LOFT CONVERSION

SKILL LEVEL ● ● ● ● ●

This project is suited to the experienced DIYer as sound woodworking and some electrical skills are required. If you are in doubt employ a qualified electrician.

Many of the operations will need two people, as the materials used are heavy and space restricted.

SAFETY FIRST

Lay planks over loft joists to prevent an accident. Lofts can be full of fine dust, so wear respiratory protection in the form of a half mask if you are cleaning up or removing old insulation. Always ensure that the power supply is switched off before starting any electrical work.

INTRODUCTION

Lofts can be a useful space to store rarely used items and many can be modified to make this easier.

In certain buildings the space can also be used for residential use. However the joists, which run in the loft, in many houses, are not designed to take loads other than the ceilings they support. The roofs of modern houses are constructed from stressed timber trusses and simply cannot be modified to carry additional loads or to give better access.

If you are going to use the space only for storage you can do this without consent under the Building Regulations, but any residential use requires notification to, and approval of, the Building Control Officer of your Local Authority. You will find a copy of the Building Regulations in your Local Public Library. These are complex and technical but we provide you with the main aspects, as far as they affect loft conversion, in this guide.

Planning consent will be required if you wish to carry out any work that changes the external aspects of the house and in certain circumstances the work must be to the approval of your Divisional Fire Officer.

2 - The stages of loft conversion

Loft conversion is best considered in the following stages:

1. **Improving access** - Lofts often have a small hatch opening that limits the size of objects you can enter into your loft area. Creation of a sufficiently large hatch is dealt with in section 3 of this guide. If you are planning to use the loft frequently it's worth putting in an extending loft ladder, which is permanently fixed. Residential use (even occasional) requires a permanent stairway and proposals for this must be approved by the Building Control Officer of your Local Authority.

2. **Increasing the strength of the ceiling joists** - Firstly check the depth of the joists, which will carry the floor. If these are not at least 200mm (8") you will not be able to carry the normal loads that you require, even for a light duty use. You can strengthen the joists by securing at least a 100mm (4") timber above each. If you were to use the space for residential purposes your Local Building Inspector could require you to put

in new 200 x 50mm (8 x 2") beams at a maximum of 400mm (16") centres.

3. **Modify the roof structure** - To open up the space fully you may want to modify the roof structure. In older dwellings this is relatively easy to do as they have large trusses with beams tying them, and rafters supporting the purlins. More recently built houses have a series of very light trusses carrying the purlins directly. These are not easily altered and some simply cannot be modified, You should seek the help of a professional Structural Engineer to guide you on this. Again for residential purposes 40% of the area must have a head height of more than 1900mm.

4. **Insulation** - Building Regulations currently require that the roof or ceiling of a loft is insulated to give a Thermal Resistance (R-value) of 5. This is equivalent to 200mm of fibreglass. To achieve this on the existing ceiling means that any floor in the loft almost certainly must be raised (see section 7 of this guide). To line the roof a light structure must be built to carry it. Be careful in this case, any insulation must leave a 50mm air space to the underside of the roof (see section 5 of this guide).

5. **Flooring** - 18mm thick tongue and grooved chipboard panels are an ideal product to use for your loft floor. Do not try to use normal grade 18mm chipboard or thinner under any circumstances. Joists to carry it should be at centres of not more than 450mm (see section 7 of this guide).

6. **Electrical supply** - Normally the lighting circuit supplying the top floor can be extended to provide lighting into the loft (see section 6 of this guide).

7. **Natural lighting** - This can be achieved in two forms. The inclusion of Velux windows, which, as they are within the roofline, only require consent under the Building Regulations for the structural alterations required. Dormer windows are popular but require planning consent in addition to Building Regulations (see section 5 of this guide).

3 - Improving access to your loft

Gaining good access

To make better use of your loft, first work out the best way of gaining access to this space: usually by using a loft ladder. There are different types of extending loft ladders available - sliding, folding, concertina; wood or aluminium - in different sizes to suit the size of the space available. The top of the joist level is the normal pivot point for the ladder.

Before buying a ladder, carefully measure your floor to loft floor height, then add 100mm (4") for the joists. Make sure there is enough space in the loft to store the ladder.

