Case No.41

Explosion due to abnormal reaction in the refining process for explosive materials

[Circumstances of Incident]

An explosion at a plant manufacturing explosive materials destroyed the plant and injured many people.

While the explosive (TNT) production line can be broadly divided into the nitrification process involving a nitrification reaction and the refining process where TNT is crystallized and refined, the accident occurred during the crystallization in the refining process.

In the morning of the day of the accident, a pipe from the sodium carbonate tank under the crystallization process got clogged soon after the start of production work for that day and a valve failed to open. Accordingly, the pipe was heated by steam and then the valve was opened. As a result, about one litter of sodium carbonate run into the crystallization tank.

Following this, nitrification oil was pumped into the crystallization tank, and the acid was separated and the temperature was increased to start the acceptance of TNT oil. When the drain of the crystallization tank was pulled out to smooth the flow of the TNT oil, brown-colored smoke was emitted together with small explosion. This smoke quickly changed to black and was accompanied by flames, and the entire plant blew up soon thereafter.

[Causes]

The following can be considered as the causes of this accident.

1. Sudden decomposition took place within the crystallization tank.

2. The clogged pipe was heated by steam.

3. A manual to deal with abnormalities was not prepared.
4. The safety management structure was insufficient.

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<thead>
<tr>
<th><strong>Caused by</strong></th>
<th>Explosive substances, etc.</th>
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<td><strong>Type of accident</strong></td>
<td>Explosion</td>
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| **Number of victims**  | Two injured (requiring an absence from work)  
                          | Eight injured (not requiring an absence from work) |