
ACCEPTANCE TEST RESULT ANALYSIS

KOMATSU MACHINE

6. ACCEPTANCE TEST RESULT ANALYSIS

6.1. CLEARANCE DURATION AT ACCEPTANCE TEST BY KOMATSU MACHINE

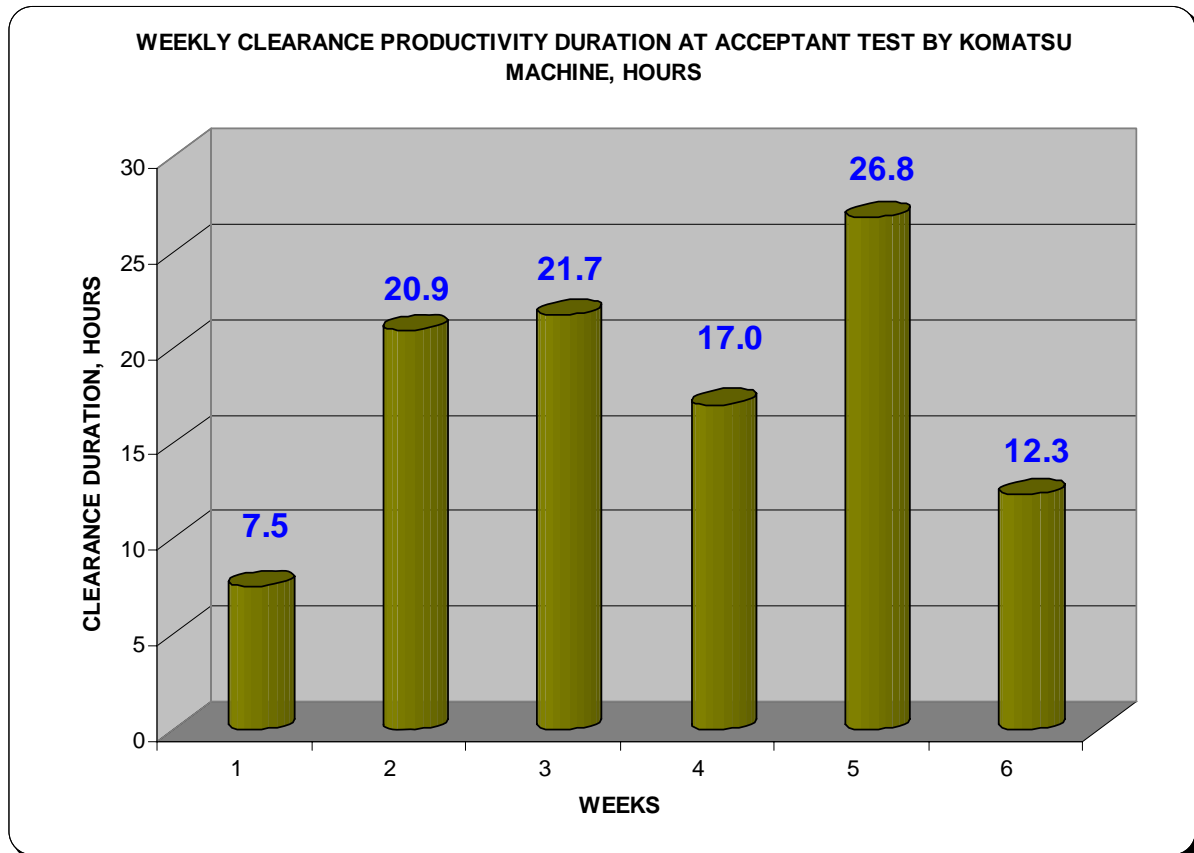


Figure 70: Clearance duration at acceptance test

Demining machine KOMATSU could perform long working hour as long as 26.8 hours per week. During its 26 days of participation (excluding Saturday and Sunday) at acceptance test, it spends 106.2 hours for mine clearance.

