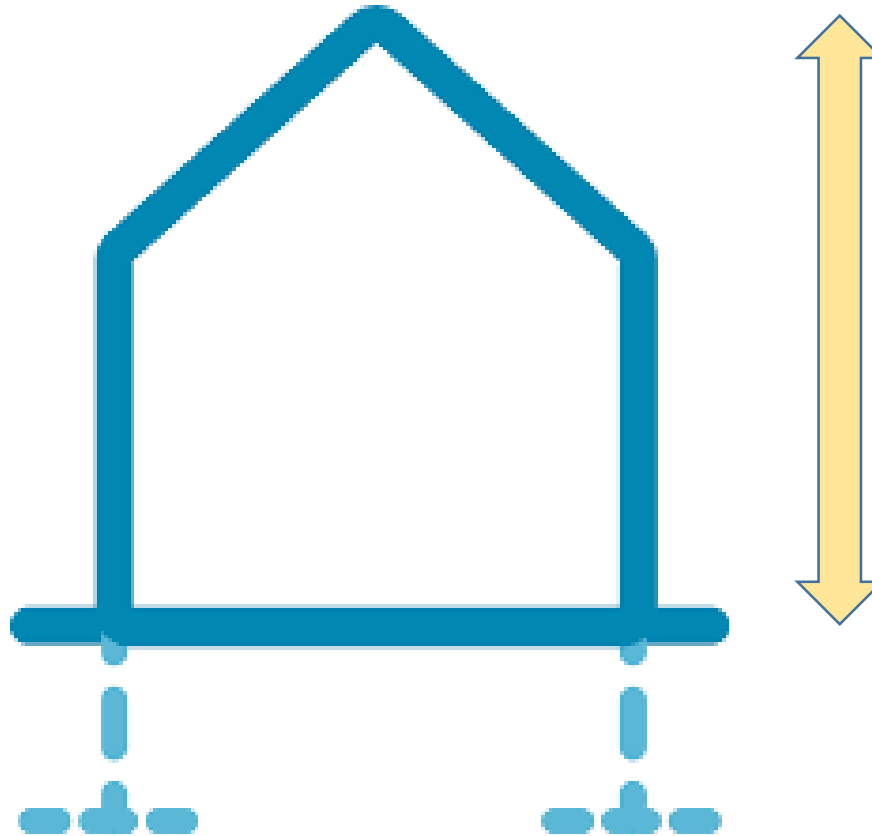
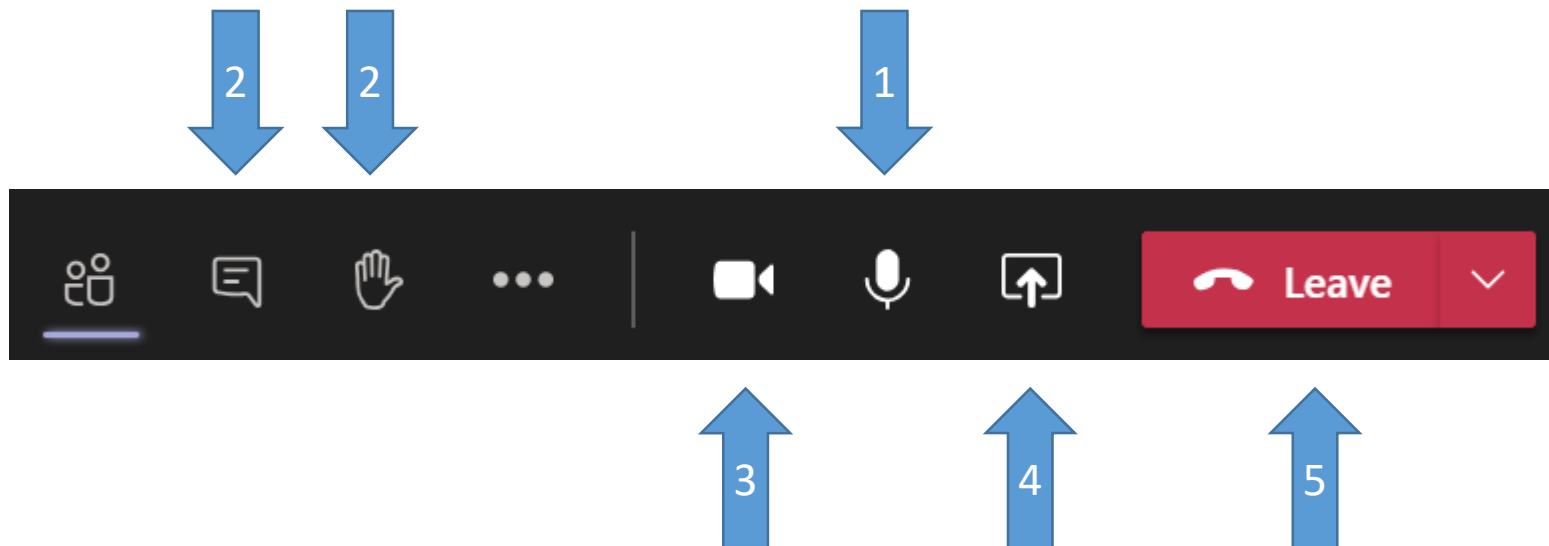


Superstructure 3: Fundamentals of Construction Technology



MS TEAMS HOUSEKEEPING

1. Mute your Microphone
2. Use Chat to Ask Questions or Put your hand Up
3. If you have a poor connection switch off Camera
4. I may ask you to share your screen.
5. When the lecture ends please hang up



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Search

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Activity

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Assignments

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FO

FUNDAMENTALS OF CONSTRUC... ..

General

GROUND WORKS 2

GROUND WORKS 3

Groundworks 1

GROUNDWORKS 5

SUB-STRUCTURE and GROUNDWORK INTROD...

Superstructure wk1

1 hidden channel

FO

General

Posts

Files

Class Notebook

Assignments

Grades

Insights

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↗ ↺

Meet

↓

+ New

↓

↑ Upload

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↻ Sync

🔗 Copy link

↓ Download

+ Add cloud storage

🔗 Open in SharePoint

☰ All Documents

↓

General

📄	Name	Modified	Modified By
📁	Class Materials		Alan Nantel
📄	ACBA4001 Assignment 1 - brief.docx	October 14	Oliver James Macki...
📄	ACBA4001 Assignment 1...		
📄	Assignment 1.docx		
📄	Borehole Log to print for		
📄	Construction Management		
📄	CPD Presentation.pptx		
📄	EXAMPLE-Site-Investigati		
📄	FOUNDATIONS1.pptx		
📄			

General > Superstructure Lectures

📄	Name	Modified	Modified By
📄	Fundamentals Con Tech Superstructure 1.pdf	November 10	Gavin Traylor
📄	Fundamentals Con Tech Superstructure 2.pdf	6 days ago	Gavin Traylor
▶	Wk 01 Superstructure - Introduction.mp4	6 days ago	Gavin Traylor
▶	Wk 01a Superstructure - Walls.mp4	6 days ago	Gavin Traylor
▶	Wk 02 Superstructure Walls Openings.mp4	6 days ago	Gavin Traylor
▶	Wk 02a Superstructure - Building Regs.mp4	6 days ago	Gavin Traylor

Fundamentals of Construction Technology (ACBA4001)

[Home](#)[My modules](#)[ACBA4001](#)

ExLibris
Leganto Online Resources List

**Fundamentals of Construction Technology (ACBA4001)**
PUBLISHED ACBA4001 (2019-20) 14 items in 2 sections

LISTS

COLLECTION

FIND LISTS

REPORTS

EDIT

LIST SENT

NEW SECTION

ADD ITEMS

Essential reading (4)

Material which is an essential part of the course and students are expected to draw on as a core part of their learning. Must be available from the library and should be available online.

	BOOK Construction technology. 1, House construction Riley, Mike., Cotgrave, Alison., Third edition., Basingstoke, Hampshire :, Palgrave Macmillan, 2013., Total Pages vii, 382 pages, 8 pages of unnumbered plates : Essential Complete Check holdings	11
	BOOK Construction technology : industrial and commercial building. 2 Riley, Mike., Cotgrave, Alison., 3rd edition., Basingstoke :, Palgrave Macmillan, 2014., Total Pages 427 p. : Essential Complete Check holdings	8
	BOOK Building construction handbook Chudley, R., Greeno, Roger., 8th ed. , Oxford ;, Butterworth-Heinemann, 2010., Total Pages xi, 828 p. : Essential Complete Check holdings	6
	BOOK Architectural technology [electronic resource] Emmitt, Stephen., 2nd ed., Hoboken, N.J. :, Wiley-Blackwell, 2012., Total Pages 1 online resource (265 p.) Essential Complete Check availability	2

Further reading (10)

ACBA 4001
FUNDAMENTALS OF CONSTRUCTION
TECHNOLOGY: LEVEL 4

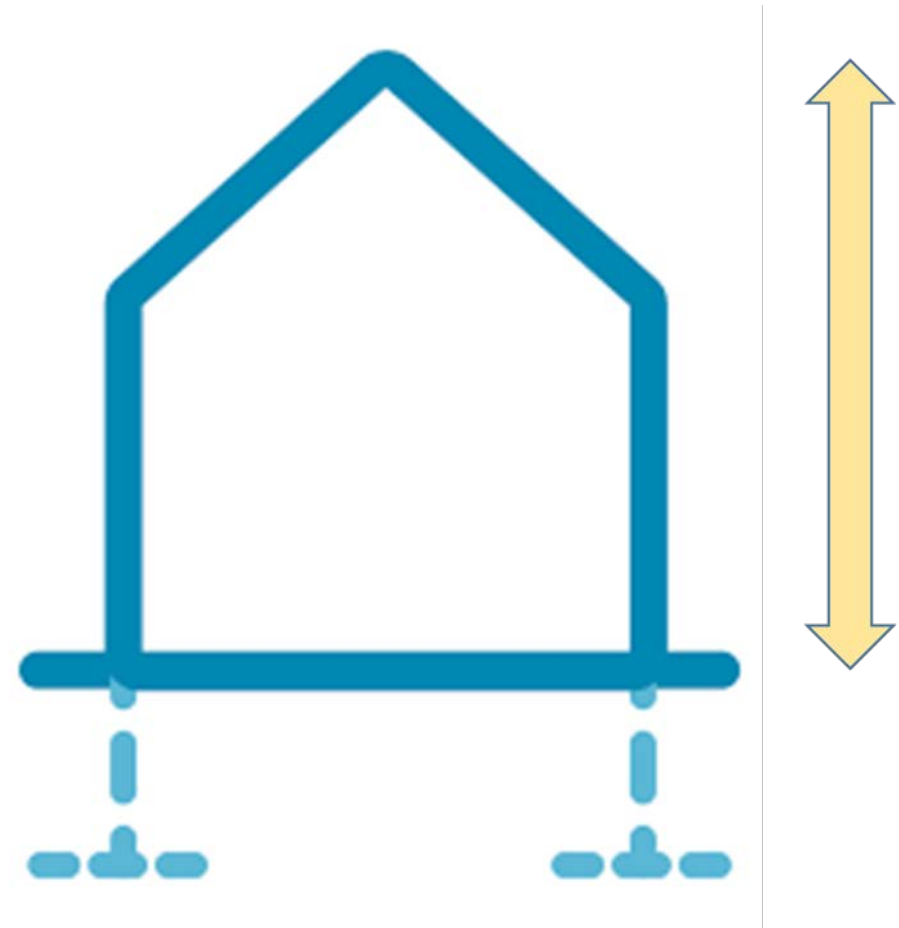
Week 3:

Introduction to Assessment 2

Recap on Openings

Recap Building Regulations (Quiz)

Partitions



Assessment 2

Submission
deadline:

22nd January 2021

Module Learning Outcomes (from module syllabus)

- Identify the different types of substructure available for a range of low-rise building systems and techniques used in their production.
- Define and produce annotated sketches that illustrate a broad range of common constructional forms, demonstrating understanding of their potential defect and repair needs.



