International Copper Association
Copper Alliance

Stock-and-Flow Model for Lead in Copper Alloys

Study Name: A Global Stock-and-Flow Model for Lead in Copper Alloys
Study Author: Fraunhofer ISI
First Presented: April 2018

Research commissioned by the International Copper Association (ICA) and conducted by Fraunhofer ISI examines the life cycle of brass in unprecedented detail, from primary material production, through the production of semi-finished goods, to the fabrication of end-use products. The picture it provides allows for an unprecedented understanding of where and in what quantities lead enters and exits the cycle, thanks to its detailed accounting of brass flows at each stage of the life cycle.

Overview

Dynamic stock-and-flow models for pure copper are available from ICA at the global and regional level, but until now, none have tracked lead.

Fraunhofer ISI's research models the global flow of leaded brass through time and in considerable detail. Crucially, this enables the calculation of quantitative scenarios for the future of lead content in brass at a global level.

Due to its toxicity, lead is restrictively regulated, leading to implications for industry. Incorporating these alloying metals into stock-and-flow models is therefore an important step.

The Dilution of Lead

The new model enables the plotting of different scenarios for leaded brass. Using the research, it is possible to model the impact of a reduction in primary lead input into copper alloys, an increase in end of life (EOL) scrap being remelted rather than smelted, a spike in demand for copper alloys in the future, or a combination of all three.

Key Findings

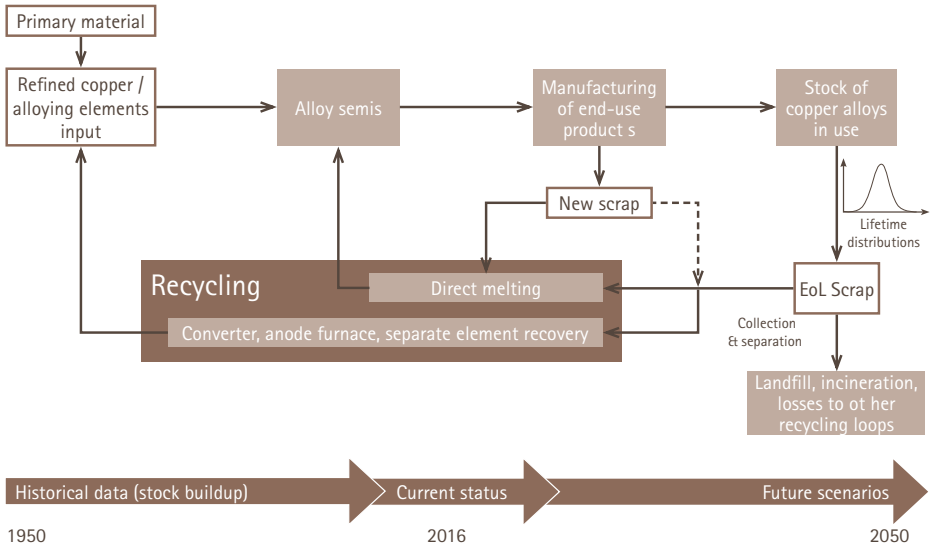
The model delivers:

- Increased transparency of lead flows in copper alloys at a global level.

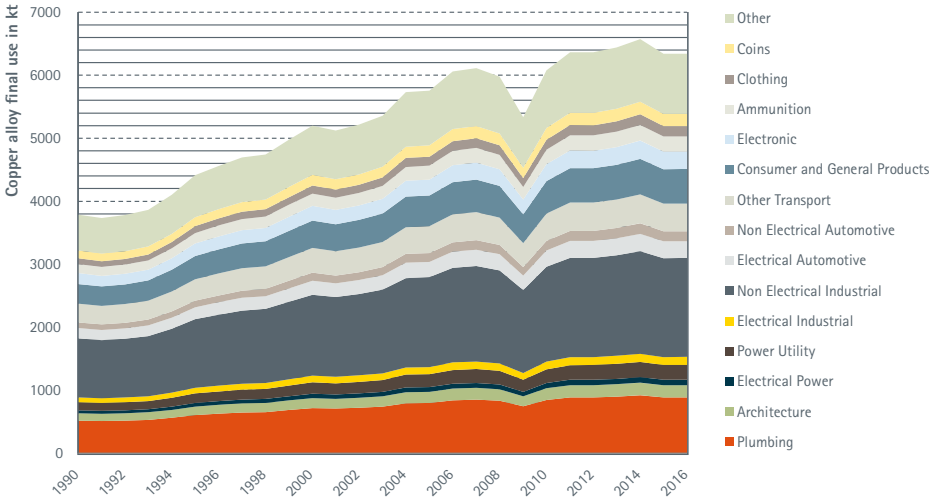
It further shows:

- Most lead contained in copper alloys is introduced to the alloy smelters as primary material.
- Dilution results are highly dependent on the scenarios of reduction of primary lead input.

Simple Sketch of the Dynamic Model



Copper Alloys by Final Use



For more information on copper demand or ICA, visit www.copperalliance.org. For information on copper's use in sustainable energy, visit www.sustainablecopper.org. Follow us on @ThinkCopper. For enquiries, email colin.bennett@copperalliance.org.uk or bryony.samuel@copperalliance.org.uk.