

THE SUSTAINABILITY OF ENGINEERED WOOD PRODUCTS

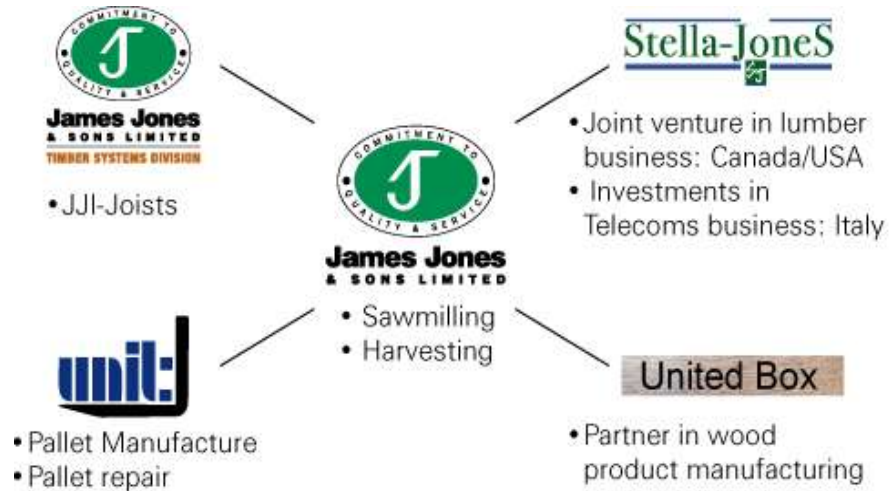
James Jones
& SONS LIMITED

TIMBER SYSTEMS DIVISION

WHO ARE JAMES JONES & SONS LTD?



James Jones (1840-1926)



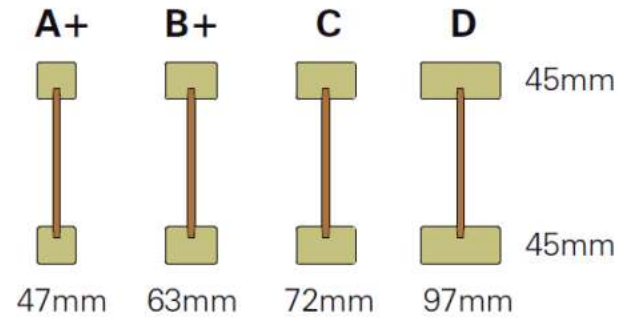
TIMBER SYSTEMS DIVISION



PRODUCT RANGE



JJI-JOISTS



JJI-Joist Flange Sizes
Depths from 145-450mm

BJ BEAMS



38mm
45mm
90mm

I-JOIST STRUCTURAL USES



© Stefan Brown



Floor joists



Roof rafters & purlins



Wall studs

What is an engineered wood product?



EWPs / Definition

“Reconstituted wood-based beam products, or I-Joists manufactured from solid or composite wood flanges and with a wood-based or metal web, fastened together to form a **composite structural** product.”

(EWPs Code of Practice, First Edition, 2007)

- > Engineered to precise design specifications.
- > Tested to meet national or international standards.

THE EWP PRODUCT FAMILY



I-Joists

Glulam

Types of Engineered Wood Products include
(*EWPs Code of Practice, First Edition, 2007*):

- > I-Joists
- > Open-Web Joists
- > Laminated Veneer Lumber (**LVL**)
- > Laminated Strand Lumber (**LSL**)
- > Parallel Strand Lumber (**PSL**)
- > Oriented Strand Board (**OSB**)
- > Fibreboard (**Hardboard**)
- > Glue Laminated Timber (**Glulam**)



Robert Burns Museum

SUSTAINABLE DEVELOPMENT

“Development that meets the needs of the present without compromising the ability of future generations to meet their own needs”.

(United Nations Commission on Environment and Development, 1987)

“The past 20 years have seen a growing realisation that the current model of development is unsustainable. In other words, we are living beyond our means”.

“Unless we start to make real progress toward reconciling these contradictions we face a future that is less certain and less secure. We need to make a decisive move toward more sustainable development. Not just because it is the right thing to do, but also because it is in our own long-term best interests”.



