

## Case Study 21:

### Fatal accident in a reactor – Zeeland Refinery

On the morning of Friday 3 February 2023, an employee of T.I.M.E. Service Catalyst Handling (the contractor) lost his life in an accident at the oil refinery operated by Zeeland Refinery (the client). This happened while removing catalyst from a reactor. Catalyst used in a reactor must be replaced periodically. There are various methods for doing this, and they are often used in combination. One of those methods involves an employee entering the reactor to vacuum up the catalyst with a vacuum hose, and to chip it off if necessary. The employee is referred to as a 'diver'. Because spent catalyst ignites if it comes into contact with oxygen, the reactor must be made oxygen-free before the work begins. This involves filling the reactor with nitrogen, thus creating an inert atmosphere. To be able to breathe in that inert atmosphere, the diver requires breathing apparatus.

In the occurrence we are dealing with, the diver was buried under catalyst. Oxygen-containing air was released from his breathing air helmet and came into contact with the catalyst that was on top of him, leading to the catalyst igniting. Colleagues attempted to extract the casualty from the reactor; they succeeded at the third attempt. After he had been extracted from the reactor, it became clear that the casualty had died.

Entering a reactor under an inert atmosphere in order to remove catalyst involves various risks in terms of occupational safety. During his work, the diver is exposed to the following risks: suffocation, falling, becoming buried, and burns. Moreover, the options for escape and rescue are limited. An accident in an inert reactor therefore often has a fatal outcome. This means that a reactor under an inert atmosphere is a life-threatening work environment.

#### *Key Lessons drawn from the investigation:*

- Cease unloading reactors by means of inert entry
- Develop new and safer methods for unloading reactors
- Share information about accidents and near-accidents within the sector

#### *Request for presentation*

Please talk about pyrophoric risks during your presentation

#### *References:*

Dutch Safety Board report: "Fatal accident in a reactor" published April 2025