1-1 Helsinki Civil Defence from History to Current Day

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Conférencier : **Jukka Lehtiranta,** President Helsinski Civil Defence Association

This conference, given by Jukka Lehtiranta at Restaurant Oiva, offers a comprehensive historical and practical overview of Finnish civil defence. The presentation traces the origins of civil defence in Finland from the hill forts of around 1000 AD, through the Winter War (1939–1940) and the Continuation War, right up to the present day. Key topics include the threat of chemical and biological warfare, which led to the founding of the Finnish Gas Defence Association in 1927 (marking the upcoming centenary of Finnish civil defence in 2027), the development of air-raid shelters in Helsinki, the famous 'barrage fire' technique that saved Helsinki from total destruction during the massive bombings of February 1944, the legislative framework making the construction of shelters compulsory since 1955, the current capacity of the shelters (130–135 per cent of Helsinki's population), the role of metro stations as dual-purpose civil defence shelters, the distinction between civil defence and broader preparedness, and the critical role of the voluntary third sector in supporting civil defence activities.

1. Historical Origins of Finnish Civil Defence

Hill Forts as Early Civil Defence

- Approximately 100 hill forts of this type exist in Finland, most of which were operational around 1000 AD—about 1,000 years ago.
- These forts served as the first defensive structures against attackers from the east, specifically Novgorod, representing what the speaker described as "a thousand years of experience with the Russians."
- They were also present in western Finland, addressing dual pressure: Swedes attempting to convert Finns to Catholicism from the west, and Novgorodians (Orthodox) from the east, making these fortifications a response to perceived attacks from both directions around the year 1000.
- The speaker noted that their ancestors (the Finns) have inhabited the region for about 3,000 years, as confirmed by current genomic research.

European Fortifications vs. Finnish Approach

- In Europe, large stone fortification systems were built, such as the fortified city of Carcassonne in southern France, which the speaker cited as a classic example of a European civil defence structure.
- These European fortifications had notable weaknesses—for example, Carcassonne's wells typically ran dry during summer sieges.
- Finland did not follow this style of fortification. The Finnish equivalent of bastioned fortifications exists but only dates back to the 1900s, and all are oriented eastward from Helsinki, reflecting the historically perceived direction of threat.

Early Use of Chemical and Biological Weapons

- The speaker emphasized that humanity has used biochemical weapons for thousands of years, citing smoke as a rudimentary chemical weapon and various fungi as biological agents.
- Before World War II (and specifically before Finland's Winter War), chemical warfare was considered the greatest threat to civilian populations.
- The Finnish Chemical Society (Finnish Chemical Association) estimated that authorities were not adequately preparing for this chemical warfare threat.

Founding of the Finnish Gas Defence Association (1927)

- The Finnish Gas Defence Association (also called the Gas Protection Association) was founded on November 27, 1927, by the Finnish Chemical Society due to concerns about official under preparedness for chemical warfare.
- The organization later changed its name to the Finnish Gas Defence Organization, then the National Shooting Organization, and subsequently the National Civil Defence Organization.
- The speaker identified this association as the formal starting point of Finnish civil defence, meaning that in 2027, Finland will celebrate 100 years of organized civil defence.
- As late as 1939, gas/chemical attacks were still perceived as the main threat to the civilian population, as evidenced by a gas defence exercise organized in downtown Helsinki in 1939.
- The development of aviation significantly increased the threat of chemical warfare: while ground-delivered gas (e.g., barrels emptied on a battlefield) posed little risk to civilians far from the front, aircraft enabled gas delivery deep into civilian areas, far from the battlefield.

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2. World War II — Civil Defence during the Winter War and Continuation War

Political Context of Finland and the Winter War (1939–1940)

- Finland gained independence in 1917 after being part of the Russian Empire for over 100 years. The border with Russia remained less than 30 kilometres from what was then Leningrad (now St. Petersburg), Russia's second most important city.
- Stalin sought to push the Finnish border away from Leningrad by negotiating land swaps. Finland refused these negotiations, and after years of increasing pressure, the Winter War broke out.
- Helsinki began civil defence preparations more than a month before the war, with documented preparations already underway in October 1939.

Pre-War Civil Defence Preparations in Helsinki

- Helsinki residents were required to clear attics of all materials (especially flammable objects) to reduce the risk of fire from incendiary bombs penetrating thin roof structures.
- People brought their most valuable possessions into their apartments; much of the rest was discarded or deposited at designated collection sites (Helsinki had five or six).
- Building basements were reinforced and protected against shrapnel, with internal structures designed to shelter residents.

