

Waste baskets in Augsburg

bifa determines composition and packaging fractions

The waste management and public cleaning service of the City of Augsburg (aws) has over 150 employees who collect waste daily from waste baskets and waste bins on the edges of roads and paths in the public space.



Each year the public cleaning service of the City of Augsburg collects approx. 2,300 Mg of waste from waste-paper bins along the different cleaning tours through the city area. bifa Umweltinstitut was engaged to analyse the contents of waste baskets in the public space, to find out the size of the packaging waste fraction. In detailed sorting analyses, we examined the contents of 683 emptied waste baskets from six city districts. Only around 4 % of them were over-filled.

Disposable paper tableware (18.7 %) accounted for the largest share of the waste basket volume, followed by other packaging made of paper (12.9 %) and cardboard (12.2 %). By contrast,

the percentage weight of these fractions is significantly lower and in total is only 18.8 %. The largest share of the waste basket volume in terms of weight is attributable to container glass with 25.8 %. These bottles were primarily for alcoholic drinks. In total, packaging of all types accounts for around 73 % of the volume. The percentage share of all packaging in the waste baskets by weight is around 52 %. The share of non-packaging made of paper, cardboard, glass, plastic and metal is rather low at around 11 % by volume and 14 % by weight. The remaining contents of the waste baskets was mainly organic material, especially food waste and dog excrement.

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Environmental hygiene

Identifying and limiting invisible risks

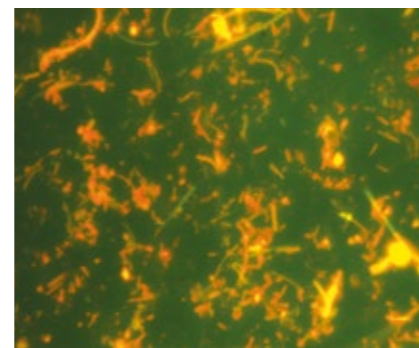
Alongside visible living organisms (humans, animals, plants), there is an incompletely registered diversity of microorganisms, which only become visible when viewed through light or electron microscopes.

These are bacteria, fungi, viruses, microalgae and animal microorganisms, which are present in almost all areas of the environment, in large numbers and diversity. Although several million species of these microorganisms have been discovered to date, only a few thousand species are pathogens for humans, domestic animals and useful plants (crops). Most of the microorganisms fulfil important ecological functions in the ecosystem and they help humans with important environmental protection tasks (e.g. cleaning contaminated water, soil and air; bio-waste treatment).

Despite diverse defence mechanisms, the small share of pathogens causes considerable damage: In Germany, the statutory health insurance spent around 39 billion euros

on medicinal products in 2018. Around 25 – 30 % of the human medicine diagnoses and treatments in Germany were to defend against infectious diseases. Around EUR 813 million was spent on animal medicinal products in Germany in 2018, to maintain animal health. 35 % of the animal medicinal product costs were used to control infections and parasite infestations. The plant protection market in 2018 was worth EUR 1.3 billion; 38 % of the around 35,000 Mg biocatalysts used were to reduce the effects of fungal diseases.

Infected humans, animals and plants are the most important source for pathogens. Therefore handling waste, excretions and gaseous emissions produced by them requires particular hygiene precautions. This is particularly applicable if they are input into material cycles, as is the case in wastewater treatment and the recycling of municipal waste and residual agricultural materials. Technical processes and products can also be impaired by unwanted colonisation with microor-



Detection of microorganisms (orange) in a process water sample

ganisms. This includes the formation of unwanted biofilms and odours, the release of bioaerosols and the irreparable damage of materials. We help clients to identify unwanted biofilms, pathogens and relevant toxins and allergens as well as with the testing and assessment of innovative defensive measures.

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Life cycle analysis of new ultrahard materials

European Flintstone 2020 project completed successfully

The Flintstone 2020 project funded by the European Union as part of the Horizon 2020 programme was completed successfully after four years.

