CARPENTRY & JOINERY

Community College HACKNEY

FCA

CARPENTRY & JOINERY

THEORY

08 SINGLE UPPER FLOORS

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Strutting Methods

As previously stated, upper floor joists are required to span greater distances than ground floor joists and therefore the depth of the joists will be greater making them more susceptible to lateral or sideways movement or buckling.

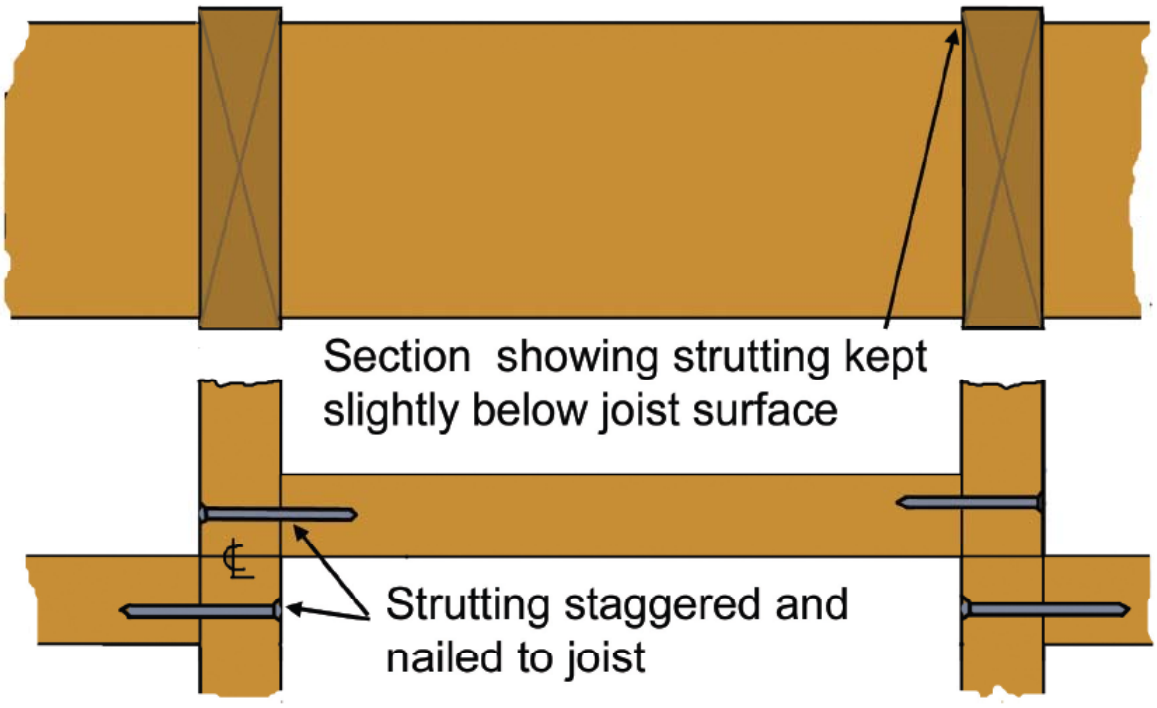
Although the floor decking and ceiling material may provide some stability, the joists will require a more permanent solution.

This problem can be resolved by providing a means of restraint called strutting. Strutting is always fixed at right angles to the length of the joists and at intervals ranging between 1.5m and 1.8m depending upon the size and area of the room.

There are three main types of strutting that can be used:
- Solid timber strutting.
- Herring bone timber strutting.
- Galvanised steel strutting.

