BATTELLE MULTI-THREAT DECONTAMINATION SYSTEM (MTDS)

On the battlefield, the warfighter may be exposed to a wide variety of threats, including chemical warfare agents (CWA), biological warfare agents (BWA), and Toxic Industrial Chemicals (TIC). No single technology is currently fielded to thoroughly decontaminate each of these different threats. The Battelle Multi-Threat Decontamination System (MTDS) incorporates multiple proven methods into a system with selectable operating modes to mitigate the widest variety of Chemical/Biological (CB) threats in a design optimized for deployment and reliability.

The MTDS Process

The warfighter selects between three decontamination methods based on the threat(s) that must be mitigated. The three decontamination processes combined in the MTDS include Vapor Phase Hydrogen peroxide (VPHP) with added ammonia (H2O2 + NH3), VPHP only (H2O2), and Hot Air Decontamination (HAD) (heat only). These processes deploys vapor and/or hot air to treat contaminated surfaces, eliminating the need for liquid immersion. For equipment that may be degraded by exposure VHP or in the absence of decontaminant supplies, the HAD mode is used to enhance evaporation of the CWA and kill most BWA.

The interior of the chamber can be scaled to basic container sizes and configured with rows of wire racks as horizontal shelves, vertical racks, or ceiling hangers, etc. Equipment is arranged to avoid contact between items to maximize decontamination contact effectiveness (figure 2).

The interior of the chamber is wired to power electronics that require internal air circulation for cooling (such as laptops). These items are powered to ensure decontamination of potentially contaminated internal surfaces.

The mechanical controls cabinet is accessed through environmentally sealed doors, allowing access to the consumables, power distribution, pumps, and blowers. The cabinet is heated to prevent freezing of consumables during operation. All operations are performed from an easy to access command center on the exterior of the chamber.

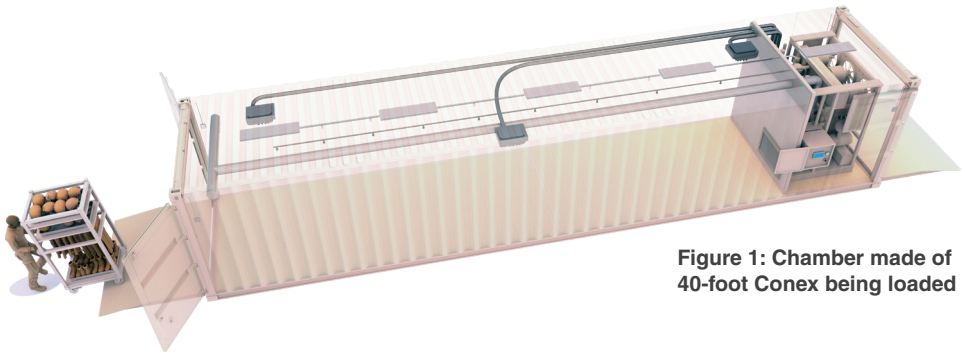

Figure 1: Chamber made of 40-foot Conex being loaded

Key Features

The MTDS presents an opportunity to incorporate lessons learned to greatly enhance fielded decontamination of both CWA and BWA.

- The MTDS merges leading chemical and biological (CB) decontamination technologies into a single scalable system
- Heat, H_2O_2, NH_3, are applied in multiple modes to neutralize the broadest range of CBthreats effectively and efficiently on the widest range of equipment materials
- Low concentration consumables selected to avoid shipping restrictions, minimize safety hazards, and improve availability
- The MTDS is a fully containerized system that simplifies transport, minimizes setup/teardown, and maximizes system availability
- Ruggedization for field conditions including broad operating temperature range, humidity, and shock and vibration tolerance for expected modes of transportation (MIL-STD-810G)

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The MTDS is transported nearly assembled for operation, virtually eliminating setup time. There is no unpacking required, no hoses to connect between components, and no sensor cables to run, because the decontaminant generator is fully and permanently integrated with the chamber.

