



2017

CZECH FIRE INVESTIGATORS ON FIRE

MINISTERSTVO VNITRA
Generální ředitelství
HASIČSKÉHO ZÁCHRANNÉHO SBORU
ČESKÉ REPUBLIKY





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Foreword

Dear readers,

in your hands you are holding a book titled „Czech Fire Investigators On Fire“. As the title says, it deals with issues related to fire investigation system of the Czech Republic. In the end of this book you can find a dictionary, which consists of concepts from the field of fire investigation.

All of the input information including the photographs were put together by Czech fire investigators. Cases in this book were published without any local or personal data. For further details please do not hesitate to contact relevant regional Fire Rescue Service, which you can find in the beginning of each case study.

To conclude, we believe that we managed to fulfill the aim of this book, which was set mainly to present a quality of work that is being done by Czech Fire Investigators. That would not be possible without support from our colleagues and superiors.

AUTHORS



Vážení čtenáři,

dostává se vám do rukou publikace nazvaná „Čeští vyšetřovatelé požárů o požárech“ (Czech Fire Investigators on Fire), která je psaná v anglickém jazyce a zabývá se problematikou zjišťování příčin vzniku požárů na území České republiky. Na závěr publikace je uveden základní česko-anglický a anglicko-český slovník pojmů z oblasti vyšetřování požárů.

Podkladové texty a fotografie, které publikace obsahuje, jsou dílem českých vyšetřovatelů požárů. U zveřejněných případů jsou úmyslně vynechány místopisné podrobnosti. Pro zájemce o podrobnější informace je u každého případu uvedeno jeho evidenční číslo EČUD (ID) a příslušný Hasičský záchranný sbor, u kterého lze informace získat.

Cílem publikace je především prezentace kvalitní práce českých vyšetřovatelů požárů a předání informací o českém systému v rámci mezinárodní spolupráce v oblasti vyšetřování požárů.

Na závěr si dovoluujeme poděkovat služebním funkcionářům za poskytnuté cenné poznatky a podporu při zpracování publikace.

AUTOŘI



HOME STRUCTURE FIRE

Fire solved by: FRS of South Bohemia Region, Regional Directorate, ID 3110006863, year 2010

Cause of fire: Negligence when installing a thermal appliance - failure to reach a safe distance between flue gas path with hot air exchanger and combustible structure of ceiling.

Description of the object

This was a fire of a wooden ceiling and a roof structure of a detached two - storey home structure.

The fire hit the interplanar space and the wooden frame of the roof truss, which was protected from the bottom by a gypsum plasterboard ceiling. The hollow space was used to store electricity, heating water and hot air.

Home structure's central heating was made by using two kinds of heating system. Warm Air heating provided by "radiant heating" (known as underfloor heating), and warm air heating.

Warm Air heating system is provided by the fireplace, which was placed in the 1st floor in the family room. The fireplace was walled according to the manufacturer's instructions.

The flue gas path from the fireplace was made by a metal flue with a chimney entrainment. A metal heat exchanger, built by the owner of the house, was placed over the fireplace liner. The truncated pyramid heat exchanger was double-walled and its underside was built on the lining of the fireplace. The back edge was adjacent to the wall.

The inner casing served as a heat exchange space for warming up the air. The outer shell served only as a shielding panel to protect people from touching the hot surface.

The air income into the exchanger was provided by two openings at the bottom of the fireplace and the outcome by a circular opening located at the top of the heat exchanger. This had a diameter of 150 mm. Flexi pipe (composition - inner surface aluminum foil, 2 cm thermal insulation mineral wool, outer surface aluminum foil) was fitted to the flange of the opening. The rudder led in the space between the gypsum plasterboard and the plank floor of the floor to the 2nd floor, spreading the warm air into the rooms on the 2nd floor of the house.

Event description

Fire occurred in the space above the heat exchanger of the fireplace in the kitchen and living room. A wooden ceiling structure was located at a distance of 38 cm above the heat exchanger. A heat exchanger flange was placed in the immediate vicinity of this wooden ceiling structure and led a flexi pipe ensuring the distribution of warm air to the individual rooms of the house. The flue way was situated 60 cm from the construction of wooden ceiling. According to the owner of the home structure, the hot air distribution was realized by himself (claimed to be an heating engineer).

Points of interest

To check the occurrence of a fire due to long-term heat stress, the heat transfer from the heat exchanger and the distribution pipe to the wooden ceiling structure was used.

The sheet metal parts of the heat exchanger were removed from the lining of the fireplace and an examination experiment was carried out. This experiment, which consisted of putting the fireplace into operation, was aimed at proving the emergence and further effects of temperatures of flue gas path and exhaust air that could cause ignition of the wooden ceiling structure.

The GIM 3090-MX 4 Infiacometer (type of contactless thermometer) and the Argus e2v thermocouple were used for measuring temperatures. In this investigation, the temperature ranges data were found on the sur-

face of the heat exchanger, flue gas path and exchanger flange. The temperatures of the air coming out of the heat exchanger were determined as well.

During the operation of the fireplace, the surface temperatures of the heat exchanger, the heat exchanger flange and the flue gas path were determined by the contactless thermometer. After approximately 10 minutes, the surface temperature of the heat exchanger ranged from 450 to 480 °C. The surface temperature of the heat exchanger flange reached values ranging from 112 to 220 °C and the surface temperature of the flue gas path was up to 675 °C. Furthermore, the temperature of the air coming from the exchanger flange was monitored. The temperature of this air reached around 190 °C.

On the basis of the above mentioned facts, it was possible to state that due to the radiant heat and contact of the hot surface of the hot air exchanger, which reached temperatures of 450 to 675 °C, with a wooden ceiling structure, the heat transfer through the radiation and the conduction into the combustible part of the structure, the closed space and the ignition of the wooden structure, whose ignition temperature is 397 °C, the self-ignition temperature of 120 °C.

The wooden construction of the ceiling could also lead to the process of self-ignition of wood. This process already occurs at temperatures above 120 °C. Heat accumulated in a wooden structure could not be released and could eventually heat up its self-ignition.



Figure 1 - Heater housing with double-walled hot air coil.



Figure 2 - Temperature flow at the top of the heat exchanger flange.

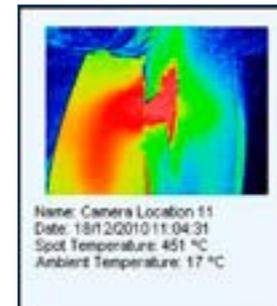


Figure 3 - Side view of the heat exchanger.

RESTAURANT AND GUEST HOUSE FIRE

Fire solved by: FRS of South Bohemia Region, Regional Directorate, ID 3113004727, year 2013

Technical Institute of Fire Protection in Prague (TIFP)

Cause of fire: Strike of a lightning into the tree crown and its current over the roots of trees and the power cable into the restaurant and guest house.

Description of the object

It was a fire of two separate buildings. The first object was a two-storey restaurant building, 15 x 8 m ground plan, in which there was a restaurant in the 1st floor and the farm room in the attic. This object was originally a barn. The perimeter structures were bricked from stone and bricks, the wooden ceiling, the beam roof structure of the gable roof, in the loft space loft made of plasterboard on steel thin-walled galvanized profiles.

The second object was the guesthouse with wellness facilities, ground plan size 36.5 x 14.5 m, two-storeys with eight guest rooms with a total capacity of 20 people. The perimeter structures were bricked from stone and bricks, wooden ceilings (arched brick section), beam roof structure of the gable roof. In part of the attic space was the attic (rooms) made of plasterboard panels on steel thin-walled galvanized profiles. The building documentation provided by the owner showed the original conditions from 1997.

The heating of the buildings was provided either by a central heating system with a gas boiler (external LPG tank) or a wood boiler with manual and automatic operation. However, these boilers were not in operation during the time.

Both of the buildings are approx. 300 years old. The reconstruction of the boarding house started in 1997 and it has been gradually equipped with luxury facilities. The distance between the objects was 4.7 m.

Event description

The fire occurred during the night hours when four persons were accommodated in the boarding house. They were woken up with a huge explosion that shook the whole building during a storm. There was a power failure. After solving the power outage, they detected a fire and reported it on the emergency line. The extent of the fire was significantly affected by the delay of 34 minutes between the lightning strike and the reporting of the fire.

Points of interest

Traces of lightning - six trees of different kinds, pulled lawns, steel plate in the country with traces of melting, damage to wiring above the guest house (lighting) and wiring of both objects. Communication with the owner (citizen of the Republic of Austria) using an interpreter. Excellent cooperation with Czech Hydro-meteorological Institute, TIFP, and Ing. Jiri Kutac - expert in electrical engineering, specialization in protection against lightning and overvoltage.



Figure 1 - The objects before the fire.



Figure 2 - The objects in a fire.



Figure 3 - Height of a fire.



Figure 5 - One of the tree trunks that were damaged by lightning over the house.



Figure 4 - Criminalistic outbreaks in the fuse box at the wooden stairs to the attic of the restaurant.



Figure 6 - Marked trees with lightning strikes and the likelihood of a lightning strike in the house.

WOOD FURNITURE FIRE

Fire solved by: FRS of Plzeň Region, Regional Directorate, ID 3211001451, year 2011

Cause of fire: Operational failure, static discharge - lighter explosion.

Description of the object

It was a two-storey home structure constructed in 1984. The object had a floor plan of 10 m x 11 m. The perimeter structures were made out of bricks. The ceilings were made of concrete panels. The roof was a gable with a cover of eternity templates. In the 1st floor there were two rooms, a utility room (boiler room, laundry) and a garage. In the 2nd floor was a living room connected with kitchen and dining room, then bedroom and children's room. The building was heated by central heating with a solid fuel KOVOTERM boiler. The fire occurred in the kitchen with the dining room that had a floor plan of 7.5 m x 3.0 m partly equipped with ceramic tiles and in the dining room with a laminate floating floor. The kitchen was equipped with a U-shaped kitchen with appropriate appliances, a dining table with two upholstered chairs and a corner dining table. The kitchen was fitted with two plastic windows.

Event description

When the fire started, there was no one in the building. After her arrival from work, the owner noticed that the whole kitchen room was filling with smoke and a wooden kitchen chair seemed to be burned as well as a vest which was placed on the table. The criminological focus was on the 2nd floor in the dining room, specifically on the upholstered wooden chair at the dining table. After examining the fire site, a gas lighter was found in the vicinity of the outbreak of the fire, which showed signs of bursting. According to information from owners, the lighter was on the edge of the dining table with an upholstered chair with a vest. On the day of the fire, it was clear with an outside temperature of around 19 °C and at the time of the fire, the sun was shining directly on the dining table where the lighter was placed.

Points of interest

After the explosion of the gas lighter and the initiation of the butane-air-electrostatic mixture, upholstered wooden chair ignited and following flame partially extent to the dining table and the floating floor. Due to the low heat output of the fire and the temperature that did not reach the value of breaking the glass wall of the plastic windows in the kitchen room, the oxygen needed to burn was depleted. That led to temperature drop and the interruption of burning. That means that there was no need for F&R Service to arrive.



Figure 1 - View of a family house.



Figure 2 - View of dining room.



Figure 3 - View of the burned chair.



Figure 4 - Detailed view of gas lighter.

