ALUMINIUM CHAMPION MATERIAL FOR BUILDING AND SUSTAINABLE CONSTRUCTION
THE PICTURE OF THE CURRENT SITUATION: PROSPECTS AND OPPORTUNITIES

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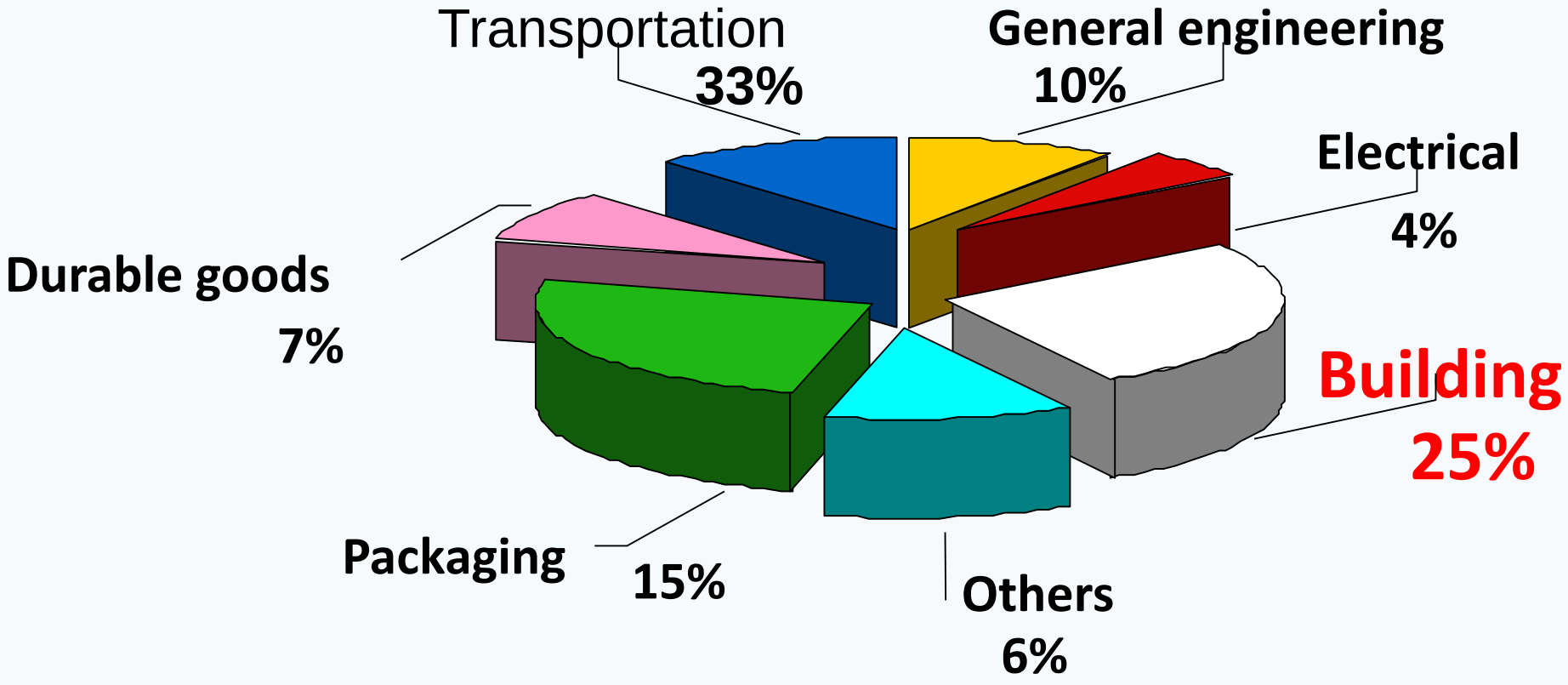
Aluminium is undoubtedly the champion material for use in construction and sustainable building, in fact today as a final destination it is the second largest sector of use of light metal worldwide

courtesy Metra

Engie Headquarters
Milan - Italy
DESIGNED BY - Park Associati S.r.l.

The European construction industry employs today around 25% of the overall total of aluminium used, which is currently about 13.5 million tons including rolled, extruded, drawn, forged, foundry castings and pressure diecastings, thus making this final destination the second largest segment of use of light metal and its alloys also in the old continent



USE % OF ALUMINIUM IN EUROPE

The role of the light metal has developed in parallel with the deeper knowledge of the advantages of its products, generally characterized in comparison to other materials from a better ratio between weight and resistance, indestructibility and recyclability, economic competitiveness, high aesthetic value and simplicity of processing and finishing.

low volume density of 2.7, one third of steel
good ratio weight /resistance
indestructibility and recyclability,
economic competitiveness compared to other materials
good toughness and corrosion resistance
high aesthetic value and simplicity of processing and finishing
excellent shape capacity
non combustibility and thermal conductivity
champion of recyclability and ecosubstainable

The growth was not an easy path, because until the middle of 1900our metal was considered, with few courageous exceptions, a poor, banal material, without its own appeal and personality.

