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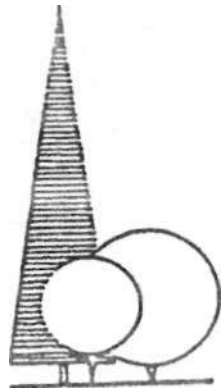

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Work Safety

IMPORTANCE OF PROCESS CONTROL IN PAPER MILLS

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Abstract

Rapid developments and changes in manufacturing technology bring important developments in production management. Computer Aided Design (CAD) and Computer Aided Manufacturing (CAM) make manufacturing processes easy, safe and improve quality.

Efficient use of computers during production makes it easier and more appropriate in process manufacturing systems that those of machinery and facilities are designed and placed for only one kind of product in process production.

The various desired settings could be implemented, and the process could just be allowed to proceed without interruption. Unfortunately, process disturbances prohibit such simple operation. Constant monitoring of the process and regular external intervention (control) are needed to assure proper equipment operation.

In this paper, importance of process control in paper mills regarding safety, environmental regulations, productivity and profitability was explained.

Key Words: Process Control, Pulp and Paper, Productivity

INTRODUCTION

Process is a progression, and also an operation group. If anything goes wrong on one of these elements, this may affect the whole process in a negative way.

In process productions, operations are found very complex. Because of this, all operations must be monitored very carefully. This constant monitoring must go through the whole process. This is called process control. Process control was made by humans in near past. Very few were done by the machines (computer, intelligent cards). Nowadays, mostly machines control it.

Efficient use of computers during production makes it easier and more appropriate in process manufacturing systems that those of machinery and facilities are designed and placed for only one kind of product in process production.

Process control is used extensively in chemical, oil, pulp and paper industry, similar. The complexity of paper industry requires more process control than many other industries.

Reasons a process must be controlled

The advantages of process control are: increased security, less environmental pollution increased profits and productivity. These are, in order of importance:

Safety. The pulp and paper industry, like all other process industries, can be quite hazardous. All of the equipment used in a mill has inherent operational constraints, which must be satisfied. For example, steam temperature and
be carefully controlled to prevent equipment rupture and explosions. The concentrations of various chemicals (i.e. Volatile Organic Compounds), and the order in which they are mixed, are often critical for safety as well as operational reasons.

Environmental Regulations. Numerous country laws limit the emissions from mills. For example, these laws specify the maximum amount of organic material (BOD) which can be released to a natural water system, the concentration of hydrogen sulfide which can be emitted to the atmosphere from a craft recovery furnace, and the amount of toxic contaminants, such as chlorinated hydrocarbons from bleach plant operations or polychlorinated biphenyls (PCBs) from paper recycling, that can be emitted. Penalties for violating these laws include fines and jail terms.

Productivity. The advantages of process control regarding productivity are: standardization of final products, decrease of errors or handling the errors very easily. Because of these, productivity will increase eventually.

Profit. Product quality is increasingly critical in order to earn a profit. All final products must meet certain specifications, such as a given tensile strength or basis weight. If a given sheet of paper has, for example, inadequate strength to traverse a printing press without a large number of breaks, the customer will reject the paper and find another supplier. On the other hand, a paper, which exceeds the specifications by too great an amount, is unnecessarily expensive to produce.

In-line measurements of products quality and process conditions update in seconds or minutes, compared with updates every hour or so in the case of manual tests. Besides in-line measurements, there are useful automated laboratory measurements, which reduce update times to a few minutes and provide a more responsive indication of process conditions (Table 1).

It is also important for the control engineer or process manager to understand that two bleach plants identical in design, production constraints, or raw material inputs. Different process equipment is configured in different conditions. Process measurements and controls are tools, which can be selected and configured to meet the specific needs of each mill. Also, it is important for the engineer or technician to realize that dynamics of a bleaching process are unique to that process. To achieve control with the least amount of variability, the control loop tuning parameters, those factors that define a control loop's response to a process change or upset, must be selected with those unique dynamics in mind.

Table 1
Important in-line measurements

Measurement	Process Reaction Inference
Pulp brightness	Quality development Reaction progress
Chemical residual	Reaction progress Chemical demand
Kappa Number	input lignin content Delignification across stage
Temperature	Reaction rate
PH	Equilibrium of reactive species Alkali (NaOH) charge
Consistency flow	Mass flow rate of fiber
Chlorine dioxide concentration	Mass flow rate of chlorine dioxide

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ЗНАЧЕНИЕТО НА КОНТРОЛА НА ПРОИЗВОДСТВЕНИЯ ПРОЦЕС В ХАРТИЕНИТЕ ФАБРИКИ

(Р е з ю м е)

Бързото развитие и промените в производствената технология водят до важно развитие в управлението на производството. Компютърният дизайн и производство (Computer Aided Design (CAD) и Computer Aided Manufacturing (CAM)) правят производствения процес лесен и безопасен и повишават качеството

Ефикасното използване на компютри по време на производството го прави по-лесно и по-подходящо за системите в производствения процес отколкото тези машини и съоръжения, създадени и монтирани само за производство на един вид продукт.

Importance of Process Control in Paper Mills

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