APPENDIX GA36a

LEVEL 4 ASSESSMENT SPECIFICATION

Student name:		Student ID number:	
Programme:	Construction Portfolio		
Module:	Fundamentals of Construction Technology		
Module code:	ACBA4001	Contribution to Overall Module Assessment (%):	50%
Lecturer:	Gavin Traylor	Internal Verifier:	Allan Nantel
Assignment Title:	New Build Dwelling: Technical report with drawings	Word count (or equivalent):	2,500 words (or equivalent)
Submission deadline:	Friday 22 nd January	Return date of provisional marks & written feedback:	Within 20 working days
Submission method:	All written assessments, where practical and possible, must be submitted via Turnitin unless otherwise instructed by the Lecturer. (Please DO NOT put this assessment specification into Turnitin or it will match many similarities with other students' submissions.) Alternative submission method (if applicable): Late submission of the assessment will result in a late penalty mark. Penalties for late submission: Up to one week late, maximum mark of 40% Over one week late, 0% Only the Extenuating Circumstances Panel may approve a change to submission dates.		
Academic honesty / referencing:	Academic honesty is required. In the main body of your submission you must give credit to authors on whose research and ideas your work is based. Append to your submission a reference list that indicates the books, articles, etc. that you have used, cited or quoted in order to complete this assessment.		

Module Learning Outcomes (from module syllabus)

- Identify the different types of substructure available for a range of low-rise building systems and techniques used in their production.
- Define and produce annotated sketches that illustrate a broad range of common constructional forms, demonstrating understanding of their potential defect and repair needs.

Assessment 2

Submission
deadline:

22nd January 2021

New Build Dwelling: Technical report with drawings (weighting 100%)

Scenario:

You have been approached by Miss A Client who has received planning consent for her single, two storey detached domestic building. [See attached floor plans and elevations].

It is to be built on a level but reclaimed site, which prior to advanced ground works had been used as agricultural land. There is a retaining wall structure to the south of the site and the Ground Investigation report suggests a suitable raft foundation be constructed for the property.

The building is a timber framed construction where the inner skin of the 'cavity wall' is 140mm thick insulated C16 timber frame. The outer skin consists of stack bonded facing brick work and blockwork with a smooth render finish. Additional PIR insulation is contained within the cavity to improve the thermal performance. There is to be an insulated ground floor with underfloor heating in the screed with upper floors to be traditional solid timber with tongue and groove softwood flooring.

Windows and external doors are to be powder coated aluminium with triple-glazed units.

Roof structure is to be trussed rafters with a metal profile sheeting finish installed on OSB sheathing boards.

The client has asked you to prepare a technical report that addresses some of the construction details required as they are unfamiliar with timber frame construction. Your technical report should be graphical and contain the tasks highlighted below:

Assessment 2

Submission
deadline:

22nd January 2021

*The following tasks are allocated a percentage to emphasise the suggested **time** you should spend on each individual task. Marks will be allocated against the set Marking Criteria indicated on page 5.*

1. Produce **neatly drawn, proportionate and suitably annotated sections and sketches** that illustrate the materials and methods for the detailing of the following building elements and construction inter-faces. Ensure that detailing shows how the design will meet the current **Building Regulations for a domestic new-build**:

The Ground floor Construction, detailing and junctions with external walls. (20%)

The First floor Construction, detailing, junctions with external walls and restraints. (20%)

Eaves detailing and roof covering – indicating appropriate weathering, fixing and laps. (20%)

The main roof **structure**. Construction, detailing and fixing. (20%)

2. Given the specified roof structure and finish describe the advantages and disadvantages of such a method. Give an example of an alternative method of construction and describe what advantages or disadvantages that it may have. (10%)

3. Appropriate ventilation can play an important part of the design of a domestic building and is even more critical when considering a timber framed construction. Clearly describe the causes and sources of condensation, and the detrimental effects of condensation upon building fabric. (5%)

Using neat, annotated, proportional sketches where necessary, describe the appropriate methods of ventilation that will reduce condensation within this proposed building. (5%)

Assessment 2

Guidance specific to this assessment:

Engagement with Literature Skills

Where techniques are suggested in the report make reference to the sources such as the Building Regulations and Good Practice. Use sources such as the CIS.

Knowledge and Understanding Skills

Demonstrate your understanding of the methods and techniques. This will be assessed by the depth and awareness of a professional context within this scenario.

Cognitive and Intellectual Skills

Demonstrate your knowledge and skills and present the work in a coherent and professional manner. This will also be assessed by the quality of your evaluation and conclusions.

Practical Skills

This will be assessed via the scenario and how your knowledge has been applied.

Transferable Skills for Life and Professional Practice

The report and drawings should be presented in a professional manner with all work clearly labelled and cross-referenced.

Submission
deadline:

22nd January 2021

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	10	
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	15	
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 (10% loss) Over 1 week late (20% loss)	%

Assessment 2

Submission
deadline:

22nd January 2021



FRONT VIEW



FRONT VIEW

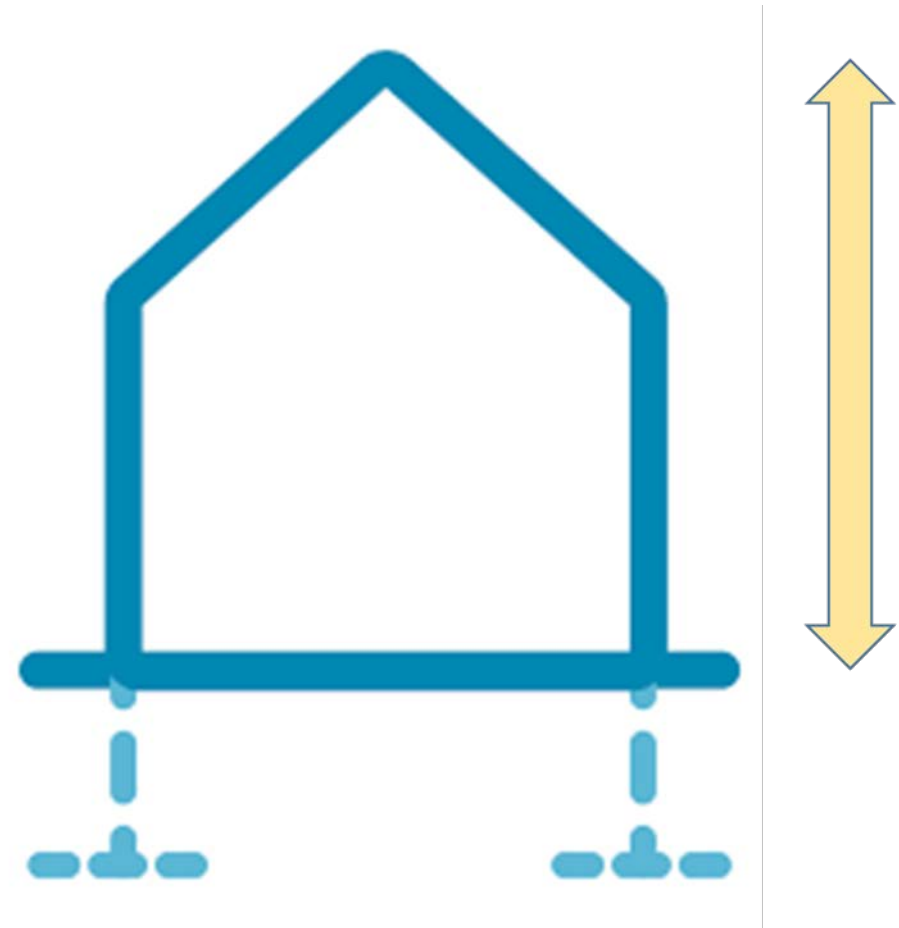
Week 3:

Introduction to Assessment 2

Recap on Openings

Recap Building Regulations (Quiz)

Partitions



Functions of Buildings

Why do we Build?

The use of buildings as protective structures or enclosures.

Since fire was first used by primitive people to provide light and heat, the use of energy to aid in environmental moderation has developed internal environments that reduce the effects and extremes in the external climate.

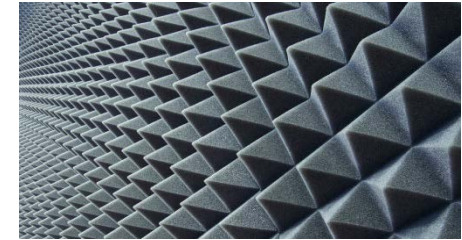
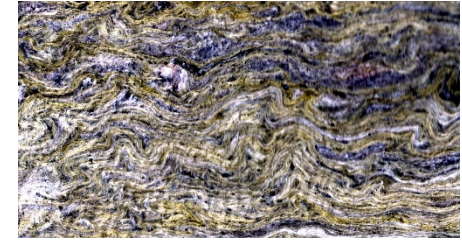


https://i.dailymail.co.uk/i/pix/2015/07/03/14/2A338A5800000578-3148511-image-a-21_1435930837225.jpg

