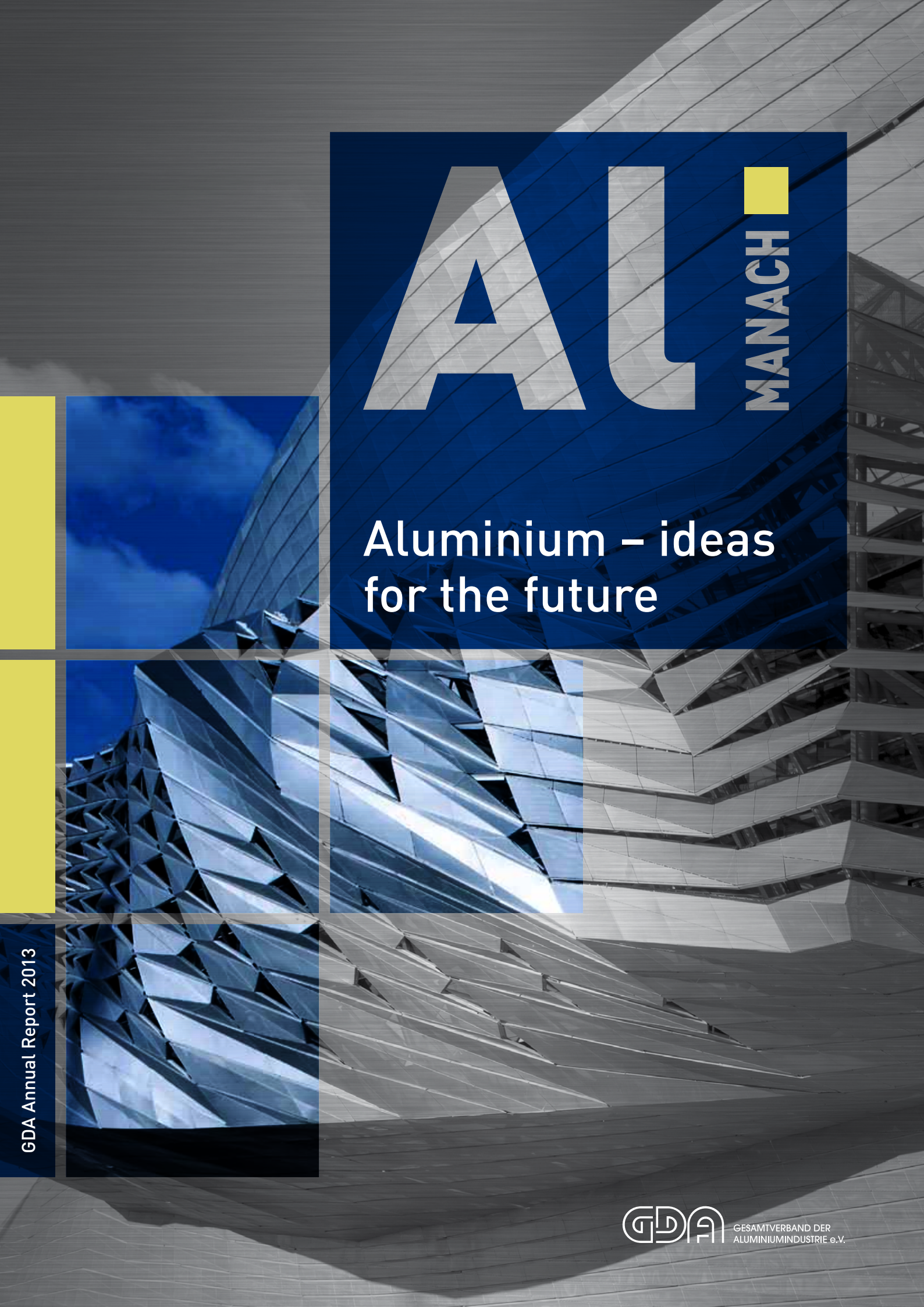


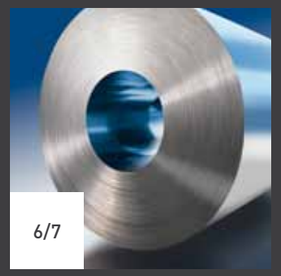
ALMANACH

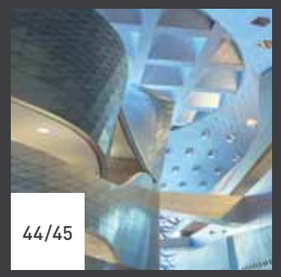
Aluminium – ideas for the future

GDA Annual Report 2013

GESAMTVERBAND DER ALUMINIUMINDUSTRIE e.V.

Contents





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German aluminium industry well positioned to face global competition

GDA's president Friedrich Brökelmann and executive director Christian Wellner talking about the German aluminium industry's economic situation and prospects.

Authors: Friedrich Brökelmann (left) and Christian Wellner

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The underlying economic situation in the aluminium industry is still difficult. The past year was a mixed one for us all. It was not a bad year for most companies, but then again it was not a record year either. The uncertainty surrounding the continuation of the sovereign debt crisis in many European countries depressed market sentiment. Planning suffered more than ever from uncertainty. However, the mood of German aluminium producers and processors improved slightly at the beginning of 2013. We hope that volumes will improve again during the rest of the year.

Despite the weak economic situation, 2012 demonstrated that the German aluminium industry is competitive in all key sectors internationally. Compared with the rest of Europe, German aluminium companies have so far proven to be robust. They are characterised by their high innovation potential, which is the basis for future viability and competitiveness.

Market forecasts for aluminium remain fundamentally positive. Our industry supplies to strong markets like the automotive, mechanical engineering and packaging industries. These user industries are highly competitive globally and are also supplying the growth regions of the world. In the car industry, a tripling of the use of aluminium is expected by 2030: from the current five million tonnes a year to about 15 million tonnes. Alongside carbon-fibre reinforced plastics and advanced steel grades, aluminium is predicted to become increasingly important, especially in car body structures. It is also possible to achieve lightweight construction using other materials so aluminium is exposed to a very competitive environment here. Co-operation and innovation projects, chaired and supported by GDA, are essential in order to promote aluminium even further where the competition between different materials is concerned.

Using raw materials and energy resources diligently and closing material loops are the challenges facing us both now and in the future in order to facilitate a sustainable method of production. Aluminium recycling, which is becoming an ever more important source of raw materials in Germany and Europe, will have a key role to play here. Given the limited primary aluminium capacity in the EU, demand for recycled aluminium will continue to grow. Aluminium recycling will thus be one of GDA's key tasks in future. It was against this background that GDA's Recycling division began work in April 2013. The most important functions of the new specialist trade association will be information and communication covering all aspects of aluminium recycling as well as actively representing members' interests at national and European levels.

GDA has adopted a proactive approach to these issues, which will be important for the metal and the sector in future. It will deal with market-relevant aluminium-specific topics and everyone will profit from them, whether they be corporations or medium-sized enterprises. There are many topics that can only be dealt with by the aluminium industry as a whole. These include image building for our metal, the discussions on sustainability and resource efficiency as well as co-operation with our user industries. With a small experienced team we will also be directing the work of the association at these key issues in future. We are striving for dialogue with members, customers, experts and politicians – also in this annual report, which reflects our association's broad remit. Contributions from various authors from industry and commerce illustrate GDA's broad field of activity and its extensive network. ■

Author:
Christian Wellner,
Executive Director
GDA e.V.

Overview of the aluminium industry

2012 was marked by economic challenge, which the German aluminium industry dealt with successfully. However, compared with the previous year, there were production cut-backs in many areas.

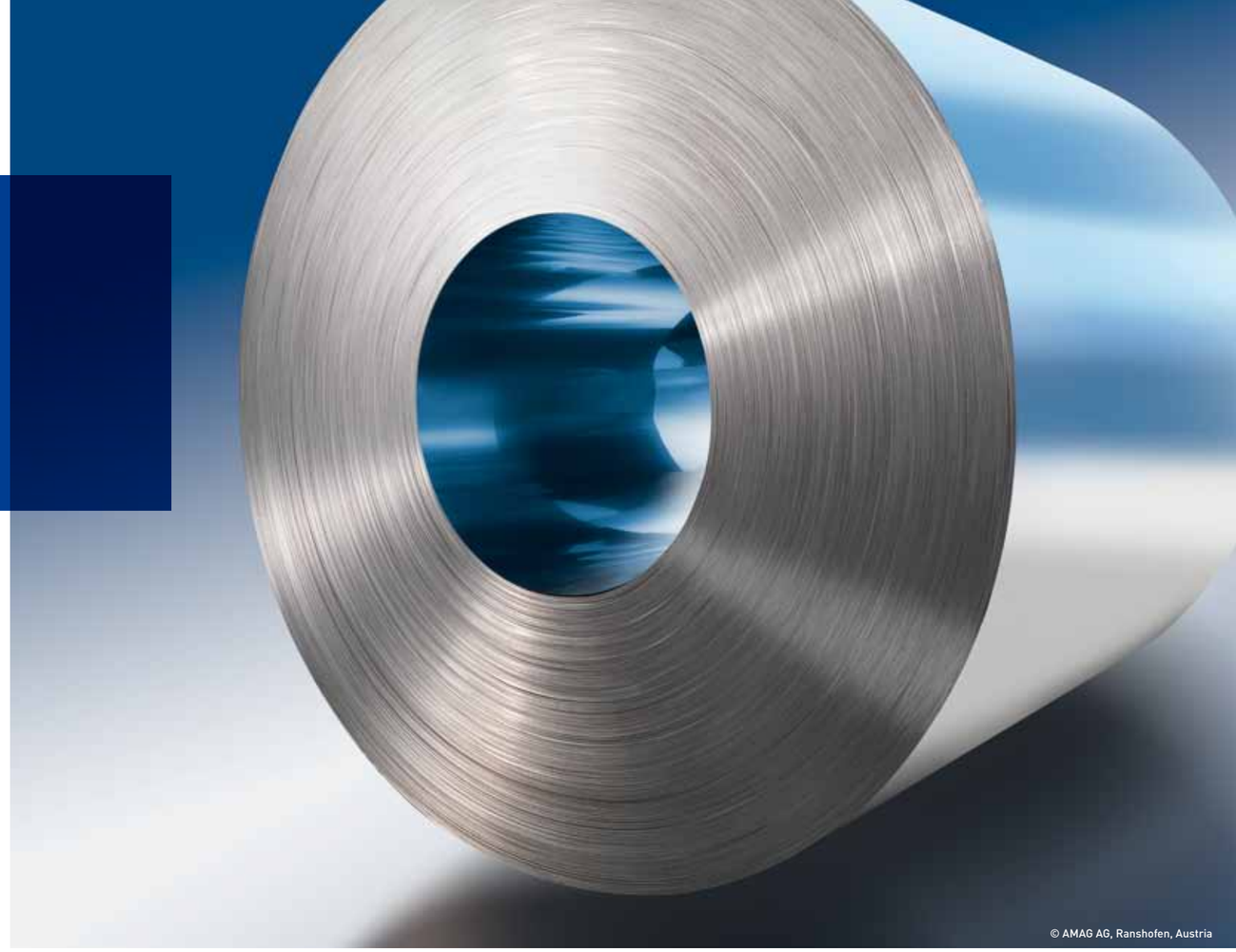
As a result of the reduced volumes and the fall in the price of aluminium on the LME, turnover in the German aluminium industry declined in 2012, totalling 13.4 billion euros. The level of turnover was still significantly higher than it was in 2010.

The approximately 600 plants that produce or process aluminium also play an important macroeconomic role in the German labour market. They are small and medium-sized enterprises and global corporations that generate work and thus income for a large number people associated directly or indirectly with this sector of the economy. The aluminium industry in Germany employed 74,000 people directly in 2012.

Quantitatively, the transport sector was the most important user market in 2012, with a 46 per cent share of total demand. Building and construction together with the packaging sector accounted for a share of 25 per cent. Mechanical engineering and electrical engineering still had a total share of 14 per cent. The remaining demand was attributable to the iron and steel industry, household goods, office equipment and miscellaneous end uses.

As with many of the country's important sectors, the German aluminium industry is also export-oriented. The most important export destinations are the member states of the European Union. The recession in Europe, particularly in the southern member states of the EU, made foreign trade difficult in 2012. Nevertheless, exports in important product sectors only declined slightly. For example, exports of aluminium semis were only 3.4 per cent lower than the previous year.