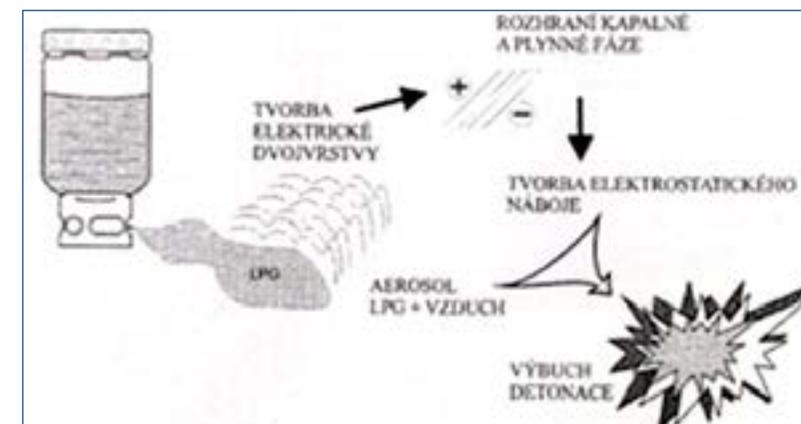


Figure 5 - Specific LPG risks are listed on the diagram.

WAREHOUSE FIRE

Fire solved by: FRS of Liberec Region, ID 5112003851, year 2012

Cause of fire: Ignition of paper boxes from concentrated solar rays.

Description of the object

The production facility was built around 1925. It had two floors, vertical building structures, 1st floor and 2nd floor were non-flammable. Horizontal construction above 1st floor was non-flammable, above 2nd floor flammable. The roof structure was flat wooden with bitumen roofing. The object consisted of one fire section. In the 1st floor was the production line of the company (glass figurines) and in 2nd were warehouses. The fire occurred in 2nd floor which was locked at that time.

Event description

A worker who worked in the 1st floor noticed shortly after noon a smell that was coming into the workshop with an unused lift shaft between the 1st and 2nd floor. When searching around the company he and the owner found that there was a fire in warehouse in the 2nd floor. At that time, the fire, due to limited air exchange, ran out of oxygen and extinguished itself. The temperature in the warehouse was already normal. The crime scene of a fire was commissioned by a fire detector on a shelf of 0.5 x 1.0 m, located approximately 70 cm from the floor. This shelf stood on the south-astern side of the room, in front of the window. On the shelf there was a carton box containing goods made of chalkboard boxes with glass figures. Next to the shelf, an elephant glass was placed in the direction of the window. This paperweight was put on by the owner several days prior to the fire. The elephant's body was a glass ball with a diameter of 20 cm and other glass components.

Following the experiment, it was found that the sphere created an optical focus of concentrated solar rays about 5 cm behind the surface of this sphere. In this focal point, the temperature was high enough to be able to ignite the carton. Another feature of the ball, unlike the classic magnifying glass, is that the focus does not deform in the sun's motion and is still effective. It was found and documented that it was at the time of the fire that the rack with the spheres and the boxes were fully illuminated by the sun, and that the sun was shining in the area between 08:00 and 09:00.

Points of interest

The focus of the glass ball was surprisingly effective even though that windows of the warehouse were pretty dirty. The annual time, the autumn, the half of November, helped by the fact that the sun was low and the rays better penetrated into the room. The focus of the moving sun was projected onto a flat surface of a cardboard box. It was just a matter of time to focus its power on a cardboard box.



Figure 1 - Manufacturing building with windows to the southeast. Figure 2 - Warehouse of finished products.



Figure 3 - Criminalistic and Fire Outbreaks.

Figure 4 - Balls shelf.



Figure 5 - Glass balls after a fire.

Figure 6 - Glass ball at the attempt, November, more than three meters from the window.

CAR FIRE - HYUNDAI I40

Fire solved by: FRS of Pardubice Region, ID 5315005815, year 2015

Population Protection Institute, Lázně Bohdaneč (PPI)

Cause of fire: Ignition of flammable substances on the chassis of the vehicle from insufficiently extinguished open fireplace.

Description of the object

HYUNDAI i40, production year 2013

Event description

In autumn morning, hunters used fire to roast sausage after exhausting hunt. Being aware of the risks of fire in the woods, they situated the fireplace at the edge of the forest, 1 m from the local road. At the end of the event, they poured a water from the stream into the fireplace. According to local residents, the hunters left the site just before 14:00. About 15 minutes driver parked his HYUNDAI passenger car at the same place. The driver did not notice the fireplace near the local road. Because of the strong wind, the fire has already been hidden by falling leaves.

By the time of the arrival of the first F&R Service unit, the entire passenger car was already on fire. The fire intervention has been launched. Suddenly, fireworks started to appear from the rear part of a car. The F&R Service unit interrupted the fire intervention until the flares ceased to fire. An unplanned „fireworks in the woods“ was documented by a random neighbor. The fireplace was found under the passenger's seat. During the fire the wind blew from the passenger's to the driver's side of the car. Therefore, the damage was more severe on the driver's side.

Place which was mostly damaged by combustion gases was found on the chassis of the vehicle. Specifically in the place behind the engine, under the driver's and the front passenger seat's. It was at this point that the fire was transferred to the vehicle. In order to exclude the possibility of a technical fault in the wiring of the vehicle, an expert in electrical engineering from PPI Lázně Bohdaneč was called to the site. No electrical markers that would indicate a technical fault on the wiring of the vehicle have been found. At the time of uncovered fire under the vehicle, approximately two hours after fire was observed, the fire temperature measured by the thermal camera of the professional fire protection unit ranged from 17 to 22 ° C. The ambient temperature of the ground was measured at 4 °C. The open fireplace was covered by loose insulation residues on the chassis of the vehicle.

In order to estimate if any wood burning residues were present in the sample, and if there were no other flame accelerants, remains of ash were taken. In this sample was unequivocally identified diesel. The presence of other combustion accelerants was not confirmed.

Points of interest

The exact cause of the fire would not be properly set without a witness of a hunting action.

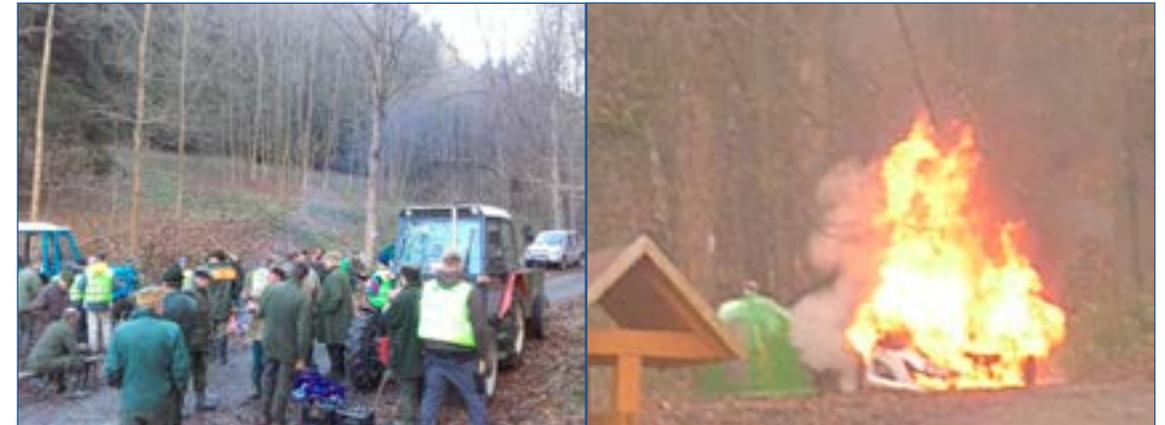


Figure 1 – Open fire beside the road.

Figure 2 - Vehicle before arrival of F&R Service.



Figure 3 - Shooting flares from the rear part of the vehicle.

Figure 4 - Vehicle condition after fire.



Figure 5 - Remnants of the fireplace under the vehicle, covered by vehicle insulation.

ATM FIRE – ATTEMPTED ROBBERY

Fire solved by: FRS of South Moravia region, ID 6215001884, year 2015

Cause of fire: Intentional fire

Description of the object

The ATM was installed in the municipal office building. The municipal office building was single-storey, with no use of the attic. The building was provisionally divided into two separate units, where part of the building served for the needs of the municipal office, and other part served as a bank. From the fire safety point of view, the building was divided into three separated fire segments. The municipal office building was built in 2005. That means that according to the laws in force at that time, the bank was a separate fire segment.

Event description

The conspicuous outbreak of the fire was reported as follows: “I was sleeping in my bedroom which is in family house next to the municipal office building. I was woken up by alarm but did not pay attention to it. It is used to start quite often. When the alarm went off, about 15 seconds later, the alarm sounded again. At the same time I heard a blow. It was something like a blast, and at the same time it sounded similar to breaking glass. I stood up and looked out the window. There was nobody on the street. Then I went to kitchen, which has windows to the other side of the house.”

Her husband awoke, and as she looked out the window, she noticed that four people were passing through the building of the municipal office. That is the part where the ATM and the fence of their house are located. One of these people carried a long object which seemed like a stick, and another carried a lighter sports. When describing these persons, they said that they were about three or four men, all dressed in dark clothes, hooded on their heads.

These men went to the parking lot behind the municipal office where they had a dark coloured passenger car. When the men were out of sight, she came out in front of the house to see if she could see them leaving, and to find out what had happened, with her husband watching the window. Then she went to the municipal office where she noticed that the ATM was burning. She immediately announced it at 01:36 hours on line 158 and then on line 112.

Criminalistic focus of the fire was determined by examining the fire site and the investigation conducted at the front of the ATM, which was the most damaged by the fire and explosion. Parts of the ATM were also several meters from the fire. The fire was extinguished by firefighters with a portable fire extinguisher.

Points of interest

When investigating the location of the explosion and the fire, it was discovered that it was an attempt to steal money from an ATM. There were no traces of using flammable liquid here, as it might seem at first glance. Instead, flammable gas was used. At the time of the fire investigation it also came to light that this was not the first attempt to steal money from an ATM in the South Moravian region.



Figure 1 - View of ATM access.



Figure 2 - View of a damaged ATM.



Figure 3 - View of the discarded front of the ATM.



Figure 4 - View of the internal damaged part of the ATM.



Figure 5 - View of an ATM, located in a bank branch.



Figure 6 - View of the rear of the ATM.

CAR FIRE - AUDI R8

Fire solved by: FRS of capital of Prague, ID 1113009442, year 2014

Technical Institute of Fire Protection in Prague (TIFP)

Cause of fire: Operational technical failure of wiring on an unprotected high-current cable

Description of the object

The fire of the vehicle was caused by a technical failure of the wiring on an unprotected (without overcurrent / short circuit protection) high-current cable (single-core copper rope) that brings potential from the positive pole of the battery to the electrical wiring rail. Two branches with a mutual electric potential (12 V) were undesirable connected due to the mechanical damage of the cable insulation where the cable pass through the aluminum body of the vehicle.

The electrically conductive touch of the cable core and the Aluminium structure (permanently connected to the negative pole of the battery) has an electric short circuit (short-circuit with up to 600 A) and an arc ignition with temperatures between 2500 and 4000 °C.

The thermal energy released during the arc ignition ignited plastic materials surrounding electric cable and the insulation of the conductors. Then it appeared in the form of copper nozzles and thermal breaks of the cable core (see Figure no. 4).

Event description

Mechanical damage to the insulation was caused by the following factors:

- existence of operating vibrations (common car operation)
- insulation material degradation (loss of required chemical and physical attributes of PVC),
- time of the year
- Time of the event
- and position of parked vehicle

The car was parked near a building site in nature. That seemed to be conditions that correspond to the destructive effects of the animals (rodents, mice, martens) that move into the vehicle. Analogical cases (interference of the surrounding fauna) were solved upon the fire investigators from TIFP and unambiguous (documented) traces proved.



Figure 1 - Audi R8 before fire occurs.



Figure 2 - Audi R8 after a fire.



Figure 3 - Interior view on the Audi R8 Torus with marked outbreak where the power cable insulation has been damaged.



Figure 4 - View of the pearls in the form of Copper nozzles and thermal break of the cable core.

