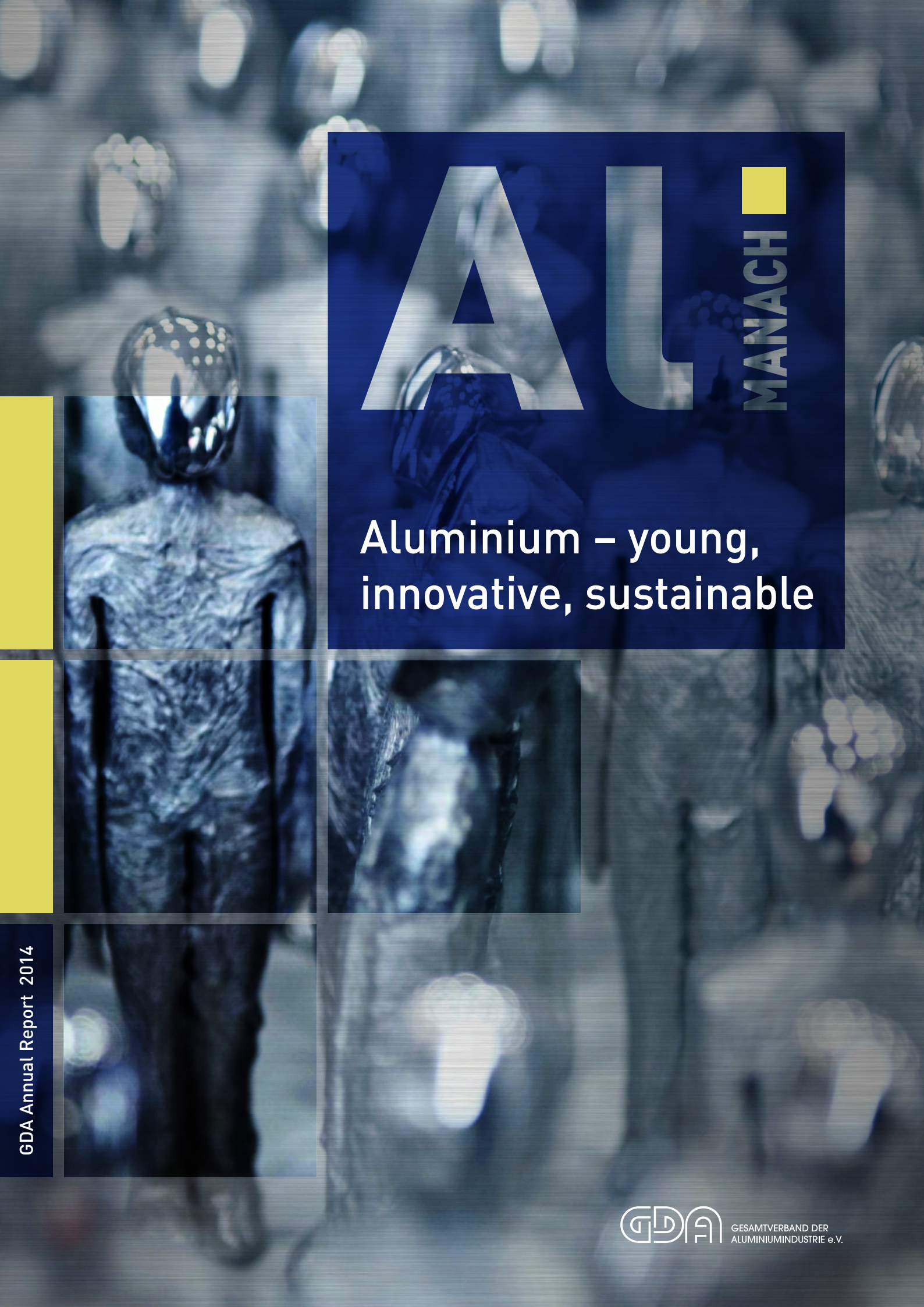

AL MANACH

Aluminium – young, innovative, sustainable

GDA Annual Report 2014

GESAMTVERBAND DER ALUMINIUMINDUSTRIE e.V.

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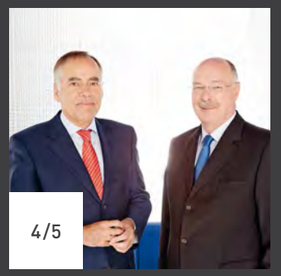

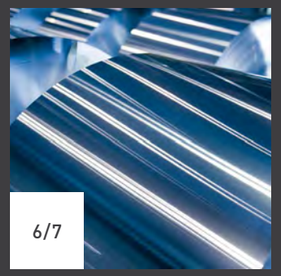

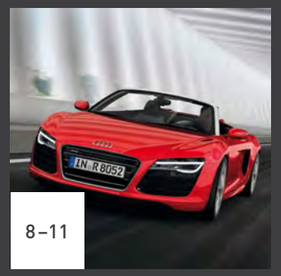

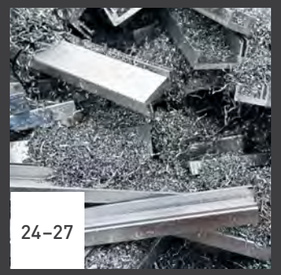

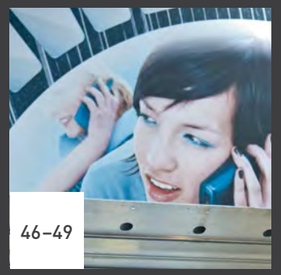

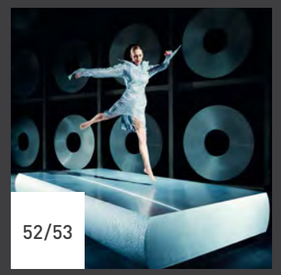

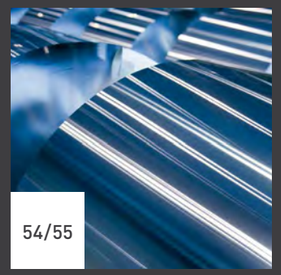

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Christian Wellner
GDA Executive Director

The future belongs to aluminium

The prospects for aluminium remain good. GDA president Heinz-Peter Schlüter and executive director Christian Wellner on the economic situation and the business prospects for the German aluminium industry.

The good level of business activity in the aluminium sector of the previous year continued in the first months of 2014. The improved order situation at the end of 2013 and the stable situation at the beginning of 2014 have given the whole sector an economic boost. Besides the good business prospects, there is also optimism with regards the medium and long term outlook for the use of aluminium. Positive underlying trends predominate in the aluminium industry's key markets. The use of aluminium worldwide will increase significantly. The boom will be driven above all by Asian markets. Growing demand from the car and aviation industries as well as the building sector will contribute to the light metal's continual growth.

Our industry has increased its competitiveness significantly in recent years via modernisation and restructuring. So our companies have been able to gain market share. Many companies have learned from the last recession and are now able to react more quickly and more cost efficiently to new situations. They have undertaken targeted strategic investments that help them respond flexibly to the overall business situation. It is about 125 years since the foundations were laid for the industrial use of our metal. Within this short period of time, the metal has established itself in numerous user markets. It is also remarkable that a third of the aluminium ever produced worldwide has been produced in the last ten years, in other words in this century!

The dynamic development of our sector is closely related to the innovative capability of our plants and employees. They are characterised by a high degree of flexibility and creativity – properties that have helped them cope with difficult economic situations.

Innovations are an important key factor for our sustainability and competitiveness. Recent years have shown that innovative business models or the use of innovative products or technologies are the technological prerequisites for future success.

Over 20 years ago the German aluminium industry made the future potential of its metal more widely known, even to the public. With its 'The New Aluminium' image and awareness campaign that was supported by numerous companies, the sector received a high level of attention from consumers and users and showed what new and diverse possible applications the young metal was able to open up. The core message of the 1990s image campaign – aluminium is young and innovative, the companies are flexible and creative – is more valid today than ever it was.

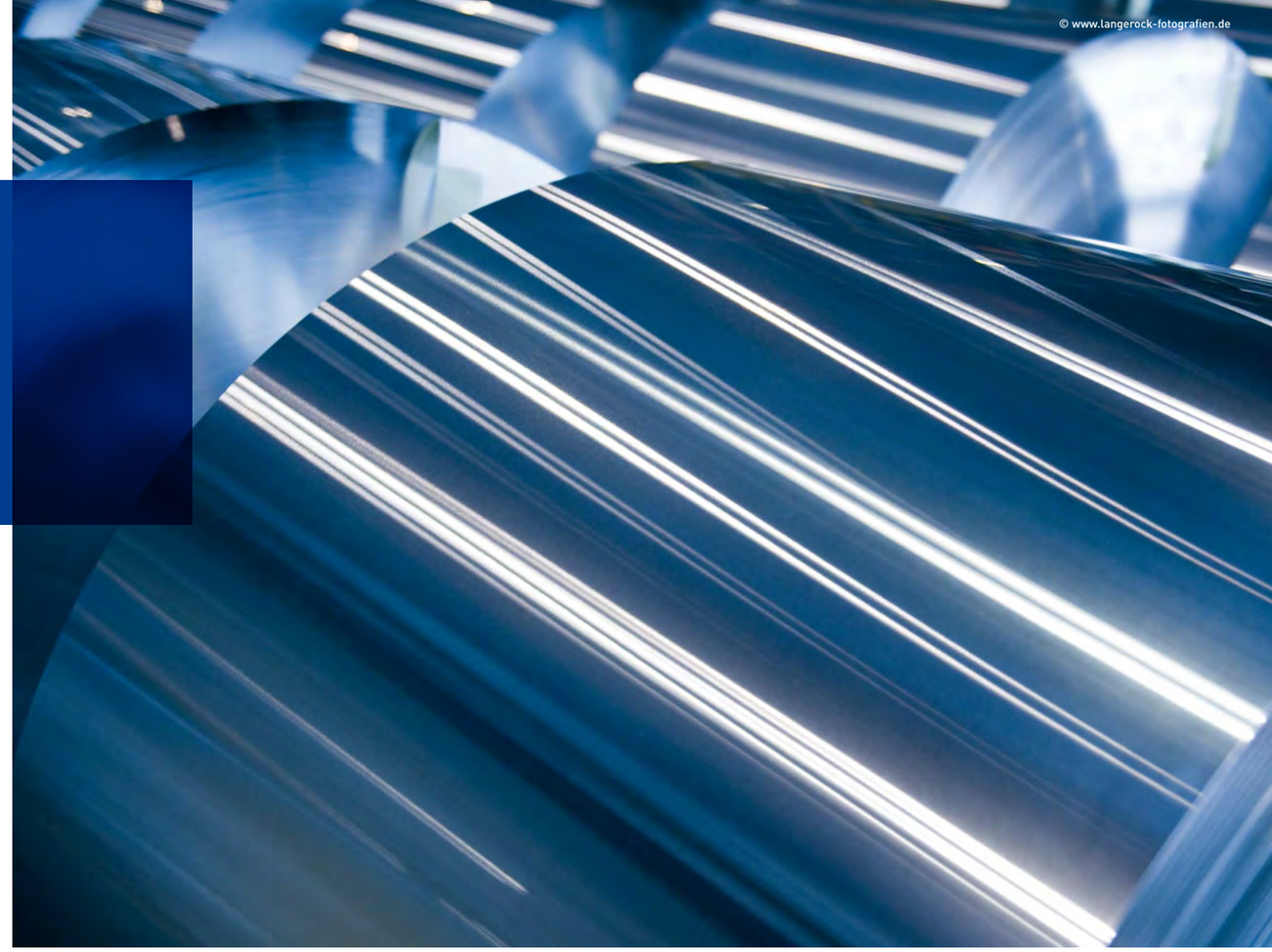
There are many examples of how aluminium will make our future 'lighter'.

The megatrend towards lightweight construction in the car industry means aluminium's growth potential in the motor car is excellent. Significant reductions in fuel consumption and the accompanying reductions in CO_2 emissions can only be achieved by reducing vehicle weight. Our industry is also a step ahead where efficiency of resources and energy is concerned. At a time when reserves of raw materials are dwindling, the importance of recycling resources and materials is continually increasing. Our sector is therefore also doing everything it can to recycle all the scrap that accrues in Germany. Numerous German and international aluminium plants are investing in expanding their recycling capacity using the latest equipment to prevent scrap being shipped abroad.

These few examples show that aluminium is the metal of the future and the aluminium industry is a key sector of our economy. We therefore have to foster understanding for the metal and its processing even more strongly and further promote the potential of our modern material. The innovative capability of the aluminium industry and its importance for other branches of industry must be given the recognition they deserve by society. We need to make our value chain transparent. The recipients of our messages are politicians, the media, schools, universities, users or the neighbour next door.