Carbon footprint of the UK. Riddlestone S, Green Building Magazine Winter 08

www.defra.gov.uk

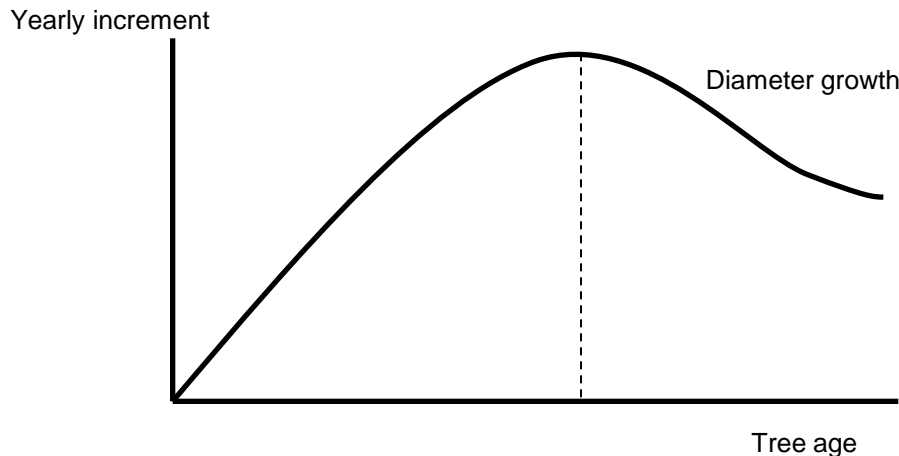
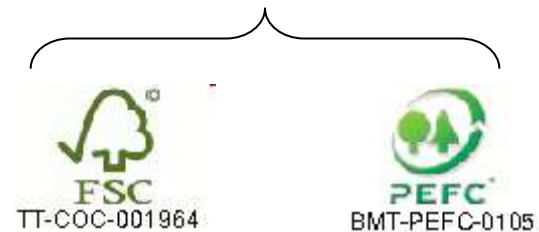
TIMBER AS A SUSTAINABLE MATERIAL



1 tonne of CO₂ is fixed per cubic metre of growth (ECCM).

1.833 kg CO₂ are fixed per kg of usable dried timber (Grasser, 1994).

The Central Point of Expertise on Timber Procurement



THE CARBON CYCLE IN TIMBER INDUSTRIES



Source: Wood for Good

SUSTAINABLE CONSTRUCTION



The Beddington Zero Energy Development

...If we are to become sustainable, developers will need to think out of the box rather than taking a business as usual approach. Solutions could include lower embodied energy materials, increased recycled content, reduced wastage....

Sue Riddlestone (CEO Bioregional)