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

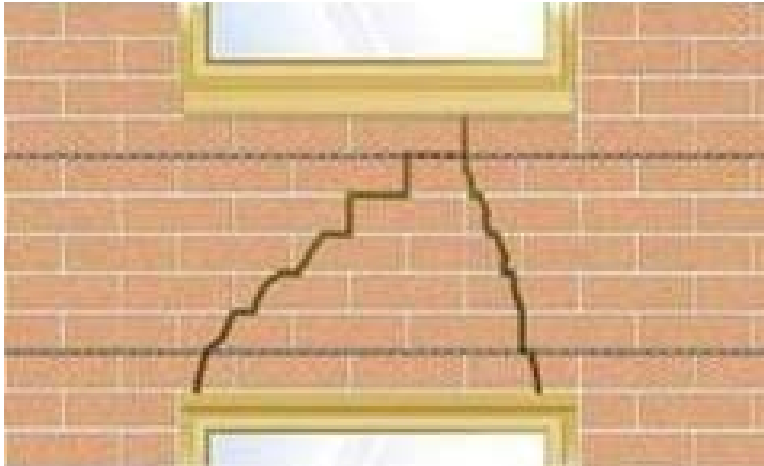


OPENINGS

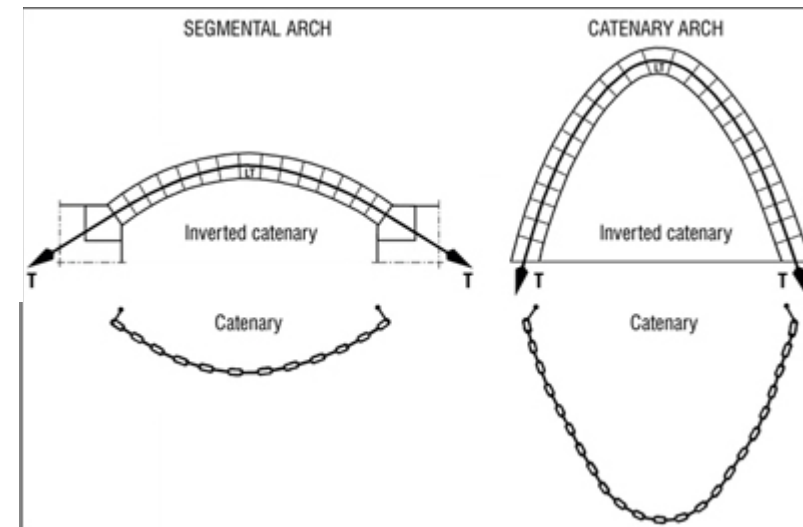
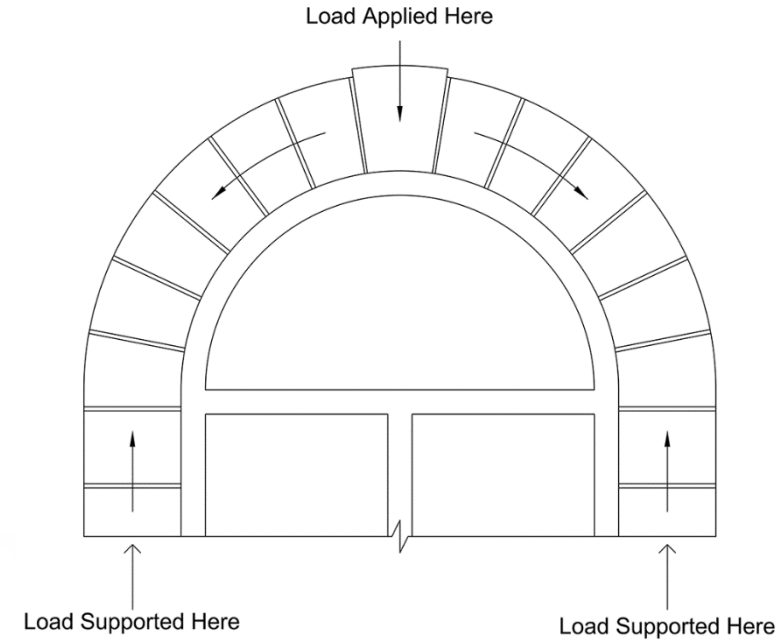
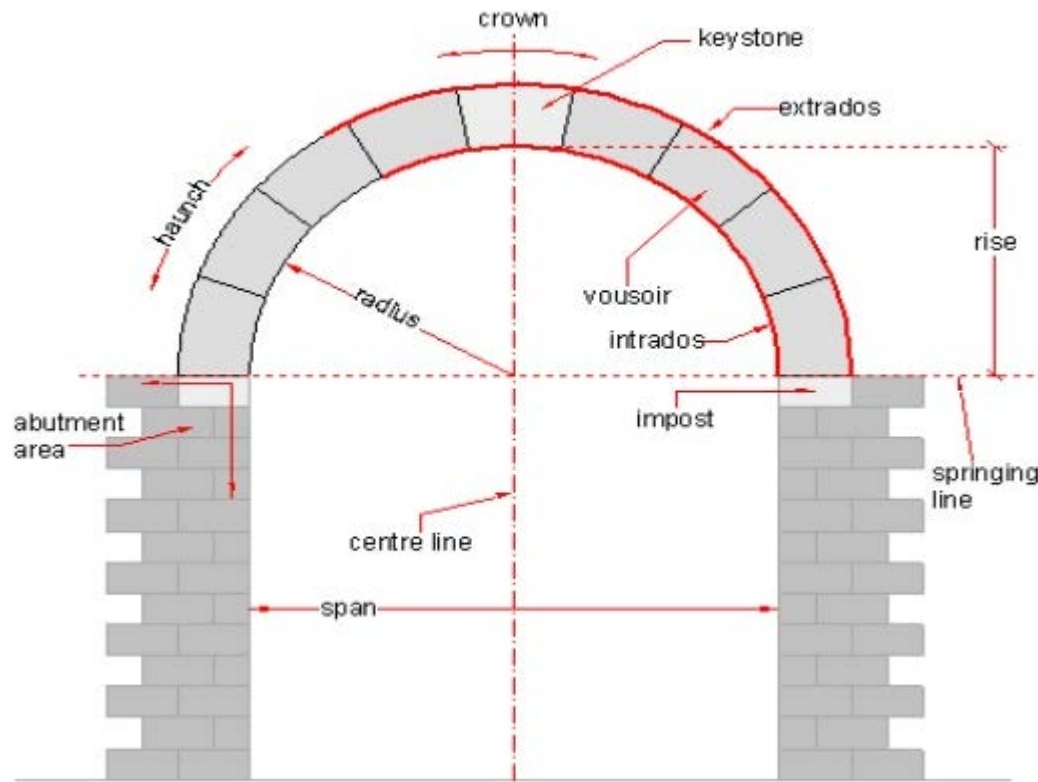


