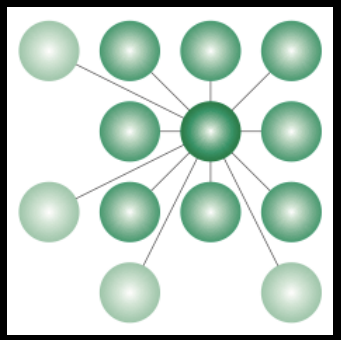

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Building Products Comparison System

(21) Masonry External Walls

CI/SfB: (21.1) Load-bearing
(21.3) Non Load-bearing

(21)Ext walls: Content

- Performance Requirements
- Unfired clay brick/block wall/partition
- External Solid Masonry walls
  - Solid brick/block walls
  - External insulated render
- Insitu Concrete walls
- Cavity masonry walls
  - Wall ties
  - Openings for windows and doors
- Resource Efficiency

(21) External walls Created for/Presented to:

- RIBA Part 1 Year 2 Architecture
- LSBU Tech & Env 2 Lecture
- Domestic, Small & Medium size buildings
- Construction methods, materials, services and systems
- Masonry External walls

© NGS 2007-2013 (21) External Walls

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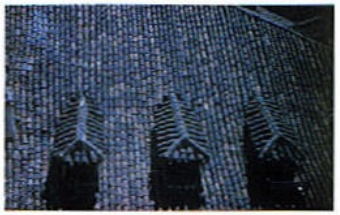
Building Products Comparison System

Performance Requirements

Principles of Element Design

THIRD EDITION

PRINCIPLES OF element design



Peter Rich &
Yvonne Dean

Architectural Press

ARCHITECTURE/DESIGN

PRINCIPLES OF element design THIRD EDITION

Peter Rich & Yvonne Dean

- **Unique in its approach to detail design**
- **Invaluable for both students and practising architects, builders and surveyors**
- **Completely updated in a convenient reference sheet format**

The construction of buildings is learnt through experience and the inheritance of a tradition in forming buildings over several thousand years. Successful construction learns from this experience which becomes embodied in principles of application. Though materials and techniques change, various elements have to perform the same function. **Principles of Element Design** identifies all the relevant elements and then breaks these elements down into all their basic constituents, making it possible for students to fully understand the given theory and principles behind each part. As all building projects are subject to guidance through the Building Regulations and British Standards, this book gives an immediate reference back to relevant information to help practitioners and contractors identify key documents needed.

Peter Rich AA Dipl (Hons) Architect, started his career with 14 years' experience as a qualified architectural technician. He then joined the AA School of Architecture, working with Bill Allen and John Bickerdike after his graduation, later becoming a partner of Bickerdike Allen Rich and Partners. He also taught building construction at the Bartlett School of Architecture, University College London, and architectural design at the Polytechnic of North London. He now acts as a Consultant.

Yvonne Dean B.A. (Hons) B.A.(Oxon) RIBA, is an architect, energy consultant and materials technologist. She also has 15 years' experience as a lecturer, travels widely and is a guest lecturer at many universities. She pioneered an access course for Women into Architecture and Building, which has been used as a template by others, and has been instrumental in helping to change the teaching of technology for architects and designers.

ISBN 0-7506-3113-9

Architectural Press
An imprint of Butterworth-Heinemann
http://www.bh.com

Wall Actions

- Gravity: downward pull
- Wind: Motive, Destructive, Penetrative
- Rain: Moisture deposition, penetration
- Snow: Moisture deposition, loading
- Moisture vapour: permeation, condensation, insulation impaired, material degredation, moisture mass
- Sun: Temp variation, thermal movement, heat gains, thermal mass, decrement, Chemical decomposition
- Dirt and Dust: infiltration, deposition, surface pollution
- Chemicals: corrosion, disintegration, decomposition
- Sound: Noise nuisance, from within and from without
- Attack: Manual, Ballistics, Bomb Blast
- Thermal: heat loss, thermal bridges, radiant coolth, condensation, Cavities: stack effect, thermal mass, air tightness, decrement: thermal lag, moisture evapouration cooling

Wall Reactions

- Gravity: Support & restraint
- Wind: rigidity, resilience, sealing, air tightness layers and detailing
- Rain: deflection, impervious skin, absorption and drainage, sealing
- Moisture vapour: resistance, hygroscopicity, permability, breathing, moisture mass
- Snow: deflection, impervious skin, absorption and drainage, sealing
- Sun: movement joints, insulation, shielding, invulnerable materials
- Dirt and Dust: repulsion, exclusion, sheilding, cleaning
- Chemicals: invulnerable materials, exclusion,
- Sound: Insulation, absorption, acoustic mass, separation, isolation,
- Attack: toughness, lamination, edge restraint, edge protection
- Insulating: thermal insulation, thermal mass, U value, Decrement delay, thermal bridge avoidance/minimisation

Principles of Element Design

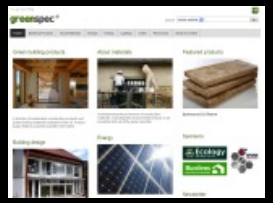
- Appearance
  - Interior and exterior materials and finishes
- Structural strength and stability
  - Load-bearing
  - Wind resistance
- Weather barrier
  - Rain, snow, wind, sun,
  - dirt dust pollution
- Durability
  - Moisture resistance, frost, mould
  - Moisture Mass & Hygroscopicity
  - Ozone and sunlight degradation
- Thermal Performance
  - Heat Resistance: loss and gain
  - Condensation Avoidance
  - Airtightness
  - Avoidance of Thermal Bridges
  - Thermal Mass
- Movement
  - Structural , thermal, moisture, Frost
  - Chemical

Principles of Element Design

- Acoustic Performance
  - Resistance, absorption
- Fire Performance
  - Surface spread of flame
  - Fire Resistance
- Security
- Inspection and maintenance
  - Inside & out
- Pest infestation
  - Termites,
  - Termite Barriers
- Rising damp
  - Barriers
  - Capillary Attraction
  - Hygroscopic or Hydrophobic
  - Frost action
- Health
  - Moisture Mass
  - Low allergy materials

Weather Envelope

Absorbent – Repellent – Open Joint Panelled
Masonry – Curtain Wall – Rainscreen



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The UK eWell-Being Awards 2004
www.sustainit.org

GreenSpec
www.greenspec.co.uk

CAP'EM
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www.capem.eu

LCGB: Low Carbon Green Buildings

Brian Murphy (GreenSpec)

Another NGS CPD file to download
See www.scribd.com/brianspecman
and www.greenspecdownload.co.uk
www.nationalgreenspecification.co.uk

www.greenspec.co.uk

Wind

Affects on buildings

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Airtightness & Testing

A94 on-site testing
Regulation, Energy loss, Testing, Sealing, Construction

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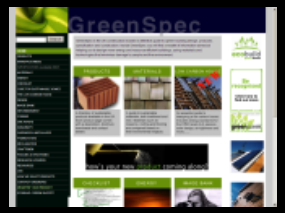

www.greenspec.co.uk

Conduction
Convection
Radiation
Conduction

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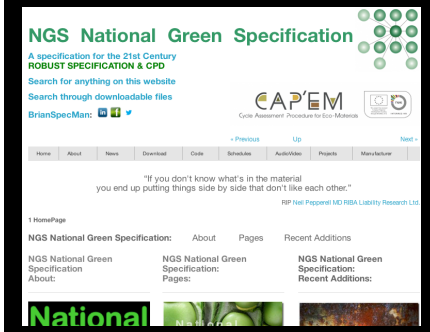

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Building Products Comparison System

Unfired Clay Block Walls

CI/SfB (21) External Walls

(22) internal Partitions

UK Eco-material Market: Unfired Clay brick/block

- Construction Resource: imported
- Natural Building Technology: encourage UK manufacturers to change specification
- 1 UK manufacturer (but WRAP push them to include waste Gypsum as recyclate)
- Format: Bricks and blocks, solid or extruded
- Material: Clay or clay & straw
- Joints: Interlocking design no mortar or clay mortar
- Capacity: Non load-bearing (moisture movement)
- Market share: low and growing
- www.limetechnology.co.uk/pages/sumatec.php

UK Eco-material Market: Chalk brick/block

- Clay block manufacturer offers
- Chalk block option
- Then product disappeared from website and market
- Market Share: shrunk to zero

Sumatec - Windows Internet Explorer

http://www.limetechnology.co.uk/pages/sumatec.php

Google

lime technology ltd

Go | Bookmarks | 328 blocked | Check | AutoLink | AutoFill | Settings

Sumatec

Page | Tools

limetechnology

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home > sumatec

Lime Technology has developed Sumatec®, a range of compressed earth blocks.

- Blocks made from earth and other recyclable waste material, saving costs and environmental damage of landfill
- Low energy manufacture, reducing carbon emissions in creation and its eco-friendly composition
- High performance thermal mass for good heat storage
- Excellent strength
- Thin joint system allows blocks to be laid quickly and easily
- Commercially viable method of creating sustainable buildings for the future

view pages : 1

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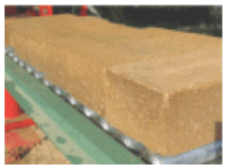
... more here



SUMATEC EARTH BLOCKS

A range of highly sustainable masonry blocks, produced from unfired earth.... more here

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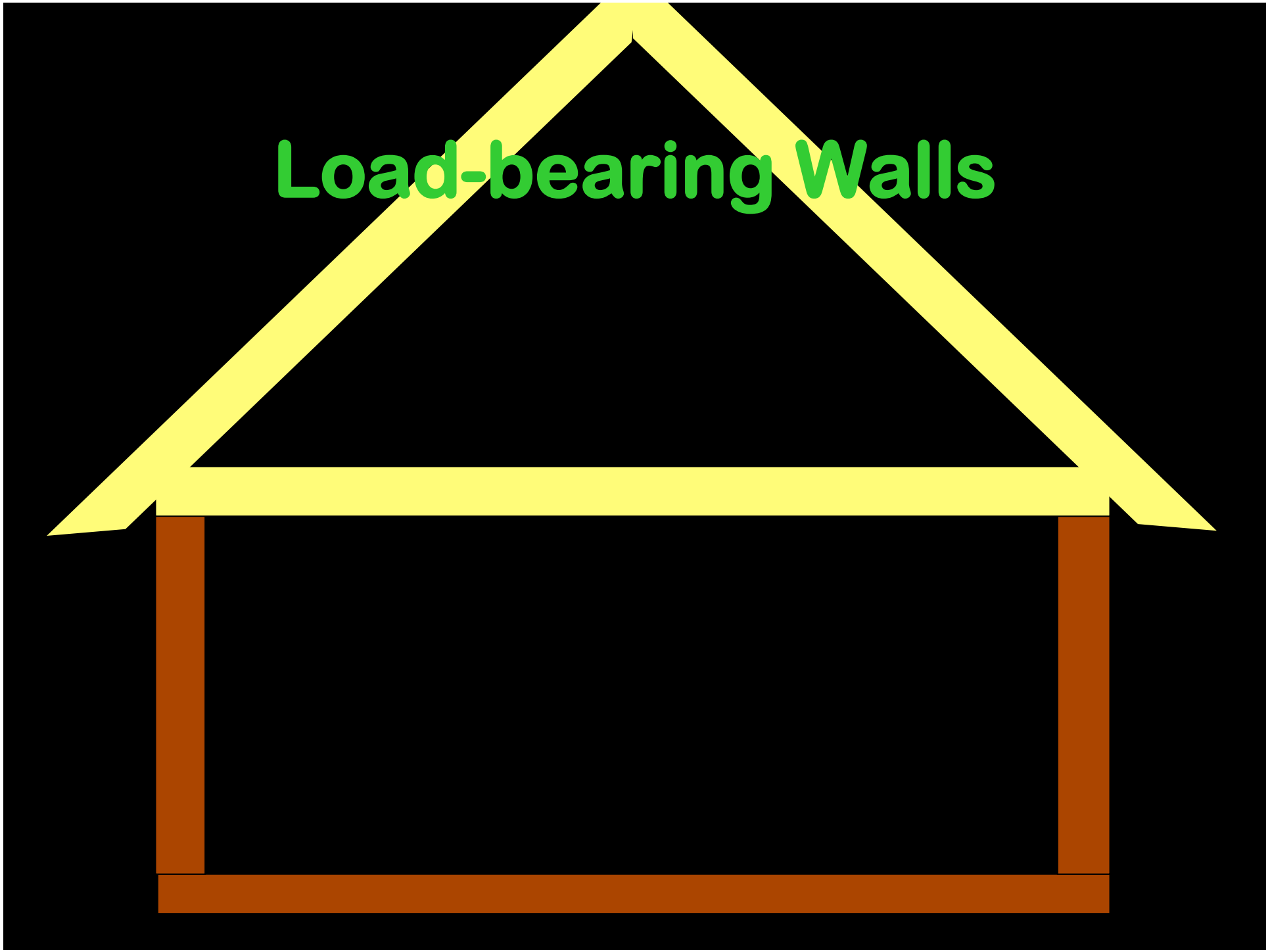
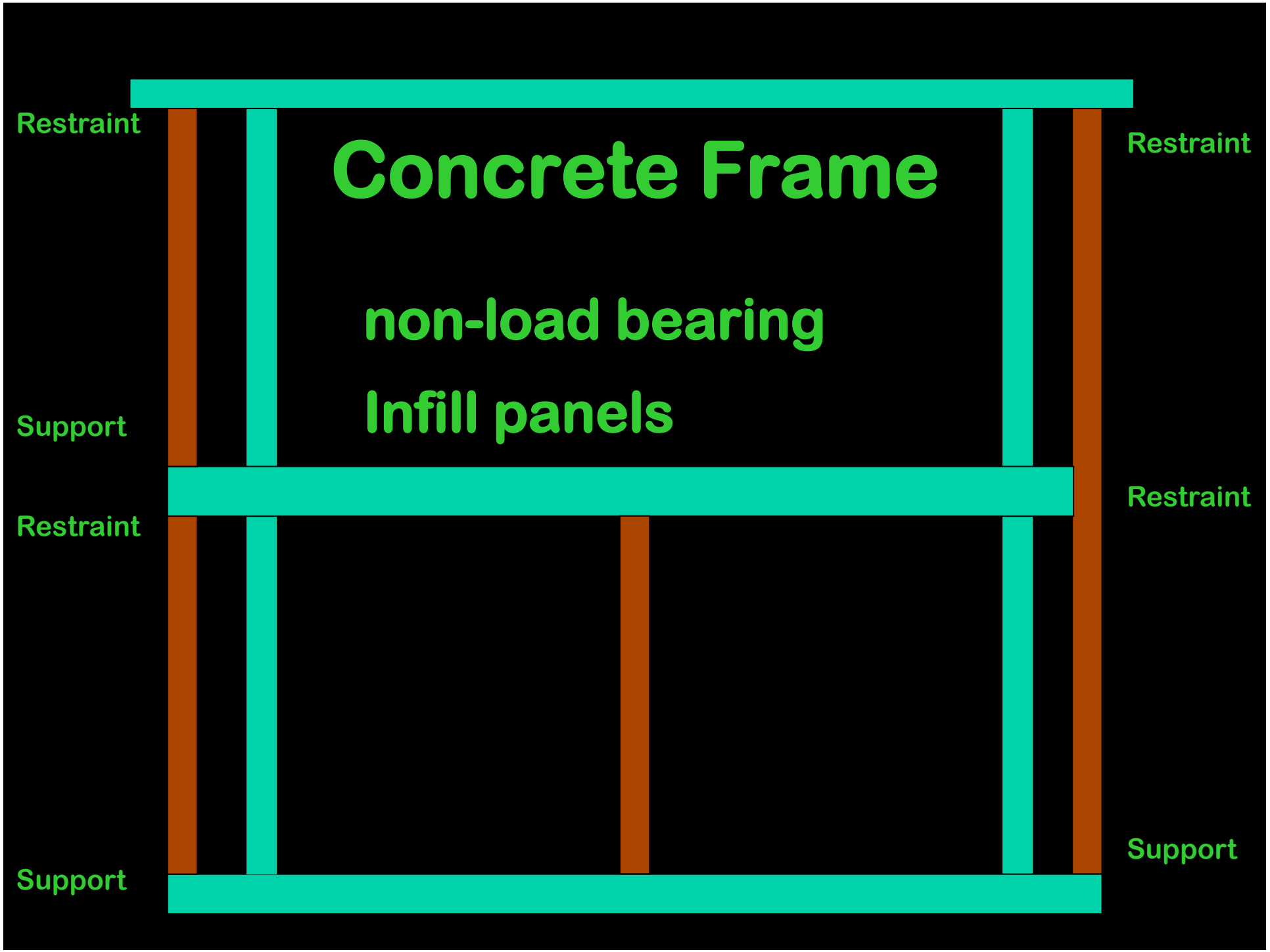
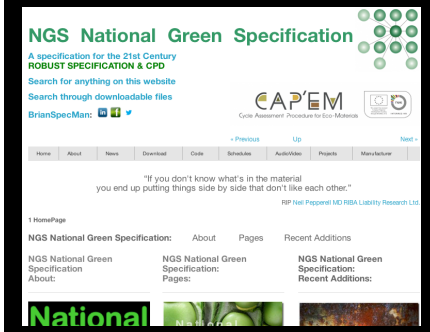
Unfired clay and straw


Load-bearing Walls


Concrete Frame
non-load bearing
Infill panels
Restraint
Restraint
Support
Restraint
Restraint
Support
Support



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Building Products Comparison System

Fired Clay Masonry Walls

CI/SfB (21) External Walls

Fired clay cellular block walls

Familiar in Mediterranean climate
Thermal insulation and load bearing capacity:
Mortared bed joints
Dry purpends
Moisture permeable
Plastered internally
Rendered externally
Low load capacity
Thermal mass
Acoustic mass

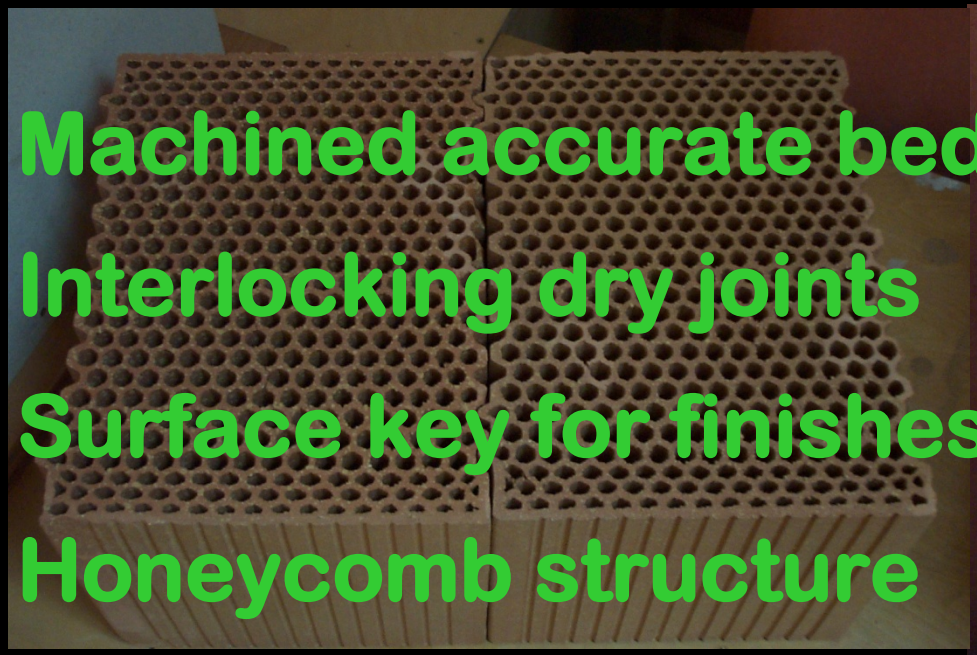
Construction Resources Showrooms Southwark London

Thermal & Acoustic Mass

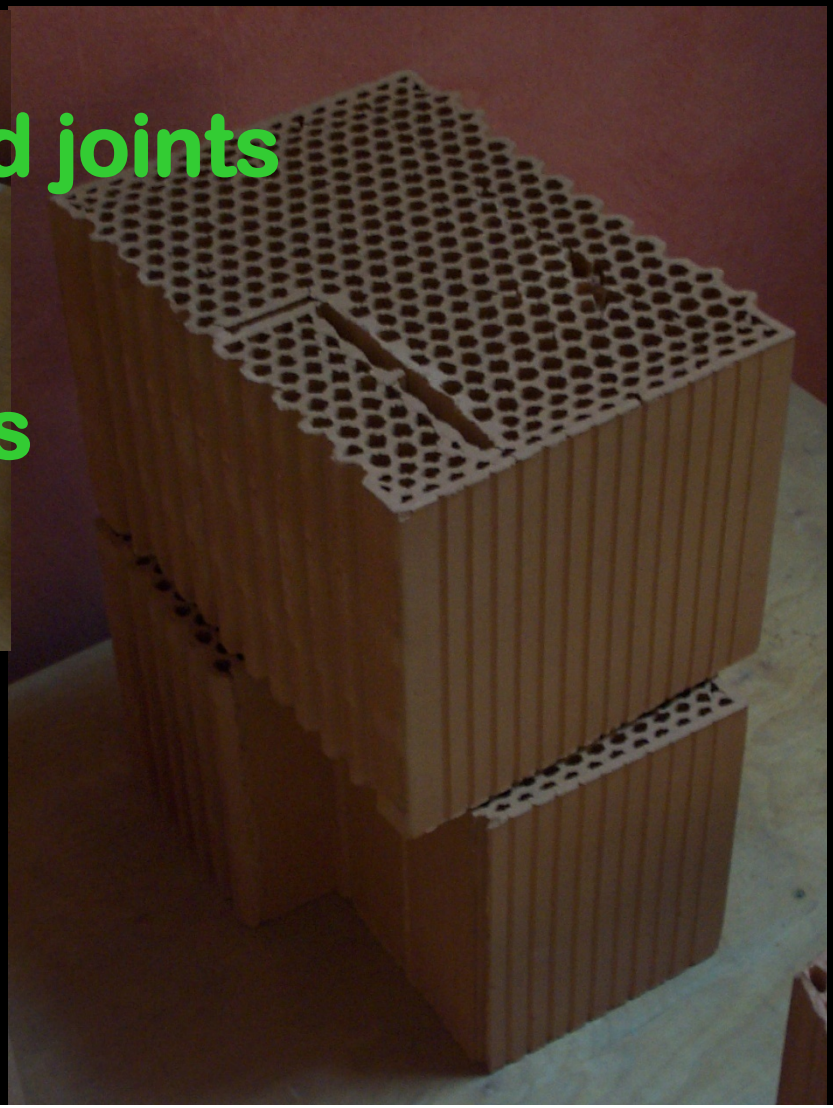
Acoustic and thermally insulating fired clay honeycomb blocks in walls and floors adds Inter-seasonal thermal mass

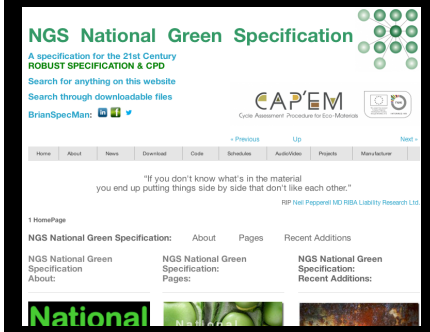
Construction Resources Showrooms Southwark London

