

## FIRES IN THATCHED BUILDINGS

Updated to include the 2010/2011 heating season, 61 fires in total

Burgoynes investigates around 25 thatched building fires a year and whilst thatch fires represent a small proportion of building fires as a whole, the losses are disproportionately high. This is because thatched properties are generally of higher than average value and are frequently listed structures, leading to high repair



costs. In addition, fires in thatch are difficult to extinguish and tend to be in remote locations, with inadequate water supplies, leading to increased damage.

Whilst a few thatch fires are a result of the spread of fire from elsewhere inside or outside the building, the association with chimneys serving solid fuel fireplaces, stoves or ranges has been recognised for some time. Traditionally, it was assumed that the thatch was ignited by embers emitted from the chimney but this assumption was challenged by the work of Angold, Sadd & Sanders at RHM Technology Ltd, as described in their report “Fire and Thatch” (1998)<sup>1</sup>. This highlighted the possibility of heat transfer through the chimney structure into the thatch, thus causing ignition. Although no actual cases of high temperatures in thatch in buildings with chimneys in use were demonstrated in the report, this heat transfer theory has gained

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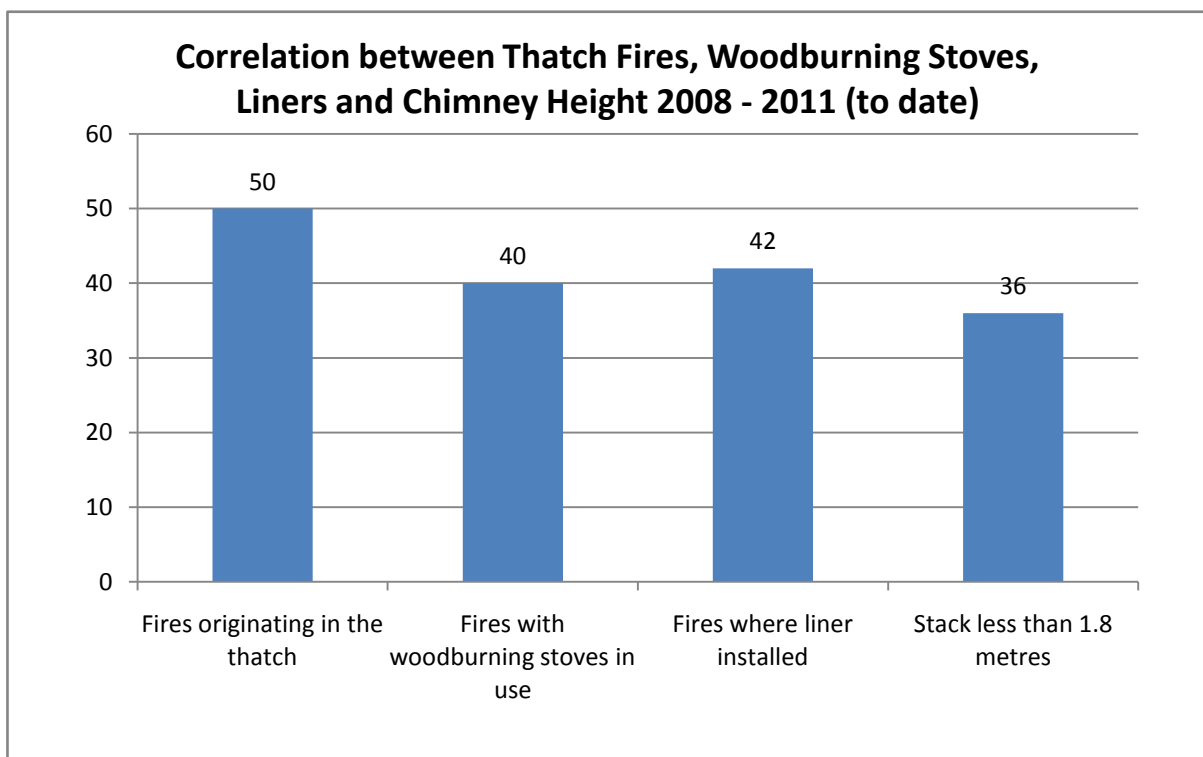
<sup>1</sup> Fire and Thatch. Project Report for Partners in Technology Project Number: CI 39/3/2866. Specification for Materials and the Treatment of Thatch. R.E. Angold, P.A. Sadd & M. Sanders

widespread acceptance over time amongst those with interests in thatch fires including Fire Brigades and Local Authorities. Hence advice that “**more than 90% of fires in thatched properties are caused by faults in the flue or chimney**” appears on some Fire Brigade websites.

With the above in mind, a review has been undertaken of the 61 thatch fires investigated by Burgoyne nationally between 1 January 2009 and 18 June 2011. These investigations have been undertaken by a number of Burgoyne forensic scientists and engineers, but predominantly by those in the Midlands, East Anglia, South East and South West. Of the 61 thatch fires, 50 originated in the thatch and of those there was a strong association, as expected, with wood burning stoves (40) or open fires (7) in use. In the remaining case there was no fire alight but a bonfire was taking place close to the building.