Green Bridge of Wales, Pembrokeshire

LINTEL FAILURE



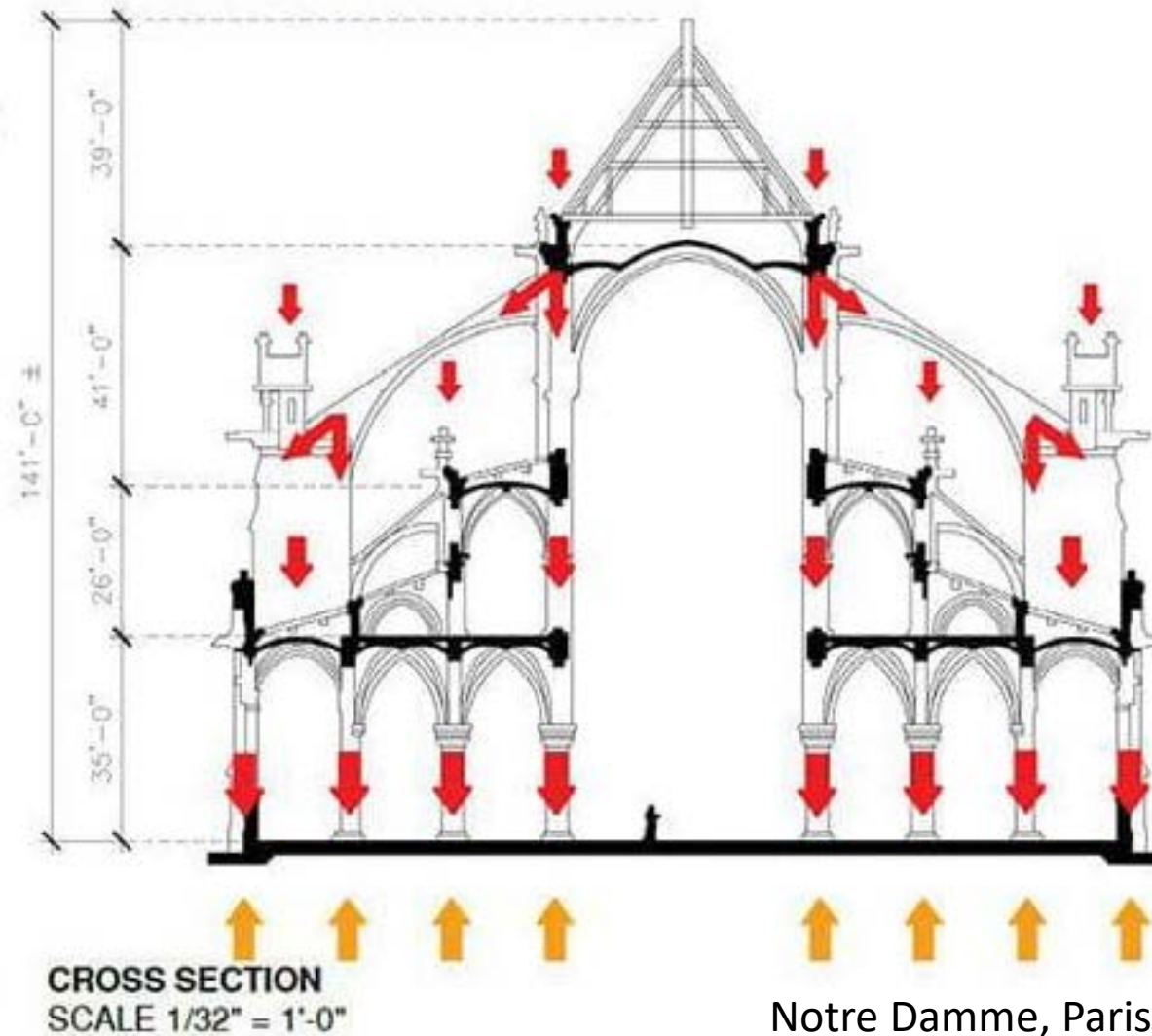
ARCH LOAD TRANSFER



<https://www.youtube.com/watch?v=JIL6ZHChhQE>

ARCH LOAD TRANSFER

GRAVITY LOAD-PATH



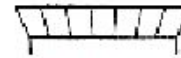
ARCH TYPES



TRIANGULAR



CORBELLED



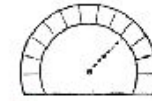
FRENCH



ROUND



ROMAN



HORSESHOE



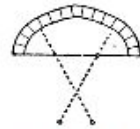
BELL



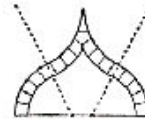
TREFOIL/GOTHIC



LANCET
GOTHIC



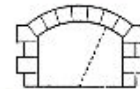
TUDOR



Ogee



SYRIAN



SEGMENTAL



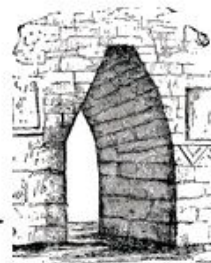
DOGTOTH



MULTI-LOBED



MEDIEVAL DOOR



HORIZONTAL

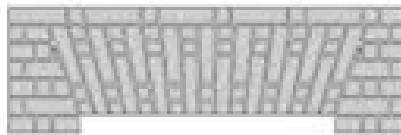


BONDED



CYCLOIDAL

FACE BRICK ARCH TYPES



QUEEN ANNE



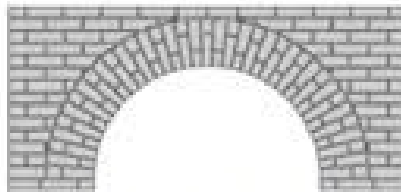
NEW CONCEPT



ELLIPTICAL



JACK ARCH



BONDED ROMAN



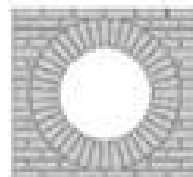
BONDED RADIAL



BONDED JACK ARCH



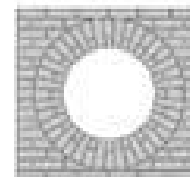
ROMAN



CIRCULAR

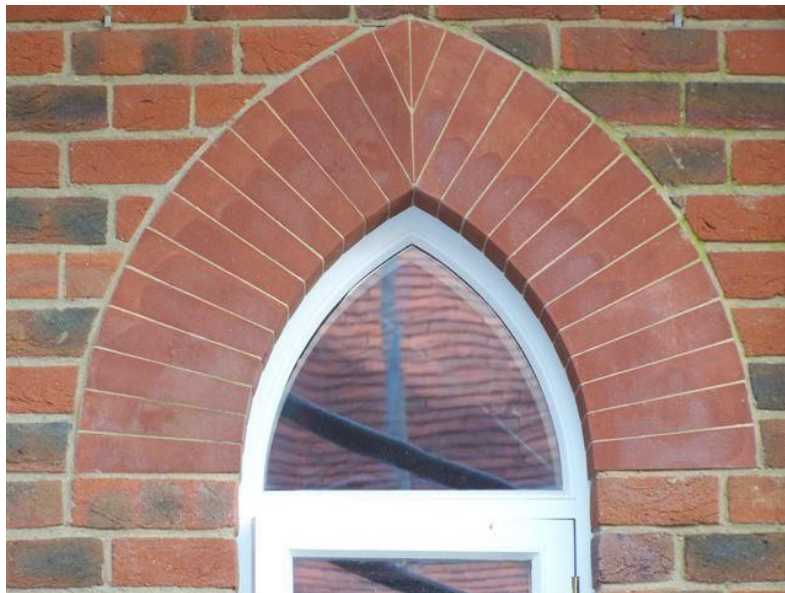


JACK PACK



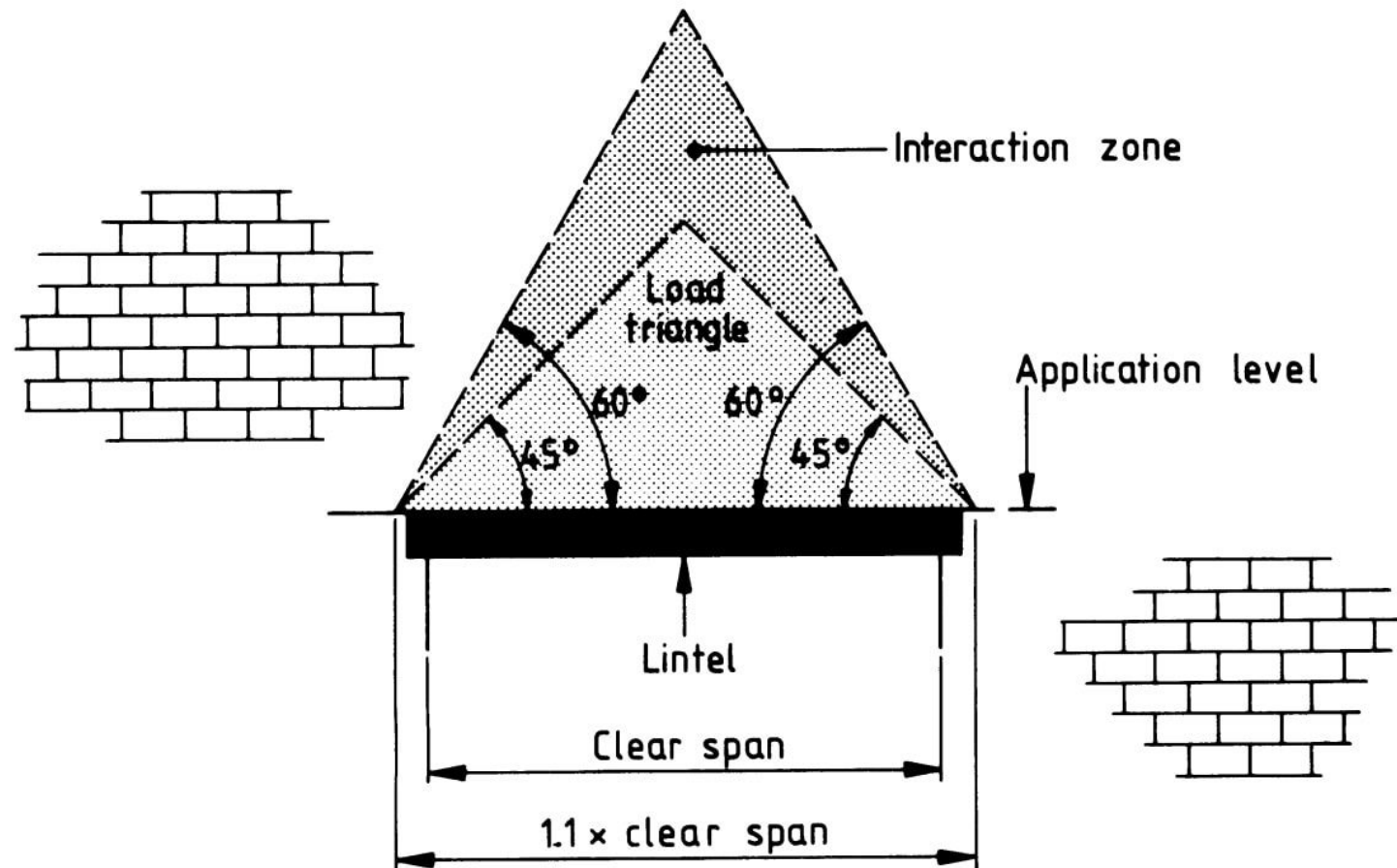
BONDED CIRCULAR

FACE BRICK ARCHES



LINTELS

Construction of element that can support flexural efforts



LINTELS

Timber elements

- They will cover the whole span and will be supported at the jambs
- Maintenance is essential
- It is more flexible than masonry and can bend without breaking
- Bending is an indicative of wrong performance but does not mean immediate failure



LINTELS

Stone elements

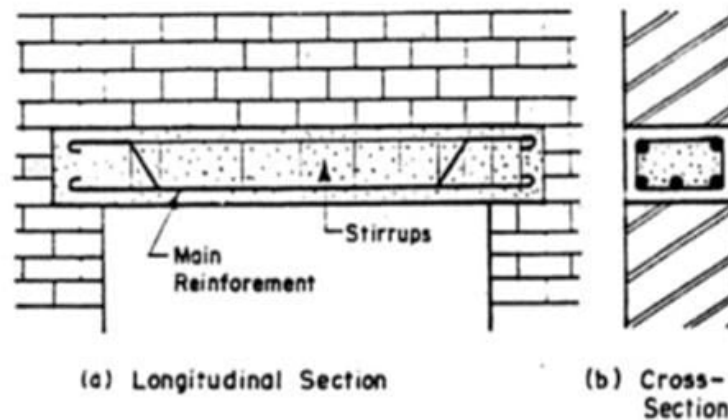
- Similar construction
- Much heavier
- No special maintenance
- Stone has little flexural strength, improved with thickness
- Fragile. Easy to break
- Ruined when broken



LINTELS

Cast in-situ elements

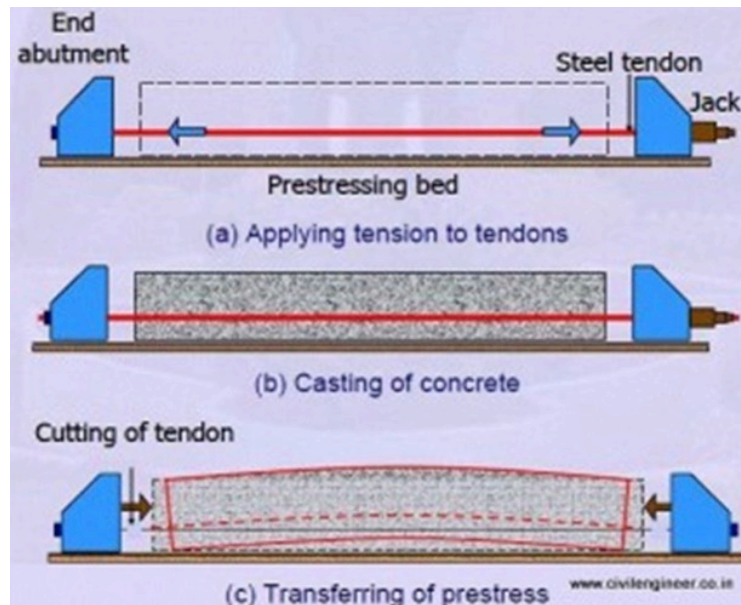
- They are made at the same time of the wall construction and form part of it
- Usually made of reinforced concrete to absorb flexural efforts properly
- More difficulty in construction
 - Framework/mould
 - Reinforcement
 - Pouring concrete
- Replacement and repair are more difficult



LINTELS

Precast/pre-stressed elements

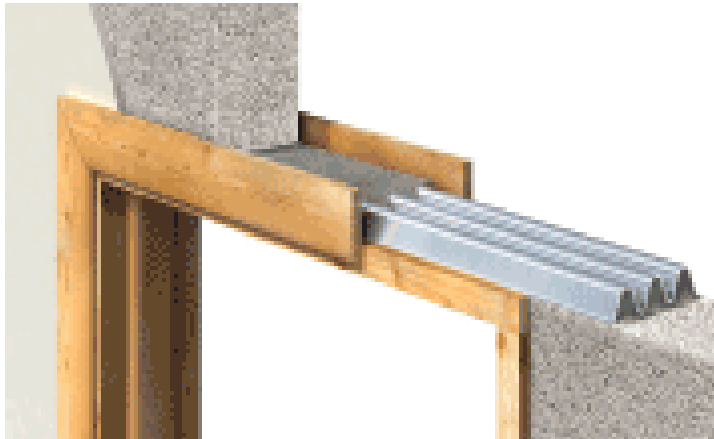
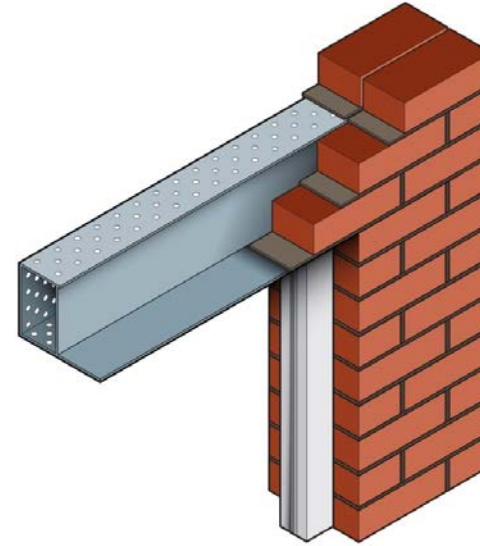
- Made off-site
- Reinforcement can be pre-stressed to absorb flexural stress better
- Health and Safety?



LINTELS

Metal elements

- Fast and cheap solution
- Light weight
- Problems with thermal bridging. It should be correctly installed and insulated



LINTELS

Metal elements

Box lintel with
perforated base
plate



**Be careful!!!
Thermal bridge**

LINTELS

Metal elements

- Cavity walls
- Concrete lintel to inner leaf
- Steel stepped lintel to outer leaf
- Cavity tray
- Insulation



LINTELS

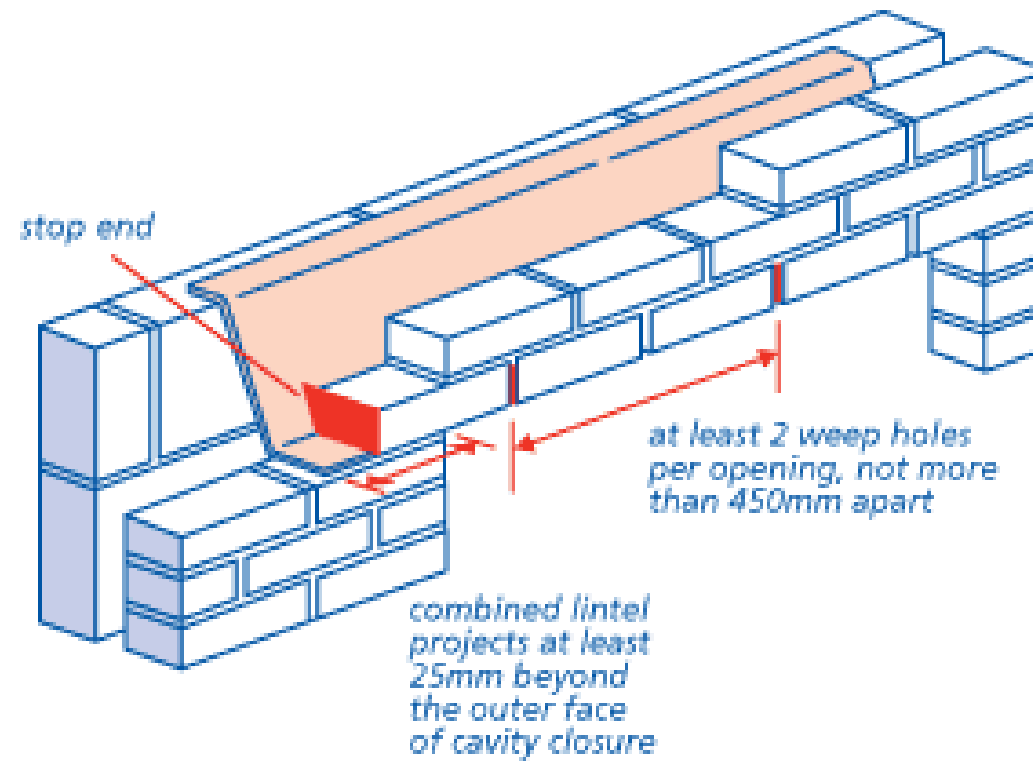
Metal elements



- Standard steel cavity lintel
- Cavity tray
- Insulation
- Size dependant upon masonry and cavity dimensions

