

Prof. Bernd Friedrich of RWTH Aachen University said their IME (open innovation centre) looks at recycling metallurgy and process technology for all non-ferrous metals with a view to joining 'why does it work?' with 'how does it work?' in practice.

Prof. Geoff Scamans of Brunel University described his full metal circulation vision, with design for long life, re-use and re-manufacture being the norm. Aluminium alloys with >450 MPa strength 6xxx/7xxx series can be processed by high shear scrap processing (HSSP), which breaks up oxides and gives uniformity to rolled and refined microstructure. HSSP has already been used to make a 650 mm diameter log in China and is in development in Sapa in Belgium. It could raise the secondary aluminium quality level enough to address high end applications. Currently EU funding for a circular economy is a mess, although Innovate UK works well. Funding is a limiter.

Werner Fragner of AMAG Austria Metall GmbH said seller and buyer need to work together for alloy to alloy recycling. They are looking for such partners, and had developed a recycled casting alloy process for structural OEM parts. A future goal would be a wrought alloy to compete with steel.

Alan Peel of ALTEK outlined a new dross salt slag recycling process. The principle solution for Alusalt focuses on the salt cake that is a by-product in the aluminium recycling process using a rotary furnace. Salt cake is a mixture of aluminium oxides and aluminium nitrides, metal and salts (mainly NaCl and KCl, with small amounts of MgCl₂ and CaCl₂). The salt cake is a growing environmental problem and companies producing this material face excessive fuming, storage problems and environmental hazards. Alusalt received EU funding in 2011. The pilot plant began operating in Q1 of 2015, while upscaling ran from September 2015 into 2017. Up to 2.5 T of salt slag can be processed in one pan. The process will allow TRF furnaces to recycle salt and aluminium and produce saleable inert oxides. A 15,000 tpy operational plant is expected mid-2017.

Adrian Platt of BEFESA said they operated a zero waste salt slag process for 30 years. An 'Inorganics Large Scale' permit was required for a new process, as well as REACH registration. Production Managers were generally resistant to using a new material. It might cost £250 k and take 3 years for a legislative application, while another £500 k is required for a quality protocol.

Martin Weiss of REDWAVE spoke lastly about their 3-way sorting of aluminium and Zorba via XRF, handling non-ferrous metals and other metals, and the separation of Cu, Zn, brass, etc. in pure fractions. LIBS sorting currently is not a high throughput operation.

Useful Links:
www.european-aluminium.eu
www.ec.europa.eu/programmes/horizon2020/

The Aluminium Times Interview

Chris Holding interviewed Gerd Götz, Director General of European Aluminium and Roland Scharf-Bergmann, Norsk Hydro ASA & Chair of the European Aluminium Recycling Division at the 14th International Aluminium Recycling Congress.

Gerd Götz, Director General of European Aluminium (EA)



Gerd Götz, Director General of European Aluminium addressing the IARC. ©www.davidadamsphotography.com

Q1. How did the IARC begin and where is the next one going to be held?

The first edition was in 1990. It is my third Congress since Gunter Kirchner gave me the torch for the Recycling Division in 2013. It was a much smaller event in the late 1990s. We bring now the total ecosystem of aluminium together. The integration of the OEA (Organisation of Aluminium Refiners & Remelters) into European Aluminium has put the producers under one roof and the energy, trade and circular economy issues can now be done holistically, also with suppliers. The next event will be in Europe in 2019 with the venue still to be decided.

Q2. The Global Aluminium Recycling Committee (GARC) brings together aluminium producers and regional and national aluminium associations. How does it operate and connect with European Aluminium?

European Aluminium is always advocating for sharing data on material and trade flows globally, because only then will we be able to influence policymakers and further develop the regulatory environment. This is the main interface with GARC.

Q3. The EU officially requested to join the World Trade Organisation (WTO) consultation launched by the US on Chinese subsidies to producers of primary aluminium in February?

European Aluminium welcomes this move of course. There is a 30-40 day's process by

which the WTO will deliberate, and other parties can move in as either co-complainants or third party onlookers. Japan, Russia and Canada have already requested to join the consultation. It is not about blaming China, it is about looking at compliance to trading rules. However, it will take time to resolve.

Q4. How many aluminium recycling plants are there currently operating in the EU?

