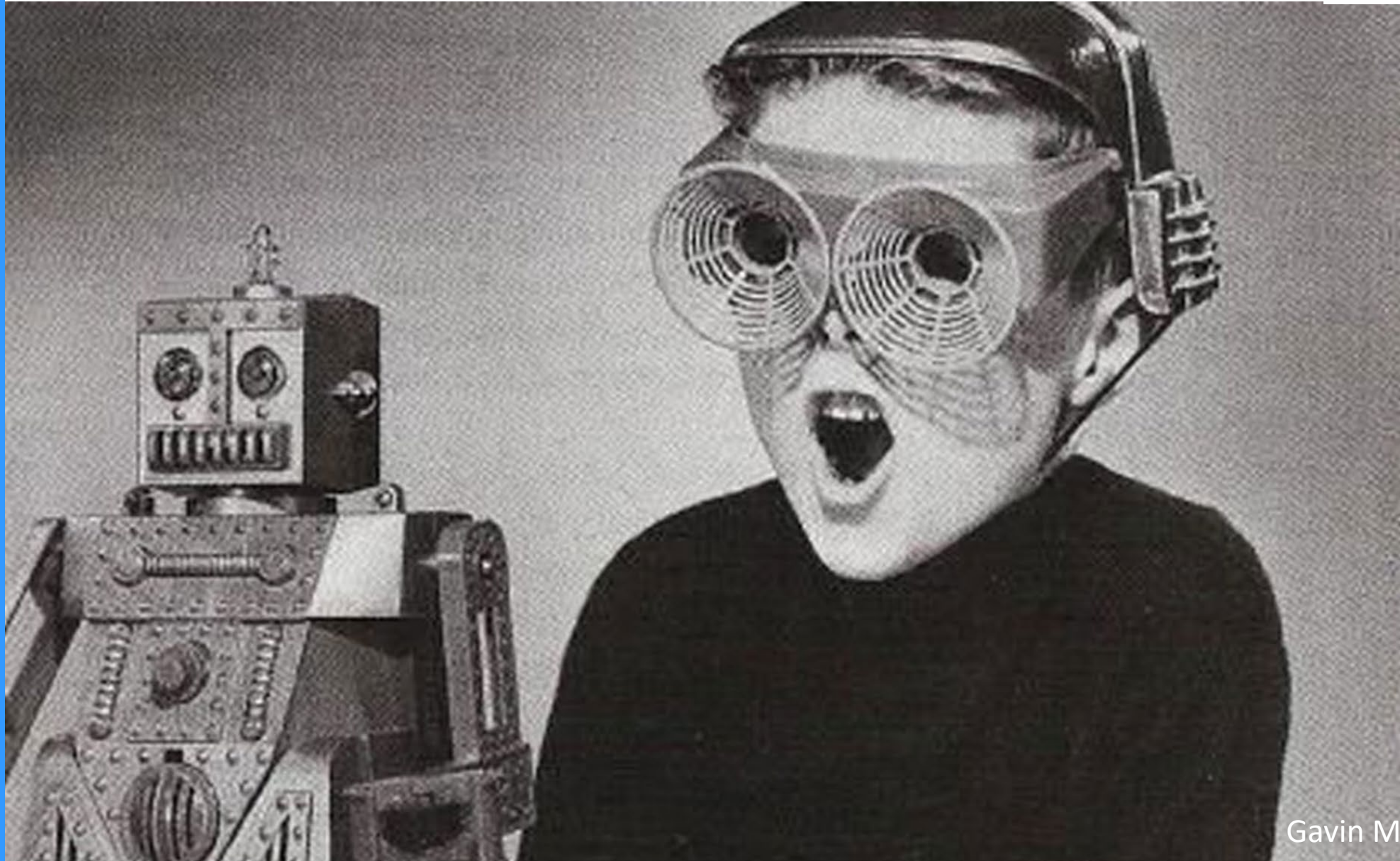


Session 5: Advanced Technology



Gavin M

Activity

Chat

Teams

Assignments

Calendar

Calls

OneDrive

mConnect

...

Apps

< All teams

SY

SSoA Year 4_M.Arch_2025-26_GRP

...

Home page

Class Notebook

Classwork

Assignments

Grades

Reflect

Insights

▼ Main Channels

General

ACAA6005 Advanced Technology

ACAA6006 Architecture Studio A

ACAA6007 Current Issues

ACAA7000 Architecture Studio B

ACAA7001 Architecture Studio C

ACAA7002 Research Methods for Architects

Program of Studies Handbook

Search (Ctrl+E)

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ACAA6005 Advanced Technology

Posts

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ACAA6005 Advanced Technology

	Name	Modified	Modified By	+ Add column
	Assessments	A few seconds ago	Gavin Traylor	
	Lecture Notes	A few seconds ago	Gavin Traylor	

What is it all about?

AIM(S)

- To review the principles of structural design, building construction and environmental science covered in the Part 1 qualification and encountered during professional experience.
- To allow students to investigate and share the latest developments in structural design, building materials, construction techniques, Fire and Safety Design and sustainable design.

LEARNING OUTCOMES

Upon the successful completion of this module, the student should be able to:

- demonstrate a systematic understanding of the main concepts of structural design, building construction and environmental science as they relate to the construction of buildings, including the science of fire, smoke generation and spread and design principles to minimise the risk of smoke and fire;
- outline the main current developments in structural design, building materials, construction techniques and sustainable design;
- explain the methods of investigation and information resources available to establish the state of current knowledge in construction technology;
- communicate the methods of utilising fabric first thermal efficiency, regenerative design solutions and ethical sourcing of products.

Core Themes

Understanding Buildings
Technology for creating data rich building stock
How Buildings Learn
Retrofit
Elemental Construction Methods
Structural Systems and Frames
Offsite
Material Science
Environmental & Low Carbon Approach
Fire Safety

Assessed through a Case Study
CW1 Technical Portfolio
CW2 Presentation

Week 5 Overview:

The story so far....

- BIM Design Construct Operate and Maintain - One truth
 - Challenging Questions of BIM
 - Use of Digital Technologies as Interoperable platforms
 - Challenges of existing Building Stock, Decarbonisation and Building Typology
 - How Buildings Learn – Parallel Ideology
 - Decarbonisation New Technologies - Early Adopters Buildings as Power Stations?
 - Creating a Data Rich Building Stock.
 - Retrofit
-
- Understanding Buildings – Elemental Approach.

What about existing building stock?
What challenges do we face?

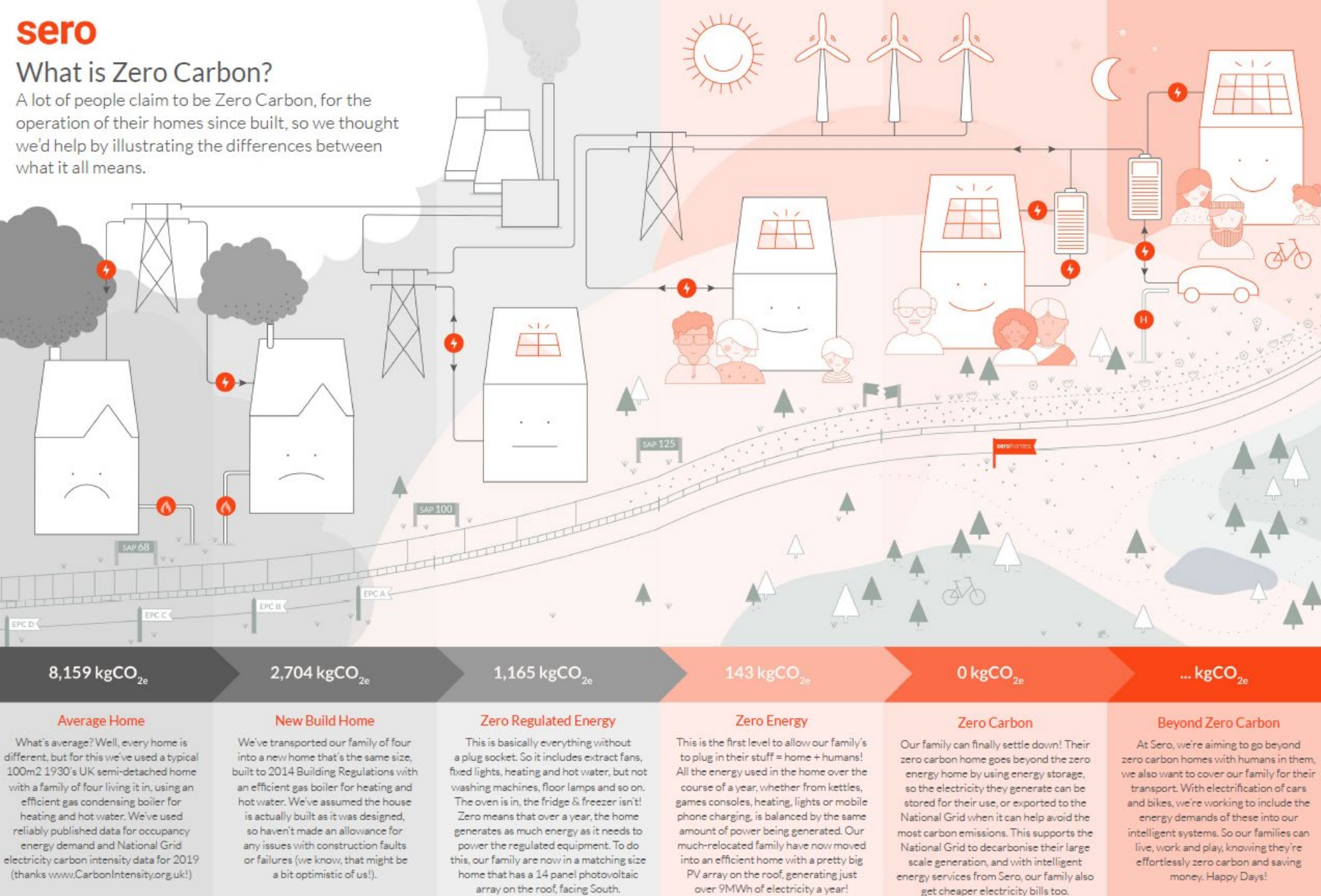
Challenges of Decarbonisation

Speaking at the CN [Decarbonising Construction](https://www.constructionnews.co.uk/sustainability/consultant-urges-delivery-of-mass-retrofit-programme-30-09-2020/) conference, Sonal Jain warned viewers that the UK Government's target of a net-zero carbon economy by 2050 is at risk because 80 per cent of the buildings that will be around in that year have already been built.

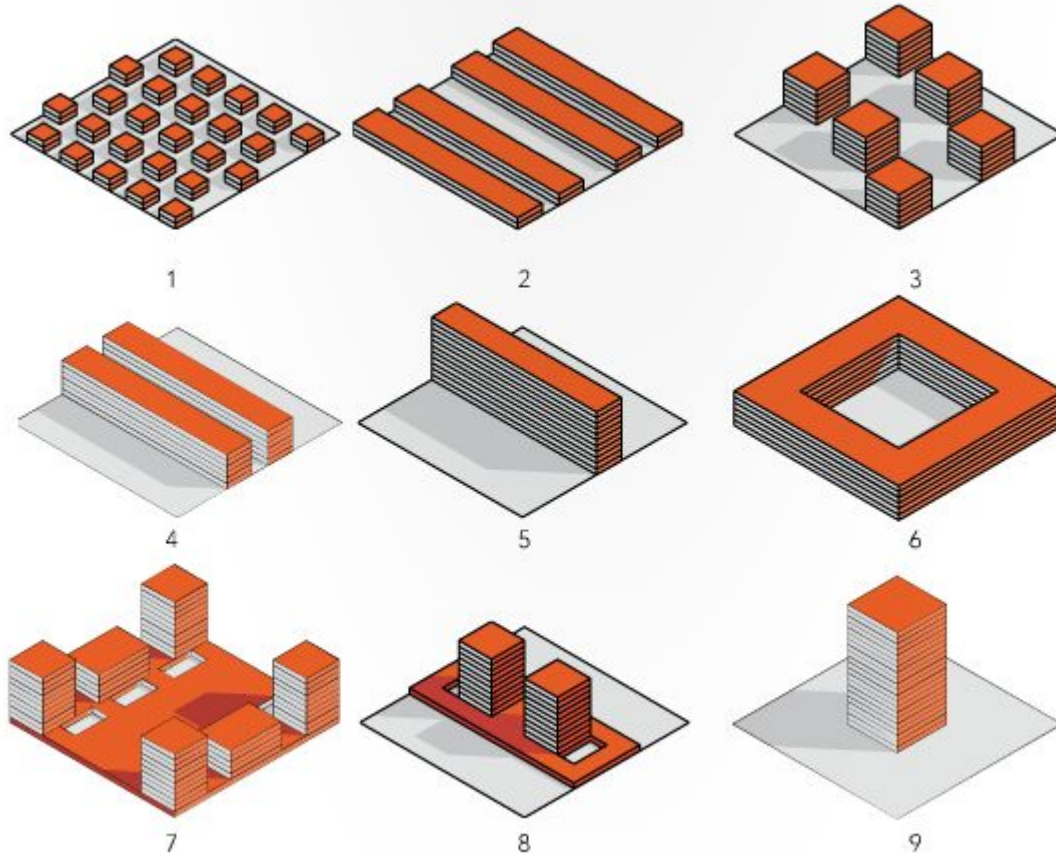
Jain said: "Because 80 per cent of the building stock for 2050 already exists, we cannot deliver on our net-zero goal without fully upgrading this. There is a limited time to upgrade the existing building stock, and delivering net-zero will require deep retrofits of these buildings."

<https://www.constructionnews.co.uk/sustainability/consultant-urges-delivery-of-mass-retrofit-programme-30-09-2020/>

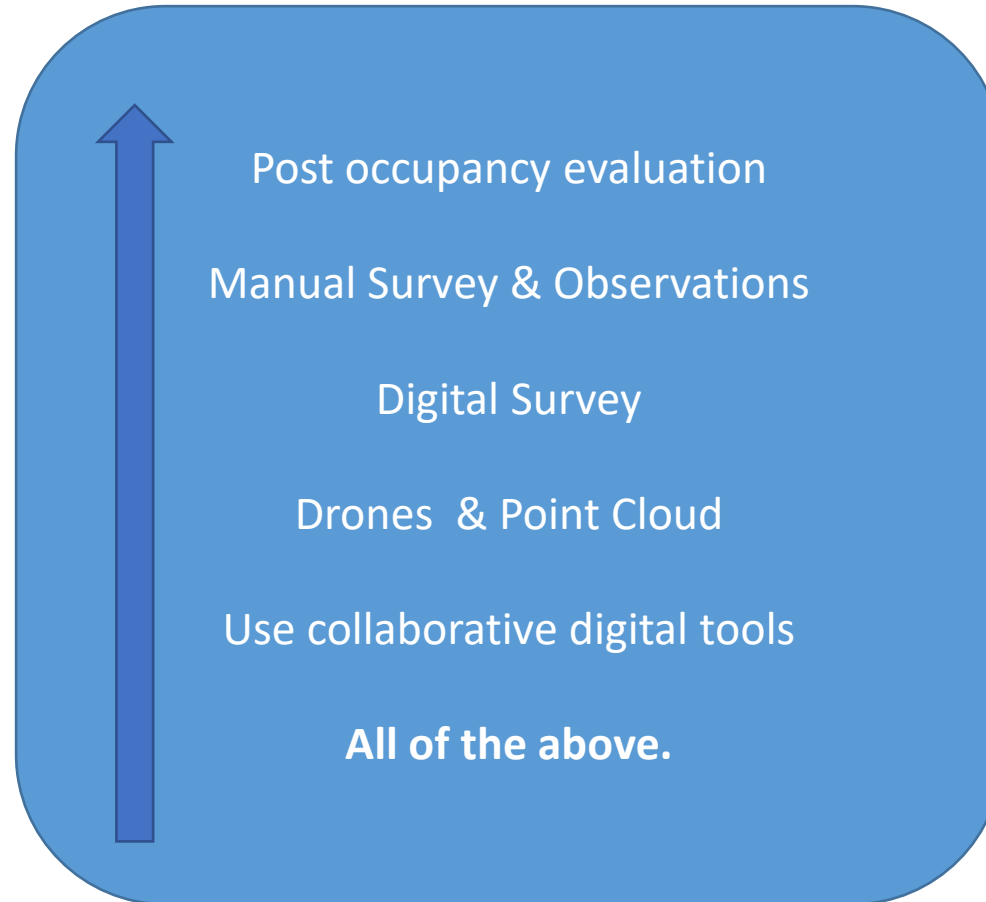




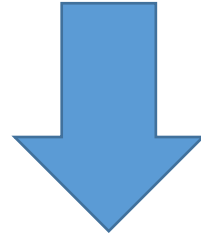
Challenges of Building Typologies



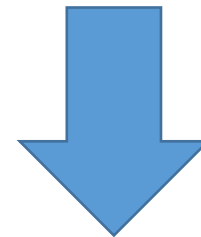
How do we evaluate?