GDA is dealing with this task. Together with the whole aluminium industry we want to provide detailed information on the metal of the future and bring the metal and all groups of society closer together – for example with this annual report, which presents the broad range of applications of our metal and reflects our association's large area of responsibility. ■

Author:
Christian Wellner
GDA Executive Director



The aluminium industry at a glance

The economic environment in the first half of 2013 was relatively weak but in the second half the wind in the German aluminium industry's sails freshened as demand improved, and the sector is now looking forward with optimism again.

2013 was a difficult year for the European aluminium industry. Nevertheless, German producers still managed to perform well in this environment and were able to increase the previous year's output in most fields.

Turnover of the German aluminium industry reached 12.9 billion euros in 2013. This corresponds to a decline of 3.7 per cent. The sales trend is closely linked to the price quoted for aluminium on the LME. Here aluminium prices tended to recede during the course of the year.

Macroeconomically, the approximately 600 aluminium companies that produce or process aluminium also play an important role in the German labour market. With their production facilities, the small and medium-sized companies and the corporate groups generate work and income for a large number of people involved directly or indirectly in this sector of the economy. The aluminium industry employed 74,000 people in Germany directly in 2013.

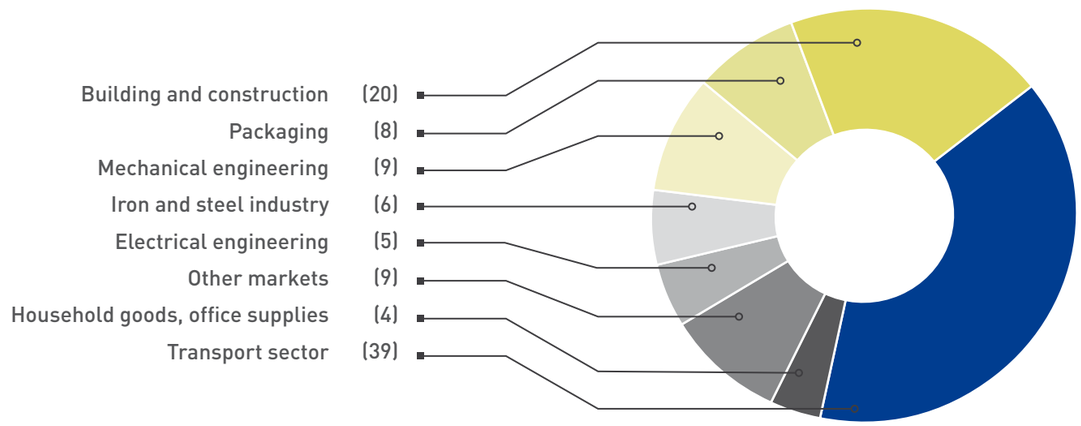
The transport sector was the most important user market in terms of quantity in 2013 with a 39 per cent share of total demand. Building and construction and the packaging sector together accounted for a share of 28 per cent, and mechanical engineering and electrical engineering had a total share of 14 per cent. The remaining demand was attributable to the iron and steel industry, household goods, office equipment and miscellaneous end uses.

The German aluminium industry is export-oriented. The most important export destinations are the member states of the European Union. The difficult economic situation in Europe made foreign trade difficult in 2013. Nevertheless, German industry was still able to increase its exports in important product sectors. For example, exports of aluminium semis were 3.3 per cent higher than the previous year.

The German aluminium industry is optimistic about the prospects in 2014. The state of the global economy has brightened up significantly. This is particularly true for the important customer countries USA and China. The business mood in Europe is also positive. These are good framework conditions for German industry, especially export-oriented branches like mechanical engineering, electrical engineering and the car industry. Business expectations are also positive in the building and construction industry. All in all, solid growth is therefore expected in 2014. ■

The production of aluminium semis totalled 2.5 million tonnes in 2013. This was a rise of 3.4 per cent compared with the previous year. GDA is forecasting further light growth in production in 2014.

Main markets for aluminium in 2013 (in %)



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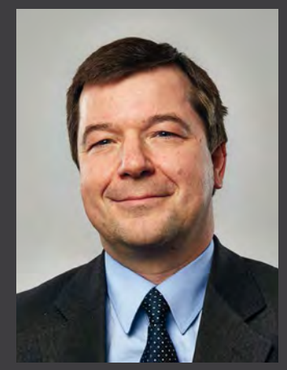
Strategies for lightweight construction in the car industry

Effective lightweight construction in the transport sector is inseparably linked with aluminium. With the mega trend towards lightweight vehicles, there is excellent potential for greater use of aluminium in the motorcar.

EAC 2013: meeting point for experts in lightweight construction

The European Aluminium Congress 2013 (EAC 2013) organised by GDA in November 2013 in Düsseldorf was the meeting point of the year for experts in lightweight construction from the international automobile and aluminium industries. The motto of the congress, which was conducted in English, was 'Aluminium Automotive Applications – Tomorrow's Design and Sustainable Performance'. The different possible applications of aluminium in carmaking and possible further developments that would make vehicles of the future even lighter and more energy efficient were presented at EAC 2013.

Over 200 experts from the semis industry, automotive component suppliers, OEMs such as Audi, BMW, Daimler, Ford, Honda and Jaguar, and equipment suppliers involved in plant manufacturing or surface treatment attended. They participated in the discussions and obtained information on new developments regarding aluminium in carmaking. Experts and participants agreed that aluminium is indispensable in cars: castings for crankcases, cylinder heads, gearbox casings and structural components in the body area are now state of the art. But semis in the form of sheet, extruded profiles and forgings are increasingly finding use in vehicles. For example, as body structural components, body sheet and crash-relevant components like bumper cross-beams or longitudinal body members.



Author:
Laurent Musy,
President Packaging and Automotive Rolled Products, Constellium

Strategies for lightweight construction are being driven by legislation

Sustainability has become a major challenge for the car industry in Europe and worldwide. Laws relating to CO_2 emissions or fuel consumption are all pointing in the same direction. Considerable reductions will have to be achieved in the coming decade. There is the threat of heavy penalties if the specified objectives are not fulfilled.

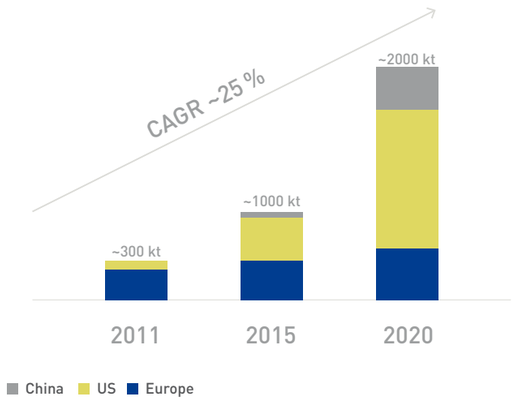
To a large extent, the methods available for meeting the objectives are well known. They are concentrated on lightweight construction, aerodynamics, drag and drive systems. In the case of lightweight construction, the aim is to achieve a reduction in CO_2 emissions of about 10 g/km per 100 kg weight. An additional indirect benefit of lightweight construction is reducing the driving force required (and thus having lower fuel consumption), which also reduces CO_2 emissions.

Aluminium will play a potentially important role in the implementation of OEM's strategies for lightweight construction because of its lower specific weight compared with steel (2.7 vs. 7.8). As is generally known, the use of aluminium leads to a weight reduction of 30 - 50 % compared with the steel components usually used. Aluminium offers the best cost/weight ratio when compared with other materials, such as ultra high-strength steels (UHSS), advanced high-strength steels (AHSS), magnesium or composites.

The global market for aluminium sheet is expected to grow from 300 kt in 2012 to 1800 kt in 2020. The USA will show the highest rate of growth – from its current level of less than 100 kt to 1000 kt in 2020 (Picture 1).

Implementation of strategies for lightweight construction: close co-operation between OEMs and aluminium partners

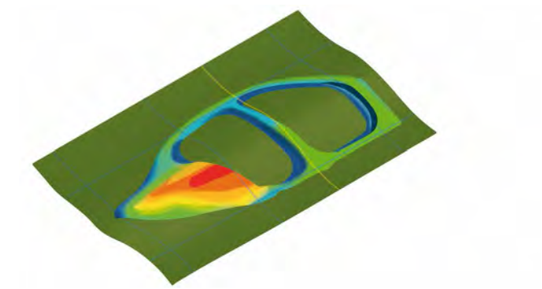
All OEM car makers are focussing increasingly on the reduction of emissions so aluminium is no longer a material that is only being used in the premium end of the market. Aluminium is increasingly penetrating the mass market and is not only being used for individual components, such as car bonnets, but for the whole body, for example raw body shells and closures. This trend presents aluminium processors with new challenges with regards to the development of new products and expansion of capacity. They will also have to prove that the life-cycle benefits that are cited for aluminium solutions are actually true.



Picture 1: Worldwide growth of the market for body sheet in kilotonnes (kt), Constellium analysis

Technical challenge

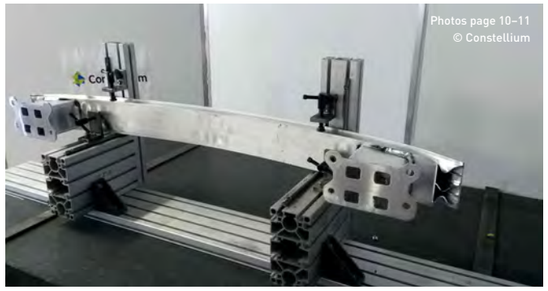
In the case of body sheet this means that the aluminium rolling mills must press ahead with the development of completely new alloys in order to match and even better the quality of existing steel solutions. Constellium, for example, is now offering completely new alloys to satisfy the requirements of German premium OEMs with regards folding and drawing for producing surfaces such as bonnets or exterior car doors. New trends for durable alloys are emerging with the development of the US market. With the addition of new components such as side parts, the alloys also need to be more readily formable to produce better results when deep stamped (Picture 2).



Picture 2: Image of a simulation for a side part, Constellium R&T Center

Formability is particularly important for components such as inside door panels, which is the reason for developing complete door solutions using a highly ductile alloy.

As ever more aluminium solutions with higher strength, higher rigidity and better crash performance come onto the market, and represent a technical alternative to steel, carmaking will become increasingly geared to the use of aluminium. Constellium is offering solutions for sheet, for extrusions and for complete components, such as crash management systems for bumpers and crash boxes (Picture 3 and 4).



Photos page 10–11
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Picture 3: Crash management system prototype – Automotive Structure & Industry, Constellium R&T Center

Picture 4: Surfalex®, a Constellium product for the exterior surface, in use.

Challenge for capacities

With the growing importance of aluminium in carmaking we must avoid down cycling and ensure that the aluminium originally produced is kept in the loop, thus taking advantage of the fact that aluminium can be recycled an endless number of times. This applies to scrap that accrues during production and end-of-life vehicles. Aluminium solutions will then be even more sustainable.

Challenge from sustainability

With the growing importance of aluminium in carmaking we must avoid down cycling and ensure that the aluminium originally produced is kept in the loop, thus taking advantage of the fact that aluminium can be recycled an endless number of times. This applies to scrap that accrues during production and end-of-life vehicles. Aluminium solutions will then be even more sustainable.

Technical working groups

The Automotive Extrusions working group comprises three OEMs, 18 extrusion plants, a primary aluminium smelter and four research facilities working together on a pre-competitive basis. The working group's key tasks are to determine additional material property data for aluminium profiles, avoid or reduce scatter bands in these values for profiles supplied by different producers, and prepare a specification sheet for the manufacture of extruded aluminium profiles for use as structural components in cars.

In the Automotive Rolling working group, representatives of the rolling mills and the rolled semifinished products sector discuss with OEMs on a pre-competitive basis how to improve the potential use of sheet by standardising mechanical and other properties. The aim is also to prepare standardised test guidelines and methods of measurement for rolled aluminium products for car applications.

GDA's European working group Aluminium Continuous Casting has set itself the task of further advancing the technology of strip casting of aluminium sheet and promoting the acceptance of the process in the aluminium industry. The working group is a platform for exchanging knowledge and experience, including the involvement of university and research institutes. Topics covered by the working group include methods of construction and types of damage on rolls used in continuous casting and rolling and the development of ceramic materials for the outlet nozzles. Questions relating to plant and occupational safety, environmental protection and improvement of the understanding of the process, are partly tackled using simulation.

The market for extruded products in Germany

German extruders increased their production significantly during the first six months of 2014, with a rise of 6.1 per cent year-on-year. Production totalled 291,800 tonnes. Besides standard products, the extruders supply an extremely wide range of niche markets. There the demands on technical expertise, individual advice and help with product development are greater, but so too is the added value. At the moment 85 extrusion presses are operating in Germany. The most important markets for profiles are the building sector (25 %), the transport sector (29 %) and mechanical engineering (14 %). The good level of demand from the transport sector and other export-oriented markets will continue to support the positive development of the extrusion business.

The situation in the extrusion market is posing particular challenges for companies in the sector. Today they are facing even more intensive competition from abroad and have to prove their competitiveness internationally every day anew. The extrusion companies are boosting their global competitiveness by developing high-grade profile applications with enhanced customer benefits.

