Still burning

Immediate and protracted humanitarian consequences of white phosphorus munitions: evidence from Viet Nam

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Photo: NPA Viet Nam

About this policy brief

This policy brief by Norwegian People's Aid sets out the harm caused by white phosphorus (WP) munitions – immediate and protracted; medical, environmental and operational. It presents the key findings of a new study by Norwegian People's Aid in Viet Nam, which draws on historical bombing records, humanitarian mine action data, survivor testimony and environmental sampling.

On that evidence, and in line with Norwegian People's Aid's policy on incendiary weapons, the brief makes the case for a full prohibition on incendiary weapons, including WP munitions, and sets out what states, mine action, health and victim assistance actors and donors should do.

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Sources and method

Unless otherwise indicated, findings on Viet Nam are from Norwegian People's Aid Viet Nam's study of the legacy of white phosphorus in Viet Nam (forthcoming, 2026). It combines U.S. air-operations records (the THOR dataset), technical manuals and archive footage, munitions data from the Quang Tri Mine Action Centre, Norwegian People's Aid Viet Nam's Standard Operating Procedures, interviews with survivors and soil and water sampling with Hue University. The interviews are illustrative, not representative; the sampling covers one demolition at one site.

Cover photograph: Two 105mm white phosphorus projectiles before demolition by Norwegian People's Aid in Viet Nam. **Photo:** Norwegian People's Aid Viet Nam.

Author of the policy brief: Kristina Duric, Head of Policy NPA, Therese Krystad Prestsæter, MD, Programme Advisor NPA

Report authors: Bui Doan Bach (NPA Vietnam), Melissa Andersson (NPA Vietnam), Kristin Obrestad (NPA HO), Therese Krystad Prestsæter, MD (NPA HO), Kristina Duric (NPA HO)

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Harm that outlasts the war

White phosphorus burns at the moment of use and goes on harming survivors, deminers and the land for decades. Evidence from Viet Nam shows how – and why states should seek a full ban on incendiary weapons, including white phosphorus.

Key messages

- **The harm is immediate and inhumane.** WP burns through skin to muscle and bone, can re-ignite in wounds and can kill even when burns are small.
- **It is also protracted and indiscriminate.** WP left in the ground went on killing and injuring civilians, many of them children, long after the war.
- **The legacy is extensive.** In one province alone, 4,210 WP munitions of 23 types have been found and destroyed.
- **Clearance is costly, and not without environmental trace.** WP needs specialist disposal, and even a correctly performed demolition raises phosphorus, lead and arsenic levels in nearby soil.
- **States should seek a full ban** on incendiary weapons, including WP. The CCW has been unable to meaningfully discuss or address the subject; a prohibition should be pursued in a stand-alone process that can deliver one.

Context

White phosphorus (WP) ignites on contact with air and burns until it is consumed or starved of oxygen.[1] Used for smoke, marking and signalling, it has the effects of an incendiary weapon – yet Protocol III to the Convention on Certain Conventional Weapons (CCW) leaves it outside its scope, covering only weapons "primarily designed" to burn and regulating ground-launched incendiary weapons less strictly than air-dropped ones.[2] Its use continues today. This brief presents the findings of a new Norwegian People's Aid (NPA) study in Viet Nam – the first systematic documentation there of WP use, survivor impact and contamination.[3]

1. Viet Nam: a legacy still in the ground

U.S. air-operations records, cross-checked against mine action data, show three types of air-delivered WP munitions in heaviest use: 2.75-inch rockets (11,086 recorded), 100 lb M47 bombs (9,970) and BLU-17/B smoke cluster munitions (5,174 dispensers, each holding 213 WP submunitions). These figures understate the total: the records do not reliably separate WP from other munitions and largely omit WP fired by ground forces. Archive footage shows WP dropped together with napalm on villages and forests, its burning white smoke spreading well beyond the napalm fireball.