Modular and Scalable

The MTDS fully integrates the chamber and vapor generation to create a building-block approach to scaling: a MTDS single block can process the gear of a platoon in 12–16 hours. For company-scale deployments, fielding multiple blocks in parallel maximizes efficiency, flexibility, and reliability.

Another efficiency of fielding multiple MTDSs is the flexibility of being able to treat different equipment with different processes. Not all materials and equipment require the same decontamination parameters. Some require longer times or higher temperatures, while others may be easier to decontaminate. Having multiple blocks that can run simultaneously enables each type of equipment to be treated with the process that ensures it remains operational and safe after treatment—increasing throughput and minimizing the consumption of power and consumables.

Finally, fielding multiple blocks eliminates single point failures that a single larger system might experience. This not only improves reliability but also reduces spares and training that might come with a system that must change configurations to accommodate various capacities.

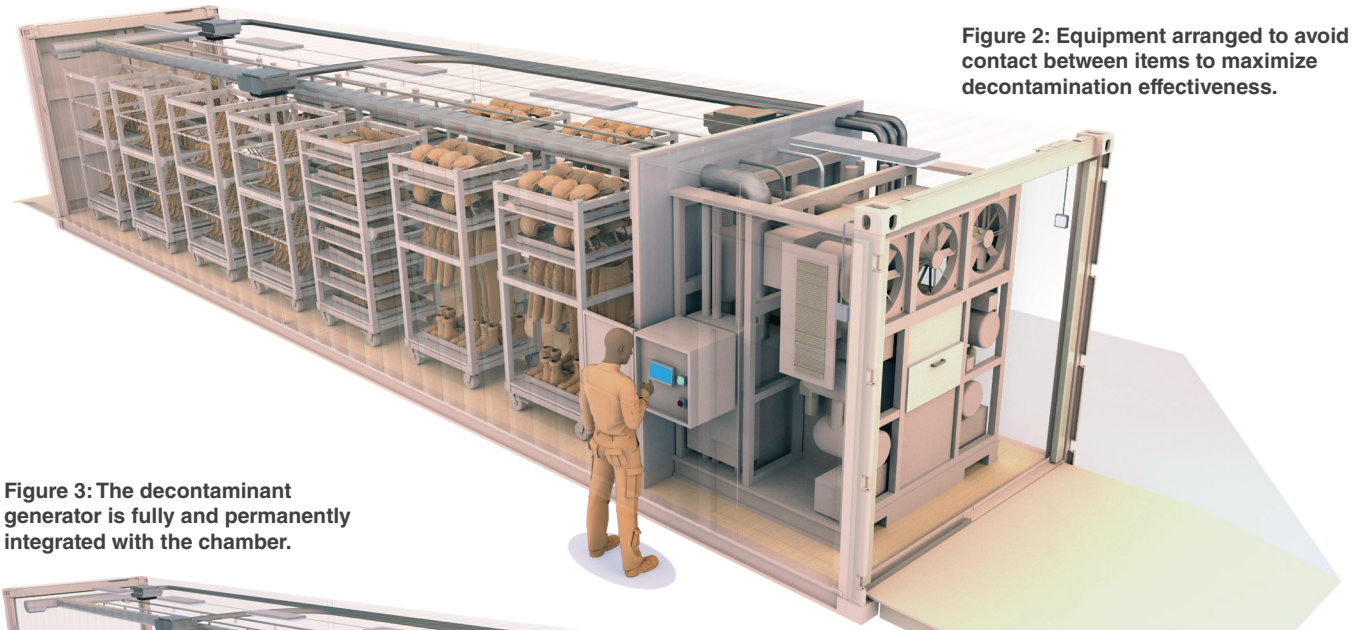

Figure 2: Equipment arranged to avoid contact between items to maximize decontamination effectiveness.

Figure 3: The decontaminant generator is fully and permanently integrated with the chamber.

For more information about MTDS, contact us at solutions@battelle.org.

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