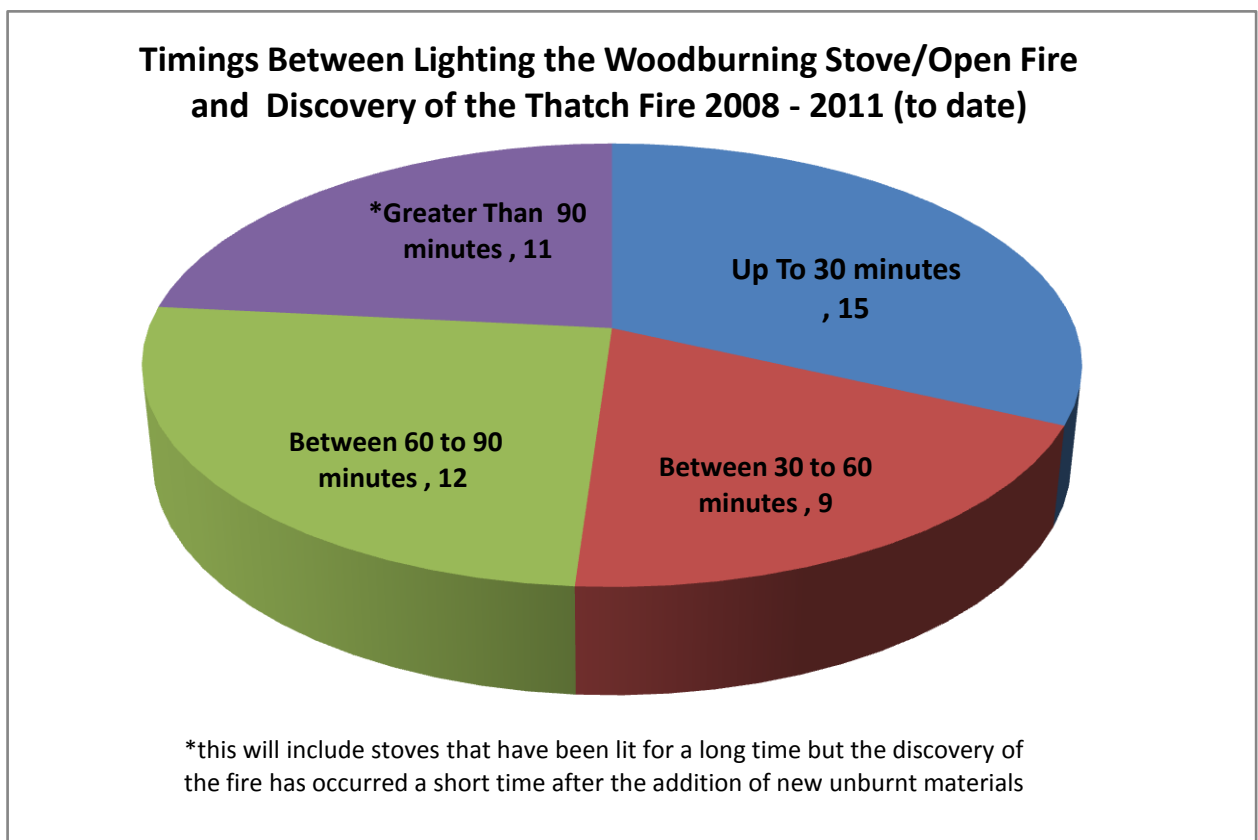
Flue liners were present in all 40 cases involving wood burning stoves (see figure A) and one open fire was connected to a liner, which was to be expected since in recent times a liner has almost always been fitted along with the stove. In 36 of those 40 cases, the chimney was less than 1.8 metres high, the minimum height specified in the Building Regulations 2000 for combustible roof coverings, including thatch.

