

ie project if available  
ion from the project]

# HARSHWORK

## OPTIMIZING RAW MATERIAL HANDLING AND PROCESSING UNDER HARSH WORKING CONDITIONS

Prof. Pär Jonsén

Div. of Mechanics of Solid Materials

Luleå University of Technology

# HARSHWORK

- HARSHWORK addresses wear and damage prediction in components for granular material handling and processing.
- Developing a software model to predict the amount of wear before failure and permit to set maintenance tasks and optimize part performance.

## Major outcome

Product, Software for simulation of wear in extreme conditions

TRL 8

Startup

## Major Milestones

2018: Perform material test and investigation at different wear conditions

2019: Calibrated wear model for different wear conditions

2020: Software validated against field experiment at extreme conditions

# HARSHWORK

- Upscaling project within the EIT KIC Raw Materials
- Project duration: 1 January 2018 – 31 March 2021
- Budget: 1.5 M€
- Project partners:
  - Luleå University of Technology, Sweden (Lead partner)
  - Bianna Recycling SL, Spain
  - Boliden Mineral AB, Sweden
  - General Council of the Catalan Chambers of Commerce, Spain
  - Fundació CTM Centre Technologic, Spain
  - IDP Ingenieria y Arquitectura Iberia, S.L.U., Spain
  - LTU Business AB, Sweden
  - Outotec (Finland) Oy, Finland
  - Outotec Pty. Ltd., Australia
  - SSAB AB, Sweden

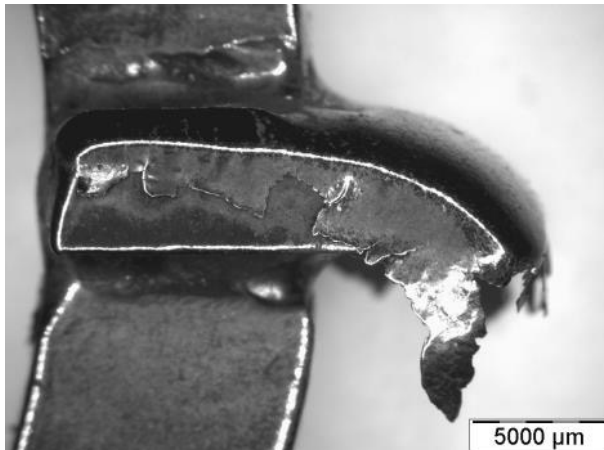
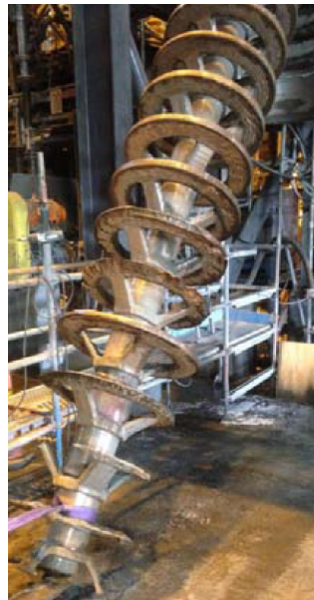
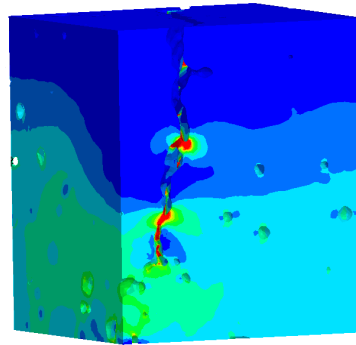
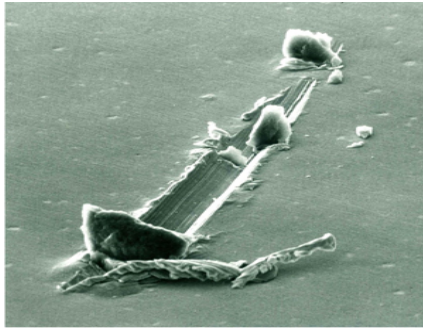
# Objective

