

50 Moments

The key milestones in the development of today's modern aluminium industry

Over the past 200 years, aluminium has evolved beyond anything early pioneers might have imagined. It continues to be processed and applied in innovative and sustainable ways.

From its use in everyday items such as pharmaceutical packaging and beverage cans, to the building of aeroplanes and spacecraft, aluminium has proved its essential role in society, technology, transport and beyond. Over the years, scientists have found new ways to process and recycle aluminium that have had a profound impact on our industry.

50 YEARS
1972-2022



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The International Aluminium Institute invited members of the industry to vote for their favourite aluminium-related events to highlight the most important milestones in the metal's legacy.

Here – as chosen by you – are the top 50 Moments in the history of aluminium...



Charles Martin Hall



Paul Hérault



1886

#1
Top 50
Moments

Discovery of Hall-Hérault Process

In 1886, American chemists Charles Martin Hall and Frenchman Paul Hérault, both aged 22, invented the Hall-Hérault process. Before this discovery, aluminium was a precious metal. The Hall-Hérault invention brought aluminium into large-scale production and the race for a commercially viable route for aluminium won.



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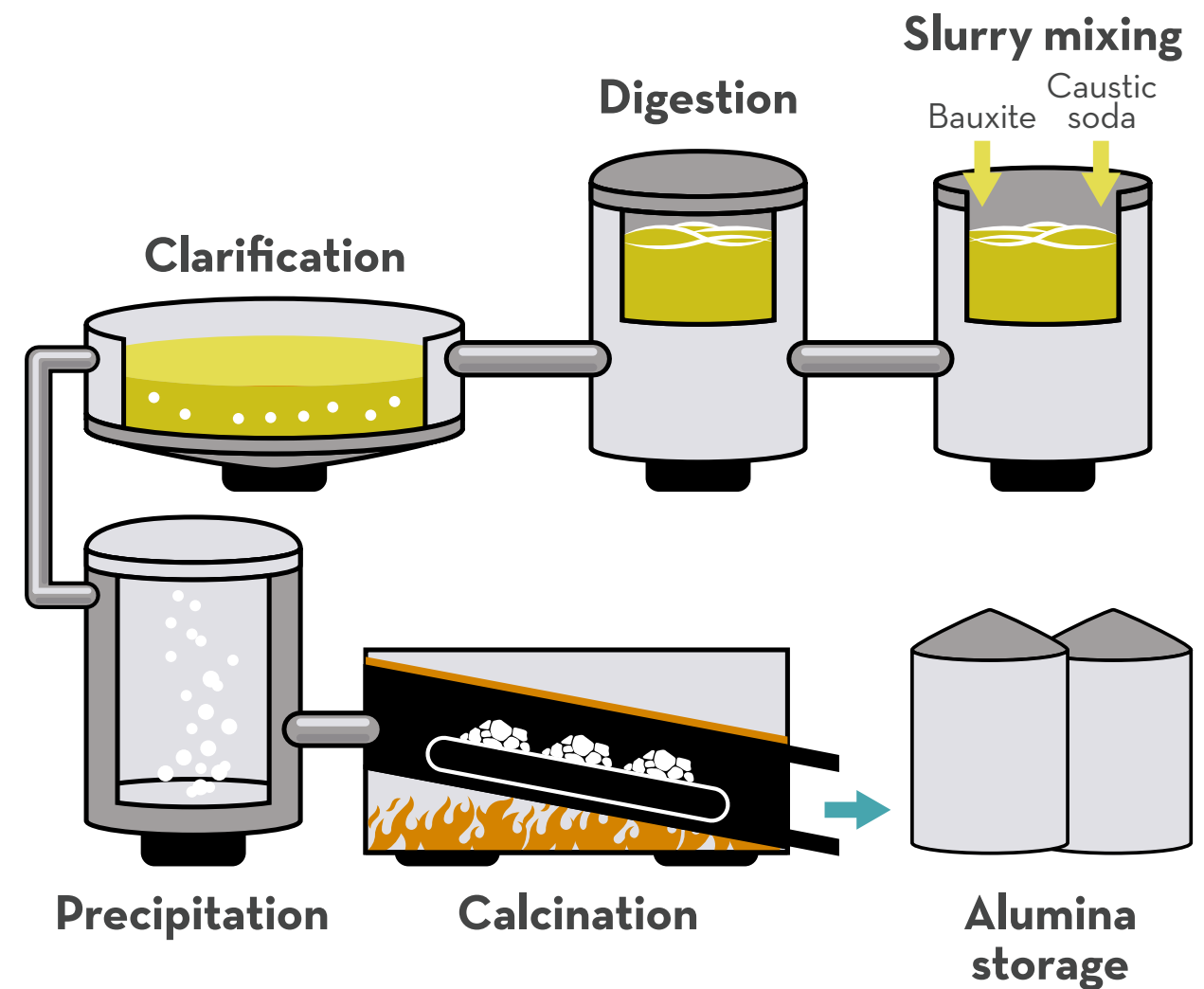
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1888

