CIRRUS
Circular Residue Usage in the Metallurgical Industry

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SWERIM in brief

Two sites
Luleå
Stockholm

Some basic facts
190 employees
250 MSEK in turnover
40 test & demonstration facilities
Owners of Swerim

RISE Research Institutes of Sweden AB
through Swerea AB (government)

Metallurgiska Forskningsbolaget i Luleå AB
(30 Nordic companies)

Stiftelsen Svensk Järn- och Metallforskning
(40 Swedish companies)
Our research areas

- A well-defined industrial value chain
- An institute with a strong combination of research experts and experimental facilities
- Opportunities spanning several industry sectors
CIRRUSS – aim and objectives

• Life-long learning project within the EIT RawMaterial KIC (2017-2020)
  • Formalize existing knowledge on circular usage of residue in a course sustainable to give on long-term
  • Train professionals and PhD students,
    • give engineers new in the field a quick start
    • give experienced engineers broader knowledge
  • Enforce development of recycling opportunities

• Special focus on challenges in the industry
• Use of latest research findings in the field
Development of course

- Initially definition and agreement on
  - Topics
  - Responsible partners and contributing partners/topic
  - Course block content
- Pilot course blocks were prepared for discussions in the project group
- Stepwise preparation of course blocks → common web portal
- Review of course block
  - Stepwise during preparation
  - finally when preparation was completed

Experience

+ knowledge on most topics available in the project group
+ Common view → smooth preparation

- More time required than expected, final material finalized just in time
- Copyright, partly a hinder

Physical meetings were crucial, comprehensive discussions needed for progress in preparation
Invitation to course

Was prepared and sent out early 2017

Invitation through

• On web pages of partners and Prometia
• E-mail
• EIT RawMaterial

Limitations to 25 participants

23 participants registered
1st course event

- 18 participants showed up
- Industry (9), institute (3) and university (6)
- Nordic countries
# Course Program

## Origin and Characteristics

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Block</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018-06-11</td>
<td>12:00-17:00</td>
<td>Block 3</td>
<td>Characteristics of industrial residues, slag, dust, scrap and ceramics</td>
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<tr>
<td></td>
<td>13:00-13:15</td>
<td>Lunch</td>
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<tr>
<td></td>
<td>13:15-15:00</td>
<td>Block 2</td>
<td>Characterisation methods for secondary materials</td>
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<td>15:15-16:45</td>
<td>Coffee Break</td>
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<tr>
<td></td>
<td>16:45-17:00</td>
<td>Feedback:</td>
<td>Participants' Reflections and Feedback on the 1st Day Seminar</td>
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## Sustainability

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Block</th>
<th>Description</th>
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<tbody>
<tr>
<td>2018-06-12</td>
<td>09:00-16:30</td>
<td>Block 4</td>
<td>Recovery of residues at industry possible in situ treatment</td>
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<td>10:30-10:45</td>
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<tr>
<td></td>
<td>10:45-12:00</td>
<td>Block 5</td>
<td>Pre-treatment for recycling including laboratory demonstration</td>
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<tr>
<td></td>
<td>13:00-14:30</td>
<td>Block 6</td>
<td>End-of-life products treatment, recovery, recycling</td>
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<td>14:30-14:45</td>
<td>Coffee Break</td>
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<tr>
<td></td>
<td>14:45-15:00</td>
<td>Block 7</td>
<td>Agglomeration</td>
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<tr>
<td></td>
<td>15:00-16:45</td>
<td>Block 10</td>
<td>Recycling in existing processes for base metal industry – capability, possibilities and challenges</td>
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## Cross-sectorial

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<tr>
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<td>10:45-12:00</td>
<td>Block 8</td>
<td>Laboratory visit at LTU</td>
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<td>13:00-14:45</td>
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<tr>
<td></td>
<td>15:00-16:45</td>
<td>Block 11</td>
<td>Recycling in existing processes for ferro-alloy industry – capability, possibilities and challenges</td>
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## Products

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<td>Recycling in existing processes for ferro-alloy industry – capability, possibilities and challenges</td>
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<td>13:00-14:45</td>
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<td>Products from residues</td>
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<td>15:00-16:45</td>
<td>Block 13</td>
<td>Sustainability for recycling and products from residues and EOL</td>
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## Follow-up Webinar: 2018-09-19 (09:00-12:00)

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<td>Products from residues</td>
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<td>Feedback:</td>
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<td>Lunch</td>
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**Circular Residue Usage in the Metallurgical Industry (CIRRUS)**

**Course Plan**

- **Introductory Webinar**: 2018-04-10 (09:00-12:00)
- **Follow-up Webinar**: 2018-09-19 (09:00-12:00)
Experience from the 1st course

- Course evaluation
  - After each block
  - At the end of the course
  - At follow-up webinar
- Technically focused blocks
- Teacher knowledge and personal practical experience
- Hard to find topics for the case studies, earlier interaction between participants should help
- Technical difficulties, many participants in webinars
Changes for the 2\textsuperscript{nd} course

- The general content of the program will be used
  - Shift of some blocks, integration of some parts
  - More time for discussions
  - Invite speakers

- Higher degree of interaction between participants during the intensive course
  - Participants give more detailed presentations of themselves and their interest areas during day one or two
  - Case study discussions will start early
  - Dinner event
Registration for next course is open

- Introduction webinar 10th of April 09:00-11:00
- Intensive course 20th-24th of May, at Oulu university in Finland
- Follow-up webinar 25th of September
- Registration via Swerims homepage

REGISTRATION
Last day for registration is 3rd April 2019. Register via https://www.Swerim.se/en/calendar/cirrus2

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Thank you for your attention

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