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Managing Director, Erbslöh Aluminium GmbH

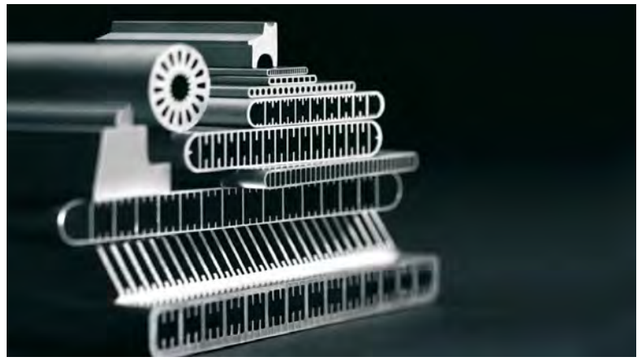
Opportunities for extrusion industry from internationalisation

Overcapacities and increased competitive pressure from southern and eastern Europe have been squeezing the margins of the German extrusion industry for years. Urgently needed investments are delayed because of longer payback periods. There is also a time delay before the substantial cost increases due to rising energy prices and metal premiums can be recouped in the market place. These are the challenges facing the German extrusion industry at the moment.

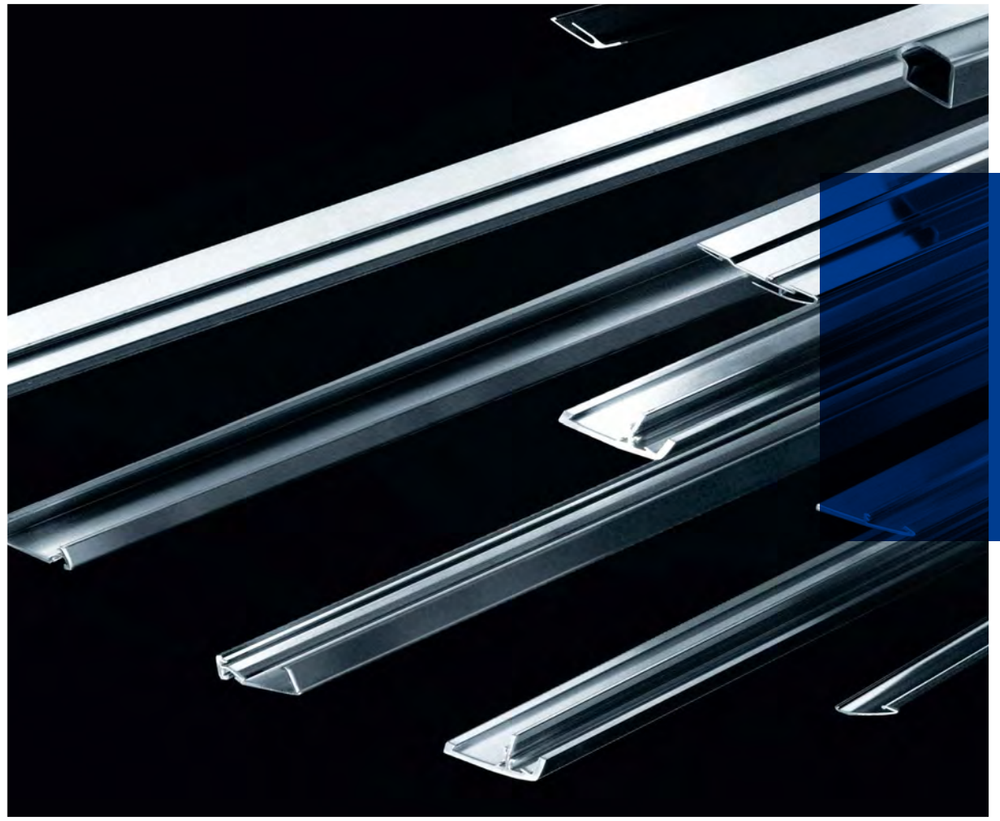
GDA ■ EXTRUSION INDUSTRY

GDA congresses are forums for technical dialogue

Knowledge of the production, processing and application of aluminium has advanced in a sustainable manner in recent years. So GDA is presenting the whole spectrum and diversity of the aluminium industry, its equipment suppliers, technology partners and customers with different main topics at its congresses. The GDA specialist congresses are designed to be forums for technical dialogue. As the representative of interests in one of the world's largest aluminium markets, GDA has a large network of specialists and experts in the sector whose knowledge and expertise it uses for the congresses. The congress visitors appreciate the combination of the presentation of the latest specialist knowledge followed by a discussion. In addition, the congresses are an outstanding platform for exchanging experience and opinions.



The German extrusion industry is setting the technical benchmark globally



There is one positive point worthy of note, though: with a good level of capacity utilisation, the industry has managed to maintain and in some sectors even increase its market share, in contrast to that of the industries in other European countries. How is this possible?

First one should make it clear that penetration of the domestic market by competitors from southern and eastern European could not be avoided completely. This led to a slight reduction in production to satisfy domestic demand. This loss was overcompensated for, however, by increased export business. For products where differentiation is possible, the German extrusion industry is attractive in other European countries and even worldwide.

The German extrusion industry is characterised by small and medium-sized enterprises (SMEs) and also profits from its outstanding reputation abroad. At international level, the technological benchmark is set in Germany. However, one only finds a few exceptions if one looks for an internationalisation of the German extrusion industry. SMEs have difficulty while aluminium concerns are at home the world over. The large concerns are characterised by large volumes and benefit from growth in general, especially in China and the NAFTA countries. They usually have sufficient capital and management capacity available to expand. In contrast, the SMEs are usually more likely to concentrate on differentiation in their traditional markets, whether it be via flexibility or logistical and technological benefits.

Production in the German extrusion industry has not risen in recent years. It would be very appealing, of course, to gain a foothold in the growth markets Asia and North America. It should be noted, though, that there is already adequate extrusion capacity available in the significant economic regions of the world. So why should one venture the risky step of internationalisation? The answer is simple: being with right product in the right place at the right time, or to put it another way, there is no success without differentiation and the right timing. In order to successfully tackle the natural barriers to market entry, for example in China or North America, one also has to do it better than the established suppliers locally.

However, before taking this decisive step and establishing a company in the growth markets for extruded aluminium profiles, one has to carry out extensive market analyses. Besides developing a strategy it is necessary to prepare finance concepts, identify suitably qualified business partners, conduct due diligence investigations, prepare a feasibility study and select a suitable location, especially with regards office and production space and personnel. After that, the next challenges are the transfer of expertise and suitable market and sales activities. The development of target group oriented marketing and sales strategies and training and qualification concepts for employees locally place considerable demands on the company's organisation in Germany. However, one has a good chance of success if one has managed to establish unique selling points as a result of these specific measures in these growth markets for extruded aluminium profiles.

It is also necessary, of course, to have the appropriate motivation to want to go along the path of internationalisation in the first place. For this one needs business drivers. Business drivers demanding a global presence have hitherto been found mainly the car and aerospace industries. If one is already a market leader as a supplier to one's traditional markets, internationalisation is not only necessary but also offers considerable potential for profitable growth.

On the basis of its innovativeness, its technological edge and its high reputation abroad, the prospects for the German extrusion industry to position itself globally are outstandingly good in principle. ■

We are investing in research and development

Our sector is continuously improving material properties, developing new products and opening up new growth potential. Ever-more intensive co-operation between aluminium producers, fabricators and user industries in future will open up even more potential applications for aluminium. This is absolutely essential if one is to be capable of withstanding the competitive pressure from other metals.

Author:
Gerd Röders,
Chairman of VDD Verband Deutscher Druckgießereien Managing Director,
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Industry 4.0. Opportunities and risks for foundries in the digital world

The question of the consequences of the upheaval in industrial manufacturing as a result of new technologies and digital networking is urrently the subject of discussion in numerous trade journals as well popular magazines. These changes are generally referred to as ‘Industry 4.0’.

International Aluminium Die-casting Award 2014

GDA’s Recycling division organised the International Aluminium Die-casting Award for the first time. Its partner was the Bundesverband der Deutschen Gießerei-Industrie (German Foundrymen’s Association, BDG). The competition had previously been organised by Verband der Aluminiumrecycling-Industrie (VAR), which was disbanded in 2013. The winners were presented with their awards by Jörg Schäfer, head of the Recycling division, as part of the opening ceremony of Euroguss 2014.

For many years, the Aluminium Die-casting Award has been a well-proven platform for demonstrating the high standard of quality of aluminium die-casting. The aim of the competition is to increase interest in the versatile material aluminium and demonstrate additional areas of application. The castings have to be produced from a popular aluminium foundry alloy. The criteria for the evaluation are quality, topicality, innovation and technological advance.

The impact of this so-called revolution was recently discussed at the Fördergemeinschaft Druckguss (association for the promotion of die-casting) of the University of Brunswick – Institute of Technology and in the light metal technical committee of the Bundesverband der Gießereiindustrie trade association.

At first, many foundries feel that they are only affected by this upheaval to a small extent or even not at all. This is because so-called platform strategies are also being adopted for cost reasons in addition to individualisation of products, which is an important characteristic of this development. Common parts are being used wherever this is not directly contrary to customer benefits. Such castings are not used where field of vision is individually designed but in the vast majority of cases lot sizes for common parts are large. Especially in the car industry, together with cross-brand co-operation this results in large lot sizes. There are considerable cost benefits for the customer as a result of mass production. It thus appears that the future is secure for the foundries with highly efficient plants for mass-produced goods.

Automation is increasing

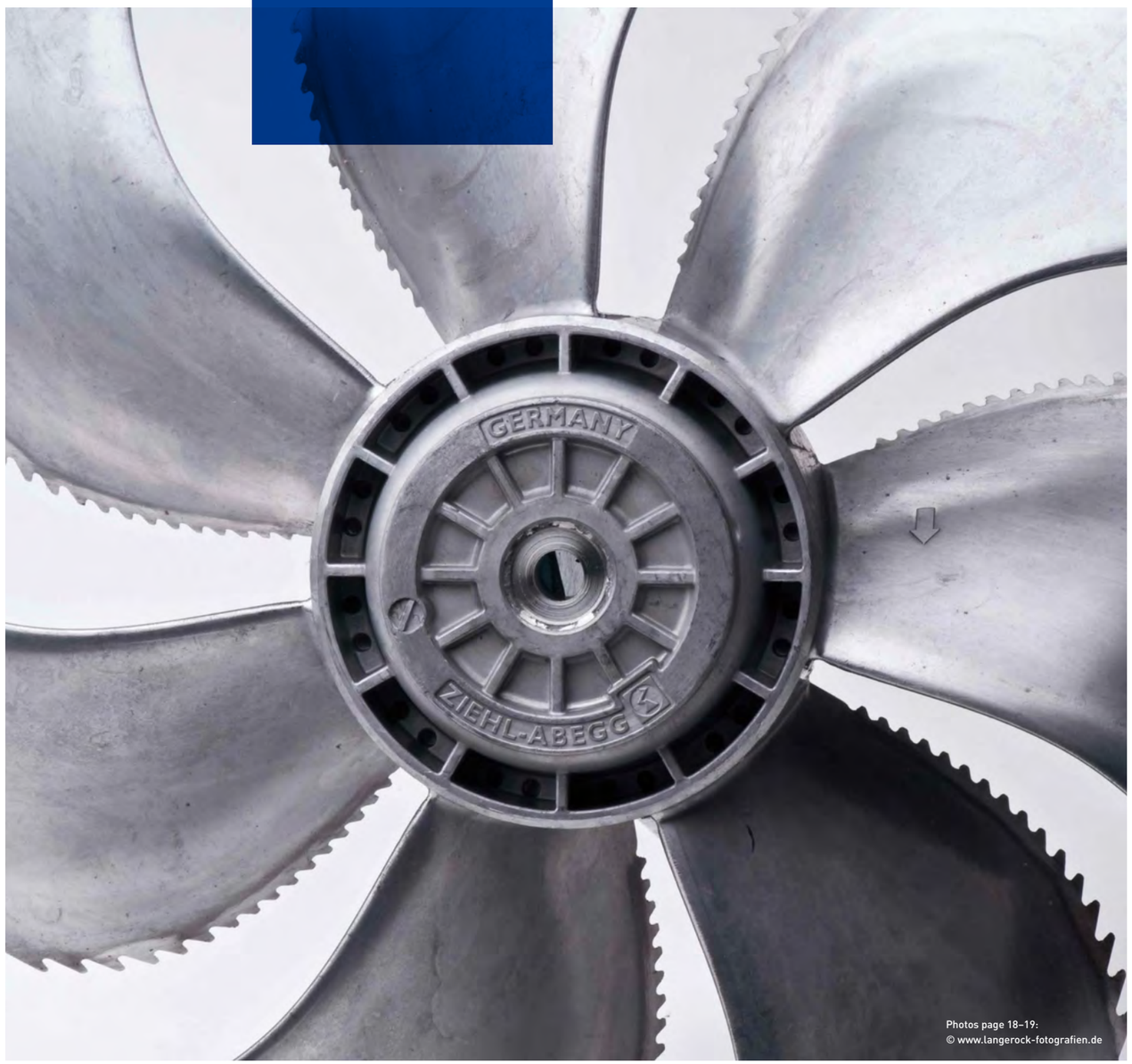
In part, the situation for those employed in the foundry industry looks different. Labour costs are still a major factor in most plants. They already account for up to 70 per cent of the added value. Until now, laborious maintenance of dies as well as the obligatory manual deburring has meant that every casting comes into contact with human hands several times before being shipped to the customer.