AVERAGE CLEARANCE DURATION: 4.1 HOURS/DAY

6.2. TRUE CLEARANCE PRODUCTIVITY RATE

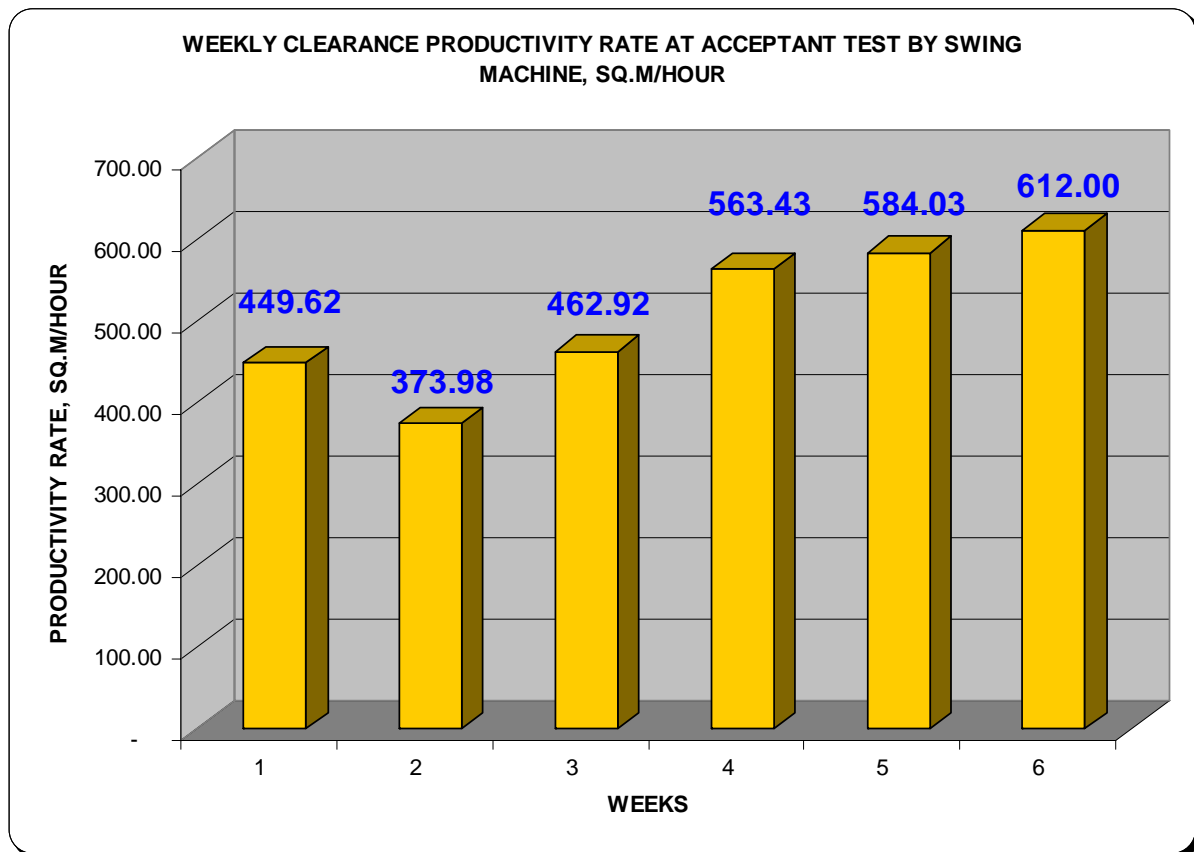


Figure 71: True productivity rate of the machine at acceptance test

Within the first three weeks of the test, KOMATSU machine could generate output less than 500m²/h. The highest productivity rate of demining machine KOMATSU is 612 m²/hour. During its 26 days or 106.2 hours of acceptance test, demining machine KOMATSU could produce 53,992 m² of true productivity. Therefore:

MAXIMUM PRODUCTIVITY RATE: 612 M²/hour
AVERAGE PRODUCTIVITY RATE: 508.4 M²/hour

6.3. THE COMPARISON OF PRODUCTIVITY AND TRUE PRODUCTIVITY

Table 47: the comparison of clearance and true clearance productivity

DESCRIPTION	TOTAL CLEARANCE SIZE	COMPARISON
CLEARANCE PRODUCTIVITY	55,923	100%
TRUE CLEARANCE PRODUCTIVITY	53,992	96.55%

Normally demining machine could not clear all its clearance area because of obstacle such as trees, hill or hole. In the above table there are more than 1,931 m² out of 55,923 m² account for 3.45% of the total area that KOMATSU could not be able to clear. Meaning that KOMATSU machine could clear the minefield up to 96.55% of the total target area. Thus it requires additional man power to clear the remaining un-cleared spot.