One of the first applications
of aluminium window systems:
the Montecatini Building
in Milan by Gio Ponti, (1935)

Today it is consolidated the fact that aluminium is beautiful, that reflections, shapes and the colors of the light metal suggest to designers and architects new balances between aesthetics and technical contents, new solutions and new effects, also the result of a new and deeper knowledge of the properties and characteristics and therefore of the true potential of aluminium alloys

courtesy Metra

Warsaw Trade Tower, Varsaw

We say aluminium, but in reality the world of light metal is made up of a great variety of its alloys; aluminium, in its original form of raw material, is a very ductile and moderately resistant metal, suitable for definite uses; thanks to the addition of alloying elements in modest percentages, such as copper, magnesium, silicon, manganese, zinc, and thanks to suitable production processes, it is possible to modify the physical and mechanical properties of the basic light metal to meet the needs of a large number of applications with a large number of alloys; light alloy parts and components are found everywhere in building and construction: in roof and wall cladding, windows and doors, shading systems, cladding panels, space frame structures, stairs and railings, roof structures, in greenhouses and verandas, in air conditioners and in heating and cooling systems.

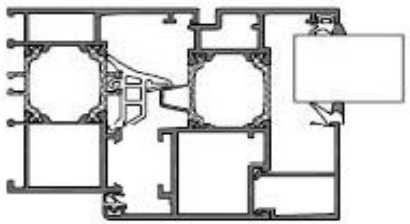
ALUMINIUM ALLOYS FOR EXTRUSIONS AND ROLLED PRODUCTS MAINLY USED IN BUILDING & CONSTRUCTION

	SECTORS	PRODUCTS	ALLOYS ROLLING	ALLOYS EXTRUSION
BUILDING	ROOFING	PROFILED METAL SHEETS	3003-5052	6005A-6063
	PANELS	ALU-STEEL AND MORE	1200-8079	6060
	FURNITURES	WALLS, PANELS, INTERIORS PARTS	5052-3003	6060
	STRUCTURES	ARENA'S, ELICOPTER DECKS, ALUMINIUM STRUCTURES		6063-6005A-6082
	FLOORS	PANELS, STAIRS, MARINE	5052-3003	6082-6005A
	BRIDGES	VARIOUS		6082-6005A
	WINDOWS	VARIOUS	3003-3105	6060-6063
	COURTAIN WALLS	SKY SCRAPERS, BUILDINGS	3003-5052	6063-6005A
	VARIOUS	COVERS, SOLAR TENTS AND MORE		6060

We have a range of materials that ensure interesting strength / weight values, with good toughness, durable and suitable for semi-structural and structural applications.

This almost unique flexibility and shape capacity is particularly evident in the extrusion sector, which allows the creation of profiles with an almost infinite range of configurations.

The shape capacity is an excellent creative opportunity in the field of window systems and facades where the shapes of the extrusions are designed and made with special cavities, and grooves to accommodate joints, gaskets, bars for thermal cutting and other accessories



Horizontal Section

Features

- 6063-T5 Aluminum Alloy Frame
- Frame Depth 65 mm [2 ½"]
- Max Glass Thickness 55 mm [2 ⅛"]
- Weather Stripping: EPDM Gaskets
- Thermal Barrier: Polyamide
- Heavy Duty Hinges
- Multi-Point Lock System
- Durable Components

Benefits

- Acoustic Insulation
- Thermal Insulation
- Quiet and Smooth Closing System
- Easy Maintenance