With the exception of very large series, it was barely possible up to now to avoid this. However, with intelligent control and modern control circuits, e.g. with camera recognition, one can create complex production lines. In doing so, the use of personnel is increasingly optimised. Only a few people are involved between the foundry and the part being ready for shipment. Considerable employment of capital is still associated with such production lines and this is an enormous task for the foundry industry with its medium-sized companies. However, the prices for intelligent solutions are continually falling here as well. It is to be expected that automation will increase as the control becomes increasingly better. Given the demographic development in Germany, this will also be necessary if the country is to remain attractive as a production location. The demands for improved occupational health and safety (dust, noise, etc.) will also drive this development forward. Unskilled industrial workers will be left at the wayside, though, and it will be necessary to create alternative jobs for them.

The above-mentioned development mainly affects the finishing of the castings and it will be difficult to further automate the casting process itself. Here there are many interactions that in part have not even been described mathematically. Professor Boris Nogowizin tries to describe these processes in his book Theorie und Praxis des Druckgusses. Research is being carried out in this direction at many university institutes today. It remains to be seen whether in future the control engineering machines will be good enough to be able to recognise whether a cast part conforms to the requirements. The design will have to be sufficiently robust to cope with the usual process fluctuations though. The large thin-gauge structural components required today are presenting founders with new challenges.

High complex die castings

Industry 4.0 is having the greatest influence on a wide range of products that are produced in foundries. The complexity and quality of these castings have reached levels that would still have been unthinkable a few years ago. Some of these parts were awarded prizes by GDA at the Euroguss trade fair in Nuremberg. Practically everything is now being made using complex castings, whether it be power trains or chassis parts for modern cars and electric cars, housings for rigid high-precision robots, or mechanical parts. In this respect, Industry 4.0 is having a major impact on foundries, and the expertise of the foundries is having an impact on Industry 4.0. This can be seen as well with the dies used in die-casting. Long before 3D printing was on everyone's lips, dies with complex geometries were being produced using laser sintering. Intelligent tooling was developed that revealed wear; modern coating processes or continuous process chains from the simulation through to computer tomography have considerably reduced both the time needed for toolmaking and the risk involved. It is only when one looks back that it becomes clear how radically toolmaking has changed in the past 15 years. Progress is perhaps at its most visible here.



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Exploit global opportunities

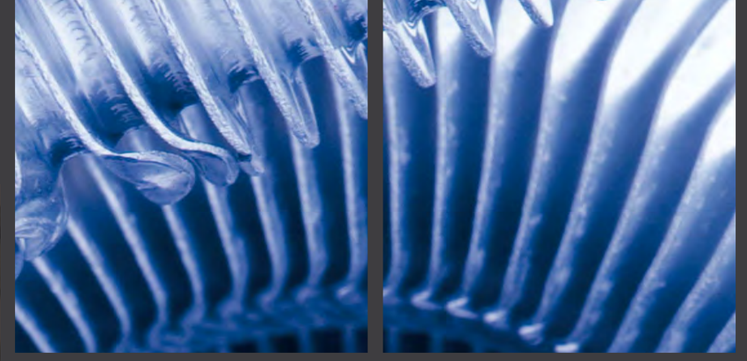
Finally, one should not omit to consider sales and purchasing. Very often one talks about the knowledge society, total networking and global opportunities. Today, some apps for mobile phones are developed in Africa or India. The lead of the 'learned' world with its good, old, established education systems is continually shrinking. In times of YouTube and Google, knowledge can be acquired in a short time almost anywhere in the world. For companies this means global competition and global opportunities at the same time. Only working for the European market might be difficult in future if customers establish their manufacturing locations worldwide and purchase their supply requirements locally. Benefits due to wage costs and energy costs at favourable locations will level out after a transition period provided world markets act according to the rules of the market economy. Transport costs and logistics will make it necessary, though, to have local locations near to the growing markets. Here, the challenges facing our industry are enormous. It remains to be seen whether an SME-based supply industry can establish itself at all in global markets. Otherwise, larger units will be formed that are managed by finance investors or large supplier groups. Here, a family-run business would not only deal with the question of location on the basis of financial considerations. In contrast, the financial investor will be neutral when comparing one location with others; this will present a further challenge for German foundries.

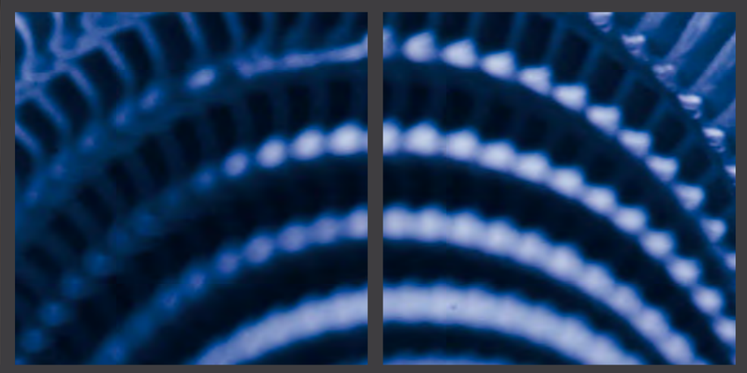
As with all changes, the current upheavals offer many opportunities and risks. It is indisputable that major changes are, and will be, taking place in the foundry industry as well. It has always been one of German industry's strengths to face up to such upheavals. The prerequisites are good thanks to a good education system, an intact infrastructure and large networks, for example via trade associations. There are also risks associated with demography and the inertia in the political and economic system. ■

Innovative environmental policy – greater resource efficiency and climate protection via sustainable utilisation

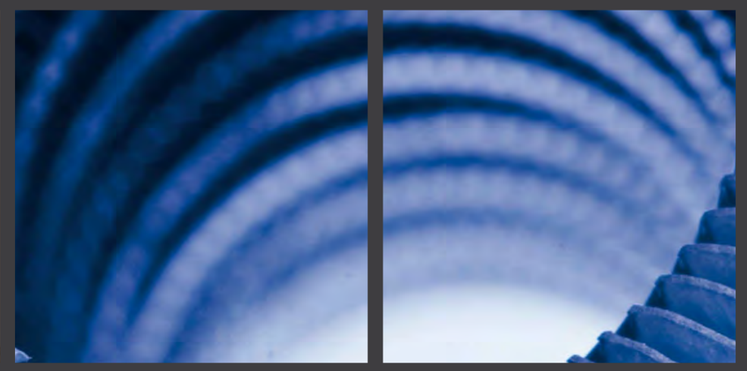
Growing resource shortages are leading to constantly rising material and energy prices – a significant part of manufacturing costs. Resource efficiency will thus become the key competitive factor.

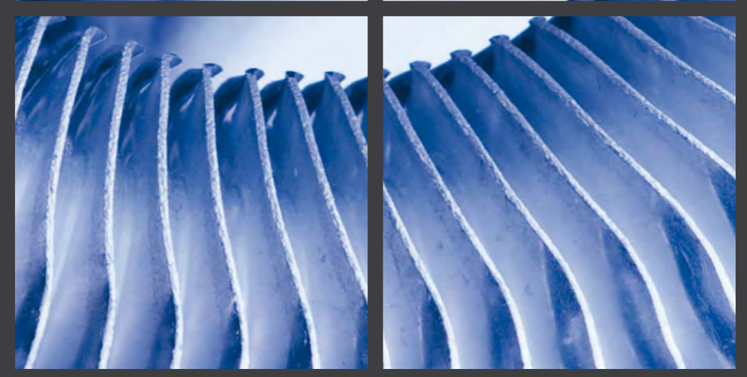
Author:
Jürgen Stichling,
Vice President Mobility,
PE international AG





Products made from aluminium contribute considerably to energy efficiency and are a useful and eco-friendly investment in creating a future that is sustainable.





Aluminium – partner of the turnaround in energy policy

The expansion of electricity grids in Europe and in particular the modification of energy supply in Germany requires a large amount of aluminium cable. Aluminium is proving to be an intelligent and innovative solution here thanks to its high electrical conductivity. So there is considerable potential for domestic production and the downstream sectors in the industrial value chain. Thanks to the scheme to throttle power demand by major users where necessary, aluminium smelters are contributing significantly to stabilising the electricity grids and avoiding blackouts. The contribution of energy-intensive companies to the stability of the grid is finally being recognised here as it is in other European countries.

Aluminium is unbeatable for recycling'

The recycling of aluminium is becoming increasingly more important in Germany and the rest of Europe. Used aluminium is a value source of raw materials for supplying processing plants with metal, particularly in a country with few natural resources like Germany.

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The main areas of application of aluminium products are in transport and transportation, building and construction, and packaging. Competition is very cut-throat in all segments. For example, carbon-fibre reinforced plastics have thrown down the challenge in transport and transportation, there continues to be competition between the different metals in the building and construction industry, and bio-plastics are being marketed in the packaging sector. Standstill means risking market share. Innovations are called for. More luxury and comfort, coupled with reliability and hygiene at lower cost, combined with the efficient use of resources and minimal level of emissions embody the zeitgeist of the customer. In a nutshell: more than 20 years after the climate summit in Rio, the idea of sustainable development and the desire for sustainable products is now firmly anchored in our society.

But what does this mean for the aluminium industry? Resource efficiency and climate change prevention must be borne in mind even during the development of products without ignoring the other customer requirements such as comfort and reliability or life style aspects. The earlier eco-friendly product development is integrated in the development process, the more efficiently environmental impacts and use of resources can be reduced. It is often only possible to make limited corrections at a later date, and then only with a high level of technical and financial effort. It is essential to have an understanding of the ecologically relevant interrelationships over the whole life cycle. Life-cycle assessments are an important instrument here. They investigate all phases of the life cycle – development and production, recycling and, what is often most important, the use of the product.

Besides considering the ecological components when analysing products and processes, economic, social and technical aspects play an important role in supporting decision-making. The term 'life cycle engineering', which was coined at the beginning of the 1990s by Prof Peter Eyerer, is used to describe this approach. It leads to controversies, of course. Nevertheless it is often the case that efficient use of resources and energy combines economic benefits with ecological benefits.

Create transparency

By adopting measures to increase efficiency, not only do companies save costs but they also lower their environmental impact and reduce risks at the same time. With the growing shortage of resources, the companies are becoming more interested in alternatives when it comes to energy supply, the production processes or even the choice of supplier. The companies in the aluminium industry should bear this thought in mind: it is not always constructive to put measures into practice behind closed doors. Communication is important – do something good, but also talk about it. One is ill advised to create the impression that the end of the road has been reached where resource efficiency and reduction of emissions are concerned. Even if a high standard has already been achieved – as exemplified by closed loops in the aluminium industry – one has to continue. A spirit of optimism and the desire to achieve more shapes a sector's image.

Aluminium offers significant benefits for sustainable utilisation in the form of its properties. Its lightness will also play a significant role in future. Whenever aluminium is in motion – whether it be as packaging during the distribution of goods or as part of a car – there are benefits that are directly related to resource efficiency and a lower level of emissions. Life cycle assessments make this clear. Even supposedly smaller components make a positive contribution here. The maxim is: less weight equals less fuel consumption and as a result lower emissions.

This is shown by a study carried out in the transportation sector that was prepared on behalf of Alcoa. Compared with a set of steel wheels, the new Alcoa wheel design has a complete weight advantage of 215 kg; this is relatively small compared with the maximum permitted weight of a truck of 22 tonnes. However, for an average loading and transport scenario in Europe, this allows an overall net saving of more than 13 tonnes of CO_2 equivalents over the life cycle of the truck, and as much as 16 tonnes under US conditions. This is a particularly strong argument for aluminium given that at first the production of aluminium leads to higher emissions; however, this is made good again several times over during the transport operations.

However, what is valid for aluminium is also valid for other materials, such as carbon-fibre reinforced plastics. These are perhaps not yet as fully developed as metals in terms of experience and from a technical point of view, but work is being carried out to achieve series production. If one takes a look at recycling, though, these materials are still in their infancy. But what does not exist today might exist tomorrow.