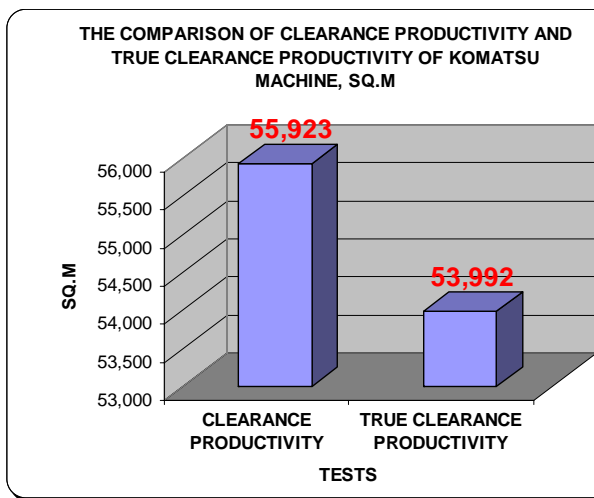


Figure 72: the comparison of true clearance productivity (sq.m)

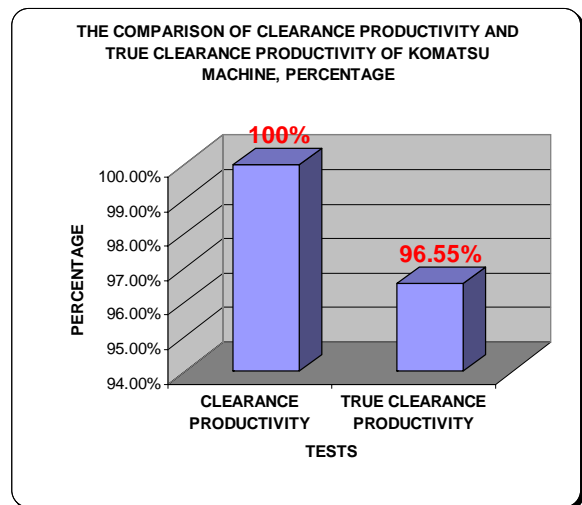


Figure 73: the comparison of true clearance productivity (%)

TRUE CLEARED AREA: 96.55%
UN-CLEARED AREA OR AREA FOR ADDITIONAL CLEARANCE: 3.45%

6.4. FUEL CONSUMPTION

Table 48 [1]: fuel consumption used by demining KOMATSU machine at acceptance test

No.	Clearance time, hour	Fuel Consumption, litre	Fuel Consumption rate, Litre/hour
1	2.5	400	160.0
2	9.3	475	51.1
3	9	400	44.4
4	9.5	485	51.1
5	9.2	380	41.3
6	10.6	380	35.8
7	5.6	185	33.0
8	6.4	470	73.4
9	5	475	95.0
10	6.5	343	52.8
11	10.8	382	35.4
12	5.1	272	53.3
13	12.2	200	16.4
14	6	200	33.3
TOTAL	107.7	5047	46.9

Note: because of fuel consumption is used for mine clearance and transportation, therefore, total of test duration of 107.7 hours is being used for the calculation.

Demining machine KOMATSU, spend 107.7 hour to clear landmine and transportation. During this period, it consumes 5047 liters of fuel. Therefore average fuel consumption rate for KOMATSU machine is 46.9 liters/hour. This fuel hike could be explained by the damaged of KOMATSU fuel measurement equipment during test and the use of fuel with other machine (as reported by the manufacturer).