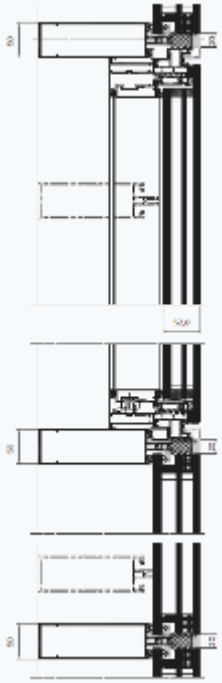
Applications

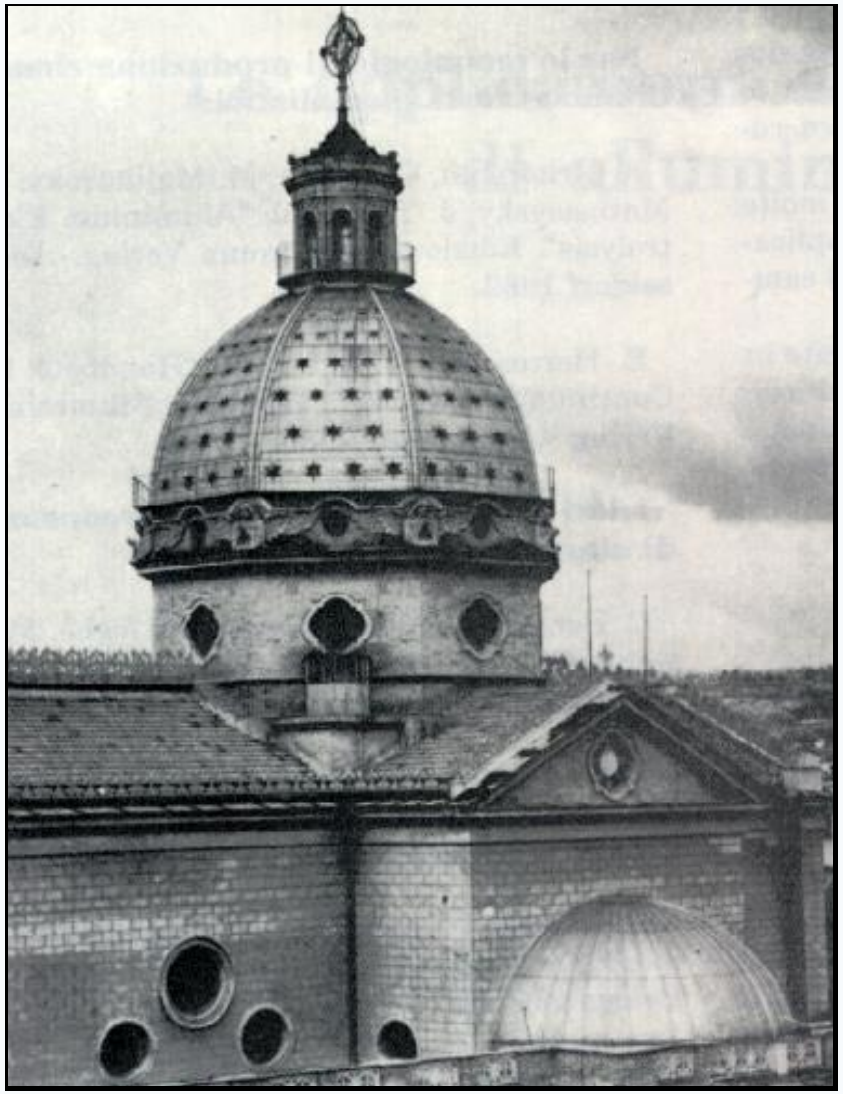
- Doors
- Fixed Windows
- Operable Windows

Technology

1. Sealed Units from 25 mm to 55 mm [1" - 2 ⅛"]
2. Heavy Duty Hinges
3. Glass-Stop
4. EPDM Gaskets
5. Polyamidic Thermal Barrier
6. Main Gasket
7. Sash Gasket
8. Tubular Heavy-Duty Framing System 65 mm [2 ½"] Deep
9. Painted or Anodized Finish

courtesy Metra





The surface treatments of aluminium makes the surface of the metal easier and simpler to clean, moreover improving the very well known excellent natural durability and good resistance to corrosion. The dome of the Church of San Gioacchino in Rome is the testimony of the qualities of the aluminium for construction, it was covered with aluminium sheets in 1897, and appears in excellent condition even today; this mythical realization anticipates the future decisive role for the light metal in redesigning buildings.

The first application

1897

The celebrated dome of the Church of San Gioacchino in Rome, roofed with aluminium sheets

Equally valuable among the properties of aluminium is the natural insurance provided by its protective oxide surface film, which allows it to resist the wear of the elements even without special surface protection; the great majority of AL alloys can be supplied painted or anodized in a wide range of colors, obtaining any type of optical effect and tactile finish to meet all the decorative needs of designers. This feature is a specific distinctive element of aluminium and its alloys in architecture that generates creativity and customization in a segment where the flatness and uniformity of other materials has dominated for years .

courtesy Sepal

Aluminium and building for recycling, ecostenibility and circular economy

And finally, our metal is easy for recycling, so that ecostenibility and circular economy are natural characteristics for which old and new aluminium scraps can be reused almost indefinitely without appreciable degradation of quality and performance, with an energy requirement in the remelting processes on average 5% compared to the production of electrolytic primary. Recycled aluminium already contributes over 30% to the raw metal requirement in Europe. For this our material is recognized as a champion of eco-sustainability, the growth potential in the recovery and recycling of light metal used in building and construction is realistically very interesting, all this makes the use of architectural aluminium even more attractive within the framework of a new green industrial policy oriented towards the circular economy.

Significant aspects and experiences in Italy of aluminium in building, construction, architecture. The role of training, communication, and close cooperation on the territory between the **associations** of the supply chain.

