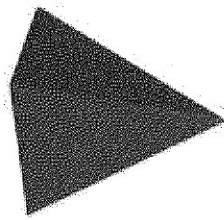


ATTACHMENT 2



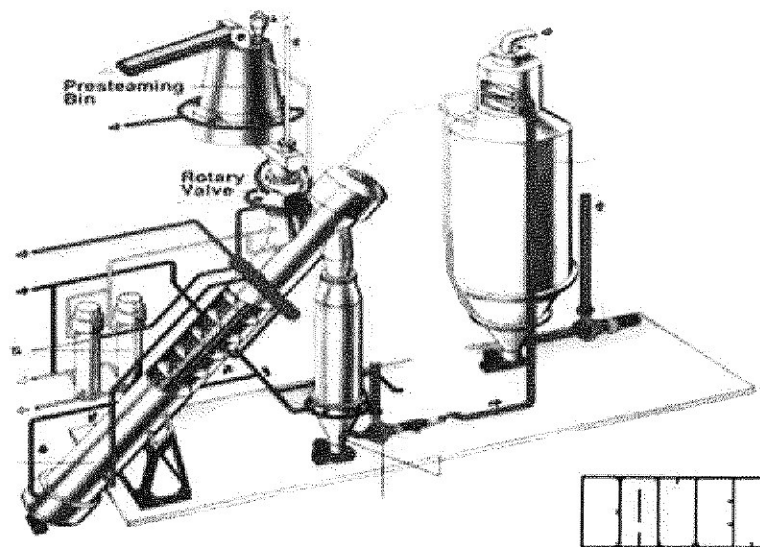
Tetrahedron

Performance Resources

Strategic Importance of Sawdust Pulping at Mackenzie Bauer M & D Digester Technology

ANDRITZ

M & D Continuous Digester System



R. T. Boughner
General Manager, Mackenzie Operations
March 07, 2000
Revised January 23, 2002; January 30, 2003; March 03, 2004

Bauer M & D Digester Technology

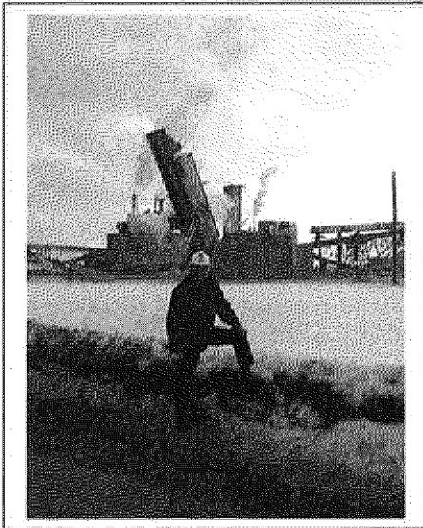
The Bauer M & D digester system was initially developed by Bauer Brothers Company in the late 1950s. Bauer's Canadian headquarters was in Brantford, Ontario. The initial concept was developed by two of Bauer's staff, H.S. Messing and C.L. Durkee, after whom the process is named. It is covered under Canadian patents 893,465 and 928,546 and is also patented in the United States, Austria, Finland, Brazil and a number of other countries.

In a classic ongoing story of merger, acquisition and divestment, Bauer Brothers was acquired by Combustion Engineering in 1973. In 1989, Combustion Engineering was, in turn acquired by ASEA Brown Boveri. ABB then decided that the Sprout-Bauer division, a merger of Bauer Brothers and Sprout-Waldron put together by Combustion Engineering, did not fit their strategic vision; Sprout-Bauer was sold to Andritz in 1990. As of the late 1990s, the Andritz M & D digester was no longer the only one available since, due to patent expiry, Ahlstrom, was also offering the M & D. As of April 2000, however, Andritz is in the process of acquiring Ahlstrom.

Strategic Importance of Sawdust Pulping

As a strategic Pope & Talbot, Inc. corporate capability, we are now producing 108,000 ADt per year of short fibre pulp from sawdust. With no other significant consumer of sawdust within viable transportation distance, this 220,000 BDU per year of sawdust had been burned, with subsequent environmental impact, prior to the startup our sawdust pulping line late in 1996. Our sawdust consumption is supplied from the Mackenzie sawmills of Canfor Corporation 50%, Abitibi-Consolidated 10-15% with the remainder coming from Winton Global in Bear Lake 10-12% and Canfor in Chetwynd 20-25%. Our Andritz-Bauer M & D digester installation consumes the equivalent of what five beehive incinerators would earlier have incinerated in the region, and does so with no atmospheric discharge of particulate.