Flexibility to change to changing needs



How Buildings Learn



How Digital Technologies can Assist

Challenges and Opportunities

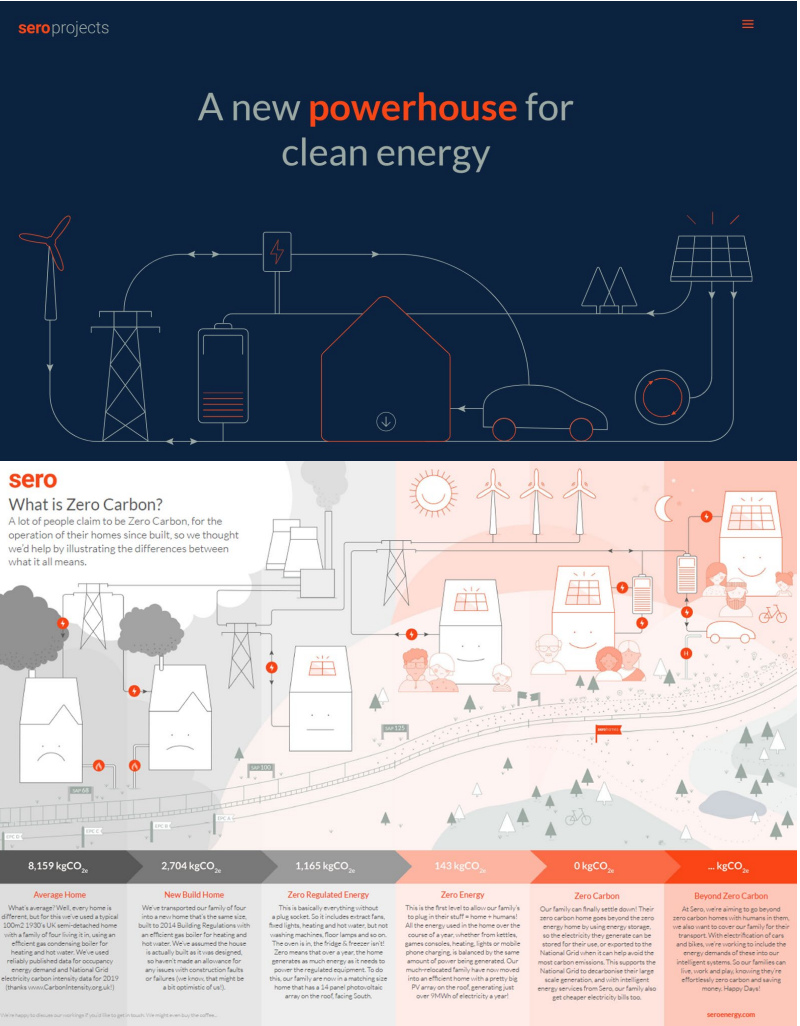


New Technology (Early Adopters – Driving Change)

Our Vision - Sero Homes

The Active Building Centre Research Programme - Welcome

Our innovative Active Buildings® are generating, storing and releasing their own energy - Swansea University



OUR CHALLENGE

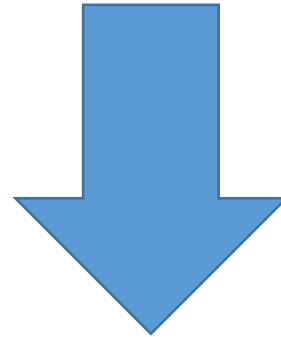
The UK Government is committing to ambitious targets for the UK to reach net zero carbon emissions by 2050.

Funded through the Transforming Construction Challenge, the Active Building Centre seeks to transform the way the UK designs, constructs and operates buildings.

Active Buildings have the potential to substantially reduce both the operational costs of buildings and their demand on the UK energy infrastructure.



There is a limited time to upgrade the existing building stock, and delivering net-zero will require deep retrofits of these buildings.



Can BIM tools help us evaluate our Building Stock?

Creating a Data Rich Building Stock

Taking Precedent:

Utilizing collaborative platforms to assist with



- Accurate geometry
- Accurate Data
- Snagging, Defects
- Monitoring / Reporting / Allocating
- Asset Tagging (QR codes)

Creating a Data Rich Building Stock

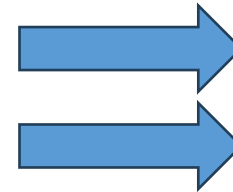
Putting Theory into Practice

Utilizing collaborative platforms to assist with



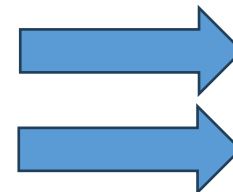
revizto™

- Accurate geometry
- Accurate Data



Laser Scan
Add Asset Data

- Snagging, Defects
- Monitoring / Reporting / Allocating



Create Stamps
Assign Issues

- Asset Tagging



Generate QR Codes

Assessment 1 (50%)

Submission
deadline:

24th March 2026 (portfolio)
Note interim deadlines

Module Learning Outcomes (from module syllabus)

Demonstrate a systematic understanding of the main concepts of structural design, building construction and environmental science as they relate to the construction of buildings, including the science of fire, smoke generation and spread and design principles to minimise the risk of smoke and fire;

outline the main current developments in structural design, building materials, construction techniques and sustainable design;

explain the methods of investigation and information resources available to establish the state of current knowledge in construction technology;

communicate the methods of utilising fabric first thermal efficiency, regenerative design solutions and ethical sourcing of products.

Assessment 1 (50%)

Submission
deadline:

24th March 2026 (portfolio)
Note interim deadlines

How Buildings Learn: The challenges of decarbonisation in the existing building stock.

The Government is committed to a reduction in carbon emissions by 2050. A vast majority of buildings will require deep retrofitting to meet the ambitious targets in the drive towards net zero.

Technical Portfolio: Case study (100%)

Over the course of the year, students shall develop a technical portfolio that will critically analyse and assess an existing case study building to evaluate the technological challenges of retrofitting. Investigation shall initially focus on the existing as built information available and coordination of new and historical data streams utilizing an interoperable collaborative platform. Your research shall consider five key themes and findings shall be compiled throughout the year and collated in an A3 format portfolio. Students will be guided on specific areas of focus within the themes below.

1. Building Appraisal & Digital Analysis (20%)
2. Retrofit and Thermal Performance (20%)
3. Construction & Structural Design: Opportunities/Constraints /New technology (20%)
4. Environmental Design & Energy Performance (20%)
5. Fire Safety Compliance (20%)

Assessment 1 (50%)

Submission
deadline:

24th March 2026 (portfolio)
Note interim deadlines

How Buildings Learn: The challenges of decarbonisation in the existing building stock.

The portfolio shall be methodically structured and presented in a professional manner, highly graphical with the use of analytical diagrams, digital media and models. Appropriate referencing shall be included where applicable.

Timetable of portfolio submission:

It is envisaged that your portfolio is developed incrementally over the academic year to allow transferable skills to the studio modules. Interim deadlines as follows:

Parts 1 & 2: 9th December 2025

Parts 3 & 4: 24th February 2026

Part 5: 24th March 2026

Final Portfolio submission on all aspects 24th March 2026

Assessment 1 (50%)

Submission
deadline:

24th March 2026 (portfolio)
Note interim deadlines

Engagement with Literature Skills

You must demonstrate wider reading around the subject, as well as where your information has come from. In doing so, you must demonstrate that you know where to search for information, that it is credible and that it relates to the topic area.

Knowledge and Understanding Skills

You must show that you understand the issues around the topics covered within the body of work.

Cognitive and Intellectual Skills

The case study should address the themes highlighted in the scenario by means of research, critical analysis and evaluation.

Practical Skills

Application of the real world scenario within the Case Study, should challenge current thinking and demonstrate the appropriateness of application of new technology and methods of practice.

Transferable Skills for Life and Professional Practice:

The work must be professionally presented as a technical Case Study report.

STUDENT FEEDBACK FORM

This section details the extent to which the assessment criteria are demonstrated by you, which in turn determines your mark. The marks available for each category of skill are shown. Lecturers will use the space provided to comment on the achievement of the task(s), including those areas in which you have performed well and areas that would benefit from development/improvement.

Generic Assessment Criteria	Marks available	Marks awarded
1. Engagement with Literature Skills	15	
2. Knowledge and Understanding Skills	25	
3. Cognitive and Intellectual Skills	25	
4. Practical Application Skills	25	
5. Transferable Skills for Life and Professional Practice	10	

Assessment Mark (Assessment marks are subject to ratification at the Exam Board. These comments and marks are to give feedback on module work and are for guidance only until they are confirmed.)	Late Submission Penalties (tick if appropriate) Up to 1 week late (50% mark) Over 1 week late (25%)	%
---	--	---

Assessment 2 (50%)

Submission
deadline:

21st April 2026

Module Learning Outcomes (from module syllabus)

Demonstrate a systematic understanding of the main concepts of structural design, building construction and environmental science as they relate to the construction of buildings, including the science of fire, smoke generation and spread and design principles to minimise the risk of smoke and fire;

outline the main current developments in structural design, building materials, construction techniques and sustainable design;

explain the methods of investigation and information resources available to establish the state of current knowledge in construction technology;

communicate the methods of utilising fabric first thermal efficiency, regenerative design solutions and ethical sourcing of products.

Assessment 2 (50%)

Submission
deadline:

21st April 2026

How Buildings Learn:

'Buildings keep on growing. A building is not something you finish it's something you start. '
Brand 1995

The Government is committed to a reduction in carbon emissions by 2050. A vast majority of buildings will require deep retrofitting to meet the ambitious targets in the drive towards net zero. The latest custodians of the case study property wish to prepare a 5-point strategy to ensure that building will develop and adapt to meet new demands.

With reference to the research aspects undertaken in coursework 1, prepare a PowerPoint presentation that crystalises the research themes investigated in your portfolio case study.

Propose a phased strategy of interventions that will enable the building to adapt to meet the new requirements, be flexible to future changing needs and adhere to the commitment to reduce carbon emissions by 2050.

Your presentation should include an outline timeline that considers short-, medium- and long-term interventions.

Your presentation should be methodically structured, highly graphical with the use of analytical diagrams and digital media. Appropriate referencing shall be included where applicable.

Assessment 2 (50%)

Submission
deadline:

21st April 2026

Engagement with Literature Skills

You must demonstrate wider reading around the subject, as well as where your information has come from. In doing so, you must demonstrate that you know where to search for information, that it is credible and that it relates to the topic area.

Knowledge and Understanding Skills

You must show that you understand the issues around the topics covered within the body of work.

Cognitive and Intellectual Skills

The presentation should address the themes highlighted in the scenario by means of research, critical analysis and evaluation.

Practical Skills

Application of the real world scenario within the Case Study, should challenge current thinking and demonstrate the appropriateness of application of new technology and methods of practice.

Transferable Skills for Life and Professional Practice:

The work must be professionally presented.

STUDENT FEEDBACK FORM

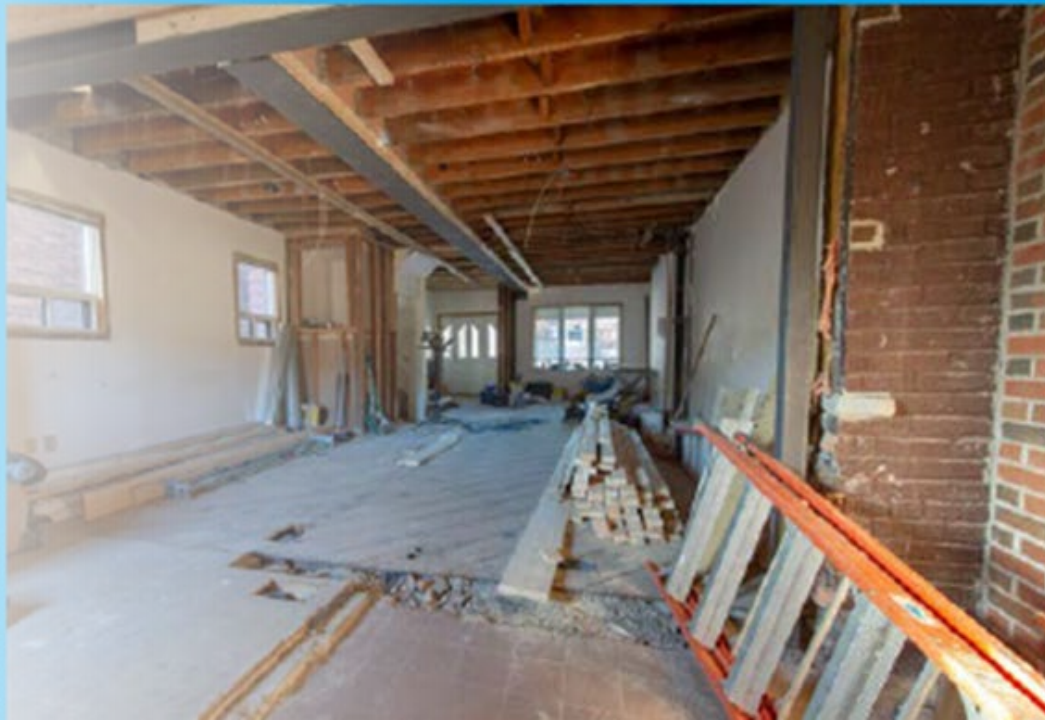
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Generic Assessment Criteria	Marks available	Marks awarded
1. Engagement with Literature Skills	15	
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3. Cognitive and Intellectual Skills	25	
4. Practical Application Skills	25	
5. Transferable Skills for Life and Professional Practice	10	

Assessment Mark (Assessment marks are subject to ratification at the Exam Board. These comments and marks are to give feedback on module work and are for guidance only until they are confirmed.)	Late Submission Penalties (tick if appropriate) Up to 1 week late (50% mark) Over 1 week late (25%)	%
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- Current refurbishment practice.
- Guidance for retrofit
- PAS 2035 for Domestic
- PAS 2038 for non-Domestic / Commercial
- What about Historic Buildings?



Refurbishment

or

Retrofit

Dictionary

Definitions from [Oxford Languages](#) · [Learn more](#)



refurbishment

/riːˈfɜːbɪʃm(ə)nt/

noun

the renovation and redcoration of something, especially a building.

"the theatre reopened following major refurbishment"

Dictionary

Definitions from [Oxford Languages](#) · [Learn more](#)



retrofit

/ˈrɛtrə(ʊ)ˌfɪt/

verb

add (a component or accessory) to something that did not have it when manufactured.

"motorists who retrofit catalysts to older cars"

noun

an act of retrofitting a component or accessory.

"uninsulated and oddly designed dream houses that are badly in need of a retrofit"

PAS 2035:2019

Incorporating Corrigendum No. 1

Retrofitting dwellings for improved energy efficiency – Specification and guidance



PAS 2038:2021

Retrofitting non-domestic buildings for improved energy efficiency – Specification



Retrofit Considerations

Adhering closely to the PAS 2035 Optimised Retrofit guidelines.

Project Considerations.

- Performance & Budget
- Fabric First Initiatives
- Systems
- Renewables

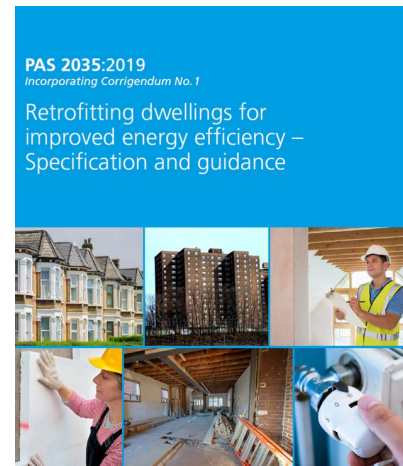
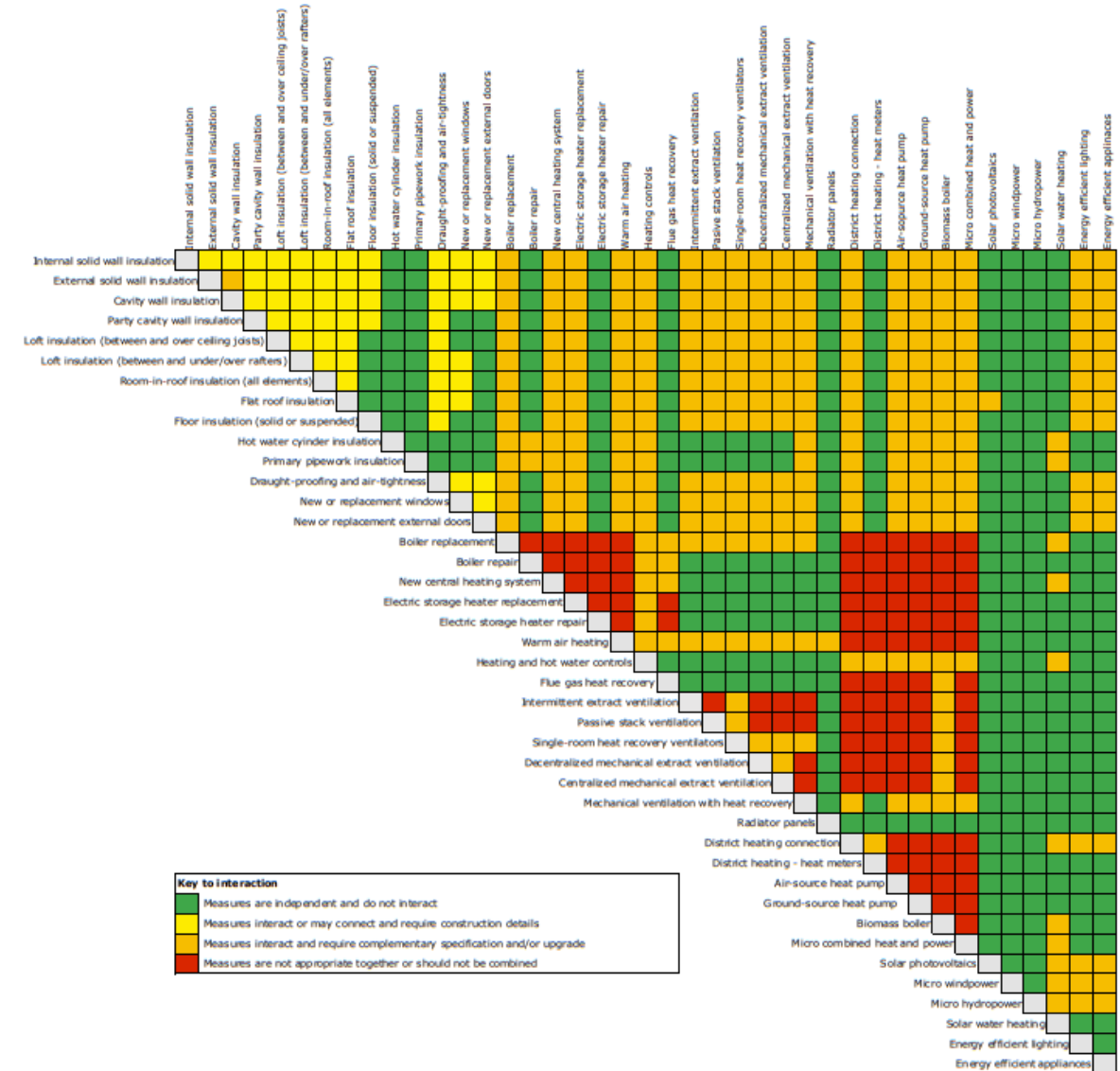


Figure D.1 – The measures interaction matrix



PAS 2038:2021

Retrofitting non-domestic buildings for improved energy efficiency – Specification



5.1 Requirement for assessment prior to retrofit

Every building that is subject to retrofit compliant with this PAS shall first be assessed by a person or persons suitably qualified as specified in 4.2 and 4.3, and hereafter referred to as the assessor(s), to provide information about the building for use in preparation of a retrofit design. Where more than one assessor (possibly with different specialisms) is required, one of them shall be designated the lead assessor, with responsibility to coordinate the assessment work.