The German aluminium industry entered 2013 with cautious optimism. Firstly, the underlying macroeconomic conditions have improved, both for Germany and for the global economy as a whole. Secondly, user industries' expectations are gratifyingly optimistic: mechanical engineering, electrical engineering and the car industry – the most important industrial users – are all expecting positive growth. In addition, business expectations are also positive in the building and construction industry. Taken together, these demand stimuli could result in a slight improvement in the economic trend in 2013. ■



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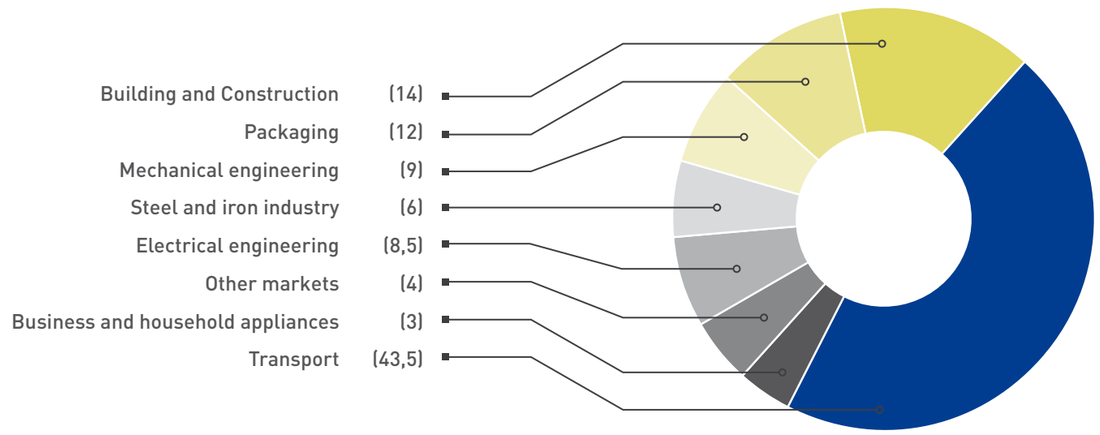
There was a slight fall in the production of semi-finished aluminium products in 2012. GDA is forecasting a stable economic situation in 2013.

Main markets for Aluminium 2012 (in %)



Premium-car manufacturer Mercedes-Benz is relying on aluminium for its lightweight-construction strategy. (Foto: CLA-Klasse, CLA 45 AMG)

Photos page 8–11:
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Interview with:
Erich Hoch (left)
and Franz Steimmel

Future use of aluminium in cars

Interview with Erich Hoch, Head of Product and Process Engineering Semi-finished Products and Franz Steimmel, Director Product Area Automotive, Hydro Aluminium Rolled Products GmbH

Lightweight construction will continue to be the greatest challenge for the car industry in the future. The market for lightweight construction using components made from high-strength steel, aluminium and carbon-fibre reinforced plastics is expected to grow to 300 billion euros by 2030, which is more than four times the level of 2010. A vehicle that is 100 kilograms lighter uses between 0.3 and 0.5 litres less fuel per 100 kilometres; this is equivalent to a CO_2 reduction of between eight and 11 grams for this distance. Furthermore, a weight-reduced vehicle offers benefits with respect to vehicle dynamics and comfort. Aluminium is the most important material for lightweight construction in the automotive sector and new solutions and applications using aluminium are increasingly being demanded because it is only possible to achieve a significant reduction in fuel consumption, and thus a corresponding reduction in CO_2 emissions, by reducing vehicle weight considerably.

The demand for aluminium solutions from carmakers is growing. Where do you see growth in demand and further potential for the lightweight material in the medium term?

Erich Hoch: *In future, there will be increased demand for aluminium in the form of extruded profiles for the body, chassis and interior areas.*

Franz Steimmel: *The percentage of semi-finished aluminium products in European vehicles will increase significantly by 2020. The substitution of steel by aluminium in the body shell area and for hang-on parts has already been successfully implemented in many premium-segment vehicles as well as some medium-sized ones. Many European OEMs have already decided to increase the use of aluminium for the car bonnets, wings and doors of the next generation of vehicles.*

What demands do carmakers make on aluminium processors with respect to strength, crash capability or formability?

Erich Hoch: *Carmakers make differing demands. In some cases they expect higher strength with good crash characteristics, such as ductility; in others they might only want maximum strength to meet the body's rigidity requirements. With regards to strength and geometries, good formability is expected in the different strength classes depending on where the component is used and whether strain can possibly be absorbed.*

Franz Steimmel: *The car industry's demands are complex. The new requirements relating to the need for a 'sharp-edged' design in the body shell area mean 6000 series alloys with the maximum formability are required. With respect to lightweight construction, reducing sheet thickness means materials need high strength. These conflicting characteristics have to be incorporated in a single material.*

What technical challenges do aluminium processors have to face, for example when it comes to the development of new alloys?

Erich Hoch: *The challenge is to develop alloys based on the 6000 series with very good formability and the highest possible tensile strength, in this case in excess of 350 MPa. However, because of the strength required, these alloys also have to exhibit very high proof stresses, e.g. greater than 320 MPa with ductilities in excess of 10%.*

Franz Steimmel: *The car industry is focussed on new aluminium alloys with improved mechanical properties such as strength, formability and corrosion resistance. However, it is also pressing ahead with the development of new rolling surface geometries and lubricants to improve tribological properties.*

What influence do suppliers have on future lightweight concepts?

Erich Hoch: *In my opinion, suppliers can have a very strong influence on OEMs' concepts for lightweight construction. For my part, it is particularly important to already be advising and supporting customers during the development phase of a vehicle's concept. Early agreement with respect to alloy, profile geometry and the processing of products can have a positive effect on manufacturing costs.*

Franz Steimmel: *Involving the aluminium semis producer early in the concept phase of the vehicle usually leads to coordinating the aluminium alloy with the requirements of the respective component in an optimal manner. Depending on the component concept, this can also result in an optimisation of manufacturing costs. Furthermore, new cost-efficient concepts suitable for aluminium are being developed in co-operation between OEMs and the aluminium industry at international level, such as in the Super Light Car project.*

As a result of more intense competition between materials, there is now closer co-operation between carmakers and aluminium suppliers. In order to pro-mote aluminium where competition between materials is concerned, carmakers are demanding co-operation and innovative projects. What measures is the aluminium sector adopting in response to this?

Erich Hoch: *The aluminium extruders have responded by sitting down together with German OEMs, such as Audi, BMW and Daimler, under the auspices of GDA. The OEMs' requirements with respect to feasibility and process reliability were investigated jointly in a scientific manner. The aim is to prepare precise specifications for the OEMs' various requirements.*

Franz Steimmel: *Aluminium companies like Hydro are co-operating with the car industry in wide-ranging projects in order to lead the way to a practical and completely efficient material mix (Super Light Car) and to also incorporate lightweight construction concepts in the design of electromobiles (ELVA). At the same time they are expanding their capacities both for the production of the semi-finished products expected to be needed – such as the expansion of the annealing line for body sheet at Hydro in Grevenbroich – and for the recycling of the end-of-life components in order to ensure endless recycling of the aluminium components via melting down and processing again once they have been used; since 2005, Hydro has installed recycling furnaces with a combined capacity of 150,000 tonnes a year in Germany alone. On the primary metal side, there is sufficient capacity available internationally in order to be able to expand the supply of rolled aluminium products to the car industry considerably within the space of a few years.*

At the same time, the European Aluminium Association is continually providing industries engaged in the mobility sector as well as the European Commission with information on how aluminium can contribute to making mobility lighter and thus safeguarding transportation and the competitiveness of Europe by significantly reducing fuel consumption and CO_2 emissions. The EAA produces important tools for calculating CO_2 savings; it has also prepared an important study on a smarter, energy-saving aluminium design for trucks that has contributed to the European Commission recognising this topic and taking it into consideration in its most recent decisions. National associations like GDA in Germany are active in a similar way.

Mercedes-Benz Concept GLA

Carmakers are increasingly basing decisions relating to their models on platform and standardisation strategies. Given ever larger production runs with extremely short delivery times in some cases, should suppliers be repositioning themselves in the market? In view of this, what will future co-operation between suppliers and the car industry look like?

The CLA-Class's lightweight alloy wheels

Automotive working groups

The Automotive Extrusions working group, which has been in existence for a long time, comprises three OEMs, 19 extrusion plants and five research facilities. The group's key tasks are to determine additional material property data for aluminium profiles, avoid or reduce the scatter bands in these values for profiles supplied by different manufacturers and draft a specification sheet for the manufacture of extruded aluminium profiles for use as structural components in cars. The test programme '3 plus' has just been completed and it will be followed in 2013 by programme '4', which will investigate the microstructure of extrusion billets through to the finished profile.

In the Automotive Rolling working group, representatives of the rolling mills and the rolled semi-finished products sector discuss with OEMs on a pre-competitive basis how to improve the potential use of sheet by standardising mechanical and other properties. The aim is to prepare standardised test guidelines and methods of measurement for rolled aluminium products for use in cars. The Methods of Measurement task group formed by the working group has carried out round-robin tests involving bending and tensile testing of coupons and a round-robin test is currently in progress to optimise measurements of titanium/zirconium layers.

Erich Hoch: *Given the short-term deliveries demanded by carmakers, suppliers must have a powerful ERP system with intelligent logistics and very flexible production control. Suppliers need to have an ear to the ground where customers are concerned.*

Franz Steimmel: *Rolled aluminium semis are increasingly being used for so-called hang-on parts (bonnets, wings, doors, etc.). The model policy adopted by European OEMs, with a significantly broader range of individual vehicles, means there will be a larger range of sizes in the body area. This task can only be solved by having flexible production lines.*

Visual accents of the new Mercedes-Benz CLA-Class

Another topic related to the use of materials in the car industry is the availability of materials and processes globally. The carmakers would like to benefit from innovative aluminium developments to the same extent at each of their production plants. How do domestic suppliers want to make their innovations and products available at different locations globally?

Erich Hoch: *The domestic suppliers have to think strategically here and make decisions that are best suited to them with respect to their company size. Not every company can set up a production or extrusion plant abroad, for example in Asia. Possibilities like joint ventures or co-operation can be one way of benefiting from growing demand for aluminium in the automotive sector worldwide.*

Franz Steimmel: *Rolled aluminium semis are usually available worldwide. In addition, capacities are being expanded globally and corresponding co-operation agreements signed. On top of this, there is a need to push forward with the harmonisation of materials with respect to mechanical properties, surface geometries and coatings for all vehicle models.* ■

GDA ■ INNOVATIONS

Author:
Dr. Martin Iffert,
CEO of TRIMET Aluminium SE,
Essen

Aluminium – the material behind the turnaround in energy policy

The aluminium industry in Germany is making a considerable contribution to preventing climate change worldwide. The metal is an ideal material for lightweight construction and energy transmission. A highly capable aluminium industry and integrated material chains provide the basis for improving efficiency in key German sectors, such as the mobility sector. And the turnaround in Germany's energy policy has also depended on aluminium. The reorientation of energy supply is necessitating enormous investments in power generation as well as in network and storage capacities. Without the high-tech materials and products made from aluminium there would be no electricity produced from renewable energy or functioning electricity grid, and no electricity storage facilities would have been built.

To maintain its capability, the primary industry is dependent on competitive electricity prices. Only then can we provide the proof that changing the supply of energy and maintaining industrial value chains are not mutually contradictory. And only then can the turnaround in energy policy serve as an example and find imitators.

The skyscraper of our highly developed industrial nation has four cornerstones and is standing on a foundation based on the supply of energy. The primary industry on the ground floor enables access to the upper floors. The cornerstones are the economy, security of supply, ecology and acceptance. In recent years the necessary maintenance work has been carried out almost exclusively on the ecology cornerstone. This has caused the skyscraper to lean over. Work is currently being carried out on the security of supply cornerstone in an equally one-sided manner. Meanwhile the cornerstones supporting the economy and acceptance are becoming ever more dilapidated. The social consequences of this development are cause for concern. The Renewable Energy Sources Act (EEG) has set in motion a redistribution process from the bottom to the top – with fatal consequences: as private electricity consumers, the blue and white-collar workers in the aluminium industry are financing the growing affluence of well-off landowners whilst at the same time fearing for their jobs, which are in danger as a result of non-competitive electricity prices.

The unbridled and uncoordinated expansion of renewable energy sources is not only leading to an avalanche of costs: it is also endangering the security of supply. It has now become increasingly clear that conventional power plants will have to be available on standby to cover consumption regardless of the installed capacity of renewable energy sources. The target triangle comprising security of supply,

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Aluminium stands for high energy efficiency – at both product and process level. Compared with other metallic materials, lightweight aluminium components reduce weight and thus fuel consumption and emissions, including carbon dioxide.

Aluminium is the material for the future thanks to its material properties, the broad range of possible ways of processing and machining it, and its high recyclability. New solutions and products are the key to further success.

Resource and energy efficiency of aluminium

The German aluminium industry is playing a leading role in the debate concerning the direction of sustainable development and for years has been involved in progressively introducing sustainable practices, both at its production plants and outside the workplace. In this respect it has had an important influence on the direction of the sustainability debate at corporate level, as well as via the work of its trade association. Of course, these activities are not isolated from the metal itself, which is predestined to be the material for conducting business and using materials in a manner that is sustainable and closed-loop oriented.

Lightweight aluminium can point to an excellent performance record when it comes to sustainability, prevention of climate change and other ecological 'footprints'. The resource efficiency of products only becomes really apparent when one takes their complete life cycle into consideration – from the extraction of the metal via its processing into semi-finished and finished products through to its utilisation and finally to its recycling and subsequent life as a new product. With aluminium, such a life cycle does not come to an end after just a few cycles: it can be repeated indefinitely. Not only theoretically but also in practice: three-quarters of all the aluminium ever produced is still in use today and has already been recycled many times over.