Cellular fired clay blocks



- Machined accurate bed joints
- Interlocking dry joints
- Surface key for finishes
- Honeycomb structure
- Long thermal paths
- Insulating air spaces
- Knock out panels





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Building Products Comparison System

Solid 1 brick thick Masonry Walls

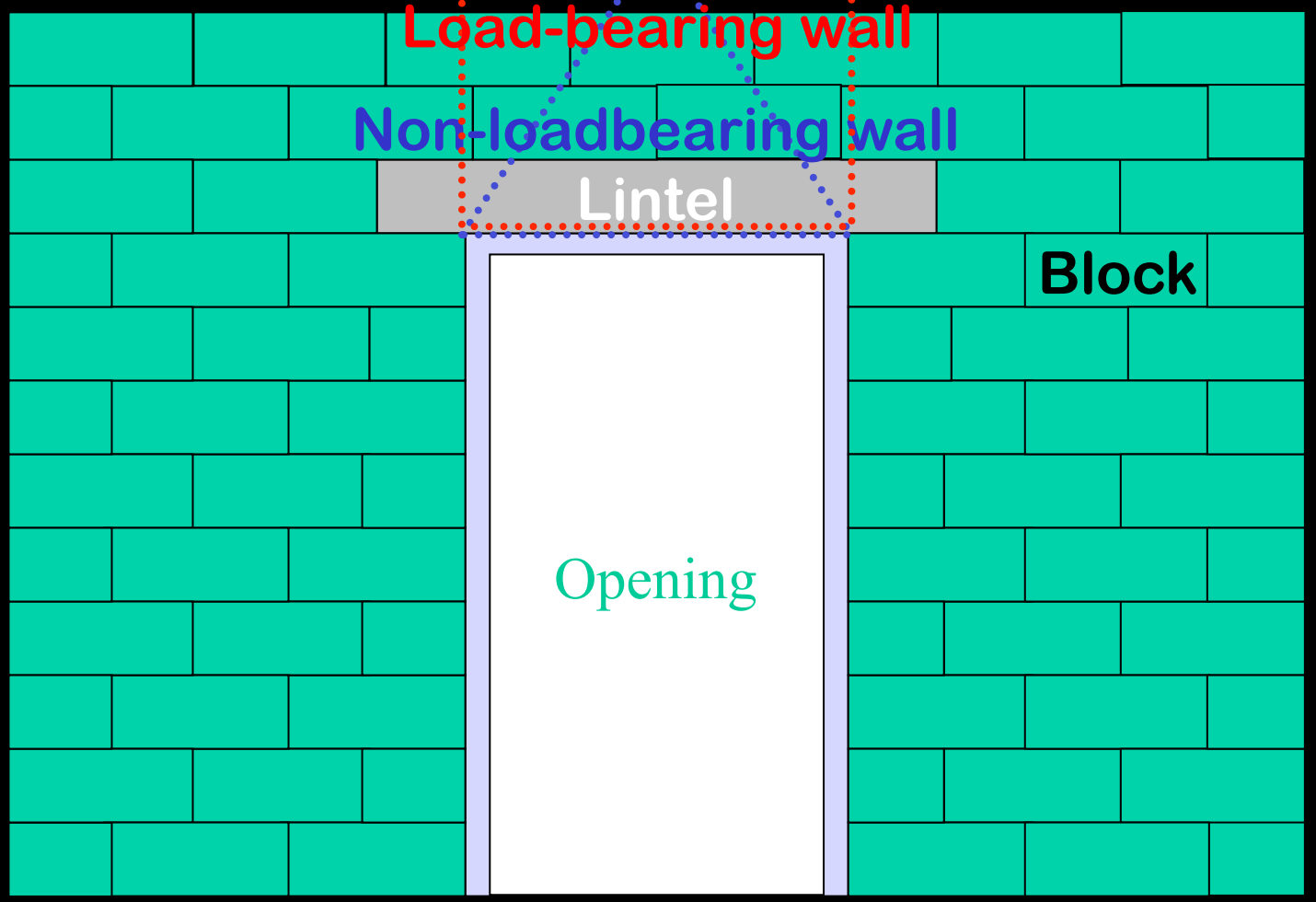
CI/SfB (21) External Walls

Victorian construction

Solid Wall Construction

- Eco Energy Refurbishment

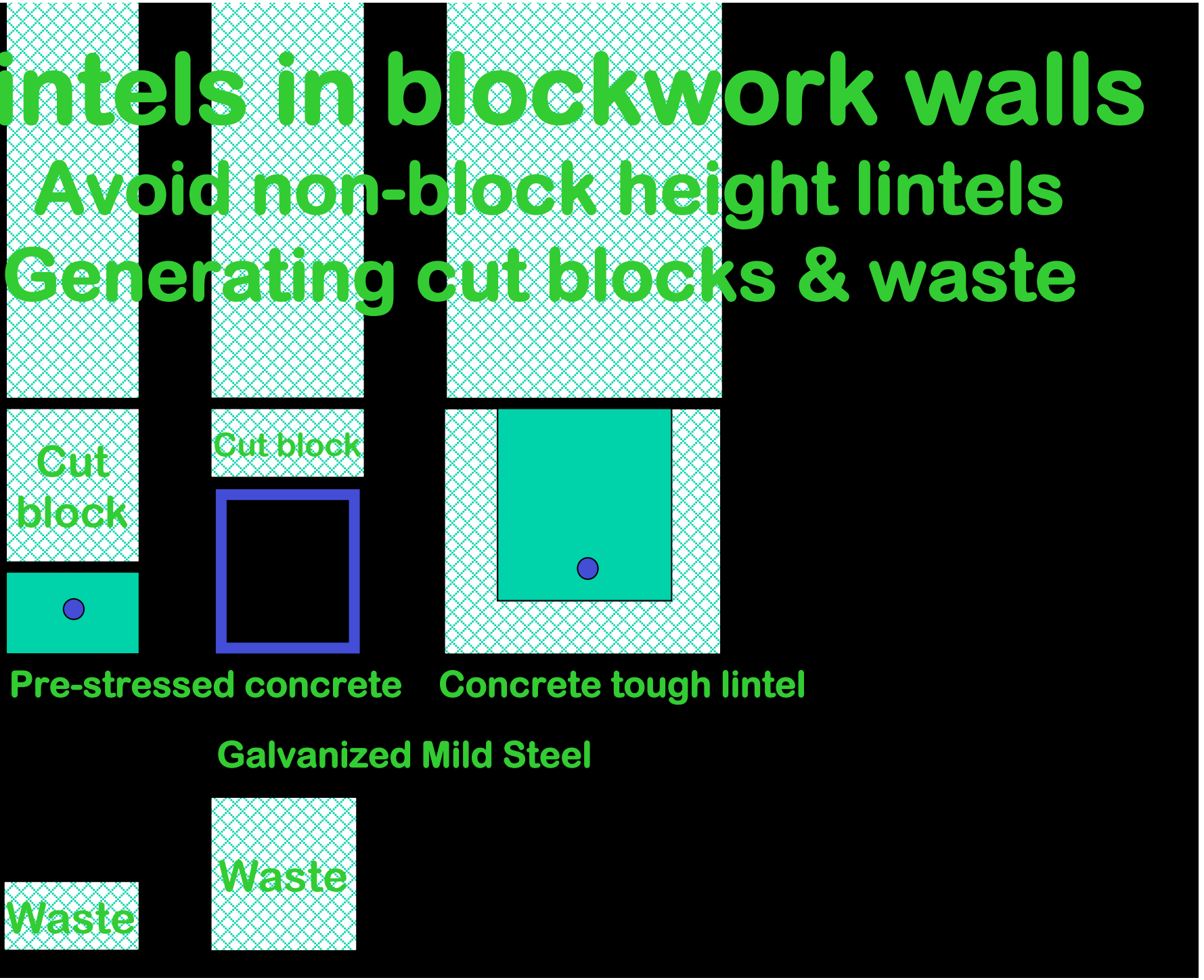
Wall & opening



Lintels in blockwork walls

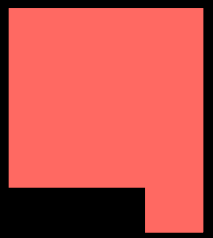
Avoid non-block height lintels

Generating cut blocks & waste

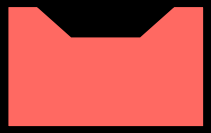


Lintels for masonry walls

Perforated Brick

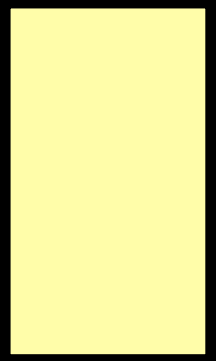


Pistol Brick

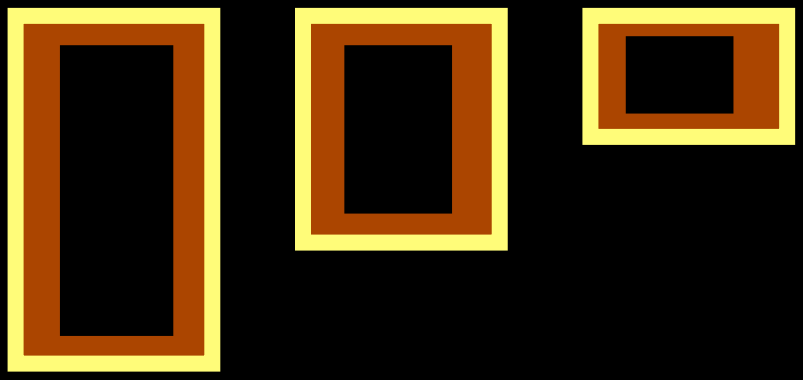


Brick

Frogged Brick



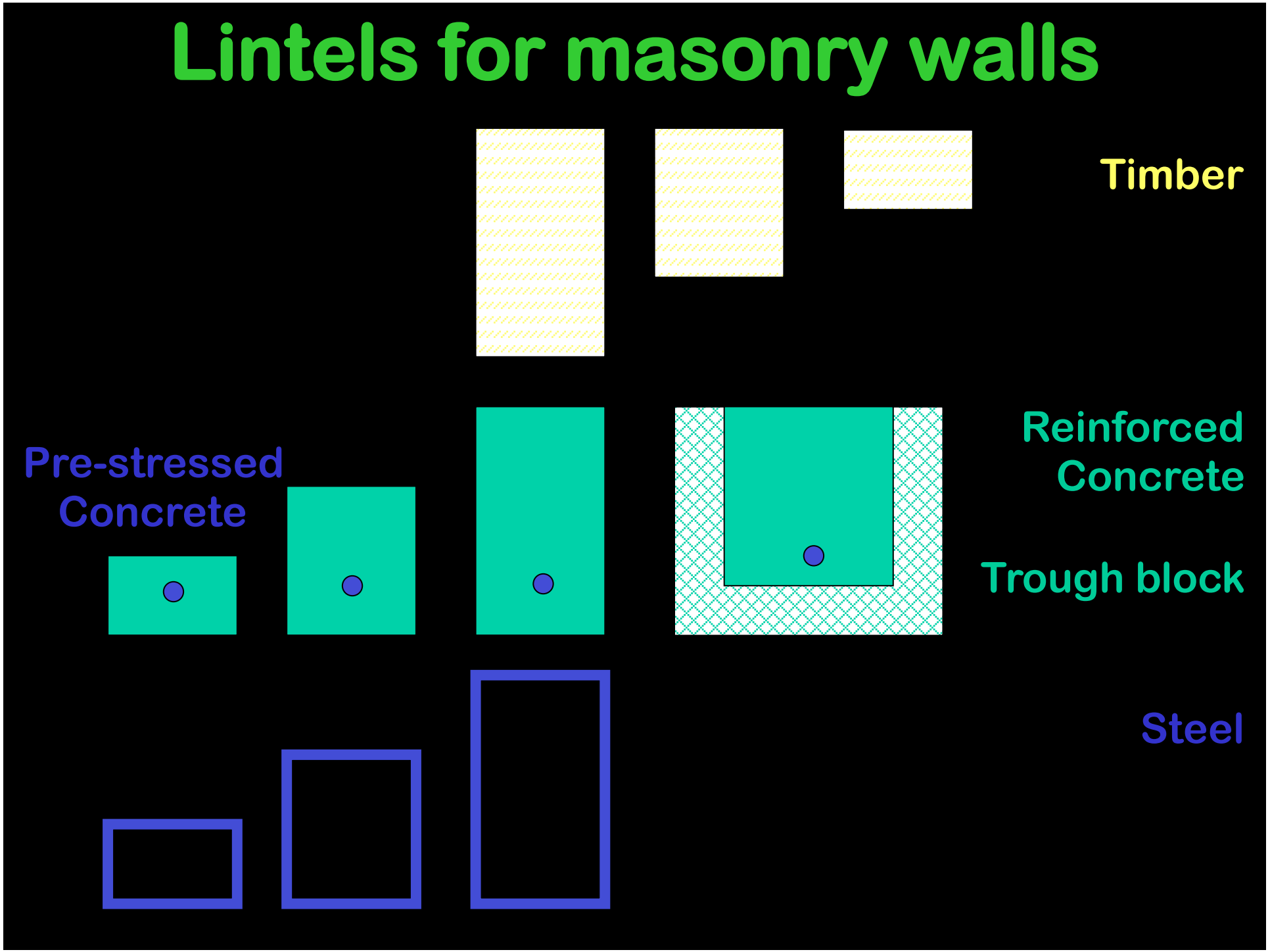
Stone

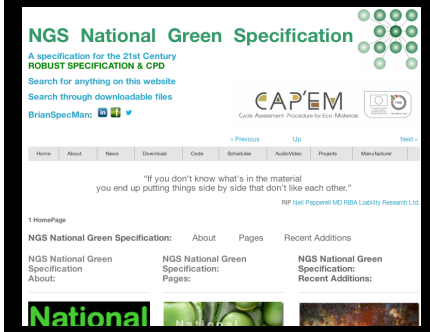


Hollow block
Saves clay
Weight
Firing time
Transport

Terracotta
Faïence

Lintels for masonry walls





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CAP'EM COMPASS
Building Products Comparison System

External Solid Masonry Walls

CI/SfB (21) External Walls

Enviroblock EV1, EV2, EV3

lightweight block

Masterblock's Enviroblock range is a new generation of environmentally engineered building block products designed to meet the needs of today's society.
Produced from selected waste raw materials, manufactured in ISO 14001 compliant factories and certified by the BRE Environmental Profile Scheme, this comprehensive range of products enables architects and specifiers to design sustainable buildings with confidence.

Solid Block (100mm)

Hollow Block (215mm)

Cellular Block (100mm)

Use: External Walls / Internal Leaf / Internal Partition Walls
Strength: 3.5N/mm²
Density: 1450 kg/m³
Thermal Conductivity: 0.51 W/m°C
U value: 0.35 W/m²K
Thickness: 440x215x100mm

greener than:	blocks made from virgin aggregate				
standards:	BS 6073: Part 1 & Part 2, BE 5628: Part 1				
BRE Ecopoints:	0.44 - 1.16 more info...				
downloads:	brochure (1.1Mb)				
specification:	n/a				
recycled content:	EV1 100% Recycled Aggregate(3.5N) EV2 Consisting of lightweight and dense recycled materials (3.5N) EV3 Consisting of lightweight and dense recycled materials (3.5N)				
cost commentry:	n/a				
manufactured in:	UK				
manufacturer:	Masterblock	UK	01285 646800 (technical)	✉	WWW
suppliers:	Masterblock				
other links:	• Enviroblock dense block				

Adobe Acrobat Standard - [Enviroblock_Brochure.pdf]
File Edit View Document Tools Advanced Window Help
Open Save Print Email Search Select Text How To..?
Create PDF Review & Comment Secure Sign 66.67%
Bookmarks Signatures Layers Pages Comments

ENVIROBLOCK RANGE

Lightweight – 1450Kg/m3	Dense – 1950Kg/m3
440x215x100mm	440x215x100mm
Enviroblock EV1 100% Recycled Aggregate(3.5N)	Enviroblock EV11 100% Recycled Aggregate (7N)
Enviroblock EV2 Consisting of lightweight and dense recycled materials (3.5N)	Enviroblock EV12 100% Secondary Aggregate(7N) China Clay bi-product
Enviroblock EV3 Consisting of lightweight and dense recycled materials (3.5N)	

CERTIFIED ENVIRONMENTAL PROFILES

Format	Enviroblock Range	Ecopoint		Green Guide to Specification Rating	Ecopoint		Green Guide to Housing Specification Rating	
		Internal Partition Wall*	External Cavity Wall**		Internal Wall*	External Wall**	Int	Ext
Lightweight	Enviroblock EV1	0.44	1.10	A - Excellent	0.52	1.01	B	A
	Enviroblock EV2	0.50	1.16	A - Excellent	0.61	1.02	B	A
	Enviroblock EV3	0.48	1.14	A - Excellent	0.55	0.96	B	A
Dense	Enviroblock EV11	0.48	1.15	A - Excellent	0.58	0.99	B	A
	Enviroblock EV12	0.51	1.18	A - Excellent	0.60	1.01	B	A

*Enviroblock internal partition wall, plasterboard on dabs, paint
**Brickwork outer leaf, insulation, Enviroblock inner leaf, plaster/plasterboard & paint

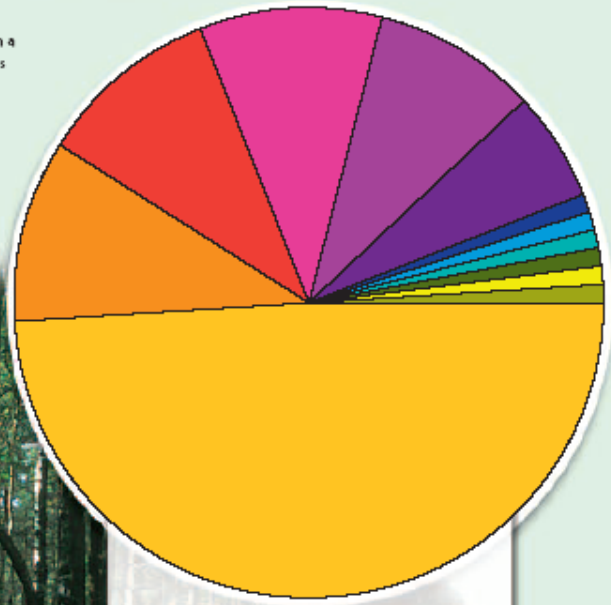
*Enviroblock internal partition wall, plasterboard on dabs, paint
**Enviroblock (reinforced) outer leaf, insulation, secured concrete blockwork, inner leaf, plaster/plasterboard & paint

PHYSICAL CHARACTERISTICS

Enviroblock	Number/m2 as laid	Vapour Resistivity MNs/gm	Average drying shrinkage	Thermal conductivity moisture content @ W/moC		Thermal resistance m2/K/W		Dry block weight Kg	Weight laid Kg/m2
				3%	5%	3%int	5%ext		
Lightweight	9.88	50	0.03-0.05	0.49	0.51	0.200	0.196	13.65	153

Environmental Profiles

The BRE have provided a chart using the Ecopoint scores from a range of environmental profiles which is shown below.



ENVIROBLOCK EV1:
Breakdown of environmental Impact by Issue

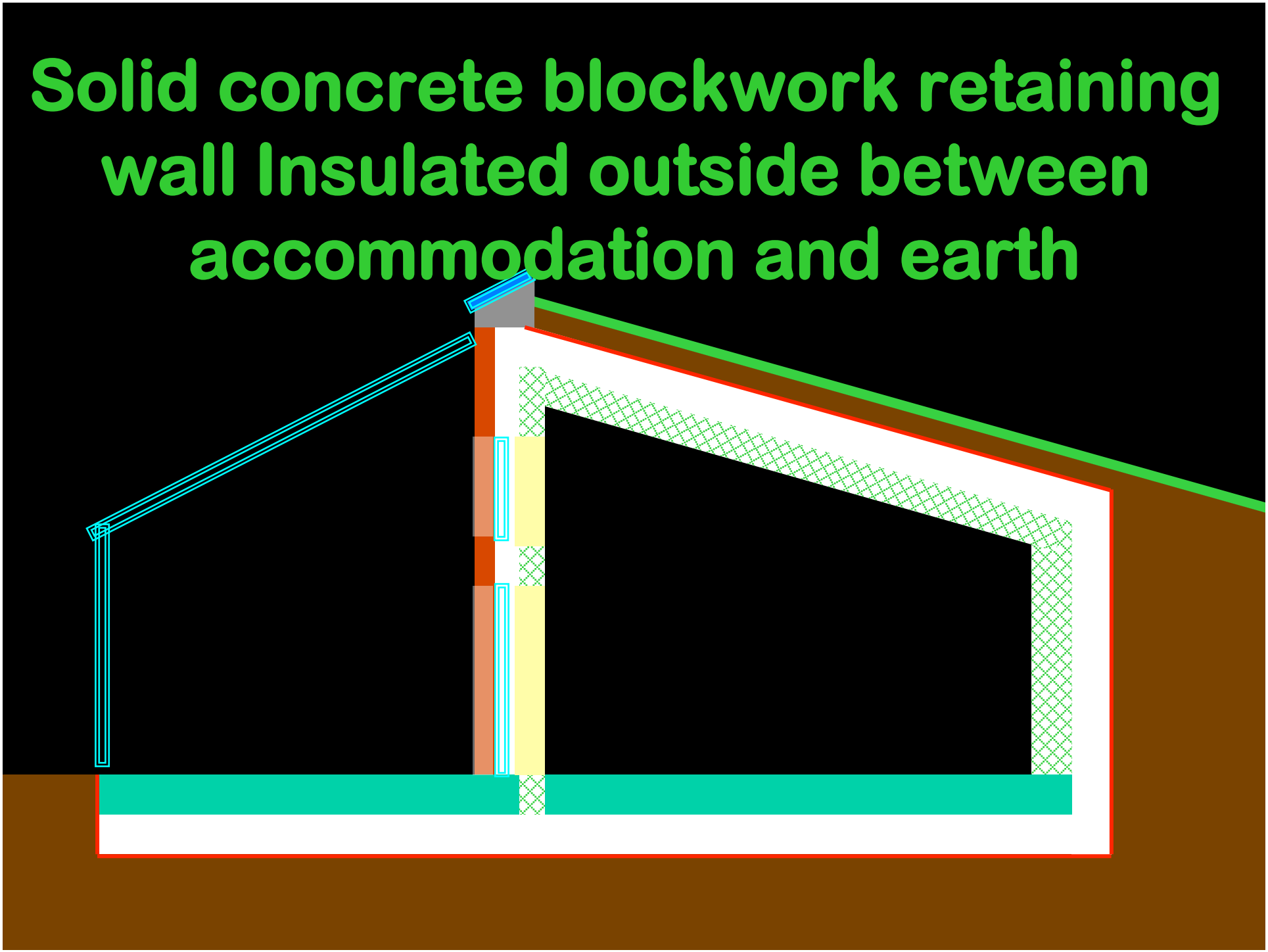
- Climate Change - 49.25%
- Pollution to Air: Human Toxicity - 12.96%
- Acid Deposition - 10.50%
- Minerals Extraction - 10.37%
- Fossil Fuel Depletion - 9.20%
- Pollution to Water: Eutrophication - 6.22%
- Pollution to Air: Photochemical Ozone Creation Potential - 0.67%
- Waste Disposal - 0.57%
- Water Extraction - 0.26%
- Pollution to Water: Human Toxicity - 0.0011%
- Pollution to Water: Human Ecotoxicity - 0.0002%
- Ozone Depletion - 0.0000%

