

**PROJECT FOR RESEARCH AND DEVELOPMENT OF DEMINING
RELATED EQUIPMENT IN CAMBODIA**

No. 4

**REPAIR &
MAINTENANCE**

SWING TYPE MACHINE

13. GENERAL MAINTENANCE WORK

13.1. TOOLS AND EQUIPMENTS

13.1.1. GENERAL EQUIPMENT FOR THE PROJECT

Table 56: General equipment for the project

No.	Name of the item, etc.	Period	Number	Remarks
1	Vehicle with driver	4 month	2	Pajero type
2	Vehicle for back up with driver	4 month	3	CMAC ambulance is acceptable. But without medical equipment
3	Trailer with driver	3 times	3	35 tons Drop bed type
4	Crane	4 weeks	2	Lifting capacity 25 ton
5	Fork lift	2 weeks	2	1 unit is OK. from workshop of CMAC
12	Hand tools set (1 set)	4 month	1	It is from w/shop Battambang
15	Diesel Fuel	Initially	22	22 drums (Total : 4400Litre)
16	Gasoline (for Generator) 1 Drum	Initially	1	
17	4ton (isuzu truck) 4WD with owing	4 to 6 month?	1	For JICS mobile office
18	Generator	4 to 6 month?	1	handy for JICS

13.1.2. GENERAL TOOLS FOR THE PROJECT FROM W/SHOP BATTAMBANG

Table 57: General tool from CMAC workshop in Battambang

No.	name of tool	Qty
1	Mechanic vise	1
2	Bolt cutter	1
3	Big size of box wrench	1
4	working lamp	1
5	Electrical welder kit	1
6	Big size hammer	1
7	Wire ropes	2
8	Caliper	1
9	Chisel kit	1
10	High speed cutter	1
11	Dolly (trolley) for pallet	1
12	Chain wrench for oil filter	1
13	Mechanic table	1
14	Generator 20KVA or more	1

13.1.3. ASSISTED TOOL FROM CMAC

Almost all of the tools/equipment required to repair/maintenance the machines were brought by manufacturer from Japan.

13.2. PERFORMANCE & ACCEPTANCE TESTS

Maintenance is implemented every morning by joint CMAC machine operators and manufacturers. The maintenance duration is taken approximately thirty to sixty minutes.

13.3. SURVIVABILITY TEST

There is well prepared and send for the test.

14. GENERAL REPAIR WORK

14.1. PERFORMANCE & ACCEPTANCE TESTS

For the repair of demining machine push type during acceptance test, please see section 5.4.3.

14.2. SURVIVABILITY TEST

14.2.1. GENERAL ASSESSMENT

- There is no damage done to the cabin
- There is no damage done to the engine
- There is no damage done to the body of the machine
- There is some damages done to the attachment

14.2.2. DAMAGE TO THE ATTACHMENT OF THE MACHINE

Table 58: Damage from anti-tank explosion

	Broken parts	Quantity
a)	Chain	11
b)	Holder	6
c)	Rubber Plate	7
d)	Steel bar for rubber plate	5

14.2.3. DETAILS OF THE REPAIR

- Time and type of transportation from the field: 5minutes by it's own trip
- Time and labor for fixing the problem

Table 59: Repair duration

a) Chain / Replacement	Time/1pc	Quantity	Total Time	Labor
b) Holder / Repair	2minutes	11		
c) Rubber Plate	15minutes	6	22minutes	1
d) Steel bar for rubber plate	10minutes	7	1h 30m	2
	*	-	1h 10m	2

* These steel bars were found to be useless from the result of the test. Therefore, they were not repaired.

- Equipment used to fix the problem

Table 60: Equipment used for repair

Description	Equipment
a) Chain / Replacement	Hexagon wrench
b) Holder / Repair	Steel cable, Lever chain block, Burner
c) Rubber Plate	Spanners

- Picture of the problem

a) Chain



Figure 114: Chains are broken from Anti-tank blast

b) Holder



Figure 115: Holders are bending from Anti-tank blast

c) Rubber Plate



Figure 116: Rubber plate to protect dust are blown away by Anti-tank blast