

FICTIONAL CASE DESCRIPTIONS

1. Explosion in an urban area

On Tuesday at 10:50, an explosion occurred in a dense apartment complex of the central city district of your work area, to which the emergency medical service was alerted with code A443. The university hospital is five kilometers away. The rescue service's response is significant, and the on-duty rescue chief immediately oversees the situation. Also, the police response covers practically all units available in the nearby areas, and social services receive their standard alert. The emergency medical service's initial response comprises four ambulance units and a medical helicopter.

Emergency dispatch quickly informs that the explosion occurred in a second-floor apartment, causing a partial collapse of the exterior wall. Adjacent buildings have also sustained damage from the blast. There is no precise estimate of the number of casualties, only "several," and emergency calls have overwhelmed all of Finland's emergency dispatch centers. A quick inspection of the management system reveals that the apartment building is located in a densely built suburb with a ground-floor grocery store.

You participate in acting as EMS incident commander for the mission.

The rescue chief soon conveys information that the scene is chaotic: people are running in different directions, and it is unclear how many casualties there are. Rescuers are attempting to direct people southward away from the incident site. A fire has ignited as a result of the explosion, and the rescue service is preparing for further explosions. Initially, an immediate danger zone is defined as 200 meters in all directions.

The rescue service announces that the upper floors of the apartment building are inaccessible due to the collapse and fire. Residents of the upper floors cannot evacuate on their own, and their condition cannot be assessed without the use of a crane.

Residents from the apartments below the explosion and the grocery store are able to evacuate on their own, but they cannot be assessed immediately. In the initial phase, emergency medical services encounter 36 casualties with various degrees of injuries. Among the casualties are blunt and penetrating traumas and multiple degrees of burns. After primary triage, 3 patients are categorized as red, 18 as yellow, and 15 as green.

About 25 minutes after the incident, you receive information from the overall rescue commander that explosives were being manufactured in the apartment. The police have been monitoring the situation for a few days, and an arrest was planned for the following day. According to the police investigation assessment, there is no reason to believe that the explosion was planned; instead, it likely occurred during the manufacturing or storage process, and the manufacturer of the explosives did not get to execute their actual plan.

Based on police information, the rescue service and the police were able to inspect the apartment where the explosion occurred. At the same time, the rescue service begins inspecting the apartments below the explosion. Three deceased individuals are found in

the target apartment. No traces of remaining explosives are found, and the rescue service begins crane operations to reach the residents of the upper floors and extinguish the fire. A mobility-impaired couple is found in the ground-floor apartments, significantly exposed to smoke. The other apartments on the ground floor are empty. The grocery store is also empty at this stage.

Within the next hour, 23 residents were evacuated from the upper floors, each with some degree of smoke exposure. The exterior wall of the apartment above the explosion partially collapsed, but no one was reached from there. Among these residents, 3 are categorized as red, 10 as yellow, and 10 as green.

Throughout the situation, social services have attempted to contact residents according to the population registry, but at this stage, only roughly half have been reached.

In total, emergency medical services encountered 51 exposed individuals, of whom 6 are categorized as red, 28 as yellow, and 17 as green. Emergency medical services did not encounter the three deceased individuals in the target apartment at any stage.

2. Chemical leak in a production facility

On Wednesday at 12:40, in the regional city about 70 kilometers away from the university hospital, a hazardous substance incident occurred at a production facility, to which the emergency medical service was alerted with code A453. The production facility is located on an island by the coast, accessible via a one-kilometer causeway. The city center of the regional city is located at an equal distance as the crow flies. The regional city also has a local hospital with a single physician on duty during the daytime. The distance from the hospital to the production facility is three kilometers. The rescue service's response is significant, and the on-duty rescue chief immediately oversees the situation. The initial police response consists of two patrols, and social services receive their standard alert. The emergency medical service's initial response comprises two ambulance units and a medical helicopter.

The emergency dispatch informs within a few minutes that, for an unknown reason, a telehandler has driven the forks of a forklift through the wall of an ammonia tank, causing an uncontrolled leak. The driver of the telehandler is slumped in the cabin and appears unconscious. The caller is in the control room of the production facility and has initiated standard personnel protection measures, such as using the sound signal to indicate the use of escape masks and moving to a predetermined assembly point. The ammonia tank is located on the eastern edge of the island facing the sea, and in its immediate vicinity are the production facility's port and a silo complex which is under construction. In addition to the regular production personnel, there are also subcontractors due to ongoing construction work, and there is one vessel in the port awaiting cargo. Based on information from the factory contact person, the rescue service estimates that there are about a hundred people present. There is no information at this stage about those exposed to the gas aside from the telehandler driver.

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The rescue chief informs that the gas cloud is being carried by the wind over the production facility towards the city center of the regional city. Therefore, a general danger sign is issued, advising people to stay indoors and close ventilation. The nearest ambulance unit supplements this information by assessing that the causeway to the production facility would be accessible if the wind direction remained unchanged. The police can easily isolate the island by cutting off the road connection.

The leaking tank has a capacity of 20 m³ and contains 10 tons of gas. An expert from the production facility provides the rescue service with an estimate that the cloud passing over the island may indeed have a concentration of 1000–5000 ppm depending on the distance from the leak, which could cause sudden death. However, crossing the maritime area would disperse the cloud, and the portion reaching the city would likely be no more than 100 ppm, if even that much, mainly resulting in irritant effects that do not require treatment.

The rescue service has begun, with the first unit, to plug the leak, which is known to be quite challenging from the initial information, and there is a concern that the tank may empty entirely. At the same time, the production facility's rescue unit evacuates people towards the main gate. According to the rescue service's estimate, about ten individuals who were near the leak may have been exposed to a large amount of ammonia and were unable to move to the evacuation site on their own. Nonetheless, they were evacuated further away from the cloud as soon as the rescue service arrived. In addition, there are an estimated 30 individuals who have been mildly exposed. Communication with the vessel's crew and subcontractors is severely hindered due to rescuers' protective equipment and language barriers. The rescue chief estimated that the entire production facility area would be evacuated within half an hour. The rescue chief informed that the decontamination line would be set up no earlier than 45 minutes from the alert.

At this stage, the emergency dispatch informs that they have received a few emergency calls from the city regarding a pungent odor. Even so, there are no severely affected individuals in the city at this stage.

The rescue service informs that they have requested assistance from the Coast Guard to limit maritime traffic and inspect nearby islands, even though the wind is not initially carrying the cloud in their direction.

Based on the exposures encountered by emergency medical services, the total number of patients with serious injuries or symptoms is confirmed to be 11, of which 3 are unconscious and 32 have mild symptoms. The remaining individuals who were present at the production facility followed the protection instructions and used escape masks. There are a total of 74 individuals, and none are experiencing any symptoms.