HOWE SOUND
PULP & PAPER CORPORATION
A PAPER EXCELLENCE COMPANY

UNWAVERING COMMITMENT
to be the Best

A Good News Story Making Pulp & Paper

Gerry Pageau, BASc, P.Eng, M.Eng
Process Engineer at HSPP since 1978

Lumber mill waste is HSPP's raw material

Lumber and plywood manufacturing generates waste material, chips, sawdust and bark. Old disposal was landfill & burning.

Bye bye bee hive burner

Lumber and plywood manufacturing generates waste material, chips, sawdust and bark. Old disposal was landfill & burning.

Fiber certification & traceabilty

1. HSPP does not own any forest or perform any harvesting. Our purchased chips are 100% controlled wood from sustainably managed forest.
2. HSPP is FSC & PEFC (CSA) sustainable forestry chain of custody certified.
3. Only about 25% of the fiber used at HSPP is certified and traceable because on the coast, the volume sold is too small for many companies to justify the cost and effort to certify.

Wood chips being delivered to HSPP

The Port Mellon Mill does not process any logs. All wood is delivered as chips.

Chips arrive by barge as separate species

Hog fuel scows are the darkest, next darkest are the Western Red Cedar scows, then comes Douglas Fir and Hemlock and brightest of all is Spruce/Pine/Fir mix.

How is paper made? – Fiber

- Fiber source:

1. Residual chips from sawmill, veneer plants, plywood mills and other solid wood producers. In 2013, residual chips made up 48% of our chip supply.
2. Whole log chips from logs harvested but not suitable for lumber due to rot, splitting, bug infestation, fire or other damage.
3. Bark from solid wood producers cannot make paper but is valuable as fuel for boilers to displace fossil fuels.

Wood chips are raw material for HSPP

Solid wood manufacturers wanted better use for their mill waste so invested in pulp mills to divert their waste stream into saleable product.

Barges at dock being unloaded

Front-end loaders drive right into barge from one of two specially made dock/ramp structures. Operators unload the chips one bucket at a time so it takes hours to unload a single barge.

Dumping loader bucket of chips

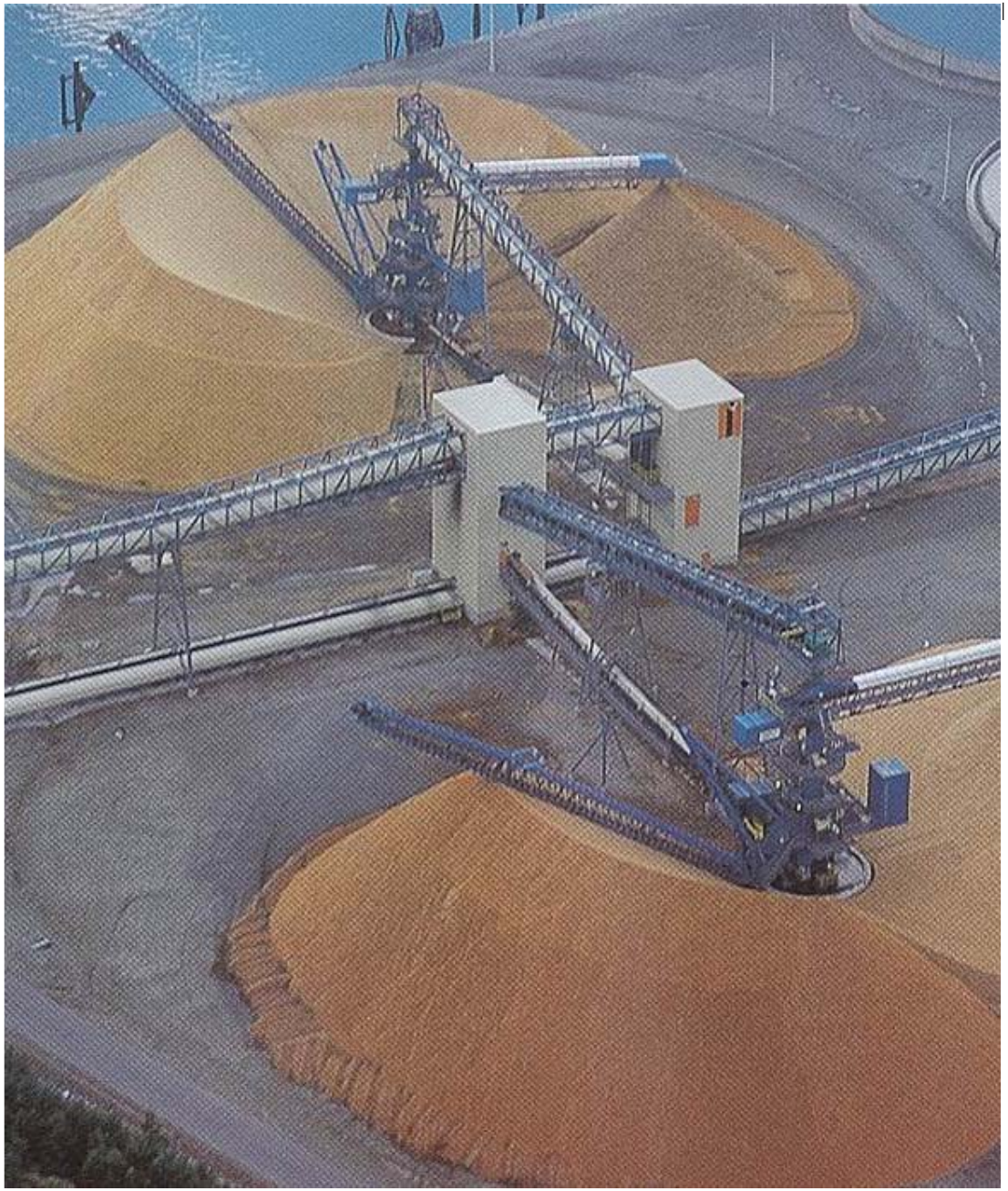
It is a short drive from chip barge to inlet bar screen of the chip conveying system. The conveyor starts right out at end of the dock at the ramp.

