

Corus Northern Engineering Services | United Kingdom

### GENERAL DESCRIPTION

The *Minelifta* flail unit is attached to a Komatsu D65EX bulldozer. It is an anti-personnel mine clearance system. It is not designed to clear AV mines. The first trials were undertaken in February 2001. Recommendations to improve performance have now been incorporated into the design. A new hydraulic unit has been added and the flailing speed increased. Minelifta is an anti-personnel mine clearance system. It is not designed to clear anti-tank mines.

Minelifta features a ventilated, hooded flail combined with a tined plough/scalping blade. The flail shaft is driven by a separate auxiliary hydraulic power pack mounted at the rear of the bulldozer prime mover. The bulldozer with the mounted flail weighs approximately 3.5 tons.

The armoured, bucket-shaped cowling prevents the flail throwing soil out of the cleared area. The operator's cab and the new fitted hydraulic unit are fully armour protected. On completion of mine clearance, the system can be employed as a standard bulldozer.



MINELIFTA chertsey blast | MINELIFTA on low loader

### CLEARANCE METHODOLOGY

The manufacturer recommends that the Minelifta sweeps a mined area up to three times to ensure the best possible clearance performance. The scalping blade scoops soil to a depth of 20 cm into the cowling where it is pulverised by the flail. This should detonate or break up mines. A plough at the rear of the bucket creates furrows between the tracks into which soil and metal particles are deposited in a continuous mound for further examination. Overlapped areas and any doubtful spots are checked and, if necessary, manually inspected.

The Minelifta cowling is designed to withstand the detonation of an AP mine without interrupting operation. Minelifta can be operated in a variety of terrain and soil conditions: light/sandy, dry/compacted, heavy sand, wet mud/clay. It can work through scrub, elephant grass and small trees up to 75 mm in diameter.

During the United Kingdom Government's Defence Evaluation and Research Agency (DERA) evaluations Minelifta performed easily on slopes up to 30° but was not tested on steeper ground.

### MACHINES IN USE TO DATE

One system was in service with Norwegian People's Aid (NPA) in Bosnia in 2003 and 2004. According to the manufacturer, in 2003 it cleared 150,000 m<sup>2</sup> and in 2004 it cleared 400,000 m<sup>2</sup> at a cost per square metre of between 0.17 and 0.11 euros.

The Corus company says it is currently open to offers to purchase the complete Minelifta machine and system from those who may wish to market this product.

## ENGINE, FUEL AND OIL

- > The primary mover is a Komatsu D65EX-12 powered by a 142 kw diesel engine with a 406 litre fuel capacity.
- > The hydraulic auxiliary power unit is driven by an air-cooled 200 kw Deutz diesel engine.
- > The hydraulic reservoir capacity is 250 litres.
- > The cooling system of the Komatsu contains 50 litres of coolant.
- > Estimated average fuel consumption is 50 litres per hour.

## FACTORY SUPPORT

The Minelifta is supplied with a comprehensive recommended spares package negotiable with the purchaser. Corus Northern Engineering Services can provide full field support.

## MAINTENANCE SUPPORT

The manufacturer says that personnel with basic mechanical skills should be able to deal with damage and wear and tear on the component parts. Full workshop manuals for the bulldozer and repair procedures are provided.

## TESTS AND EVALUATIONS

Since December 2000, Minelifta has undergone trials by the development team from Corus Northern Engineering Services (without explosive ordnance). In December 2000, a report from Cranfield University concluded that the system had “merit”.

Cranfield University reviewed Minelifta operator cab protection in February 2002 and recommended materials/thicknesses, etc., which have since been incorporated into the design.

In February 2001, extensive evaluations were carried out by DERA (now QinetiQ). Recommendations were made for the further development of the system. These evaluations included mobility tests with live ordnance to simulate AP mines of up to 200 g of TNT. Minor damage was reported. For further information contact Corus Northern Engineering Services.

In 2003, the machine was tested by QinetiQ in a field trial in Bosnia and Herzegovina (Leach, C.A. Field Trials for Minelifta, Bosnia, June 2003 to Sep 2003. Farnborough: QinetiQ, 2003). Approximately 130,000 m<sup>2</sup> was cleared under the supervision of NPA. The rate of clearance during tests was approximately 2,300 m<sup>2</sup>/h for one run in light terrain with light vegetation with 10 cm flailing depth. The report is available at [www.itep.ws](http://www.itep.ws)

## REPORTED LIMITATIONS AND STRENGTHS

### Limitations

- > Minelifta is for clearance of anti-personnel mines and small ERW – not AV mines.
- > System creates huge dust clouds, as occurs with all flail systems in dry environments.
- > The system requires transportation by low-loader over longer distances.

### Strengths

- > Mounted on a basic and widely-distributed bulldozer, which can be used as a bulldozer after completing mine clearance operations.

## DIMENSIONAL DATA

1. Length without attachment	5,550 mm
2. Length total	9,030 mm
3. Width without attachment	2,900 mm with blade removed and no Minelifta parts fitted
4. Width total	3,340 mm with all Minelifta parts 3,970 mm with standard bulldozer blade (removable)
5. Clearing   Working width	2,740 mm
6. Height   Overall	3,580 mm
7. Mass   Basic vehicle	15,255 kg
8. Mass   Detachable unit(s)	18,545 kg
9. Mass   Overall	33,800 kg

## OPERATIONAL DATA

10. Wheels   Tracks (description)	Tracks 660 mm width
11. Ground Bearing Pressure (kPa)	0.82 kg/cm <sup>2</sup>
12. Hill climbing ability (in degrees)	30°
13. Number of Chains   Chisels   Tools	72
14. Beat pattern (hits per m <sup>2</sup> ) at different operating speeds	Gap between chains 155 mm (static centred)
15. Length of Chains   Tools	Not given
16. Diameter of drum	Not given
17. Rotation Speed	150 rpm
18. Clearance   Working depth in varying terrain	Up to 200 mm
19. Working Speed (m <sup>2</sup> /h)	
> Light Soil   Medium Vegetation	2,740 m <sup>2</sup> /h
> Medium Soil   Medium Vegetation	1,800 m <sup>2</sup> /h
> Heavy Soil   Dense Vegetation	800 m <sup>2</sup> /h
20. Control of Clearance   Working depth	Manual from 0 to 20 cm, depth controlled by angle of bucket set by driver
21. Additional attachable working tools	
22. Armour	6 mm of CP 50 armour
23. Remote controlled	No
> greatest distance	N/A
24. Transportation	
> short distances	Needs low-loader for overland transport
> long distances	
> sea transport	
> air transport	

## SYSTEM STATUS AND DEPLOYMENT

25. Machines in use	1
26. Other types	No
27. Location of use	Bosnia and Herzegovina
28. Totally cleared so far (m <sup>2</sup> )	450,000 m <sup>2</sup>

## ENGINE | FUEL | OIL

29. Engine	Komatsu D65 EX-12
30. Engine power at the flywheel	142 kw
31. Sufficient power supplied to working tool	200 kw
32. Fuel capacity	406 l Komatsu Dozer
33. Fuel consumption	Depends on the ground conditions
34. Separate engine for working unit	Yes Komatsu D65 EX with 200 kw
35. Cooling system	Flail engine is air cooled
36. Oil capacity (both engines)	Not given
37. Hydraulic oil capacity (both engines)	50 l for Komatsu Dozer

## COSTS

38. Cost of system	On request
39. Other costs	On request
> training	—
> spare part set chains   belts	—
40. Availability for hire	Yes

## OTHER

41. Operator comfort	Not given
42. Air conditioning	Yes