4,210
WP munitions found and destroyed in Quang Tri province

23
types of WP munition recorded, 18 of them infantry weapons

1 million+
WP submunitions in BLU-17/B dispensers alone

Ground-fired WP dominates what clearance teams find today. Of the 4,210 WP munitions recorded as destroyed in Quang Tri, most are mortar rounds (1,794) and artillery projectiles (1,073). WP-filled fuzes from napalm bombs also still surface; one is suspected of causing the deadliest accident documented in the study.

2. Medical harm: at impact and for life

At impact. WP is toxic by skin contact, inhalation and ingestion. Burning particles stick to skin and clothing and burn until removed, consumed or cut off from oxygen, causing thermal and chemical burns that can reach muscle and bone.[4] Particles left in a wound can re-ignite on exposure to air, endangering patients and medical staff. The smoke injures the eyes and airways of anyone nearby. Absorbed phosphorus can stop the heart within an hour, so even burns covering less than a tenth of the body can be fatal.[5]

Survivors in Viet Nam describe exactly this. When a munition remnant detonated among eight children herding cattle in 1982, survivors recall leaping into a pond to douse the flames. In the hospital, the burning went on undetected through the night, as it smouldered deeper into the body without open flames.. It stopped only when visiting doctors who had experience with WP injuries recognised the cause and cut off oxygen with wet dressings. Only four survived.

Decades on. All survivors interviewed were injured after the war had ended – while herding cattle, preparing land or handling an object they did not recognise. Four were children at the time of interaction with WP. Two of the four accidents killed others. Today all survivors interviewed have scarring;

[1] Agency for Toxic Substances and Disease Registry (ATSDR), *Toxicological Profile for White Phosphorus* (Atlanta: U.S. Department of Health and Human Services, 1997).
[2] Protocol on Prohibitions or Restrictions on the Use of Incendiary Weapons (CCW Protocol III), adopted 10 October 1980, 1342 U.N.T.S. 171, arts. 1(1) and 2.
[3] NPA Viet Nam, study of the legacy of white phosphorus in Viet Nam (forthcoming, 2026). Unless otherwise indicated, findings on Viet Nam are from this study; see "Sources and method", p. 2.
[4] ATSDR, *Toxicological Profile for White Phosphorus*; D. J. Barillo, L. C. Cancio and C. W. Goodwin, "Treatment of White Phosphorus and Other Chemical Burn Injuries at One Burn Center over a 51-Year Period," *Burns* 30, no. 5 (2004): 448–452; L. N. Al Barqouni et al., "White Phosphorus Burn," *The Lancet* 376, no. 9734 (2010): 68; World Health Organization, "White Phosphorus," fact sheet (15 January 2024).
[5] M. Wang et al., "White Phosphorus Munitions: Pathophysiology, Clinical Management, and Multidisciplinary Perspectives," *Frontiers in Public Health* 13 (2025): 1632840; T. D. Chou et al., "The Management of White Phosphorus Burns," *Burns* 27, no. 5 (2001): 492–497; K. G. Davis, "Acute Management of White Phosphorus Burn," *Military Medicine* 167, no. 1 (2002): 83–84.

four out of five report chronic pain and four out of five failing sight, both worsening with age (Figure 1).

These are survivors' own accounts: while no complementary medical records exist explicitly stating the WP as the clinical cause of the survivors' symptoms, they match, however, complications recorded in the medical literature – contractures, chronic pain, disfigurement and psychological injury.

The economic harm is just as lasting. Families sold assets and borrowed to pay for medical treatment; children lost schooling; survivors now live from low-income farming, ill-suited to their health, with minimal follow-up care. Such harm is seldom recorded: a 2026 review found only 36 peer-reviewed reports on incendiary weapon injuries worldwide this century.[6]



Figure 1. Long-term effects reported by five survivors of post-war WP accidents (number of survivors). Self-reported; not clinically verified.