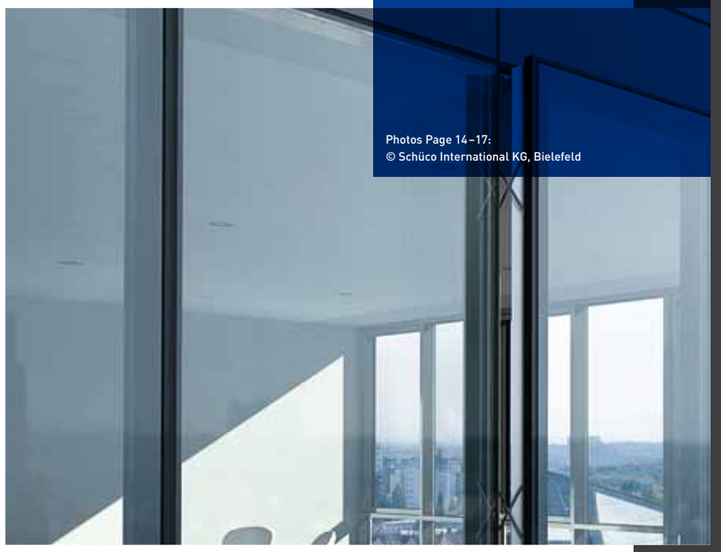
environmental protection and competitiveness has become dangerously imbalanced. Today, the major challenges of the turnaround in energy policy in Germany are the avoidance of blackouts and maintaining high social standards. Given the continually increasing quantity of renewable energy available, storage solutions must be found and brakes fitted in order to rein in costs. It is up to politicians to distribute the burden of the turnaround with a sense of proportion for social justice and to create incentives for pushing forward with the harmonisation of industrial processes and the future supply of energy.

TRIMET Aluminium SE has developed a process that in combination with conventional power plants turns alumina-reduction cells (pots) into energy stores for renewable energies. The principle is based on the line-commutated mode of operation used in smelters. The pots are modified in such a way that their power demand can be increased or throttled for several hours. The smelters thus store excessive energy in the form of aluminium, which is then used to make energy-saving products. The aluminium smelters become electricity stores within the network.

The great opportunity for the turnaround in energy policy is to be found in a network comprising a classical energy industry together with renewable sources of energy and industry acting in tandem. The aluminium industry offers the material for this. And it also offers solutions that benefit modifying the energy supply system while contributing to maintaining Germany's position as a location for industrial production. ■

GDA ■ BUILDING AND CONSTRUCTION

Aluminium has proven itself as a modern building material and has developed into a multifaceted feature in architecture and the building industry.



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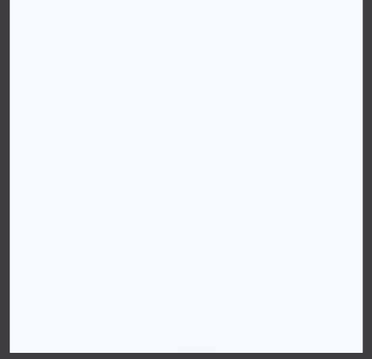


Author:
Rolf Brunkhorst,
Head of Sustainability
Schüco International KG

Aluminium for the façade of the 21st century

Modern aluminium windows and façades provide energy efficiency today and are tomorrow's source of materials. Aluminium allows ecological and economic demands to be satisfied in a sustainable manner.

Energy efficiency and material resources in buildings

Where buildings are concerned, the environmental discussion is still likely to be focussing on energy efficiency in the coming years. The optimisation of energy use has already been given an enormous boost. Many trades and especially highly developed window and façade technology have contributed to the energetic improvements. Refurbishment of old buildings offers great potential. The long time-scale involved is evident in government programmes. Germany's long-term objective is set for 2050, with increasing demands expected in addition.

However, it is also foreseeable that it will become increasingly difficult to meet the growing demand for building materials worldwide and at the same time dispose of the massive amounts of building waste via landfill. Both will lead to new bottlenecks if countermeasures are not taken. This means that in view of the longevity of buildings, measures for tomorrow need to be taken today in order to face the challenges proactively and turn them into opportunities.

Aluminium is per se particularly well suited for use in the façades of the future because of its high level of availability, also in the long term, extremely favourable recycling properties, extremely high durability and functional properties.

Joint project: environmental product declarations for building applications

GDA has prepared environmental product declarations (EPDs) for aluminium building components as part of a joint project with Institut Bauen und Umwelt e. V. (IBU), PE International GmbH and other partners. Environmental impacts over the whole life cycle were taken into consideration and EPDs for families of products were subsequently drawn up for the following building products: plain aluminium sheet, coil-coated aluminium sheet, cold-formed aluminium sheet and aluminium composite panels. GDA received certificates for the EPDs from IBU at the start of BAU 2013 in Munich. In addition, GDA became an affiliated member of IBU.

EPDs demonstrate the possible environmental impact of individual products or building materials and thus make a contribution to transparency in the public debate on sustainable development. EPDs are also an active component in the evaluation of buildings via certification schemes such as BREAAM, LEED, BNB/DGNB, ÖGNI or SGNI. When preparing the EPDs as part of the GDA joint project, the first step was to carry out life-cycle assessments for the products cited, which were then transformed into an environmental product declaration. The companies participating in the project – Novelis, Hydro, Alcoa, Prefa, and 3A Composites – can draw up their own product and company-specific EPDs based on the EPDs for families of products.

Architecture

Besides forward-looking design, modern architecture gives detailed consideration to possible demolition at a later date and recyclability. The aim: no waste and all materials have to be recycled and thus available to be used again.

Sustainable methods of construction set standards and these are then confirmed by certification schemes for buildings. The building products used and the choice of materials have a marked effect on the rating.

Aluminium scores with its recycling properties, durability, functionality and design opportunities.

Windows and façades are becoming multifunctional and intelligent

Modern windows and façades have a multifunctional design. Weather protection, thermal insulation, solar and anti-glare shading, sound insulation, fire protection and automation are all self-evident functions today. The multifaceted benefits become clear when one couples this with the use of solar heat in winter, the provision of daylight, visual contact with the outside world and other options like decentralised space ventilation and energy-saving outdoor lighting using LEDs. Systems are tailored to the needs of the people in the buildings and provide a healthy and pleasant environment for working and living.

Advances in thermal insulation have led to optimal values being achieved. There is enormous potential for improvement in the modernisation or refurbishment of old façades.

It is already possible today to incorporate photovoltaic elements in the façade and this will become the technical standard in the future. As far as a building's energy efficiency is concerned, it is now possible to erect zero-energy or even energy-plus houses.

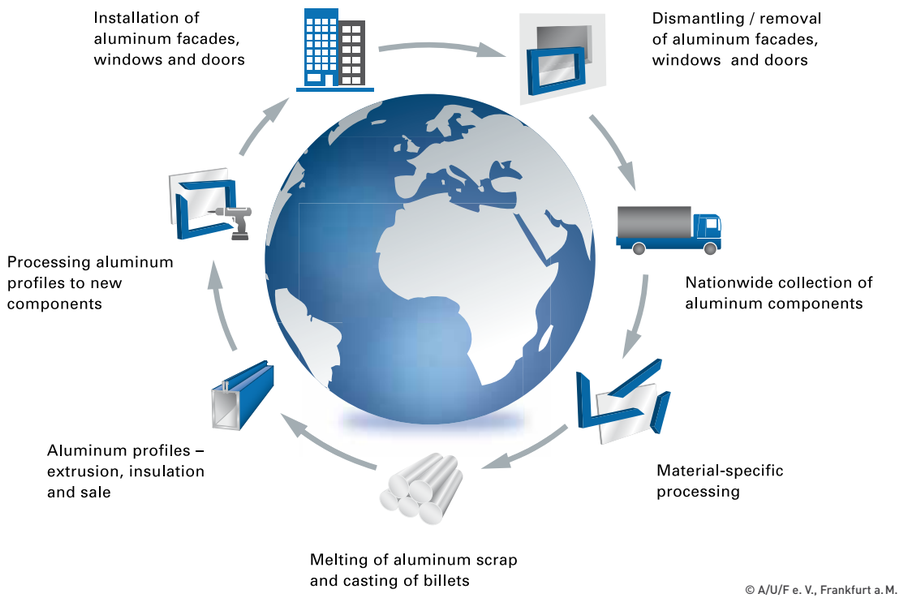
The demands made on functionality will continue to grow, leading to ergonomic and energetic optimisation. These demands can best be met using aluminium.

Recycling and ecology

Holistic evaluations of sustainability show that based on the life of a window frame the various materials used today are almost equivalent ecologically. There are significant differences, however, when possible recycling is evaluated.

There are marked differences between the materials here. Comparison shows that aluminium has an exceptionally high recycling potential. In buildings, and particularly with windows and façades, aluminium has positive functional and usage-related properties. The material is extremely durable and does not corrode. Three-quarters of all the aluminium that has ever been extracted is still in use today. In the building sector, practically all old aluminium windows are returned to the material loop. Using appropriate processes and processing technologies, the level of quality can be maintained so that new profiles can again be produced from old windows. Aluminium is recycled time and time again over many generations.

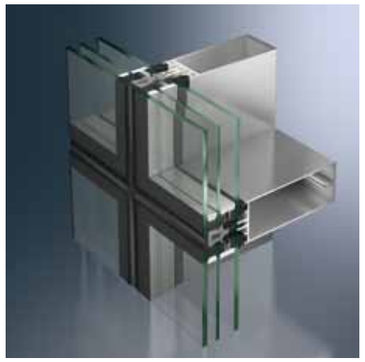
Aluminium Recycling Loop



Initiative A/U/F e. V. is an organisation that ensures that product-specific collection schemes and the treatment processes used are suitable. A/U/F has processors all over Germany that act as partners.

Holistic approach

Forward-looking product selection starts at a very early stage: when a building is first planned. It is possible then to think ahead to sustainability and possible ways of subsequent recycling. Modern building certification schemes specify the requirements for this and facilitate the planning process. There is a need during planning and implementation for professional support with respect to energy-efficient use and reliable recycling, and this can be provided for each phase of a building.

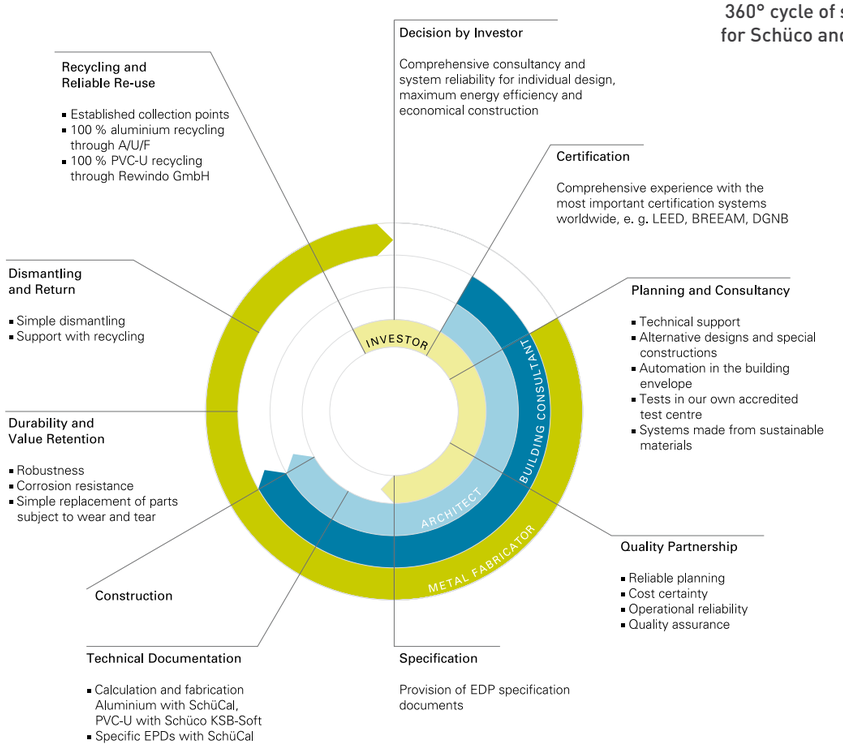


Well-functioning aluminium recycling loop: used profiles are collected (lower image) and the resultant aluminium scrap is turned into new window profiles. (left: Schüco AWS 90.SI+ Green)

Conclusion

Future challenges will be the reliable and ecologically/economically sensible use of resources and materials. There is already a need today for building products with a long life that are highly capable of being recycled and these properties will be indispensable in future. This means aluminium is particularly well suited for use in façades. ■

360° cycle of sustainability for Schüco and its partners



Aluminium packaging offers pure emotion

Choosing a specific branded product in the supermarket frequently depends on the design of the packaging. Aspects such as material texture and the form, graphic appearance and tactile appeal of the packaging all contribute towards the decision to purchase a product. Packaging thus becomes an important distinguishing feature in the competition between brands, and the more so the greater the similarity between the contents.

