Metallic raw material flows - inventory analysis

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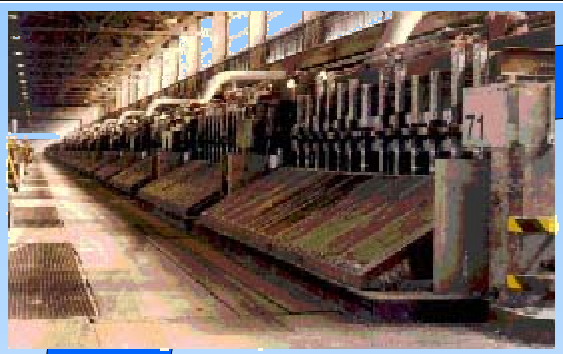
Collaborative Research Center 525

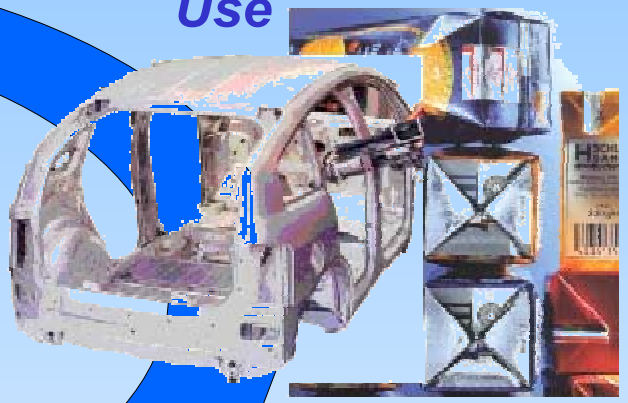
"Resource orientated analysis of metallic raw material flows"

...along the material flow of aluminium

Primary metal production



Use



Recycling

Bauxite mining and renaturation

Red mud disposal

Metallic raw material flows – Inventory analysis

The CRC 525 develops instruments for material flow management including an LCI data base. Here the level of detail is one decision to be made.

Examples for the chosen level of detail:

1. Technical status $\Rightarrow$ to express technical innovation
2. Alloy groups $\Rightarrow$ to model different recycling mechanisms

Technical status

In LCI generally different technologies are considered. In addition to that the CRC 525 also considers the technical status of this technologies. So changes according to time and development status can be considered, for example to represent technical innovation.

The CRC 525 distinguishes between 4 categories:

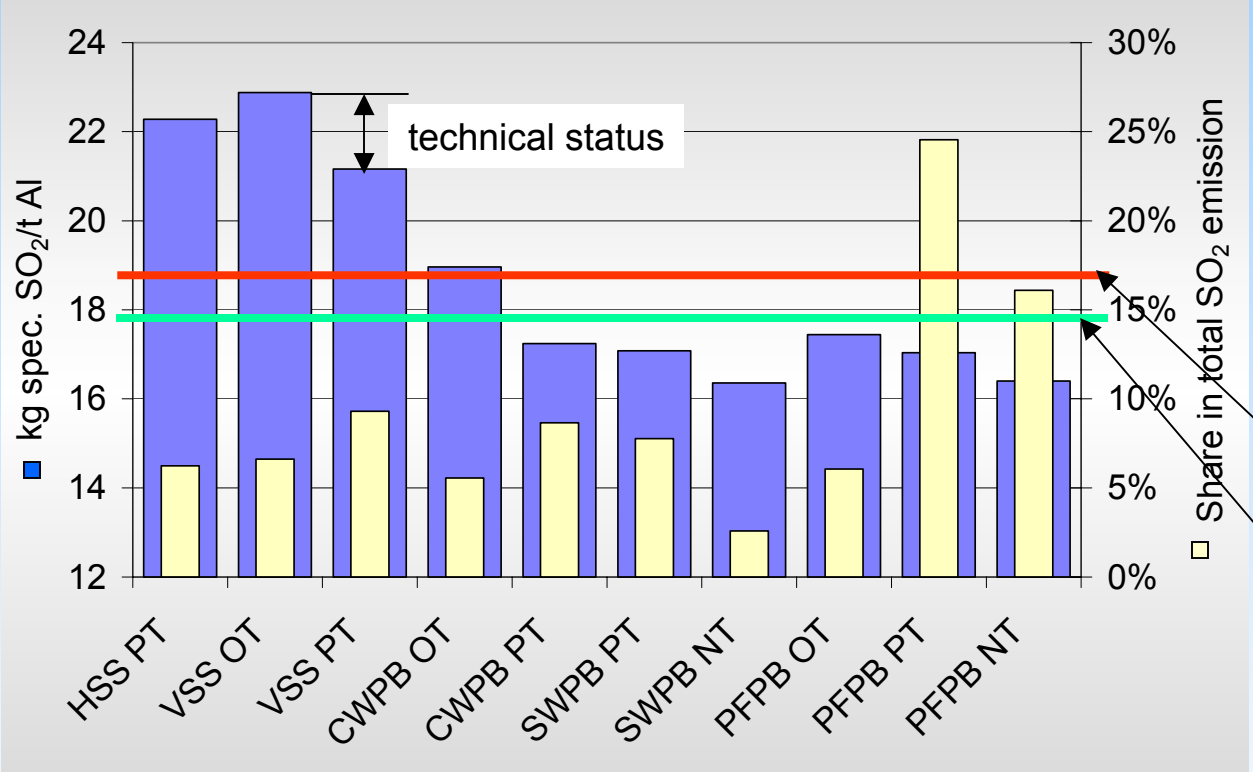
- Old technology (OT)
- Present technology (PT)
- Newest available technology (NT)
- Future technology (FT)