The possibility to recycle products has to be a central element in sustainable utilisation and sustainable product development, especially where the primary manufacture is energy intensive. With life cycle assessments, for example in the case of the aluminium beverage can, it is apparent how recycling rates have an effect on ecological performance. If the recycling rate is above about 50 per cent, aluminium packaging performs better than packaging made from other materials. This is not a problem in Germany, but how does the situation look in other countries? The role of the consumer is essential in this connection. Consumers thus decide on the efficacy of recycling – by deciding whether they throw the cans away or recycle them. Consumers also need to be more consciously aware in matters such as aluminium and end-of-life products. This is also a task for the future.

Today's solutions have to satisfy the requirements of the future. It is a matter of combining maximum possible customer benefits with the highest possible standards of safety and reliability and at the same time setting standards with regards environmental compatibility and resource efficiency. The aluminium industry is well equipped to do this but in future it has to actively address the challenges of the future. ■

Recycling: advantage aluminium

Used aluminium is a valuable source of raw materials for providing metal for manufacturing plants, particularly in a country like Germany that has few natural resources. At a time when reserves of raw materials are dwindling, the importance of recycling materials is increasing more and more. Therefore our industry is doing everything it can to recycle the scrap accrued here in Germany. Numerous German and international aluminium companies are investing in expansion projects involving state-of-the-art recycling facilities to prevent scrap being drained off abroad.

Aluminium products excel particularly in the key categories 'conservation of resources' and 'energy efficiency'. The resource efficiency of products only becomes really apparent when one takes their complete life cycle into consideration – from the extraction of the metal via its processing into semi-finished and finished products through to its utilisation and finally to its recycling into new products. With aluminium, such a life cycle does not come to an end after just a few cycles: it can be repeated indefinitely.

Raw material loops in the aluminium industry

Used aluminium is a valuable source of raw materials for supplying processing plants with metal, particularly in a country with few natural resources like Germany where a well-functioning logistics system has existed for decades.

Unlike other materials, aluminium can be melted down and turned into new high-grade products time and time again without any loss in quality.

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Aluminium Recycling division

The recycling industry and the tasks it performs have changed markedly in recent years. The recycling of aluminium is becoming an ever more important source of raw materials. In Germany, we are already producing more recycled aluminium than primary aluminium, and this will become more pronounced in future. The urban raw material aluminium scrap will play an increasingly more important role when it comes to providing the markets with metal efficiently and sustainably, especially in Germany. It is becoming apparent that the earlier differentiation between 'primary' production from the geological raw material bauxite and 'secondary' production from scrap has become obsolete: there is no difference in the material properties of aluminium extracted from urban raw materials and that extracted from geological raw materials.

A key task of the recycling industry in future concerns the further improvement of systems for collection, sorting and processing. Via its Aluminium Recycling division, GDA is supporting the aim of closing recycling loops and achieving high recycling rates. In Germany, the stages of the value chain are quite well developed but need to be further optimised in detail. There are still products that slip through the recycling net. Here it is a case of working together with other organisations and initiatives, such as with the A/U/F recycling initiative (A/U/F = Aluminium Windows and Facades and the Environment) or Deutsche Aluminium Verpackung Recycling GmbH (DAVR), the German aluminium packaging recycling organisation.

Bauxite is the primary raw material for the production of aluminium and as such will be available in sufficiently large quantities for generations. The subject of aluminium recycling is becoming increasingly important in the industrialised countries due to people becoming ever more environmentally aware and the associated pressure this exerts on industry. Besides conserving natural resources, the large amount of energy required to produce primary aluminium by electrolysis is also playing a role. This is because in addition to saving primary raw materials and alloying metals only a maximum of ten per cent of the energy required for primary production is needed to recycle aluminium. Here one should give particular mention to aluminium's special advantage of infinite recyclability. When correctly processed, aluminium does not suffer any loss in quality and thus differentiates itself positively from other materials, such as paper or plastic, which suffer a loss in quality whenever they are recycled.

The aluminium industry will grow strongly in the next few years as a result of the metal's manifold possible applications and favourable properties. Recycling alone cannot cover the resultant raw materials requirement. The most energy-intensive step in the production of aluminium, namely electrolysis, will thus be the main focus of ecological considerations. Regardless of the source of the electrical power used for electrolysis, this process step results in so-called Scope 2 emissions, in other words emissions via bought-in energy (electricity) which can be in the range 2-16 kg CO_2 per kilogram of aluminium produced. The first figure is for the case where the electrical energy used is obtained via hydropower; the higher figure applies for the use of electricity from coal-fired power stations.

The energy sources used for primary production and the repeated use of secondary raw materials are thus important factors affecting the ecologically compatible development of the aluminium industry. Possible exports of valuable scrap from Europe for further processing in countries with lower environmental standards deserve particular attention here. Besides indirectly exporting the energy tied up in the metal, this will also not make any contribution to the global emission balance.

Ideally the aluminium should be separated at the point where it accrues or is collected in order to avoid mixing, and therefore downgrading, to a large extent. The aim is so-called alloy-to-alloy recycling in a closed loop with the customer in which a specific alloy can again be used for the same application. If mixing occurs, it is necessary to separate the aluminium from non-metallic fractions (e.g. wood, glass, plastic, etc.) and other metals (such as iron, steel, copper, etc.). It is even possible nowadays to separate different aluminium alloys. The challenges today are still the detection of the individual alloying elements and separating out aluminium scrap that does not have a bare surface (e.g. is painted or lacquered, contaminated, etc.) and material composites.

Photos page 26:
© AMAG AG, Austria

The aluminium industry is doing everything it can to also recycle in Germany all of the scrap that accrues there.

The recycling of aluminium scrap meets about 40 per cent of the demand for aluminium in Europe.

Aluminium is a material of the future: for example, special aluminium alloys with a large recycled metal fraction are showing great potential for the car sector. New applications in the field of crash-relevant solutions demonstrate the possible uses of secondary aluminium for highly stressed components in lightweight construction. The carbon footprint is then borne by vehicles during the whole life cycle, including the production phase.

To summarise, one can say that aluminium recycling will not be able to cover the aluminium industry's growing demand for raw materials but closing raw material loops, alloy-to-alloy recycling in a closed loop with the customer, and appropriate processing make sense economically and ecologically and are sustainable. ■

Photos page 27:
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Geo-mining takes place at the beginning of the industrial value chain while urban mining is carried out at the end of a product's life.

Resource efficiency has many facets

The use of natural resources is confronted by a basic dilemma: development cannot take place without using raw materials and environmental resources; their use results in multifarious ecological, economic and social problems.

The use of natural resources depends on several fundamental factors. These include population growth, the finiteness of natural resources and the demands made on the environmental media water, land and air during extraction, processing and disposal. In past decades, discussions centred on the geological availability and the finite nature of natural resources, but nowadays it is issues such as fair access to resources and using them responsibly that are to the fore. By using energy and raw materials efficiently one can safeguard against natural depletion of resources and price and market risks. The efficiency approach offers adequate potential to cushion the risk of shortages in supply in all three spheres of activity. The aim and crux of every efficiency strategy is to secure the global utilisation of resources over the long term with minimal demand on ecosystem services.

Companies that operate in a resource efficient manner can expect social recognition but not always economic success. However, work is being carried out intensively globally, at a European level and in Germany on initiatives, programmes and indicators.

Photos page 28:
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Innovation: the elixir of life

Aluminium tubes for cosmetic and care products steal the show with their elaborately designed packaging in matt and shiny finishes, with or without metallic effects, or with lacquers that have special haptic properties – and they exude appeal when they are on the shop shelf.

Tealeaf readers in the packaging sector are predicting the worst: "The aluminium tube is slowly dying!" The figures from etma in recent years tell a different story. Is it really dying? And how quickly is it dying? My opinion: innovation is an outstanding and life-prolonging elixir.

There will no longer be any epochal innovations involving the aluminium tube. But there are innumerable outstanding detail developments that will gift the aluminium tube many good years of life. The use of other forms of aluminium packaging – such as cans and small tubes – is growing steadily. Aerosol cans have the best prospects.

The benefits of aluminium packaging remain undisputed:

- The metal provides the perfect barrier (whereby we are facing the challenge here of wanting to use less and less material).
- Reserves of the raw materials are almost inexhaustible (in contrast to dwindling crude oil reserves).
- The material is dimensionally stable (particularly important for printed packs).
- It can be readily recycled without any loss in quality.

In view of these good characteristic properties, the question that has to be asked is: Where is there hidden innovative potential for aluminium packaging? We differentiate here between reactive and proactive innovation.

Reactive and proactive innovation

The public and legislators will continually be placing new demands on packaging and the industries involved. Examples are the substitution of bisphenol A (BPA) or N-Methyl-2-pyrrolidone (NMP) in protective inner coatings. This is something that is completely normal in an evolving society with a growing body of knowledge. We manufacturers of aluminium packaging have regularly shown that we can react to such requirements: with innovation. We owe it to society to be open to new challenges.

A further broad area for active innovation is endeavouring to increase the efficiency of the individual manufacturing processes – and to do that over the complete life cycle of the aluminium, from the extraction of the raw materials via the processing through to recycling. We manufacturers of aluminium packaging are ready to play our part and expect or hope other players in the life cycle of the metal will do so too.

The market shows us where there is potential

The market itself usually shows us where there is potential for product innovation. The definitive keywords here are 'function' and 'emotion'. The trend towards ever-greater differentiation between user groups presents us with new challenges. An example: if we were to adopt the idea of a universal design, every consumer would use the closures that are easiest to use, but this would result in inestimable disadvantages for people with impaired motor skills.

At the point of sale it is often not the products that are in competition but the packaging – above all when emotions play a major role in the decision-making process. Aluminium packaging scores here with new shapes and new finishes. Shaped aerosol cans, for example, or printing in photo quality, metallic effects or haptically attractive surfaces. The development still has a long way to go. Technologies create opportunities, opportunities create needs, needs create technologies.

The world that we know today would not be possible without aluminium packaging. Above all when we regard innovation as an obligation. Innovation is an outstanding elixir of life. ■


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New packaging brochure

GDA published a new packaging brochure to coincide with interpack 2014. Titled 'Well Packed', the brochure adopts a storytelling approach using everyday stories involving different forms of aluminium packaging – at breakfast time, while playing sport, when childminding or during leisure time.

Good storytelling means presenting oneself and one's own products or services in an accurate and exciting manner. The stories in the new brochure are easy to follow thanks to the modern design. They are intended to make people curious and in doing so help communicate sober facts simply but emotionally.


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YOUR TUBE AWARD

The european tube manufacturers association (etma) held its YOUR TUBE AWARD competition for the second time in 2014. It is aimed at out-standing concepts for the aluminium tube in the fields of product and graphic design. With this competition, etma awards prizes to creative minds that present the aluminium tube as a unique combination of material, design and functionality in a new and innovative manner. The success of the first competition, for which smart product ideas and even complete market concepts were submitted and presented with prizes, encouraged the manufacturers of aluminium tubes who are members of etma to uncover further potential for ideas and position the aluminium tube effectively in the market and the media.

The five best projects were preselected by a panel of experts and then presented at interpack 2014 in Düsseldorf on the GDA / AEROBAL / etma joint stand. The visitors to the trade fair then chose the winners.


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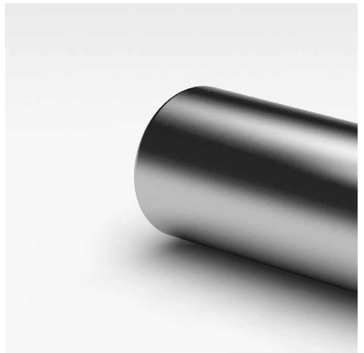


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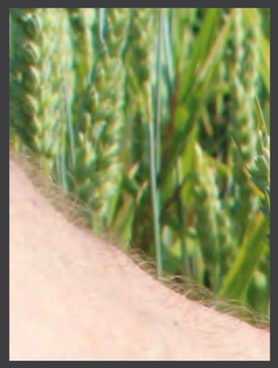

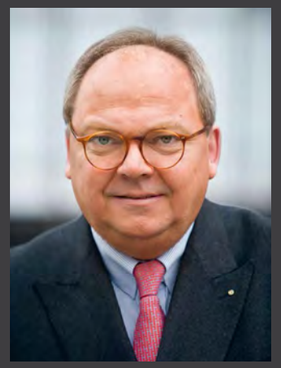

Werner Matthias Dornscheidt, President and CEO, Messe Düsseldorf GmbH

Industry plays key role in battle against food losses and waste

Interview with Werner M. Dornscheidt, chairman of the board of Messe Düsseldorf GmbH, which has launched the SAVE FOOD initiative with the Food and Agriculture Organization of the United Nations (FAO).