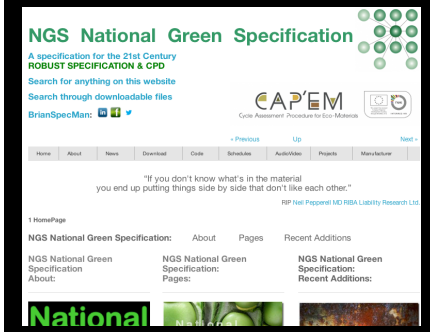
16.54 x 11.69 in
5 of 6

Agg. Ind. Masterblock Enviroblock

- All sites ISO 14001
- Sponsors Civic Trust Sustainability Award
- Annual Reporting on Sustainability of production
- Has Biodiversity Action Plan for sites
- Uses 'Envoy' Intranet to facilitate company wide learning
- Intelligent educational literature addressing environmental sustainability issues and their products in this context
- 100% recycled or 100% secondary (china clay) aggregates or 'consisting of lightweight and dense recycled materials'
- Ordinary Portland Cement (still considering GGBS)
- Local supply only
- 5 products in range lightweight and dense
- BRE (independent 3rd party) Certified Environmental Profiles
- EcoPoint scores between 0.44 and 1.18
- (10 = 1 UK citizen's Env. impact in one Year)
- Surpasses generic product data in BRE GGtS & GGtHS setting new standards in sector
- A rated in non-domestic external and internal walls
- A rated in domestic external walls, B rated in domestic internal walls
- A rated construction elements can score points in EcoHomes and BREEAM
- Adopts existing tried and tested building techniques well known in the industry

Solid concrete blockwork retaining wall Insulated outside between accommodation and earth





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Building Products Comparison System

External Insulated Render on Solid Masonry Walls

CI/SfB (21) External Walls

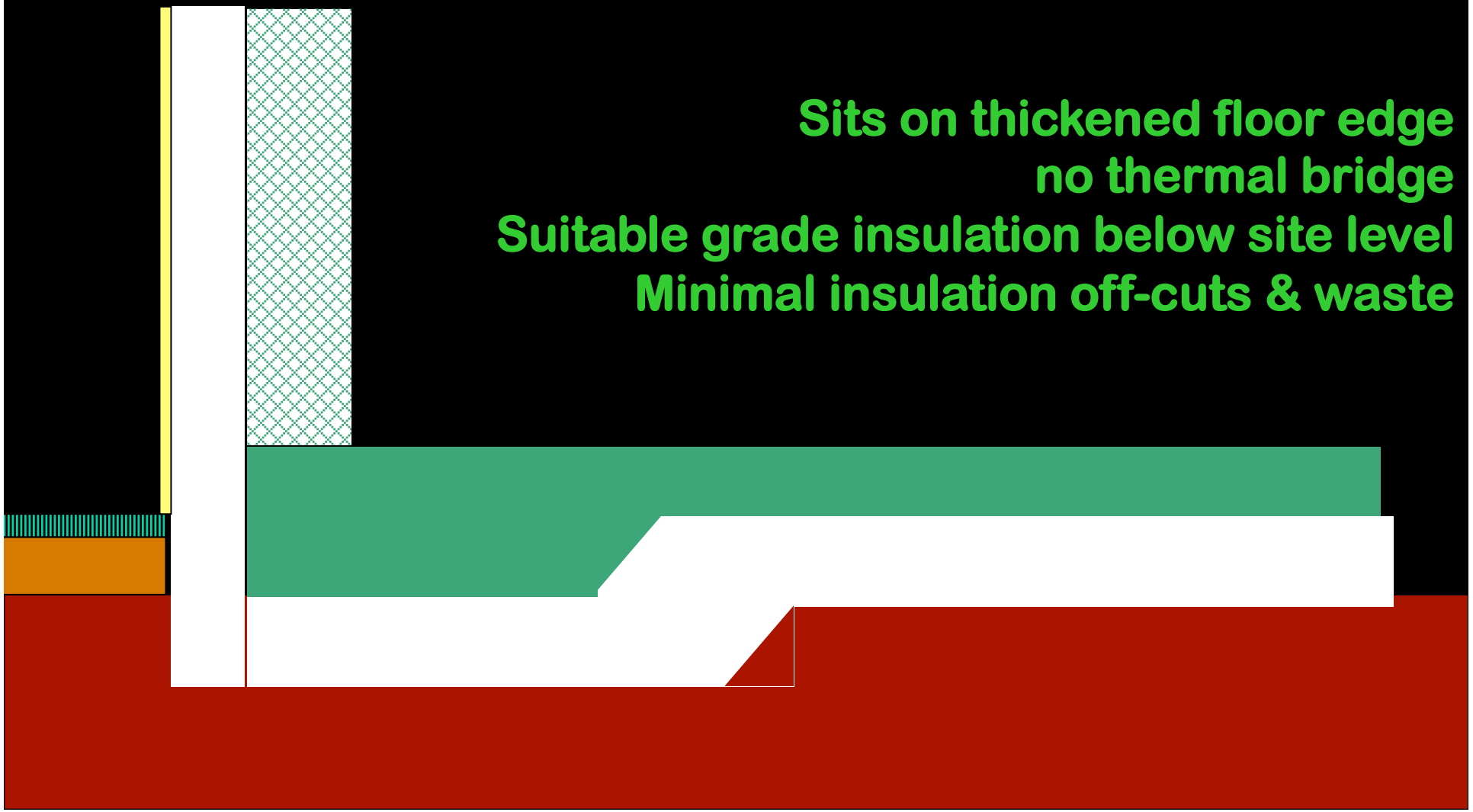
EIR External Insulated Render system on solid masonry walls

- Concrete block solid wall
- Reinforced Insulation system externally
  - Expanded polystyrene or
  - Rockwool
  - Aluminium carrier system or
  - Synthetic Reinforcement mesh
  - Metal/Plastic large head ‘nails’
- Render applied externally
  - Acrylic
- Gypsum plaster or plasterboard drylining inside

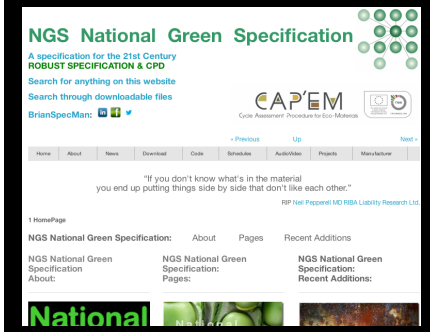
EIR External Insulated Render system on solid masonry walls

- Eco-Concrete block solid wall
- Reinforced Insulation system externally
  - Dense cellulose insulation
  - Synthetic reinforcement mesh
- Render applied externally
  - Mineral based render
- Clay Plaster or clayboard drylining inside

eco-concrete blockwork foundation thick insulation layer and render



Sits on thickened floor edge
no thermal bridge
Suitable grade insulation below site level
Minimal insulation off-cuts & waste



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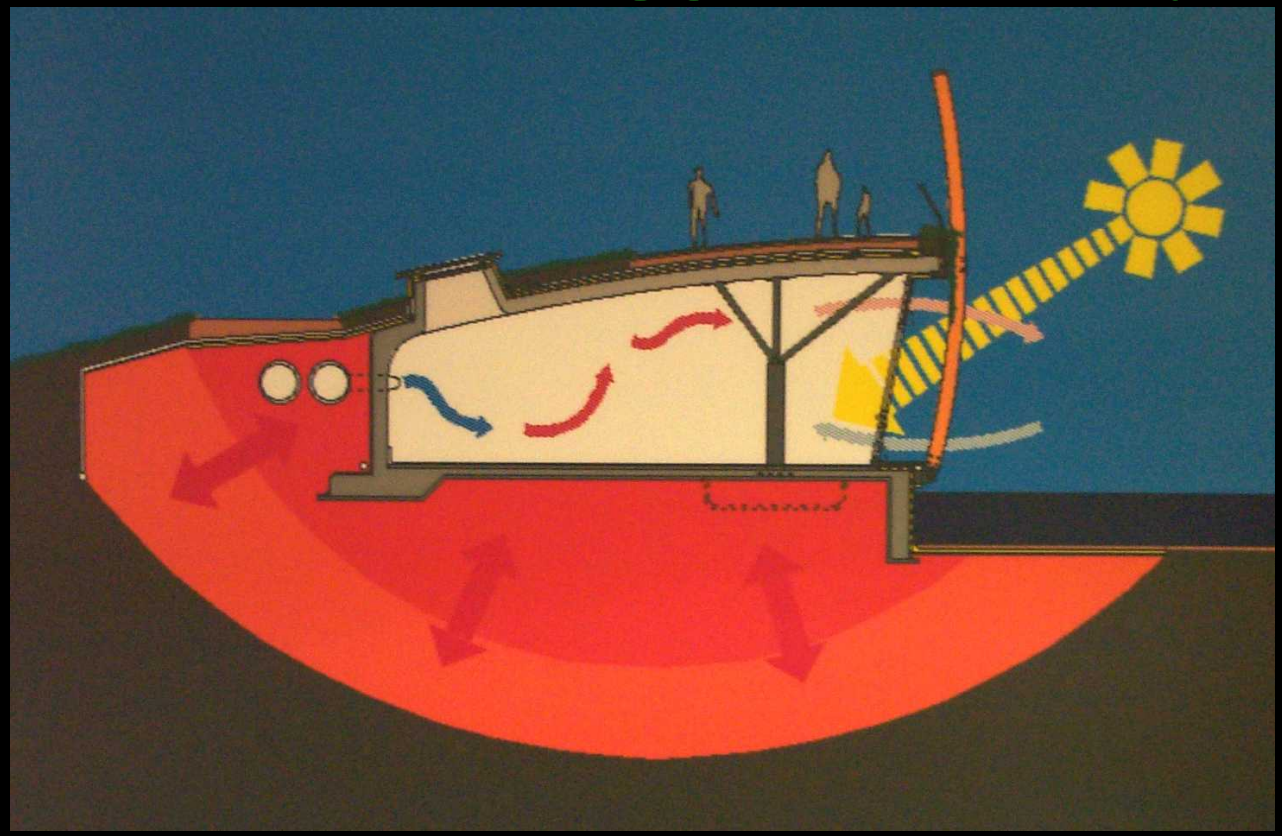
Insitu Concrete Walls

CI/SfB (21) External Walls

Zero Energy Development

Mile End Road Park

Zero Energy Development



Zero Energy Development Use of thermal mass of earth to store heat for 6 months

Mile End Road Park, E London

1960's insitu concrete tower refurbishment

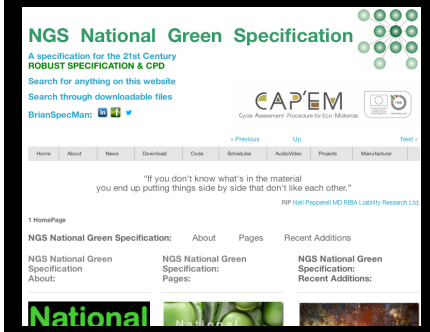
- Eco Energy Refurbishment

www.greenspec.co.uk

Violet materials: Cement Concrete & Blockwork

The Environment & The Problems
The Competition & Some Solutions

Another GreenSpec CPD to download soon



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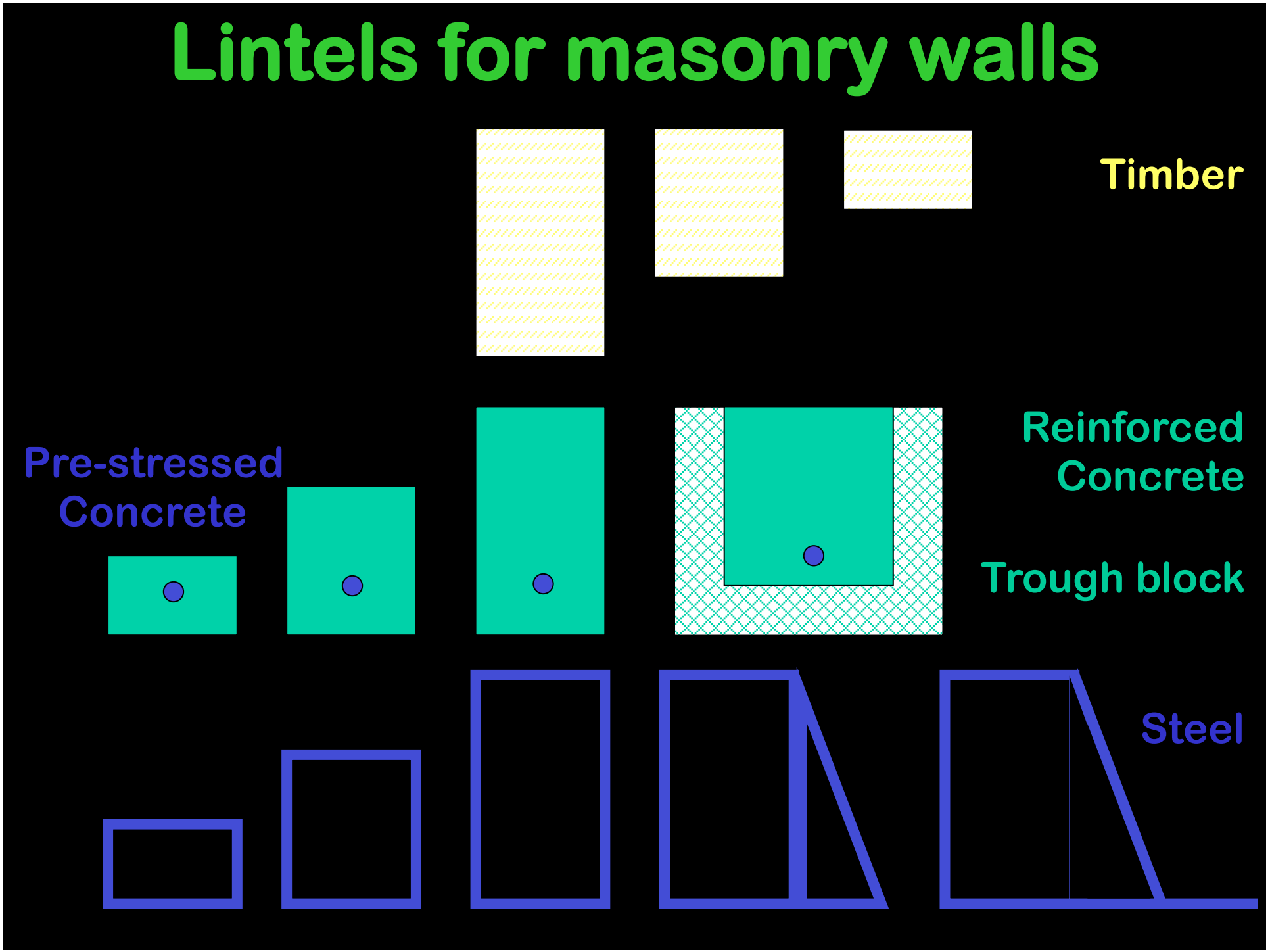
Cavity Masonry Walls

