Rybro International Ltd. | United Kingdom

GENERAL DESCRIPTION

The *Mine-Guzzler* was developed by Bofors Defence in Sweden. Under the new owner, Rybro International Ltd., it has been redesigned and is now based completely on commercial components for easy maintenance, repair and accessibility of spare parts.

The Mine-Guzzler is based on a double track arrangement of Caterpillar. A demining tiller is located on hydraulic supports at the front of the vehicle and powered by a 640 kw engine with hydrostatic drive. The complete vehicle is fully protected against fragments from detonation of mines and UXO. Any plates that become damaged can be easily replaced in the field by oxyacetylene cutting and welding. Each vehicle can be equipped with a spare roller to enable the demining to continue while a tiller is being repaired. A complete tiller change takes less than 30 minutes using the hydraulic supports to lift the tiller for access or to load/unload the roller onto a vehicle.

The 45-tonne Mine-Guzzler may be operated either by remote control using onboard television cameras or from the protection of the driver's cabin. This is further protected against fragments by a raised armoured superstructure. The driver's cabin is designed to withstand detonations from 12 kg of TNT.

The machine has four parts – the protected cabin, the chassis, the engine compartment and the tiller unit. These can all be easily disassembled for transportation if required. This facilitates transport in countries with poor roads. The rotator can be replaced by a blade to allow the machine to be used as an armoured bulldozer.

MINE-GUZZLER | Left, back and front view

CLEARANCE METHODOLOGY

The vehicle drives forward into the suspect area by revolving the tiller unit. It rotates clockwise at up to 190 rpm. The demining tiller, which can be angled to follow ground undulations, is adjustable for depth and automatically maintains the depth set. The tiller comprises a series of circular plates fitted with tungsten carbide teeth at their edges, which either causes the mines (AP and AV) to detonate or breaks them into small pieces.

The Mine-Guzzler can clear AP and AV mines to a depth of 50 cm and over an effective width of 3 m. Maximum demining speed is 4 km/h depending on ground conditions.

The machine can be equipped, as an option, with a GPS system allowing navigation and documentation of the cleared area. The system will record the area covered including the preset depth that is set for the area.

MACHINES IN USE TO DATE

One machine is in use in the Basra area in Iraq, operated by NMAA.
Two prototypes were previously made on a Leopard 1 chassis.

ENGINE, FUEL AND OIL

A Caterpillar 3412E, TTA 641 kw (860 hp) diesel engine powers the Mine-Guzzler. The tiller unit does not have a separate engine. Fuel capacity is 800 litres. The hydraulic oil capacity for the tracks is 235 litres, while the lift and tilt system requires 70 litres. During two tests in Germany in October 2000, the average fuel consumption was 70 to 90 litres per hour.

FACTORY SUPPORT

Rybro International has signed distribution agreements with Caterpillar dealers in Egypt, Ghana, Iraq, Kenya, Nigeria, Russia, Sierra Leone, Tanzania and Uganda to secure local support for spare parts, repair and maintenance and training. More countries will be added if requested by any customer/user.

The main components (engine, tracks, filters, etc.) are from Caterpillar. Special parts can be ordered either from Caterpillar agents or directly from Rybro International.

Training, spare parts catalogue and comprehensive manuals in English are part of the delivery package. Training can be provided locally or in the UK prior to shipment.

MAINTENANCE AND SUPPORT

Daily maintenance is performed by the machine operator. Repairs can be done in the field, assuming oxyacetylene cutting and welding equipment.

Recommended operators for the machine are one trained and experienced heavy machine operator and one manual deminer.

TESTS AND EVALUATIONS

In May-June 2000, the Mine-Guzzler passed testing in Croatia with CROMAC. A minefield of 80,000 m^2 was cleared.

In October 2000, five different machines were tested by the BWB (Bundesamt für Wehrtechnik und Beschaffung) for the German Army. The Mine-Guzzler achieved the best overall results.

In February 2001, the machine was tested by the Egyptian Armed Forces. The test was performed in live minefields in Hurghada and Safaga.

In July 2001, the Swedish Army tested the Mine-Guzzler, Scanjack 3500 and Hydrema MCV 910 at their SWEDEC facilities in Eksjö, Sweden.

Three test reports are available at www.itep.ws:

1. BRTRC Technology Research Cooperation, *Area Mine Clearing System (AMCS)*, Study Report, by US Army Project Manager for Close Combat Systems (PM - CCS), 2002: www.itep.ws//pdf/AMCSStudyReport.pdf
2. SWEDEC, *Performance Test of Demining Machines Performed by SWEDEC, by Scandinavian Demining Group (SDG)*, 2001: www.itep.ws//pdf/Scanjack_mineguzzler_970mcv_performance.pdf
3. Theimer (TRAR), Summary Report MINE GUZZLER, Landmine Clearance Test Facility WTD 51, Germany 2001: www.itep.ws//pdf/MineGuzzler_EN.pdf

REPORTED LIMITATIONS AND STRENGTHS

Limitations

- The Mine-Guzzler is a large, tracked vehicle.
- Over long distances it will require transporting by low loader.

