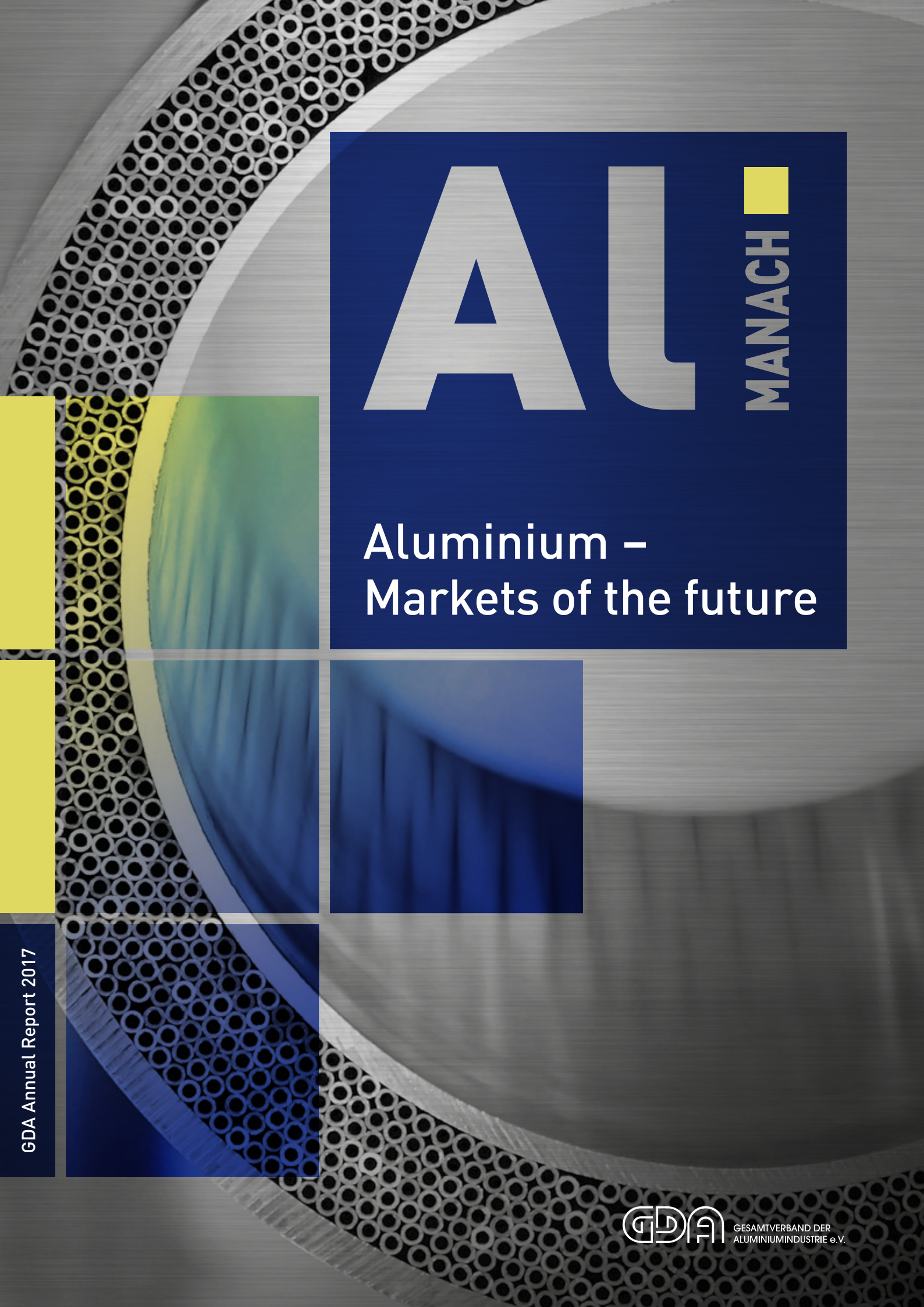
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Aluminium –
Markets of the future
GDA Annual Report 2017
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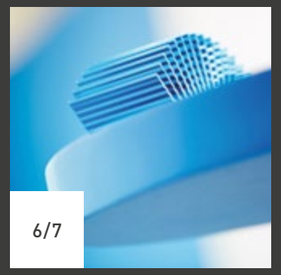

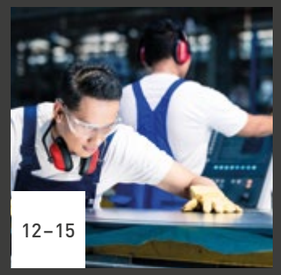

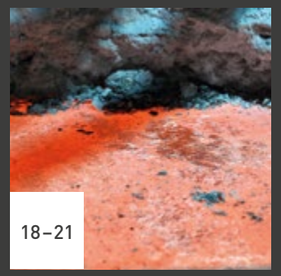

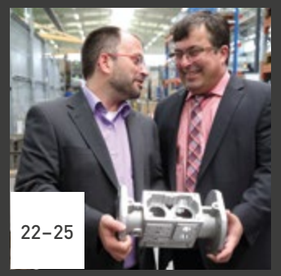

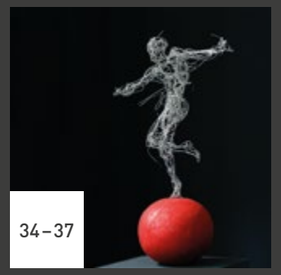

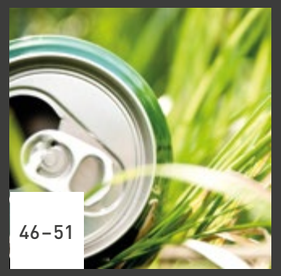

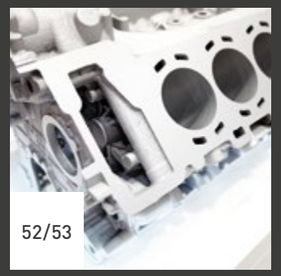

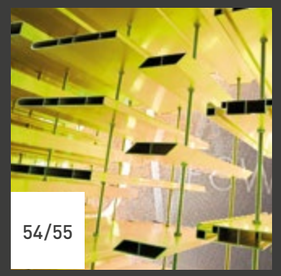

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Looking to the future with optimism: GDA President Dr. Ing. Hinrich Mählmann (left) and Christian Wellner, Executive Member of the Managing Board of GDA.

One step ahead of the future

The German aluminium industry has out-standing opportunities in the tomorrow's markets.

We are living in an age where technologies are developing at a faster pace than many would ever have deemed possible. Internet and smartphone are defining our times, robots and digitisation are infiltrating ever more day-to-day situations, both social and professional, and driverless cars or the Hyperloop are no longer mere science fiction but could soon become reality. Given this rapid technological change and the globalisation of business activity, it is not easy to make forecasts regarding the markets of the future. Nevertheless, it is expected that our sector will also have good prospects in future in the important classic user markets like the automotive, building and construction, packaging or mechanical engineering industries. On top of this, lightweight construction and e-mobility, recycling and energy efficiency, and additive manufacturing will open up numerous new prospects.

One thing is certain: anyone who wants to produce for and supply the markets of the future must be a step ahead of the future. Creative ideas, innovative research projects and the latest technologies are prerequisites for being competitive in the growth markets. In recent years, the aluminium industry has demonstrated that it can react quickly and innovatively to changing demands. Our sector has grown continually since the financial crisis. Germany has developed into the most innovative market for the use of aluminium. This is also apparent when one looks at the economic data. Business activity in the aluminium sector was stable in the first half of 2017, and showed the sector was in good shape. It is foreseeable that the positive trend will continue in the second half of 2017. Domestic demand in Germany is being driven in particular by export-intensive user industries, such as the car sector, which is operating at a high level.

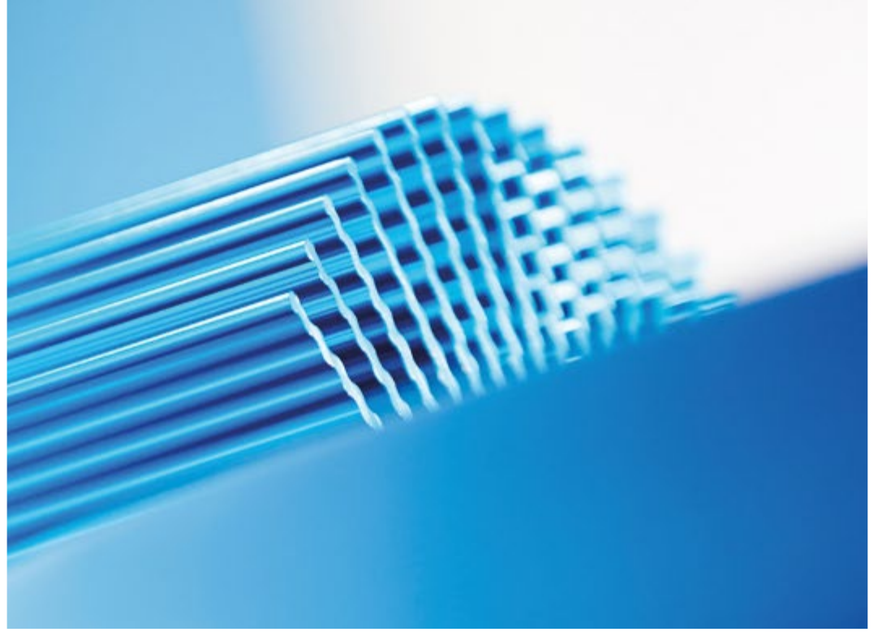
The aluminium industry has established a strong position for the future. Investments in modern equipment and factories, in research and development, and in training and further education of employees are prerequisites for our sector's high technological standard. Many aluminium companies have already completed this step and have improved their competitiveness markedly in recent years by undertaking modernisation and restructuring and thereby creating the basis for continued good economic development. These ambitious and wide-ranging measures have paid off. Our extrusion plants, rolling mills and foundries are the most modern in the world and they support their customer industries with innovative components and assemblies. Furthermore, our modern smelters and recycling plants ensure a high degree of security of supply degree, which makes our industry more independent of developments in the raw materials markets.

Despite the good economic development, our sector is still facing challenges and we find ourselves in a changing environment. Markets are changing more rapidly or are shifting. In addition, the social environment is demanding solutions from our industry. To counter competitive pressures and global competition, our companies are banking on high quality, absolute reliability, a high degree of flexibility and the desire to face up to the complex demands of the future. We are convinced that there are outstanding opportunities for those companies that have a good feel for tomorrow's markets. The mainstays for being highly competitive are therefore innovation and creativity in the creation of added value combined with a high level of automation and production.

At the societal level, demographic development or digitisation are driving the processes of structural change. Politicians, business associations and trade unions should jointly find concrete solutions and develop measures to maintain and strengthen industrial competitiveness. GDA is a trendsetter here: for almost ten years we have been conducting a social-partnership dialogue with the IG Metall trade union on resource and energy efficiency or the importance of aluminium in terms of industrial policy. In this way, we are contributing jointly to safeguarding jobs and Germany's position as a location for investment and industrial production.

Political and societal changes mean ever greater demands are being made on our companies and thus on the trade association itself. Together with our member companies, GDA is facing up to current and future challenges at national and international level. For us, economic success and sustainable technological innovation are mutually dependent. In recent years, GDA has adopted an even higher profile and expanded the services for its member companies. As a strong trade association, GDA offers its member companies a wide variety of services and extensive, exclusive information. The structure of our association is modern and future-oriented so that we can deal with our tasks efficiently and successfully. We will continue to work intensively to make the public aware of the aluminium industry's accomplishments, as well as to make the sector even more attractive to young people. Because in this way we will make a significant contribution to safeguarding Germany's position as a location for innovation.

Under its guiding theme 'Aluminium – Material for Markets of the Future', GDA's 2017 Annual Report demonstrates aluminium's potential in existing and new markets and documents the focus of the association's work. In guest articles, experts from the aluminium and customer industries explain how one can bring about market changes and shape the future using aluminium. In addition, GDA articles covering to day-to-day activities show how the association is positioned for the future in its important fields of activity. ■



An overview of the aluminium industry

The German aluminium industry was stable and in good shape last year.

Overall, the German aluminium industry can look back on positive development in 2016. It could boost production of raw aluminium, aluminium semis and aluminium castings. There was decline in production in downstream processing, but this was only slight.

Turnover in the German aluminium industry declined 2.6 per cent to 15.1 billion euros in 2016. The year-on-year fall was primarily attributable to the low base cost for the metal: the price of aluminium quoted on the London Metal Exchange (LME) plus the premium. There was not only a fall in the LME price for aluminium but in the premium as well. The average base price in 2015 was 1710 euros a tonne and in 2016 it fell to 1569 euros. This represents a decline of 8.2 per cent.

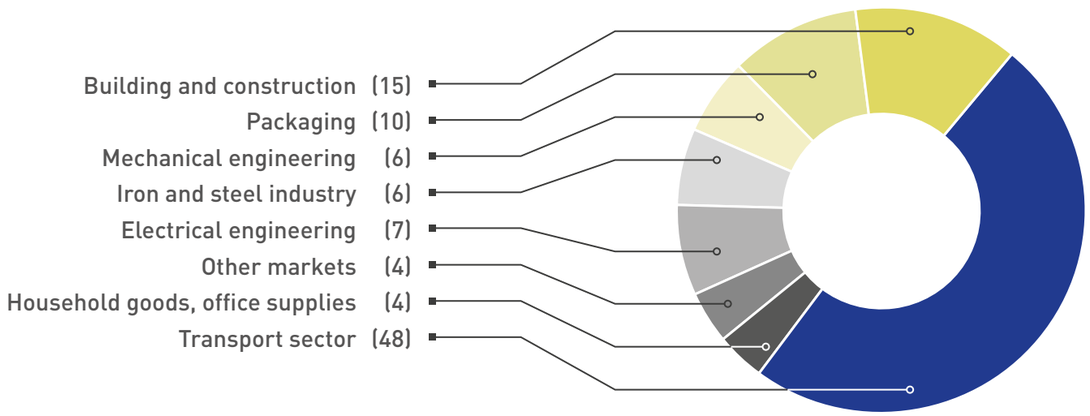
The aluminium industry comprises small and medium sized companies as well as international concerns. It employs some 74,000 people directly in about 600 plants in Germany. Additional impacts on employment are generated in associated branches of the economy so the significance of the aluminium industry for the German job market should not be underestimated.