FIRE OF BALCONY

Fire solved by: FRS of Capital of Prague, ID 1113010378, year 2013

Cause of fire: Children's play with fireworks (fun pyrotechnics)

Description of the object

It was a fire of wooden cabinet and other equipment placed on the balcony on the 3rd floor of a residential building. The object was built in the first half of the 20th century. The building construction was combined, vertical supporting structures were brick, both sides with fire resistance REI 120, vertical non-load-bearing structures were brick, double-sided with plaster with fire resistance REI 90. The base structures were made of concrete. The perimeter wall was laid on concrete strips. The vertical load-bearing structures were made of burnt bricks with mortar. Ceiling structures were made of wooden beams and plaster, fire ceiling resistance was REI 45. The roof of the building was a gable with wooden load-bearing structure and fire-proof structure covering, windows were wooden. The interior and exterior doors were wooden with a steel door frame. Walls in the corridors were plastered with stucco plaster with a core. The residential object had a supply and distribution of electricity, water and gas.

Event description

At 8:41 p.m. during a patrol activities in the street the Police officers recognized a fire on a balcony in one building. They used the portable-fire extinguisher on fire. It was fire of wooden cabinet and other equipment on the balcony on the 3rd floor of a residential building. Police officers extinguished the fire from neighbouring apartment because there was no one in the affected apartment. Firefighters subsequently extinguished the fire with water from the local source.

Points of interest

During the investigation on the fire scene, the fire investigators focused on finding the burner initiator. During this searching they saw fun pyrotechnic flying from a higher floor in neighboring block. After a few minutes of waiting they saw fun pyrotechnic again but that time it fell down into the open yard. It flew from another balcony in the neighbouring house, which was about five meters away. Police immediately proceeded to examine the balcony where the firework was used. The suspected flat was determined in the 4th floor of neighbouring house situated at the right angle to the house where the fire took place. In this flat the Police-man found large family of foreign nationals living in the Czech Republic. The next investigation found, that after dinner two children went to the balcony, where they played with fun pyrotechnics without the presence of adults. After the ignition they threw the pyrotechnic down from the balcony.



Figure 1 - Fire of a balcony.



Figure 2 - A view from the balcony where fun pyrotechnic was thrown.



Figure 3, 4 - Fun pyrotechnics.

FIRE OF THE CHILDREN'S ROOM IN A BLOCK OF FLATS

Fire solved by: FRS of South Bohemia Region, ID 3112005281, year 2012

Cause of fire: Technical fault on the lithium battery placed inside the Chou Chou doll

Description of the object

It was a fire of a baby portable chair and a Chou Chou doll, which was placed in it. The fire broke out in the children's room in block of flats placed in České Budějovice. The flat (4 + 1 rooms) was situated on the second floor of the block of flats and formed a separate fire section. The entrance door to the apartment, which were violently opened by the intervening firefighters, were made of wood. Before the firefighters intervening to the apartment unit, the entrance door was intact and locked. The fire occurred only in the children's room.

Event description

The fire started between 9:50 a. m. and 10:10 a. m., two hours after the father went to work. He checked the apartment before he left and everything was all right. A wife and children were away from home for more than 24 hours. No one smoked in the apartment. Point of origin was set to area where the electricity distribution did not interfere and all the circuit breakers were in the "on" position. Before the fire started a portable seat with Chou Chou doll in it was placed at the point of origin.

The investigators found damaged pieces of three lithium batteries inside the torso of the doll. Before the fire started, the Chou Chou doll contained a water container for imitating the tears. Before the inserting the lithium batteries inside the doll, the batteries were already used in photographic cameras and they were slightly surface-damaged.

In the production, use and disposal of lithium batteries, we must avoid contact of lithium with water (air humidity), otherwise explosion or self-ignition (as with sodium metal) may occur.

Source: Power supply of electronic devices, Doc. Ing. Vlastislav Novotný, CSc., faculty of electrical engineering and communicational technologies, ČVUT Brno.

Lithium is a flammable, silvery, glossy solid with a flash point of 180 - 200 ° C. Lithium burning can also occur in oxygen and carbon dioxide. The reaction of lithium with nitrogen starts at room temperature, with red ignition occurring. Lithium reacts violently with water, water decomposes while forming hydrogen, which can ignite due to the react heat.

Source: Tables of Combustible and Dangerous Substances, Fire Protection Union CSSR, Prague, 1980.

Points of interest

The further development of the fire was limited by the lack of air oxygen, also thanks to the closed windows and closed door of the children's room. After the violent intrusion into the apartment the fire fighters only extinguished the rest of glowing material.



Figure 1 – A view on the fire scene with marked criminalistic focus.



Figure 2 - Chou Chou doll.



Figure 3 - Battery which was removed from the doll.



Figure 4 - Lithium battery.

FIRE OF THE PRODUCTION HALL

Fire solved by: FRS of Olomouc Region, ID 7113135193, year 2013

Cause of fire: Intentional ignition by unknown person (arson) after violent intrusion into a production hall

Description of the object

A new building of a production hall, which was built in 2012, was properly approved after trial operation at the end of 2013, less than a month before the fire happened. In the hall there were installed machines for elaboration and production of plastic products – plastic injector, welding of plastic fittings and piping. The hall was one separate fire section.

The production hall had dimensions of 37,1 m x 17,51 m, which was 650 m² of the hall's floor plan, the height of the hall to the skylight was 10,5 m. The supporting construction of the hall consisted of steel profiles and beams. The perimeter wall consisted of Kingspam “sandwich” panels with fire resistance EW 30. It contained: sheet, insulation, sheet. Roof cladding was also made with sandwich panels consisting of: sheet metal, insulation, roofing. The steel structure of the hall contained certified fire protection coating, the floor in the hall was from concrete. There was no heating installed in the hall, the hall was heated only by residual technological heat. The hall was equipped with one internal wall hose system with a 30 m long-standing hose and six portable fire extinguishers. When the fire started, two trucks (VW LT 35 and Mercedes-Benz 208 D) were parked in the hall, which was against the safety and fire regulations. The nearest building was 7 meters away.

Event description

The fire started during morning hours. It was in period when whole company had days off due to the Christmas holidays.

The fire started in two places (see Figure 4). One criminalistic focus of fire was set at the rear of the hall in the area where an injector Mitsubishi 1600 MMVW was placed. This place indicated the highest degree of damage on the equipment and components. The second criminalistic focus was set on the driver's seat in the cabin of the parked vehicle VW LT35. Due to the drained hydraulic oil from Mitsubishi injector as well as due to the stored material (polypropylene granules and polyethylene on pallets) the fire quickly spread to the whole floor area of the hall. Experts from Technical Institute of Fire Protection in Prague were also called to the place of event, for the purpose of preparing an expert opinion to the point of origin of the fire.

Points of interest

Significant damage in tens of millions of Czech crowns resulted from a unique manufacturing technology, which was about 80% of the total damage. The rest of the damage was on the construction of the production hall, the material and the vehicles. The intervening firefighters were highly valued in terms of building fire prevention - the construction of walls, the construction of underground tanks for the supply of fire water. They also appreciated the impact of making comprehensive and thematic fire control throughout the site, including outdoor storage areas.



Figure 1 – Fire in its III. phase.



Figure 2 – Photo from investigation.



Figure 3 - View of the production hall from fire ladder.



Figure 4 – Examination the scene with cooperation between Fire investigator and Police.



Figure 5 - Burned technology and parked vehicles.

FIRE OF WOODEN BUILDING

Fire solved by: FRS of Olomouc Region, ID 7115152831, year 2015

Cause of fire: Technical fault on the Li-Pol battery (parameters 11.1 V, 850 mAh)

Description of the object

A new family wooden house was hit by a fire. The basic dimensions of the house were 8,75 m (length) x 7,75 m (width) x 8,04 m (height). In the ground floor there was a hall, toilet with bathroom, corridor, staircase with chamber, room, living room and kitchen with dining area. On the west side of the house was a terrace with access from the living room. In the attic there were two children's rooms, a bedroom, a bathroom and a toilet. The entrance to the attic was possible from the ground floor only by using detachable stairs. The house had no cellar.

Point of origin was located on the ground floor in the room, which was called by owner as a technical room. Only this room was affected at the time of recognizing the fire. Afterwards there was a rapid development of the fire and its extension on the whole house.

The vertical external and internal structures of the house were made of wooden sandwich walls. Ceiling constructions were made of wooden beams with slab and insulation, the roof structure was a gable type. The supporting part consisted of wooden trusses, the roof was made of wooden lath. The ceilings in the rooms were made of thermal insulation boards, the waterproofing was a Tondach ceramic bag. The stairs at the attic were wooden. The family house was built between 2007-2009.

Event description

At the time of fire outbreak only the owner was at home. He was sleeping in the attic, then he woke up and noticed strong cracking and some noises like shooting. He took his mobile phone and ran down the stairs to find out what was going on. He smelled a smoke already on the stairs, on the ground floor the rooms were heavy smoky. A heavy smoke and heat was spreading from the technical room, where he was charging batteries. He ran out from the house to the terrace to bring the garden hose and tried to extinguish the fire, but the heat and the smoke pushed him out. When he recognized that he could not extinguish the fire by his own force, he called an emergency line. Then he did not go inside the house again. He was just spraying water on the house from the outside. Subsequently Fire fighters arrived and they extinguished the fire. Owner stated to fire investigator that he had not do anything in the technical room besides charging the Li-Pol battery into the helicopter. He had started charging about 20:00 and he had went to sleep in the bedroom between 22.00 and 23.00.

Points of interest

During the investigation of the point of origin of the fire there was found charger and battery. On the battery (three-element) was one cell torn.



Figure 1 – View from street.

Figure 2 – View from courtyard.



Figure 3 – View from street.

Figure 4 – Point of origin.



Figure 5 – Charger and battery.

Figure 6 – Battery with broken cell.

FIRE OF FLAT

Fire solved by: FRS of Moravian-Silesian Region, ID 8115007975, year 2015

Cause of fire: Negligence during cooking on a gas stove. The user of the apartment was making lard and when raw bacon was added to the dissolved lard the hot lard has boiled over on the stove.

Description of the object

It was the fire of an apartment placed in the 2nd floor of a four-storey block of flats. The apartment building had been built in the 80s of the last century and formed a separate fire section.

The supporting structures of the house were made of profiled reinforced concrete beams. The perimeter walls of the house, the ceilings and the internal partitions were made of concrete panels except the bathroom and toilet, which were made from high-pressure laminate. The outside wall was insulated with polystyrene thermal isolation. The roof of the house was flat and covered with waterproofing board. Access to the individual apartments was through the concrete staircase.

Event description

The fire started in the kitchen of the apartment in the afternoon. User decided (after returning from the restaurant) to prepare lard on a gas stove. When more fat was added during the melting of lard in the pot, there was overflow of liquid lard into the burner under the pot and its ignition. The user tried to extinguish the fire with water from the water conduit. He suffered burns on his body. The fire spread into the hood above the cooker and on the suspended wooden cabinets above the work area of the kitchen. Upon the arrival of firefighters, the fire continued to spread outside the kitchen room to the high-pressure laminate core of flat and the burning products filled the whole apartment. The apartment user was hospitalized for 17 days in the hospital, where he was subjected to burns II. degree on about 20% of the body.

Points of interest

Elimination of the fire was complicated by the heavy smokes of the staircase, because the user of the apartment had left the front door open when he had escaped his apartment. His body was found in front of the apartment during an exploration by firefighters. When the window glass was destroyed in the kitchen, thermal insulation (polystyrene) melted on the facade and a fire could be transferred to the upper floors of the apartment building.



Figure 1 – Damaged house.

Figure 2 – View of the stove.