Italy is a large user of aluminium for building, a pioneer in the development of aluminium door and window systems since the 1960s; according to the data of the UNICMI, this market absorbs in Italy a large quantity of extrusions for this application characterized by high quality and high aesthetic value, appreciated by architects and engineers.

*Unione Nazionale delle Industrie delle Costruzioni Metalliche dell'Involucro e dei serramenti

The Pirelli skyscraper (1956) by Gio Ponti, recently subjected to a conservative restoration preserving all the dimensional, architectural and functional characteristics.

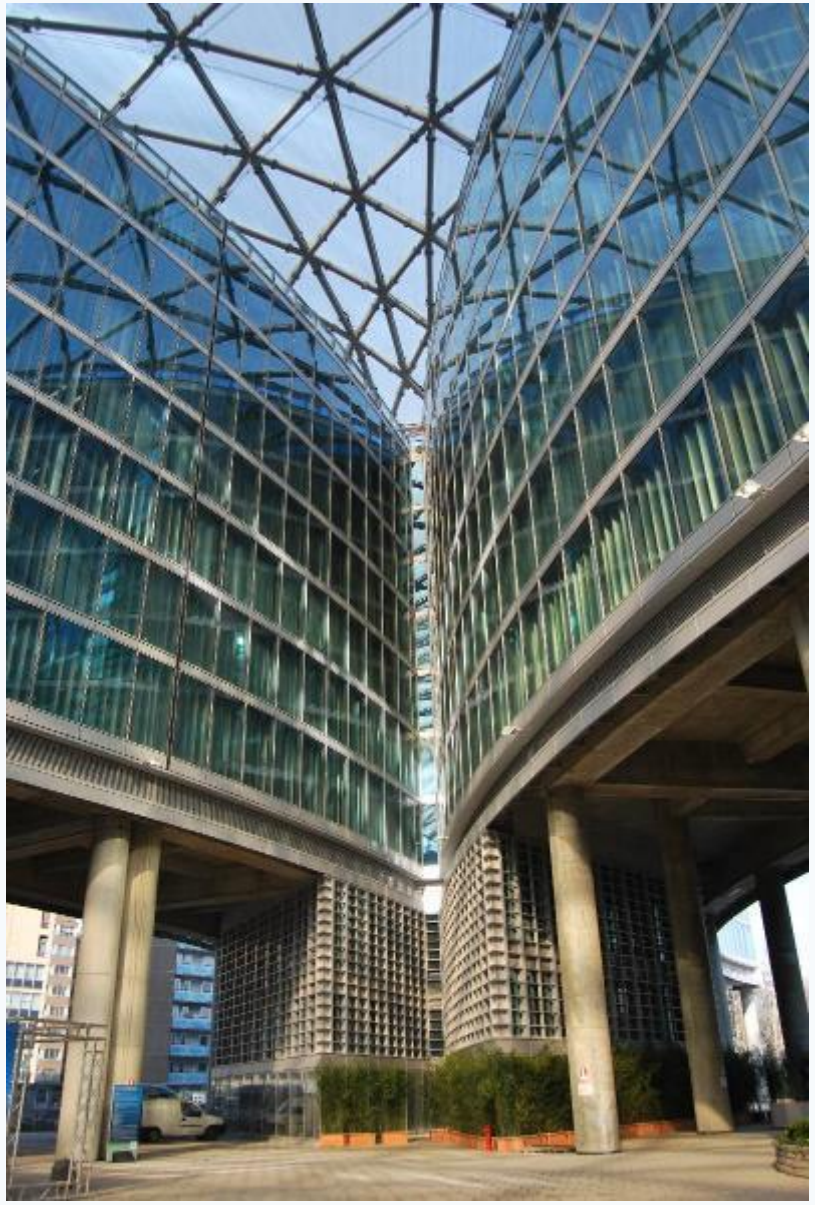
The Italian market for aluminium frames, doors and windows has maintained its position very well in recent years compared to the competing materials PVC and wood. To underline the importance of this area of use, already in 1991 one of the main Italian extrusion companies, Metra, decided to launch a large competition on architectural applications with its own systems for doors and windows, the International award "Concorso Sistema d'Autore" today renamed "Concorso Internazionale D'AUTORE", a competition thirty years old created to testify the special and valuable prerogatives of aluminium in the construction of building and architectural items. The various editions of the competition have so far recorded the participation of over 6000 architectural creations on windows, doors, curtain walls, shading systems,solar and photovoltaic panels, movable walls of public and private buildings for homes and offices or industrial, economic and monumental, new or restored, awarding more than 700 works

Courtesy METRA

We report in the following an some examples of the items presented in the years to thr Concorso Internazionale Metra because they fully expresse the great value of an initiative set up at the beginning of the 90s. It was addressed with a decisive pioneering imprint to a wide target, from large design and construction studios to the smallest ones manufacturers of doors and windows, it attracted hundreds of participants with the involvement of the entire supply chain, from residential homes to large complexes, from new buildings to recovery and refurbishment buildings, from the precious renovations of large historic buildings to the replacement of the frames of modest single-family houses.

