



Accidents in small fireworks warehouses

Two serious accidents that recently occurred in France along with others from the more distant past recall the risks associated with handling fireworks in small warehouses or shops, as well as the need to respect pertinent basic workplace rules.

The items contained in this fact sheet aim at raising the awareness of all parties but do not substitute to compliance with explosives-related regulations applicable to small shops and warehouses (workplace safety report, technical certification, or even an authorisation under the classified installations regime, depending on the specific activities conducted).

1st Case : August 4, 2008 : Déols (ARIA 35012)

In the yard of a home located within a residential zone, fire broke out around 7:45 pm in a 150-m² building where pyrotechnic equipment was stored. Neighbours notified authorities mentioning several explosions. Fire-fighters set up a safety perimeter of 50 m around the storage site. Rescue workers were able to control the blaze using 4 fire

hoses after one hour on the scene. The body of the homeowner, who held a K4 certification in explosives use and who was handling the fireworks at the time of the incident (preparation of a display for the surrounding towns), was found under the rubble. The mine clearing unit called in secured the site and recovered 50 kg of miscellaneous fireworks for destruction. The quantity of fireworks in the hangar was estimated at between 100 and 400 kg: this storage had not received any technical approval.

Hazardous materials

Fireworks are pyrotechnic products. As such, their manufacturing (including the fusing step), storage (even temporary), possession, sale (including import-export trading), transport (within the scope of transport of dangerous goods), use (launches) and destruction are all regulated by a series of legislative texts produced by Ministries with oversight for the environment and transport, the interior, labour, defence and industry (see the summary of applicable texts available on the Website of the Ministry of Sustainable Development).



2nd Case : August 7, 2007 : Vielverge (ARIA 35168)

A fire broke out around 2:00 pm in a 100-m² building made available to an explosives technician by a company not involved in pyrotechnics. The manager of the premises and a friend (a 55 year-old retired person who was still working occasionally), both of whom held a K4 explosives certification, were preparing for a fireworks show. They were using parts that did not operate during previous pyrotechnic events.

An improperly-handled igniter started ; the fire quickly propagated to all of the fireworks stored in the room (approx. 25 kg in all), and then to the building. These premises had not been equipped with a fire extinguisher; the only one present onsite was located in a distant office.

The retired person, who was not wearing any individual protective gear, received second- and third-degree burns

over 30% of his body; he was subsequently evacuated by helicopter to a hospital with a burn centre.

The fire-fighters set up a safety perimeter and had the fire extinguished by about 4:00 pm; a total of 30 m² of floor area and the roof were destroyed.

The onsite manager raised two hypotheses: either the victim would have walked on an igniter that had lost its protective casing and/or would not have given enough length to an igniter connected to a candle, thereby leading to ignition.

An investigation conducted by both workplace inspectors and classified installation inspection authorities revealed that neither the employee nor the fireworks warehouse had been officially declared (lack of technical certification to operate the premises, since the operator had not responded to the



comments and observations addressed by environmental authorities (DRIRE) regarding the permit application, which was judged inadequate in terms of safety measures). First of all, inspectors reported the absence of: proper risk evaluation, a safety study, protective gear, training, safety guidelines, an input/output register, and fire-fighting resources. Moreover, they noted the onsite presence of combustible materials, electrical equipment and unwrapped fireworks.

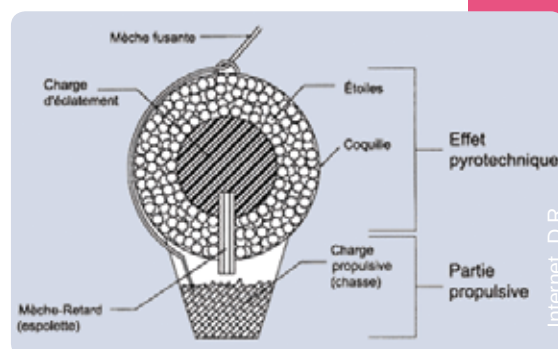
3rd Case : July 12, 1999 : Calonne-Ricouart (ARIA 19122)

During the assembly of pyrotechnic materials in the cellar of a local town hall, a bomb exploded triggering, by chain reaction, the explosion of all the other fireworks (200 kg) stored onsite waiting to be launched the following day (for Bastille Day celebrations). Fire-fighters responded with three small hose nozzles to control the fire outbreak. It seems that those responsible for preparing the fireworks display had proceeded with fusing the explosives in the actual storage area (prohibited handling), thus turning the initial event into a catastrophic situation. 4 individuals were present in the room: 2 explosives technicians and 2 municipal employees. One person was seriously hurt while the three others sustained lighter injuries. From a general standpoint, pyrotechnic experts recommend that pyrotechnic products not be stored in the basement but rather in specific rooms adapted and dedicated for such a purpose. The question was also raised over the level of training and qualifications held by municipal personnel for conducting pyrotechnic activities.

Other accidents recorded in the ARIA base:

Some fifty accidents involving fireworks in France have been recorded in the ARIA database (not including accidents occurring to individuals or during launches). In all, 12 deaths and 56 injuries can be attributed to these accidents.

Several relate to small warehouses, often set up without legal approvals: ARIA 31562, 29067, 22747, 19122, 17751, 13371. When accident causes have been identified, handling errors or failure to comply with basic precautions, especially during fusing (ARIA 27249, 32144, 20825, 11736, etc.), have often been cited.



Questions to be answered for both personal and property safety:

- Has the full set of risks related to the kinds of operations anticipated (storage, handling, etc.) been identified, along with the adapted prevention and protection measures (emphasis on fire protection)?
- Have the various pyrotechnic operations been addressed in a safety study (or safety report, if applicable)?
- Does the storage facility allow for rapid evacuation of individuals? Is it located on the ground floor? If located on a higher floor or in the basement, has it been specifically studied for safety?
- Is the storage area clean, tidy, devoid of all combustibles and emptied of all hazardous materials other than the explosives it has been designated to contain?
- Are rules on the compatibility for common storage of explosive products being fully obeyed?
- Are the quantities stored being monitored and tracked (up-to-date input/output register)?
- Have the pyrotechnic articles been well packaged (in closed cardboard boxes for all warehouse handling / with appropriate sales wrapping in the shops, etc.)? Are they correctly marked (authorisation number, designation, safety distance to respect, etc.)?
- Are the freight packaging removal and picking operations conducted in a compliant manner in an appropriate room, outside of the warehouse (or outside the shop if open to the public)?
- Does guidelines exist that specify both the maximum number of individuals simultaneously present in storage spaces (measure intended to limit the number of potential victims) and the type of operations authorised?
- Has a rule been adopted that stipulates at the very least the requirement to turn off cell phones, the restriction not to smoke or carry any smoking-related devices, and the prohibition (except when a special permit has been issued) against working with exposed flames, incandescent objects, matches or any other means of ignition? Is this rule posted?
- Are fusing operations performed outside of the warehouse and under adequate safety conditions (workstation organisation, adapted tools, individual protective gear, etc.)?
- Are public access restrictions clearly posted?
- Has a specific shop procedure been established indicating the general measures to implement in case of fire or explosion and the behaviour to adopt under such circumstances? This procedure will specify at the very least the type and maximum quantities of explosive objects and any other hazardous material, as well as their packaging and locations allocated for their storage.
- Has the staff been trained in the associated risks and evacuation procedures? Are exercises held on a regular basis?
- What is the management policy regarding unsold objects or duds (returned to the manufacturer, disposal, etc.)?