Solid Timber Strutting

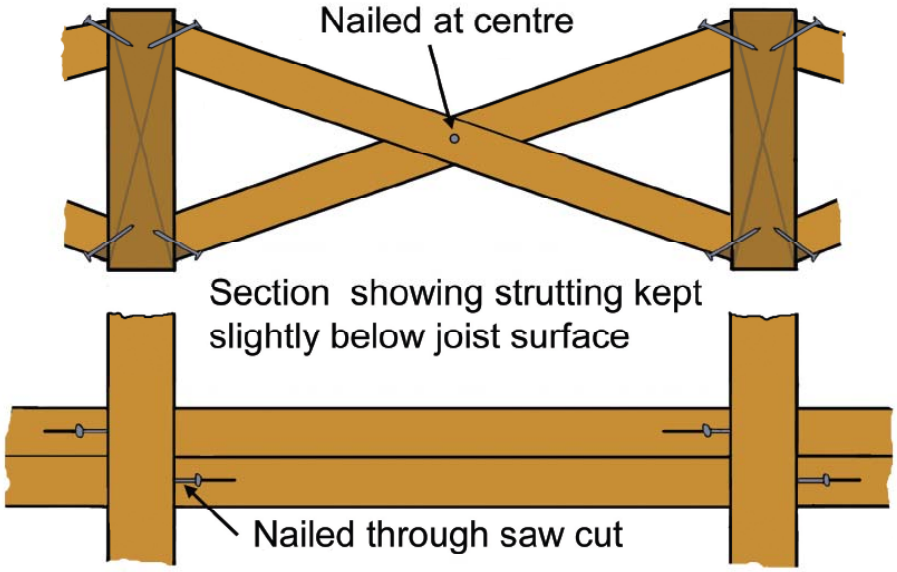
This type of strutting is quick and easy to install. The struts are cut from short ends of joists and can be fixed flush with the top and bottom of the joists or reduced in size to approximately two thirds of the joist depth. The struts are staggered either side of a centre line to permit easy fixing by nailing. This form of strutting tends to become loose when the timber shrinks making it less effective than other methods.



Solid timber strutting

Herringbone Strutting

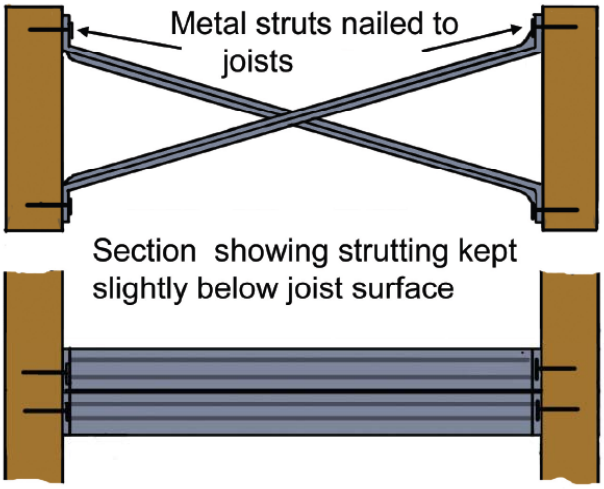
This type of strutting is very effective since it tightens when the joist shrinks. The strutting is usually small sections of timber 50mm x 38mm which are nailed to joists. The strutting is kept below the level of the floor and to assist nailing and prevent the ends of the struts splitting. A saw cut or kerf is cut in the top edge of the strut. This also adds to the holding power of the nail.



Herringbone strutting

Galvanised Metal Strutting

An alternative to timber herring bone strutting is the use of a proprietary galvanised metal struts. This metal strut is shaped and designed so as not to buckle and is fixed in a similar way to timber herringbone strutting. The disadvantage of this type of strutting is that the depth and spacing of the joists has to be specified when ordering the struts as different depths and spacing will require different sized struts.



