CASE STUDY 8

Company awareness and responses to critical materials in product design – research update April 2012
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This update highlights the first results of ongoing research that was first reported to the conference entitled Resources That Don’t Cost the Earth – Encouraging European Solutions and Collaboration, at the British Embassy, Berlin, 1 – 2 December 2011.

The goal of this research is to assess the effects materials criticality has on technological companies in the Netherlands and what kind of implications that could have for industrial design engineering.

Participating companies were chosen from the membership of the Dutch industry association FME-CWM which brings together more than 3,000 companies in the metal, plastics, electronics and electrotechnical industry and related sector. A total of 30 companies participated.

From the research the following conclusions can be drawn:

1 Three quarters of businesses (to a greater or lesser degree) are familiar with the concept of critical materials

Just over three quarters of the companies are familiar with the concept of critical materials under different names. The majority of companies face problems with the purchase of raw materials or components. Nine of the 30 companies follow critical materials developments closely; fifteen companies are doing that to a lesser degree, whilst six companies do not feel critical materials is an issue for them.

2 Critical materials certainly do play a role in the Dutch technology industry as a whole

Out of a total of 35 different critical elements on the EU list, 12 are used by the companies. The best known are cobalt, magnesium, graphite, and tungsten (as an alloying element for steel) and neodymium as an element in permanent magnets. In addition, the companies name another 14 materials as critical, but they are not on the EU list. This includes nickel, chromium (both as a part of Stainless steel), copper and plastics constituent materials. Critical materials are usually included in intermediate goods and parts. In only 7% of cases, is a critical raw material purchased in a ‘pure’ form. In 52% of the cases it was included in base metals or semi-finished products and 36% in bought-in components. This reflects the position of Dutch industry in the production chain, which is mainly dependent on imports of already processed materials, semi-finished products and components. This makes the Netherlands, of course, more sensitive to supply disruptions in critical materials.

3 Problems with critical materials are supply chain problems
As many as 24 of the 30 participating companies, or 80%, have, over the last five years encountered problems with the delivery of critical materials. These are materials on the EU list, but also materials named by companies themselves as critical. In many cases the supply chain was sensitive to disruptions and there are very few critical material alternatives available. With the advent of the critical materials phenomena, the purchasing departments in these companies have been given a new challenge to address. Only a handful of companies are working on alternatives through changes in product design and production. The R & D departments are even less involved in critical materials.

Forecasts for the next five years

Twenty-two companies expect that the role of critical materials will increase. The reason for this is directly linked to the expected production growth of businesses, increasing use of electric cars & e-bikes, and the increased application of high-tech electronics & appliances. The general expectation is that the prices of critical materials will increase.

Threats and opportunities

Sixteen companies expect to experience no problems with critical materials as a result of their good supply chain management and new (external) developments in the field of recycling and production of critical materials. In contrast, six of the 30 companies do expect problems in the next five years, either because of their small size (they do not have power over their suppliers), or because there is insufficient time and/or resources to innovate alternative products.

Seven of the 30 companies see a great deal of opportunity resulting from critical materials. A better controlled and understood supply chain can be a competitive advantage over other companies. In addition they see critical materials as an incentive to develop smart materials and cradle to cradle design solutions.

Conclusions from survey

This initial survey among Dutch companies is primarily intended as input for follow up discussions about materials and their critical role in the Dutch technology sector. The best approach for this discussion is to have all stakeholders are involved - government, industry and knowledge institutions. The researchers laying the ground for such discussions should make note of the following recommendations:

- Create and maintain a situation tailored for the Dutch list of critical materials. The EU list of critical materials covers only a part of the critical materials in the Dutch context. For a specific Dutch policy in Critical Materials a tailored list is needed. Furthermore, many companies want to follow developments in the field of critical materials in order to prevent problems, and/or find opportunities.

- Ensure the supply chain for the Dutch technological industry is robustly maintained. Problems with critical materials in the short term are largely preventable by improving the usually fragile supply chains of Dutch companies. The
improved mapping of the various supply chains should make it more robust. In particular improvements can be found by addressing issues such as single sourcing.

[bullet] Encourage innovation in companies in the field of alternatives. Changing the product design and the use of alternative materials in response to problems with critical materials is currently rarely carried out. Over the long-term, companies that do undertake these approaches will find this gives them a very clear advantage. Stimulating innovation in companies into the field of alternatives can turn a disadvantage for the Netherlands (where there are few natural resources) into an advantage.