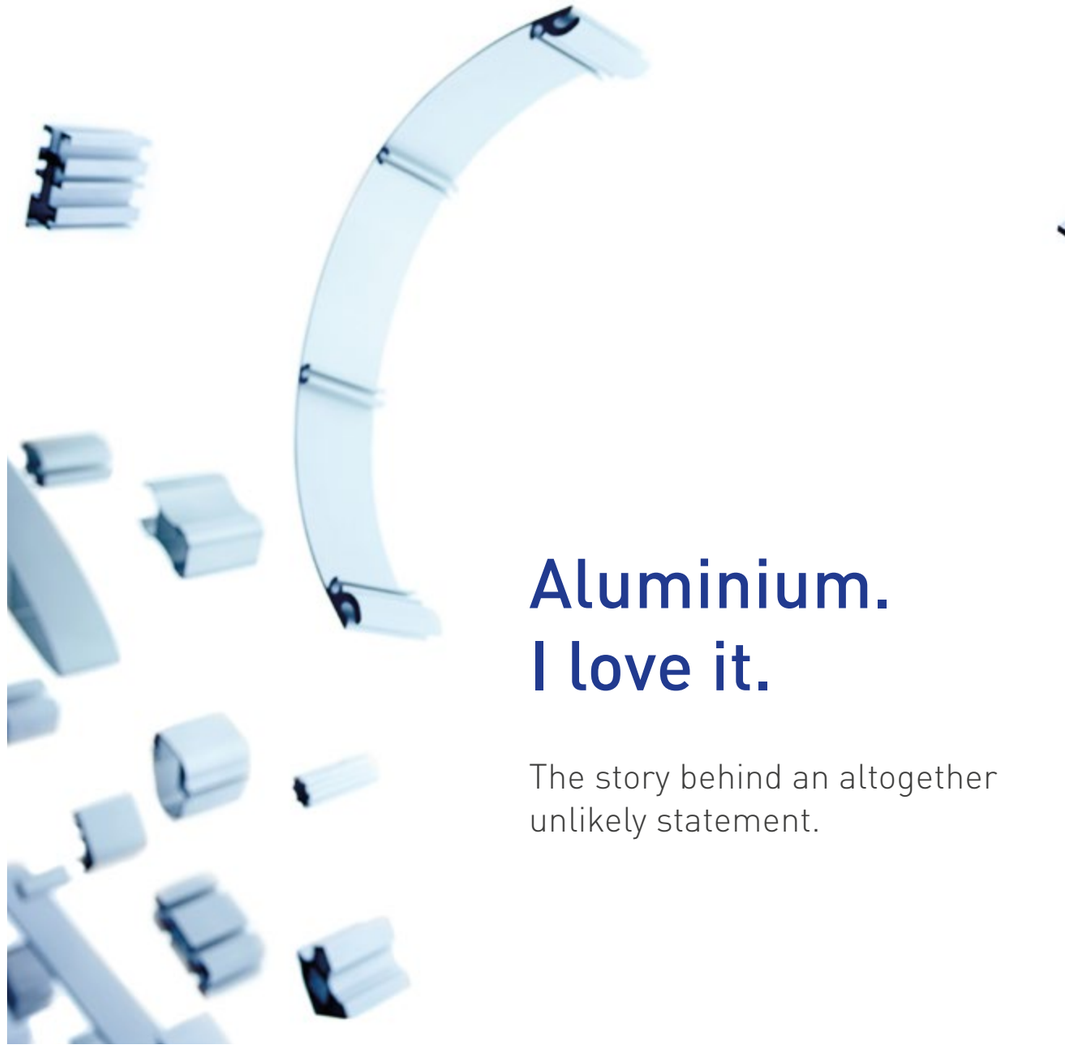
Traditionally, the transport sector is the most important market segment for the German aluminium industry. With a market share of 48 per cent in 2016, the transport sector was three times larger than building and construction. The third most important market segment is the packaging sector with a share of ten per cent. Electrical and mechanical engineering together have a share of 13 per cent. The remaining demand goes into office equipment, household goods, the iron and steel industry and other end uses.

Foreign trade plays an important role in the development of the aluminium industry. Germany is a country poor in resources so it is dependent on the import of raw aluminium. This becomes apparent when one sees net imports of 2.2 million tonnes. However, exports of aluminium semis exceed imports because of the high production capacities in Germany. This export surplus also increased in 2016 and can be interpreted as being due to the greater competitiveness of the German production locations.

Sentiment in the aluminium industry in Germany is positive. So far, there are still no signs of any high geopolitical risks, and expectations for most customer segments are pointing upward. This is especially the case for industrial user markets and the building and construction industry in Germany and Europe. Furthermore, the global economy is stabilising and gaining momentum slightly. In this environment, the German companies are planning to increase production quantities. The chances that this will become reality are not bad at the moment. ■

Main markets for aluminium in 2016 (in %)





Aluminium. I love it.

The story behind an altogether unlikely statement.

Author:
Prof. Dr. phil. Klaus Kocks,
Buisness Consultant and Publicist

The German Federal President ought to be a patriot; that is the least one can expect from a head of state. Nevertheless, in an interview with the 'Der Spiegel' magazine in 1969, Gustav Heinemann admitted he lacked patriotism. When he was asked whether that meant he did not love his country he replied, "I don't love nations, I love my wife, and that's it." This statement about a 'difficult fatherland' (as Heinemann also called it) has gone down in history because it is regarded as being particularly authentic. How is our relationship with the difficult metal aluminium? If it were a diva, it would be admired by everyone. This is apparently not the case. Declarations of love involving the element with the atomic number 13 are among the most unlikely statements of our time. One will quickly be able to reach agreement that this is not something that is in the nature of things, in other words it cannot be the result of a scientific investigation.

One often suspects that psychology is at play; for example, if the users of a deodorant develop a fear of aluminium salts and believe that they are close developing Alzheimer's or dy-ing from cancer because of the spray. One refrains from shaking one's head. Disparaging the end-user more or less openly as being 'psychologically disturbed' falls short of the mark, and is also not an appropriate gesture on the part of an industry. The customer is always right. He may have lost his marbles as far as the experts are concerned, but as a citizen the customer is always right. It is not a matter of some or even all people being off their heads. The heart of the matter is more profound. It concerns the cultural question as to what people consider to be 'natural' and what to be 'artificial'. And why they react to something natural with a sense of basic trust and to something artificial with deep-seated fear. The matter is made more difficult by the fact that these judgements are subject to a historical change. In doing so, progress might well be a retrograde step for some things. In short, we cannot avoid talking about philosophy.

When it comes to the fixtures and fittings in cars, people are increasingly wanting seat covers that are of non-animal origin. Only a decade ago, high-grade leather was the non-plus-ultra replacement for cheap 'plastic'. Those people who the zeitgeist regards as 'natural' have now given up livestock farming, the much-vaunted house slaughtering and the Sunday roast. Country life is stylised as an English garden. Factory farming and cheap meat are increasingly being regarded as worthy of sanctions, and vegetarian or even vegan cuisine is becoming established. Not by all people, but by ever more people: a trend is developing. The associated construct of nature no longer has anything to do with what constitutes real life in and is determined by nature. It is the philosophical construct of an ideal world. This natural idyll in the tradition of a Jean Jacques Rousseau has nothing in common with reality, which Charles Darwin for example describes as the survival of the fittest. Itis a case of an ecological substitute religion.

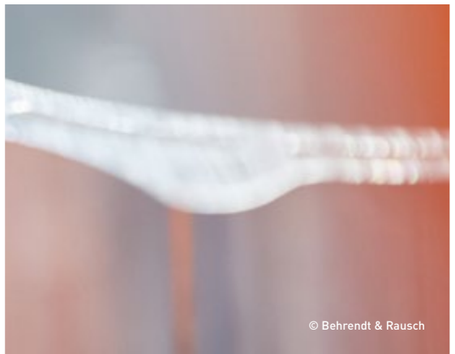
If the consumer decides to pay seventy euros for a kilogram of coffee instead of seven euros by purchasing it in capsule form, this raises economic questions but not any ecological ones. Eight billion coffee capsules only mean eight tonnes of aluminium and this will not destroy the tropical rain forests.

However, one should not underestimate the power of superstition. In the German energy sector, it has led to a tremendous industrial fissure that is allowing nuclear energy and coal to be phased out and solar and wind energy to take its place. Anyone who wants to question this publicly today risks taking a lot of stick, even in a middle-class environment. The fact that it is only the Germans who are going down his route, andno one else globally, not even the Japanese, does not bother the friends of the energy revolution. It is quite possible that this course is the right one to follow both economically and technically; the ideology behind it though derives from mythology.

All ecological myths are of Christian origin: the myth of creation. God created the world, so the Bible tells us, and here one is referring to Paradise, from where Adam and Eve were cast out because they ate from the tree of knowledge. The zeitgeist now specifies those human impacts on God's creation that should be regarded as sacrilege. To Germans, these include gene manipulation, as well as nuclear power and increasingly the use of fossil sources of energy. Fate punishes anyone who sins. Just like our beauty rituals in the bathroom every morning that release a spray of deodorant to cause dementia or cancer. We will not discuss at all here the terrible things that threaten those who eat pretzels.

The zeitgeist starts out as a mild breeze, develops into a wind in certain milieus and can then builds up into a proper hurricane. But it is a work of man and is thus shapeable. Friedrich Schiller's drama 'The Robbers' is based on a theme that he borrowed from Hippocrates; it says: 'What medicines (medicamenta) do not heal, the lance (ferum) will; what the lance does not heal, fire (ignis) will.' At first it deals with the doctor choosing the correct remedy, but then in Schiller's Storm and Stress drama it deals ultimately with revolts, if not revolution. There is no extinguisher that one can use to battle the fire created by the opinion leaders of the zeitgeist, in other words: rational objections exacerbate the conflict but do not solve it. One can only fight fire with fire. In many places, though, one experiences another attitude: a wait-and-see attitude. The public watches the fire until the house has burned down. It can lead to the strangest of results: no one can explain to me why PET of all things is the ideal material for drinks containers. But that is where we are though today. Aluminium needs friends who are ready to ready to fight for this cause. Sentimentality is not a substitute. ■

In recent years, GDA has worked intensively to provide information about the metal and contributed to improving its acceptance and providing an objective view of aluminium and the aluminium industry.



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Georg Grumm,
Head of Information and Communication

Dialogue is the best form of communication

GDA adopts a proactive approach to future issues concerning the metal and the sector. The association's information and communications strategy is closely oriented to the needs of the market and the metal, and everyone benefits from them, whether they be medium-sized companies or large concerns. Many topics can only be dealt with by the sector as a whole. These include promoting the metal's image, discussions on sustainability and resource efficiency, and collaboration with user industries.

Continual and up-to-date press work is the basis of GDA's communication activities, with press conferences, background briefings and the placement of application-related and authored articles. In addition, exhibiting at leading trade fairs, such as ALUMINIUM, and successfully organising congresses are also key tasks of the association's media work and PR activities.

Press releases with information about the sector, economic data and information about personnel appear regularly and make the aluminium sector transparent for editors. Classic print media and digital channels of information, such as the GDA website and GDA's presence in the social media, ensure that the contents are widely distributed. One-on-one conversations and up-to-date specialist articles ensure there is a good trust-based relationship with the editors of the various target media.

China’s aluminium industry – joining forces with the state to reach the top

The European aluminium industry is suffering increasingly from market distortion by China.

Author:
Prof. Dr. Markus Taube, University Duisburg-Essen, THINK!DESK China Research and Consulting

The Chinese aluminium industry is growing and growing and growing. It produced some 31.6 million tonnes – 54 per cent of global production – of primary aluminium in 2016, the 13th record result in succession. And it does not look as if the dynamics of expansion will abate in the coming years. The current 13th five-year plan is projecting increases in growth of more than five per cent a year until 2020, when the 40-million-tonne barrier for annual production is expected to be broken. There is hardly any doubt that this target will be met. China already has the capacity it needs! And the projected increase in new capacity is even greater than the planned growth in output.

This therefore raises the question as to what this expansion is intended to achieve. Is it based on a strategic calculation or is it more a case of uncontrolled rampant growth, caused by a miscalculation within the Chinese market structure? The answer is certainly an 'as well as' coupled with the realisation that the expansion of massive excess capacity, for which there is responsibility at local level, is at least being tolerated by central government.

The Chinese aluminium industry's mere volume expansion is certainly no longer at the centre of the current management of industrial policy. In the words of the Chinese political and business elite, it is primarily a case of also making the Chinese aluminium industry 'strong' now that it has already become 'large'. In this context, 'strong' means capable of fulfilling the highest possible quality requirements, developing its innovative strength and penetrating ever deeper into downstream stages of the value chain. The aluminium industry is thus a key cornerstone of the 'Made in China 2025' initiative, which aims to make China the leading global economic power by the middle of this century. Five of ten selected key sectors are assigned a central role in the implementation of the programme: new materials, machine tools and robotics, aerospace, rail transport, energy saving and new drive systems.

As a consequence of the high strategic importance given to the aluminium industry, it is also receiving massive state support. It is benefiting from the provision of complementary infrastructure facilities and state support programmes for the formation of clusters, preferential treatment in all administrative aspects, such as approval and licensing procedures. Furthermore, it is enjoying cost savings made possible by state intervention in the capital, land and commodity markets. And finally, the aluminium industry is also – by far – the largest recipient of direct subsidies in the Chinese non-ferrous industry.

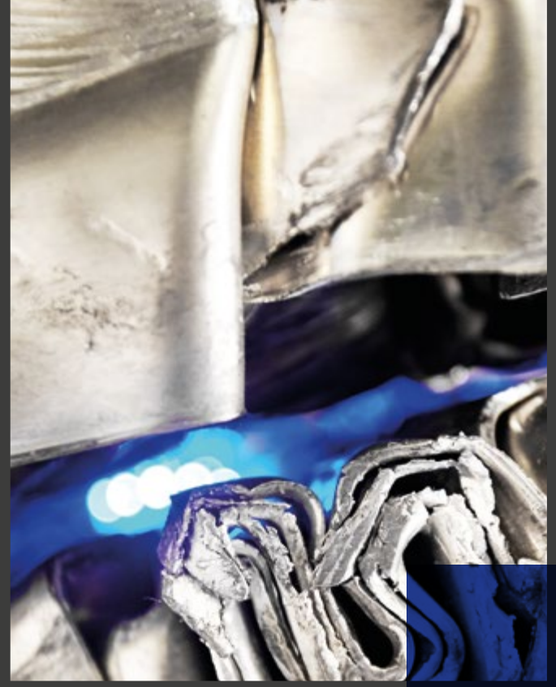
The picture that emerges is thus one of an industry that with explicit state support (i) already dominates the world market in terms of production volume and capacity today, and is continuing to grow, (ii) is investing considerable resources in further increasing its technical capability, which is already at a high level, and (iii) is enjoying significant financial support because of its close involvement in government programmes and does not have to pursue any short-term profitability targets. One can hardly imagine a 'market' that is more pleasant than the one in which China's major aluminium producers currently operate.

However, this is resulting in a serious potential threat to the aluminium industry in Germany and the rest of Europe. China's aluminium companies have considerable cost advantages over them that are not the result of higher productivity but brought about by state-sponsored price distortion. Together with the huge excess capacity for primary aluminium production in China, this provides Chinese suppliers with a price advantage when they offer primary aluminium and products made from it on the global markets. At the moment, this competition, which is not in line with market conditions, can be countered using product-related anti-dumping and countervailing duty measures. Such protection has to be fought for time and time again, though.

The largest threat, however, will result primarily in any way from the medium-term consequences of the massive state support for the Chinese aluminium industry. There is a danger that in the medium term domestic suppliers will first of all be forced to operate in the downstream stages of the value chain and subsequently be edged out of the primary stage. Chinese aluminium companies are currently in the process of massively expanding their basic technical and quality skills as well as their capability to process aluminium along the whole value-added chain (e.g. car components, railway engineering, household appliances, such as foil, conductors, etc., or aircraft construction). However, the financial basis for these activities is built on income not generated by competition but which is provided by government support programmes. At the same time, the acquisition of foreign players, which is also government-supported, boosts the acquisition of expertise even more rapidly.

