

Advice and assistance in detection and clearing

Unexploded explosives

The Dutch soil contains many hidden unexploded ordnance and explosives from the Second World War, including munitions, grenades and bombs. This may lead to dangerous situations and health risks. TNO is studying this situation, advising and assisting in detection and clearing.



Building work, excavation and sewage work regularly discover unexploded ordnance, creating disturbances and significant safety risks for the community. An explosion without any form of protection in a residential area usually has disastrous results. Buildings are often seriously damaged by pressure waves, flying shards of glass, fireball of ground shock. There may be casualties, fatal or otherwise, among residents.

Safety plan

In the decades following the Second World War, the clearing of unexploded ordnance was the task of Defence's Explosive Ordnance Disposal (EOD) technicians. In the meantime, detection has also been performed by civilian

firms. However, the detection and disposal of improvised explosive devices (IED) (such as letter bombs) is exclusively performed by EOD personnel. TNO advises and supports the Ministry of Defence, local authorities and civilian detection firms among others in drawing up a safety plan that contains, for instance, the safety contours around an unexploded ordnance.

Safety contours

TNO investigates the consequences of unexploded ordnance when it accidentally explodes during detection, clearing or dismantling. An investigation such as this enables local authorities and detection firms to draw up safety contours in consultation

with TNO. This enables the precise calculation of insurance premiums. Strict safety measures are then implemented within the established contours.

The task of detecting unexploded ordnance has been outsourced to civilian firms by local authorities: these firms must submit a safety plan. The local authorities assign TNO the task of evaluating these plans, including their safety measures and reports.

Protective structures

In addition to the drafting of a safety plan, TNO helps civilian firms and the Explosive Ordnance Disposal team to design and evaluate protective structures. These are used for ditch and harbour dredging as well as for the disposal of aircraft bombs. TNO also develops structures for the temporary storage of unexploded ordnance and explosives.

Furthermore, TNO investigates techniques that can reduce the impact of an explosion and consequently the safety contours around an unexploded ordnance or explosive, which is particularly welcome in densely populated districts. One of the reducing techniques that has a significant effect is a sand cover.

Development of products

In respect of unexploded ordnance and explosives, TNO has extensive knowledge and expertise. The combination of simulation models and large-scale testing facilities enables TNO to make a significant contribution to the development of new products. For instance, in collaboration with

civilian firms, TNO has developed a number of protection products, including the Episafe, a temporary storage container and protection structure that reduces the destructive capacity of munitions and explosives.

TNO. Committed to innovation for a safer world.



In collaboration with TNO, a civilian firm has developed the 3D-Borehole Radar detection method that enables unexploded ordnance and explosives to be detected at a great depth.



Safety contours are based on TNO investigations.



TNO has developed a container for the temporary storage of unexploded ordnance and explosives.



During the disposal of aircraft bombs, a protective structure is used. This structure has been tested by TNO.



In collaboration with TNO, a civilian firm has developed the Episafe: a protective structure that reduces the destructive capacity of munitions and explosives.

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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