Strengths

- The Mine-Guzzler is designed to destroy AP and AV mines.
- The CROMAC test report said it can easily cope with thick vegetation as well as individual trees up to 20 cm diameter.
- The CROMAC report also said the machine's daily efficiency was "good".

DIMENSIONAL DATA

1. Length without attachment	7,000 mm
2. Length total	8,570 mm
3. Width without attachment	3,590 mm
4. Width total	4,540 mm
5. Clearing | Working width	3,150 mm additional 700 mm with the always attached plows
6. Height | Overall	3,575 mm
7. Mass | Basic vehicle	36,000 kg
8. Mass | Detachable unit(s)	15,000 kg
9. Mass | Overall	51,000 kg

OPERATIONAL DATA

10. Wheels | Tracks (description)	Number of track plates per side 52 track plate type 3 ridges track plate width 550 mm
11. Ground Bearing Pressure (kPa)	99 kg/dm^2
12. Hill climbing ability (in degrees)	+/- 15° during demining +/- 30° during transport
13. Number of Chains | Chisels | Tools	Teeth 405
14. Beat pattern (hits per m^2) at different operating speeds	1 km/h: 3,158 hits per m^2 1.5 km/h: 2,105 hits per m^2 2 km/h: 1,579 hits per m^2 2.5 km/h: 1,263 hits per m^2 3.0 km/h: 1,053 hits per m^2
15. Length of Chains | Tools	Between tube and teeth 300 mm
16. Diameter of drum	1,200 mm
17. Rotation Speed	190 rpm
18. Clearance | Working depth in varying terrain	100 - 500 mm clearance depending on setting. In very hard terrain it is recommended not to go deeper than 300 mm clearance depth. Standing still the machine can clear down to 700 mm
19. Working Speed (m^2/h)	
> Light Soil | Medium Vegetation	9,000 m^2/h
> Medium Soil | Medium Vegetation	6,000 m^2/h
> Heavy Soil | Dense Vegetation	3,000 m^2/h
20. Control of Clearance | Working depth	Active depth holding system using sensors on each side giving signals to hydraulics that control the clearance depth keeping it on preset level at all times
21. Additional attachable working tools	Not given
22. Armour	13 and 16 mm ARMOX steel
23. Remote controlled	Yes incl. camera control and monitor
> greatest distance	500 m
24. Transportation	
> short distances	In one piece on a low bed trailer, otherwise transportable on std trucks divided into parts having a max weight of 20 ton per truck
> long distances	
> sea transport	
> air transport	

SYSTEM STATUS AND DEPLOYMENT

25. Machines in use	1 machine in Iraq operated by NMAA
26. Other types	This is the third machine developed by Bofors Defence in Sweden
27. Location of use	Basra area in Iraq operated by NMAA
28. Totally cleared so far (m^2)	1,500,000 m^2

ENGINE | FUEL | OIL

29. Engine	CAT 3412E, TTA, 27 l, 12 cylinder diesel engine
30. Engine power at the flywheel	Effect at 2,100 r/min 641 kw (860 hp)
31. Sufficient power supplied to working tool	Effect at 2,100 r/min 550 kw
32. Fuel capacity	800 l
33. Fuel consumption	Between 40 and 90 l/h depends on soil/speed/depth
34. Separate engine for working unit	No
35. Cooling system	Not given
36. Oil capacity (both engines)	60 l
37. Hydraulic oil capacity (both engines)	70 l & 235 l for the transmission

COSTS

38. Cost of system	1.7 million euros
39. Other costs	
> training	Included
> spare part set chains | belts	N/A
> repair costs for one year	165,000 euros
40. Availability for hire	Not at the moment

OTHER

41. Operator comfort	The Mine-Guzzler has a fragment-protected cabin located at the rear of the vehicle. The cabin is mounted on vibration and shock absorbers to minimise accelerating stress effects on the crew when mines are detonated. The driver's seat can be rotated, making it easier to drive the vehicle backwards in transport mode. The large windows, made of armoured glass, allow free sight around the vehicle. The cabin is designed with a high level of comfort and easy access to all controls. For the comfort of the crew, the seats can be adjusted forwards/backwards, in height and for weight, as well as for back support and arm support width. Each seat is also fitted with a four-point safety belt. A fan with filters supplies the cabin with fresh air. The cabin is also equipped with an air conditioning unit with heating and cooling capacity.
42. Air conditioning	Yes