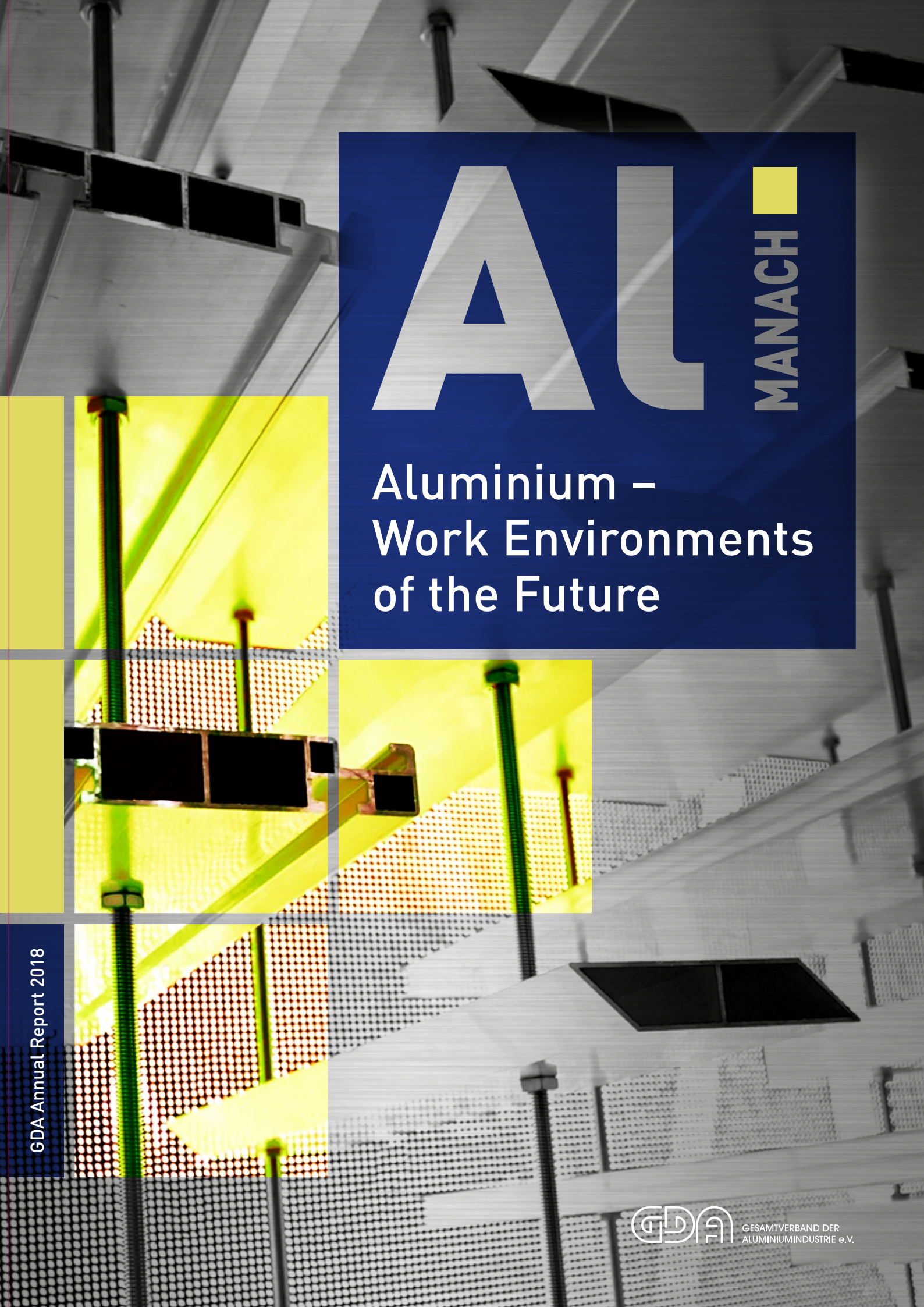

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Aluminium – Work Environments of the Future

GDA Annual Report 2018

GESAMTVERBAND DER ALUMINIUMINDUSTRIE e.V.

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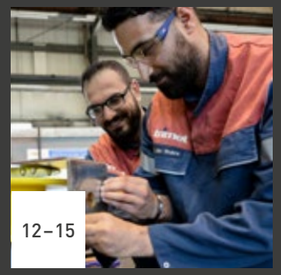

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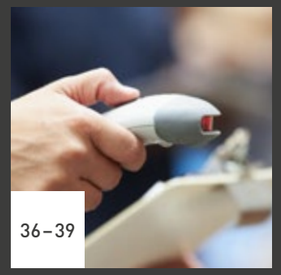

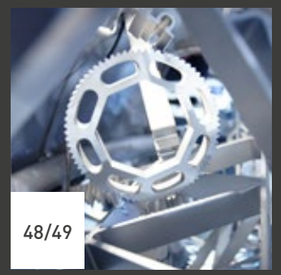

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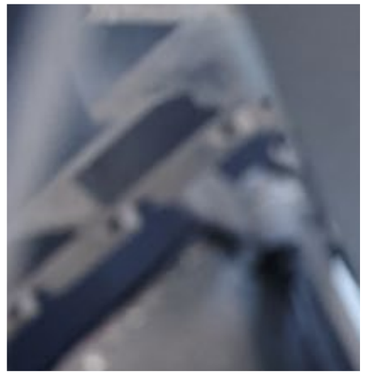


Dr Ing. Hinrich Mählmann,
President of GDA

Christian Wellner,
Executive Member of the Managing Board of GDA

Recognising digitalisation as an opportunity

Don’t be afraid of Industry 4.0: Digitalisation as an opportunity for future-oriented work places

For the past ten years or so the global economy has enjoyed a continual upswing, not least because of technical advances by industry. Digitalisation has played a key role here and a network using every type of smart terminal device enables highly flexible forms of work to be carried out today. This development will continue to gather pace with ever-newer technical opportunities and the growing demands made by clients, employees and society. Great progress has also been made in our industry and as a material aluminium is globally available and deployable. With one new possible application after the other, has become a symbol of technical development in the 21st century.

Continual growth and high innovative capability are not some law of nature. Full employment, brimming state coffers and successful companies must not obscure the fact that Germany could be in danger of losing contact with those countries that are resolutely tackling the issues that concern the future. When it comes to digitalisation and education, infrastructure or excessive bureaucratisation, we are too often content to maintain the status quo and fail to develop visions. Often, we only deal with the future until we come up against the next everyday problem. This is not the way to solve the challenges of the future. It is necessary for us to face up to changing situations and find solutions. This applies above all to qualifying our employees so that they are capable of coping with future working conditions and job requirements.

International studies predict that soon almost every second job will be affected by new competition from computers that will steadily become more and more intelligent. This applies to technical jobs as well as the service sector. Growing automation and digitalisation will lead to changes in the working procedures that are common today and many jobs will disappear in part or completely. Companies are now having to pay greater attention to hiring qualified personnel than used to be the case. Digitalisation is accompanied by new demands being made on qualifications.

What opportunities and challenges do the jobs of the future bring with them? What solutions can research, science and the economy offer regarding these issues? What working-time models are asserting themselves? Can everybody participate in this development? And how will society change if we increasingly communicate and interact digitally? As the aluminium industry, we must also find answers to these questions – ideally together. The new working environments will not appear suddenly, although changes will come sooner than some people – above all politicians – imagine. A glance into the past shows that these changes can also be mastered in the future. A hundred years ago more than every second person in this country was employed in farming – today it is only every twentieth person, with a declining tendency.

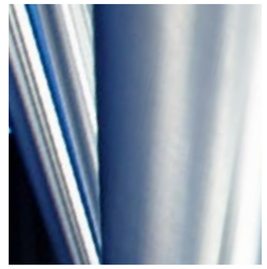
Digitalisation and technical advancement in the working environment will present many sectors with challenges – but will also open up new opportunities, create new professions and employment, and make many things possible in future that seem to be impossible today. Our industry has to understand that digitalisation is an opportunity and not a threat – and grasp the opportunities that present themselves.

GDA’s Annual Report 2018 with its guiding theme ‘Working Environments of the Future in the Aluminium Industry’ wants to stimulate debate on how the digital transformation of companies will change employment in the aluminium sector and what challenges the companies will have to overcome. In guest contributions, experts from the aluminium and client industries discuss how the processes and forms of cooperation can be shaped in future in the fourth phase of the industrial revolution. In addition, GDA contributions based on daily business practice reveal how the association is already positioned to deal with its important fields of activity in future.

The end of 2018 will bring with it an important change for GDA: after more than 20 years, the association is changing its location and will be moving from Düsseldorf-Golzheim to Düsseldorf-Lörick on the other side of the River Rhine. The association’s new location is in the modern ‘Fritz-Vomfelde-Straße 26-32’ office complex and offers about 1000 m² of office space and meeting rooms.

We look forward to being able to welcome the representatives of our member companies to our new home from the beginning of 2019 onwards. ■

GDA ■ BUSINESS ACTIVITY



Author:
Dr Andreas Postler,
Head of Economics and
Statistics at GDA

An overview of the aluminium industry

Last year, the German aluminium industry presented itself as stable and in good shape.

The German aluminium industry experienced a robust economic environment in 2017. Supply and demand for aluminium tended to be at a satisfactory level. The development on the production side was positive in practically all product segments along the value chain. Production increases were reported for raw aluminium, aluminium castings and aluminium conversion. Only in the semi-finished aluminium products sector was output slightly lower than the previous year's level.

The German aluminium industry increased turnover in 2017: 1.4 billion euros or seven per cent to 21.1 billion euros. Of this, 11.7 billion euros was achieved at home and 9.4 billion euros abroad. The rise in turnover was primarily the result of the increased costs attributable to the metal price compared with the previous year. The average price for aluminium on the London Metal Exchange in 2016 was 1,451 euros and this rose to 1,743 euros in 2017. This means metal purchase prices increased by 20 per cent.

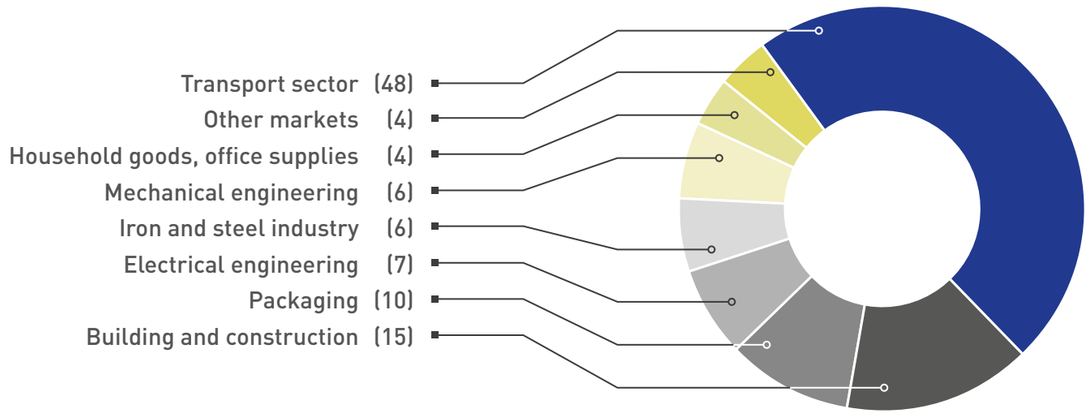
The German aluminium industry comprises companies of every size. In 2017 there were 248 plants employing some 63,500 people directly. This represents an increase of 1,570 or 2.5 per cent on the previous year. The aluminium industry is important for employment in Germany: besides being an important employer in its own right, it also generates additional employment in related industries.

Regarding the user markets for aluminium products in 2017, the transport sector accounted for the largest market share with 48 per cent of the total. The building and construction industry had a market share of 15 per cent and was thus the second largest user industry. The packaging market was the third most important client segment in 2017 with a share of ten per cent. Electrical engineering, mechanical engineering and the iron and steel industry each accounted for a share of six to seven per cent. The remaining eight per cent of total demand was used for producing household articles and other end uses. All in all, there were thus only marginal structural changes compared with the previous year.

The supply of raw materials is a topic that plays an important role in Germany, and one that is of outstanding importance for the aluminium industry. This becomes immediately apparent when one looks at the net imports of raw aluminium: net imports of well in excess of two million tonnes were needed in 2017 to satisfy production in the downstream stages of the value chain. Germany plays an important role in Europe as an aluminium producer. German exports exceed domestic demand, especially in the case of aluminium semis. Here, too, the volume of exports increased again in 2017.