A good solution is a permanently fitted loft ladder that is hinged from a trap door opening (1) and can be folded up and kept out of the way in the roof space. Some ladders come complete with the hatch cover, frame and fittings.

Folding or sliding ladders come in two or three sections, with spring locks that hold the ladder in it's fully extended or closed positions.

Some ladders are fitted with a sprung power pivot arm that prevents the ladder from dropping down under its own weight. This also makes it easy to raise the ladder into the roof.

To accommodate a loft ladder, you may need to enlarge your existing hatch or create a completely new one, possibly in another area more suited to your requirements.

Enlarging an existing hatch

This is easier than creating a new hatch as you can see the joists are positioned and can mark the plaster area to be cut, from above, by piercing through with a bradawl. Hazards such as electrical cable can also be clearly seen.

Creating a new hatch opening

Ideally a hatch should be located above the landing if there's enough space for the ladder to be fully extended to the floor. The pitch of the roof should also be taken into account to ensure there's enough headroom and sufficient space above and behind the hatch opening to allow the ladder to be freely raised and stored.

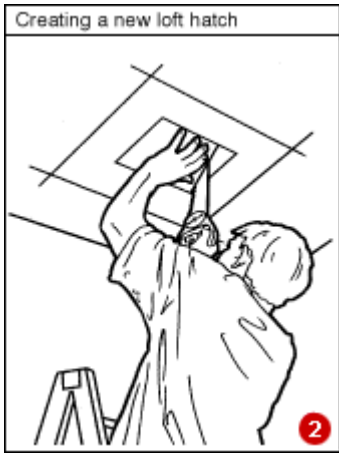
If you have already chosen a sliding or folding loft ladder the size of the new hatch opening should be specified by the manufacturer. Check the space required in the loft for the ladder to be stowed.

To create a sufficiently wide opening for both you and the ladder, you normally need to cut away a section of ceiling joist. In older houses, these are sturdy and usually spaced at 350mm (14") apart. Aim to cut no more than one joist. On some post-war homes it may not be necessary to cut any, as they may be spaced as much as 600mm (24") apart.

In modern houses the joists are more lightweight, however each one may play a fairly critical role, so it's advisable to check with a builder before proceeding to cut them.

Locate the joists by piercing the ceiling with a bradawl. Plot out the points where resistance is encountered to find the edges of the joists and the direction in which they lie. For a plasterboard ceiling use a metal detector to detect the nails in the centres of the joists.

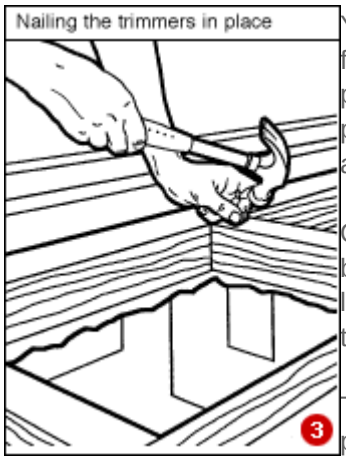
While working on the new hatch you will need a sturdy ladder, a good trailing light and a large dust sheet. Always turn off the electricity supply before cutting through a ceiling if you are unable to see what lies above.



Mark out the square for the hatch opening (2). Using a general purpose saw cut an inspection hole between two joists within the marked area, large enough to accommodate your head and the trailing light. This will allow you to inspect the area for hazards and space requirements.

Strip away the ceiling plaster within the marked area. Climb up between the joists and lay a board across them to support yourself. Then saw through the central joist with a fine toothed saw, cutting it back to 50mm (2") from the edge of the new opening at each end.

This will allow for the two 'trimmers' (lengths of joist timber that fit between the joists to form the two ends of the hatch opening). Allow for a 12mm (0.5") deep square housing where these will be fitted to the joists.



You must also allow for the facing boards (linings) of planed timber which will provide a neat finish all around the loft opening.

Once the trimmers have been nailed in place, the linings can be nailed over them (3).

The nail heads should be punched below the surface, and the holes and any damaged edges made good with filler in readiness for subsequent painting.

Nail a mitred architrave around the opening.

