

Major accident risk in Vihtavuori: investigation report abstract

Major accident risk	<p>The emergency services were alerted when a chemical reaction occurred in an intermediate bulk container (IBC) which contained bulk-emulsion explosive waste. When the rescue operation got underway, it was assumed that the container could go on fire or explode. The situation was hazardous because the container was stacked together with about 200 other waste containers at a distance of approximately five metres from an explosives warehouse. At that precise moment, the major risk was seen to be an explosion, whose pressure effects could extend to a radius of about 1300 metres from the warehouse. The rescue services decided to evacuate all the inhabitants in the area before they attempted to move the container and cool down the interior. To safeguard all the inhabitants, the evacuation was extended to cover the whole Vihtavuori village, which has about 2000 inhabitants. After a successful rescue operation, the evacuation was completed during the same evening.</p>
Time of event	Tuesday 9 July 2013, 10:50 pm – Wednesday 10 June 2013, 8:30 pm
Place of event	Oy Forcit Ab's explosives factory in Vihtavuori, Laukaa (Finland)
Summary of the major accident risk and the results of the investigation	<p>The sensitized bulk-emulsion explosive and rock material, containing pyrite, reacted together in a steamed waste container which was situated next to the explosives warehouse. The container was originally from the Pyhäsalmi mine, where exactly one year earlier an attempt to load the blast holes in the roof of the tunnel with emulsion explosives by means of a new mobile explosive manufacturing unit (MEMU) failed. As a result of this, a significant amount of sensitized emulsion dropped onto the floor of the tunnel. The miners did not realize that the mixture of sensitized emulsion explosive and rock material was a non-conformity waste. Accordingly, the waste was handled as typical emulsion waste and was sent to Vihtavuori. The production volumes of bulk-emulsion explosives in Oy Forcit Ab have multiplied over the past few years because of increasing mining and infrastructure development. At the same time, bulk-emulsion explosives are being increasingly used instead of traditional explosives. Oy Forcit Ab has not been able to keep pace with the disposal of the emulsion waste. The emulsion waste occurs during both the production phase and the application phase. Emulsion waste containers have been stored mainly in the yard of the explosives factory and in the yard of the explosives warehouse. Tukes has requested that Forcit takes corrective actions to resolve the waste-container warehousing problem. Forcit has taken several corrective actions, but these actions have been inadequate due to the simultaneous increase in production volumes.</p> <p>The Explosives Act that is currently in force covers the production, use and disposal of traditional explosives. The special properties and risks connected with the production, use and disposal of emulsion explosives have not adequately been taken</p>

	into account in these legal requirements.
Measures proposed by the investigation team to prevent similar incidents	<ol style="list-style-type: none"> 1. All parties need to ensure that they have adequate processes and procedures in place related to the handling, storage, transportation and disposal of emulsion explosives. They also need to ensure that these methods are properly implemented. 2. In major hazard installations everyone is responsible for safety and following instructions. Managers need to ensure that regulatory requirements are met and corrective actions are adequate. 3. In particular, it is essential to observe how changes in performance affect safety. Safety-critical changes may include a significant and rapid increase in production volumes, the use of new technology or new kinds of products, or changes relating to organisational structures and responsibilities, or supply chains. There is a need to organise training for personnel and to improve instructions to better identify and manage the effect of these changes on safety. 4. In addition, there is a need to organise training for personnel and improve instructions related to the identification and handling of safety-critical non-conformities. 5. The major accident scenarios presented in safety reports should be more systematically communicated when preparing internal and external emergency plans. In addition, training for those scenarios should be comprehensive. 6. A complete reform of the Explosives Act is called for. To this end, the requirements should be updated to take account of the specific properties and risks connected with emulsion explosives.
Criterion for investigation	Act on the safety of handling of dangerous chemicals and explosives 390/2005, 99 §; Decree on Explosives 473/1993, 99 – 101§.
Date of investigation report	1 November 2013
Signatures of the investigation team and names in block capitals	<div style="display: flex; justify-content: space-between; padding: 0 10px;"> Kirsi Levä Jesse Nurmela Mikko Ojala </div>