CI/SfB (21) External Walls

Cavity Wall Construction

- Eco Energy Refurbishment

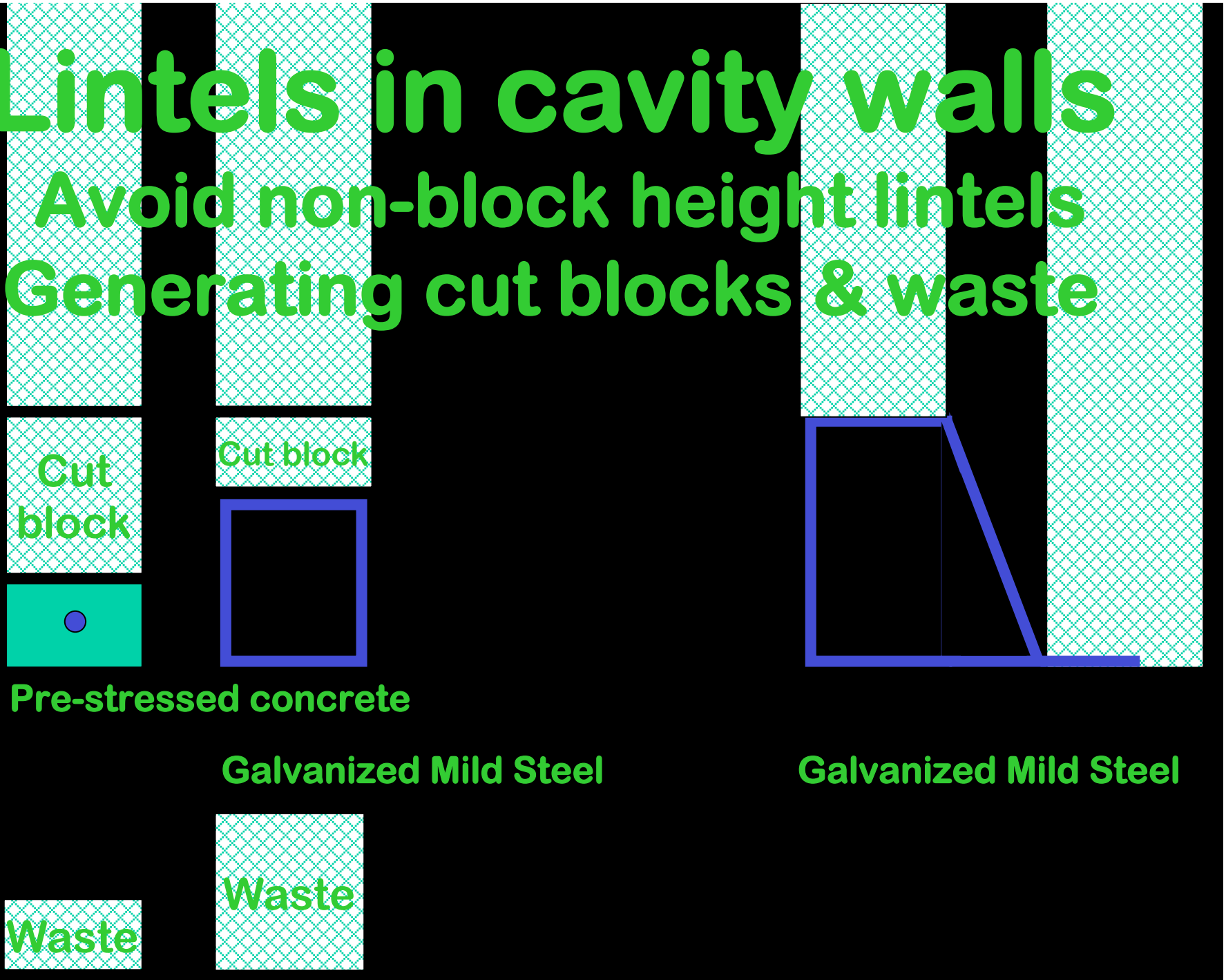
Lintels for masonry walls

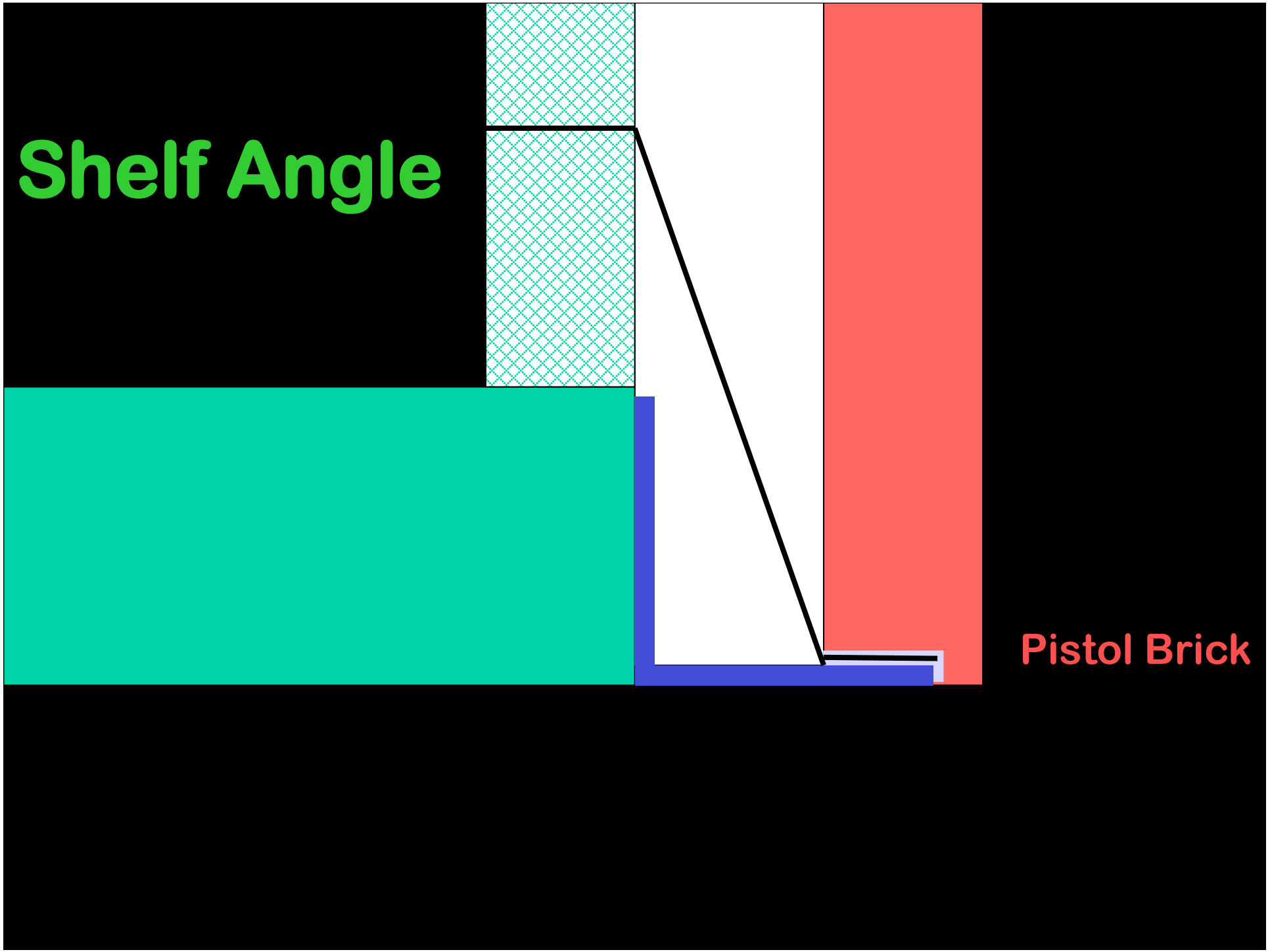


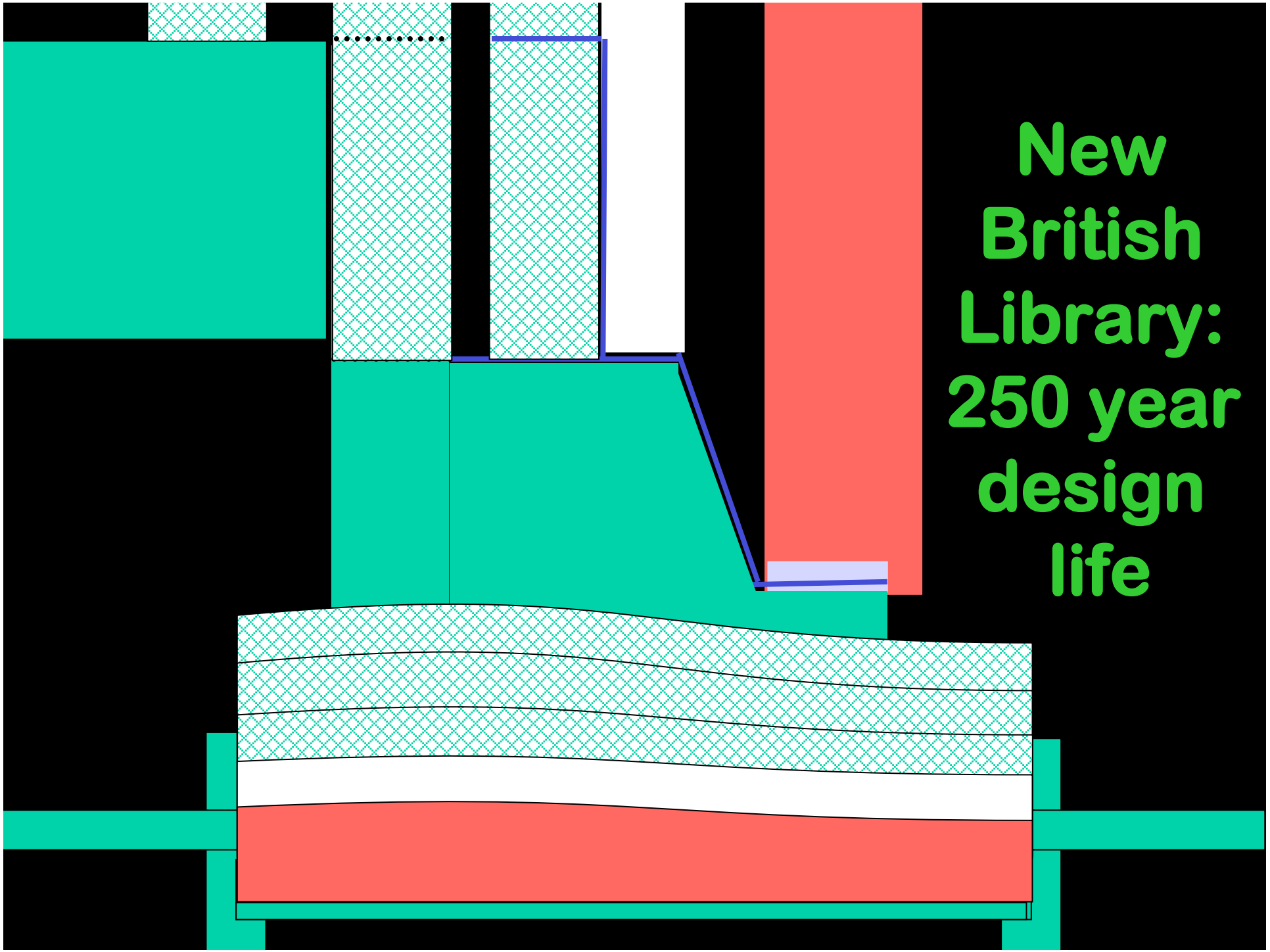
Lintels in cavity walls

Avoid non-block height lintels

Generating cut blocks & waste



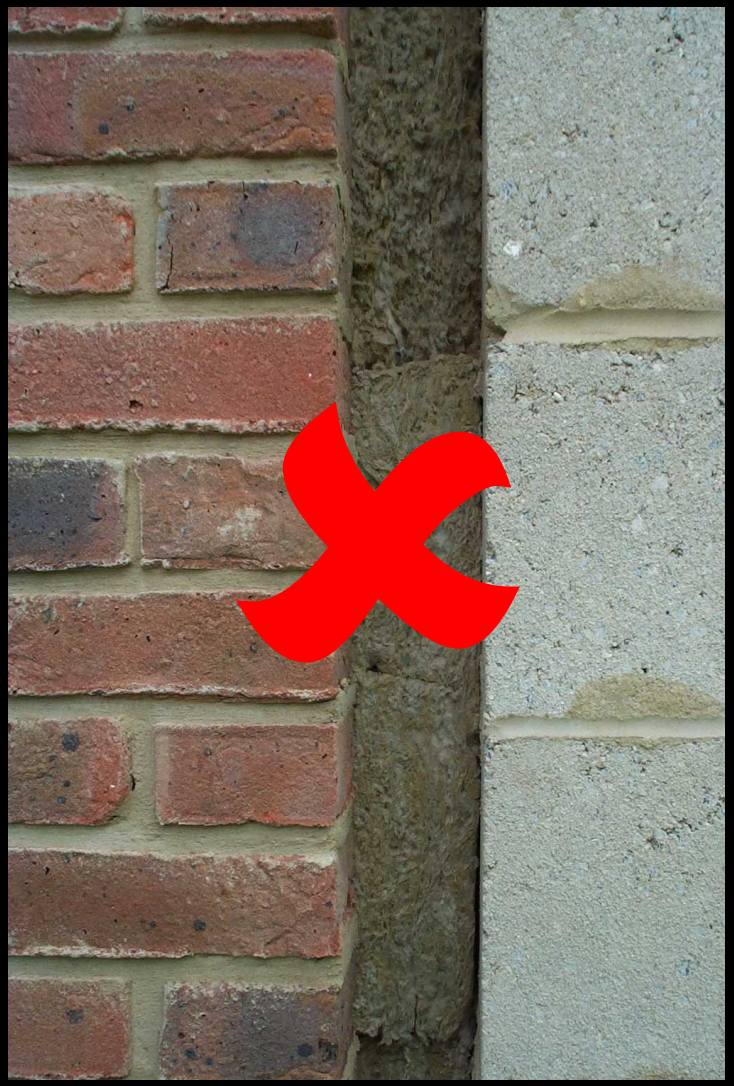

Shelf Angle
Pistol Brick


New
British
Library:
250 year
design
life

50 mm. insulated
cavity is history

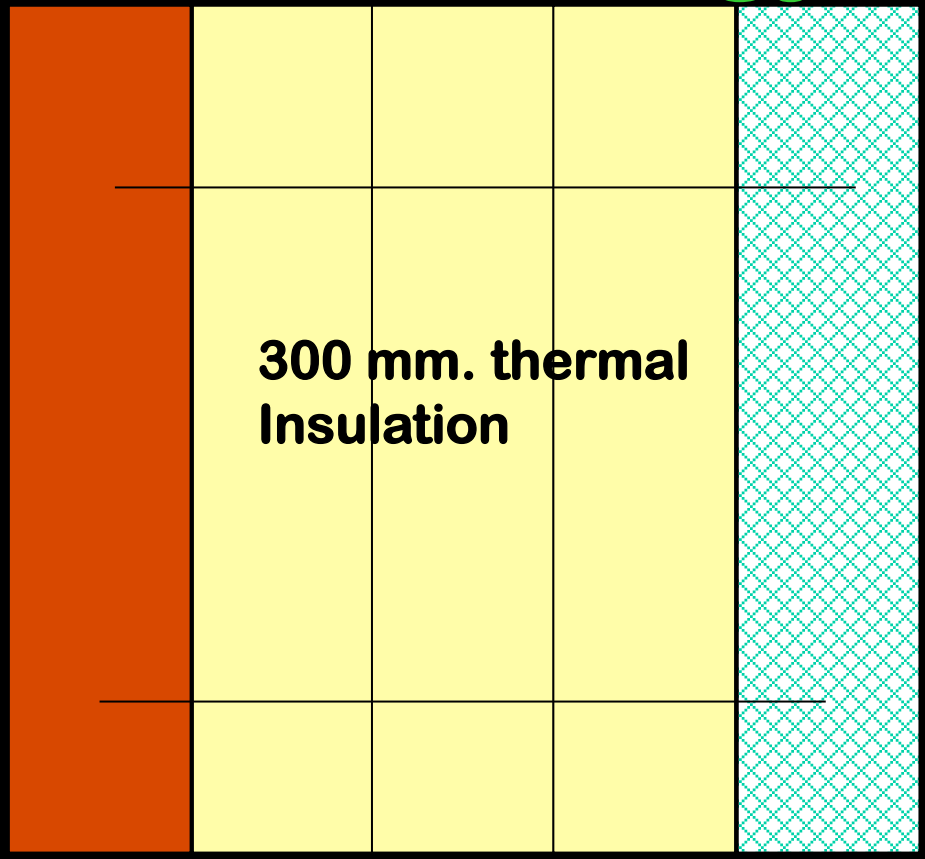
300 – 600 mm.
is optimum

Ties and
tie spacings
will change



BedZED Beddington Sutton Architect: Bill Dunster

U Values of 0.1 W/m2.K approach Zero energy demand



Zero Fossil Fuel Energy Development

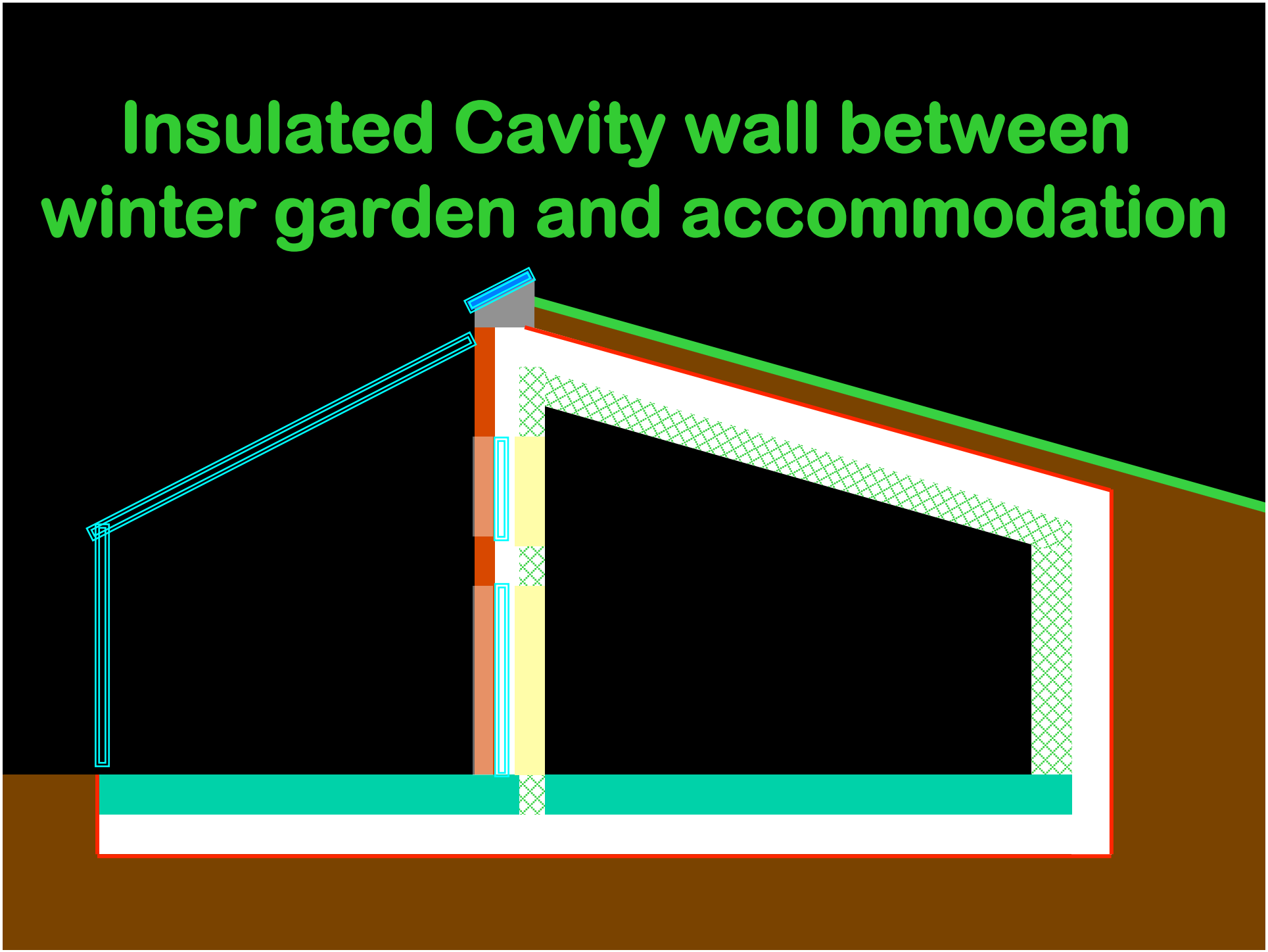
High thermal mass cavity walls, roofs and floors

Low U values
300 mm.
Rock Mineral Fibre

Long 2 part cavity ties

BedZED Beddington Sutton Architect: Bill Dunster

Insulated Cavity wall between winter garden and accommodation

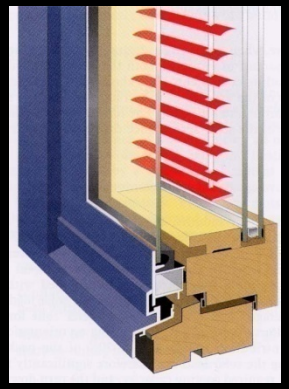


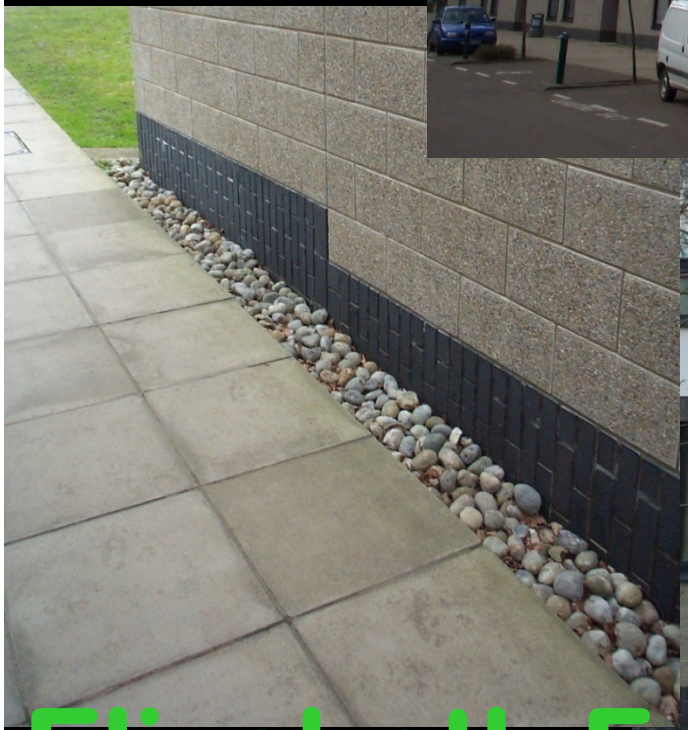
Hot house in the middle of winter

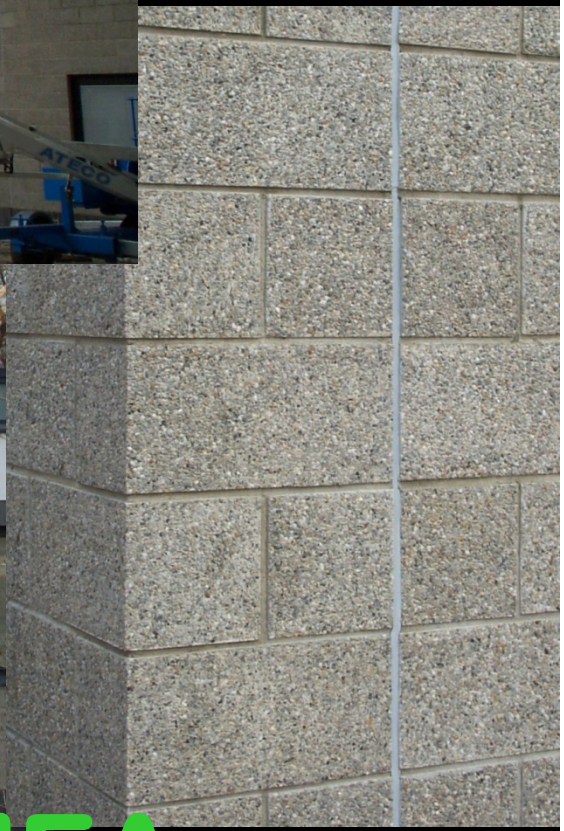
Zero Energy Development

Reduce demand for artificial light and heating:
Outdoor living
Conservatory life
sunny warm cave to retreat to in the cold of night

Hockerton Newark Nottinghamshire

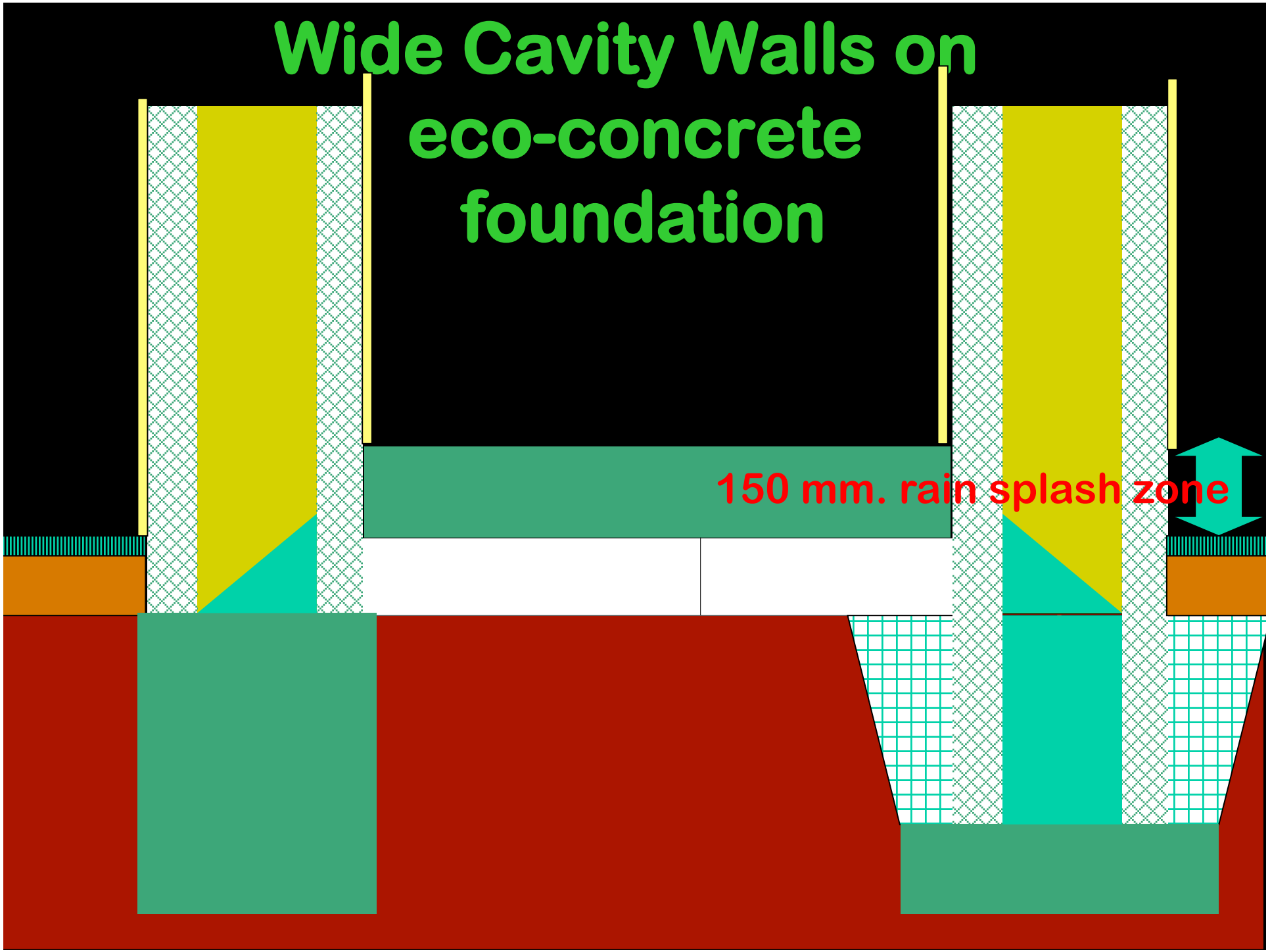






Elizabeth Fry Building UEA

was one of the most energy efficient buildings in the UK


Wide Cavity Walls on eco-concrete foundation
150 mm. rain splash zone

Masonry Cavity Walls

- Outside
- Stone, Brick, Concrete block Outer Leaf

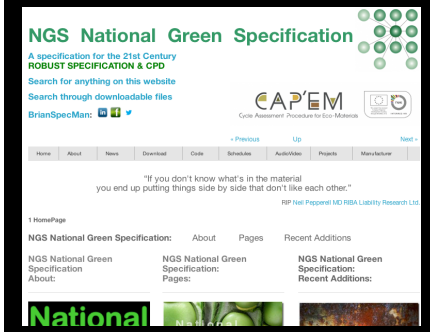
Cavity

insulation

- Full fill

Partial Fill

- Brick or concrete block inner leaf
- Inside



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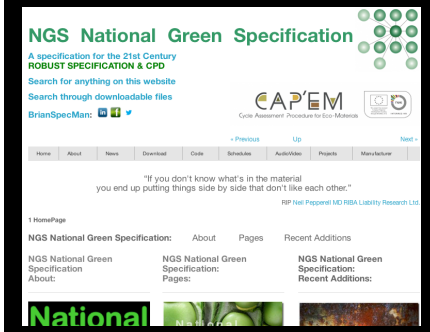
Building Products Comparison System

Wall ties



Thermal insulating Plastic Wall ties

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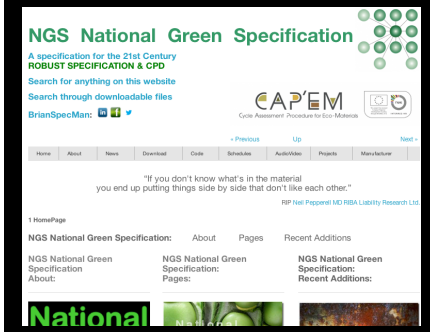
- range of wall ties
- Properties: thermally insulating
- Material: composite basalt fibre
- Manufacturer: MagmaTech Ltd.
- Product Reference: TeploTie



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- Contact
- Ben Williams
- MagmaTech Ltd
- +44(0) 203 468 1769
- info@magmatech.co.uk
- www.magmatech.co.uk

Composite wall tie

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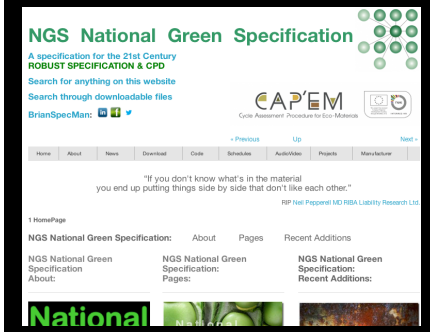
- The ties replace standard stainless steel wall ties which act as thermal bridges in cavity walls.
- reduces heat loss and energy wastage
- Improves the U value of traditional cavity walls by up to 10 per cent
- U-Value improvements of up to 20-40% have also been calculated for wide 150mm – 300mm insulated cavities
- thermally insulating properties improve the thermal efficiency of highly insulated masonry wide cavity walls.