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Author:
Oliver Höll,
Managing Director
Karl Höll GmbH & Co. KG

Creative and innovative design, functionality and convenience are just some of the facets that modern packaging has to offer. Of all the multifarious packaging materials available, aluminium is one of the most versatile and highly capable – either as a mono-material or in combination with other packaging materials. It is possible to create exceptionally attractive designs with strong advertising impact thanks to aluminium's shiny metallic appearance and good formability. Furthermore, the material can easily be embossed and is suitable for all printing processes.

Eye-catcher at point of sale

The market success of aluminium packaging is also attributable to it being an eye-catcher at the point of sale. Functionality is just one of many purchasing criteria. Not only do today's consumers want well-protected products, they also want packaging that has an exclusive and modern appearance that is in keeping with their convenience and lifestyle-oriented consumer behaviour. Aluminium packaging satisfies this desire for emotional perceived value in a number of ways.

Lifestyle products like deodorants, hairspray or shaving cream in aluminium aerosol cans only attain their emotional perceived value through the exclusive and modern look of their packaging, which turns them into fast sellers at the point of sale. In the case of aluminium spray cans, for example, this can be because of the embossed can body, the curved shape, the improved grip or the latest printing process with pin-sharp, photo-quality graphic motifs.

What is true for aerosol cans is also true in a similar manner for aluminium tubes. Aluminium tubes for cosmetics and care products steal the show thanks to their elaborately designed packaging. This is available in matte or shiny designs, possibly with metallic effects or with lacquers that have special haptic properties, and thus exudes attractiveness on the shop shelf.

GDA: global player in the world of aluminium packaging

GDA's Aluminium Foil trade association and its Tube, Cans and Impact Extrusions trade association both represent the interests of some 40 members in the fields of politics, public relations, statistics, standardisation, technical matters and food legislation. Its members manufacture aluminium packaging and most of them are structured as medium-sized companies. The trade associations use intensive media activities to improve aluminium packaging's image and to establish themselves as opinion leaders on European and international issues.

At European and international level, the International Organisation of Aluminium Aerosol Container Manufacturers (AEROBAL), and the european tube manufactures association (etma), which are both managed in a dual-role function by GDA, represent the interests of the packaging industry in these fields. So with it international divisions, GDA is the global player in the world of aluminium packaging.

In addition, the tube, the classical form of packaging, allows excellent, modern packaging designs to be combined with retro features. In order to encourage new designs and ideas for the aluminium tube, etma organised the 1st Aluminium Tube Design Award in 2012 (see box). With regards to foil applications, embossed, high-grade printed and shiny aluminium foil for chocolate products is not just a big hit optically: it is also an exclusive pleasure for the consumer, not to mention the chocolate rabbit wrapped in aluminium foil that has already become a brand icon.

The aluminium beverage can, which has been back on the shelves of German supermarkets and discounters for some time, is capable of reinventing itself time and time again. New slim shapes are now available in addition to the classical cylindrical can. There are also shaped variants and cans with extensive blind pressing or digital printing. Textured surfaces offer the consumer a new tactile experience and thermochromic colour technologies indicate when beverages are at the ideal drinking temperature. This is all possible in an enormous diversity and range of colours. There are even aroma cans with fragrances under development. Moreover, there are sophisticated systems for reclosing cans available today.

etma looks for new designs of aluminium tube with YOUR TUBE AWARD

In the beginning there was the idea: 'New prospects for the aluminium tube!' The idea was to give the aluminium tube a new look, create new, innovative combinations of material, design and functionality and to use a design competition to make packaging, product and graphic designers more aware of the traditional aluminium tube: the 1st International Aluminium Tube Design Award, the YOUR TUBE AWARD, was born. It was held by etma for the first time in 2012. The association was looking for innovative presentations of the basic material, aluminium, in the shape of a tube – and did not stipulate any guidelines that might stifle creativity.

By the end of 2012, the specialist jury comprising experts from the design field, packaging and industry had received over 60 top-quality and unusual entries from designers, young professionals, students and schools of design in eleven countries, and this helped make the YOUR TUBE AWARD a complete success. The competition for the first three places was between design professionals and design students from France, Iran and Mexico, with a special prize for the best overall concept going to young designers from Germany and Mexico. The winners shared prize money totalling 10,000 euros.

© AEROBAL, Düsseldorf

The exclusive modern appearance of the aluminium aerosol can creates packaging with a high emotional perceived value for lifestyle products, like deodorants, hairspray or shaving cream.

© Behrendt und Rausch, Bonn

The aluminium beverage can is eternally young and elegant so it is able to reinvent itself time and again. It can now be embossed and shaped, allowing signets, logos or slogans to stand out three-dimensionally.

GDA supports SAVE FOOD initiative

Since 2012 GDA has been a supporting member of SAVE FOOD, an initiative of the Food and Agriculture Organisation (FAO) of the United Nations in collaboration with Messe Düsseldorf GmbH. The aim of the initiative is to demonstrate how individual steps in the value chain can make a contribution towards combating food waste worldwide via packaging, logistics and transport. GDA sees its collaboration with SAVE FOOD as an opportunity to convey the message that packaging is part of the solution for achieving more sustainability in production and consumption.

The shaped aluminium bottle has established itself as a niche specialty for alcoholic mixed drinks or energy drinks in trendy restaurants and bars, in discotheques and at parties. In other parts of the world it has long since been a much-used form of packaging for beer, soft drinks and juices – and not only by trend-conscious consumers.

In the coffee and tea sector, luxuriously decorated aluminium capsules with special lacquers in the most varied range of colours and optimal aroma protection are becoming established; consumers can choose the right type to suit their personal taste, perfectly portioned. ■

GDA promotes co-operation in supply chain

The REACH directive has resulted in a number of new obligations for those involved in a supply chain. Producers of aluminium aerosol cans and tubes for foodstuffs, pharmaceuticals or cosmetics are also affected because of the internal coatings used for their products; they are now striving to achieve co-operation and a continual exchange of information within the supply chain. This will permit approaches to be adopted more effectively, allowing risks along the supply chain to be identified and controlled efficiently; it will also allow alternatives to be explored as well as common aims like product quality to be pursued in an efficient manner.

Sustainable Aluminium Packaging Summit

GDA is organising the Sustainable Aluminium Packaging Summit in Essen in 2013. The event aims to intensify the exchange of views and experience between aluminium packaging manufacturers, their customers and scientists with respect to sustainability and recycling and provide information on the functioning value chain for packaging recycling. It is the second GDA summit: the first took place in June 2012 in Düsseldorf and was well received by GDA member companies.

Substances of very high concern (SVHCs) are substances that have been identified within the framework of the REACH directive as being particularly dangerous when available scientific data are taken into consideration. Above a certain level of exposure, these substances can seriously impair human health and the environment. The listing of a substance as an SVHC by the European Chemicals Agency (ECHA) is the first step in the scientific discussion in the REACH process as to whether there should be restrictions or bans on the use of the substance.

Substances such as N-methyl-2-pyrrolidone (NMP) or bisphenol A (BPA), which are used for the internal coating of cans and tubes, have come under pressure as a result of the REACH legislation and reporting in the media worldwide. NMP is used as a solvent in the production of internal protective lacquers for aerosol cans and tubes and is on the REACH candidate list of SVHCs. Epoxy resins are among the products made from bisphenol A. Tubes, aerosol cans, beverage and food cans, and storage tanks for wine, for example, are lined on the inside with epoxy resin coatings. In various European countries, like Sweden, Denmark, France and Belgium, there is national legislation over and above existing European regulations relating to bisphenol A that limits the use of this substance.

According to measurements carried out by the industry, the exposure and migration data for both substances are below the statutory limits so that there is no risk to the consumer. Nevertheless, the substances are suspected of being a health risk or having a mutagenic effect, which has led to considerable pressure in the packaging sector for substitution. Put in a nutshell, user industries are demanding that their suppliers forego the use of the substances across the board. There is thus agreement along the whole supply chain, from lacquer producers and packaging suppliers through to packagers and brand owners, on the need to develop new internal coatings that are free from questionable substances. The development of new lacquer formulations needs time, however, sometimes years. Everyone involved in the supply chain has been informed accordingly. In order to avoid any unrealistic expectations concerning how quickly it will be possible to develop alternative internal coatings, everyone involved has been asked to co-operate and coordinate their activities relating to communications, information and marketing in a purposeful manner.

Together with AEROBAL and etma, GDA has developed a communication strategy involving everyone involved in the supply chain and regularly provides information on current statutory requirements and the status of the development of alternatives to the chemicals NMP and bisphenol A. The idea was the brainchild of Gregor Spengler, head of the Packaging division at GDA and secretary general of GDA divisions AEROBAL and etma. Some 50 representatives from the whole of the supply chain have participated in the workshops and discussions on co-operation which are unique for this sector and which have so far taken place in Frankfurt three times since October 2011. The aim is to present those involved in the supply chain with feasible solutions and alternatives that allow both substances to be dispensed with in the lacquer formulations without the functionality of the packaging having to suffer. It has already been agreed to continue the joint discussions and a further meeting is planned for early 2014. ■

Author:
Leopold Werdich,
Chairman of Tubes
and Aerosol Cans Division
at GDA

Exemplary dialogue

Together with AEROBAL and etma, GDA is conducting a dialogue with all of its partners in the supply chain. As far as sustainability and regulatory conformity issues are concerned, it has managed in recent years to direct attention more and more towards the complete value chain. This holistic approach is increasingly becoming accepted in the industry and the retail trade. GDA sees its supply-chain dialogue as a platform for the sector to discuss issues of practical relevance. It involves those responsible from the supply chain exchanging views and information on the latest developments, approaches and solutions relating to the issues of the sustainability/recycling of aluminium packaging and its conformity with food legislation, and doing it in a concerted manner.

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Aluminium aerosol cans are produced without a seam by impact extruding a single piece of metal; these so-called slugs (right-hand side) are discs stamped from aluminium strip. Uniquely shaped seamless tubes (top) act as highly effective ambassadors for a brand, especially in the cosmetics and personal-care markets.

The diversity of can shapes makes it easier for drinks companies to market the most varying range of beverages in aluminium cans. Beer and alcoholic mixed drinks, lemonade and iced tea, energy and wellness drinks rich in vitamins and minerals, coffee-containing soft drinks – the range is growing all the time.

Author:
Welf Jung,
Business Development Director,
Sustainability Director
Rexam Beverage Can

Recycling empty cans at full tilt

Who could have foreseen it happening maybe ten years ago: in an advertising spot for the German Football Association, Manuel Neuer, the goalkeeper of the country's national team, catches an empty beverage can that is flying through the air towards a rubbish bin and says, "There's a deposit on that!" He prevents the foul throw and cleverly demonstrates what resource efficiency really means: namely collecting, recycling and using again. The aluminium beverage can then becomes a genuine closed-loop form of packaging. Aluminium is the ideal material to convey this message and the aluminium beverage can is an exemplary product because it can be recycled any number of times without any loss in quality.

It might seem strange at first that this message is being conveyed by Manuel Neuer. However, when one thinks about it, the logic becomes clear: we Germans have achieved something with the aluminium beverage can that we have not been able to achieve on the football pitch for many years: we are the European champions – in the collection of used aluminium beverage cans – and with a recycling rate of 96% are now playing alongside the world's best! Interestingly, Brazil achieves the highest recycling rate worldwide, with over 98%. No scientific link has yet been found between recycling rates and footballing ability!

It is no surprise that the recycling of aluminium beverage cans is paying off. Some 95% less energy is required and 95% less greenhouse gases are released into the atmosphere than during the primary production of aluminium. When these facts are taken into account, closing the aluminium loop means putting resource efficiency into practice.

The aluminium beverage can requires some 60 days for this. Turning old into new – recycling empty cans at full tilt. Aluminium beverage cans are the most recycled form of packaging worldwide. But recycling rates are not over 90% everywhere. That's where we are aiming to be in the long term.

Under the motto 'Every can counts' we are carrying out campaigns to promote awareness that every recycled can is a contribution to the supply of raw materials and resource conservation. Our aim is to achieve an average recycling rate of 75% in Europe by 2015 – an important step. It does not matter whether the recycled can is turned into a new one or some other high-grade aluminium product: aluminium is still aluminium.

Germany is leader in recycling of aluminium beverage cans

Sustainability is becoming increasingly more important for consumers. They are demanding products that are ethical, ecologically impeccable and packaged in a resource-conserving manner, but which nevertheless are undamaged when they reach the consumer. This presents packaging manufacturers with a major challenge: the industry wants to save material but, whatever happens, the packaging has to be stable.

From an ecological point of view, the aluminium beverage can is on a par with other forms of packaging in many situations. In Europe, two-thirds of all used aluminium beverage cans are recycled. In Germany, the figure is 96 per cent; the country is thus Europe's leader in the recycling of such cans. The high recycling rates for aluminium packaging show that the aluminium industry has worked very successfully to close material loops even further.

