



The Current State of Dissertation and Future Work

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CONTENS

- Introduction
- Methods of evaluation
- Results
- Future work



Title:

Identification of changes of acoustic emission signal parameters as a result of mechanical damage of construction

Supervisor:

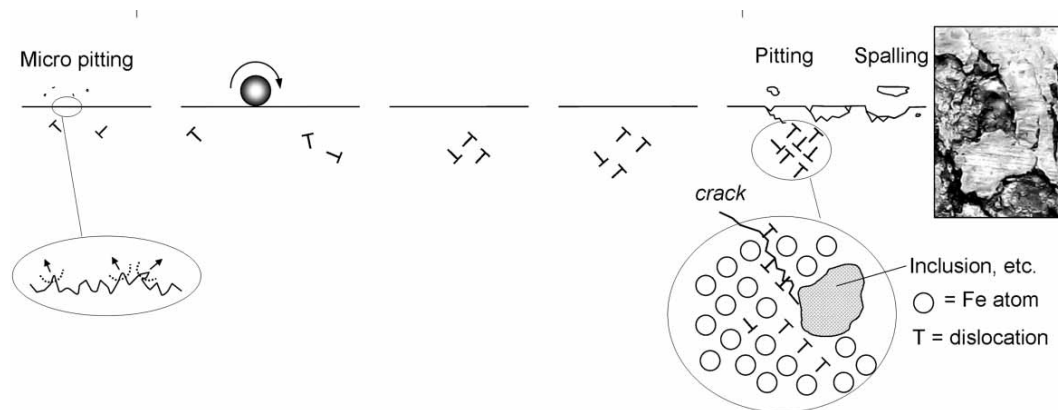
doc. Ing. Pavel Mazal, CSc.



Aim of dissertation

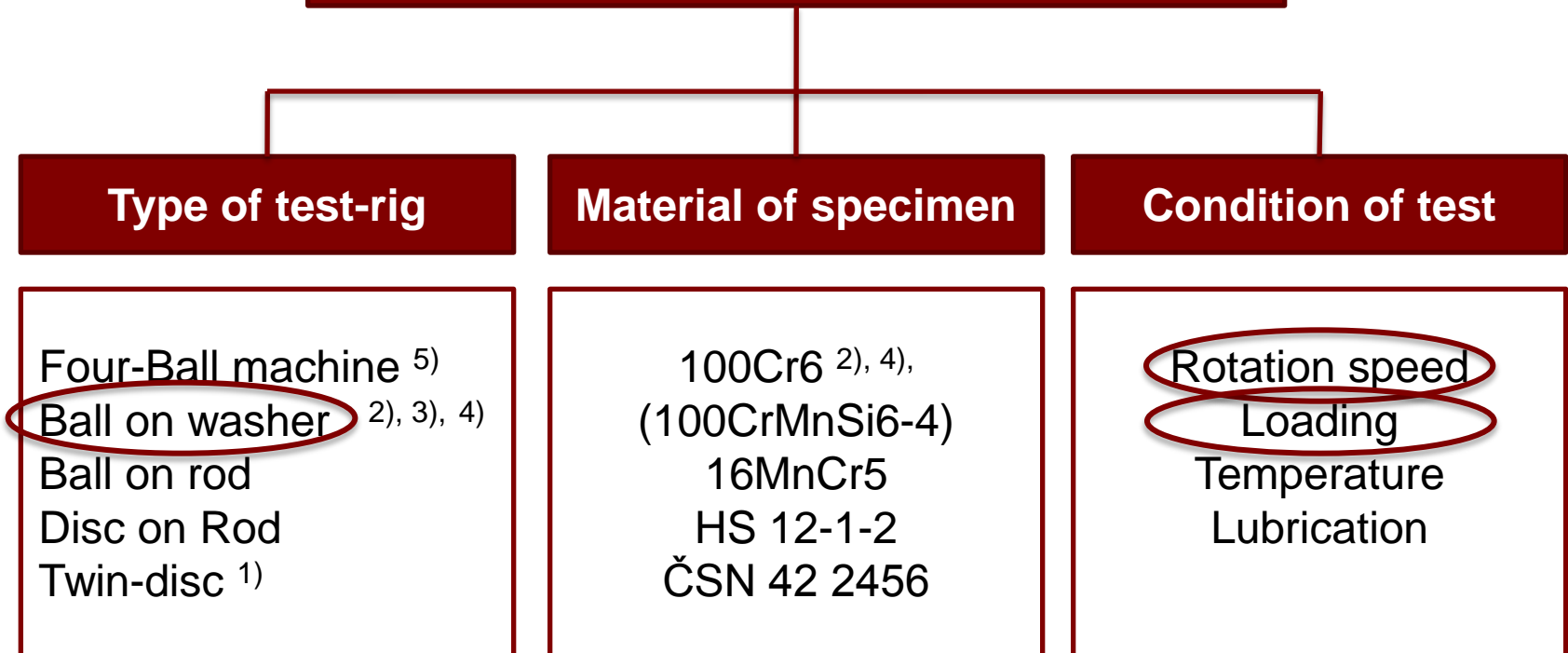
Determination of AE parameters suitable for the identification of formation and propagation of contact damage and build an advanced evaluation algorithm

