FREQUENT STOPPAGES to adjust the machine or change out a product wastes time and material. In spite of this, many mills continue to run to failure, repair their parts with third-party repairs and experience excessive downtime. However, when plant managers commit themselves to undertake planned maintenance, performance improves and costs drop. So why aren’t maintenance managers more committed to upgrading parts and tackling maintenance before things fail?

As the global economy has slowed in certain parts of the world, managers don’t always have the budget to keep experts on staff to help design and manage cutting-edge maintenance programmes, or tackle equipment performance issues. The dual pressure to rein in costs and squeeze out additional profits have led some companies to take a second look at their maintenance challenges and programmes.

Upgrading to Ensure Reliable Pressure Control
Paper Mills are undergoing production challenges like most plants as machines have become faster and the requirements more stringent for higher pro-
not vary more than 2 or 3 psi outside a
pre-determined setting. The finished
product is a 4,500-kilogram roll of paper
used for newspapers and magazines.
Moog and its distribution partners
recently helped several paper mills to in-
stitute a planned maintenance approach.
Montreal, Quebec-based MCS-Servo is
a designer, distributor and servicer of
servo systems and industrial automa-
tion products. MCS-Servo recently
helped one of its paper mill customers
in Canada upgrade its servo valves from
an early digital type to the latest, high-
performance Moog digital system. Along
with the upgrade, MCS-Servo trained
its client on using the new valves. The
Montreal firm also put in place a support
and inventory control programme for its
customer.

The paper mill runs a Metso calen-
der roll, which consists of a number of
10-meter-long rolls arranged one above
the other. As sheets of paper up to one
kilometre long pass through these rolls,
the machine imparts varying degrees of
smoothness and gloss to the product.

When the Canadian paper mill men-
tioned here called on MCS-Servo, it was
because the customized servo valves
running its calender rolls weren’t able
to consistently control the pressure on
its paper. The valves, which were ten
years old at the time, were increasingly
difficult to service and maintain. In spite
of their age, the valves were actually
quite durable. But the electronics boards
for the valves, which were designed
especially for this mill, could no longer
be sourced. This servo valve model had
been upgraded to a newer version with
many advances over the first-generation
design. Initially, the mill had called on
Metso for help. But the manufacturer’s
knowledge of (and support for) the
valves wasn’t adequate to meet the mill’s
needs.

Testing, Training and Tuning
So MCS-Servo entered the picture. Be-
cause the valves were at the end of their
model lifespan MCS-worked with Moog
to implement an exact replacement for
that valve and sent one of its engineers
to Moog to become a technical expert on
digital servo valve technology and soft-
ware features.

With the latest digital valve in hand,
the MCS-Servo team returned to the
mill and worked with the maintenance
team to install and test it in the calendar
roll. MCS-Servo also provided instruc-
tions and training for the mill’s staff, so
they could take advantage of the digital
valve’s features such as real-time condi-
tion monitoring, easy-to-use adjust-
ments to operating parameters and di-
agnostics. The high-performance valve’s
software allowed the paper plant to tune
and set flow gains and null position, save
these settings and download them to
multiple valves at once, highly valuable
on a machine with 30 valves vs a tradi-
tional manual tuning.

The new digital valve controlled both
the paper position from an external
source feedback and pressure feedback,
which is internal to the valve. The up-
grade of these valves for the Canadian
mill helped the maintenance profes-
sionals achieve higher speed and better
positioning of the paper. The upgrade
worked flawlessly, and MCS-Servo
focused on fixing the first of three ma-
chines with plans to upgrade more ma-
chines on a planned basis.

Replacing the valves took approxi-
mately two days for each machine. MCS-
Servo prioritized the machines, working
first on the one that had been giving the
mill the most trouble. The team replaced
the valves on the second machine as part
of a regularly scheduled maintenance
period. The third machine is due for its
upgrade in the coming months.