Calendar of
February -
Calendar of Fo
February - Jul



Dumfriesshire:

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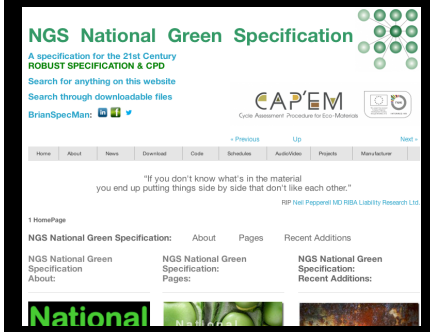
- first UK projects 29/04/08
  - dense concrete block walls
  - 200mm cavity
  - fully filled with two 100mm glass wool batts
  - TeploTies (325mm long ties).
- U-Value:
  - 0.18 W/(m^2 K) calculated[1]
  - 0.21 W/(m^2 K) stainless steel wall ties
    - (~17% less thermally efficient).



Calculations:

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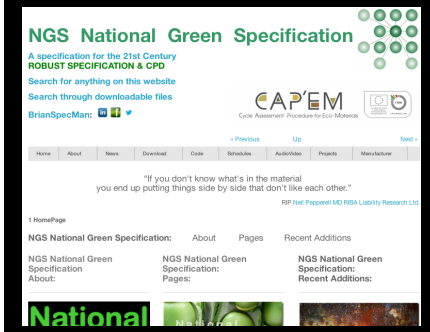
- [1] Calculated using BRE approved software:
  - "U-Value calculator 1.10" and
  - "BuildDesk 3.2 U" Software: BuildDesk Ltd.



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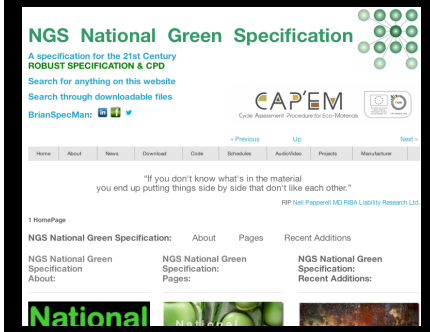
- Resource inefficient wasteful design/ construction: cut blocks
- inconsistent U values around openings with bricks in block walls
  - it turns out that both are by AECB members! We should know better



Pembrokeshire:

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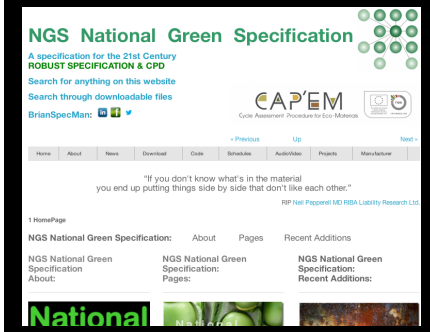
- dense concrete block walls
- 300mm wide cavity
- fully filled: 3 x 100mm mineral wool batts
- TeploTies (425mm long)
- U-Value:
  - 0.12 W/(m^2 K) calculated[1]
  - 0.17 W/(m^2 K) Stainless steel wall ties
    - ~42% less thermally efficient

masonry cavity wall construction

- surely we will move on from this every increasingly complicated and labour workmanship prone method of construction?
- We will keep looking for solution to keep going
- The teplo-tie permits its continued use

Strange comparison

- The results of the calculations are worded oddly to make them sound better than otherwise
- 17-42% reduction sound like a lot, but only over a very small area of tie
- ISO 14021 aims to stop this
- I wonder about sectional areas of ties in the calculations compared to some stainless steel ties available on market
- when you are getting down to seriously low levels in Passivhaus design or code level 5, every bit becomes important.



I wonder

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- I wonder about the embodied energy in manufacture
- I wonder about durability
- BBA certificate helps a lot for PII peace of mind

GreenSpecPASS

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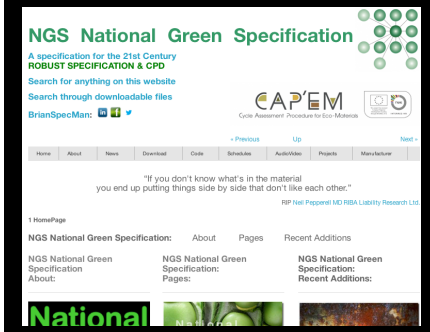
- 2013 NGS carried out a PASS for GreenSpec and Travis Perkins
- PASS: Product Assessment Sustainability Screening PASS
- We like TeploTie
- www.geenspecdownload.co.uk
- www.nationalgreenspecification.co.uk



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Openings

© NGS 2007 (21) External Walls

Masonry wall window opening

- England

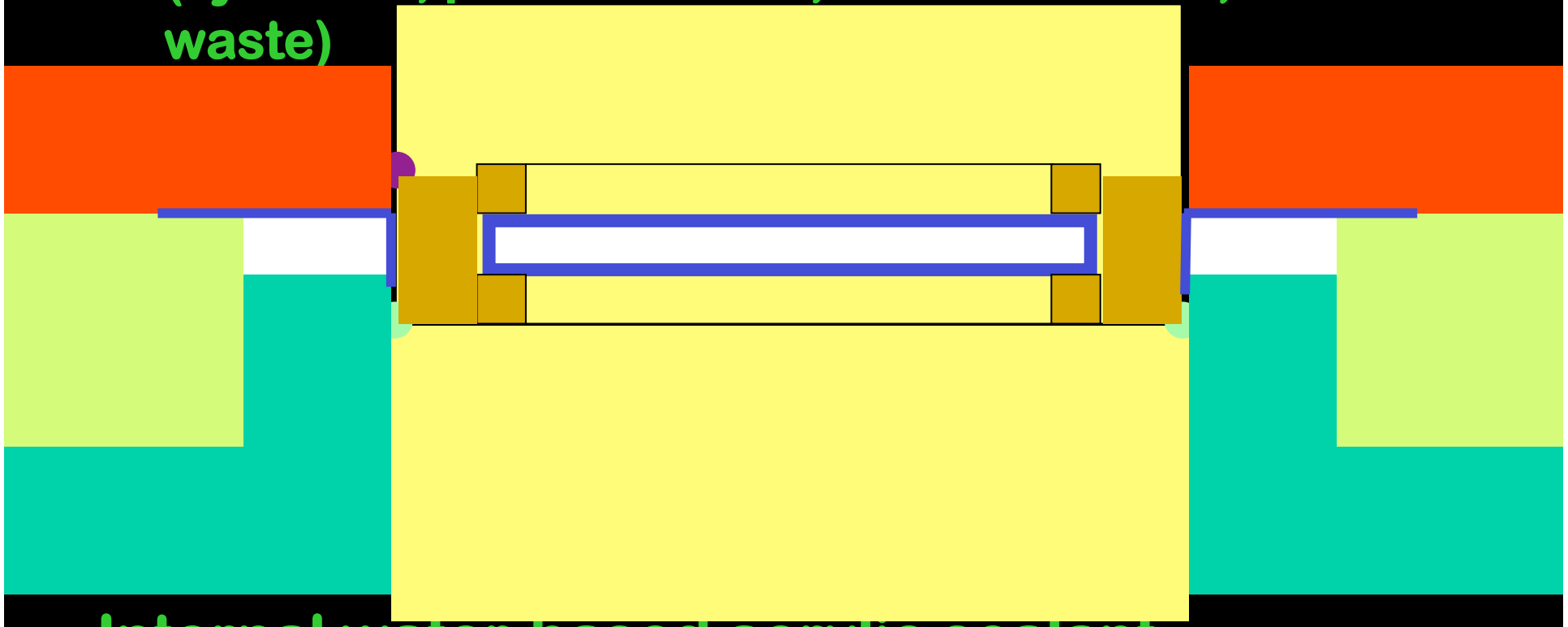
Scotland & Europe

- DPC damp proof course between inner and outer leaf
- Cavity closer incorporating insulation DPC and fixing for window

Windows in walls: Sealants

Plan View

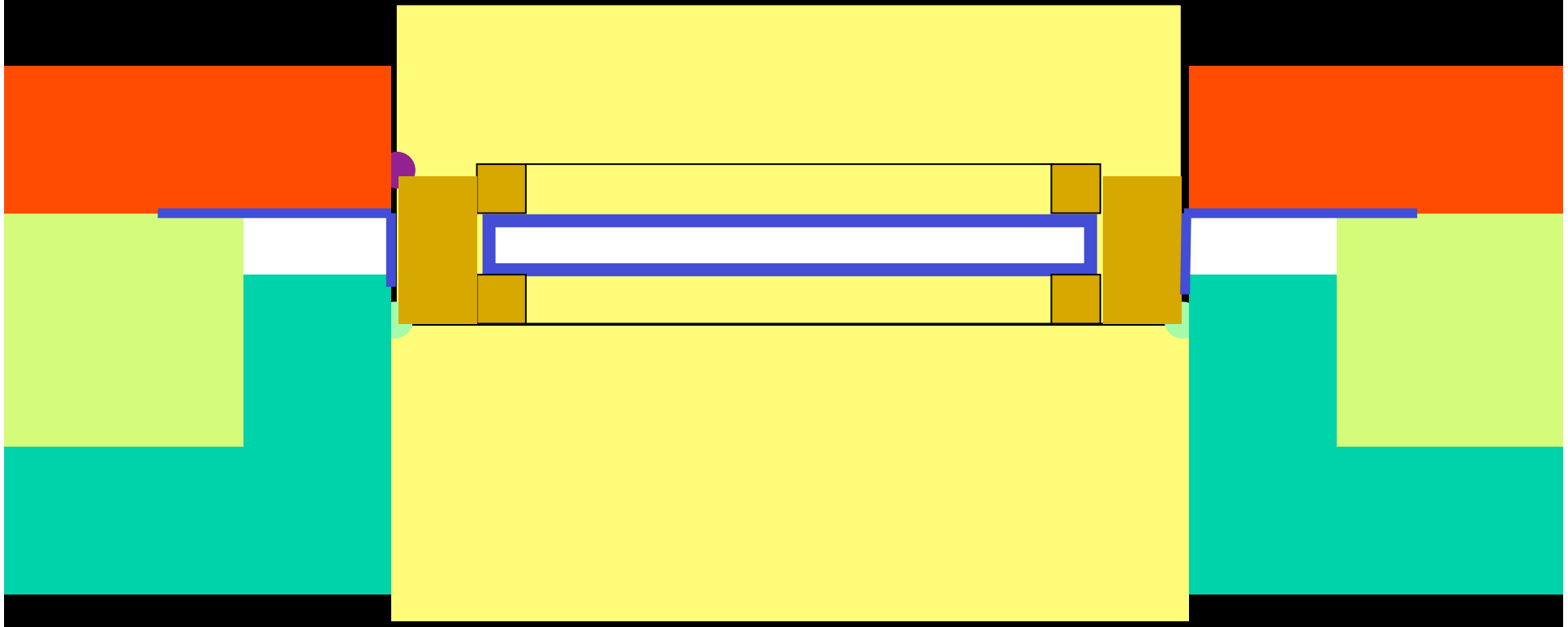
- External sealant — Avoided
  - (synthetic, petrochemical, non-renewable, hazardous waste)



- Internal water-based acrylic sealant
  - (water based, acrylic)

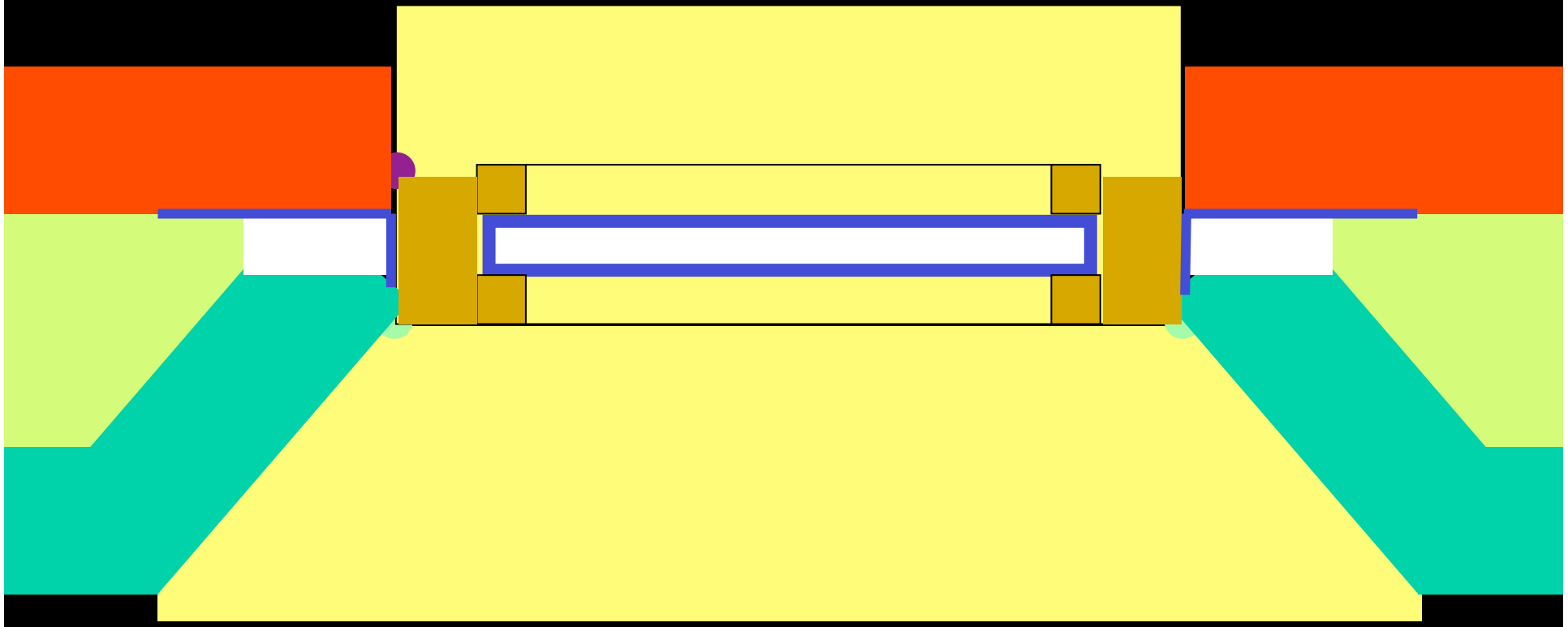
Windows in walls: Natural Sealants

- External sealant Plan View Sealant Avoided
  - (linseed putty, plant based, natural solvent)



- Internal water-based acrylic sealant
  - (linseed putty, plant based, natural solvent)

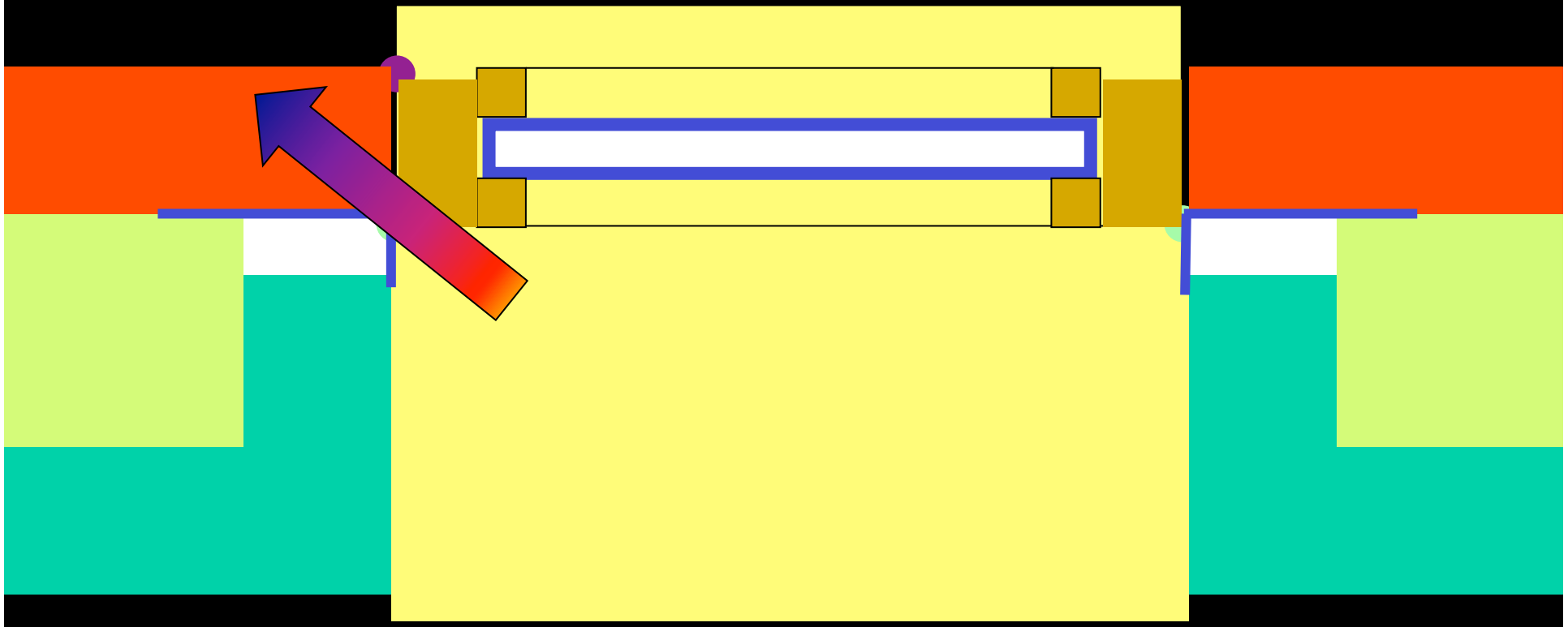
Maximise light penetration
Minimise glare



Windows in walls: Position

Plan View

- The position of the window in the opening can maintain its performance or suffer significant loss of performance

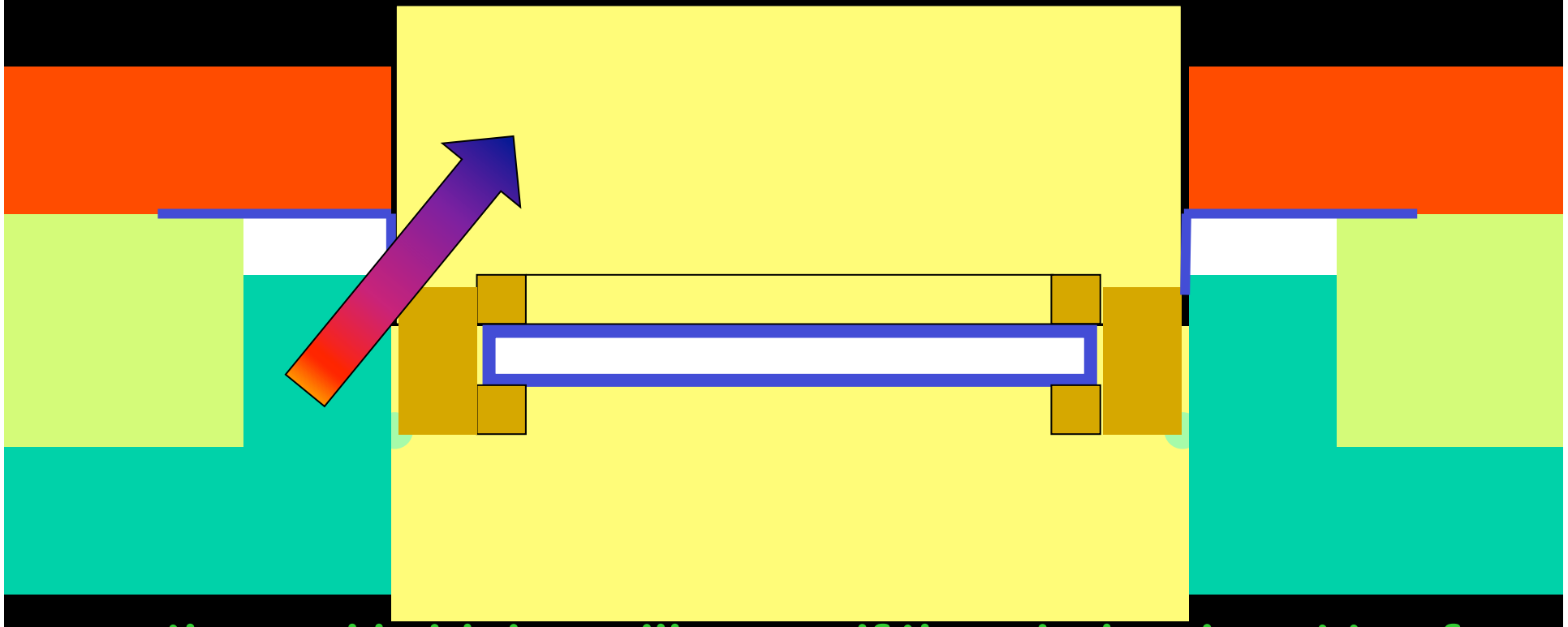


- thermal bridging will occur if the window is set too far forward in relation to the cavity closer and insulation

Windows in walls: Position

Plan View

- The position of the window in the opening can maintain its performance or suffer significant loss of performance

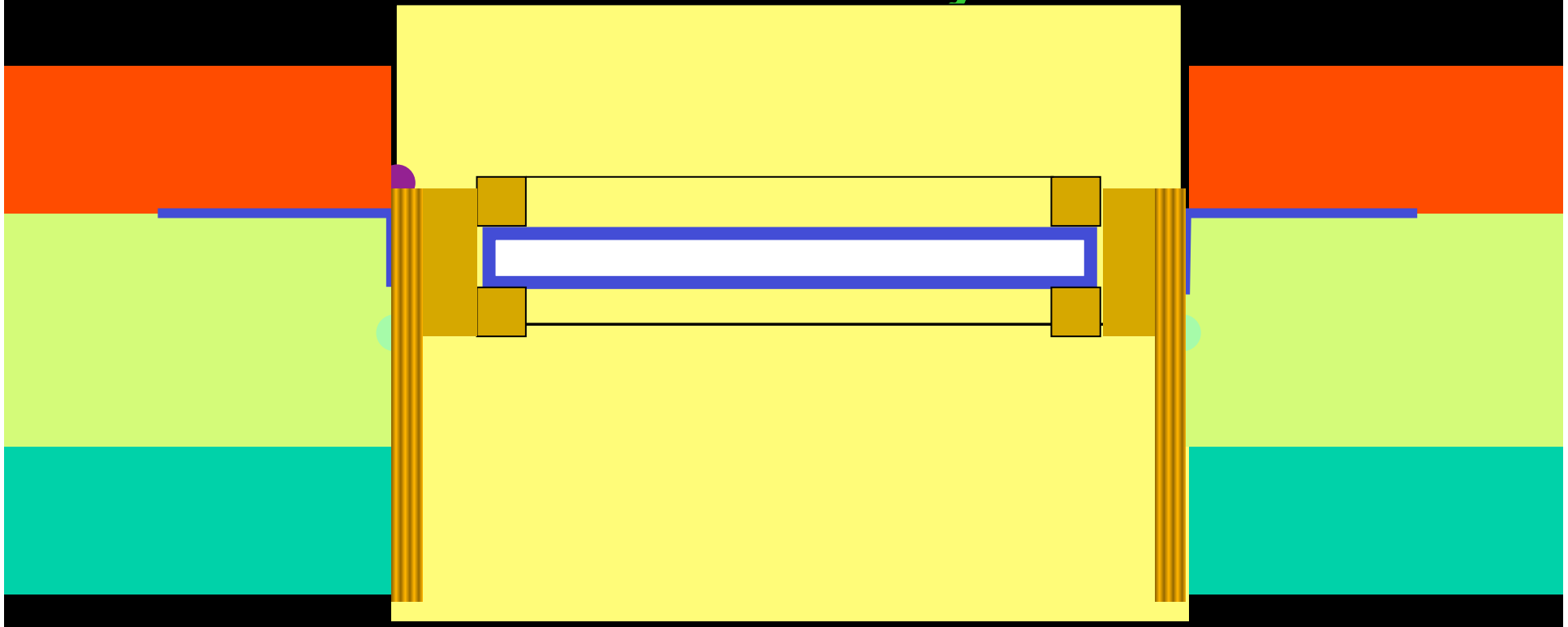


  - thermal bridging will occur if the window is set too far forward in relation to the cavity closer and insulation