With this in mind it is difficult to understand the demands being made for the use of as much recycled aluminium as possible in beverage cans; after all, used aluminium beverage cans made into other products, such as an engine block or a window, achieve the same objective. They provide the aluminium that is needed to make the product. What is important is what was made clear by Manuel Neuer: collecting, recycling and using again and thus, in the case of the beverage can, closing the aluminium material loop. ■

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Innovative processing technologies allow creative designs to be used with aluminium beverage cans to meet consumer demand for new sensory impressions and a high-class appearance.

© BCME, Germany

GDA's Ecology and Sustainability training course

GDA is adopting a new approach to training and qualification and is now offering member companies seminars at their own facilities on the subject of ecology and sustainability. This specialist seminar gives apprentices, sales personnel and/or technicians an introduction to the basics of sustainability. The seminars consist of a general module together with advanced modules and modules covering specialist topics. Depending on the actual interests of the attendees, they can be oriented towards the specific information requirements of the building, transport or packaging markets. Each seminar includes the basic topic 'What is Sustainability' as well as information on recycling, product life-cycle assessments, recycling metal content and urban mining.

Author:
Christian Wellner,
Executive Director
GDA e.V.

The recycling of aluminium is a market that is self-sustaining to a large extent and above all functions well. There is no difference in quality between primary and recycled aluminium.

Aluminium is still aluminium

Germany has few natural resources, and large parts of Europe are in a similar situation. Here, the reliable, efficient and eco-friendly – in other words sustainable – supply of raw materials and metals means not only ensuring a supply of the ores or intermediate products used for metal production but also directing attention to all resources that are suitable for satisfying metal demand. This is particularly the case with the non-ferrous metal aluminium, which after steel is the second most important industrially used metal, with applications in almost all fields of technology and everyday life.

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GDA's Aluminium Recycling division up and running

GDA's newly established Aluminium Recycling division began work with effect from 1 April 2013. The members of the 'new' specialist trade association include the member companies of Düsseldorf-based Verband der Aluminiumrecycling-Industrie e.V. (VAR), which was disbanded on 31 March 2013. The Aluminium Recycling division will initially maintain the same range of services as VAR but will expand them in the medium term. Jörg Schäfer is the division's new head.

The establishment of the specialist trade association comes at a time when the importance of aluminium recycling is growing, with it becoming ever more important as a source of raw materials in Germany and Europe. In order to recycle raw materials even more intensively in Germany, aluminium companies are investing in the expansion of recycling capacities and in doing so are using the latest plant engineering. Demand for recycled aluminium will continue to grow in the EU given the continuing closure of primary aluminium capacity. At the same time, however, recycling of aluminium is also one of the most important factors for demonstrating the resource efficiency and sustainability of the metal.


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Aluminium recycling consists of three stages: collection, treatment and conversion of the scrap into an alloy that can be used again.

Geo-mining takes place at the beginning of the industrial value chain while urban mining occurs at the end of a product's useful life: the town, an urban area with its products and waste, will become a storage site for raw materials – the raw materials mine of the future. Production, use, disposal and processing are the four ore deposits of an urban mine. Houses, cars and mobile phones will become treasure troves of urban raw materials and after use these will become a valuable, national raw materials reservoir instead of rubbish and waste that requires disposal.

Aluminium scrap as urban raw material

For the aluminium industry this means that in addition to having a geo raw material, bauxite ore, as the starting product for the extraction of aluminium there will also be an urban raw material, aluminium scrap, that can be used to manufacture new products. The mineral raw material, the ore, will be joined by a metallic raw material, aluminium scrap. The earlier differentiation between primary and secondary raw materials has had its day.

There is, in any case, no qualitative difference between primary aluminium and recycled aluminium. When one looks at an engine block one cannot tell what source of aluminium has been used to produce it. The same is true for a window profile, a beverage can or any other aluminium product. When it comes to product design, the decisive question is what properties, such as strength or formability, the aluminium product needs to have. This determines which material and which alloying elements are to be used and whether the semi-finished product or end product should possibly be subjected to heat treatment. However, it is not important whether the metal used was obtained from aluminium oxide or post-consumer scrap.

There is no downgrading of aluminium scrap after it has been melted down again for the umpteenth time. In metallurgical terms, the crystal lattice of the metal does not wear out. One can manufacture the same products from melted-down scrap as those that were made by digesting the bauxite ore. This means aluminium scrap can be classified as a raw material, as the starting material for new products.

The starting point for an aluminium product made from the ore is a bauxite mine. At the end of a product's useful life there is a house that has to be demolished, a car that has to be dismantled or packaging that has to be separated into different fractions. Recovery from end-of-life products still involves a lot of effort, of course: not all materials are returned to the material loop. Energetic recycling at the end of a product's life is also an option in some countries.

Massive expansion of aluminium production from urban raw materials

With aluminium, the high intrinsic metal value is a guarantee for widespread recovery of the metal. In long-lifetime applications, such as cars or buildings, recycling rates of about 95 per cent are already being achieved today. For aluminium products with relatively short lifetimes, like the packaging sector, the recycling rate in Germany is over 87 per cent – quite an impressive value. The recycling rate for used aluminium beverage cans in Germany, with its deposit scheme, is now over 95 per cent.

In order to make even more intensive use of urban sources of raw materials, aluminium plants in Germany have been making massive investments to expand recycling capacities for several years using plant engineering that is setting the benchmark for the rest of the world.

End-of-life scrap only partially satisfies aluminium demand

Despite all the efforts being made to recycle aluminium, one cannot forego production of the metal from bauxite ore completely. There is a lot of talk about fibre-reinforced materials in aircraft construction but the major part of new aeroplanes, even modern ones, is made from the light metal aluminium. The same is true in carmaking, where ever more light metal is being used, and not just as castings, but also as wrought alloys for body applications. Many aluminium rolling mill owners are expanding their capacities worldwide in response to new applications in the car and aerospace industries.

It will not be possible for many decades to meet aluminium demand simply by collecting end-of-life scrap. This can satisfy a good third of demand at best. The situation will not change as long as global demand for aluminium grows at a faster rate than aluminium scrap is returned to the loop. As far as the expansion of recycling systems is concerned, the level of recycled material in a specific product is therefore not important. As long as demand for aluminium is greater than the amount of recycled aluminium in the pool that can be used to satisfy it, the scrap aluminium will always find a use, if not for Product A, then for Product B.

What is more important is the question of where the hugely expanded recycling capacities are going to get their feedstock in a few years' time. Europe has been a net exporter of aluminium for ten years. In 2011 alone, almost a million tonnes (955,285 t) of aluminium scrap were exported to third countries, while imports from third countries totalled some 40 per cent of this amount (378,214 t). The drain on aluminium scrap from Europe was thus 577,071 tonnes. Europe has not been a net importer of aluminium scrap since 2001. In the intervening period there has been a net outflow of 4.7 million tonnes from Europe. This is 4.7 million tonnes of valuable raw materials that had been collected with a great deal of effort and which contained around 66 million megawatt hours of energy. Enough energy to supply the city of Munich with electricity for almost nine years. ■


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Geo mining | urban mining info folder

For the ALUMINIUM 2012 trade fair, GDA prepared an info folder that presented the two different sources of raw materials used for aluminium. Besides production of aluminium from bauxite as the raw material, the so-called geo mining route, there is also the urban mining route. This involves recycling used aluminium from buildings, vehicles or other applications and this will become more important in the years and decades ahead.

GDA's aim is to point to the future challenges in the collection and recycling of aluminium which result from the discussions on the resource efficiency of products. The main idea here is to concentrate on the closing of material loops instead of increasing the fraction of recycled material in aluminium products. This will increase the total quantity of recyclable materials returned to the loop, conserve resources and save energy.

© GDA e. V., Düsseldorf

GDA's 'Geo Mining / Urban Mining' folder provides information on both sources of raw materials for aluminium.

Metal traders safeguard our supply of raw materials

There has been a division of responsibilities between traders and industrialists for centuries and they are mutually dependent on its proper functioning. Industrialists produce metals and products made from metals and traders supply the industrialists with the necessary raw materials and in addition take on the function of a processor, order picker, logistics expert and financier. Normally, traders are active worldwide because Europe is a region with few natural resources and Europe has to import most metallic raw materials. China is one of the most important suppliers of so-called rare earths, Chile and Peru of copper ores, and Australia and Guinea play a special role in the case of bauxite. Free and fair international trade is indispensable. It can, of course, be a one-way street for traders. Germany in particular is dependent on the export of all kinds of products, because export is the particular strength of the German economy. This is also true for metallic raw materials. Thus large quantities of scrap are traded worldwide every year. Traders bring the material to where it is needed and are professionals at importing and exporting in equal measure.

For a long time, the subject of raw materials was not on the political agenda in Europe. Only in recent years have politicians recognised that safeguarding raw materials and resources are key issues in the 21st century. Our economic development will have no future without an adequate supply of raw materials. The world's population is growing, the so-called emerging countries are gradually turning into industrial nations and require modern technologies and ever more copper, aluminium and other metals. On the other hand, natural resources are dwindling worldwide, our raw materials are finite. It is therefore only logical that the European Union and national governments are applying themselves more intensively to raw materials policy. With its Eckpunkten einer Rohstoffstrategie für Europa (Cornerstones of a Raw Materials Strategy for Europe), VDM has actively entered the debate and is providing support for the political process in Berlin and Brussels.

Cornerstone 1: We need free and fair global competition

The shortage of supply for certain important raw materials in the world's markets has led to changes in the strategic trading policy of some countries. They are using protectionist measures like export duties and taxes and benefits for imports to protect their domestic markets from foreign demand. Unfair trade and competition are one of the major problems when it comes to the supply of raw materials for the European or German economies. Distortional measures are contrary to free world trade and decisive steps must therefore be taken to counteract them. Politicians must insist that all countries observe WTO rules.

Cornerstone 2: Encourage recycling

Recycling is the most reliable and most ecological form of securing raw materials in Europe. The treatment of the scrap available in Europe is efficient and energy-saving. Take aluminium for example: today more recycled aluminium than primary aluminium is being use in carmaking in Germany. The fact that metals can be recycled an unlimited number of times without any loss in quality whatsoever using only a fraction of the energy required for primary production improves their energy balance dramatically. Such energy savings apply to all non-ferrous metals, being most outstanding in the case of aluminium recycling.

It is the business of politicians to actively promote recycling. This does not have to involve financial benefits but primarily political and strategic support. It would be desirable, for example, to modify current legislation on waste, which also applies to scrap, so that it differentiates between different types of waste. Metallic scrap and residues with a high market value do not require the same statutory environmental controls as waste in the usual meaning of the word. It would make sense to simplify matters for the sector and this is possible.

Cornerstone 3: We need harmonisation of regulations in Europe

Despite the many EU regulations and EU guidelines, there is still little homogeneity in the European internal market. This is particularly true for laws relating to tax or the environment. Here, the devil is in the detail and the very different implementation of European legislation. There are sometimes even serious differences in the implementation at local level. Not only does this lead to distortion of competition, it also leads to a high degree of legal uncertainty.

Recycling is the most reliable and ecological way of securing the supply of raw materials in Europe.

Photos page 33:
© VDM e. V., Berlin

Cornerstone 4: Improve raw materials efficiency

One can find the expression 'raw materials efficiency' in every paper on political strategy. However, one must approach this in a differentiated manner because reduced metal use can also result in loss of recyclability. For example, the copper used in electronic equipment can be recycled without difficulty. However, if the copper is only lightly sprayed on, for reasons of economy, it may no longer be economically and/or technically feasible to recover the metal in certain circumstances – the copper is then lost. The question of possible recycling must always be taken into consideration when manufacturing products.

Cornerstone 5: Political support for raw materials policy

More importance must be given to raw materials policy in Europe and Germany. Economic considerations usually have to take a back seat to other political considerations today. Rethinking is called for here. For example, whoever extracts or processes raw materials has to be in a position to obtain the required energy at a competitive price; taxing energy to support other political objectives is counterproductive in this case. Safeguarding the supply of raw materials serves the common good. ■

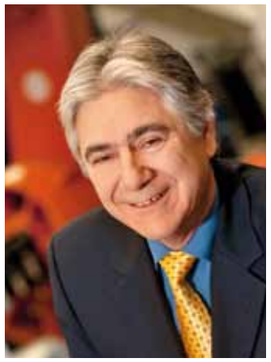
Strong competition for scrap

The market for recycled aluminium is self-sustaining to a large extent and above all functions well. Alloys made from recycled aluminium even have their own contract for trading on the London Metal Exchange. This fact needs to be emphasised because given the current discussion on increasing raw materials efficiency and the role of recycling it is easily forgotten that aluminium is already being recycled in a highly efficient manner in a good many areas. For aluminium, recycling is an integral part of raw materials management.

An adequate supply of scrap is the prerequisite for a well-functioning aluminium recycling industry. The European aluminium recycling industry faces strong competition in international markets. It has to accept this because it speaks out itself in favour of free competition. Problematic, however, is that competition is taking place under very unequal conditions in many areas. The environmental standards in the EU are significantly higher than in many other countries. This results in considerable cost disadvantages for production plants located in the EU. On top of this is the growing tendency for trade restrictions in many countries of the world.