GDA ■ SAVE FOOD


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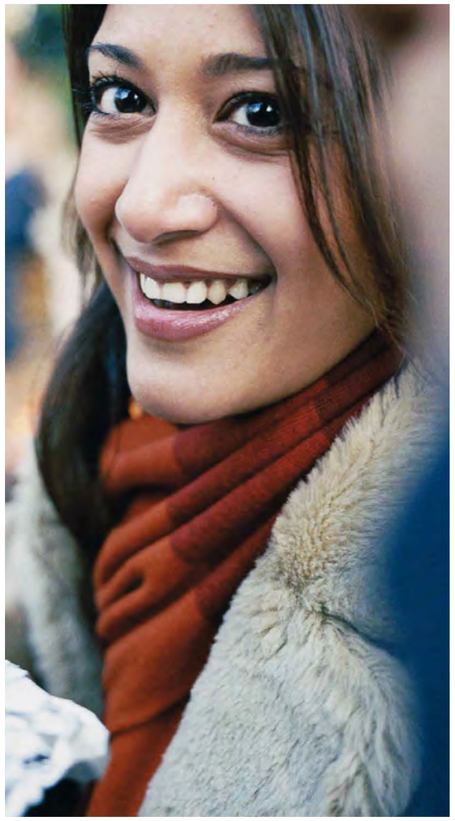

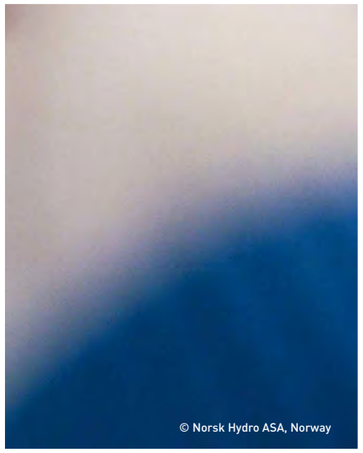
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Each year some 1.3 billion tonnes of food goes bad or is thrown away. A quarter of this would be enough to feed those people in the world who are starving. This is the reason why the SAVE FOOD initiative is confronting food loss and waste – one of the most urgent problems of our time. With intelligent solutions, packaging and process technology can make a decisive contribution here.

What are the aims of the SAVE FOOD initiative?

Dornscheidt: SAVE FOOD is a joint project of the Food and Agriculture Organization of the United Nations, FAO, the United Nations Environment Programme, UNEP, and Messe Düsseldorf. Our initiative has set itself the goal of highlighting concrete approaches to reducing global food loss and waste by bundling together the strengths and expertise of its members from industry and public-sector organisations. It includes the whole food value chain from the producer through to the consumer, including logistics and trading. As the world's leading exhibition for the packaging sector and the associated process industry, Messe Düsseldorf's interpack trade fair plays a leading role and offers the ideal platform for dialogue at the international SAVE FOOD Congress.

What expertise can members contribute to solving the problem?

Dornscheidt: First it is important to consider the causes of this global problem in a somewhat more differentiated manner. In the industrialised countries we are mainly dealing with the waste of food by the consumer, with up to 30 per cent being disposed of unused because its shelf life is too short or simply because too much has been purchased. In the less developed countries the problem is mainly food loss. In these parts of the world, 40 per cent of all food produced goes bad every day before it can reach the consumer. Fruit goes bad almost directly after harvesting or during transport because there are no suitable opportunities available for storage or packaging. Our key task is to inform the public about this global problem and link the different parties along the value chain in order to be able to develop joint solutions. If we think specifically about the members of GDA, their packaging solutions could enable longer storage lives to be achieved and thus permit the food to be transported. In combination with the appropriate production technology it might even be possible to forego continuous cold chains.

What has been the reaction to the initiative so far?

Dornscheidt: Without exception the response has been positive. After kicking off SAVE FOOD at the first SAVE FOOD Congress three years ago, we now have over 110 companies and associations. On top of this there are numerous organisations and universities from all over the world. Furthermore we have also not only managed to move this subject higher up the political agenda but also to broaden it globally as well. We are also a good step nearer to having concrete projects aimed at food loss and waste. A study that we commissioned on mango losses in Kenya has led, for example, to different technology suppliers from among the members of SAVE FOOD now working on a solution to this problem. What is crucial, however, is that a problem of this size can only be mastered by means of a joint and holistic approach by all involved. As the producer, processor and supplier to the consumer, private enterprise has a key role to play here as the driving force.

We are supporting the SAVE FOOD initiative

The SAVE FOOD initiative shows how individual elements of the value chain in the fields of packaging, logistics and transport can contribute to preventing food losses worldwide In co-operation with the SAVE FOOD initiative, GDA sees an opportunity to get across the message that packaging is part of the solution for more sustainability in production and consumption.

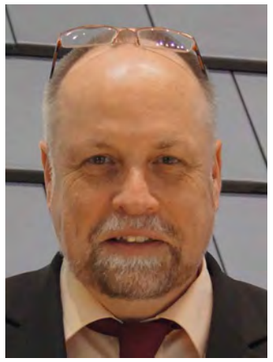
WE PROMOTE initiative save FOOD solutions for a world free of its resources

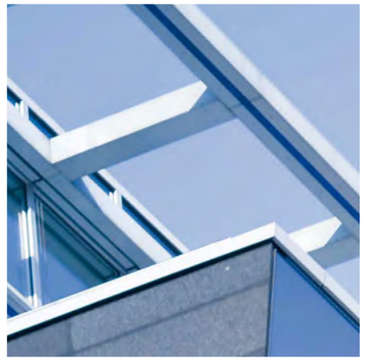
www.save-food.org

GDA is supporting the SAVE FOOD initiative

Since 2012 GDA has supported the SAVE FOOD initiative, a co-operation between the World Food Organization (WFO) and Messe Düsseldorf GmbH to combat global food loss and waste. The United Nations Environment Programme (UNEP) has also supported the initiative since the beginning of 2013. SAVE FOOD wants to bring together players from business, politics and research in a network, stimulate dialogue and help prepare solutions along the food value chain. Additionally, the aim is to initiate and encourage own SAVE FOOD projects with the support of industry.

By collaborating with SAVE FOOD, GDA sees an opportunity to communicate that packaging is a part of the solution for more sustainability in production and consumption. In the discussion of sustainable paths of development, GDA plays a leading role and has been engaged in implementing sustainable action for many years. In this context GDA has added important emphasis to the sustainability debate: for example, by commissioning life-cycle analyses for the most varied aluminium products.





Author:
Dr. Burkhart Lehmann,
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Environmental product declarations for aluminium building applications

Building and construction that is sustainable and suitable for the future involves considering numerous aspects. In addition to social, cultural, economic and urban development requirements, developers, planers and architects are increasingly being asked to satisfy ecological criteria. Not least because the public is focussing its attention on energy requirement, use of resources and emission levels.

Buildings play an important role as a consumer of resources and as a source of emissions. A sustainable building and construction industry therefore demands instruments and criteria that are transparent and as objective as possible in order to be able to evaluate in a traceable manner the sustainability aspect of the performance profile of a building together with its building products. For this, environmental product declarations (EPDs) provide an input for the ecological dimension of sustainability. They show the raw material requirements and the environmental impacts from the production through to the recycling of a building product. This enables statements to be made regarding the use of energy and resources and about the extent to which a product contributes to the greenhouse effect and other ecologically relevant emissions. EPDs thus offer basic information for preparing life cycle assessments of buildings and are therefore used in their sustainability certification.

EN 15804 (Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction) has established itself as an instrument for considering building products ecologically. As a pioneer in this field, Institut für Bauen und Umwelt e. V. (IBU) offers services for the preparation, verification and publication of environmental product declarations. GDA has prepared EPDs for aluminium building products in a joint project with IBU.

EPDs do not offer evaluative statements as to whether a product is good or bad. It is more a case of making the environmental impact of a product transparent in an independent and traceable manner because they contain comparable information that is checked and verified by independent third parties.

In addition to the above-mentioned ecological information on the use of resources and emission levels, the declarations also provide comprehensive technical information as the basis for a very broad range of products for multifarious fields of application. In the joint project, EPDs were prepared for four product groups: plain aluminium sheet, coil-coated aluminium sheet, cold-formed aluminium sheet and aluminium sandwich panels. These EPDs have already generated lively interest from the target markets.

EPDs are not only used for public building projects: corporate building owners are attaching ever greater importance to obtaining sustainability certificates for their administrative buildings. The use of a product is often tied to providing an EPD. Without EPDs it can be difficult to win projects. These ideas now extend much further than Germany's borders. As a founder member of ECO Platform, IBU is actively involved in the European harmonisation of EPDs. ECO Platform was founded in 2013 and brings together the national EPD programme operators. The basis has thus been established for transnational recognition of EPDs and simplifies the dialogue between business partners. This is one of the reasons why the EPDs for aluminium building applications are available in German, English and French.

It should be mentioned here that GDA is a member of IBU and the EPDs are published on the IBU website. This co-operation has proved to be successful and IBU is available for preparing further EPDs within the IBU declaration scheme. ■


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EPDs for aluminium applications in the construction industry

GDA has prepared environmental product declarations (EPDs) for aluminium building products in collaboration with Institut Bauen und Umwelt e. V. (IBU), PE International GmbH and the producers Novelis, Hydro, Alcoa, Prefa and 3A Composites. As part of the joint project, life-cycle impact assessments were prepared for four different building products: plain aluminium sheet, coil-coated aluminium sheet, cold-formed aluminium sheet and aluminium sandwich panels.

In the EPDs, background information on the products with regards production and the environment together with specific engineering properties are presented in a transparent manner. So EPDs also provide the likes of architects, engineers, building owners and public authorities with an information base, for example in connection with certification schemes for buildings. The EPDs can be obtained free of charge from the IBU website (www.bau-umwelt.de).

Many modern buildings only unfold their 'personality' when aluminium is used


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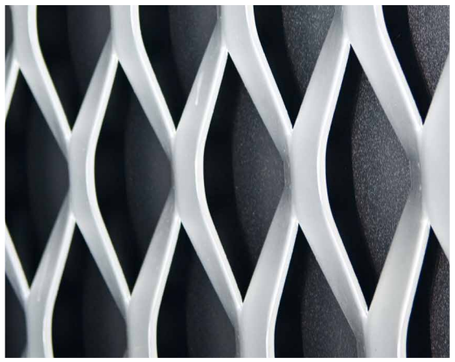
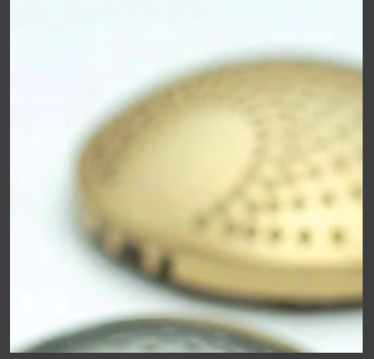
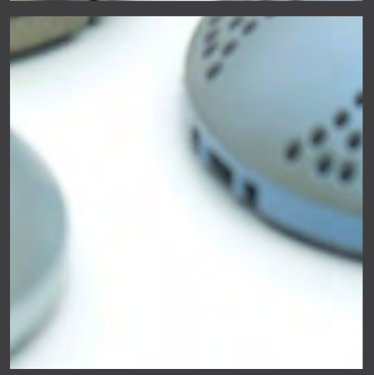


Aluminium creates limitless freedom for creative visions

Aluminium allows any architectural concept to be turned into reality – regardless of whether it is a new building or a modernisation project. Its range of applications includes façades, roof and wall systems, windows and doors, balconies and conservatories, interior decoration and the design of living space.



Author:
Dieter Lutz,
Head of Safety and
Environment, Eckart GmbH



Metal powder for innovative, future-oriented applications

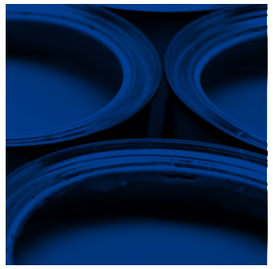
The metal powder industry has a long tradition in Germany. The country has been one of the world's most important locations for the metal powder industry for over a hundred years. This is both an obligation and a commitment for the future in equal measure.

International Aluminium Powder and Paste Health and Safety Workshop in Berlin

The European Metal Particulates Association, which is an affiliated division of GDA, organised the biennial International Paste and Powder Health and Safety Workshop that was held from 18–21 May 2014 in Berlin. Some 70 participants from three continents attended the event to discuss safety-relevant topics pertaining to the manufacture of powder products. More than 30 papers covering best practices, innovations and legal considerations at international level were presented and subsequently discussed. Getting to know each other and making contacts was also of major importance.

The workshop has been an institution in the sector for years. GDA / EMPA organises the workshop alternately with the American Aluminium Association, with the meeting taking place every two years either in Europe or the Americas.

The next workshop will again be held in the United States, in 2016.



Metal powder and paste

Metal powders and pastes are often not visible but are nevertheless an essential part of our daily lives. They are fine in more ways than one. We encounter them every day in a wide range of applications, where they guarantee important functions and optimise product properties. They can provide protection for increasing product life or be used as an additive in production processes, thus satisfying a variety of important demands, for example for contact and composite materials, soldering and joining techniques, friction linings or functional surfaces. The unremitting and innovative development of metal powders and pastes is continuously opening up new fields of application, such as for preparing special metal alloys that cannot be produced using conventional processes or for producing special metallic components using 3D printing technology in a resource-conserving manner.