Galvanised metal strutting

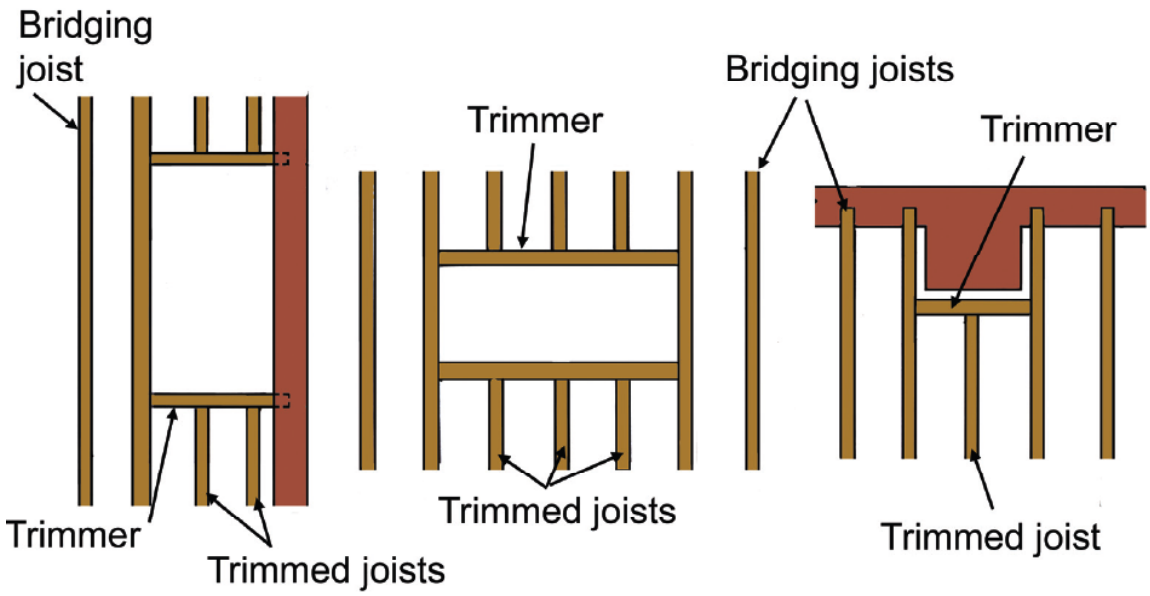
Trimmer And Trimming Joists

Most domestic housing will require some form of access from the ground floor to other floors above. This is usually achieved by means of a staircase which will require an opening or stairwell to be formed in the floor above. The process of forming these openings is called framing or trimming an opening. The size, shape and way the opening is framed will depend upon what the opening is for and the direction of the floor joists in relation to the opening. The members which form the opening, and the joists supported by the framing, each have their own function and they are named accordingly.

Framing Member Terminology

Trimmed joists – A joist that has been cut or trimmed to form the opening in the floor.
Trimmer joist – A joist which is placed at right angles to a bridging joist and gives support to the cut ends of a trimmed joist.
Trimming joist – A joist with a span the same as a bridging joist and which supports the end of a trimmer joist.
Bridging joist – A joist which spans across the floor and is also called a common joist.

As these framing members have to carry heavier loads than an ordinary bridging joist they are usually thicker in width. It is not uncommon to connect two bridging joists together to obtain the additional width required. It is now advisable to use tables which have been calculated to give the size of trimmers to be used in relation to span and the number of trimmed joists the trimmer has to support or the size required may be calculated by a structural engineer.



Trimming to openings in upper floors

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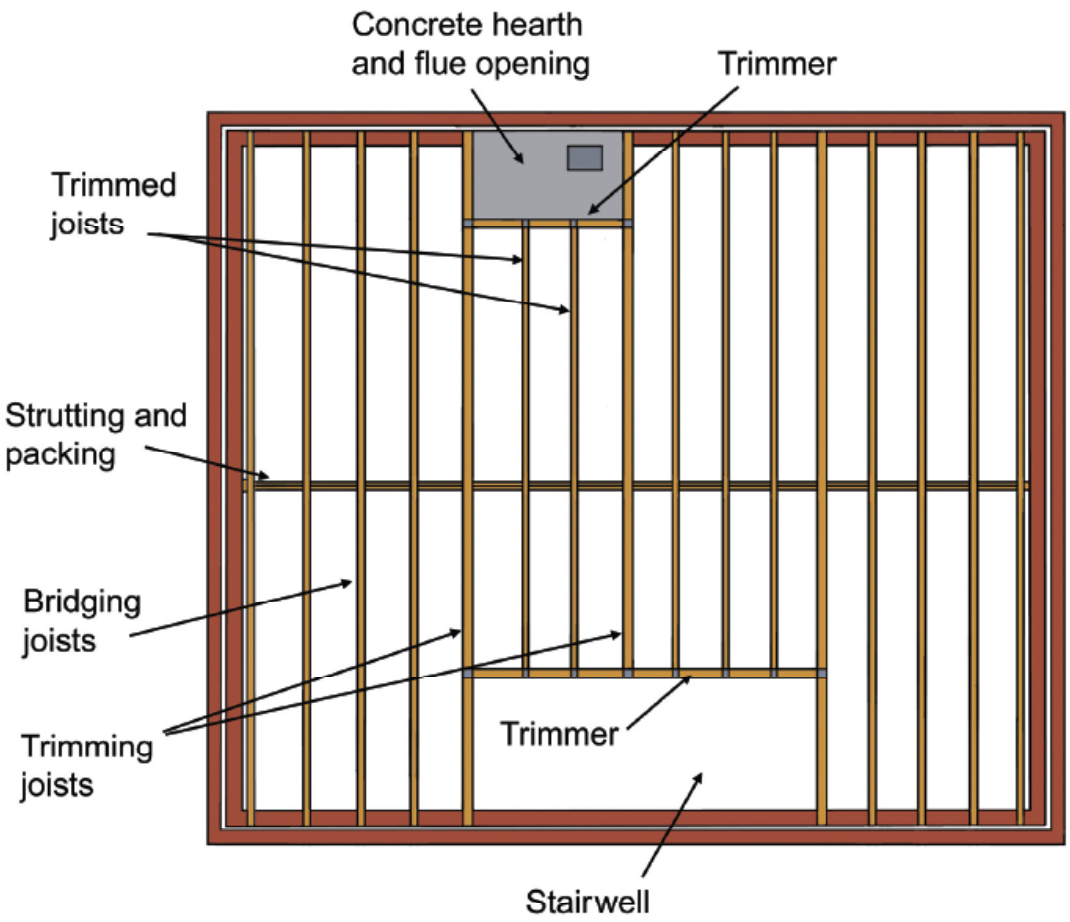
Upper Floor Joist Layout