Within the project, new types of alternative material solutions based on tungsten carbide/cobalt and polycrystalline diamond/cobalt were developed for increasing the lives and possible substitution of the critical raw materials tungsten and cobalt in tools for metalworking and stone machining. The project was coordinated by the University of Lund (S) with support from Boukje.com (NL). Other partners, apart from bifa Umweltins-

titut GmbH and the TU Bergakademie Freiberg (D) were the V.Bakul Institute for Superhard Materials (ISM) (UA), CRNS (F), and the industrial partners Sandvik, SECO Tools (S) und Element Six (GB). The developments included the production of the new materials, their integration in tools and testing them in metalworking and stone machining under extreme conditions. bifa examined the potential environmental aspects for the new materials in production, use and recycling and combined the results with performance and cost data of Lund University to produce an ecoefficiency portfolio. >>

Dear Readers, Dear Partners and Customers of bifa,

We're supposed to be in the middle of winter. Not that you'd notice it! Climate researchers are letting it be known that this is a foretaste of future winters in our part of the world. It must have dawned on everyone by now that climate change is in full swing. We must do everything we can to dampen the effects, but it is also high time to adapt to it and to act accordingly. The circular economy can make a considerable contribution. Many talks on the 1st day of the pending Bavarian Waste and Landfill Days (Bayerischen Abfall- und Deponietage), which we are helping to organise, deal with this topic.

Society and the media are currently more occupied by the "new type of corona virus" and the threatened pandemic than with climate change. At first glance, the two topics are entirely unrelated. But when we take a second look we find that changing climate conditions also facilitate the spread of pathogens. This will have effects on environmental hygiene, which we at bifa have been concerned with for many years. Read the article on page 4.

W. Rommel
Yours, Wolfgang Rommel

Also in this issue:

Resource efficiency in the Bavarian trades

Results of an analysis of potential page 2



Local knowledge digitalised

Geodata analyses improve waste management and energy supply decisions page 3



Waste baskets in Augsburg

bifa determines composition and packaging fractions page 4



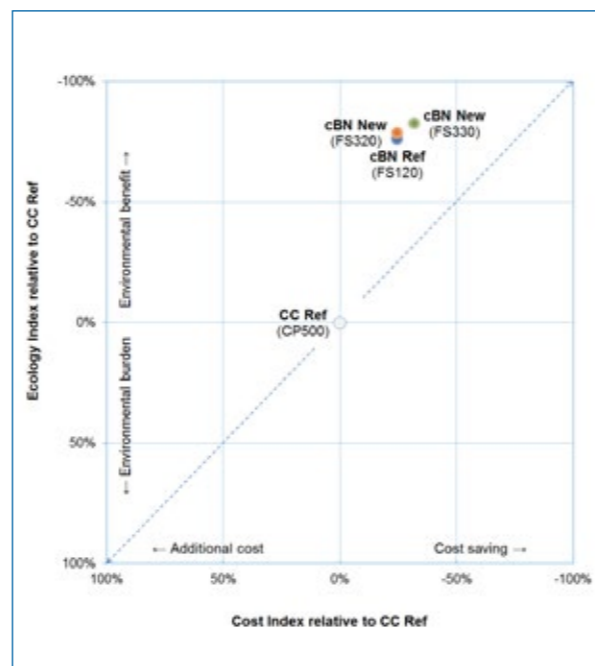
>> In the project, numerous new material combinations were produced and tested on the basis of diamond and cubic boron nitride, as well as new types of superhard phases. Particular attention was also paid to the achievable performance and the costs, as well as an in-depth understanding of the underlying microstructures, tool geometries and resulting wear mechanisms. With the continuous delivery of data by all partners, a life-cycle model was created for the materials and energy and was updated in line with the respective project progress. Missing data were taken from the literature or databases. The following two routes were considered:

- > Sintering of cutting tools based on hard metal with protective coatings and
- > combined production methods by sintering hard metal blanks com-

bined with sintered on superhard cutting inserts, which are generated using high-pressure high-temperature methods.

Due to the optimised materials, better machining results and longer lives were achieved by the new tools. The new products are up to 80 % more environmentally friendly and save up to around 25 % costs. The exemplary figure, in the top right below the bisecting lines of the angles, shows the new materials in relation to the reference material with their clear cost-cutting potential and higher environmental compatibility in the case of metalworking. The largest hurdles on the way to new industrial products are thus largely overcome.

The project was funded by the EU under ID 689279 as part of the Horizon 2020 research and innovation programme.