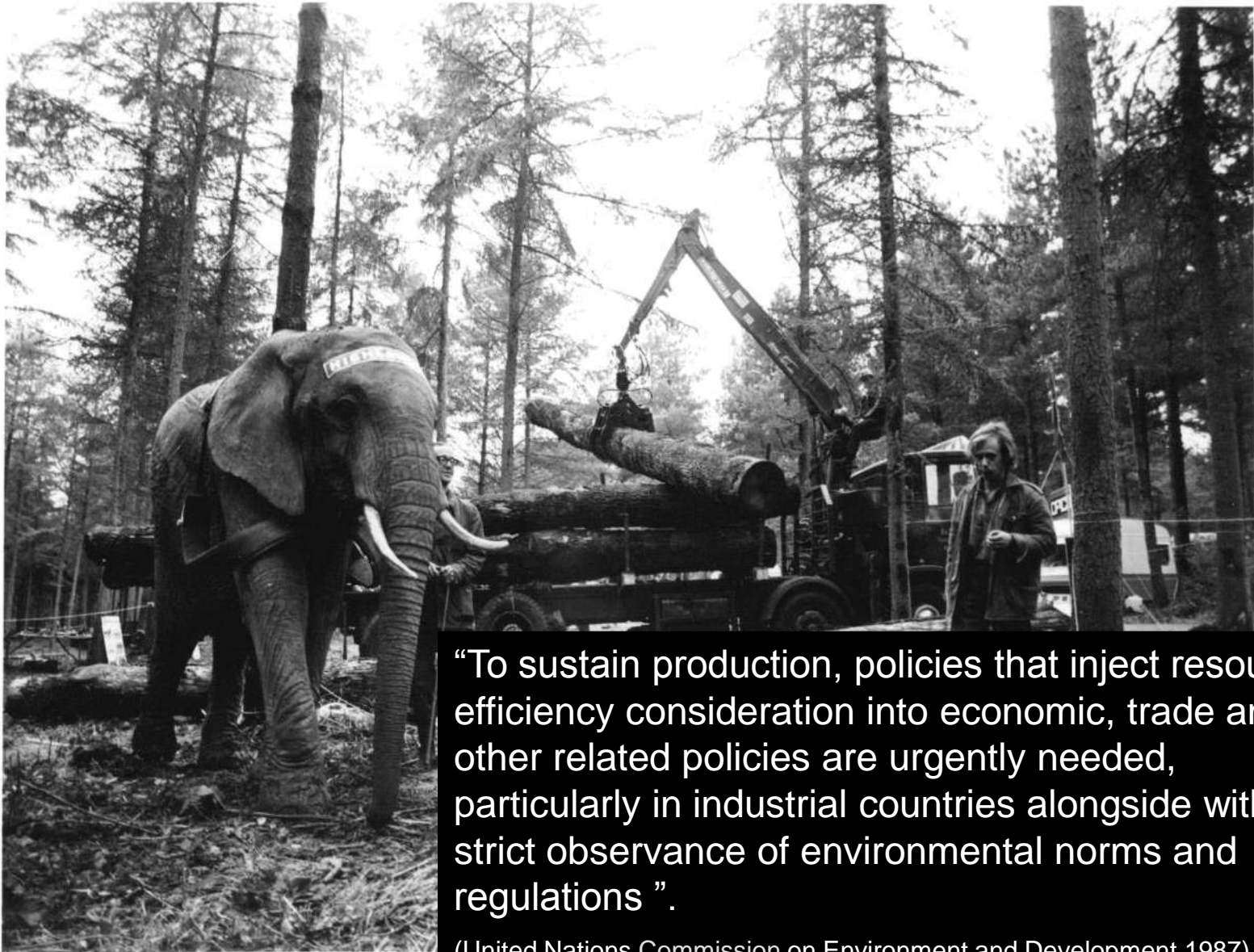


ASDA-Bootle Mezzanine Floor



Fair Isle Bird Observatory

CAN WE IMPROVE TIMBER?



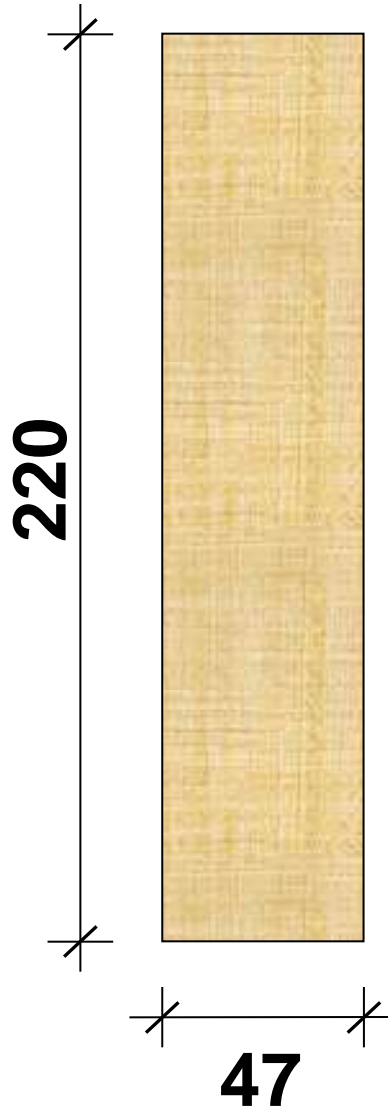
“To sustain production, policies that inject resource efficiency consideration into economic, trade and other related policies are urgently needed, particularly in industrial countries alongside with strict observance of environmental norms and regulations”.

(United Nations Commission on Environment and Development, 1987)

