COMMERCIAL TEST REPORT **REPORT NO.: IMP- 2011/366**
MONTH: JUNE 2022

सत्यमेव जयते

TRACTOR OPERATED ROTARY MULCHER-7 FEET (TERRASOLI-SAMURAI 707)

TESTED AT

STATE LEVEL FARM MACHINERY TRAINING AND TESTING INSTITUTE, RAHMANKHERA, HARDOI ROAD LUCKNOW, U.P. – 226101

Telephone: 0522- 2841021 E-mail: fmtcsima@.com

(The Institute is approved Testing Centre by Department of Agriculture & Cooperation, Ministry of Agriculture, GOI vide letter no. 8-1/2004-My (I&P) dated September 14,2010 and subsequent letters)

THIS TEST REPORT VALID FROM 03.06.2022 TO 02.06.2029

TEST REPORT NO.	NAME OF THE MACHINE/IMPLEMENT, MODEL NO.	MONTH	YEAR
IMP-2011/366	TRACTOR OPERATED ROTARY MULCHER-7 FEET (TERRASOLI-SAMURAI 707)	JUNE	2022

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Telephone: 0522- 2841021 E-mail: sametiup@gmail.com

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Type of test	:	Commercial
Name of machine	:	TRACTOR OPERATED ROTARY MULCHER-7 FEET (TERRASOLI-SAMURAI 707)
Test Code referred	:	IS: 11531-1995 (Reaffirmed) Test Code For Puddler. IS: 4468-2007 (Pt.-I)-Agricultural Wheeled Tractors-Rear Mounted Three Point Linkage. IS: 4931-1995 (Reaffirmed)- Technical Requirements For Power Take-Off Shaft Of Agricultural Tractors. IS: 6690-1981 (Reaffirmed)-Blades For Rotavator And Power Tillers. IS: 15805 – 2008 (pt-1) Straw Reaper-Combine –Test Code Part 1 Terminology
Test requested by	:	M/s- Jai Auto Pvt-Ltd, B-44, site iv, Industrial area, sahibabad Dist-Ghaziabad (U.P) India-201010
Testing Authority	:	State Level Farm Machinery Training And Testing Institute, Rahmankhera, Hardoi Road- Lucknow, U.P. – 226101
Period of test	:	January 2022 To June 2022

1. This Test Report should not be reproduced in part or full without prior permission of the Incharge Testing Centre.
2. The data given in the Test Report pertain to the particular machine submitted for test by the Applicant.
3. The data collected during the test do not in any way attribute to the durability of the machine.
4. The results reported in this report are observed values and no corrections have been applied for atmospheric and site conditions.

Selected Conversions

S. No	Units	Conversion Factor
1	**Force**	
	1 kgf.	9.80665 N
		2.20462 lbf
2	**Power**	
	1 hp	1.01387 metric hp (Ps)
		745.7 W
	1 Ps	735W
	1 Kw	1.35962 Ps
3	**Pressure**	
	1 psi	6.895 kPa
	1 kgf/cm^2	98.067 kPa = 735.56 mm of Hg
	1 bar	100 kPa = 10 N/cm^2
	1 mm of Hg	1.3332 m-bar

CONTENTS

1. SCOPE OF TEST

The Scope of test was to check and assess the following:-

1.1. Laboratory Test

- Checking of specifications.
- Hardness of straw chopping blades.
- Chemical analysis of critical component.
- Wear analysis (on mass basis)

1.2. Field test

- Rate of work.
- Quality of work
- Labour requirement
- Ease of operation, maintenance and adjustments
- Defects, Breakdowns &Repairs

2. TEST PROCEDURES

No BIS code available for testing of Mulcher. However following test code were referred during testing for testing of tractor PTO operated Mulcher.

IS: 6690-1981 (Reaffirmed in 2012)	:	Specification for Blades for Mulcher for Power Tillers. (First Revision)
IS: 4931-1995 (Reaffirmed in 2014)	:	Agricultural Tractors-Rear Mounted Power Take Off type 1, 2 and 3.
IS: 4468 – 2007 (pt-1) (Reaffirmed in 2012)	:	Agricultural Wheeled Tractors – Rear Mounted Three Point Linkage.
IS: 15805 – 2008 (pt-1)	:	Straw Reaper-Combine –Test Code Part 1 Terminology
IS: 11531-1995 (Reaffirmed)	:	The test code for puddler.

3. METHOD OF SELECTION

The test sample was directly submitted for test by the applicant at the Institute.