Unloading, Storage and Reclaiming



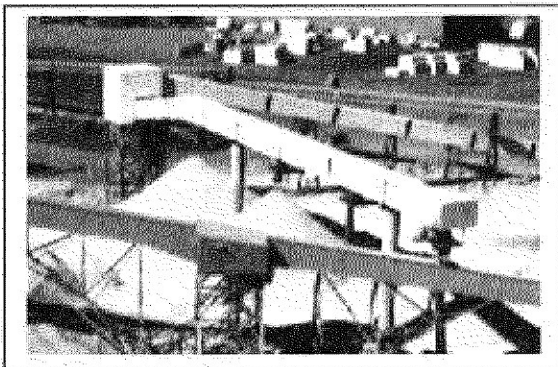
The short fibre handling and storage system is a series of conveyors, chutes, reclaimers and auxiliary equipment that transports truck-delivered sawdust and shavings to the surge bin ahead of the M & D digester. The system starts at the Megatech drive-through truck dumper 20-1100 from which the fibre is dumped into a hopper.

The dumper is an 85-foot tilt-table system designed for six truckloads per hour at a nominal 20 BDU/load. Four 4-stage hydraulic cylinders of 11 ⁷/₈", 10 ³/₈", 9 ¹/₈" and 7 ⁷/₈" cylinder diameter and 40-ft extension raise the table to a 63-degree incline to permit the chips to dump by gravity into the receiving hopper.

The hopper is 32 feet long and 22 feet wide at the top to receive the flow out of the trailer and converges to 34 feet long and 10 feet wide over the live bottom. It is 17 feet deep at the north end and 8 feet deep at the south end as the live bottom conveyor 20-1130 is inclined 15° upwards towards the discharge.

The chain conveyor is 10 feet wide and 33 feet long and is hydraulically driven by a Hagglands Marathon MB 400 hydraulic drive. The conveyor discharges onto the #1 unloading conveyor 20-1150.

This #1 belt conveyor is a 40 foot long 48-inch belt conveyor that serves to lift the fibre stream 9 feet from the low elevation at the drop-off from the bin bottom and lifts it high enough to dump onto #2 unloading conveyor 20-1160. #2 is another 48-inch belt unit running perpendicular to the #1 with a 478-foot long run sufficient to lift the fibre stream 112 feet vertically from below ground to an elevation above the height of the storage piles.

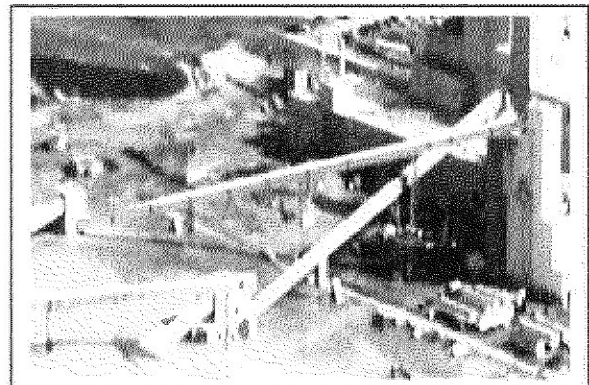
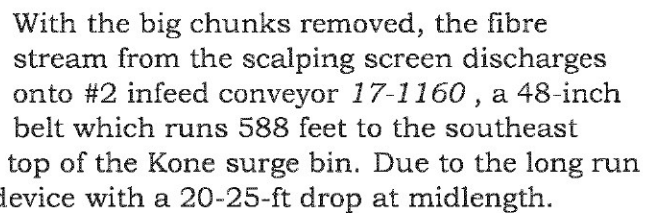


The transfer point between #2 unloading conveyor and #3 unloading conveyor is located in the transfer tower 80 feet above the ground at the elevation above the top of the three conical sawdust piles.

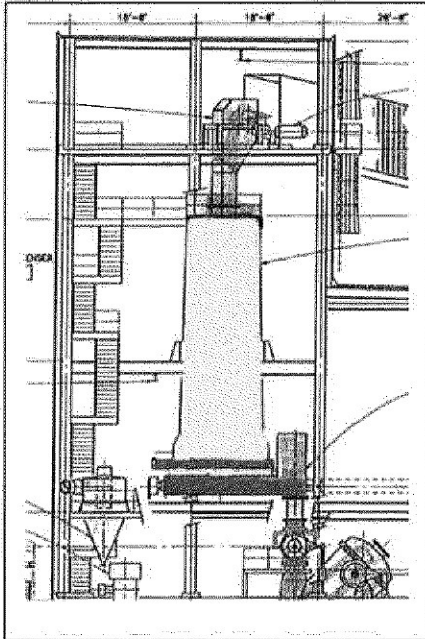
The #3 unloading conveyor 20-1180 is a 54-inch belt that has an initial uphill run but essentially runs out 352 feet horizontally to the east, above the three piles. It has three adjustable plows with "elephant trunk"

telescopic chutes to form the three conical short fibre piles which are centred 75 to 100 feet apart.

clock with a 41 foot working radius. The fibre stream from the reclaims is fed onto #1 infeed belt conveyor 17-1140, a 30-inch belt which runs 395 feet to the east with a 43 foot lift and, in turn, discharges under a self cleaning magnet onto the Acrowood 648 disk-type scalping screen 17-1150.