Pyramide du Louvre in Paris

Courtesy METRA



Courtesy METRA

Headquarters of the Lombardy Region in Milan

Design engineer for Pei Cobb Freed & Partners, Caputo Partnership and Sistema Duemila of Milan

Courtesy METRA

The European Parliament in Strasbourg

Design : Architetture Studio

Courtesy METRA

Rebuilding of the Ara Pacis in Rome, a Roman monument built by the emperor Augustus in 9 BC

Courtesy METRA

Examples of restoring of old industrial buildings in Italy

Courtesy METRA

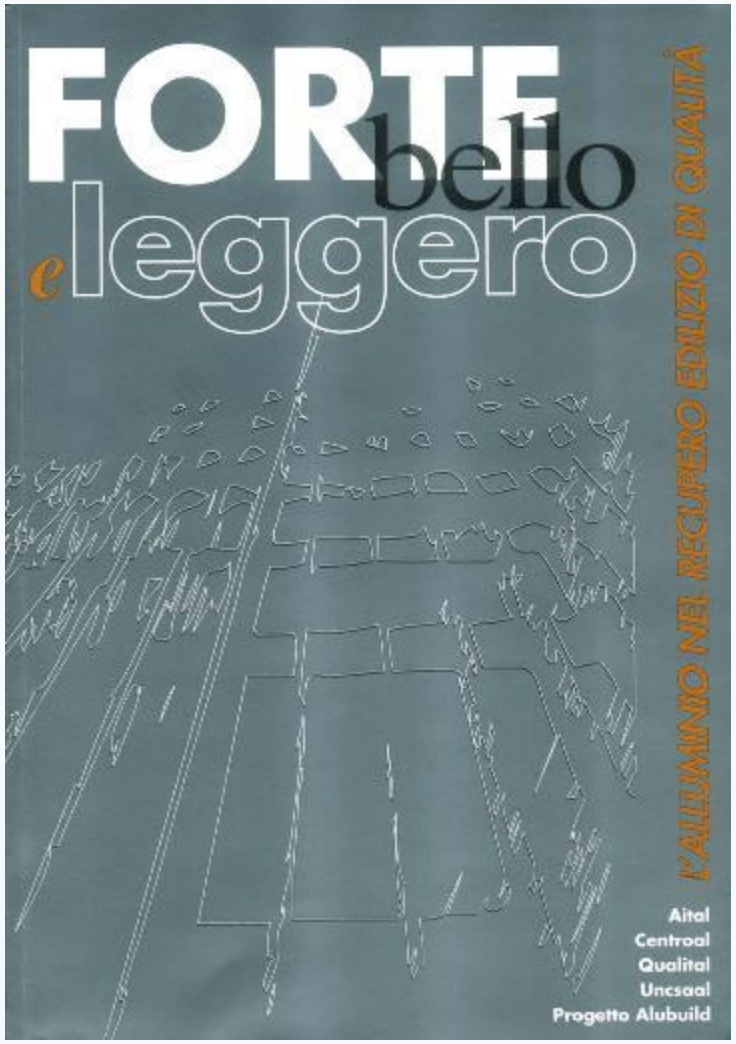
Examples of restoring of private residences in Italy

Courtesy METRA

Examples of restoring of private residences in Italy

The Metra initiative "Concorso Sistema d'Autore" had, and continues to have, great success in terms of image and concrete results in the market. It was set up right from the start with an adequate communication plan aimed not only at the supply chain of technical workers but also extended to the world of end users, to public administrations and to the academic world of schools and universities. It really offered an excellent knowledge to university professors and students of architecture and engineering interested in concrete aluminium projects, demonstrating that the aluminium market holds a great potential, if faced with the right perspective, with the research for new shape solutions, new alloys and new productive and design technologies.

