

LibMAS 09.50

Annex A

Second Edition: January 2017

TERMS OF REFERENCE (TOR) FOR MECHANICAL VEGETATION CUTTER, FLAIL, ROTARY TILLER ON-SITE ASSESSMENT FOR ACCREDITATION

Responsible National entity:

Libyan Mine Action Centre (LibMAC)
mandated by the Ministry of Defence (MOD)

Contact: LibMAC Deputy Director
quality.assurance@lmac.gov.ly

**NOTE:**

This document is current at the date shown on this page. The Libyan Mine Action Standards (LibMAS) are subject to regular revision, so users should ensure that they are using the latest version of each document in the standards. The most recent versions of LibMAS are the versions that are posted on the LibMAS pages of the LibMAC website www.lmac.gov.ly

Copyright notice

This document has been written with reference to the International Mine Action Standards (IMAS).

In its current form, this document is © **LibMAC Libya 2017** – All rights reserved.

Contents

1. Introduction.....	3
2. Accreditation Board Composition.....	3
3. Test Category.....	3
4. Aim of the Test.....	3
5. Operational Deployment.....	3
6. Location, Date and Time.....	4
7. Provisions for the Preparation of the Test Area.....	4
8. Conduct of Test.....	5
8.1 Weather Conditions.....	5
8.2 Preparation of Test Area.....	5
8.3 Demining Procedures.....	5
8.4 Test Criteria.....	6
8.5 Action on Failure.....	6
9. Summary.....	7

1. Introduction

In order to authorise the use of Machines to conduct mechanical demining operations in Libya, the LibMAC must first accredit them. The mechanical accreditation desk and on-site assessment shall be in accordance with LibMAS and where necessary, reference shall be made to IMAS for additional guidance.

2. Accreditation Board Composition

The Accreditation Board shall comprise of the following:

- a. LibMAC, and/or
- b. LibMAC appointed Representative/s

3. Test Category

Acceptance Test: A test to ensure that a machine is able to work in the environment where it is intended to be used.

4. Aim of the Test

The aim is to conduct a mechanical on-site assessment to confirm the capability of the machine for deployment in mechanical demining operations in Libya. Depending on the operational requirements, the machine must achieve the following:

- a. **Vegetation Cutting Tool:** Consistently cut vegetation to the required standard in accordance to the LibMAS and Mine Action Organisation's SOP. Depending on the machine type, this may be achieved using the flail, or another tool specifically designed for vegetation cutting. When using the flail, hammers may be removed if required, and in accordance with the Mine Action Organisation's SOP.
- b. **Flail Tool:** Consistently and effectively penetrate the ground to the required depth in accordance with the LibMAS and/or site specific Implementation Plan (IP).
- c. **Tiller Tool:** Consistently and effectively penetrate the ground to the required depth in accordance with the LibMAS and/or site specific Implementation Plan (IP).

5. Operational Deployment

Anti-Personnel Mine Hazardous Ground: Yes No

Anti-Tank Mine Hazardous Ground: Yes No

ERW Hazardous Ground Yes No

Limitations: Yes No (If yes detail below)



6. Location, Date and Time

The location, date and time of the on-site assessment shall be agreed between the LibMAC and Mine Action Organisation in advance, allowing sufficient time to prepare the test site and area/s. The test site and area/s may be prepared by the LibMAC or the Mine Action Organisation, and the test site and area/s must be approved by the LibMAC.

7. Provisions for the Preparation of the Test Area

7.1 The Mechanical Vegetation Cutter assessment shall comprise at least one area which shall be prepared as follows:

- a. The ground conditions must be similar to those where the machine shall be deployed. As a minimum it shall comprise consistent low, medium or high vegetation as specified in the LibMAC.
- b. The test area shall be a minimum of 100 square metres (area to be cut), i.e. 10m x 10m, unless a reduction is authorised by the LibMAC.
- c. Sufficient space shall be allowed to manoeuvre the machine / tool and perform an effective procedure.
- d. The test area shall be clearly marked.