The drawing above shows the upper floor of a building to have two openings, an opening for a stairwell and an opening for a fireplace hearth and flue.

These openings will need to be trimmed to accommodate the stair and the fire hearth.

Construction Details

• The joists are built into the inner leaf of the cavity wall, or they could have been supported on metal joist hangers.
• The bridging joists span the full span of the floor.
• Larger trimming joists are positioned and fixed to accommodate the necessary trimmers.
• The trimmers are fixed to the trimming joists with metal joist hangers.
• Trimmed joists span from one inserted trimmer to the next, and from the stairwell trimmer to the opposite internal wall.
• The floor is stiffened with a row of strutting and further braced with packing pieces which are placed against the last bridging joists and the internal wall.

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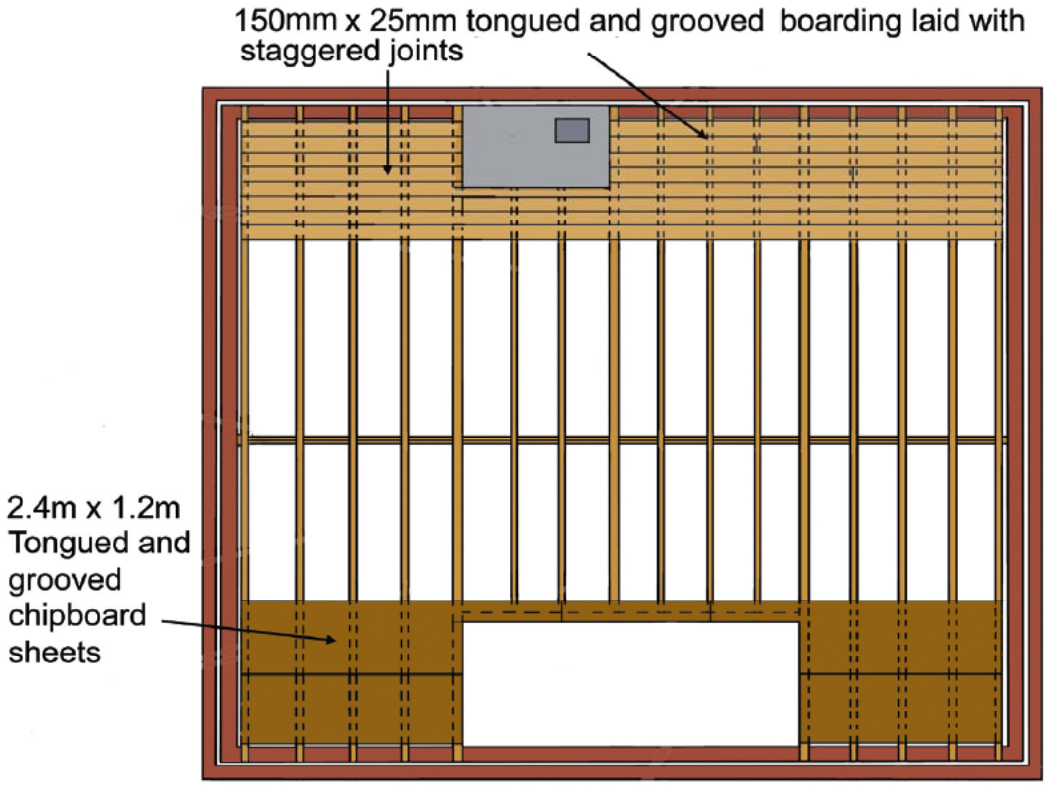
Upper Floor Coverings



