

THE NATIONAL SOCIETY
OF
MASTER THATCHERS LTD



Fire Prevention in Thatched Homes

**PREVENTION IS ESSENTIAL - DETECTION IS NEARLY ALWAYS
TOO LATE**

“IF YOU ONLY READ ONE PAGE MAKE IT THIS ONE”!**SUMMARY**

(sheet 1 of 8)

Properties most at risk:

Old properties with deep thatch, particularly those constructed pre-1960, are incompatible with the installation of modern wood burning stoves particularly in traditional chimney breasts. In some at risk properties there is no safe way to use a wood burning stove; choose an alternative, open fire, oil gas or electric enclosed fire. In thatch a fire, once alight, is almost impossible to control. Chimney fires are high risk for properties with a thatched roof, but for all wood burning stove users there are common sense preventative actions that can be taken.

Chimneys:

- Modern multi fuel stoves fitted into old fire places and inglenooks can compromise chimney safety and cause a fire in the thatch.
Action: **Get the installation and chimney construction checked. Use an alternative heater**
- Sweep the chimney twice a year.
Action: **Sweep in October sweep again in February – March. The most thatch fires occur in April.**
- Birds love to nest in open chimney pots and can fill a chimney with flammable sticks in a very few days.
Action: **Fit a bird guard.**

Using a log burner safely:

The only safe fuel is properly seasoned wood, wood should ideally be cut in year one stored in year two and used in year three. An alternative is to buy kiln dried wood from a reputable supplier.

- Action: **Check wood moisture content is below 20%, using a probe (obtainable from any builders merchant) Or buy professionally kiln dried wood. Store in a dry airy place.**
- Use a chimney thermometer to optimise burn conditions. Too hot will compromise the temperature gradient between chimney bricks and flue gases even with a liner. Too cold will allow a build-up of tar, which if left can cause chimney fires.
- Action: **Never burn rubbish or treated timber.**

Look for the warning signs:

- Stoves are not incinerators; do not burn any waste materials.
- Chemically treated timbers and building waste will produce tar.
- A properly managed fire, using the correct fuel will not blacken the glass.
- Look at bird guards and spark arrestors, if they are black there will be tar build up in the chimney which could ignite (This is the most common cause of chimney fires and is completely avoidable).
- Soot is a powder; any lumps indicate tar formation in the flue.
- Be aware a fire can burn unseen in a deep thatch for several days before it is detected.

PREVENTION IS ESSENTIAL - DETECTION IS NEARLY ALWAYS TOO LATE

STOP CHIMNEY FIRES IN THATCHED PROPERTIES

(Sheet 2 of 8)

A quintessential “*Chocolate box*” thatched house is a unique feature of the UK country landscape. Add a glowing wood burning stove on a chilly spring evening and the picture becomes a rural dream for some lucky (or unlucky) families; that dream combination is not without extreme risk for the unwary. A chimney fire is wholly preventable. In a thatched property, a fire in the chimney can easily spread to the thatch and once alight thatch is very difficult, almost impossible, to put out. The damage caused in dealing with a thatch chimney fire can be devastating.

Records taken over many years show March to June, is the most likely time to experience a chimney fire. Peak times are during cold spring bank-holiday weekends, after the central heating has been turned off.

There are two causes of chimney fires, nesting birds and using unsuitable material as fuel.

Bird nests: a determined pair of Jackdaws can fill a chimney with large twigs and sticks in a surprisingly short period of time. Next time a fire is lit below, the



sticks can catch fire when this happens, burning brands can be ejected onto the thatch. An essential precaution is to fit a bird guard, your thatcher or local chimney engineer will advise. A clean bird guard indicates that properly prepared and stored fuel is being used.



The protected chimney on the left has been in regular use over the past 12 years. The one on the right is next door and has been used for only two years; the owner burns treated builders’ rejects.

Selecting fuel for a wood burning stove: Wood burning stoves are not incinerators. The only safe fuel is properly seasoned wood. All wood should be stored in a position that allows free air circulation, protected from rain and adverse weather. Inappropriate fuel will cause a rapid build-up of flammable tar in the liner.



Blockages and Chimney fires: Water vapour combines with other gases and particles going up the chimney and unless the chimney is kept warm, the condensation forms a creosote-like substance which hardens to form tar on the surface of chimney liners and may seep into brickwork in an unlined chimney. The picture (left) is a blocked liner after only one year of burning chemically treated builders’ timber off-cuts.

