogue" and "Digital" channels are described in the "readme_data_description.pdf" file.

The machine and process parameters used for the tests as sampled from the machine's control system (Numerical Controller) and compiled for all test runs in a single file "process_data.csv" in the folder "proc_param". The column description is available in "readme_data_description.pdf" under "Process Parameters".

The measured quality data (nine quality parameters - normalized) of the selected produced parts are recorded in the file "measured_quality_param.csv" under folder "quality". The description of the quality parameters is available in "readme_data_description.pdf".

The quality parameter disposition based on their actual acceptance tolerances for the process step is presented in file "quality_disposition.csv" under folder "quality".

Data contains personal data

No

Language

[English](#)

Data format / data structure

[Numeric](#)

Data collection 1

- Mode of collection: Experiment
- Description of the mode of collection: Raw time series data collected from machine and sensors during production of bearing rings and bearing rings quality measurement data.
- Data collector: AB SKF
- Instrument: Lidköping SGB55 - External Grinding machine used in SKF for bearing ring grinding
- Source of the data: Physical objects

Responsible department/unit

Department of Engineering Sciences and Mathematics

Research area

[Other electrical engineering, electronic engineering, information engineering](#) (Standard för svensk indelning av forskningsämnen 2011)

[Reliability and maintenance](#) (Standard för svensk indelning av forskningsämnen 2011)

Keywords

[Analysis](#), [Grinding machines](#), [Diagnostics](#), [Maintenance](#), [Bearings](#), [Condition monitoring](#)

Publications

Ahmer, M., Sandin, F., Marklund, P., Gustafsson, M., & Berglund, K. (2022). Failure mode classification for condition-based maintenance in a bearing ring grinding machine. In The International Journal of Advanced Manufacturing Technology (Vol. 122, pp. 1479–1495).

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Ahmer, M., Marklund, P., Gustafsson, M., & Berglund, K. (2022). An implementation framework for condition-based maintenance in a bearing ring grinder. In Leading manufacturing systems transformation – Proceedings of the 55th CIRP Conference on Manufacturing Systems 2022 (pp. 746–751).

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DOI: <https://doi.org/10.1016/j.procir.2022.05.056>

SwePub: <oai:DiVA.org:ltu-90896>

Accessibility level

Access to data through SND

Data are freely accessible

Use of data

[Things to consider when using data shared through SND](#)

License

[CC BY 4.0](#)

Versions

[Version 2](#). 2023-03-10

Version 1. 2022-09-07

Contact for questions about the data

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Download metadata

[DataCite](#)

[DDI 2.5](#)

[DDI 3.3](#)

[DCAT-AP-SE 2.0](#)

[JSON-LD](#)

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[File overview \(CSV\)](#)

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