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Resource efficiency in the Bavarian trades

Results of an analysis of potential

Resource efficiency is an important contribution to environmental protection and at the same time helps to increase competitiveness. However, until now it was not known whether and to what extent the Bavarian trades were considering this topic.



Therefore, on behalf of the Bavarian State Environmental Agency (LfU) and in cooperation with the Bavarian Chamber of Trades, bifa carried out a representative survey of companies in eight trades on handling material and raw materials.

The results show that material efficiency plays a role in all the trades examined, in particular for bakers, joiners and in the main building trades (roofers, carpenters, bricklayers and concrete operatives); while it plays somewhat less of a role for installers and heating installers, precision mechanics and metalworkers. It is also worth noting that the role of material efficiency is independent of the size of the material costs share in the respective trade. Instead, it is aspects such as image and customer requirements, as well as legal requirements that play an important role. Never-

theless, potential savings were seen in all trades, in all areas covered in the survey, starting with the material selection as well as in the reuse or recovery of residual materials.

The interviewees therefore also found measures for the reuse and recovery of residual materials, improvement of storage conditions, transport logistics and the ordering processes as well as customer advice and employee involvement to be particularly helpful in improving material efficiency. On the other hand, external consultants and grant schemes were considered to be less helpful. Differences between the trades were also seen in the type of measures used:

- > Employee focus, especially among carpenters, joiners and installers
- > Customer focus, especially among precision mechanics and metalworkers.

The study also shows the limits to implementation: Above all, these are reasoned in the already achieved exhausting of possible savings, as well as in the lack of skilled personnel or low interest, or other priorities. The quality standard of the trade is particularly important: "Quality is when the customer comes back and not the product".

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Local knowledge digitalised

Geodata analyses improve waste management and energy supply decisions

Including local knowledge is a given for successful municipal decision-makers. However, in many cases the multi-faceted nature of local structures extends beyond what the individual can register.

Geodata analyses and digital municipal registers allow local information to be used comprehensively, systematically and computer-assisted. Information from different sources and formats can be linked together in computing systems. Map representations communicate the knowledge acquired graphically.

In waste management, for example, municipalities ask themselves whether a bring or a delivery system is preferable for certain waste fractions. Apart from waste management expertise, we can use spatial forecasts of waste quantities and composition to create an essential basis for decision making.

By superimposing the local waste produced with the spatial distribution of collection points or treatment plants, it is possible to avoid under- or oversupply of new waste systems and to minimise investments.

Geodata analyses also assist with municipal energy issues regarding production potential or selection of the location for an energy producer. Existing energy infrastructures together with geographic and urban planning characteristics and nature conservation concerns can be incorporated into the planning early.

Registers, which present the heating demand of individual buildings and business enterprises are a valuable planning basis for local heating network projects. With their help, optimised pipe layouts can be defined for district heating networks. The setting up and development of these networks can therefore be and advanced



successfully in the long-term. Coordination with project partners and informing citizens is made significantly easier by a concise and easy to understand planning basis.

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Introduction of biowaste collection in the Rural District of Sigmaringen

bifa advises in the selection and design of the optimum collection concept

In October 2018, the rural district Landkreis Sigmaringen was the last in the state of Baden-Württemberg to decide to introduce separate biowaste collection.

bifa, with its waste management expertise, has worked for Landkreis Sigmaringen for several years. For example, we used sorting analyses to determine the biowaste and recoverable material potential in household waste.

We have now currently comprehensively examined the prospects of separate biowaste collection and the effects in a report. The core of the study was for the knowledge to be based, as far as possible, on the real data of the district, and thus make the result as precisely fitting as possible for the situation in Landkreis Sigmaringen. For example, extensive geodata, specific route lengths for waste collection,



the population structure in the district and the present day and future expected waste quantities were all incorporated into the report. On this basis, we developed and analysed a set of different collection systems (i.e. biobin) and delivery systems.

The individual systems were assessed according to different criteria such as service for citizens, effects on waste

charges, the expected ecological advantages and integration in the district's existing collection structure. The assessment shows that collection systems have the advantage, especially when it comes to citizen convenience and improved life-cycle assessment. The particular plus point of the delivery systems is their lower costs. We are currently assisting Landkreis Sigmaringen, within the scope of events and a questionnaire to determine the mood of the citizens regarding the future arrangements for biowaste collection.

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