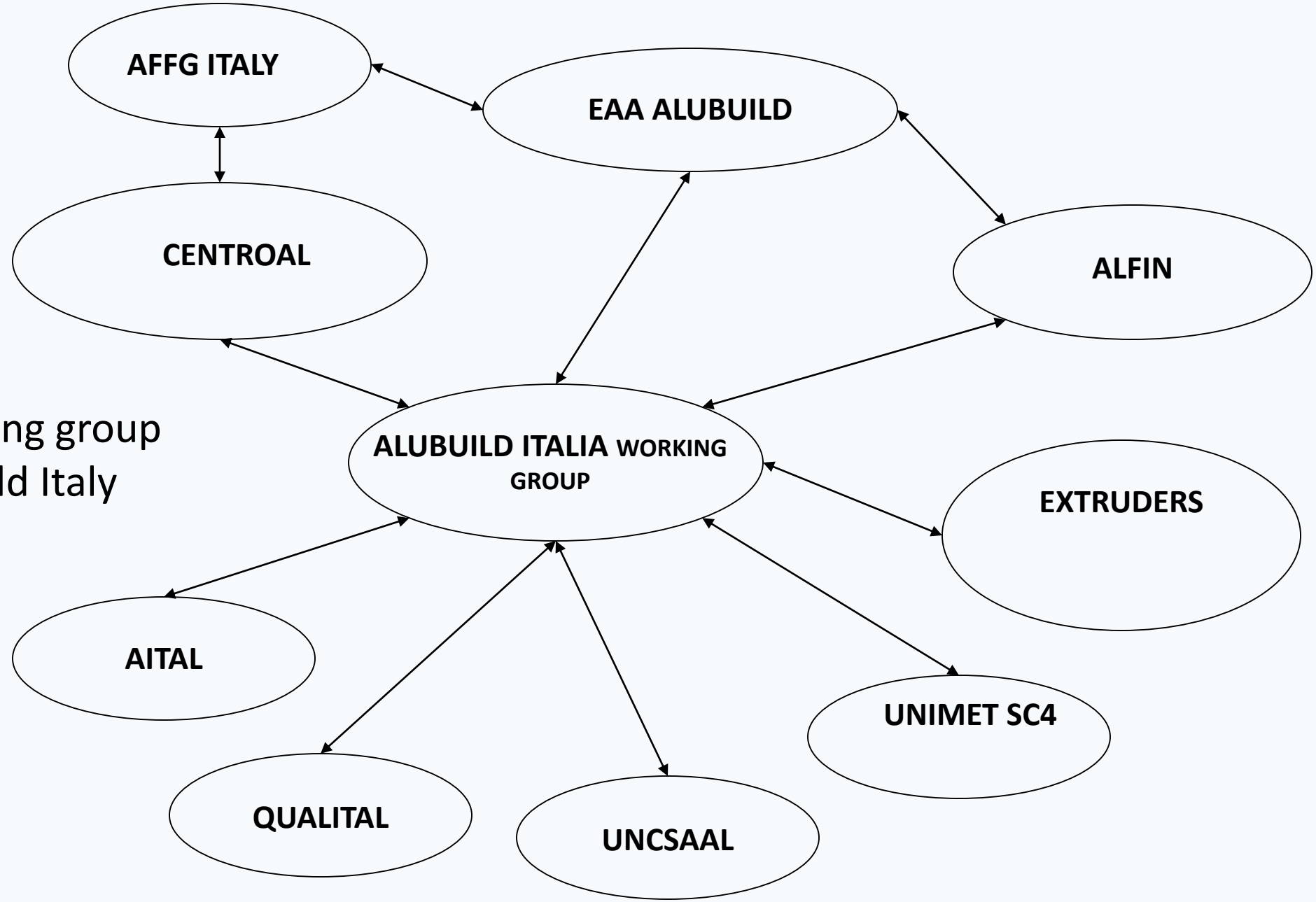
The European Parliament in Bruxelles



The book “BEAUTIFUL, STRONG AND LIGHT” by Alubuild Italia and the National Associations Centroal, Aital, Qualital, Uncsaal. (2004)

A further example of initiative set up in Italy to develop a correct aluminium path in construction and architecture was the close collaboration at the beginning of the 2000s between the Italian trade associations connected to the aluminum supply chain Aital (Surface Treatments Aluminum), Centroal (Production and aluminum transformation), Qualital (aluminum certification) and Uncsaal (manufacturers of aluminium windows and facades, now UNICMI), joined in the ALUBUILD project, with the support of Edimet and the A&L magazine. The joint project dedicated to Aluminium in Quality Building Recovery was finalized with a volume published by Uncsaal entitled "STRONG, BEAUTIFUL and LIGHT - Aluminium in High Quality Building Recovery ", printed in tens of thousands of copies and sent to architects, designers, builders, window makers, technical firms, public administrations, schools and universities.

The working group of Alubuild Italy (2006)



The communication campaign of ALUBUILD achieved excellent results in documenting and witnessing the success factors of light alloys in construction and architecture in the very delicate sector of high-quality recovery: the intrinsic qualities of the material, the innovative creativity of the designers, the continuous development of transformation and processing, finishing and assembly. In those years, building and construction was the main final use of aluminium in Italy, roughly half of the extrusions produced were destined for buildings.