Ground floors and upper floors can be covered with many different types of covering materials. The general term used to describe this covering material is flooring.
Flooring may be softwood or hardwood tongued and grooved boarding, or man-made sheets or boards which can also be tongued and grooved or straight edged.

Tongued And Grooved Boarding

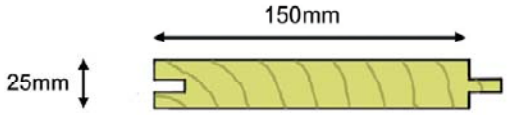
This type of flooring is made from softwood or hardwood and is sold planed all round (PAR) with tongued and grooved edges. The sizes of these boards can range from 60mm to 150mm in width and 18mm to 25mm in thickness. The narrow boards produce superior floors because any shrinkage that may take place is less noticeable. Narrow boards are usually produced from hardwoods and are much more expensive than wider softwood boards.

The best floorboards are quarter-sawn boards which produce boards that are less likely to distort due to shrinkage. However the quarter-sawn method of cutting timber logs is much more wasteful than cutting boards tangentially and therefore they are more expensive.

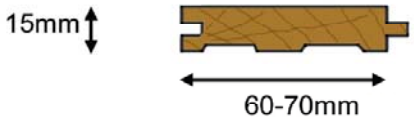
Most boards are cut tangentially to reduce costs, but boards cut in this way tend to ‘cup’ across their width and should be laid and fixed with the concave side uppermost to prevent splitting.

Tongued And Grooved Boards

The tongue and groove machined into the edges of these boards is not at the centre of the edge but is offset to produce a thicker edge joint nearer the upper surface of the board.



Softwood T&G Board



Hardwood T&G Board

Chipboard Flooring Sheets

This is a man-made flooring material made up of wood particle or chips bonded together with a strong adhesive and pressed into sheets of various sizes.

There are various grades of chipboard but only flooring grade chipboard should be used for covering floors. Flooring grade chipboard, is compressed to a higher density than standard grade and can be purchased as either square edged or tongued and grooved boards.

The standard size of square edged flooring grade chipboard is 2.4m x 1.2m x 18mm thick. If square edge boards are used as a floor covering, care must be taken to ensure that all the edges are supported and therefore it may be necessary to support the ends of the sheets on noggings nailed in between joists.

Tongued and grooved boards are available in two grades:
• Standard.
• Moisture resistant.

The standard size of both grades is 2.4m x 600mm with thickness sizes of 18mm and 22mm. Moisture resistant boards should always be used where damp conditions are likely to occur, such as in bathrooms and kitchens. The 18mm thick boards are suitable for laying on joists spaced at no more than 400mm. The 22mm thick boards are more suitable for joist spaced at 600mm.

Chipboard sheet profile

Medium Density Fibre Board

Medium density fibre board, or MDF as it is commonly known, is a man-made board made from compressed wood fibres.

It is manufactured in three grades:
- Standard grade.
- Moisture resistant grade.
- Exterior grade.

This board material has a very smooth surface and is very durable if the correct grade is selected for the work in hand.

It is available in square edged sheets 2.4m x 1.2m and in a wide range of thicknesses. It is more expensive than chipboard but cheaper than plywood.