- Part failure by wear is one the most relevant sources for part and system malfunction in the industry. How to predict wear and fatigue?
- Develop a new numerical software that can predict wear in parts subjected to harsh working conditions.
  - - Subarctic mining conditions (Boliden), mill lining (Outotec), parts for recycling plants (Bianna).
- Commercialization of software validated against field experiments at harsh conditions.
- Improve raw material handling and processing by optimizing material choice and geometry for parts and systems subjected to severe wear.
- The project will optimize exploitation costs by reducing maintenance periods, decreasing costs and increasing performance of machinery.

# Work plan 2018 to 2020

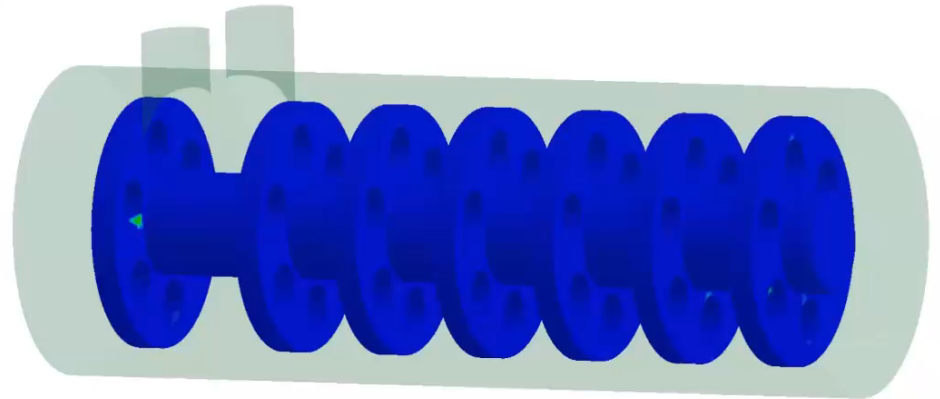
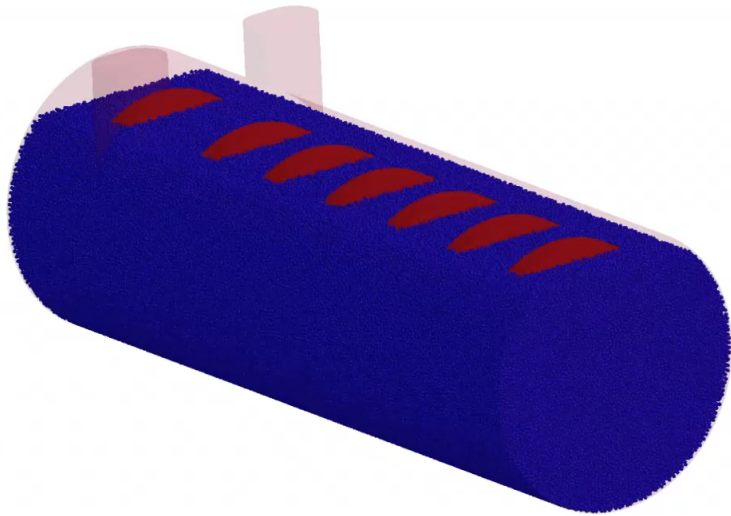
- For 2018 the project is focused on feasibility study, experimental investigations and model design
  - Wear test for different steels against different granular material at various conditions
  - Model development for different harsh conditions
- For 2019 development of digital twins and calibration of models are in focus
  - Creation and adaption of digital twins for harsh condition simulation
- For 2020 field tests and validation of the software at selected harsh conditions are in focus
  - Final validation and software tests at real harsh conditions.

# Harsh conditions





# Large scale modelling of granular material flow and wear



# Research and Innovation as an Enabler for Future Sustainable Raw Materials Supply

## - The Nexus between Industry, Academic and Research





**Thank you for listening !**



**SIP | STRIM**