4 - Fitting the ladder

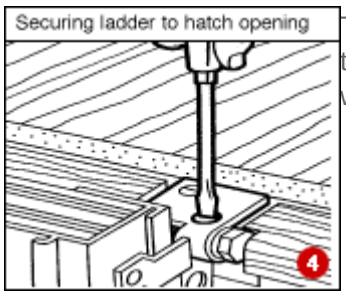
It is extremely important that before buying a loft ladder you carefully check the vertical distance between the top of the joists inside your loft and the floor on which the ladder will stand. It's a good idea to add 100mm (4") to this dimension to allow for the thickness of any future adjustments to stiffen the floor. Also check that there will be sufficient space for the ladder to swing below the roof as it is stowed.

Always follow the instructions provided with the loft ladder.

If the previous trap door was of the drop-in type supported by battens underneath the door, these battens must be removed and surface blemishes from nails or screws made good.

Either use the old door or, if it is flimsy or in poor condition, cut a new one from 12mm Water-proof Bonded Plywood (WBP). It needs to be hinged at the bottom of the lining to open downwards.

Check that you have 12mm clearance between the lining to the hatch and any architrave so that the door will hang clear. A push lock/release catch can be fitted at the other side to hold the trap closed.



The screws used to secure the ladder fixings to the top of the trimmer may be quite large (4). Do not attempt to drive them in without first drilling pilot holes into the wood.

5 - Insulating your roof space

Loft insulation should be considered in two stages. Firstly if you want to use the loft area for only intermittent storage, Building Regulations require that the ceilings of any rooms below an open loft be insulated to give a Thermal Resistance (R value) of at least 5m^2K/W, this is the equivalent of 200mm of fibreglass, and of most other insulating materials.

If your existing insulation does not have this thickness, an extra layer should be added to give good heat loss protection. If very dirty, it should be removed and replaced by 200mm thick rolls. Insulation that contains Miraflex fibre (Supawrap Pinkplus), is a very convenient way of doing this as it is encapsulated in a plastic tube, making it much easier to handle and prevent contamination by dirt.

For more information on the method of actually laying your insulation see our guide on 'How To' Insulate Your Home.

It's important that air is allowed to circulate under the roof. You can do this by making sure any insulation is at least 150mm short of the eaves, taking care not to block any eave ventilators.

It's also important to recognise that moisture will still rise in a well-insulated ceiling, causing condensation on the underside of the roof, unless a moisture barrier is put in place. You can of course reduce the amount of moisture in the house by ventilating bathrooms or installing a dehumidifier.

If you want to keep the area cleaner using hardboard or chipboard sheets on the rafters, you must tack a moisture barrier of 1000 gauge polythene sheeting to the rafters before securing the sheets.

If you are looking to use the space for residential or multiple uses then;

- Line the underside of the roof, to comply with the Building Regulations a Thermal

Resistance (R Value) of up to 5 is necessary. This can be achieved in various ways depending on the depth of the rafters. These are normally 100mm deep

- The space between the rafters can be filled with 50mm thick expended polystyrene foam sheets. This will leave the 50mm air space to the underside of the roof required to prevent dry rot forming in this area. A framework can then be built to carry a ceiling of plasterboard or chipboard 150mm below the rafters and the space filled with fibreglass.

  To further prevent moisture problems it is best to use plasterboard with a moisture barrier.

- The underside of the roof can be sprayed with polyurethane foam by a specialist and when complete the space between the rafters again filled with 50mm polystyrene. In this case the ceiling can be fixed directly to the rafters.

- This work will be subject to inspection by the Building Control Officer of your Local Authority.

Remember when insulating your loft to also insulate any water pipes and storage tanks. If your tank does not have a lid make one from plywood. Pipe insulation is available in pre-formed foam sections that clip onto the pipes. They can be cut to length with a craft knife.

6 - A light in your loft

A permanent light in your loft will enable you to see what you are doing and to find the items that are stored there more easily.

When choosing a loft light, take the size and height of your loft into account. In general, a fluorescent strip light at the apex of the roof will cast fewer shadows than a single light bulb.

Electrical circuits for the floor below should be readily accessible, so fitting a light should be fairly straightforward. If in doubt consult a professional Electrician.

Either fit a conventional light switch within easy reach of the loft opening or fit a pull-cord switch to the ceiling near the loft hatch so it can be operated from the floor below. A switch with a neon warning light will tell you if the light has been left on when the trap door is closed.

