

Oxfordshire Fire & Rescue Service

Thatched property safety guide



**OXFORDSHIRE
COUNTY COUNCIL**

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Thatched roofing is enjoying a revival in the UK.

Roofing was traditionally made from several materials depending on location and availability.

Today, however, only three materials are widely used, long straw, combed wheat reed and water reed, all of which will burn rapidly in a fire.

This booklet has been produced by your local Fire and Rescue Service as a useful guide for house holders to help prevent a fire occurring.

This booklet should be kept close at hand and passed onto the new occupier should you move.

Although fires in a thatch roof are not common, over 90% start as a result of a faulty fire or chimney.

The thatch is designed to repel water and so for a Fire and Rescue Service this makes it a difficult task to extinguish such fires.

“Prevention is essential, detection is nearly always too late!”

What is heat transfer?

Recent research has identified that a major cause of chimney related thatched fires is attributable to heat transfer through the brickwork of the flue into the adjacent thatch. The government backed team of scientists from the National Society of Master Thatchers (NSMT) have conducted research into the use of straw and reed as a roofing material. In particular their research included an investigation into the causes of preventable thatch fires.

It was believed that the major cause of thatch fires was attributed to sparks or burning brands issuing from

the chimney and igniting the thatch. In fact, controlled tests have shown that it is difficult to ignite thatch with such a short-lived point of ignition as a spark. It is particularly difficult to ignite when the thatch is cold and wet; as is invariably the case when homeowners are lighting fires that send up sparks from the chimney.

Their experiments have shown that the temperature of the flue gases inside the chimney will heat the surrounding brickwork. The “hot bricks” of the chimney will heat the adjacent thatch around the chimney. Thatch is an extremely good insulator and the heat will be retained in the centre of the thatch around the chimney. The experiments showed that once a critical temperature of approx 200°C was achieved at the thatch

Causes

chimney interface, charring and pyrolysis of the thatch occurred and eventually developed into a roof fire. This process develops over longer periods of time.

Open fires and wood burners

Many thatched homes were built with single skin brick chimneys that rise centrally through a deep thatch layer.

They were designed to cater for open fireplaces, often smoking inglenooks, where large volumes of cooling air drawn from draughty rooms mingled with flue gasses as they rose through the flue. Diluted in this way, these flue gases did not reach sufficiently high temperatures to pose a threat to the thatch adjacent to the chimney. As the chimney traditionally emerged through the highest point of the thatch, any partly combusted particles were expelled

upwards and were extinguished before they drifted down towards the thatch.

Modern enclosed solid fuel appliances are designed to burn efficiently and cleanly. This means they burn at a much-increased temperature to promote a “clean burn”. Solid fuel stoves can generate flue gas temperatures in excess of 300°C to 600°C . When these appliances are fitted into elderly chimneys and there is only a 4-inch layer of brick between the flue and the thatch, then the thatch is especially vulnerable to risk of heat transfer. Modern chimney linings can prevent flue leaks, but they do not significantly reduce the temperature achieved by

heat transfer within the thatch when the appliance is in constant or regular use.

It has been shown in test that the thatch adjacent to the chimney can reach 85% of the flue gas temperature after only one day of continuous use. The critical temperature of 200 °C can be achieved and sustained with relative ease.

Chimney fires

Chimney fires can occur in any home with a working flue, including homes that have conventional tile or slate roof.

It should be remembered that soot is not merely a by-product of burning; it is a combustible material in its own right. A soot-lined chimney is a chimney lined with fuel just waiting to burn. Once ignited, the draught within the chimney can draw the fire into something akin to a jet engine exhaust. This extremely fierce combustion is capable of reaching such high temperatures that the

structure of the chimney can be significantly damaged. In a thatched home the conventional chimney fire carries the additional risk of igniting the roofing material.

Faulty chimneys

Old or poorly maintained chimneys can deteriorate to the point where smoke and hot gases can escape from the chimney into the upper rooms, the roof space or directly into the thatch.