This means the real competition for customers and user markets, and with it the future existence of the aluminium industry in Germany and in Europe, is thus shifting increasingly to the downstream stages of the value chain. This is where the decisive attack of the state-supported Chinese suppliers will come from – not from the level of primary aluminium.

For the aluminium industry in Germany and the rest of Europe this means they must not merely fix their gaze myopically on the market distortions and unfair imports from China that are occurring in the short term. It is more important to take a broad look at the long-term consequences of Chinese state support for industry as a whole. This means maintaining regulatory principles for which it should also be possible to show solidarity with the traditional users of aluminium products and their trade associations in Europe. ■



Photos page 14–15:
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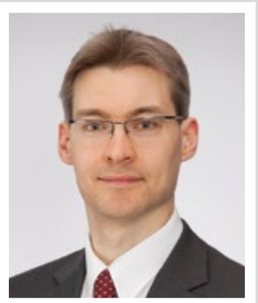
At the moment, Europe and China are not playing to the same rules. This applies to environmental regulations as well as the practice of providing subsidies.



Dr. Andreas Postler,
Head of Economics and Statistics

Data and statistics for company success

Statistical reporting is at the heart of the activities of GDA's Economics and Statistics department. It is an important field for GDA members because it makes general and special market information available. General information covers matters such as the current and forecast developments in important customer industries, reports on foreign trade and economic forecasts. Special information includes product-specific surveys and data collections relating to orders received, shipments and production, and surveys covering capacity and business activity. In addition, statistical reporting is an important source of information for external target audiences. The data are made available here via a number of media (e.g. the GDA website and press releases) and information channels (e.g. working groups and data exchange programmes).

Preparing this diversity of data requires complex and extensive data collection and its analysis. Various sources are used and an extensive network is maintained. GDA obtains primary data from the companies in the aluminium industry (national and international), receives data from research institutes (DIW, ifo Institut), from banks (Commerzbank, Deutsche Bank, IKB), from statistical authorities (Federal Statistical Office, Eurostat), analyst firms (CRU, Habor Aluminum) and many other sources. A further Information pool is the national and international network (WVMetalle, BDG, BDI, Bundesbank, European Aluminium, IAI). Pooling analyses of the data collected leads to another core area of statistical reporting, namely forecasting. In particular, these are demand forecasts for different product groups. GDA's members are regularly informed about these via the market working groups and publications.

Author:
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Photos page 16–17:
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Benefit to employees and industry must be fair

IG Metall wants to continue social partnership for sector dialogue.

The 'Social Partnership for Sector Dialogue 2016 – Industrial Policy and Qualification' between the IG Metall trade union and GDA has provided new and strong stimuli. It demonstrates very clearly the strengths of German corporatism in an impressive manner. It is important to continue this sector dialogue in such a way that the aluminium industry and its employees profit from it fairly.

Collective bargaining agreements and co-determination coupled with institutionalised cooperation between works councils, trade unions, employers and their trade associations, particularly GDA, offer good opportunities for mastering the challenges of the future. Some of these can only be overcome jointly with the help of government policy.

The German aluminium industry is an important driving force for the economy and society. As a metal, aluminium standsfor useful, durable, reliable and safe products. It must be judged using changed ecological and economic benchmarks in Germany.

This means this energy intensive sector is under considerable pressure to invest in order to make future-proof innovations marketable. Will its products be there where one will use them, and will they meet expectations and self-imposed goals? Are they:

- light and energy saving in the transport sector
- long-lasting and corrosion resistant in the building and construction industry
- neutral-tasting and practical as packaging
- mobile and robust in mechanical engineering applications
- universal and efficient when used in electrical engineering?

The aluminium industry is still taking too little advantage of the opportunities offered by the ecological transformation of industrial society – the energy revolution and electromobility. In particularly, it is not promoting sufficiently vigorously the value-creation chain needed for this transformation. Climate protection targets affect every field where aluminium is used.

The social partners must endeavour jointly to modernise industrial policy, which must take into consideration globalisation, with the USA's changing trading policy, the digitisation of companies and the proclaimed energy revolution in Germany.

In addition, demographic change is also part of the megatrends; this can be mastered if

- work is designed in such a way that it is suitable for older and ageing employees so that they are healthy when they reach retiring age or can continue working for the company before that
- the aluminium industry remains an attractive employer for young people for whom other sectors are also competing.

IG Metall wants to broach these subjects in future in the 'Social Partnership for Sector Dialogue'. In essence, the aim is to ensure that if there is a danger of jobs being lost, industrial policy and companies are called upon to adopt countermeasures proactively so that new and future-proof jobs can be created.

Future industrial policy should not be limited merely to economic conditions. IG Metall wants attention to also be given to:

1. Good working conditions. Employees want secure and fair jobs, which therefore means preventing precarious employment, better regulation of temporary employment and working on contract, and further improvement of the legal situation.

2. Ecological sustainability. In future, it will not be possible to enjoy a good life without sustainable business. Essentially, this presupposes that resources will be used sparingly in order to achieve ambitious climate targets as well as expanding regenerative energy production methodically.

3. A strong welfare state. The gap in society between rich and poor and between winners and losers from digitisation is becoming ever greater. Industry must also recognise its social responsibility in order to ensure there is social peace.

The 'Social Partnership for Sector Dialogue' makes sense if it is fair and beneficial to both sides. Representatives of companies and employees in the aluminium industry working together as partners should aim to strengthen the economic success of the sector and safeguard jobs and working conditions. It is in the nature of things that the participants have different interests. A fair dialogue involves expressing these clearly and overcoming them with compromises step by step.

Strong, equal partners are most likely to achieve progress. The works councils and shop stewards of the IG Metall and IG Bergbau, Chemie, Energie trade unions at the plants will continue to commit themselves to employers having complete co-determination and even more employees becoming unionised.

In the end, the social partners must meet their responsibility to society as a whole. At this moment, this includes confronting right-wing populists and other right-wing extremists with determination because they are endangering democracy and Germany's position as a location for investment and industrial production.

Furthermore, this also means there has to be a high degree of acceptance by the population for the aluminium industry and for the jobs in Germany. One must reach out honestly to the people in order to explain to them the risks and opportunities. IG Metall is convinced that the employees and the industry will benefit fairly from a continuation of the 'Social Partnership for Sector Dialogue'. ■

GDA ■ SECTOR DIALOGUE

It is not always easy to reconcile the interests of employees and employers. GDA and the IG Metall are relying on dialogue in the form of a social partnership – to the benefit of both sides.

Author:
Dr. Martin Iffert,
Member of the Steering Committee of GDA e.V.,
President of Wirtschafts-vereinigung Metalle e.V.

Supplying markets with aluminium

Approaching a precision landing.

Sixty million tonnes of aluminium were processed worldwide in 2016, and market observers are expecting solid growth during the current year. If one accepts their estimate, there will be growth of 3.5 per cent in the global aluminium market. A large proportion of demand is associated with fields of application that are of major importance to export-oriented industries. First and foremost, it is the transport sector. It demands the lion's share of the available aluminium and is also the key growth driver. Lightweight construction in cars is far from having exhausted every opportunity and is in a continual state of development. The main issue, electromobility, is advancing this trend still further. Besides the transport sector, the building and construction sector is also promising increasing demand for aluminium following the investment backlog of recent years. Given the growth prospects and the stable markets for packaging and rolled products, the aluminium industry in Germany can look forward confidently to 2017.

In Germany, about 3.5 million tonnes of aluminium are processed annually. Some 35 per cent of the metal required is produced in the country: 20 per cent is obtained via recycling and 15 per cent is produced as primary aluminium. The German aluminium industry has an intact value chain thanks to its closely interconnected production steps. It can reliably fulfil future needs regarding quality and quantity. It cannot influence the price of aluminium though; that is governed by the world market. China plays the main role on that stage – with decisions that are made by the government and are not the result of the mechanisms of a market economy. The country is now the world's largest producer of aluminium – and the largest market. With some 35 million tonnes a year, China accounts for almost 60 per cent of the aluminium produced worldwide.

Spotlight on China: the signs are pointing to change

Massive industrial expansion in China has raised the level of rosperity and driven consumption. However, there has been a high price to pay for this development with its severe environmental impact because of emissions by industry and power stations. There are now many indications that the Chinese Government is no longer prepared to pay this price. Announcements that industrial capacity will be shut down this year are becoming more specific. The plan envisages reducing the production of primary aluminium in Chinese provinces by 30 per cent during the winter months in 2017/2018. The locations affected have a combined capacity of about 11 million tonnes a year. The planned reduction would be equivalent to a reduction of 3.5 per cent in the annual production of aluminium in China, which is 1.9 per cent of global supply. The planned cutbacks in the production of alumina and anodes, two raw materials used in aluminium smelters, is more pronounced, though. This reduction in capacity will lead to significant increases in the input costs for primary aluminium smelters worldwide.

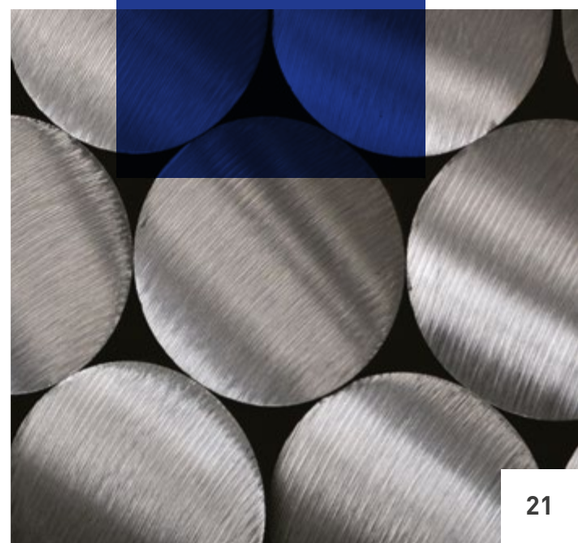
The government in Beijing has already announced production cutbacks several times without turning words into action. Whether things will change after the latest announcements is uncertain. However, observers see several signs that indicate they will. They include the demand for environmental standards to be observed and a healthy living environment, which the population is expressing ever more confidently. In addition, a demographic effect could facilitate the decision on industrial shutdowns: the number of people of working age in China will decline for the first time in 2017, and thus also the demand for jobs. It is regarded as certain that China's export rates in the current year will lag those of the previous year. The largest aluminium market will export fewer shapes, semi-finished products and ready-to-install parts in 2017.

Production capacity serves global demand

The world market price for aluminium rose at the beginning of 2017. This was in part a reaction to the signals coming out of China. At the same time, the rise reflects the expected increase in demand based on the plans for infrastructure expansion in important markets. For example, China wants to invest over 110 billion US dollars this year in the expansion of its rail network. The new US administration has also made the modernisation and expansion of the country's infrastructure a priority. With the announced relaxation of regulations relating to environmental protection and declarations regarding the provision of cheap energy, President Trump wants to broaden the foundation for a national economy that will depend on increased industrial production. The prolonged low-interest-rate phase globally, which is spurring on the construction boom and other investments with cheap money, is providing an added stimulus. The aluminium market is thus developing in what is overall a healthy environment. However, there are risks and uncertainties. These include a possible interest rate turnaround in the USA as well as the tendencies for protectionism and market foreclosure, which would affect sectors that are particularly export oriented.

In view of these developments, supplying the markets with aluminium will resemble a precision landing in 2017. Production capacity will meet global demand for aluminium almost exactly. However, taking a look at the distribution of raw material sources and user industries worldwide also reminds us how important it is for the aluminium industry to have an intact domestic value chain that includes the raw materials industry with its primary production and its efficient material loops. ■

About 3.5 million tonnes of aluminium a year are processed in Germany. Some 35 per cent of the metal required is produced domestically.



Photos page 20–21:
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Aluminium foundries: facing challenges with confidence

German foundries supply not only castings but also advise their clients competently and offer them comprehensive solutions for the design of their final products.

Author (on the right side):
Hans Peter Grohmann,
Member of the Steering Committee of GDA e.V.
Member of the Steering Committee of BDG e.V.

The German non-ferrous metal foundries produced 1.2489 million tonnes in 2016, which was 2.2 per cent more than the previous year. The contribution of the aluminium foundries rose 2.3 per cent to 1.097 million tonnes. They were thus able to maintain production at a very high level in 2016. The non-ferrous metal foundries reported orders totalling 1.299 million tonnes for the whole of 2016, an increase in demand of 11.3 per cent on the previous year.

Good growth prospects for the foundry industry

Companies should be able to look forward to doing good business in 2017 as well. They have continually gained in importance as suppliers to carmakers, the mechanical and plant engineering sectors and other branches of industry, for example communications technology, the furniture industry, and the electrical and electronics sector. The foundries no longer merely supply castings: they also offer their clients competent advice and comprehensive solutions for the design of finished products. The direct export rate in 2016 was 11.9 per cent. The level reached 148 200 tonnes. Cast aluminium components accounted for 83.4 per cent of exports.

The important customer sectors for the aluminium foundries are indicating that 2017 will not necessarily be a bad year for them and that there are growth prospects. Overall, our aluminium member companies estimated the business situation to be stable at the beginning of 2017. There are uncertainties due to a Chinese economy that is in search of growth stabilisation, the trend towards domestic orientation in the USA and the discussions about the effects of Brexit.

Supply and demand for aluminium will continue to increase. Even if the metal should lose market share in some fields of application, it will open up new ones in turn. Growth will continue to be greater than substitution, for example in cars. The use of aluminium will be strengthened by the trend towards energy-saving cars, new applications in the e-mobility sector and the metal's optimal reusability, with the resultant opportunity to completely use once again the energy that has been invested in producing the raw material.

Photos page 24–25:
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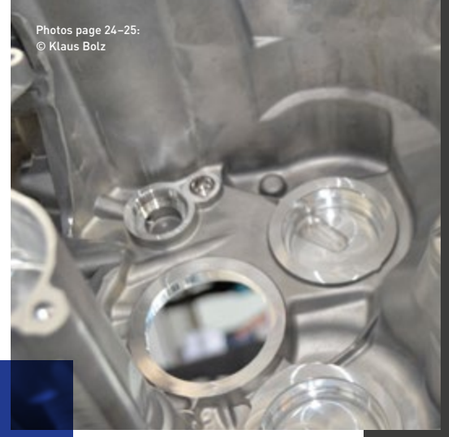


German foundries supply all major vehicle manufacturers in Europe as well as selected markets on a global scale.

Vehicle manufacturing remains the most important customer industry

The automotive industry is by far the most important customer sector for us. This does not only mean German OEMs because the German aluminium foundries also supply every important vehicle manufacturer in Europe and selected markets on a global scale. These supply structures are evidence of the innovative capability of those German aluminium foundries that have the appropriate unique selling points. It is, of course, primarily the premium manufacturers among the OEMs that are the driving forces for sustaining the level of research and development. It is only by cooperating with these clients that it is possible to keep international competitors at bay. It also becomes clear here that the aluminium foundries cannot sit back and relax but can nevertheless react relatively calmly to developments in the automotive industry. In the other customer segments, such as mechanical or plant engineering, or the electronics and electrical industry, the demand for castings is significantly more restrained. A positive exception are the investments in building and construction, which are at their highest level for 20 years and are therefore providing additional stimuli.