Windows in walls: Position

Plan View

- Cavity closers form a thermal bridge even if insulted
- Omit inner leaf returns close cavity with window box



- Install window in box

Materials Protection:

Full high build micro porous paint/stain scheme over all surfaces in the factory

No absorbent surfaces

Unlike UK practice of priming hidden faces or leaving bare and absorbent

BedZED Beddington Sutton Architect: Dr Bill Dunster

Packaging & Protection:

Palleted
Corner protection
Lateral bracing
Poly wrap
Breathing holes
Site tarpaulin
But:
Adjacent to traffic routs: potential splash and damage
Lean doors on it
JIC not JIT

BedZED Beddington Sutton Architect: Bill Dunster

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Wall Integrity at Floor Junctions

CI/SfB (21) External Walls

Weather, Acoustic, Fire, Thermal, Airtightness

Floor Joists in external walls

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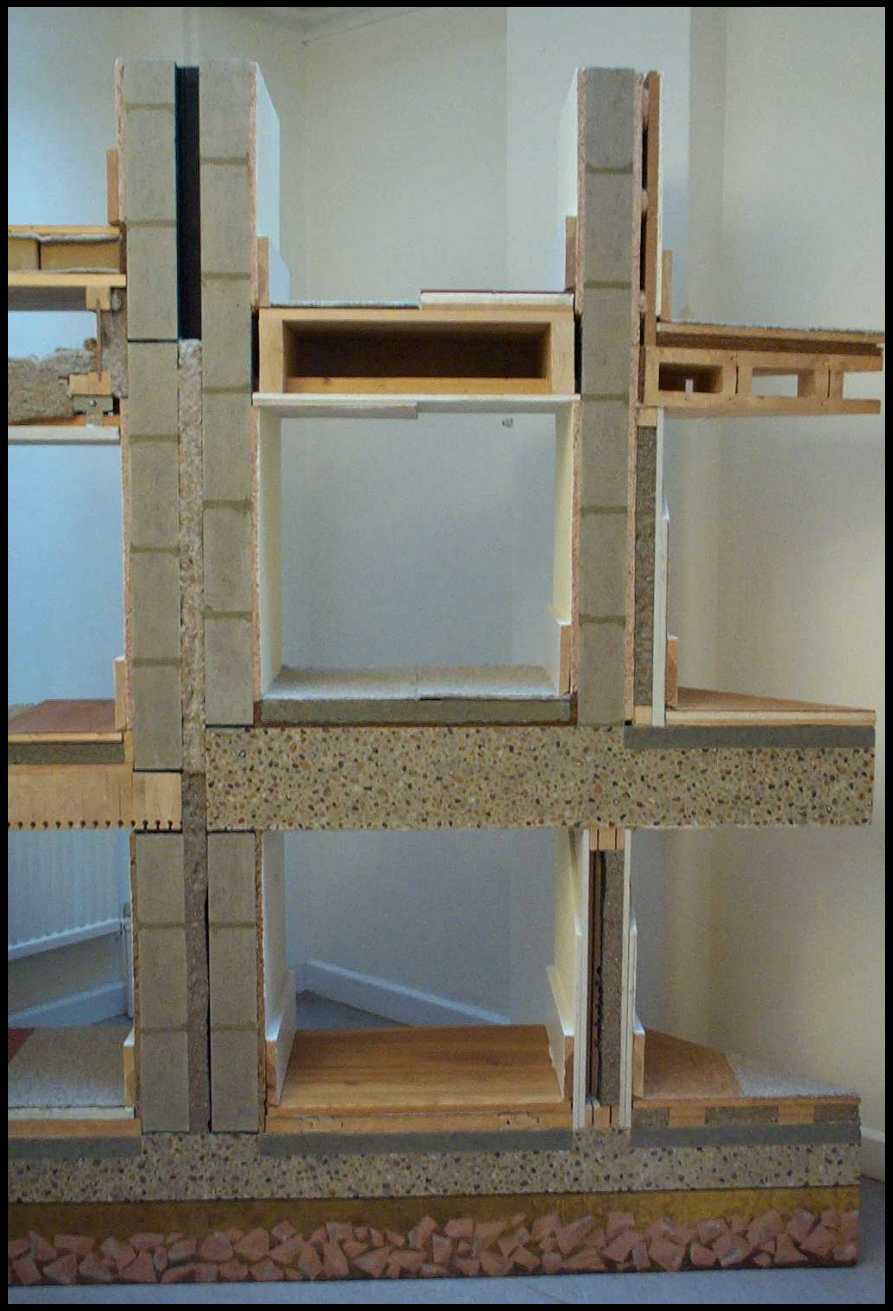
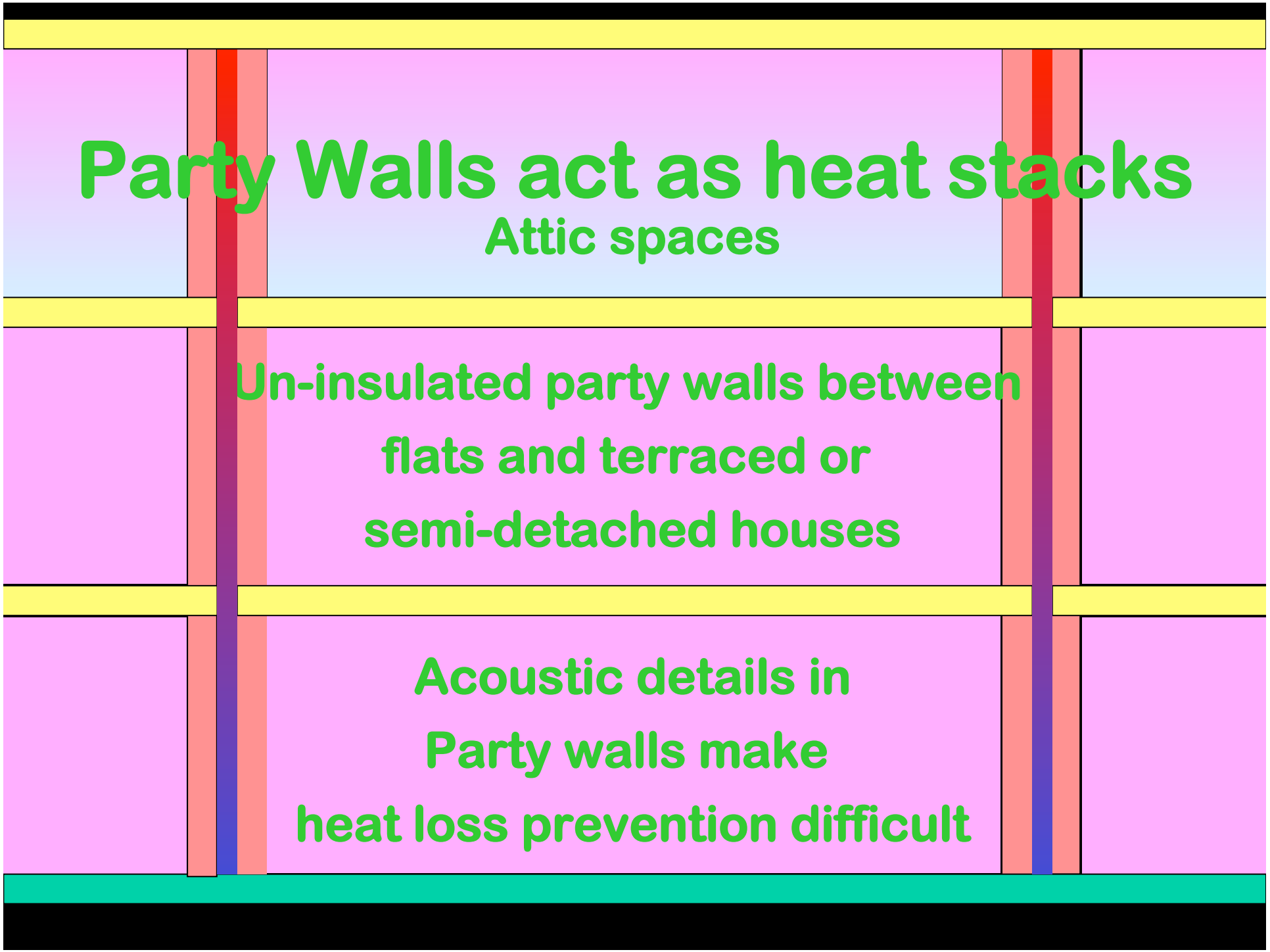
Joist penetrations into wall need to be airtight and not form air gaps for heat loss

Different Acoustic solutions to walls and floors
Cavity and solid walls and lightweight partitions



Different Wall Structures

Acoustic Construction in walls


Party Walls act as heat stacks
Attic spaces
Un-insulated party walls between
flats and terraced or
semi-detached houses
Acoustic details in
Party walls make
heat loss prevention difficult

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Resource Efficiency

COMMENDED
The UK eWell-Being Awards 2004
www.sustainit.org

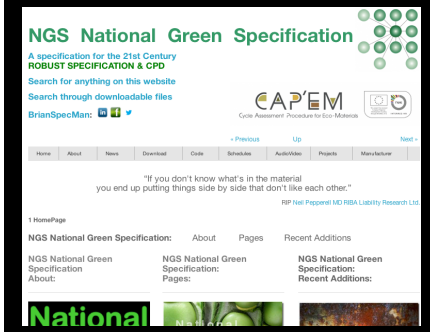
GreenSpec
www.greenspec.co.uk

Design to help Reduce Waste

Easy steps to reduce your share
of the 90 m tonnes of construction and
demolition and excavation waste each year

© NGS 2002-2006 Waste At Design Diagrams

Another NGS CPD file to download
See www.scribd.com/brianspecman
and www.greenspecdownload.co.uk
www.nationalgreenspecification.co.uk



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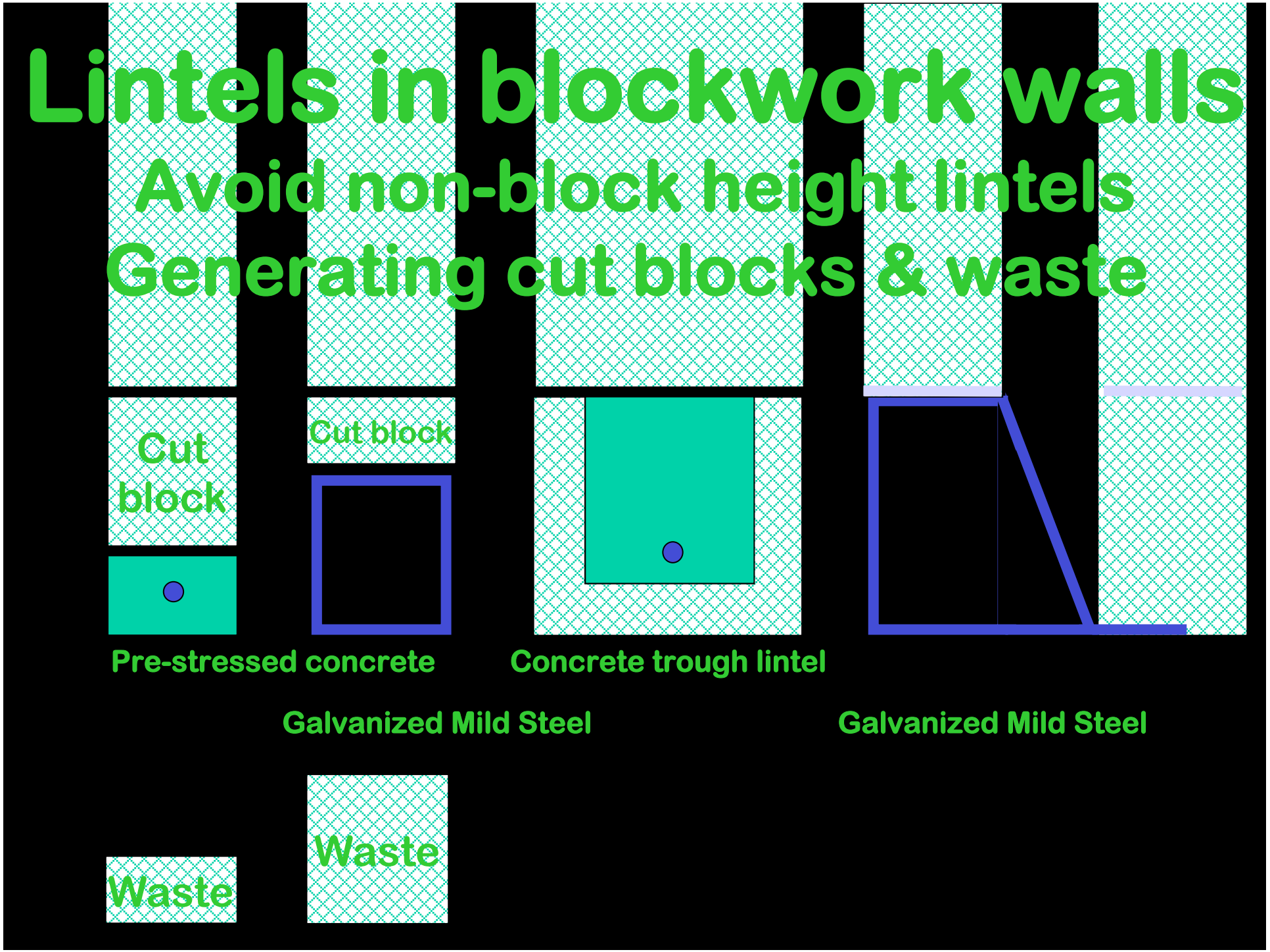
Resource Efficiency: Masonry

Design for Deconstruction

- Bricks are inherently reusable
- But brickwork can prevent it
- Lime mortar (weaker bond) enables walls to be dismantled and bricks reclaimed for reuse
- Lime mortar is also recyclable
- Cement mortar (stronger bond) prevents separation without risk of damage
- Are unsuitable for all but crushed hardcore

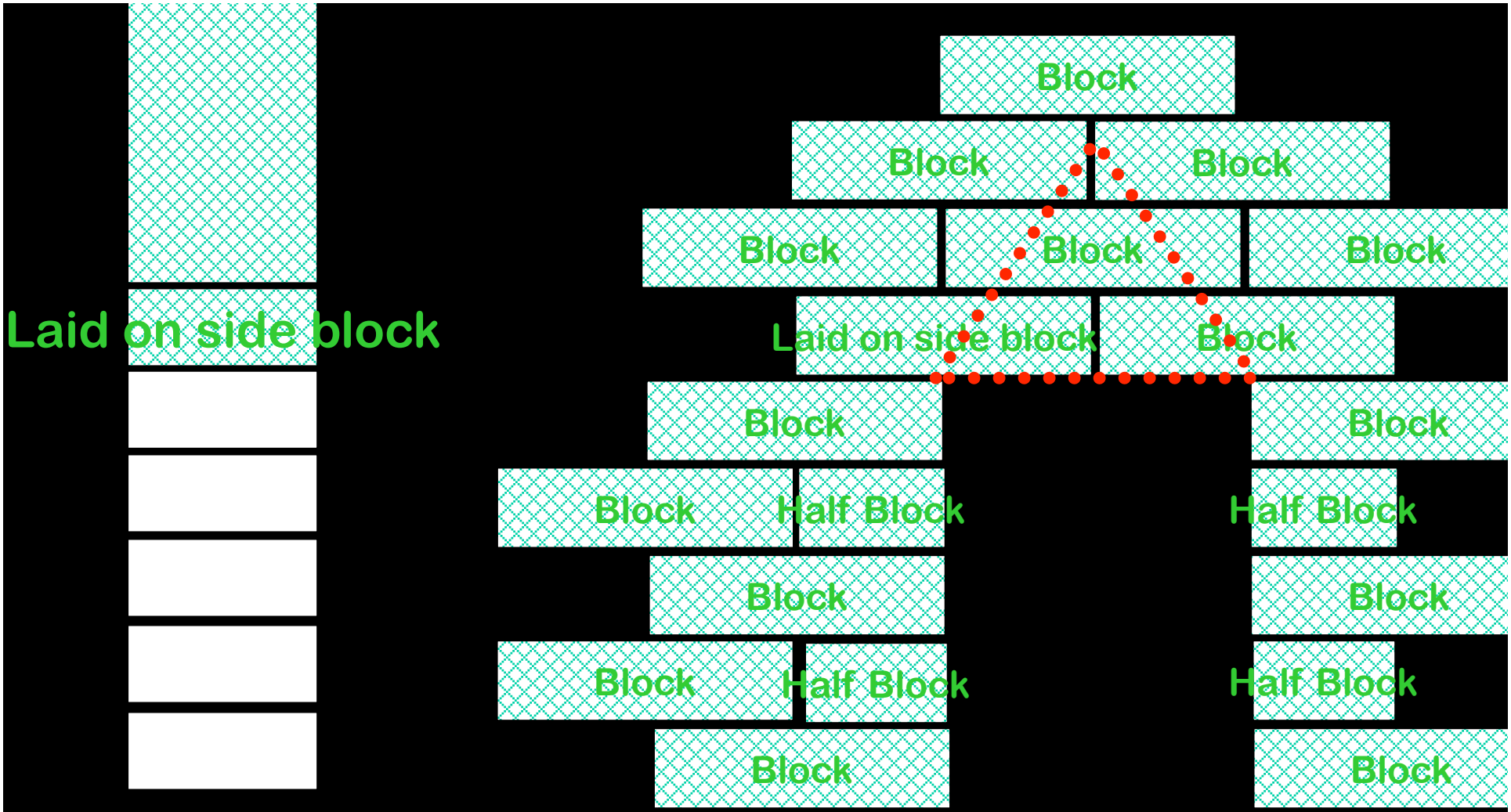
Lintels in blockwork walls

Avoid non-block height lintels Generating cut blocks & waste



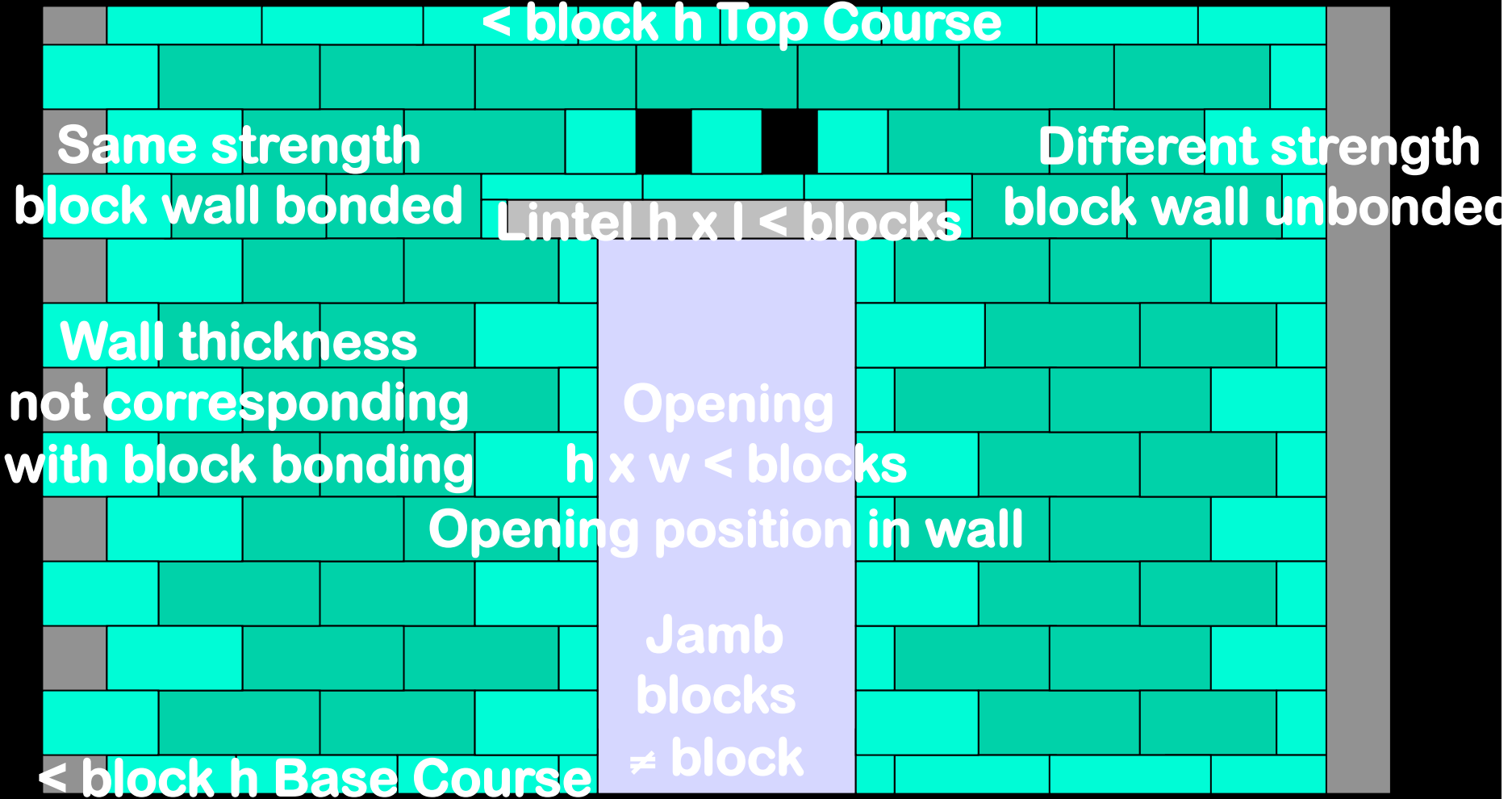
Minimise Waste

- Co-ordinate block course and lintel heights to minimise waste from cut blocks
- 215 mm. bearings
- Design openings to be block and half block sized