#2
Top 50
Moments

Discovery of Bayer Process

Developed by Carl Josef Bayer in 1888, the Bayer Process is the principal industrial and most economical means of refining bauxite to produce alumina. It involves four steps: digestion, clarification, precipitation and calcination. The process used today is practically the same as when it was discovered 100 years ago and is used to produce nearly all the world's alumina supply.



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Aluminium beverage cans production

Companies such as Coors Brewing Company, Kaiser Aluminium, Reynolds Metals Company and Royal Crown were key players in the early days of aluminium beverage can production.

The aluminium can was originally made with only two pieces – a body and an end – making it lighter and more recyclable than the three-piece steel cans. The first two-piece aluminium cans weighed approximately 85 grams – they now weigh approximately 15 grams.

c.1960

#3
Top 50
Moments



Aluminium recycled from scrap

The process of recycling aluminium involves re-melting the metal, which is less energy-intensive than producing new aluminium from bauxite. The global aluminium industry saw a significant increase in the availability of aluminium scrap from 1995. Global recycled aluminium production increased from just nine million tonnes in 1995 to 21 million tonnes in 2010, and then to 33 million tonnes in 2020.

1995



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1808

#5
Top 50
Moments

A new metal is discovered

Aluminium – a new metal was identified by the English chemist Humphry Davy around 1807-1808 and named after “alum” (“alumen” in Latin). Davy showed that alumina could be decomposed in an electric arc and reduced to an aluminium-iron alloy. However, he could not isolate the aluminium from the alloy.



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#6

Top 50
Moments

1969

Apollo 11 – man on the Moon

In July 1969, the Apollo 11 spacecraft landed on the Moon with astronauts Neil Armstrong and Buzz Aldrin. Aluminium was a critical material in the success of this mission. It was made of an aluminium honeycomb sandwich bonded between sheets of aluminium alloy. The Saturn V rocket that launched the spaceship was also constructed of aluminium due to its high strength and low weight characteristics.



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Inert anode: emission-reducing ELYSIS process is introduced

The production of aluminium at the ELYSIS Industrial Research and Development Center in 2021 marks a significant milestone – using a full industrial design at a size comparable to a small smelting cell in operation today. ELYSIS brings carbon-free aluminium smelting a step closer and aims to have its technology available for installation from 2024.

2021



Wright Brothers flight

The Wright Brothers made the first successful flight of The Wright Flyer in 1903 – heralding the start of the development of the aircraft industry being highly dependent on aluminium alloys. The Wright Military Flyer was sold to the US Army Signal Corps in July 1909 and became the world's first military aircraft.

#8

Top 50
Moments

1903

#9

Top 50
Moments

First extraction of aluminium

Danish physician Hans Christian Ørsted first extracted the metal by the electrolysis process in 1825.

1825





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China aluminium production reaches 50% of global total

China's primary aluminium production surged from around 16 million tonnes in 2010 to 26.5 million tonnes in 2013 and accounted for 50% of the world's total production. China's aluminium production continues to grow – 39 million tonnes in 2021, about 58% of total global production.

#10
Top 50
Moments

2015



#11
Top 50
Moments

1821

Discovery of aluminium ore

The ore was discovered by geologist Pierre Berthier in France in 1821. The rock was named bauxite after Les Baux, France, the area where it was found.

50
YEARS
1972-2022



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1980

#12

Top 50
Moments

Aluminium used in motor vehicles

Aluminium's share in the overall weight of an average car has constantly risen – from 35kg in the 1970s to about 152kg presently. Ford created a milestone by switching its F-150 truck body to aluminium and launching its Ford aluminium F-150 in 2015. The body was made from military-grade aluminium alloy that made the truck 700 pounds lighter and more fuel-efficient. The all-aluminium truck improved Ford's sales.



