Europäische Metall-Union
European Metal Union
Union Européenne du Metal

Newsletter first semester 2023

Next EMU events

June 2023 (Online meeting, exact date to be determined)	Green Manufacturing Working Group meeting on “How do you support your respective members on making their company ESG compliant?”
21-22 September 2023 (the Netherlands)	EMU General Assembly
10 October 2023 (online meeting)	EMU Working group on Standardization
18-19 April 2024 (Austria)	EMU Assembly of Delegates

Work on welding fumes continues

During our latest Administrative Council in Switzerland, participants commented the on the European Commission proposal to include welding fumes (in a broad sense, this includes all processes in which metal is heated above the boiling point: vaporised) as a generic term in annex I of the Carcinogens and Mutagens (and Reprotoxic substances) Directive, or CM(R)-Directive, currently under revision.
On 17 November 2022, the European Chemicals Agency (ECHA) published an evaluation report, and an online questionnaire was launched (https://ec.europa.eu/eusurvey/runner/77ada233-c24c-4095-93cc-db13b5eb86da). For the metal sector, this inclusion has major consequences, as all welding processes will then be regarded in a broad sense as carcinogenic, mutagenic and/or toxic to reproduction. This means that the highest and most stringent control regime must be introduced for all these processes. Metaalunie has already investigated, to know whether there is sufficient scientific substantiation for this inclusion. They are conducting, together with specialists, a critical review of the ECHA report. The findings of this critical assessment will be reported in a concise report. To be continued…

Disruption in aluminium production in China

With only 6% of the world's aquifer reserves, China's per capita water availability is less than a third of the world average. Far from the natural balance it once enjoyed, Yunnan province, the country's metallurgical heartland, is regularly suffering from drought.
The hydraulic turbines power the Chinese aluminium valley, where giants such as Chinalco transform bauxite into alumina, from which aluminium is extracted by electrolysis. Yunnan's hydroelectric power stations are also part of the West-East energy system. With primacy over land and water reserves at the expense of agriculture or residential projects, they provide power to the rich and overpopulated provinces. On several occasions since last year, aluminium production has been cut back due to the lower utilisation rate of hydroelectric power stations, in order to maintain supply to the east coast.
Ironically, aluminium is increasingly replacing copper in China's power grids. The strategic interest of the silver-grey metal lies in its weight, which is half, that of copper: an essential property for the construction of these suspensions, which stretch over titanic distances.
The power cuts of 2021 and 2022 are therefore likely to be repeated this year throughout the country. China's aluminium and poly-silicone production is therefore likely to be severely disrupted in 2023. While on the other hand, Russian metal could "flood" the warehouses of the London Metal Exchange, according to Harvey Roy, CEO of Alcoa, the world's eighth largest aluminium producer, behind the top three formed by Chinalco (nearly 7 million tonnes per year!), Hongqiao and Rusal.

How to use x rays to test materials without harming them?

For SMEs, laser-plasma accelerators have emerged as a promising cheaper alternative to the expensive particle accelerators used by the scientific community. These devices use a pulse of energy to create an electric field wave in a plasma (a gas transformed into a cloud of electrons and ions). It is a bit like a boat leaving a wake when it crosses water. If a group of particles is correctly timed, it can surf on this wave and it can be accelerated much faster than in a conventional accelerator.

An interesting application of this technique is radiography, for checking components and identifying defects in a material without destroying it. The small size of the particle packets supplied by laser-plasma sources makes it possible to probe components at high resolution. Initial laboratory results indicate that it would be possible to monitor the occurrence of cracks as small as 100 microns. It is therefore a simple way to see if there is a crack in a piece of steel, for example, without having to cut it, which would mean replacing a potentially very expensive part.

The size of the defects, which can be detected and monitored, is largely determined by the size of the accelerating source. Laser-plasma acceleration is a good solution in this respect since we start with a very small source size. Verifiers are a bit like medical radiologists, but the 'patients' are the materials. When they pass X-rays through a material, they will be less absorbed in the area of a defect. The defect is imaged in exactly the same way as a radiologist does for bone fractures. These x-rays do not pass through the human body, but through pieces of concrete or steel, which means that one needs much higher energy rays than those used by radiologists.

For further information, see: Ben-Ismaïl, O. Lundh, C. Rechatin, J. K. Lim, J. Faure, S. Corde, and V. Malka, Compact and high-quality gamma-ray source applied to 10 μm-range resolution radiography, Applied Physics Letter 98, 264101 (2011); https://doi.org/10.1063/1.3604013

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