Sawdust Bin 31-1205 and Bin Discharger 31-1210

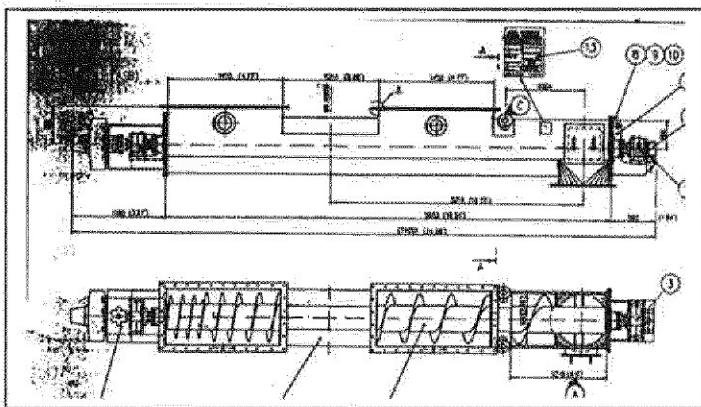


Sawdust from the 48-inch #2 infeed conveyor discharges at a transfer point that is 130 feet above the ground, into the top of the surge bin. The surge bin is 35 feet high and expands in diameter from 10.5 feet at the top to 13.5 feet at the bottom. The negative taper minimizes the risk of hang-ups. The bin nominal capacity of 90 cubic metres or 12 BDU provides 20-25 minutes retention time

Attached to the bottom of the bin is the Andritz-Kone 4-armed HELP bin discharger with double-cylinder hydraulically drive: 31-1212 and 31-1213. This device scrapes back and forth across the bottom of the bin to ensure a constant positive delivery of sawdust to the metering screw conveyor. The action of the discharger, which sweeps the entire bottom surface of the bin, along with the shape of the bin itself, ensures a uniform plug flow. This minimizes channelling of

sawdust down through the bin. The discharger loosens the compaction at the bottom level of the bin and permits the sawdust to drop by gravity into the metering screw.

Digester Feed Metering Screw 31-1215



The Andritz-Kone metering screw is driven by a Hagglunds Viking UK44-03300 hydraulic drive and provides accurate metering of sawdust to the digester and an initial impregnation with weak black liquor injected through nozzles, into the sawdust. The metering screw is the device that determines the system production. The geometrically determined delivery rate is 3.9 cubic feet per

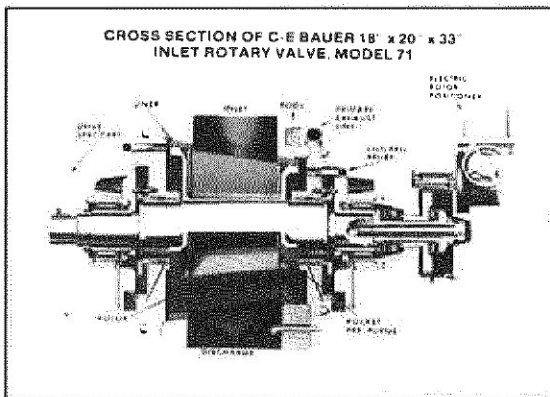
revolution. Operating speed is about 30 RPM which delivers almost 120 ft³ per minute, a rate corresponding to 330 unbleached tonnes per day. Variations in screw pitch allow for the even draw down from the bin and ensure a full volume of this screw into the metering shroud. At the discharge of the metering shroud, the screw pitch is doubled to provide an even flow of raw material into the rotary valve.

The original process design had allowed for presteaming provided in the metering screw by utilizing all of the vented steam from the rotary valve. Flash steam was to enter the dome of the metering screw, so that any sawdust carried over in the vent steam is returned to the digester infeed. This was never successful, however, probably

due to the fluffy nature of our "sawdust". Instead, weak black liquor dilution at 100-150 usgpm is supplied to the top of the metering screw to improve feeding. The source of the black liquor is from the D-D washer filtrate tank.

As the screw is filled in the metering shroud, the steam is forced through the bulkhead into a cavity above the screw. A differential pressure cell is mounted on the feed end of the metering screw to indicate the pressure in the metering screw. The presteamer is connected to the rotary valve through a downspout. The downspout is attached to the rotary valve so that the flow of raw material approaches the valve nozzle from the small diameter end of the valve.