This allows to model

- replacement of technology but also upgrading at a specific site
- different status of technology at different sites using the same technique

Case study: SO_2 emissions

Specific SO_2 emission and share in total SO_2 emissions in 1997 of the electrolysis processes without gas cleaning



worst ← technology → best

The figure shows the differences between various

- technologies and
- technical status,

compared to the average

- spec. technical emissions and
- world SO_2 emission

Alloy groups

Metals are theoretical fully recyclability according to the atomic structure. In reality the re-use in other systems is restricted and has to be considered modelling recycling mechanisms.

The CRC 525 distinguishes between 6 categories for aluminium:

Wrought

- unalloyed
- low alloyed
- medium alloyed
- high alloyed

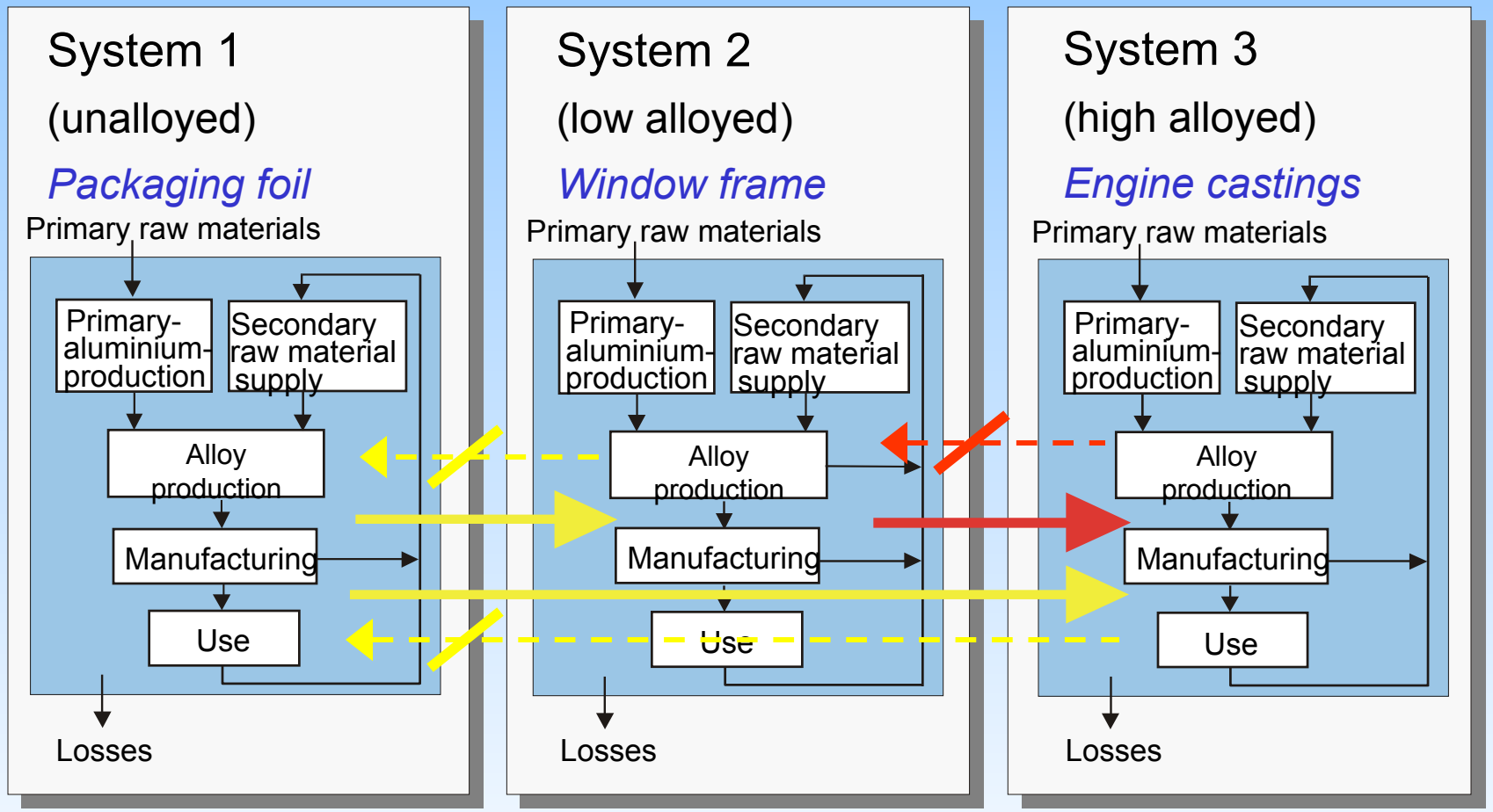
Cast

- primary
- refined

This allows to

- model the general re-usability of metals
- model the restricted re-usability in other systems
- differentiate various qualities of recycled materials for the interpretation

Case study: Interaction between product systems



In the impact assessment and the interpretation the higher re-usability of unalloyed wrought aluminium has to be valued compared to the low re-usability of cast material