GREEN ARCHITECTURE DAY

RETREAD:

Practical Ways To Deliver Low Impact Buildings

Sunday 19th April 2009

Sallis Benney Theatre

Presented by Duncan Baker-Brown RIBA

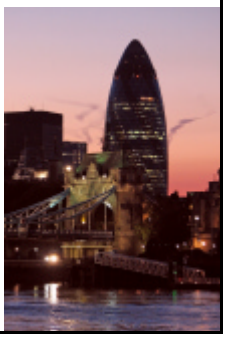
of BBM sustainable design

www.bbm-architects.co.uk

What Architect's Do

What Architect's Do

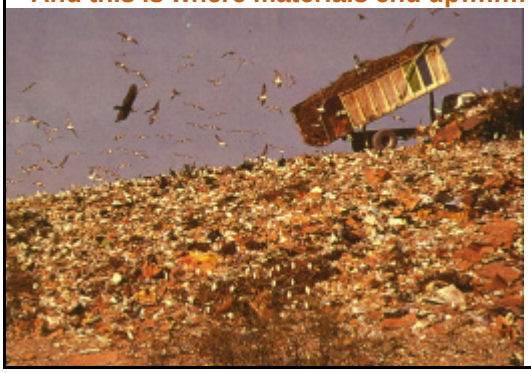
What Architect's Do



And this is where materials come from…

And this is what we do to redundant buildings…

And this is where materials end up……..

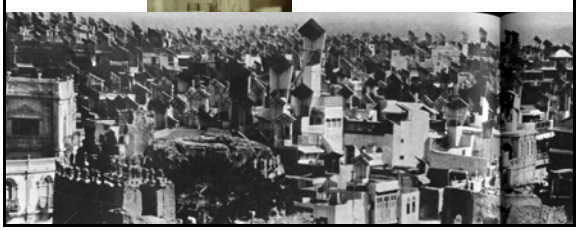


One Planet NOT Three!

How do we do this?

By stealing from our future……

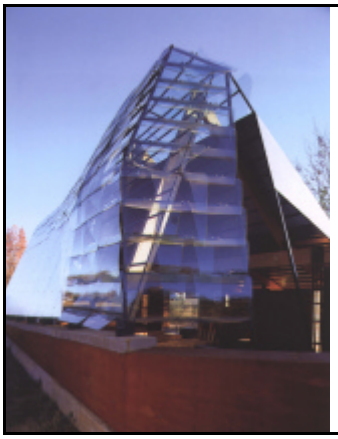
Unfortunately this is Sustainable Design……
Hyberabad-sindh



However this is not…
but it is beautiful

but you learn something everyday…

Is this?



Perhaps

Perhaps

I think this is….

but how is it relevant?

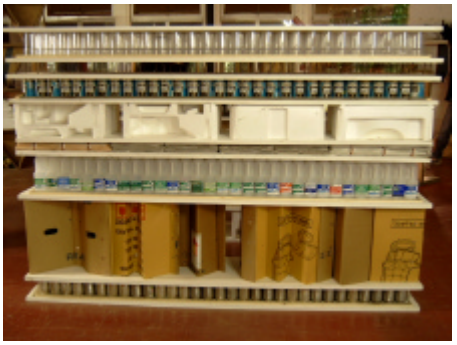
Rural Studio….

Carpet tiles

Architecture Student Project's

Architecture Student Project's

Architecture Student Project's



Recycling is a big deal.....

But in order of preference....

- REDUCE
- REUSE
- RECYCLE
- Design for Demolition!