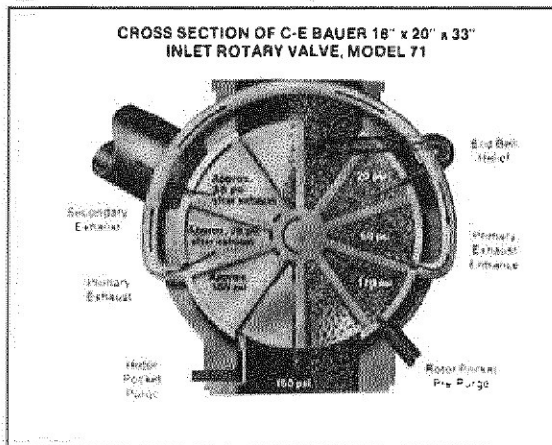
Inlet Rotary Valve 31-1225



Compared to the more-familiar Kamyr digester system, the rotary valve, in spite of the deceptively simple name, performs the roles of the low pressure feeder, steaming vessel, high pressure feeder and top separator. Accomplishing that is a precision machine that stands 60" high, outlet flange to inlet flange and weighs 8 tonnes. It has 17 ports, ranging in size from the 42" rotor insertion port to the two 1" white liquor injection ports.

The unit is an Andritz-Bauer model 2000 H, driven by a Hagglunds Marathon MA 200 hydraulic drive and designed to transfer sawdust starting from atmospheric pressure and ending in the high pressure conditions of the main M & D digester vessel and to preheat the sawdust. The geometrically determined delivery rate is 6.7 cubic feet per revolution.

The drive end cover plate is 48.75" diameter and the adjusting end cover plate is 39.0" diameter. The rotor tapers from 32" diameter at the back end to 41" diameter at the front end and measures 27", along the length of the shaft. The 1:6 ratio of radius change per axial distance means a 6mm axial shift corresponds to a 1mm change in radius or 2mm change in diameter. The body is a rugged, thick wall steel casting to provide dimensional stability throughout the expected range of temperatures and pressures. The body is overlaid with hardened Inconel 625 steel and also has stellite on the rotor seat surfaces. This overlay is replaced each time the valve is overhauled annually.



Viewed from the adjusting end, farthest from the stairwell, the valve rotates clockwise. Understanding the operation is helped by visualizing the ten pockets and corresponding ten pocket positions. Consider the orientation with the dividing vane vertical; positions 1-5 are on the descending side and positions 6-10 on the rising side. Sawdust from the metering screw drops through the 26" inlet port in positions #10 and #1, into the valve rotor which makes a half rotation and drops the sawdust out through the 28" outlet port at the #5 and #6

position, down into the main digester vessel. The rotor's ten pockets successively fill and empty.

Typical operating speed of the rotary valve is 65% of the metering screw speed so should be about 20 RPM which delivers about 135 ft³ per minute at a 330 tpd production rate. This corresponds to about 30 RPM on the metering screw and the rotary valve volumetric delivery rate is about 115% of that of the metering screw to provide a “take-away” factor to prevent “backup”.

The steaming vessel function is performed through the injection of recycled steam and fresh virgin steam in sequence to elevate the pocket pressure from atmospheric to digester conditions and then back down again through the rotation.

After being filled with sawdust in the #10 and #1 positions, the pocket moves to #2 position where end bell relief recycled steam enters through a 4" diameter connection to elevate the pressure to 20 psig. Next, in the #3 position, the primary exhaust steam from the high pressure side comes in through a 4" connection at lowest point of the pocket to further elevate pressure to 60 psig. Together, these recycled streams provide the first phase of preheating to digester conditions. The preheating is completed with three 190 psig steam connections by injection of 10,000-12,000 lb/hr of fresh steam.

First, through the 2" FCV "A" which generally runs wide open, pre-purge steam comes into the #4 position from the header through two 1" nozzles that enter radially, one at each end of the pocket. These channel steam to the bottom of the pocket to aid in blowing the sticky wetted sawdust out of the pocket and finish elevating pocket pressure toward digester pressure.

As the pocket reaches the discharge nozzle at the #5 position, the sawdust falls down into the digester inlet. Nozzle purge steam can be supplied through 4" FCV "C" through a 6" nozzle, pointing downwards below the #5 position, to keep the discharge passage down to the digester clear. Generally this is not run since it causes back pressure and restricts pocket emptying. In the #6 position, emptying is completed by pocket purge steam supplied through 6" FCV "B" through a 6" nozzle on rising side of

the pocket directed by a turning plenum upward to scour the pocket clear of residual sawdust. This valve generally runs 45-50% open. As the pocket passes the #7 position, it is cleanly emptied but holding digester pressure which must be vented.

There are two more nozzles, 2" in diameter, located on the 28" diameter bottom discharge nozzle of the rotary valve. These allow for the direct addition of a portion of the white liquor charge. The first phase of depressurization occurs in the #8 position where the primary exhaust port, a 4" nozzle drops the pressure to about 70 psig by allowing transfer, as noted above, around to the #3 pocket which operates at about 60 psig.