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Aluminium sector Greenhouse Gas Pathways to 2050 are launched

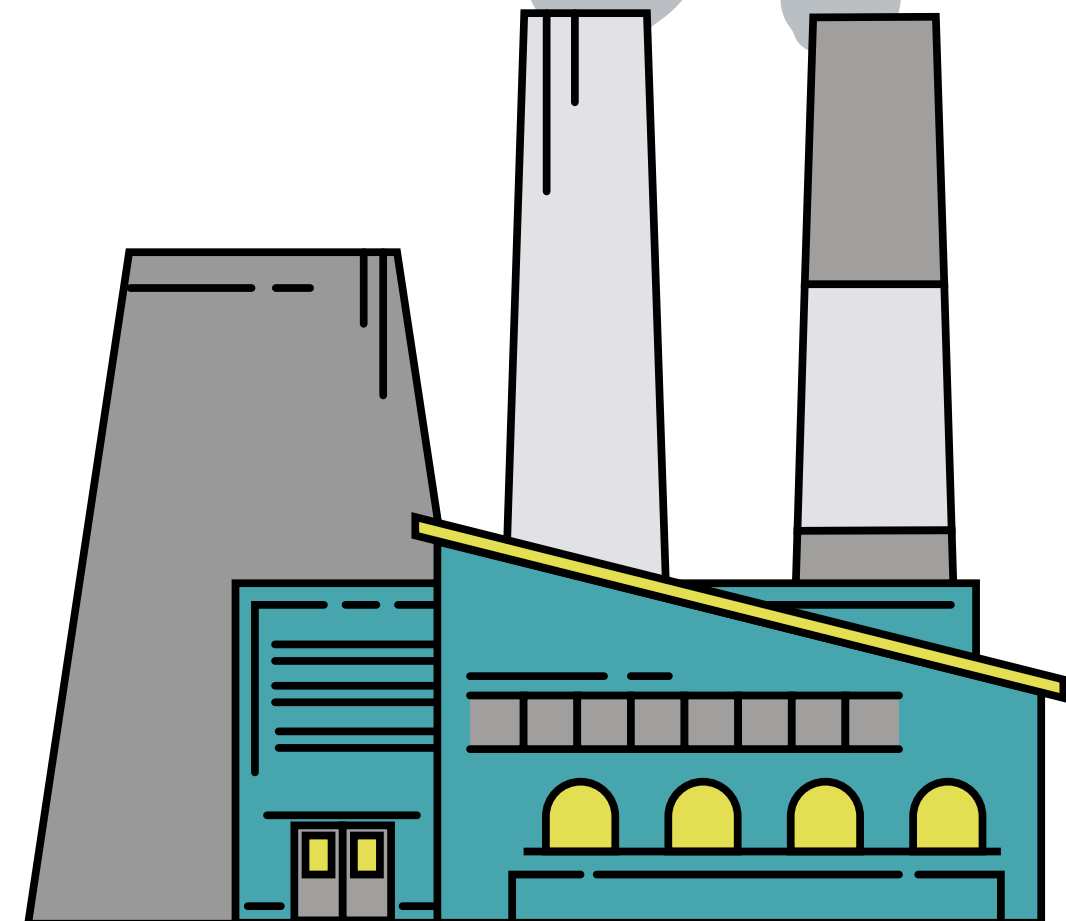
The aluminium industry set out three credible and realistic approaches to emissions reductions in line with the International Energy Agency's Beyond 2 Degrees Scenario. The pathways, formulated in 2021 and based on IAI unrivalled data and leading analysis of the global aluminium industry, are: electricity decarbonisation; direct emissions; and recycling and resource efficiency.