Rolling contact fatigue process:



J Halme and P Andersson, 2009

Evaluation of Rolling Contact Fatigue



Pozn.:

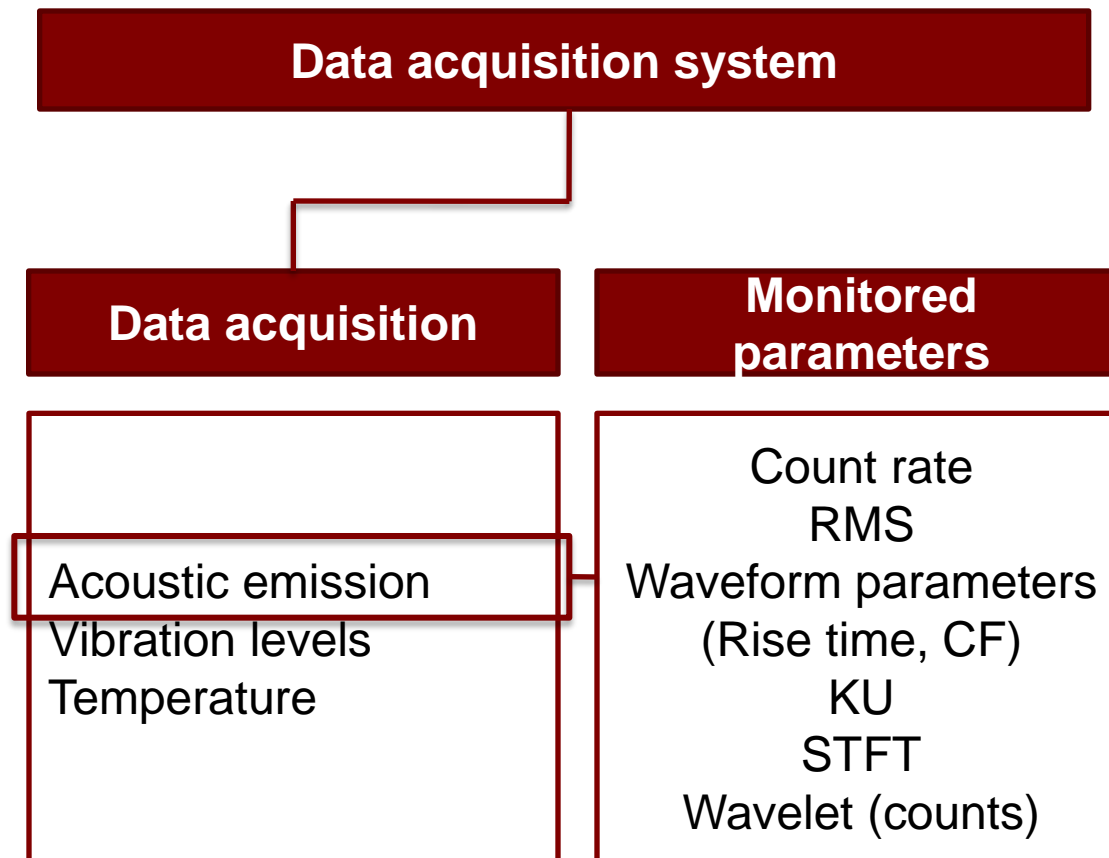
1) RAHMAN, Z. et al. 2008

2) ELFORJANI, M; 2008, 2012

3) UCHIDA, J et al. 2005

4) YOSHIOKA, T; 1995, 2001

5) PRICE, E. D. et al. 2005



Condition of AE monitoring and analysis

1st phase

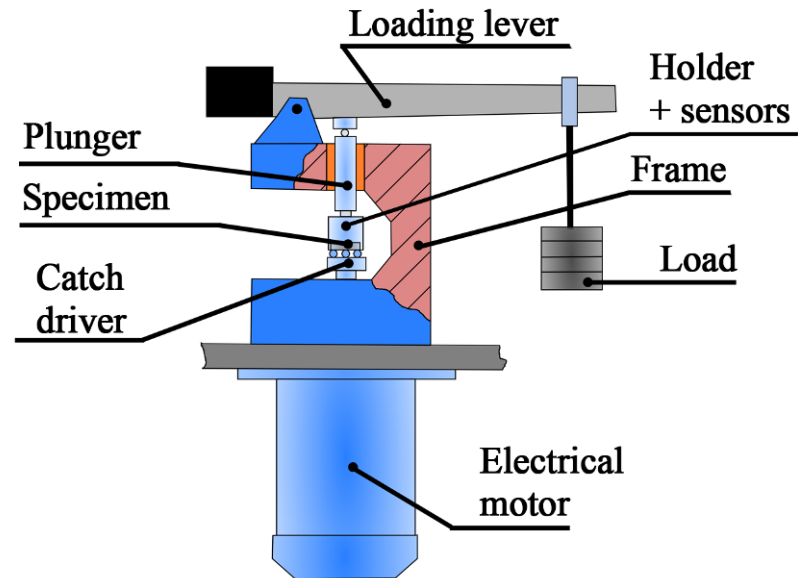
- Standard speed of rotation (1380 rpm)
- Continuous monitoring of AE (XEDO system), temperature, vibration levels
- Periodically monitoring of AE (IPL system):
 - Analysis of advanced AE parameters
 - Sensitivity to RCF initiation and developing