NOTE Assessments of buildings will vary in detail according to the types and sizes of the buildings and the nature of the improvements proposed. However, all assessments should include collation of information in at least four categories.

- 1) *Context – the building's architectural, cultural and historic context, and its physical setting, including aspect and exposure, access, planning constraints, etc.*
- 2) *Condition – the building's structural condition, and its construction, services and controls, the presence of defects and the need for repairs or maintenance (especially any essential precursors to retrofit work).*
- 3) *Occupancy – the number of occupants and their pattern of use of the building, including heating, cooling, ventilation and lighting regimes and controls, the use of hot water and small power, and the arrangements for ensuring occupants' health and safety.*
- 4) *Energy performance – how much energy the building uses, broken down by end uses and fuel types, and how its energy performance relates to typical and/or good practice benchmarks (if available).*

5.2 Scope of assessment

The assessment shall include:

- a) an appraisal of the building's heritage, architectural features, structure, construction and condition and the installed building services to establish the suitability of the building for improvement;
- b) identification of any constraints imposed by the site, e.g. elevation and exposure (to sun, wind and rain, flood risk, adjacent major roads and industrial activity), radon exposure, access, party walls, rights of light, and consideration of adjoining properties;
- c) identification of any constraints and regulatory requirements related to improvement of the building (including requirements for energy

efficiency, fire safety, planning permission, and any arising from Listing as of Special Architectural or Historic Interest, location in a Conservation Area, Tree Preservation Orders or archaeological investigation);

d) identification of:

- 1) the location and severity of any existing construction defects, structural defects or leaks;
- 2) any moisture accumulation, condensation or mould growth and the need for specialist investigation; and
- 3) any improvement measures (e.g. additional insulation) previously installed;

e) an appraisal of existing occupancy, including:

- 1) the number of occupants and regular visitors;
- 2) the hours of occupancy and business;
- 3) any special considerations such as the presence of vulnerable persons; and
- 4) the types of occupants and their requirements for indoor environmental quality;

f) a measured survey to establish the following:

- 1) the overall dimensions of the building's heat loss envelope (including any basements and attics);
- 2) the dimensions of all building elements (exposed floors, external walls, roofs); and
- 3) the dimensions of all window and door openings;

NOTE 1 Items 1) to 3) are all sufficient for accurate plans, sections and elevations of the building to be prepared (unless such drawings already exist).

NOTE 2 Where drawings of the building already exist, a measured survey might not be necessary, but the drawings should be checked for accuracy and corrected if appropriate. Where drawings of the building do not already exist, the preparation of drawings is recommended, but for some small, simple buildings annotated and dimensioned sketch plans and sections, supplemented by photographs, may suffice.

- g) an appraisal of the building's construction to establish the thermal and moisture properties of the main building elements (exposed floors, walls and roofs) and the suitability of each element for improvement;

NOTE 3 Where an Energy Performance Certificate (EPC) assessment has been completed, the thermal properties of the main building elements might already be recorded, but they should be checked for any obvious inaccuracies, and corrected if appropriate.

PAS 2035:2019
Incorporating Corrigendum No.1

Retrofitting dwellings for
improved energy efficiency –
Specification and guidance



 Department for
Business, Energy
& Industrial Strategy

bsi.

PAS 2038:2021

Retrofitting non-domestic
buildings for improved energy
efficiency – Specification



 Department for
Business, Energy
& Industrial Strategy

bsi.

Holistic Approach

Holistic Approach
You need to
understand what
you have before
you make
recommendations

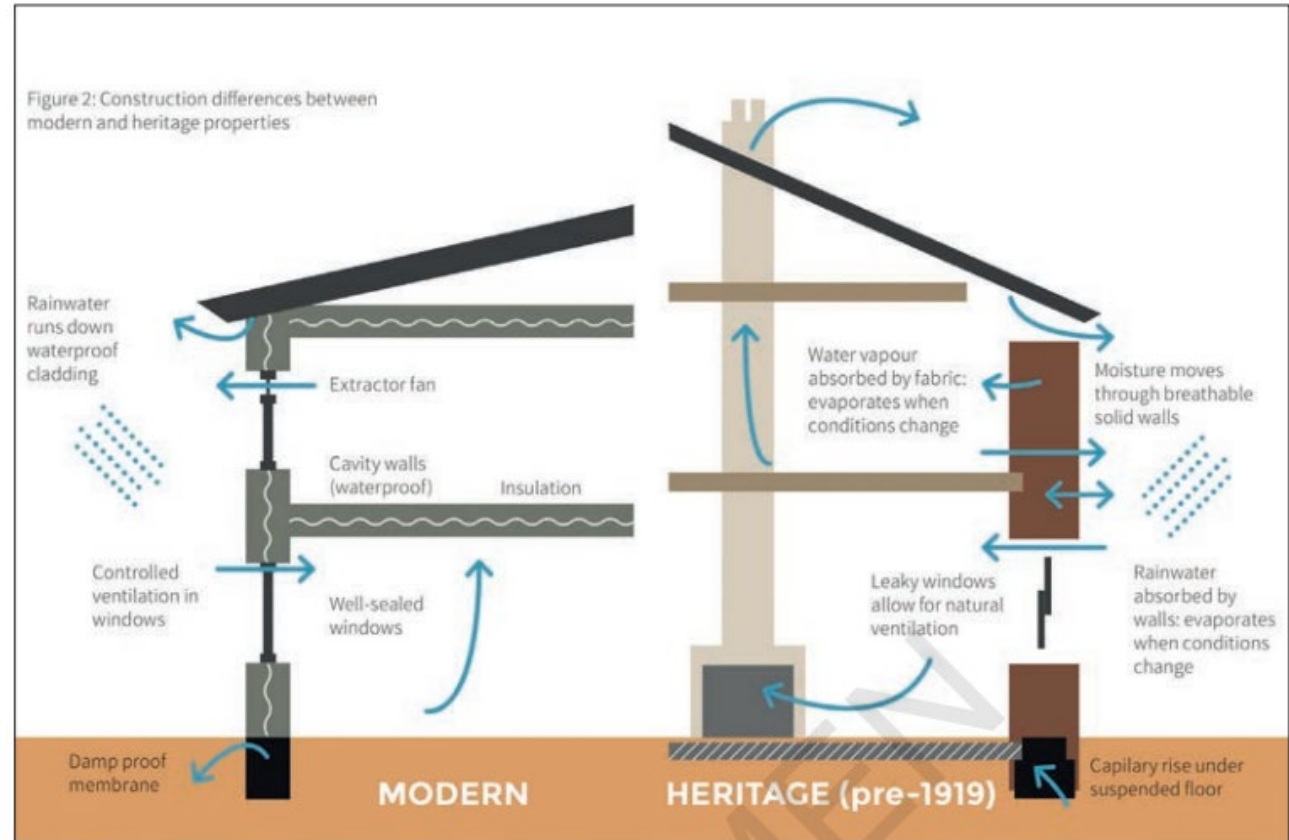


Fig 3.1: Comparison of the performance of modern and traditional buildings¹¹

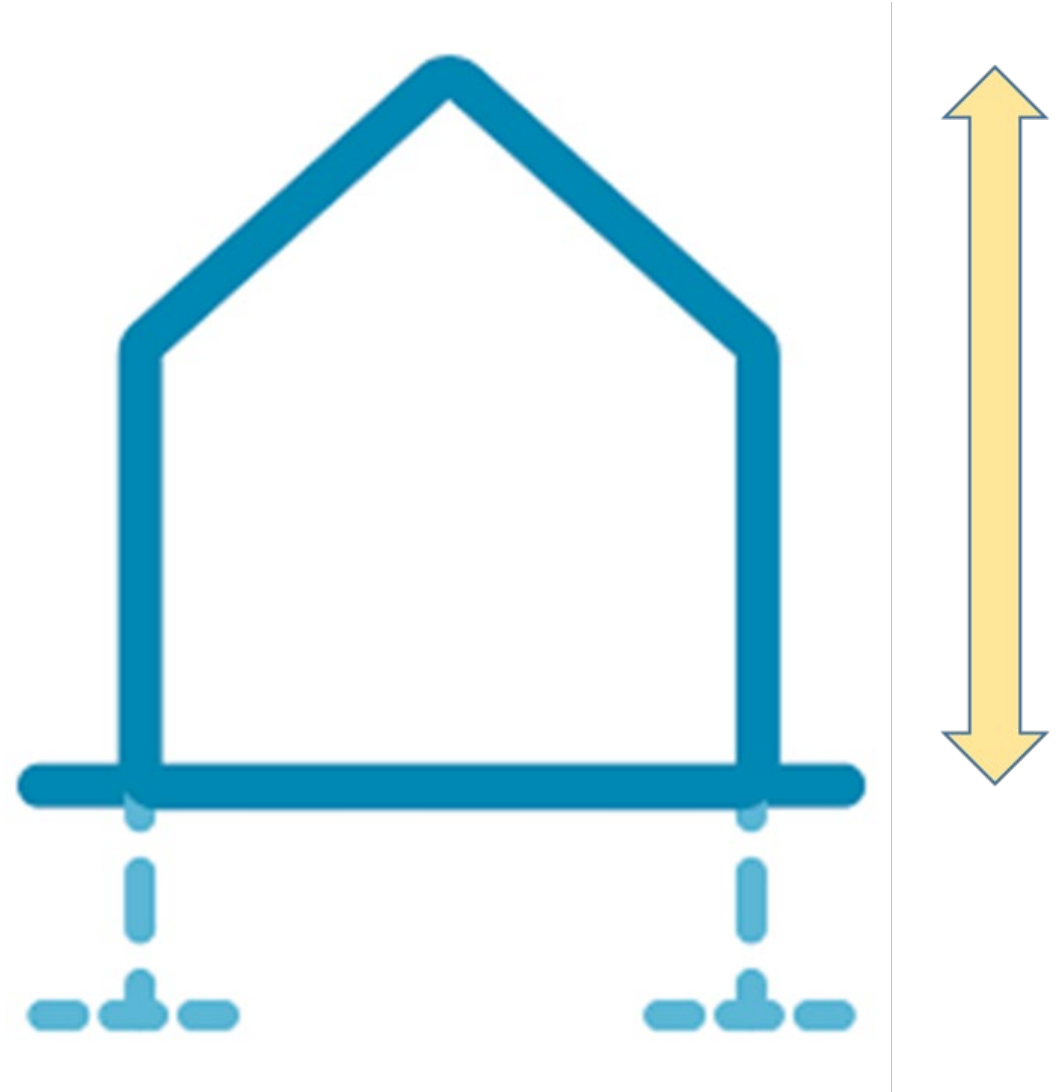
Retrofit

- Performance Standards
- Passivhaus
- ACTIVE House
- LEED
- BREEAM
- EnerPHit
- SKA



What about Historic Buildings?

Understanding Buildings



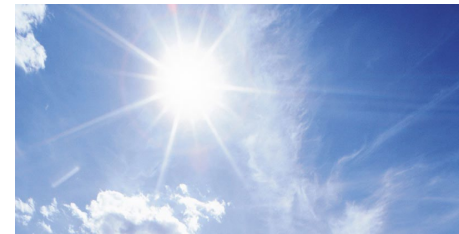
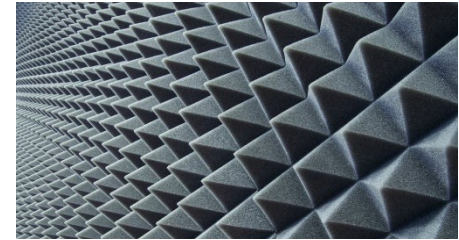


Condensation is intrinsically linked to thermal performance, as the temperature reduction inside to outside through the building **enclosure** is a principal factor in its creation.

The use of buildings to house people, equipment and processes have resulted in the development of buildings that can control these internal environments with greater accuracy.

As well as protection and **enclosure** we can now consider:

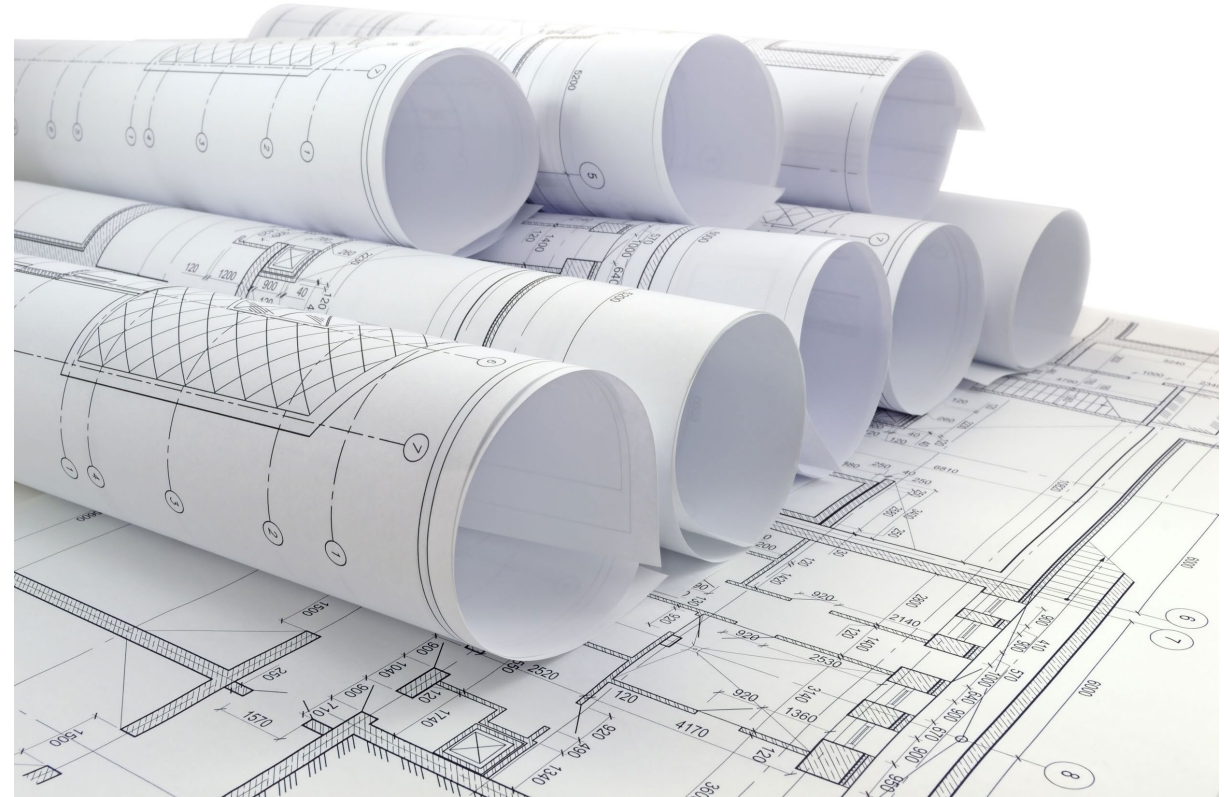
- Thermal Insulation and temperature control
- Acoustic insulation
- Provision of Light (natural and artificial)
- Controls for humidity and ventilation
- Exclusion of contaminants.



Performance Requirements of the Building Fabric

What are the key drivers in providing a building that is suitable for the need?

- Structurally Stable
- Durability
- Thermal insulation
- Protection from weather and exclusion of moisture
- Acoustic performance
- Flexibility to change to changing needs
- Aesthetics
- Buildability
- Sustainability



Key Terms

Types: Surface Condensation and Interstitial Condensation.

Surface Condensation is a familiar problem eg: humid air hitting a cold surface such as bathroom and kitchen windows.

Condensation can be damaging in extreme instances where it leads to residual dampness in plaster and other finishes, and can be the source of mould growth over time.

Interstitial Condensation – most serious type and causes the most problems in lightweight building enclosures where the condensation occurs within the constructional thickness.



Surface Condensation

Two people active for one day



= 3 pints

Cooking and boiling a kettle



= 6 pints

Having a bath or shower



= 2 pints

Washing clothes



= 1 pint

Drying clothes



= 9 pints

Using a paraffin or bottled-gas heater



= 3 pints

**Total amount of moisture
produced in your home
in one day**

= 24 pints



Key Terms

Dew Point

The temperature at which saturation and condensation occurs.

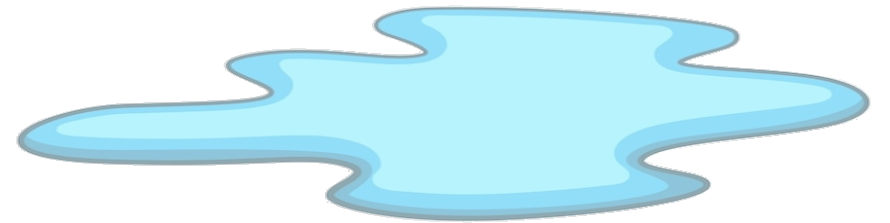
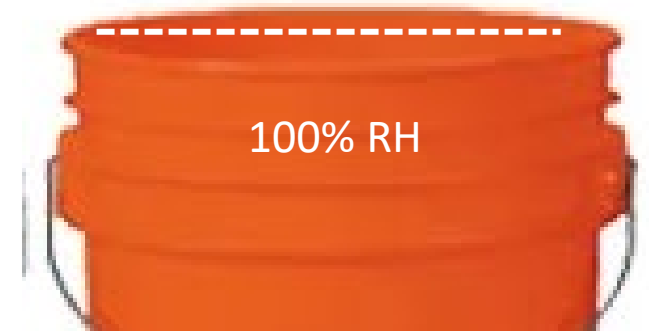
When water vapour in the humid air is cooled it eventually reaches a saturation temperature where the water vapour condenses into water droplets.