THE GOOD NEWS

- Everybody is talking about
  - saving energy & reducing CO_2
  - reducing waste & water consumption
  - buying good local food
  - cycling to work

- **It saves lots money, adds value to property** - *UK Green Building Council stated that low carbon new built office buildings cost as little as 5-10% extra over 'normal' versions*

- **Green building can be at the heart of a low-carbon economic recovery,** *boosting growth and creating green collar jobs. This is particularly true in our leaky existing homes and buildings, where we need a massive programme of refurbishment to cut carbon, reduce energy bills and produce more comfortable places to live and work.....Green Building Council*

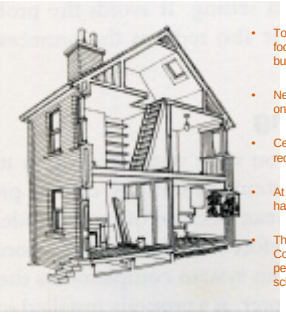
- **There are lots of new networks helping the construction industry to reduce waste**

THE CURRENT REALITY


Lights go out across Britain as recession hits home

Electricity demand falls as economy slows at fastest rate since 1980

THE CHALLENGE



- To make a real impact on CO2 emissions we must focus on improving energy efficiency of existing building stock
- New buildings are well insulated but account for only 0.01% of building stock (each year)
- Central government requires CO2 emissions to be reduced by 80% by 2050.
- At current demolition rates we should expect to have 80% of our current building stock in 2050
- Therefore we need to retrofit existing homes to a Code Level 4 standard at least at a rate of 500,000 per year for 40 years!!..... And that doesn't allow for schools, offices etc..

So How Did Pre-Industrial Society Cope?

"...man has from age to age translated the manuscript of the earth into the terms of his own thought and use...To realize the differences between place and place; to observe the varieties in expression of the genius locci by noting the correspondences between the raw material below and the finished structure above the ground"

H.J. Massingham, Cotswold Country, Batsford Press, London, 1937, P.3

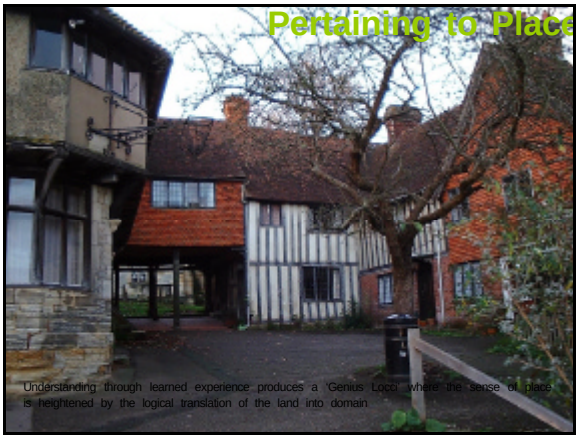
Pertaining to Place

Vernacular styles of architecture were derived from the materials found close to the site - regional differences of geology and vegetation resulted in logical variations in constructional language

Pertaining to Place

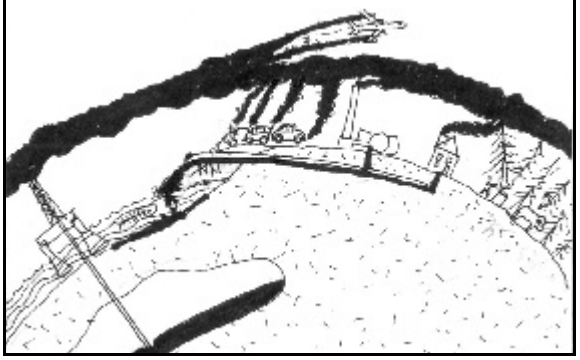
The palate of regionally available materials if honestly expressed can provide a clarity and rigor to an architectural language as well as a sense of identity

Pertaining to Place



Understanding through learned experience produces a 'Genius Locci' where the sense of place is heightened by the logical translation of the land into domain