**Figure A**



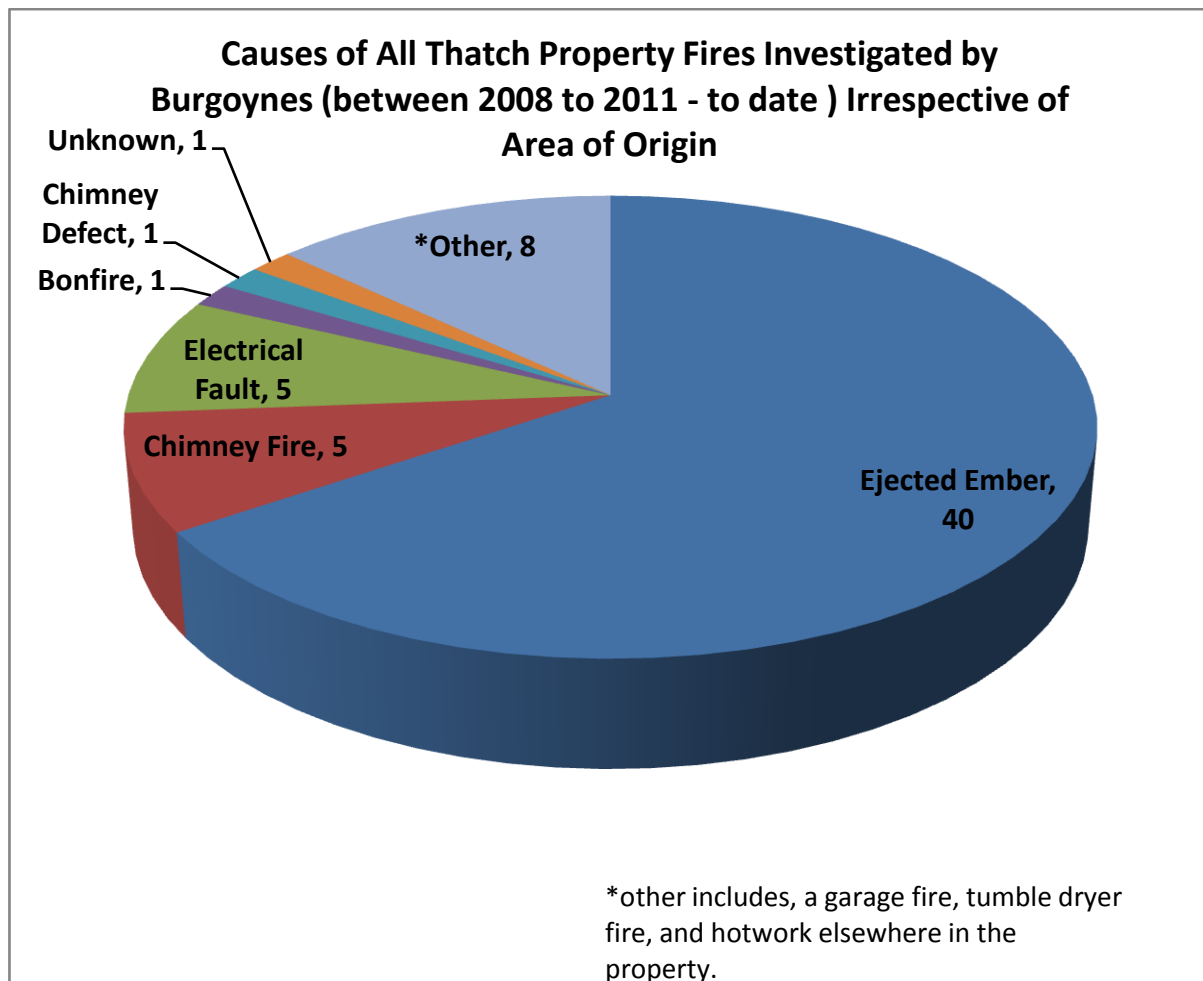
The time between the lighting of the stove or fire and discovery of the fire was also examined and out of the 40 fires, 15 occurred within 30 minutes of lighting, 9 between 30 and 60 minutes and 12 between 60 and 90 minutes (see figure B). **Thus a total of 36 of the 40 fires occurred within 90 minutes of lighting, a very striking statistic.** Moreover, in a number of other instances, fuel had been added to an existing fire within 60 minutes of discovery. A further factor was that in 5 cases a chimney fire was reported.

**Figure B**



Looking at all of the 61 investigations (see figure C), by far the most common cause identified by Burgoyne's was an ejected ember (40), with the next most common being chimney fire (5) and electrical (5). A chimney defect was only identified in one case.

**Figure C**



As stated previously, the association of thatch fires with wood burning stoves was to be expected but the occurrence of liners, low chimneys and a short time between lighting and the fire is also striking. Typically, flexible metal liners are used which may be insulated with mineral wool or Vermiculite (or occasionally factory made insulated sectional flues are used) and the absence of cold secondary air and a small diameter compared with a traditional chimney results in a strong draught soon after lighting. Whilst often advocated for safety reasons, liners ironically have an increased tendency to carry embers from the fire on to the roof, especially when combined with the low chimneys often found in thatched properties.

Where there is a short time between lighting and the discovery of the fire in the thatch, these fires in particular are best explained by embers produced during the lighting process, rather than heat transfer through the structure, which would require a prolonged period of operation. Chimney fires, which almost always eject much

more burning material from the chimney and are therefore very dangerous for thatches, have only been recorded in 5 cases. However, it may be that more have in fact occurred, because chimney fires are relatively transient, may not be noticed by the occupants and have often ceased by the time fire-fighters arrive.

Finally, it has been observed that there is an association between the number of thatch fires referred to Burgoynes for investigation and spells of cold, dry weather. Clearly, cold weather will result in the use of wood burning stoves and it is suggested that in dry weather thatch is more readily ignited by embers, it not necessarily being continuously damp in the autumn, winter and spring.

In conclusion, the evidence from this survey provides a strong association between thatch fires that started in the thatch and the use of wood burning stoves with lined chimneys below the current recommended height. It further supports the view that the majority of fires associated with chimneys arise from ejected embers, often generated during lighting the fire, rather than defects in chimneys or heat conducted through the structure.

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