LINTELS

Metal elements

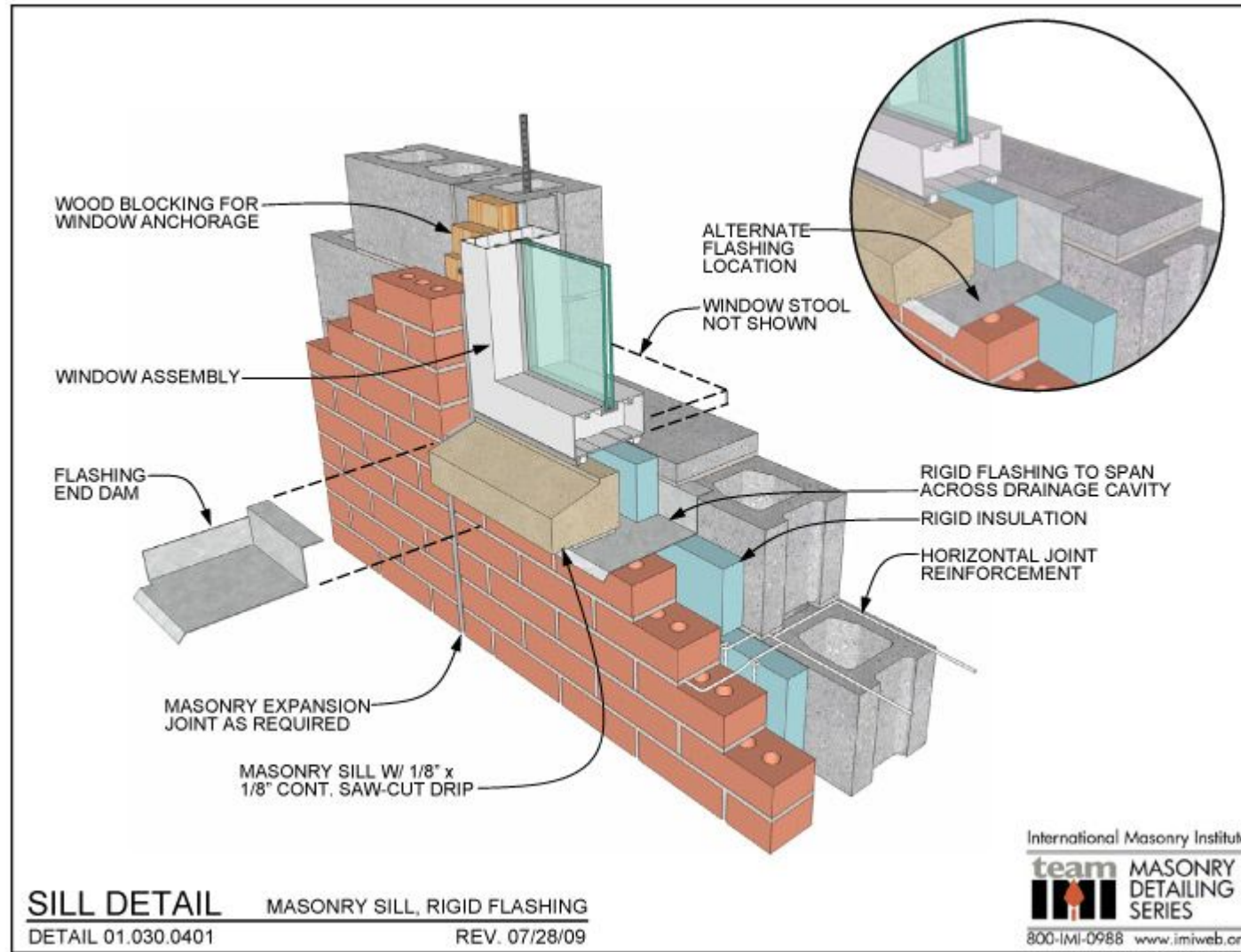


LINTELS

Specifications

- Lintels should be installed with a minimum end bearing of 150mm, bedded on mortar and levelled along its length and across its width.
- The masonry above the lintel should be built in accordance with BS EN 1996-2:2006.
- Raise the inner and outer leaves simultaneously to avoid excessive eccentricity of loading, with a maximum height difference of 225mm (Masonry should be laid on a mortar bed and all perpendicular joints should be filled.)
- Allow the mortar to cure before applying floor or roof loads (Temporary propping beneath a steel lintel is practised to facilitate speed of construction).
- A damp proof course (DPC) or cavity tray should be installed over all openings in external cavity walls.
- When installing concrete floor units or other heavy components above a lintel care should be taken to avoid shock loading and floor units should not be dragged into position. Masonry immediately above the lintel should be allowed to cure.
- Point loads should not be applied directly onto lintel flanges. Lintels should have a minimum of masonry 150mm high between the flange and the application level of any form of loading.

Sills



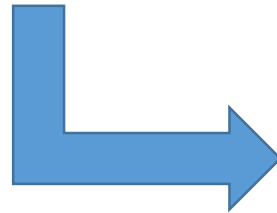
The Building Regulations

Access your individual products

► The Construction Information Service - CIS

The most comprehensive source of technical standards legislation and technical guidance for construction industry professionals.

[view product](#)



https://whel-primo.hosted.exlibrisgroup.com/primo-explore/dbfuldisplay?docid=44UWTSD_ALMA61194958940002421&context=L&vid=44WHELF_UWTSD_VU1&lang=en_US&adaptor=Local%20Search%20Engine&tab=jsearch_slot&query=contains,dbcATEGORY,&sortby=title&databases=category,Institute%20of%20Science%20and%20Art%E2%94%80Architecture,%20built%20and%20natural%20environment

Complying with the Building Regulations on Domestic developments

FO

Superstructure wk3

Posts

Files

Notes

Fill | Fundamental of ...

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↷

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⋮

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Fundamental of Con Tech

Building Regulations - Quick fire revision quiz.

...

Hi Gavin, when you submit this form, the owner will be able to see your name and email address.

* Required

1. The number of air changes and room volume calculations are considered within
(2 Points)



Part A: Structure



Part B: Fire safety



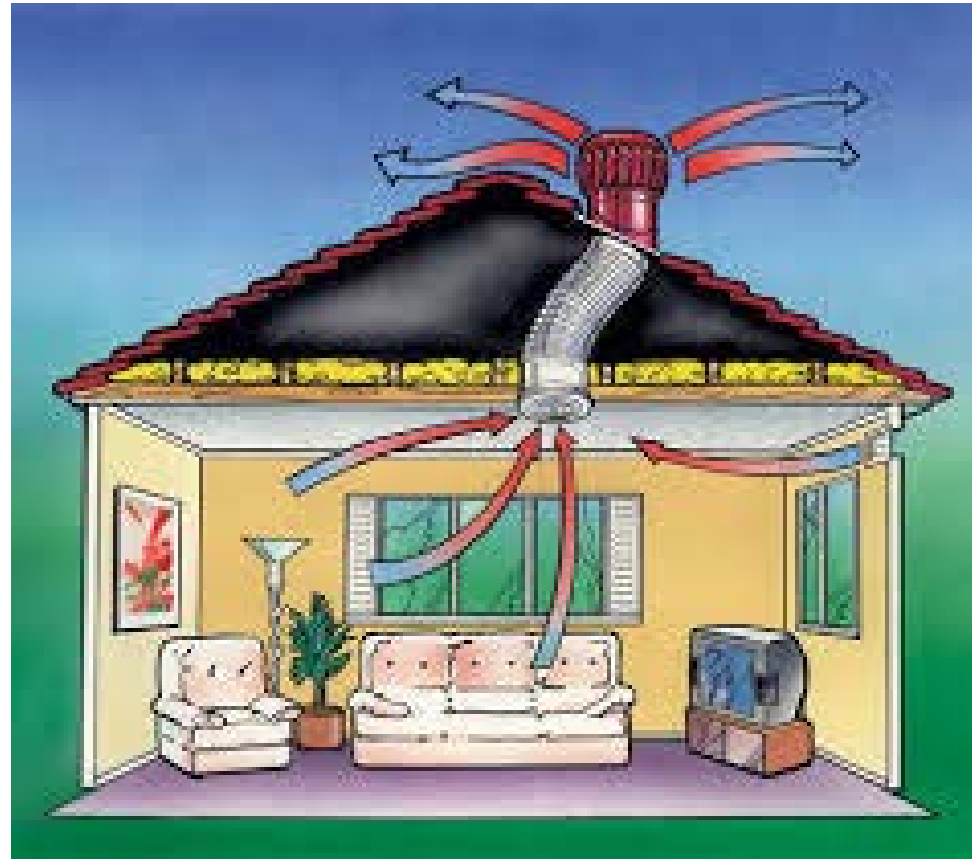
Part C. Site preparation and resistance to contaminants and moisture



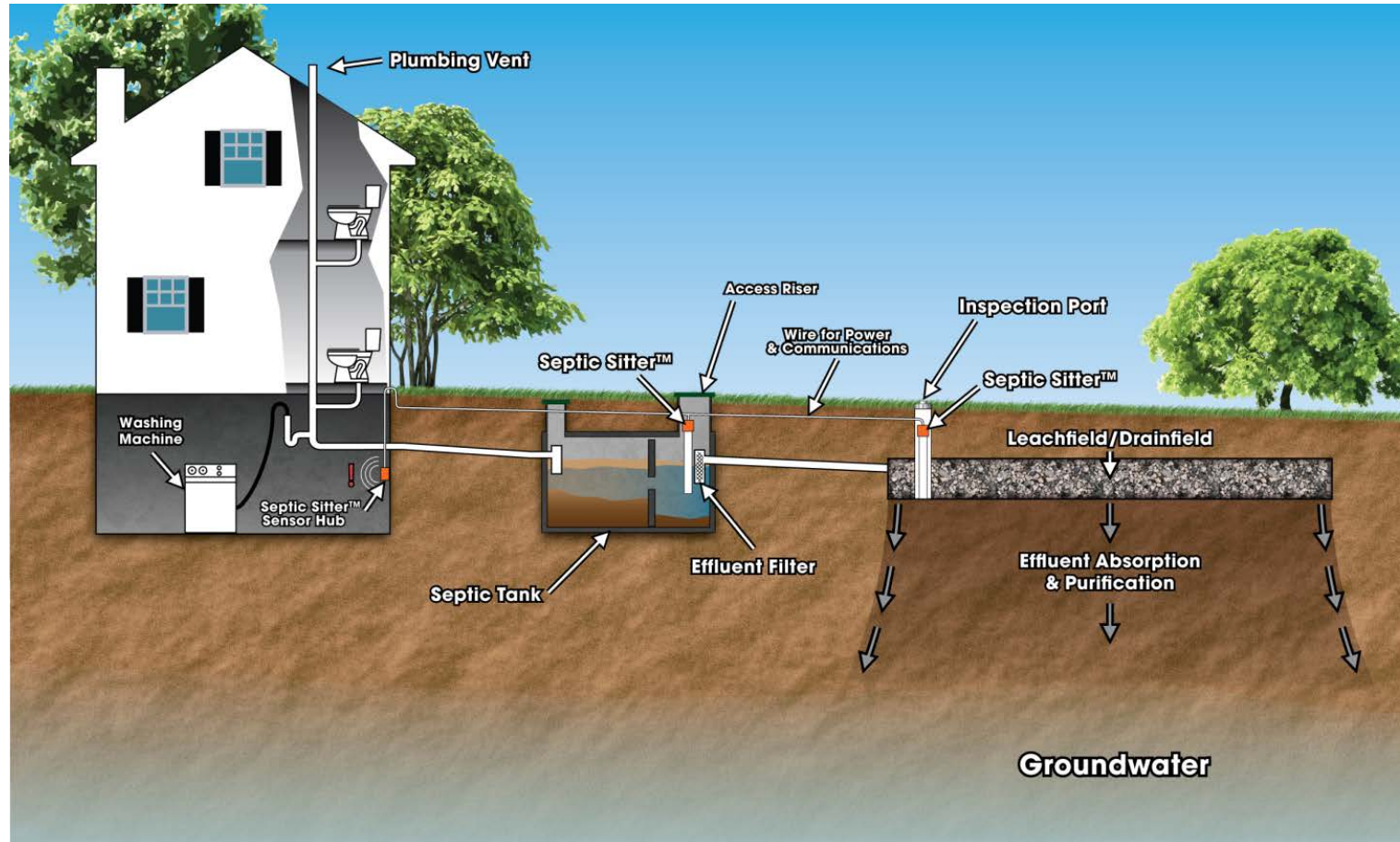
Part E. Resistance to the passage of sound