4. BRIEF DESCRIPTION OF EQUIPMENT

The rotary mulcher is operated by a tractor of 60 hp and is combination of rotary mulcher. The rotor unit contains two sets of 'L' shape blade. During operation the rotary mulcher blade cuts the standing stubble of wheat field residues and then evenly mulch at on the soil surface and pressed by the press roller.The machine is transported on three point linkage of

tractor. The rotor unit is operated by tractor pto shaft . It also adds the organic manure to the soil and eliminate the environmental pollution causes due to burning of wheat residues on the field . Mulching of hay charge on the ground field also helps in retention of soil moisture.

SPECIFICATIONS			
4.1	**General:**		
	Manufacturer/ Applicant	:	M/s- Jai Auto Pvt-Ltd, B-44, site iv, Industrial area, sahibabad Dist-Ghaziabad (U.P) India-201010
	Name of machine	:	Mulcher (SAMURAI-707)
	Type of implement	:	Tractor P.T.O Operated.
	Make	:	Jai Auto Pvt. Ltd.
	Model	:	SAMURAI-606
	Serial number	:	MLS707HA221002
	Year of manufacture	:	2022
	Type of blade	:	L and Straight.
	Power source as recommended, hp	:	50 and above.

4.1.1	**Chassis/Main Frame: Constructional Details**: It is fabricated in trapezoidal shaped M.S sheet (Shield or top cover). One M.S sheet is welded in front beneath of the mainframe and One M.S sheet are welded in top of the mainframe. A primary reduction gear box is mounted on MS sheet of main frame and supported by one pipe, which is a jack pipe On both sides two M.S plates are welded on LHS and RHS respectively. The hitch pyramid is welded and mounted unit.		
	Material	:	M.S. box fabricated
	Dimensions of frame ,mm Rear	:	2085×100×100
4.1.2	**Side plates:**		
	Numbers	:	02
	Material	:	M.S Sheet fabricated.
	Thickness, mm :		
	LHS side	:	8.0
	RHS side	:	8.0
	Method of fixing	:	Fixed to frame welded with chassis frame.
	Shield (top cover)		
	Type	:	Curved shape
	Material	:	M.S. sheet fabricated
	Size of sheet, mm	:	2085×985×4
	Method of fixing	:	Welded to side support of main frame chassis.

4.1.3	**Trailing board:**		
	Number	:	One
	Material	:	M.S. sheet fabricated.
	Size, mm	:	2070×510×3
	Method of fixing	:	M.S rod is passing in every clamp through M.S. bush and fixed with main chassis frame.
	Provision for locking	:	02, clamps welded to chassis frame. The board is held in position by locking.
	Concave		
	No. of rows of blade	:	Two
	No. of blade in each row of concave	:	19,20 blades on Alternative row.
4.1.4	**Baffle plate (Rear):** **Size-** Width, mm Tip to tip distance, mm Length, mm Thickness, mm	 : :	` 150 2075 4.0
5	**Rotor unit:-**		
5.1	**Rotor shaft:**		
	Axle	:	Tubular section with brackets for Fixing of blades.
	Material	:	M.S. pipe.
	Constructional details		This shaft is fixed in an hub through two ball bearing one (6309) on pulley side & one (6311) on other side.
	Number & arrangement of brackets		22
	Type. of Brackets		U type bracket welded on Rotor shaft.
	Size of brackets, mm Out side Inner size	 : :	 48.31 28.45
	No. & Size of holes on each brackets for fixing blades, mm		One and size of blades (20.14Ø)
	No. of blades on each brackets.	:	3 blades.
	Method of mounting blades on each brackets, mm	:	Each blade is mounted with the help of one bolts and nuts size (74.80×19.50×2)
	Gap between two brackets, mm	:	60
	Distance between two brackets, mm	:	200
	Distance between two brackets in a spiral line, mm	:	115, 200

	Dia. of roller with brackets ,mm	:	310 Ø	
	Dia. of roller with blades ,mm	:	540 Ø	
	Length & Diameter of rotor Shaft, mm	:	1713 and 170	
	Method of fixing	:	Rotor shaft is bolted with hubs on both ends. These hubs are centrally mounted with two ball bearings on each end.	
	Provision for lubrication	:	Lubrication points are provided hubs on both ends.	
5.2	**Rotor blades (refer fig 1):**			
	Numbers and Type	:	**L – shape blade**	**Straight blade**
	Material	:	High carbon steel	High carbon steel
	Thickness (mm) Overall Beveled edge	 : :	 6.50 2.92	 6.56 3.43
	Length and Width of blade, mm	:	210 and 69	180 and 68
	No, Size of the holes on each blade for fixing it to the flange, mm)	:	One (20.78 Ø)	One (20.25 Ø)
	Ground clearance from rotor blade, mm	:	25	15
	Arrangement of blades on the axle	:	Each blade is mounted with the help of one no. of bolts and nuts size (74.90×19.50×2) mm.	