Almost finished with this barge

The loader may look small in this picture but it could pick up a small car in its bucket.

Chip piles at HSPP

1) Unloaded from barges at chip link by loaders
2) Conveyors bring chips to separate piles for storage
3) The piles are managed on first in, first out basis to minimize age of chips
4) Each pile has one quadrant stacking new chips while the reclaim boom removes chips from other side of pile to send to cooking
5) Chips can be blended to meet customer needs
6) Hemlock, Douglas Fir, Cedar & SPF



Chips being piled by stacker

The conveyor system which starts at dock, ends at the top of chip pile. The stacker can rotate around central pier to lay out a semi-circular pile. The reclaimer can simultaneously remove chips from the pile to a second conveyor to bring chips to chip screens

In the chip screening building

Chip screens separate chips into four streams. Heavy items such as rocks and metal are sent to landfill. Very fine sawdust is sent to bark boiler. Oversized chips are sent to crusher then join with the accepts. 99.5% of chips continue on to pulping.

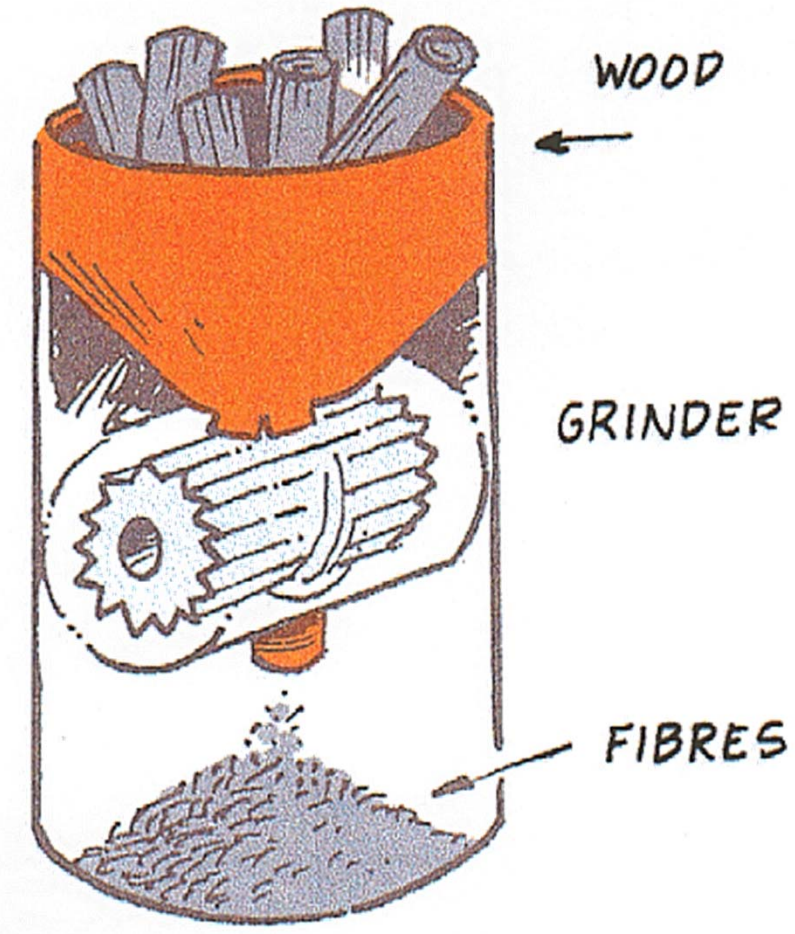
Acceptable chips

For highest pulp strength, an best yield, there is an ideal chip dimension. Length and width need to be small enough to handle but thickness is critical. Our system diverts chips which are over 10 mm thick to a crusher.

Either too thick or too long to crusher

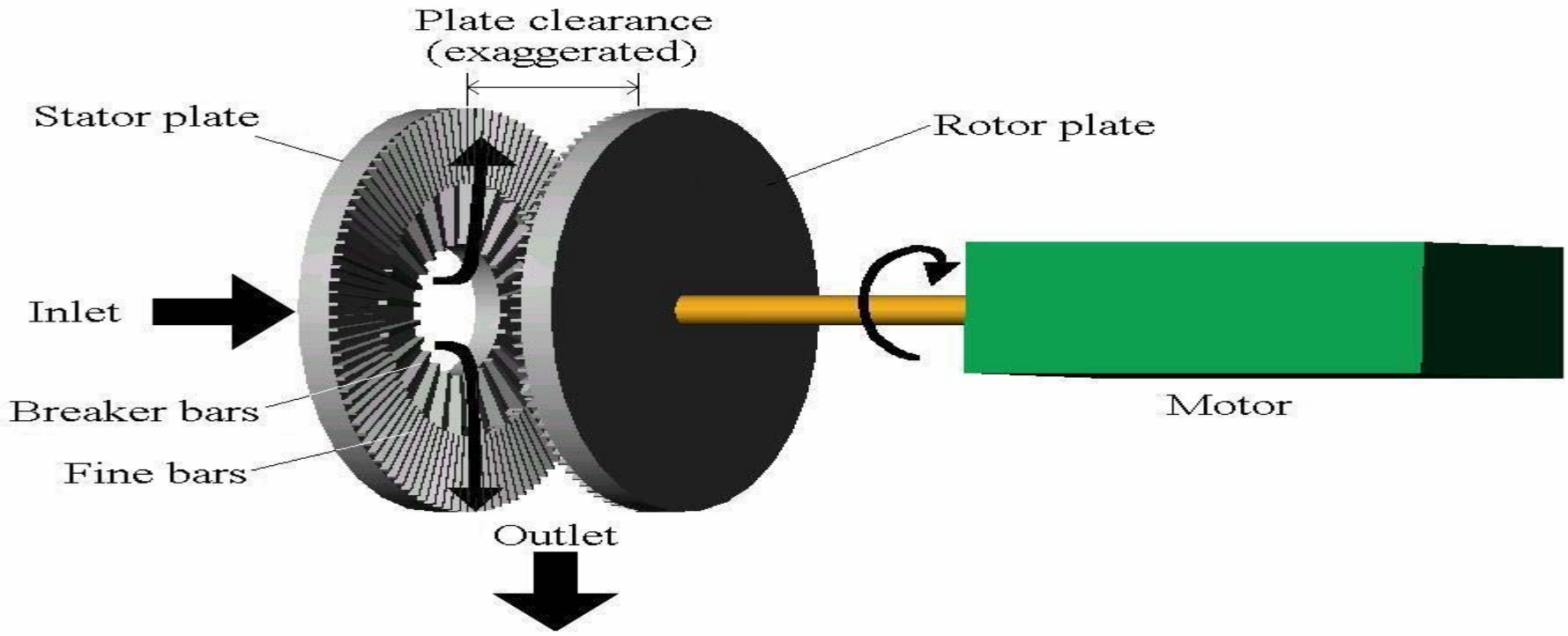
Crushing chips causes multiple cracks to form. These cracks allow the oversized chips to be returned to the process as they are now acceptable for making Kraft pulp.