Figure 3 – Living room.

Figure 4 – View of bathroom and toilet.



Figure 5 – View to the kitchen.

Figure 6 – View from living room to kitchen.

FIRE OF A CAR JAGUAR XJL 3.0

Fire solved by: FRS of Hradec Králové Region, Technical Institute of Fire Protection in Prague , ID 5213002506, year 2014

Cause of fire: Leaked oil and subsequent ignition of oil vapours mixed with air from surface temperatures of the exhaust gas collector.

Description of event

In the area of the crankshaft and connecting rods, there was an unexpected fault on the mechanical firmness of the moving parts. These moving parts broke through the engine block (directly beneath the right exhaust gas collector) because of its movement energy. Leaking of heat engine oil in contact with an exhaust gas collector (whose temperature in the heated engine ranges from 360 to 480°C), started immediately to evaporate and arisen combustible mixture formed with the air. The claim of the vehicle's owner corresponds to that. He heard hollow wound at the first moment (during the ride) and afterwards he noticed a cloud of white smoke behind the vehicle. The surface temperature of the exhaust gas collector was perfectly sufficient to ignite the oil vapour with dash of air (ignition temperature above 360 ° C) and it started the fire. Afterwards the fire spread further to surrounding flammable engine compartment materials in immediate closeness.



Figure 1 - View of criminalistic focus.

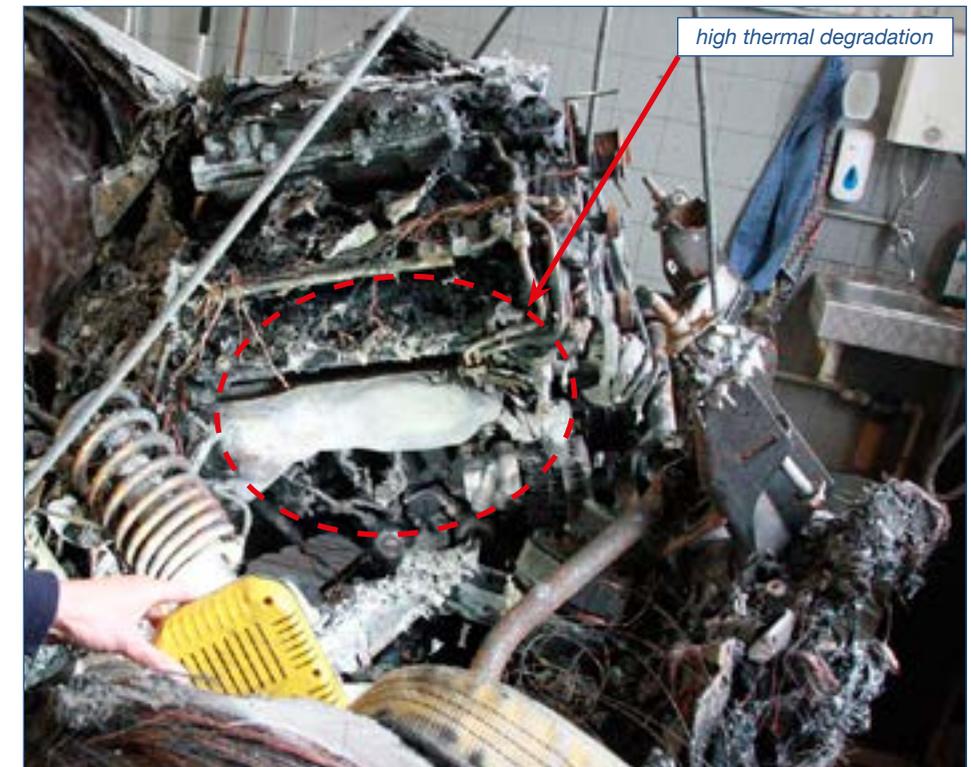


Figure 2 - Drive unit.

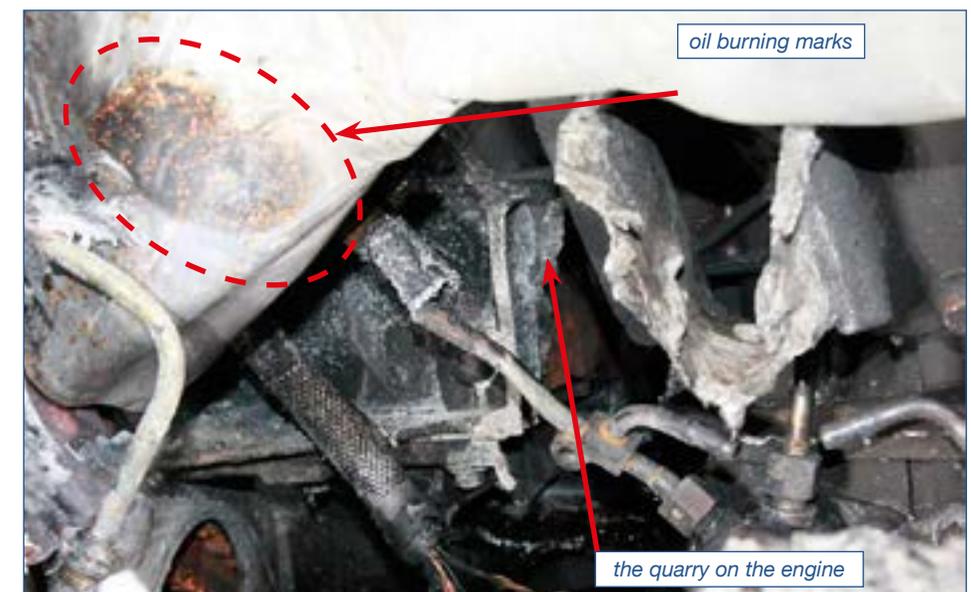


Figure 3 - View of the engine block and exhaust gas collector.

FIRE OF A WORKROOM IN A FAMILY HOUSE

Fire solved by: FRS of Vysočina Region, ID 6115000589, year 2015

Cause of fire: Violation of safety regulations for welding.

Description of the object

A family house (ground plan size 10 m x 13 m), which was built in 1975, had a ground floor (technical back-ground - boiler room, garage), two residential floors and attic space, which was not used. The perimeter walls were made of bricks, a ceiling structure was made of thin-walled brick elements embedded in beams and slabs. The roof was covered by sheet metal. The house was not divided into the fire sections. The fire started in a workroom located on the ground floor of the family house. No heater was installed in the workroom. Fire damaged workroom equipment, wiring and plaster in a family house.

Event description

The fire of the workroom in the family house was announced by the owner, the investigation revealed that the fire was extinguished by himself three days ago. The fire investigator was informed only due to need of a document for the insurance company. The fire started when the owner left the workroom and only the daughter (who had noticed the fire) remained in the house. By investigating the fire scene it was discovered, that a fire had started under the working desk placed in the workroom. A variety of materials (masonry tools and wiring material) were stored under the working desk.

Fire investigator looked at the desk and found two used electrodes, pliers, gloves and a meter. On the desk he also found traces, that testified presence of some objects at the time of the fire but afterwards they have been removed away. According to the owner's announcement there was nothing else on the ground and he did not move anything after the fire. He also stated, that electrodes were in place for a long time because he sold the welding aggregate about a year ago.

The fire investigator examined the fire scene and he excluded wiring as a cause of the fire. Because of the switch, the electrical socket and their distribution boxes were not damaged by the fire and the other wiring did not lead in the point of origin. Arsonist was also excluded, because the family house was locked during the fire. Another investigation found, that owner's daughter took several photos on her camera after the fire, but these photos were accidentally deleted by the owner.

Points of interest

During the whole fire investigation the owner denied that he was welding in the workroom before the fire. Although the traces found were evidence of the opposite. He confessed after recovering the data from the camera's memory card. The Figures showed that a plug (welding machine) was plugged in the 230 V socket, because the socket was not smoked. When the fire investigator examined the socket, it was already smoked, this fact indicated the manipulating with the socket after the fire. Based on the submitted photo documentation, the owner of the house admitted that he had welded himself in the workroom and deliberately damaged socket with a candle flame and waxed with a wax.



Figure 1 - Damaged workroom.



Figure 2 - Traces after objects.



Figure 3 - Socket just after the fire.



Figure 4 - Socket during examining by fire investigator.



Figure 5 - Detail of socket immediately after the fire and during examination by fire investigator.

FIRE OF AIRPLANE

Fire solved by: FRS capital city of Prague, ID 1112003689, year 2012

Cause of fire: negligence of maintenance personnel when handling flammable liquids.

Description of the object

This was a fire of a twin-turbine turboprop highwing airplane designed for shorter regional lines, year of production 2005, with a maximum transport capacity of 50 persons. At the time of the fire, the aircraft was placed inside the hangar “F” in Hall 1 second stand. Hangar “F” building was located at the airport area of Vaclav Havel Airport about 1 km south of the north terminal. The object of ground plan dimensions of approximately 213 x 100 m and height of 17 m was made up of a one floor hangar hall divided by a glass partition with steel profiles into two parts designed for aircraft maintenance. Northwest part of the building had two floors with partial basement and included technical and sanitary facilities (workshops, paint shop, warehouses, etc.). The building was equipped with manually operated water screens dividing the space of the hall into sections, every about 24 m, and the EFS (electrical fire signalization) system. The building structure was non-flammable. The supporting vertical structures consisted of a reinforced concrete skeleton with support pillars and beams. Vertical partitions were brick, or plasterboard, metal partitions. The roof was self-supporting, hung on steel rods anchored on the perimeter wall and fitted with roof skylights. The perimeter walls were formed of glazed shields on the southwest and northeast, the south-eastern front wall was designed as a sandwich sliding construction allowing unlimited access to the full height and maximum width of the hall.

Event description

The fire was reported to fire investigators at 21:23 pm. In the time before the set of the fire, there was made on the aircraft so-called “heavy maintenance”, including complete aircraft drainage plus complete disassembly of internal and instrumentation. Subsequently, the „Dinitrol“ internal anticorrosion paint should be gradually removed to the base structure, exclusively according to the approved technological procedure, the operating and fire regulations of the workplace and only prescribed preparations with minimum content of flammable liquids, max. 0.5 l of technical gasoline. It was found that this activity was performed by maintenance personnel in contradiction with the above-mentioned regulations using approximately 50 liters of technical gasoline (in four canisters) and 2 liters of ethyl methyl ketone (MEK). Again, in contrary to the regulations, this mixture was applied by pressurized sprayer, and in the immediate vicinity of the aircraft an COMAC C 130B electric floor cleaner was used to suck up the outflow mixture. As a result of the above described activity of the maintenance staff it gradually ranged from approximately 20:50 (start of work) to the continuous leakage of a mixture of technical gasoline, MEK and other preparations from the fuselage (where they were applied) to the floor of the hall under the fuselage. Here it was accumulated in an area of approximately 30 m². Following the initiation of a fire inside the body of the vacuum cleaner of the floor cleaning machine (probably on the electric motor commutator of the vacuum cleaner), there was a flare of flammable liquid vapors above the pool of flammable liquid, which was situated under the cart’s chassis, and from this position continued the spread over the surface of the pool of flammable liquid below the fuselage. As a result of the spread of fire in the open rear doors of the destroyed aircraft an accumulated mixture of vapors of combustible liquid in an explosive concentration with air in the interior of the aircraft was initiated and the consecutive explosion has resulted in the destruction of the airframe.

Points of interest

A similar fire became again in the same place for the same cause and under similar circumstances in 2016 but this time a much lesser consequences on a Boeing 737 aircraft.

