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Krohn offers another 'tool' for OE removals

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A new approach, the Krohn Mechanical Mine Clearance System, was used last summer to remove various types of ordnance from a range at the Combat Maneuver Training Center in Hohenfels, Germany.

"The Corps is always looking for safer and better ways to remove ordnance," said Bob Nore, the Corps of Engineers' Huntsville Center lead for the project. "By using this 'different,' or new approach, we now have data that can be applied for use of this type of technology at other sites. This type of technology may have potential for use at ranges in the United States."

The Krohn system, developed by European entrepreneur Herr Walter Krohn, is designed to drive through and "till" ordnance contaminated soil. This detonates any ordnance present while simultaneously withstanding the blast and protecting the operator from sound, metallic fragments, and over pressure caused by blasts.

The Krohn can withstand up to 10 kilograms, or 22 pounds of explosives. It consists of an armor plated, track-driven vehicle equipped with a front-mounted tiller system. The tiller includes a roller approximately three meters wide (or about 10 feet) fitted with teeth approximately 22 centimeters (eight inches) in length and four centimeters (one and one-half inches) thick.

The teeth are offset on the roller to ensure complete excavation of subsurface materials during each revolution. The offset, combined with the rotation of the roller, loosens the soil and shreds most everything from vegetation and stone, to land mines and other unexploded ordnance to a depth of approximately 32 centimeters, or one foot. The range on which the Krohn machine was tested was used as a direct fire anti-tank range.

The Krohn Mechanical Mine Clearance System

The Krohn machine was used for clearance of about 17 acres during a four-week time frame. More than 64 different types of ordnance items were encountered at this range. Items ranged from 40mm grenades, to M8 mines, to Light Anti-tank Weapon (LAW) rockets, to 90mm projectiles, which were the largest items demolished at the site by the Krohn. A minimum separation distance (or work exclusion zone) of 300 meters from the sides and back of the machine, and 586 meters from the exposed front was established (the distance was calculated by Huntsville Center) as a safety measure for the anticipated detonations caused by the tilling.

"Because of the high density of ordnance, the initial plan was to use 'mag and flag,' which means using a magnetometer to locate potential ordnance items, excavating and identifying the item, then disposing of any unexploded ordnance and ordnance scrap," said Nore. "But by using the tiller, we anticipated that it would make geophysical mapping safer and more efficient by eliminating surface items, removing vegetation and uneven surfaces; and saving clearance time by eliminating some excavations."

The contractor, EODT, requested a proposal for the Krohn. "It was our job to ensure that the Krohn met our safety requirements and effectively minimized the risks. After Huntsville Center Safety approved its use and we revised the safety plan, we moved forward," Nore said.

To evaluate the Krohn's performance for ordnance removal, a test grid using 25 meters by 25 meters and cleared to a depth of 4 feet was established comparing "not tilled" areas to "tilled" areas. "Advantages to using this machine included better visibility of unexploded ordnance, faster and safer excavation and more accurate geophysical mapping," said Nore. "Disadvantages included the need to establish a minimum separation distance for planned detonations, down time due to the roller being jammed with target scrap and worn teeth due to rocks and limestone, a one-foot effectiveness limit, and landscape limits (not feasible in mud, limestone or rocky areas)."

Nore emphasizes that a machine like the Krohn is best suited to ranges or isolated areas where the minimum separation distance does not impact residents or traffic. "We now have another tool in our project 'toolbox' that meets our stringent safety standards," he said.

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The Corps Environment

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Corps embraces 2001 Earth Day theme

By MAJ. GEN. HANS VAN WINKLE
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On April 22, the Army will join the rest of the country in celebrating Earth Day. Although there isn't a national theme for Earth Day, the Army does have one — "Transforming The Army … Sustaining the Environment." As Gen. Eric K. Shinseki, Army Chief of Staff, notes in his 2001 Earth Day Message, "[this theme] highlights our goals for the future and our continued success and dedication to environmental stewardship on our installations."

The point the Chief of Staff is making is that the success of Army Transformation depends on balancing the Army's training and operation missions with protecting and sustaining the environment. The U.S. Army Corps of Engineers is uniquely qualified to support this effort and will play a vital role in achieving the goals the Chief of Staff has outlined.

We have programs that help Army and Air Force installations fulfill their environmental missions. We also are responsible for protecting and sustaining the environment through our cleanup, regulatory, cultural resource preservation and ecosystem restoration initiatives.

Lt. Gen. Robert Flowers, Chief of Engineers, has set environmental stewardship as one of his five goals to accomplish. He has challenged each of us to "create environmentally sustainable systems that protect people, property and economic growth across the United States."

Our projects balance economic and engineering concerns with the need to protect and enhance the environment. We are applying this mandate across all our missions from our support to the military, including Army Transformation, to our Civil Works mission, going beyond our legal and regulatory requirements.

As we mark Earth Day, we are defining our role in Army Transformation, an initiative to make the Army more agile, efficient and rapidly deployable. To reach these important goals, the Army must have access to realistic training – training that can only occur if the ranges and training areas are both environmentally and technologically capable of supporting it. If we lose our enviromentally healthy ranges, we lose our training capacity, which will impact our readiness.

To meet the military's growing and changing training needs, we have developed land use inventory and management systems that help the Army balance training and operations with environmental needs. Our goal is to maintain effective training while ensuring a viable ecosystem flourishes for future use.

Our labs are playing a large role in the environmental aspect of Army Transformation by developing the necessary technology for sustainable military training lands, focusing on threatened/endangered species, cultural resources, dust and invasive species control, noise management, training carrying capacity and erosion control and restoration.

Because Army installations are homes to many endangered species, both plants and animals, our engineers and scientists are developing technologies and strategies that will enable the Army to train now and in the future without damaging those habitats often found nowhere else in the country. That's why it is vital that we continue to look at endangered ecosystems and wetlands mitigation while preserving military readiness through Army Transformation.

In addition to our direct support of our military, we support the nation through a broader range of civil missions. As stewards of nearly 12 million acres of land and water within the United States, the environmental decisions we make are far-reaching. The environmental investments we make benefit the Nation, the Army, ecosystems, our social well-being, and the economy for present and future generations. Through our regulatory program, we balance the need for continued economic growth against the need to protect valuable, but fragile wetlands. In our flood control and navigation missions, we look for solutions with the least negative environmental impact or those that offer environmental enhancements.

We recognize that all of our missions impact the environment. To understand, plan for and mitigate this impact, we are helping Army Transformation by preparing a Strategic Environmental Assessment and a Programmatic Environmental Impact Statement, using Mobile District's resources. The Strategic Environmental Assessment will lay out the environmental issues the Army and the Corps must address during the transformation process. The Programmatic Environmental Impact Statement, expected to be completed this month, will provide the macro look at all the environmental issues for the entire process.

We are focused on defining engineer requirements during the Army Transformation, matching Corps capabilities to those requirements and integrating engineering support into the transformation process – most notably through installation support and research and development.

Supporting Army Transformation while sustaining the environment is a challenge, but it's the right thing to do.