- Temporary public shelters were built in Esplanade Park (the main public park in downtown Helsinki), with about half a dozen shelters placed so that people walking in the city centre could quickly find a nearby shelter.

Shelter Capacity at the Start of the Winter War

- When the Winter War began in 1939, Helsinki had about 20 actual dedicated shelters.
- Helsinki's population at the time was about 250,000 people, making 20 shelters clearly insufficient.
- Engineers and technicians calculated the structural reinforcement needed to allow building basements to remain standing even if the entire building collapsed above. Through this approach, the usable shelter capacity was increased to about 850,000 people—a dramatic increase achieved by repurposing reinforced basements across the city.

Underground (Bedrock) Shelter Construction

- Helsinki began building a network of underground shelters during the war years. The Civil Defence Museum shelter (Sieber bunker) was completed in July 1941, and it was among the first in this network.
- By 1944, a total of 12 underground shelters had been completed in Helsinki.
- The Civil Defence Museum is located in the Sieber bunker shelter, which served as a first aid post for the local area during the Continuation War.
- Immediately after the war, in 1946, the Sieber bunker provided temporary housing for about 30 families who had lost their homes—usually families with children. Residents lived there for months, and historical newspaper ads even listed the shelter's address as their home (e.g., "London bomb shelter, apartment number one").

Mass Bombing of Helsinki (February 1944)

- In 1943–1944, Germany and the Soviet Union—initially allies at the start of the war—were at war with each other. Stalin sought to end the conflict with Finland and force a peace.
- At the Tehran Conference, where Eisenhower, Churchill, and Stalin met, the Allies gave Stalin a "blank cheque" to deal with Finland.
- On February 24, 1944, Stalin organized massive bombing raids on Helsinki. Under his direct command was a fleet of 1,000 bombers, which collectively made over 2,000 sorties over Helsinki.
- An estimated 16,490 bombs were dropped. One war historian calculated that if they were evenly distributed over Helsinki, this would result in one bomb impact every 9 metres—about two bomb impacts in a typical room.
- Stalin's intention was similar to what was later done in Dresden: to destroy the city.
- Only 5% of the bombs actually hit residential buildings, meaning the city was largely spared.

Barrage Fire — The Innovation that Saved Helsinki

- A Finnish colonel developed the "barrage fire" technique, which was the main reason most bombs missed their targets.
- The fundamental concept of barrage fire is not to directly hit enemy aircraft, but to block and deny the flight path by creating an impassable wall of explosions in the sky.

- Thousands of pre-calculated “windows” (zones) in the sky were identified, and all anti-aircraft batteries had pre-calculated coordinates to fire simultaneously into these zones.
- The munitions used were equipped with timers so that the shells would self-detonate upon reaching the target altitude, whether or not they hit an aircraft.
- The explosions were enhanced with additional chemicals that made them ten times brighter than normal gunpowder explosions, causing the entire sky in front of approaching pilots to suddenly light up.
- The result was that bomber pilots, faced with this sudden wall of light and explosions, dropped their bombs into the Baltic Sea and returned home. This was the primary mechanism that prevented the destruction of Helsinki.
- A historian studying this subject concluded that the bomber crews were not very professional, which also contributed to the low accuracy of the bombings.

3. Post-War Legislation and Development of Civil Defence Shelters

Decline of Civil Defence After the War

- After the wars ended, Finland was forced by the peace terms to drastically reduce its military. Civil defence, which had been subordinate to air defence and had some quasi-military functions, was effectively dismantled (“scrapped”).
- The legal obligation (established by the 1939 law) requiring shelter construction was repealed.
- As a result, the construction of new shelters plummeted, with some years seeing no new shelters built at all.

Revival of Civil Defence Legislation (1955)

- The period of civil defence neglect ended when the government reversed its policy. From January 1, 1955, all new building construction in Finland has been legally required to include a civil defence shelter.
- The current threshold is 1,200 square metres of building floor area (previously 600 square metres; the threshold was raised so that smaller buildings are not required to build shelters).
- This requirement applies to all types of buildings—residential apartment buildings, sports arenas, shopping malls, and others. The speaker cited a sports arena (basketball hall) in Kauklahti, about 70 kilometres north of Helsinki, as an example where a new arena had to include a civil defence shelter even though the facility is only used 10–20 hours per week.

