

Forensic fire testing to disprove accidental ignition

Investigators used 'proof of concept' forensic fire testing to determine whether a discarded cigarette could have caused a house fire, ultimately disproving accidental ignition as a plausible cause.

First published

9 April 2026

Key details

Purpose	Investigation cases
Topic	Homicide Criminal damage and arson Forensics
Organisation	Nottinghamshire Police
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Start date	December 2021

Description

Fire crews attended a house fire where a disabled elderly female was still inside. The occupant subsequently died from her injuries.

The fire was reported by the victim's daughter-in-law at 1:25 am, who claimed to have discovered the house alight when she visited the property. She was unable to give a consistent or satisfactory explanation for why she suddenly went to the property in the middle of the night.

Financial enquiries revealed that the daughter-in-law had substantial debt and had tried to transfer £10,000 out of the victim's bank account earlier that day. She was subsequently arrested on suspicion of murder, but maintained these matters were coincidental.

Initial fire investigations identified the seat of the fire as the bottom corner of the victim's bed. The victim was known to occasionally smoke at her kitchen door when assisted by her carers. Because of this, fire investigators were unwilling to rule out the possibility that the fire could have been started by a discarded cigarette if the victim had been smoking in bed.

Testing at the scene and the recovery of fragments were limited because of the consumption of material in the fire. The cause of the fire was inconclusive, meaning the suspect could not be charged.

Line of enquiry

The officer in the case challenged the inconclusive findings and instructed Prometheus Forensic Services to undertake 'proof-of-concept' testing, to test the hypothesis that the fire could be accidental. Prometheus reconstructed the fire scene using comparable materials.

A similar type of bedding was used to show that branded cigarettes self-extinguish and do not generate sufficient heat to ignite and inflame the material such as to cause combustion. Combustion was only achieved using a cigarette lighter, thus disproving the hypothesis of an accidental fire.

Outcome

The suspect was subsequently charged and convicted of murder.