



DISIRE Project Workshop

*Integrated Process Control based on Distributed In-Situ Sensors into
Raw Material and Energy Feedstock*

WP5 Workshop Minutes

Bornit Hotel, Szklarska Poręba 5 - 7 IV 2017

Brief Summary

This document summarises the discussions that took place at the DISIRE Project Workshop held at the Bornit Hotel in Szklarska Poręba (Poland) on 5-7 April 2017. The aim of the workshop was to prepare the concept of verification of ore by using PAT systems, prepared by DISIRE project. Different approaches has been discussed and verified by participants: KGHM, CUPRUM and WUT.

At the beginning Robert Król (WUT) welcomed the participants, presented agenda and the purpose of the meeting. After that, Witold Kawalec (WUT) presented different methodologies which can be applicable to verify ore and its lithological composition. Leszek Jurdziak (WUT) shown developed schemata and visualization of the underground test.

KGHM has presented the belt conveyor system which includes underground mine part and elements on the surface leading to ore enrichment plant. Based on information given by partners and after deep discussion it was decided that first part of the test will be held in WUT premises. After that the in- situ test will be performed in KGHM: Lubin Mine and ore enrichment plant- Lubin Area. Based on objectives and proposed alternatives of the test, the visit in KGHM is planned at the end of April. Also administrative, safety and security issues were discussed and process of test approval has been started.

The meeting was very successful, and allowed to exchange knowledge and experience between partners and brought clear indications for the DISIRE test which will be performed in close future.

Workshop Participants

Cuprum

- Piotr Kruczek
- Agnieszka Wyłomańska
- Paweł Stefaniak
- Anna Michalak
- Jacek Wodecki
- Jakub Sokołowski

WUT

- Robert Król
- Witold Kawalec
- Leszek Jurdziak
- Damian Kaszuba
- Waldemar Kisielewski

KGHM

- Andrzej Rożek
- Adam Godek
- Marek Jach
- Paulina Mołodyńska-Glapska

Workshop Agenda

Wednesday

17:00 - 19:00 Supper

19:00 - ... Team building event

Thursday

07:00 - 09:00 Breakfast

10:00 - 13:00 Sesion 1 – Formal aspects of DISIRE Project

- Update on the Project status by Work Package Leader
- Project Managers' reports
- Teleconference with DISIRE Project Leader
- Team Photo

13:30 - 14:30 Lunch

15:00 - 18:00 Sesion 2 – DISIRE Experiment in KGHM

- Work Package Leader and/or DISIRE Project Leader – The experiment from DISIRE Team point of view
- KGHM Polska Miedz S.A. Team – Formal and Legal limitations for experimentation in KGHM
- Wroclaw University of Science and Technology Team – The idea of experiment
- Discussion, Creating Work Schedule, Assingment of work and responsibilities

19:00 - ... Supper

Friday

07:00 - 09:00 Breakfast

10:00 - ... Workshop closing



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Discussion Summary

1. Organizational and formal aspects of the DISIRE Experiment in KGHM

1.1. Formal difficulties of the experiment

Changes in Management Board of KGHM and in foreign guests visiting regulations. Currently it is not possible to organize access into the mine for foreign guests.

All equipment installed in underground mines in Poland has to be approved by Polish Mining Authorities.

The IT Security Policy (Polish Mining Authorities) prohibits the use of GSM technology in works carried out in mine and ore enrichment plant area.

1.2. Formal arrangements with KGHM

Official letter to Director of Department of Research and Innovation at KGHM with request for permission to carry out the DISIRE experiment in Lubin mine and ore enrichment plant area.

Official letter to Director of ore enrichment plant with request for permission for one day local visit for 7 guests from DISIRE team in Lubin ore enrichment plant on 20th April 2017. The goal of the visit is to evaluate the possible experiment site and plan the experiment with use of PAT (Process Analyser Technology) technology to identify and trace the lithological composition of run-of-mine copper ore for the purpose of improving the efficiency of ore enriching process.

Official letter to Director of ore enrichment plant with request for access to quantity and quality data gathered by ore enrichment plant for run-of-mine copper or entering the enrichment process, copper flotation concentrate and tailings (effectiveness of ore enrichment process). It is required to evaluate the impact of run-of-mine copper ore parameters variability on enrichment process.

2. Technical aspects of the DISIRE Experiment in KGHM

2.1. Known limitations and technical conditions


The measuring gate will be installed in the shredding area of Lubin ore enrichment plant, which is characterized by difficult access. Also it is not possible to stay in this area during the entire experiment. It is necessary to monitor the measuring gate during the experiment and for this purpose to involve KGHM employees to supervise the measuring gate.

Moreover, the run-of-mine copper ore from skips is fed into two transport routes, each containing two belt conveyors which causes that the experiment requires minimum two measuring gates.



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Due to the fact that the remote access to the measuring gates is prohibited and it is impossible to supervise the measuring gate during the entire experiment the measuring gate needs to be fully autonomous, which means:

- the measuring gate have to be equipped with data storage unit storing data read from pellets,
- the measuring gate have to be able to continue work after failure like power outage, operating system error etc.

Pellets will be dropped into transportation system during one selected working shift. Due to the way of emptying of bunkers through the week the experiment will begin on Tuesday (the bunker will be partially filled over Monday). The measuring gate will be operating for 7 days from the beginning of the experiment.

2.2. Technical arrangements in KGHM

Verification if the grain size distribution of run-of-mine copper ore is available in KGHM's database or was the subject of earlier research by M. Jach (OEP).

Verification if it is possible to use the 125kHz (RFID) frequency during the experiment by M. Jach (OEP).

Local vision of belt conveyors in hoisting shaft area (underground) on 13th April 2017 by A. Rożek and A. Godek (Lubin Mine).

Verification if it is possible to register working status (on/off) of belt conveyors feeding the skips by A. Godek (Lubin Mine).

Locations where pellets will be dropped into transportation system were selected as follows; 4 loading points of belt conveyors (each loading point will be fed from different mining area) and 1 belt conveyor preceding the shaft bunker. 5 locations in total.

Detailed plan of installation and connecting the measuring gate with KGHM's structure will be formed during local vision and arrangements between KGHM-WUT-CUP-ELECTROTECH.

2.3. Other Technical arrangements – DISIRE Team


Following details have to be precised: what is the specification of handheld readers, who will the measuring gate look like, is the measuring gate equipped with emergency power supply (UPS) of some kind? Questions to ELECTROTECH.

The experiment requires 4 or 5 handheld readers and minimum two measuring gates.



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Basic tests for impact sensitivity of epellets should be carried out (has it been tested?). How will the epellets react to the magnetic field generated by magnetic separator (epellets can be extracted from bulk material stream, destroyed or will pass through with no damage)? These two issues should be included in future report (probably by ELEKTROTECH).

Does the measuring gate generate only the magnetic field which powers the epellet allowing it to send 125kHz signal or the gate itself also sends 125kHz signal?

Can the measuring gate's magnetic field disturb other devices using radio communication (e.g. emergency services etc.) ?

3. Research aspects

3.1. WUT team

Required number of pellets for the experiment.

Actual detailed scheme of the belt conveying transportation network.

Available method of representation of run-of-mine ore granulation (on the entrance to the skip crusher).

Idea of comparison of simulation and DISIRE RFID tags based experiment results

3.2. KGHM team (cooperation with WUT)

Description of the use of measurement results for tuning the settings of ore processing machinery equipment.

Evaluation of the possible savings (ore grinding Energy? Metal recovery?) on the basis of experiment results.