Therefore, a fuel consumption of KOMATSU machine that had been measured by the good measurement equipment during performance test is used for this acceptance test. Because of difficult terrain, a fuel consumption rate of 40.39 liters/hour plus 4% increased is used for this acceptance test. Therefore, average fuel consumption rate for KOMATSU machine is:

FUEL CONSUMPTION RATE: 42 LITERS/hour

Table 48 [2]: Estimated fuel consumption used by KOMATSU machine at acceptance test

No.	Clearance time, hour	Fuel Consumption, litre	Fuel Consumption rate, Litre/hour
1	2.5	358	143.3
2	9.3	425	45.7
3	9	358	39.8
4	9.5	434	45.7
5	9.2	340	37.0
6	10.6	340	32.1
7	5.6	166	29.6
8	6.4	421	65.8
9	5	425	85.1
10	6.5	307	47.3
11	10.8	342	31.7
12	5.1	244	47.8
13	12.2	179	14.7
14	6	179	29.9
TOTAL	107.7	4,520.3	42

6.5. PRODUCTIVITY – FUEL RATIO

Demining machine KOMATSU machine refuel 11 times during its acceptance test and spend 107.7 hours for demining test. With fuel consumption rate of 42 liters/hour, the total fuel consumption rate could be re-plotted as follows:

Table 49: Productivity of the machine and fuel consumption

No.	Clearance time, hour	Fuel Consumption, litre	True Productivity, m ²	True Productivity - fuel ratio, m ² /litre
1	2.5	358	761	2.12
2	9.3	425	4,678	11.00
3	9	358	3,853	10.76
4	9.5	434	2,825	6.50
5	9.2	340	3,522	10.35
6	10.6	340	5,595	16.44
7	5.6	166	3,706	22.37
8	6.4	421	3,460	8.22
9	5	425	2,412	5.67
10	6.5	307	3,708	12.07
11	10.8	342	6,287	18.38
12	5.1	244	2,544	10.44
13	12.2	179	6,553	36.58
14	6	179	4,088	22.82
TOTAL	107.7	4,520	53,992	11.94