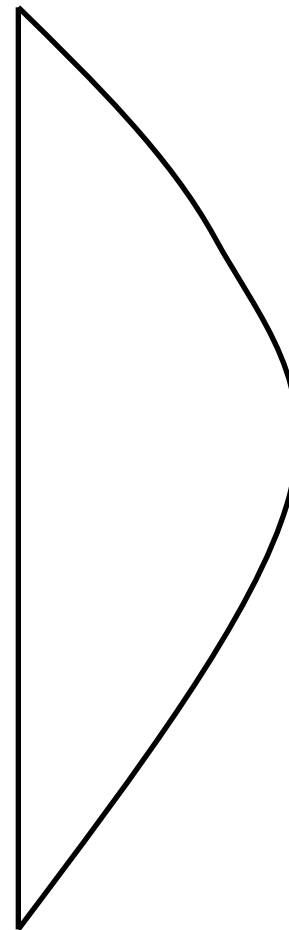
AN ANALYSIS OF STRESSES



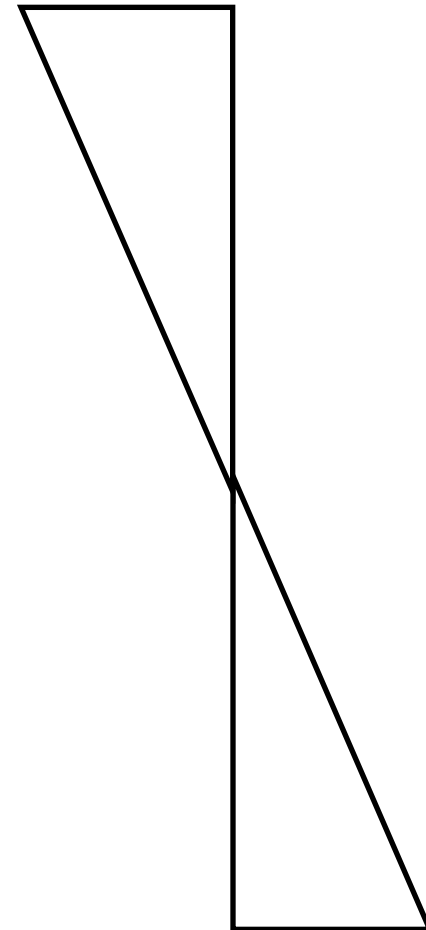
47X220 TIMBER SECTION



STRESSES THROUGH THE SECTION

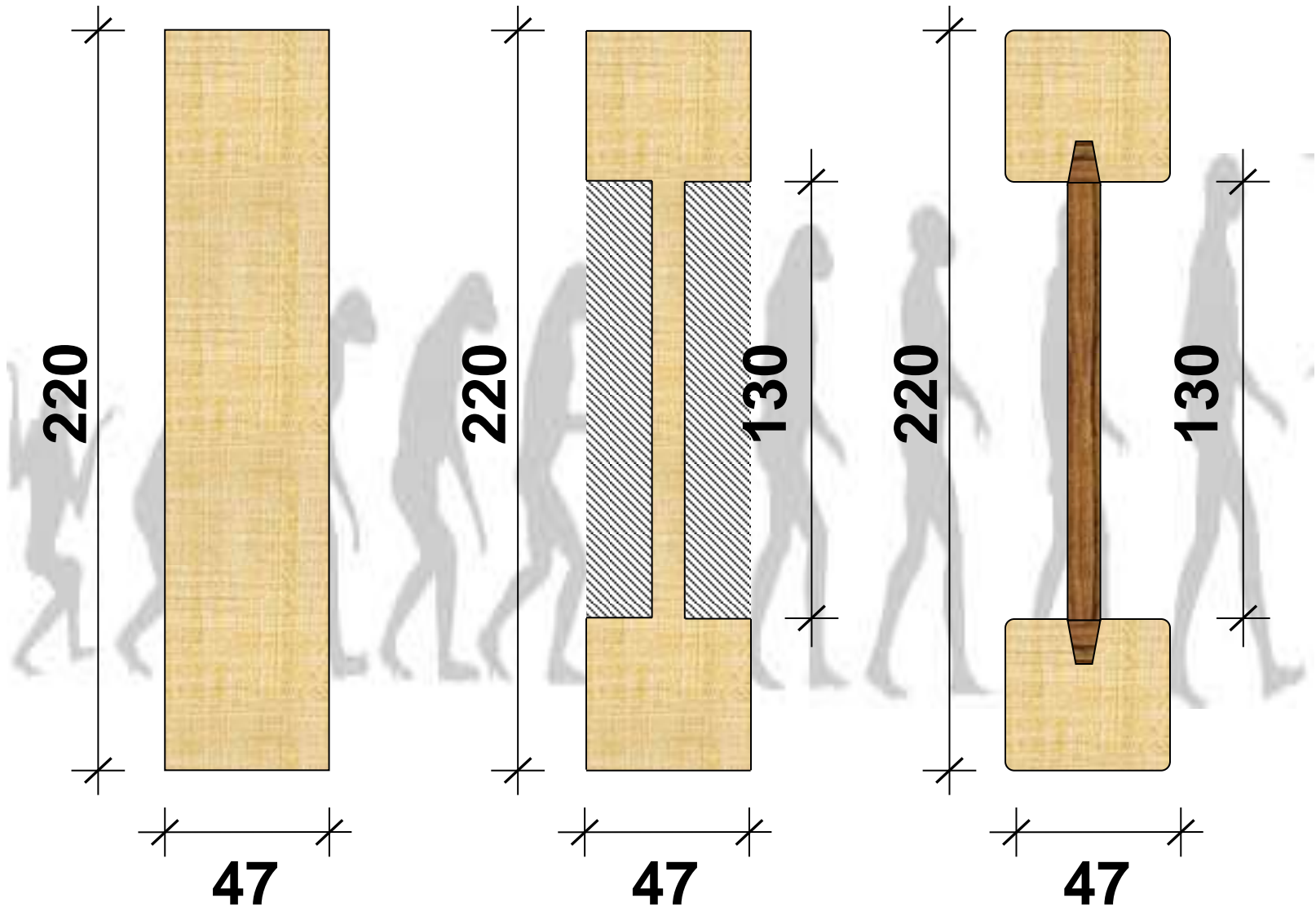


SHEAR



BENDING

THE EVOLUTION OF TIMBER





The Tree House (Zero Carbon Development, London)

The technological paradox:

“Environmental disruption and degradation have been brought by the modern industrial economy, but the advancement of the industrial economy, arguably has been and will continue to be the main route to environmental quality ”.

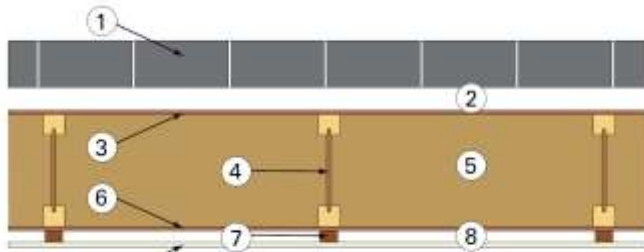