FORTE BELLO e LEGGERO
Aluminium for high quality refurbishment

Finally, we also recall the important commitment in Italy dedicated to the specific area of structural applications of aluminium and its alloys in building, construction and architecture, with the ALUPROGETTO initiative which started within Metef 2006, with the support of the AFFG initiative, Aluminium for the Future Generations of the European Association EAA and the Italian Centroal, together with Uncsaal and the Italian metallurgy association AIM, and with the communication support of the A&L Magazine. The mission of Aluprogetto was to debate between the various protagonists of Metef, with particular attention to the world of engineers, architects and designers, highlighting the extraordinary possibilities offered by aluminium alloys in the field of structural applications.

Aluprogetto was an international competition for structural aluminium constructions, dedicated to four thematic sections of specific application interest:

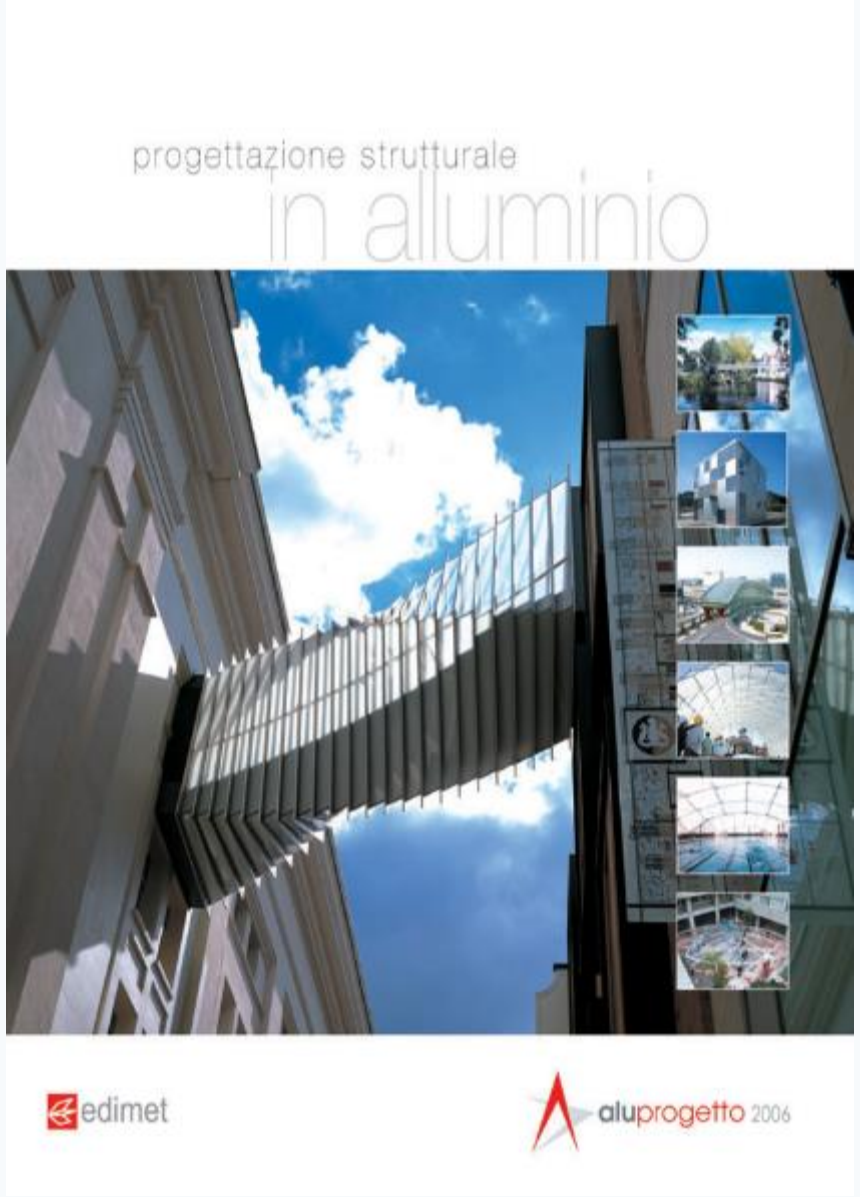
- bridges and walkways;
- civil and industrial structures (buildings, warehouses, hangars, stairs, platforms, self-supporting facade envelopes);
- mobile structures for temporary use;
- elements of urban furniture with structural value.