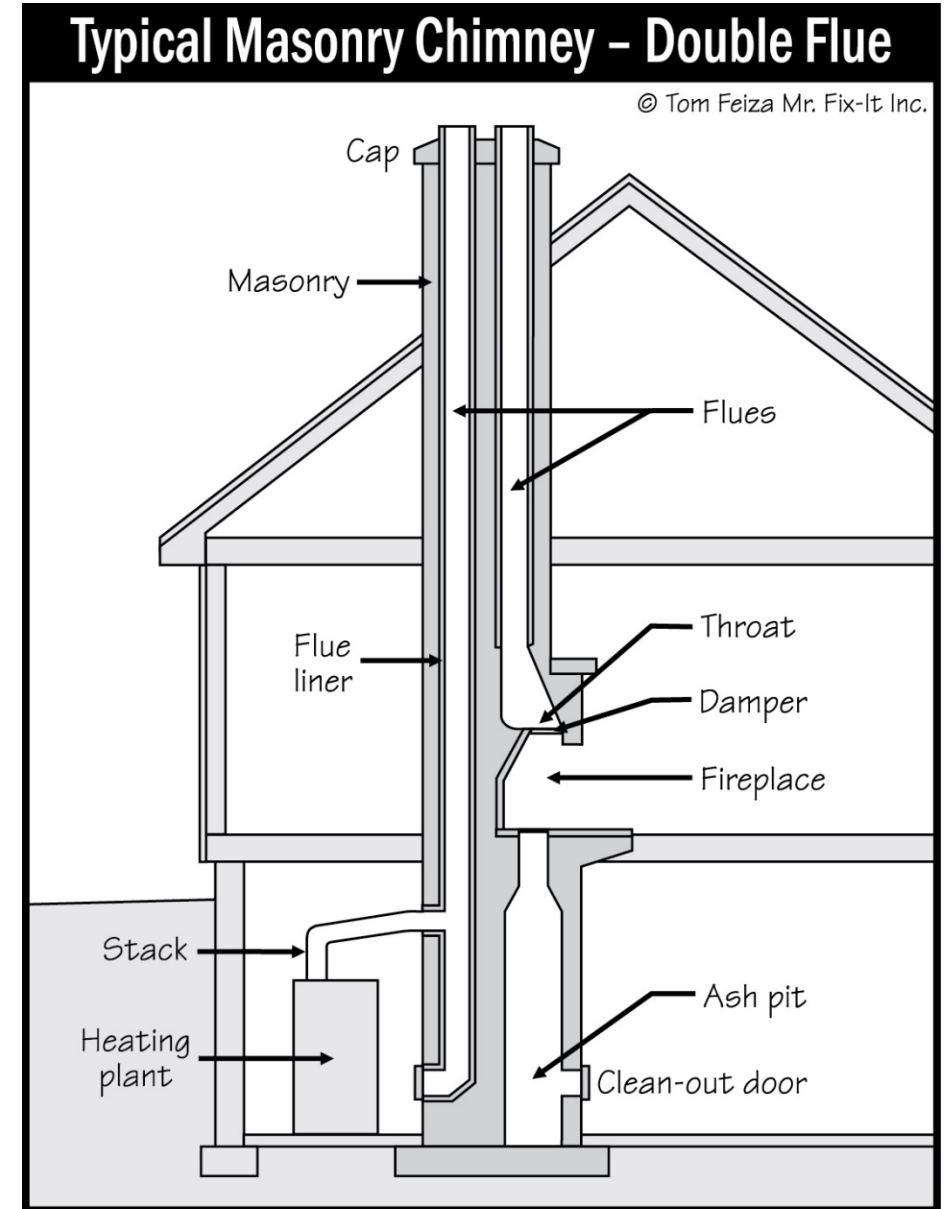
Part F. Ventilation



Part H. Drainage and waste disposal

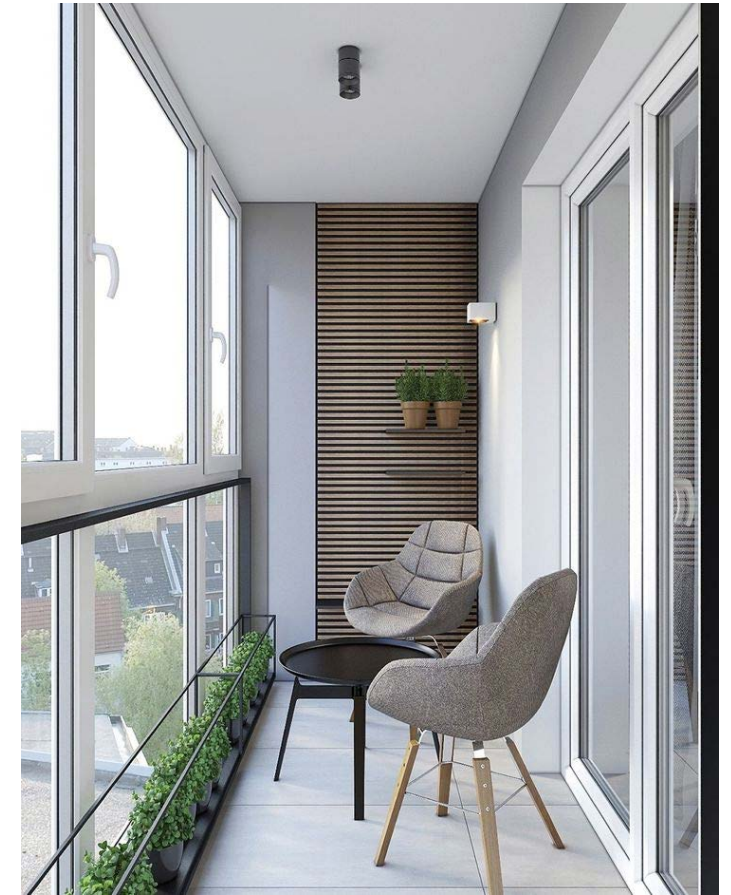
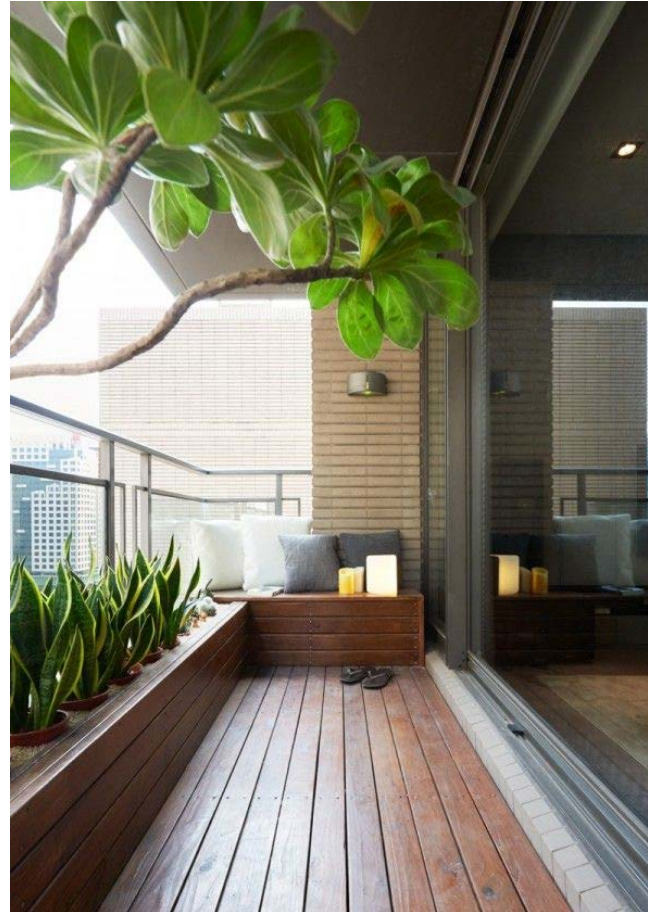


Part J. Combustion appliances and fuel storage systems

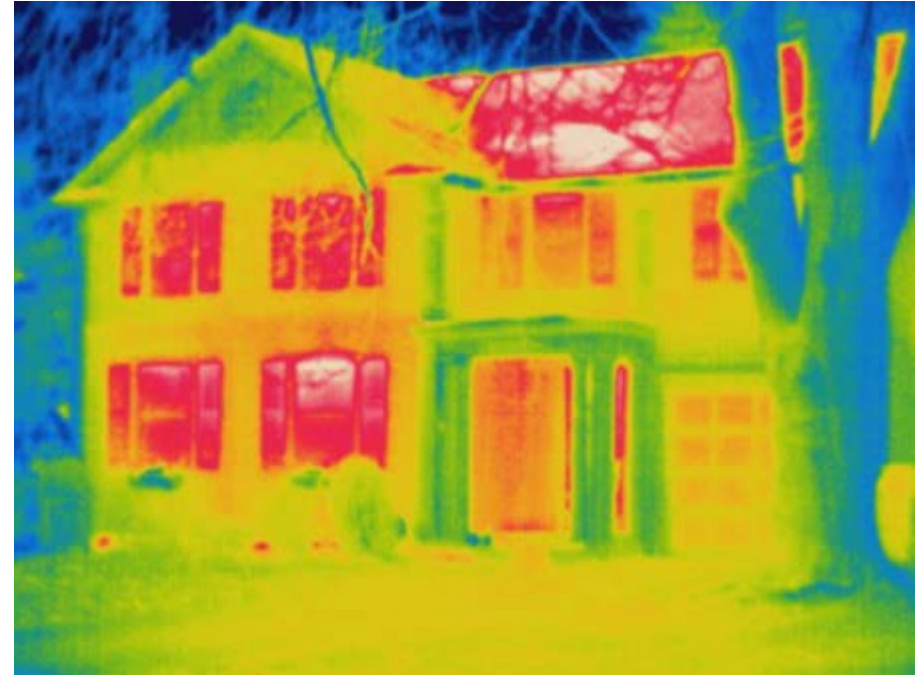
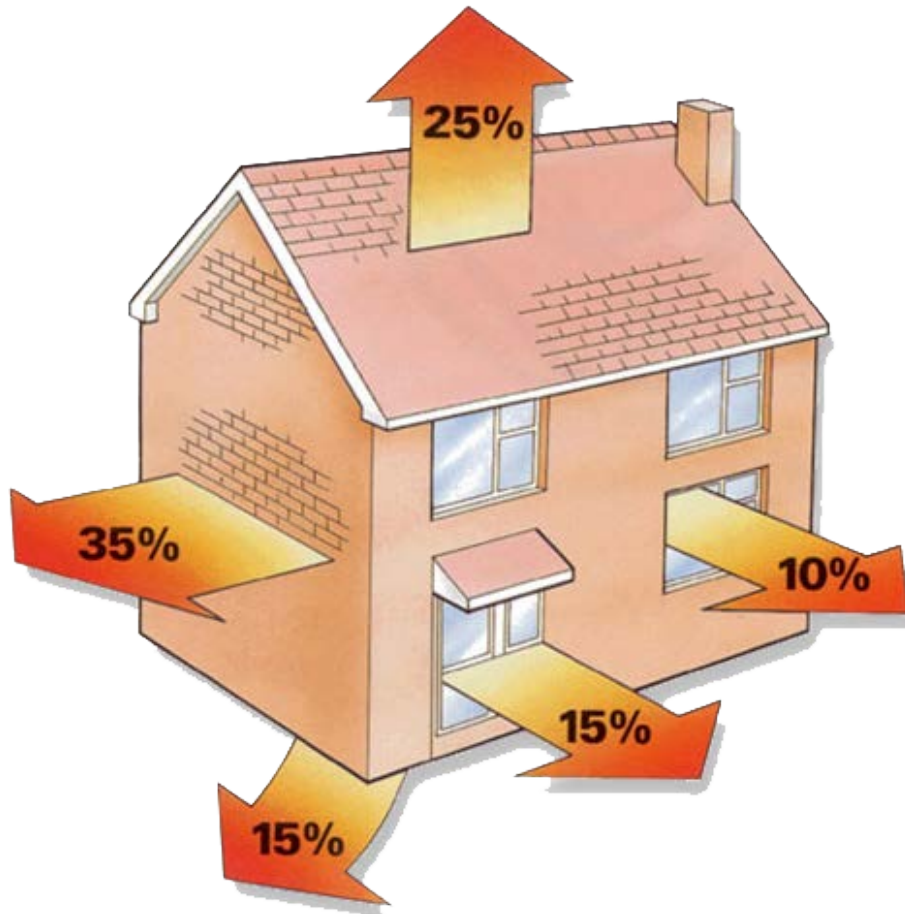


F002

Part K. Protection from falling, collision and impact



Part L. Conservation of fuel and power



Part M. Access to and use of buildings





PARTITION WALLS



DEFINITION

- Wall or division with the purpose of dividing one room or space
- They are designed as non-load bearing walls
- If they are load bearing then they are called as 'internal wall'
- Light in weight and cheaper costs in construction
- Occupy less area
- Easily constructed
- Adaptability

REQUIREMENTS

- Thin cross-section to occupy minimum floor area
- Provide adequate privacy in rooms (sight and sound)
- Light, sound, uniform, homogeneous, durable materials
- Easy and economical in construction
- Sufficient resistance against fire, heat, dampness, etc.
- Rigid and strong enough to support sanitary fittings and heavy fixtures

TYPES OF PARTITION WALLS

- Brick partitions
- Clay brick partitions
- Concrete partitions
- Glass partitions
- Plaster slab partitions
- Metal lath partitions
- Timber partitions