(Business and the environment, OU)

Eco-efficiency

“Competitively priced goods and services that improve the quality of life while reducing ecological impacts and the intensity with which resources are used to a level that meets Earth’s carrying capacity”.

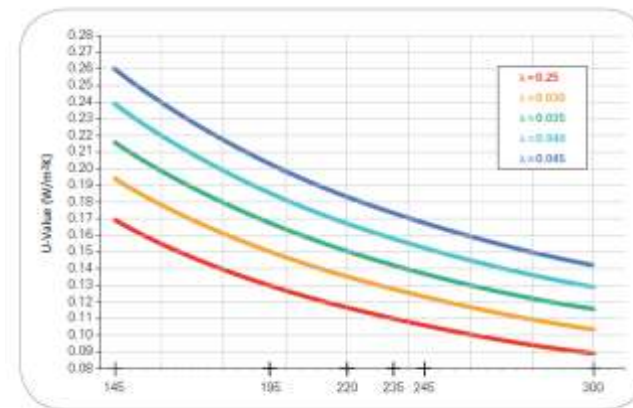
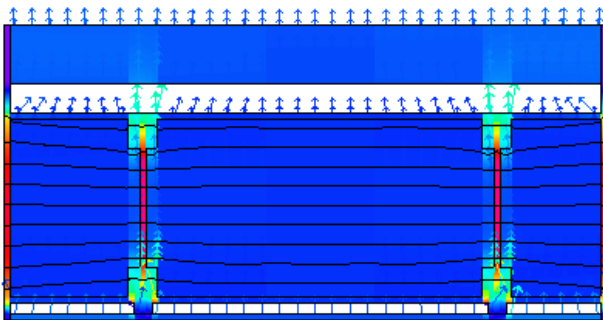
(World Business Council for Sustainable Development)

ADVANTAGES OF I-JOISTS



1. Masonry 100mm
2. Air Cavity 50mm
3. Wood based board 9mm
4. JJI-Stud
5. Insulation material
6. Wood based board 9mm
7. Softwood batten 38 x 25
8. Service void
9. Plasterboard 12.5mm

