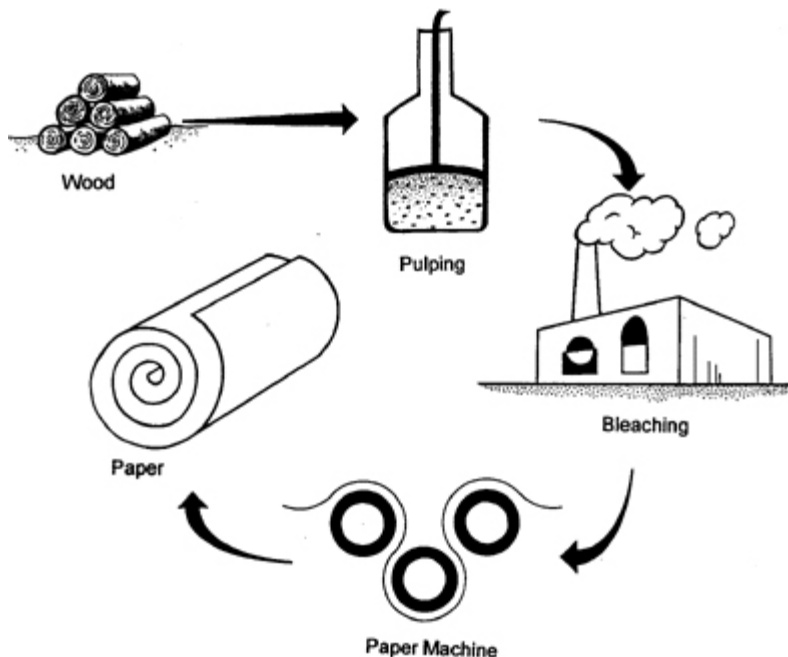


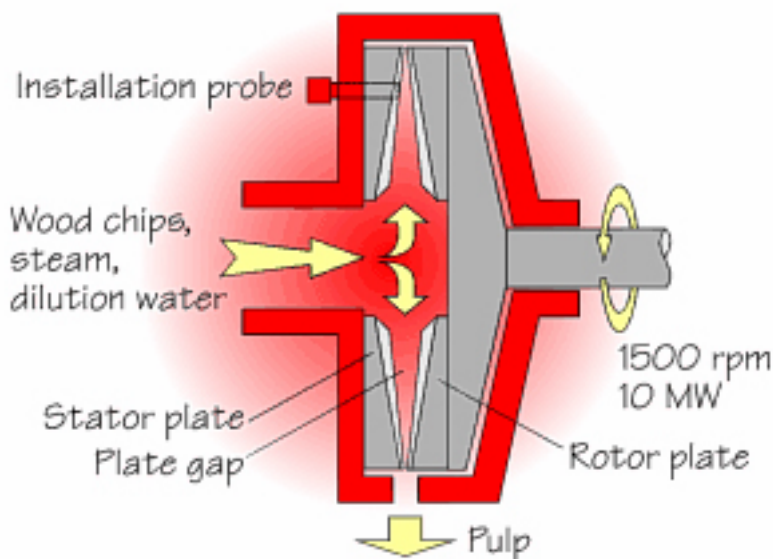
Paper Production Process



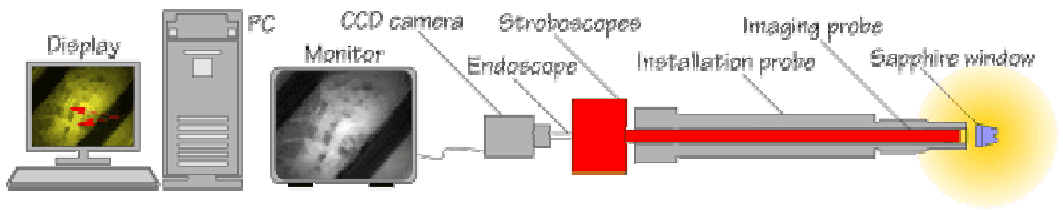
Pulping

Thermo mechanical pulping is a common method to refine wood chips into pulp. Main disadvantage of the method, like with other mechanical pulping processes, is the high energy consumption of the process.

New equipment has been developed in this project for quantitative visualization of the refining process. The measurement system is based on multipulse stroboscope, endoscope optics and CCD camera. Measurements were carried out at first-stage refiner operating at 10 MW level.



Thermo mechanical Pulping Process.
Wood chips and dilution water is inserted into the refiner.



Measurement Equipment

Bleaching

The goal of the pulp bleaching process is to produce a whitened, yet strong pulp for both hardwood and softwood pulps. Hardwood contains less lignin than softwood and is therefore easier to bleach. Both the hardwood and the softwood bleaching processes use a counter-current flow. That is, the wash flow goes in the opposite direction to the pulp flow. This way, filtrate from the later bleaching stages can be used as dilution in the earlier stages. This minimizes water usage and the amount of chemicals used, resulting in both environmental and economic benefits.

In the first stage of the bleaching process of both pulps, the lignin that remains in the wood fiber is chemically attacked with chlorine dioxide to remove its colored degradation products. The final two stages of the bleach process are usually referred to as brightening. In the second bleaching stage, hydrogen peroxide (sodium hydroxide and oxygen) is used to extract the remaining lignin. The third stage uses chlorine dioxide to ensure brightness. At this point, 98 percent of the lignin has been removed.



References:

<http://www.pulpanpaper-technology.com/projects/silao/silao2.html>

<http://www.tut.fi/optics/aoresearch/dlstrobo/>

http://www.dodge-reliance.com/industry/pulp_and_paper/pulp_mill_operations/bleaching.html