a material consideration



Case Study

New House + Studio Hove

Case Study

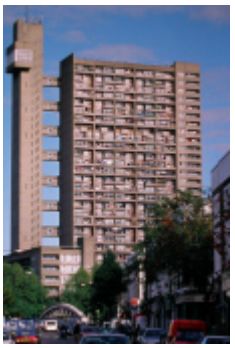
New House + Studio Hove

Case Study

New House + Studio Hove

THESE ARE OUR FUTURE ECO TOWNS

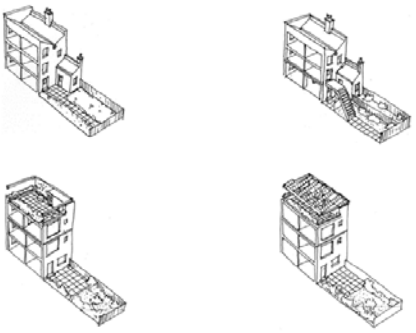
Working with Existing Buildings



Working with Existing Buildings

Working with Existing Buildings

The evolution of a terrace house



Case Study

SALFORD QUAYS

Urban Splash

Working with Existing Buildings

Jakob & Macfarlene's *Cite de la mode et du design* in Pari

Case Study

The Green House Ripe

Case Study

The Green House Ripe

Case Study
The Green House Ripe

Case Study
The Green House Ripe

Case Study
The Green House Ripe

Case Study
The Green House Ripe

G.I.A : 207m^2 inc. garage

Mayor refurbishment of existing building & 20m^2 extension

Contract Sum: £227,000+vat

Cost/m^2 inc. renewables £1,338/m^2

Grants for renewables worth £1.9k

Case Study
The Green House Ripe

RENEWABLES:
8kW Biomass Boiler £8k + £1.5k store/ hopper for pellets +
4m^2 solar thermal panel £3k

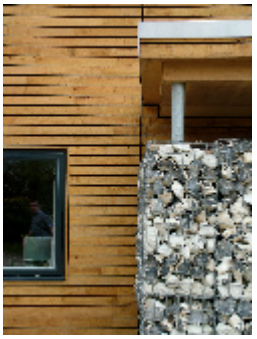
ENERGY FIGURES:
Aiming for 'U'Values -
Walls - 0.14
Roof - 0.11
Floor - 0.25

NB: This building has been pressure tested at 5no. Air Changes per hour.

Case Study
The Green House Ripe

Case Study
The Green House Ripe

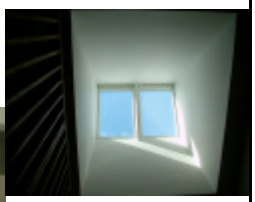
Case Study
The Green House Ripe



Case Study
The Green House Ripe

Case Study
The Green House Ripe

Case Study
The Green House Ripe



Case Study
Hamsey Village Hal

Case Study
Hamsey Village Hal

Case Study
Hamsey Village Hal

G.I.A : 146m²

Mayor refurbishment of existing building & 37m² extension

Final Account: £207,000+vat

Cost/m² inc. renewables £1,417/m²

Grants for construction from DEFRA/ VIRADOR/ BIFFA

100% Grants for renewables worth £38.5k 50% from EDF + 50% Clear Skies

Case Study
Hamsey Village Hal

RENEWABLES:

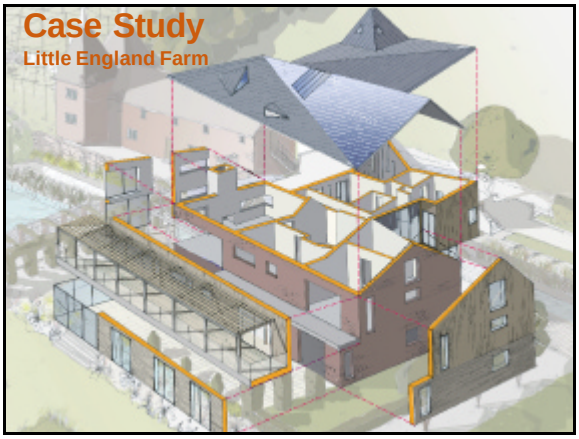
• after year one the wind turbine generated:

6,700 Kwh of electricity with the wind turbine. The charity have signed up with Good Energy and their payback scheme pays 9p/Kwh hour. This gave an income of £603. The electricity bill for the first year was £413!

There are also roof mounted solar thermal collectors.

