

Sustainable construction: a new approach

Climate change, a growing world population and increasing urbanization – with the world's cities expected to house nearly 70% of the population by 2050 - call for new approaches to building design and construction.

The steel industry is meeting much of the world's need for sustainable construction and infrastructure. ArcelorMittal's researchers can calculate exactly where steel can bring added sustainability value compared with other materials, ensuring that modern infrastructure produces fewer carbon emissions and is more energy-efficient.

ArcelorMittal is investing in innovation – developing new products, software and engineering components for the construction and infrastructure sectors, and working alongside its customers to meet their needs and anticipate future trends.

R&D – at the heart of developing new sustainable solutions

With 1,300 full-time researchers employed across the globe, ArcelorMittal's research and development teams are at the heart of developing new steel products and solutions. To keep the group at the forefront of innovation, ArcelorMittal has 12 research centres located in Europe, North and South America working on a wide range of different projects. In 2014, the group invested \$260 million in R&D. 37% of that money was targeted on processes, 57% on products and solutions, and 6% on exploratory research.

ArcelorMittal's Global R&D team has been researching the sustainability of steel and its various applications for the construction industry for almost a decade. The team is responsible for ArcelorMittal's industry-leading series of Environmental Product Declarations (EPDs¹) for its Estetic®, Granite®, and Solano® Nature products. The team also trains ArcelorMittal's customer technical support (CTS) staff on life cycle assessment (LCA), EPDs, or building rating systems such as LEED and BREEAM.

Lifecycle assessment – a holistic approach to sustainable construction

Lifecycle assessment (LCA) is defined by the ISO standard 14040:44 as the *“analysis of the potential environmental burdens of a product or service in its production, use phase and disposal (end of life).”*

ArcelorMittal has developed a number of LCA tools for steel products to identify those points in a product's life cycle where the environmental impact is most critical – and develop effective solutions or alternatives whenever necessary. LCA tools can also be used to compare the performances of a steel product to other materials, such as concrete, plastics or aluminium.

Lifecycle analysis in the construction industry has become essential for both regulatory and certification reasons. For example, LCA provides additional points in obtaining environmental certification such as BREEAM and LEED.

ArcelorMittal is a member of the SOVAMAT (Social Value of Materials) initiative, a consortium

¹ Compliant with ISO 14025, an EPD® (Environmental Product Declaration) is an independently verified and registered document containing transparent and comparable information about the environmental impact of a product over its lifecycle.

of material producers - steel, non-ferrous metals, concrete, cardboard, wood, glass, plastics and composites – and scientists from social sciences to engineering whose aim is to identify the role of structural materials in a post-carbon society². A SOVAMAT panel meets once a year to analyse the progress made on LCA tools.

Training and software to support sustainability

Co-developed with CTICM (French Steel Construction Industry Technical Centre), **ArcelorMittal's ISO-compliant softwares AMeco and LicaBuilt®** allow architects, design offices, engineers and students to evaluate the environmental footprint of steel or composite structures in buildings and infrastructure, and determine which materials will have the least impact on the environment in terms of CO₂ emissions, waste generation and energy/water consumption.

AMeco 3, the latest version of AMeco software released in 2013, is an app and website that uses thermal analysis to estimate the energy consumption of a building during its use phase. AMeco relates solely to the structure of the buildings (i.e. the floors, columns and beams).

In contrast, ArcelorMittal's ISO-compliant software, **LicaBuilt®**, offers LCA for the whole building, including the envelope, joinery, partitions, and all other constituent elements whatever the type of materials. This enables a precise analysis of their impact on the environment (known as 'embodied impact'). Both types of software include thermal analysis and are compliant with ISO-13370, ISO-13789 and ISO-13790 and the European norm EN 15316.

² www.sovamat.org