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User report:
Briquetting of aluminium chips at Euler Feinmechanik GmbH
[ca. 9 600 characters]
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Efficiency through optimized chip processing

Contract manufacturer Euler Feinmechanik briquettes aluminium chips and recovers valuable secondary raw material

Euler Feinmechanik GmbH produces top quality aluminium products for their customers, who are mostly in the optical industry. One of RUF's briquetting systems is adding to the contract manufacturer's cost effectiveness in chip processing. The system, which works automatically, transforms bulky and wet aluminium chips into compact and practically dry briquettes, which can be sold as valuable secondary raw material.

Even the Corona crisis was only able to slightly impact the growth of Euler Feinmechanik GmbH, which is situated at the gates of Wetzlar, the City of Optics. In 2020, the contract manufacturer managed to keep turnover constant despite the restrictions and even invested around 1.5 million euros in new technology. In 2021, they have targeted a further increase in turnover of between 5 and 10 percent, to between 9 and 9.5 million euros. And after the first three and a half months of this year, they report that new machines had already been procured for the plant in Schöffengrund for a further 1.5 million euros.

Their success is no accident. The managing directors Hans and Leonard Euler, son and grandson of the company founder, consistently focus on quality and reliability, orientation to customer needs, and on cost-effectiveness in their contract manufacturing. "When it is important to increase efficiency through automation and digitalization, however, we should not only look at the core processes of turning and milling," states Leonard Euler. "The periphery is also of major importance, for example the chip handling with our briquetting plant from RUF", emphasizes the

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36-year-old graduate industrial engineer. It is a simple calculation. The less time consumed by a machine operator for chip handling, the more time specialists can dedicate to productive activities and keeping the roughly 45 turning and milling centres running, around the clock. The company processes about 38 tons of aluminium per month, resulting in around 25 tons of aluminium chips, on these machines.

Pressing minimizes the volume and recovers cooling lubricants

Dealing with chips takes a lot of time and resources. They have an extremely high bulk volume, so they take up a lot of space. Bringing these quantities to collection containers and filling them manually takes a lot of time. When contaminated with cooling lubricants, they often pollute the production areas during transport and storage. In addition, only limited revenues can be achieved with wet chips, because the logistics are complex and the chip preparation before melting causes additional costs, among other things for the separation of the cooling lubricants, which then have to be disposed of.

But Euler have chosen another path, because pressing into easy-to-handle briquettes solves all of these problems. Depending on the type of chip, the volume can be reduced to between a third and one tenth of the original. The cooling lubricants are almost completely pressed out during the process. Storage and transport of the briquettes is simple and clean; in addition, they have a permanently low and defined residual moisture, meaning discussions on moisture discount when selling scrap are avoided. As a rule, this means a medium to high double-digit figure of additional sales revenue is possible, and in many cases a three-digit amount is realizable. These are all comparisons to selling loose chips. And keep in mind that the recovered cooling lubricants are reusable in many cases. This results, in general, in amortization periods of 1.5 to 3.5 years.

Increasing efficiency is the top priority at Euler

When Euler purchased a 11/4000/70 RUF press in 2019, it was clear that an increase in efficiency was the priority. Complemented by an upstream lifting-tipping device, shredder and chip conveyor as well as a

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downstream filter system for the cooling lubricants, the system is designed for unmanned 24/7 operation.

The roller-mounted chip collection containers at each milling and turning center are pushed by a machine operator to the chip preparation plant when they are full. There is already an empty container waiting, which he takes from the lifting device and then pushes the full container into it (the lifting device). Pushing a button is all it takes to start the process, and he can immediately return to his workstation with the empty 400-litre container, without having to worry about the briquetting process. Because the container is automatically lifted three meters into the air and emptied into the shredder. This shreds flow chips and chip accumulations as well as ejecting any foreign objects via a coarse parts discharge. Slat band chains are used to convey the shredded chips to the press hopper, which is equipped with a level sensor. The system starts automatically when the hopper is full and stops when the chips are briquetted.

The RUF 11/4000/70 compresses the chips with its 11-kW motor and boasts a pressing power of up to 4000 kg/cm$^{2.}$ It produces round briquettes with a diameter of 70 mm and a length of also about 70 mm. The density of the briquettes is a good 2.3 kg/l and is therefore not far from the raw density of solid aluminium at 2.7 kg/l. At the same time, the clinging cooling lubricant is practically completely pressed out and collected separately. The finished aluminium briquettes fall into a collection container which can hold about one cubic meter.

Briquetting saves about 30 man hours per week

Leonard Euler is totally satisfied with the success. He stresses: "The chip press has made a major contribution to the automation of our processes and the increase of efficiency. In evaluating the investment, the benefits were so clear that we did not have to carry out any complex analyses or elaborate amortization calculations down to the last detail." After the system went into operation, it was actually found that the manual effort saved by automation was roughly equivalent to three-quarters of a staff position, and that can now be used for productive activities. This effect alone was a contribution to the quick amortization period. And keep in mind, this benefit is seen although Euler had previously briquetted chips, but with a less automated system.

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Further to the efficiency gains, the contract manufacturer has also been able to increase revenues from briquettes as opposed to loose chips. In addition, the reuse of the cooling lubricants results in considerable savings, as Ralf Lorbach, technical consultant at RUF calculates: "At an annual consumption of 40,000 liters of cooling lubricants, which are produced from 3,200 liters of concentrate, the potential savings lie between 12,000 and 15,000 euros per year." Euler is also equipped already for further growth with this briquetting system. To date, it is processing an average of 40 kg of chips per hour; up to 120 kg per hour is possible.