In the automotive industry, the saturation point is in sight. Nevertheless, following the election in the USA a spirit of optimism might manifest itself, particularly in the pickup sector. In China, developments in the car market continue to be good because of support programmes (for up to 1.6 litre engines). German domestic production of cars is taking place at a high level, near to stagnation. Moreover, no major stimuli are expected in 2017. In the commercial vehicle sector, one must expect anticipatory effects from 2016 due to the Euro 6 standard. One should therefore anticipate possible repercussions with respect to new registrations in 2017.

Following stagnation in the mechanical engineering market in 2016, hardly any improvement can be expected in 2017. The official forecast from VDMA is an increase of one per cent spread across all sub-sectors.

Further stimuli are possible in the German building and construction industry: domestically, a positive development can be expected in the medium term due to demand from multi-storey residential building. Investments in the infrastructure should also provide stimulation in the next few years.

Continuous Casting working group (WG CC)

The members of GDA's European Continuous Casting working group (WG CC), which was founded in 2011, comprise users of the continuous casting process, suppliers of plant and equipment, and university and research institutes. It includes companies and institutes from Germany, France, Greece, Italy, Luxemburg, Norway, Poland, Turkey, Czech Republic, USA and Canada. The aim is the pre-competitive development of continuous casting, improved understanding of the process and the optimisation of plant components with respect to safety and availability.

This involves an intensive exchange of experience, leading to joint suggestions and tasks being prepared for the working group. It also includes simulation of the continuous casting process. Phases 1 and 2 of a self-financed project regarding solidification behaviour in the roll gap were carried out during the period 2014 to 2016 and a proposal for Phase 3 is currently in preparation.

2018 International Aluminium Die-casting Competition

GDA's Recycling division is again organising the International Aluminium Dievcasting Competition for 2017/18. Partners in the running of the competition are the German Foundrymen's Association (Bundesverband der Deutschen Gießerei-Industrie, BDG), the Austrian Economic Chambers (Wirtschaftskammer Österreich, WKO) and the Swiss aluminium association (alu.ch). The International Aluminium Die-casting Competition has been a successful platform for demonstrating the high standard of quality of aluminium die-castings for many years.

The aim of the competition is to boost interest in the versatile metal aluminium and to identify further fields of application. The criteria for evaluating the castings entered in this year's competition are a design that is die-casting-friendly and is resource efficient. Customers or in-house foundries can participate in the 2018 International Aluminium Die-casting Competition and any number of castings may be submitted. In addition to the need for the castings to demonstrate discernible innovation, particular attention will be given to the constructional design and the execution with respect to casting procedure and mould. Other castings might receive special recognition. The presentation of the awards for the best entries will be made on 15 January 2018 during the opening ceremony of EUROGUSS (16. – 18 January 2018) in Nuremberg. The winning castings will be displayed there and at other trade fairs.

The challenge of globalisation

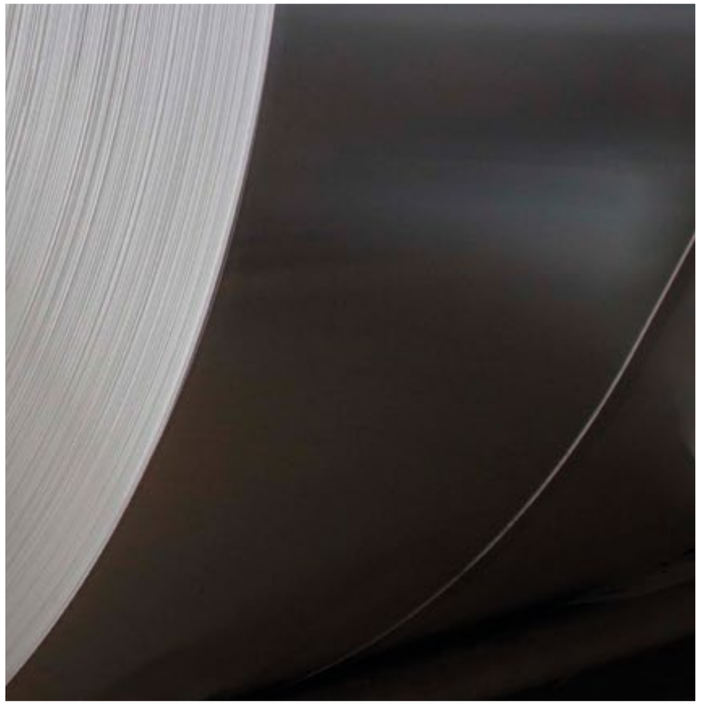
The German foundry industry is the market leader in Europe. The sector has been world-class for many years with products that are technologically demanding and innovative. We continue to set new standards and place our trust in our own competence. However, our competitors are strong so with regards materials and production processes we must stay alert and face the competition with innovations, productivity improvements and the best possible service from advice through to quality and reliable delivery. Given the global challenges, our companies are involved in new processes, new alloys and new production technologies more intensively than ever before.

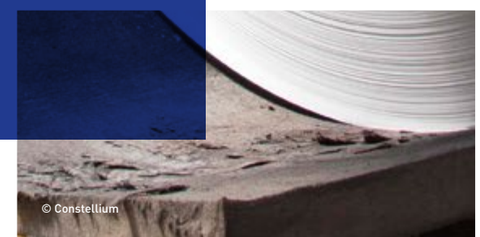
At the moment, the German foundry industry is characterised by accelerating technological development. Overcoming existing challenges in the technical field is flanked by a changing political and ecological environment. Globalisation and a growing worldwide network as suppliers of the most varied foundry products make it necessary to assess the current location and regularly evaluate the direction in order to remain competitive globally in the long term. As with all changes, the current upheavals are also a source of many opportunities and risks. There will also be major changes in the foundry industry. Facing up to these and finding solutions was always a strength of the German foundry industry. ■

GDA ■ ROLLED PRODUCTS

Enormous growth potential for new applications

Aluminium rolling industry facing major challenges.





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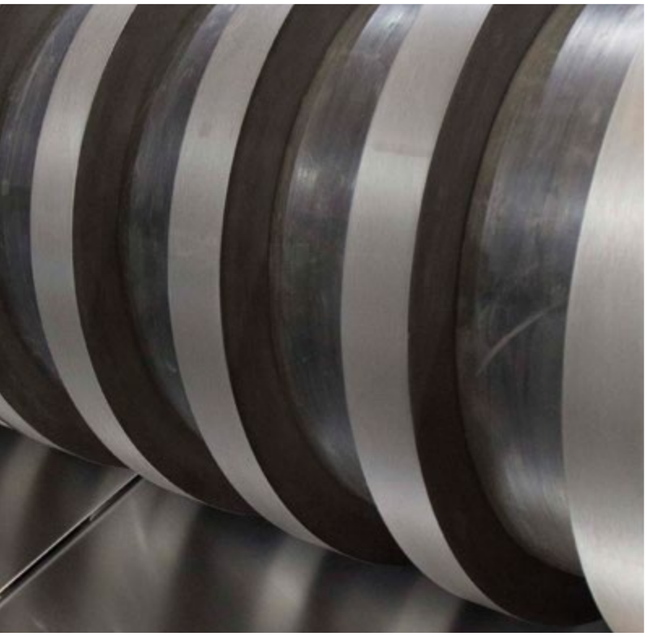

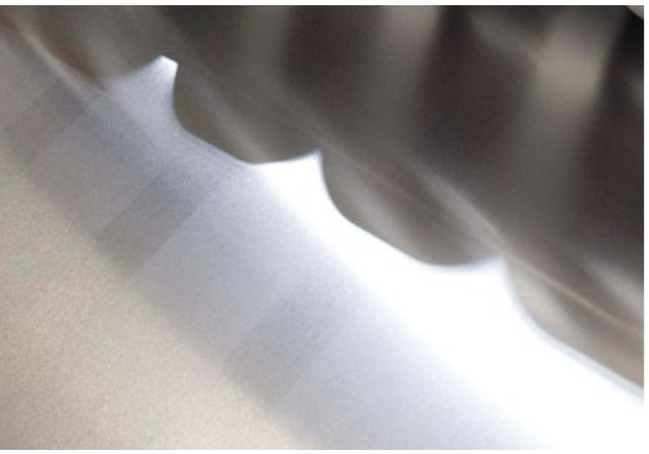

Automotive Rolling working group

GDA's Automotive Rolling working group was formed in 2011 and deals with further development of standards (e.g. VDA recommendations), specifications and testing procedures for aluminium flat products for use in carmaking.

The work is carried out jointly by experts from both the aluminium rolling mills and the car industry (AUDI, BMW, DAIMLER, FORD, OPEL and VW) with the involvement of university institutes and it relates to the common definition of standard alloys and their properties.

In addition, test procedures to determine mechanical, forming and surface properties are being developed or developed even further. This involves regularly carrying out interlaboratory comparisons with all participating laboratories in order to validate the quality and uniformity of the test results and measurements.

The rolling industry in Germany and the rest of Europe has undergone stable development in recent years and has proven to be extremely competitive and productive. However, despite the good economic situation, the sector is facing enormous challenges in the light of the sector dynamics worldwide, with continually increasing demand and marked expansion of capacity in China, Russia and the United Arab Emirates. In the next few years our companies will have to face the task of opening up new market segments using innovative, differentiated products and, in an ever-more dynamic environment, examining existing positions with respect to their sustainability and resistance to competition, specifically in the context of an analysis of a product's critical life cycle and potential.

In 2016 the European rolling industry produced some 4.8 million tonnes of rolled products. The supply side was of almost the same magnitude as the demand side. Germany is the largest production location within the European aluminium rolling industry. Production of rolled aluminium products here totalled 2.046 million tonnes in 2016, which was an increase of about 10.2 per cent compared with the previous year (2015: 1.857 million tonnes).

In 2016, 1.5 million tonnes of rolled products, or 30 per cent of European production, were used in Germany alone. This represents an increase of 1.1 per cent compared with the previous year and marks a new all-time high. Germany is thus by far the largest user of rolled products in Europe. Up until 2020 there will be a strong increase in demand for rolled products, with average annual growth rates of about four per cent. Demand in Europe will increase from 4.7 million tonnes in 2016 to 5.3 million tonnes in 2020, in other words by an average of four per cent a year.

The rolling industry in Germany and the rest of Europe is characterised by a degree of market orientation strongly aligned to the needs of the end-user. The companies in the sector are adaptable, and time and time again have manged to utilise their capacities flexibly to satisfy market needs.

Large overcapacity worldwide

The global aluminium rolling industry is characterised by marked overcapacity. In 2016, some 24.9 million tonnes were produced but capacity stood at 37 million tonnes. In 2020, global production is expected to reach 29.3 million tonnes but by then the capacity will have risen to 42.1 million tonnes. On the supply side, China in particular is becoming increasingly important. European imports from China have increased significantly in the past two years and China's market share in Europe rose to 4.6 per cent in 2016. In addition to China, suppliers from other countries, such as Russia, Turkey or Saudi Arabia, will also be attempting to increase shipments to the European market.

The current low level of differentiation and growing 'commodification' mean European production is in danger over the longer term. Producers from the countries mentioned above can supply products that are characterised by a low level of differentiation in conjunction with the high level of overcapacity worldwide, such as is the case with canstock or foilstock, and at very competitive prices. The European and particularly the German rolling mills are very well positioned on the technology side when it comes to quality, reliability, sustainability and logistics. However, we should be prepared in future for the large quantities of standard products that make up the base load of the rolling mills being imported from China or other countries. Our challenge for the future is therefore to reconcile the structural differences between global overcapacity, production and consumption. We must redefine the base load of the rolling mills using a combination of less tonnage and enhanced added value – and do that continually. In future, we need more innovative and specialised products in every market segment because it will be difficult in the long term to supply market segments where margins are no longer adequate.

Transport industry is growth driver

It is above all the good economic situation in the car industry that is driving demand for aluminium. Cars are a key growth driver for the sector because not only is individual transport continuing to grow strongly worldwide but also there is growing pressure to use lightweight materials to protect the environment and prevent climate change. Every large German and European aluminium rolling mill has expanded its capacity for aluminium body sheet because of strong demand from the car industry. Applications in the sheet area ('body in white') and vehicle components continue to be major future markets for the aluminium rolling mills. In cooperation with our industry, Tier 1 suppliers are developing new concepts for the use of aluminium body sheet. Furthermore, we have additional opportunities for further growth in new user markets, such as the commercial vehicle industry with enormous potential in the truck cab or for new bodywork solutions. It is important that our industry is involved directly in the development of prototypes in order to then participate with our material in the series production as supplier.

Another growth market for our sector is the aerospace industry and the large market leaders regularly release information on new long-term supply contracts. New aircraft are being built on a massive scale and here, too, China will be setting the standard in the next two decades. Apart from the mobility sector, aluminium also plays an outstanding role in the packaging industry as foil or cans. And finally, there are good opportunities for rolled aluminium products in niche markets, such the building and construction industry or consumer electronics. We even have large potential when it comes to special products, such as the use of rolled plate, above all in industrial applications, tool or die making, shipbuilding and mechanical engineering, or the commercial vehicle sector.

Differentiation is safeguarding future markets

The possible applications of rolled aluminium products are still far from being exhausted. The aluminium sector is still a very young industry and we must position our products even more strongly and emphasise the differentiation and substitution potential in order to win additional market shares and address new fields of application in conjunction with the economic and ecological appeal of the metal. We must realise that we do not supply mass-produced products but specialities in accordance with the needs of the customer. Unlike North America, where aluminium is strongly anchored in the minds of development engineers, European markets are still heavily dominated by steel. Here we have even larger potential for growth and substitution in all fields of application. It is a collective challenge for our industry to pursue intensive dialogue with the development departments of our existing and potential (!) clients in order to place greater emphasis on opportunities that make even more specific and intelligent use of aluminium. The industrial challenge for the aluminium sector is to rigorously pursue possible new applications and counteract commodification by means of differentiated product properties and presenting product benefits of the 'miracle metal' aluminium in a manner that is easy to explain. ■

All large German and European aluminium rolling mills have expanded their capacity for body sheet because of strong demand from the car industry.

Photos page 28–29:
© Constellium

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Frank Busenbecker,
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Highly competitive thanks to differentiation

The German aluminium extrusion industry is excellently positioned – in all matters, from plant engineering, expertise and customer loyalty through to service and logistics.

The aluminium extrusion industry in Germany and Europe is on course for further growth. Germany continues to be one of the largest production locations within the European aluminium extrusion industry and produces about 570,000 tonnes annually; its capacity utilisation is around 90 per cent. Total demand in Germany is some one million tonnes a year, which is a third of European demand. Although Germany's import of extruded products, mostly commodities, has increased, we have compensated for that with higher exports – the export share is around 20 per cent. The good level of business activity in the extrusion sector is being supported by the development of premium profile applications with enhanced user benefits, specialisation in niche markets with a high degree of product differentiation, and more products being offered along the whole value-creation chain.

Despite the relatively high level of imports, German extrusion plants are highly competitive. Our extrusion sector has increased its productivity and competitiveness significantly in recent years by investing in new presses, modernisation and rationalisation; for example, several extrusion plants are concentrating on the presses with higher press forces needed to process difficult-to-extrude alloys or to produce larger profiles. There is strong demand for such profiles in the car industry.

In addition, the German aluminium extrusion industry is exceedingly well positioned technologically. This applies to all aspects, including plant and tooling technology, process reliability, customer retention, service and logistics. Compared with foreign suppliers, our performance is outstanding, we have a high degree of automation and we are a strong link in the value chain. Decisive for our good competitive position are high levels of productivity and innovation, creativity in the generation of added value and the fact that we are highly automated. This gives us an advantage over importers from low-cost countries. The technical competence of the German extrusion plants coupled with the added value we offer our customers makes us highly competitive.