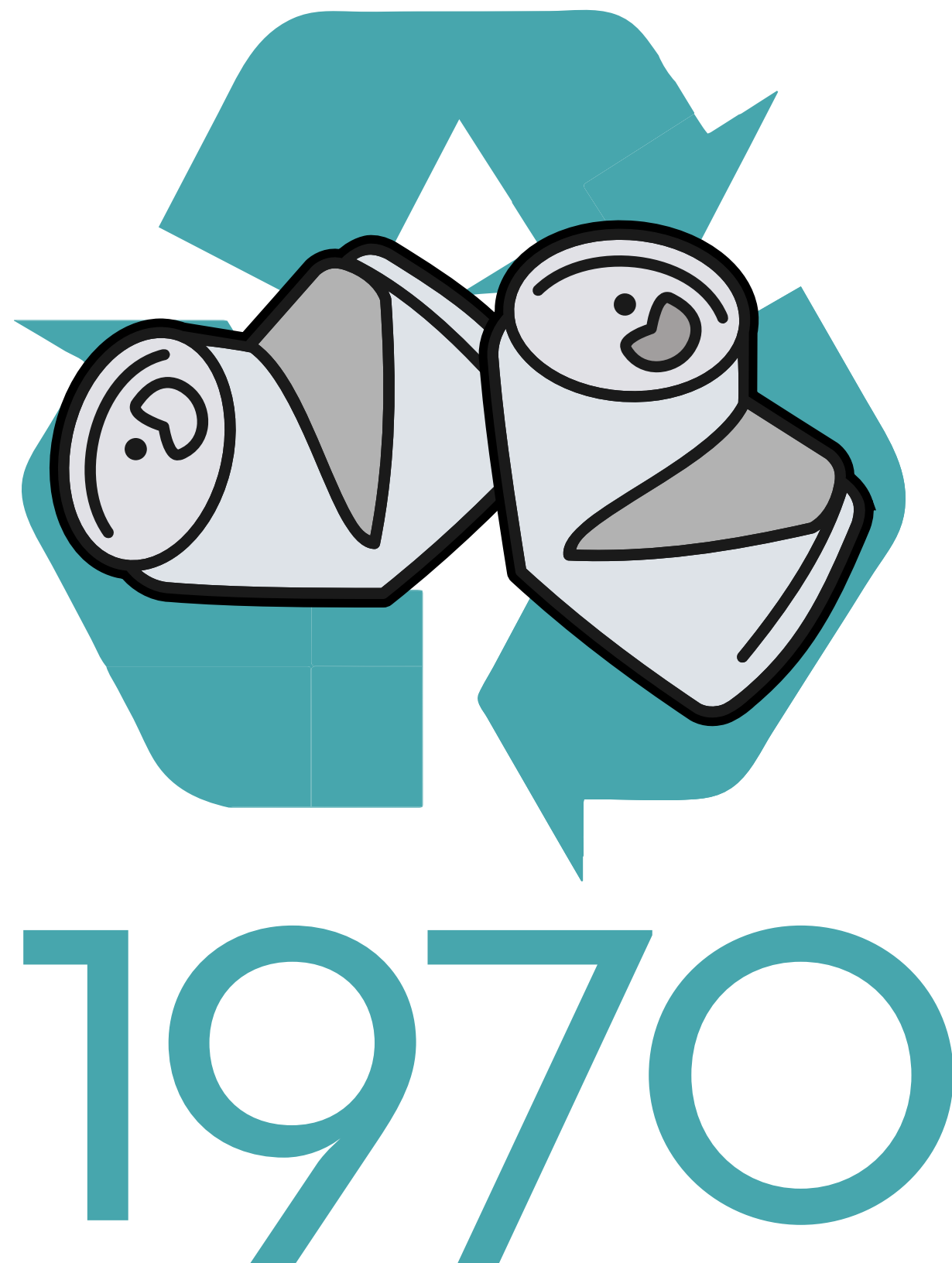


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2021

#13
Top 50
Moments





The creation of the closed-loop can recycling

#14
Top 50
Moments

Closed-loop recycling sees a used aluminium can recycled and put back on the grocery shelf as a new can in as little as 60 days. The first aluminium can recycling plants were built in Chicago and Cleveland, USA, in 1904. Gary Anderson, a 23-year-old, created the modern concept of reduce, reuse, recycle with his Mobius Loop logo in 1970, therefore providing the basis for closed-loop recycling of aluminium cans.



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The Eros statue

At almost 2.5 metres high, the Eros aluminium statue of Anteros, an Ancient Greek god, in Piccadilly Circus, London, became the first large piece of art made from aluminium. It was unveiled by the 1st Duke of Westminster in 1893.

1893

#15
Top 50
Moments



2003

#16
Top 50
Moments

Life Cycle Assessment (LCA) benefits aluminium

The aluminium industry was the pioneer in using Life Cycle Assessment methods to demonstrate sustainability credentials in the automotive sector. The global life cycle analysis of aluminium was first released in 2003. Considering 90%+ recycled content from post-consumer scrap and calculating that over the lifetime use on the road, aluminium-intensive cars turn out to be less energy-intensive than steel.