As the pocket moves into the #9 position, the trailing vane is passing the 16" secondary exhaust port which allows depressurization to 3-5 psig by venting up the pipe to the sawdust bin for most effective re-use. The pocket then moves into the #10 position at the top where filling begins, to initiate a new cycle. With a 10-pocket rotor and the rotor at 15 RPM, there are 150 pocket-cycles per minute. The most apparent indicator of this frequency is the rapid chug-chug-chug pattern as the pockets pass the secondary exhaust port in the 8 o'clock position.

During operation, small quantities of steam and sawdust blow through the operating clearance between the rotor and the valve body and on into the end bell cavities of the rotary valve. This material is exhausted from the end bells through the manifolds to the previously mentioned 16" diameter connection at the 2 o'clock position and back into the feed pockets. This relieving of the end bell pressure improves feeding efficiency and reduces loading on the thrust bearings packing. If the rotor is poorly seated, the clearance between the rotor and the housing is too great and sawdust build-up in the end bells further aggravates seating, resulting in excessive steam blowback up into the metering screw, ultimately stalling it out.

Mackenzie's species mix is the same blend that makes our MK - 90 chip pulp a global quality leader: 40% western white spruce, *Picea glauca*, 40% lodgepole pine, *Pinus contorta* and 20% alpine fir, *Abies lasiocarpa*. But the characteristics of our "sawdust" furnish are significantly different from typical sawdust. It is 20% green saw kerf and 20% green chip screens undersize fraction; this portion is typical. The other 60% is planer shavings; lumber is planed after the drying kilns, so this 60% is kiln dried. The overall feed stream has an average bulk density of 9.25 OD lb/ft³ or 150 kg/m³. The moisture content ranges 10-30%, very dry by conventional standards.

The general arrangement elevation views of the principal sawdust pulping process equipment: sawdust bin, M & D digester, surge tube, blow tank, brown stock washer and auxiliaries are shown in the following views from the east looking west and from the south looking north.



Bauer Digester Vessel 31-1230



Our M & D digester is a nominal 300 tonne per day unit, 90 feet long flange to flange, 100 inches diameter for a calculated volume of 5,175 ft³ and nominal working volume of 3,450 ft³, mounted at the M & D characteristic 45° angle. It was fabricated by Nooter Corporation in St. Louis, Missouri in 1996 and is rated for 200 psig and 400 °F. It is divided into upper and lower halves by the midfeather. The internal chain conveyor moves the fibre from the discharge of the rotary valve down the upper side of the midfeather to the bottom of the digester and back up the underside to the outlet to the surge tube at the top end. It is driven by a haggglunds Marathon MB 400 hydraulic drive on the head shaft.

This 45° inclination gives the M & D digester its uniquely characteristic features of the vapour phase impregnation zone at the inlet as in the Kamyr and Impco designs along with the positive movement and guaranteed retention time associated with the Black Clawson Pandia digester. The decantation and vapour phase blow stream is unique to this design.

The Digester operating pressure of 150 psig is maintained by the injection of 25,000-35,000 lb/hr of 190 psig steam to the inlet rotary valve. As a pressure vessel, the digester is designed for a maximum pressure of 200 psig and a maximum temperature of 400 °F. Digester operating temperature is controlled by the combined effects of direct injection of 190 psig steam to the digester body and assisted by 8500-10,000 lb/hr of 80 psig steam to the liquor heater which raise the liquor temperature to 300 °F. This digester design provides the potential for three distinct temperature zones: top, mid- and bottom although at Mackenzie we generally run at 350-360°F throughout. It is particularly critical to maintain a bottom temperature of 355-358 °F.

The chain conveyor speed is adjusted according to production rate and head shaft rotational speed should be about 2.4% of the metering screw speed. So at a 300 tonne per day production rate at 28 RPM on the metering screw, the head shaft speed would be about 0.67 RPM.

The running mechanism consists of two 11.625" diameter steel shafts: head shaft at the upper end and tail shaft at the lower end. The head shaft is driven by a Haggglunds Marathom MB 400 hydraulic motor; the tail shaft is an idler with tension adjustment capability. The upper shaft has a pair of 39" diameter 12-tooth sprockets mounted on the shaft, centred about 50 inches apart. The lower shaft is attached to a

