ABB’s Paper Machine Drive solution enables improved productivity
by means of enhanced datalogging, maintenance tools and expert
services – at site or remotely

Drive parameter tools, data historian tools or other informative tools,
together with the drive control, work as a logical entity, allowing the production personnel to search relevant information and assist the experts by means of well established sets of details.

In the PMC800 systems this combination is three-fold: opera-
tors’ views of the drive status, electricians’ view to the detailed
drive status and history events, and ultimately the drives experts’
knowledge combined with the customers’ own expertise in
analyzing the situation.

Operators’ information
ABB’s Operator Station includes an informative set of different
system status displays. Similar information can be showed on the
control panels in operators’ desks. This includes basic information
of motor and drive: load, draw, operating status, control mode
and alarms. Master display of a drive point gives information
about interlockings, set points and actual values. Tension displays
show tension values, differences, limits and status. However, the
operator needs support and assurance for the equipment not to
fail under his supervision.

Correctly focused maintenance actions will save money, save
machinery from idling during production, and avoid costly over-
serving.

Analyzing the System data
A lot of system data is usually measured and available for inves-
tigation, for example for a paper machine drive system. The data
is most useful, when not analyzed in overwhelming amounts.
When the taken measurements are designed for an appropriate
time window, measured with correct accuracy and filtered for
likely phenomena in the different parts of the equipment, they will
provide the best results. This requires lots of process and drive
knowledge. However, the reward is that predictive conclusions are
faster to make, and root causes of disturbances can be narrowed
down more easily without unexpected downtimes.

Typical reports could be the following:

*...at the beginning and end of the acc/dec tension varies less
than +/-30 N/m and during constant acceleration less than +/-15
N/m. Tension levels are stable when machine speed is constant.
During the splice Unwind tension varies about +/-50 N/m. To
improve existing situation, see...*  

Today in modern Paper Machine Drive installations FFT analyses
are made automatically by means of the PMC800 Datalogger
connected to each drive directly. Torsional disturbances originat-
ing from the process or equipment, and causing additional stress
to shafts, couplings, gears, etc. can be detected. This allows
timely maintenance and process controls tuning before actual
quality or production losses happen.

The PMC800 Datalogger enables the user to specify history
lengths, which typically are 30 days. The PMC800 Datalog-
ger supports statistical calculations for the collected values
and mathematically created variables. The values are collected as often
as they are updated in the drive communication link between the
drive and the application controller, typically 10-100ms. This en-
sures enough data to detect the undesired process phenomena,
which can be corrected by means of the drive system controls.

In aging machinery, there are more possible interference sources.
Effective filtering measurements with event triggered analysis may
have even greater impact in improving quality and availability of the
production.

Expert support – remotely and smoothly

*...Mechanical brake opening and closing delays varies according
to the conditions in pneumatic/hydraulic system. This is normal
and it seems that above mentioned delays need to be checked to
decrease start-up breaks...*  

When the drive control is well designed for different process varia-
tions, the equipment behaves expectedly and the drive system
filters minor issues most of the time. Typically, remote service is used to assist mills in solving problems
with software modifications and enhancements by tuning the drive
system. Besides fast trouble shooting, who would not like to be
assured by the Drive expert, from time to time, that fine tuning was
just done and operation can continue smoothly.

*...For better function of the calender, it was decided to com-
pensate frictions of top and bottom rolls separately. New friction
compensation was added and measured values were calculated
to the program...*  

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