

Focusing on working conditions

# Health risks from munitions

Munitions contain chemical substances that can be harmful to people. TNO studies the potential risks to health that occur as a result of exposure to munitions-related substances. TNO also advises on minimising these risks.



Studying the concentrations of munitions-related substances at (indoor) shooting ranges

*The Occupational Health and Safety Act stipulates that employers must keep the exposure of employees to harmful substances to a minimum. Research into the higher risk work of, for instance, Defence personnel is needed in order to establish where, and the extent to which, harmful munitions-related substances are released. This will enable the employer to suitably modify his occupational health and safety policy.*

## Health problems

There are various ways in which people may come into contact with chemical substances used in munitions or created as a result of firing. A gunner, for instance, is exposed to a whole variety of substances during a firing exercise. Explosive Ordnance Disposal (EOD)

personnel are exposed to all kinds of harmful substances when they destroy munitions and old explosives. Some high-risk substances are also released due to ageing.

Exposure to such substances can cause acute symptoms like inflamed eyes or irritated skin, with repeated contact even leading to chronic symptoms like allergies. TNO is commissioned to perform extensive research into the health problems that arise in different circumstances. Using experimental measurements and simulation models, TNO is able to identify the working conditions and advise the employer on occupational health and safety policy and measures that can be taken to safeguard the implementation.

Studies have shown that the disposal of munitions by open detonation and incineration results in a deterioration of the local air quality. This is not a technique to be recommended in view of working conditions. TNO has developed new, mobile techniques to enable the environmentally-friendly and safe disposal of various munitions.

## Identification of substances

The chemical substances incorporated are not known for all munitions, but in order to take appropriate health and safety precautions such knowledge is crucial. Therefore, TNO has begun the process of identification. Apart from giving advice to occupational health and safety precautions, the identification can lead to replacements of substances that are harmful and thus improve working conditions. TNO's knowledge of munitions and related substances is extensive. Furthermore, TNO has reliable simulation models and unique facilities to carry out experiments, all of which makes TNO the perfect partner to perform this identification study.

## Personal protection

Attention often focuses on health risks that arise from the actual firing or disposal of munitions. The risks at such moments are significant, but people may come into contact with harmful substances throughout the complete lifecycle of munitions, in production and maintenance, for example. TNO has accumulated specific knowledge on how the human body absorbs these substances, the toxicity and physical-chemical properties of these substances in

relation to health risks. During various kinds of work with munitions, TNO can determine the risks that personnel are exposed to and advise on the most suitable personal protection.

**TNO. Committed to innovation for a safer world.**

*When disposing of munitions, the chance of*



*exposure to munitions-related substances is considerable; personal protection is therefore a must.*

**TNO Defence, Security and Safety**

'TNO Defence, Security and Safety' is the title under which TNO operates as a strategic partner for the Dutch Ministry of Defence and makes innovative contributions to enhancing the security of the Netherlands both at home and abroad. We also use our accumulated knowledge for foreign governments and for defence-related industries.

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