Automotive sector as growth market

The market and our customers, especially the automotive and aerospace industries, are the driving forces for developing new products. They are focussing on new aluminium alloys with improved mechanical properties such as strength, formability and corrosion resistance. In industrial sectors like the building and construction industry, mechanical engineering or the electronics sector, which are strong markets for profiles, we must be creative and offer ourselves as a proactive development partner.

Aluminium has changed the car industry and will continue to change it in the future as well. It offers the best cost-benefit ratio when compared with other possible substitutional materials. Even-more intensive cooperation between aluminium producers, processors and carmakers in future could open up yet further potential for the use of aluminium here. Solutions made of aluminium tailored to the needs of our customers are our claim and permanent goal. A prerequisite is that we research and develop superior alloys that exhibit ever better properties.The megatrend to automotive lightweight construction offers German extruders new sales potential and growth opportunities. The major car producers have long since pursued the strategy of using the right material in the right place and are therefore pushing ahead with dealing with all possible kinds of materials intelligently and flexibly in order to be able to use the material that is optimally suited to each specific use. The extruders are facing this challenge with the confidence that they have a good number of trumps in their hand. This is borne out by the latest statistics: whereas a car only contained 14 kilograms of aluminium profiles on average in 2012, according to a recent survey it had already reached 19 kilograms by 2016, which is a growth of about a kilogram a year.

The driving forces for growth are structural engineering and lightweight construction in the automotive sector. Additionally, electromobility offers further growth potential for extruded aluminium profiles, for example for battery cases, structural parts and in the drive area. For many new products and applications, aluminium profiles are the only sensible solution because of some other design requirement of electric cars, for example because of the possibility to integrate functions or cooling into the profile. In order to fully develop aluminium's potential, we must provide greater support to the electromobility market, which is still only showing moderate growth at the moment.

Security of supply is of primary importance

Security of supply is an important challenge for us as aluminium processors. High energy costs in Europe and increasingly in the USA as well are leading to the primary aluminium industry shifting to more remote regions of the world. So far there have not been any supply bottlenecks but the enormous demand from the car industry could lead to shortages in future. We need safe and reliable production and supply locally and we must not allow ourselves to become completely dependent on imports. Thus, we need a rational political framework so that our primary aluminium can remain competitive.

We must also face up to new competitive challenges where processed profiles are concerned. There is a danger here that subsidised, value-added products will come onto the market and endanger our industry and jobs. We need free trade in raw materials but for value-added products we must observe the market carefully in order to establish possible rules at a political level. The aim must be to tackle excesses with respect to subsidies and ensure equilibrium in the marketplace. ■

The megatrend to automotive lightweight construction offers German extruders new sales potential and growth opportunities.

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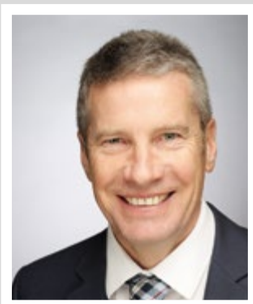

Wolfgang Heidrich,
Head of Transportation, Engineering, Standardisation

Automotive Extrusions working group

The GDA Automotive Extrusions working group has prepared, financed and carried out five test programmes (UP 1 to UP 5) since being formed in 2008. The aim of these test programmes is to gain a better understanding of the extrusion process and in particular of the effects of extrusion parameters on extruded profiles that are suitable for use in crash situations; the results are then used to open up additional potential for lightweight construction and fields of application in car body structural constructions. The test programmes cover die trials by institutes (e.g. the Institute of Forming Technology and Lightweight Construction (IUL) of TU Dortmund or the Extrusion Research and Development Center (FZS) of Technische Universität Berlin) and on industrial presses, simulations of the extrusion process and the determination of representative characteristic material values for the strength classes and tempers investigated, through to preparing a material card.

The sixth test programme (UP 6) is currently being carried out.

The project is aiming to investigate the effect of die design and construction on the achievable wall thickness tolerances of extruded profiles and in turn on their influence on the energy absorption of crash profiles and the joinability of the profiles tested.

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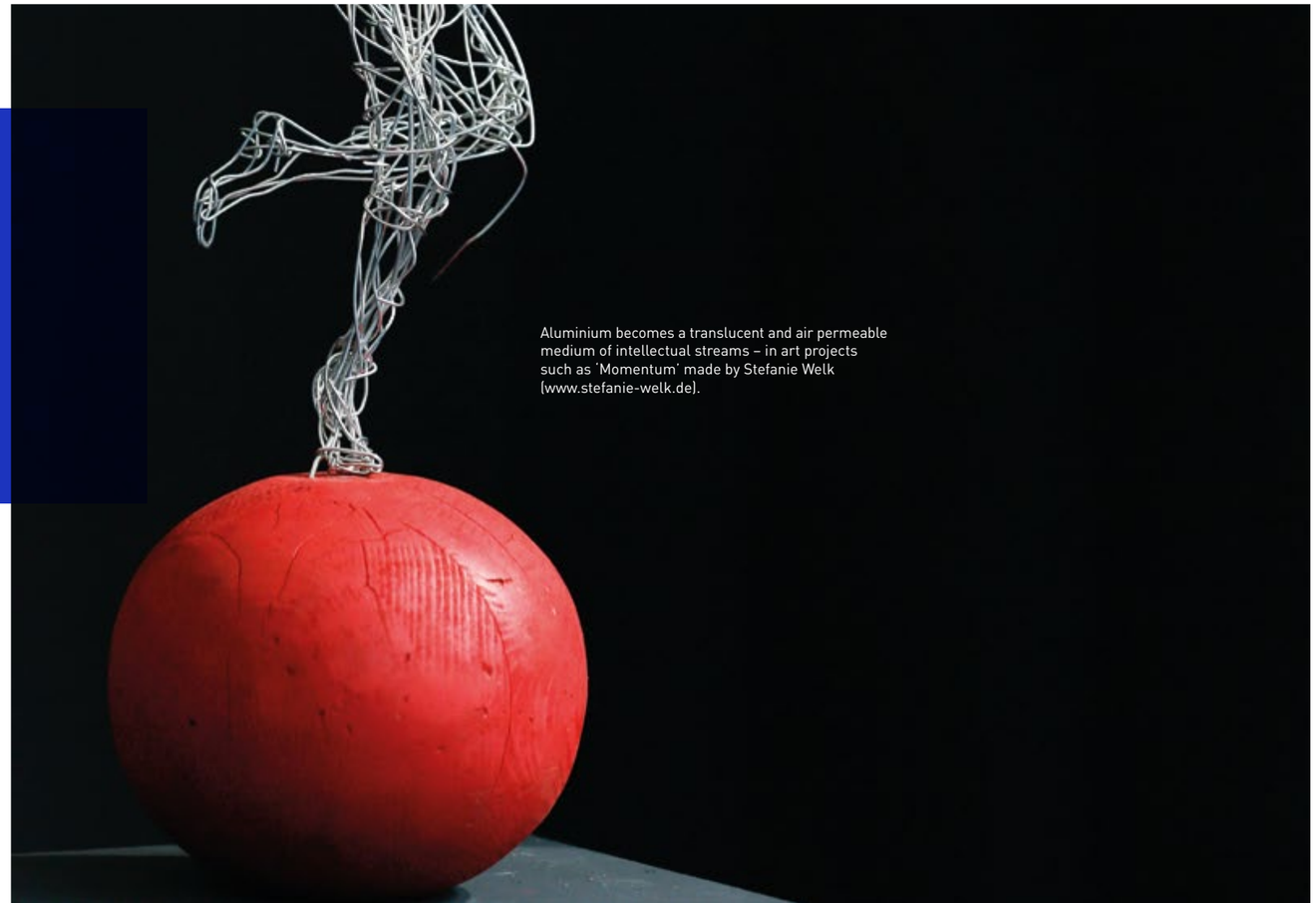

Aluminium becomes a translucent and air permeable medium of intellectual streams – in art projects such as 'Momentum' made by Stefanie Welk (www.stefanie-welk.de).

Aluminium wire – the inconspicuous problem solver

Aluminium wire and the products made from it are used practically everywhere. Without it, technical systems would not function and technological progress would not be possible.

The market for technical wire also experienced very positive development in 2016. Even traditional applications, such as food packaging, were very robust and they are still on a path of growth. However, as in recent years, this pleasing development is being borne in the main by the automotive sector.

Wire made from aluminium or an aluminium alloy is used in many different forms for the most diverse applications that utilise the metal's intrinsically low weight, outstanding corrosion-protection properties and high electrical conductivity. Advances in production and processing are continually opening up new areas of use in addition to the well-known applications.

As the demands made on technical systems grow, the capability of their components is being exploited more and more. Wire products made from aluminium must also be capable of doing their job reliably under the most demanding conditions.

Photos page 36–37:
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Car industry as innovation driver

Ever-fiercer discussion regarding CO_2 emissions means the use of aluminium is acquiring particular importance, above all in the lightweight construction of cars. High energy savings, and thus large reductions in CO_2 emissions, can be achieved by reducing the mass that has to be moved, or must be accelerated or slowed down frequently. With its special wishes and demands, the car industry is the innovation driver for manufacturers of aluminium cable and screws. Even a medium-size car now contains wiring up to three kilometres long in total in order to carry electric current to the numerous units that serve the operation, safety and driving comfort. The development of electrical and hybrid drives and the necessity to save weight have led to copper being replaced by lightweight aluminium in vehicle wiring systems.

Aluminium wire can contribute to reducing weight in the most varied range of applications, especially in the motorcar. One can mention here sealing plugs and valves for closed oil and air circuits, safety elements in seat-belt retention systems, system components for highly efficient cooling circuits, screws and other fasteners in the car body and hot zone – both in drive-train applications and in engine manufacturing itself.

Aluminium is still continuing to replace other materials in cars and this is creating additional growth for welding filler materials and wire for cold upsetting applications. Wire is in demand wherever the focus is on joining and connecting. In recent years, 6000-series alloys in particular have been used, and these are still the important volume provider today. However, the demand for thermally stable, high strength alloys is also growing, which means not only new opportunities but also immense challenges, and could lead to aluminium being used in parts of the car that are unimaginable today.

The market for technical wire is characterised throughout Europe by small, mostly non-integrated, medium size companies and almost without exception these operate in a very innovative manner. Intensive thought is already being given to interesting future-oriented projects regarding electromobility.

Aluminium is a partner of the energy revolution

The energy revolution in Germany means it is necessary to enlarge and modernise the 'electricity highways'. The size of the electricity grid must be increased significantly and new, eco-friendly power plants will be built. This ambitious plan can only be implemented with an additional 3,600 kilometres of high-voltage power lines in Germany. The pending expansion of the distribution network and renewable energy sources in Germany means there will be high additional demand for aluminium. There is thus considerable potential for domestic producers and for downstream areas of the industrial value-creation chain.

The producers of aluminium cable for overhead power lines are hoping for growing demand because aluminium is an important component of cables and conductors, without which it would not be possible to transmit electricity. Aluminium is characterised by good electrical conductivity, can be processed with relative ease and has good corrosion resistance. Aluminium has been used for high-voltage overhead power lines for a long time because of its lower weight and the resultantly lower tensile forces that act on the power line itself and on the pylons. In conventional designs, a steel cable core provides the necessary tensile strength and there is no need for insulation. To increase the transmission capacity, cables are increasingly being used that have aluminium wire with a trapezoidal cross-section instead of a round cross-section – and thus a larger conductive cross-section. The profiled wire is concentric about a steel core or an element made from fibre-composite material stranded together and compacted. In certain cases, such power lines can operate at temperatures up to 250 °C.

Producers are pursuing many different routes to develop new cable systems. One example are aluminium overhead power cables with a composite core: a very lightweight conductor with a carbon fibre reinforced plastic core is embedded in an epoxy matrix, that is then enclosed in wire made from an aluminium alloy or hardened aluminium. Such an overhead cable is characterised by high strength, small linear thermal expansion, extremely little sag and low susceptibility to corrosion. Its high breaking load means it is possible to span very long distances between pylons. An aluminium overhead cable with composite core is particularly well suited for crossing rivers and the number of pylons can be reduced where transmission distances are long. ■

Werner Mader,
Head of Surface Technology,
Corrosion and Construction

Aluminium and surface belong together

GSB International has been a partner for building owners, architects and metal fabricators for 40 years. It was the world's first quality organisation for the coating of components made from aluminium or steel. GSB International and GDA have now been cooperating for six years and they form a strong alliance in the European aluminium industry. Strengthening GSB's international network and the bundling of knowledge and research activities were important reasons for engaging in this cooperation.

Working together, GDA and GSB have managed to position the quality association strategically and thus ensure the further expansion of the GSB quality mark. The close interdependence between aluminium, semi-finished aluminium products and their surface coatings contributes to quality assurance and thus to more widespread use of the quality mark. The continual and innovative development of the processes within the network results in resource-conserving and sustainable solutions.

GDA ■ PACKAGING

The relevance of aluminium as a packaging material

Aluminium can be used universally and is one of the most efficient packaging materials of all – either as a mono-material or in a composite with other packaging materials.

Author:
Jürgen Heinisch,
Managing Partner GVM

Aluminium packaging: great recycling rates.

Some 122 kilotonnes of aluminium were used in packaging 2015. This corresponds to 0.7 per cent by weight of all packaging used in Germany (18,105 kilotonnes). However, these figures are deceptive when it comes to the actual importance of aluminium in the packaging world.

Aluminium as packaging material and functional layer

Aluminium is indeed an extremely flexible packaging material that can be used in a wide variety of applications. It plays an important role as the main constituent of rigid or flexible packaging materials (which we will call aluminium packaging material here). According to the definitions of the VerpackV packaging ordinance, this includes mono and composite aluminium packaging materials. The use of these materials in packaging totals 103 kilotonnes. The most important applications are beverage cans, aerosol cans, other cans, tubes, foil and trays. In addition, closure materials such as roll-on closures or sealing foil or strip play a large role.

Aluminium is also used as a functional layer in combination with a substrate, mostly with paper, carton, cardboard or plastic (which we will call aluminium functional layers here). If one calculates the amount of aluminium used, the answer is 20 kilotonnes. The best-known examples of use are drinks cartons, stand-up pouches, paper and plastic bags or composite cans. The importance of aluminium as a packaging material lies in its outstanding material properties: It is flexible to use, resistant or insensitive to temperature to a large extent, and has very good barrier layer properties, such as providing protection against light or acting as a barrier to oxygen or water vapour etc. An added benefit as a packaging material is its appearance. Aluminium coatings are thus well suited for special optical effects that emphasise the high perceived value of a packaged item. Also important is the fact that aluminium is outstandingly suitable for an excellent printed finish.

Sectors where aluminium is used

Thanks to its manifold properties, aluminium is used as a packaging material in the most varied range of sectors.

To the fore are the foodstuffs and alcohol and tobacco sectors with just over 95 kilotonnes. The most important product group is beverages, which uses 41 kilotonnes of aluminium. In terms of weight, the most interesting form of packaging is the beverage can, sales of which have almost doubled in tonnage terms since 2010. Closures for returnable or non-returnable glass bottles or ring-pull lids for tin plate cans also play an important role. Aluminium-functional layers are found mainly in drinks cartons and stand-up pouches. Incidentally, both types of packaging have been classified as ecologically beneficial forms of beverage packaging for a good many years.