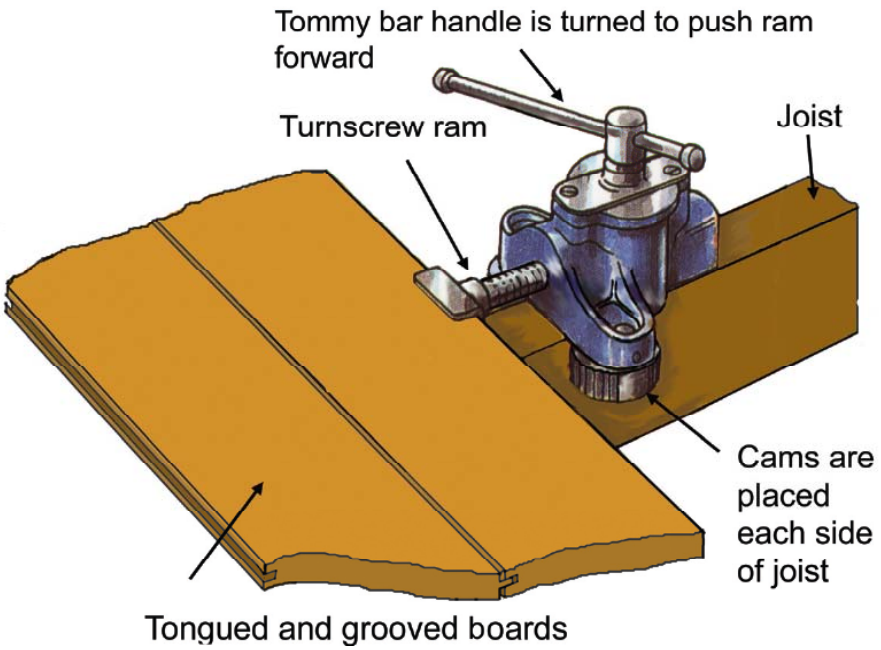
Plywood

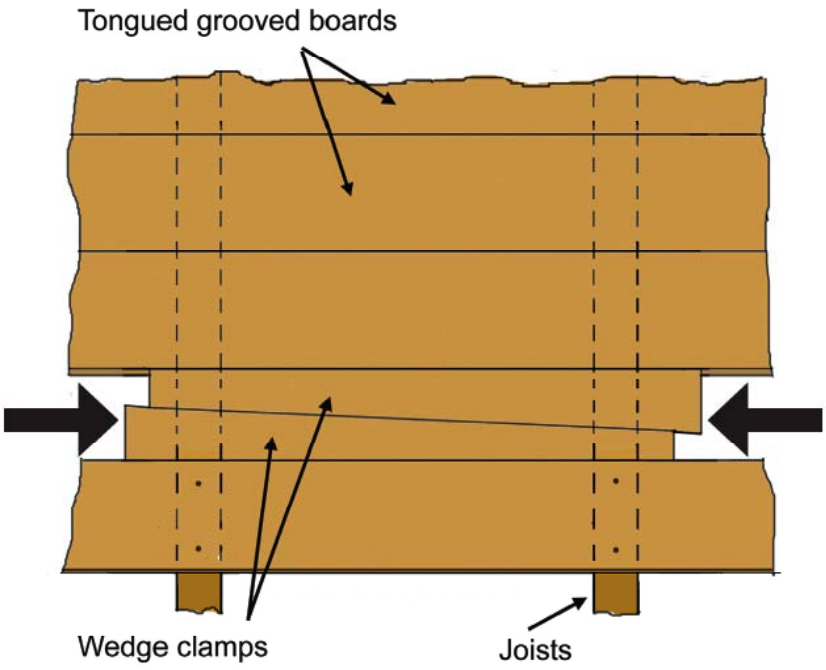
Any exterior grade plywood (WPB bonded) can be used as a flooring material. The sheets can be purchased as square edged or tongued and grooved on all four edges. The most common thicknesses used for flooring are 16mm and 18mm.

It does not require intermediate supports such as noggings, and can be laid directly over the joists. Plywood is often laid over an existing floor surface to level it and to serve as an underlay for tile and plywood strip flooring.

Laying Floor Coverings

It is essential when laying any kind of flooring material that all edge joints are entirely closed up. Special floorboard clamps are available to assist this procedure or, if these not available, a method of wedging the boards into place can be devised. Either method is quite successful in achieving tight, secure joints.





Folding wedges