WHEAT STRAW REAPER
(PAL-077)

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

NORTHERN REGION FARM MACHINERY TRAINING AND TESTING INSTITUTE
TRACTOR NAGAR, SIRSA ROAD, HISAR-125001 (HARYANA)

Telephone : 01662-276824,276172
Website : http://nrfmtti.dacnet.nic.in

Telefax No. 01662-276984
E-Mail : fmti-nr@nic.in
9. FIELD TEST

The straw reaper fitted with John Deere 5310 tractor at engine throttle setting corresponding to 2000 rpm was tested in the field for 36.2 hours for harvesting of wheat straw left over by grain combine. During testing wheat straw was harvested to assess field performance of straw reaper 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 given in Annexure-II.

9.1 Rate of work and fuel consumption

The “split straw percentage” is defined as the percentage of straw splited 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 harvesting tests, rate of work in wheat straw varied from 0.429 to 0.562 ha/h. The speed of operation varied from 2.74 to 3.24 kmph and gear used was L-II in wheat harvested field. Fuel consumption varied from 5.17 to 6.70 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>Avg. Length of bhusa (mm)</th>
<th>Straw split (%)</th>
<th>Straw recovery (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DBW 17</td>
<td>2.74 to 3.24</td>
<td>0.429 to 0.562</td>
<td>5.97 to 6.51</td>
<td>13.2 to 22.8</td>
<td>96.3 to 97.4</td>
<td>71.3 to 78.8</td>
</tr>
<tr>
<td>PBW-373</td>
<td>2.90 to 3.24</td>
<td>0.447 to 0.489</td>
<td>5.49 to 6.70</td>
<td>13.1 to 24.2</td>
<td>96.7 to 98.0</td>
<td>71.0 to 78.2</td>
</tr>
<tr>
<td>PBW-550</td>
<td>2.93 to 2.96</td>
<td>0.500 to 0.503</td>
<td>5.17 to 6.43</td>
<td>23.7 to 23.9</td>
<td>97.0 to 98.7</td>
<td>74.6 to 80.0</td>
</tr>
</tbody>
</table>

9.3 Quality of work:

9.3.1 Wheat straw harvesting:

During wheat straw harvesting the straw split ranged from 96.3 to 98.7 % and straw recovery ranged from 71.0 to 80.0%

The length of straw in wheat ranged from 13.1 to 24.2 mm. The straw recovery mainly depends upon the stubbles height remaining in the field after harvesting by the combine harvester. The length and splitting of straw so formed is considered to be satisfactory as animal feed.
The blades of chaffer cylinder after 36.2 hours of operation had wear in the range of 0.29 to 1.00 % and concave from 0.29 to 0.88 % which is normal.

13 DEFECTS, ADJUSTMENTS, BREAKDOWNS AND REPAIRS.

No breakdown was observed during 36.2 hrs. of field operation under test.

14 SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS:

14.1. Rate of work and fuel consumption
On the basis of test replications, rate of work for wheat straw harvesting varied from 0.429 to 0.562 ha/hr. The speed of operation of tractor John Deere 5310 varied from 2.74 to 3.24 kmph in A.2 gear. Fuel consumption of tractor varied from 5.17 to 6.70 l/h (10.34 to 14.48 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 96.3 to 98.7%. The average length of straw observed from 13.1 to 24.2 mm. The straw recovery was from 71.0 to 80.0%.

14.2 EASE OF HANDLING DURING OPERATION:
No specific problem was observed during operation of wheat straw reaper in field.

15. COMMENTS AND RECOMMENDATIONS
1. Quality of wheat straw was observed to be satisfactory and is considered to be suitable for animal feed.

2. The straw split percentage was observed from 96.3 to 98.7. This is considered to be normal side.

3. Hardness of the blade of chaffer drum and cutter bar are not conforming the IS requirement. Therefore the blades conforming to IS:6025- Dec-2004 should be use at regular production level.
4. Chemical composition of blades of chaffer drum & cutter bar are not conforming to IS:6025- Dec-2004. The blade complying with BIS requirement should be use at regular production level.

5. It is recommended to incorporate the safety device is drive shaft & safety guards/covers needs to be provided.

6. Safety instructions/ signals have to be displayed for threshing drum as per IS requirement.

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

8. Chaffer drum blades are tightened with double nuts to avoid its loosening.

9. Adequate provision has been made for making the adjustments of the moving parts.

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

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

16. LITERATURE
The manufacturer has developed specification of machine. Operator's manual, service manual, part's catalogues etc in single booklet. However, it needs to be modified in Hindi, English and other regional language's for guidance of users and service personnel's as per IS: 8132-1999.

TESTING AUTHORITY

| (J. P. MANDAL) AGRIL. ENGINEER |
| (P. K. CHOPRA) (SENIOR AGRICULTURAL ENGINEER) |
| (A. N. MESHRAM) DIRECTOR |

APPLICANT'S COMMENTS
No comments received

NORTHERN REGION FARM MACHINERY TRAINING & TESTING INSTITUTE, HISSAR