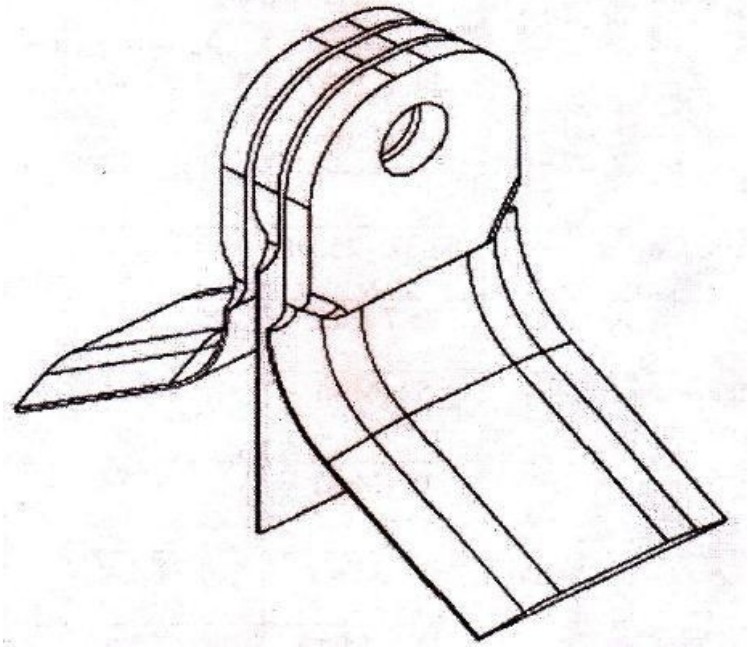


Fig-1 (Systematic Diagram of mulcher blade)

6	**Flap (Front)**		
	Type	:	M.S. flat curved.
	No. , Size of the M. S. sheet, mm	:	19, 225×95×3.14
	Spacing of the M. S. sheet and holes dia. on each M. S. sheet for fixing it to the M. S. rod, mm	:	3.73,19.67,56.65 & and holes dia. 18.0Ø
	Dia. and length of M. S. rod, mm	:	15.70 and 2135
	Method of fixing	:	Each M. S. sheet for fixing it to the M. S. rod, mm on main frame and side MS sheet (Side plates) of main frame.
	Provision for locking	:	The Flap (Front) device is clamped through bracket on main frame M. S. sheet at front and M.S Side plates of main frame. Locked at LHS side of Side plates.
7.	**Primary reduction:**		
	Type	:	Gear drives (Bevel and pinion).
	Mode of power transmission	:	It takes drive from the tractor PTO shaft through a PTO drive shaft, and transmits it to the secondary reduction belt and pulley at right angles through a jack shaft.
	Dia. and No. of teeth on drive crown pinion gear	:	36
	Dia. and No. of teeth on driven bevel pinion gear	:	12
	Gear ratio	:	1:0.33
	Type of lubrication recommend	:	(SAE-90)
	Lubrication oil capacity (lit)		3.0
	Provision of breather	:	Provided.
	Provision for checking oil level	:	Dipstick
	Oil change period (h)	:	First change after 200 Hrs of operation and subsequently after every 500 hours of operation or once in a year.
	No. of splines	:	6
	No. of Bearing	:	5 Bearing (02 ball bearing 6208, 02 ball bearing 6209) and one tapper roller bearing 32208.

7.1	**Auxiliary Drive shaft**		
	Type	:	M.S Circular
	Size of shaft, (mm) Length Dia.		 860 45 Ø
	Method of fixing	:	Shaft is supported on flange mounted & fitted with gear box side plate.
	No of type of bearing	:	One sealed taper roller bearing (32211)
7.2	**Secondary reduction (Ref. Fig 2)**		
	Type	:	V-Belt and Pulley
	Mode of power transmission	:	It takes drive from PTO of implement through the jack shaft, and transmits it to the rotor shaft.
	Location	:	On LHS side plates.
	Type of pulley	:	Multi-groove pulley.
	No. of pulley	:	Two
	No. and size of V-belt	:	Three and C 63
	Dia. of drive pulley, mm	:	254 Ø
	Dia., of driven pulley, mm	:	210 Ø
	Pulley ratio	:	1:0.83