There are several tell tale signs that indicate problems with the chimney. Any staining of the plaster work or wallpaper around the chimney breast, or black or brown localised deposits on

the chimney in the roof space should be taken seriously. Soot on cobwebs in the loft is another vital sign that something is wrong with the chimney.

Chimneys built before the 1960's, and this is true of most thatched homes, are most likely of a single brick thickness and parged, not lined. The internal protective parging or roughcast plasterwork will crumble and disintegrate with age, leaving the brickwork or stonework of the chimney exposed to the acidic condensate that is generated by modern appliances. The chemical reactions that subsequently occur accelerate the attack on the mortar and further deterioration can be rapid.

Because of the great age of many thatched homes, the construction of the chimneys can be highly unconventional. Period homes built before Building Regulations were introduced, often have timber lintels over the fireplace and timber joists built into the chimney stacks. These can be exposed to scorching when the protective parging inside the chimney disintegrates.

Seasoned wood

The combustion products from burning sap in “green” wood are the main cause of tar deposits within a chimney. When wood is properly seasoned

the sap content is substantially reduced and so is the tar. Apart from minimising the build up of tar, there is also a significant financial benefit of burning properly seasoned wood. With its lower sap content it gives off more heat and offers better value for money.

Irrespective of how dry the shed or garage is, storing wood inside will result in “sweating”. Any sap, which is drawn to the cut surface of the wood, will condense on the surface as opposed to being taken away.

Stacking it outside where it is exposed to the wind and sun properly seasons the wood. The wood should either be stored under a shelter or the top layer should be covered to protect the stack against excessive rain.

Height of chimney

A chimney with only a little part of the stack visible, is likely to be buried in deep thatch, raising the chimney stack does not reduce the risk of fire.

Old properties can have thatch at the eaves up to 10ft deep, making this a property at risk. One meter or more of thatch round a chimney is a potential hazard, at the time of re-thatching work with the thatcher and the conservation officer to have recent layers of thatch removed to reduce the risk.

Spark arrestors

In the past, accepted wisdom largely dictated that a major cause of fires in thatched homes was attributed to sparks issuing from the chimney and igniting the thatch.

As a consequence, many owners of thatched homes were persuaded to install spark arrestors on working chimney pots. Although we do NOT recommend spark arrestors on chimneys, if they are installed they must be kept clean.

In a recent survey by the team of scientists from NSMT, it was found that of all the thatched properties

investigated, which had suffered chimney related fires, many had some type of restrictor on the roof. This was often an clogged spark arrestor.

If a spark arrestor is fitted or is going to be fitted it must be kept clean to allow it and the chimney to work efficiently. The National Association of Chimney Sweeps recommend that if a spark arrestor is fitted to a chimney in regular use, the chimney should be swept every 3 months and the spark arrestor taken down and thoroughly cleaned.

Heat detectors

There are systems available, which use heat detectors inserted into the thatch around the chimney connected to a control panel.

The system is designed to give an audible warning when the brickwork and thatch around the chimney approaches a critical temperature. Installation costs and an annual maintenance program need to be considered, together with a risk management strategy to be adopted when an alarm is given.

The system is designed to

give an early warning of a potential overheating of the thatch so measures can be taken to reduce the temperature of the chimney i.e. extinguish the fire in the grate and inspect the chimney.

The Dorset model

Working in close association with the fire service, thatcher's, builders, electricians, insurers, scientists and building control divisions throughout the county of Dorset have grappled in recent years with planning demands for new thatched properties to be built.

As a result a design guide has been drawn up called the “Dorset model”, which meets the criteria of all the specialist advisers appointed to the technical committee.

By following this design guide it is possible to build a new house with a thatched roof.

Some of the principles in the “Dorset model” could be considered if any major renovation work or re-roofing is planned. Consideration could be given to:

- Construction a fireproof barrier between the roof timbers and the thatch layer. The thatch would be viewed as “sacrificial” in the event of fire and the fireproof barrier would help stop the roof fire from getting into the structure of the house. This would therefore drastically reduce

the effect of a thatch roof fire.