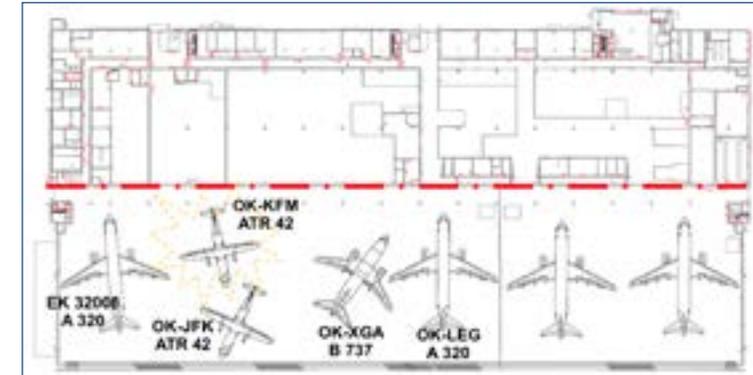


Figure 1 - Hangar floor plan.



Figure 2 - Consequences of explosion in front part of an airplane. Figure 3 - Photo from camera recording of an airplane.



Figure 4 - Criminalistics focus.

Figure 5 - Area of ignition.

EXPLOSION AT THE GAS STATION

Fire solved by: FRS of Central Bohemia, Regional headquarters, ID 2113013386, year 2013

Cause of fire: Breach of working procedures when working in explosive atmospheres - use of angle grinder.

Description of the object

It was an explosion (explosive combustion) of flammable vapors at a petrol station where complete reconstruction was being done at the time of the explosion and was completely closed to the public. There were eight fuel tank shafts built in the ground distributed in two lines of four. The middle shafts were structurally connected in a line, which means a limited movement between the tank fittings was possible. The work was carried out on four middle shafts.

At the time of the fire, the building was used only by the employees of the petrol station and the employees of the company, which carried out the overall reconstruction of the building. At the time of the fire the old tanks were dismantled. All employees were provably instructed on the principles of work safety, fire protection and environmental protection. The object of the gas station was equipped with the material of fire protection despite the ongoing reconstruction.

Event description

The fire started in the afternoon at a time when work was being carried out inside the fuel tanks leading to replace the tanks (disassembling of flanges and connecting fittings). The Point of origin was located in the Tank named „F“ where the flange of the tank was being dismantled. Inside the tanks were found traces of metallic materials, which were separated by the method of material removal (cutting, grinding,...). In addition, tools found on place were inappropriate for a work in explosive environments. There were used electric tools and people were not wearing antistatic work clothes. Employees used their own work clothes and tools without the employer's consciousness.

Points of interest

After an explosion when a worker using an angle grinder inside the tank was killed the co-workers removed the electric tools from the fire scene. Employees consistently alleged that they did not know about the using of such a tool, although it was clear from the CCTV record that they brought the angle grinder to the inside of the tank and also they used it.



Figure 1 – Gas station.



Figure 2 – Working place.



Figure 3 – View on shafts fitting.



Figure 4 – Detail view on a screw which was grinded by angle grinder.



Figure 5 - Detail view on a screw which was found in a shaft.



Figure 6 – Detail view on matrix.

FIRE TRACKED VEHICLE IN THE MINE AREA

Fire solved by: FRS of the Karlovarsky region, regional department Sokolov, ID 4115002400, year 2015

Cause of fire: Breach of fire safety conditions when doing a work with open fire - burning and welding of metals.

Description of the object

It was a mobile opened electric power equipment, located on a tracked chassis, used to transport the coal material from the mining machine to the belt conveyors. Tracked vehicle was located in the mine area on the coal bed. The tracked vehicle was made of steel. Part of the vehicle was control cabin with controls, electric substation and electrical equipment, a loading boom, a central hopper, an unloading belt boom, a walking bridges and a system of supporting and tensioning steel ropes. The length of the vehicle from the edge of the loading boom to the edge of the unloading boom was 72 meters, height 13.4 meters and width 9 meters.

Event description

The fire was spotted in the evening when burning took place in the central part of the tracked vehicle and gradually spread to other technological parts of the vehicle. The fire started at place where the burning and welding work was carried out on a tracked vehicle in the time of dry weather at an outside temperature of 26 ° C to 30 ° C and the east wind speed of 2 to 6 m/s.



Figure 1 – View on the subject during a fire.



Figure 2 – View on the subject after a fire.



Figure 3 – Point of origin.

FIRE OF BOAT

Fire solved by: FRS of the South Moravian region, regional department Znojmo, ID 6212003783, year 2012

Cause of fire: arson

Description of the object

The fire started on a passenger boat HYDROBUS type 301 with the name “DYJE”, which was anchored at berth No. 5 at the dam of the Vranov water reservoir. The fuselage reinforcing support parts of the floor and the roof structure were made of aluminum alloy. The structure of the ship was divided into nine watertight spaces where the first and last spaces of the so-called collision spaces were separated by a bulkhead along the entire length to the deck level. In the center of the vessel was the engine room, the wheelhouse, the toilets and the buffet. The remaining space was used for the transportation of persons. The floor was wooden and covered by an office carpet. Sheets and ceilings were fitted with high-pressure laminate boards and wood-fiber boards. The chairs were fixed to the floor. The chairs were the same as delivered to IKARUS buses. The ship was equipped with a wall hydrant system and portable fire extinguishers. Basic technical data: year of construction 1959, manufacturer Dunai Hajógyár Hungary, powered by two diesel engines, each 125 kW, fuel tank 4x 500 l, length 26,66 m, width 5,69 m, number of waterproof compartments 7 + 2 collision spaces, maximum occupancy 150 persons.

Event description

The fire started in the late night hours when a loud hollow sound was recorded at the time of the fire, with subsequent cracking. A witness of the fire said that the sound resembled an explosion. This fact is confirmed by the CCTV record, on which is shown the sudden flare of the ship and the spread of the fire. Fire started in the middle of the ship from where it subsequently spread across flammable structures to other parts of the ship.

Points of interest

The extinguishing of the fire was hindered for the fire units by limited access from the pontoon. In addition, during the fire, the anchor ropes burned out, and the ship began to move away. As a result of the damaged reinforcement and the hull of the ship due to a fire it could be broken. A powerboat was used to bring the ship back to the pier. Due to the fire of the ship on the water surface a sufficient amount of water was provided for extinguishing. But there has to be taken into account the effectiveness of extinguishing using a minimum amount of extinguishing agent. The sinking of the vessel had to be avoided, because there was a risk of water in the water reservoir Vranov being contaminated by the operating fluids of the ship. Water reservoir is the source of drinking water for the surrounding area.

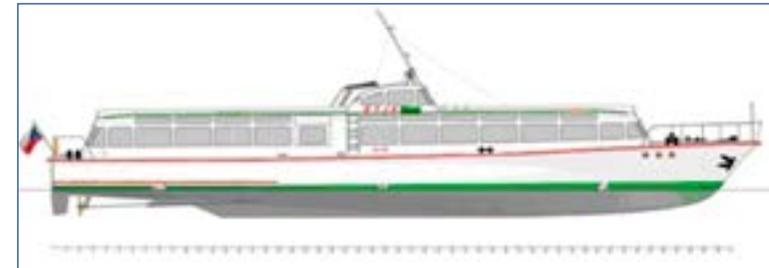


Figure 1 – Boat model (www.hajoregiszter.hu).



Figure 2 – Situation before a fire.



Figure 3 – Situation with point of origin marked.



Figure 4 – Fire (captured by Jakub Třeštík).



Figure 5 – Place of fire occurred.

FIRE OF THE HARVESTER TYPE 9230

Fire solved by: FRS of Central Bohemia, regional department Benešov, ID 2113011955, year 2013

Cause of fire: overload / blocking of the balancing system of the sieve box (shaking).

Description of the object

The fire of the harvester was caused due to overloading / blocking of the balancing system of the sieve box (shaking). The barrier created a braking force blocking the smooth operation of the electric motor and did not allow sufficient conversion of electrical energy into mechanical work. The resulting “ohm losses” in the rotor winding caused emission of the “Joule’s heat” to the enclosed space. Cumulative heat generation led into rise of temperature. The heating of the system negatively affected the thermal degradation of the insulating layer of the winding conductor, creating inter-screw short circuits with a higher flow of electric current (proportionally rised the total heat radiated). The whole process consequently graduated into the initiation of burning of the surrounding plastic components and accumulated dirt from grain process. Blocking the balancing system of the sieve box has resulted from an unspecified rigid barrier that hinders the movement of the horizontal plate (such as stone, rock or dirt).



Figure 1 – Case 9230 harvester with marked criminalistics focus.



Figure 2 – Harvester of same construction.



Figure 3, 4 – Comparison of damaged and undamaged electromechanical system of harvesters sieve box.



FIRE OF FACTORY HALL

Fire solved by: FRS of Vysočina Region, regional headquarters, ID 6113000205, year 2013

Cause of fire: A technical fault in the Bosch 18 Volt, Li-Ion, 2.6 Ah accumulator module caused by its non-standard use in strapping machines with different power.

Description of the object

It was a factory hall with an external dimensions of 15.85 x 61 m. The building system of the hall was non-flammable. The perimeter walls were made from classical full bricks. The roof structure of the saddle roof with a slight inclination was formed by steel trusses, on which at wooden laths trapezoidal sheet was attached the thermal insulation - polystyrene and bituminous covering. The height of the hall was 5.2 m in the top. The fire started in a small hand-held warehouse of the dimensions 2.4 x 6.1 m. Warehouse walls were made of wood fiber boards (MDF). Besides storing paper and waste there was also a sofa and lockers in this warehouse where workers stored the hand tools and they also charging it there. The entire hall and the warehouse was one fire section. Wood fiber boards composite furniture and packaging materials were stored in the hall.

Event description

The fire started on Saturday at 12:30. Last workers left the hand-held warehouse on Friday at 22:00. The last activity the workers had in the hand-held warehouse was charging the battery to the strapping machine after about 15 minutes the battery was charged and the worker then the charger pulled out of the socket (this was confirmed during the examination of the fire scene).

The cause of the fire was a technical fault in the Bosch 18 V, Li-Ion, 2.6 Ah battery pack (next only „AKU1“) which was stored in the Bosch AL 1860 CV stand-alone battery charger. This technical failure of AKU1 was the result of a previous non-standard use when the module inappropriately powered the OR-T 250 strapping machine with a nominal voltage of 14.4 volts with a nominal voltage of 18 V. By active strapping function (especially its EC motor) was overloading the AKU1 and thereby destroying its elements. Critical damage to one of the elements then, along with the fast-charging procedure, initiate the process of successive self-discharge of its fully charged paired cell (pairing for higher capacity).

The gradual increase of the current resulted in the emission of thermal energy and also the increase of the temperature in the AKU1, which was initiatory in relation to the fire.

Points of interest

Warehousemen Stanislav and Milan reported that the “German strapping machine“, ie the BXT2 had two batteries (Bosch 18 V) and „Czech“, ie OR-T 250, only one (Bosch 14.4 V). These batteries were used in both types of strapping machines, always replacing the discharged with a charged one. According to the statement of the warehouse they used all three batteries at both straps. By examination the whole hand-held warehouse only two accumulators and one charger were found. To avoid confusion of other types of accumulators, strapping machines and accumulators are provided with grooving. It had to be deliberately modified to allow confusion of the accumulators. This means that the modification had to be deliberately removed by one of the five warehousemen, who had to steal one battery with the charger. In spite of repeated interrogations the offender was not identified and the case had to be postponed by the Czech Police.



Figures 1, 2 – OR – T 250 strapping machine.



Figures 3, 4 – Comparison of two batteries.



Figure 5 – Complete assembly of battery.

FIRE ON THE DESK

Fire solved by: FRS of the South Moravian region, regional department Břeclav, ID 6205000661, year 2005

Cause of fire: unexpected change in operating parameters.

