

Summary of the research report „Environmental compatibility of recycling products“ - F 469

The so-called recovery commandment applies for construction and demolition waste (demolition waste, construction site waste, road construction waste and excavation debris). Recovery of waste has priority over waste disposal, to the extent that this is technically possible and economically reasonable. This commandment doesn't apply when the utilization is either technically impossible or uneconomical, or when disposal would be environmentally more compatible. The legislative authority therefore demands an environmentally compatible recovery. In general, the environmental compatibility of products and production methods is viewed from the aspect of interaction with water, ground and air, which should be protected. All participants must agree on the criteria according to which the environmental compatibility is to be assessed objectively, in order to achieve an environmentally compatible recovery. On the basis of an extensive literature evaluation and personal investigations, the present research report should give information on the general assessment of the environmental compatibility of recycled mineral demolition waste / road construction waste and which judgement criteria should be considered when using such products as concrete aggregates.

In the frame of this project, recycling materials from a separation plant for demolition waste, road construction waste and excavation debris, as well as concrete chippings produced in the laboratory, were examined. The aim was to investigate the leaching behaviour of mineral recycling products as well as that of the mortar and concrete produced by using those materials.

The following methods were chosen in order to obtain sufficient information on the leaching behaviour of heavy metals:

- the determination of the total content of trace elements as well as the leachability under extreme conditions to characterize the samples.
- leachability according to the modified DEV-S4-method,
- Time-dependant leaching of test samples with real measurements and leaching conditions that are close to practice conditions

In addition to this, organic parameters were determined for the recycling materials from mineral demolition waste, for the solid as well as after leaching according to the modified DEV-S4-method for the leachates.

The test results show that the leaching of heavy metals from cement-based building materials is largely independent of their total amount in the building material, as long as these exist within the customary frame known for concrete raw materials. This applies in the same way for mortar and concretes with the use of natural aggregates as well as the use

of recycling products from separated mineral demolition waste and/or concrete chippings. It could not be clarified in the frame of this research project whether these statements would also apply in the case of organic parameters. Various results from literature indicate nonetheless, that this can be assumed for at least some parameters.

There is, in Germany at the moment, no standardized or set method with which the leaching behaviour of cement-based building materials can be tested, and thus no valuation scheme with reference to substance and application classification for recycling materials in cement-based building materials exists. It is therefore recommended at the moment, transitionally, to proceed according to the technical rules „Demolition Waste“ from the Länder Working Group Waste (Länderarbeitsgemeinschaft Abfall - LAGA), when evaluating recycling materials as concrete aggregates (e.g. in the frame of investigations for official authorization) taking into consideration the preventative aspect and a uniform procedure. The limiting value Z2 should then be decisive.