Oracle II

General description of the machine and prime function

The Oracle demining system was developed in Sweden in 1994. The Oracle II is based on an armoured Caterpillar 973C TTL and is designed to clear both AP and AV mines as well as other explosive objects. The main mine clearance tool is a rotating tiller drum fitted with replaceable heavy-duty steel teeth. The tool is designed to be easily repairable if it is damaged by a mine blast. The machine comes with different tools for use depending on conditions.

The choice of tool is determined by the depth at which mines are expected to be found, the types of mines on the site, and local soil conditions. Except of the standard tool also a “fine tool” is available to deal with very small mines as well as a heavy duty tool for very tough and rocky ground conditions.

The tiller drum on the Standard Tool has 252 bits: the drum on the Fine Tool has 490 bits. The staggered positioning of the digging tools on the rotor is designed to prevent AP mines passing between them. The tiller unit is powered by two commercial Caterpillar diesel engines and a hydraulic pump system, towed behind the prime mover on a trailer armoured to the same specification as the prime mover. The Oracle II uses a standard Caterpillar track vehicle and the system (basic vehicle, hydraulic power unit and tiller tool) weighs 65 tonnes.

Other attachments for the Caterpillar vehicle, such as a demolition bucket and a mine clearance rake, can be fitted. The Caterpillar mine rake is standard equipment for the U.S. Army. Designed to rip mines from the soil, the rake has a clearance width of 229 and a clearance depth of 30 cm. The rake uses 35° tines
The system can be operated directly by an operator or by optional remote control.

Operator comfort and ergonomics were priorities during the design. Controls are simple, needing minimum effort from the driver. The cab is pressurised with filtered air and air conditioned.

Oracle II main features are:

- The driver is protected by Armox 370T Class 2 Armour plates with armour glass and polycarbonate at the same level of protection;
- The machine is protected by Armox 370T Class 2 Armour plates;
- Automatic speed control system;
- Automatic depth control;
- Three escape routes for driver;
- Automatic fire extinguisher system and manual fire extinguishers;
- Designed to destroy both AP and AT mines;
- Large size tiller machine;
- Claimed maximum clearance speed is 15,000 m2/h;
- It can be transported by road on a low-bed trailer, or by rail, ship or large cargo aircraft

**Working methodology/Specifications**

The tiller drum rotates clockwise at nominally 200 rpm (depending on soil conditions) and achieves a penetration depth of 20-50cm depending on required demining depth. A depth sensor fixed to the rotor regulates the clearance depth.

The action of the rotating steel teeth is intended to break up or detonate mines.

The clearance width of the system is 322cm. During demining, the maximum speed is 5km/h.

Demining and vegetation cutting is done in one operation. Claimed maximum theoretical clearance speed is 15,000 m2/h in very light soil, but in practice between 4,000 to 8,000 m2/h under normal conditions. Vegetation has little negative effect on clearance speed.

**Engine, fuel and oil**
The prime mover is powered by a 178kw Caterpillar C9 diesel engine. The hydraulic system has two 522kw Caterpillar C18 diesel engines and uses mineral hydraulic oil: fuel capacity for this attached unit is 1 800 litres.

Normal fuel consumption for the prime mover is 40 litres per hour, for the hydraulic power unit 200 litres per hour.

**Factory support**

The Oracle II uses Caterpillar components, which are supported by Caterpillar’s worldwide service, parts and logistical organisation. Caterpillar claims to deliver parts to almost any location within 48 hours.

Driver and mechanic training is available on request: drivers one week, mechanics two weeks.

All documentation is in English and can be translated into any major language on request.

**Machines in use to date**

One Oracle I machine has been operating in Croatia since 2000 by the demining company Terrafirma, a subsidiary of Countermine Technologies AB. Two Oracle II are operating in Libya since 2008..

**Maintenance and support**

Maintenance is according to Caterpillar standards for track loader machines.

Maintenance of the tool depends on type of soil and type of mines.

The system requires one operator and one mechanic, backed up by a small workshop (in a small bus or container) with the necessary tools for servicing heavy equipment.

Daily service: 1-2 hours. Weekly service: 4 hours.

Service and maintenance schedules are provided.

**Test and evaluation**

One test report is available on the Oracle I:

Reported limitations and strengths
No information yet available for the new Oracle II.

Technical specification

Machine
Model
Oracle II

Machine Category
Mine clearance machine

Machine weight
Heavy (> 20’0000 kg)

Dimensional data
Length without attachment
6094 mm
Length total
14712 mm
Width without attachment
2755 mm
Land clearance width
3220 mm
Height overall
3650 mm
Mass basic vehicle
31500 kg
Mass detachable unit(s)
25500 kg
Mass overall with tracks
65000 kg

Operational data
Wheels
❌
Tracks
✅
Ground bearing pressure tracks
1.1 kg/cm²
Hill climbing ability (max grade slope degrees)
30
Number of tools
490
Beat pattern at different operating speeds (hits per m²)
227
Diameter of tiller drum
1450 mm
Rotation speed (rpm) From
105 rpm
Rotation speed (rpm) To
205 rpm
Clearance depth in varying terrain
>30cm
Working speed for light soil with medium vegetation (m²/h) To
15000
Working speed for medium soil with medium vegetation (m²/h) To
8000
Working speed for heavy soil with dense vegetation (m²/h) To
4000
Control of clearance depth
Automatic
Armour
ARMOX 370T Class 2 armour plates, protective glass and polycarbonate
Remote controlled
✔
Transport method for short distances
max speed on tracks 10km/h
Transport method for long distances
by low bed trailer or as per European railway profile or ship or large cargo aircraft

System status and deployment

Machines in use
3 (1 type Oracle I, 2 type Oracle II)
Other types
Oracle old type
Location of use
Croatia and Lybia
Total cleared land area so far (m²)
Engine

Engine description
Prime mover 1XCAT C9 @ 178kw

Engine power at the flywheel
1044 hp

Effective power at the clearance tool
800 hp

Fuel capacity
430 ltr

Fuel consumption
40 ltr/h

Separate engine for working unit
2X CAT C18 @ 522 kw total 1044kw

Cooling system
liquid cooled/air to air after cooled charger air

Oil capacity (platform engine)
29 ltr

Oil capacity (clearance tool engine)
2x40 ltr

Hydraulic oil capacity (platform engine)
250 ltr

Hydraulic oil capacity (clearance tool engine)
850 ltr

Costs

Base price for the system
1.5 - 2 million

Repair costs for one year (USD/Euro)
5000-15000

Availability for hire
yes on request

Other

Operator comfort
Driver completely air suspended, 4 point safety belt, 3 scape doors, 5 extinguishers automatic and manual, ergonomic controls
Air conditioning
yes

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