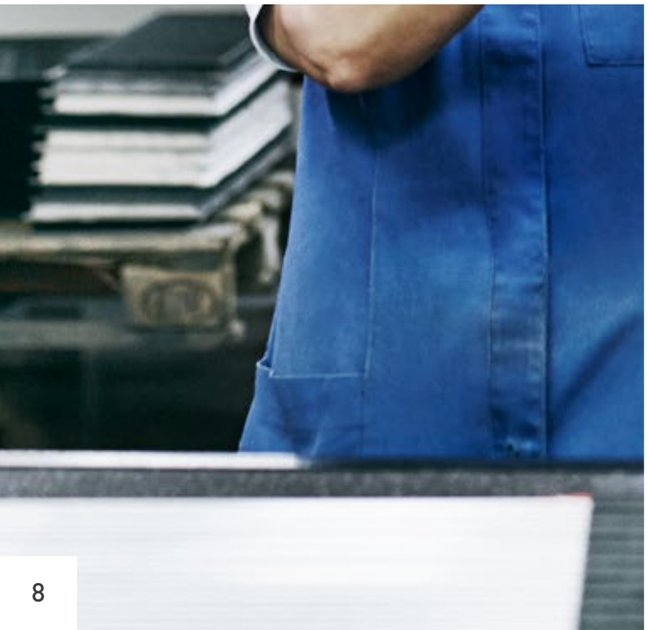
Sentiment in the aluminium industry in Germany is positive. The reason for this is the positive outlook in the most important client segments. This is particularly true for industrial user markets and the building industry in Germany and the rest of Europe. However, a decline in the economic momentum is expected given growing protectionism and the risk of a global trade war. This harbours considerable risks for the export-oriented German industry. ■

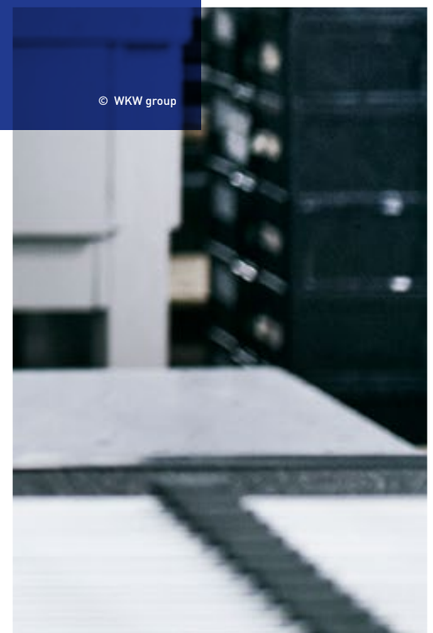
Main markets for aluminium in 2017 (in %)



Battling for the best brains or empowering the employer brand

The aluminium industry in Germany is doing well, full order books are a testament to the booming economy. Despite this, the situation could be better for some companies, as there is a lack of employees.





Author:
Monika Kocks,
Vice President Communication of WKW.group and CEO of WKW Unternehmens-Akademie GmbH

The stress of having to recruit capable employees or highly qualified specialists means those responsible both in management and the human relations field are increasingly resorting to grandiloquent expressions. Slogans such as 'The battle for the best brains' or 'War of talents' do not sound like well-founded personnel recruitment concepts but more like the name of the latest film in the **Star Wars** series. New ways are needed to find personnel if one is to be successful when hunting for the best brains. Being perceived as a desirable employer plays a decisive role here. But how successful is this when, following the initial contact, during the period of getting to know each other it all turns out to be hot air from the applicant's point of view?

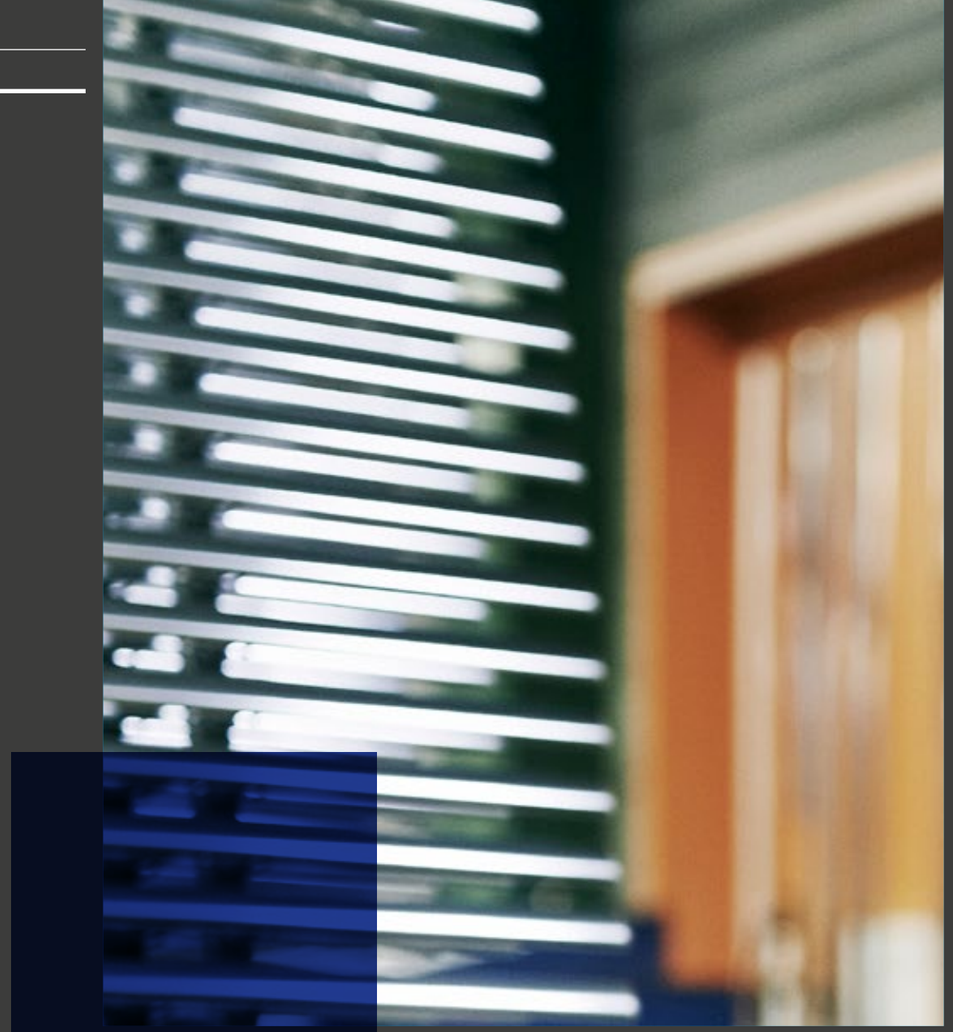
Presenting employers on Facebook, Instagram, Twitter, Xing or LinkedIn as agile, fresh organisations with a youthful image has now become part of everyday business in the field of communications. When one reads recruiting advertisements one is bombarded with empty phrases like 'leading company that offers unique development opportunities and promotion prospects' is looking for 'young, enthusiastic employees' who can count themselves as being an intimate member of the top employers' club thanks to their 'honours degree, extraordinary commitment and team spirit'. However, the more often candidates read these hackneyed phrases, the more implausible is the company's presentation of itself as a unique employer.

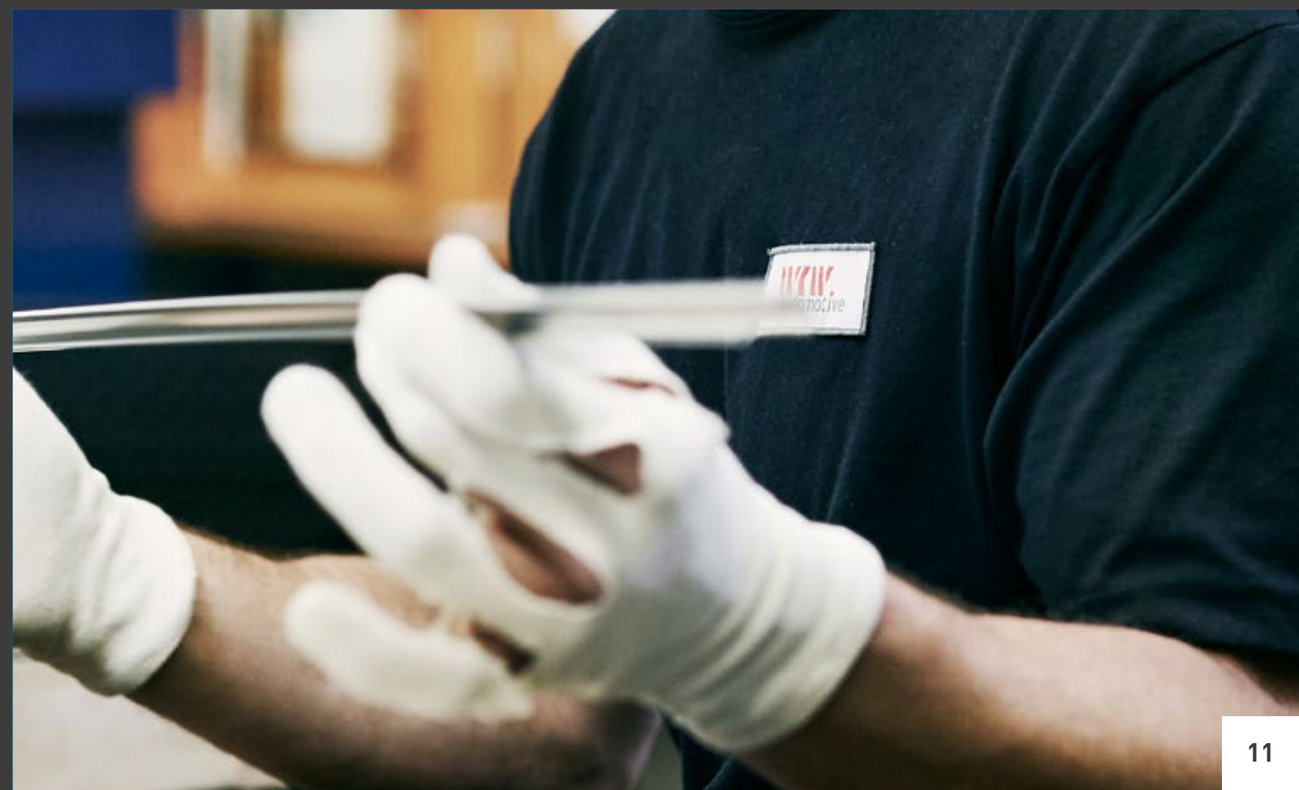
One must first clarify whether the personnel recruitment department is capable at all on its own of creating an image of the company as an attractive employer, or whether this is a job for more complex brand development, where corporate management must also play a significant role. Establishing a distinctive brand is now one of the most important strategic organisational tasks in many companies. Just a few years ago, this was something that fell into the category 'ought we be doing something about it', and then mainly from a customer loyalty point of view.

Nowadays, it is no longer a case of developing strategies with regards to how an organisation will be perceived from the outside. It is significantly more effective to actually implement a genuine employer brand within the organisation. This brand must visibly be part of the organisation's corporate culture and accepted so that all employees can personally identify with the company's values. Furthermore, only something that is implemented and practised in a sustainable manner will be able to withstand critical examination from the outside.

One proven method is to continuously motivate and support employees. Many organisations decide to consider personnel development as a strategic unit, based also on the realisation that expanding individual abilities must be organised anew. The formal intelligence of an employee becomes significantly less important than his or her social intelligence. As a result of this, many organisations establish their own training centres or corporate universities whose main task is the development of soft skills. Based on demand analyses, specifically tailored concepts for training and further education are developed to prepare employees for fulfilling the demands that every individual employee, and of course the company also, will be confronted with in the volatile markets of the future. Every employee has the opportunity to participate in an individual consultation regarding their personal and professional development and, as a result of this, to participate in appropriate programmes. Of course, particular attention is given to encouraging the new generation of managers so that when necessary management positions can be filled by the company's own personnel, and one is no longer obliged to participate in the hostilities associated with potential applicants.