1911

#17
Top 50
Moments



First use of aluminium foil

The Swiss chocolate Toblerone became the first product to use aluminium foil in 1911.

To this day, Toblerone still uses aluminium foil for its products.

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1972-2022



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#18

Top 50
Moments

2021

First aluminium sustainability label using blockchain technology

Rio Tinto is setting a new standard in transparency and traceability for the aluminium industry with the launch of START. Launched in 2021, START helps customers meet the demand for consumer transparency around where and how the products they purchase are made. It provides information about the site where the aluminium is produced and covers criteria such as carbon footprint, water use, recycled content and energy sources.



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Aluminium contracts on the LME

The London Metal Exchange (LME) was established in 1877 to cater to the metal needs of British industries. LME has grown into the world's largest marketplace for non-ferrous metals – including aluminium. In 1978, aluminium contracts were introduced and account for about one-third of all contracts made on the LME.

1978

#19
Top 50
Moments



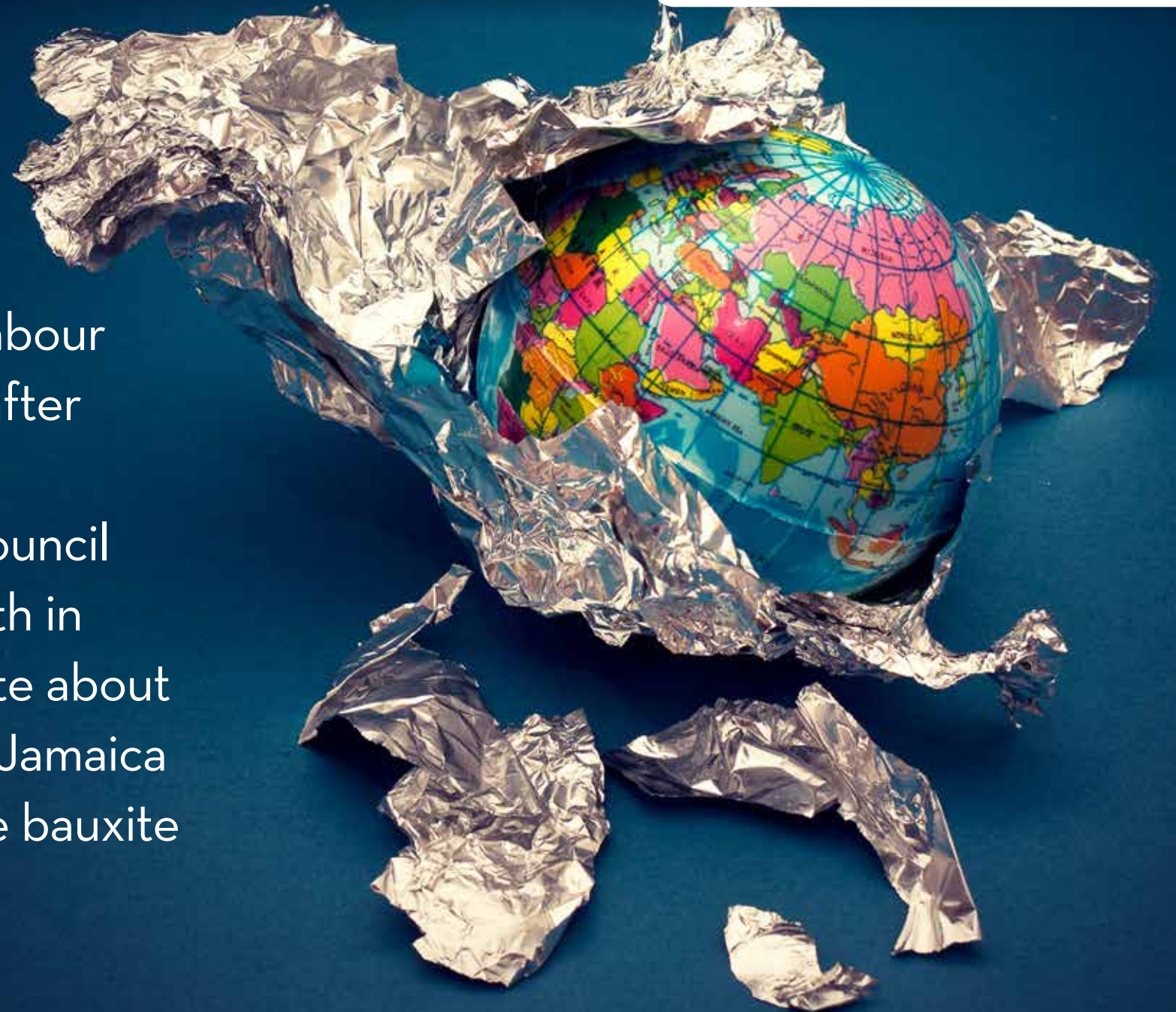
2010

#20
Top 50
Moments



Aluminium production goes global

Driven by better availability of raw materials, labour and energy sources, a shift became apparent after 2010 with the significant growth of aluminium production in China. The Gulf Cooperation Council (GCC) countries and India saw immense growth in primary aluminium; both regions now contribute about 15% of global aluminium production. Australia, Jamaica and Guinea gained prominence because of the bauxite reserves and as key exporters of the ore.



1954

Standardisation of alloys

A classification system for alloys created in 1954 included a procedure to set standards for existing alloys and a process to register new alloys. This progress expedited the development, manufacturing, selling and commerce of aluminium products and progress among producers and customers across the globe. The Aluminum Association, based in North America, created the designation system for wrought alloys in 1954. It was later adopted by the International Organisation for Standardization (ISO) in 1970.

#21
Top 50
Moments



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#22
Top 50
Moments

The development of automotive alloys – 6061

Aluminium alloy 6061 is a medium to high strength heat-treatable alloy developed in 1935, originally called Alloy 61s. It is one of the most extruded alloys known for its corrosion resistance and weldability. Its mechanical properties make it ideal for multiple applications in the transport, building and electrical sector.

1935

2000

#23
Top 50
Moments

PFC emission reductions

