

Maintenance and other operations In silos storing plant products



DANGER!

We need to pay special attention to the circumstances under which accidents in silos storing plant products take place. Experience shows that the frequency of accidents is far higher during the working phase including the preventive or curative maintenance, change, assembly or disassembly of facilities. This is also true for both staff technicians carrying out operations in the silo and subcontractors working in a sector where the risks are often underestimated.

In the absence of a clearly defined set of precautions, operations involving the use of soldering, grinding and cutting devices are likely to stir up and suspend in the air inflammable dust particles and cause them to explode. Operations generating hot spot are even more often the cause of "smouldering fire" or fire triggered by the projection of sparks, accidental fall of hot parts or heating of stored products by thermal conduction.

Besides the damage caused to the facilities by several accidents during the working phase, there are tragic human casualties : 12 people died on 18 October 1982 in an explosion that took place in a malt house in Metz, 1 death was reported in an agricultural marketing cooperative on 15 June 1989 in Bourges, 1 person died and 1 seriously injured in a horizontal silo on 14 May 2001 in Albert, 5 people injured including 2 seriously in a feedingstuff manufacturing plant in Aigueperse on 29 March 2006, etc.

Moreover, before issuing a "hot work permit", a thorough analysis of risks is indispensable to draft the preventive measures to be taken into account ... *The safety of people depends on it.*

Food for thought before issuing a “hot work permit”

1. Can the operations involving the hot work permit be carried out in a workshop ?
2. Has an skilled person analysed the risks involved in the operation planned on site ? Have the main findings of this analysis been communicated to the operators ?
3. Do we know the danger potential of plant products, combustible matter and dangerous materials present in and around the working area likely to be involved in the event of an accident ?
4. Do the operations require the facilities and some related equipment to be decommissioned ?
5. Is the working area free of combustible dust particles ? Have the inflammable or dangerous material (oxidising substances, toxins, etc.) that are not indispensable to the operation been evacuated from the site ? Is an explosive atmosphere likely to be present (dust particles, gas, inflammable vapour) ? Is a formal inspection of the site planned before and during operation ?
6. Have the possible way of fire to spread (sparks, incandescent projections, heat transfer, etc.) been identified?
7. Have measures for preventing « smouldering fires », ordinary fires and explosions drafted and formalised for the operation : explosive atmosphere detector (hexane for oilcakes, propane, etc.), marking, obstructions of interstices and openings (flame retarded blankets and salvage covers, protective screen against incandescent projections), monitoring ?
8. Are the initial attack measures adapted, functional and available on site ?
9. Have all staff members likely to be affected by the shut down of the facility been informed ? Have the technicians and staff members in charge of the operation and decommissioning (both employees and subcontractors) been informed of the risks of fire and explosion and the inherent preventive measures ?
10. Are they aware of the guidelines to be followed in the event of an accident : initial attack measures, emergency alert, access to emergency exits, etc.?
11. Are they trained to use the emergency equipment ?
12. Has an skilled supervisor been appointed to ensure compliance with safety measures during the progress of the operations ?
13. After the end of operations, has an on-site inspection for a sufficient period of time been planned to detect any possible anomalies or “smouldering fires”?
14. Has the hot work permit been formalised after a comprehensive analysis of risks ? Does it have a validity period adapted to the possible commissioning and decommissioning of the facilities, precise description of operations and area of intervention, etc. ?



**In the working phase,
the probability of an accident are 10 times more !**

Even though the working phases generally represent less than 5% of the service life of facilities, more than one accident (fire, explosion, etc.) out of three* in France occurs during the working phase.

Are the persons involved in the organisation and progress of operations aware of this ?

*In the ARIA database, one out of five accidents in the technological accidents report concerning all industrial and agricultural facilities involves working phases. To view this report, go to:

www.aria.ecologie.gouv.fr