- > Low U values
- > Thicker walls = increased thermal performance & energy savings
- > 9mm OSB web reduces repeated thermal bridging by up to 10%
- > FSC/PEFC certified timber ensuring sustainability
- > Manufactured in a factory environment reducing wastage and improving quality
- > Incorporating traditional timber frame technology giving a rapid build system
- > Lightweight construction compared to solid sections of the same dimension
- > Reduced raw material required to achieve structural performance

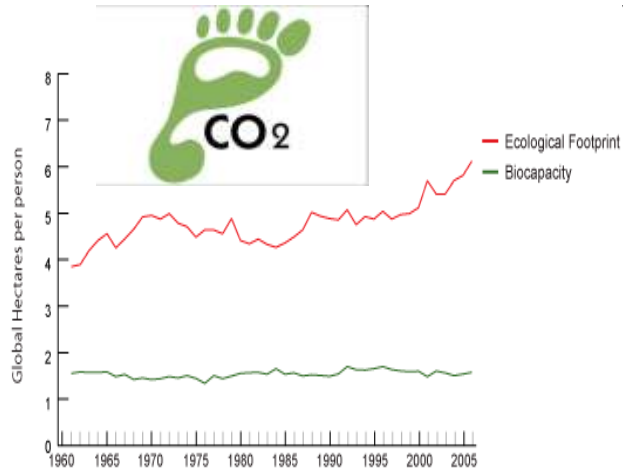


JJI-Joist wall U-Values

I-JOIST POSITION WITHIN TIMBER INDUSTRIES



SUSTAINABILITY METRICS



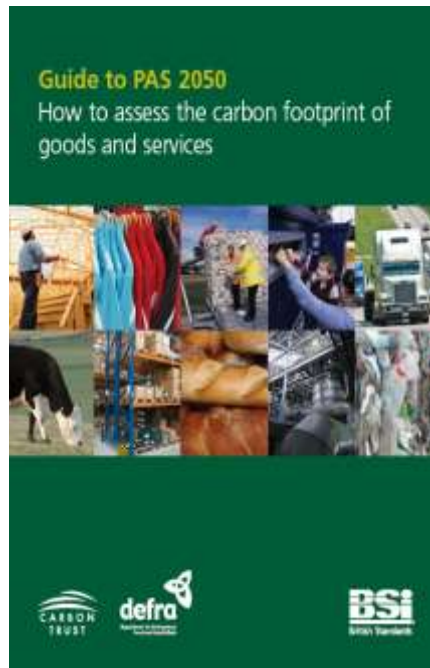
www.footprintnetwork.org

“When you can measure what you are speaking about and express it in numbers, you know something about it”