Total perfluorocarbons (PFC) emissions were reduced by 38% in the global aluminium industry (46% by IAI member companies) between 1990 and 2000, while primary production increased by 24%. Voluntary programmes have been effective in reducing PFC emissions. Further, emissions have reduced from 1.6 ton/tAl in 2008 to 1.2ton/tAl in 2018.



50 YEARS
1972-2022



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2005

#24
Top 50
Moments

Material Flow Analysis reveals that 75% of aluminium is still in use

Aluminium is one of the most recycled and recyclable materials used today and is tailor-made for a circular and sustainable economy. A global material flow model for the aluminium industry was available from 2005 and has become the basis for the fact that 75% of aluminium ever produced is still in use today due to the infinite recyclability and longevity of the metal.

1959

Invention of the pull-tab

#25
Top 50
Moments

Ermal Fraze designed the pull-tab in 1959, attaching an aluminium ring-pull lever with a rivet to a pre-scored wedge-shaped tab section of the can top, eliminating the need for a separate opener tool. It is most commonly used in cans.



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First operating smelter opens in Southern Hemisphere

The Bell Bay aluminium smelter is a unique part of Tasmanian and Australian history. Addressing the difficulties in importing aluminium during wartime, this joint venture became the first aluminium smelter in the southern hemisphere when it began production in 1955.

1955



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#27
Top 50
Moments

1915

First all-metal aircraft takes flight

The first all-metal aircraft was an experimental monoplane designed by German aircraft designer Hugo Junker. It was the Junkers J 1, also nicknamed the Blechesel, which means “Tin Donkey” or “Sheet Metal Donkey”.

2018

#28
Top 50
Moments

First ASI certifications are issued

The first Aluminium Stewardship Initiative Certifications for the Performance Standard and for the Chain of Custody Standards were issued in 2018. The ASI program continued to grow strongly during this and subsequent years.



Construction of the Empire State Building

Aluminium was used in New York's Empire State Building's construction, which was finished in 1931. The building's basic structure and components were completed using aluminium and the interior and lobby were finished with aluminium.

#29
Top 50
Moments

1931





Construction of Sputnik

The Sputnik satellite was constructed of aluminium alloys and was launched into space by the Soviet Union on 4 October 1957. Aerospace aluminium alloys are designed to deal with sub-zero and extreme temperature conditions.

#30
Top 50
Moments

1957

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Boeing Jumbo developed

The Boeing Aircraft Corporation, created in 1912, became a leader in developing the earliest all-aluminium alloy aircraft, including the B-314 in 1938 (among the early pioneering transatlantic flying boats), the B-707, in 1958, and the most iconic – the Jumbo Jet B-747 in 1969.