A New Service Programme

As MCS-Servo upgraded the machines,
it also instituted a valve exchange
programme. Each time the mill sends
MCS-Servo one of the machine’s original
valves for repair, there is an incentive
to purchase a new valve. With the new
valves in place, the mill says pressure
and position are much more stable and
frequency of response is improved. This
gives plant personnel more time to react
if there is trouble with the calender roll.
There are also fewer stoppages because
there is better control of the roll, which
also increases the quality of the finished
product.

With the software and electronics
controlling the new digital valves, the
mill can now use fieldbus communica-
tions to make quick, real-time changes
and smaller step changes that are
nearly infinite. This translates into small
changes that produce fine paper with an
enhanced surface quality. Machines like
the kind MCS-Servo worked on will run
Workers inspect a paper machine’s calender rolls; Machines have become faster and the requirements more stringent for higher productivity, reliability and safety.

Servo Valves precisely control the position and pressure on a paper machine’s calender roll and the pressure between rolls cannot vary more than 2 or 3 psi outside a pre-determined setting.

Beware Third-Party Repair
Another example of the benefits of upgrades and planned maintenance comes from a Canada-based maker of pulp, wood products, tissue and newsprint. One of its South Carolina-based paper mills uses more than 40 analogue pQ-valves to control flow and regulate pressure on a Voith Janus™ calender roll machine. The mill was having reliability issues with its machine due to the age of the installed analogue valves. The company had sent the valves to a local repair house for a fix. But when the valves came back, they weren’t restored to original condition. They soon failed again and caused lost productivity and in some cases an extended clean-up effort.

To rectify the situation, the mill hired a reliability engineer to audit its machines and make recommendations. As part of his audit, he reached out to the local Moog distributor, Hydraulic and Pneumatics Sales (H&PS) of Charlotte, N.C.

Working with the reliability engineer, H&PS also conducted an audit of all the valves in the plant, which Moog reviewed, and recommended an upgrade to digital valves. The mill owner concurred and purchased two, new digital valves to test and run in analogue mode with a 4 to 20-milliamp signal; these valves will control one of several calendar rolls on a machine in the plant. Once the digital valves have proven to duplicate the performance of the old analogue valves, the mill will look at converting the valves on the remaining calendar rolls. While planning to run the digital valve in analogue mode for the short term, the plant will be ready to take advantage of the full capabilities of digital controls when the machines are converted to fieldbus.

After Moog put in place a plan to get the paper mill’s old analogue valves crossed over to digital ones, its team began working on a planned maintenance programme for the valves. Moog and H&PS developed a unique approach to planned maintenance. Moog would control the maintenance schedule by looking at each valve and building a custom schedule for the plant. If the team performed the regular valve maintenance and kept the oil clean, it could prevent accelerated wear and greatly reduce the actual maintenance over a lifecycle in contrast to running the valves to failure. As designed by Moog, the South Carolina paper mill’s planned maintenance programme would last six years.

Helping Hydraulic Hand on Maintenance
H&PS also audited the hydraulic power units in the facility. To complement Moog’s work, the distributor is providing a planned maintenance agreement on the hydraulic fluid systems that power Moog’s valves. If the valve oil is kept clean and the plant staff follow the recommended schedule, the plant will pay a flat rate fee; if problems arise, then the repair cost is borne by Moog. However, if the oil goes out of specification, the mill owner must bring the oil back to within the standard or the planned maintenance schedule can be compressed to prevent unplanned failures and lost productivity.

The onus for success is on Moog, the distributor and the mill because cyclic use is just one wear component, friction is another.

Offering companies a unique, win-win approach for reducing maintenance costs should be attractive for anyone responsible for maintenance and production. Equally appealing for maintenance managers is working with a supplier that can offer planned service agreements and upgrades through a manufacturer’s local distributor, especially when it involves upgrading to the latest digital motion control technology. It’s a planned approach with a payoff for maintenance managers anywhere.