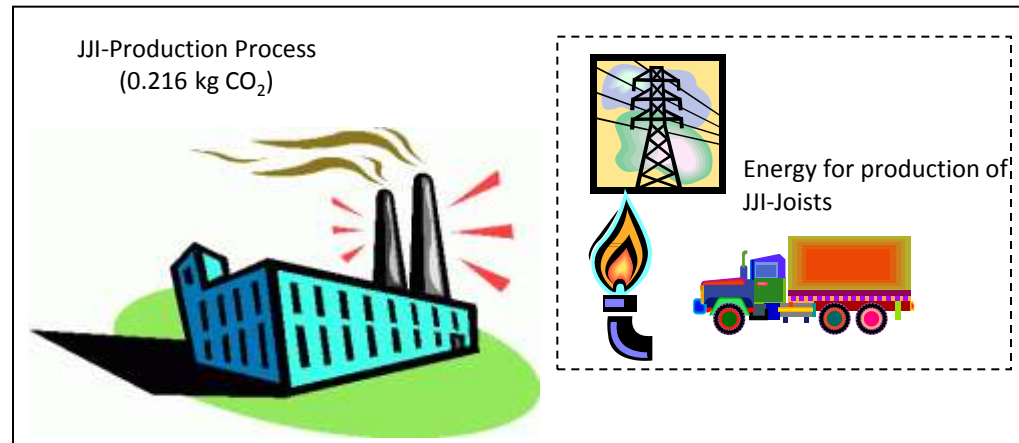
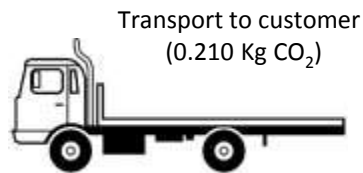
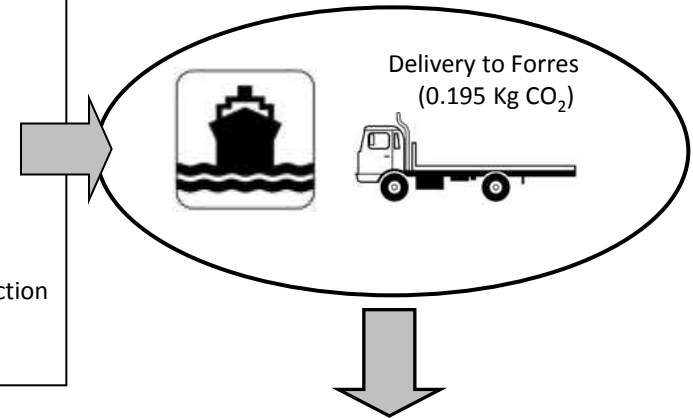
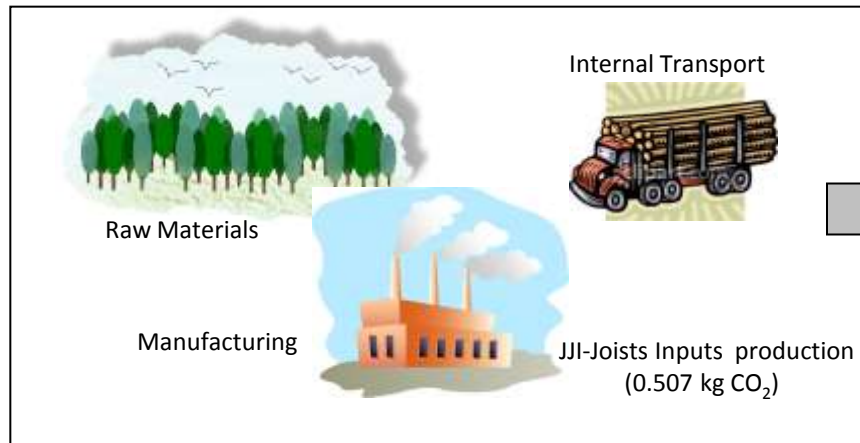
Lord Kelvin

Two good metrics:

- Carbon Footprint
- Life Cycle Assessment



CARBON FOOTPRINT EXAMPLE



TOTAL EMISSIONS
1.128 Kg CO₂

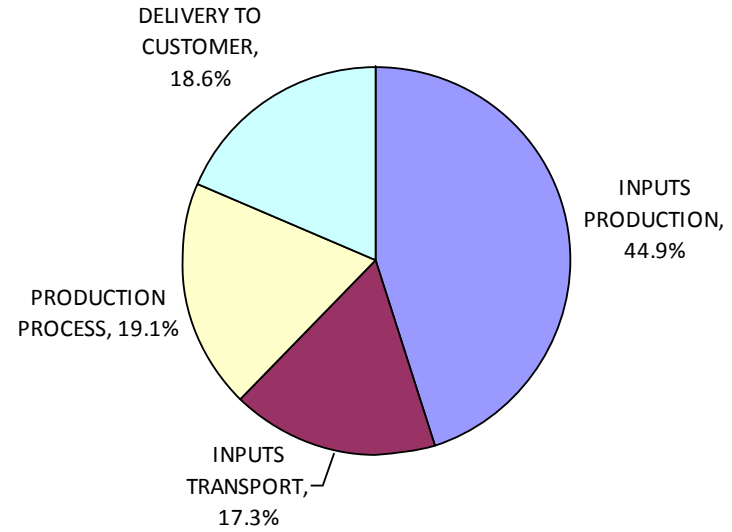
STORED CARBON
5.497 Kg CO₂

Total = -4.370 Kg CO₂

CARBON COMPARISONS



CARBON FOOTPRINT OF 1LM JJI-JOIST



Product	Kg CO ₂ eq/m ³	Source
Joist	137	James Jones (2010)
Glulam	164	Puettmann (2005)
Hardboard	350	Rivela (2007)
MDF	216	Gonzalez-Garcia (2009)

THANK YOU

Abel Munoz

Technical Manager

James Jones and Sons
Timber Systems Division
Forres

A.Munoz@jamesjones.co.uk

Grant Barclay

Senior Design Technician

James Jones and Sons
Timber Systems Division
Forres

G.Barclay@jamesjones.co.uk

