

Brand i ett mejeri

Start datum: 990414

Händelse kod: DE/1999/004-[01]

Kort rapport

Typ av händelse

Brand i ett mejeri.

Inblandade ämnen

Explosiv damm-/luftblandning.

Olycksobjekt

Den 14 april 1999 startades branden i ett mejeri. Vid 17:45 startades mjölk-torkningsprocessen igen av skiftchefen efter byte från mjölkpulver till vasselpulver.

Vid 19:45 visades på dataskärmen i kontrollrummet en temperaturökning i ett luftfilter; samtidigt aktiverades den automatiska utsugningen och fabriken stängdes ner.

Larmtemperaturen visade 120°C. Luftfiltrena var konstruerade för maximalt 90°C. Vid 120°C bildades ett glödnäste i utrustningen. Efter kort tid märkte man på grund av rökmoln som släpptes ut från filtren, att elden inte kunde bli släckt av det automatiska släcksystemet.

Omedelbart startades det manuella släck-/kylsystemet och brandkåren larmades. Brandkåren kom till plats efter fem minuter. Tack vare sandröret i trapphuset, gav brandkåren insats omedelbart resultat och branden var under kontroll efter 1 timme. Temperaturen ökade till ca: 1000°C. För att undvika att branden skulle flamma upp igen, startades släck-/kylsystemet flera gånger till klockan 23:00. Ingen person kom till skada men den materiella skadan var omfattande. Branden blev isolerad. Spridningen av branden till andra delar förhindrades. Spridningen av damm och den följande explosionen orsakade inga konsekvenser.

Olycksorsak

Den mest eventuella brandorsaken var ett glödnäste av damm (vilken formades i en ogynnsam position på insidan av luftfiltrena), som orsakades av en spontan reaktion eller vid stängning och processtart med produktförändringar.

Skador

De materiella skadorna uppgick till ca. 600,000 Euro.

Akutåtgärder

Det automatiska släcksystemet och stängningen aktiverades. Brandkåren larmades.

Erfarenheter

- 1) CO-detektion systemet byts till ett automatiskt läckagekontrollsystem som införlivades i kontrollprogrammet som ett startvillkor för att starta torkningsanläggningen.
- 2) Läckage i ett luftrör i CO-installation skall orsaka larmsignal i enheten.
- 3) Alla säkerhets relevanta fel i CO-enheten visas i ett program och i torkmaskinen byts produkttillförseln automatisk över till vatten.
- 4) En fungerande CO-enhet skall kontrolleras regelbundet med CO-prov-gastillförselssystem vilken har också blivit utbyt.
- 5) CO-detektions systemet kontrolleras med processkontrollsystemet till torkningsanläggningen. CO-tröskeln har korrigerats.
- 6) Signalförstärkare pumparna är installerade på släckvattensrörledningen för att öka dess släcktryck. De signalförstärkande pumparna kopplas på när släcksystemet aktiveras och kopplas till akutenergitillförseln.
- 7) En luftkompressor kopplas också till akutenergitillförseln.
- 9) Enligt rekommendationen av brandkåren, har en vattenslang blivit installerad på varje torkningsanläggnings golv medan existerande rör har blivit kopplad till sprinklersystemet.

11) Avloppsbrunnarna får lock som förhindrar att damm fastnar i avloppsbrunnen.

Personalen informerades vid en av 3 alert faser och den hela torkanläggningen besiktigas enligt check listorna för eventuella kvarlämningar eller glödrester. Kontrollistorna, beredskapsplanen, det CO-provande systemet och kalibreringen dokumenteras. Följande säkerhetsprocedurer uppehålls: Vid varje produkt förändring, skall en optisk inspektion av torkanläggningen för pulver insättning genomföras. Under operation skall anläggningen stängas omedelbart och granskas.

English.summary

Start date: 14/04/1999

Accident code: DE/1999/004-[01]

Accident Type(s)

Fire in a dairy spray drying plant

Substance(s) directly involved

Explosive dust/air mixtures

Immediate source(s) of accident

14/04/1999: a fire occurred in a dairy spray drying plant.