Groundwood Mechanical Pulp

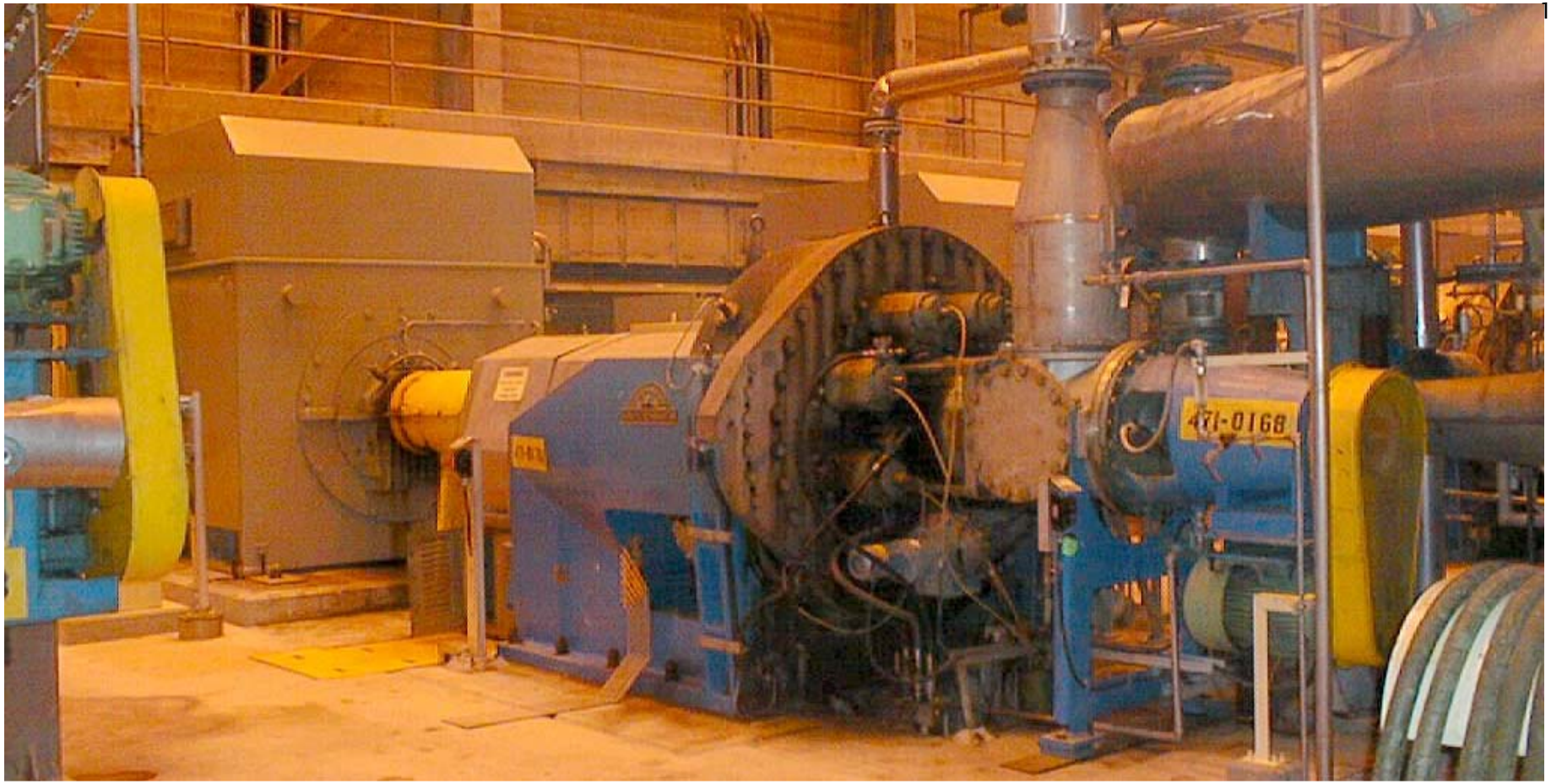


- In the past, large stones were used to grind logs into fibers
- These fibers make weak paper and usually require reinforcement to keep sheet together
- High pulp yield and high electrical cost