7.2 The Mechanical Flail and Tiller assessment shall comprise at least one area which shall be prepared as follows:

- a. The ground conditions must be similar to those where the machine shall be deployed.
- b. A minimum of three (3) and a maximum of five (5) profile boards (normally made from plywood or similar material) shall be placed in the ground at the required depth to record the pertinent test results. The profile boards shall be positioned with the top flush with the surface of the ground and positioned in the same direction at regularly intervals sufficient to conduct an accurate test.
- c. The test area shall be large enough to accommodate the minimum required number of boards and enable the machine to perform an effective procedure.
- d. There shall be adequate space around the test area to manoeuvre the machine / tool and provide an overlap in accordance to the LibMAS and Mine Action Organisation's SOP.
- e. The dimensions of the profile boards shall be as follows: **Thickness** = 2 to 6 mm. **Length** = the width of the flail or tiller tool measured between the outermost flail chains / hammers or tiller bits / teeth plus a minimum of 10% wider than the flail or tiller tool, e.g. a flail width of 1.50 cm shall require a minimum profile board width of 1.65 cm. **Width** = the required flail or tilling depth plus a minimum of 10 cm overlap on the profile board, e.g. a flailing depth of 20 cm shall require a minimum profile board height of 30 cm. **These are minimum requirements and the LibMAC shall increase the dimensions of the profile boards if necessary.**

- f. The profile boards shall be marked in increments of at least 5 cm from the top to bottom across the complete width of each profile board.
- g. The condition and location of each profile board shall be checked by the LibMAC prior to burial.
- h. The soil shall be compact over the area of the profile boards.
- i. The test area shall be clearly marked.

8. Conduct of Test

On arrival at the Test Site the LibMAC and the Mine Action Organisation shall each conduct a brief which should include the following:

LibMAC

- Introduction to Accreditation Board.
- Timings.
- Test procedure.
- Test criteria.
- Test results and documentation.
- Further action following an Acceptable or Unacceptable test.

Mine Action Organisation

- Introduction to Organisation Representatives.
- Summary of Machine (operational deployment, tool, performance, survivability).
- Marking and designated areas (control point, safe areas, test area/s).
- Communications.
- Medical and safety precautions.

8.1 Weather Conditions

Evaluation shall only be carried out if the weather is similar or better as the conditions under which the machine would normally operate. If the weather is such that according to the LibMAS or Mine Action Organisation's SOP the machine would not be used, then the test shall be postponed until conditions improve. As a general rule, tests shall not be carried out if the ground is too wet.

8.2 Preparation of Test Area

A minimum of one (1) test area shall be prepared for each machine / tool (e.g. Vegetation Cutter, Flail or Tiller). The preparation of test areas and the positioning of test targets shall be in accordance to these Terms of Reference (TOR). In the absence of specific test requirements within the TOR the LibMAS and IMAS may be referred to by the LibMAC for guidance.

8.3 Demining Procedures

The LibMAS shall only accept procedures as stated in the Mine Action Organisation's SOP regarding the operations and limitations of the machine to be tested. The machine must conduct the demining procedure in accordance with the Mine Action Organisation's SOP during the assessment process. In the absence of pertinent details in the SOP the LibMAC

may revert to the LibMAS and IMAS; alternatively the test shall be suspended pending inclusion in the SOP and on approval by the LibMAC.

8.4 Test Criteria

The following details the Test Criteria for Passing or Failing the On-site Assessment:

Vegetation Cutting Tool

- a. The machine shall cut all the vegetation in the designated area to the required ground clearance as detailed in the LibMAS and Mine Action Organisation's SOP.
- b. It is understood that when using the fail with hammers, that depending on the objective cut height the hammers may make contact with the ground, however they shall not be permitted to regularly penetrate the ground as is the case when flailing or tilling.
- c. The LibMAC shall assess the operator's ability to control the process, machine and tool to ensure that it is systematic, accurate and in accordance with the proposed objective and Mine Action Organisation's SOP.
- d. The test shall be considered as a **FAIL** if the LibMAC concludes that the vegetation is not cut to the required distance from the ground, the ground is regularly disturbed to such a degree that it is likely that any mines / ERW would be activated, or it is determined that the operator is unable to perform the process as required.