2nd phase

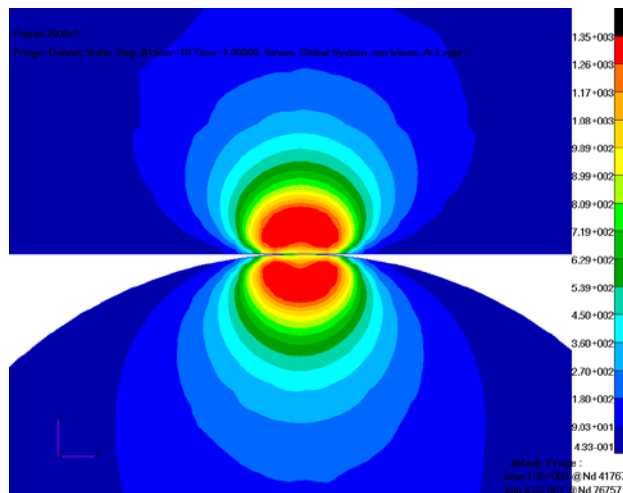
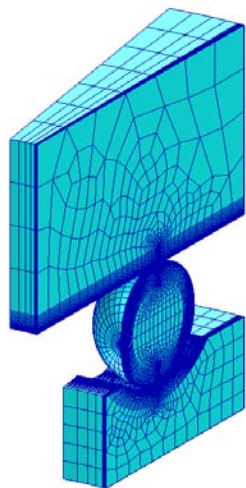
- Reduced speed of rotation (lower energy of burst)

TEST-RIG modification

- Modified design of holder
- Two AE sensors
- AE continuous monitoring
- Vibration monitoring
- Temperature monitoring
- Various rotation speed



Condition of experiment



Material: 16MnCr5

Inner diameter	(mm)	10
Outer diameter	(mm)	28
Thickness	(mm)	5
Ball number	(-)	21
Ball diameter	(mm)	3.175
Surface roughness	Ra	0.26
Average hardness	HV30	478.8
Lubricant		RENOLIT EP2

Load: 2660 N

Contact pressure:

Stress (von Mises):