It is not always necessary to fit a permanent light in the loft if you are only using it for storage, and you may find an inspection lamp on a long lead, such as those used in the motor trade, is perfectly adequate. This can be suspended from a convenient spot or carried by hand.

Another option is small battery-operated lights located in spots where they're likely to be most needed, for example, by the cold water tank, or loft access hole. These independent light sources can be very handy when your mains power is cut due to household emergencies, such as burst pipes in winter weather. Keeping a torch handy just inside the access hole is also a very good and simple precaution.

7 - Boarding out

If your house has been built in the last 60 years then it's most unlikely that the ceiling joists will serve to carry only the lightest loads. If you want to board out the loft it is much better to either strengthen the existing joists or to put in new joists to carry the weight of the floor and

likely loads.

Plating on top with 100 x 50mm timbers can strengthen the existing joists. These should be screwed through to the joists below using a 140mm no.12 screw at 400mm intervals . This will serve for storage loads, but to carry residential loads you need to put in new joists 200 x 50mm at no more than 450mm intervals. They can normally be notched to sit on the existing wall plates and carried on any central beam. This work must be done to the satisfaction of the Building Control Officer of your Local Authority. A visit from the Officer will be useful to agree the details to be used.

Choose an overcast day to work in the loft. Bright summer sunshine will make it uncomfortably hot and in the winter it can get extremely cold.

Tongued and grooved flooring grade chipboard is available in two forms. Panels 1220 x 330mm that will enter through the normal loft hatches, or Sheets 2440 x 600mm which require larger openings. Use the largest sheets possible. Ensure that any board passes over at least three joists. As the ends of the panels are also tongued and grooved they can meet between joists, try to avoid this where possible.

Before starting, calculate the number of boards you will need. Part lengths should be counted as full boards as they must span at least two joists.

Before laying the boards, check that there are no junction boxes, cables or pipes that project above the level of the joists, as you don't want them to become trapped by the new floor. If possible, re-route these items away from the floor area or drill small holes in the joists to feed the wires through. Old nails or fixings that project above the level of the joists should also be removed.

Cut-outs in the joists reduce their strength and should be avoided wherever possible. If necessary you may have to make suitable cut-outs in the flooring to cater for fixed obstacles that you cannot move.

Work from one end of the loft and progress across the width. The second row of boards should be staggered so that end joints do not coincide. Where necessary cut boards to length with a circular saw or jigsaw, marking the exact lengths from the joist centres.

Avoid cutting with electrical power tools in your loft space, as the fine dust particles circulating in the confined space of a loft are a hazard to your health.

The boards should be fixed in place with 1.5in x No. 8 zinc plated screws. Drill 4mm pilot holes in the boards and countersink so that screw heads are flush with the boards or slightly recessed.

Make sure that the tongued and grooved joints are well seated together before fixing panels to the joists (5).

If you need to persuade the joints between two boards to fit together better, use a protective length of wood batten to spread the force of hammer blows. Chipboard edges, particularly edge joints, will be damaged by direct blows from a hammer.

As you fix each floor panel, mark it to show the run of any cable or pipes underneath - both for future reference and to prevent you from screwing into these items accidentally.

Levelling up joists to produce a base on which you can lay a floor is likely to be harder in older properties as they tended to be built of less standard materials, and the heights of the joists may vary. It's useful to have a few lengths of roofing batten on hand just to bring the odd joist up to the desired height, especially if you are using the standard 1220mm (4ft) lengths of chipboard flooring. On uneven joist heights these can be difficult to fit, so it's worth taking a little time and trouble to even up your joists before laying your floor.

Remember that you can nail your battens to the sides of the joist if you wish to raise the level (with the sufficient amount just standing above) and so get the exact height required.

If a joist is too high you can nail the batten (again on the side) but below the top of the joist and let the thickness of the chipboard make up the required amount.

Whichever method you use it is a useful precaution to leave small inspection covers about 1ft square, secured by screws over any points of potential trouble such as junction boxes and pipe unions.

It's worth re-routing electrical wiring so that it runs clearly on the surface. Always use a qualified electrician if you are in any doubt.

When fixing the panels, drill a 3mm tap hole through into the joist below. If this is not done the screws will become difficult to turn after a certain point, and the screwdriver may slip and rip the edges of the screw slots, making it impossible to drive them in.

Use candle wax rubbed on the threads of long screws to make them easier to drive in.