Flail and Tiller Tool

- a. The machine shall penetrate all the profile boards (3 to 5 profile boards shall be used) to the required depth across the complete width of the flail or tiller tool.
- b. The machine shall be evaluated on its ability to achieve a consistent flailing or tilling depth on each profile board therefore, the maximum depth achieved on all the profile boards across the complete width of the flail or tiller tool shall determine the results and the machine's operational limitation (depth). For example, to achieve a flailing or tilling depth of 20cm, each profile board shall be penetrated at a minimum depth of 20cm below the surface of the ground across the complete width of the flail or tiller tool, ensuring that there are no 'skip areas' where the hammers or bits/teeth have not made contact with the profile board and achieved the required depth.
- c. The machine must successfully penetrate all profile boards in the test area and on culmination of the process the profile boards shall be carefully uncovered to review the results.
- d. Excessive time where the flail or tiller is stationary in the location of a profile board shall result in the exclusion of the specific profile board/s from the assessment and, in circumstances where there is less than three (3) valid profile boards remaining in the test area the assessment shall be terminated and the machine considered as **Unacceptable**.
- e. If one (1) profile board within the test area is considered as **Unacceptable**, then the assessment of the machine shall be considered as a **FAIL**.

8.5 Action on Failure

If the machine fails either test (e.g. vegetation cutting, flail or tiller tool) a new area may be developed for a second assessment on request from the Mine Action Organisation. If the Machine fails a second test, a third and final test may be conducted on request from the Mine Action Organisation, after a month of operator retraining and/or internal machine trials, depending on the reason for the failure. If the machine fails the assessment three (3) times then the machine shall be denied Accreditation.

9. Summary

Previous tests results such as Performance and Survivability tests should be submitted to the LibMAC by the Mine Action Organisation prior to the Acceptance Test as part of the Desk Assessment process. **Annex B** is an example of Mechanical Test and Evaluation Pre-test Conditions.

The LibMAC shall decide test requirements which shall take into account Pre-test Conditions documentation and previous test results. Pertinent information shall be recorded during the Mechanical Acceptance Test such as: The test target, soil and vegetation type, which shall assist in determining the operational ability of the machine and tool. This information should be included in the LibMAC Mechanical On-site Assessment (Acceptance Test) form which should be completed after the culmination of the test. Reference **Annex C**.

In the absence of pertinent Pre-Test Conditions documentation or in addition, the LibMAC may require that further tests are conducted during the Acceptance Test, e.g. the operating speed (metres/min-cm), the number of passes required to achieve the objective, or maximum Capacity for cutting vegetation (m²/h). The tests shall assist with internal and external QA monitoring during operations and with the accreditation of additional machines.