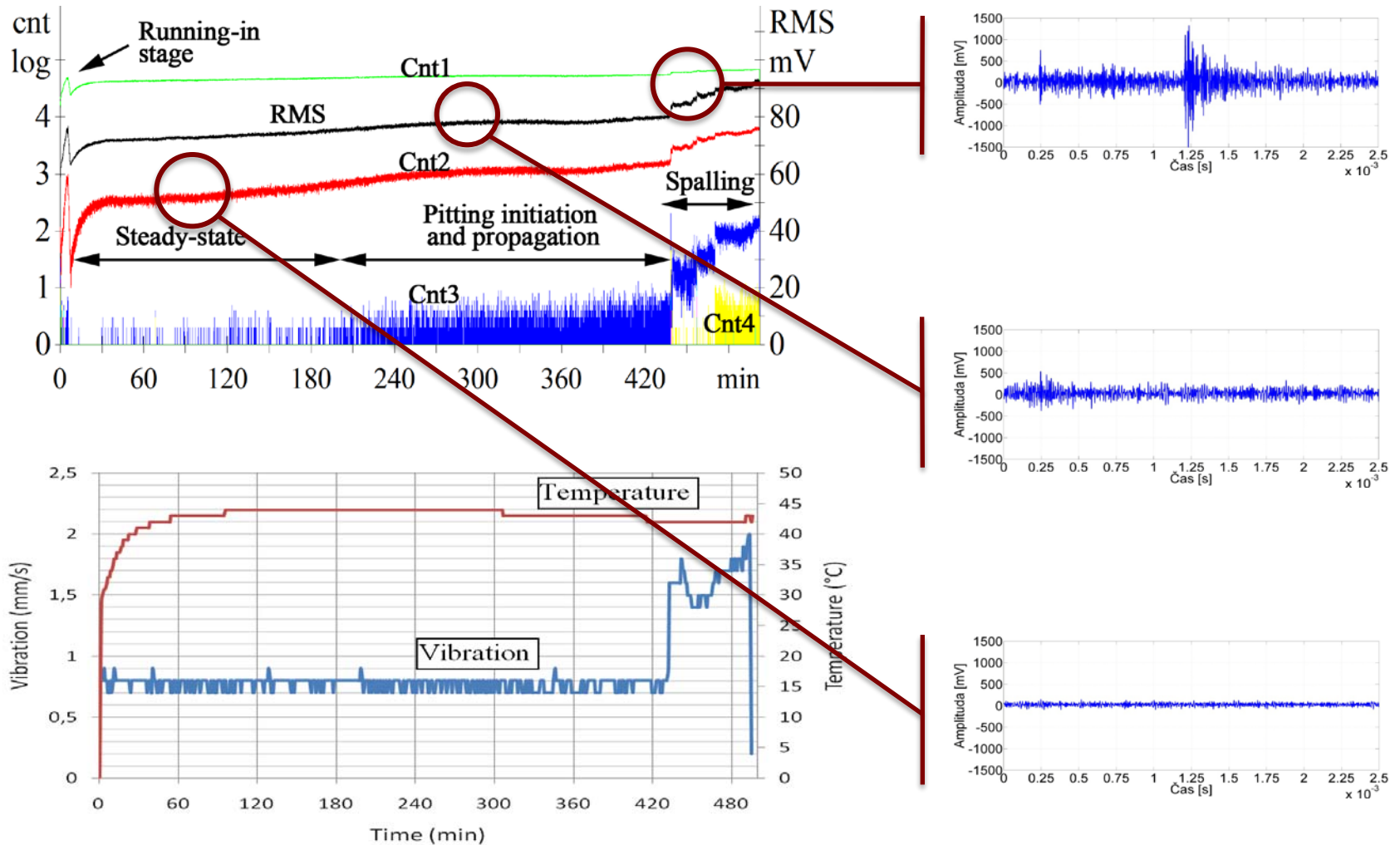
4250 MPa (elastic model)

2420 MPa (elastoplastic model)

1350 MPa

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Material: 16MnCr5



Future work

- Analysis of AE parameters – influence on RCF evaluation (in progress)
- Comparison of evaluation parameters – different materials, operating conditions
- Design of final evaluation algorithm

Scientific Contribution

- More precise (earlier) identification of contact degradation
- Verification of previous works on different materials and different test station design
- New algorithm for evaluation of RCF using acoustic emission

Other activities

- Teaching (1K, 2K)
- HS
- Projects (MPO, BD ...)
- etc.



Thank you for attention.

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UK ústav
konstruování

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