Cereal Straws - Estimated Losses Before the Digester

Robert W. Hurter, P.Eng., MBA
President
HurterConsult Incorporated
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When properly cleaned and prepared nonwood fibre raw material enters the digester, many of the hurdles of producing pulp and paper from nonwoods have been overcome.

In many instances, however, economic problems encountered by nonwood-based pulp and paper mills are related to a lack of attention to the losses which are incurred before the digester. Losses from the field to the digester have a significant impact on the amount of the nonwood fibre raw material required and the cost of the fibre raw material per ton of pulp produced.

These losses generally can be classified as:

- transportation and storage losses
- fibre preparation losses which depend on the type of nonwood raw material being processed and the selected fibre preparation system.

Once it has been determined how much prepared raw material is needed to feed the digester, the next step is to develop a clear understanding of the transportation, storage and fiber preparation losses, all of which are critical to establishing how much nonwood fibre raw material must be harvested and delivered to the mill. Please refer to Fibre Raw Material Issues are Critical to the Success of Nonwood Pulp & Paper Mills for additional details.

The following figures provide some general rules-of-thumb concerning losses before the digester for selected cereal straws and the selected fiber preparation systems. The amount of loses for a given raw material can change significantly depending on the configuration of the selected fiber preparation system. For example, baled wheat straw may include wet cleaning in addition to dry cleaning or it may contain double dry cleaning. These variations will increase the typical losses in the preparation system.
Rice Straw Requirements in bdmt / bdmt of Pulp
(Soda or Kraft Pulping)

**BLEACHED PULP - for Writing & Printing Paper**

Purchased Rice Straw

<table>
<thead>
<tr>
<th>Straw Storage</th>
<th>Chopping &amp; Dry Cleaning</th>
<th>Wet Cleaning</th>
<th>Pulp Mill</th>
<th>Bleached Pulp</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.88 bdmt</td>
<td>3.78 bdmt</td>
<td>3.38 bdmt</td>
<td>2.78 bdmt</td>
<td>1.0 bdmt</td>
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<td></td>
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<tr>
<td></td>
<td>0.10 bdmt</td>
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<tr>
<td></td>
<td>Storage Losses</td>
<td></td>
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<tr>
<td></td>
<td>0.40 bdmt</td>
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<td></td>
<td>Dust &amp; Chopping Losses</td>
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<tr>
<td></td>
<td>0.60 bdmt</td>
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<tr>
<td></td>
<td>Wet Cleaning Losses</td>
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</tr>
</tbody>
</table>

**UNBLEACHED PULP - for Corrugating Medium**

Purchased Rice Straw

<table>
<thead>
<tr>
<th>Straw Storage</th>
<th>Chopping &amp; Dry Cleaning</th>
<th>Wet Cleaning</th>
<th>Pulp Mill</th>
<th>Unbleached Pulp</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.12 bdmt</td>
<td>2.07 bdmt</td>
<td>1.85 bdmt</td>
<td>1.52 bdmt</td>
<td>1.0 bdmt</td>
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<td>0.05 bdmt</td>
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<td>Storage Losses</td>
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<td>0.22 bdmt</td>
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<td>Dust &amp; Chopping Losses</td>
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</tr>
<tr>
<td></td>
<td>0.33 bdmt</td>
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</tr>
<tr>
<td></td>
<td>Wet Cleaning Losses</td>
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</tbody>
</table>

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bdmt = bone dry metric tons
Animal Threshed Wheat Straw Requirements in bdmt / bdmt of Pulp
(Soda or Kraft Pulping)

BLEACHED PULP - for Writing & Printing Paper

Purchased Wheat Straw
2.65 bdmt → Wheat Straw Long Term Dry Storage → 2.59 bdmt → Wet Cleaning → 2.47 bdmt → Short Term Wet Storage → 2.44 bdmt → Pulp Mill → 1.0 bdmt → Bleached Pulp

- 0.06 bdmt Storage Losses
- 0.12 bdmt Wet Cleaning Losses
- 0.03 bdmt Storage Losses

UNBLEACHED PULP - for Corrugating Medium

Purchased Wheat Straw
1.65 bdmt → Wheat Straw Long Term Dry Storage → 1.61 bdmt → Wet Cleaning → 1.54 bdmt → Short Term Wet Storage → 1.52 bdmt → Pulp Mill → 1.0 bdmt → Unbleached Pulp

- 0.04 bdmt Storage Losses
- 0.07 bdmt Wet Cleaning Losses
- 0.02 bdmt Storage Losses

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bdmt = bone dry metric tons
Baled Wheat Straw Requirements in bdmt / bdmt of Pulp
(Soda or Kraft Pulping)

BLEACHED PULP - for Writing & Printing Paper

Purchased Wheat Straw

2.85 bdmt
→ Wheat Straw Long Term Dry Storage
→ 2.75 bdmt

Chopping & Dry Cleaning

2.44 bdmt
→ Pulp Mill
→ 1.0 bdmt

Bleached Pulp

0.10 bdmt Storage Losses

0.31 bdmt Dust & Chopping Losses

UNBLEACHED PULP - for Corrugating Medium

Purchased Wheat Straw

1.77 bdmt
→ Wheat Straw Long Term Dry Storage
→ 1.71 bdmt

Chopping & Dry Cleaning

1.52 bdmt
→ Pulp Mill
→ 1.0 bdmt

Unbleached Pulp

0.06 bdmt Storage Losses

0.19 bdmt Dust & Chopping Losses

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bdmt = bone dry metric tons