Author:
Thomas Reuther,
President of Verband Deutscher Metallhändler e.V.

Author:
Professor Dr. A. Erman Tekkaya,
TU Dortmund University



From research to industrial application

© IUL – TU Dortmund University

View of the test facilities at the Institute of Forming Technology and Lightweight Construction (IUL) at TU Dortmund University; IUL works together closely on research projects with GDA and companies from the aluminium industry.

GDA: close co-operation with researchers

Germany, the nation of poets and thinkers, is above all a nation of researchers. The focus of the co-operation that GDA and its member companies have with universities and institutes is on the further development of the co-operation between business and science. Co-operation in research offers major benefits to both sides; companies benefit above all by having access to the latest scientific knowledge and can use this for innovative products and solutions to problems. Thanks to co-operation with universities and research institutes, they also have the opportunity to have tasks dealt with using new methods and from a new perspective.

The Institute of Forming Technology and Lightweight Construction (IUL) at TU Dortmund University is engaged in forming processes for metallic materials. Aluminium is one of the materials that are often used in research projects and it can be formed in many ways, for example by extrusion, electromagnetic forming, blanking, deep drawing or bending. The institute has suitable plant and equipment for investigating forming processes. The processes are also usually subjected to digital imaging.

IUL has been working closely for some time with GDA and companies from the aluminium industry in order to investigate various questions regarding the forming of aluminium alloys and to give stimuli to further research work. Regular meetings to discuss the direction of the research take place in Dortmund with an industry advisory committee. The committee includes representatives from companies and organisations such as GDA, which is represented by its technical officer Wolfgang Heidrich. The committee acts as a discussion body and in addition to providing guidance on collaborative, application-oriented research projects also helps IUL transfer the results of its university-based basic research to industrial applications.

GDA contributes to the orientation of the research projects by making introductory presentations to IUL's industry advisory committee and as part of IUL's lecture series. Furthermore, representatives of GDA continually participate in the lecture series in Dortmund. There is also close co-operation between the university and industry via the IUL's active participation in GDA's Automotive working group. In this group, representatives from the car industry, extrusion plants and research institutes deal with user-orientated extrusion-related process knowledge.

An example of the transfer of research results is a special project with the title 'Efficient Extrusion Simulation for Industrial Applications' that was carried out jointly with GDA and the participation of industrial companies. The project was initiated from IUL's side as part of the Transregio10 Collaborative Research Centre 'Integration of Forming, Cutting, and Joining for the Flexible Production of Lightweight Frame Structures' and supported by the German Research Foundation (Deutsche Forschungsgemeinschaft). As a result of this project, it was possible to develop a method for predicting metal flow and the position of the longitudinal seam in extruded profiles produced on an industrial scale. The figure shows a comparison of the predicted and actual positions of these seams in the cross sections of profiles.

It was also possible to improve the models used and broaden knowledge of the effect of process parameters on the mechanical properties of chambered profiles. The results obtained in the course of the project were published and are thus available to the general public should questions regarding this topic arise. In addition, the resultant IUL dissertations relating to the forming of aluminium were made available to GDA for use in its comprehensive library.

In order to exchange research results and compare the capabilities of extrusion simulation programmes, IUL organises the International Conference on Extrusion and Benchmark in co-operation with scientists from Bologna every two years. The conference is aimed at attendees from both academia and the industry. GDA helps the organisers publicise the event. IUL also regularly makes presentations at GDA conferences and helps the organisers by chairing individual sessions.

The co-operation between IUL and GDA is not limited to extrusion. At a workshop organised by GDA and IUL with attendees from the industry, it became apparent that an overview of all research activities in the field of aluminium does not exist and considerable effort is needed to find a suitable contact person. A common activity in future will thus be to produce a map showing current research activities and possible research results. ■

R&D co-operation involving GDA:

IUL (Institute of Forming Technology and Lightweight Construction), TU Dortmund:
Research projects in the field of extrusion, including the simulation of extrusion processes

aec – aluminium engineering center, RWTH International Academy, Aachen
Co-operation seminars on the technology of aluminium

FZS (Research Centre for Extrusion), TU Berlin
Extrusion tests and microstructural investigations, projects from GDA's Extrusion working group

Fachhochschule Südostwestfalen, Meschede
Lectures on the subject of lightweight construction using aluminium

SLV Duisburg
Seminars on joining Lectures as part of training courses for welding engineers

Metallbaucenter der TU München, Munich
Eurocode 9 research project: fatigue data on aluminium alloys

KIT (Karlsruhe Institute of Technology)
Building inspectorate approvals for sinusoidal aluminium profiles

MPA (Materials Testing Institute), Darmstadt
Bioethanol – compatibility of aluminium with alternative fuels

The breathlessness of global markets

GDA had its own stand at ALUMINIUM 2012 and provided information on the services it has to offer. For the fair, it put together an attractive supporting programme which included technical papers at the Aluminium Conference and discussions with experts as part of Aluminium Talk.

Author:
Hans-Joachim Erbel,
CEO, Reed Exhibitions Germany

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ALUMINIUM trade fair – GDA and Reed confirm partnership

GDA had its own stand at the ALUMINIUM 2012 trade fair, where it provided information on the services it has to offer and gave advice on the use of aluminium in a company-neutral and product-independent manner. At the same time, the GDA stand served as a communications platform and meeting point for visitors and exhibitors. On all three days of the fair, numerous representatives of member companies visited the GDA stand and took the opportunity to exchange opinions with other members of the aluminium community. Recycling and the challenges that are arising from the discussions on the resource efficiency of products were the main theme of the fair. GDA had compiled comprehensive information material on this subject.

The future partnership between GDA and Reed Exhibitions Deutschland GmbH, the organiser of the ALUMINIUM trade fairs, was confirmed. The new partnership agreement envisages co-operation for an unlimited period. GDA will also continue to be patron and congress partner of the ALUMINIUM fair in future.

A book was published in 1985 which predicted much that seemed to be utopian for us at the time. From today's viewpoint, though, it seems it had already experienced a touch of the breathless pace of today's global markets. It was titled Triad Power and was edited by the well-known Japanese economist Kenichi Ohmae; it outlined the image of an unchained world economy that would lead to an explosion of international trade globally based on the growing division of labour internationally and to the integration of three regions in the world: Europe, North America and Southeast Asia.

The reality at the time looked much different, of course: China, the Middle Kingdom, was isolated economically, Europe was far from having implemented the four great freedoms of the internal market, and Germany, the export world champion, was sending a larger proportion of its exports to its neighbour Austria than it was to the whole of eastern Asia.

Today, almost three decades later, the mechanics of internationalisation and integration is deeply rooted in economic policy.

This is also true for the aluminium sector where, from the extraction of the raw materials through to production and processing, companies have established a global production and sales chain of specialist suppliers that has developed into the driving force for dynamic expansion of the international sphere of activity.

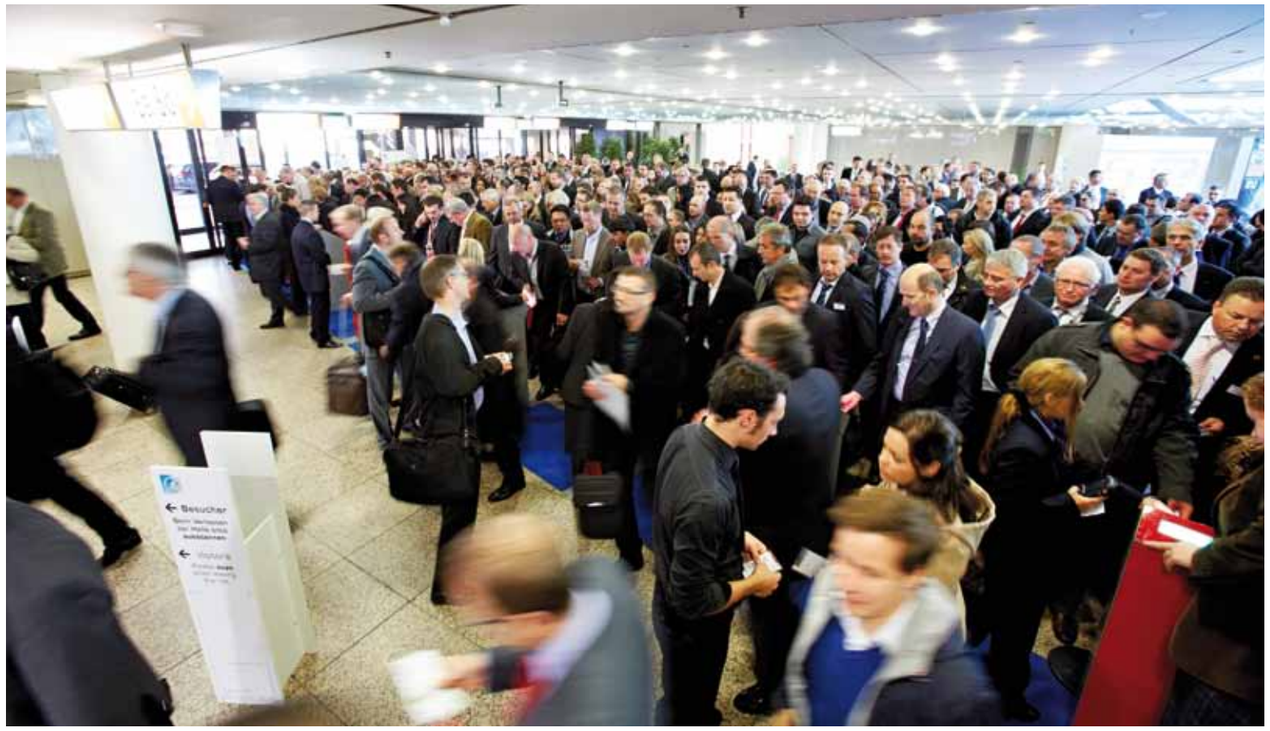
Trade fairs are world markets for a limited time period. They do not have a home but in no way are they organised by stateless journeymen either. Trade fairs have to specialise and be international, acting where market partners want to use them to open up markets or as a catalyst for markets. It was therefore no coincidence that in the middle of the 1990s the trade-fair strategy that had been pursued for a long time, namely presenting a large number of industrial sectors at monster trade fairs, no longer seemed to be in keeping with the times.

This was also true for our sector which together with GDA, and at first under its lead management, decided to hold what was initially a small specialist trade fair in 1997 – ALUMINIUM – which has since experienced extremely dynamic growth. In the past 15 years it has developed into one of the most successful industrial trade fairs in Europe and which with its offshoots on the important continents and in the most important regions now serves the key markets that Kenichi Ohmae so impressively described.

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

Technical seminars and presentations

GDA's seminar programme includes the classics "Joining of Aluminium Profiles and Sheet", "Surface Treatment of Aluminium" and "Technology of Extruded Aluminium Profiles", which are held regularly. It includes basic seminars on the metal as well. GDA also co-operates regularly with the aluminium engineering center (aec) of the RWTH International Academy on the seminar "Introduction to the Technology of Aluminium", which is aimed at scientists, engineers and technicians from the aluminium industry and the aluminium-processing industry.



Ten percent more exhibitors, 20 percent more exhibition space and 23 percent more visitors: the ALUMINIUM trade show made a successful debut at its new venue in Düsseldorf following its move from the Ruhr to the Rhine.

GDA is co-sponsor of the European Aluminium Award

The European Aluminium Award was awarded for the eighth time at ALUMINIUM 2012. It is the aluminium industry's most important international prize and it looks for new ideas for the efficient and advanced use of aluminium. GDA has supported the award for many years as a co-operation partner and has backed the idea and aim of the competition in the German and European aluminium industries.

Aluminium 2012 set new records for the number of exhibitors and visitors.

International congresses

In recent years, GDA has established itself as an organiser of specialist international congresses. The next European Aluminium Congress (EAC) will be held in November 2013 and its main theme will be 'Aluminium Automotive Applications – Tomorrow's Design and Sustainable Performance'. EAC 2013 will cover not only the various applications of aluminium currently to be found in cars but also possible further advancements that would make vehicles of the future even lighter and more fuel efficient.

For the second time in 2012, GDA organised the ALUMINIUM Conference, which was held in parallel with the ALUMINIUM 2012 trade fair. The conference was aimed at aluminium users, with presentations on innovations.

Various sector events on the GDA stand offered opportunities for an exchange of views.

GDA's international network

Everyone is becoming increasingly aware of the global economic challenge. As the representative of interests in one of the largest aluminium markets of the world, GDA also makes its expertise available at international level, where it is actively involved in the most important associations and committees. GDA is conducting direct dialogue with other trade associations and organisations in Germany and Europe because future challenges like sustainability and resource efficiency will have to be solved at European level. Following the establishment of its Recycling division, recycling will move to centre stage where GDA's international activities are concerned. The aim is to acquire refiners and remelters throughout Europe as members of the new trade association and to firmly and enduringly establish the end-of-life approach to recycling in the aluminium sector.

