

ALiCE

Al-rich industrial residues for mineral binders in ESEE region

Within the first year (2019), the RIS-ALiCE project was disseminated on various levels and different events, such as:

- at seminars at 3 partner institutions: SIJ ACRONI, ZAG and GeoZS in Slovenia;
- at 5 scientific conferences: XII "Stone-Gravel Days" Annual Mining Conference in Velence in Hungary (oral presentation); 51st International October Conference on Mining and Metallurgy in Bor in Serbia (poster and oral presentation); 24th Consultation of Slovenian geologists in Ljubljana in Slovenia (poster presentation); NORM IX Conference, Denver, Colorado, USA (oral presentation); 1st International Conference on Advance Production and Processing in Novi Sad, Serbia;
- to more than 150 students at 5 universities: TU Wien in Austria, University of Kragujevac and University of Niš in Serbia, University of Ljubljana in Slovenia, Ss. Cyril and Methodius University in North Macedonia;
- on 2 workshops: at the Faculty of Civil Engineering, University of Zagreb in Croatia (title of the workshop: Transformation of ash from wood biomass into value added construction composites), at ZAG in Ljubljana, Slovenia (title of the workshop: 3D and 4D materials analysis with synchrotron analytics);
- at the Adria Innovation Days in Portorož in Slovenia (Regional Center Adria in cooperation with the Chamber of Commerce Slovenia organized Adria Innovation Day 2019 with the title "Innovation in primary and secondary raw materials sector in South East Europe"). The event was attended by more than 90 stakeholders from research institutions, industry, universities, government departments, legislators and start ups from SE Europe (Slovenia, Croatia, Bosnia and Herzegovina, Serbia, Kosovo, North Macedonia, Albania) and other parts of Europe (Belgium, Germany and Hungary);
- during 4 site visits to landfills and producers of industrial by products as well as end users: slag processing plant (EAF C slag) in the company SIJ ACRONI in Slovenia, Šoštanj Thermal Power Plant in Slovenia, cement plant USJE Cementarnica - TITAN Group in North Macedonia, thermal power plant REK Bitola in North Macedonia;
- in 2 popular papers: in journal Gradbenik (entitled "Secondary mineral resources for the sustainable production of cement") and in the journal Mineral & Gradnja (entitled "New low carbon and low energy cements from by products of industry and construction waste").

For promotional purposes, flyers and a roll up were designed and a website launched (<http://ris-alice.zag.si/>).



Lecture at the University of Niš in Serbia



Lecture at the TU Wien in Austria



Seminar at the GeoZS in Slovenia



Slag processing plant visit participants at ACRONI SIJ in Slovenia



NORM IX Conference, Denver, Colorado, USA



Seminar at ZAG in Slovenia

Additionally, in Slovenia, Serbia, Bosnia and Herzegovina, Hungary and North Macedonia national workshops were organized in order to promote the innovative approach of Al-rich residues recycling and to raise the awareness among the stakeholders.



National Workshop at VINS in Serbia



National Workshop at FTM in North Macedonia



National workshop at ZAG in Slovenia

In order to establish a network of relevant stakeholders in the area of currently unused and landfilled Al-rich industrial residues, the following 19 stakeholders officially confirmed their interest in the RIS-ALiCE project:

Faculty of Natural Sciences and Engineering, University of Ljubljana • Faculty of Energy, Materials and Physics, China University of Mining and Technology • SIJ Elektrode d.o.o., Ltd., Jesenice • University of Zagreb, Faculty of Science • KAMTEH GmbH, Podružnica Smartno ob Paki • Inlecom innovation astiki mi kerdoskopiki etaireia • Aoks group d.o.o. Skopje, North Macedonia • University "Ss Cyril and Methodius" Skopje Institute of Earthquake Engineering and Engineering Seismology • SUGS Georgi Dimitrov • Arcelor Mittal Zenica • Rudarski institut Prijedor d.o.o. • Kakanj cement plant • Alumina d.o.o. Zvornik • JP EP BiH TE Kakanj - Kakanj • PC of Electric Power of Serbia • Alumetal Group Hungary Kft. • University of Miskolc, Faculty of Earth Science and Engineering • INOTAL Zrt.

Within the framework of the RIS-ALiCE project, the following activities have been completed in 2019:

The main objective of Work Package 3 (Mapping and assessment of Al-rich residues in the East and South-East Europe region (ESEE)) is to collect the available data on Al-rich industrial and mine residues from the ESEE RIS partner countries with respect to their suitability for use in the low CO₂ mineral binder. Therefore, mapping of aluminium based secondary raw materials has been performed. Data have been collected in three countries: Slovenia, Hungary, and Bosnia and Herzegovina. So far, mine waste from bauxite and metal mine tailings, red mud, steel slags, fly ash and bottom ash from different industries, and other types of waste, for instance paper sludge from the paper industry, were identified. In all three countries the first samples have already been collected and sent to the partners responsible for the valorization of chemical, physical and radiological parameters.



Aggregate from EOP C slag SIJ Acroni in Slovenia



Sampling of red mud in Bosnia and Herzegovina



Sampling of fly ash in Bosnia and Herzegovina

The main goal of Work Package 4 (Al-rich residue registry) is the development of an online registry of Al-rich waste materials in the ESEE region. In 2019, a review of similar existing registries was conducted and the corresponding deliverable has been submitted. Workshops and communication among RIS-ALiCE partners serve as a basis for the preparation of the registry blueprint, which is currently on going. Stakeholders will allow the creation of a registry prototype, which will be tested by the partners and relevant stakeholders at the workshops next year.