There are around 220 presently, both large companies and family owned businesses. We have also seen recent additions primarily coming from Hydro and Novelis Nachterstedt, for example. These big investments reflect a high demand for aluminium going forward.

Q5. In 1990 total world aluminium production was around 28 Mt (with over 8 Mt recycled from scrap). What is the latest annual figure available 2016/2015, and what are the projections to 2020, both globally and for Europe?

Today, the total primary production is close to 60 Mt globally while the aluminium scrap consumption is about 25 Mt. By 2020, primary production capacity is forecast to increase globally by 24%. In Europe, the total aluminium production is about 9 Mt, and more than half of it comes from recycled production.

Q6. The European Aluminium Sustainability Roadmap was launched in April 2015. There is a notable increase in post-consumer aluminium scrap expected, so what sort of scrap is becoming available?

That is very difficult to answer. We already have traditionally very high comparative recycling rates in Europe. Technological advances in certain areas are certainly needed to bring the Circular Economy to fruition, given the changing shapes and complexity of feed materials. One of the major changes is that we have better sorting technologies. That makes a huge difference because you can really increase your scrap intake. From the manufacturers, pre-consumer aluminium scrap loops are becoming more optimised, and the scrap lifecycle is becoming an integral part of the production process. Having said that, at a European level there is a margin to improve further sorting technologies to recover even more aluminium from municipal waste, which should be fostered by the circular economy strategy.

www.european-aluminium.eu

Roland Scharf-Bergmann, Chair, EA Recycling Division

Q1. Can I ask how does Hydro measure its recycling programme progress towards the carbon neutral target for 2020?

We look at all aspects of our supply chain, including mining, primary aluminium production, and energy consumption in processing on the one side. Then we look into the aspects of the use phase. Depending on where the aluminium goes, there are different levels of CO₂ savings going against it. The savings are higher in transportation, e.g. with automotive sheet. The post-consumer scrap recycling side is also saving energy.

Q2. Hydro has a present total of around 2.1 Mt primary capacity and 1.0 Mt remelt/recycling capacity, including stand-alone remelters, recycling facilities and additional casthouse capacity at primary plants. What recent investments have you made to increase your post-consumer scrap processing?

Hydro has invested in developing new technology at its Clervaux Remelter in Luxembourg in 2016 to enable the more efficient recovery of metal from post-consumer scrap that comes from shredding operations in chip form. There is first a delacquering stage which preheats the metal in a delacquering furnace (Insertec), then the most optimum way to melt is to feed into the liquid metal is via a submergence unit, which we developed together with ALTEK, but have applied uniquely. We had an issue with fluid flow, so we ran simulations to establish a way to optimise the

flow. With ALTEK we tested then applied the method successfully.

Q3. How will the EA Scrap Classification Manual benefit the industry?

It will increase visibility of the complexity of different scrap types, also with the administration in legislation for imports and exports, where scrap is declared under certain waste codes, they are able to check against photos whether the scrap is being declared in the right way. The main purpose is in traceability and data accuracy. There is approximately 1 Mt of aluminium scrap leaving the EU annually.

Q4. The Karmoy Technology Pilot was 70% completed at the end of 2016. When is it due for completion and what is the nature of the so-called 'creep ambition' from Hydro here?

The Pilot plant will be started in the fourth quarter of 2017. The 'creep ambition' is a further evolution of primary metal production, with several new features to give higher productivity and lower power consumption. Doing that means magnetic fields are going to be different from standard cells, and managing operations will require more automation than ever. Some of the Pilot technology items we will be able to roll out to our existing smelters, in a tailored way depending on individual setups. This will give us our 'capacity creep'



Roland Scharf-Bergmann, Norsk Hydro ASA & Chair of the Recycling Division.

in our existing plants. Don't forget that even the pilot will be producing 75,000 tpy of primary aluminium.

Q5. Hydro has signed a co-operation agreement with Austin AI Inc. (AAI), Texas, on joint development of advanced LIBS technology to sort automotive aluminium alloys?

We looked at a number of European suppliers for this LIBS application. The approach taken by AAI was different and we have tested it and found it worked better. We saw that AAI was a small engineering company, so we felt that by combining our development knowhow with them in sorting for the elements appearing with aluminium, we could better protect any solution we develop, to still give us an edge.

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