GDA's closely knit network and co-operation with national and European institutions, such as the European Aluminium Association (EAA) or the International Aluminium Institute (IAI), are the basis for effective lobbying at international level. Various international groups, such as the Aluminium Aerosol Container Manufacturers (AEROBAL), the European tube manufactures association (etma) or the European Metal Particulates Association (EMPA), are also managed from Düsseldorf. In addition, GDA manages the Hard Alloy Extrusions and Slug Producers working groups. GDA's specialists also represent the German aluminium industry's interests with regards standardisation at European level in the Global Advisory Group (GAG) and the European Committee for Standardization (CEN).

GDA's remit also continues to include the management of GSB International. The quality association has been a partner for building owners, architects and metal fabricators for over 30 years. It was the world's first quality organisation for the coating of components made of aluminium or steel. Its aim is to ensure the quality of the painting and coating of aluminium and steel and their alloys for use in architecture and to further develop these processes so as to keep abreast of technical advancements.

Close co-operation has been agreed between GDA, the Swiss aluminium association (alu.ch) and the non-ferrous metals trade association of the Austrian Economic Chambers (Fachverband der NE-Metallindustrie, Wirtschaftskammer Österreich). In future, it is planned to carry out different joint activities under the 'D-A-CH, Allianz für Aluminium' logo (D-A-CH, Alliance for Aluminium; D = Germany, A = Austria, CH = Switzerland). D-A-CH is a huge market and German is the largest language group in Europe. This has led the three aluminium associations to co-operate more closely with the aim of taking advantage of synergies wherever possible. The first result of this co-operation appeared in 2012: an information brochure titled Planning for the Future – Building with Aluminium. ■

D-A-CH brochure for building industry: three associations co-operate

GDA has published a new information brochure titled Planning for the Future – Building with Aluminium. The brochure was prepared in close co-operation with the Swiss aluminium association (alu.ch) and the non-ferrous metals trade association of the Austrian Economic Chambers (Fachverband der NE-Metallindustrie, Wirtschaftskammer Österreich) in order to be able to serve the whole German-speaking area. It is the first time the three aluminium associations have co-operated in the conception of a brochure and it is intended to serve as a model for future co-operation. The three countries (D, A and CH) have a long common tradition when it comes to aluminium. They have a combined population of almost 100 million, of whom some 95 per cent have German as their mother tongue, making it the largest language group in Europe. D-A-CH is a huge market and it is intended to carry out further joint activities under the 'D-A-CH, Allianz für Aluminium' banner in future.

Online Services from GDA

New emphasis for online communications

GDA is making increasing use of online media for its communications both within the association and externally. Digital channels of communication open up new opportunities for preparing and distributing news and other content to specific target groups in a very selective manner.

GDA will be expanding its website further in 2013 and designing it so that it is even more informative for all users. The concept envisages giving greater consideration to mobile devices as well as focussing on more self-service for visitors and a more transparent calendar of events. Special apps will also be developed in order to improve the service offered to different interest groups.

Current GDA online services

GDA offers comprehensive information about aluminium on its website at www.aluinfo.de; services include the Knowledge Shop, technical advice, information about products and manufacturers, and basic information on the sector's important topics and markets. The extranet section for GDA member companies contains statistics, presentations and reports from working groups which can be accessed exclusively by GDA members and their employees. On top of this there are the online presentations that accompany GDA events like the ALUMINIUM Conference or the Aluminium Congress.

The next generation

The technical aspects of online communications and user behaviour have undergone major changes in recent years, and the importance of mobile reception devices like smart phones or tablet pcs has grown significantly. GDA will be orienting its online content more strongly towards increasing speed and mobility and bearing users and devices in mind when it comes to further development. This means all GDA online services will be revamped visually, structurally and technically in order to ensure optimal presentation on important mobile devices.

GDA's new online services

GDA's new online presentation will contain an up-to-date and relevant selection from the whole range of services available. There will be more space for the latest news, information about aluminium and the most important events and services in order to provide visitors and members with an up-to-date insight and comprehensive service.

It will be possible to change the appearance, particularly of the home page. It will also be possible to incorporate other media, such as videos. GDA's new-look website will also include an expanded media area both on the home page and inside.

The Knowledge Shop will be closed down and all documents will be available for downloading free of charge. GDA will thus prepare the way for a comprehensive self-service information service for its members as well as for the general public and educational establishments. The aim is to make documents more widely available.

Offering downloads free of charge is only the first step. Additional information services will be introduced gradually and these will also be processed so that they are suitable for mobile reception devices and available as apps. The first service of this kind will be Weber's Aluminium Pocket Encyclopaedia, which will appear as an HTML5 app in German and English. This research and knowledge app will include the complete work and the contents will be completely searchable and navigable. Furthermore, it will be possible to share the contents with other people and platforms.

New events portal

The relaunch of the website will also see greater emphasis given to GDA events such as congresses, workshops or seminars. All events organised by the association will be grouped together under a separate menu item. This should make a larger target group more aware of the seminars available.

Central services associated with the events will be expanded and streamlined, and greatly simplified for visitors. All information relating to seminars and congresses will then be available directly online, where registration will also be possible; contents will be accessible interactively. Integrating all events centrally via aluinfo.de will permit a standardised registration system with comprehensive management of attendees to be used. This approach will also give attendees a comprehensive view of all topics and content, such as the speakers' PowerPoint slides or documents or the proceedings of the event afterwards. Options like a reminder service will give the events area a finishing touch. ■

Author:
Volker Meibrink,
Managing Director
dmkzwo

www.aluinfo.de

GDA Website

The **extranet section** is for GDA members only and contains statistics, presentations and reports from working groups; access is restricted exclusively to GDA member companies and their employees. Technical Informations, technical reports, brochures and facts sheets can be downloaded directly.

The **product and manufacturer database** helps find manufacturers of aluminium products. A simple template facilitates the search for optimal solutions and products from innovative companies.

GDA's online library provides an answer to almost any question relating to aluminium. It is based on the GDA's reference library, the largest German library devoted to aluminium. The contents can be accessed online via a link on the GDA home page. Access and searches in the online catalogue are free of charge. Visitors can conduct searches via titles and abstracts or via the classification system. Specialist articles, for which a charge is levied, can be ordered online.

www.aluminium-congress.com

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.

Business activity in aluminium sector in 2012/13

The forecasts for Aluminum remain optimistic. Worldwide, the consumption of aluminum will increase steadily. The boom is mainly driven by the rising demand from the automotive and aircraft industry and the building and construction sector as well.

Raw aluminium: production broadly stable / declines in exports

The production of raw aluminium in Germany in 2012 was about 1.045 million tonnes. It comprised 410,413 tonnes of primary aluminium and 634,995 tonnes of recycled aluminium. Overall, there was a year-on-year decline in raw aluminium production of 2.0 per cent. This was attributable to a fall of 5.1 per cent in the production of primary aluminium. In contrast, the production of recycled aluminium rose slightly, by 0.1 per cent.

German exports of raw aluminium in 2012 totalled 387,713 tonnes. This was a decline of 22.2 per cent on the previous year. The export of primary aluminium fell from 246,909 tonnes the previous year to 159,206 tonnes, a fall of 35.5 per cent. In contrast, the decline for recycled aluminium was only 9.2 per cent, decreasing from 251,536 tonnes to 228,507 tonnes.

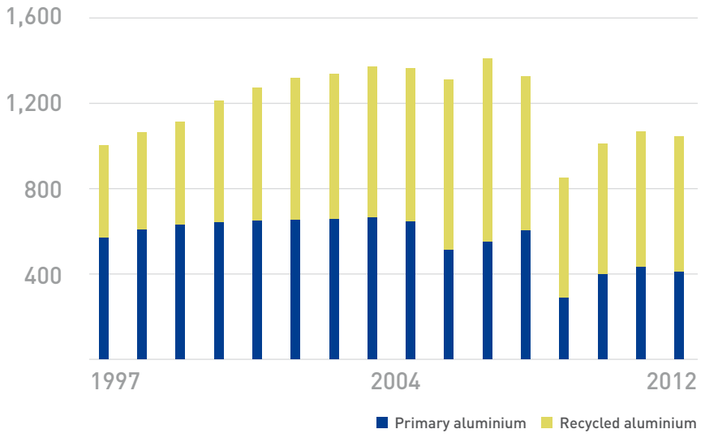
Aluminium semis production almost unchanged

About 2.412 million tonnes of semi-finished aluminium products were produced in Germany in 2012. Compared with the previous year, this represented a slight fall of 1.3 per cent. Semi-finished products include rolled products, extrusions, wire and forgings. In tonnage terms, aluminium semis are the most important sector in the German aluminium industry.

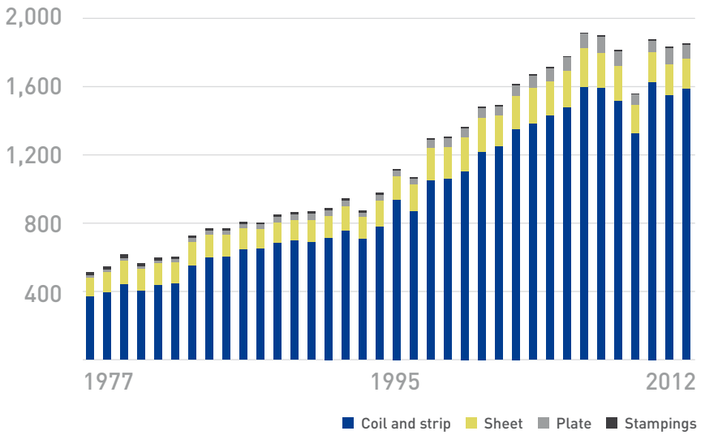
Slight increase in production of rolled products

A total of 1,854,454 tonnes of rolled products were produced in Germany in 2012. This represented a rise of one per cent on the previous year. The slight increase was attributable to a 2.2 per cent rise in the most important product group in terms of quantity: coil and strip. In contrast, production declined in the other product groups (sheet, plate and stampings). The fall was most pronounced for stampings: 13.7 per cent.

Raw aluminium production in Germany from 1997 to 2012
('000 tonnes)



Production of rolled products in Germany from 1977 to 2012
('000 tonnes)



Decline in extrusions production

Production of extrusions in Germany in 2012 totalled 535,727 tonnes and was thus 8.6 per cent lower year-on-year. The decline in the production of aluminium rod and bar and tube was even more pronounced: the quantities produced declined 20.3 per cent and 22.9 per cent respectively.

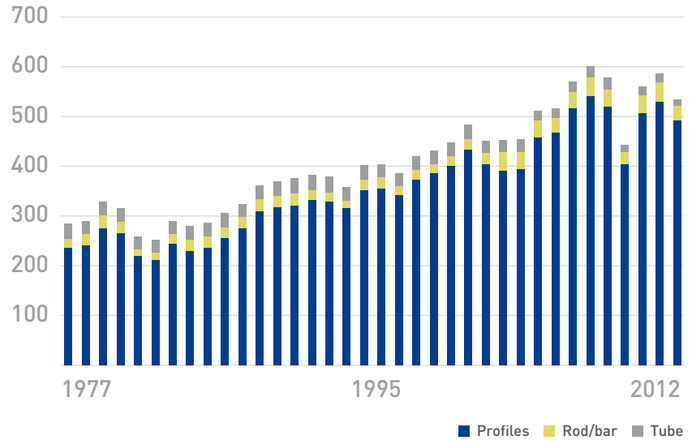
Exports difficult

It was a difficult year for exports of semi-finished products. German industry exported a good 1.4 million tonnes in 2012, which was a decline of 3.4 per cent compared with 2011. At 2.1 per cent the decline was much lower for the producers of rolled products than it was for the extruders, where a nine per cent fall was recorded. European partner countries play a prominent role as user markets for the German aluminium industry. Europe's share of all exports reached about 77 per cent, with a figure of 70 per cent for the EU27 countries.

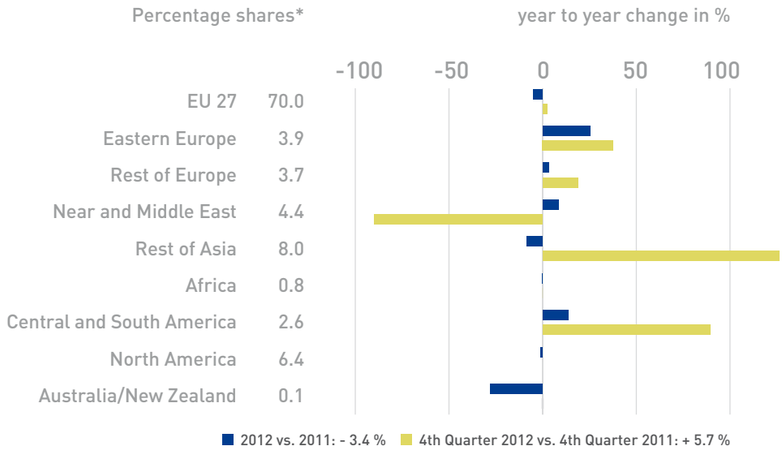
Aluminium downstream processing

Downstream processing in Germany accounted for 345,025 tonnes of aluminium in 2012. The volume was thus 4.6 per cent down on the previous year. Downstream processing is subdivided into three groups: foil and thin strip; tube and aerosol and other cans; and metal powder. Declines in the production of foil and thin strip and of metal powder of 5.0 and 3.8 per cent respectively were significantly more pronounced than they were for tube and aerosol and other cans, where the decline was 2.0 per cent. ■

Production of extrusions in Germany from 1977 to 2012
('000 tonnes)



Exports of aluminium semis according to region in 2011 and 2012



* on total exports of aluminium semis during the current year

Outlook

The economic environment for aluminium continues to be characterised by great uncertainty. However, there are now initial signs of recovery. The global economic climate improved in the first quarter of 2013 – especially in Asia. This is good news for the export-oriented German economy and is in line with the encouraging development in the business climate in Germany. Primarily, the car industry, mechanical engineering and the electrical industry are expected to profit. As these industries are among the largest users of aluminium products, one can expect stimulation for aluminium demand from these industries. In addition, business expectations for the German building sector remain positive and are in line with the cautiously optimistic economic outlook for the German aluminium industry.