Case Study
Little England Farm

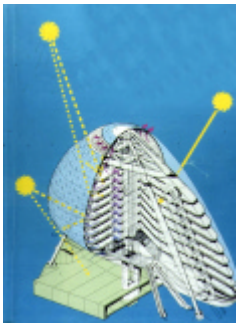
Case Study
Little England Farm



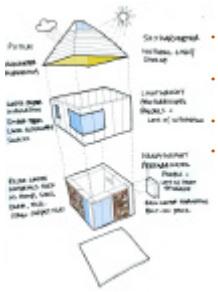
We need good ideas...
the Swiss Sound Box

We need good ideas…
warm tarmac + solar juice

But watch out for *greenwash*

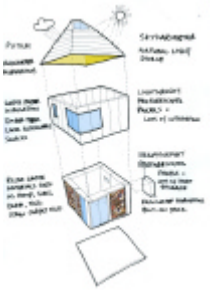


THTKB: THE CHALLENGE



- To create Europe's first truly environmentally-friendly 'Prefa house
- Using predominately non-toxic, organic, locally-sourced, replenishable and/or secondhand/ waste materials
- To use fully integrated rooftop 'renewables'
- And do it live on TV in 6 days!

THTKB: THE IDEA



- To combine two brand new innovative green prefab systems
- MODCELL - Heavyweight, highly insulated, locally sourced, affordable replenishable/ waste materials - combining a minimal amount of expensive engineered timber plus cheaper straw/ lime/ hemp *Creating* cellular, self-cooling/ warming ground floor bedrooms & bathroom
- FACIT - Lightweight, highly insulated, replenishable/ waste materials, all cut out with a computer controlled router *Creating* double height open plan living room/ kitchen/ dining room 'balloon'
- Both designed by UK Architects pushing the boundaries

THTKB: THE AMBITION

- To prove that fluffy, crumbly, organic low carbon materials can compete with their more established high energy high carbon counterparts
- To focus on prefabrication because it reduces wastage on site to a minimum (up pf 20% of building material ends up in landfill using traditional 'wet' trades
- To use high tech construction methods to reduce time on site, material waste and accuracy on site
- To prove that an understanding of lightweight material to insulate and heavyweight materials to store energy will mean that you don't have to rely too much on expensive high tech gear to create a low carbon house

MODCELL's off-site Flying Factory

MODCELL's off-site Flying Factory


DAY 1: MODCELL ON SITE


DAY 2: THATCH

DAY 2: UPSTAIRS WITH FACIT


DAY 2: UPSTAIRS WITH FACIT


DAY 2: UPSTAIRS WITH FACIT


DAY 2: THTKB

DAY 3

DAY 3: RAMMED EARTH

DAY 3: TOPPING OUT

DAY 4: ACCOYA WINDOWS

RUBBER ROOF/ PAPER LINING

DAY 4: GLASS SOLAR TILES

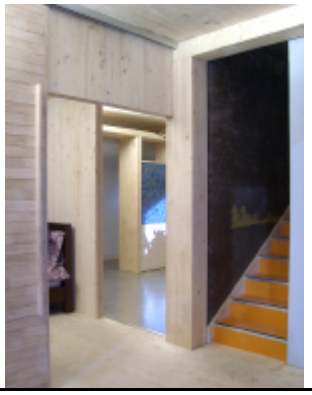
SOLAR THERMAL & PHOTOVOLTAIC

RECYCLED PAPER & PLY CLADDING

DAY 5: COMPLETE

DAY 5: COMPLETE

DAY 5: ENTRANCE HALL



DAY 5: BATHROOM

DAY 5: THE LIVING ROOM

DAY 5: THE DINING ROOM

The House that Kevin Built

G.I.A : 85m²

Type of Project: Prefab New build

Final Account: £170,000+vat

Estimated Cost/m² inc. renewables £2,000/m²

Contact Period: 5 days

Energy Rating: A+

Code For Sustainable Homes Rating: Level 5

Renewables:
Solar Thermal Glass Tiles
1.5kW Photovoltaic Tiles

4000 PEOPLE IN TWO DAYS

PRECISION CUTTING & FABRICATION

Working Together

We have the capacity to make a real difference