



## Sustainable construction

Steel solutions for sustainable development requirements in the construction sector

Steel has many advantages with regard to the demands of sustainable development. In the construction sector, in which regulation on environmental matters is becoming increasingly strict, it is vital to communicate and demonstrate the advantages of steel to builders, specifiers, the authorities (regulatory bodies, in particular) and educators. This is one of Otua's missions.

In the construction sector, steel has many environmental advantages, which have a social and economic impact. Hence the close linkage between these three aspects of sustainable development for steel in construction.

- **Environmental advantages (Planet)**

- Steel is **durable**: it requires little maintenance and can be protected effectively, by means of metallic or organic coatings, against corrosion and various types of deterioration.

- Steel is **recyclable** and it is the **most recycled** material in the world, by virtue of its magnetic properties. At the end of their lives, steel buildings are "deconstructed" and their various components are recycled.

- **Steel construction sites** are **clean and dry** (as opposed to the so-called "wet system"), and **free of detriment** (noise, dust, storage requirements...) to the local environment.

- Steel's elevated mechanical properties permit the use of **less material** than is the case with other materials. They enable very light structures, maximising the glass area, and hence light, thus **reducing energy consumption**, for the optimum benefit of the occupant and our planet.

- **Steel production and processing are environmentally friendly.** Steel is produced from iron, one of the most abundant elements on our planet. In less than 50 years, the energy consumption required for steel production has been slashed by more than 50%, CO<sub>2</sub> emissions have been halved and dust dispersion has diminished by more than 90%. Water used by the steel industry is purified and recycled and the by-products from steel production are reused (slag being converted into cement or ballast, for example).

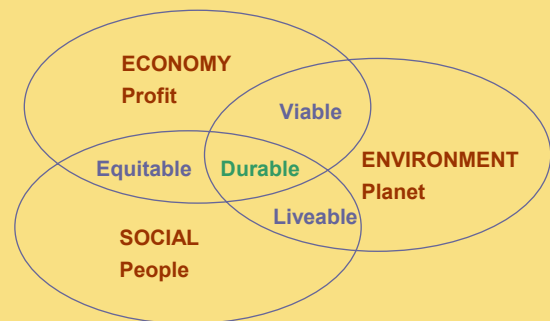
- Steel structures are **lightweight** and **fit harmoniously** into their environment, especially as steel offers great freedom of volume and form.

### Sustainable development: the three P's

The expression appeared officially in 1987: "sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs".

**People, Planet, Profit** are the three areas of application (the 3 P's) of sustainable development.

Human development must be based upon a better social, environmental and economic balance.



- **Social advantages (People)**

- Steel construction involves the assembly of semi-finished factory-made products. This promotes **safety and pleasant working conditions** during construction.

- Steel structures maximise glazed areas, and therefore natural lighting. Volumes are large and adaptable. The result is **enhanced quality of life** in steel buildings.

- Steel enables construction solutions offering good **thermal and acoustic insulation** properties.

- **Economic advantages (Profit)**

- Steel structures promote **energy savings**, particularly by means of high-performance exterior insulation techniques.

- Steel structures offer the possibility of large glazed areas, and therefore natural lighting, thus reducing electricity costs.

- **Erection is rapid**, enabling a reduction in investment costs and more rapid amortisation of financial charges.

- Steel's mechanical strength enables the **use of less material** for equivalent performance.

- Steel is **easy to maintain** and, when properly protected, it is **extremely durable**.

## Otua's actions and projects in the field of sustainable construction

- **Monitoring regulatory and technological developments**

Otua is in constant contact with institutional bodies that are influential in respect of environmental regulation in the construction sector, and in particular the FFB (French Building Industry Federation), ADEME (Environment and Energy Management Agency), CSTB (Construction Industry Scientific and Technical Centre), **AIMCC (Association of Construction Materials, Components and Equipment Industries)**, the HQE (High Environmental Quality) Association.

Otua represents steelmakers in particular within AIMCC and defends steel's position and interests.

- **Communicate and promote steel's advantages and steel solutions for "sustainable construction"**

**Otua informs** its members (steelmakers, steel construction companies, federations) of developments in environment-related building **regulations**: thermal (RT 2000), acoustic and waste regulations.

**Otua promotes steel's environmental advantages** to all current and future stakeholders in construction: specifiers, construction companies, the authorities, students in schools of architecture and engineering, etc. by means of:

- conferences directed towards higher education institutions and steelmakers
- the publication of documents, such as a brochure on steel solutions for the 14 HQE targets (see box in next column), which is currently being prepared.

**Otua directs** the preparation of **environmental and health declaration fact sheets on steel construction products** in response to requests for information from developers and project managers and in order to promote steel's positioning against other construction materials.

In the next two years, at least 3 steel fact sheets are due to be published, on the subject of beams, cladding and sandwich panels.

**For further information**, read the "sustainable development" pages in the "Expertises" section of the Otua website: [www.otua.org](http://www.otua.org)

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- **Contribute to the development of techniques and systems further facilitating the recycling (and its monitoring) of steel from end-of-life buildings.**

Particularly through participation in steel industry **research projects** on the following subjects:

- The development of channels for the **recycling of steel from end-of-life technical equipment** (heating, air-conditioning, plumbing, electrical equipment)
- The development of techniques for the **separation and recycling of composite products** (steel + concrete, or steel + plaster, or steel + insulation).

### **14 criteria to define a building's environmental quality**

The construction sector consumes enormous quantities of natural resources, energy and water.

The construction of a building can therefore contribute significantly to degrading the quality of our environment. It accounts for a quarter of French greenhouse gas emissions.

**Today, a building's environmental quality** is evaluated on the basis of its ability, at all stages of its life, to meet criteria or "targets" defined by the High Environmental Quality (HQE) Association.

#### **14 targets have been identified:**

Seven relate to the control of the building's impact on the **external environment**:

##### **Eco-construction targets:**

- Harmonious relationship of buildings to their immediate environment
- Integrated choice of construction processes and products
- Low-nuisance (waste, noise, pollution) construction sites

##### **Eco-management targets:**

- Energy management
- Water management
- Process waste management
- Management of maintenance

Seven others relate to the building's ability to create a comfortable and healthy environment for its **users**.

##### **Comfort targets**

- Hygrothermal comfort
- Acoustic comfort
- Visual comfort
- Olfactory comfort

##### **Health targets**

- Cleanliness of the internal environment
- Air quality
- Water quality