Relative Humidity

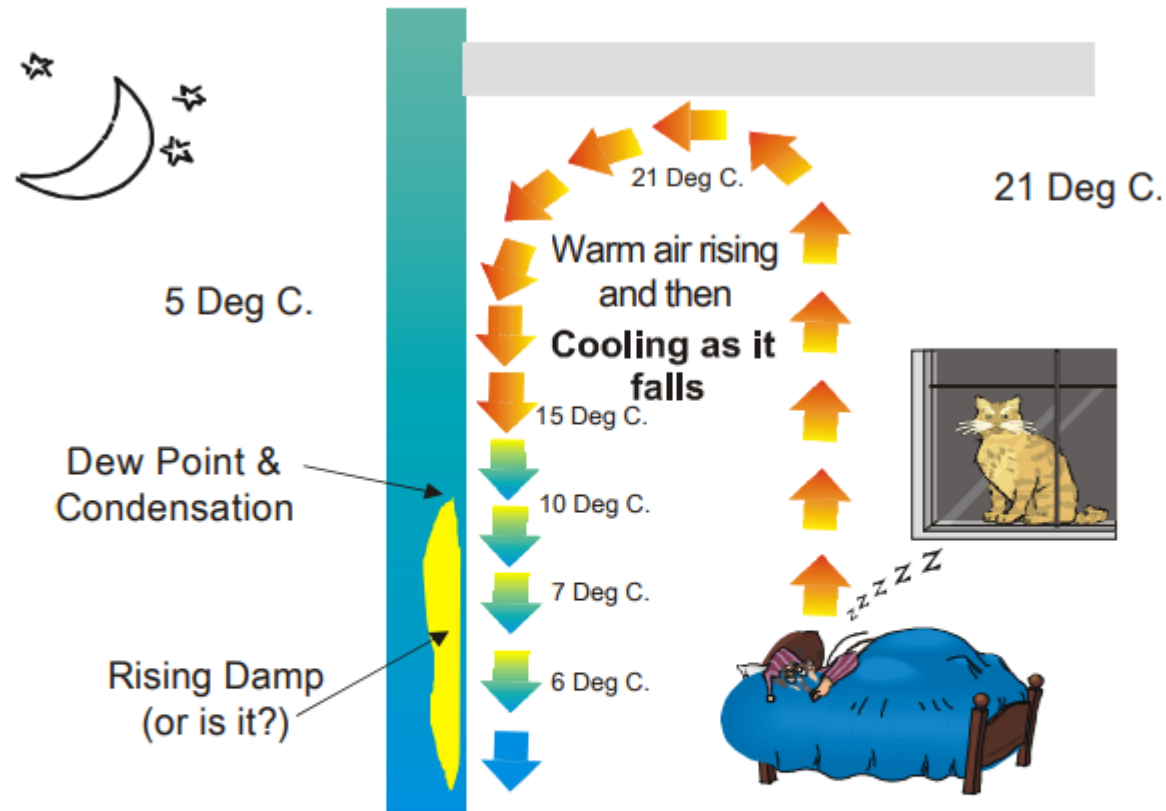
This is the relative wetness of a given volume of air. This is expressed as a % based on the amount of water vapour in the air relative to the amount of water vapour the air *could* carry.

e.g if the RH is 50% then the air's carrying capacity is at half.
If the air temperature is reduced to a where the RH is 100%
- Dew point.





Reducing the size of the bucket (air temperature) whilst keeping the contents the same means puddles!



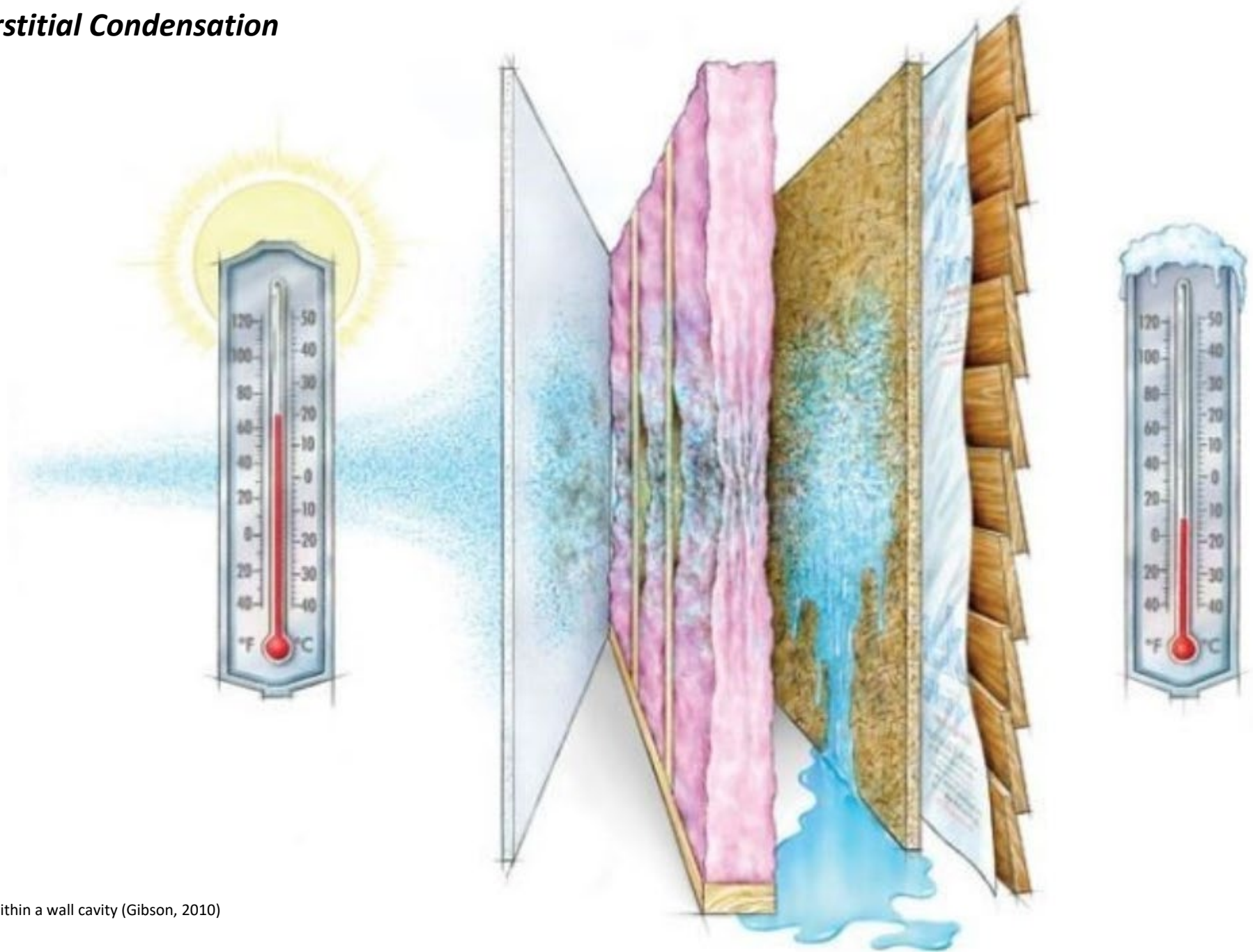
Rising Damp?

What might be happening here?

How could we tell the difference?

In this example shown above; if the Relative Humidity is only 50% (and with two people breathing in a bedroom it could easily be higher), and the inside room temperature is 21 deg C., then the dewpoint temperature is 10 deg C. Many outside walls have lower temperatures than this during the winter!

Interstitial Condensation



Examples:

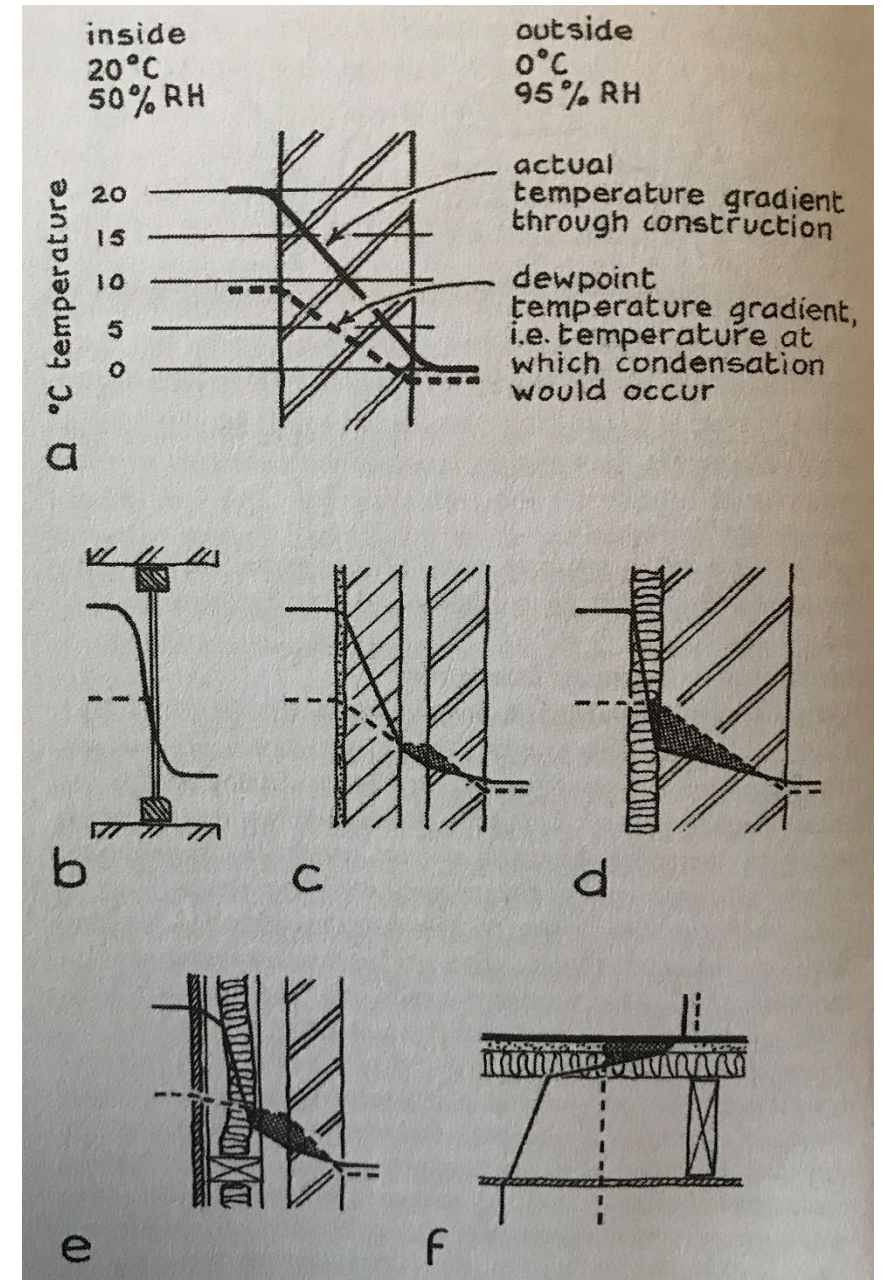
Domestic Internal temp 20 degs C and 50% RH

External Cold Winter 0 degs C and 95% RH

Note: The air outside has a higher RH than the inside only because it is colder – although it actually contains less water vapour.

Actual Temperature Gradient and Dew point Temperature Gradient Basic Principles and Examples (a – f)

Interstitial Condensation occurs where the two gradients cross.



Preventing Condensation

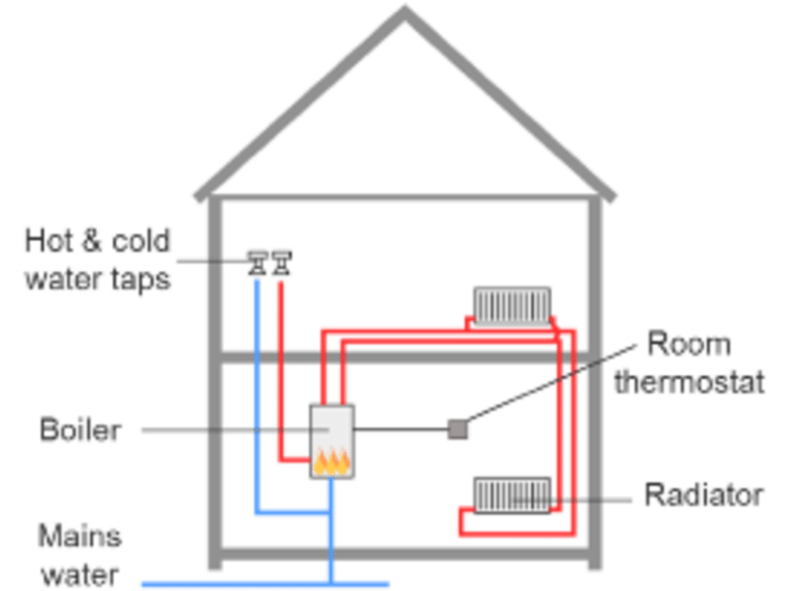
Heating and Ventilation.

Improve the heating of the building and increase the ventilation.

Does that mean - Heating on full with all the windows open?

Ventilation is limited, but additional fans in kitchens and bathrooms will reduce the vapour content in the air.

This may provide solutions for surface condensation but this will do little for the interstitial condensation.



Preventing Condensation

Placing Insulation towards the Outside

This has the effect of making the gradient distortion a safer one, but is not always a practical solution. **(a)**

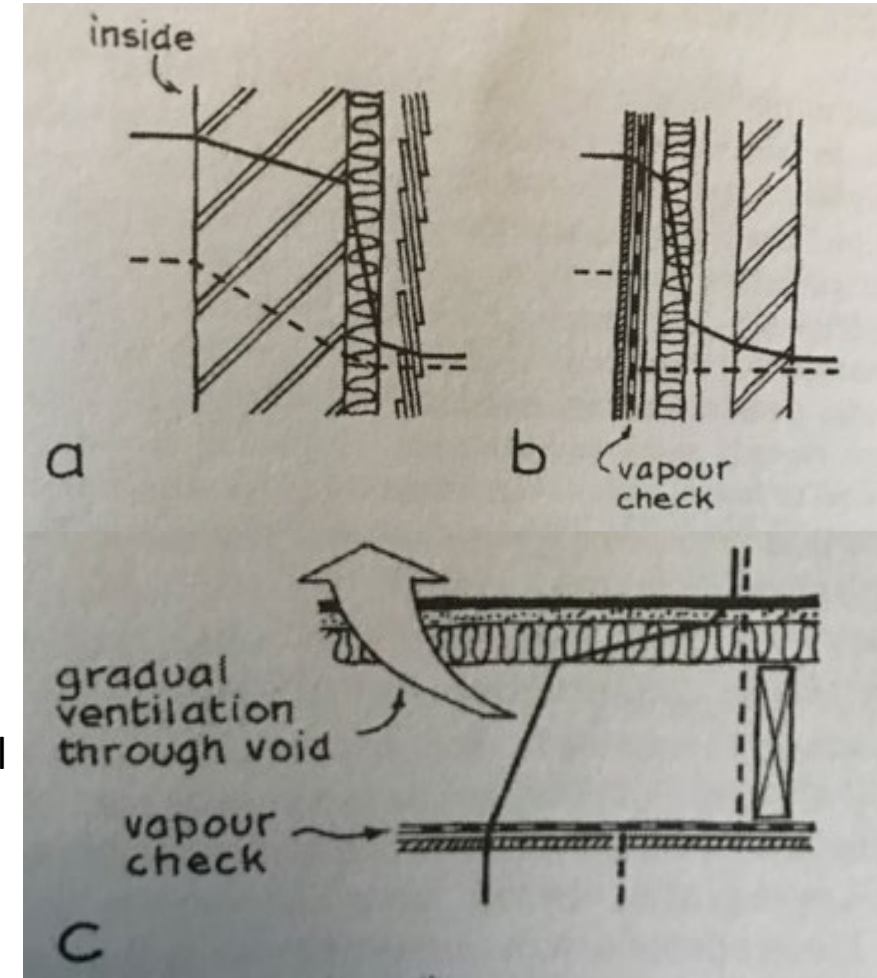
Vapour Checking

An effective vapour check can reduce the dew point gradient and makes the dew point in the enclosure the lower outside level. **(b)** Typically the positive vapour check can be a thin layer of plastic sheeting or metal foil.

Vapour Checking and Construction Ventilation

In an extreme case - flat roof timber construction **(c)** a vapour check is not enough. They cannot be relied on 100% due to fixings etc.

The answer is to allow the construction some ventilation to the outside. Gradual through ventilation, (Soffit vents / eaves vents / airbricks) will carry any residual ventilation away. Vapour checking and gentle ventilation avoid condensation without significant heat loss.



Summary

Condensation is caused by warm moist air reaching cold places.
Precautions are:

- Improving heating and ventilation generally
- Possibly putting insulation to the outside
- Vapour checking **ON THE WARM SIDE** of the insulation
- Ventilating the Construction to the fresh air if there happens to be a vapour trapping membrane on the outside.

CONDENSATION IS A CRITICAL FACTOR WHICH NEEDS TO BE RISK ASSESSED WHEN RETROFITTING.

Further Reading:

Esmond Reid: 'Understanding Buildings'

Mike Riley: Alison Cotgrave: 'Construction Technology 1-3'

McMullans: 'Environmental Science in Building'

After fifty years studying moisture, defects and decay, Colin King has watched Britain repeat the same mistakes. He warned government that insulation without understanding would breed a national mould crisis. He was right.

Knowledge, Ignorance and Power: What About the Mould?