By including as many employees as possible in specially tailored training programmes, one creates an employer brand based on a respectful conception of people and as a result also generates an improved employer reputation with respect to organisational performance. Discussions with potential applicants show there is a growing trend for opportunities for professional development and further training being regarded as a crucial factor for entering into a contractual relationship with a particular company. ■

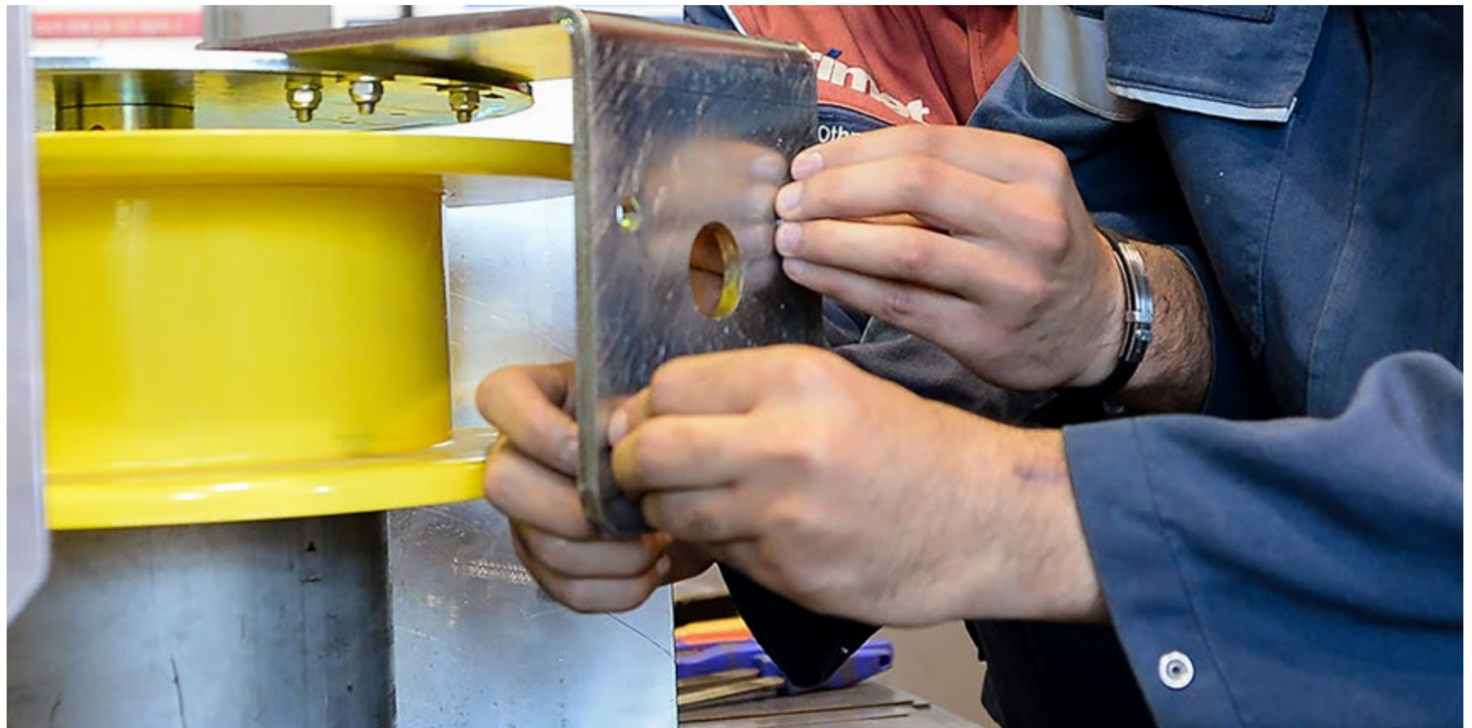




A smart home creates a lot of work

The aluminium industry puts a strong emphasis on training its own junior professionals.

Author:
Dr Martin Iffert,
Chairman of the Board of
TRIMET Aluminium SE



GDA ■ INTRINSICALLY VALUABLE INDUSTRIAL PRODUCTION

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In the 19th century, Luddites fought against the industrialisation of manufacturing processes that threatened to replace qualified trades with the work of unskilled workers. Despite considerable social conflict, the development took a different course to the one that had been feared. Industrial production has changed but not replaced skilled trades: it has produced specialised and highly qualified professions and created the jobs that are the backbone of our society today.

This is because the strength of our economy is based above all on industrial value chains that integrate the complete process from the production of the materials through to the installation of finished products. An industrial nation is like a tall skyscraper. The raw materials industry occupies the ground floor. From here one can access many different (value chain) floors that are closely linked together. The digital economy is currently occupying the penthouse and considering how it can convert the skyscraper into a smart home.

Contrary to some fears, this smart home cannot function in isolation. We need industrial jobs to operate and maintain it. However, digitalisation will change industrial production. It will affect manufacturing processes, the logistics of the flows of materials and goods, and the organisation of work in the production facilities: workpieces and machines will become increasingly part of a network. Innovations such as adaptive manufacturing will enable customised products to be produced even in the smallest possible lots. In future, components and specific customer requirements, and not the control centre, will define the next processing steps.

The company as a learning organisation

This will have a considerable impact on the way worked is organised. Central control of the production steps will give way to new forms of cooperation. We have known for a long time that engineers and management are not solely responsible for the good ideas in a company. Rigid and complicated chains of command belong to the past. Flat hierarchies are more effective and can make better use of resources. Decentralisation of decision-making does not mean the dissolution of order. However, ensuring that production processes are efficient, products are of a high quality and delivery is reliable place high demands on the workforce.

Education is a key to fulfilling future demands. If employees develop further, so will the company. In this sense, TRIMET regards itself as a learning organisation. Continuous development is essential and requires the commitment of all employees. That is why at all levels in our company we do not regard training as an individual privilege but the consequence of economic logic and a corporate necessity. We have adapted the principle of continuous optimisation of products, processes and structures to our requirements in accordance with the Kaizen method and expanded it by means of the organisation of work and production processes to include the sustainable management of raw materials, resources, energy and environmental protection. It covers all areas of the company and at the same time it is open to new demands from society. Education and training are the pillars that support personnel development in order to combat the shortage of specialists and help develop qualified junior employees. It does not matter who you are but what you can do.

Industrial labour integrates people

Industrial jobs are a guarantee for people from different social and cultural backgrounds to have a secure existence so that they can live a self-determined life and integrate successfully. They offer opportunities for social advancement and thus contribute to solidarity in society and social peace.

TRIMET is counting on this integration capability with its 'Vocational Training for Refugees' project. During the period up until 2022, my company will be making additional apprenticeships available for a total of 66 young people who have been driven from their homeland by war and persecution and have sought refuge by us. Accompanied by measures to facilitate integration, we want to offer the refugees long-term career prospects at TRIMET. We have increased staff numbers in our personnel and training departments and have extended the training facilities so that we can introduce preparatory and accompanying training courses. Many employees at TRIMET are actively involved as mentors. They help their new colleagues settle in at their new workplace, accompany them when they have to deal with the authorities or visit a doctor, and they are on hand to answer questions regarding everyday matters in their new home.

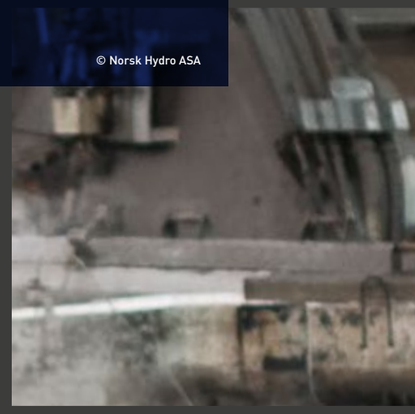
Industrial production that relies on products that maintain their value and continually faces up to the demands of the time also creates and ensures intrinsically meaningful employment. With jobs that are both integrated and integrating, it forms the robust backbone of a competitive location that above all allows innovative technologies to flourish houses lots of people in the form of a smart home. ■

The future of work in the aluminium sector – safe, fair and self-determined

Our working world is in a transitional phase. How, where, and how much we will work in the future will depend on digitalisation, demographic change and automation.

Author:
Dr Jürgen Klippert, Political Secretary, Future of Work section of the administration of the IG Metall board of directors in Frankfurt

GDA ■ SECURING JOBS AND FUTURE WORK DEMANDS



Most of us can no longer recall the times when there were no computers on desks. For many, memories of life with out a smartphone have faded. And this despite the fact that these intelligent mobile devices have only been around for a good ten years. Change is part of the daily agenda in a highly industrialised society. This is particularly true for the aluminium sector, which plays a central role in many value chains. What must the sector tackle now to ensure that employment is safeguarded, and that people can cope confidently with future demands?

Aluminium production – digitally networked in value chains

Value chains are controlled digitally: sending requests for quotations, confirming delivery dates, triggering material call-offs and administration is now conducted via the internet. Geometric data for producing moulds or programmes for CNC machining are made available via the worldwide web. Huge quantities of data travel along the value chains. This form of horizontal networking is increasingly being augmented by the vertical integration of data in real time. Vertical integration means making the data available for the higher levels of a hierarchy: managers, foremen and supervisors. They can see how processes are running, which orders are pending, which machines are free and whether there are experienced and qualified staff available to process the order.

Once the data required to control processes are available digitally, the next step is not far off: the automation of production planning. Most steps in production planning can be standardised, which means they can be formulated as an algorithm. Then the supervisor no longer plans and controls matters: the algorithm produces the production planning for the coming week. Only those doubtful cases where the technology is not able to reach a decision are delegated to people.

Safeguarding jobs – mastering new challenges

Above all, digitalisation will contribute to the automation of brainwork. Manual work has already become rare in the sector and will decrease still further with digitalisation. This gives us reasons to fear that many jobs are in danger and robots and algorithms will take over our work in future. This cannot be ruled out of hand completely. However, experience from previous waves of automation has shown that human labour survives. So we cannot expect to be replaced by robots and artificial intelligence. Even though jobs will disappear on the one side, new ones will appear on the other. These often require other qualifications. To safeguard employment, it is important to recognise such a need for qualification in good time. Besides additional specialist training, new forms of collaboration will also have to be learnt. Plants that want to survive in the digital economy must be versatile. In flat hierarchies, people must learn to adapt products and processes to the changed conditions in a self-organised and self-controlled manner. This demands relearning at all hierarchical levels, right up to top management. If agile working is to be successful, senior management will have to learn to trust their subordinates.

Get everyone involved – shape the future of work now

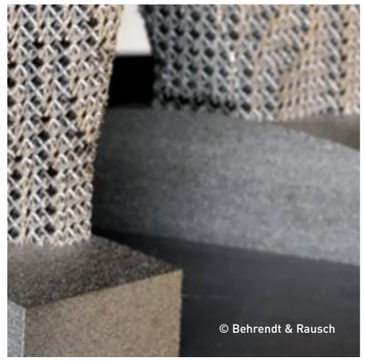
The aluminium sector has it in its own power to set the course for the future in good time. Here are the requirements very briefly:

- → recognise the need for qualification in good time and implement it
- → create health-promoting regulations for flexibility.

For this, work must now be undertaken in the plants on a strategic personnel plan so that the necessary qualifications are available early enough. This will enable employees to master agile working processes in flat hierarchies in a self-organised and self-controlled manner and to handle changes flexibly. In order that work is safe, fair and self-determined, flexibility should not be a one-way street. One-sided flexibility – only in the interests of the company – leads to additional burdens on the employees. In the long term, being constantly on call makes people ill. Flexibility must therefore be regulated. And it must always be possible to also be flexible from the employee's point of view.

Working hours must adapt to the needs of the people. With it latest wage agreement, the IG Metall has taken a major step in this direction.

To conclude, one can say that the future of work will be safe, fair and self-determined if a company's digitalisation strategy includes qualification being carried out early enough that it involves everyone, working hours taking the life of the worker into consideration and the needs of the employees being satisfied. ■



Author:
Dr Ing. Lukas Kwiatkowski,
Head of Innovation at OTTO FUCHS KG

Industry 4.0 – Concrete Steps into the Future

The digitalisation of production is especially challenging for the medium-size aluminium industry.

The term Industry 4.0 first came to public attention at the Hannover Messe in 2011. Since then, no other topic has received such extensive consideration and evaluation at conferences and meetings, in discussion forums and in trade journals. It has resulted in an understanding of terms like networked systems, smart data or factory cloud so that they no longer seem like foreign bodies in the world of production.