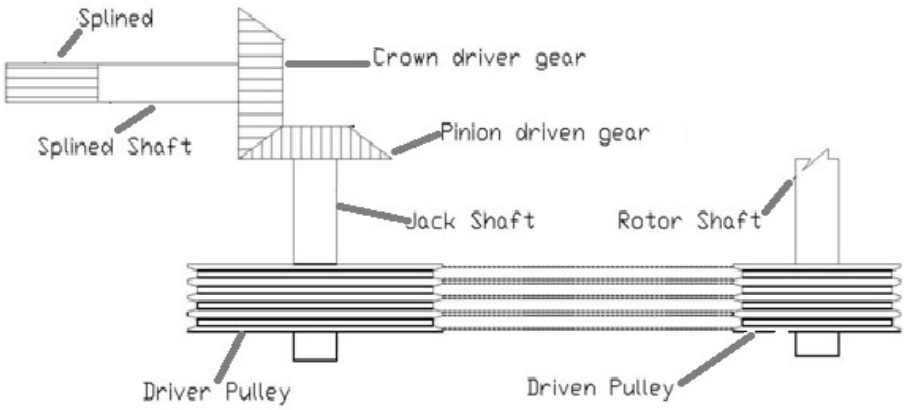
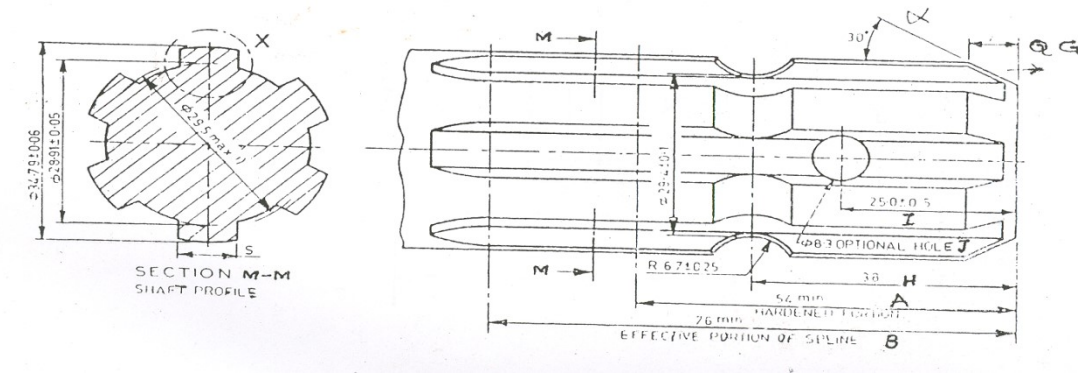


Fig.2:- Schematic Diagram of Power Transmission of Mulcher

8.0	**Dimensions of power input shaft (Ref. Fig 3)**		
Notation	**As per IS:4931-1995 (mm)**	**As observed (mm)**	**Remarks**
D ǿ	34.79 ± 0.06	34.78	Conforms
d ǿ	28.91 ± 0.05	28.06	**Does not conform**
S	8.69 (max.)	8.46	Conforms

R	6.7 ± 0.25	4.98	**Does not conform**
ά	30º	30º	Conforms
Q	7.0	5.61	**Does not conform**
H	38.0	38.0	Conforms
A	54.0 (min.)	59.49	Conforms
B	76.0 (min.)	72.34	**Does not conform**



Ref. Fig 3 :- Dimensions of power input shaft (PTO) as per IS: 4931:1996.

8.1	**Power Transmission:**		Propeller shaft is provided to transmit the power from tractor PTO to primary reduction gear box. The propeller shaft takes drive from PTO shaft of the tractor and transmits power to rotary shaft through gearbox and secondary reduction Multi-groove pulley and V-Belt.
8.2	**Propeller shaft:**		
	Type	:	Telescopic (with two segment) having one universal joint on each segment with spline ends to insert the PTO shaft of tractor and drive shaft of primary reduction gear box.
	Length of the shaft (mm)		
	➢ Minimum	:	740
	➢ Maximum	:	935
	Mass of shaft (kg)	:	15.870
	Provision for locking	:	Spring loaded locking pins on both sides are provided.