Refiner Mechanical Pulp



- Refiners grind chips instead of logs and use metal plates instead of stones. RMP has high yield but high energy cost. Paper strength is better but still needs reinforcement.



Thermo Mechanical Pulp – TMP at HSPP

By adding heat and pressure in the refiner, yield remains high and higher paper strength is achieved. Some mills also add chemicals in a CTMP process to further improve properties.

- At HSPP, chips are converted to fiber in 7 TMP refiners
- Depending on paper grade, bleach is added to whiten the fiber
- Starch or sizing or clay may be added to make smooth sheet
- Recycled water is added to spread fiber into very thin sheet
- Sheet is pressed to squeeze out as much water as possible
- Sheet is dried by passing over steam heated cylinders

HSPP paper machine »

Paper forming roll at end of dryer

- Paper travels through the machine at more than 60 km/hr
- HSPP makes about 600 tonnes of paper per day

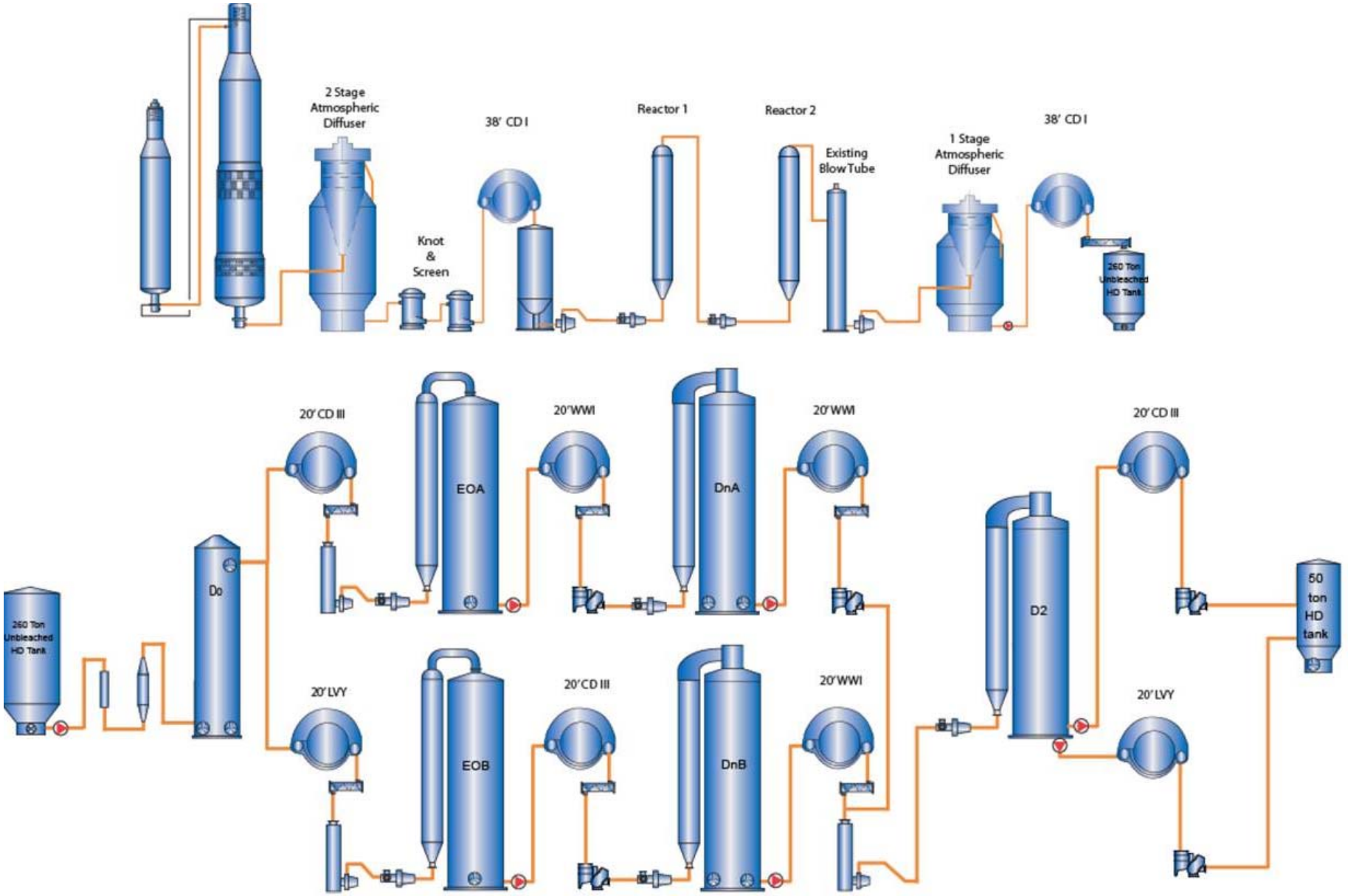
Rolls are re-wound for customer

Most press rooms require custom roll length and width for each press. HSPP creates the roll size needed by customer.

Wrapped rolls in warehouse ready for shipment

Rolls are handled by overhead crane which picks up 12 rolls at a time from the top using vacuum so rolls are not damaged.