> "I didn't have time to think much about the accident. I was more worried about putting food on the table every day."
>
> Survivor of a 1977 white phosphorus accident, Viet Nam

3. Environmental harm: lasting traces

At impact. WP sets vegetation alight, and studies estimate that up to a tenth of the phosphorus in a munition may remain unburned.[7] Driven into waterlogged soil or sediment where oxygen is scarce, residues can persist for decades and re-ignite when the ground is disturbed or water levels fall.[8] At Eagle River Flats, Alaska, WP from military training killed thousands of waterfowl every year; remediation took over two decades.[9]

Decades on. Demolition is the only safe way to destroy WP munitions, yet it leaves its own trace. After NPA destroyed four WP munitions at its demolition site in Thua Thien Hue province, Hue University tested 33 soil samples taken at up to 400 metres from the blast point (Figure 2).

Concentrations fell with distance, nearing background levels at 400 metres. Water used to store leaking munitions held 60 per cent more phosphate and 45 per cent more phosphorus than a nearby watercourse. While all readings were within national standards, sandy, acidic soil makes lead and arsenic more mobile. Only one demolition was measured, without a baseline; and thousands of WP items still await disposal. The cumulative footprint is unmeasured, and a changing climate may corrode casings faster, raising the risk of leaks and unplanned ignition.

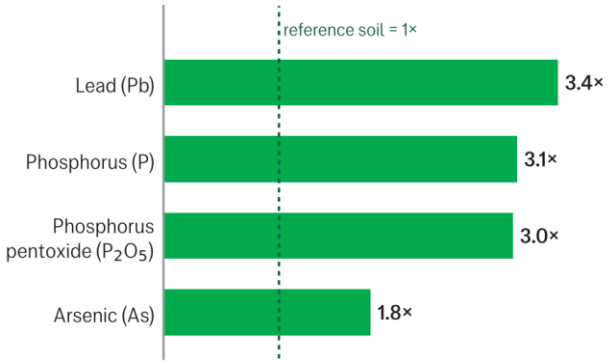


Figure 2. Soil at the point of demolition relative to the reference mean. All values within Vietnamese standards.

4. Operational risks: clearance and destruction

At the demolition site. WP cannot be destroyed like other ordnance. For comparison, cluster munition remnants are demolished with the blast directed downwards, as most other explosive ordnance (EO); WP, however, must be thrown upwards to burn off in the air rather than be driven into the ground. That scatters burning fragments widely, can set vegetation alight and produces a toxic cloud. Bursting charges add unpredictability, and corroded items leak and must be kept under water until destroyed.

Over time. NPA Viet Nam reserves WP work for operators certified at IMAS EOD Level 3 or above. Teams wait 30 minutes after the last visible smoke, rake the ground for unburned fragments and rest each disposal site for 24 hours. Every step adds time, skill and cost to programmes, delaying clearance of other EO contamination. Additionally, affected communities rarely understand WP as distinct from napalm or other EO contamination – only that "it burns like crazy" – explosive ordnance risk education (EORE) needs to specifically address it as a distinct risk, training the EORE teams on its specifics is necessary.

5. The response: a full prohibition

The evidence from Viet Nam shows that WP's harm cannot be confined to the moment or place of its use. A weapon that burns without distinction at impact and endangers civilians, deminers and the environment for half a century, is not made acceptable by rules on how it is delivered or what it was designed to do. The report makes a clear case that incendiary

[6] T. K. Prestsæter et al., "The Medical Consequences of Incendiary Weapon Use in 21st-Century Armed Conflict: A Scoping Review," *Burns* 52 (2026): 108120.
[7] Ø. A. Voie et al., "Environmental Risk Assessment of White Phosphorus from the Use of Munitions – A Probabilistic Approach," *Chemosphere* 79, no. 6 (2010): 633–639; R. J. Spanggord et al., *Environmental Fate of White Phosphorus/Felt and Red Phosphorus/Butyl Rubber Military Screening Smokes* (U.S. Army Medical Research and Development Command, 1985).
[8] Y. B. Rivera, T. Olin and R. M. Bricka, *Summary and Evaluation for White Phosphorus Remediation: A Literature Review*, IRRP-96-7 (U.S. Army Engineer Waterways Experiment Station, 1996).
[9] C. H. Racine et al., "White Phosphorus Poisoning of Waterfowl in an Alaskan Salt Marsh," *Journal of Wildlife Diseases* 28, no. 4 (1992): 669–673; M. R. Walsh, *Eagle River Flats Remediation Project Comprehensive Bibliography, 1998–2003*, ERDC/CRREL TR-03-15 (2003).