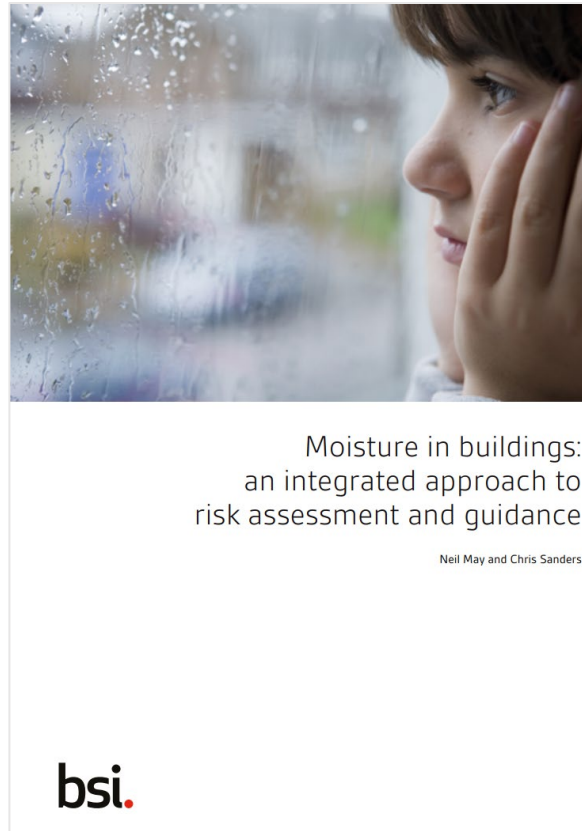
Moisture Safe Approach to Buildings –
The 4 C's a principles approach:

Context

Capacity

Coherence

Caution



[Colin King LinkedIn - Moisture In Buildings](#)

THE MAN MOULD FEARS



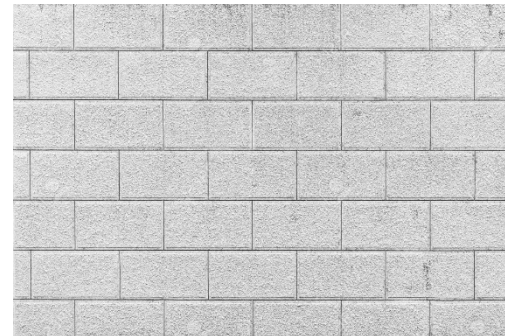
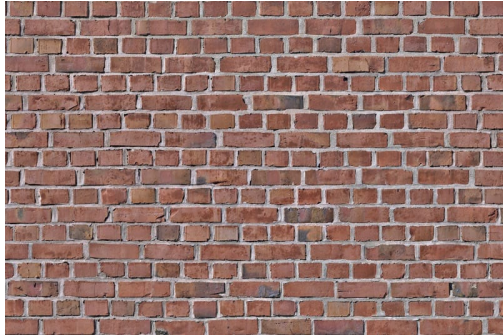
EXTERNAL WALLS



FUNCTIONAL REQUIREMENTS OF EXTERNAL WALLS

Weather protection
Fire resistance
Thermal resistance
Strength and stability
Durability
Buildability
Noise insulation

SOLID WALLS



Built with brick, stone or block



Load-bearing and non-load bearing

SOLID WALLS

1919?

Traditional construction. Pre 1919 solid walls

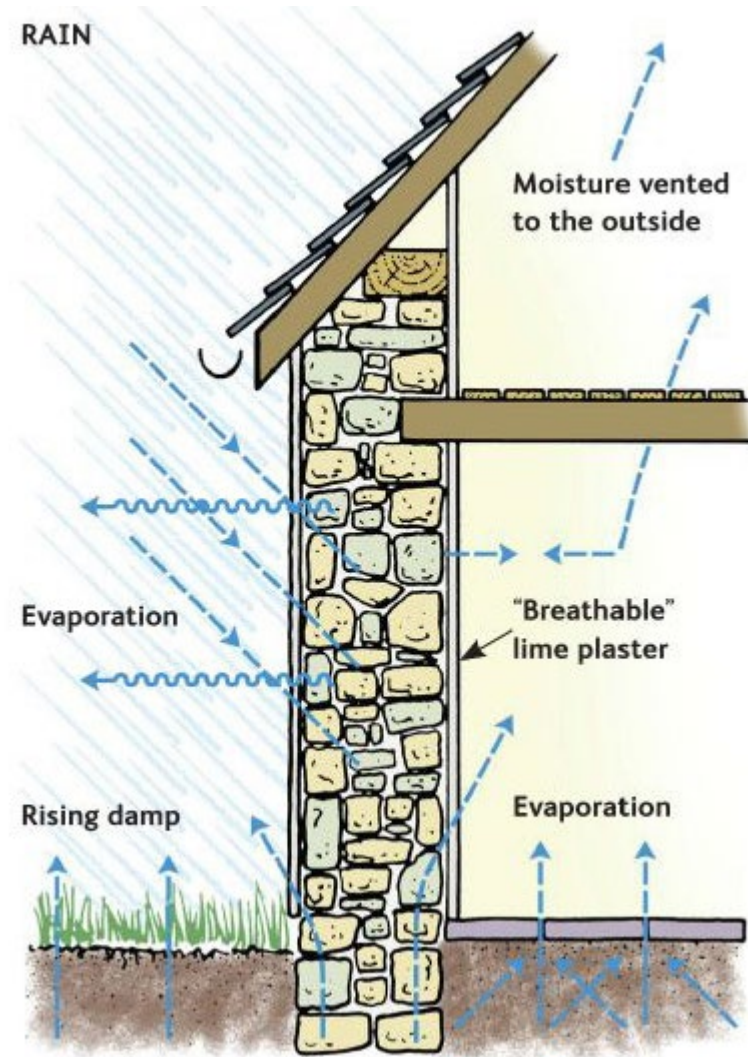


SOLID WALLS

Traditional construction. Pre 1919 solid walls

Characteristics:

- Thick walls
- Random rubble
- Lime mortar
- Shallow foundations
- No DPC



SOLID WALLS

Traditional construction. Pre 1919 solid walls

Earth walls – Rammed Earth



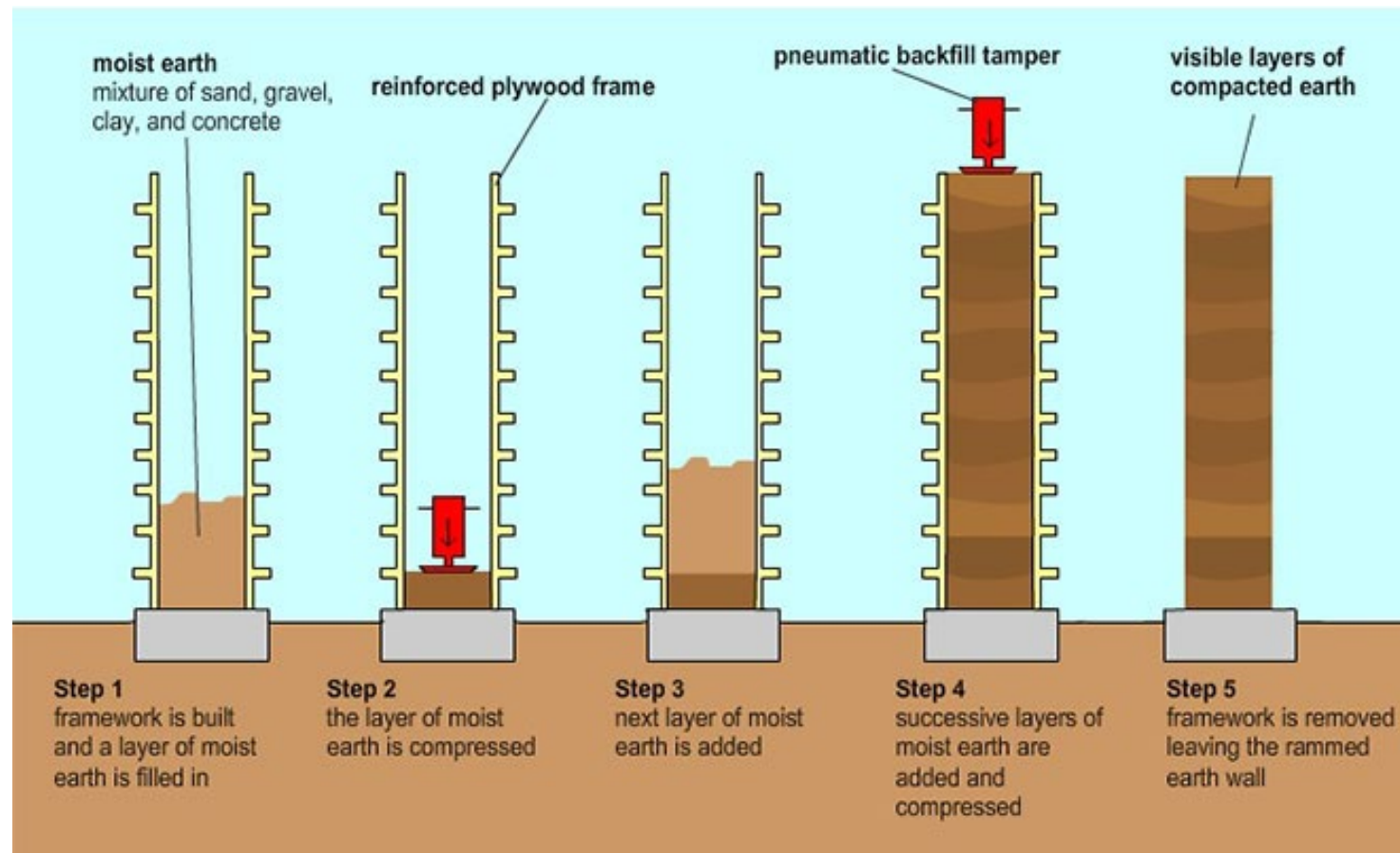
SOLID WALLS



SOLID WALLS

Traditional construction. Pre 1919 solid walls

Earth walls – Rammed Earth



SOLID WALLS

Traditional construction. Pre 1919 solid walls

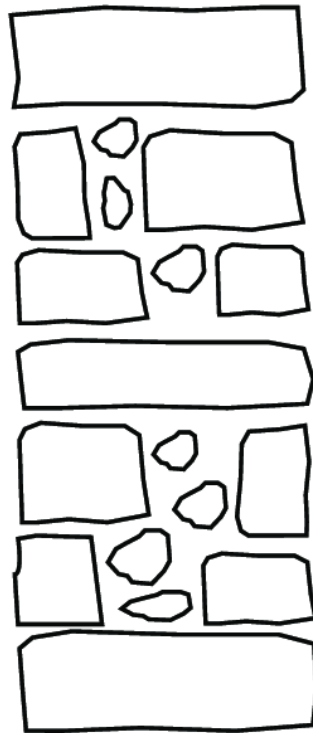
Random rubble



SOLID WALLS

Traditional construction. Pre 1919 solid walls

Random rubble



Earthquake
resistant



Earthquake
prone

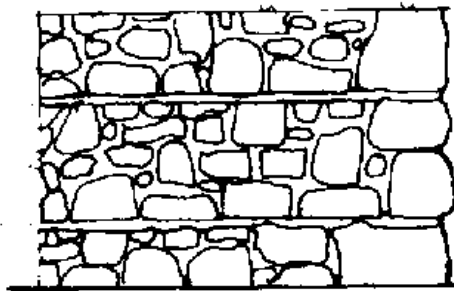
SOLID WALLS



PLAN



SECTION



ELEVATION



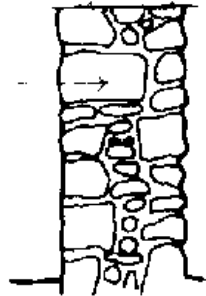
Coursed

Bonder

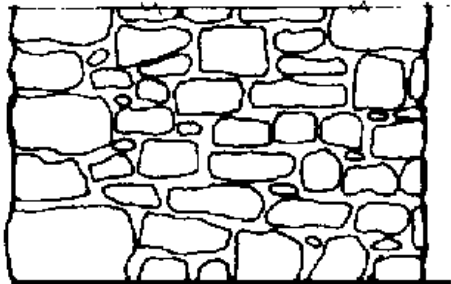


PLAN

Bonder



SECTION



ELEVATION

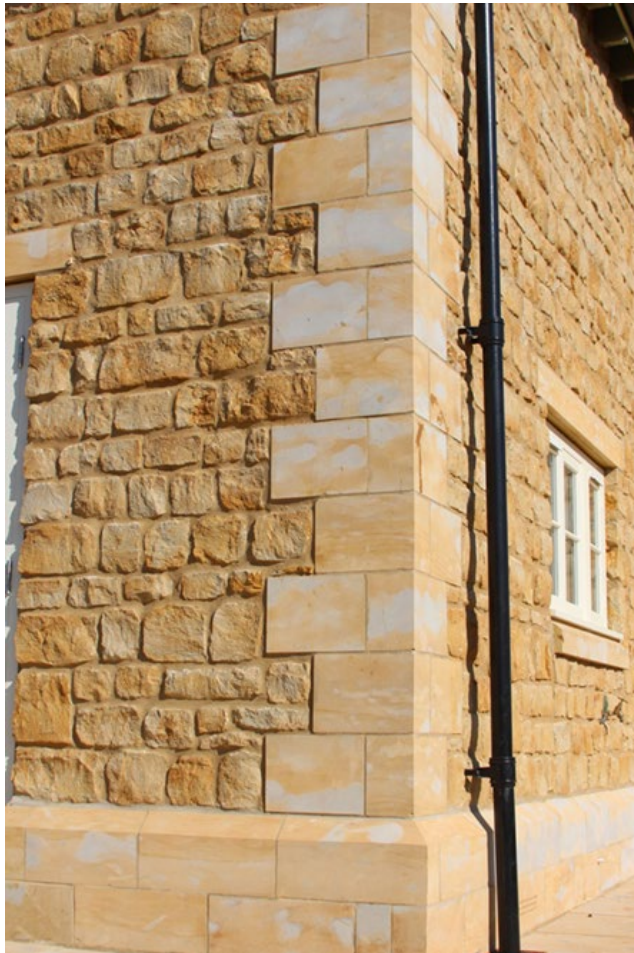


Uncoursed

SOLID WALLS

Traditional construction. Pre 1919 solid walls

Ashlar



SOLID WALLS

Traditional construction. Pre 1919 solid walls

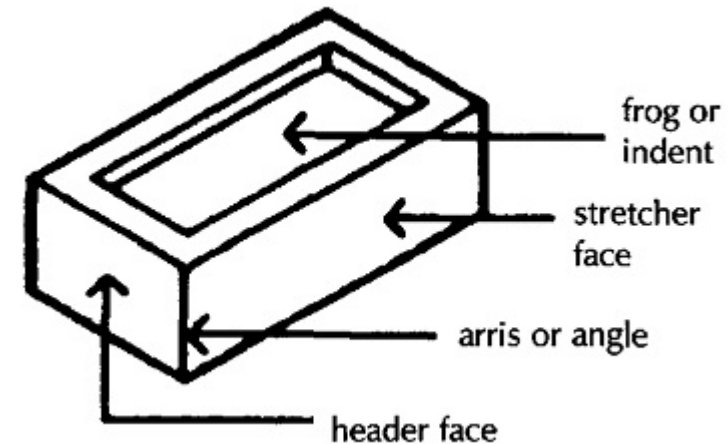
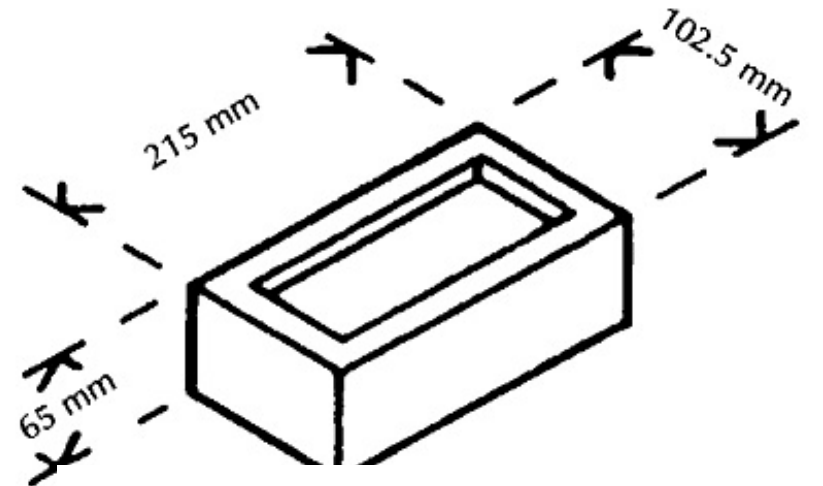
Brickwork