TYPES OF PARTITION WALLS

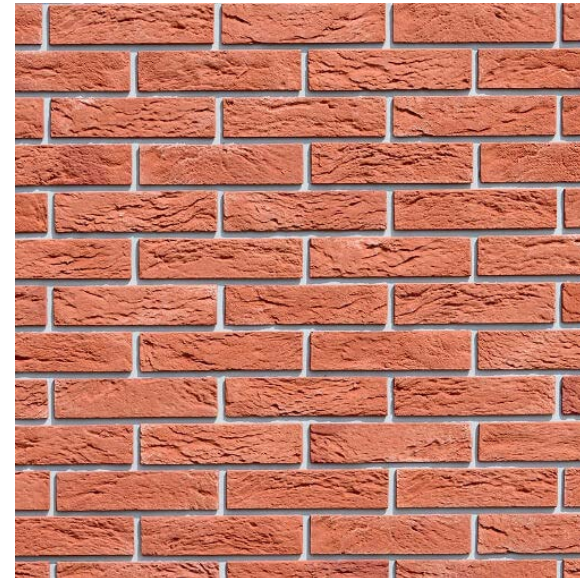
Plain brick partition wall

Common and cost effective

Bricks layed as stretchers in cement mortar

Recommended height: maximum 2m for construction in a day

Strong and fire resistant



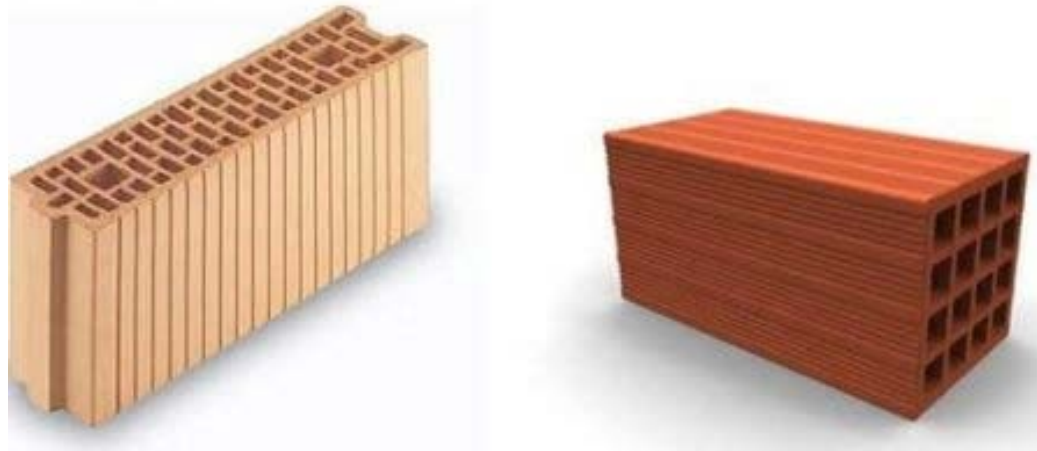
TYPES OF PARTITION WALLS

Hollow clay brick partition wall

Reduced weight

Increased thermal and acoustic insulation

Similar construction to structural walls but they are non-load bearing



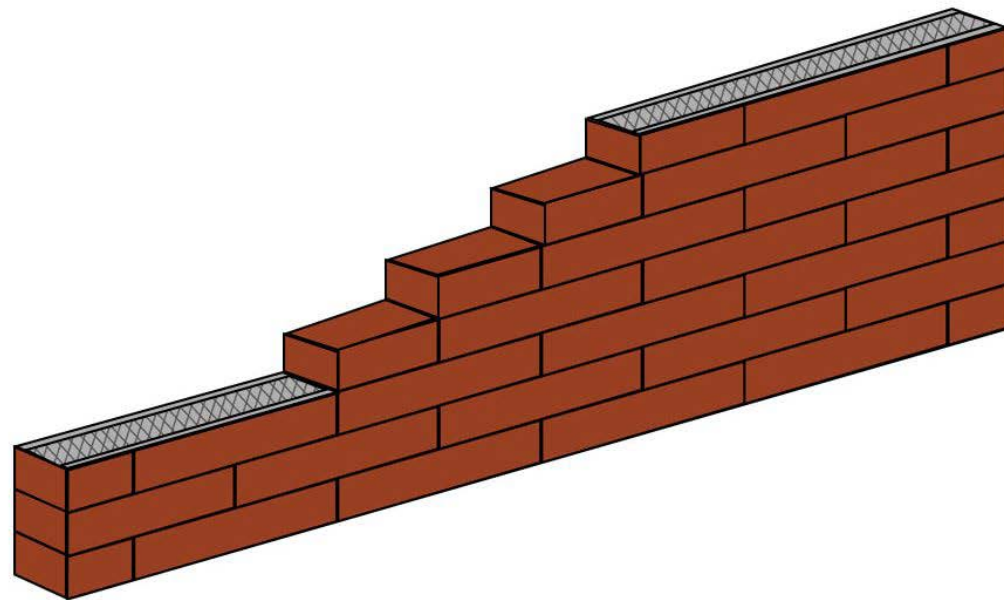
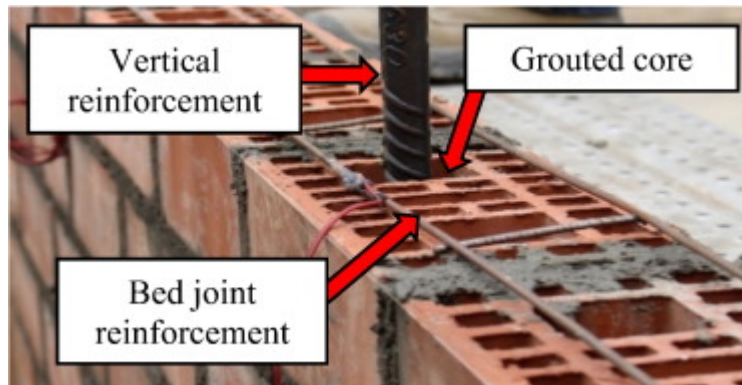
TYPES OF PARTITION WALLS

Reinforced brick partition wall

Reinforcement of wire mesh strips or iron bars

Placed at every third or fourth course

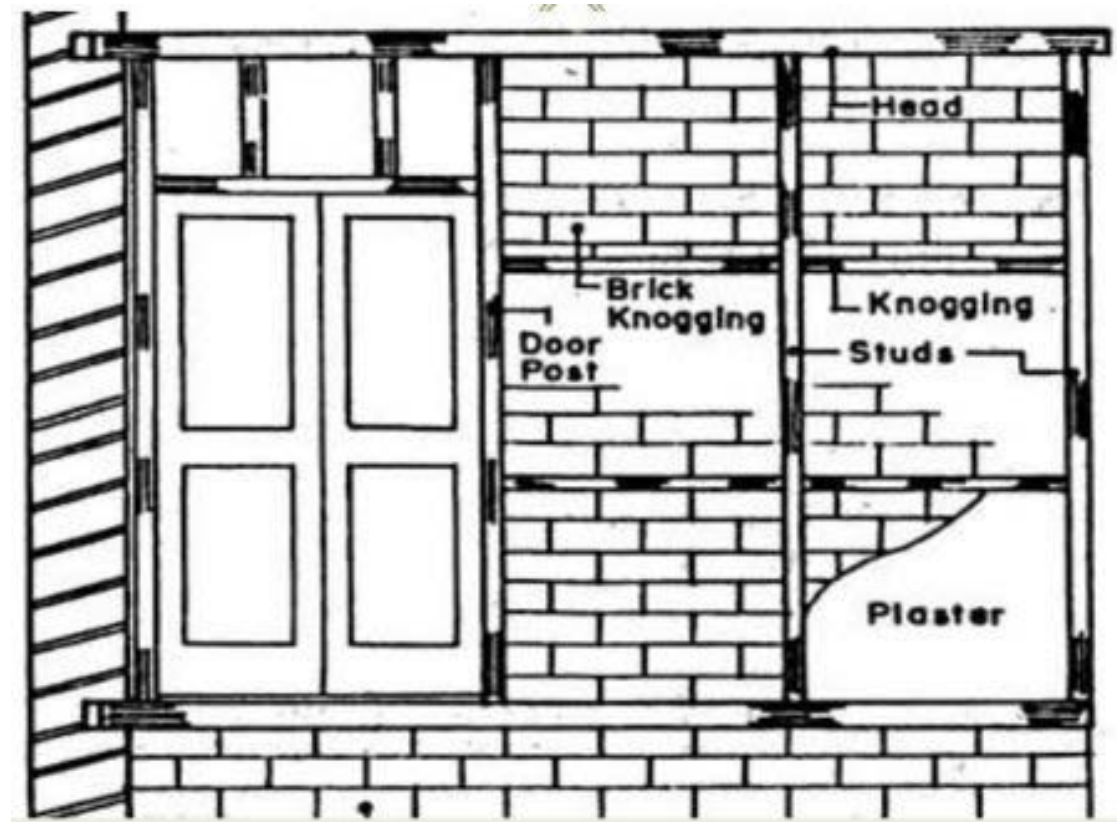
Used to strengthen the partition when it has to support additional loads



TYPES OF PARTITION WALLS

Brick noggin partition wall

Brickwork built within a framework of wooden members
Studs (vertical posts) spaced at 60-150cm
Nogging pieces (horizontal) housed into the studs at 60-90cm vertically



TYPES OF PARTITION WALLS

Glass partition wall

- Light in weight, vermin proof, damp proof and soundproof
- Glass sheets are fixed to a wooden framework
- Glass fixed with beadings or by putty



TYPES OF PARTITION WALLS

Safety glass

Safety in glazing. Documents applicable:

- BS 6262:2005. Glazing for Buildings
- Building Regulations. Approved Document N

Types:

- Tempered glass (or toughened glass)
- Laminated glass
- Wire mesh glass
- Engraved glass

TYPES OF PARTITION WALLS

Safety glass

Tempered glass (or toughened glass)

- Shower doors
- Architectural doors
- Component of bulletproof glass



Tempered

Float

TYPES OF PARTITION WALLS

Safety glass

Laminated glass

- Used when possibility of human impact
- Skylight glazing
- Automobile windshields
- PVB interlayer gives more acoustic insulation and blocks most of UV radiation



Interlayer of poplyvinyl butyral (PVB)

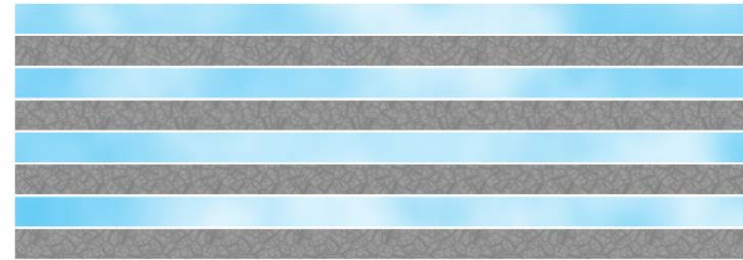


TYPES OF PARTITION WALLS

Safety glass

Bulletproof glass

- Type of laminated glass
- Combination of different types of glass (hard and soft)
- The more layers, the more resistance
- Used in windows that require such security (jewellery stores, embassies, banks, etc.)

