Lumpbreaker roll—operation & installation

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SUMMARY

Installation of Lumpbreaker roll on existing machines with open draws will pay its dividends by improving poor runnability on account of initial weak wet strength of the sheet due to short fibre content in the furnish. Use of lumpbreaker roll will deliver a drier sheet, therefore stronger, into the press nip. If the existing presses have been working on optimum nip loads before installation of lumpbreaker roll, there can not be an improvement in the sheet dryness after presses. However, there will be some production gains due to reduction of breaks at suction couch and press.

Proper installation and selection of lumpbreaker roll is essential to get optimum gains. However, installation of lumpbreaker roll on existing machines can not be considered as a substitute for closed draw. It is just an aid to relatively improved runnability.

On new machines lumpbreaker roll will help in better utilization of press section by designing them for higher nip loads, in order to deliver a drier sheet into the dryers. Even on machines with suction pick up lumpbreaker roll can be used to certain advantages.

A number of existing mills in India are today faced with the problem of machine runnability due to weak wet strength of sheet on account of short fibre content in the furnish. Some mills have been forced to use hardwoods due to shortage of conventional raw materials and some others are based on Agro-wastes.

Lumpbreaker roll installation and operation helps improve the runnability of machine with open draw. Though it looks a simple equipment, it is not really that simple when you come to operate and install it to get optimum results.

With its installation, the sheet dryness off-couch improves, thereby reducing sheet breaks at couch and improving runnability through press. It does not however. effect a drier sheet into the dryer section since it depends on the optimum utilisation of the press. However, a proper selection, installation and operation of a lump breaker roll on existing machines will pay fair dividends by way of relatively improved runnability.

ADVANTAGES

Use of lumpbreaker roll offers definite advantage on open draw machines producing fine papers

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Lumpbreaker roll can also be used on machines with suction pick up.

Lumpbreaker rolls are more effective on light weight sheets than on very heavy sheets. Though their use levels out the sheet moisture as well as basis weight it has no measurable effect on paper at the reel. A lumpbreaker roll over suction couch increases the sheet dryness by around 2-3% depending upon roll diameter, nip loading and the rubber cover. This increase in sheet dryness helps increase in wet tensile strength of the sheet by as much as 50%. With drier sheet coming out of couch, obviously stronger, the draw percentage will reduce. As a consequent the final sheet will be less directional. The sheet quality and formation improves due to compressing of sheet which in turn appears to help in preventing the sheet deformation. A more compressed sheet yields improved fibre bonding and produces a sheet that has less tendency to pick and crumb on the 1st press.

Contrary to what might be expected, the wire mark is not worse and may even be less since the wire

*Paper Machinery Division Jessop & Co. Ltd., Calcutta mark is more often caused in the forming area of the wire part rather than at the lumpbreaker nip. The compressed sheet over the suction areas of couch reduces the pore diameter of the sheet and it seals the couch against outside air, and increases air velocity thus stripping excessive free water off the fibres, thereby obtaining a drier sheet.

INSTALLATION AND OPERATION

Location of lumpbreaker roll over the suction couch and nip width required are of prime importance. Softer covers and wider nips call for higher horse-power requirements. Normally the lumpbreaker roll is positioned over the couch to ensure that the outgoing sheet is dry enough and there are no chances of picking and sheet wrap up. Generally ideal location of a lumpbreaker roll is between half to two thirds of the suction box opening towards the wet end.

Since the location of the lumpbreaker roli is over the suction couch roll, the roll with its pneumatic lifting/loading mechanism is supported either on the couch bearing housing or from the first press frames.

The alignment of the lumpbreaker roll on the couch is most important. Its centre line must be maintained absolutely parallel with the couch centre line on which the roll is lowered into position. The lumpbreaker roll when supported on the couch bearing housing has to be taken out everytime a new wire is put on. Therefore, mounting of the lumpbreaker roll has to be designed in such a way that its alignment with the couch is not disturbed when it is reinstalled after wire change. The lumpbreaker, when supported from the first press frame, suitable arrangement must be provided for lifting the roll to such an extent that adequate clearance from the couch is maintained for draping new wire.

It is necessary to provide an air roll located at proper position after the couch in order to ensure that the sheet from the couch remains steady and it takes off from the couch not beyond the suction box opening. The mounting of the air roll should be such rhat it can be easily lifted and lowered to a 1y position.

To avoid fibre build up or wrap up on the lumpbreaker roll low pressure drip or fog shower is installed over the lumpbreaker roll for providing a light film of water on the roll surface to prevent picking. The amount of water necessary is insignificant but will add about 1/0% of the moisture content of the sheet at the couch. Therefore power-



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ful showers are not used. In order to regulate the film of water over the roll surface and also for its uniform spreading over the entire length of the roll a shower with a squeeze roll can be installed.