The same is true in the aluminium industry. Activities surrounding digitalisation, the new shooting star, are treated as if they have the same status as traditional key features of aluminium like lightweight construction and recyclability. Such discussions enable the sector to develop an understanding for the digital future and allow for specific corporate interpretations, even though these are also quite different. And that is a good thing. In the context of a common exchange about possible visions and impacts, for example via the GDA network, the extent of the issue with regards opportunities and risks is becoming increasingly apparent. As a result, almost 60 per cent of medium-sized companies spanning various fields of industry see Industry 4.0 continuing to grow in importance and in general as a major opportunity. This was the view of 90 per cent of the companies surveyed. A positive assessment of the digital future is above average among traditional industrial companies. Productivity was mentioned as a potential sphere of activity for Industry 4.0 by 57 per cent of the respondents.

Successful design of digital business models

But besides opportunity thinking, what about being more specific? Depending on the survey, the proportion of companies saying digitalisation is an integral part of their corporate strategy is between 40 and 80 per cent. Despite the large differences here, there has been a steady increase in activities in recent years spanning various fields of industry. This growth has been necessary and will also continue to be so in future. Compared with Asian and American companies there is considerable pent-up demand here for European companies to deal with digital business models. At an international level, German industry also sees itself as tending to occupy a mid-table position. The major hurdle for companies that are focussed purely on manufacturing technology in a traditional manner can often be found in the general conditions prevailing today. As there is only biased expert opinion available regarding the uncharted territory called the internet, often in the form of an in-house IT department, the future is often assessed via the rear-view mirror. Changes to the structure of the sector, competitors, clients and suppliers, prices and demand, as well as to technological parameters such as lot sizes and plant performance thus often appear to only be logically conceivable if they are continued.

There is growing interest in the use of scenario methods to overcome this obstacle. These result in several often markedly different visions of the future so that one can deal with the still-unknown territory critically. At the moment, one can observe the preparation of future scenarios in the car industry, particularly by OEMs and suppliers. However, such work is usually taking place in the secure area of the individual companies. Given the diverse fields of application of aluminium today and the intrinsic value of the metal, this is an area in particular where one could achieve added value for the sector and greater use of the material by means of cross-company activities. Associations could instigate suitable initiatives here.

Innovations need courage and commitment

And what are the next steps in the implementation? According to representative surveys, German industry is hesitant at the moment. The lack of time and financial resources are given as reasons why the rollout of Industry 4.0 is taking place more slowly than desired. According to this statement, though, it is not a problem of digitalisation itself, but a typical dilemma associated with innovations. This situation is also understandable at first given the fact that business activity is now positive and the development of digital business models is only in its infancy in the manufacturing industry. It appears all the riskier, though, when one analyses the speed of earlier digital changes. Market positions that have been built up over decades can undergo massive changes within the space of a few years or even months.

Platform systems are on the way in

Platform systems are currently characterised as being particularly 'effective'. They are often used as a self-managing market place for bringing supply and demand together. Furthermore, by bringing together a large quantity of information or data from various sources and then analysing these data, they succeed in recognising or creating additional market needs. While such platforms are now part of our everyday dealings in consumer markets, they are only slowly entering the production sector. However, the first signs are already apparent here, too. Paradoxically, the extensive market penetration by platform systems is being achieved because of the lack of key factors in the form of structures and facilities which are otherwise normal. This results in the customer and his information being the exclusive focus of attention. The scalability of such digital business models is greater and more flexible than a bond with production facilities. However, one cannot rule out that industrial companies will also initiate such activities or take part in them. Here there is a need for politicians, science and business associations to set up additional working groups and make financial resources available to create a 'secure area' outside the traditional structures that brings together the necessary different disciplines and testing environments.

The motivation for such an approach is multifaceted. First of all, the best preparation for the future is characterised by it being one that one can shape actively and impartially oneself. In the case of commodity products, though, consciously dealing with new directions of focus nevertheless offers an opportunity to develop new solutions with distinguishing features and create new demand. However, developing employees into the skilled workers of the future is ultimately also considerable motivation. This will not succeed in a timely manner if the traditional boundary conditions prevail. It is now up to us to develop the profile of the aluminium industry so that it is forward-looking. The necessary prerequisites are already in place. ■

Saves time, cuts costs and is fascinating

Simulation saves time and reduces costs. Important functions, processes or the logistic flow of material can be reviewed early in a virtual system. Optimisation potentials are integrated into the planning phase.

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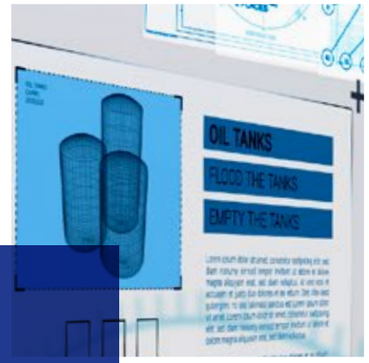
Section Rolling and Forging
SMS group



© SMS group
Photos: Dr Mark Haverkamp

In the SMS Group, VR-glasses do not just allow the passive viewing of ongoing processes, but also allow the user to actively intervene in the process.

It makes the heart of every plant operator or mechanical engineer beat faster: being able to move completely freely between production units that are in operation. Poking one's head into the most inaccessible spots to get a close-up view of red-hot metal being processed. Or soaring high above the plant to survey the complete logistics in the factory. These are probably the most fascinating experiences that SMS group's experts for simulations can offer their clients. That unique feeling of experiencing a new plant or machine using virtual reality and a pair of VR glasses, even though the plant does not actually exist.

Despite all this enthusiasm, there are clear-cut benefits for clients, developers and designers with regards economics and process engineering when simulations are used. So-called simultaneous simulation leads to valuable time-savings because it is even possible to investigate important functions, processes or logistical material flows on the virtual plant at a very early stage and then incorporate the potential for optimisation into the planning. This speeds up all subsequent work right through to commissioning. Moreover, discussions of technical solutions with the client beforehand are much better if one can view it as a concrete virtual machine. During ongoing operation as well, digitalisation is also making it ever-more important to use a digital clone or digital twins of the plant. The SMS group has already set up digital clones of their plants so that clients can carry out cost-efficient tests for new processes, new products or process optimisation and then transfer the successful variants to their real plant. Digital clones are also ideal for training operating and maintenance personnel.

Simulations using virtual and augmented reality

In the age of digitalisation, a so-called digital plant clone is becoming increasingly important. It is used among other things for virtual reality simulations and is of strategic importance for the plant operator's future competitiveness or competitive edge. A 3D model is available for simulation in virtual reality that can be seen using VR glasses or on a monitor or via large-scale projection.

The client can use the digital clone to carry out optimisation on the virtually displayed plant without ongoing operations being adversely affected. The SMS group has also installed digital clones at clients' facilities for teaching purposes. They are used in particular for training with regards maintenance and operation. Incidentally, a digital clone is also suitable for carrying out training courses long before a plant actually starts production.

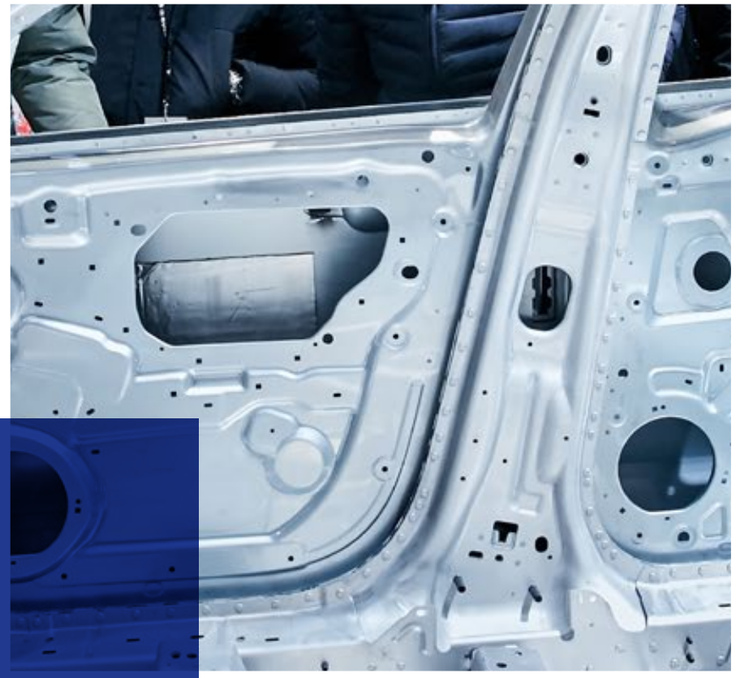
At the SMS group, when anyone steps into the virtual space of a plant wearing VR glasses, they can do more than just observe ongoing processes: they can actively intervene in what is happening. In the spatial simulation it is possible to press the virtual buttons of the automation or an operating panel and the plant's mode of operation changes accordingly. Marco Koepe, plant simulation developer for the SMS group, explains why this all feels so astonishingly real: "We use highly sophisticated game engines for many VR applications. This has the advantage that the powerful software already incorporates features from the physical world, such as gravitational forces or simulations of motion. It makes our work easier and handles it in a more efficient manner. However, we can't use it for those issues where physics is particularly important for the process, and in such cases we develop our own models, which carry out calculations simultaneously in the background."

A second development that is also being used by the SMS group is augmented reality, or AR. Here, real and virtual worlds are linked together using projections onto a pair of AR glasses. This means animations, 3D models or machine information can be superimposed onto the lenses of the glasses and this can help technicians or maintenance personnel carry out their respective task using this augmented reality. Marco Koepe: "Using our AR solutions and a suitable pair of glasses, a maintenance technician can look at a pump, for example, and then see its internal configuration in 3D. Projection onto the glasses means he benefits from functions being much better to understand. If necessary, augmented reality can give him instructions regarding the sequence in which the pump should be dismantled or, for example, how a pump change should be carried out. He sees the specific steps."

Partner for clients in the digital age

For the SMS group, process and logistics simulations, hardware-in-the-loop simulations and applications that use virtual or augmented reality are not unknown territory: they are already part of its daily work in many fields. State-of-the-art simulations are used by engineers in their work and for cooperation with clients. However, this is not a reason for Mark Haverkamp and his team to rest on their laurels. On the contrary: the new opportunities that digitalisation has to offer mean there are currently many novel applications and solutions under development at the SMS group.

"Real and virtual worlds are linked together using projections onto a pair of AR glasses." ■



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Lightweight construction with aluminium still the trend

Lightweight vehicles score well in CO_2-reduction, driving dynamics and comfort. As one of the most important lightweight construction materials in the automotive-sector, the raw material aluminium reaps the benefits.

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Sub-suppliers are facing a multitude of innovative developments ranging from new types of drive, digital or autonomous driving, to the ever-greater importance of lightweight construction. Digital networking means suppliers and purchasers in the various value chains are moving ever-closer together.

Digitalising production planning

Simulation and a better understanding of complete production processes are important integral parts of the growing digitalisation now taking place. The results of simulations can be used in different ways: for process optimisation, for improving process chains and for optimising product properties. Furthermore, they can also be used to derive measures to conserve raw materials and energy.

Increasing digitalisation has opened up new prospects, especially in the field of numerical simulations because the technologies are becoming increasingly interlocked. Furthermore, only with the help of the latest digital technologies will it be possible in future to economically satisfy increasing demands, such as the need for certified processes for safety-relevant components.

Data security as a challenge

The term 'Industry 4.0' is widely used but a common understanding of what it actually means does not appear to have been reached. However, important boundary conditions relating to the handling of digitalised data have already been defined precisely not only within the individual companies but also for bilateral relationships (e.g. client/supplier) and ensure that the exchange of data is secure.

In the case of multilateral systems and the storing of data in the cloud, there are some questions relating to data security and manipulation that still have to be clarified. In particular, clarification is required regarding responsibility in the case of data loss or the use of falsified data by third persons and the resultant damage that arises. This will be a challenge for the near future.

Material for lightweight design par excellence

Aluminium has changed the car industry and will continue to do so in future as well. It offers the best cost-benefit ratio when compared with possible substitutional materials. Evermore intensive cooperation between aluminium producers, processors and carmakers in future could open up yet further potential for the use of aluminium here. The developments in electromobility are giving the metal a fresh impetus: the power electronics, electric motors and above all the battery with its casing to protect it against outside influences bring with them additional potential in the lightweight construction of vehicles. Other design requirements for electric cars mean that aluminium profiles are the only sensible solution for many new products and applications, for example because they offer the possibility to integrate functions or cooling into the profile. Light-metal solutions will establish themselves for battery cases, structural parts and in the drive area.