weapons, including WP munitions, should be prohibited in all circumstances.

The need is current and urgent: WP use was verified 23 times in southern Lebanon between March and May 2026 alone.[10] Yet the CCW has not been able to take the issue forward. Protocol III has had no agenda item on the issue of its own, apart from a dedicated agenda item, but without discussion on it 2018. Since 2021, at least 27 High Contracting Parties have asked for time to discuss it, without consensus being reached, and the 2025 annual meeting was confined to procedure.[11]

A forum that has been unable to successfully address the subject of incendiary weapons through time set and exercised as per its agenda, let alone discuss it in substance, cannot reasonably be expected to resolve it. This reflects the limits of consensus - not the will of most of the forum's members.

States that share this responsibility need not wait – but the route matters. Taking the question to the UN General Assembly is likely, as we have seen with other matters, to see it referred back to the CCW, where it would again be held up by the consensus rule. The conventions banning anti-personnel mines and cluster munitions point to another possible path: both were negotiated in stand-alone processes, led by committed states, when the CCW could not deliver.[12] Half a century on, Viet Nam is still paying the price for white phosphorus used during the war. The use of WP is on the rise in contemporary conflicts. The response cannot wait any longer.

Recommendations

To states

1. **Seek full prohibition.** States have a responsibility to address the harm caused by incendiary weapons, including WP. The parties to Protocol III first among them should commit to prohibiting the use, production, stockpiling and transfer of all such weapons, and to assisting victims and clearing and remediating affected land.
2. **Pursue it in a stand-alone process** among committed states, as was done for anti-personnel mines and cluster munitions – not by a route that leads back to the CCW and its consensus rule.
3. **Say so at the Review Conference.** Put on record that Protocol III does not give adequate protection and that, after eight years without an agenda item, another route is needed.
4. **Cease and condemn the use** of WP and other incendiary weapons in the meantime.

To mine action, health and victim assistance actors and donors

5. **Treat WP as a distinct hazard:** record it as a separate item in clearance and disposal operations, name it in risk education, share disposal procedures among the humanitarian clearance operators to ensure learning and good practice sharing, and resource the extra time and skill it demands.
6. **Monitor soil and water** before and after WP demolitions.
7. **Keep cases open** for survivors whose symptoms worsen years later, and support families in injury-related debt.
8. **Document WP injuries as they occur** and fund comparative studies in other affected countries.[13]

[10] Human Rights Watch (HRW) and International Human Rights Clinic (IHRC), Harvard Law School, *Uncontrolled Burn: The Inhumane Effects of White Phosphorus Munitions and the Need for Stronger Law* (9 September 2026).
[11] HRW and IHRC, *Uncontrolled Burn*. Consensus on dedicated discussions was withheld by Cuba and the Russian Federation in 2021 and by the Russian Federation at subsequent meetings: HRW, "Incendiary Weapons: Recent Developments and Use" (12 May 2023); HRW and IHRC, "Incendiary Weapons: Need for Stronger Law and a New Forum" (3 October 2025).
[12] NPA, "Incendiary Weapons."
[13] H. B. Wild et al., "Increasing Access to Casualty Care Data in Low-Resource Conflict Settings: A Practical Toolkit," *World Journal of Surgery* 49, no. 6 (2025): 1490–1496.

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Postbox 8844 Youngstorget
N-0028 Oslo, Norway

Norwegian
People's Aid