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Koch Mine Safe and the Cordon Sanitaire Clearance Program

Through the work of Koch Gmbh and Mine-Tech, the 359 km-long Cordon Sanitaire in Zimbabwe is being demined in one of the first humanitarian demining efforts of its kind.

By Henry Thompson, RHS Associates

Background

In 1993, the European Union (EU) funded a survey of the Cordon Sanitaire in Zimbabwe, a series of six border mine fields covering 766 km. The contract for the survey was won by the mine clearance NGO Mine-Tech, who had three months to perform the survey in late 1994.1 Mine-Tech did not survey all of the mine fields because the fields and a major portion of the adjacent service road had not seen maintenance for two decades. However, maps were available at the Zimbabwean Army Engineer’s Headquarters at Pomona Barracks, and Mine-Tech completed the survey and handed over the final report. The report included maps, diagrams and a broad assessment of the problems and difficulties in clearance. While the report also contained some significant inaccuracies, it did present a broad overview of the mine fields.

Of all mine fields, the top priority was a 359 km-long one in the northeastern corner of Zimbabwe. To advise on the tendering process for a clearance contract, the EU hired consultant Patrick Blagden. The European Development Fund provided funding for the project, while the Zimbabwean Ministry of Defence handled financial control and contractual issues. The invitation to tender was issued in late 1997, and was comprised of two contracts: main works (clearance) and quality assurance (QA).

This was one of the humanitarian companies to bid with a fixed price. Six companies expressed interest in performing the clearance. Mine-Tech was one of the companies allowed to bid—an unusual action for a company that performed the initial survey. The bidding companies were allowed to visit the mine field at the

Mukumbura and end for two days under the supervision of the Ministry of Defence, but high vegetation hid much of the visible detail within the mine field. Four companies (Mine-Tech, Koch Gmbh, Royal Ordnance and Minelieve) then presented technical accreditations and bids that were judged by a technical threshold and by price.1 Koch made its bid in partnership with Mine Safe, a Zimbabwean company owned by retired Zimbabwean army officers.

After passing the technical pre-qualification, Koch Mine Safe (KMS) won the contract with the lowest bid. And while Koch couldn’t provide a performance guarantee, it was successful in finding backing for deployment from a major Dutch salvaging company, Royal Boulakos Westminster NV, a group that owned the German subsidiary company Heinrich Héide GmbH, an EOD company. The Qb contract was issued to BaTec.

The Cordon Sanitaire

The Cordon Sanitaire mine field consisted of a 25 m-wide strip of ground laid with three rows of Max AP mines at a density around 5,500 mines per kilometer. The mine field was fenced on both sides by a game fence of three strands of steel wire supported on thin steel posts set in concrete and was cleared of vegetation. The bottom strand held a thin wire mesh game fence. Also attached to the fence was an intruder alarm system linked to control points that fed information to patrol teams. By 1997, virtually all the fencing had been removed by local people or had disintegrated. Three lanes of mines were laid using knotted ropes. Within the three rows, patterns were only discernable over short distances. The majority of mines in the Cordon Sanitaire were the South African R2M2 and the Portuguese M969. The Italian VS50 was also laid. Due to breaches of the mine field and animal incursions, there was a good level of in-filling with more random patterns and different landmines.

The Cordon Sanitaire was backed for most of its length by a second “ploughshare” mine field containing three rows of large fragmentation mines mounted on pipes above the ground. The fragmentation mines were laid with 30 m stripwires and three additional blast mines protected each mine. The mine density in this field was around 100 fragmentation mines and 300 buried blast mines per kilometer. The rows were unevenly spaced and the vegetation was not cleared, so the mine field contained substantial trees and dense thorn bush. The field was subject to a great deal of in-filling and randomly spaced APLs, and had a service track running behind and parallel to it to allow patrolling and maintenance. Amazingly, the Cordon Sanitaire was even found to run up to 8 km into neighboring Mozambique —indicating the hasty nature of its deployment.

Under its contract, KMS was restricted to three working teams, though mechanical methods were allowed only if the land was manually checked. The contractor had to ensure that environmental damage was minimal.

The Clearance Operation

KMS planned to deploy its clearance operation in October 1998, but it actually deployed six months late at Mukumbura in March 1999. The mine clearance outfit experienced problems assembling manual teams because the available pool of experienced deminers in Zimbabwe was minimal, meaning KMS had to do more training than anticipated. As a result, there is now a small outflow of KMS-trained deminers joining other companies. Also, in March, Alistair Craib gained control of the demining operation from Patrick Blagden and made his first visit to the project.

After an initial halt to reassess procedures following some early accidents, work recommenced in April 1999, and clearance efforts moved slowly for four months. Metal contamination forced clearance rates...
to be about 30 m² per two-man lane per day. By the end of May, eight months into the contract, 0.25 percent of the 10,000,000 m² of land had been cleared. Efforts were then further slowed by heavy rainfalls, which led to outbreaks of cholera and the suspension of work by local health authorities. Due to the force major, KMS was granted a two-month extension to its 18-month contract. Meanwhile, BacTec had deployed 26,000 m² a month, which made area verification a much simpler task. However, the deminers had underestimated the logistical difficulties of the operation. The soil in winter is very hard, so by July 1998, the manual teams required 7,500 liters of water per day to water the mine field cleared all metal from the center mined lanes and was encouraged by the Zimbabwe Ministry of Defence and BacTec to clear all metal, which makes area verification a much simpler task. However, the deminers had underestimated the logistical difficulties of the operation. The soil in winter is very hard, so by July 1998, the manual teams required 7,500 liters of water per day to water the mine field.