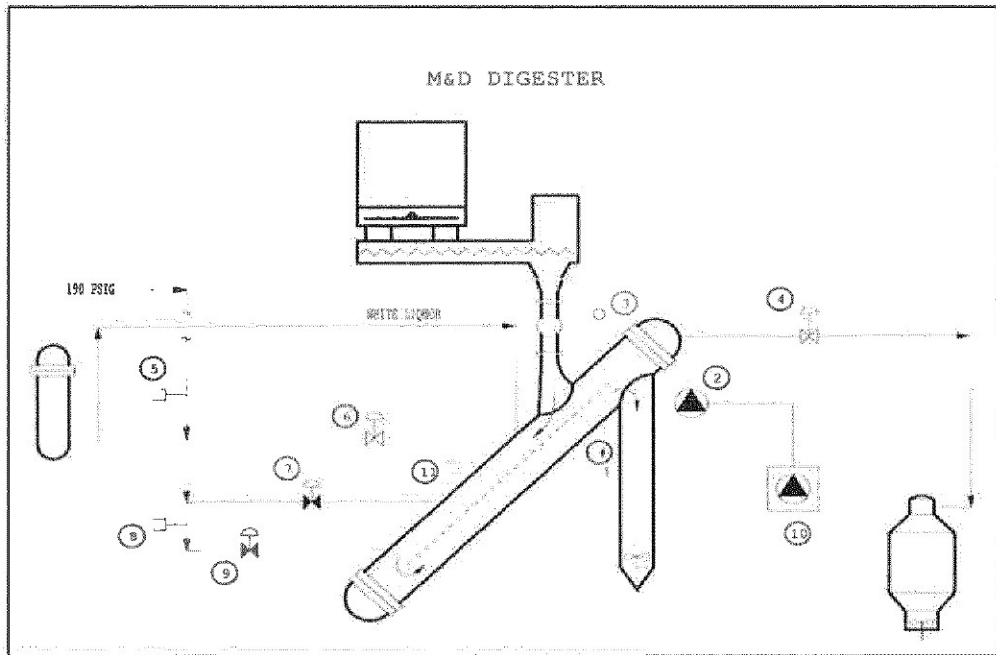
hemispherical inner head that forms a housing, similar in section to the lower head of the vessel.

This hemispherical head and lower idler shaft are permitted to move in the inward direction along the digester axis. The degree of this movement is controlled by a shaft attached to the idler lower end and extending through the bottom head of the digester for connection to compression springs. The hemispherical inner head and lower idler shaft are limited in outward movement to indicate chain wear and keep spring force at design load. The chain assembly consists of two parallel strands of 20" links, one running on each pair of upper and lower sprockets.

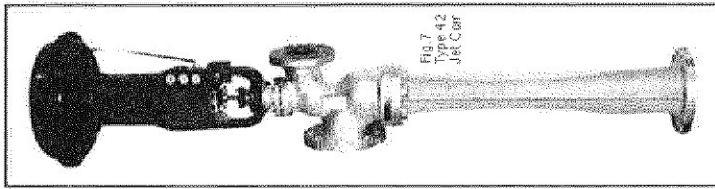
There is a conveying flight on every third link for a total of 36 flights. The size and shape can be described as a segment of a 100" diameter circle, cut by a chord 20" displaced from the diameter, therefore enclosed by 133° of the circumference. That makes it approximately 90 inches wide along the chord and 30 inches maximum height, measured along the radius, chord to circumference. The flights are bent on a line, parallel to the base and 16" away from the base to provide a 140° included angle, making a pocket effect. At a typical chain speed of 0.58 RPM on the head shaft, the chain will travel at 6 feet per minute, or 10 feet per sprocket revolution, and the 180 foot running length of the chain will make a cycle in 30 minutes. The chain running length, inlet nozzle to outlet nozzle is 159 feet and with a normal liquor volume of about 85% of the total vessel volume, the liquor phase cooking time would be about 25 minutes.

Once retention time is set, K-no control is achieved by adjusting the E.A.:wood ratio. The main cooking liquor addition is directly to the digester body and a smaller fraction to the rotary valve. White liquor at about 200 usgpm is diluted with about 25 usgpm of weak black liquor and the combined stream is heated from 145°F to 280°F in the liquor heater before being injected into the upper shell.

Cooking is essentially at constant H-factor; temperature at $355\text{--}365^\circ\text{F}$ or $180\text{--}185^\circ\text{C}$ and retention time at 20-24 minutes remain constant over the normal range of production rates.



Thermocompressor 72-4001 and Desuperheater System Operation



Because of its need for steam of higher pressure and temperature than other mill applications, the M & D digester system includes a Schutte & Koerting model 426 venturi-type thermocompressor

to provide 190 psig steam. The unit is 101 inches overall length and has a 4" inlet for 625 psig steam, 6" inlet for 165 psig steam and a 6" outlet for 190 psig steam.

Physically, it is oriented horizontally and installed along the west side, nearly at the roof level of the Power Boiler, on the fourth floor level, adjacent to the power boiler drum and the two deaerator heads. The digester's consumption rate of up to 35,000 lb/hr is produced by using 10,000 lb/hr of boiler header pressure steam at 625 psig to elevate the pressure of 25,000 lb/hr of 165 psig high pressure steam. Because of the proximity of supply of 625 psig steam, the thermocompressor is located in the Power & Recovery building although it is dedicated to the M & D digester.