Chimney sweeping: Regular cleaning and sweeping is essential. The chimney must be swept at least twice a year when logs are used and more often if they are constantly used. A sound, unrestricted

chimney flue is essential to the safe operation of the stove. Tar is flammable. In thatched properties sweep the chimney in the autumn and in February. Look for the warning signs, soot is a powder, it looks like black granulated sugar, and lumps are tar.

SELECTION OF HEATING FUEL FOR WOOD BURNING STOVES

(Sheet 3 of 8)

The majority of thatch fires are chimney related, and most often associated with the installation and use of modern wood burning stoves. The potential for a fire is entirely dependent on understanding and managing the risks during the design and installation process and the subsequent selection of the correct fuel.

Choice of wood as a fuel:

The commonly available and most suitable hard wood types are Ash, Beech, Birch, Blackthorn, Elm, Hawthorn, Hazel, Hornbeam, Maple, Oak, Rowan, Sycamore, Wild Cherry, Willow, Alder, Apple, Pear, Holly. Wood is divided into two main categories, hard and soft. A rule of thumb is

Unseasoned logs cost you money and increase the risk of flammable tar build up in a flue.

33 logs at 60% moisture content are required to produce an equivalent heat output of **10** logs with a moisture content of 25%.

Never burn recovered chemically treated building off cuts.

that around twice as many softwood logs as hardwood logs may be required to achieve the same heat output. Softwoods, (conifers) include spruce and pine, burn much faster than hardwoods and have a tendency to spit and crackle. Freshly harvested wood contains a naturally high amount of water, between 65-90% depending on the species. Removing the water is known as seasoning. This term suggests a period of time, and for natural air drying up to two years is recommended. The

more efficient a fire burns, the less fuel is required and less flammable tar is deposited.



It is important that logs should be dried and stored under cover for a minimum of a year to get the moisture content down; this releases more heat energy per log into the room and reduces the amount of creosote and tar deposits in the chimney.

The correct fuel uses only well-seasoned wood with a moisture content <25%.



Potential dangers from burning inappropriate fuel.

Black smoke is a sure sign of burning the wrong fuel. The pub on the left has experienced 3 chimney fires in the past 12 years.

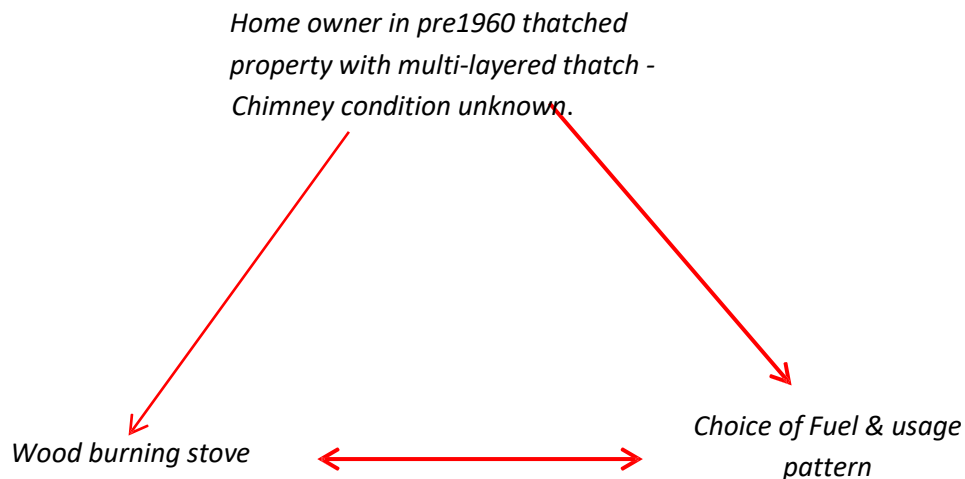
A correctly set stove, burning kiln dried wood will burn cleanly. Note the temperature gauge on the flue, which manages optimum operating temperatures



Correct efficient use of a wood burning stove

Problems caused by using the wrong fuel:

- Wet logs cause a chimney to cool, condensation occurs and a residue is formed. This residue is brown or black and can be flaky, sticky, runny, tar-like or hardened and will sometimes be all of these in the same flue. This tar is flammable.
- The chimney may become completely blocked or the volatile residue can ignite causing a dangerous chimney fire.
- Corrosion, excessive condensation from wet wood which normally forms in the upper part of the chimney is acidic in nature and will corrode the inner surface of a metal liner, eventually leading to perforation and failure of the liner.