Loading paper rolls with vacuum crane



Kraft Fiber Line – Digester to Bleach

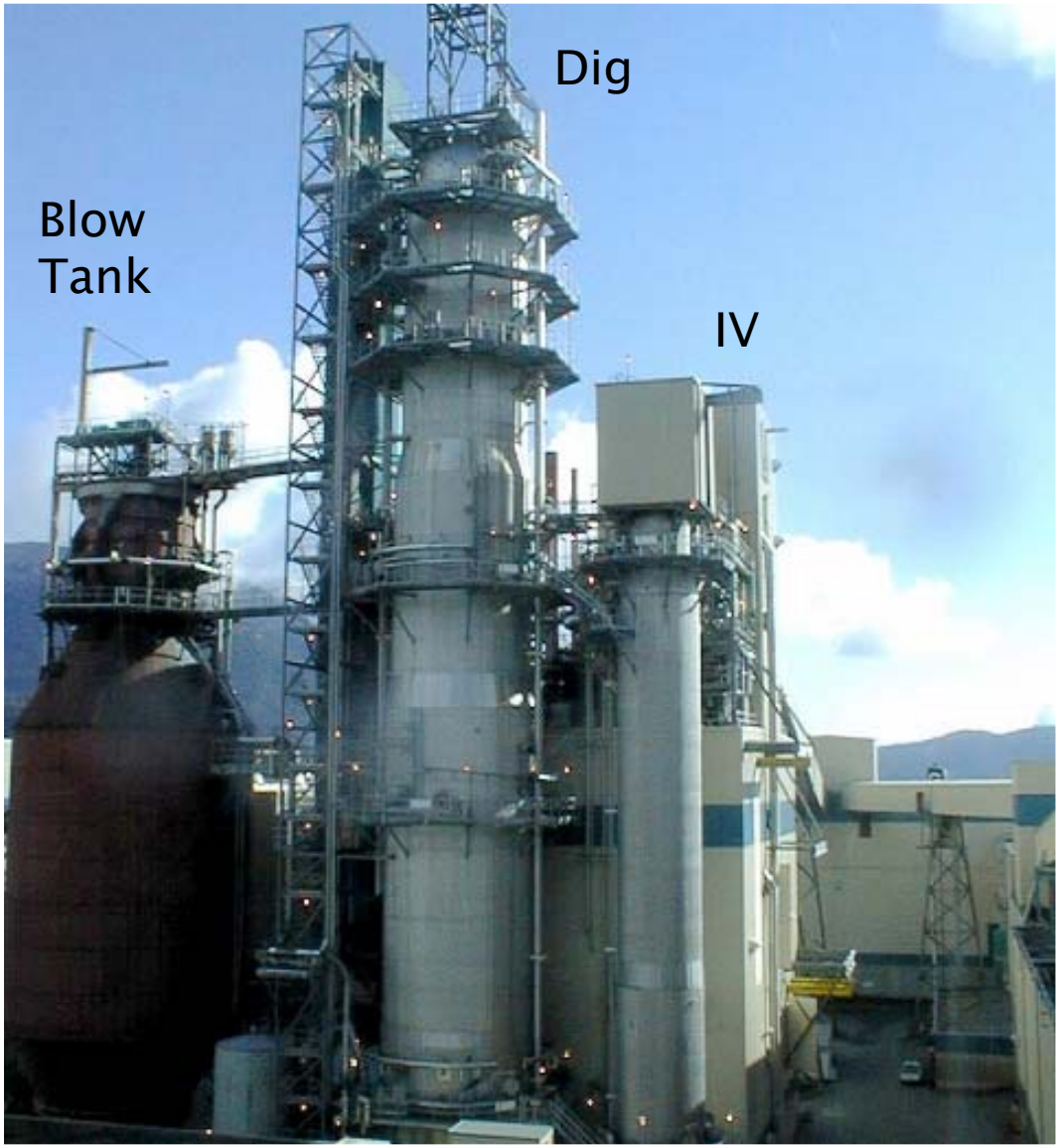
Impregnation vessel Digester Blow tank

Chips are fed to the top of impregnation vessel with a caustic cooking liquor containing a solution of sodium and sulphur compounds. Chips soak at high pressure for about 40 min.

The chips exit from bottom of IV and are sluiced up to top of digester where they are heated to 160 deg C. About half the chip mass is dissolved by the cooking liquor during the 5 hour trip to the bottom of digester.

The dissolved lignin and spent cooking liquor is washed out and sent to the recovery process.

The remaining long cellulose fibers are discharged into blow tank. Because lignin "glue" is no longer between fibers, the chip disintegrates into individual fibers as it exits the digester.



Two stage oxygen delignification

From blow tank, fiber passes through knotters and screens to remove any uncooked chips or other debris. After further washing, the fibers are again exposed to a caustic solution but this time with O2 added to remove lignin from inside the fiber.

Four stage bleaching: DEopDnD

Brown fibers from O2 delig could make brown paper bags but market (and price) is much better for fully bleached Kraft pulp. It takes about 8 hours of soaking in solutions of chlorine dioxide, caustic and hydrogen peroxide to remove every last bit of lignin and make pulp white.

Rotary vacuum washers clean the pulp

There are six stages of brownstock washing (radial washing in bottom of digester, 3 stages of diffusers and 2 vacuum drums). There are four stages of washing in bleach plant (eight vacuum drums in two lines).

Centrifugal cleaners remove fine dirt