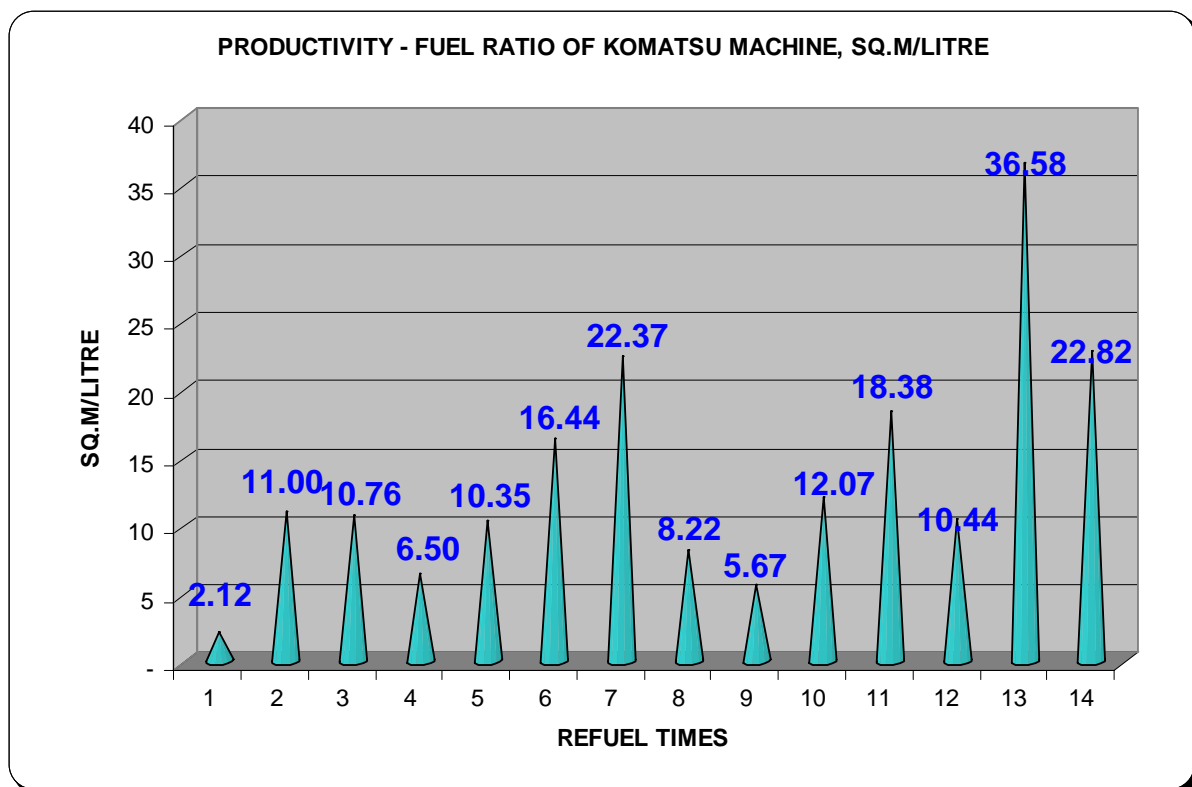


Figure 74: Productivity – fuel ratio

To clear 53,992 m² of landmine, demining machine KOMATSU consume 4,520 liters of fuel, therefore average productivity – fuel ratio is:

PRODUCTIVITY – FUEL RATIO: 11.94 M²/liter

6.6. THE REPAIR OF A DEMINING MACHINE KOMATSU

Table 50: repair activities

Week	Weekly Repair, times	Weekly Repair, hour	Weekly True Productivity, m ²	Weekly Clearance duration, Hour
1	0	0	3,372	7.5
2	1	4.5	7,816	20.9
3	2	2.9	10,045	21.7
4	1	1.0	9,578	17
5	0	0	15,652	26.8
6	0	0	7,528	12.3
TOTAL	4	8.4	53,992	106.2

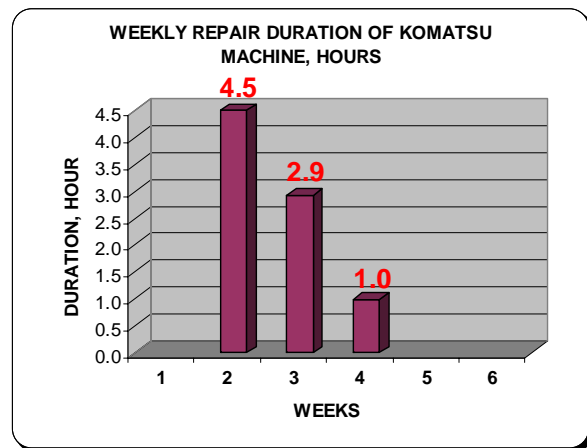
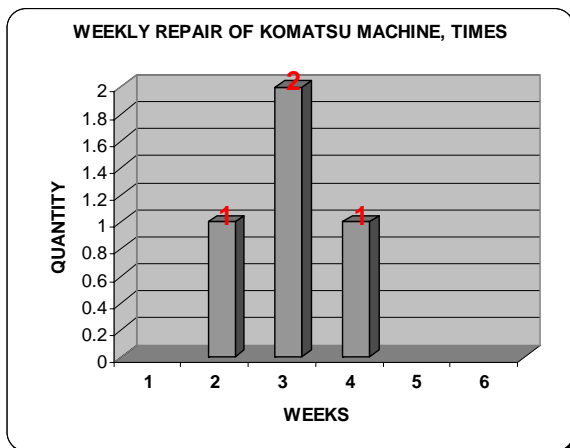


Figure 75: Repair activities of the machine

Demining machine KOMATSU requires 4 repair times during 6 weeks of the acceptance test. During its peak of operation, it requires 2 times per week to repair. During week 2, it takes 4.5 hours to repair the machine. The total number of repair of demining machine KOMATSU during 6 working weeks is 4 times and it takes 8.4 hours to complete. Therefore, the average of repair duration per week is 2.1 hours/week.