**The Classic ‘at risk’ thatch fire scenario:**

The safe use of a wood burning stove in a thatched property is totally dependent on the responsibility of the user in understanding the risks associated with a modern wood burning stove installed in a traditional single brick chimney. New buildings with thatch are safer as some known problems have been designed out.

PROPERTIES MOST AT RISK FROM A FIRE IN THE THATCH

(Sheet 4 of 8)

Owners of listed thatched properties have a responsibility and duty of care to protect their precious thatched buildings. “Chocolate box” style thatched houses with multi-layers of historic thatch are unique to the United Kingdom, but it is this very design, coupled with a wood burning stove that has made England the thatch fire capital of the world. Open fires or oil/gas enclosed appliances in properties with thatch are considerably safer than an enclosed wood burning stove. The property below had two wood burning stoves as the sole source of heating. The hidden poor condition of both chimneys meant this property was at risk.



Every year, between 50 and 80 thatched properties will experience a serious fire. Almost all of them are older properties, pre-1960. Listed properties with deep straw thatch are the most at risk. In many such properties, ancient chimney construction makes them incompatible with the installation of modern stoves. In some at risk properties there is no safe way to install and use a wood burning stove.

Since 2008 there have been at least 450 serious fires in properties with a thatched roof; this is equivalent to the devastation of one family per week losing their home, and the irretrievable destruction of heritage. Media reports of a roof suddenly bursting into a sheet of flame are an accurate account of what happens when a fire deep inside thatch is fed by oxygen from the surface, which causes the fire to flash over the roof. The thatch may have been burning for many hours before the fire is detected. The majority of thatch fires occur from September to Easter; particularly during cold snaps in bank holiday periods. Fires are associated with modern enclosed stoves, inappropriate fuel, a build-up of tar in the flue, cold snaps during holiday periods. Once alight thatch fires are almost impossible to control with salvage the only option for the Fire and Rescue Service.



The detail on the left, shows the positions of layers of thatch which have built up over the years. It also shows the missing brick, which would have been hidden between the thatch layers. The wood burner fitted in this chimney had no liner and the tar indicates leaking flue gases into the thatch.

The chimney on the right was also fitted with a wood burner, again with no flue liner. The chimney had no bricks, only a plaster construction, the chimney cracked with the heat. Both of these flues were an accident waiting to happen, and with a neat thatched roof the serious structural faults would have been hidden.

(Easter 1996)



The pictures are details from the featured property and are an example of the damage caused from a thatch fire and also illustrate the hidden dangers and the difficulty in knowing where the fire started and the exact cause.

Thatch was a common roofing material long before chimneys were invented, with the obvious consequence of numerous thatch fires. The invention of the chimney reduced the risk but introduced a new range of issues and causes for fire in thatch. Because of the age of many thatched properties, chimney construction can be “unusual”. Some chimneys might be built off a cob breast, causing them to lean, and others might have lath and plaster in-fills where old fire places have been closed. Homes built before the introduction of the Building Regulations may often have timber lintels over a fireplace and timber joists built directly into the chimney stack; these can be scorched as protective pargetted linings disintegrate. Any chimney built before 1960 is likely to be constructed of single thickness brick work and pargetted but not lined. This type of internal sealing of the brick work will crumble with age after which further erosion of the brickwork and mortar will be assisted through acid condensation from flue gases. Even with a flue liner these chimneys are unsuitable for the installation of a wood burning stove.

COMMERCIAL FIRE PROTECTION DEVICES

(Sheet 5 of 8)

There are no devices on the market which can remedy inappropriate installations and irresponsible practices. To put the selection of various commercial devices into context, no device is a substitute for proper maintenance, good practice and a thorough understanding of thatch fire risk management. Remember when seeking advice, it is often being given by someone trying to sell you something! Smoke alarms are essential for the preservation of life, but by the time they have detected smoke, it will be too late to save the property.

