

EMISSION STATEMENT

MANUFACTURERS AND SUPPLIERS ARE KEEN TO TRUMPET THEIR PRODUCT'S SUSTAINABLE CREDENTIALS, BUT WHO SHOULD WE BELIEVE? CM ASKED REPRESENTATIVES FROM THE TIMBER, CONCRETE AND STEEL CAMPS TO STATE THEIR CASE. THIS IS WHAT THEY SAID



A 10% INCREASE IN TIMBER FRAME HOUSES IN EUROPE WOULD PRODUCE 25% OF THE CO₂ REDUCTIONS PRESCRIBED BY THE KYOTO PROTOCOL

Timber

IT MAY SEEM PARADOXICAL, BUT THE MORE WOOD we use for construction, the more beneficial it is in the fight against Global Warming. Good forest management and effective legislation backed by credible certification schemes mean that Europe's forest cover is increasing each year by 3,500 sq miles – about the same area as Cyprus, or equivalent to 100 football pitches every hour.

This increasing resource results in more CO₂ – the major contributor to the greenhouse effect – being sucked out of the atmosphere and more oxygen being released. Forests act as carbon 'sinks', keeping large amounts of CO₂ locked up and out of the atmosphere.

Even after it is harvested, wood continues to act as a carbon store throughout its life. For every cubic metre of wood used instead of materials, such as concrete or steel, 1.1 tonnes of CO₂ is prevented from entering the atmosphere. In addition, for each cubic metre, 0.9 tonnes of CO₂ is stored in wood.

Based on these figures, a 10% increase in timber frame houses in Europe would account for about 25% of the CO₂ reduction prescribed by the Kyoto Protocol, the agreement signed by 141 countries (excluding the US) which aims to cut greenhouse gas emissions by 5.2% by 2012.

Using wood also helps to make a building more energy efficient, as its cellular structure provides outstanding thermal insulation: 15 times better than concrete, 400 times better than steel and 1770 times better than aluminum.

Developments in glue laminated timber (glulam) are continuing to push boundaries and it has been used in public buildings such as the National Assembly for Wales and the Princess Royal stadium in Boston.

Timber and timber products, used both for structural purposes and for fittings and finishes in UK construction work, now account for around £4bn a year, and timber is the third most important product after concrete and plastic goods. Prices are competitive and there is no shortage of good-quality softwood, mainly from Sweden, Finland and the UK.

Although other materials are increasingly trying to claim sustainability credentials, wood is the only genuinely sustainable building material. It is infinitely renewable, thermally efficient, recyclable and can help to reduce global warming. What other materials have those credentials?

Charles Trevor, managing director of industry organisation Wood for Good

Concrete

OVER THE LIFE OF A HOME, THE WHOLE LIFE operational CO₂ emissions of a house have far more environmental impact than the CO₂ in the materials used to build it. Some 50% of the UK's carbon emissions are due to the energy used to heat, cool and light buildings.

A study by Arup Research & Development shows that conventional masonry homes that take advantage of their inherent thermal mass can save a significant amount of energy over their lifetimes compared with lightweight timber frame housing. These savings can offset the slightly higher level of embodied CO₂ in a masonry house in as little as 11 years and ultimately lead to the lowest whole life CO₂ emissions.

The independent research compares lightweight timber homes with medium weight and heavyweight masonry and concrete homes. It found that lightweight homes will overheat more frequently during the predicted hotter summers of the 21st century, which could in turn lead to an increase in the use of air conditioning. Homes built using heavyweight construction materials with their inherent thermal mass will be cooler in the summer and so will not suffer overheating to such a degree. The lightweight home was found to need air



**STEEL HAS THE MAJOR BENEFIT
OVER OTHER MODERN
CONSTRUCTION MATERIALS OF
BEING 100% RECYCLABLE**

**OVER A 60-YEAR PERIOD THE
TIMBER HOME WAS FOUND
TO EMIT 9-15 TONNES MORE
CO₂ THAN A MEDIUM WEIGHT
MASONRY HOME**

Steel

conditioning by 2021. This compared with 2041 for the medium-weight home and 2061 for the medium-heavy and heavyweight homes.

The building's thermal mass can also capture heat from the sun on winter days and re-radiate it into rooms as the temperature begins to fall in the late afternoon. Known as passive solar design, this energy-saving technique requires little more than glazing that faces south and adequate thermal mass in the floors and/or walls to capture and store heat from the winter sun.

Over the lifecycle of the homes, the increased reliance on air conditioning in the lightweight home will significantly negate its initial lower embodied CO₂. The medium-weight masonry home was calculated to have around 1.25 tonnes more embodied CO₂ than the equivalent timber house, yet over a 60-year period the timber home was found to emit 9-15 tonnes more CO₂.

The report findings show that masonry and concrete construction could well provide the best long-term sustainable building option, especially if the benefits of thermal mass are fully exploited.

■ Andrew Minson, head of framed buildings at the Concrete Centre

BY USING MODERN METHODS OF CONSTRUCTION (MMC) and an entirely recyclable material, steel housing systems offer a high-quantity cost-efficient solution, which has a minimum impact on the environment and can deliver sustainability that exceeds the latest government requirements.

By adding supplementary insulation in the depth of the studs, modern steel homes can exceed Part L of the Building Regulations and the recently launched EcoHomes 2006 'Very Good' standard, without having to compromise the amount of useable floor space.

What's more, the modern insulation materials used in steel frame construction produce low U-values and high standards of air tightness, which promote a warm, draught-free environment, reducing energy consumption and the associated utility bills for the occupant. Similarly, the multiple and resilient layers of materials, along with a cavity and insulation in lightweight steel construction, provide excellent acoustic performance.

Steel also has one major benefit over other modern construction materials. It is 100% recyclable, resulting in saved landfill space and the conservation of natural resources. Research in conjunction with National Federation of

Demolition Contractors (NFDC) shows that 84% of the steel arising from demolition sites is in fact recycled and a further 10% re-used.

The off-site processes used in the manufacture of steel homes also help reduce the impact of construction on the environment. Components that are cut to length, drilled and fabricated specifically for individual jobs ensure minimal waste and high levels of efficiency. Offsite processes also assist just-in-time delivery from factory to site, reducing site logistics that disturb the surrounding area.

Already forming 70% of the commercial construction sector and used by half of the government's Design for Manufacture competition winners, steel systems offer a practical method for the creation of cost-efficient sustainable buildings.

With the push for more sustainable construction coming from the government and consumers alike, steel's speed of construction, cost effectiveness, outstanding performance and unrivalled sustainable qualities are being recognised, and could soon become the new housing "tradition".

■ Graham Raven, convener of the Steel Homes Group