Complete system from a single source without interface problems

The management were also pleasantly surprised by the smooth commissioning of the complete system. The fact is, it consists of machines and components from several manufacturers: the press from RUF, the lifting/tipping device and the crusher from Erdwich as well as the filter system from Polo. "We practically didn't notice that we were dealing with different suppliers," is the praise from Leonard Euler for the good coordination and cooperation between the companies. "From day one, the cooperation with Mr. Lorbach worked very well; he coordinated everything and we did not have to worry about the coordination between the companies involved," the CEO emphasizes. Ralf Lorbach goes on: "We coordinate with each other, make proposals to the customer, for example, for the networking of the control system, and finally, fitters from the participating companies construct the system together at the customer's premises."

As Leonard Euler reports, this brings clear benefits to the users: "The entire system is linked to each other free of potential, i.e., when, for example, the coolant container of the filter system is full, a sensor on the coolant container reports this. This signal stops the filter system and passes the information on to the press, the shredder and the lifting device, so that the entire system stops and switches to a standby mode. Once the coolant container has been emptied, a push of a button is enough to restart the entire process. This gives us a coherent network."

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The RUF press itself is just as reliable as the network. "Very low maintenance requirements, no unplanned downtime; we are absolutely satisfied with the machine," concludes Leonard Euler.

((Info box Euler Feinmechanik GmbH))

Euler Feinmechanik GmbH ...

...is an owner managed contract manufacturer with over 70 employees, which manufactures complex turned and milled components for demanding and quality-oriented customers, all from one source.

Among their services are post-processing, surface treatments and component assembly. The company processes both metallic materials and polymers, with 45 turning and milling centers, currently. A vast range of aluminium alloys make up the lion's share with about 75 percent. The company's headquarters are in Schöffengrund, on the outskirts of Wetzlar, the City of Optics, and therefore they work extensively for the optical industry. However, vacuum and industrial technology are currently a strong growth driver. The company is run by Hans Euler and his son Leonard, who are strongly advancing further development in the fields of automation, robotics and Industry 4.0.

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Picture captions:

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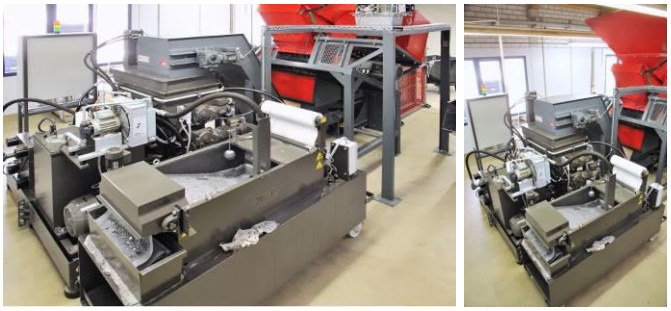
Dry, easily manageable briquettes instead of bulky wet chips: The RUF press has immensely simplified the handling of production residues. A container collects the recovered cooling lubricants. Pictures: RUF Maschinenbau GmbH & Co. KG



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Compact, high performance system: The briquetting system with lifting/tipping device and shredder (red) and filter system (in the foreground) for filtering the cooling lubricants. Picture: RUF Maschinenbau GmbH & Co. KG

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Simple transport: Standardized 400-liter containers on rollers collect the aluminium chips from each machining center. Picture: RUF Maschinenbau GmbH & Co. KG

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Efficient processes: The chip containers only need to be pushed to the lifting/tipping device and the processing is started with the push of a button. Picture: RUF Maschinenbau GmbH & Co. KG

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Leonard Euler: "The chip press has made a major contribution to the automation of our processes and the increase of efficiency." emphasizes the managing director of Euler Feinmechanik GmbH.
Picture: RUF Maschinenbau GmbH & Co. KG

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Managing Director Leonard Euler and RUF Technical Consultant Ralf

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Lorbach put together an optimal combination of briquette press, lifting/tipping device, shredder and filter system.
Bild: RUF Maschinenbau GmbH & Co. KG

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Filter system: The cooling lubricant, which is pressed from the aluminium residues, is filtered through a fleece and can then generally be reused.
Bild: RUF Maschinenbau GmbH & Co. KG

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Aluminium briquette: Using a pressure of up to 4000 kg/cm^{2,} the chips are pressed into cylinders with a diameter of 70 mm and a length of also about 70 mm. The density is just over 2.3 kg/l, not far from the 2.7 kg/l of solid aluminium. Picture: RUF Maschinenbau GmbH & Co. KG

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Simple operation: A touch panel serves the controls of the press as well

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as displaying the most important information, clearly.
Picture: RUF Maschinenbau GmbH & Co. KG

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The Company:

The Zaisertshofen based company was founded in 1969 by Hans Ruf. Today, his sons Roland and Wolfgang Ruf direct the business.
Around 150 employees develop and produce highly innovative briquetting systems in modular design for wood, metal and other residues. The smallest machine type RAP (RUF integration press) with a motor power of 4kW achieves a throughput rate of 20 to 150 kg/h (depending on material and chip type). The largest system with 90 kW (RUF 90) achieves up to 2,500 kg/h for aluminium, for cast iron up to 3,000 kg/h and for copper materials up to 5,000 kg/h.
In 1985 Ruf presented his first briquetting press and sold it to a woodwork factory. It is fully functioning to this day, proving the solid construction of the RUF systems. Today, more than 5,000 RUF briquetting systems are in operation in more than 100 countries.

If any questions concerning the text and pictures arise, please contact k+k-PR GmbH.
Further information about the company, technology and products can be obtained directly from Ruf Maschinenbau GmbH & Co. KG.

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