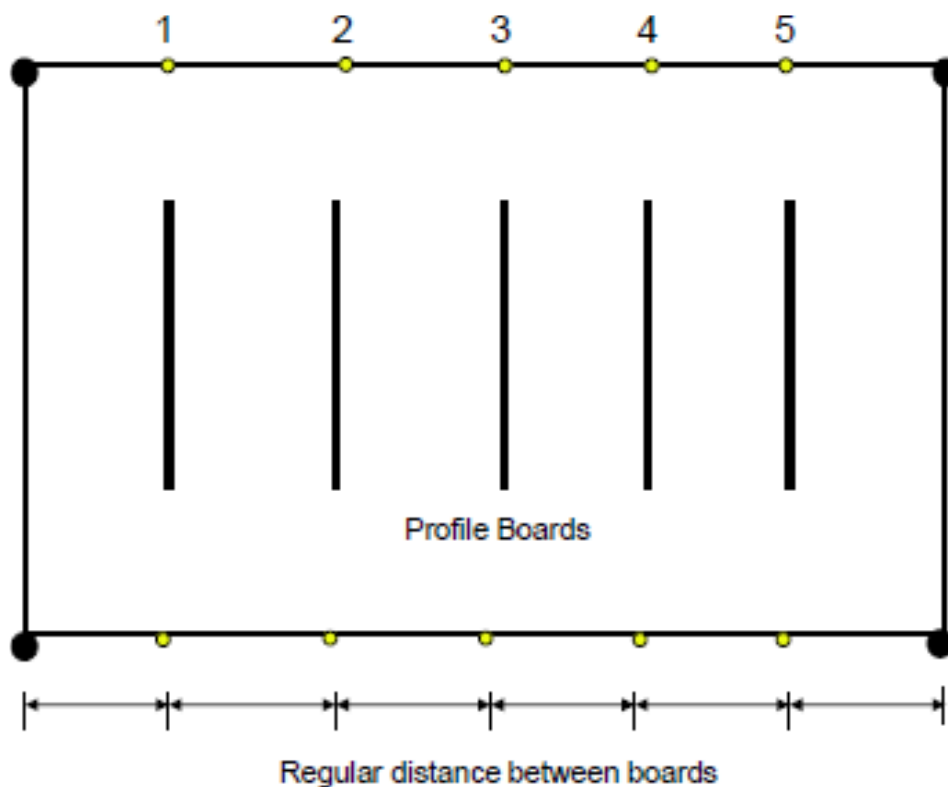


Figure 1: Flail and Tiller Test Area

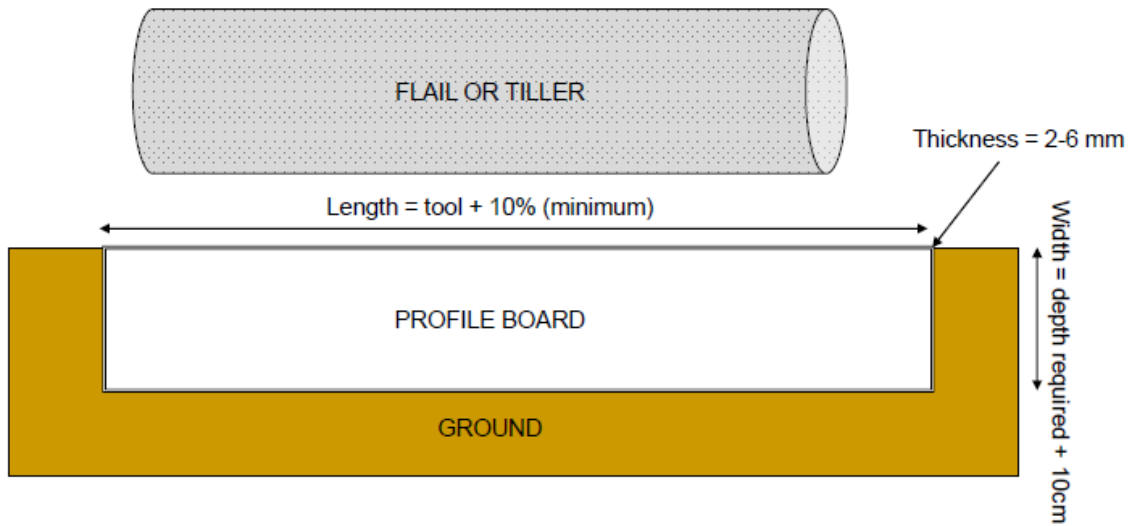


Figure 2: Preparation of Flail or Tiller Test Area

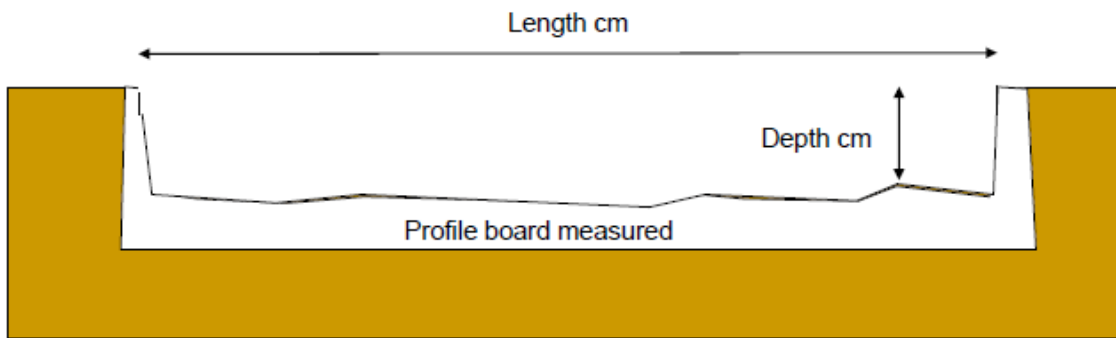


Figure 3: Confirming Test Results