Creating Green Jobs for Youth

MAKAR Ltd + Neil Sutherland Architects LLP

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The Team
The Work

- Over 60 projects in the Highlands & other parts of Scotland
- Wide range of projects: houses, community buildings, offices, and smaller structures such as woodland shelters
- Initial design focus has developed into an integrated design + build approach
- A timeline of projects shows the company’s development
If 50% of Europe’s Carbon Emissions relate directly or indirectly to the built environment:

- Is energy or carbon efficiency enough?
- Or do we need more fundamental change?
- Regional Approach balancing Equity, Ecology, Economy
Housing challenges are urgent:

Across the North of Scotland:
- We are failing to meet housing demand + need
- We have some of the lowest space and performance standards in the world
- We are creating unhealthy places with little or no distinction
- The majority of new houses delivered by volume builders are based on the old model of cheap and plentiful energy
Sullivan Report – 2007

Scottish Government’s Carbon Emission Reduction Programme

Domestic buildings
2010 = low carbon standard (30% reduction on 2007 CO2 levels)
2013 = very low carbon (60% reduction on 2007 CO2 levels)
2016 = net zero carbon in use
2030 = total life zero carbon domestic standards

Programme currently under pressure from volume builder interests
Integrated Solutions

Design Criteria –
Successful design aims to balance:

1. Program – customer brief
2. Context – place
3. Delivery – flexible design / build method
4. Effectiveness – healthy / sustainable

Poor design results when one or more of these are compromised
Cradle to Cradle –
Re Making the Way We Make Things:

Chemist - Michael Braungart
Architect - William McDonough

• Industry can be a positive environmental force

• Understand how to cycle physical & technical nutrients
Respond to the Local Renewable Construction Resource and Influence its Future
Changing Design & Delivery Methods - Innovative Modern Methods of Off-site Construction

- Integrated – Design / Manufacture / Delivery

- Improved – Quality Standards, Reduced Waste, Reduced Embodied Carbon, Less Defects & Remedial Works, etc

Meaningful - Work, Local Supply Networks, Inter-Sector Working
Timber Product Development in Scottish Materials

1. Laminated Modified Timber Beams
2. Dowel-lam – or Brettstapel a form of Massive Construction

Research must be relevant to project delivery
Lean processes - a continuous improvement cycle, where applied research and development drive an evolutionary process.
Scottish Dowel-lam

- Scots pine side boards, 100x20mm
- Hardwood dowels, 20mm
- Moisture transfer locks elements
Dunsmore House – Accoya GluLam Beams
Engineered Flexible Manufacture
(Not the Ford-ist Production-Line)

(Prefabricated Approach
• Negative associations, lack of customer focus, inflexible, rigid)

Engineered Flexible Manufacture
• Large one-off sub-assemblies; closed insulated panels, pods etc
• Detailing and method repeated skillfully
• Avoiding Design - random innovation
• Maintaining high levels of efficiency & effectiveness
Carbon Issues - Working with:
The Carbon Trust & University of East Anglia

- Assessment of our Organisations Operational Carbon Footprint and a Plan for its Reduction
- Methodology to measure the Embodied and Sequestrated Carbon related to our products
- Previous work by UEA suggests a 34% reduction in Embodied Carbon for Off-site MMC approach
MAKAR Expansion

- Workspace 500 SquM,
- Infrastructure, Equipment & Training
- Special Features - Gantry Crane, Wood-fuel heating
- £500 000 Investment
- Grant supported by Scottish Rural Development Program
- Set to double our output within 18 months
- Launch by Fergus Ewing MSP, Monday 25th June
- An essential stepping stone
Natural - Structural Insulated Panel, n-SIP

- Breathing Fabric - hydroscopic properties
- Non chemically treated local timber
- Natural or low processed Insulation options; Cellulose, Sheep’s wool, Soft-board
- 0.15 U-value typically 245mm C16 stud with 60mm Soft-board
front elevation

typical section

first floor layout

ground floor layout

1 entrance
2 utility
3 wc
4 cooking
5 eating
6 living
7 bedroom

MAKAR
www.makarconstruction.com
Two bed house, 80m²
• A Personal Story
• Making Things Regionally; Equity, Ecology, Economy
• Culture of Enterprise – change in physical planning
• Knowledge Work & Practical Work Balance
• Co-operative long-term approach to a Green Economy, Linking; Public Sector, Academia, Enterprise, Resources
• Vision, Leadership & Action
Thanks for your attention