The members of the specialist trade association are producers of different metal powders such as grit, granules and flakes.

Challenges and opportunities for our industry are resulting from the global structural change which is leading to increased competition on the one hand but is also offering opportunities to open up new markets. Quality, expertise in product solutions, service and innovative capability are taking on a leading role here. But the political environment and topics such as resource efficiency, occupational safety and environmental protection remain important issues.

Metal powder finds use in many different forms and has proven itself in a multitude of fields of application. Markets include the lacquer and plastics industry, which uses pigments made from metal powder. Automotive coatings are one of the highest quality uses of lacquers today, not least because of the continual development of pigment technology. Not only are metallic effects in demand, but functional requirements like resistance to the weather and chemicals and corrosion protection place demands on the pigments. In the building industry, aluminium powders and pastes are used because of their surface structure, grain-size distribution and for their response behaviour during the production of aircrete. The metal is not visible in these applications, but it is an important quality characteristic of the products.

Metal pigments have been commercially available for about a hundred years. Thanks to intensive research, new special products, innovative problem solutions and optimisation are continually being developed for the most varied fields of application. Pigments are therefore fulfilling more and more functions but are still having to improve the properties of the end product.

It is not always the metallic lustre that is decisive. Heat reflection or conductivity can also be decisive when it comes to choosing an aluminium pigment. For example, interior paints containing aluminium pigments can create a heat-reflecting effect. This leads to the energy from the heating system and body warmth being reflected from ceilings and walls back into the room, thereby leading to energy savings. Electrical conductivity is a material property that is increasingly being required. Until now, silver pigments have been used. However, silver is expensive and so-called hybrid materials are therefore now in demand. They are alternatives to pure silver pigments and consist of a carrier material (e.g. aluminium) coated with a thin layer of silver. These silver-coated aluminium pigments also have outstanding electrical conductivity, but are significantly cheaper. Applications are lacquers for electromagnetic shielding to protect sensitive electronic equipment (e.g. in the medical sector) or conductive adhesives for connecting electrical components.

These two examples of future-oriented applications show how new fields of use can be opened up via the functionality of pigments.

The political environment will also determine the future of our industry. In 2012, the evaluation of chemicals as legally required by REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals) began in the European Union. The regulation is based on the principle that manufacturers, importers and downstream users must ensure that they produce, place on the market or use chemicals that do not adversely affect human health or the environment. A wide range of studies was carried out with the participation of our industry. The implementation of the regulation meant, and still means, an enormous amount of effort, which is associated with not insignificant costs. Innovative capability can also be brought into question by such framework conditions.

Occupational safety is very important for our industry. At regular intervals we organise health and safety workshops via GDA. Examples of best practice and dealing safely with hazards and substance are discussed with the aim of providing our industry with a safe future even where occupational safety is concerned. ■

GDA ■ RESEARCH

Author:
Dr. Ing. Sören Müller,
Head of the Extrusion
Research and Development
Center, TU Berlin

From the research stage to industrial use

The Extrusion Research Centre provides a bridge between basic research and commercial application.

Technische Universität Berlin's Extrusion Research and Development Center (FZS) is engaged in the continual development of the extrusion process and the tooling and plant needed for extrusion. Investigations carried out at FZS also help develop new materials and alloys that can be processed by extrusion.

FZS has three extrusion presses with maximum press forces of 0.5 MN, 7.2 MN und 8 MN. This broad range of machinery allows investigations to be carried out into direct, indirect and hydrostatic extrusion of light and non-light metals as well as special materials. All three extrusion presses are equipped with load cells which allow the extrusion loads that occur to be measured and recorded throughout the whole process. The temperature of the exiting profile can be recorded during extrusion by means of two integrated radiation pyrometers in the press channel in the 8 MN extrusion press and thermocouples in the bearing of the die.

For the extrusion of quench-sensitive alloys, a water quench can also be installed in the run-out of the press to allow the profiles to be quenched in a water bath as well as by a spray mist. A puller integrated in the control device can be used for the extrusion of long profiles. Several chamber furnaces and a single-billet induction heater are available for heating the extrusion billets.

In addition to actual extrusion trials, simulations of the extrusion process are also performed at FZS.

As is common practice in industrial production, simulations are often carried out prior to the actual extrusion trial, for example in order to be able to evaluate tool designs with respect to their influence on the extrusion process before they are actually used, thus reducing development costs. FZS is currently involved in several research projects involving different questions relating to the extrusion of aluminium alloys. Extrusion trials and subsequent metallographic analyses are being carried out at FZS in collaboration with GDA's Automotive Extrusions working group. The aim of this work is to systematically compare the most important process parameters and their effect on the mechanical properties of the profiles. As part of the Automotive Extrusions working group, these tests will be evaluated with respect to preparing material cards for the car industry.

In another project, FZS's scientists are engaged in preparing a process modification for the extrusion of profiles with a longitudinal gradient and the analysis of the precise friction conditions during the extrusion of aluminium in order to be able to develop improved simulation tools based on the results obtained. In a further project, the process route from the homogenisation of the billet through to the heat treatment of the profiles for 7000 series aluminium alloys is being investigated with the aim of being able to produce profiles with adequate ductility in addition to high strength.

As these project examples demonstrate, in addition to research into the fundamental relationships that are relevant to extrusion, many research and development projects are conducted with a firm reference to industrial practice. This close relationship between FZS and industry manifests itself in the large number of projects commissioned by industry as well as in FZS's industrial patron's association, which has been in existence for over 25 years. Today nearly all of the companies associated with extrusion in Germany and German-speaking countries are members of the association. Member companies of the association are drawn from the following areas:

- mechanical engineering
- plant for billet and container heating
- tool manufacturing
- semis producers for light and non-light metals.

The association contributes to the maintenance of the FZS's facilities and promotes the education of qualified young professionals in the field of extrusion.

FZS offers the member companies of the patron's association the following services:

- presentation of the latest research projects
- annual reporting of research results
- joint application for third party funded projects
- training of member companies' employees in the field of extrusion. ■

Material for innovation

Aluminium is a very young metal but nevertheless it is already the most widely used non-ferrous metal. About a third of the aluminium ever produced worldwide has been produced as recently as the last ten years. The material is young and innovative and the companies are flexible and creative. The aluminium industry is continually improving the properties of the material, developing new products and opening up growth potential.

The sector is developing ever newer aluminium alloys with improved mechanical properties, such as strength, workability and corrosion resistance. Further potential for the use of aluminium can be opened up if aluminium producers and processors and user industries work together even more intensively in future.

Lightweight Construction Network

GDA has established the Aluminium Lightweight Construction Network together with the Institute of Forming Technology and Lightweight Construction (IUL) at TU Dortmund University. At the network's website at

www.alu-leichtbaunetzwerk.de

searches can be made into research activities conducted since 2000 that involve aluminium lightweight structures and were or are being supported by BMBF, AIF or DFG. Over 700 projects from some 400 institutes and companies provide details of contact persons for future projects. The aim of the Lightweight Construction Network is to collate information on completed and ongoing research projects covering the development of aluminium lightweight structures. The Lightweight Construction Network is the interface between the aluminium industry and university research facilities and has its roots in the Transregio10 collaborative research centre and the long-standing co-operation between IUL and GDA.

The Transregio10 (SFB / TR10) collaborative research centre, which is supported by the Deutsche Forschungsgemeinschaft (German Research Foundation, DFG) at three locations, namely Dortmund, Karlsruhe and Munich, covers the investigation of the scientific basis for flexible small-scale production of lightweight frameworks. Different subprojects are conducting investigations in the fields of technology development, simulation, integration in the process chain, flexibility, optimisation and the transfer to industrial practice.

Author:
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Press Spokesman, Reed
Exhibitions Deutschland GmbH

Trade fairs give markets a face. Communication in the age of big data

In a world where communication becomes increasingly more ‘industrialised’, the need for direct, personal contact will not diminish but if anything will increase. It is personal encounters that make trade fairs like ALUMINIUM inspirational and valuable.

GDA organising conference at ALUMINIUM 2014

At ALUMINIUM 2014, GDA and Reed Exhibitions are again organising the specialist congress that will take place in parallel with the trade fair. From 7–9 October 2014, experts from the sector will present an overview of future opportunities for aluminium in the different user markets. Presentations on the topics Plant and Equipment, Automotive, Surface, Recycling Technologies and Aluminium Markets are planned under the motto 'Aluminium – Material for the Future'.

The speakers are well-known and practical specialists from global aluminium producers and the processing and user industries.

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European Aluminium Award 2014

Aluminium Centrum (Netherlands) will again be presenting the European Aluminium Award this year in collaboration with the European Aluminium Association (EAA), GDA and the ALUMINIUM 2014 trade fair. Prizes will be given for products and projects that use aluminium as a material in an innovative manner.

The jury is looking for innovative industrial and consumer products in six categories: Design & Lifestyle, Lighting & Interior, Building & Architecture, Aerospace & Automotive, Marine & Offshore and Production Techniques, Tools & Machinery. The winners of the European Aluminium Award will be presented at ALUMINIUM 2014 in Düsseldorf in October.

How will we be communicating in the future? How will we reach our business partners and customers in a targeted manner? There is hardly a company today whose marketing department is not dealing intensively with the question of the 'where to' of customer communication.

The answers that would be given by representatives of the 'big data' faction – with their vested interest – would be as unambiguous as they are self-confident: "Big data is the oil of the 21st century," said the head of one of Germany's largest business networks recently. And perhaps if he was still alive today the oil baron John D Rockefeller would be investing in companies that extract, process and market the data as the lubricant of business communication. The quantities of data that are extracted and supplied daily, and allow customer profiles to be developed, have become huge business. One of the largest big data brokers alone puts together more than 2.7 billion items of information every day on the surfing behaviour of consumers and major business clients worldwide. The volume of the data stored thus grows by about 24 terabytes every 24 hours. Once before, at the beginning of this century as the first dotcom wave befell us, it seemed that it was only a matter of time before traditional forms of marketing would finally be swept away. Physically travelling to a trade fair in an era of bits and bytes seemed anachronistic, almost archaic. The surprising ending is well known: trade fairs such as ALUMINIUM, which now also takes place with great success in China, Arabia, India and Brazil, the dynamic regions of the world, have developed during this period into powerful driving forces in the global economy.

Why? The answer came a short while ago from of all people a top manager at a well-known software company. Asked about what new products his company was working on to enhance networking, he replied: "Shoes. One puts them on and goes out to meet customers." Despite all of the merits and benefits that are doubtlessly embedded in the world of big data algorithms, it is only personal contact and the unexpected encounter with new products and people, achieved without the help of the media, that make trade fairs so inspirational. It may sound very old fashioned, but trade fairs give markets a face and bring people from all over the world into contact. Trade fairs are a special media form because they are the only marketing medium that achieves the reach of the mass media but at the same time enables direct personal contact. This is what makes it so special – despite all the condemnation by suppliers and users and the marketing world.

It may seem paradoxical at first, but in a world where communication is increasingly 'industrialised', the need for direct, personal communication will not decline but is actually more likely to increase. Reducing the multi-media marketing mix to one-sided digitalised communication raises immense marketing problems. This also applies, by the way, to the journalistic performance of (specialist) publications: it is journalistic unpredictability and thinking outside the box – which has perhaps met with our disapproval occasionally – that ensures that we reassess facts anew and evaluate them differently. I cannot see the logic of the algorithms being capable of doing this. It is a situation that Gabor Steingart, who was editor-in-chief of the Handelsblatt newspaper for many years and is now its publisher, recently raised in a keynote address. He, too, spoke of a fundamental fallacy in current brand communication saying that companies think one has to stalk customers. Steingart is thus also expecting a renaissance of more sedate forms of advertising. I would even go a step further and talk of the renaissance of direct, word of mouth communication between people.

This was also true for our sector which together with GDA, and at first under its lead management, decided to hold what was initially a small specialist trade fair in 1997 – ALUMINIUM – which has since experienced extremely dynamic growth and created its own forum. In the past 17 years it has developed into one of the most successful industrial trade fairs in Europe.

With its move to Düsseldorf, ALUMINIUM has finally become a global fair. Thanks as well to the partnership with our trade association, GDA, which has always been open, forward-looking and based on trust. ■

Primary and recycled aluminium

Some 492,400 tonnes of primary aluminium and about 597,400 tonnes of recycled aluminium were produced in Germany in 2013. The production by remelters only represents a part of the aluminium recycled in Germany, though. It is estimated that some 1.3 million tonnes of in-house scrap is also recycled directly in foundries and aluminium semis plants. This means the figure for recycled aluminium in Germany is actually about 1.9 million tonnes a year.