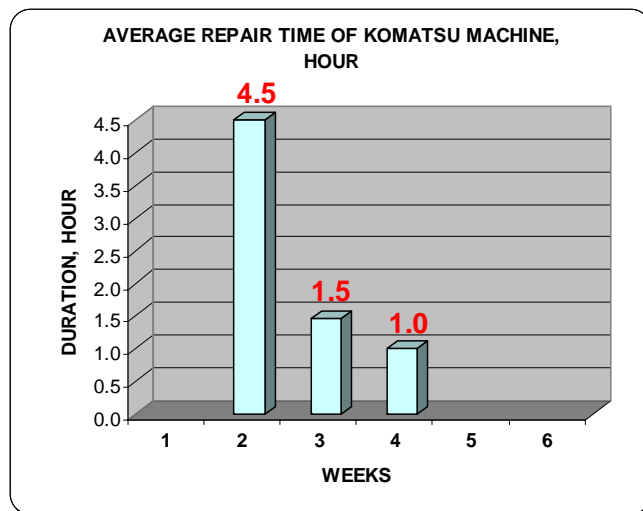


Figure 76: Average repair time of the machine

MAXIMUM REPAIR: 2 TIMES/WEEK
MAXIMUM REPAIR DURATION: 4.5 HOURS/WEEK
AVERAGE REPAIR DURATION: 2.1 HOURS/WEEK

6.7. AVERAGE PRODUCTIVITY FOR ONE HOUR REPAIR

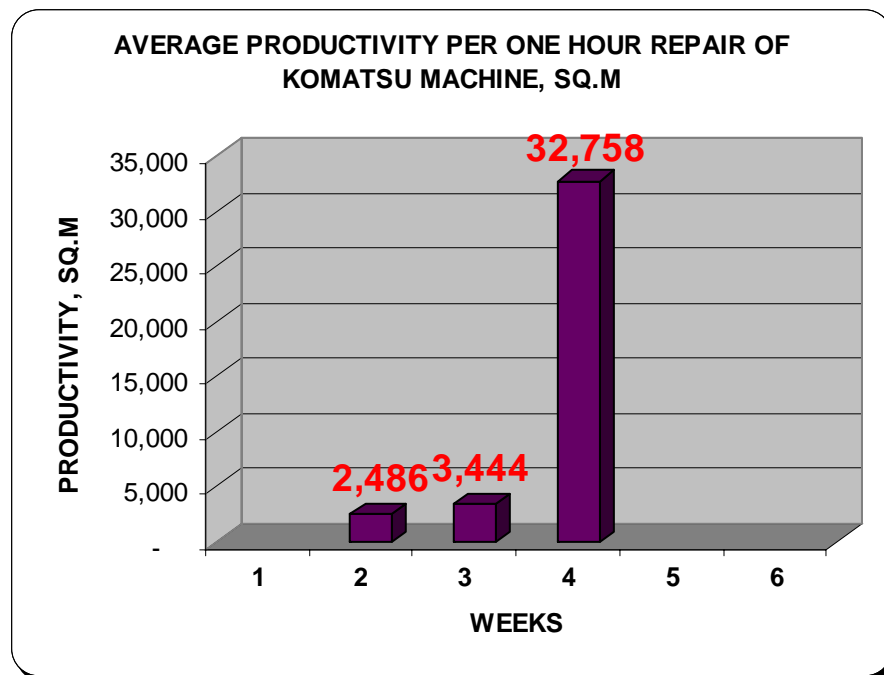


Figure 77: The relationship between productivity and repair

Total productivity for a demining machine KOMATSU is 53,992 m² and to achieve this clearance productivity, it takes 8.4 hours to repair the machine. Therefore:

AVERAGE PRODUCTIVITY/REPAIR: 6,415 m²/repair hour

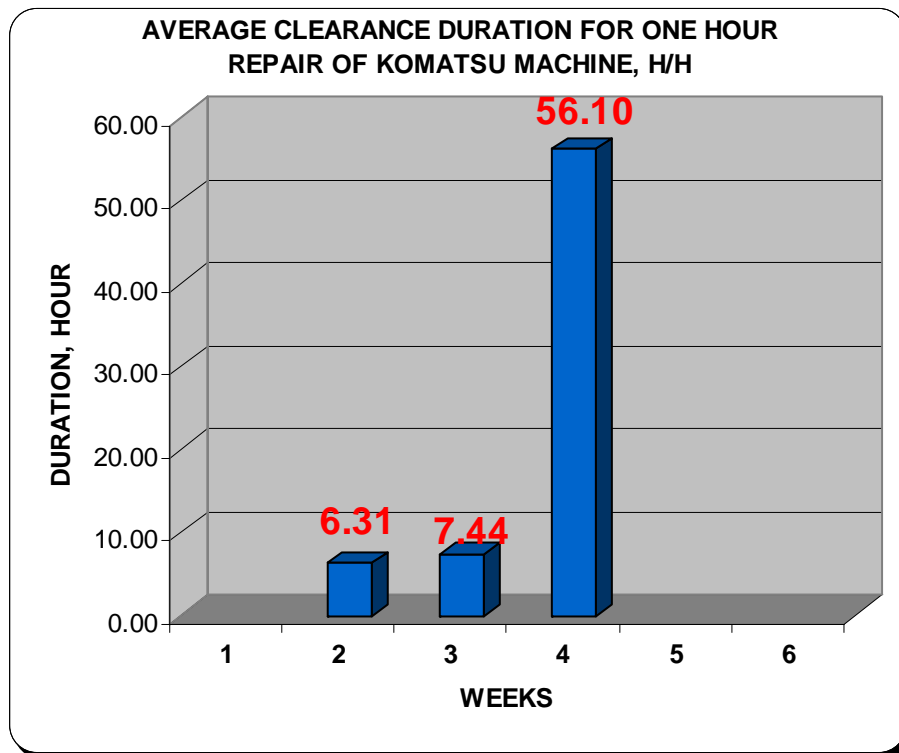
6.8. AVERAGE CLEARANCE DURATION FOR ONE HOUR REPAIR

Figure 78: Average clearance duration

Total clearance duration of demining machine KOMATSU is 106.2 hours. Within this period, it takes 8.4 hours to repair. Therefore, for one hour repair, machine could work as long as 12.62 hours.

AVERAGE WORK/REPAIR: 12.62 work hour/repair hour

7. COMPARISON BETWEEN PERFORMANCE AND ACCEPTANCE TEST

7.1. A COMPARISON OF TRUE PRODUCTIVITY RATE, M²/HOUR

Table 51: True productivity rate at performance & acceptance tests

Test	True Productivity rate, m ² /hour	Comparison
PERFORMANCE TEST	601.77	100%
ACCEPTANCE TEST	508.40	84%

According to the above table, demining machine KOMATSU is having difficulty to clear landmine at acceptance test area where vegetation is fully grown. It lost 36% of its productivity rate in comparison with its productivity rate at performance test area (dry, wet and light bush test area).