As thatch is classified as a flammable material Approved Document J requires (in Paragraph 2.18 Separation of Combustible Materials from fireplaces and flues) *“Combustible material should not be located where it could be ignited by the heat dissipated through the walls of fireplaces or flues”*. Compliance with Approved Document J of the Building Regulations requires that any work carried out on an appliance or chimney is notifiable to the local authority (usually via the HETAS compliance certificate). A material change of any part of the combustion system (appliance or chimney) will require the complete combustion system to be brought into compliance with current Building Regulations. When buying a property, make sure any compliance certificate is available and current before lighting the fire.



There are only two safety products worth considering. On the left a 6 mm aluminium heat sink inserted during re thatching between the chimney and the thatch. On the right a chimney temperature monitor which helps users manage the stove at a consistent efficient combustion temperature.

- Bird Guards: are essential and should be fitted on all open chimneys.
- The current design of spark arrestors offer little benefit and can add to the risks.
- Historic England advice does not permit the removal of any thatch layers. Taking off a couple of the most recent layers would reduce risk and improve the effectiveness of fire-fighting.
- Increasing the chimney height will not solve any problems. It could create new ones including structural damage.
- Do not install or use a wood burning stove.

BE PREPARED – IF THE WORST HAPPENS!

(Sheet 6 of 8)

The primary purpose of any fire safety advice is to protect life. The advice given here is provided by the Department for Communities and Local Government, Crown copyright 2005. For additional information visit: www.firekills.gov.uk

What you should do:

- **Fit smoke alarms:** where you can hear them, check the batteries every week & make sure batteries are changed annually.
- **Make an escape plan:** all family members & visitors need to be aware of the plan; it should be displayed in a prominent position and reviewed regularly.
- **Know where the keys are kept:** Door and window keys may need to be located in a hurry. Agree with everyone in the household where keys are to be kept & keep them there.
- **Keep escape routes clear:** The best escape route is the normal way in and out of the house, choose a second route in case this one becomes blocked by fire. Keep routes clear of obstructions.
- **Pre-prepare a list of valuables and their location:** a thatch fire will take a long time to bring under control the fire service is good at salvage. Prepare a salvage plan in advance.

In a fire

- **Keep calm & act quickly.** Alert everyone – get everyone out!
- **Don't waste time investigating,** thatch fires are misleading don't try and tackle it yourself.
- **Call 999:** don't go back inside wait outside for the fire and rescue service.
- **Shut doors as you leave.**

If there is a fire.....

**Get Out
Stay Out
Call 999**

In these times of fear of crime, it is easy to be very security conscious with all doors and windows securely locked. Security systems should not compromise safety. All family members should know the escape plan, where keys to locked doors are kept and how to open doors and windows for escape purposes in any moment of crisis. Planning ahead is essential.

Fire prevention officers understand thatch. Every thatched property is different, Fire Officers can advise you on the best precautions for individual situations **do register your details with your local fire and rescue service.** The Service can be prepared in advance to know what to expect for your property and will then be in the best position to manage the situation.

To avoid injury and to do the best for you and your property, fire fighters need to know in advance:

- The exact location of your property, particularly if you live in a rural area and the property is isolated.
- The exact location of the nearest usable water supply.
- The history of the property and the likely volume of thatch they are going to have to deal with.
- Location of any gas bottles.
- The structural stability of any chimneys.
- If your property is protected by fire board, beneath the thatch.

The officer in charge will decide a strategy based on local conditions. Water damage from fire-fighting can be worse than fire damage. Firemen are good at salvage; decide beforehand which are

your most precious possessions and where they are located. Whatever happens, be prepared for a mess!

Once alight, thatch fires are almost impossible to extinguish; the success or failure in controlling a fire is early detection, and an advance understanding by the Fire and Rescue Service of the roof structure. A thatch fire requires a long time to bring under control; and this can allow fire crews time to remove possessions. In assessing the aftermath following a thatch fire, a successful outcome for fire fighters is not too much water damage, a part of the roof still in place and most of the personal effects carefully salvaged. Because burning thatch is so difficult to control owners are advised to be prepared for a serious mess. Fire-fighting will be based on damage limitation.

If safety and circumstances allow, fire fighters will endeavour to cut a break ahead of the spreading fire. Because the fire can develop unseen, and deep in the thatch it is difficult to estimate exactly where to cut a break for it to be effective. Pouring water on a burning thatched roof has little cooling effect towards fighting the fire; thatch is designed to shed water and water will penetrate less than 3 centimetres.

In the majority of cases after a serious thatch fire, families can expect to be in alternative accommodation for a minimum of a year and on most occasions for very much longer.