The second most important sector is dairy products, which uses almost 15 kilotonnes of aluminium. One should mention the sealing foil that one finds on dairy products in pots, and once again the drinks carton, which is used for long-life milk products. Paper-aluminium composites, such as those used for butter, are another important segment.

Aluminium is also very important for packaging pet food, with 9 kilotonnes being used. One should mention high-grade trays and cans here; in addition, various plastic foil laminates with an aluminium barrier layer also play a significant role.

The remaining 30 kilotonnes of aluminium is used in various branches of the food, drinks and tobacco industry: trays for ready meals, service packaging or baked products, food cans, plastic film with aluminium for coffee or processed foodstuffs, paper composites with aluminium for spices, powdered soups, confectionery and snacks, and tubes for mustard, tomato puree or similar products.

The chemical-technical industry uses 28 kilotonnes of aluminium for packaging purposes. The largest field of use is for cosmetics, with almost 13 kilotonnes. Aerosol cans are the leading form of packaging here, followed by tubes, albeit a long way behind.

A further important field of application is as packaging material for pharmaceutical or health products (four kilotonnes). Sealing strips or backing for push-through packs are a typical field of application.

One should mention service packs (foil, trays) and detergents and cleaners

(mainly aerosol cans) as important uses of aluminium in terms of weight.

Relevance of aluminium in packaging

These examples of the range and diversity of applications have illustrated the importance of aluminium as a packaging material. But it is only when one looks at the quantities used that the actual relevance becomes apparent. For example, over 93 billion items of packaging containing aluminium were placed on the market in Germany in 2015. This represents some 11-12 per cent of all items of packaging or packaging aids.

The figure includes not only the main items of packaging (cans, trays, pouches, tubes, etc.) but also all other items of packaging or packaging aids (closures and closing aids, backings, labels, inserts, etc.). The importance of aluminium as a universal form of packaging is thus considerably greater than an evaluation based on packaging weight might indicate.

What about developments in the next few years?

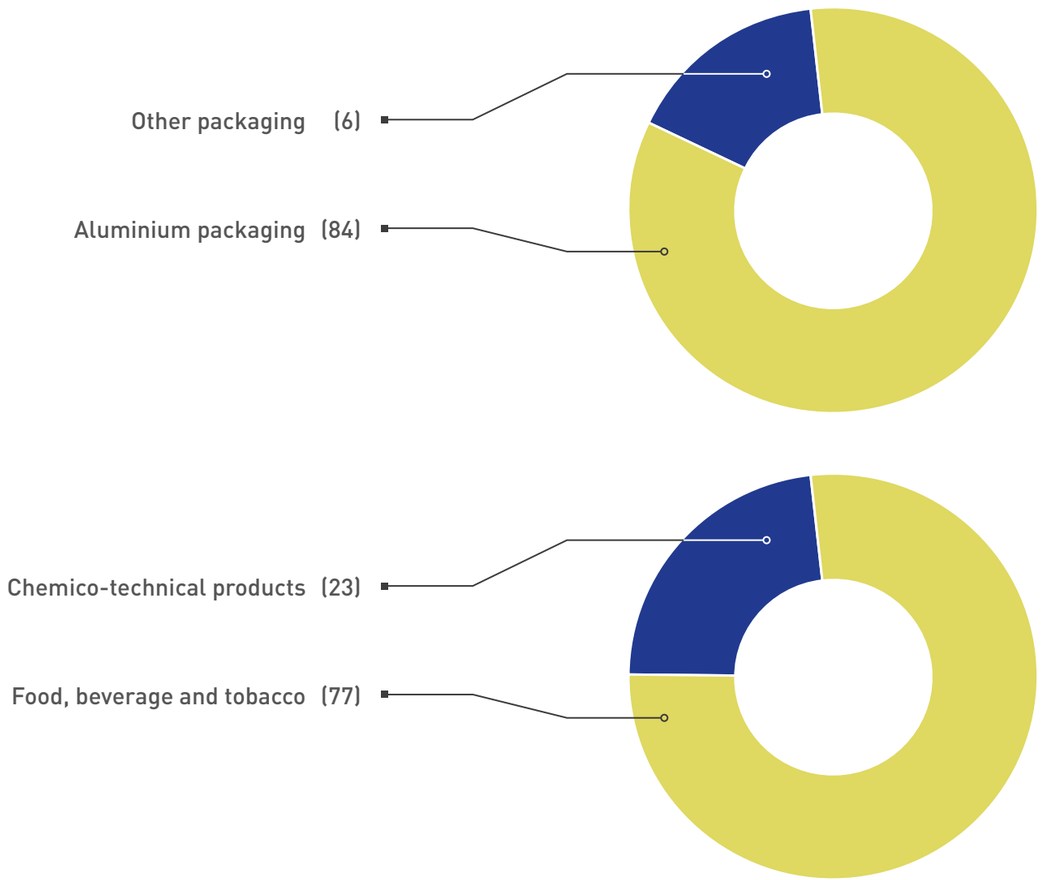
Firstly, one should make it clear that there are a number of growth sectors for aluminium as a form of packaging.

Packaging brochure updated

GDA's revised and updated packaging brochure, ' Aluminium in the Packaging Industry – Production, Use, Recycling', was presented at interpack 2017.

It gives a good overview of the broad range of aluminium packaging available, its functional benefits, its method of manufacture and its resource-conserving sustainability.

Segmentation of Aluminium
Based on packaging consumption Germany 2015



Both graphics: © Gesellschaft für Verpackungsmarktforschung

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For example, sales of beverage cans will continue to grow in future. In addition, we see continuing substitution of tinplate beverage cans, so the aluminium beverage can will benefit in two ways. Likewise, wine bottle closures have shown a strong growth trend in recent years. The high demand for cork with its associated quality problems opened up major growth opportunities for roll-on closures. Variants such as the long or short cap enabled solutions to be offered that satisfied the different quality requirements of the products. The roll-on closure has now become widely established in German winemaking circles as well as with consumers. Sales will increase further in future, albeit somewhat more restrained.

The increasing sales of pet foods in aluminium trays or cans are also interesting. There is a trend towards high-value goods, which require appropriate packaging. It is precisely this requirement that aluminium can satisfy.

The situation is more critical when it comes to aluminium functional layers. The use of aluminium depends on the success of this form of packaging. This is illustrated by the decline in sales of the drinks carton or the growth of aluminium-containing stand-up pouches. However, regardless of this, aluminium will experience increased competition from other functional layers, such as EVOH or SiOx coatings. Recyclability is a driving stimulus for substitution.

The recycling rates being achieved in Germany for forms of packaging that contain aluminium show that the sector is well equipped for the future. However, this is only true to a limited extent for composites that have an aluminium functional layer. Important here is how the composite material is treated in the sorting plant. Today, many composites of paper and plastics with aluminium are regarded as being unrecyclable. ■

Gregor Spengler,
Head of Packaging, Head of Tubes and Cans

Aluminium packaging: great recycling rates

Besides its optimal barrier properties, in the packaging sector aluminium is characterised by its lightness, good formability, stylish premium appearance and above all its outstanding recyclability.

The recycling of aluminium packaging has improved still further at what is already a very high level. According to the official figures issued by Gesellschaft für Verpackungsmarktforschung mbH (GVM), about 108,900 tonnes of aluminium packaging were used in Germany in 2015, of which 94,800 tonnes were recycled. This represents a recycling rate of 87 per cent. In the case of beverage cans, which are now subject to a deposit, almost 100 per cent of the aluminium cans were collected as part of the established bring system and then sent for recycling.

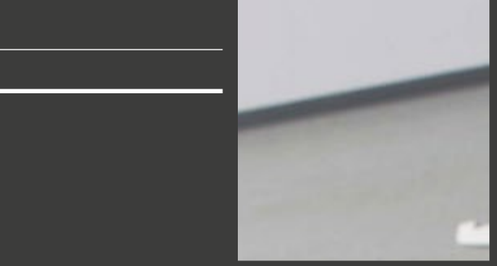
Material recovery from aluminium packaging has reached a level in Germany that is exemplary throughout Europe – if not the whole world. The quantity and quality of the aluminium fraction sorted could be continually improved thanks to use of the latest sorting techniques, such as eddy current and induction technologies.

Not only does the efficient recycling of aluminium packaging make a noteworthy contribution to environmental protection, it also ensures that the supply of raw materials is safeguarded for future generations as a result of a functioning circular economy and sustainable handling of valuable resources.

Author:
Peter Sander,
Vice President, Manager Emerging,
Technologies and Concepts Germany,
Airbus Operations GmbH Hamburg

Changes in manufacturing and product design due to additive manufacturing (AM) – 3D printing

Additive manufacturing's potential in lightweight construction can be utilised in interplay with aluminium to develop completely new products.



GDA ■ ADDITIVE MANUFACTURING

3D printing, additive manufacturing, laser cruising or selective laser sintering – while an attempt is still being made to find a common name for these novel manufacturing processes, massive investments are already being made worldwide and the average growth rate in the past four years was over 30 per cent a year. 3D printing is now used in many branches of industry: human joints, teeth, in-ear hearing aids, spare parts for cars, aircraft, trains or ships, gold jewellery and nowadays even complete houses. The reason for this sudden boom is that 3D printing enables novel products to be made with minimal use of resources, during manufacturing as well as during operation. However, the new products must first be developed and approved – and that is not always easy given the innovative nature of the method of manufacture.

AM plant technology makes it possible

Strictly speaking, additive manufacturing technology has been around for over 20 years. It is only now that it has experienced an industrial breakthrough. Additive manufacturing describes a process in which a component is produced in layers based on three-dimensional design data. Weldable metals and meltable plastics are available as materials. Powdered material is welded layer by layer in the printer using a laser or electron beam or applied via a nozzle.

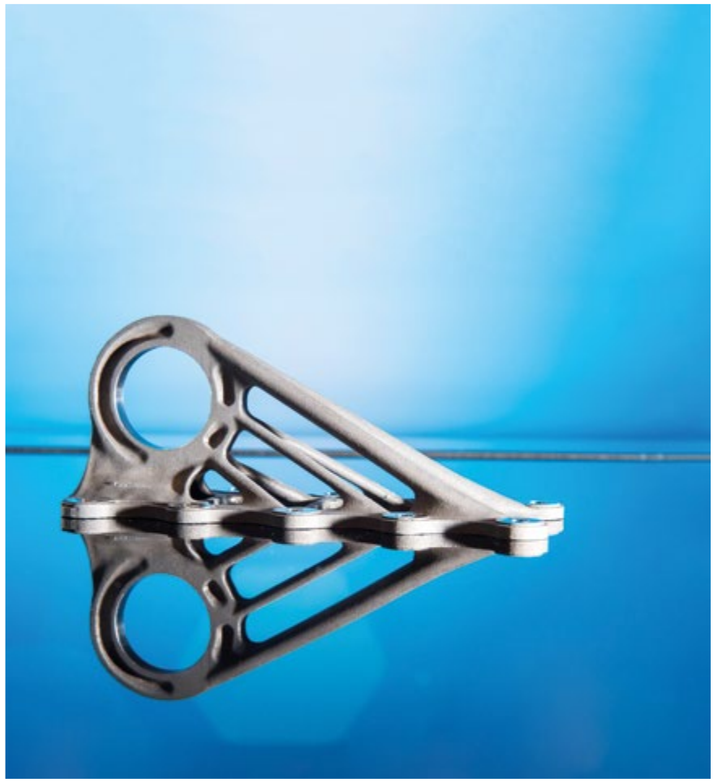
Systems for carrying out AM processes with metal have long since been available for industrial use. Not only do they have a larger build envelope, the space where the products are manufactured, the system laser power is also becoming ever greater in multi-laser applications. The development started in 2011 with systems that had a laser power of 250 watts; today there are systems commercially available with up to two kilowatts and it has been announced that a four-kilowatt unit will be introduced in 2017.

The most powerful series printer for metal currently available is the Concept X-Line 2000, a double-laser unit with a total laser power of two kilowatts. The largest powderbed printer is in South Africa. It was developed by Aerosud, a supplier to Airbus, with the help of public funding. From 2017 onwards it is intended to produce titanium components at a rate of 250 cubic centimetres an hour using a five-kilowatt laser system.

Systems are thus not only getting faster and larger, large amounts of money are also being invested in the development of these technologies. For industrial applications, besides the laser power and the build envelope, it is primarily the in-process control that is of interest. The production units continuously control all the parameters of the printing process and give the operator the first indications whether and where in the component there might be an area that must be specially examined after manufacturing.

Potential applications in the aerospace industry

So far, more than 230 AM metal projects have been implemented in cooperation with a large number of engineering teams, mainly in Germany. It is becoming clear that AM combined with topology engineering or function integration is opening up completely new potential for the aerospace industry as well for other industries. An example here is the hydraulic control block for raising and lowering the spoiler on the A380. The printed housing can reduce weight by 35 per cent, and there are thus new opportunities to reduce flow resistances within the equipment. These components (produced by Liebherr in cooperation with Airbus) was successfully tested for the first time in the Airbus A380's test facility on 30 March 2017, a world first.



Industrial 3D printing is now established as a manufacturing process for series-produced parts thanks to advantages such as design freedom, rapid and simple product individualisation, or integration of functions.

Potential CO_2 savings made possible by AM-related generative (automated) design can best be illustrated using the 'bionic partition': during an average operating year of an A320, printed latticeworks in Scalmalloy (an AlMgSc alloy) lead to a 45 per cent weight saving and an approximately three tonne saving in kerosene consumption, and thus reduced emission of about ten tonnes of CO_2.

In the long term, so-called 'clean sheet designs' will emerge. One takes a complete component and produces multifunctional designs that are only feasible using AM. The first demonstration project is an assembly for attaching a hydraulic tank in the aircraft. Previously, this comprised 126 individual parts and more than 60 fasteners. It is conceivable that there will a solution for series production in 2019 that consists of only three or four parts and at the same time will still reduce weight by about 30 per cent.

Further prospects

It is foreseeable that AM will become established in most industries, primarily for any means of transport. The strived-for electromobility in particular will have to utilise additional lightweight construction potential. Process engineering as a whole, e.g. in mechanical engineering, will also be able to use new design freedoms, e.g. for supplying or dissipating heat in order to reduce process times.

→ Sooner or later, AM will affect every industry

The new printable AM-CAD model is the best example for future digitisation.