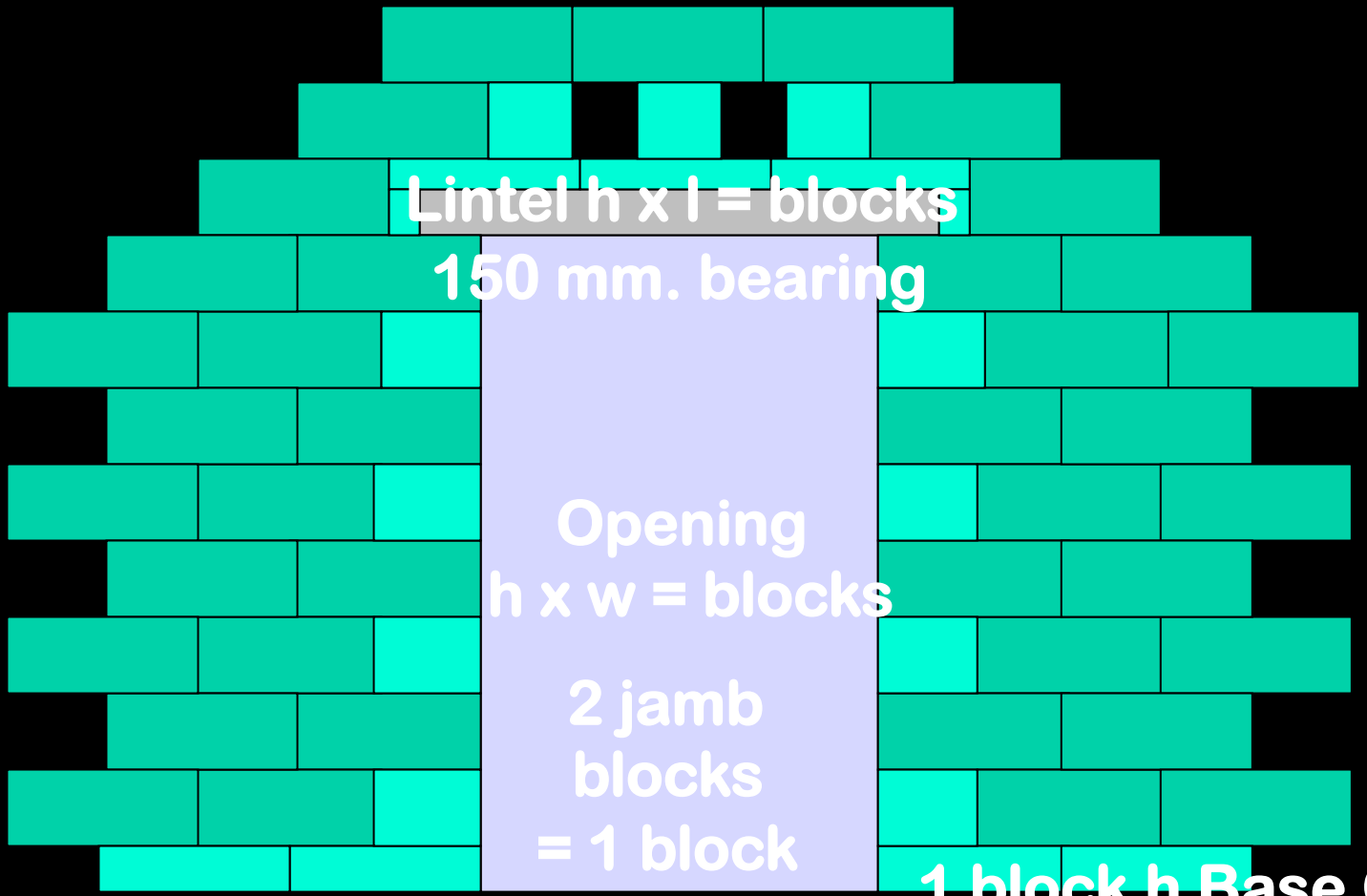


Concrete blocks forming lintel in walls over opening of max 440 mm. No lintel, no cutting, no waste

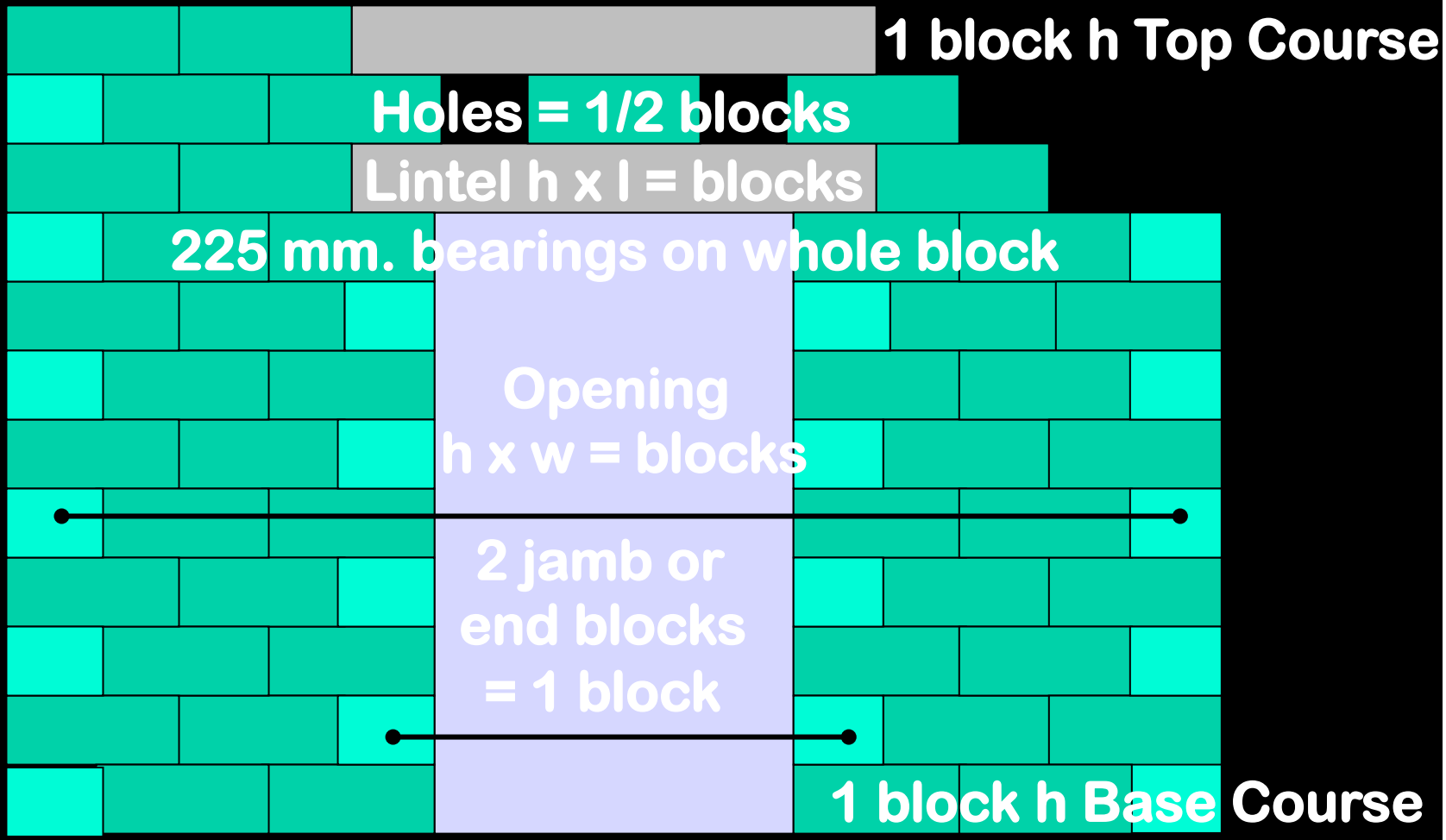
No Design: Offcuts 33%+



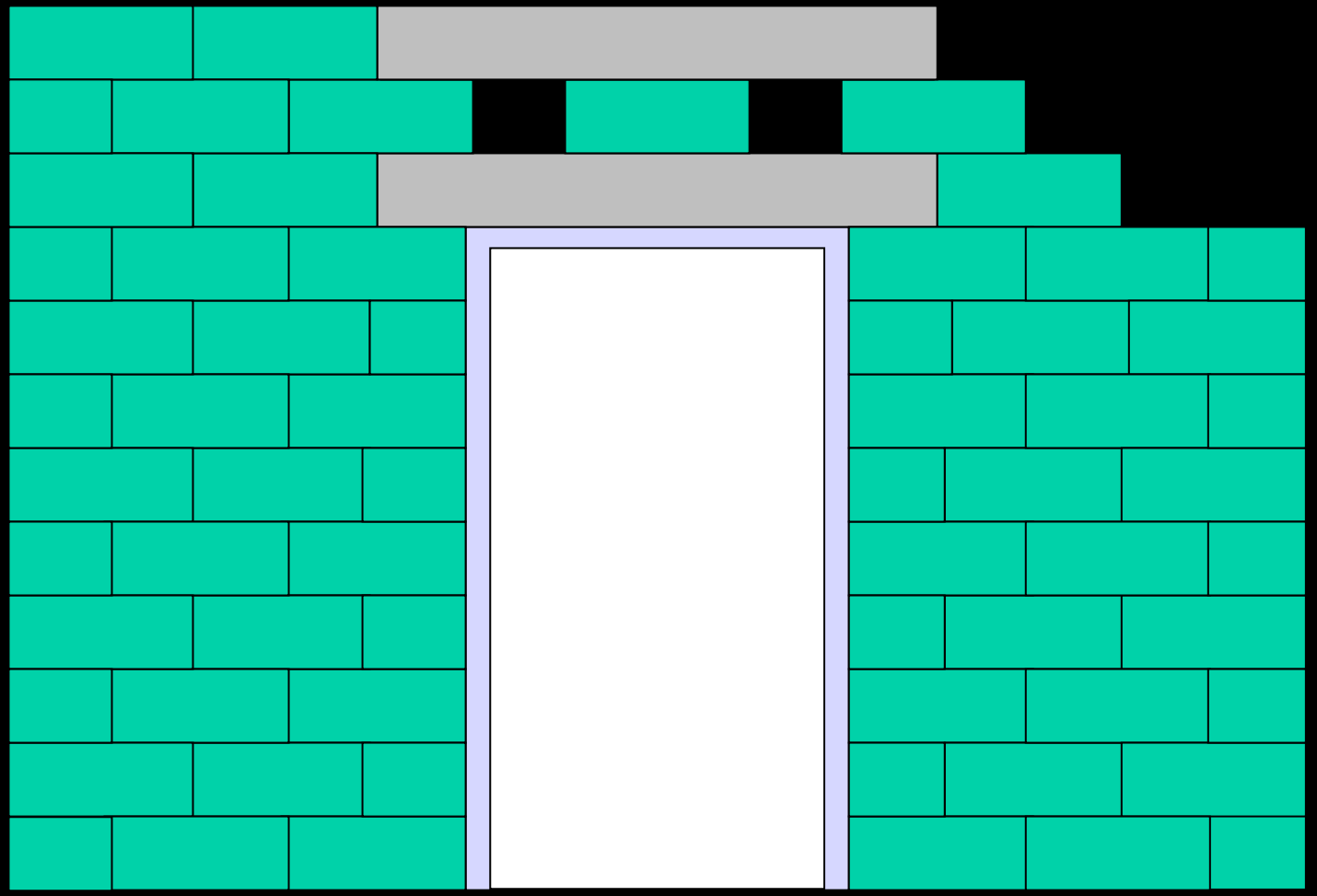
Offcuts 33%


Lintel h x l = blocks
150 mm. bearing
Opening
h x w = blocks
2 jamb
blocks
= 1 block
1 block h Base Course

Modular design: considerably less than 33%

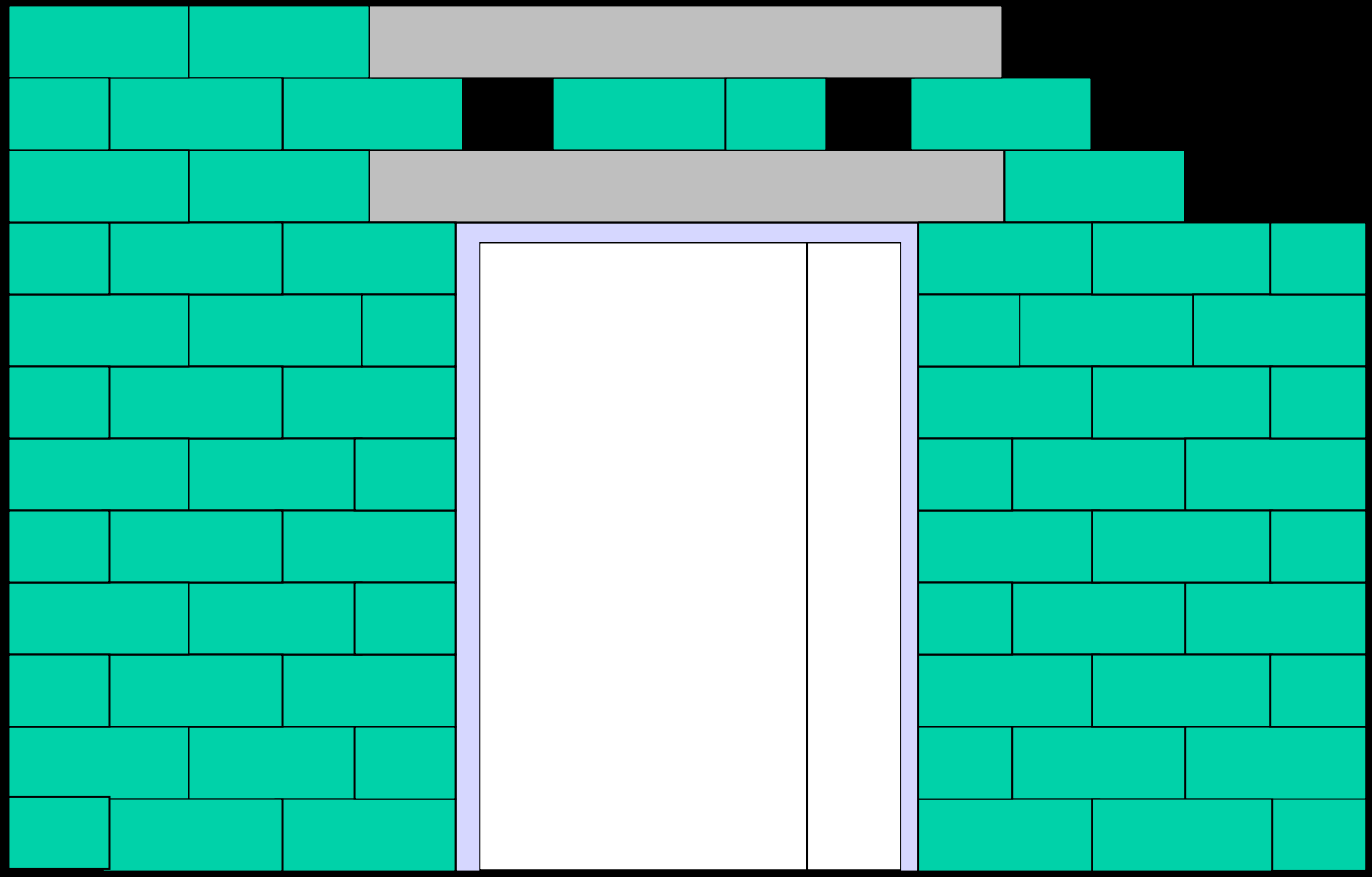


Doorsets to fit openings



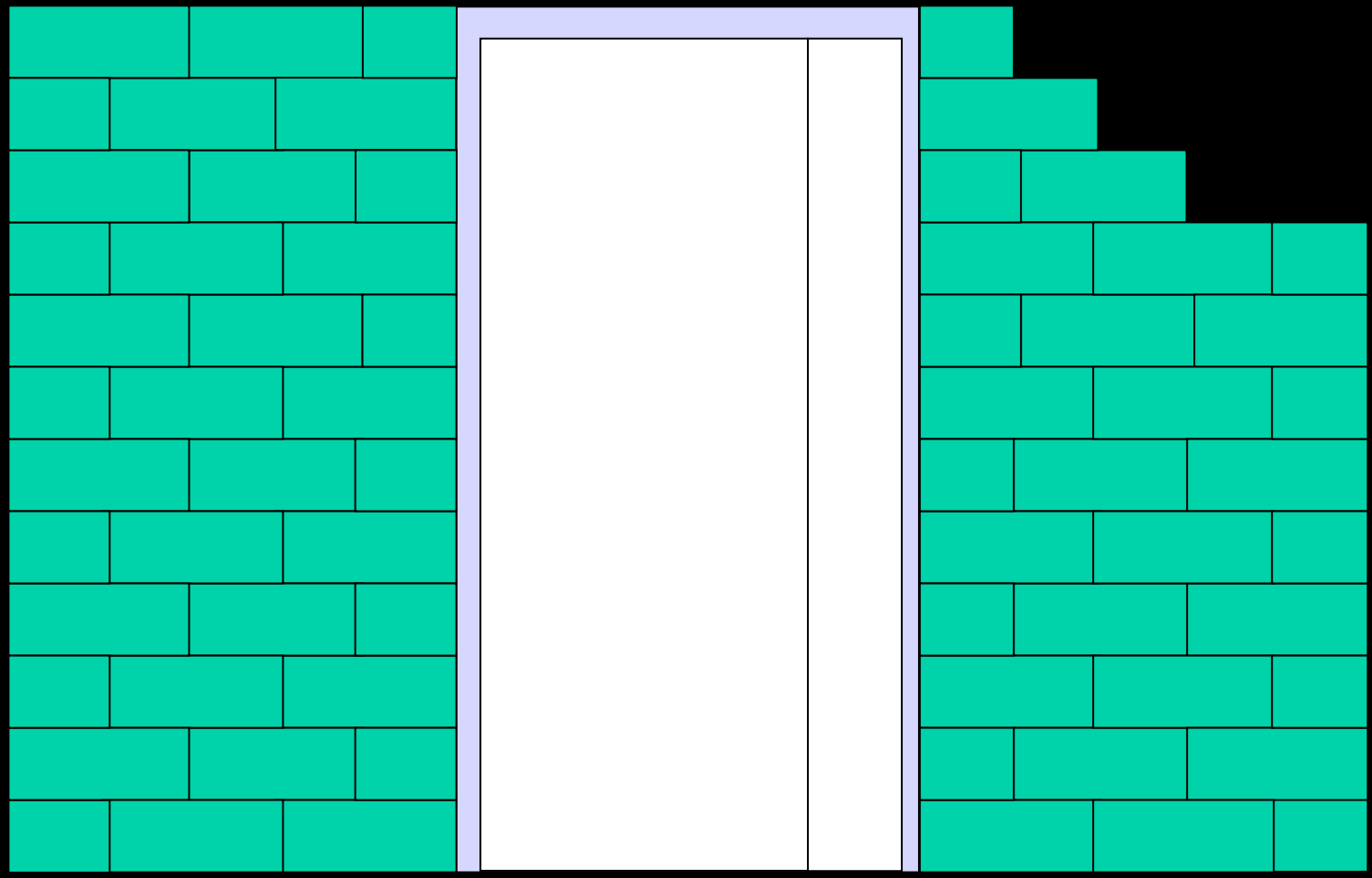
Services apertures half block size

Doorsets to fit openings

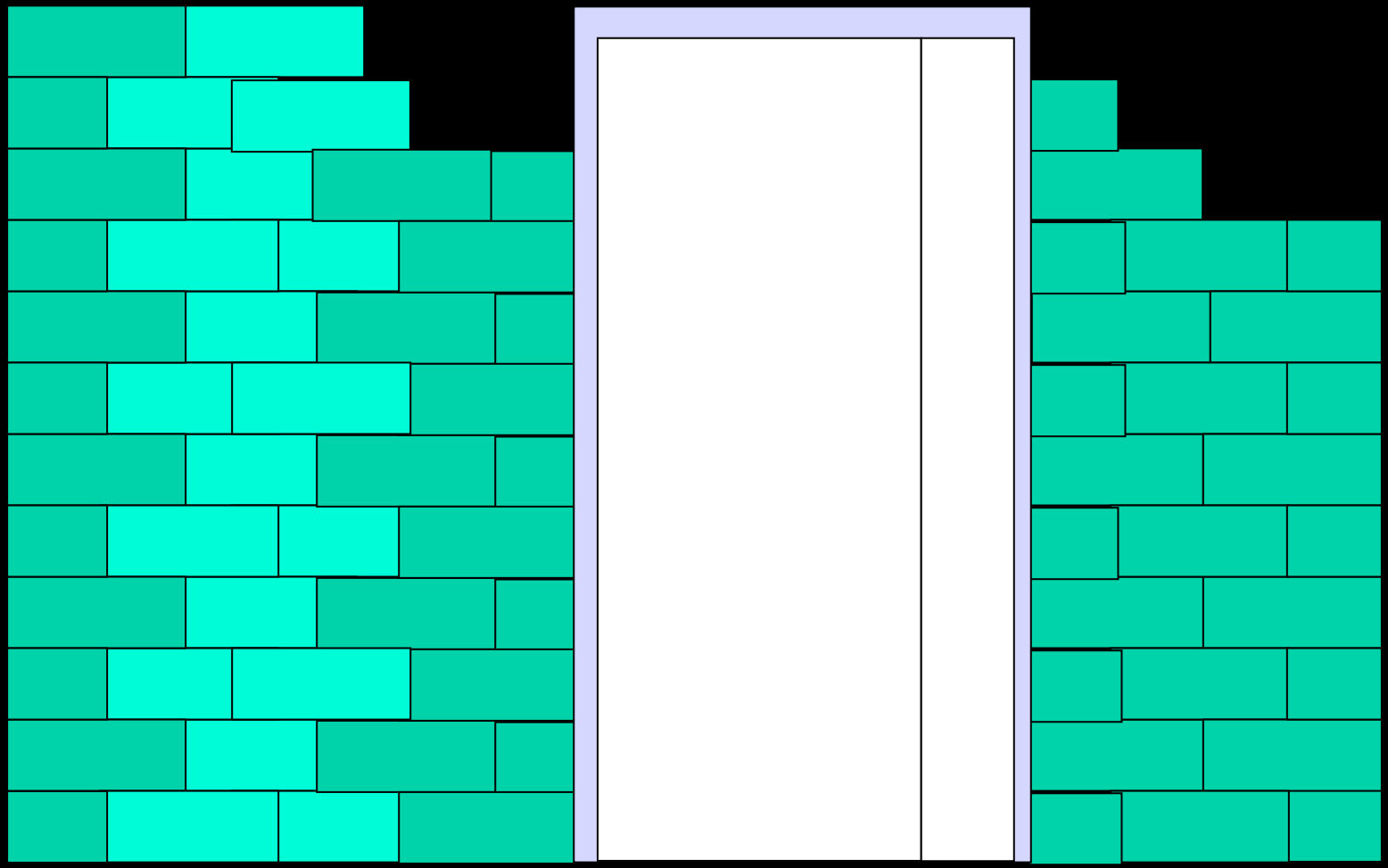


Fire regulation dictates overall door width,
Opening: block sizes, Standard Door + half leaf: size to suit