- Insulating the flue of the chimney to reduce the risk of heat transfer.

Tar removers

The build up of tar deposits within the flue can increase the risk of a chimney fire.

Tar deposits are encouraged to form, particularly when burning wood, when hot flue gases condense in the cooler parts of the chimney. As the coolest region is the uppermost section of the flue, ignition of the tar at this point represents a serious threat to thatch.

There are chemical products available that can be applied to the embers of the hearth fire or firebox in a stove to dry out the tar deposits in the flue and cause them to disintegrate.

The treatment should be repeated at the recommended intervals to prevent new deposits from forming. Routine sweeping and scraping of the flue will be required, especially where heavy tar deposits persist. A qualified chimney sweep will be able to give you further advice regarding the best products to suit your particular requirements.

Stove pipe monitors

Careful management of any solid fuel or wood-burning appliance is an effective way of reducing the risk of heat transfer from the chimney to the thatch.

Using stovepipe thermometers to monitor the temperature of the flue gases leaving the appliance gives a good indication of how high the temperatures in the upper part of the chimney will be. The fire box can be suitably managed to ensure that the flue gas temperature is not excessive (approx 200 °C) at the level of the thatch.

Chimneys

Chimneys should be checked or surveyed to ensure that they are structurally sound, well maintained and able to cope with the demands made of them by modern heating appliances.

The first measure is to ensure the chimneys are regularly swept by and experienced and preferably qualified chimney sweep, who should be able to identify potential problems at an early stage.

If a chimney lining has been installed, this should be internally inspected at intervals, especially when the main fuel burnt is wood, as

tar deposits are highly combustible and corrosive. The majority of chimney linings were not designed with a thatch home in mind. Metal liners are vulnerable to corrosion and do not have a long life expectancy in association with wood burning appliances. CCTV can be used to inspect the internal condition of the flue. Potential hazards can be identified, diagnosed and remedies prescribed by a qualified chimney engineer.

One way of addressing the risk of heat transfer from the flue to the thatch is to use an insulated flue liner. There are a number of insulated flue liners available on the market. Metal liners are available with insulation or an infill can be used around the liner. This

infill is an insulating material such as “vermiculite” or “pumice”. Clay liners can be used or there are preformed cement modules incorporation kiln burnt and pumice aggregate. These have very good thermal qualities.

Whichever type of lining is considered, the chimney should be scrupulously cleaned prior to installation to remove combustible deposits that otherwise might ignite between the lining and the flue. A competent chimney engineer who understands the special risks associated with thatch properties should install any linings.

Fire plan

Make sure all your family know what to do in the event of a fire and how to escape safely.

Your fire plan should include:

- Planning your escape routes and keeping exits clear.
- Keeping door and window keys handy.
- Considering how a fire in your house will be detected. Have you got a sufficient amount of smoke alarms and are they in the correct position?

Smoke alarms

We strongly recommend that you fit smoke alarms in your home and test them weekly.

- Fit a smoke alarm on every floor of your home, ideally in the hallway or landing ceilings.
- Alarms are available with 10-year batteries.
- Put a smoke alarm in the loft space and link this to others inside the house.
- Don't put a smoke alarm in the kitchen where it can be set off accidentally.
- Get into the Test it Tuesday

routine and make sure your smoke alarms work by testing every Tuesday.

- You can follow OxonFireRescue on Twitter or Oxfordshire Fire and Rescue Service (Official) on Facebook to receive a free "Test It Tuesday" reminder.
- Alternatively Safelincs have created a free reminder service for smoke alarm testing. They will send you either a SMS text message or an email to remind you to test your smoke alarm. The Safelincs service is free and can be cancelled at any time. To register for this service please visit www.safelincs.co.uk

- Or you can download and print off a 'test your smoke alarm tracker' from www.365alive.co.uk and display in your home. Tick off each time you test your alarms.
- Never fill chip pans more than one-third full of oil.
- Consider a thermostatically controlled deep fat fryer.
- As a CFS (Community Fire Safety) department we do NOT recommend fire extinguishers to be used in the kitchen.