→ Far less hardware will be transported and in future production will take place without fixtures at the point of use (starting with digital spare parts ...). ■

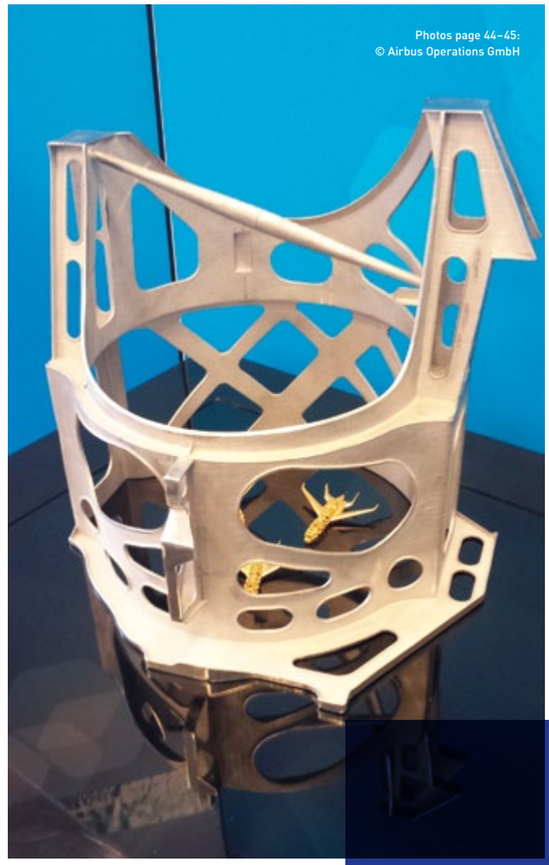
Specialist seminars and presentations

GDA's seminars 'Joining of Aluminium Profiles and Sheet', 'Surface Treatment of Aluminium' and 'Technology of Extruded Profiles' have been held regularly for many years and have now achieved classic status. The seminar programme is complemented by basic seminars on the metal and a module-based range of seminars that focus on ecology. In collaboration with the Aluminium Engineering Center Aachen (aec) of the RWTH International Academy, GDA also regularly organises the training seminar 'An Introduction to the Technology of Aluminium', which is aimed at natural scientists, engineers and technologists from the aluminium industry and the aluminium processing industry.

EAC European Aluminium Congress 2017

GDA is organising the EAC European Aluminium Congress 2017 on 27-28 November 2017 in Düsseldorf under the heading 'Aluminium in Automotive Engineering – Challenges and Solutions'. EAC 2017 will present the various possible uses of aluminium in vehicle manufacturing as well as the possible developments that will make vehicles of the future lighter and more energy efficient. Speakers and participants from the aluminium industry, automotive component suppliers, OEMs and from mechanical and plant engineering will discuss innovative developments and new technologies in the automobile engineering of the future. A comprehensive exhibition will round off the programme.

GDA is organising the event within the scope of 'D-A-CH, Allianz für Aluminium' with the support of alu.ch, the Swiss aluminium association, and the non-ferrous metals trade association of the Austrian Economic Chambers (Wirtschaftskammer Österreich, Fachverband NE-Metallindustrie).



Photos page 44–45:
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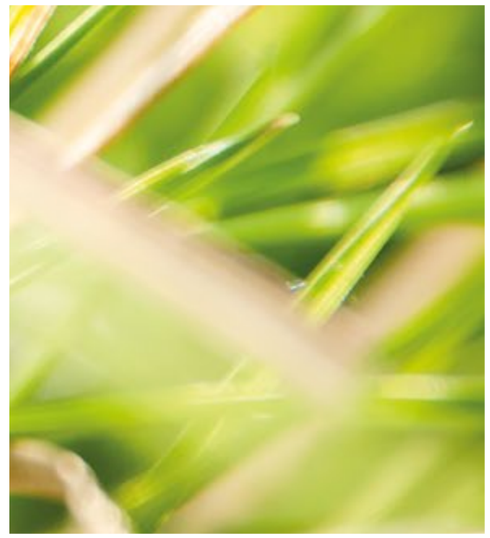
GDA ■ SUSTAINABILITY

Future impact of the Aluminium Stewardship Initiative (ASI)

Numerous companies that produce, process or use aluminium and other social organisations have joined forces to form the Aluminium Stewardship Initiative in order to prepare a global sustainability standard for the aluminium value chain.



Author:
Dr. Fiona Solomon,
Managing Director ASI – Aluminium Stewardship Initiative

In 2015, countries adopted a set of seventeen goals to end poverty, protect the planet, and ensure prosperity for all, as part of a new Sustainable Development Agenda.

Governments, businesses and civil society together with the United Nations have started to mobilize efforts to achieve these goals by 2030. As the goals are universal, inclusive and indivisible, implementation of the Sustainable Development Agenda will rely on action by all stakeholders.

The aluminium sector has been focused for many years on environmental and sustainability issues, including, for example, the use of aluminium to reduce the life cycle impacts of products, improving management of process wastes, enhancing recycling of scrap and end-of-life products, reducing greenhouse gas emissions, and improving occupational health and safety.

The Sustainable Development Agenda provides a broader framework in which to anchor those efforts, and identifies the many ways in which the sector can continue and expand its contribution to the development of a better world and improvements in the lives of people everywhere.

Development of a new Certification program to support Sustainable Development

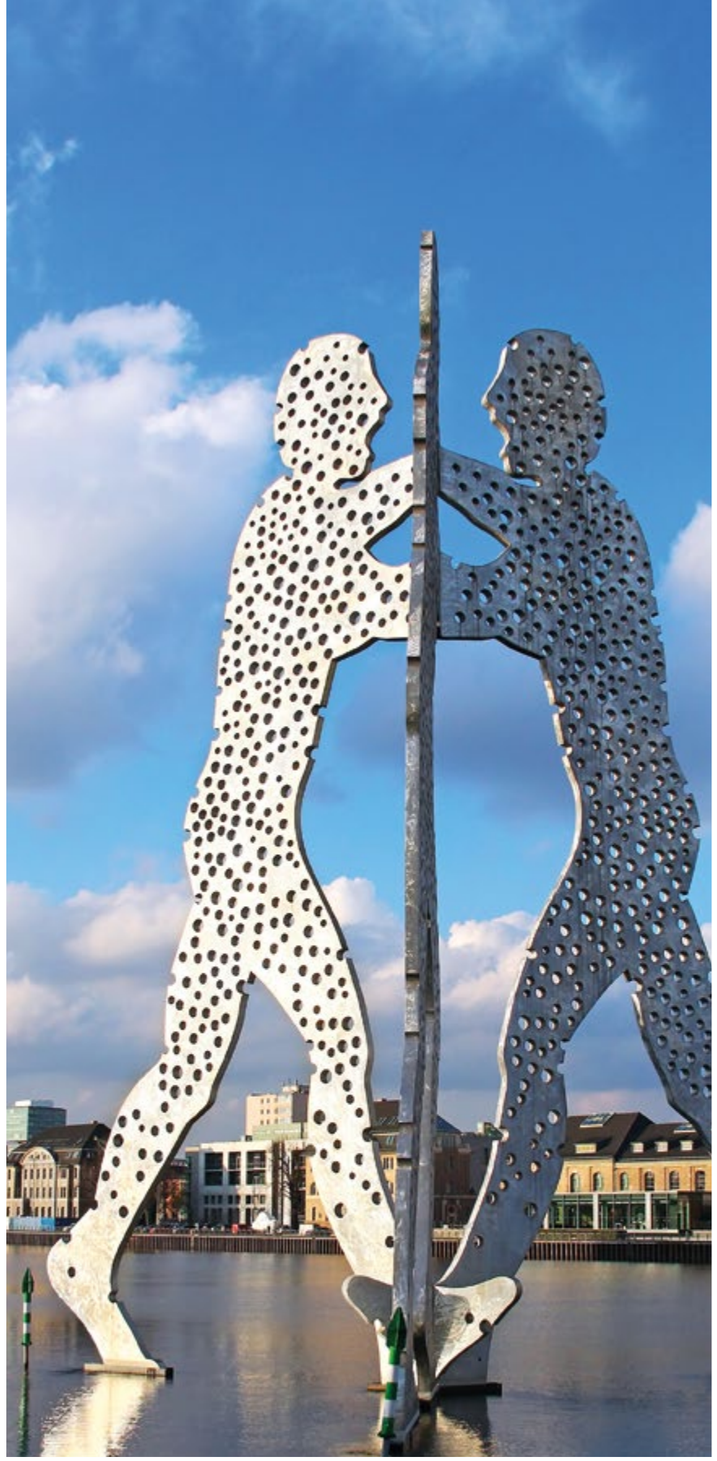
The Aluminium Stewardship Initiative (ASI) was established to foster sustainability and transparency in the aluminium value chain. Both goals are important: sustainability in the context of supporting better outcomes on the ground, and transparency in the context of making more information available on progress and impacts.

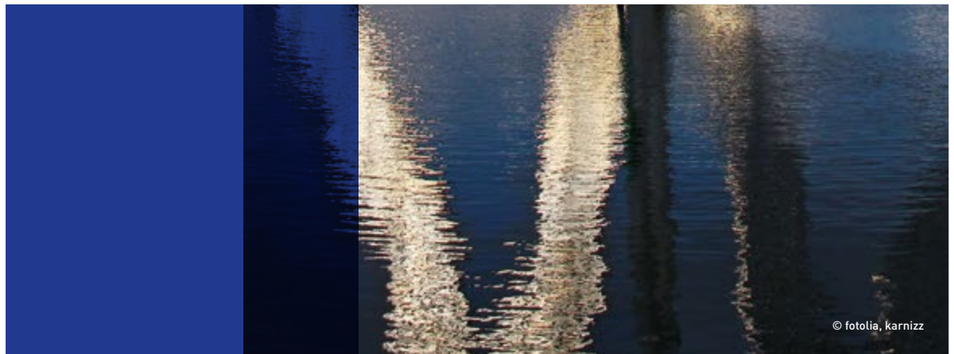
ASI was incorporated as a legal entity in 2015 and its focus since then has been on the development of its multi-stakeholder governance model, culminating in the adoption of its Constitution at its inaugural Annual General Meeting in Ingolstadt Germany in 2016, and the creation of its broader Certification program, which ASI aims to launch by the end of 2017.

ASI's certification program aims to drive uptake of standards that foster responsible production, sourcing and stewardship of aluminium by companies in the supply chain. ASI's Certification program will be based on two standards: a Performance Standard and a Chain of Custody Standard.

© UN Sustainable Development Goals

ASI is the first-ever initiative to create a sustainable standard for the aluminium value chain.





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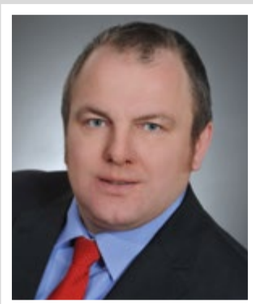
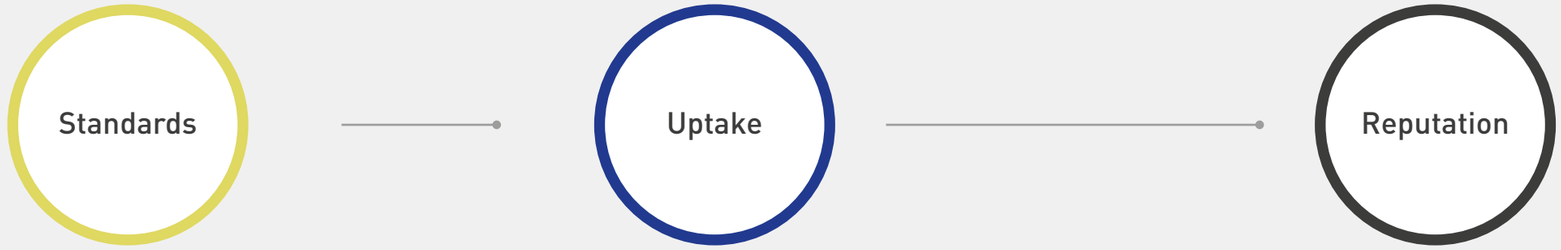


Jörg Schäfer,
Head of Recycling and Sustainability,
Head of Metal Powder

Energy and resource efficiency: advantage aluminium

Aluminium stands for high energy efficiency – at both product and process level. Compared with other metallic materials, lightweight parts made of aluminium reduce weight and thus fuel consumption and emissions. Energy consumption during production has been reduced significantly thanks to manifold technical innovations. Long before the need for sustainable development was being discussed, the aluminium industry had established an almost completely closed loop for its metal, involving metal extraction, processing, use and recycling. Not least because aluminium has a high intrinsic material value as scrap and it can be recycled to new products time and time again without any loss in quality. The product-related material loops from extraction via processing through to recovery of the metal are almost completely closed today. This was always the case for long-life applications in cars or buildings – with recycling rates of around 95 per cent. Recycling rates of around 90 per cent are being achieved for aluminium packaging in Germany. The recycling rate for aluminium beverage cans in Germany, which carry a deposit, is now over 95 per cent. The aluminium sector is not resting on its laurels in any way but is continuing to work on closing more of the gaps that still exist in the circular economy. In order to be able to recover the raw material even more intensively in Germany, international aluminium companies are also making investments here to expand recycling capacity and are resorting to the latest plant technology to achieve this.



Sustainability and human rights principles are increasingly embedded in aluminium production, use and recycling.

- Reduced climate impact.
- Reduced environmental impact from upstream processing residues.
- Enhanced biodiversity management.
- Practices that implement business' responsibility to respect human rights.
- Increased material stewardship by all actors in the aluminium value chain.

Companies increasingly invest in and reward improved practices and responsible sourcing for aluminium.

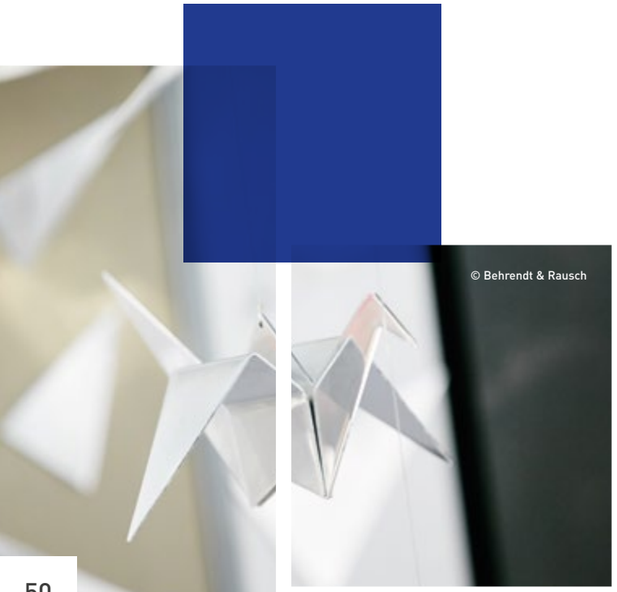
- Membership is accessible.
- Wide uptake of certification by diverse businesses.
- Relevant, practical and consistent assurance.
- Continual improvement among certified entities.
- Enhanced ability to demonstrate impact and reduced duplication.

Aluminium continues to improve its sustainability credentials with stakeholders.

- ASI is recognised as valued assurance.
- Society makes effective use of aluminium.

© ASI Theory of Change- Desired impacts and outcomes

The aluminium standard developed by ASI is very comprehensive and includes the complete material management, especially product design and recycling.



The Performance Standard has direct linkages through to the Sustainable Development Goals. This includes requirements related to the UN Goals on good health and wellbeing (3), gender equality (5), clean sanitation (6), decent work and economic growth (8), reduced inequalities (10), sustainable cities and communities (11), responsible consumption and production (12), climate action (13), and life on land (15). And ASI itself represents an example of partnerships for the goals (17).

Linkage to future markets

The Performance Standard focuses on the actions of each company. The linkage to markets can then be achieved by a tool to connect claims about practices to claims about material. The most common way to achieve this is via a 'chain of custody' mechanism, which can link responsible production practices to the flow of the material through supply chains.