High speed rotation of pulp slurry inside cones separates and removes heavy dirt such as sand, silt and bark fibers from the pure white cellulose fibers. There are 5 stages of cleaning to minimize fiber loss.

The pulp machine Fourdrinier and presses

Add recycled water to make very fine slurry of pulp (99% water), spread out evenly across 6 meter wide traveling screen to form sheet. Remove water from sheet using gravity, vacuum and presses until only about half of water remains.

Pulp Dryer

Presses can only remove about half the water in a sheet of wet pulp because much of the water is inside the fiber.

The wet sheet is fed into the top of the Flakt dyer and is the thickness of a typical piece of cardboard

The dryer floats the pulp sheet on a cushion of hot air and the sheet passes back and forth through dryer 21 times before exiting from the bottom of the dryer.

There is now only about 10% water in the pulp sheet. Because pulp is strongly hygroscopic, there is no point drying any further than this because pulp would just soak up moisture from the air to return to about 10% moisture.

Baling line

A 6 meter wide infinitely long sheet of pulp is not practical to ship to customers so sheet is slit into 7 then cut, stacked, pressed and wrapped.

Bale press

Each stack pf pulp weighs about 250 kg. The stack is pressed to reduce shipping volume and also to allow safe stacking.

Hooking pulp units to ship crane

Eight wrapped bales are tied together as a unit with very strong baling wire. The ship crane can lift the unit by hooking onto these wires. This crane can lift eight units at a time, about 16 tonnes of pulp, about 19 minutes of production.

HSPP pulp is our customer's raw material

A primary use is as reinforcement for paper products which contain large amounts of recycled or mechanical pulp.