Aluminium semis production almost unchanged

Almost 2.5 million tonnes of semi-finished aluminium products were produced in Germany in 2013. Compared with the previous year, this represented a rise of 3.4 per cent. Semi-finished products include rolled products, extrusions, wire and forgings. In tonnage terms, aluminium semis are the German aluminium industry's most important sector.

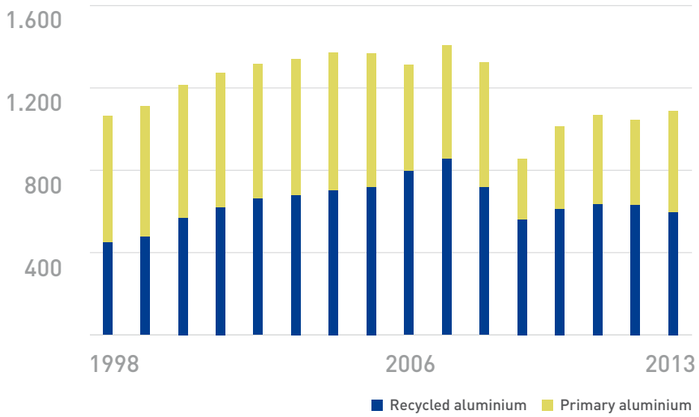
Clear positive trend in production of rolled products

A total of 1,933,000 tonnes of rolled products were produced in Germany in 2013. This represents a rise of 4.2 per cent on the previous year. With the exception of plate production, which declined 6.2 per cent, volumes in the other product sectors all showed positive trends: production of coil and strip, the most important product group in terms of quantity, rose 3.6 per cent; the increases in the other product groups (sheet and stampings) were even more pronounced.

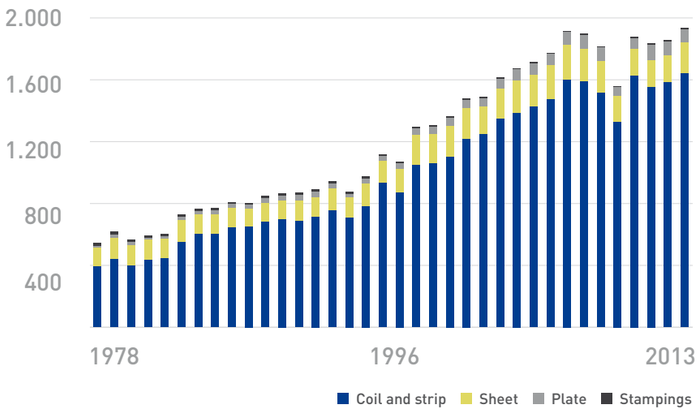
Business activity in the aluminium sector in 2013/14

The German aluminium industry's business situation and expectations improved in 2013/2014. The competitiveness of the aluminium industry will increase further thanks to the large potential for innovation in Germany.

Production of primary and recycled aluminium in Germany from 1998 to 2013 (in '000 tonnes)



Production of rolled products in Germany from 1978 to 2013 (in '000 tonnes)



Slightly positive trend in production of extrusions

A total of 539.500 tonnes of extrusions were produced in Germany in 2013, which was 0.6 per cent more than the previous year. Production of profiles grew more strongly than that of rod and bar and tube.

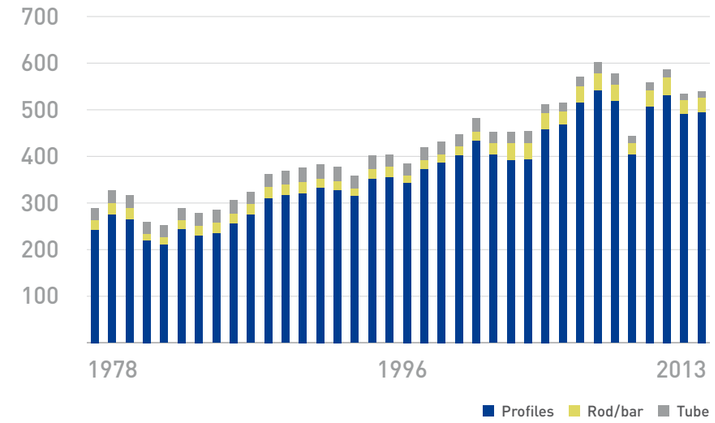
Pleasing trend in exports

Exports of semis showed a pleasing trend. The German aluminium industry exported over 1.5 million tonnes in 2013. Exports were thus 3.2 per cent higher than in 2012. European partner countries play an outstanding role as consumer markets for the German aluminium industry. Europe's share of all exports reached about 74 per cent, with a figure of about 70 per cent for the EU27 countries.

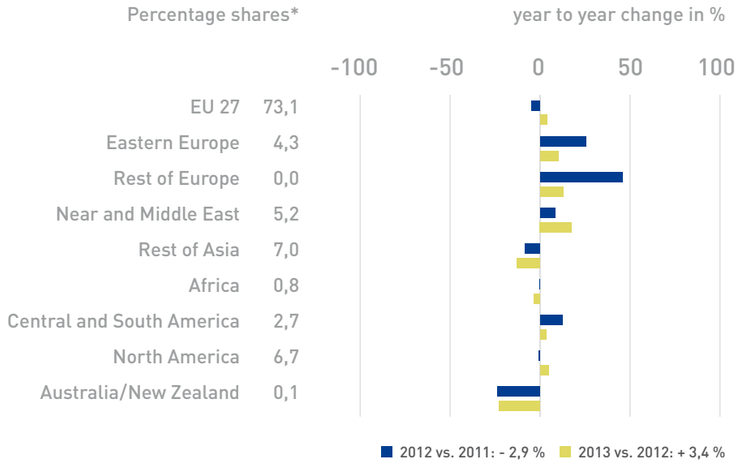
Aluminium downstream processing

Some 333,600 tonnes of aluminium were subjected to further processing in Germany in 2013. Production volume thus declined 2.7 per cent year-on-year. Downstream processing is divided into the categories aluminium foil and thin strip, tube and aerosol and other cans, and metal powder. Production of aluminium foil and metal powder fell 3.3 and 9.7 per cent respectively but there was an increase of 5.4 per cent in the manufacture of tube and aerosol and other cans. ■

Production of extrusions in Germany from 1978 to 2013 ('000 tonnes)



Exports of aluminium semis according to region in 2012 and 2013



* on total exports of aluminium semis during the current year

Outlook

The growth prospects for the German aluminium industry in 2014 are good. The global economic environment improved continually during the course of 2013. This is particularly the case in the USA: consumer confidence is growing, investments are rising again, industrial production is growing and the situation in the labour market is improving. The prospects for China have also improved and stable growth rates at a level that are reasonably high for the country are expected. However, Brazil, India and above all Russia are lagging behind this trend. There are risks for the global economy, especially in the case of Russia. Even so, the expectations of German manufacturers of plant and machinery, German carmakers and the German electronic sector are all positive. The business expectations of the German building and construction industry are positive as well and fit into the country's positive economic picture. This all means growth prospects for the German aluminium industry are good.

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DMKZWO GmbH & Co. KG, Cologne

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 ...

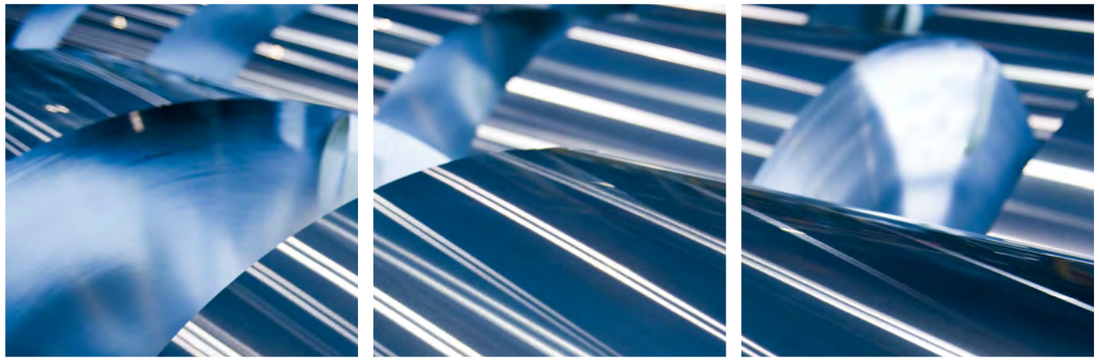
... answers practically any question relating to aluminium via its **library.** GDA's library is the largest German library dedicated to aluminium. The library's archives contain one of the most extensive collections of information on aluminium – all well documented and edited.

... 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.

Statistics

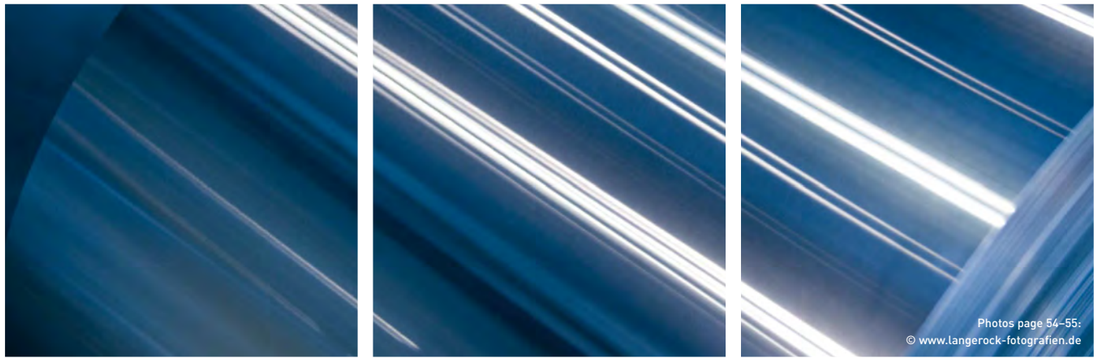


Production

Semi-finished aluminium products	2012	2013
Rolled products	1,854,500	1,933,000
Rods and bars	30,500	30,600
Profiles	491,900	495,500
Tubes	13,400	13,400
Wires	16,600	16,800
Forgings	N/A	N/A
Conduction material	4,400	5,000
Total	2,411,300	2,494,300

Aluminium castings (tonnes)	2012	2013
pressure die-casting	470,800	499,500
Permanent-mould casting	275.900	275,100
Sand casting	94.100	104,500
other casting processes	6,200	3,600
Total	847,000	882,700

Further processing of aluminium (tonnes)	2012	2013
Aluminium foil	280,200	271,000
Tubes, Cans and Impact Extrusions	39,900	42,000
Aluminium powder	22,800	20,600
Total	342,900	333,600



Photos page 54–55:
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Foreign trade

Primary aluminium (tonnes) 2012			Primary aluminium (tonnes) 2013		
Country	Import	Export	Country	Import	Export
EU 27 (with Croatia)	1,457,895	366,597	EU 28	1,354,722	384,806
EFTA	514,227	25,496	EFTA	552,898	21,995
Eastern Europe (without Croatia)	118,904	594	Eastern Europe	137,732	950
Rest of Europe	0	1	Rest of Europe	0	0
Europe total	2,091,026	392,688	Europe total	2,045,352	407,751
North America	37,545	1,038	North America	50,523	1,109
Central and South America	15,768	3	Central and South America	7,781	21
Africa	57,804	95	Africa	78,966	239
Asia	167,122	9,338	Asia	181,429	9,653
Total	2,369,265	403,162	Total	2,364,051	418,773

Secondary aluminium (tonnes) 2012			Secondary aluminium (tonnes) 2013		
Country	Import	Export	Country	Import	Export
EU 27 (with Croatia)	882,580	1,021,082	EU 28	771,994	1,054,390
EFTA	141,222	53,410	EFTA	143,034	59,907
Eastern Europe (without Croatia)	160,598	55,570	Eastern Europe	172,852	62,648
Rest of Europe	0	22	Rest of Europe	1	25
Europe total	1,184,400	1,130,084	Europe total	1,087,881	1,176,970
North America	16,672	92,563	North America	16,911	97,062
Central and South America	6,850	38,392	Central and South America	7,453	39,738
Africa	18,953	11,675	Africa	21,486	11,303
Asia	35,821	180,439	Asia	41,758	176,947
Total	1,262,696	1,453,153	Total	1,175,489	1,502,020

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. ■

Executive Committee

Heinz-Peter Schlüter (President)
TRIMET Aluminium SE

Dietrich H. Boesken (Honorary President)
Boesken GmbH

Oliver Bell (Vice President)
Hydro Aluminium Rolled Products GmbH

Oliver Höll (Vice President)
Karl Höll GmbH & Co. KG

Dr.-Ing. Hinrich Mählmann (Treasurer), OTTO FUCHS KG

Friedrich Brökelmann
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Martin Kneer (Executive Member of Steering Committe)
WirtschaftsVereinigung Metalle e. V.

Roland Leder
Aleris Rolled Products Germany GmbH

Laurent Musy
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