

Aluminium empowering the Green Building Revolution

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Aluminium in the Construction Industry – History

Aluminium has been at the core of buildings for almost a hundred years and aluminium alloys have been applied in the construction of residential and commercial buildings. Being the second most used metal in the world, Aluminium's role in the construction industry is very vast and diverse. The construction industry has a heavy dependence on aluminium not just in the structural components but also in the exteriors making it a preferred metal for buildings. From doors, windows, stairs, floating ceilings to even roof sheets, formwork aluminium has been a very key ingredient in the creation of buildings. The construction industry accounts for 22 percent of the global aluminium consumption, which establishes how aluminium is increasingly becoming a favored metal for builders all over the world. 1

The Green Building Revolution – Concept and Emergence

The construction industry was taken by storm with the start of Green Building revolution. This revolution has changed the way, builders and architects conceptualize buildings. Green buildings are designed to minimize the overall impact of construction on the natural ecosystem. A green building structure is defined as a structure that is environmentally-responsible and resource-efficient throughout its life-cycle. Some of the key features of Green Buildings include consumption of non-toxic/recycled material, optimal use of natural resources, increased use of renewable energy, minimum interference with the landscape, indoor air quality. The revolution started in the USA when people realized the need for a more sustainable way of creating structures and buildings. With humans impacting the earth drastically, there was a dire need to build more energy-efficient and green structures to minimize the impact it had on the environment and the people. To make it a standardized norm, LEED (Leadership in Energy and Environmental Design) came into play. This provided a platform to measure green structures and was soon adopted by countries all over the world. India too adopted this change and the Green Building Revolution became an integral part of India's construction industry. Currently, 2.2 billion square feet of the green building footprint is in India. 2

Aluminium's role as a sustainable material in the Green Building Revolution

Aluminium has been empowering the green building revolution due to its unmatched properties. The fight against pollution and



environmental damage and the race to energy efficiency have led to aluminium becoming a green material. Given below are a few of the properties of aluminium that makes it a perfect match for sustainable architecture.

Strong and durable: Aluminum's strength makes it the first choice for structural frameworks. Being lightweight but strong and long-lasting is an added benefit of aluminium. Its high strength to weight ratio makes it a preferred metal in sustainable structures. Its strength supports the high glass spans thereby making it a strong foundational material. The durability of aluminium increases the life span of aluminium and minimizes the constant need for up-gradation.

Corrosion-resistant: Aluminum's longer life span can also be attributed to its property of being corrosion resistant. This reduces the need for regular maintenance and is hence used not just in the foundation structures but in the intricate interiors as well. With further surface treatments, aluminium can minimize the harmful impacts of corrosion on people as well as the environment thereby making it a green material.

Reflective: Aluminium's main role as a green material is to reduce the energy emission and make the building more energy-efficient. Aluminium is natural when it comes to saving energy. Ninety five percent of the natural light is reflected by coated aluminium roofs making the building energy efficient. The metal maximizes solar energy during winters and minimizes it during summers due to its natural properties thereby bringing in a cost efficiency when it comes to heating or cooling the building. A key trend that we see in Green buildings is the emergence of cool roofs. A roof that absorbs less heat and reflects sunlight more is called a cool roof. Aluminium coated cool roofs are a key application in green buildings.

Malleable & Light: This unique property of aluminium is the reason it is increasingly used to make architectural wonders. With the ability to be bend into any shape, form and size, this metal has found its way into green buildings to ensure weight decrease as well as extrusion into desired requirements in the form of windows, curtain walls, etc. Apart from just the exteriors, aluminium also enhances the interiors of the buildings by using extruded aluminium in windows and doors. These intricate shapes allow for maximum flow of air thereby improving the indoor air quality.

Recyclable: Seventy five percent of the aluminium produced across the world since the late 19th century is still in use today.³ One of the key properties of aluminium is its very nature of being recycled, recovered and reused. Green buildings are always on the look-out for resources that minimize the burden on the planet. The recyclability of aluminium makes it the apt choice as a sustainable material. The recycling rate pertaining to the construction industry is around 92-95 percent.⁴ This property of aluminium saves the energy and cost of producing the metal again to meet the world's construction requirements.

Use of Aluminium products in a Green Building

The above-mentioned properties of aluminium make it an excellent material for green buildings. It optimizes the energy efficiency of a building without comprising on the quality of the building. The applications of aluminium in these green buildings are plenty. Aluminium in its various forms enhances solar efficiency and minimizes air leakage through aluminium fenestration. Fenestration refers to the

usage of windows and facades in the building and wall envelopes. Through advanced technology, aluminium fenestration is now a key trend in the manufacturing of green buildings. Aluminium in products like wind turbines, insulation systems and thermal systems enable the generation of energy that can be used in the green building itself or taken back to a power grid for future consumption

Conclusion and Way Forward

With the industry becoming more environment-friendly, the need for aluminium in green buildings is only set to grow further. The Green Building Revolution has transformed the way buildings are now imagined and created; aluminium has a key role to play in this journey. This positive shift in the industry is paving way for creation of sustainable structures that reduce the impact on the environment.

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