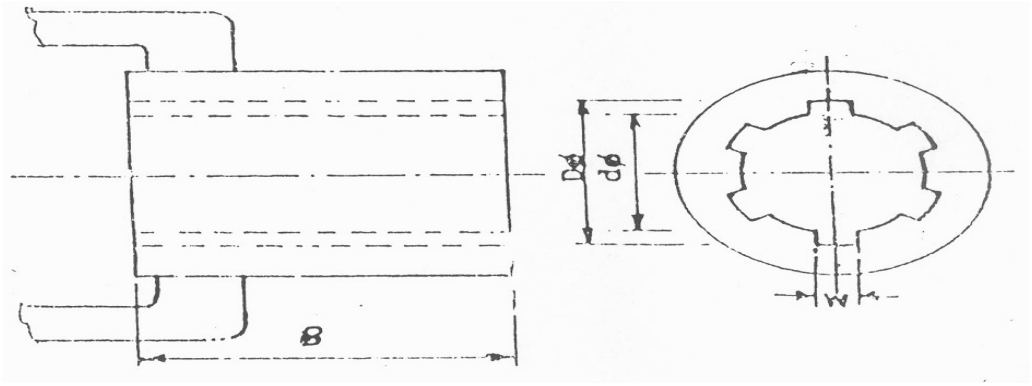


Fig 4. : Propeller Shaft Insert Dimensions, (mm)

8.3	Propeller shaft hub dimensions (Ref. Fig.4)		
Notation	**As per IS:4931-1995 (mm)**	**As observed (mm)**	**Remarks**
D ǿ	34.93± 0.03	34.96	Conforms
d ǿ	29.7± 0.1	30.08	**Does not conform**
W	8.69 (min)	8.70	Conforms
B	54 (min)	61.33	Conforms

8.4	**Straw pressing device :**		
	Type	:	M.S Cylinder
	Size,(mm) Length Dia.	 : :	 1945 140 Ø
	Method of fixing	:	The Straw pressing device is clamped through bracket of MS sheet with ball bearings on MS Side plates of main frame. Bolted on rear RHS and LHS side of side plates with two bolts and nut.
	Provision for lifting and lowering of Straw pressing device	:	Not provided.
8.5	**Scraper**		
	Number	:	One (on rear side of Straw pressing device)
	Material	:	M.S Rectangular
	Size of M.S angle iron of Scraper, mm	:	2010×50×5
	Method of fixing	:	The Scraper is bolted with side support through two nut & bolts.

8.6	**Hitch Pyramid.**		
	Type	:	M.S. plate fabricated.
	Size of flat, mm	:	685×180×5.73 (front) & 960×260×5.73 (Rear) respectively.
	Shape	:	Pyramid.

Specification of Hitch Pyramid As per IS: 4468-2007 (pt-1) (refer fig.:-)				
S. No.	**Specifications**	**Dimension (mm)**		**Remarks**
		As per IS : 4468 – 2007 (pt-1)	**As measured**	
Upper hitch points :-				
A	Dia. of hitch pin	24.37-25.50	24.81	Conforms
B	Dia. of hitch pin hole	25.7 ± 0.2	25.63	Conforms
F	Width between inner faces of yoke	52 (Min.)	57.29	Conforms
E	Width between outer faces of yoke	86 (Max)	81.15	Conforms
D	Linch pin hole distance	76 / 93 (Min.)	106.69	Conforms
L	Dia. of linch pin hole	12.0 (Min.)	12.96	Conforms
Lower hitch points :-				
G	Dia. of hitch pin	27.8 – 28.0	27.66	**Does not Conform**
H	Dia. of hitch pin hole	28.7 ± 0.3	28.57	**Does not Conform**
K	Linch pin hole distance	49 (Min.)	106.26	Conforms
L	Dia. of inch pin hole	12.0 (Min.)	12.99	Conforms
M	Mast height	610 ± 1.5 (Min)	530	**Does not Conform**
N	Lower hitch point span	825 ± 1.5	810 (fixed)	**Does not Conform**

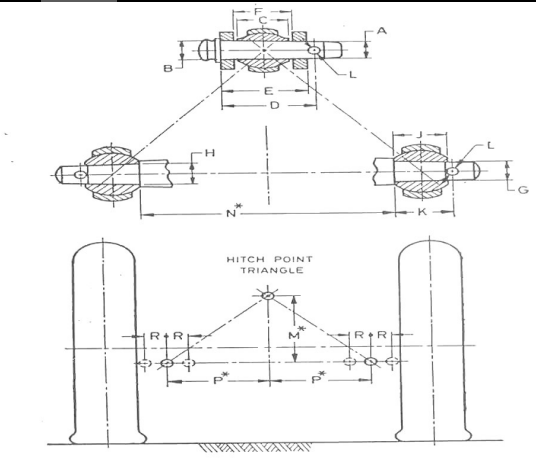


FIG. 1. DIMENSIONS OF HITCH POINTS

Fig.:5 Dimensions of Hitch Points

9.0 Overall Dimensions (mm):		
	Length	1440
	Width	2235
	Height	880
9.1	**Colour:**	Green
9.2	**Mass, (apa) kg:**	630
9.3	**Marking/Labeling of implement :**	Provided.