The ASI Chain of Custody Standard is thus designed to be used to connect assurance about a company's practices against the ASI Performance Standard, to claims about aluminium and responsible sourcing. By supporting supply of, and demand for, 'ASI Aluminium', commercial incentives for the implementation of responsible practices by businesses can be created.

Businesses and consumers are becoming increasingly focused on responsible, sustainable or ethical sourcing, to address specific supply chain issues, manage risk and/or increase knowledge of the production practices which applied to raw materials and products. Certification programs are thus a tool that respond to increasing market demand in a range of sectors for evidence of enhanced sustainability.

Theory of Change

ASI's Theory of Change, in Figure 2, sets out the desired outcomes and impacts of its program. Progress towards the desired impacts for 'Standards' will help to support 'Uptake', which in turn will support the continuing improvement of the 'Reputation' for aluminium.

Conclusion

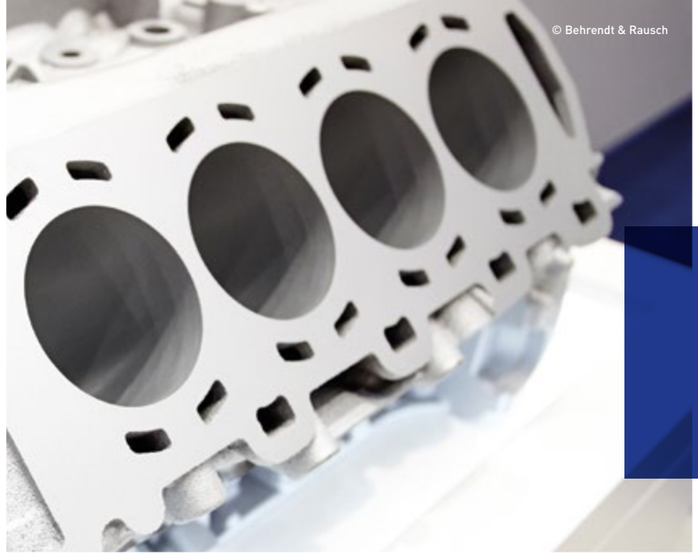
Certification programs are not an end in themselves, they're a means to achieve impact and they can enhance their contribution by encouraging a common direction, at scale. ASI continues to welcome new members and partners, to enhance collaboration on the global sustainable development agenda and work to achieve more together. ■

Amin Bakhshi,
Recycling, Sustainability, Metal Powder

Environmental product declarations (EPDs) for aluminium components

GDA has prepared environmental product declarations (EPDs) for aluminium components together with Institut Bauen und Umwelt e.V. (IBU), Thinkstep and the manufacturers Novelis, Hydro, Arconic, Prefa, and 3A Composites. As part of the project, environmental performance evaluations were carried out over the life cycles of four different construction products: plain aluminium sheet, coil-coated aluminium sheet, cold-rolled aluminium sheet and aluminium sandwich panels. Background information on the products with respect to production and the environment as well as specific technical properties are presented transparently in the EPDs. They serve as basic information regarding certification systems for buildings, for example for architects, engineers, developers and the authorities.

The ECO Platform was established to harmonise environmental product declarations and ensure that they can be used in other countries. It is the umbrella organisation for the various national EPD programme operators in Europe. The ECO Platform label on EPDs is intended to make visible the minimum requirements developed by the ECO Platform with respect to quality management and the verification procedure of the different programme operators. EPDs that carry the ECO Platform EPD logo thus offer the best possible comparability in terms of a coordinated European solution at this point in time.



GDA ■ MARKET

Business activity in the aluminium sector in 2016/17

Business activity in the German aluminium industry was stable in the past 12 months and the sector was in good shape.

Raw aluminium

Raw aluminium production in Germany in 2016 comprised 546,800 tonnes of primary aluminium and 722,900 tonnes of recycled aluminium. This meant that compared with the previous year the production of raw aluminium rose 2.3 per cent to 1.27 million tonnes. The increase in the production of recycled aluminium was 3.2 per cent and thus more dynamic than primary production, where growth was one per cent. It also meant there was a slight increase in recycled aluminium's share of total production in 2016, to some 57 per cent.

Semi-finished aluminium products

German production of aluminium semis in 2016 totalled 2.48 million tonnes. This represents an increase of 1.3 per cent compared with the previous year. By volume, rolled products and extrusions the major groups of aluminium semis; smaller product groups are wire, forgings and conductor material. Rolled products and extrusions together account for 99 per cent of all aluminium semis.

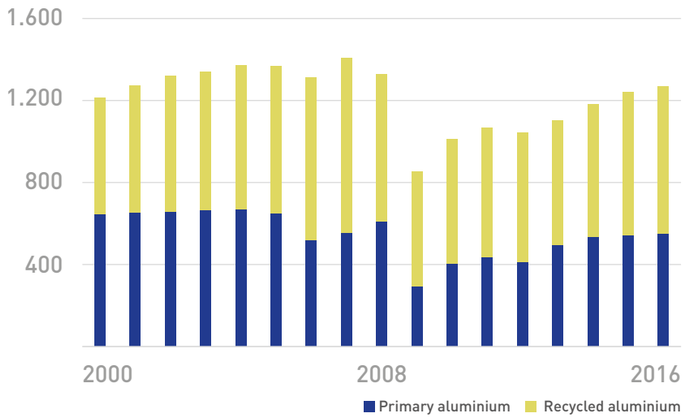
The production of rolled products in Germany increased by 30,000 tonnes in 2016 to 1,887,900 tonnes (up 1.6 per cent). The development in detail: in the case of coil and strip thicker than 0.2 mm – the most important sector in terms of quantity – production rose 1.7 per cent or about 27,400 tonnes compared with the previous year to 1,605,500 tonnes. Sheet (0.2 mm to 5.99 mm thick) accounts for the second largest share of production. Here, some 207,500 tonnes were produced in 2016. This represents a year-on-year rise of 3.7 per cent or 7,400 tonnes. The production of stampings in 2016 totalled 5,100 tonnes (a decline of 1,000 tonnes). There was also a decline in the production of aluminium plate (down 4.4 per cent).

The production of extrusions in Germany in 2016 totalled 569,900 tonnes and was thus at the same level as the previous year. Production includes profiles, rod and bar, and tube. The output of profiles was 516,600 tonnes (down 0.3 per cent) and thus still nearly the same as the previous year. However, the development for rod and bar and tube was more volatile: rod and bar production could be increased by 3.3 per cent year-on-year, but tube production was three per cent down on the previous year's level.

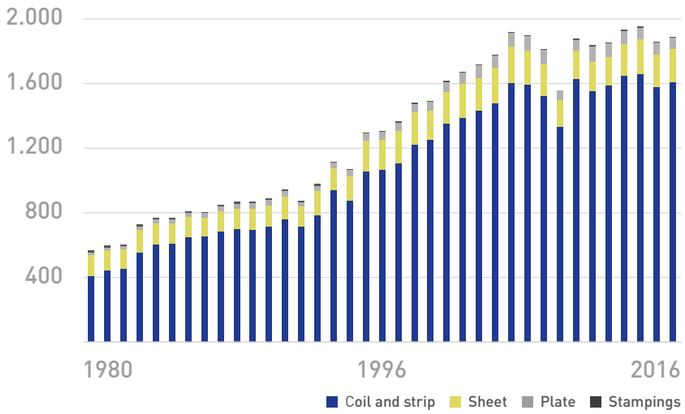
Aluminium conversion

Altogether, 336,600 tonnes of aluminium were subjected to downstream processing in Germany in 2016. This represented a year-on-year decline in the production volume of 2.7 per cent. Aluminium conversion is divided into three sectors: foil and thin strip, tube and aerosol and other cans, and metal powder. Business activity declined in all three sectors in 2016. ■

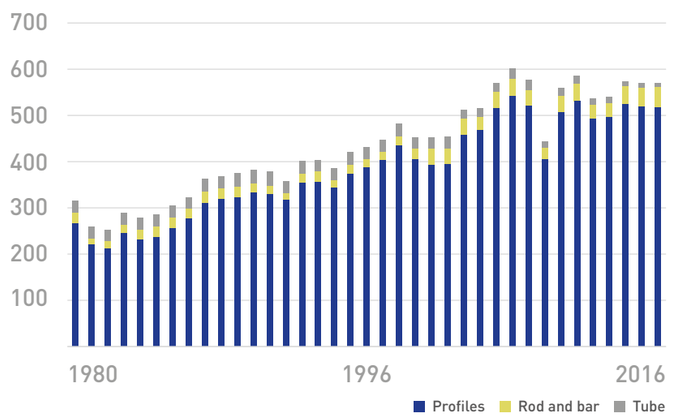
Production of Primary and recycled aluminium in Germany from 2000 to 2016 (in 1000 tonnes)



Production of rolled products in Germany from 1980 to 2016 (in 1000 tonnes)



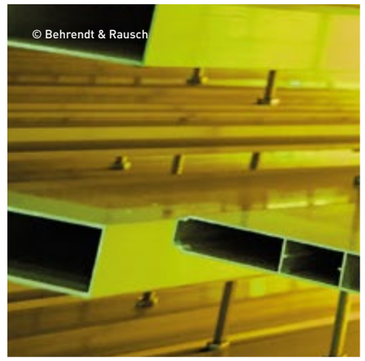
Production of extruded products in Germany from 1980 to 2016 (in 1000 tonnes)

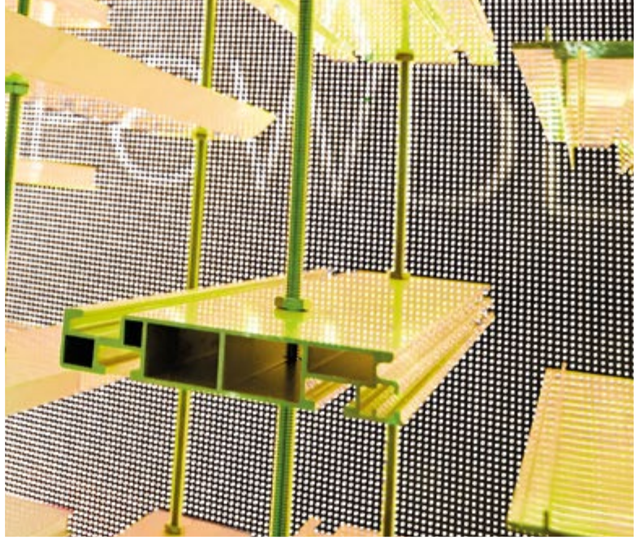


Outlook

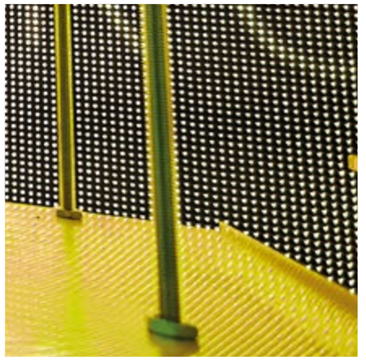
Despite the high geopolitical risks, sentiment in the companies of the German aluminium industry is positive for 2017. Forecasts for the global economy have improved slightly in recent months. This applies not only to the core markets in Europe but also to export destinations. The growth expectations in the European industrial sector and building and construction industry can be described as solid.

Furthermore, turning points are detectable in some important crisis countries. This is indicated by the positive signals coming from the respective car markets. As is to be expected, the momentum of the Chinese economy is declining slightly, but is still continuing at a sound level, though. The chances for increased production in the German aluminium industry are thus not bad.





GDA ■ STATISTICS



Statistics

Production

Semi-finished aluminium products (tonnes)	2015	2016
Rolled products	1,857,300	1,887,900
Rods and bars	42,100	43,500
Profiles	517,900	516,600
Tubes	10,100	9,800
Wires	16,900	17,700
Forgings	N/A	N/A
Conduction material	4,100	5,400
Total	2,448,400	2,480,900

Aluminium castings (tonnes)	2015	2016
pressure die-casting	614,500	631,300
Permanent-mould casting	332,000	343,800
Sand casting	111,100	111,000
other casting processes	7,900	10,500
Total	1,065,500	1,096,600

Further processing of aluminium (tonnes)	2015	2016
Aluminium foil	269,600	266,300
Tubes, Cans and Impact Extrusions	44,400	42,000
Aluminium powder	32,100	28,300
Total	346,100	336,600

Foreign trade

Raw aluminium (tonnes)	2015		2016	
Country	Import	Export	Import	Export
EU 28	1,439,200	353,200	1,459,700	365,100
EFTA	459,300	63,800	469,100	114,700
Eastern Europe	257,300	1,100	266,000	800
Rest of Europe	100	0	0	0
Europe total	2,155,900	418,100	2,194,800	480,600
North America	33,200	6,000	21,600	1,500
Central and South America	6,500	0	18,400	100
Africa	73,300	100	83,000	0
Asia	235,100	9,600	273,600	9,000
Australia/New Zealand	600	0	1,300	0
Rest of the world	95,400	0	90,100	0
Total	2,600,000	433,800	2,682,800	491,200

Aluminium semis (tonnes)	2015		2016	
Country	Import	Export	Import	Export
EU 28	923,900	1,307,200	997,800	1,414,900
EFTA	244,100	48,000	276,300	60,400
Eastern Europe	185,200	71,200	176,100	77,100
Rest of Europe	0	0	0	41
Europe total	1,353,200	1,426,400	1,450,200	1,552,400
North America	48,700	85,100	25,300	83,200
Central and South America	6,300	32,200	3,100	49,500
Africa	18,700	14,500	23,000	18,500
Asien	90,400	16,500	87,500	126,700
Australia/New Zealand	100	7,500	100	15,200
Rest of the world	0	0	0	0
Total	1,517,400	1731,200	1,589,200	1,845,500

GDA goes Social Media

Arne Regenbrecht, Social Media Manager

Facebook, Twitter, WhatsApp and the like have brought people closer together, and above all they have made fundamental changes to the demands made on companies and trade associations. The social media have completely transformed our communications and their influence will continue to grow in future. Dialogues about brands, companies or even materials are being carried out intensively on the web. GDA will use digital paths of communication more intensively in future in order to enhance added value for members, provide information on services and activities, provide more opportunities for networking with each other and boost the visibility and image of the aluminium industry in public. Our social media manager is responsible for looking after the association's profile on sites such as Facebook, XING and Instagram as well as the strategic implementation of the association's online communications strategy. ■

You can find GDA in the social networks here:

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

Services from GDA: quick, competent, informative

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

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

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

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

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

GDA ...

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

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

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

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

GDA – Gesamtverband der Aluminiumindustrie e. V.

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

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

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

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

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Boesken GmbH

Kjetil Ebbesberg (Vizepräsident)
Hydro Aluminium Rolled Products GmbH

Oliver Höll (Vizepräsident)
Karl Höll GmbH & Co. KG

Dieter Höll
Constellium Singen GmbH

Roland Leder
Aleris Rolled Products Germany GmbH

Thomas Reuther (Schatzmeister)
TRIMET Aluminium SE

Bernd Schäfer
Arconic GmbH

Eric Tonkowski
Novelis Deutschland GmbH

Christian Wellner
(Geschäftsführendes Präsidialmitglied)
Gesamtverband der
Aluminiumindustrie e. V.

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Boesken GmbH

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Erbslöh Aluminium GmbH

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Aluminiumindustrie e. V.

Leopold Werdich
TUBEX GmbH

Theo Wingen
Drahtwerk Elisental W. Erdmann
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