A Teflon sleeve over the lumpbreaker roll has given positive results to overcome fibre build up and sheet wrap up where furnish has excessive fines.

Certain amount of caution is required while using wet end additives, solvents, defoamers and steam showers because the rubber is sensitive to such chemicals and high temperature due to which the lump breaker roll cover can develop hard and soft patches on the surface.

The lumpbreaker roll diameter is an important factor. The roll size is based on couch diameter and couch suction box width in addition to the physical limitation of the roll. Usually couches without wire turning roll require smaller lumpbreakers because of the potential interference between the lumpbreaker roll and the air roll.

To secure optimum benefits it is better to determine the proper loading of the lumpbreaker. Maximum nip pressure of 65 PLI can be used on fine papers. Higher nip loading can result into sheet breaks at the couch, scuff marks, distortion of sheet etc. In addition, overloading the lumpbreaker roll may cause the wire to curl up at the edges.

The lumpbreaker roll generally running at a speed below 1000 FPM does not require drive. Otherwise it is necessary to have the lumpbreaker roll driven In operation the lumpbreaker roll is lowered on to the couch after the sheet is on the wire and it is desirable to have the roll running at the same speed as the couch when contact is first made. It is normal to speed up the drive after making contact, so that some power is applied to the top mills, otherwise the strain on wire can cause wire damage. Generally the lumpbreaker rolls have a soft, rubber cover having hardness between 180 to 225 P & J plasto-

The lumpbreaker roll usually extends beyond either end of full wire width and it is necessary to undercut or dub the ends of the roll for avoiding any tendency for stock from the ragged edge of the untrimmed sheet to build up on the face of the roll.

Installing lumpbreaker roll on existing machines, the increased sheet dryness at the couch may not bring any positive gain on sheet dryness after the press section unless additional nip pressure are used at the presses. It was found in one machine of Bergstrom Paper Co., Wisconsin, producing a sheet of 80 GSM from a very high percentage of deinked fibre. that though the sheet dryness after couch improved by nearly 3% by using lumpbreaker roll, there was no measurable gain in the dryness after 1st and 2nd press.

The counter sunk holes on old suction couch shell are prone to give shadow marking under wider and higher nip loadings. A comparatively harder rubber cover and a narrow nip width would give better results in such a case, but relatively smoother surface can cause picking and wrap ups specially if the furnish is extremely short fibred or having a fair amount of ground wood pulp.

Mandya National Paper Mills, using about 85% bagasse was facing the problem of excessive couch breaks and picking at first press. By installing a lumpbreaker roll the number of breaks at couch and picking at press have been reduced to a very great extent.

CONCLUSSION

To summarise the use of Lumpbreaker roll we can now say that :

- 1. Use of Lumpbreaker roll is apt to improve runnability of machine with open draw, specially when the furnish is weak.
- 2. Use of lumpbreaker roll will give higher sheet dryness after the suction couch but any positive gains in dryness after presses will call for higher nip loadings at press section.
- 3. Location of Lump-breaker roll over the suction couch, its diameter, hardness of rubber and nip loads are critical and should be carefully selected by manufacturers for optimum results.

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BELOIT TWINVER PRESS

- *Wire mark minimized due to contact with hard center roll
- *Vanta-Nip second and third press for better uniformity and overall press efficiency
- *First open draw after two presses
- *Compact design with three full pressing operations
- *Easily adapted to an existing machine
- *Easy broke handling

BELOIT COMBINATION (TRANS) PRESS

An ideal configuration for rebuild of old machines with open draw.

- *Efficient pressing through unique combination of suction & Venta nip press.
- *Quick and easy felt change
- *Less two sidedness
- *Open frame work gives easy access to maintenance.

BELOIT TRI-NIP PRESS

- *Three presses without open draw
- *Double-felted first press provides increased water removal and improved sheet quality
- *Water removal in two directions minimizes two-sidedness
- *Sheet picking is reduced
- *Minimum space required for three presses
- *Full width self-dumping broke disposal without broke conveyor

BELOIT COM-PRESS

- *Eliminates dropoff problems on all sheet weights
- *Wire-side finish
- *Minimum space requirements
- *Simplified felt change
- *Combines suction pickup and first press function eliminating one suction roll with helper drive
- *Broke disposal into existing couch pit

BELOIT BI-NIP PRESS

- *Water removal in two directions minimizes two sidedness
- *Sheet picking is reduced
- *Full width self-dumping broke disposal without broke conveyor
- *Recommend third press for highnip providing topside finish and maximum mullen on lincrboard
- *Nip loads in third press can be varied without affecting the second press.

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