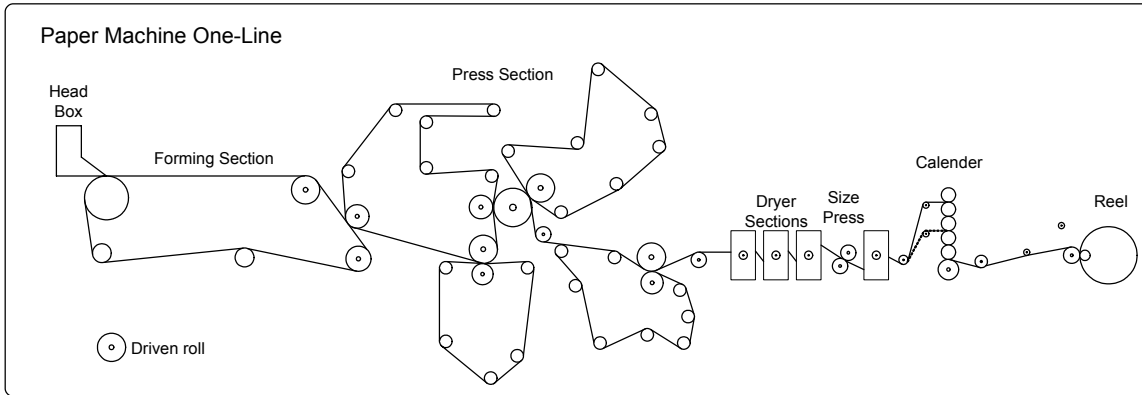
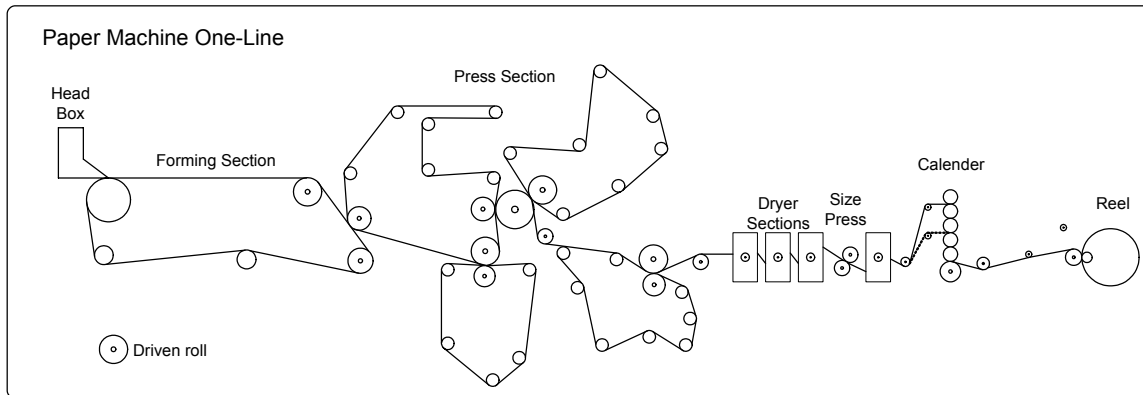


Paper Machine System Diagram



Mechanical Components of Paper Machine	Associated Drive Control Concepts	Regenerative Drives
<p>Head Box / Fan Pump The Paper stock at this point in the process is 99% water and 1% fiber. The Fan Pump forces the Paper stock through a set of nozzles in the head box onto the “wire” mesh. The fan pump speed is a major factor in the basis weight (caliper) and formation of the sheet of paper.</p>	<p>Fan pump drive control is typical for industrial pump loads. Variable torque is required, increased speed means increased flow.</p>	<p>No</p>
<p>Forming Section A typical flat former is a continuous rotating wire (today this is plastic) mesh that removes water from the paper by sucking it out of suspension. Multi-layer paper machines and paper board machines include additional forming sections (one forming section for each layer of paper).</p>	<p>Forming section drives have a high friction load due to the suction (normal forces) of the water through the wire mesh. This results in a high normal running load, but a low acceleration load.</p>	<p>No</p>
<p>Press Section Rolls are nipped (pressed) together to squeeze the water out of the sheet of paper. Multiple rolls are used with a felt (blanket) supporting the sheet and accepting the water from the sheet.</p>	<p>Press section drives also have a high load due to the strong forces in the nip between the rolls deforming the felts and roll. This results in a high normal running load, but a low acceleration load.</p>	<p>No</p>
<p>Dryer Sections Typical dryer sections consist of quantity four to ten steel cans 5 to 6 ft (1.5 – 1.8 m) in diameter. These cans are filled with steam that evaporates water from the sheet as it passes around the cans.</p>	<p>Typically, one drive powers all of the cans in a dryer section. The dryer section has a small rolling friction load during steady state operation of the machine. However, during acceleration/deceleration, the sum of the dryer cans represents a large inertial load. Thus, the acceleration/deceleration requirements for the machine determine the power ratings of the dryer drives.</p>	<p>Yes</p>

Paper Machine System Diagram



Mechanical Components of Paper Machine	Associated Drive Control Concepts	Regenerative Drives
<p>Size Press Two rolls are nipped together with the sheet in between and water mixed with sizing (starch) is impregnated into the sheet to change its characteristics (improve ability to receive print).</p>	<p>The Size Press drive has a high normal running load due to the strong forces in the nip between the rolls deforming the rolls and supplying tension in the sheet of paper. It has a relatively low inertia, thus has a low acceleration/deceleration load.</p>	<p>Yes</p>
<p>Calender Stacked sets of nipped rolls crush the top and bottom of the sheet, making the paper smoother.</p>	<p>Calender drives pull the sheet through the nipped rolls and supplying tension in the sheet. Stopping quickly is important. Two hard rolls nipped together require less power than a combination of hard/soft nipped rolls.</p>	<p>Yes</p>
<p>Reel The sheet is wound onto a spool that is driven from a reel drum. Continuous production requires that spool changes occur "on the fly".</p>	<p>The reel drum pulls/stretches the sheet of paper, thus the associated drive operates in tension control. Required sheet tension and deceleration requirements factor into the sizing of the drive/motor.</p>	<p>Yes</p>