Over half of the accidents were incurred during excavation. The primary cause of one-third of these was attributed to management error, notably serious injuries from handling mines. A total of 20 people were injured in 18 accidents from February 1999 to July 2000. Two of the seriously injured subsequently died in the hospital—one from pneumonias contracted in recuperations. Only one accident occurred as a result of stepping on a deeply-buried mine on land not yet offered for QA.

The accidents show a number of clear features:

• Only one deminer was seriously injured while clearing mines and adhering to all Standard Operating Procedures (SOP).
• Nine out of 14 (64 percent) of those injured were back at work within 10 days of the incident.
• The two facilities both occurred offline and under medical care.
• No one was killed or injured by a ploughshares fragmentation mine (no ploughshare mines were found intact with detonators).

The contract does not specify clearance of all metal but requires clearance to U.N. standards of 99.6 percent of mines removed down to a depth of 20 cm. In practice, KMS before probing or excavating, KMS also had to build access roads to the mine field. The Mine-Tech survey document (and subsequently the Ministry of Defence contract) specified that there was a service track running about 50 m behind the mine field. In reality, the track was between 300 m and 1.7 km from the mine field and no longer existed in certain areas.

Safety

KMS was also strongly criticized for a high accident rate. From March to June 1999, 12 accidents occurred, following a review of SOPs, the practice was abandoned and, henceforth, all mines were destroyed intact. One way of assessing accidents in mine clearance is to look at the density of mines and UXO (based on the fact that no mines and no UXO equals no accidents). KMS’s teams were handling very large quantities of metal. There was a management-level decision to use only large metal mines. A total of 20 people were injured in 18 accidents from February 1999 to July 2000. Two of the seriously injured subsequently died in the hospital—one from pneumonias contracted in recuperations. Only one accident occurred as a result of stepping on a deeply-buried mine on land not yet offered for QA.

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Comparative densities of mines and UXO in clearance operations in the region:

<table>
<thead>
<tr>
<th>Region</th>
<th>Square meters</th>
<th>Mines/UXO removed</th>
<th>Square meters per mine/UXO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Koch Mine Safe</td>
<td>3,809,281</td>
<td>65,185</td>
<td>58</td>
</tr>
<tr>
<td>NPA, Songo, Cabinta Bassa</td>
<td>738,180</td>
<td>12,072</td>
<td>61</td>
</tr>
<tr>
<td>Mechem, Massingir</td>
<td>89,634</td>
<td>349</td>
<td>467</td>
</tr>
<tr>
<td>Mechem, Comunana Dam</td>
<td>1,700,000</td>
<td>3,600</td>
<td>472</td>
</tr>
<tr>
<td>Mozambican average</td>
<td></td>
<td></td>
<td>1,000 - 2,500</td>
</tr>
</tbody>
</table>


Working under extended hours, the mechanical team was capable of bringing the company up to between 6.5 to 7.5 million m² of land by February 2001. The Mine Collector processes 20,000 m² of ground per day, and the manual team covers around 12,000 to 12,500 m² per day, potentially destroying over 1,000 mines per day.

On average (over both mine fields), KMS’s teams are lifting and destroying one mine per 58 m² of ground. In the Cordon Sanitaire mine field, this broad average rises to one mine per 20 m². The mechanical team working in the center of the Cordon Sanitaire clears one mine per 12 m² on average—spot densities can be more than double this figure.

Two things characterize the current clearance program:

- The high density of mines and number of mines being cleared. In June 2000, KMS cleared 421,000 m². By mid-July 2000, the team had cleared a total of 3,809,281 m² of land and 65,185 mines—one mine per 58 m². By any standards, the current safety record of KMS is exceptional considering the conditions.
- No "nurtured mines" have been reported by BaeTeC, which assures 10 percent of the land cleared. The level of quality achieved under these conditions is very high.

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References
1 Chris Pearce, Director, Mine-Tech, Interview in Johannesburg, June 6, 2000.
3 Koch-Mine Safe was using Vallen detectors, fine German detectors capable of high sensitivity—but more complex to use than many comparable models. The Q8 team was using British Guard MDR detectors, a robust and simple model.
5 Data from Andy Smith, DDDV database, April 6, 2000.

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Mine Detection Dogs At Work

continued from page 87

the [dogs’] ability to detect plastic mines when metal detectors are ineffective is even more important."

The Global Training Academy has the capacity to train 30-36 dogs per year in mine detection. In 2001, 18 dogs will be trained for deployment in Lebanon, Oman and Thailand. In addition, the Academy currently has dog teams working in ten countries: Mozambique, Rwanda, Bosnia, Costa Rica, Honduras, Nicaragua, Croatia, Namibia, Thailand and Afghanistan. These dog teams often work with the host country’s military in mine clearance operations.

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M-Detect

M-Detect, a mine dog training facility in Germany, specializes in training MDDs for mine detection operations in mine-affected countries. Each year, M-Detect trains and deploys approximately eight dogs. This year, MDDs are being trained for deployment in Bosnia-Herzegovina and Croatia. Martin Weitkamp, director of M-Detect, said MDDs are "an important part of the international demining toolbox" if used as quality assurance in unknown areas. Weitkamp adds that dogs should not be used in a known mine field in place of deminers or demining machinery but in unknown areas where sweeping the fields with an MDD is faster and more efficient.

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Conclusion
MDDs are an effective means for mine clearance operations worldwide. With proper training from mine-dog companies and organizations, MDDs employed in mine-infested countries return successful results. Their driven success continues to be an asset to countries in times of need.