All in all, the aluminium industry is facing exponential growth in the automotive sector. The demand and need for aluminium will increase still further. Even if the metal loses market share in some fields of application, in turn it will open up new ones. Growth will continue to be greater than substitution, for example in cars. The trend towards energy-saving cars, new applications in electromobility and the metal's optimal reusability, which ensures that it is possible to completely recover the energy that was originally invested in extracting it from its ore, will strengthen the use of aluminium.

Together with representatives of user industries and member companies, GDA is actively engaged in several working groups in a project-oriented and pre-competitive manner in order to consider further possible uses of aluminium in vehicle manufacturing. ■

Continuous Casting working group (WG CC)

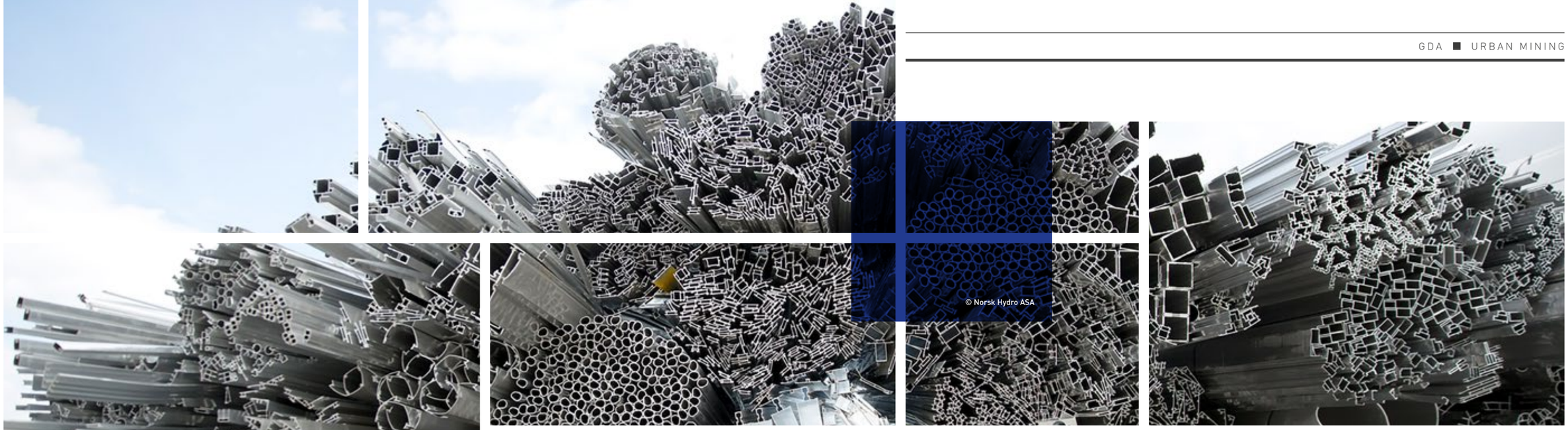
The international members of GDA's Continuous Casting working group comprise users of the continuous casting process, suppliers of plant and equipment, and university and research institutes. Two sub-projects to simulate the strip casting process (Phases 1 and 2) have already been completed successfully and work is currently being carried out on Phase 3, which is expected to be completed by the end of 2018.

Automotive Rolling working group

In GDA's Automotive Rolling working group, experts from the aluminium rolling mills have already prepared or revised a complete series of VDA recommendations together with experts from the car industry (Audi, BMW, Daimler, Ford, Opel and VW). These have already been published in recent months or it is planned to publish them shortly. They include, for example, a VDA recommendation for aluminium sheet, a testing and documentation guideline for the experimental determination of characteristic mechanical values for aluminium sheet for CAE calculations (PuD AL) and VDA recommendations for the plate bending and roping tests. Work currently being carried out is dealing with the continual revision of existing documents as well as new test specifications regarding spot welding and laser-beam welding of aluminium.

Automotive Extrusion working group

Since it was founded in 2008, GDA's Automotive Extrusion working group has prepared, self-financed and carried out six test programmes (UP 1 to UP 6). UP 6 was successfully completed at the beginning of 2018. Overall one can say that the simulations regarding tool deformation and material flow could depict the actual relationships precisely. In the simulations of compression behaviour, the use of a fine network of volume elements enabled differences due to tolerance deviations to be determined. It is thus possible, for example, to qualitatively describe the effect of the web. Preparations are currently being made for the seventh test programme (UP 7), which will focus more intensively on the uses and requirements of extruded profiles in electromobility.



The urban raw materials potential is enormous. In Germany, approximately 10 billion tons of mineral materials are contained in buildings alone.

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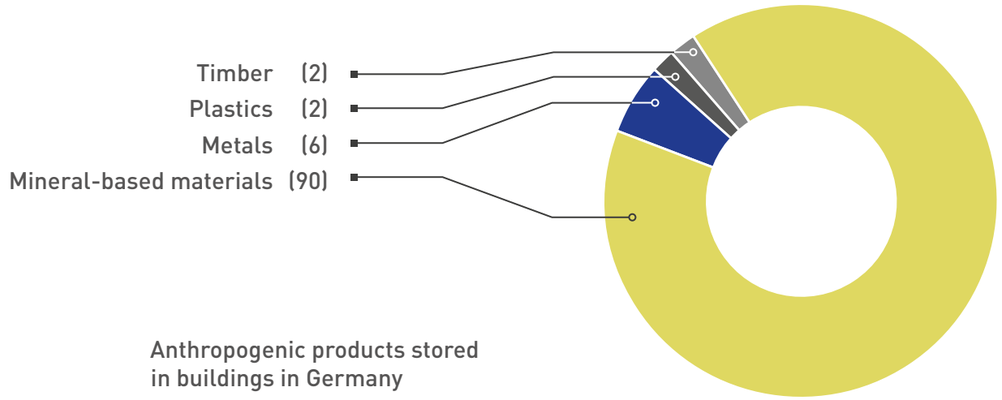

Anthropogenic products stored in buildings in Germany

15 billion tons

Figure 1

The town as a goldmine

With the enormous potential for recyclable construction materials in buildings, "Urban Mining" will become increasingly important in the years and decades to come.

The growing per capita consumption of resources coupled with exponential growth in the world's population is leading to ever more raw materials being tied up in short- and long-life products. This growing anthropogenic materials store together with a simultaneous decline in primary resources means it is necessary to recover valuable materials efficiently. As an extension to the typical circular economy, the term 'urban mining' is currently being used ever more frequently in this context. As a space that contains products and waste, the town is becoming a store for raw materials, the mine of the future for such materials. The four ore deposits of such an urban mine are production, consumption, disposal and processing for reuse. After reaching the end of their useful lives, houses, cars and mobile phones will become treasure troves of urban raw materials and a valuable domestic raw-material reservoir instead of becoming waste requiring disposal.

According to the Federal Environmental Agency, Germany comprises over 50 billion tonnes of valuable materials. Urban mining is the term used to describe the targeted use of this store of materials. Buildings account for a large part of the store's potential as a source of raw materials (Fig. 1).

There are technical, logistical and organisational requirements that must be fulfilled if one is ultimately going to be able to actually realise the potential for urban mining in buildings. It is justifiable to ask questions such as "Are there adequate processing technologies available for enriching the reusable materials and do user markets exist?", "Is the processing economically viable?" or "What level of quality can be achieved by recycling the materials?" One can then conclude how valuable the materials really are.

Fact checking of raw materials

Let us first check the facts concerning the individual materials from buildings with respect to them actually becoming able to realise their potential as a source of raw materials and the subsequent value of the recycled materials.

Mineral-based materials like sand, concrete blocks and building bricks constitute by far the largest material fraction in buildings – about 90 per cent of the total. After processing, which includes crushing, cleaning and classification, most mineral-based raw materials recovered from buildings end up in the construction of roads or as aggregate in the production of asphalt or concrete. One cannot necessarily assume that road construction, for example, will continue to grow as a market. Questions regarding available user markets for the recycled material and preserving material value are perfectly justified. With mineral-based raw materials, the basic aim is to find a use and avoid landfill. Economic aspects frequently fall by the wayside.

Timber is a renewable raw material and after it has been used for the first time it can be recycled, for example as chipboard. It is also justifiable here to question whether material value is being preserved. When timber is recycled, energy recovery is ultimately the final step. As far as the material loop is concerned, the material is thus lost. The CO_2 emissions that are captured when trees grow are released into the atmosphere again during combustion.

Plastics constitute about two per cent of buildings. They are among those materials that when they are recycled for the first time can only preserve their material value to a certain extent and then only at the expense of considerable logistical, economic and technical effort. Heat treatment, for example, leads to a progressive loss of material quality. In other words, the macromolecules lose their properties when their chains are broken; this results in a change in mechanical properties, means the desired colouring cannot be maintained and the necessary properties for shaping the material no longer exist. There are many plastics whose material properties mean they cannot be shaped a second time. In addition, there are only limited markets for recycled plastic materials. Not least because of this, the final step is often combustion. The material is thus lost from the material loop.

When estimating the quantities of materials that are a potential source of raw materials, one should bear in mind that timber and mineral-based materials tend to be the conventional materials used in buildings. There are buildings that still exist today that originate from the time when buildings were constructed virtually exclusively from these materials. Some are subject to preservation orders and for this reason alone cannot be demolished. Half-timbered houses would be an example here. It would be more appropriate not to refer to urban mining in such cases.

Aluminium scrap as an urban raw material

In contrast, steel was first used in larger quantities in buildings in the 19th century. Aluminium, the modern-day material, only began to be used on a large-scale in buildings in the post-war period at the beginning of the 1950s. This has an impact on the amounts of such material that are tied up in buildings. The potential for metals as a source of raw materials in buildings is about six per cent of total building stock. Estimates from the Federal Environmental Agency cannot be broken down into specific metals. It is probably mainly steel because of the above-mentioned historical architectural development. In terms of quantity, non-ferrous metals will account for a rather small fraction. In the case of aluminium, large-scale use in buildings is still relatively new. The oldest building in Germany with an aluminium envelope is the Westfalenhalle in Dortmund, which was built in 1952. In any comparison one should also bear in mind that aluminium is lighter in weight than steel, copper and/or zinc.

There is no question that aluminium's potential as a source of raw materials in buildings will actually be used. Aluminium is removed from buildings prior to demolition, collected in containers and returned to the aluminium smelter, either directly or via the trade. The logistics, such as the necessary processing and sorting technologies or melting capacities, are already available. This material chain is profitable for everyone concerned. That is because aluminium can be recycled time and time again without any loss in quality. The infrastructure required for recycling is already in place and does not need to be laboriously established. The markets are the same as those for 'virgin' aluminium that has not yet been recycled. One talks about aluminium being a permanent material. That means it is a material whose quality or value does not suffer even when it is recycled a multiple number of times.

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Buildings and structures generally have long lifespans, the construction materials and products they contain are not usually returned to the economic and material cycle for many decades.