Kitchens

Two-thirds of fires that start inside the house relate to the kitchen.

Consideration should be given to:

- Keeping items that can catch fire easily, such as tea towels, oven gloves, away from cookers and toasters.

Electrics

Check for signs of loose wiring and faulty plugs or sockets, such as scorch marks or flickering lights.

Replace any worn or taped-up cables and leads.

Don't overload sockets

Consider having your electrical system checked by a qualified electrician in accordance with the Institution of Electrical Engineers (IEE) guidance. If your incoming power supply is overhead, check to see if it is the insulated type. If you are in doubt your power supplier can give you further advice.

Contractors

If you are having any work done on your house that will involve “hot works” such as plumbing or paint stripping, make sure the

contractors are fully aware of the potential risk of a thatch fire.

Bonfires

It is always good practice to limit the number and location of any bonfires to reduce the risk of fire to your property. It is also a good idea to discuss this with any neighbours who have a bonfire near your property.

Water supplies

Assess the water supplies to your property. Consider having an outside tap with enough house pipe to reach

around your house including the roof. This will help you control any small fire you discover. Only tackle a fire if it is safe to do so.

Heat sensors

There are systems available, which use heat detectors inserted into the thatch around the chimney connected to a control panel. They are designed to give an early warning if the thatch is overheating. The fire in the grate can then be extinguished to allow the chimney and the thatch to cool down.

Sprinkler systems

In recent years there have been many advances in domestic sprinkler systems. The life safety advantages and the extra property protection can be considerable.

Summary of advice

- **Recent research has shown the major cause of fire in thatch properties is heat transfer from the chimney into the thatch. The thatch then reaches its ignition temperature and a roof fire can develop.** It is important to insulate the chimney flue to prevent the heat from transferring into the thatch layer. This is especially important when a solid fuel or wood burner is installed as they burn at higher temperatures than conventional open fires.
- **Have the chimney inspected by a qualified chimney engineer.**
- **Have the chimney swept regularly by a qualified chimney sweep.** A chimney in regular use should be swept twice a year.
- **Only burn seasoned wood.**
- **If you have a spark arrestor fitted clean it regularly. This should be done every 3 months on chimneys in regular use and the arrestor should be taken down to clean.**
- **Smoke alarms should be installed throughout your home.** If you have a loft space then an interlinked smoke alarm should be installed which is linked to at least one other within you home.

- **Develop a fire plan for your home.**
- **Check the electrical system throughout your home.**
- **Be careful when using blowtorches or heat guns (when plumbing or painting etc).**
- **Restrict the use of bonfires near to your property.**
- **Consider a system of heat sensors within the thatch around the chimney.** This will give you an early warning of any overheating of the thatch.
- **Install an outside tap with enough hose to reach around the house including the roof.** This can be used to extinguish any fires at an early stage.
- **Residential sprinkler systems will greatly improve the fire precautions within your home.** The advantages will be much better life safety and property protection.
- **If you are undertaking renovation work or re-roofing, consider forming a fireproof barrier between the roof timbers and the thatch layer.** Any thatch fire will then be mainly restricted to the thatch and will not get into the structure of the house so greatly limiting the damage from fire.

The contacts listed will give you specialist information regarding their products.

Please go to the back cover for local Fire and Rescue contact details.

National Association of Chimney Sweeps

www.chimneyworks.co.uk

National Fireplace Association

www.nfa.org.uk

English Heritage - Listed buildings/graded properties

www.english-heritage.org.uk

The National Society of Master Thatchers (NSMT)

www.nsmtltd.co.uk

Local area Fire Prevention Officers

www.firekills.direct.gov.uk

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www.365alive.co.uk**



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