

## Case Study 23:

### Explosion MSPO2 at Shell Moerdijk

On 3. June 2014 at around 22:48, two severe explosions occurred at Shell in Moerdijk followed by a large fire.

On 25 May 2014 Shell Moerkijk put the propylene oxide-styrene monomer 2 plant (MSPO2) out of operation for a scheduled replacement of the catalyst in two reactors within the MSPO2 plant. After the catalyst had been replaced a number of steps were followed to prepare the unit for production. O

On 3. June 2014 at around 21:00, heating of the reactor was started. An unforeseen chemical reaction occurred which led to gas production and a pressure increase in the reactor.

At 22:16 an automatic protection system that was designed to prevent liquid from entering the exhaust gas system (flare) was triggered. As a result, the gases produced by the unintended reaction could not escape and a runaway reaction occurred. The reactor exploded because of the increase in pressure. The contents of the reactor and a close by separation vessel were blasted across distances up to 250 m and debris could be found up to 800m away. The explosion was heard 20 kilometers away.

Two people working close the unit that exploded were hit by the pressure wave of the explosion and the hot and burning catalyst pellets that were flying around and sustained bruising and second-degree burns. The other employees working at the time of the explosion were in the control room and were not injured.

#### *References:*

Dutch Safety Board: Summary – Explosions MSPO2 Shell Moerdijk, July 2015

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