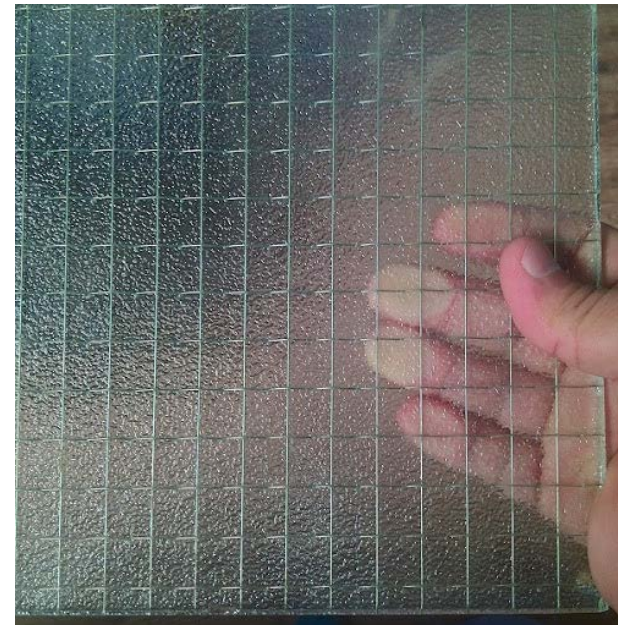


TYPES OF PARTITION WALLS

Safety glass

Wire mesh glass

- Fire-resistant capacity
- Fire protection partitions
- Not as strong as other types of glass
- Breaking in sharp pieces that can cause injuries
- Not commonly used



TYPES OF PARTITION WALLS

Safety glass

Engraved glass

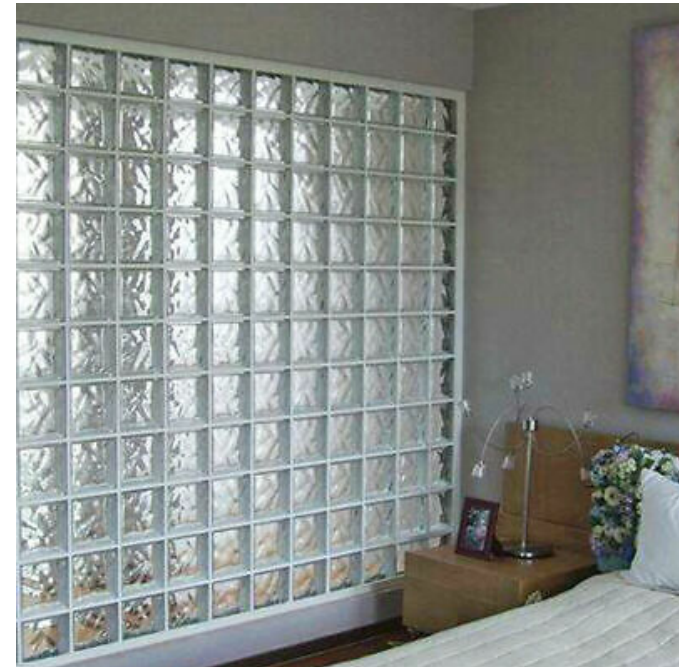
- Engraved networks of micro-cracks produced with laser
- Energy is dissipated much better



TYPES OF PARTITION WALLS

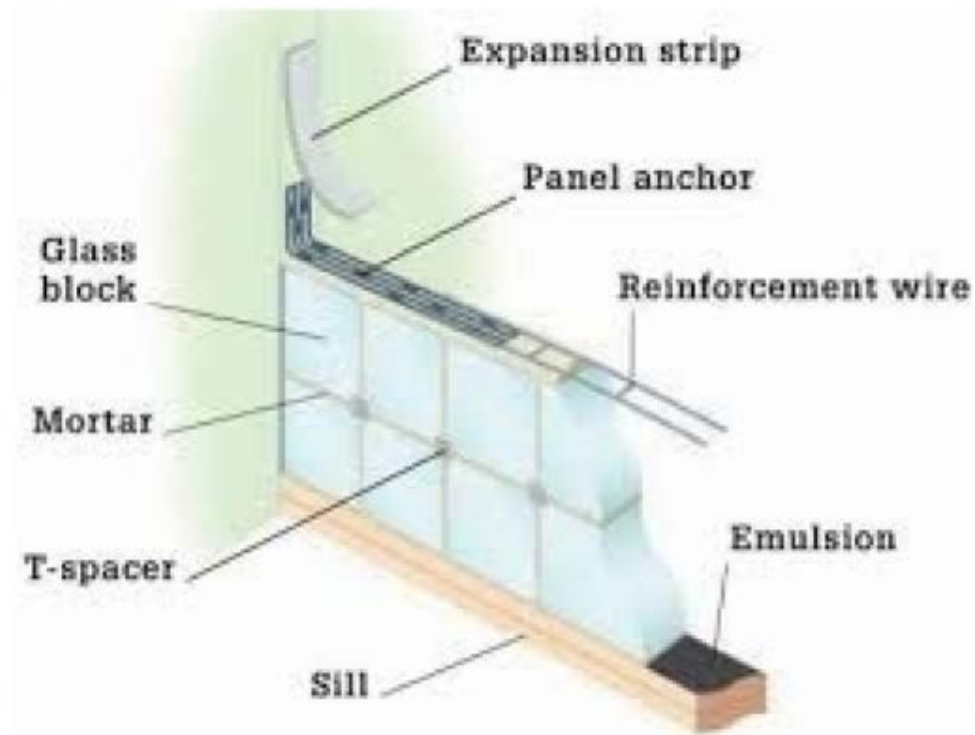
Hollow Glass partition wall

- Using hollow glass blocks
- Standards size 14x14cm or 19x19cm, thickness 10cm
- Blocks laid in cement-lime mortar and fine sand (1:1:4)
- All joints filled conveniently
- Reinforcement placed at every course



TYPES OF PARTITION WALLS

Hollow Glass partition wall



TYPES OF PARTITION WALLS

Plaster slab partition wall

- Slabs made of burnt gypsum or plaster of paris, mixed with sawdust or other fibrous material
- Size of 1 to 2m long, 30cm high and 50 to 100mm thick
- Provided with grooves to create rigid joints
- Adhesive plaster as a binder
- BS EN 12859:2011

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TYPES OF PARTITION WALLS

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TYPES OF PARTITION WALLS

Plaster slab partition wall



TYPES OF PARTITION WALLS

Plaster block partition wall



TYPES OF PARTITION WALLS

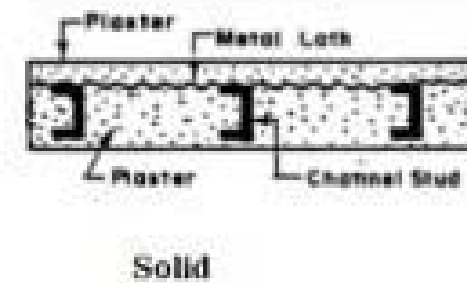
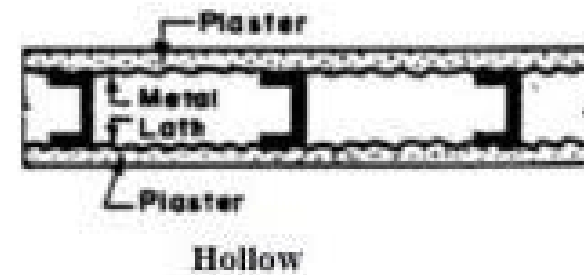
Metal lath partition walls

- Constructed placing 2cm or 2.5cm studs and fixing metal lath to it on one side
- Plaster is applied to both faces of the metal
- When a hollow partition is needed, metal lath is fixed to the channels on both sides and then plaster is applied



TYPES OF PARTITION WALLS

Metal lath partition walls



Partitioning Systems

Metsec manufacture a full range of dry lining metal profiles.

- C Stud
- Heavy Duty C stud
- Acoustic Stud
- I stud including Shaftwall and Independent wall lining
- Wall Liner
- Tracks – Standard, Deep and Extra Deep
- Metal Furring ceilings including SMF5, SMF6a, SMF7 and angle
- Floating Floor systems
- Resilient (Acoustic separating) Bar
- Angles and Channels



Thanks to extensive research and development with advanced manufacturing techniques Metsec offer partitioning systems that conform to the latest British and European standards.



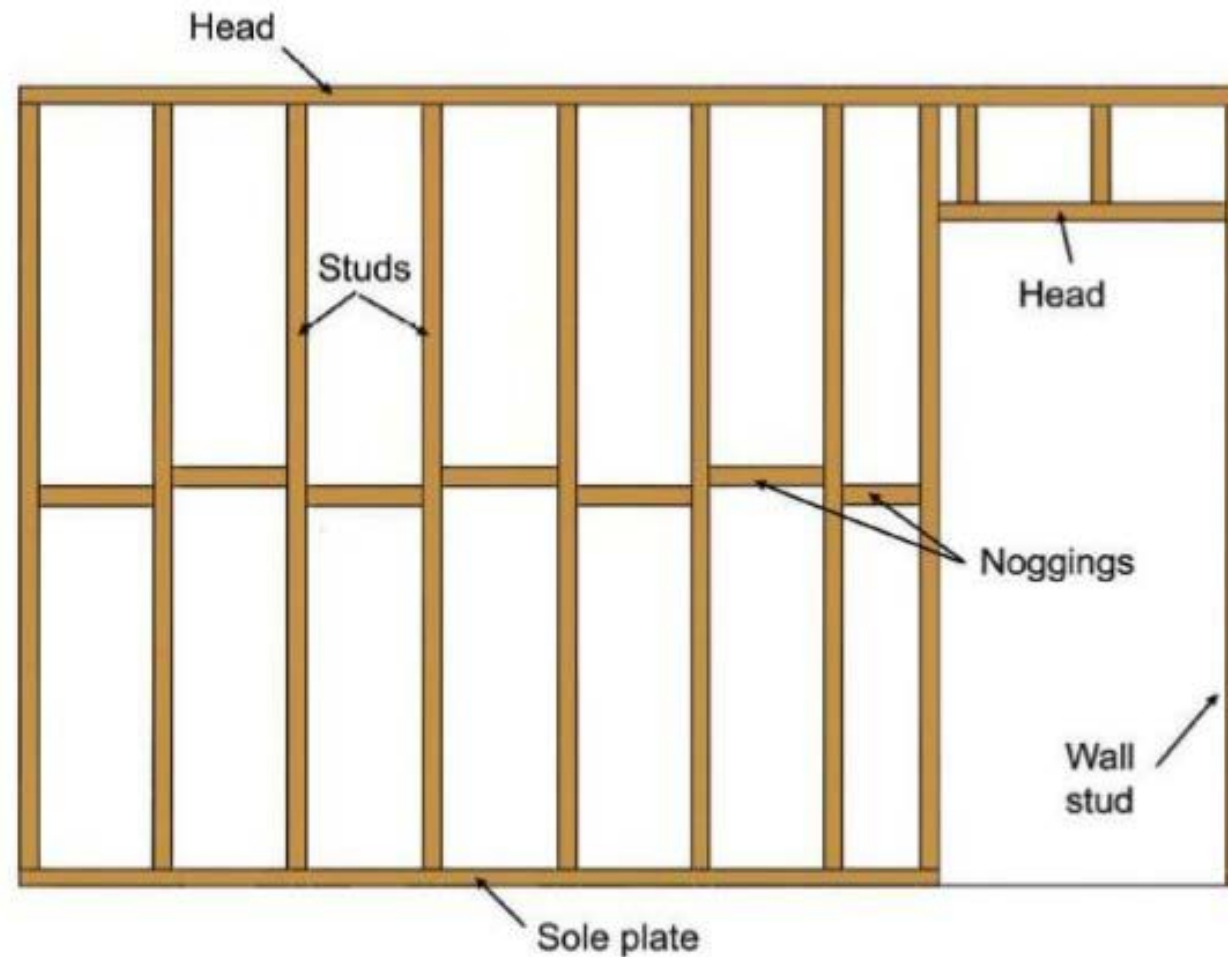
TYPES OF PARTITION WALLS

Timber partition walls

- Stud framework as vertical loadbearing skeleton
- Studs placed at 600mm or 400mm centres
- Top and bottom rails are the same size as studs
- Sizes 38x89mm and 38x140mm (BS EN 336 Structural Timber)
- Use of noggins:
 - Support for plasterboard edges
 - Reduce buckling of studs
 - Provide fixing points for fittings and fixtures

TYPES OF PARTITION WALLS

Timber partition walls



TYPES OF PARTITION WALLS

Timber partition walls

- Sheeting can be covered by:
 - plasterboard
 - OSB, plywood or fibreboard
- Nailed to the internal substructure
- Joints are filled and taped, applied second coat and sanded to smooth finish



TYPES OF PARTITION WALLS

Plasterboard

Also known as drywall

Inner layer of gypsum sandwiched between two outer layers of lining paper

- Different additives in gypsum
- Different weight and strength of lining paper

Characteristics:

- fire resistance
- Acoustic insulation
- Not good for continuous wet environments (special product for moisture and water resistance in kitchens and bathrooms)

TYPES OF PARTITION WALLS

Plasterboard

Width size generally 1200mm
(to cover distance between studs)

Two faces:

- Ivory
- Brown (plaster never applied on this face)

Screw fixing

Two options:

Tapered edge (jointing or skimming)

Square edge (textured finishes)



Summary Week 3:

Assessment 2

Recap Openings

Recap Building Regulations

Partitions