About 17:45h. the milk drying process was started up again by the shift manager after changing from milk powder to whey powder.

At 19:45 h in the control room a computer display indicated a temperature rise in an exhaust air (gas) filter; simultaneously, the automatic extinguishing system of the exhaust air filter was activated and the plant was shutdown.

The temperature alarm is released at 120°C. The exhaust air filter is designed to operate at maximally 90°C. At a temperature of 120° C, the presence of smouldering nests or incandescent nests in the equipment concerned is assumed.

After a short time, due to the smoke plumes emitted by the filter, it was clear that the automatic extinguishing system could not extinguish the fire. Immediately, the manual extinguishing / cooling procedure was started and the fire brigade was alerted. The fire brigade reached the site in five minutes.

Due to the installation of a standpipe in the adjacent staircase, the intervention of the fire brigade was immediately effective and the fire was under control after 1 h.

Temperatures of approximately 1000°C developed in the exhaust air filter. In order to avoid a new flare-up, the extinguishing- cooling procedure was continuously repeated until 23:00 h.

No personal injuries. Significant material damages were caused. A spreading of the fire in other plant sections was avoided.

The dispersion of dust and the consequent explosion did not cause other consequences.

Suspected cause(s)

The most probable cause of the fire was smouldering nests of dust deposits (which may have formed in an unfavourable position inside the tube filter), caused by a spontaneous ignition process or by the shutdown and start-up processes associated with product changes.

Immediate effects

Material loss of approximately 1.200.000 DM - 600.000 EURO

Emergency measures taken

Activating of the automatic extinguishing system and shutdown of the plant. Alerting of the fire brigade.

Immediate lessons learned

1) The CO-detection system has been retrofitted with an automatic leakage-control system of the exhaust gas duct, which was integrated in the drying tower control program as starting condition for the start-up of the drying plant.

- 2) Leakages in the exhaust air duct of the CO installation are detected by an additional flow monitor installed directly downstream the exhaust air detector. A leakage causes an alarm signal in the CO-unit.
- 3) All safety relevant faults of the CO-unit are displayed by the program and in the dryer the product feed is switched automatically over to water.
- 4) The correct functioning of the CO-unit is regularly checked from the scrubbing tower by the CO-test-gas feeding system, which has also been retrofitted.
- 5) The CO-detection system is monitored by the process control system of the drying plant. The CO- thresholds have been corrected.
- 6) Booster pumps were installed on the extinguishing water pipelines (respectively, on the pipe leading to the spray-dryer tower and to the tube filters) in order to raise the necessary extinguishing pressure. The booster pumps are switched on when the extinguishing system is activated and are connected to the emergency power supply.
- 7) An air compressor, also connected to the emergency power supply, has been installed in order to guarantee the supply of air for the control of the extinguishing water valves.
- 8) Freshwater pumps in the pumping room were connected to the emergency power supply in order to guarantee the supply of freshwater.
- 9) According to the recommendations of the fire department, extinguishing hoses have been installed on every drying plant floor whereas the already existing dry pipe has been connected to the sprinkler system.
- 10) Additional area drains were installed near the tube filter extraction lock of the tube filter in order to improve the drainage capacity of extinguishing water.
- 11) Additional detachable manholes covers were installed as measure for preventing the dust depositions in correspondence of the manholes.

The personnel in charge is informed at the release of one of the 3 alert phases and the whole drying plant is inspected according to check lists for eventual deposits or smouldering nests.

The already existing maintenance plan of the CO-plant, including also the maintenance service every six months by the plant manufacturer and a 4-week calibration by measurement and control -technicians, has been extended, It integrates now also the above mentioned CO-test-gas feeding system for the functional check of the CO-system.

The checklists, the emergency plan, the CO-testing system the calibration are documented in the updated process documentation system.

The following safety procedures are maintained:

At every product change, an optical inspection of the spray drying plant for powder deposits is performed. During operation the plant will be immediately shut down, inspected and eventual deposits immediately manually removed.