Fig No. 6 Overall Dimensions Rotary Mulcher-7 Feet (Terrasoli-Samurai 707)

9.4 Hardness:- The surface hardness of Mulcher blade was recorded as under:-

S. No.	Hardness (HRC)			
	Description	**As per IS: 6690-1981**	**As observed**	**Remarks**
	Edge portion	37-45	25.9 to 42.7	partially conforms

10. LABORATORYTEST

	Chemical composition			
	The chemical composition of blades is tabulated in Table-			
Sl. No.	**Material**	**Requirement as per IS:6690-1981 (Reaffirmed) (% by weight)**	**As observed (% by weight)**	**Remark**
1.	Carbon (C)	0.50 to 0.60	0.25	**Does not conform**
2.	Silicon (Si)	1.50 to 2.0	0.32	**Does not conform**
3.	Manganese (Mn)	0.50 to 1.0	1.28	**Does not conform**
4.	Sulphur (S)	0.05 (max.)	0.024	Conforms
5.	Phosphorous (P)	0.05 (max.)	0.032	Conforms

10.1 FIELD PERFORMANCETEST

Tractor PTO operated mulcher with Mahindra 605 (DI) Arjun (Novo) tractor at engine rpm setting 1700 to 1800 corresponding 540 PTO rpm in the field for 27.7 hr. for cutting and mulching wheat stubbles in combine harvested field. The observed parameters during field test are also given in ANNEXURE – II

Summary of field performance

Sl. No	Parameters	Wheat Stubbles
1.	Tractor used	Mahindra 605 (DI) Arjun (Novo)
2.	Type of soil	Sandy loam
3.	Av. Soil moisture, %	11.9 to 15.85
4.	Av. Slippage	
5.	Av. Speed of operation, kmph	2.72 to 2.78
6.	Av. Depth of cut / mulch, cm	1.75 to 2.30
7.	Av. Working width, m	2.09 to 2.10
8.	Area covered, ha/h	0.418 to 0.490
9.	Time required for one hectare, h	2.04 to 2.39
10.	Av. Length of residues before operation, cm	19.0 to 32.0
11	Av. Length of residues after operation, cm	3.60 to 4.70
12.	Av. Weight of residues before operation, kg/m²	0.300 to 0.610
13.	Av. Weight of residues after operation, kg/m²	0.280 to 0.500

14.	Fuel consumption	
	- l/h	4.150 to 4.600
	- l/ha	8.466 to 10.665
15.	Field Efficiency (%) was recoded	72.07 to 83.90

10.1 Rate of Work

10.2 Field Operation

The rate of work in sandy loam in wheat stubbles residues operation was recorded as 0.418 to 0.490 ha/h and the forward speed as 2.72 to 2.78 kmph.

10.3 The Av. Working width (m) was observed as 2.09 to 2.10.

10.4 The time required to cover one hectare area was recorded as 2.04 to 2.39 h.

10.5 The fuel consumption varied from 4.150 to 4.600 l/h and 8.466 to 10.665 l/ha.

10.6 Quality of Work

Field Operation

10.7 The depth of Wheat residues operation was recorded as 1.75 to 2.30 cm.

10.8 The field efficiency of wheat residues operation was recorded as 72.07 to 83.90 %.

10.9 The Av. Length/height of residues before/after during field operation observed from 19.0 to 32.0 cm and 3.60 to 4.70 cm respectively.

10.10 The Av. Weight of residues before/after during field operation observed from 0.300 to 0.610 kg/m² and 0.280 to 0.500 kg/m² respectively.