1969

#31
Top 50
Moments



Aluminium used in solar panels

Bell Laboratories produced the first efficient silicon solar cell in 1954. Since then, aluminium alloys have been a key material in the construction and structure of photovoltaic solar systems. Aluminium's lightweight and electrical conductivity makes it a preferable material to use.

2000

#32
Top 50
Moments





Scrap-friendly alloys developed

As the aluminium sector realised the environmental, low cost and carbon footprint advantages of recycled aluminium, recycling-friendly alloys started to be designed, manufactured and commercialised in the early 1970s. This enabled the use of high recycled content in final products with performance attributes comparable to that of primary-based alloys, such as beverage can sheets.

1970

1909

#34
Top 50
Moments

Invention of duralumin

Alfred Wilm, a German metallurgist, extracted an aluminium alloy just as lightweight, but significantly harder, more durable and elastic. Introduced in 1909, duralumin contained copper, manganese and magnesium.



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The development of inert anode technology

Inert anode is a technology that involves an anode that is insoluble in the electrolyte during electrolysis. Inert anodes do not get corroded and release oxygen instead of CO₂. This technology, developed in 2010, is a pathbreaker in lowering CO₂eq emissions during the aluminium smelting process.

Several companies are aiming to commercialise an inert anode electrolysis process in the next few years.

2010

#35
Top 50
Moments

The development of aerospace alloys - 7075

7075 aluminium alloy is an aluminium alloy with zinc as the primary alloying element and copper as secondary. It has excellent mechanical properties and exhibits good ductility, high strength, and toughness. Its high strength makes it suitable for high-stress situations such as aerospace applications. Japan's Sumitomo Metal secretly developed the 7075 in 1935. It was later introduced in 1943 by Alcoa before becoming standardised in 1945 for aerospace use.

#36
Top 50
Moments

1943

1985

Aluminium companies develop downstream

#37
Top 50
Moments

When the primary aluminium production base started shifting out of historic regions after the 1980s, the emphasis moved from producing standardised “commodity” aluminium to specialised products with greater value added – either complex aluminium-containing materials or downstream products. This led to the development of the downstream industry in the west and the emergence of a consumer market.



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1972

International Primary Aluminium Institute established

#38
Top 50
Moments

The IPAI was formed by leading aluminium producers in 1972. The initial aim was to publish credible statistics on global aluminium production and foster collaboration on key environmental issues and other shared purposes. Renamed the International Aluminium Institute (IAI) in 2000, the activities have expanded to include a broader range of statistics, collaboration on issues covering all aspects of sustainability, as well as promotion of the industry and its products.



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1910

First rolled product is invented

#39
Top 50
Moments

Robert Victor Neher took out a patent for the continuous rolling process and opened the first aluminium rolling plant in Kreuzlingen, Switzerland, in 1910.

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1972-2022



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1952

The first use of aluminium foil blister

#40
Top 50
Moments

The first alufoil blister was used in 1952, becoming an ideal packaging solution for pharmaceuticals due to its protective properties against external factors. The format has also found new applications over the years, such as confectionery and chewing gum.



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INDUSTRIAL
RESIDUE
ACTIVATION FOR
SUSTAINABLE
CEMENT
PRODUCTION

2015



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#41
Top 50
Moments

First EU-funded bauxite residue utilisation research

The EU funded bauxite residue utilisation research under the EU Horizon 2020 initiative. Funding supports PhD studies into waste valorisation and the ReActiv project exploring bauxite residue in supplementary cementitious materials.



Aluminium used in electrical cables

The first aluminium wires were used around 1880 in Chicago, USA, when the train station head noticed the outdoor copper wires were corroding and replaced several hundred metres with aluminium. Aluminium's high electrical conductivity makes it suitable for electrical engineering. It is lighter and cheaper than copper, making it more popular for overhead power lines.

1880

#42
Top 50
Moments

1980

Aluminium becomes a financial instrument

#43
Top 50
Moments

The aluminium market has benefitted from participants who are neither producers nor consumers of the metal. They are the financial participants who provide liquidity through market making or investing in the metal. Financial futures markets started operating in the 1970s and 1980s. Financial institutions and investors play a key role in influencing LME prices.



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1980

#44
Top 50
Moments

Aluminium exchanged in commodity trading

The dominance of historical producers has declined since the 1980s as new producers appeared and the producer-dominated pricing system declined.

The concentration of capacity among the big six started dwindling. Aluminium became an exchange commodity with standardised consumer attributes. The market price of aluminium is now determined by the official LME price, regional premium, and commodity mark-up.