Outlet Surge Tube 31-1240

Cooked fibre discharges by gravity from the digester vessel into the surge tube. The surge tube is nominally 50 feet high and 90 inches in diameter, with a vertically mounted bottom agitator, 31-1255, providing five minutes retention time at typical conditions. The stock temperature is reduced from 350 °F at the top inlet to 280 °F at the bottom outlet by recirculation of about 200 usgpm of weak black liquor filtrate from the D-D washer first stage filtrate tank. The liquor for both surge tube dilution and subsequent further dilution in the blow tank is cooled from 185 °F to 125 °F by circulation through the filtrate cooler before return to the surge tube. The cooling water from the cooler is at 160 °F and goes to the hot water system.

The stock is then directed to one of two blow lines to the blow tank. There is a sampling device off the surge tube for stock tests.

Blow Tank 31-1260

The stock enters the flat bottom short fibre blow tank at approximately 5.5% consistency. The blow tank has an overall height of 70 feet and a nominal volume of 24,000 cubic feet or 180,000 usgal. The main storage section of the blow tank is 26'-3" feet in diameter and 48 feet high for a nominal capacity of 100 ADt. The bottom of the blow tank is a 16'-6" foot diameter, 12 feet high dilution zone with side-mounted agitator, 31-1265.

About 200 usgpm of primary dilution is added to the bottom zone of the tank itself and another 100 usgpm is added as secondary dilution to the pump suction. This dilution supply is also cooled in the filtrate cooler. The stock transfer pump, 31-1270

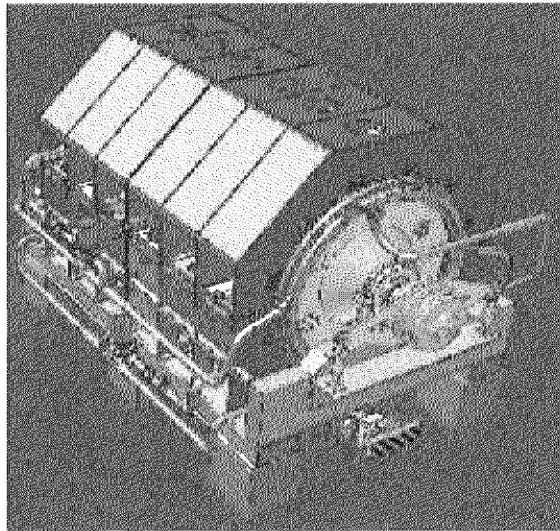
delivers to the Ahlstrom D-D (drum displacer) but this next washing phase of the operation is beyond the scope of this section.

Blow Heat Cyclone 31-1261 and Vent Condenser 31-1290

The blow tank is equipped with a vent system consisting of a blow heat cyclone and vent condenser. The cyclone underflow returns by gravity to the blow tank. This cyclone separates any entrained stock from the gas stream. The "cleaned" vapour stream then and passes on to the vent condenser which condenses any condensable gases with the resulting foul condensate pumped to the evaporator seal tank. The remaining stream of noncondensibles, (NGGs) goes on to the Kamyr relief condenser.

Stock spills in the digester area are collected in the spill recovery sump. They are then pumped to the clean fibre salvage or to general sewer.

Short Fibre Brown Stock Washing



The heart of the Andritz-Ahlstrom 4040 drum displacer washer 34-1100 is a rotating drum, 4.00 meters in diameter and 4.00 meters wide. The drum is driven by two Hagglunds Marathon MB 800 hydraulic drives, one on each end of the trunnion.

The cylindrical surface has 40 axial compartments, each 4 metres long across the drum width and about 30 cm wide in the circumferential direction. Perforated screen plate material forms the bottom of the compartments. There is no traditional face wire or fabric required on the drum. Under the perforated plates are the filtrate compartments which are connected to the collection chambers at the end of the drum. The pulp at 3-9 psig enters the inlet box for

even distribution into the pulp compartments on the drum face. It is then thickened into a uniform cake that fills each compartment in turn.

Sealing bars separate the feed box from the washing zone and the outlet box. The sealing bar of the wash zone serves the second function of wiping off the pulp cake so the compartments are uniformly filled as they enter the wash zone. The closed pressurized feed box, stable control of feed pressure and precise thickness of the cake to be washed all combine to achieve very efficient washing. The discharge sheet consistency ranges from 9-13%.

Our D-D washer is a 3-stage unit. The wash liquor is distributed evenly from the washer casing at 7-15 psig over each wash zone. During washing, the pulp and filtrate compartments are hydraulically flooded to ensure air-free sheet formation and constant speed of displacement of the wash liquor through the sheet. The surface of the rotating drum has been divided into pockets by ribs surrounding the drum is a casing to which sealing elements are attached.