11 WEAR OF BLADES

11.1 On Mass basis

Wear of hatchet blades on mass basis after 29.0 hrs. of field operation are tabulated in Table-

12. Percentage wear of Mulcher blades on mass basis:-

S. No.	Position	Initial mass of blade (g)	Mass of blade after 29.0 hours of operation (g)	Loss in mass		Wear on (%) hour basis
				(g)	(%)	
1.	**Left (A)**	640	600	40	6.25	0.21
	Straight (B)	558	538	20	3.58	0.12
	Right (C)	608	583	25	4.11	0.16
2.	**Left (A)**	615	585	30	4.87	0.16
	Straight (B)	600	560	40	6.66	0.22
	Right (C)	609	570	35	5.74	0.19
3.	**Left (A)**	601	576	25	4.15	0.14
	Straight (B)	640	610	30	4.68	0.16

	Right (C)	637	609	28	4.39	0.15
4.	**Left (A)**	615	590	25	4.06	0.14
	Straight (B)	564	534	30	5.31	0.18
	Right (C)	645	610	35	5.42	0.18
5.	**Left (A)**	649	609	40	6.16	0.21
	Straight (B)	616	566	50	8.11	0.27
	Right (C)	620	590	30	4.83	0.16
6.	**Left (A)**	623	583	40	6.42	0.22
	Straight (B)	555	540	15	2.70	0.09
	Right (C)	615	595	20	3.25	0.11
7.	**Left (A)**	560	530	30	5.35	0.18
	Straight (B)	580	540	40	6.89	0.23
	Right (C)	585	560	25	4.27	0.14
8.	**Left (A)**	614	584	30	4.88	0.16
	Straight (B)	605	590	15	2.47	0.07
	Right (C)	608	583	25	4.11	0.14
9.	**Left (A)**	614	584	30	4.88	0.16
	Straight (B)	548	528	20	3.64	0.12
	Right (C)	588	538	15	2.55	0.08
10.	**Left (A)**	643	618	25	3.88	0.13
	Straight (B)	612	572	40	6.53	0.22
	Right (C)	620	585	35	5.64	0.19
11.	**Left (A)**	642	602	40	6.23	0.21
	Straight (B)	619	594	25	4.03	0.13
	Right (C)	620	590	30	4.83	0.16

13. EFFECTIVENESS OF SEALING

After completion of field operation for 29.0 hours, the implement was dismantled for checking the effectiveness of sealing provided against ingress of dust, and water/mud in various sub-assemblies/components. The observations are given in ensuing table.

SI. No.	Location	Whether ingress of mud and /or water was observed (Yes/No)
1.	Primary reduction gear box	No
2.	Secondary reduction gear box	No
3.	Rotor assembly (hub)	No

14. EASE OF OPERATION, ADJUSTMENTS & SAFETY

-The propeller shaft has telescopic sections with universals joints, to adjust the length of drive shaft which is adequate.

-Depth adjustment can be possible by raising or lowering through tractor hydraulic system.

15. DEFECTS, BREAKDOWNS AND REPAIRS

-No breakdown occurred during 29.0 h operation in the field.

16. COMMENTS & RECOMMENDATIONS

16..1 The dimensions of three point linkage system are not conforming to the requirement of As per IS:4468-2007 (pt.- I) (mm) the standard three point linkage system conforming to BIS should be used at regular production level.

16.2 Dimensions of power input & corresponding propeller shaft hub have not been provided as per reuirements of As per IS:4931-1995 (mm) form the standardization point of view and inter changeability of components provision of input and propeller shaft as per the standard specification is necessary. It may be corrected at the production level before the commencing sale of the mulcher.

16.3 The chemical composition of Mulcher blades Carbon, Silicon, Manganese does not meet As per IS: 6690-1981. The standard chemical composition of blades should be used at regular production level.

16.4 Maneuverability of tractor with Rotary mulcher was found to be satisfactory. The quality of work was observed to be satisfactory.

16.5 The wear percentage wear of blades on mass basis during field operation (27.7 hr) ranged from 0.06 to 0.31 %hour basis, which is normal

16.6 Arrangement should be made to permanently display the quality and parameters obtained in the test in all commercially manufactured (agriculture machines by putting engraved seals or plates) on the machines, so that the farmers can get proper information about the quality of the equipment.

17 LITERATURE :

The specification of the implement operating manual, maintenance, safety instruction and spare parts catalogue provided in English. The literature developed is found to be adequate for the guidance of user and service personal. However, it need to developed (as per IS: 8132: 1999) Hindi & in other regional languages.

18. APPLICANT'S COMMENTS:-

1) During normal Production we will change chemical composition of blade To the requirements of IS.
2) During normal production we will maintain all specifications as per IS standards, which are does not confirm in draft report.

This report is being issued with the condition that the tested implement will be rectified as per recommendation and comments given by the Institute and applicant respectively and after rectification the implement should be manufactured on commercial basis.