HOW WELL DO YOU UNDERSTAND YOUR LOG BURNER AND CHIMNEY? Sheet 7 of 8)

Check your score to determine your risk levels and understanding on the potential for a fire in your thatched property. By completing the form below and adding up the score can provide a guide to measuring the risk associated with the particularly type of heating installation in your home.

APPLIANCE			
Wood-burning stove (More than 6 years old)	Y	N	+ 4
Wood-burning stove (1 to 5 years old)	Y	N	+ 3
FLUE			
Not lined with stove	Y	N	+ 6
Solid fuel flexible liner	Y	N	+5
Rigid single wall flue pipe	Y	N	+ 5
Rigid twin wall insulated flue (more than 11 years old)	Y	N	+ 4
Rigid twin wall insulated flue (less than 10 years old)	Y	N	+ 2
No knowledge of flue lining age and type	Y	N	+ 6
INSULATION			
Clay/pumice solid block liner	Y	N	- 2
Stack vented top & bottom	Y	N	- 2
TERMINATION			
Less than 1800 mm from roof surface	Y	N	+ 5
Spark arrestor	Y	N	+ 5
No pot no bird guard	Y	N	+ 4
Other type of cowl	Y	N	+ 4
FUEL			
Unseasoned wood and builders waste	Y	N	+ 8
Seasoned wood	Y	N	+ 3
Smokeless fuel	Y	N	+ 2
Gas/oil Other	Y	N	0
OTHER			
Tar on inside of flue	Y	N	+ 5
Tar on inside of chimney	Y	N	+ 5
Chimney / flue not swept regularly	Y	N	+ 4
Appliance not serviced regularly	Y	N	+ 3
Rope seals damaged / not replaced	Y	N	+ 4
Appliance installed incorrectly	Y	N	+ 20
Flue system touching / too close to inside brick	Y	N	+ 15
Chimney brickwork in poor condition	Y	N	+ 5
Clean bird guard fitted	Y	N	- 3
Tar coated spark arrestor	Y	N	+4
Multi-layered thatch (straw)	Y	N	+8
TOTAL Y Score			

Total = 0 - 10 Low Risk, 11 - 20 Med Risk, 21 - 30 high Risk, 31 + Very High Risk.

Any don't knows consider further investigation or add 6 to the score.

SOURCES OF INFORMATION AND FURTHER READING

(Sheet 8 of 8)

Angold R.E., Sadd P.A., Sanders M., (1998) *Fire and Thatch*. Project Report for Partners in Technology Number: CI 39/3/2866. Specifications for Materials and Treatments of Thatch Volume 1. Now available through the National Society of Master Thatchers

Angold R.E., Sanders M., (2007) *Managing Fire Risk in Historic Thatched Buildings*. Journal of Architectural Conservation Vol.13 Number 3 Pages 59 – 72.

Angold R.E., Sanders M., (2012) *Thatches and Thatching a handbook for owners, thatchers and conservators*. Crowood Press ISBN 978 1 84797 321 4

Benjamin K. (updated 2016) *Fire in Thatched Buildings*

<http://www.burgoynes.com/articles/2013/12/fires-in-thatched-buildings>

Building Research Establishment Action Sheets Crown Copyright (1989) HMSO

Domestic chimneys: re-building or lining existing chimneys.

Domestic chimneys: solid fuel – flue installations.

Repairs or rebuilding masonry chimneys (Sept. 1990)

Surveying masonry chimneys for repair or rebuilding. (May 1990)

Dorset Building Control Technical Committee *The Dorset Model* The Dorset Model is prescribed in Approved Document B of the Building Regulations when dealing with issues of external fire spread.

The Dorset Model can be downloaded from: <http://www.dorset-technical-committee.org.uk/>

Forestry Commission website www.forestry.gov.uk

Glockling L D. (2015) *Fires in Thatched Properties with Open Fires and Wood Burning Stoves*. Fire Protection Association

Henry A, Glockling L D. (2017) *Fires in thatched Properties*. IHBC Conservation Directory .

HETAS, (2009) *Chimneys in Thatched Properties*

National Society of Master Thatchers (2017) *Thatch Fire Prevention Advice Notes* (sheets 1-8)

Pratt P., (1998) 1:735 John Albion & Partners, Norwich

Solid Fuel Technology www.solidfuel.co.uk

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