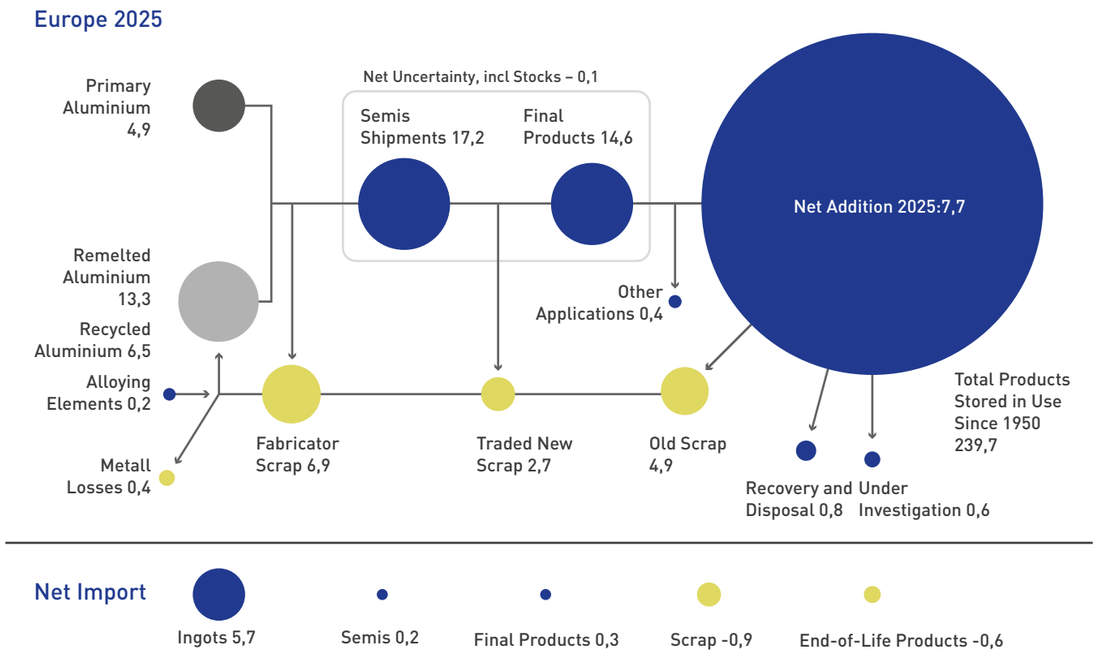


Figure 2 · Source: International Aluminium Institute

Aluminium packaging with the highest recycling rate

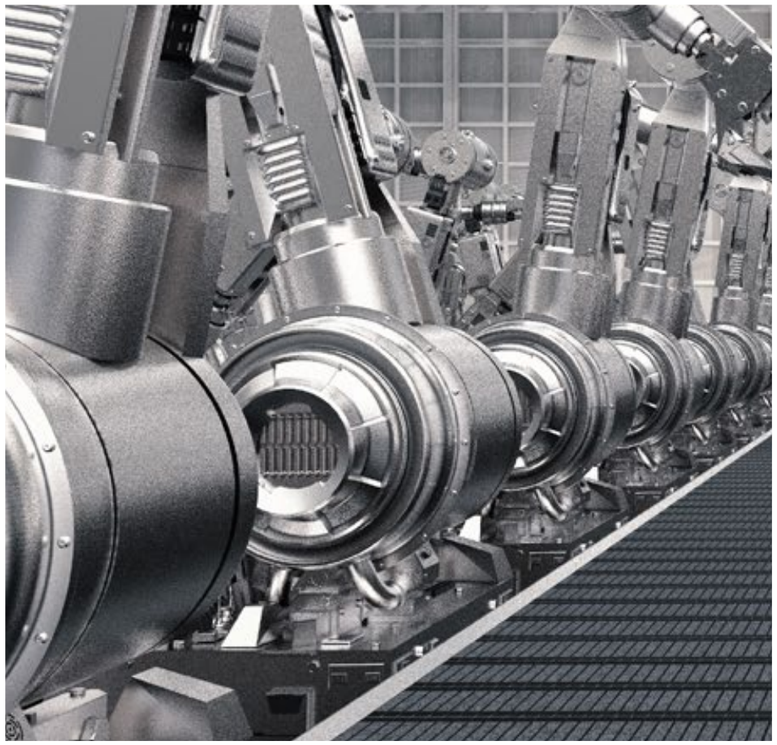
The figures for the total potential of buildings in Germany acting as a source of raw materials are estimates. With some 100,000 tonnes a year in Germany, the packaging sector is the front runner when it comes to aluminium scrap being returned for recycling. It is estimated that about 60,000 tonnes of aluminium scrap is recovered from buildings every year and the figure for cars is some 70,000 tonnes. These quantities do not necessarily remain in the country: the German aluminium industry is suffering from an enormous outflow of scrap.

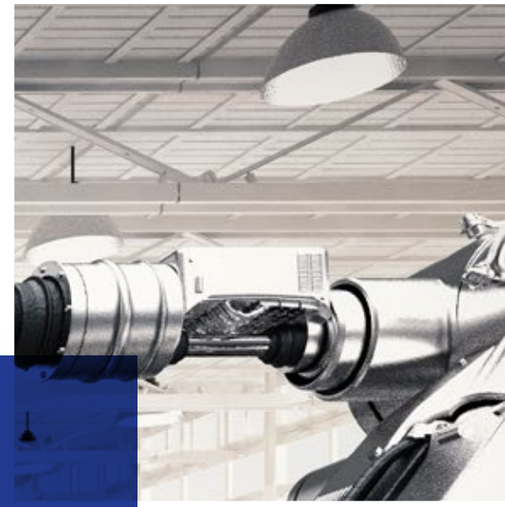
According to a model for Europe from the International Aluminium Institute (Fig. 2), 3.6 million tonnes of aluminium scrap were accrued from anthropogenic products stored in all fields of application throughout Europe in 2016. Besides the three main markets already mentioned, the aerospace industry, transmission lines, and mechanical and electrical engineering are also examples of anthropogenic stores. Based on the model, it is predicted that in 2025 it will be possible to take some 4.9 million tonnes of scrap out of the store.

One can look forward to ever greater quantities of aluminium scrap becoming available and used in future. However, market growth will determine what share of the total demand for aluminium can actually be met by the available scrap. ■

Industry 4.0 is changing production processes

'Change will never again be so slow as it is today.' This sentence of unknown origin accurately describes the current situation.





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Artificial intelligence is no longer hype these days. It was the focus of research in the Federal Republic of Germany way back at the end of the 1970s and the beginning of the 1980s. The German Research Center for Artificial Intelligence (DFKI) in Kaiserlautern was founded in 1988. The focus of many projects at the time was the development of expert systems. Using various knowledge-representation mechanisms, empirical knowledge for a number of problems was mapped in programmes, for example to carry out diagnosis in the field of medicine or to select inspection procedures in the field of corrosion. Buzzwords were 'computer integrated manufacturing' (CIM) or 'computer aided design' (CAD). In many cases these projects were way ahead of their time. They often came up against limitations: they did not have the benefit of today's infrastructure like the internet, WLAN etc. A terminal device with the functionality of a smartphone was not available for any amount of money. However, they did create the basic principles that are used today.

Now, more than 30 years later, many of the things that were only vague ideas at the time have become self-evident. Game changers have transformed the world and will continue to do so. A small online bookseller who was ridiculed by major department store groups has now become a global player. The department stores no longer exist or are now only a shadow of their former self.

Industry 4.0 is changing production processes. It is no longer merely a case of automating individual production steps: it is now a matter of incorporating and integrating people and machines into the whole production and management process. In the field of aluminium surface treatment one can observe investment in new plant and equipment to be able to once again carry out certain production steps in-house and integrate them in the manufacturing of components and products. This trend is on the up and it is changing the sector.

Knowledge as a resource has become more important for companies in the recent past. In view of the demographic change, knowledge management is becoming ever-more important. As a study of knowledge management by the member companies of GSB International showed, this has been recognised but to date it is not yet part of the corporate strategy of all companies.

How will knowledge be exchanged? How will knowledge be protected? Which platforms are effective? Emails, which are still the predominant form of communication today, are often the cause of efficiency problems. When it comes to the social media channels (LinkedIn, Xing, Facebook, etc.) in the B2B field, there are greater reservations nationally than there are elsewhere in the world. Social media channels are currently being used frequently to obtain information and as an advertising platform. The use of these platforms for the management or exchange of knowledge will increase rapidly. The current upcoming generation, who already use these tools as a matter of course, will act as the promoter here. ■

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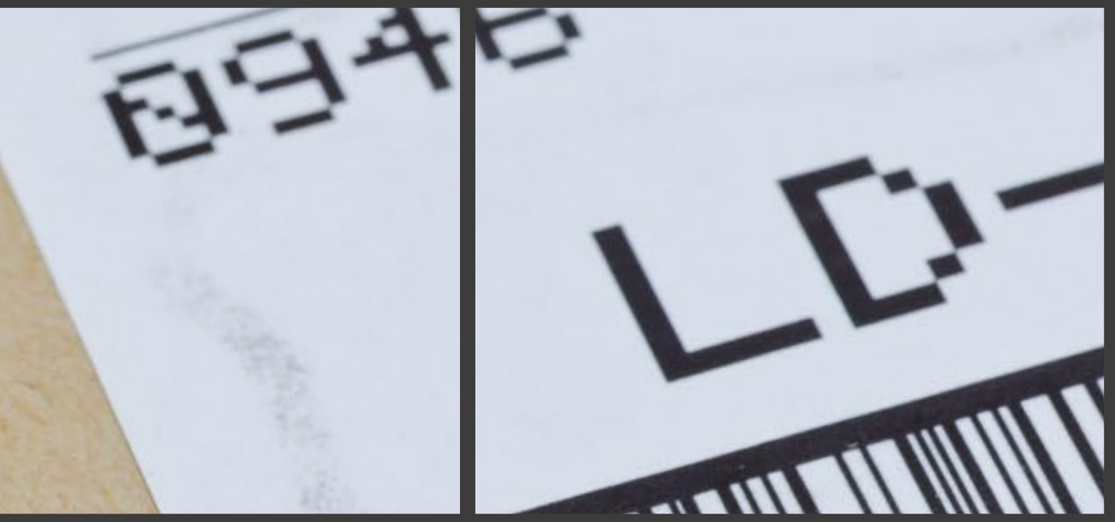
Packaging – the link between real and digital worlds

Buildings and structures generally have long lifespans, the construction materials and products they contain are not usually returned to the economic and material cycle for many decades.



Packaging has to fulfil numerous functions in a modern and increasingly demanding society. First and foremost, it must protect products effectively. However, at the same time it needs to be eco-friendly and convenient for consumers, it must satisfy requirements along the whole transport and distribution chain, and it must inform the consumer about the packaged product.

In an increasingly networked and digitalised world, improved connectivity of the packaging is playing an ever-more important role when it comes to optimising the supply chain and addressing the consumer.

The so-called Internet of Packaging (IoP) is demanding ever-more intelligent packaging solutions that allow information to be exchanged along the whole supply chain, and directly with consumers via their smartphones or other mobile devices, thereby forming a creative and efficient purchasing process.

The packaging also thinks

Technologies such as radio frequency identification (RFID) chips, barcodes, 2D codes or quick response (QR) codes on packaging do not only allow products to be traced along the complete supply chain and thereby make distribution more transparent: they offer better protection against counterfeiting, comprehensive information regarding the production history, composition and shelf life of the packaged product, simplified management in the event of a recall, and last but not least sales promotional communication with the consumer.

Printed electronics is gaining ground. It is being driven by packaging designers and the marketing departments of brand manufacturers, who are interested in having a design area on the packaging that is as large as possible and thus who are interested in dispensing with the need for chips or codes. It is expected to take over the functions performed by RFID chips or bar, 2D or QR codes. This is being achieved, for example, using a digital watermark spread over the whole packaging; the watermark is invisible to the human eye but can be read using a special app installed on a mobile device. The watermark can be applied using commonly-used printing processes such as offset, flexo or inkjet printing.

Smart shopping

The supermarket of the future will recognise you whenever you enter or leave the shop. Using his or her mobile purchasing assistant (a mobile phone equipped with special software), the customer will scan the products using the mobile phone's camera. The purchasing assistant will then serve the customer, for example with information about current prices and discounts, the origin of the goods, purchasing recommendations, access to product and promotional videos or information on competitions. The assistant will also help the consumer find products in the shop or prepare shopping lists. Once customers have completed their shopping, they will press a button and transfer the details to the purchasing assistant. The mobile phone will then display a barcode that can be scanned by the payment stations of the express checkouts, where customers will be able to pay for their purchases in cash, by card or using fingerprint authentication.

All of this will only be possible because the connectivity of modern packaging links the real world with the digital world.

But it is also possible to make things even simpler: Amazon has started to revolutionise the physical shopping experience. Amazon's convenience store (Amazon Go) offers a novel 'shopping experience' using sensors, cameras and evaluation algorithms (sensor fusion). When customers enter the shop, they check in using the Amazon Go app and a QR code scanner. Cameras and a weight sensor integrated in the shelf recognise that a customer has taken an item from a shelf and put it in a shopping trolley – as well as which customer it is. When a customer leaves the store, his or her purchases are debited to the respective Amazon account. This means queuing and paying at a till are things of the past.

Customers pay with their data

Packaging that uses elements of modern communication even offer a solution for those consumers who no longer have any desire to purchase their food in a shop. In future, in the Internet of Things, intelligent packaging will communicate with the intelligent refrigerator, which will send the consumer a message on his or her smartphone about what needs to be purchased. The consumer then places an order for the products concerned using an app from the retailer, who then delivers them free of charge at the appointed time.