It was a great success with international participation and with over one hundred projects from all over the world and the involvement of technicians, engineers and designers who daily deal with light alloy design and related processing and finishing technologies. With 10 achievements from Great Britain, Holland, Japan, Spain, Italy, Belgium, awarded by the international jury, and two special reports, (SLIDES 25-30) the Aluprogetto competition marked the starting point for a series of annual courses on structural aluminium organized by the Italian Association of Metallurgy in collaboration with Metef.

aluprogetto

A&L

More and more aluminum structures will be produced through the efforts of architects,
engineers and builders, given that day by day increases anywhere the technical
knowledge of the unique advantages of our material



aluprogetto

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Self supporting staircase
air control tower at Barcelona
design engineer for
Mauro and Giacarlo Giuliani

Ecoms Pavillon, a flexible aluminium
applications in building structures
Design engineer for Toshihiko LiJima

aluprogetto

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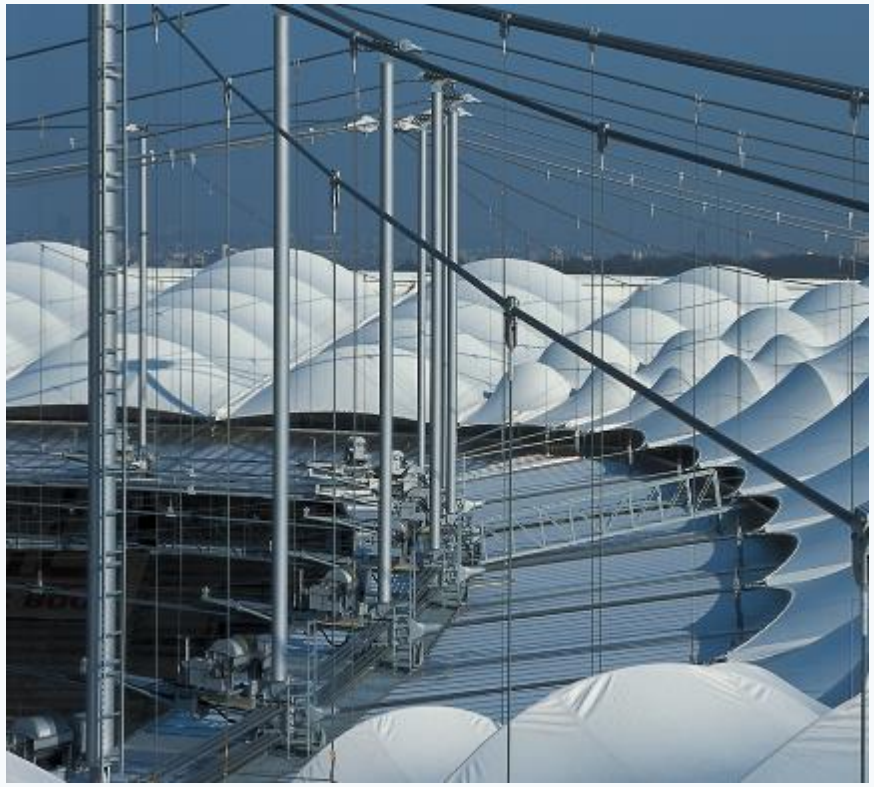

Waldstadium in Frankfurt. To fasten the membrane to the external roof,
Corus Aluminium Section Technology of Vogt
supplied special bar shaped aluminium profile fasteners.
More than 27 tons of these profiles are employed.

Inside view of the Dome - There are subway station and event plaza under the center of the ground floor

"MOTENASI" DOME in KANAZAWA Station plaza covered by Alminium Structure 2

Design engineer for R. Shirae, architect, and M. Saitoh engineer

aluprogetto

A&L

All the projects selected by the jury, are collected in the Edimet book “Structural Design in Aluminium” sponsored by EAA

FINAL COMMMENTS

Beautiful, strong and light is perhaps the most convincing synthesis of the success of aluminium in construction and architecture, eco-sustainabille, the material of the future, it saves energy and resources, it is recyclable, environmentally friendly, competitive and symbol of the circular economy.

- Buildings are long lasting goods, and in this area aluminium has excellent opportunities of further development.

- The qualities of light metal in building are technical, economical, environmental and social, sustainability is the target, and recycling is a key aspect of the sustainability, aluminium is and will be recycled, aluminium recycling is saving energy and resources, aluminium is the sustainable solution in building.

- Our metal is confirmed as the quality material for architectural and construction uses, because it ensures excellent performance in terms of resistance, aesthetics, safety, durability.

- The experience of the past years in Italy for the technical information and the promotion of the various aluminium uses in construction and architecture has been exciting and very positive, due to a strong convergence created between the associative domestic world related to the light metal to make convincing shared communication on potential final consumers, on company technicians, on universities and on the public administrations.

- Information and communication is strongly required, the capacty of architects and designers to specify aluminium is proportional to the extent that they can understand its properties and modes of application

- Continuous lobbying too is required, because it is difficult to convince private home owners and public proprietors of the energetic benefits of windows suitable for passive low-energy buildings, permanent lobbying to prepare and promote legal standards is a must for window renovation do work.

- After Covid there is a need to rebuild, the sector of construction had long stops, now we have the conditions to start again, we must recreate the confidence and the enthusiasm of a few years ago to promote and use the light metal in construction, and for this we will also have to return to the principles of creativity and innovative solutions that have made it possible to achieve great successes, concentrating all available forces in research and development to find original technologies, always being one step ahead.