Description of the object

It was an older corner building from the first half of the 20th century situated in a row of urban area. The building was made of bricks with basement two-story with usable attic under a saddle roof with a non-flammable cover. The whole object was used for the office's purposes. The place where the fire started was located in the 2nd floor in the head of the department office, which was situated to the south side of the street.

Event description

Investigation of a fire in co-operation with members of the Czech Police in Břeclav and on the basis of the explanations given by the employees the following facts had been identified:

1. The Point of origin and place of fire were located on a wooden desk in a place where elaborate written materials (writings) were stored near there were no electric initiators. Computers by the windows at a distance of about one meter were not damaged. Electric lamps with covers over desks were not damaged.
2. In the immediate vicinity of the writings was a glass, transparent ball (paperweight) with a diameter of 7.5 cm, by which the worker had built folded A4 paper with notes, focus cone, including ash was engraved on a wooden desk from a glass paperweight to the stored files.
3. The office was locked after working hours on Friday afternoon after which cleaning was carried out. The cleaning woman picked up trash cans and locked the office again.
4. The aftermath of the fire were noticed on Monday morning by a female employee, who smelt smoke in the hallway after she arrived had unlocked the door of the neighboring office and saw that the office was burnt down, nowhere has anything been burning or shouldering.
5. Both office workers do not smoke there is smoking prohibition in the office.
6. Both windows of the office are located south to the street, they are without curtains and sunblind, curtains were cut off. The headmaster said the curtains were cut off because of the flowers in the office.
7. At the time of the fire, the two days of the weekend shone sun intensely into the windows of the office without shadowing by the clouds.

Due to the intense sunlight and the storage of flammable material (paper) in the immediate vicinity of the glass paperweight, there was a physically optic phenomenon - the focusing of the optical bundle with subsequent ignition of flammable office paper. According to the literature, two basic physical and optical conditions for the ignition of slightly flammable substances have to be met. There should be no filtering or substantial weakening of the long-wavelength of the spectrum of infrared sunlight. Rays must be bent on a sphere that separates two optical environments into one focus. The smooth clear deflected glass balls the matte surface and the scarring that the sun's rays have long passed, have fulfilled these conditions.

Points of interest

From the burning office paper the fire spread to the near elaborate writing materials, the wooden boards of the two writing desks and other hold over items of flammable materials. After exhausting air oxygen in a closed room a subsequent self-extinguish followed. The fire did not spread outside the office room.



Figure 1 – View captured from right side.

Figure 2 – View captured from left side.



Figure 3 – Detailed picture of transparent glass ball. Figure 4 – Detailed picture of a back side of a table.

FIRE OF A BUS WITH CNG GAS INSTALATION

Fire solved by: FRS of Pilsen Region, ID 3215003057, year 2015

Cause of the fire: technical fault in the vehicle's oil system.

Description of the object

A fault on the tightness of the oil system occurred during the ride of the vehicle and it caused that the oil leaked (under pressure) out from the lubrication system. Hot surface of the exhaust pipe close to the leakage ignited the oil. The fire started to spread from the engine toward the front part of the bus. Approximately after 10 minutes the fire increased the temperature around CNG cylinders (placed on the roof of the bus) above the temperature limit.

CNG multifunctional cylinder valves (with thermal fuses) responded to these conditions and controlled leakage occurred. This was reflected by upward fire jet which persisted several tens of second. Any CNG cylinders explosion did not occur. None of passengers were injured, but the bus was completely destroyed.

Points of interest

That was the first CNG bus fire in the Czech Republic. All security features of CNG system work properly (in the past foreign reports mentioned several explosions of CNG tank due to a failure of security features).



Figure 1 – the CNG bus.



Figure 2 – CNG bus after the fire.



Figure 3 – CNG cylinders on the roof of the bus.



Figure 4 – Thermal fuse.



Figure 5 – The rear part of the bus - engine.

FIRE OF A GARAGE

Fire solved by: FRS of Pilsen Region, ID 3214002329, year 2014

Cause of fire: negligence in use an electric heater and combustible liquid.

Description of the object

The fire occurred in garage placed in garage grounds. The ground plan of the garage was 2.8 m x 5.8 m, height 2.2 m. Horizontal and vertical structures were concrete, the roofing was made from asphalt board. The electricity was installed in the garage (single-phase electric distribution 230 V, the main circuit breaker 10 A). The garage had one entrance - metal door with a concrete counterweight secured with two padlocks.

Event description

The fire occurred at night. When the fire unit arrived, the fire was widespread in the whole garage interior, door was opened, the bundle of keys and unlocked padlocks were laying on the ground in front of the garage as well as a large pot full of unknown liquid.

The investigation revealed that a lot of suspicion things were present in the garage – e. g. various chemical packaging, medicines and electric cooker. This signs indicated illegal drug production.

A specialist from the department of forensic technique and expertise was called to the place of the event and secured 13 chemical pieces of evidence. In these samples the chemical test confirmed substances used for the production of pervitin (e. g. phosphorus, toluene, hydrochloric acid) and one sample contained the final product of pervitin - methamphetamine.

From the above was found that the garage had been used for an illegal drug production. For this purpose the chemical substances were dissolved in the pot, which was placed on an electric cooker. The heating spiral of the cooker ignited vapors of the toluene and the fire started to spread. One person was burned (second-degree burns on his hands and head).

Points of interest

The police failed to prove to the person concerned the use of found chemicals for the production of pervitin and the criminal prosecution was postponed. Then the case was handed over to the FRS of the Pilsen region where the case was closed by imposing a fine for negligence fire.



Figure 1 – Fire attack.

Figure 2 – Position of the entry door at the time of fire unit arrival.



Figure 3 – Pot used for pervitin production.

Figure 4 – Interior of the garage.



Figure 5 – Point of origin - left side.

Figure 6 – Table on which the electric cooker was placed.

LPG CAR EXPLOSION IN A GARAGE

Fire solved by: FRS of Vysočina Region, ID 6140400190, year 2004

Cause of fire: negligence - unauthorized manipulation with the LPG system.

Description of the object

There was a car with installed LPG system (Dodge Intrepid 3.4, 1993), which parked in the underground garage of family house. House floor plan dimension 11.5 m x 13.6 m. Walls were made of bricks, ceiling structure was made of ceramic blocks attached to steel beams. Gable roof was made of wooden beams covered with roof tiles. The house was built during the years 1982 - 1985.

Event description

The fire occurred in the afternoon when the owner of the car was trying to clean up the gas fuel filter placed inside the solenoid valve due to the low engine power.

When he loosed fitting of solenoid valve placed in engine he immediately noticed the gas leakage from this place.

He was not able to tighten the screw sufficiently, therefore there was a permanent gas leakage for some time. In the basement, the gas concentration increased above the lower explosive limit.

Despite his efforts to eliminate potential initiators (electricity switching off in the whole building) the explosion with subsequent fire occurred. The pilot burner of boiler placed in an adjacent room was determined as the initial source of the explosion.

Points of interest

The LPG system had been installed in the car since 1999 but the owner had not performed compulsory regular expert inspections (revisions) by an expert - for this type of vehicle the interval of inspection is determined each 50.000 km or one year.

Any unauthorized manipulation with the LPG system by unauthorized person is prohibited, all repairs and maintenance are allowed to be performed by a qualified person only.

In the Czech Republic, the regulations do not allow repairs and maintenance of LPG cars in underground or insufficiently ventilated spaces without protective elements.

In this case, the gas leakage occurred also due to a malfunction of the shut-off cylinder valve. It was caused by impurities and neglect of maintenance. The shut-off cylinder valve is controlled by solenoid valve and it should have been closed because the car was not in operation. Therefore when the user loosed the fitting of a solenoid valve the gas could leak.



Figure 1 – House and the car after pulling out of the garage.



Figure 2 – Car engine - solenoid valve (blue arrow).

Figure 3 – Place of the gas leak - fitting of the solenoid valve.



Figure 4 – Shut-off cylinder valve.

Figure 5 – Damage to the garage under the house.

GAS EXPLOSION

Fire solved by: FRS of Capital of Prague, ID 1113002697, year 2013

Cause of fire: neglect of safety regulations.

Description of the object

The object was located in the historically protected area of Prague. The house was formed as a closed „palace“ disposition with an inner courtyard. On the first floor of the building there were two galleries, a warehouse, an archive and a reception, on the second and third floor there were offices only. Walls of the building were bricked, the ceiling above the basement was predominantly vaulting above other floors and was made of wooden beam structures. The roof was made of wooden rafters and purlins. The building was built during the years 1935-1936, the last reconstruction took place in 2005.

Fire safety equipment was installed in the building – e. g. fire dampers, fire extinguishers, electric fire alarms, fire hose reels).

Safe leaving of the object was secured with two protected escape routes (both type A).

Event description

In the morning, the explosion of natural gas occurred on the ground floor parts of the building, where the warehouse and the archive were placed.

In the course of the investigation, it was necessary to find out the location of the gas leak. For this purpose, gas pressure tests were performed on the pipelines, both inside and outside the building (in the distribution network). The result of the tests revealed that the gas leakage occurred on a pipeline below the roadway, approximately one meter from the perimeter walls of the building.

After the excavation work, it was revealed that the pipeline leakage was caused by electrical breakage arc, which occurred after the contact of metal gas pipeline with underground tramway traction line.

Nobody died, 43 people were injured, 230 people evacuated. The explosion damaged 16 houses and 16 cars.

Points of interest

The investigation revealed that during the laying of the gas pipeline between the years 1977 and 1978, the construction process did not follow the approved project documentation and it was contrary to the valid regulations. The gas pipeline was placed directly on the underground tramway traction wire, without the required distance or concrete protector. Considering the fact that the responsible construction manager died long before the event occurred, the case was postponed. CCTV record significantly helped the investigators to clarify the situation before and after the explosion, especially the original location, time, and course of the explosion.



Figure s (1. – 12.) – CCTV record – course of the explosion

1) normal condition; 2) place of initiation; 3) preparing of explosive mixture; 4) preparing of explosive mixture; 5) explosion and pressure increase; 6) explosion and pressure increase; 7) explosion and pressure increase; 8) explosion and pressure increase (maximum); 9) secondary explosions (gas accumulated in the drain in front of the building); 10) secondary explosions (gas accumulated in the drain in front of the building); 11) moving of CCTV camera caused by pressure wave; 12) end of explosion

FIRE OF A TOASTER IN THE KITCHEN

Fire solved by: FRS of Capital of Prague, ID 1116003488, year 2016

Cause of fire: negligence in securing the control of the cooker before unintentional switching on (by pet).

Description of the object

The toaster was placed on a glass ceramic plate of a stove in an apartment (disposition 3 rooms). The apartment was situated on the 1st floor of a residential building (total 3 floors). The whole apartment created one fire compartment. Horizontal and vertical load-bearing and non-load bearing structures were made by masonry (fire resistance REI 120 / EI90).

Event description

When the FRS of Capital of Prague arrived to the fire scene a smoke with acrid smell was spreading out through the entrance door of the apartment unit. Firefighters forcibly entered the entrance door and found the toaster in the fire laying on the glass-ceramic plate of kitchen stove. The on-site investigation revealed that the toaster placed on the glass ceramic plate was not plugged into an electricity source. The apartment user stated that he had left the apartment about three hours before the fire occurred. The user also said that he had been preparing breakfast in the morning and he had used a toaster only - he had not used the glass-ceramic plate. At the time of the fire, nobody was present in the apartment except a cat which could move around the apartment. Another investigation revealed that firefighters recorded the light of the ceramic plate power indicator during the fire extinguishing and the users confirmed that the cat turned on the glass-ceramic plate by jumping on it.