Statistics

Production

Semi-finished aluminium products	2011	2012
Rolled products	1,835,400	1,854,500
Rods and bars	38,300	30,500
Profiles	530,800	491,900
Tubes	17,300	13,400
Wires	16,400	16,600
Forgings	N/A	N/A
Conduction material	4,800	4,500
Total	2,443,000	2,411,300

Aluminium castings (tonnes)	2011	2012
pressure die-casting	448,900	425,600
Permanent-mould casting	290,600	265,200
Sand casting	94,400	92,900
other casting processes	9,800	17,400
Total	843,700	801,100

Further processing of aluminium (tonnes)	2011	2012
Aluminium foil	294,854	280,186
Tubes, Cans and Impact Extrusions	40,636	39,839
Aluminium powder	25,991	25,100
Total	361,481	345,125

Foreign trade

Primary aluminium (tonnes)	2011		2012	
Country	Import	Export	Import	Export
EU 27	930,215	239,705	875,136	150,868
EFTA	527,487	4,303	480,630	6,186
Eastern Europe	141,235	650	114,056	475
Rest of Europe	0	0	0	1
Europe total	1,598,937	244,658	1,469,822	157,530
North America	50,479	396	33,987	375
Central and South America	23,875	9	15,367	1
Africa	58,508	2	53,809	1
Asia	134,366	1,845	166,113	1,300
Total	1,866,166	246,909	1,739,097	159,206

Secondary aluminium (tonnes)	2011		2012	
Country	Import	Export	Import	Export
EU 27	587,958	218,053	572,444	199,788
EFTA	24,320	24,491	23,339	19,310
Eastern Europe	29,089	250	5,115	545
Rest of Europe	0	0	0	0
Europe total	641,367	242,794	600,898	219,643
North America	5,746	812	3,558	663
Central and South America	0	1	2	2
Africa	1,487	25	308	94
Asia	2,548	7,470	1,010	8,037
Total	651,149	251,102	605,776	228,439

Semi-finished aluminium products (tonnes)	2011		2012	
Country	Import	Export	Import	Export
EU 27	959,327	1,071,243	856,410	1,011,373
EFTA	136,197	51,516	141,072	53,133
Eastern Europe	172,717	45,305	154,831	56,775
Rest of Europe	0	15	0	22
Europe total	1,268,241	1,168,079	1,152,313	1,121,303
North America	15,495	93,076	16,499	91,741
Central and South America	10,917	33,727	6,846	37,965
Africa	17,222	11,711	16,918	11,670
Asia	55,557	185,951	34,845	179,989
Total	1,367,432	1,492,544	1,227,421	1,442,668

GDA – Gesamtverband der Aluminiumindustrie e.V.

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

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

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

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

Executive Committee

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F. W. Brökelmann Aluminiumwerk GmbH & Co. KG

Dietrich H. Boesken (Ehrenpräsident)
Boesken GmbH

Oliver Bell (Vizepräsident)
Hydro Aluminium Rolled Products GmbH

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

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(Schatzmeister)
OTTO FUCHS KG

Martin Kneer
(Geschäftsführendes Präsidialmitglied)
WirtschaftsVereinigung Metalle e.V.

Laurent Musy
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Wolfgang Beck
Eduard Hueck GmbH & Co. KG

Oliver Bell
Hydro Aluminium Rolled Products GmbH

Dietrich H. Boesken
Boesken GmbH

Friedrich Brökelmann
F.W. Brökelmann Aluminiumwerk GmbH & Co. KG

Frank Busenbecker
Erbslöh Aluminium GmbH

Bernd Gebhardt
AFM aluminiumfolie merseburg gmbh

Hans-Peter Grohmann
Johann Grohmann GmbH & Co. KG

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Oliver Höll
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Martin Kneer
WirtschaftsVereinigung Metalle e.V.

Roland Leder
Aleris Recycling (German Works) GmbH

Dr. Dieter Lutz
ECKART GmbH

Dr.-Ing. Hinrich Mählmann
OTTO FUCHS KG

Manfred Mertens
Hydro Aluminium Rolled Products GmbH

Laurent Musy
Constellium

Carl Pfeffer
Aluminium-Werke Wutöschingen AG & Co. KG

Heinz-Peter Schlüter
TRIMET Aluminium SE

Eric Tonkowski
Novelis AG

Leopold Werdich
TUBEX GmbH

Members

Members

AFM aluminiumfolie merseburg GmbH
06217 Merseburg

Albéa
96110 Scheßlitz

Alcoa Extrusions Hannover
ZWNL der Alcoa Holding GmbH
30453 Hannover

Aleris Extruded Products Germany GmbH
88267 Vogt

Aleris Recycling (German Works) GmbH
41515 Grevenbroich

Aleris Rolled Products Germany GmbH
56070 Koblenz

Aluminium Norf GmbH
41468 Neuss

Aluminium Oxid Stade GmbH
21683 Stade

Aluminium-Werke
Wutöschingen AG & Co.KG
79793 Wutöschingen

Aluminiumwerk Unna AG
59425 Unna

AMAG casting GmbH
5282 Ranshofen · Austria

AMAG rolling GmbH
5282 Ranshofen · Austria

Amcor Flexibles Singen GmbH
78224 Singen

apt Hiller GmbH, Alu-Profil-Technik
40789 Monheim

Ardagh Aluminium Packaging
Netherlands
50126 Bergheim

BAGR Berliner Aluminiumwerk GmbH
13407 Berlin

Ball Aerocan
90522 Oberasbach

Borbet GmbH
59969 Hallenberg-Hesborn

Constellium Extrusions
Deutschland GmbH
76829 Landau

Constellium Singen GmbH
78224 Singen

Drahtwerk Elisental
W. Erdmann GmbH + Co.
58809 Neuenrade

ECKA Granules Germany GmbH
90763 Fürth

ECKART GmbH
91235 Hartenstein

Eduard Hueck GmbH & Co. KG
58511 Lüdenscheid

Erbslöh Aluminium GmbH
42553 Velbert

Essel Deutschland GmbH & Co. KG
High Tube aus Dresden
01099 Dresden

F.W. Brökelmann
Aluminiumwerk GmbH & Co. KG
59469 Ense-Höingen

Fonderie Mario Mazzucconi S.p.A.
24036 Ponte San Pietro · Italy

GARTNER EXTRUSION GMBH
89423 Gundelfingen

Gerhardi AluTechnik GmbH & Co. KG
58513 Lüdenscheid

GRIMM Metallpulver GmbH
91154 Roth

GUTMANN AG
91781 Weißenburg

GUTMANN ALUMINIUM DRAHT GMBH
91781 Weißenburg

Henrich Goldfuchs
Bronzefarbenwerk GmbH
90530 Wendelstein

HMT Höfer Metall Technik
GmbH & Co. KG
06333 Hettstedt

Hydro Aluminium Bellenberg GmbH
89287 Bellenberg

Hydro Aluminium Extrusion
Deutschland GmbH
04519 Rackwitz

Hydro Aluminium Extrusion
Deutschland GmbH
28832 Achim – Uphusen

Hydro Aluminium Rolled
Products GmbH
41515 Grevenbroich

Hydro Aluminium Rolled
Products GmbH
21129 Hamburg

interfer Aluminium GmbH
59457 Werl

K + S Entsorgung GmbH
34131 Kassel

Karl Höll GmbH & Co. KG
40764 Langenfeld

Linhardt & Co. GmbH
Metallwarenfabrik
76707 Hambrücken

Linhardt GmbH & Co. KG
Metallwarenfabrik
94234 Viechtach

Linhardt Pausa
Metallwarenfabrik GmbH
07952 Pausa

Martinrea Honsel Germany GmbH
59872 Meschede

Mittelrheinische Metallgießerei
H. Beyer GmbH & Co. KG
56626 Andernach

Nedal Aluminium B.V.
3500 GA Utrecht · Netherlands

NORDALU GMBH
24539 Neumünster

Novelis Deutschland GmbH
Werk Lüdenscheid
58507 Lüdenscheid

Novelis Deutschland GmbH
Werk Nachterstedt
06469 Stadt Seeland

Novelis Deutschland GmbH
Werk Göttingen
37075 Göttingen

Novelis Deutschland GmbH
Werk Ohle
58840 Plettenberg

Nussbaum Frankenberg GmbH
Aluminium-Monoblockdosen
09669 Frankenberg

Nussbaum Rielasingen GmbH
Fabrik für Alu-Verpackungen
78239 Rielasingen

OTTO FUCHS KG
58540 Meinerzhagen

Rexam Beverage Can
Berlin GmbH
14167 Berlin

RHEINFELDEN SEMIS GmbH & Co. KG
79618 Rheinfelden/Baden

Sapa Aluminium Profile GmbH
77656 Offenburg

Schlenk Metallic Pigments GmbH
91154 Roth – Barnsdorf

ScholzAlu Trading GmbH
73457 Essingen

STENA Aluminium AB
34321 Älmhult · Sweden

TRIMET Aluminium SE
Primary Products Essen
45356 Essen

Tubex GmbH
72414 Rangendingen

Tubex Wasungen GmbH
98634 Wasungen

Voerde Aluminium GmbH
46562 Voerde

WESERALU GmbH & Co. KG
32423 Minden

Corporate member

Bundesverband der Deutschen
Gießerei-Industrie (BDG)
40237 Düsseldorf

Supporting members

Alu-Menziken Extrusion AG
5737 Menziken · Switzerland

Alufinish GmbH & Co. KG
56626 Andernach

Aluminium Laufen AG
4253 Liesberg · Switzerland

Aluminium Powder Company Ltd.
Penrhos Works
LL65 2UX Anglesey · Great Britain

ALUNOVA RECYCLING GmbH
79713 Bad Säckingen

Alutecta GmbH & Co. KG
55481 Kirchberg

AVL Metal Powders
8500 Kortrijk · Belgium

Benda-Lutz Werke GmbH
3134 Nussdorf ob der Traisen
Austria

Carlfors Bruk AB
56121 Huskvarna · Sweden

Chr. Otto Pape Metalle GmbH
30855 Langenhagen

EURAL GNUTTI S.p.A.
25038 Rovato · Italy

GGP Metalpowder AG
Eckart Plaza
90763 Fürth

Grillo-Werke AG
38644 Goslar

Hoesch Granules GmbH
41460 Neuss

IMR metal powder technologies GmbH
9220 Velden am Wörthersee
Austria

Makin Metal Powders Ltd.
Buckley Road
OL12 9DT Lancashire · Great Britain

NIMEX NE-METALL GmbH
06311 Helbra

POMETON S.p.A.
30030 Maerne (Venice) · Italy

Poudmet S.A.S.
60140 Bailleval · France

Poudres Hermillon
7330 Hermillon · France

ProfilGruppen GmbH
70794 Filderstadt

Rudolf Ambruch
Fassadenpflege GmbH
70197 Stuttgart

SC Alba Aluminiu SRL
51600 Zlatna – Jud. Alba · Romania

Silberline Ltd.
Banbeath Road
KY8 5HD Scotland · Great Britain

TePro AG
50354 Hürth

Toyal Europe SA Usine du Pont-du-Roy
64400 Accous · France

ZIMCO ALUMINIUM CO. (PTY) LTD.
3 Falkirk Road Industrial Sites, Benoni
1502 Gauteng · South Africa

University members

aluminium engineering center
aachen e.V. (aec)
RWTH Aachen GI Gießerei-Institut
52056 Aachen

Technische Universität Berlin
Forschungszentrum Strangpressen
Institut für Werkstoffwissenschaften
und -technologien
13355 Berlin

Technische Universität Dortmund
IUL Institut für Umformtechnik
und Leichtbau
44227 Dortmund

GESAMTVERBAND DER
ALUMINIUMINDUSTRIE e.V.

Am Bonneshof 5
40474 Düsseldorf
Germany

Postfach 10 54 63
40045 Düsseldorf
Germany

Phone: +49 211 47 96 0
Fax: +49 211 47 96 408

information@aluinfo.de
www.aluinfo.de