

COUNTER-ARGUMENTS PRECAST CONCRETE VS TIMBER AND STEEL

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Intro

The timber and steel industries often claim special advantages from their material approach, which often benefit from a positive image to the general public. Their arguments are confronted with facts from the (precast) concrete industry that may demystify the substitutes and underline the advantages of precast concrete. This compilation may help producers of precast concrete in their own argumentation against their market competitors from the timber and steel industries.

These arguments are based on the “*Competitive Analysis of the Timber and Steel Frame Building Industry in Europe*”, Stockholm 2009, initiated by the BIBM Marketing Commission and elaborated by the Swedish Precast Concrete Association, Betongvaruindustrin.

Arguments of the timber industry and counter-arguments (CA)

Wood does not produce any waste and is totally recyclable

- CA To keep wood in good shape over the years, it has to be protected by chemical treatment. The result is toxic waste, impossible to recycle and extremely polluting.
- Leftovers from cutting trees have to be burnt, or they rot and emit CO₂ which is immediately released into the atmosphere.

Wood has just one tenth of the weight of steel and much less compared to concrete

- CA Concrete and steel bring a multiple stability compared to wood.

Extraordinary structural-physical characteristics: Wood is CO₂-neutral

- CA This perspective isn't based on a whole life-cycle analysis, but only considers the time until erection and it does not either consider long-distance transports, working and treatments.

Building with wood is a cheaper way of building

- CA In fact wrong: compared to houses without a cellar (esp. in Germany or Austria); Timber precast houses are most of the time more expensive than masonry or precast concrete buildings.
- Cost drivers are: fire protection (fire safety engineering), sound insulation, maintenance, and at the end of life: recycling (separation of different materials from the construction (foils, metal (fixing materials), and protected wood as toxic waste).

Prefabricated timber elements are the most exact way of building

- CA Wrong! Compared to precast concrete elements which have the same standards (or even higher) of exactness compared to timber buildings.

Wood is the material with the best rate of insulation and heat storage and saves heating costs for every housing space.

- CA Wood has a good insulation rate only with massive wood elements which is a very unusual way of building with timber. You get superior heat storage performance the thermal mass of concrete: smaller amplitudes of temperature mean less heating in winter and less cooling in summer.

Concrete has more thermal mass and better heat conductivity. This means optimal storing and releasing effect of heat and cool. Timber has lower heat conductivity. It therefore functions too slowly as a heat balance during day and night.

Wood burns, but the breakdown of wood in case of a fire is exactly accountable, an advantage that not all materials have

CA A sarcastic view: wood “protects” the fire brigade but not the inhabitants of timber buildings who died before the fire engines arrive.

No safety of rescue ways – rescue ways must not burn; Wood is part of the load of the fire (the German “Brandlast”).

This argument is valid only for big massive beams, but not for usual lightweight housing construction.

Concrete does not create smoke which annually kills a lot of people in fires.

Timber buildings have a good durability

CA In most of the examples there is no long-term experience. To keep timber buildings in shape, chemical treatments have to be applied to avoid rotting.

If timber is used over a long time, it has the following effects: change of surface (colour, clefts); dry (higher fire risk); susceptible to unplanned impacts like water, moisture, mechanical impacts etc.

Long durability with wood is reached only with painting every 5 years or with toxic chemical treatments.

Surfaces of wood strongly contribute to a comfortable room climate, since wood regulates air humidity efficiently

CA Just an emotional success of advertisement. A constant temperature is better for a feeling of wellness, – and much easier to achieve with concrete than with wood.

Timber industry uses regional resources

CA Precast concrete industry also. Today a big volume of wood is imported from Eastern Europe and Africa, causing ecological damages in importing countries. e.g. average transport distance of concrete in A (readymix) less than 30 km, precast parts have an economic radius of max 100 km, which is much less than timber or lightweight.

Wood is requested by most customers

CA Forests are state-owned in most European countries. The interest of the state is therefore to promote timber building to have a good return on investment.

In countries where forests mostly belong to private owners, the public opinion is influenced by green political opinions.

The agriculture lobby is the most efficient lobby in the world. Customers perhaps like wood, but they are against cutting trees!

Timber industry protects small and medium enterprises

CA The precast concrete industry is also a SME sector with a lot of family businesses offering local jobs, which is socially sustainable.

The major players in the saw-mill industry or in the chipboard industry (the German “Spanplatten”) are much bigger than concrete factories. Concrete production is a very local and fragmented industry.

A study of the Austrian cement industry states that 1 job in the Austrian cement industry implies the need for 4 local jobs (plus the jobs in the “after cement” chain: e.g. in the concrete production, construction sites...).

The timber industry prefers industrial harvesting of wood and long transportation distances.

Building with wood is simple and demanding at the same time; Architects, designers and construction workers are fulfilled by using such material because they deal with a renewable and philanthropic resource.

CA Concrete also contains natural resources that are recyclable. The marketing gag is to make people believe that it's more intellectual to build with timber. The real intellectual performance is the combination with other materials (plastic foils, metal fixing parts, chemical treatment).

Arguments of the steel industry and counter arguments (CA)

Only steel offers lean construction with static properties

CA New concrete developments also offer slim sized structures, with superior material performance (CO₂).

Concrete is the better way to take up the pressure of heavy loads.

Steel prefabrication fastens the erection process

CA Precast concrete elements offer at least the same speed in building erection. The regional availability of precast elements also leads to fasten the process.

Steel offers a constant quality by a homogeneity of the material

CA Same constantness with precast concrete elements ensured by a double quality control: controls made in the factory by the producer and by a third party.

Permanent improvements and innovation in precast concrete factories.

Steel offers high variety – everything is possible with steel

CA New ultra high performance concretes offer the same performance and even more. Concrete as a cladding material has absolutely the largest variation of alternatives and without any painting or other surface treatments. Steel cannot be used without concrete, see foundations and flooring in steel skeleton buildings.

Strong steel companies invest a lot in research to reach out for new material qualities

CA Research in new concretes allows slim structures comparable to steel.

Innovation potential of steel is still high – light and strong is both possible

CA Steel never solved basic problems like rust at an acceptable price level.

Steel is a highly durable building material

CA Corrosion is only avoided when steel is protected, year after year.

Steel does not resist fire when it reaches temperatures of 700 to 800°C. Many steel bridges have to be painted all the time for protection and to achieve durability.

Steel is 100 % recyclable

CA Precast concrete is also recyclable; the reinforcement is 100 % recycled steel.

Steel allows an efficient time and cost management (Just-in-Time)

- CA Effective time and cost management is a feature of the whole construction industry and does not characterize steel only. It is also possible with precast concrete elements

Steel is not organic and therefore safe to build with in regards to damp and mould

- CA Precast concrete elements offer the same advantages compared to wood, combined to advantages of fire protection and corrosion.

Steel building is a low-cost building

- CA Steel prices are determined by the market. China alone multiplied by 10 its steel consumption in the last two years. On the long run steel buildings will be the most expensive buildings.

Conclusions

The precast concrete industry has a lot of arguments to “win the battle” against substitutes. The industry has to develop some more self-confidence and be proud of its technical and aesthetical solutions.

Technical advantages are often not the leading arguments for customers’ decisions, esp. in private housing. “Make concrete more emotional” could be an additional way to the superior technical performances of precast concrete elements.

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