TESTING AUTHORITY

(UPENDRA KUMAR) -SENIOR TECHNICAL ASSISTANT-	
(DIGVIJAY SINGH) -TEST ENGINEER-	
(JIWAN PRAKASH) -ASSOCIATE PROFESSOR – ENGG.	
(DR. PANKAJ TRIPATHI) - DIRECTOR-	

ANNEXURE-I

BRIEF SPECIFICATIONS OF THE TRACTOR USED DURING FIELD TEST

1	Make, model and type	Mahindra-605 (DI) Arjun (NOVO) Two; wheel drive Agriculture purpose tractor
2	Number of cylinders	4
3	Maximum PTO power, Kw	42.5
4	Power at standard Power Take-Off speed, 540± 10 rpm, Kw	35.3
5	Rated engine speed, rpm	2400
6	No load engine speed during field test, rpm	1800
7	Drawbar power, Kw	37.3
8	**Drawbar pull, kN :**	
	- Without ballast	22.93
	- With ballast	17.70
9	Type of wheel equipment	Pneumatic
10	**Number & size of tyre :**	
	Front	02; 6.00-16.00-8PR
	Rear	02; 12.4-28-12PR
11	Standard track width, mm :	
	- Front	1315
	- Rear	1420
12	Wheel base, mm	2050
13	Ballast condition	un -ballast
14	**Total Operational Mass, kg :**	
	- Front	680
	- Rear	1150
	- Total	1830

IMP-2011/366	TRACTOR OPERATED ROTARY MULCHER-7 FEET (TERRASOLI-SAMURAI 707)	COMMERCIAL	17

ANNEXURE – II

Place of Test : Vill- Pilakhana, Dhaura, Hasanganj (Unnao)
Tractor used **:** Mahindra-475 (DI)
Gear Used : L-2

Test No.	Date of test	Name of residues	Duration of test (h)	Length of before operation (cm)	Length of after operation (cm)	Weight of before operation (kg/m2)	Weight of after operation (kg/m2	Av. Soil moisture (%)	Av. Speed of operation (kmph)	Av. Depth of cut (cm)	Av. Working width (m)	Area covered (ha/n)	Field efficiency (%)	Time require (h)	Fuel consumption	
															(l/h)	(l/ha)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1.	12.05.2022	Wheat stubbles	4.0	32.0	4.25	0.610	0.440	13.35	2.74	1.75	2.09	0.450	75.53	2.22	4.600	10.212
2.	13.05.2022	Wheat stubbles	6.0	25.0	4.40	0.530	0.500	15.85	2.73	2.3	2.10	0.422	73.65	2.37	4.500	10.665
3.	16.05.2022	Wheat stubbles	7.0	19.0	4.50	0.300	0.280	12.9	2.76	2.25	2.10	0.418	72.07	2.39	4.200	10.038
4.	17.05.2022	Wheat stubbles	6.0	28.25	3.60	0.500	0.400	14.9	2.72	1.9	2.09	0.460	80.98	2.17	4.450	9.656
5.	18.05.2022	Wheat stubbles	6.0	26.25	4.75	0.510	0.390	11.9	2.78	2.25	2.10	0.490	83.90	2.04	4.150	8.466

ANNEXURE –III

SYMBOL AND ABBREVIATIONS

SYMBOLS:

I-	**SYMBOLS ASSIGNED TO BASIC SI UNITS**		
S.N.	**PHYSICAL QUANTITY**	**NAME OF SI UNIT**	**SYMBOL**
1	Length	Meter	m
		Millimeter	mm
2	Mass	Kilogram	kg
		Gram	g
		Tone	t
3	Time	Second	s

II-	**SYMBOLS ASSIGNED TO SOME DERIVED UNITS**		
S.N.	**PHYSICALQUANTITY**	**NAME OF SI UNIT**	**SYMBOL**
1.	Area	Square centimeter	cm^2
		Square meter	m^2
		Hectare	ha
2	Speed/Velocity	Meter per second	m/s
		Kilometer per hour	kmph
3	Pressure	Newton per square millimeter	N/mm^2
4	Time	Minute	min
		Hour	h
5	Volume	Cubic centimeter	cm^3
		Milliliter	ml
		Liter	l
6	Minimum	Min	Min
7	Maximum	Max	Max

ABBREVIATIONS:

As per applicant	**:**	apa	Clause	**:**	Cl.
Degree	:	deg	Figure	**:**	Fig
Indian Standard	:	IS	Kilowatt	:	kW
Number	:	No.	Not available	:	N.A.
Not Recorded	:	N.R.	Percent	:	%
Reference	:	Ref.	Revolution	:	rpm