Technical Requirements for Shelters

- Each shelter must meet technical specifications that have remained relatively stable over time.
- Requirements include: minimum floor area per person, division of large spaces into separate sheltered rooms, connection to bedrock for thermal energy absorption, and specified ventilation standards.
- Ventilation systems in modern shelters use large ventilation machines with an electric motor and a propulsion fan. Filters are arranged in parallel (usually five special filters), so that when one filter is clogged, it can be bypassed by the next—similar in design to US shelter ventilation systems.

Helsinki Metro Stations as Civil Defence Shelters

- A key political decision in Helsinki was to equip all downtown Helsinki metro stations as civil defence shelters—the speaker described this as a particularly smart and effective approach.
- In the Kamppi shopping centre (a major downtown hub), an escalator descends to the platform level where shelter doors are visible on the sides of the passage.
- In five other metro stations, the shelter door is located in the floor, protected by a metal cover. When activated, the door is raised, sealing the entrance. Corresponding rails are visible in the walls and ceiling.
- Each of the four train tunnels can be sealed gas-tight if necessary.
- Each metro shelter meets all relevant civil defence technical specifications.
- In contrast, the neighbouring city of Espoo (described as a neighbouring "Westport" city) made the political decision not to equip its new metro stations as civil defence shelters.

Current Shelter Capacity in Helsinki

- Helsinki currently has 950 shelters in total, of which 600 are relatively large facilities.
- The total shelter capacity in Helsinki relative to its population is officially 130% (according to 2024 Ministry of the Interior figures); the speaker's own calculation suggests about 135%, and the figure continues to rise.
- Helsinki is expected to have 700,000 inhabitants in 2026.
- Shelters are divided between private shelters (e.g., owned by housing associations or private companies) and shelters owned by the city government. One notable city government-related shelter is the underground parking garage beneath the concert hall built next to Finlandia Hall (designed by Alvar Aalto, which hosted the European Conference in 1975); part of this parking garage has been equipped as a civil defence shelter and is owned by a limited liability company 100% owned by the housing association.
- Finland's total national shelter capacity covers about 4.8 million people, compared to a total population of about 5.6–5.7 million. This figure is considered solid because many people live in rural municipalities where shelter construction is not practical or required.

Typical Peacetime Use and Activation

- In peacetime, typical shelter use in cities is dry storage, with very light interior partitioning because owners are required to clear and prepare shelters when authorities order it.
- From the moment authorities issue a preparation order, shelter operators have 72 hours to make the shelter ready for use.
- The speaker noted that in a realistic crisis scenario, an authority order would likely not be a total surprise, as conflicts usually escalate over days or weeks, giving people time to anticipate and mentally prepare.

4. Civil Defence vs. Preparedness — Scope and Responsibilities

Distinction Between Civil Defence and General Preparedness

- Civil defence and preparedness are not synonyms.

- By definition, civil defence specifically means the protection of the population from the use of (military) force.
- Preparedness is a broader concept encompassing 11 types of events or threats that could occur even in normal peacetime (e.g., natural disasters, accidents, infrastructure failures). Civil defence is one component of the broader preparedness framework.
- When military force is applied, the likelihood that these other preparedness-related events will occur also increases.

Civil Defence as a Municipal Responsibility

- Civil defence is legally the responsibility of municipalities (cities/local governments), not the central government, although the central government is involved in some areas (e.g., receiving international humanitarian aid, which typically arrives at the port of Helsinki).
- A publicly accessible civil defence guidance document has been published by Helsinki for every citizen. It covers the main topics of civil defence and is about 30 pages long—described by the speaker as something everyone should read.
- Civil defence activities include tasks such as receiving and distributing international humanitarian aid, managing shelters, and coordinating with volunteer organizations.

Outsourcing and the Third Sector

- A growing global trend among municipalities and public organizations is to outsource civil defence tasks, especially to the third sector (volunteer/non-governmental organizations).
- Authorities are already very busy in normal times; in wartime, they become even more so, requiring broader participation from volunteers and civil society organizations.
- The rescue service, for example, began training shelter operators around 2019 (about 8.5 years before the conference, calculated from mid-2026) and sought volunteer associations as partners in this effort.