50 YEARS
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1964

#45
Top 50
Moments

First aluminium closures developed

STELVIN developed the aluminium closure in response to cork taint and shortage of corks in some areas, offering excellent preservation and protection for bottled beverages.



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Work with indigenous communities

Australia's bauxite mining industry worked with the traditional owners of the land for many years. In 2001, 11 Traditional Owner groups entered into an Indigenous Land Use Agreement over the mining lease areas with bauxite miner Comalco. The Western Cape Communities Co-Existence Agreement resulted in many changes in bauxite mine operations, such as the 25% indigenous employment rate at Weipa, one of the world's largest mines.

2001

#46
Top 50
Moments





50
YEARS
1972-2022



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Development of 500kA cells

The 500kA pot was a significant milestone in improving the prebaked cells technology, which raised potline amperages by 900% to 500kA from the 1940 vintage 50kA cells. Aluminium Pechiney designed and built the first 500 kA pot in the year 2000 and perfected the technology over the following two decades.

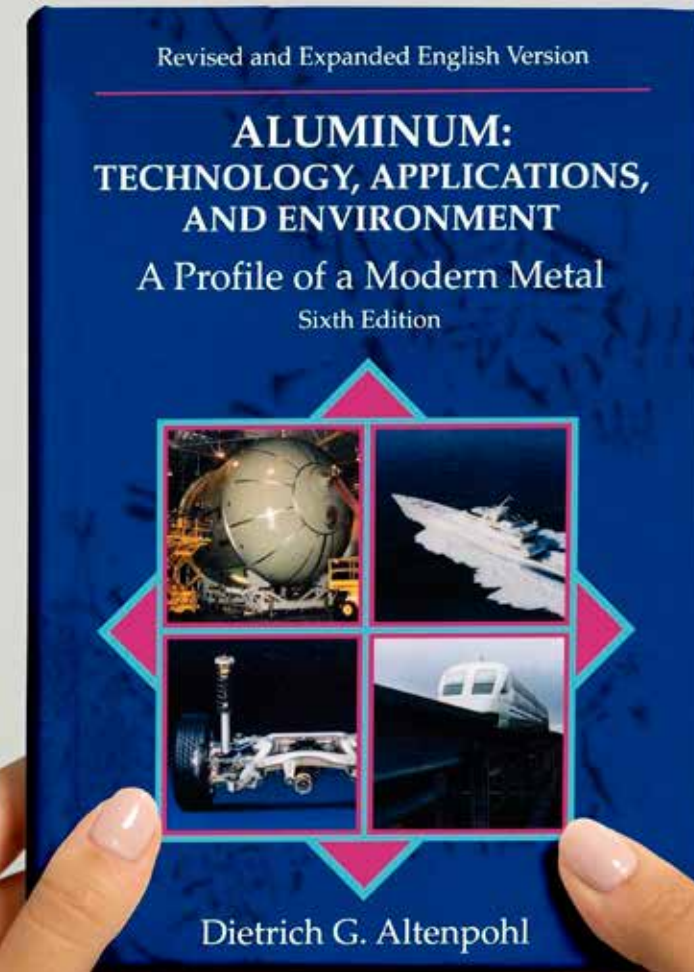
#47
Top 50
Moments

2000

#48
Top 50
Moments

The book **Aluminium: Technology, Applications, and Environment** is published

Authored by Dietrich Altenpohl, and jointly published in 1998 by The Aluminum Association and The Minerals, Metals and Materials Society, this book played a critical role in communicating the advantages and benefits of aluminium and its alloys as engineering materials. Dr Rodney Hannemann notes in the Forward that it serves as reference for years to come for the use of aluminium and its alloys in numerous applications.



1998

2014

#49
Top 50
Moments

Orion spacecraft is test launched

NASA's Orion MPCV is a new spaceship for humans designed to visit destinations such as the Moon and Mars under a NASA plan called Artemis. The structural backbone of the crew module is made of an aluminium-lithium alloy, which gives the body strength while reducing weight. This aluminium alloy spaceship was test-launched in December 2014 and Artemis successfully launched in November 2022.

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1972-2022



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Creation of the Washington Monument



Completed in December 1884, the Washington Monument featured a top made from a nine-inch aluminium pyramid. The structure was made of 100 ounces of solid aluminium that protected the monument from lightning. The pyramid was the largest piece of aluminium to be used anywhere during that time.



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1884