Points of interest

The investigation found that the unintentional switching on of the glass ceramic plate by the domestic animal can occur in spite of the activated child safety device, which the animal turns off first with its movement.



Figure 1 - The glass ceramic plate in the kitchen unit.



Figure 2 - The toaster.

FIRE OF A FRUIT DRYER

Fire solved by: FRS of South Bohemian Region, District Tábor, ID 3115008023, year 2015

Cause of fire: manufacturing defect of the fruit dryer.

Description of the object

The fruit dryer was situated on a cupboard in the utility room of a family house. Information and parameters of the fruit dryer: brand - Silver Crest, IAN 111549, FoodDehydrator SDA 260A1, distributor - a food chain, manufactured by TARGA GmbH, operating Voltage 230-240 V, electric input power 230 to 260 W, weight approximately 1,255 kg. The connection to the power supply was via stranded wire and a plug, operating temperature range from 35°C to 70°C, white color. Drying trays can be laid down in layers and closed from above.

Event description

The fire was detected by the owner of the family house at night hours approximately two hours after the start of the drying process. The affected area was defined by the floor plan of the fruit dryer. The damage of the chipboard table, on which the dryer was placed, was surface only (several millimeters). The fire was caused by technical dysfunction of the electrical parts of fruit dryer (possible initiators: electrical short circuit, electrical transient resistance, current overload or ignition of plastics in the vicinity of electric heating spirals).

Points of interest

The fire occurred around four months after the purchase of the product at the German retail chain sales of food. FRS of South Bohemia Region was contacted by a representative of this distributor in order to obtain the manner and circumstances of a fire investigation and information whether any evidence had been secured. The burned torso of fruit dryer was passed on the distributor, which carried out an expert examination in Germany. On the basis of the expert report, this product was withdrawn from the market due to a manufacturing defect.



Figure 1 - Overall view of the fire scene in utility room of family house.



Figure 2 - The warning the public to withdraw the dangerous product from the market (published on entry to the store and on the website for 3 months).

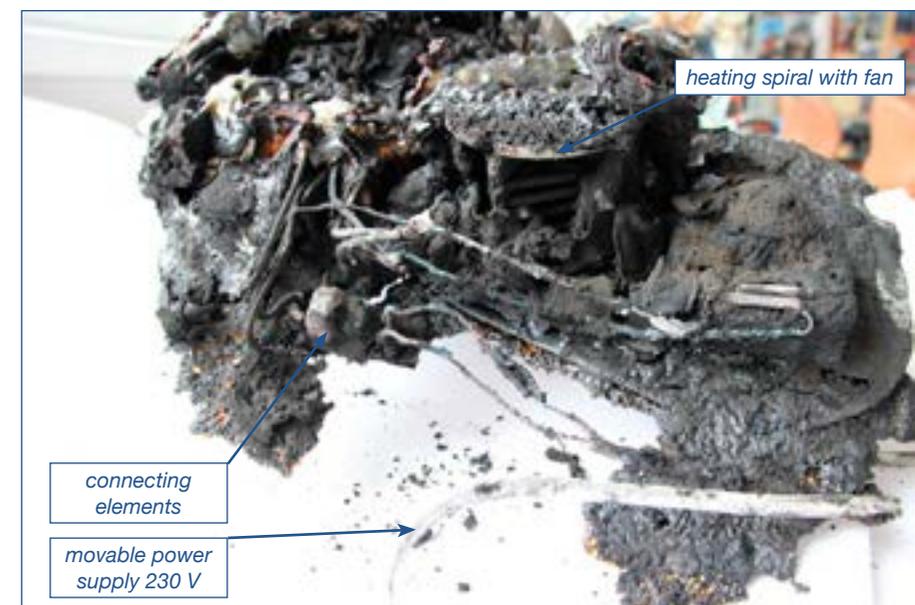


Figure 3 - The point of origin on the base unit of the fruit dryer.

LAUNDRY FIRE IN THE CARGO COMPARTMENT OF THE VAN

Fire solved by: FRS of South Moravia Region, District Brno-city, ID 6214001417, year 2014

Cause of fire: chemical auto-ignition.

Description of the object

There was a Volkswagen Crafter TDI parked in a parking lot on a public road. There were five laundry cages in the cargo area of this car (dimensions approximately 0.8 x 0.8 x 1.5 m), these cages were filled up with washed laundry. The car was locked and there were not any signs of violent intrusion during the fire.

Event description

The van driver stated that he loaded his laundry in laundry house at 3:00 p.m. and then around 4:00 p.m. he parked the car in the parking lot. Around 11:00 p.m. his wife walked around the van and noticed smoke coming out of the van. She told the driver and he went to see what happened. He opened the side door and found glowing combustion inside the last cage closest to the back door. He opened the back door using the lifting ramp and pulled the cage out. After the cage left the cargo space the glowing combustion changed to flame. So he called on emergency line 112. By on-site investigation was found that there was not any evidence of violent intrusion or technical fault, which could cause the fire. The person, who had carried the laundry cleaning, stated (by phone) that the cage contained cotton laundry used in a massage salon and the laundry was washed in an ordinary manner in a washing machine, not chemically cleaned. Therefore, the laundry could contain residues of massage oils even after washing.

Professional literature (Tables of Flammable and Dangerous Substances issued by the Czechoslovak Fire Protection Association, Prague 1980):

Cotton is a flammable fiber, has a tendency to chemical auto-ignition. Vegetable oils on cotton very quickly oxidize (risk of auto-ignition!). For example, a cotton pack of dimension 105 x 105 x 105 mm dipped in 200 g olive oil is ignited at 40 ° C for nine hours. The order of vegetable oils according to the tendency to oxidize on cotton: castor oil, cottonseed oil, linseed oil, chinese wood oil.

Points of interest

A similar case occurred in Brno in 2007, where the fire started in a laundry house. Affected laundry was also used in a masseur salon. The laundry's owner left this laundry in a basket the day before the fire at 7:30 p.m. The investigation estimated the start of the fire at 4 am the following day (approximately 8 hours after washing and drying). As the cause of the fire was determined as autoignition.



Figure 1 - Burning laundry cage.



Figure 2 - Laundry cage after extinguishing.



Figure 3 - Vans cargo space.



Figure 4 - Vans side.

FIRE OF A FAMILY HOUSE

Fire solved by: FRS of South Moravia Region, District Blansko, ID 6212000460, year 2012

Cause of fire: negligence in use of a vacuum cleaner.

Description of the object

The small one-storey family house, floor plan approximately 7 x 6.5 m, age 100 years. The whole house constituted one fire compartment. Walls of the house were brick and plastered. The ceiling was made from wooden beams, plastered planks and thermal insulation (chaff). The saddle roof was covered with a bag. The windows and doors were wooden, doubled glazed. The house was electrified.

The main heating source was solved by solid fuel stove, which was used to prepare meals also. The second heating source - thermal storage heating stove - was not plug in.

Event description

The house user lived here alone and with the owner's permission he heated the whole house with the solid fuels stove. For this reason, he removed all room doors except entrance and toilet doors. A witness confirmed that user used the stove in the morning on the day of the fire and then he left the house, when he came home in the evening he was drunk. He used the vacuum cleaner to remove ash from the solid fuel stove. The user placed the vacuum cleaner with accessories into a cardboard box, then he put the box on the floor in front toilet door to keep the door open and to improve heating of the room. Then he rested on the bed and probably fell asleep. Embers inside the vacuum cleaner ignited the paper bag and from this place and the fire spread on the whole vacuum cleaner and the cardboard box with accessories. Closed windows limiting the amount of oxygen in the air caused incomplete combustion joined with high producing of carbon monoxide. The user woke up and tried to go to the window and open it, but unsuccessfully. He fell down on the floor and died. The autopsy determined the cause of his death as carbon monoxide poisoning in combination with drunkenness. Later the fire went out itself.

Points of interest

The first sign of the fire (changing colors of windows glasses caused by soot) was noticed by a neighbor, but she just thought the user had new blinds installed. And because she also noticed lights in the house and radio voice coming from the house, she did not pay attention to this sign. Next day the house owner came to visit the user. When she unlocked the entrance she smelled smoke and found dead user lying on the floor. She also found burned stuff in front of the toilet door which later the fire investigator identified as the vacuum cleaner with accessories and an original packaging - the cardboard boxes.



Figure 1 - Floor plan of the house.



Figure 2 - Point of origin - burned vacuum cleaner in front of the toilet door.

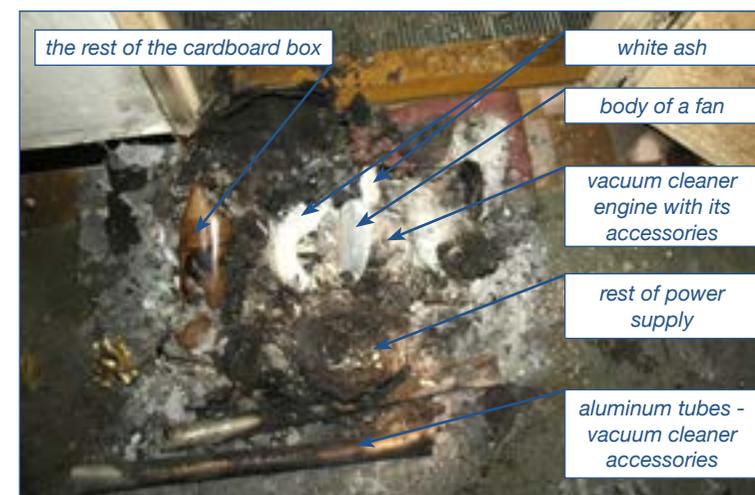


Figure 3 - Point of origin - detail.

Dictionary

ANGLICKY	ČESKY
Accelerated combustion	Urychlené hoření
Accident	Nehoda, úraz
Actual loss	Vzniklá ztráta
Actual value	Reálná hodnota
After- flame	Dohořívání
After- flame time	Doba dohořívání, doba samovolného hoření
Aftercombustion/afterburning	Dohořívání
Aid	Pomoc
Airplane	Letadlo
Amount	Částka
Amount of damage/loss	Výše/částka škody
Applicant	Zájemce, žadatel
Area	Nástupní plocha
Arson	Žhářství, úmyslné založení požáru
Arsonist	Žhář
Ashes	Popel
Ashtray	Popelník
Assembly area	Shromažďovací prostor
Assesment of claim	Odhad škody
Assesment of fire risk	Posouzení požárního nebezpečí
Authorized person	Pověřená osoba
Autogenous heating	Samovolné zahřívání
Autogenous ignition	Samovznícení
Autoignitation temperature	Teplota vznícení
Automatic fire detection and alarm	Elektrická požární signalizace
Beam	Nosník
Blackmail	Vydírání
Blame	Zavinění
Boiling temperature	Teplota varu
Breach	Porušení
Building	Budova
Burn	Spálenina, popálení, spálení
Burn (to)	Hořet, spálit
Burn out	Vypálení, propálení
Burner	Hořák
Burning rate	Rychlost hoření