SOLID WALLS

Brickwork. Materials

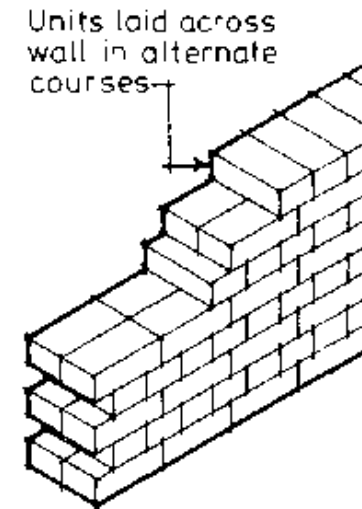
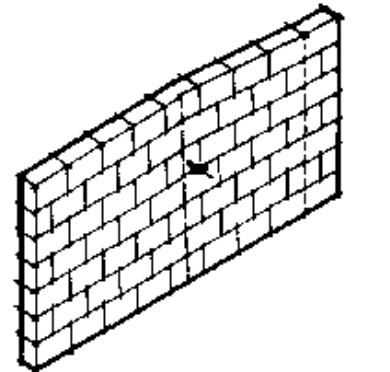
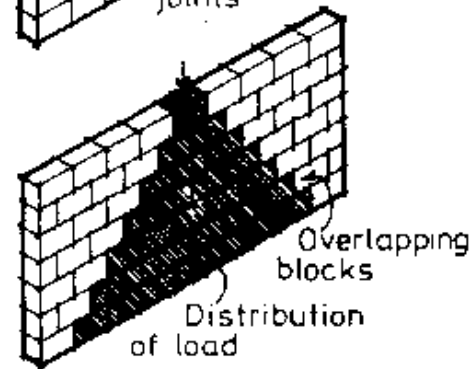
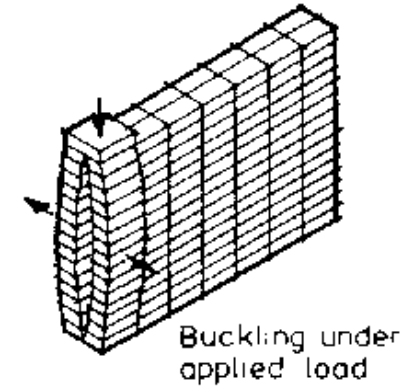
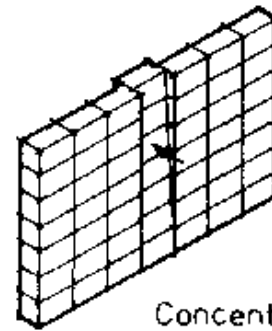
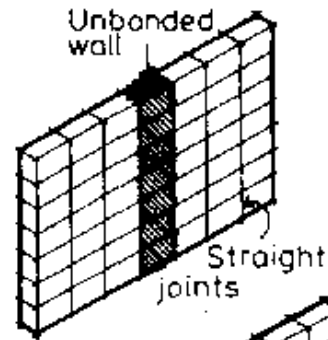
- **Nominal size** :- A standard metric brick has coordinating dimensions of **225 x 112.5 x 75 mm** (9" x 4.5" x 3")
- **Architectural size** :- Working dimensions (actual dimensions) of **215 x 102.5 x 65 mm** (8.5" x 4" x 2.5")



SOLID WALLS

Traditional construction. Pre 1919 solid walls

Brickwork. Bonds



SOLID WALLS

Traditional construction. Pre 1919 solid walls

Brickwork. Bonds

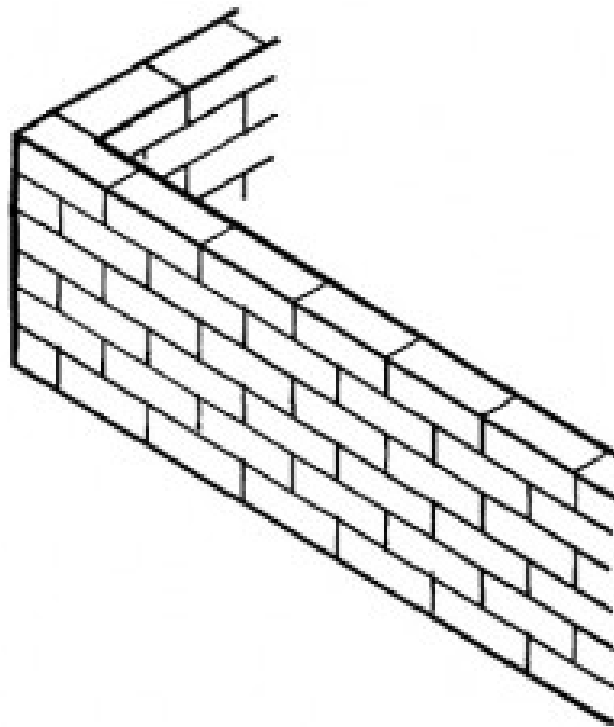


Fig. 52 Stretcher bond.

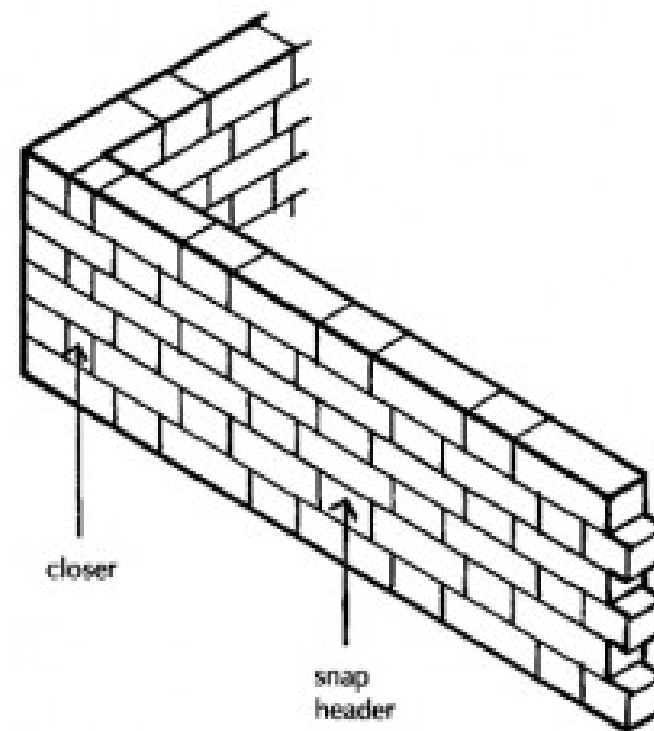
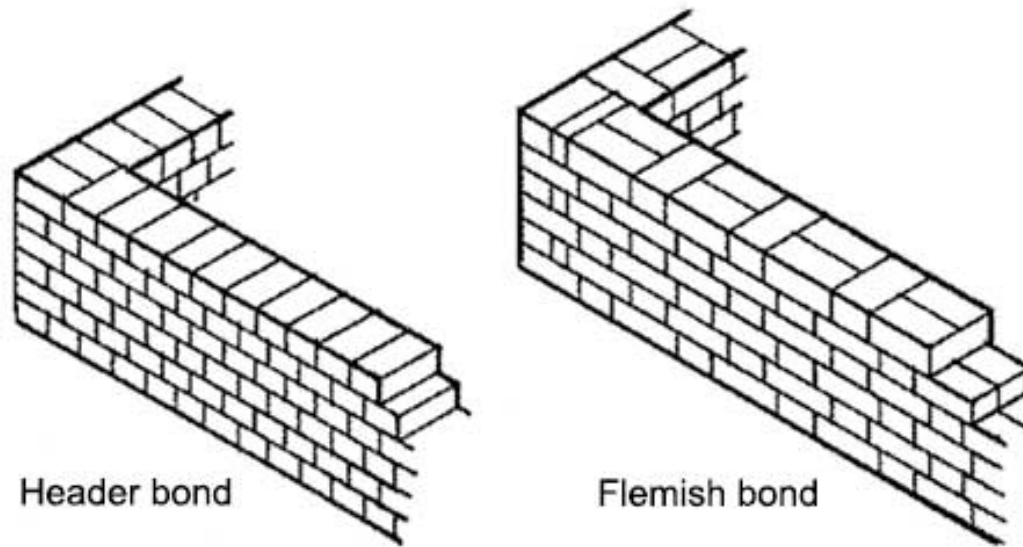


Fig. 53 Flemish bond with snap headers.

SOLID WALLS

Traditional construction. Pre 1919 solid walls

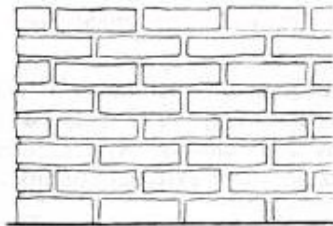
Brickwork. Bonds



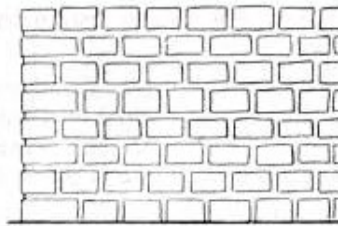
SOLID WALLS

Traditional construction. Pre 1919 solid walls

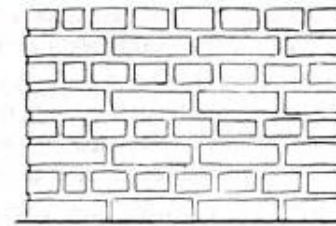
Brickwork. Bonds



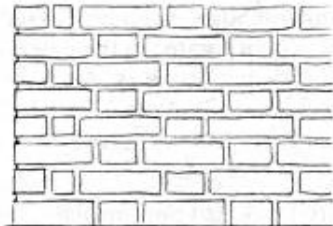
STRETCHING BOND.



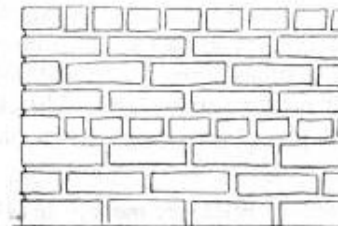
HEADING BOND.



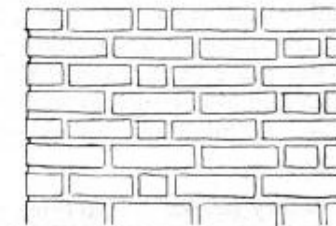
ENGLISH BOND.



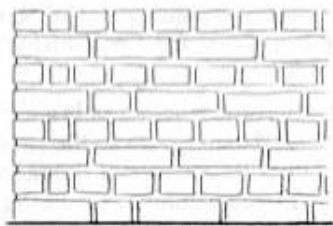
FLEMISH BOND.



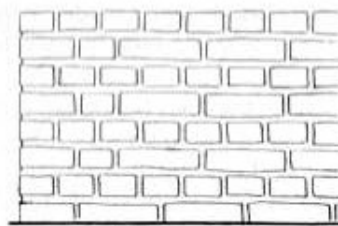
ENGLISH GARDEN
WALL BOND.



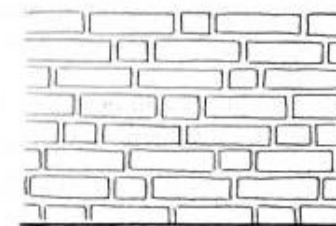
FLEMISH GARDEN
WALL BOND.



ENGLISH CROSS BOND.



DUTCH BOND.

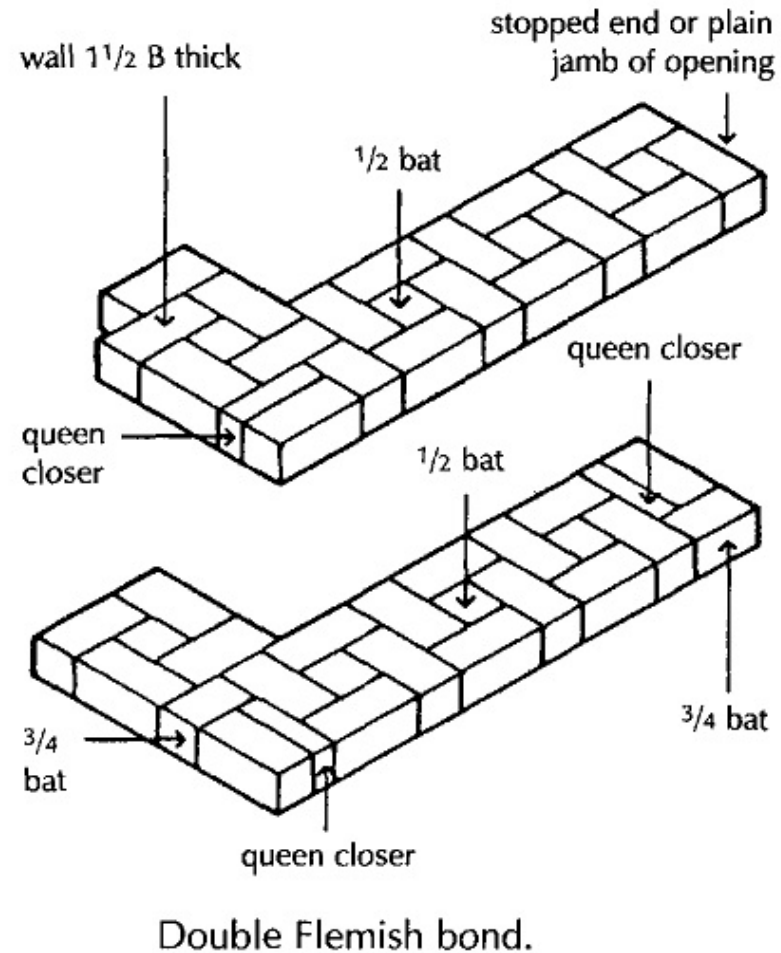
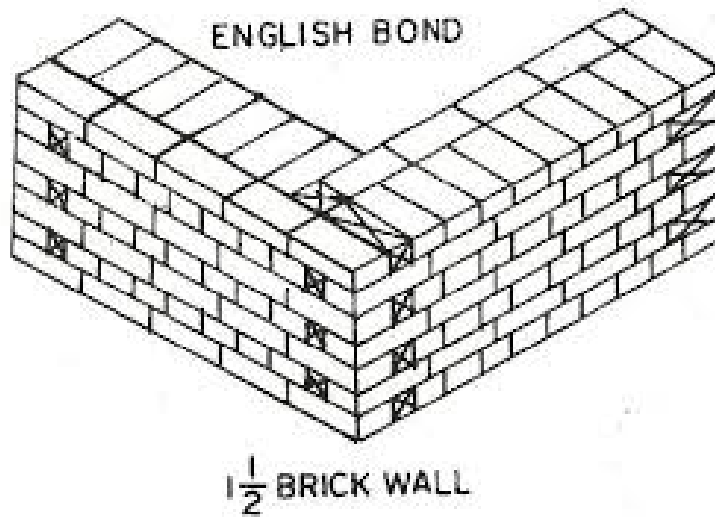


MONK BOND.

SOLID WALLS

Traditional construction. Pre 1919 solid walls

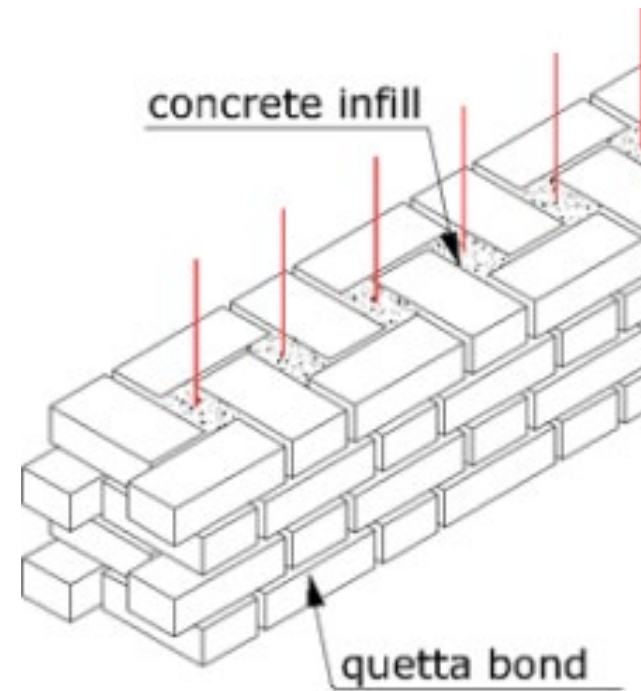
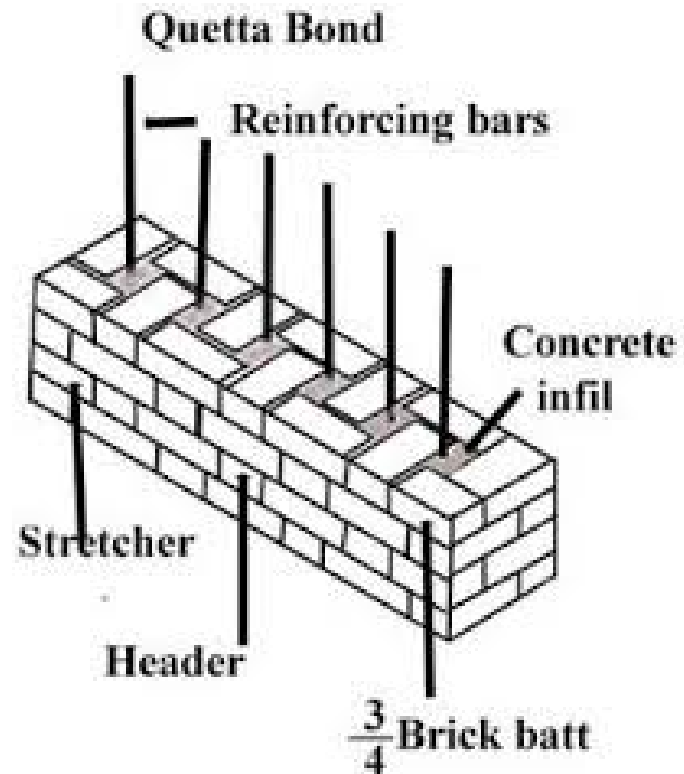
Brickwork. Bonds