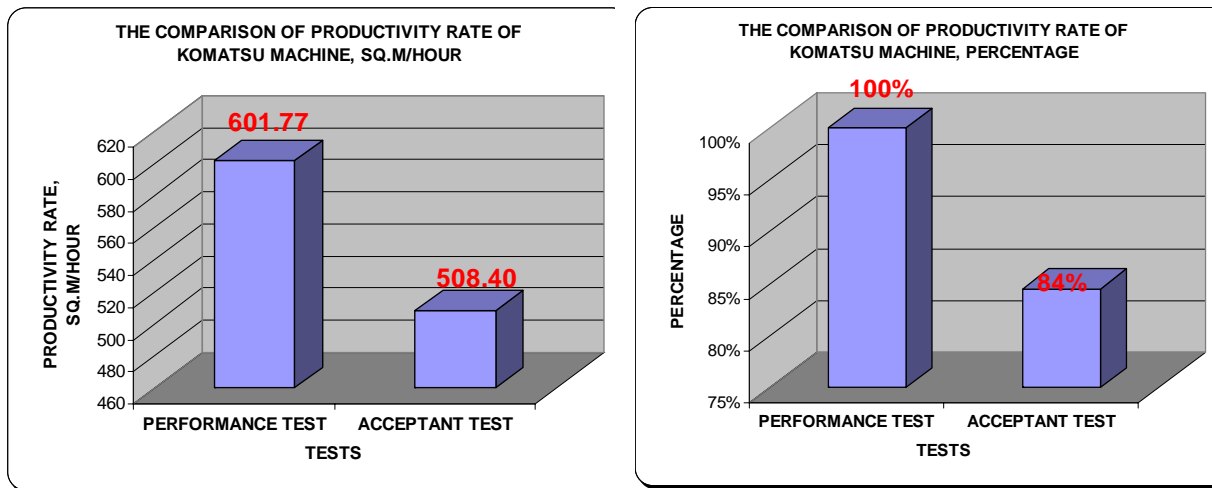


Figure 79: the comparison of productivity rate

During performance test at Siem Reap province, within one hour, demining machine KOMATSU could clear landmine 601.77 m². Within the same period of time, it could clear only 508.40 m² during acceptance test at Battambang province. This represent the lost of 36% of its clearance capacity.

TRUE PRODUCTIVITY RATE IS REDUCED BY 36%

7.2. A COMPARISON OF FUEL CONSUMPTION RATE

It is estimated that fuel consumption rate of KOMATSU machine is increased by 4% (see point 6.6)

AVERAGE FUEL CONSUMPTION RATE: 42 LITER/hour

7.3. A COMPARISON OF PRODUCTIVITY – FUEL RATIO

Table 52: A comparison of productivity-fuel ratio at performance & acceptance tests

Test	Productivity - fuel ratio, m ² /litre	Comparison
PERFORMANCE TEST	14.99	100%
ACCEPTANCE TEST	11.94	80%

The figure in the table indicates that during performance test at Siem Reap province, demining machine KOMATSU could clear up to 14.99 m² before it consume 1 liter of fuel. However, during acceptance test at Battambang province, the machine could clear only 11.94 m² before it consumes 1 liter of fuel. This represents a decrease by 20% of clearance area for the consumption of 1 liter of fuel.

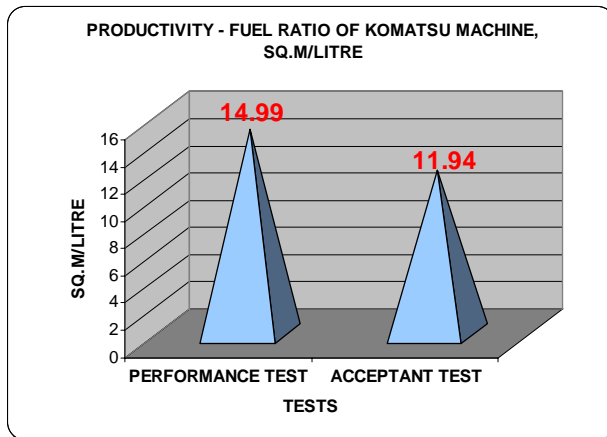


Figure 80: A comparison of productivity – fuel ratio at performance & acceptance tests (sq.m/l)

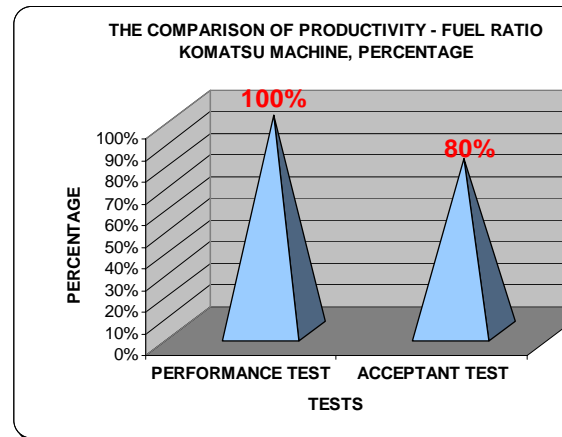


Figure 81: A comparison of productivity – fuel ratio at performance & acceptance tests (%)

PRODUCTIVITY – FUEL RATIO IS DECREASED BY 20%