

Lecture PA9

Preventing Accidents in Detonator Transportation

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I. BACKGROUND

1. The waterproof truck was usually used before this detonator transportation accident. A sign with black word and yellow background was hanging on it: "vehicles for dangerous goods transportation." The driver was trained technically and had driving experience of such dangerous goods transportation. The detonators were loaded in the truck according to the strict regulation.
2. In this accident, a Dongfeng brand truck made in China was carrying 285,000 units detonators and there were 15,000 units MS Shock Tube Detonators with 5-metre-long Shock Tubes among them. All of them were packed with carton inside and wooden box outside, totally 160 cases, they were piled up in three layers in the truck. Because the Shock Tube Detonators were delivered to a customer in midway, they were loaded on the uppermost layer (the third layer).
3. The road condition is very complicated in this transportation. There were bridges, tunnels, villages and a lot of slopes and crooks.

2. THE ACCIDENT

At 8:50 a.m. on July 27 1999, this Dongfeng brand truck carrying about 285,000 detonators was running, at the speed of 30-40km/hr toward a bridge at Changshou County in Chongqing. When the truck swerved in the road, a minor explosion occurred inside the loading of the truck, which caused the next big explosion after the truck ran a further 20 meters at a quarter to ten a.m.

3. ITS DAMAGE

After explosion, a crater of 2.7-metre in diameter and 0.3-metre in depth was formed in the right middle side of the highway, The truck was destroyed completely, and the buildings nearby were also destroyed seriously. The explosion caused the death of 14 people including the driver the supercargo and passer-by. Besides, 61 people were injured at different extent.

4. THE CAUSE OF THE ACCIDENT

1. Firstly the space of the third-layer cases loading the Shock Tube Detonators was not fully occupied. The special measures fastening boxes were not taken either, which lead the third-layer case easily to vibrate and bump violently while the truck went uphill and downhill or turned around, causing the broken cases .
2. Secondly, the detonators were scattered from the cases and dropped into the lower layers or gaps between the cases. When the truck swerved at high speed, the cases slid and struck the scattered detonators strongly due to the centrifugal force and then the detonators were initiated and blasted.
3. Finally, the other detonators were sympathetically detonated after the explosion of one or several detonators. Thus a massive explosion of the entire load occurred.

5. PREVENTIVE MEASURES

1. Special vehicle for dangerous goods should be used to transport detonators. The ordinary waterproof truck with dangerous consignment transportation sign is not safe enough. Now this special vehicle has been manufactured and will be used extensively step by step.
2. When loading the detonators, each layer of wooden cases should be fastened to avoid any moving or sliding. In addition, the strength of wooden cases against bumping action should also be improved to avoid the cases broken and the detonators scattered.
3. When transporting the detonators, the speed of the truck should be controlled strictly to improve the stress condition of the cases while it goes uphill and downhill or makes a turn under poor road conditions, thus avoiding the violent vibrating and bumping of the case.