So much comfort, digitalisation and automation of the shopping process also comes at a personal price that is over and above the price of the product. Forgoing personal privacy to a great extent and voluntarily making information and data available means that for brand manufacturers and the retail trade the consumer will become increasingly transparent and open to manipulation. ■

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Knowledge storage and knowledge transfer in the digital age

In recent years digitalisation has put the media in a constant state of flux. Digitalisation makes it necessary to build and develop on existing competencies and knowledge.

When it comes to imparting and storing knowledge in future, what will the working environment be like in the field of education? Whatever else, it will be digital. That is something we can say with certainty because the future has already arrived in this field, and in the media sector as a whole. The way knowledge is generated, stored and imparted has undergone fundamental change in the digital age. The fact that it is possible to store knowledge digitally today means it can be researched more easily, accessed more quickly, is available to much larger user groups and is also easier to update. These benefits have led to GDA's deciding to have its library digitalised completely on a full-text basis. This work will be carried out during the current year. But first let us look back at the developments that preceded this decision.

Largest German library devoted to aluminium

GDA's extensive reference library, which contains items that go back to the 1930s, is the largest German library devoted to aluminium and one of the largest of its kind in the world. It documents some information on magnesium and titanium as well. Besides the latest articles from well-known trade journals it also contains historical material on aluminium and is therefore the leading address for searches related to the metal.

There are opportunities for basic research here in the form of books, congress proceedings, periodicals and individual papers. The fields of knowledge are categorised into 25 main groups and over 1000 sub-groups. National and international specialist publications are regularly evaluated with respect to the following topics: the aluminium industry, the extraction of aluminium, material properties, metallurgy, materials testing, corrosion, first-stage processing, heat treatment, mould casting, chipless forming, machining, joining, design, surface treatment, uses, building and construction, chemical engineering, food, packaging, electrical engineering, transport and defence technology.

Online since 2006

As was common practice in libraries at the time, the contents of articles and books together with the relevant key data were managed non-digitally for decades using file cards that allowed the contents to be searched according to subject. A step forward was taken in 2003 when GDA developed its concept for the future. The library's catalogue was first digitalised: in 2004 thousands of file cards were scanned, in 2005 a library software was installed that allowed GDA's employees to access the bibliographical references, and a test phase was then started to activate access via the internet. This goal was achieved in June 2006 after a long process that was complex technically and organisationally: the GDA library was now accessible via the internet. From then on, interested parties could access the literature data base online from anywhere in the world and order literature on aluminium from the GDA library. It made digital searches possible. The library's catalogue has been available via a link on GDA's home page ever since. The database is updated regularly. Access and searches in the online catalogue are free of charge. The visitor can conduct a search either in titles and abstracts or more selectively via the classification system. Digitalisation also led to the idea of providing users with compact information on new additions to the library, in the form of a digital 'periodical' – called Aluminium-Literaturschau (AL). Since 2013, this review of the literature has been distributed as a PDF file twice a year to over 1000 email addresses from industry and research.

The final step on the road to digitalisation

The term 'library' does not only mean a collection of books and other written documents. Its main purpose is to make it possible for people to utilise the volumes and articles that have been collected. Digitalisation has also changed this.

The decision to full-text scan all the technical literature on aluminium that has been acquired over the years means taking the final step on the road to digitalisation: complete digital access will now be possible. Users can then not only conduct searches from afar: they will also be able to see the complete texts. This simplifies access to older texts. Furthermore, after almost a hundred years it is only natural that the catalogue has reached such a size that it now appears sensible to only store certain publications in digital form. These include journal articles and individual papers. Furthermore, it is more comfortable to search through texts on a computer than to thumb through volumes of periodicals that have become dusty with time. After all, over the past 90 years a not inconsiderable proportion of the volumes have survived the bombing of Berlin and several moves within the Rhineland.

For copyright reasons, it is planned to make online access with the full-text option available exclusively to members of the association at first. Consideration is still being given to whether and when non-members should and could have access to full texts. Certain texts – especially older ones – have open access licensing and can be distributed and used without any restrictions. However, copyright means others can only be viewed by certain user groups.

The future of GDA's literature database will be very interesting! ■

Being merely digital is not enough

Social media have changed everyday communication radically. Corporate communication must adapt to these new developments.

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Social Media Manager at GDA

The media have long since not functioned like they did 20 years ago. Newspaper and magazine circulations are declining continuously. At the same time, Facebook has grown rapidly since it was founded in 2004 and now boasts about two billion active users. Even the once much smaller Instagram from Mark Zuckerberg's empire now has 700 million users (source: Techcrunch.com/Statista). Worldwide, YouTube reaches some 1.5 billion viewers a month – a figure that the classical TV channels can only dream of achieving. Although the much talked about death of television and newspapers certainly belongs to the realm of speculation, there is no denying the decline in the conventional media on the one hand and a rise in digital and social media and instant messaging on the other. Corporate communication must adjust to this digital revolution. It would be wrong, though, and would offer little promise of success, if an identical copy were to be adopted that uses the new media but does not pay due regard to their special features.

Huge quantities of user data have become available since the internet developed into Web 2.0 and web consumers became web producers. Even though analysis of target groups has become much easier and less expensive, corporate communication has still not adapted comprehensively to this change. When it comes to subjects, companies and target groups on the internet discuss topics that are in part completely different or they set different priorities. Even the language and tone differ markedly: perfectly written rational communication encounters a language that is emotional and closer to the spoken word. Furthermore, office hours and a sluggish consultation system often contrast with the user's leisure time and his or her speed of action. In the worst case, the use of the wrong channels means the defined target group is not reached at all.

This difference leads to the need to postulate user centricity. Corporate communication has not been a one-way street for a long time. However, adapting to two-way communication requires more than just a linguistic, temporal and thematic orientation in the relevant social networks. More transparency and open and proactive communication will increasingly be demanded from the company because of critical assessment of the content and subsequent feedback by the community, which in the worst case can lead to a shitstorm. Anyone who is unprepared and merely waits for a critical response will react too slowly and it will then be too late to contain any possible indignation.

Without doubt, those companies that have always been strong when it comes to public relations, and can develop these strengths further, will be at an advantage. The picture is different where producers, public authorities, insurance companies and trade associations are concerned. The social media create new communication relationships, for example because consumers are now communicating more with producers directly and not with distributors. This requires stronger PR and this will also counteract the online reputation taking its own course.

A new feature of communication relationships is also the dialogue between the individual user and the employee. Whereas in the past social media managers mainly addressed the masses in the social media, the spread of instant messaging apps like WhatsApp and Facebook Messenger has led to ever more non-public dialogue. These apps are offering customer advisors an opportunity: to facilitate processes and, in particular, B2C companies like distributors and insurance companies are increasingly using chatbots – automated communication tools that provide standard answers to frequently recurring questions. While instant messaging is already being used in some companies for internal communication – often set up by employees in WhatsApp groups without permission – sooner or later the communication between companies will not be able to avoid the influence of this global trend: since 2015 the number of users of the four largest instant messaging apps – WhatsApp, Facebook Messenger, WeChat and Viber – has been greater than the number of users of the apps from Facebook, Instagram, Twitter and LinkedIn, which have also been increasing (sources: BI Intelligence/Companies, TechCrunch, Apptopia). Even the grey zone of data-protection law in which WhatsApp finds itself, which has strengthened the position of competitors like the Swiss provider Threema, could do nothing to curb the app's uninterrupted growth.

Companies see themselves being confronted by many short-lived changes in the field of digital communication. Since the beginning of 2018 in particular, many are bemoaning a smaller range of coverage on Facebook, which is caused by strong competition between posts and contributions from friends being given preference in the newsfeed. To counteract this, highlighted 'stories' on Facebook and Instagram, 'Facebook Live' and other videos, influencer marketing, instant messaging and a mixture of the social media channels are playing an ever-greater part. Understanding current trends and the special features of the respective social networks is therefore indispensable. Being merely digital is not enough. ■

You can find GDA in the social networks here:

- www.facebook.com/aluverband
- www.instagram.com/aluverband
- www.twitter.com/aluverband
- http://tinyurl.com/GDA-YouTube
- www.xing.to/aluverband
- www.linkedin.com/company/aluverband

Business activity in aluminium sector in 2017/18

The aluminium industry in Germany has experienced a predominantly positive development in the last 12 months.

Recycled-material content of raw aluminium increases

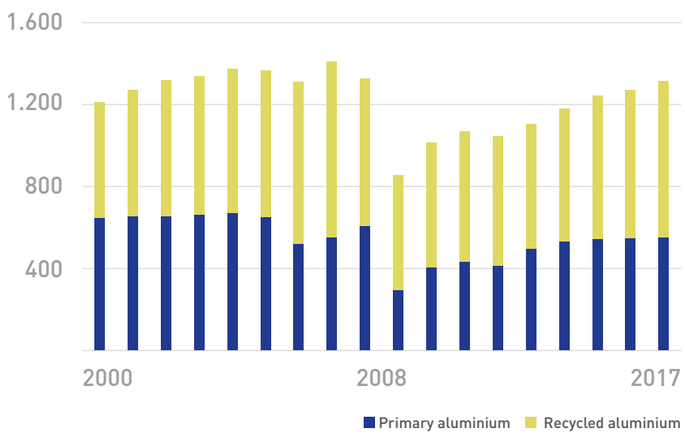
The production of raw aluminium in 2017 was 1.31 million tonnes and was therefore 3.4 per cent higher than the previous year's figure. It comprised 550,000 tonnes of primary aluminium and 763,200 tonnes of recycled aluminium. Growth in the production of recycled aluminium was 5.6 per cent and thereby significantly more dynamic than the rise in primary aluminium production of about half a per cent. This means there was an increase in the recycled-material content, which is now 58 per cent.

Heterogenous development in production of aluminium semis

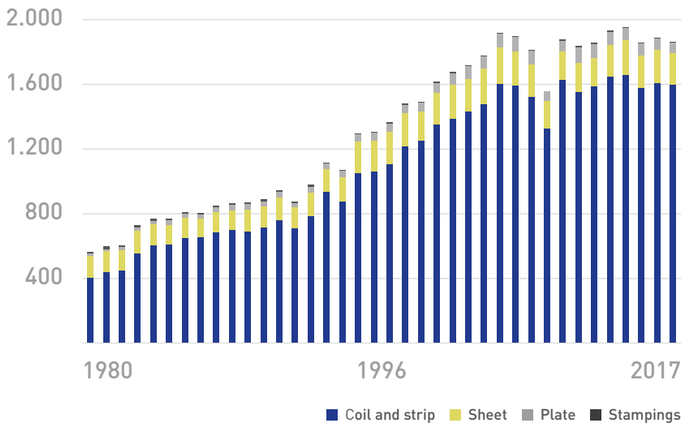
Semi-finished aluminium products include rolled products, extrusions, wire, forgings and conductor material. German semis production in 2017 totalled about 2.47 million tonnes. This represents a decline of 0.5 per cent compared with the previous year. Rolled products and extrusions are the largest product sectors in terms of volume and developments in production in 2017 differed.

In the case of rolled products there was a fall in production of 1.4 per cent or 26,800 tonnes to 1,861,100 tonnes. The development was negative for all quantitatively important rolled-product groups. Production of coil and strip thicker than 0.2 mm decreased 0.5 per cent or about 8,800 tonnes year-on-year to 1,596,700 tonnes. The production of aluminium sheet (thickness above 0.2 mm to 5.99 mm) totalled 192,800 tonnes. This represents a decline of 7.1 per cent or 14,700 tonnes. There was also a decline in the production of aluminium plate (down 6.2 per cent or 4,300 tonnes). The production of stampings in 2017 was 6,100 tonnes (up 18.8 per cent or 1,000 tonnes).

Production of Primary and recycled aluminium in Germany from 2000 to 2017 (in 1000 tonnes)



Production of rolled products in Germany from 1980 to 2017 (in 1000 tonnes)



In the case of extrusions, one differentiates between profiles, rod & bar, and tube, and production totalled 583,700 tonnes in 2017. This represents growth of 2.4 per cent compared with the previous year's figure of 569,900 tonnes. The output of profiles was 527,300 tonnes and thus 10,700 tonnes more than the previous year, an increase of 2.1 per cent year-on-year. The development in the case of rod & bar and of tube was more volatile. The industry was able to increase the production of rod & bar by 7.6 per cent to 46,800 tonnes but tube production declined two per cent to 9,600 tonnes.

