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Mass Casualty Incident after Roof Collapse of a Military Command Centre

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Background: During the NATO Exercise Joint Winter 2000, the Community Centre Building of Bardufoss was leased by the Norwegian Defence Forces to serve as a central command station. On 11 March, the snow-laden roof of the building collapsed with 76 people inside. A sport hall 125 meters from the command post, served as Reconvalescence Camp comprised of 86 troops (7 physicians (2 present at the time of the incident, 7 nurses, and 69 soldiers). All authors served in key positions in the medical set-up of the exercise and also in the immediate incident management. This presentation is based upon information obtained from the Military Medical Report, Military Incident Log, ambulance logs, and eyewitness observations.

Roof construction was comprised of wood and wooden and steel beams. At 18:47 hours, a splintering sound was heard followed by a roar as the roof collapsed one second later. The shock wave blew out all of the windows. People and the contents were slammed against the wall. Some were blown out into the open. Others were blown into empty spaces between furniture, which partially supported the collapsed roof, thereby reducing the number of persons injured.

Rescue operation: The Reconvalescence Camp was alarmed 1 minute after the event. An Incident Command Officer was appointed, and a casualty clearing station was established in the sports hall. An alarm was sounded immediately to all relevant military and civilian authorities. Immediately after the event, the less wounded helped each other. Proper search and rescue was organised thereafter. The building had to be secured before the entrapped people could be located, partly by human efforts and partly by search dogs. The Fire Brigade and the Norwegian Engineering Battalion completed extrication. Due to the potential seriousness, ample resources initially were sent to the scene. The significance of proper Incident Command therefore, proved crucial to avoid the development of chaos. Eleven hours after the event, the rescue operation was terminated, as all persons confirmed to be within the building at the time of the collapse had been extricated.

Results: Of 76 persons in the building at the time of the collapse, their were 29 casualties: 3 dead, 10 seriously injured, and 16 with minor injuries. Patients were brought to the clearing station where triage and initial treatment was done. Due to the difficulties for the rescue personnel, only 1–2 patients were extracted at a time, thus allowing sufficient time for adequate treatment. All deaths were immediate and were due mainly to crush of the thorax (e.g., ruptured thoracic aorta, petechial bleedings, complete spinal cord lesion). All of the seriously injured were treated adequately and evacuated by helicopter to either the German Military Hospital or the Regional Hospital in Tromsø. Casualty distribution was in concert with casualty distribution reported from other similar incidents, e.g., mortality, 4% of total; 10 % of the injured; and 33% of the seriously injured. Type of injuries (partly combined) for the hospitalised were: 1) hypothermia (2 patients); 2) fractures (9 patients, 4 with multiple fractures, 5 with major, long-bone fractures, 2 with rib fractures); 3) head injuries (4 patients); 4) lung contusion; 5) kidney contusion; and 6) soft tissue damage.

	Time (minutes)	Resources
Medical Resources	1–30	4 physicians, 3 nurses, 5 paramedics, 61 officers and soldiers,
	30–120	14 physicians, 21 nurses, 16 paramedics, 86 officers and soldiers and unknown number of Red Cross volunteers
	>120	24 physicians, 34 nurses, 16 paramedics, 233 officers and soldiers and unknown number of <Red Cross volunteers
Medevac	1–30	5 military ambulances, 4 civilian ambulances
	30–120	21 military ambulances, 8 civilian ambulances, 7 military helicopters,1 civilian helicopter, 1 Hercules aeroplane, 2 twin Otter aeroplanes
	>120	27 military ambulances, 8 civil ambulances, 16 military helicopters, 1 civilian helicopter, 1 Hercules, 1 ambulance aeroplane and two Twin Otter aeroplanes

Discussion: From the first minute, the number of medical personnel was adequate. Additional resources were ample, and they rapidly were made available due the expectation of high number of severely injured (worst case upper limit 100). A major challenge proved to be Incident Command and resource allocation to avoid a counter-productive influx of people and equipment at the site of incident. This also was needed to keep people out of the danger area. This responsibility was allocated to an Incident Command Officer (non-medical) with full authority to control the area. In spite of some shortage of ketamine, the medical equipment was sufficient. However, insufficient marking of the different professional categories did create confusion. Medical outcome could not have been improved in any way.

Conclusion: This was a mass casualty incident with ample resources, and as such, not a disaster. However, the influx of a large amount of resources could have become counter-productive. Through a firm Incident Command, the high influx of resources was not allowed to confuse or obstruct the operations, and it also prevented unsolicited personnel from exposure to additional, unnecessary risks during the rescue operation.

Keywords : building collapse; casualty clearing; evacuation; extrication; hypothermia; incident command; injuries; mass casualties; resources; search and rescue; snow; structural collapse; traumatic asphyxia