Sealing elements separate different washing zones and are connected to the ribs. The feed zone extends from the 6:30 o'clock position to the 8:00 o'clock position; the first washing stage from 8:00 o'clock to 10:30; the second washing stage from 10:30 to 1:00 o'clock; the third washing stage from 1:00 to 4:00 o'clock; the thickening zone from 4:00 to 6:00 o'clock and the pulp outlet at the 6:30 position.

The distribution valve connects the drum channels and filtrate circulation pipes for filtrate removal and counter-current washing. The distribution valve, located at one end of the drum, has been divided into sectors corresponding to the washing stages so the filtrates are not mixed. Filtrate from the thickening zone and from the first washing stage zone are discharged through two separate droplegs into the D-D washer filtrate tank 34-1150. It is 18'-0" in diameter and 21'-6" high, a nominal 32,000 usg tank with an internal seal well to submerge the discharge from each downleg. Weak black liquor from this tank is pumped to the main storage tanks, 60-1001 and 60-1002.

The D-D washer can have 1 to 4 washing zones, depending on the application. Our washer has 3 washing zones. In addition, the washer has a feed zone and a discharge zone. Pulp is removed below the discharge zone by a discharge screw.

The pulp is pumped to the feed zone at a pressure of 1.5 - 7.0 psig and at a consistency of 4.0 - 4.5 %. The pressurized pulp is thickened on the surface of the perforated plate of the drum and fills the pockets separated by the ribs. Concurrently the filtrate passes the perforated plate.

When the pocket filled with pulp passes the first sealing element, excess pulp is wiped off keeping the thickness of the pulp cake constant. The feed pressure is controlled along with the feed consistency. This results in the porosity of the

pulp cake being uniform. This gives the optimum washing result at each operating rate.

The pulp cake entering the first washing zone is of uniform thickness and porosity and at 10 - 12 % consistency. As the drum rotates, 3 displacement washings are carried out using the counter-current washing principle. The dirtier liquor present in the pulp cake in the previous stage is displaced by the filtrate of the cleaner stage. Then the filtrate is fed to the previous dirtier stage as washing liquid.

Filtrate from the decker filtrate tank is used as washing liquid in the third washing stage. The maximum pressure of the wash water is 14.5 psig. The pressure of the wash filtrate is increased somewhat by circulating filtrate pumps located between the washing stages.

The complete washing and filtrate circulation is pressurized by the wash water pressure and intermediate filtrate pumps. This prevents the air from mixing with the pulp.

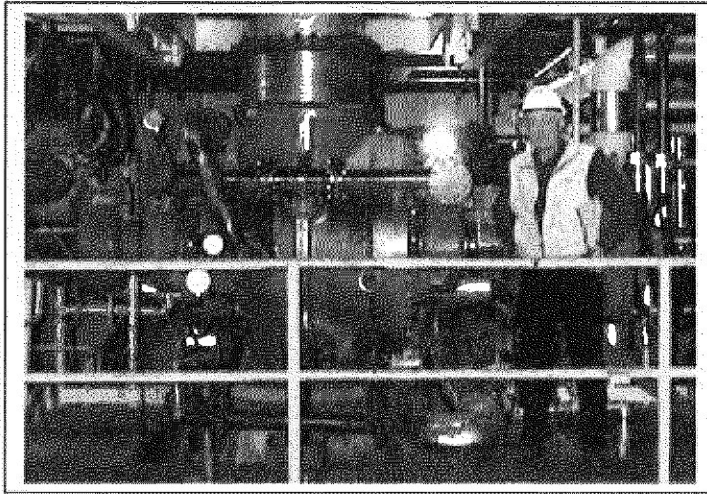
From the last washing stage the pulp enters the discharge stage. When the cake is by the last sealing element, a connection opens from the filtrate channel to the vacuum pump which increases cake consistency by drawing the filtrate from below the perforated plate. After the cake has passed the suction point, a short pressurized air impulse is introduced below the perforated plate. This air impulse loosens the cake so the pulp falls onto the discharge screw.

After the pulp has been discharged, the perforated plate of the drum is washed by the wash water showers. The perforated plate shower pump increases the shower water pressure to 116-145 psig.

Washing of the perforated plate can occasionally be made more effective by the supplying the showers through the high-pressure wash pipe, e.g. with wash intervals of 5 min. The maximum allowable wash water pressure in the pipe is 1450 psig.

Conclusion

Our M & D digester based sawdust pulping system has been an extremely successful addition to the Mackenzie facility. Higher temperature-pressure and higher alkali:wood charge makes the M & D digester a high-intensity cooking machine! An M & D digester doesn't have to "look big" to "produce big". Volumetric productivity is 4-5 times that of a Kamyr or batch system...~60 tpd per 1,000 ft³ compared to ~15 tpd per 1,000 ft³.



Tom Boughner
Mill Manager, Pulp Operations
Norske Skog Mackenzie
September 20, 2000