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5. Role of Volunteer Organizations and the Third Sector

Finnish Volunteer Rescue Service

- Finland has a volunteer rescue service with 13,000 volunteers across the country, available 24/7, ready to assist authorities in tasks such as searching for missing persons and other emergency response activities.
- The trigger for the founding of this organization was the disappearance of a 5-year-old girl in a forest (the speaker referred to this event as having occurred in a place they called “Nepal,” though contextually this seems to be a Finnish location). The case received national media attention, prompting members of the public to spontaneously flood the search area to offer help—but without an organizational plan, resources, or coordination. A local police officer spent their own money on fuel and food for the helpers.
- The girl was found dead on the fifth day. The subsequent reflection was that if the organized preparation, number of people, and plans present on the fourth day had existed on the first day, the outcome might have been different. This realization became the founding motivation for the organized volunteer rescue service.

The Speaker's Association — Civil Defence Museum and Wartime Commitments

- The speaker's association operates the Civil Defence Museum, which is open to the public on Saturdays from September to May. The next public opening after the conference date (12-06-2026) will be on Saturday, September 10, 2026.
- The association has over 50 people committed to being called into service in wartime.
- The association has over 15 trained dogs and over 800 members/staff involved in various capacities. The dogs and their handlers are committed to training for specific civil defence search purposes.
- Activities include an emergency area search group (in cooperation with police and fire departments) and an environmental search and rescue group (in cooperation with the rescue service for normal operations, with wartime roles also defined).
- The association currently has 120 members and provides training characterized by about 1,000 "recommendations" (training achievements or certifications), with plans to increase this number.
- Training is also extended to what the speaker called the "spontaneous sector"—members of the general public who receive training and can then train others (about 4 people), averaging about 3 training events per month.
- The association also participates in activities in other countries.

Shelter Dog Training

- The search and rescue dogs used by the association receive specific training related to civil defence shelters, including acclimatization to shelter environments, navigating entry and exit routes (official inbound and outbound air traffic paths), and operating in confined underground spaces.

Could the Barrage Fire Technique, Which Saved Helsinki in 1944, Be Adapted to Modern Air Defence Strategies?

- The barrage fire technique, as used to defend Helsinki in 1944, relied on specific principles suited to the threats and technologies of the time.
- While the exact method is not directly transferable to modern air defence strategies, some of its underlying principles may resonate in contemporary approaches.

Why the Literal Technique Is Not Directly Adaptable:

1. **Nature of Threats:** In 1944, the main threat was fleets of piloted bombers, which were relatively slow and predictable. Today, aerial threats are much more diverse, including stealth fighter jets, hypersonic cruise and ballistic missiles, and drone swarms, all characterized by greater speed, agility, and stealth.
2. **Targeting Technology:** Barrage fire relied on pre-calculated "windows" and timed munitions. Modern air defence systems use advanced radars, infrared sensors, and precision guidance systems to intercept individual targets with high accuracy, often at extreme speeds and altitudes.
3. **Psychological vs. Technological Effect:** The visual effect of bright explosions was a powerful deterrent for human pilots. Modern threats are often autonomous or remotely piloted, and their navigation and targeting systems are not affected by a "wall of light."

4. **Cost and Effectiveness:** Firing thousands of shells to create a barrage would be extremely costly and ineffective against fast, manoeuvrable targets that can easily avoid a predefined area.

How the Underlying Concept Remains Relevant:

5. **Defence Against Drone Swarms:** Facing swarms of cheap, small drones, it is not always economically or technically feasible to use expensive missiles for each target. Area-effect weapons, such as high-power microwaves (HPM) that can disable the electronics of multiple drones simultaneously, or smart munitions dispersing submunitions, can be considered a modern form of "barrage" aimed at neutralizing a multitude of threats over a given area.
6. **Electronic Warfare (EW):** Creating a "barrage" of electronic jamming to disrupt enemy navigation, communication, or targeting systems over a wide area is a modern air defence strategy that aims to deny access or effectiveness to the attacker without necessarily physically destroying it.
7. **Layered Defence:** While different from a single barrage, the multi-layered air defence strategy aims to create an increasingly difficult environment for the attacker as it approaches the target, combining different types of interceptors and sensors to increase the probability of interception.

Summary

The specific barrage fire technique used in Helsinki is obsolete. However, the strategic idea of area denial and overwhelming the adversary that it embodied continues to inspire modern approaches, particularly in the context of counter-drone warfare and electronic warfare, where the goal is to make an area impassable or an attack ineffective through non-kinetic or area-effect means.