SOLID WALLS

Traditional construction. Pre 1919 solid walls

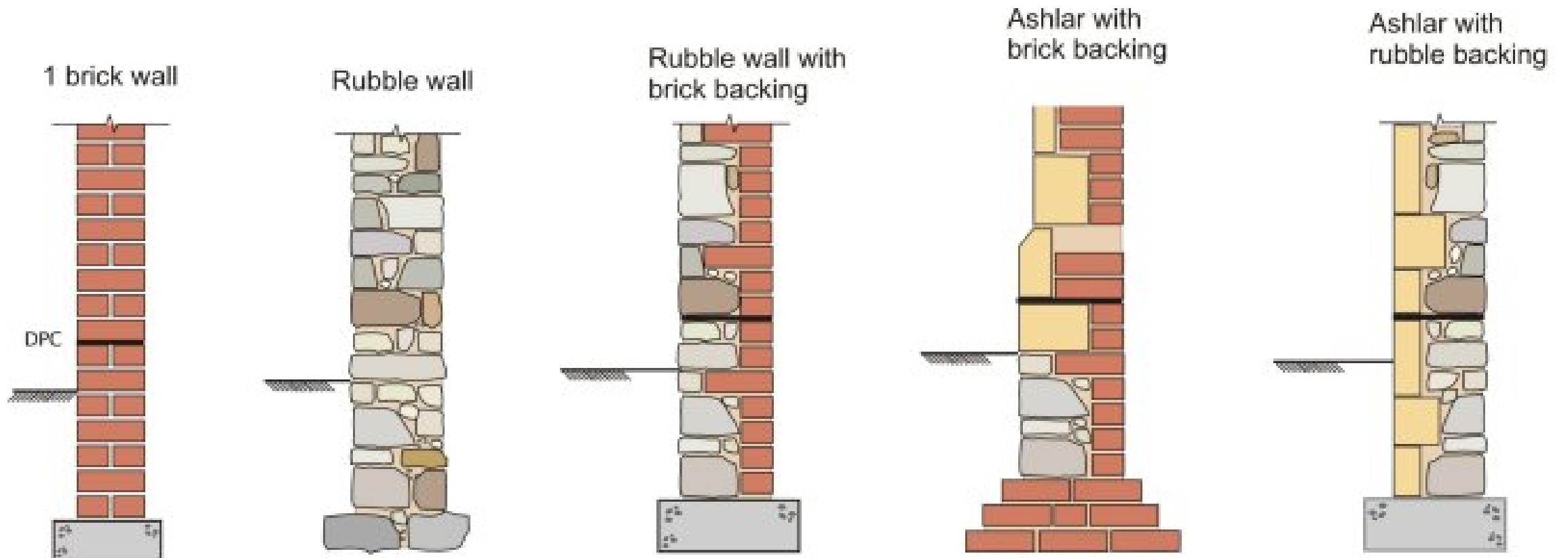
Brickwork. Bonds



SOLID WALLS

Traditional construction. Pre 1919 solid walls

Combinations

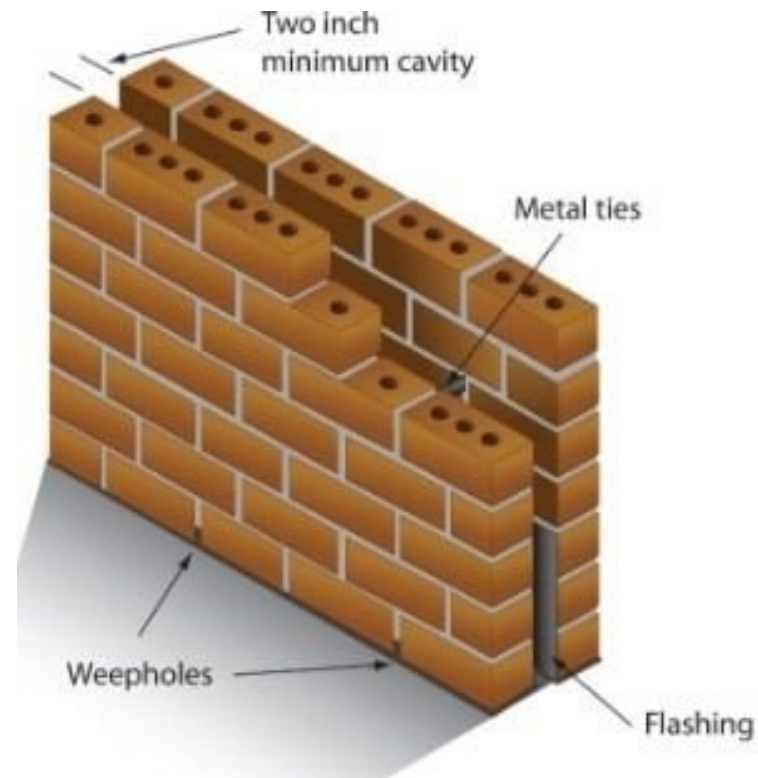


CAVITY WALLS

Type of double skin created by two walls and a cavity in between

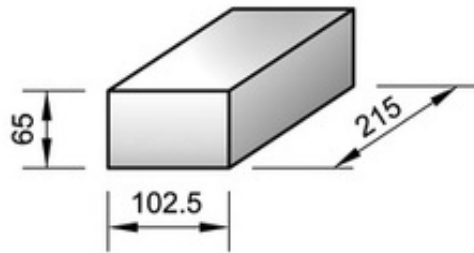
Purpose:

- Weather protection
 - Thermal insulation
 - Noise attenuation
-
- Two walls joined by metal ties
 - Weepholes to release any moisture or humidity

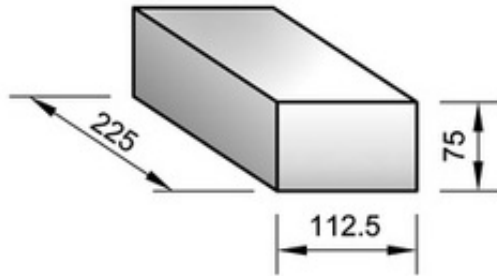


BRICKWORK

WORK SIZE
(TYPICAL BRICK)

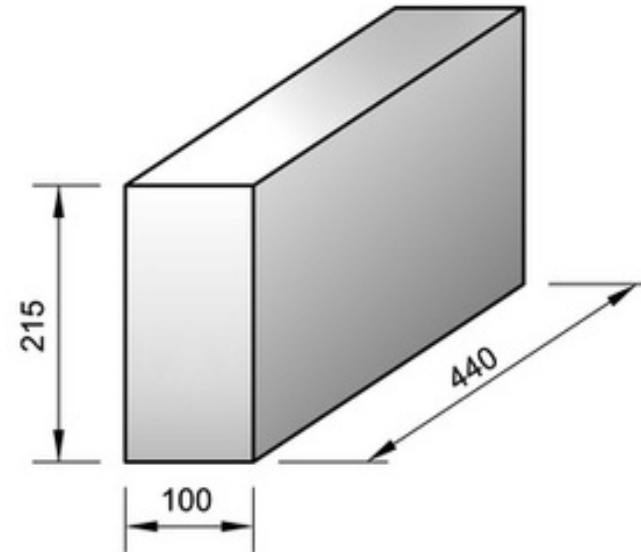


CO-ORDINATING SIZE



BLOCKWORK

WORK SIZE
(TYPICAL BLOCK)



FACE SIZES:

- 440 x 100
- 440 x 140
- **440 x 215**
- 440 x 430
- 540 x 440

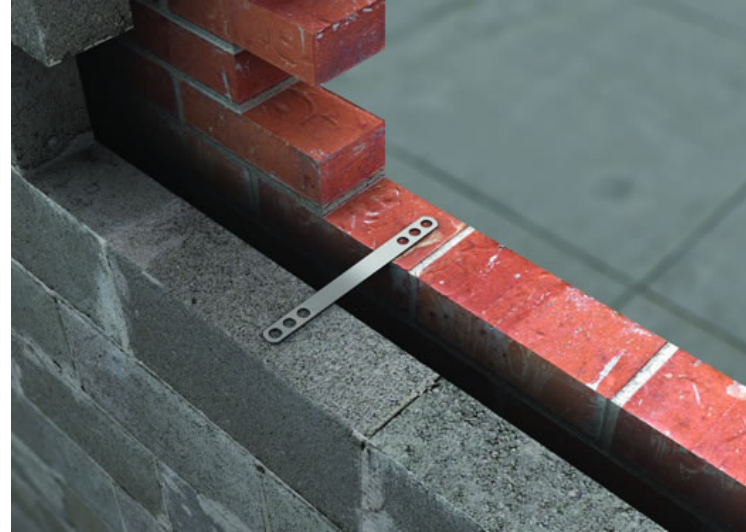
THICKNESSES FOR 440 x 215:

- | | |
|-------|-------|
| - 100 | - 190 |
| - 115 | - 200 |
| - 125 | - 215 |
| - 130 | - 265 |
| - 140 | - 300 |
| - 150 | |

[All dimensions are in: mm]

To obtain the co-ordinating dimensions add the specified joint thickness (normally 10mm) to the height and length of the block

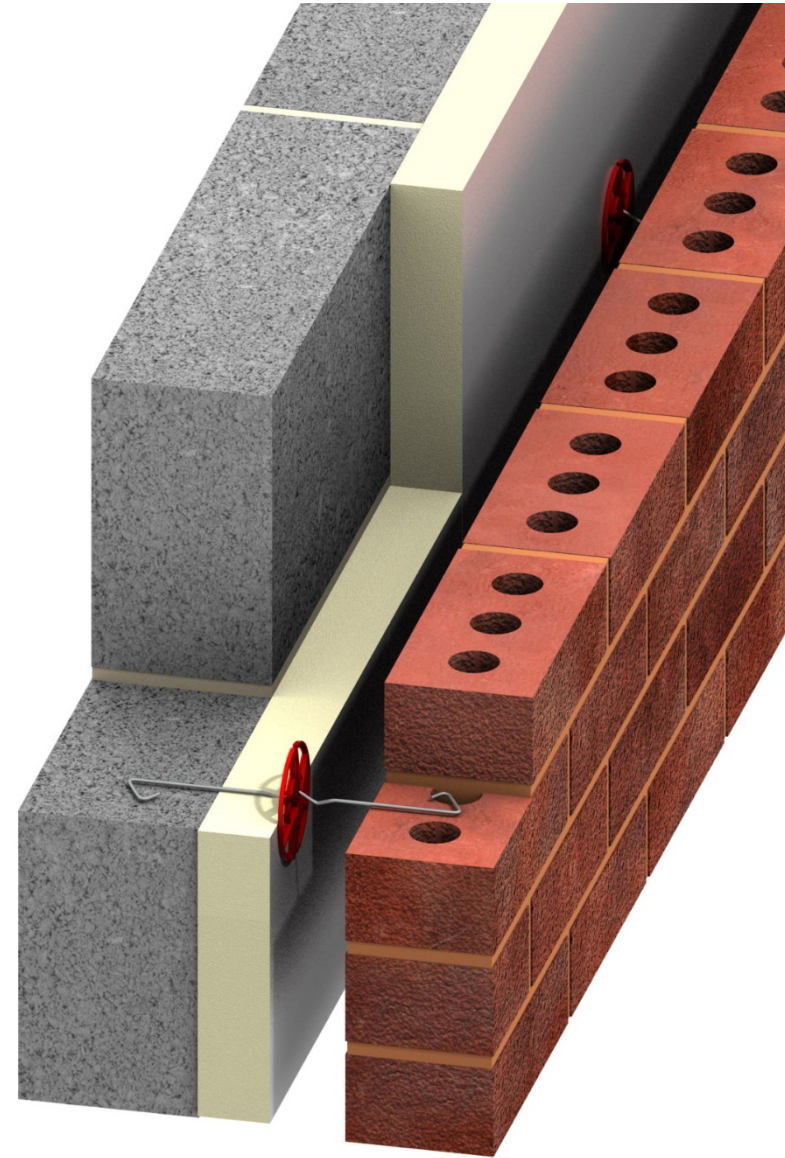
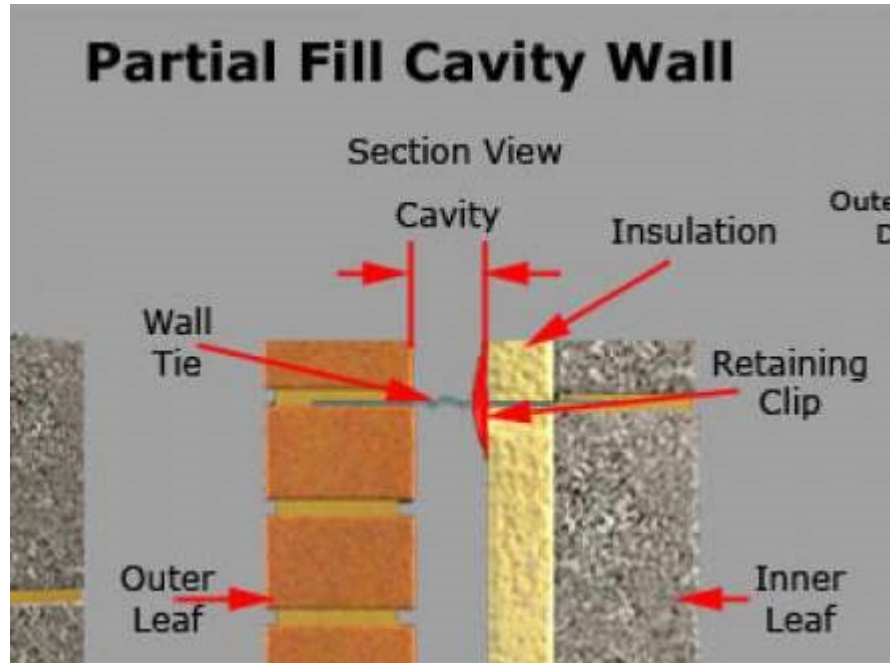
CAVITY WALLS



- Two walls joined by metal ties
- Weepholes to release any moisture or humidity

CAVITY WALLS

Insulation



CAVITY WALLS

Insulation. Some types



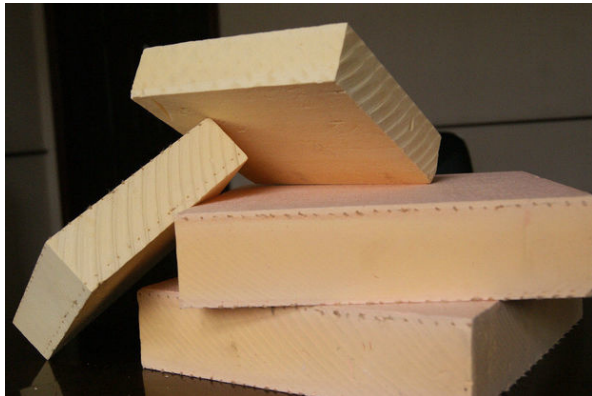
Rock mineral wool



Glass mineral wool



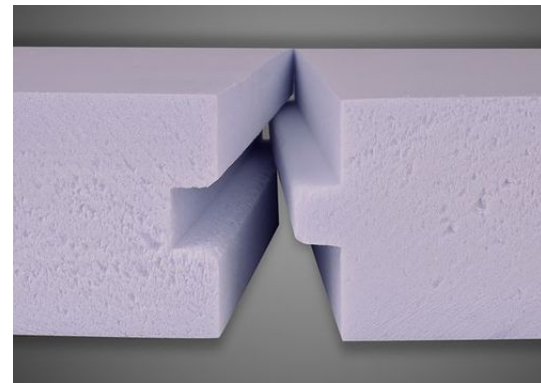
Expanded polystyrene



Phenolic foam



Polyurethane foam



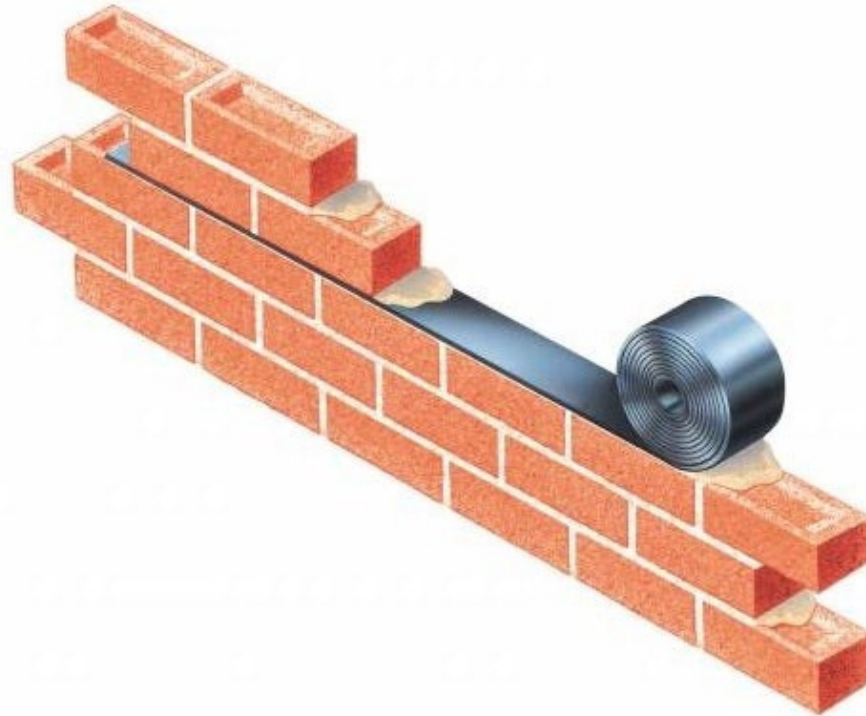
Extruded polystyrene



CAVITY WALLS

Damp Proof Course (DPC)

