COMMERCIAL TEST REPORT

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WHEAT STRAW REAPER
“B.S.-761”

GOVERNMENT OF INDIA
MINISTRY OF AGRICULTURE
(DEPARTMENT OF AGRICULTURE & COOPERATION)

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LABORATORY TESTS:

A-2 Idler pulley bearings
1. Idler pulley bearing of cutter bar drive belt - After 8 – 15 hours
2. Idler pulley bearing of blower belt 2 After 8 – 15 hours
3. Idler pulley bearing of beater belt - After 8 – 15 hours
4. Idler pulley bearing of main shaft 2 After 8 – 15 hours
5. Idler pulley bearing of cutter drive mechanism 2 After 8 – 15 hours

Total 6

A-3 Grease cups:
1. Grease cup of wheel bearings 2 After 8 – 15 hours

B. Oiling points:
1. Reel moving bushes 20 After 8 – 15 hours
2. Reel drive mechanism pulley 2 After 8 – 15 hours
3. Sieve drive mechanism pulley 10 After 8 – 15 hours
4. Chain wheel -

Total 32

8. LABORATORY TESTS:

A. Hardness of knife blades (HRC) As observed As per IS:6025-Dec. 2004 Remarks

a. Hardened Zone : 16 48 to 58
Does not conform
b. Remainder Zone : 18 20 to 35
Does not conform

B. Hardness of chaffers drum blade (HRC) As observed As per IS:6025-Dec. 2004 Remarks

Hardened Zone : 24 48 to 58 Does not conform
Remainder Zone : 23 20 to 35 Conforms

C. Chemical composition of Knife blades As observed As per IS:6025-Dec. 2004 Remarks

Carbon % 0.78 0.70 to 0.95 Conforms
Manganese % 0.66 0.30 to 0.50 Does not conform

D. Chemical composition of chaffers Drum blades As observed As per IS:6025-Dec. 2004 Remarks

Carbon % 0.83 0.70 to 0.95 Conforms
Manganese % 0.82 0.30 to 0.50 Does not conform

FIELD TEST
The straw reaper fitted with Swaraj 855 FE tractor at engine throttle setting corresponding to 1800 rpm was tested in the field for 35.33 hours for reaping of left over straw stubbles after harvesting by grain combine. During tests (Refer col.3 of Annexure-II) field performance of straw reaper was assessed with regard to quality of work, rate of work, fuel consumption, safety and soundness of construction etc. The crop parameters and atmospheric conditions as observed during field tests are also given in Annexure-II.
9.1 Rate of work and fuel consumption

The "split straw percentage" is defined as the percentage of straw split to the total weight of straw sample collected after passing through the machine. The quantity of straw collected is expressed in terms of straw recovery percentage which is defined as the percentage of difference of straw weight before and after machine operation to the initial weight of straw in the randomly selected sample area of test field.

During straw field tests, output of the machine varied from 0.47 to 0.60 ha/h. The forward speed varied from 2.80 to 3.01 kmph in L-1 gear. Fuel consumption varied from 4.15 to 5.23 l/h.

The results of field performance tests are summarized in Table-1 and detail is given in Annexure-II.

**TABLE -1 : SUMMARY OF FIELD PERFORMANCE TEST**

<table>
<thead>
<tr>
<th>WheatCrop variety</th>
<th>Forward speed (kmph)</th>
<th>Rate of work (ha/h)</th>
<th>Fuel consumption (l/ha)</th>
<th>Fuel consumption (l/ha)</th>
<th>Av. Length of straw (mm)</th>
<th>Straw split (%)</th>
<th>Straw recovery (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WH -711</td>
<td>2.80 to 2.95</td>
<td>0.47 to 0.52</td>
<td>1.92 to 2.13</td>
<td>4.15 to 4.79</td>
<td>8.22 to 9.20</td>
<td>18.8 to 29.2</td>
<td>96.0 to 97.0</td>
</tr>
<tr>
<td>DBW -17</td>
<td>2.88 to 3.01</td>
<td>0.49 to 0.60</td>
<td>1.67 to 2.04</td>
<td>5.00 to 5.23</td>
<td>8.35 to 10.46</td>
<td>21.1 to 29.1</td>
<td>97.0 to 98.0</td>
</tr>
</tbody>
</table>

9.3 Quality of work:
9.3.1 Wheat straw harvesting:

During the field tests straw split ranged from 96.0 to 98.0% and straw recovery ranged from 73.1 to 85.2 %

The length of straw in wheat varied from 18.8 to 29.2 mm. The straw recovery mainly depends upon the left over straw stubbles height in the field harvested by the combine harvester. The length and splitting of straw so formed is considered to be satisfactory as animal feed.

10 EASE OF HANDLING DURING OPERATION

No specific problem was observed in handling during operation of straw reaper.

11 LABOUR REQUIREMENTS.

Prior to each test, about 2 man hour were required for daily maintenance of tractor and straw reaper for operation. One skilled operator is enough to operate tractor with straw reaper. Extra labour is required for handling and transportation of bhusa.

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14 SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS:

14.1. Rate of work and fuel consumption
   On the basis of field test, output of machine varied from 0.47 to 0.60 ha/h. The forward
   speed of tractor John Deere -5310 varied from 2.80 to 3.01 kmph in L-1 gear. Fuel
   consumption of tractor varied from 4.15 to 5.23 l/h (8.22 to 10.46 l/ha).

14.1.2 Quality of work
   Quality of straw is expressed in terms of split straw percentage and length of straw. The
   split straw was observed as 96.0 to 98.0%. The average length of straw ranged from 18.8
   to 29.2 mm. The straw recovery ranged from 73.1 to 85.2 %.

14.2 COMMENTS AND RECOMMENDATIONS

1. Quality of wheat straw was observed to be satisfactory and is considered to be
   satisfactory as animal feed.

2. The Straw split & straw recovery percentage was observed from 96.0 to 98.0 & from
   73.1 to 85.2 %, respectively. This is considered as normal.

3. Adequate arrangements have to be made for protecting drive shafts, belts & pulleys viz.
   main drive, guide drum, threshing drum, blower and cutter bar assembly etc.

4. Hardness of the blade of chaffer drum and cutter are not conforming the IS requirement.
   Therefore, the blades conforming to IS:6025-Dec. 2004 should be used at regular
   production level.

5. Carbon content of cutter & chaffer drum blades is within the specified limit of IS: 6025-
   Dec. 2004 whereas the manganese content in both the blades are higher than the
   prescribed limit and hence this should be looked into at regular production level.

6. The bearings are protected against the ingress of dust and foreign material.

7. Provision should be made for lowering and raising the reel assembly.

8. Adequate provision has been made for lubricating/ greasing of the moving parts.

9. Shape of the toeing hook of the straw reaper is not as per the code IS: 12362-(Part-1)
    2007. The details of the same are given in fig. 5.

10. A safety clutch should be provided in drive shaft or chaffer drum pulley drive to protect
    the braking or damage in the events of over loading.

11. Some provision should be made in machine to lift the wheat stubbles which are pressed
    under the tractor rear wheel which is left uncut in field.