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Intentionally setting fire to JCB excavator for fraudulent insurance claim

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Abstract

In the instant case, the author was requested by an insurance company to determine the cause of fire reported to have occurred in a JCB excavator. According to the driver of the excavator, while clearing debris he suddenly noticed fire emanating from the centre of rear left tire of the JCB. Before the fire brigade reached, the JCB was burnt. A thorough Forensic examination was conducted by author and his team and it was found that the fire was caused due to human intervention.

Keywords: JCB excavator, fire accelerants, burnt debris, GC-MS, aliphatic hydrocarbons.

Introduction

Forensic Fire Investigation is the scientific analysis of fire related incident and is conducted to determine the origin and cause of fire.

The forensic investigator follows a series of logical scientific steps such as observation and examination of the fire scene, gather information about the event, collect burnt debris samples from the site of fire incident for conducting chemical analysis to determine the presence of fire accelerants, study videos and photos taken during the incident of fire, formulate and test a working hypothesis, revising the working hypothesis as needed to fit with the available data before finally reaching a conclusion.

All types of automobile vehicles are subject to fires of either accidental or intentional in origin. Automobiles contain substantial quantities of ignitable liquids as fuels and electrical and mechanical systems which can provide ignition sources. Automobile fire can start from a variety of accidental causes and arsonist try to simulate such accidental fire to escape detection. It is important for the forensic investigator to be familiar with fuel and sources of ignition present in vehicles so that all fires can be properly assessed.

Observations and Findings

According to the driver of JCB Excavator while he was clearing heap of soil as a part of his work, he noticed fire in the centre of rear left tire.

He jumped out and informed the fire brigade. By the time the fire brigade reached the scene, the JCB was extensively burnt.

Figure-1: A front view of burnt JCB.

Figure-2: A backside view of the JCB.

Figure-3: A close up view of the left rear tire upper central portion.

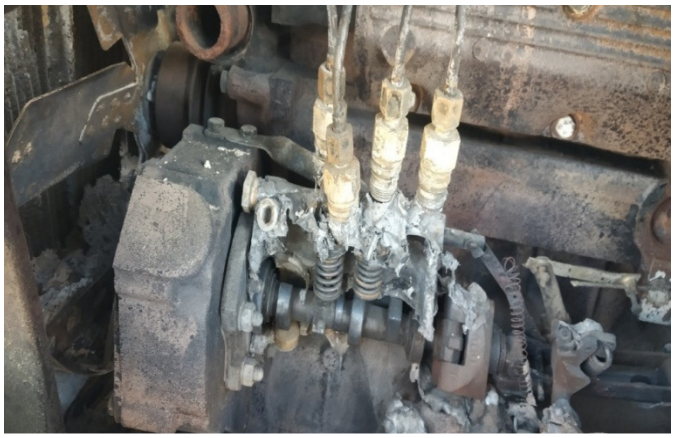

Figure-6: A view of the burnt engine.

Figure-4: A view of left front tire.

Figure-7: Diesel tank unaffected by fire.

Figure-5: A view of completely burnt right rear tire.

Figure-8: A view of burnt battery.

All the flammables inside the cabin of JCB such as seat covers, rubber mats etc., were totally burnt. Also the dash board, steering wheel and other fittings in the dashboard were totally burnt.

Figure-9: A view of completely burnt cabin, steering wheel etc.

Results and discussion

Forensic fire debris analysis is an important part of fire investigation, and gas chromatography– mass spectrometry GC-MS[1] is the accepted standard for detection of ignitable liquids in fire debris.

Two samples of partially burnt debris at two different locations of the JCB were collected for subjecting them to GC-MS analysis for detection of fire accelerants. The samples were analyzed by GC-MS technique on Agilent 5973 N MSD with 8690 GC system and the spectra are shown in Figure-8 and 9.

The spectra revealed the presence of aliphatic hydrocarbons[2-8] such as Undecane, Dodecane, Tridecane, Tetradecane, Pentadecaneetc, in the range of C11 to C20 indicating the presence of kerosene/diesel in the burnt remnants.

According to the driver, he first noticed fire in the central upper portion of left rear tire. A detailed examination of that area did not reveal any cause for the fire to originate at that spot. There was no satisfactory answer from the driver when asked the reason for the fire to originate at the spot. Further it was found that the right two tires of the JCB were totally burnt whereas the left two tires were partially burnt. This was contrary to what was expected, had the fire originated from the left side of the JCB.

The possibility of any electrical short circuit in any of the engine electrical wiring system or the battery mechanism was ruled out because such short circuit leading to fire could not have caused intense burn effects including the burning of the metallic doors and bonnet as observed in the instant case within a short period. A thorough examination of the burnt wires coming from the battery did not reveal any formation of beading, further ruling out the possibility of short circuit being the cause of fire.