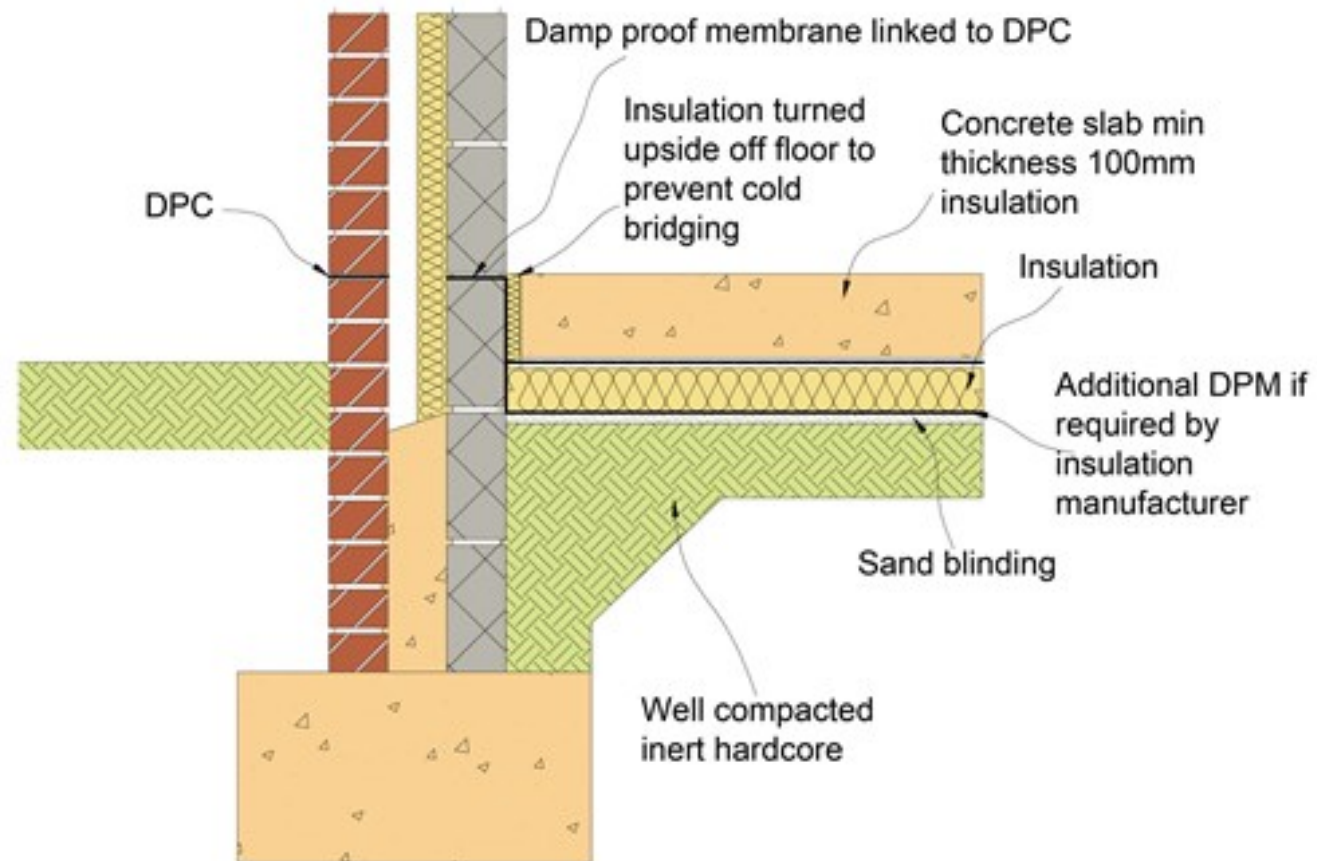
Prevents groundwater from being absorbed by capillarity action in walls



CAVITY WALLS

Damp Proof Membrane

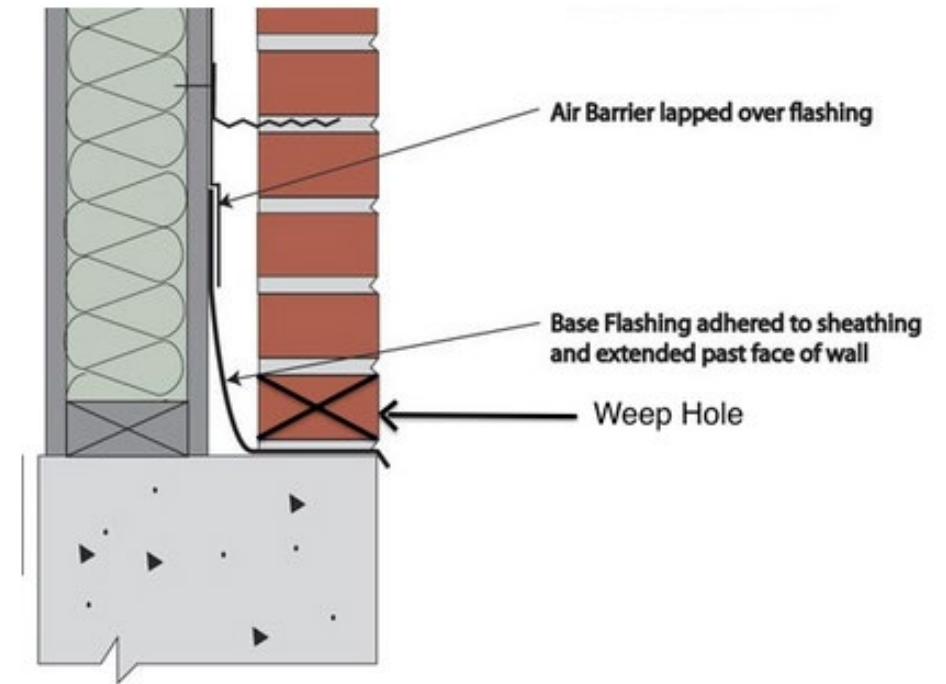
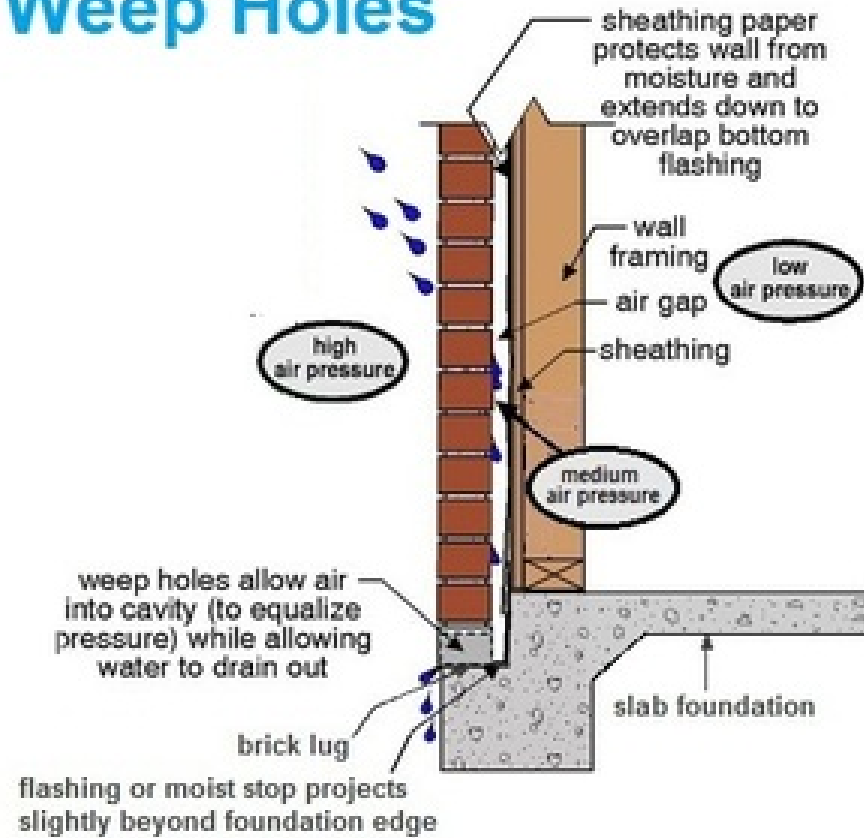
Application in floors



CAVITY WALLS

Cavity drainage

Weep Holes



CAVITY WALLS

Cavity drainage



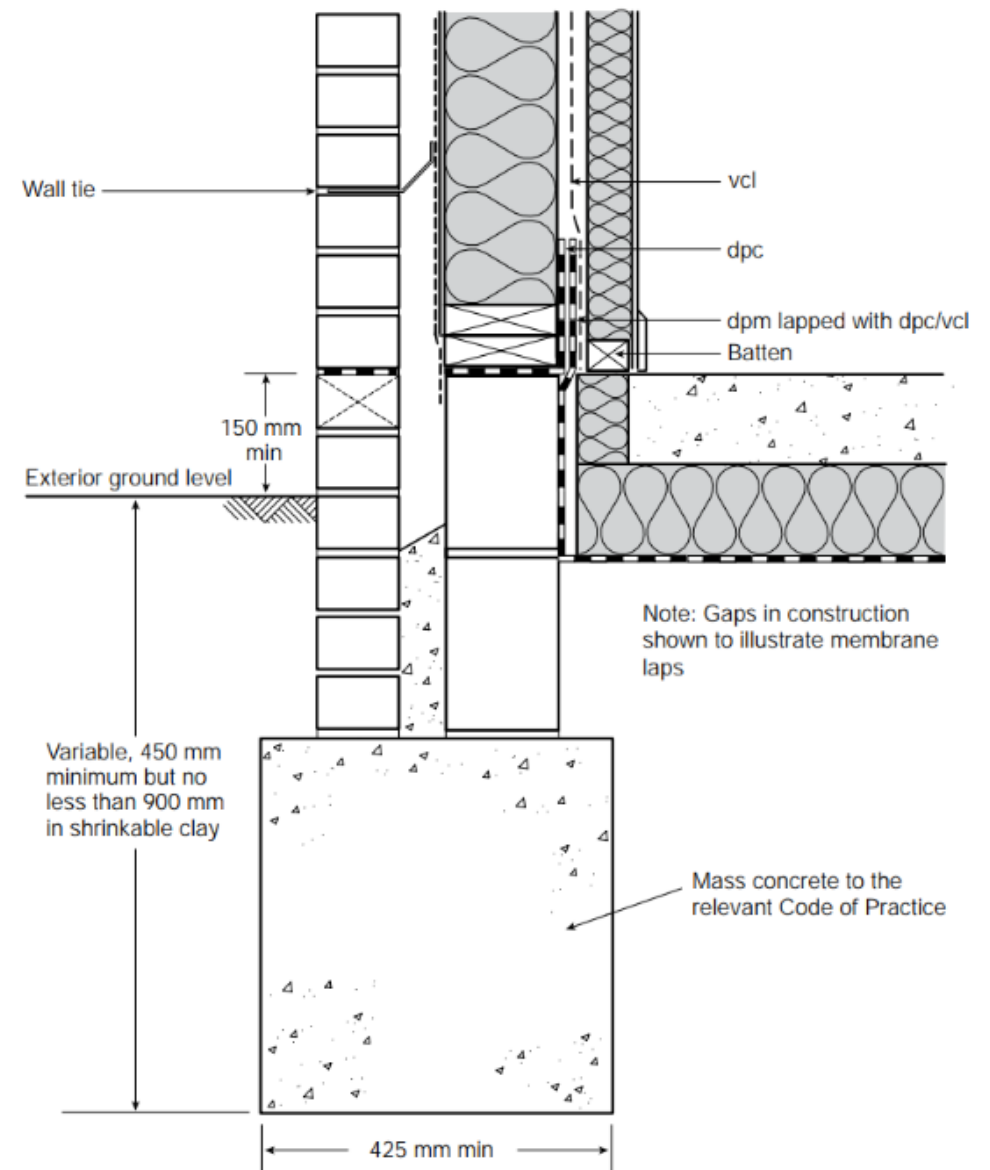
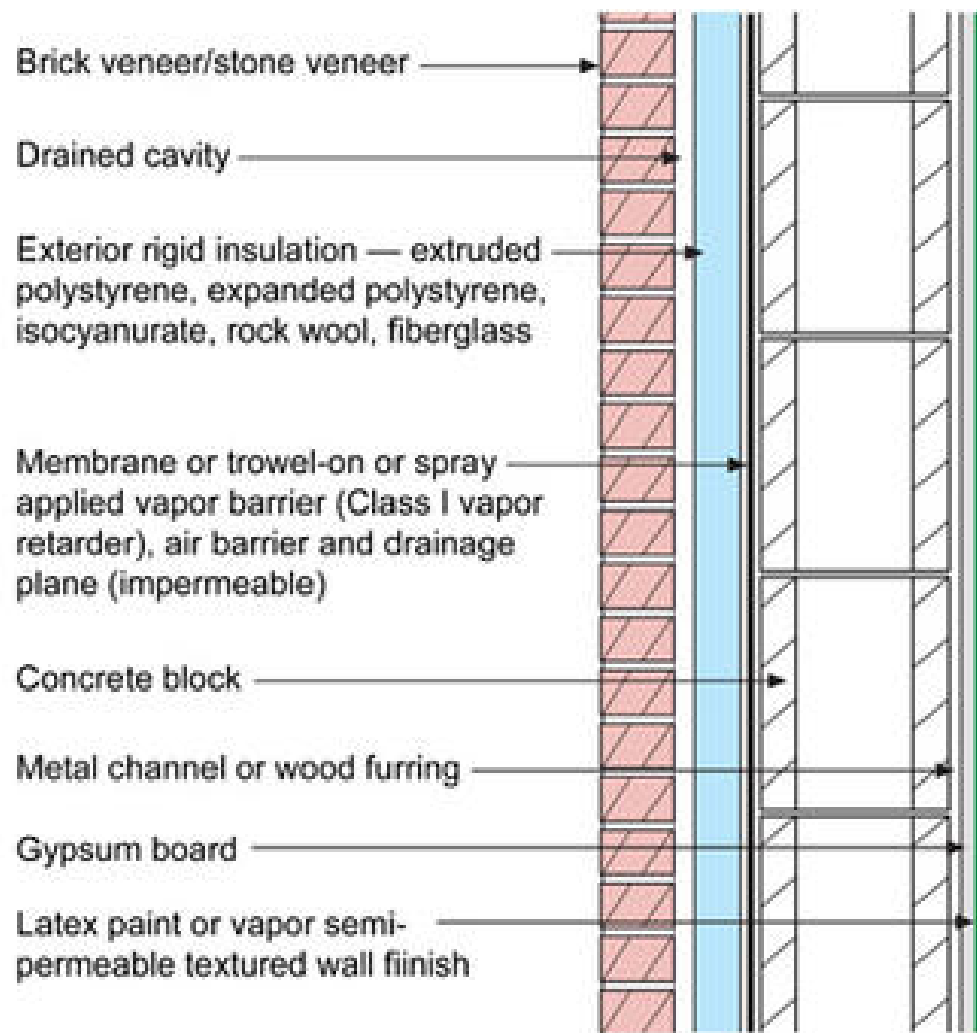
VAPOUR CONTROL BARRIER / LAYER (VAPOUR CHECK)

Block the warm moisture in a room to enter the wall and affect insulation and other elements inside (structure frame, other layers, etc.)

Not needed in warm climates

If in the wrong position, it can cause more harm than benefit
Always in the warm side (between insulation and drywall)

Depending on the type of construction, we may to consider a waterproof, breathable layer.

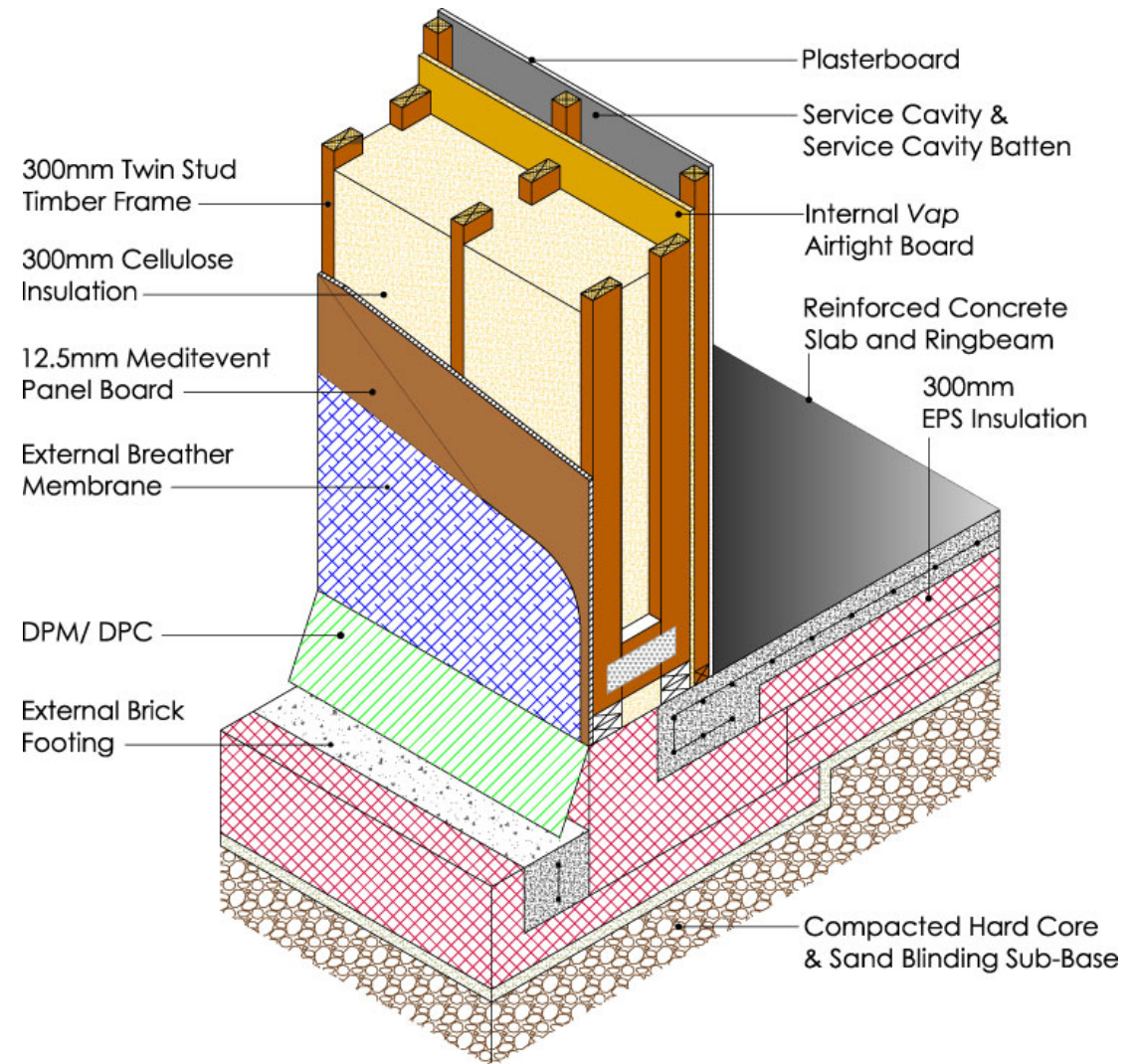


Timber Frame Construction



Timber Frame Construction

Twin stud is two timber frame stud walls in parallel, separated by a cavity, but only one of these carries the vertical load of the building.



Passive Wall & Foundation Junction

Timber Frame Construction



EXTERNAL WALLS & CLADDING

Framed construction generally use non load bearing walls these may include:

Infill panels

Cladding

Curtain Walling

HEMP & STRAW BALE
OVER CLADDING & EWI
INTERNAL CLADDING IWI