Aluminium die-castings are growth driver for shape-casting foundries

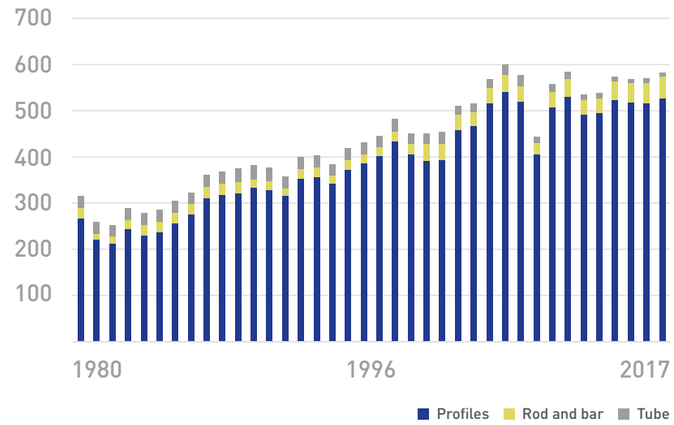
The production of shaped aluminium castings is sub-divided into the segments die-casting, chill casting, sand casting and other casting processes. With a share of about 60 per cent of total German foundry production, aluminium die-casting is the most important sector in terms of quantity. The main consumer sector for the aluminium foundries is the automotive industry.

Production totalled 1,118,900 tonnes in 2017. This represents growth of two per cent compared with the previous year. There was growth of 5.1 per cent in die-casting production and this was significantly greater than the average for all foundries. Growth in the production of chill castings was slightly positive (up one per cent), while there was a decline in production using sand casting or other casting processes.

Production increase in all aluminium-converting segments

In the German aluminium-converting sector, production increased from 336,600 tonnes to 346,500 tonnes in 2017, a year-on-year volume increase of 9,900 tonnes or 2.9 per cent. Aluminium conversion is divided into three sectors: foil and thin strip, tube and aerosol and other cans, and metal powder. All three sectors reported positive developments in 2017. Production in the foil and thin strip sector, which is the largest in terms of volume, rose 2,600 tonnes to 268,900 tonnes, which represents a relative increase of one per cent. Production in the tube and aerosol and other cans segment increased 2,600 tonnes to 44,600 tonnes (a rise of six per cent). There was also an increase in the aluminium powder segment: 4,700 tonnes in absolute terms or 16.6 per cent in relative terms. ■

Production of extruded products in Germany from 1980 to 2017 (in 1000 tonnes)



Outlook basically positive – risks increasing

Generally speaking, the German aluminium industry's expectations for 2018 are positive. Economic developments in the industrial and consumer-related user industries as well as in the building industry remain on an upward trajectory.

However, the global economic environment has become gloomier. The reason for this is the realignment of trade policy and economic sanctions on the part of the USA, which have numerous implications for global trade flows for aluminium and present the European aluminium industry with numerous challenges. This is particularly the case for the supply of the raw materials alumina or primary aluminium and the potential rerouting effects as a result of the new situation regarding import tariffs. The European Commission has reacted accordingly, and this has caused the USA to reassess possible threats to its national security. The risk of a global trade war has therefore increased.

In contrast, the medium- to long-term outlook for the aluminium industry is extremely positive. New and innovative products will lead to a significant increase in demand in the years to come. One example is the development in the electromobility sector, and battery cases in particular here. This segment will grow considerably in the coming years and will boost the aluminium content of cars significantly.

GDA ■ STATISTICS

Statistics

Production

Semi-finished aluminium products (tonnes)	2016	2017
Rolled products	1,887,900	1,861,100
Rods and bars	43,500	46,800
Profiles	516,600	527,300
Tubes	9,800	9,600
Wires	17,700	18,500
Forgings	N/A	N/A
Conduction material	5,400	4,100
Total	2,480,900	2,467,400

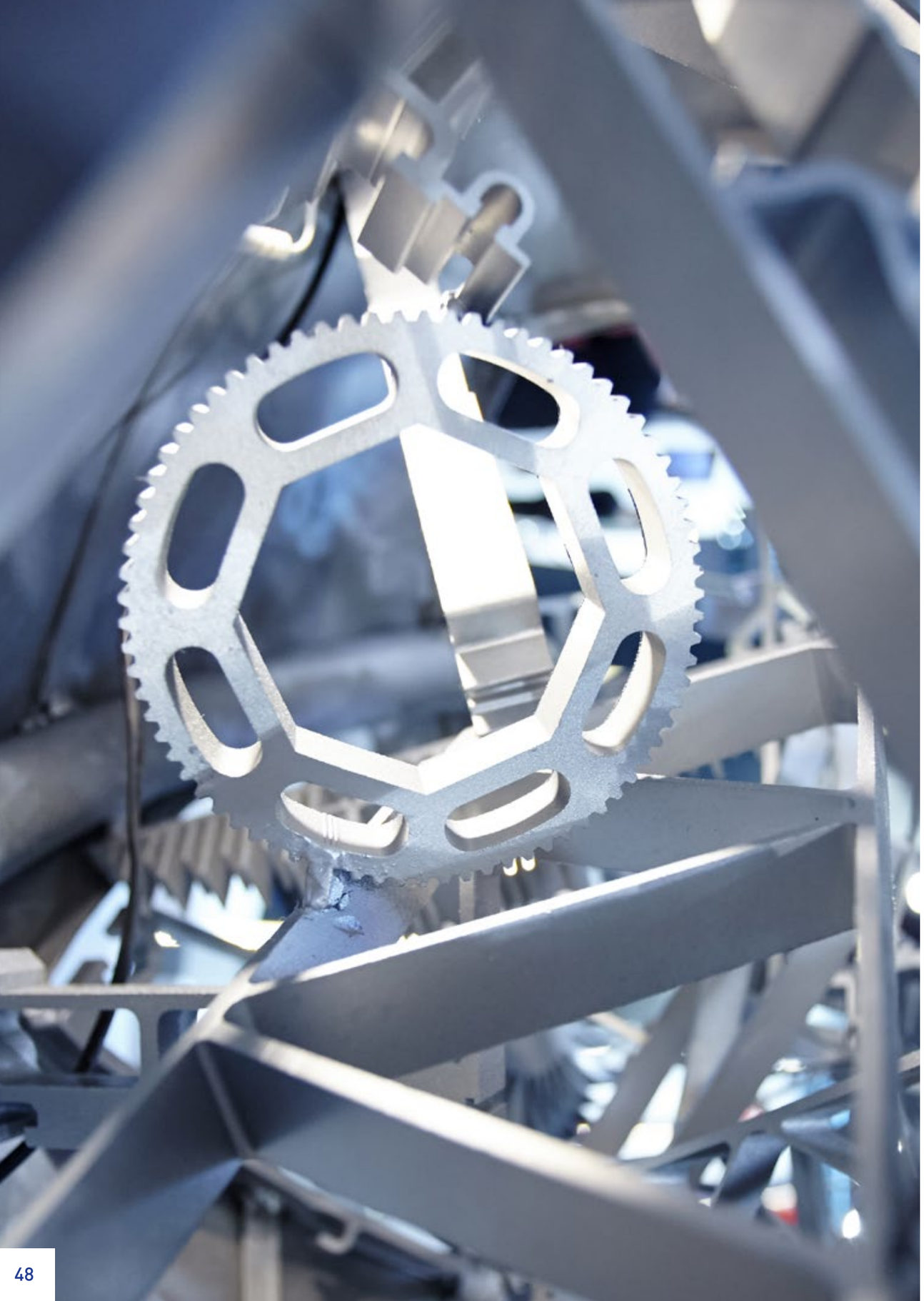
Aluminium castings (tonnes)	2016	2017
pressure die-casting	631,400	664,000
Permanent-mould casting	343,800	347,400
Sand casting	111,000	98,500
other casting processes	10,500	9,000
Total	1,096,700	1,118,900

Further processing of aluminium (tonnes)	2016	2017
Aluminium foil	266,300	268,900
Tubes, Cans and Impact Extrusions	42,000	44,600
Aluminium powder	28,300	33,000
Total	336,600	346,500

Foreign trade

Raw aluminium (tonnes)	2016		2017	
Country	Import	Export	Import	Export
EU 28	1,469,200	365,200	1,462,300	348,900
EFTA	474,600	114,600	455,700	110,900
Eastern Europe	266,000	800	234,700	800
Rest of Europe	0	0	0	100
Europe total	2,209,800	480,600	2,152,700	460,700
North America	21,600	1,500	12,000	1,100
Central and South America	18,500	100	7,000	100
Africa	83,000	0	87,500	0
Asia	281,400	9,000	282,800	13,300
Australia/New Zealand	1,300	0	300	0
Rest of the world	91,600	0	96,600	0
Total	2,707,200	491,200	2,628,900	475,200

Aluminiumhalbzeug (Tonnen)	2016		2017	
Land	Einfuhr	Ausfuhr	Einfuhr	Ausfuhr
EU 28	1,007,600	1,418,900	1,060,300	1,450,200
EFTA	280,000	60,300	292,600	80,500
Eastern Europe	176,300	76,300	169,100	85,900
Rest of Europe	0	0	0	0
Europe total	1,463,900	1,555,500	1,522,000	1,616,600
North America	25,300	83,100	33,000	79,100
Central and South America	3,100	49,400	100	67,800
Africa	23,000	18,500	20,100	29,200
Asia	84,600	126,700	80,700	110,500
Australia/New Zealand	100	15,200	100	7,500
Rest of the world	0	0	0	0
Total	1,600,000	1,848,400	1,656,000	1,910,700



Services from GDA: quick, competent, informative

GDA rigorously pursues a policy of being a modern trade association for its members, customers and those with an interest in the sector, offering the aluminium industry and its partners a comprehensive range of services.

GDA's comprehensive range of services covers education and training, technical advice, information such as statistics and the library, and specialised events. The services offered are aimed at GDA members, establishments of further education and the public at large. The following list is an overview of the services offered.

... supports rapid searches for information on manufacturers of aluminium products via its **products and manufacturers database.** A simple system and online search form helps the user find innovative companies and optimal solutions.

... is actively engaged in the area of **schools and education and training.** The future of work does not begin in the production facilities. When it comes to determining future direction, important steps are already taken during school education. GDA develops teaching materials, such as folders or DVDs, and provides information on practical training and works visits in the aluminium industry.

... offers comprehensive information on aluminium as a material **on its website at www.aluinfo.de.** The extranet section is for GDA member companies and contains statistics, presentations and reports from the working groups, and can be accessed exclusively by GDA members and their employees.

GDA ...

... answers practically any question relating to aluminium via its **library.** GDA's library is the largest German library dedicated to aluminium. The library's archives contain one of the most extensive collections of information on aluminium – all well documented and edited.

... provides specific advice on the processing and application of aluminium, including topics such as standardisation, alloy designations and alloy data, via its **Technical Advisory Service.**

... provides information on the current economic and business situation in the German and European aluminium industries together with the latest **statistics.** Statistical data on indices, employment, turnover, production or foreign trade help analysts and market players asses market developments.

... publishes its information **online.** Anyone interested can download technical information sheets, technical papers, brochures and fact sheets directly.

GDA – Gesamtverband der Aluminiumindustrie e. V.

Gesamtverband der Aluminiumindustrie e. V. (GDA) with headquarters in Düsseldorf, Germany, was established in its current form in 1992 in Dresden. It is an association of aluminium companies that produce raw aluminium or aluminium products, including composites with other materials. As an industrial sector association, GDA represents the interests of an efficient aluminium industry and the jobs it offers with the aim of:

- conveying the economic, ecological and technical benefits of aluminium
- implementing the ecological, economic and social aims of the aluminium
- continuing determinedly to pursue the implementation of sustainable, future-oriented development in the aluminum industry.

As the representative of the aluminium industry, GDA strives to maintain an open dialogue with the general public in order that customers and consumers have a more transparent view and better understanding of aluminium and the products of its member companies. To this end there is a continual exchange of experience and ideas within the association; this ensures that the interests of all member companies are represented effectively, also externally.

GDA and its specialist trade associations have made it their job to represent the common interests of all of their members and thus the whole sector in all areas of the economy relating to aluminium. This involves the collection and processing of market information and planned legislation at national and international level. In addition, the association carries out media and public relations work for its member companies. GDA is also co-operation partner and promotional supporter of the world's largest aluminium trade fair ALUMINIUM. ■

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