Doorsets to fit floor heights
Door set widths to fit blocks

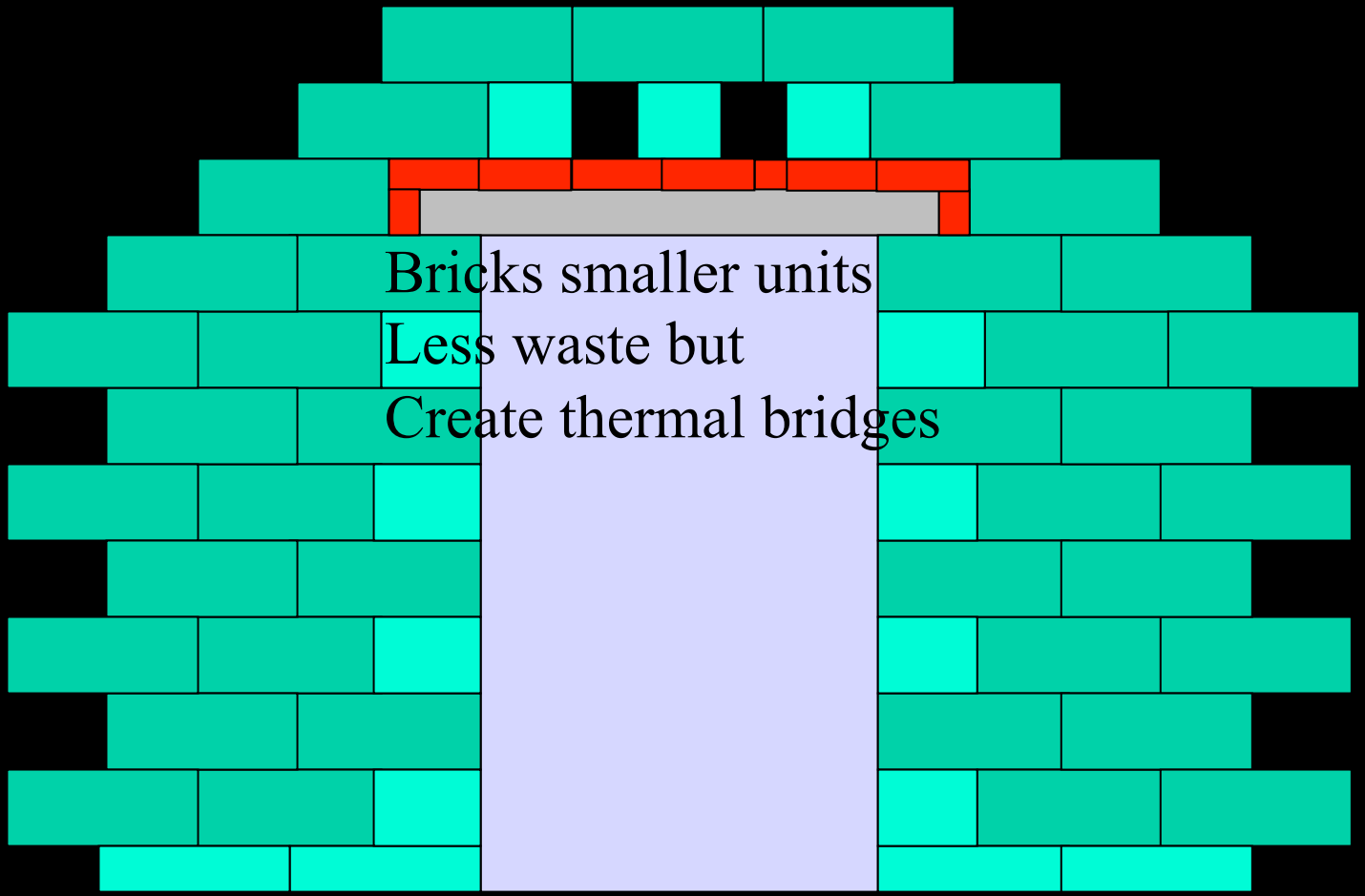


Blocks cut short in wall

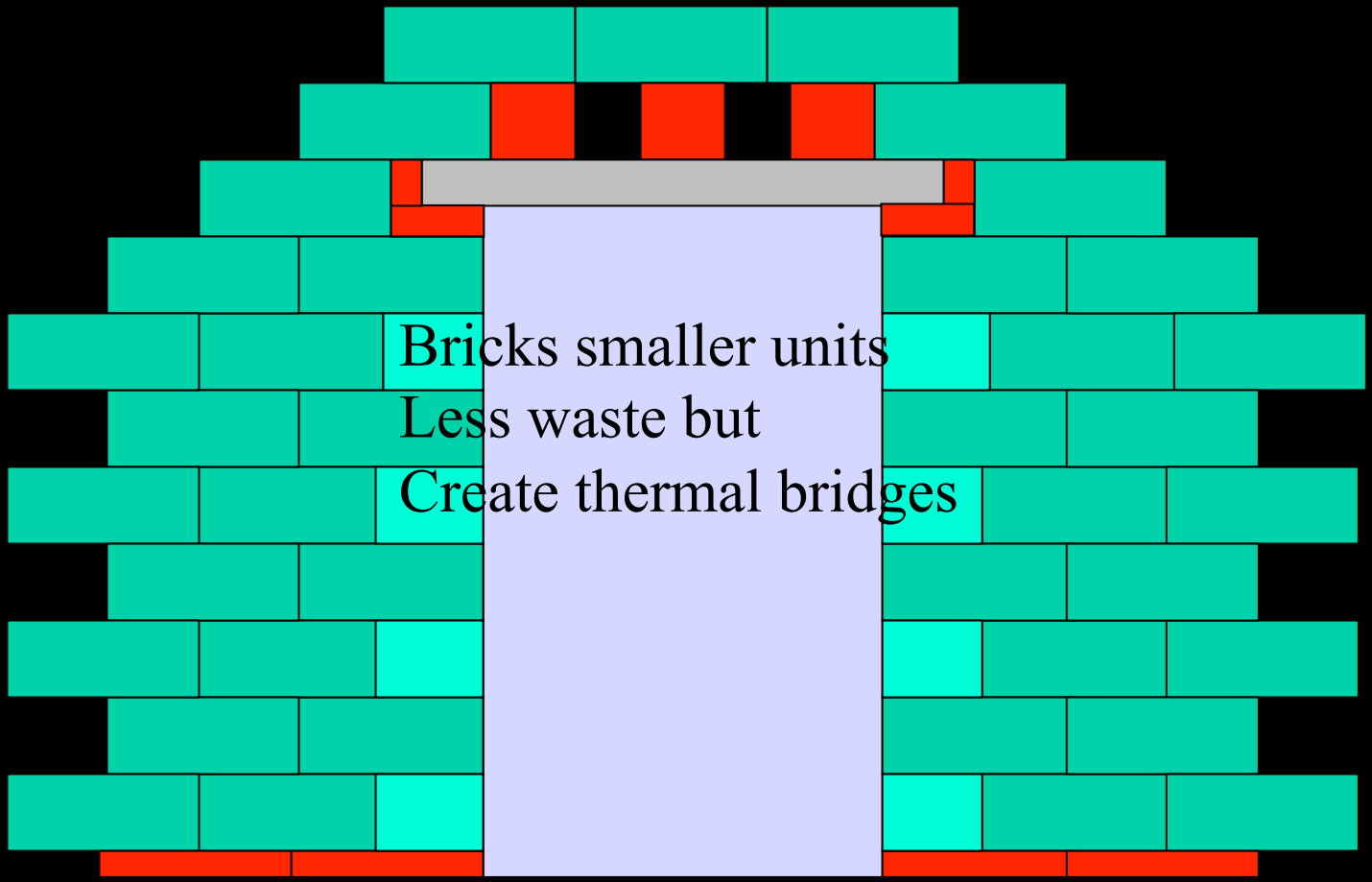


Irregular purpend or block alignment

Off-cut waste 33%



thermal Bridges: Inconsistent U value

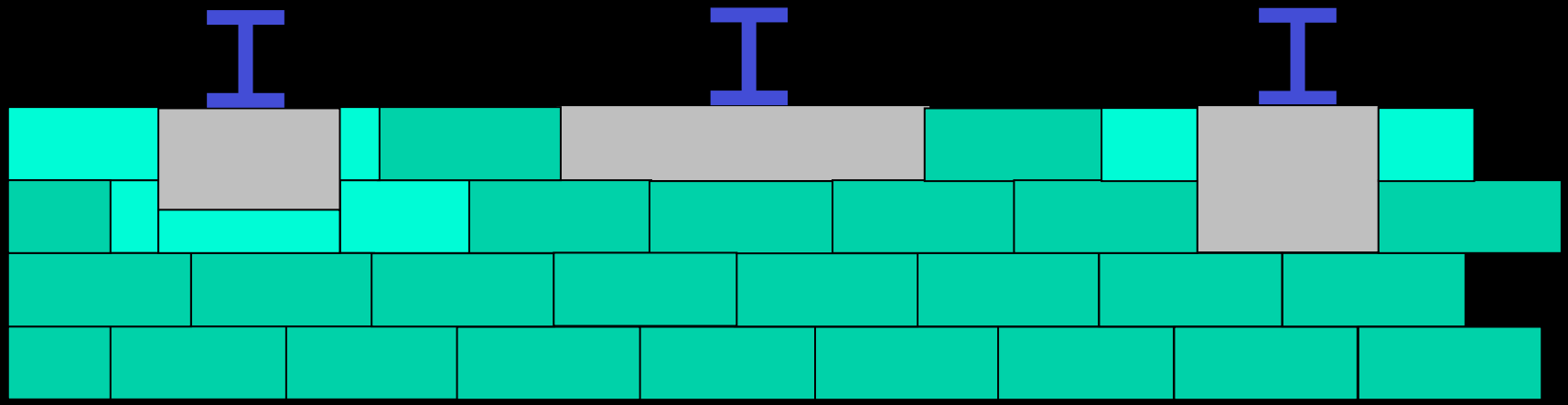


Attempting to reduce waste: creating thermal bridges
thermal bridge reducing ties won't make up for:
brick inner leaf and brick padstones for lintels
Omitting jamb returns reduces waste and thermal bridges

Elizabeth Fry Building UEA

was on of the most energy efficient buildings in the UK
Modular design carried out to minimise waste

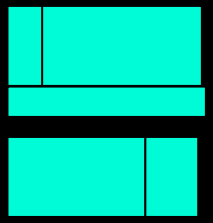
Padstones



Non-block size causes cutting & waste

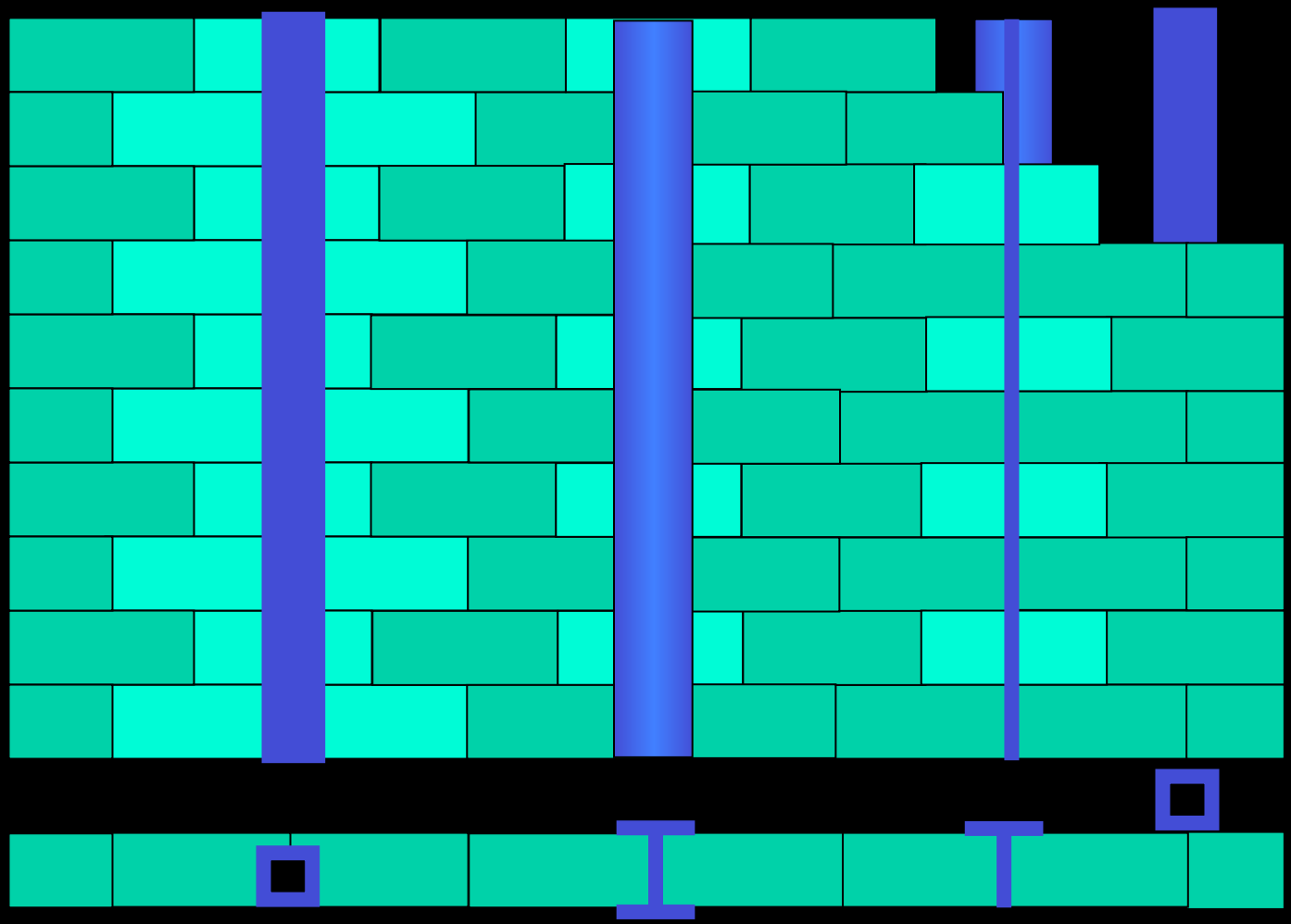
Block module size no cutting & no waste

Block module size one cut and reuse no waste



Different dense materials: thermal bridge?

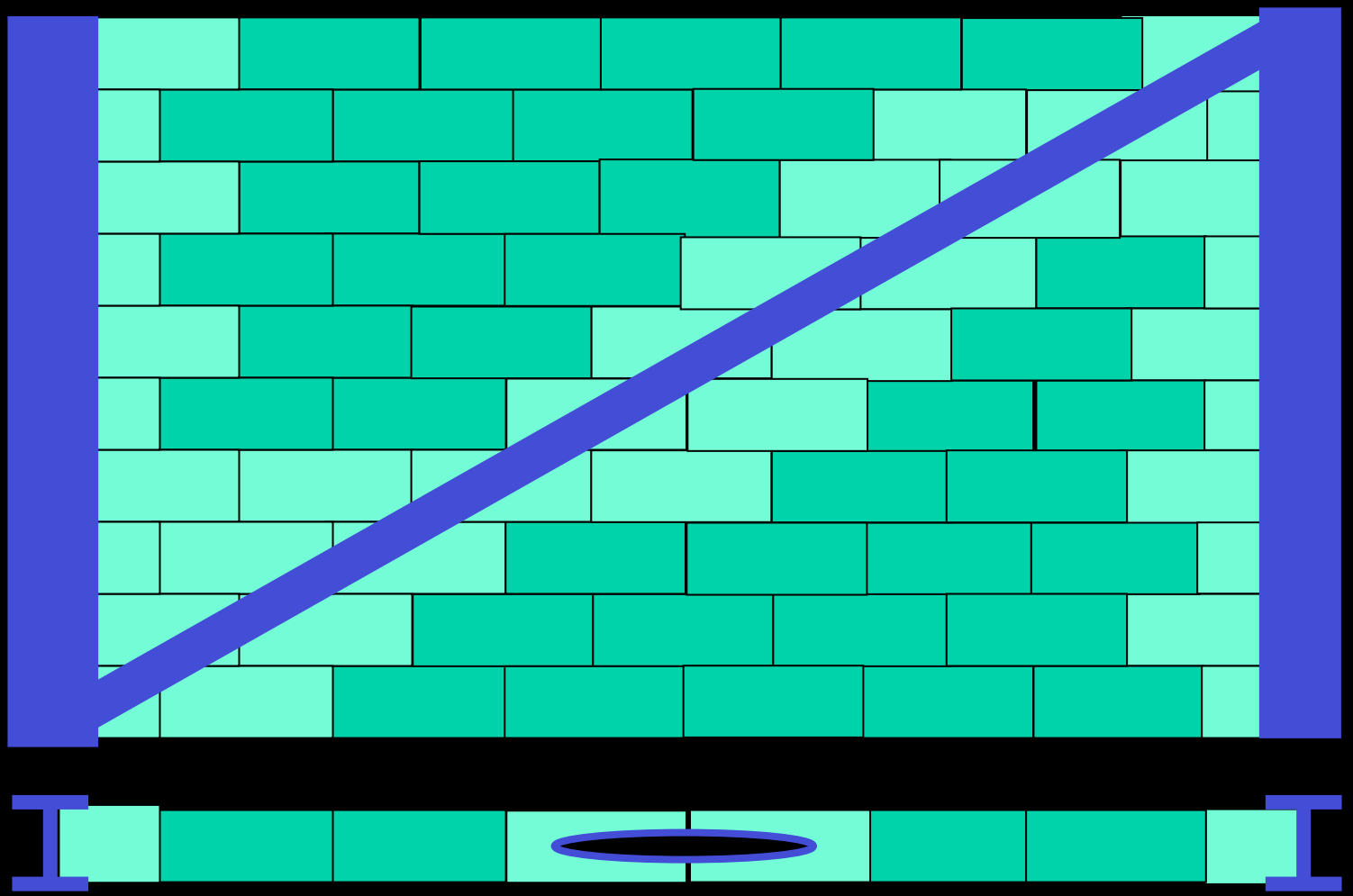
Wind or Stability Posts



Wall interruption will create waste: minimise by design

Different dense materials: thermal bridge? Airtightness?

Lateral Bracing



Frame bracing will create waste: avoid by design

Different dense materials: thermal bridge? Airtightness?

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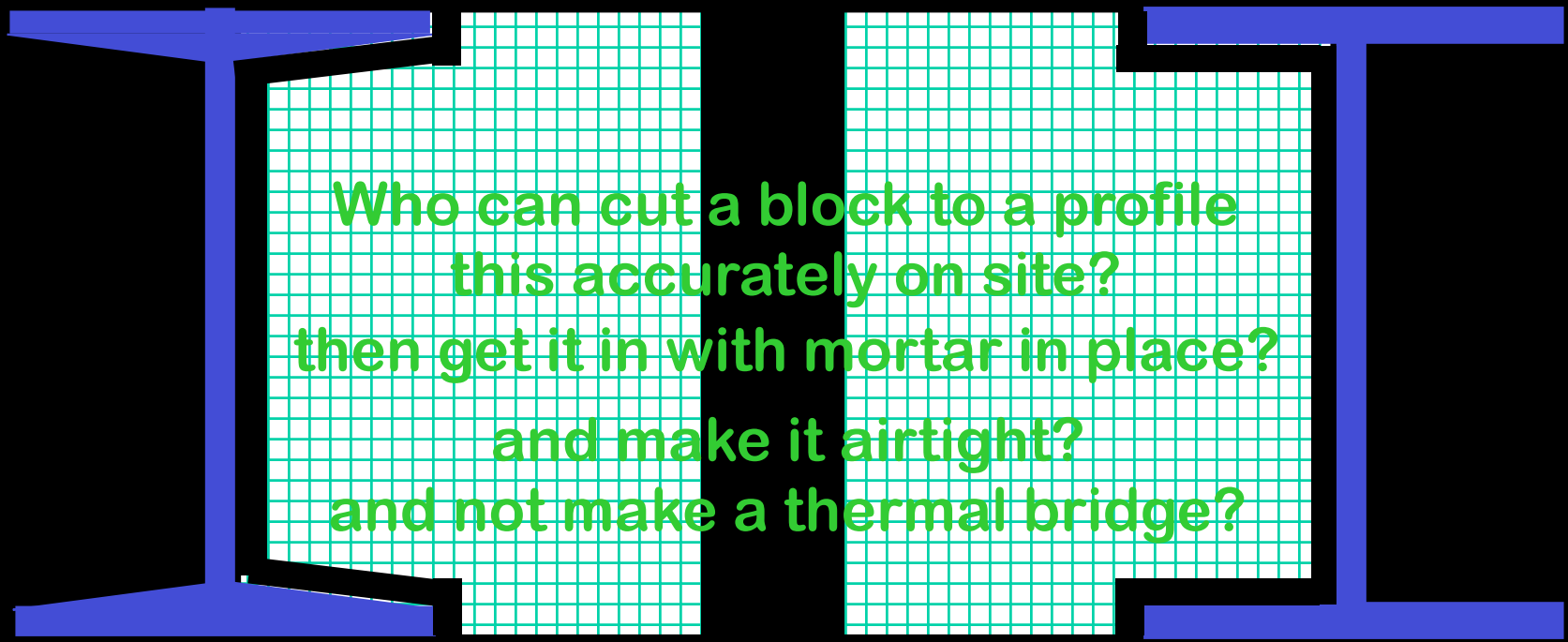
Labour intensive Wasteful Opportunity for rejection



Who can cut a block to a profile
this accurately on site?
then get it in with mortar in place?
and make it airtight?
and not make a thermal bridge?

Rolled Steel Sections Parallel Flange Sections

Mad Mad World

- HHP: Nick the Builder has a business taking architects drawings the constructor can't understand and redrawing for them
- Lovells: They use external CAD Jockeys, the drawings did not acknowledge brick sizes, when asked to correct it, told that is extra money.

Layered Construction

Avoid chasing masonry
Avoid waste materials
Avoid masonry dust
Avoid conduits
Avoid Rendering-in

Surface mount all services and cover with hollow Skirtings, dado, etc.

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Another NGS CPD file to download
See www.scribd.com/brianspecman
and www.greenspecdownload.co.uk
www.nationalgreenspecification.co.uk

Sampler

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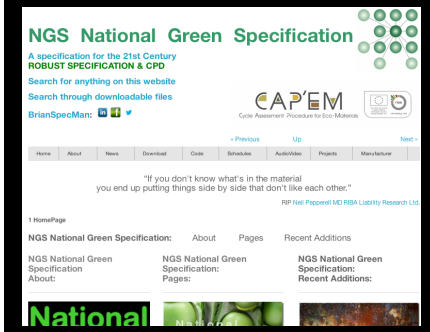
- This is a cut down version of the original file to give you a sample of the whole
- It's the front end of the file with the middle and rear end deleted
- Go to www.GreenSpecDownload.co.uk
- www.nationalgreenspecification.co.uk
- to down load the whole file
- You will find a large number of other files there too



Feedback

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- These files are created by generalists with a big dollop of green flavour
- These files are updated from time to time
- We are not experts so from time to time these file may get out of date or may be wrong.
- If you feel that we have got it wrong please let us know so we can put it right.

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