Burnt area	Spálený prostor
Bursting	Výbuch (exploze)
Cable	Kabel
Carbonization	Karbonizace, zuhelnňování
Cardboard	Lepenka
Cargo	Náklad
Carrier	Dopravce
Cash	Peníze, hotovost
Cause	Příčina
Cause (to)	Zapříčinit
Cladding	Krytina, oplechování
Claim	Nárok
Class of construction	Druh stavby
Clearance of debris	Odstranění suti
Coating	Nátěr
Collapse	Zhroucení, zřícení
Column	Sloup
Combustible dust	Hořlavý prach
Combustible gas	Hořlavý plyn
Combustible liquid	Hořlavá kapalina
Combustible material	Hořlavá hmota
Combustible metal	Hořlavý kov
Combustible solid	Hořlavá pevná hmota
Combustible vapours	Hořlavé páry
Combustible with difficulty	Těžko hořlavý
Combustibles	Hořlaviny
Combustion product	Zplodina hoření
Company	Společnost
Conscious violation	Vědomé porušení
Consent	Souhlas
Container	Kontejner
Contamination	Kontaminace
Contract	Smlouva
Controlled combustion	Řízené hoření
Convective heating ignition	Vznícení přenosem tepla konvekcí
Cooling	Chlazení
Corrugated metal	Vlnitý plech
Cost of replacement	Náklady na výměnu
Cover damage (to)	Krýt škodu
Criminal act	Trestný čin

Damage	Poškození
Damage caused by extinguishing the fire	Škoda způsobená hasebními pracemi
Damaged object	Poškozená věc
Danger	Nebezpečí
Dead – burned	Vypálené „na škvarek“
Deadline	Lhůta
Defective product	Vadný výrobek
Degradation	Degradace
Device	Zařízení, mechanismus
Dust	Prach
Dust explosion	Výbuch prachu
Dwelling unit	Obytná buňka
Effect	Platnost, účinek
Elapse (to)	Uplynout
Elevator	Výtah
Emergency exit	Nouzový východ
Engine	Motor
Entry	Vstup
Environment	Životní prostředí
Escape direction	Směr úniku
Escape route (protected)	Úniková cesta (chráněná)
Expert	Znalec
Expire (to)	Zaniknout
Exposure	Vystavení
External wall	Obvodová zeď
Extinguish a fire	Uhasit požár
Extinguishing system	Hasicí zařízení
Fan	Větrák
Fault	Zavinění
Fence	Plot
Fine	pokuta
Fire	Oheň, požár
Fire code	Požární předpisy
Fire compartment	Požární úsek
Fire control	Lokalizace požáru
Fire door	Požární dveře
Fire extinguisher	Hasicí přístroj
Fire insurance	Pojištění pro případ požáru
Fire investigator	Vyšetřovatel požáru
Fire penetration	Prohoření

Fire resistance	Požární odolnost
Fire risk	Požární riziko
Fire safety	Požární bezpečnost
Fire separation	Požární dělení
Fire wall	Požární stěna
Flame	Plamen, oheň
Flame (fire) retardant	Retardér hoření
Flame colour	Barva plamene
Flame combustion	Plamenné hoření
Flame ignition	Vznícení plamene
Flame propagation rate	Rychlost šíření plamene
Flame spread	Šíření plamene
Flame temperature	Teplota plamene
Flammability	Hořlavost
Flammable	Hořlavý
Flammable liquid	Hořlavá kapalina
Flash	Vzplanutí, záblesk
Flash temperature	Teplota vzplanutí
Flashless	Bezplamenný
Flashover	Celkové vzplanutí
Floor area	Podlahová plocha
Flying brands	Létající částice, oharky
Force majeure	Vyšší moc
Foreign	Zahraniční, cizí
Forest	Les
Fork lift truck	Vysokozdvizný vozík
Form	Formulář
Fraud	Podvod
Frequency	Četnost
Fuel	Palivo
Fumes	Páry
Furnace	Pec
Gas	Plyn
Gasoline	Benzín
Girder	Nosník, trám
Glow	Žhnout, žár
Glowing red	Rozžhavený do červena
Government	Vláda, stát
Government supervision	Státní dozor /dohled
Ground floor	Prizemí

Guaranty	Záruka
Gypsum / gypsum wall	Sádra, sádrové stěny
Harmful	Škodlivý
Harmless	Neškodný
Hazard	Nebezpečí, riziko
Heat flux	Tepelný tok
Heat release	Uvolňování tepla
Heat transmission / transfer	Přenos tepla
Heating system	Topení
Heating value	Výhřevnost
High temperature	Vysoká teplota
Humidity	Vlhkost
Hydrocarbon	Uhlovodík
Hydrogen	Vodík
Hydrogen cyanide	Kyanovodík
Hydrogen peroxide	Peroxid vodíku
Hydrochlorid acid	Kyselina chlorovodíková
Chassis	Podvozek
Chimney effect	Komínový efekt
Chipboard	Dřevotříska
Ignitable	Vznětlivý
Ignite (to)	Vznítit se
Impact of vehicles	Náraz vozidel
Implosion	Imploze
In writing	Písemně
Indemnity	Odškodnění
infringement of the duties	Porušení povinností
Injury	Úraz
Inspection	Kontrola
Insurance company	Pojišťovna
Insurance conditions	Pojistné podmínky
Insurance contract	Pojišťovací smlouva
Insurance fraud	Pojišťovací podvod
Investigation	Vyšetřování
Is liable to	Je povinen
Jack	Stabilizační podpora
Joining beam	Vazník
Joint	Spára, kloub, spoj
Joist	Stropní nosník tvaru „I“
Juveniles	Mladistvý

Laboratory	Laboratoř
Leakage	Vytékání
Legal entity	Právní osoba
Legislation	Právní předpis
Lessor	Pronajímatel
Lifetime	Životnost
Lift	Výtah
Lightning	Blesk, úder blesku
Lightning conductor	Hromosvod
Litigation	Soudní spory
Litter	Odpadky
Loadbearing structure	Nosná konstrukce
Location	Místo
Lock	Zámek
Lorry , truck	Nákladní vůz
Loss	Ztráta, škoda
Lost profit	Ušlý zisk
Lower limit of explosibility	Dolní mez výbušnosti
Lower limit of flammability	Dolní mez vznícení
Lubricant	Mazadlo
Maintenance	Údržba
Major loss	Větší škoda
Management	Vedení
Manual	Návod
Masonry	Zdivo
Material damage	Věcná škoda
Mineral wool	Minerální vlna
Minor loss	Drobná škoda
Missing object	Pohřešovaná věc
Modification	Úprava
Moisture	Vlhkost
Mortar	Malta
Naked flame	Otevřený plamen
Natural person	Fyzická osoba
Natural ventilation	Přirozené odvětrávání
Negligence	Nedbalost
Neighbouring area	Sousední prostor
Nitric acid	Kyselina dusičná
Non sparking	Nejiskřivý
Non sparking tools	Nejiskřivé nářadí

Number of claims	Počet škod
Obligation	Povinnost, náležitost závazek
Occupancy	Obsazení osobami
Occupant load	Projektovaný počet osob
Office hours	Úřední hodiny
Oil	Nafta
Open flame	Otevřený plamen
Operator	Obsluha
Origin	Vznik, původ
Outbreak of fire	Vypuknutí požáru
Overall	Celkový, úhrnný
Overall height	Celková výška
Overall width	Celková šířka
Oversight	Přehlédnutí, omyl
Overturn	Převrátit
Padlock	Visací zámek
Paid to date	Zaplaceno do
Pain	Bolest
Penetration	Prostup
Physical explosion	Fyzikální výbuch
Pilot flame	Zapalovací hořák
Pipeline	Potrubí
Plasterboard , gypsum	Sádrokarton, sádra
Pole	Stožár
Power line	Elektrické vedení
Priming	Sání
Probability	Pravděpodobnost
Property	Majetek
Proposal	Návrh
Protected escape route	Chráněná úniková cesta
Radiant heat	Sálavé teplo
Radiation	Záření, radiace
Railway	Železnice
Raising	Zvedání
Raw material	Surovina
Real value	Skutečná hodnota
Record	Evidence, záznam
Registered office	Hlavní sídlo
Remote control	Dálkové ovládání
Remove (to)	Odstranit

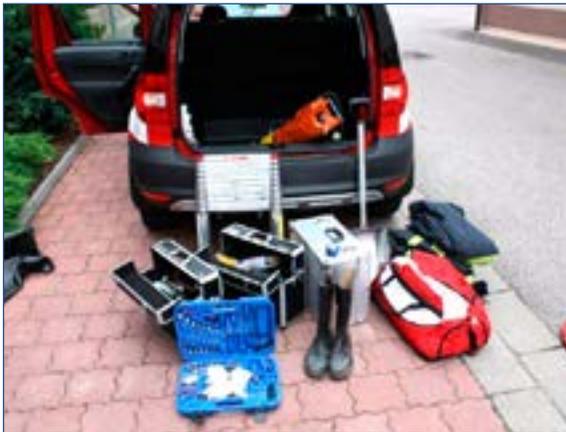
Replace (to)	Nahradit, vyměnit
Report	Zpráva
Request (to)	Žádat, vyžádat
Return	Navrácení
Risk	Riziko, nebezpečí
Roof	Střecha
Roof covering	Střešní krytina
Roof venting	Střešní větrání
Rubbish	Odpadky
Sabotage	Sabotáž
Safe	Trezor
Safety /fire patrol	Bezpečnostní / požární hlídka
Safety camera	Bezpečnostní kamera
Safety device	Bezpečnostní zařízení
Safety officer	Bezpečnostní technik
Safety regulation	Bezpečnostní předpisy
Self – closing	Samozavírací
Self – ignition temperature	Teplota samovznícení
Self-ignitation	Samovznícení
Separation distance	Bezpečnostní vzdálenost
Shift	Směna (pracovní)
Shock wave	Rázová, tlaková vlna
Short circuit	Zkrat
Smoke	Kouřit, kouř, dým
Smoke damage	Škoda způsobená kouřem
Smoke spread	Šíření kouře
Smolder	Doutnat
Smouldering	Doutnání
Source of ignition	Zdroj zapálení
Speed	Rychlost
Speed of spread of flame	Rychlost šíření plamene
Spontaneous combustion	Samovznícení
Spread	Šířit se
Spread of fire	Šíření ohně
Stability	Stabilita
Staircase	Schodiště
Standard	Norma
Static electricity	Statická elektřina
Steam	Pára
Steel	Ocel



Storage	Sklad,skladování
Store	Skladovat
Suitable	Vhodný
Supervision	Dozor
Surroundings	Okolí
Suspended ceiling	Zavěšený podhled
Tank	Nádrž
Tank vapours	Páry v nádrži
Technical competence	Technická způsobilost
Technical documentation	Technické podklady
Technology	Technologie
Temperature	Teplota
Tenant	Nájemce
Test	Zkouška, test
Test report	Protokol o zkoušce
Test sample	Zkušební vzorek
Thermocouple	Termočlánek
Tool	Nástroj
Tools	Nářadí
Transmission	Převodovka, přenos, předávání
Transportation	Přeprava
Undamaged	Nepoškozený
Uniform	Pracovní stejnokroj
Unprotected escape route	Nechráněná úniková cesta
Untimely, prematurely	Předčasně
Upper limit of explosibility	Horní mez výbušnosti
Upper limit of flammability	Horní mez vznícení
Upper storey	Vyšší patro
User	Provozovatel
Vacuum	Podtlak
Valid	Platný
Validity period	Doba platnosti
Value	Hodnota
Vapour , steam	Pára
Ventilation ducts	Ventilační rozvody
Violate	Porušit
Visibility	Viditelnost
Warehouse	Sklad
Warning	Varování
Water	Voda

Water pollution	Znečištění vody
Wear and tear	Opotřebení a trhání
Weight	Váha
Weld	Svářet
Welding	Svařování
Wind	Vítr
Wind speed	Rychlost větru

Some of vehicles and equipment used by Fire Investigators in Czech Republic



Czech Fire Investigators dislocation



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Vydal	MV-generální ředitelství Hasičského záchranného sboru ČR, Kloknerova 26, 148 01 Praha 414
Tisk	Tiskárna Ministerstva vnitra, p.o., Bartůňkova 4, 149 01 Praha 4
Vydání	první
Rok vydání	2017

ISBN: 978-80-87544-64-8