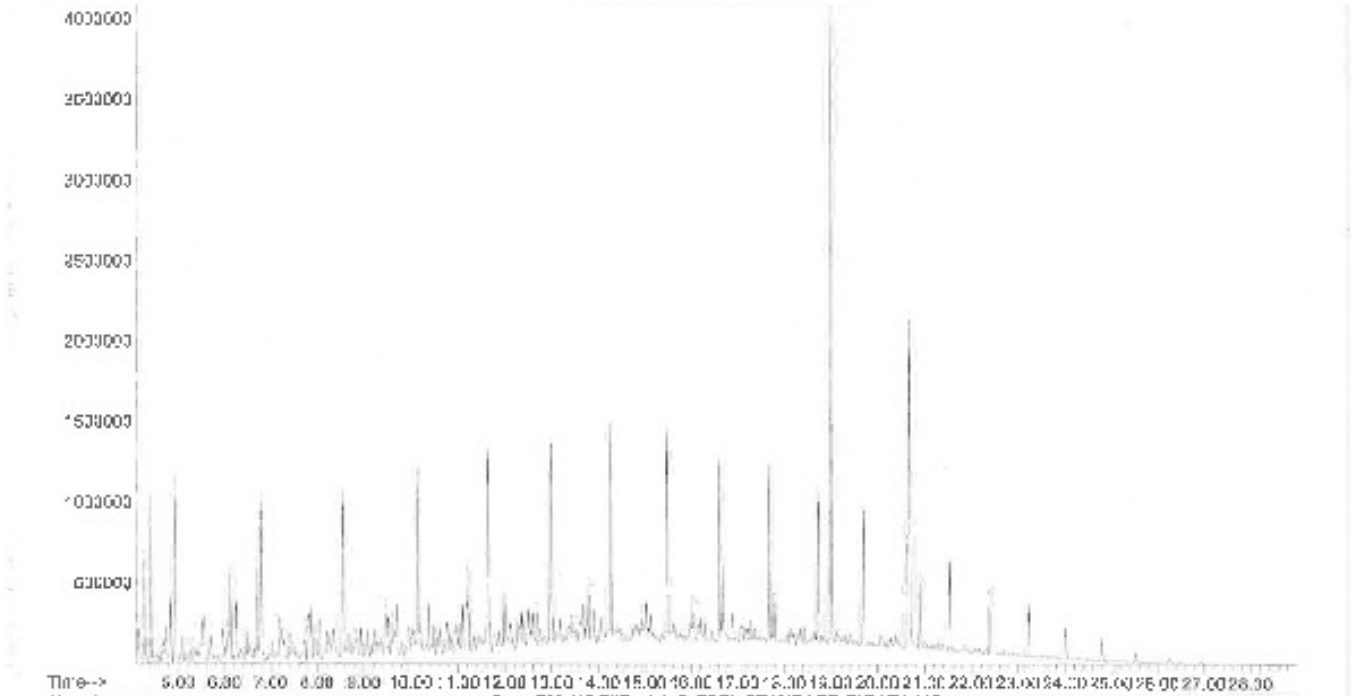

Figure-8: GC-MS spectrum of the sample collected inside the cabin.

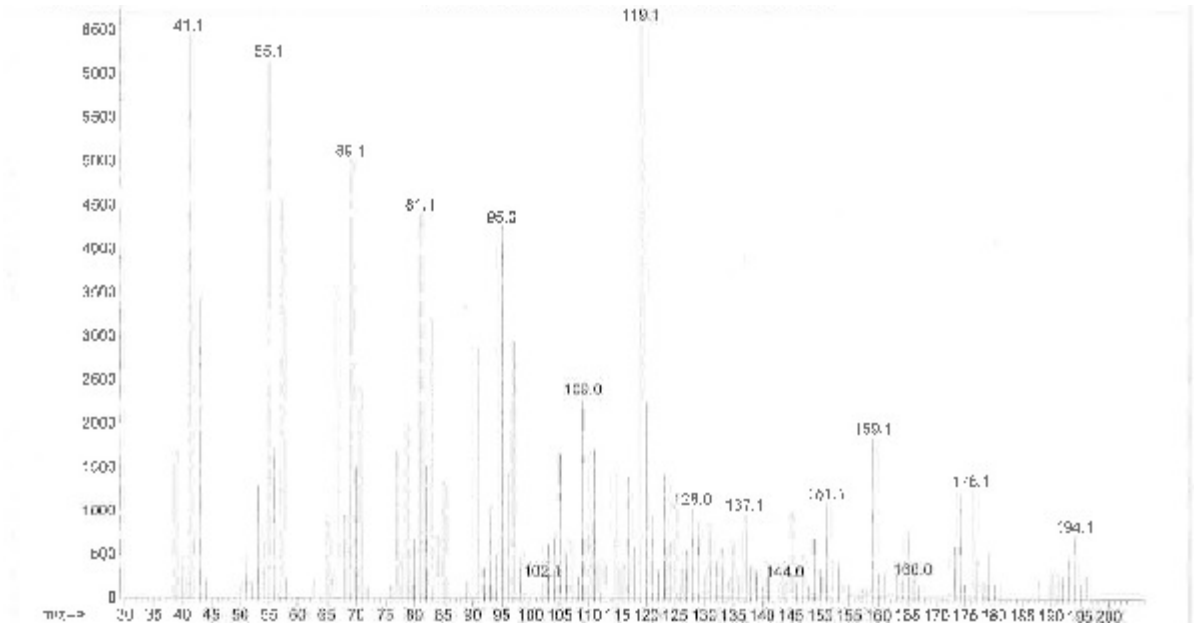

Figure-9: GC-MS spectrum of the sample collected from the tire

The cause of fire due to electrical and mechanical systems providing ignition sources was ruled out as the JCB Excavator was not in operation at the time when fire was first said to be noticed.

The cause of fire due to rupture of the fuel tank producing hazardous spill was ruled out as the fuel tank was totally intact.

Taking into consideration the burn patterns in the cabin and around the body as well as in the engine compartment lead to a conclusion that the vehicle suffered intense heat and fire effects only an account of deliberate and planned attempt.

Conclusion

Based on a thorough and in-depth inspection of the fire incident followed by search, identification, collection, analysis of physical and oral evidence and applying fire dynamics, it is concluded that, the fire in the JCB was on account of deliberate setting of fire by pouring kerosene/diesel all over the body and in the interiors of the JCB cabin in an attempt to stage manage the accidental fire by someone and taking into consideration the means, motive and opportunity to cause such a deliberate fire, the possibility of the owner being directly or indirectly responsible for its ignition, initiation and propagation cannot be ruled out.

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