

Roll Shop Management Systems

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Key words: RSMS, Roll Shop, Grinding Machines, Software, Automation, Steel Mills

INTRODUCTION

This paper describes some aspects of the impact of software systems on a modern roll shop, analyzing the different ways software brings value, and concentrating on what is called a Roll Shop Management System.

While touching many areas of the roll shop affected by software, I will not focus on the automation at the CNC and PLC levels, a core aspect, but well understood by most people working in a machine shop. I will focus one level above, on the software that runs on PCs and computer networks often present on and around roll grinding machines.

FROM IMPROVED PRODUCTIVITY TO DECISION MAKING

The role of automation has increased in importance in the last 20 years, not only in the roll shop, but in any machine shop, as well as in many other fields in almost all industries. Initially automation was introduced to increase productivity and reduce manpower and therefore costs, but soon it became necessary to keep pace with market demands for improved quality, predictable output and optimized use of available resources. Then, with an increasing attention to safety, automation's role became even more central. Now we are in a stage where automation is broadening its reach and becoming a decision support system (DSS) by providing better and more elaborate information, statistics, Key Process Indicators (KPI), a lot of aggregate and graphical data to help decision makers do their work. The next step is for automation to take, in part, the role of the decision maker itself; more and more software will be responsible for taking some decisions that previously required the intervention of skilled operators or engineers.

Currently, automatic systems not only drive a machine by using a grind program selected by an operator to create a specific profile created by another operator, but they are also able to analyze the grinding schedule, move the rolls around the roll shop from the transfer car through the racks to the grinders, decide what grind program and what profile to use, modify them during the process taking into account the roll defects that are automatically measured and classified according to information based on previous experience, and decide what to do with the roll, if and how to grind it, and when to accept it.

ROLL SHOP NETWORK CONFIGURATION

Focusing on a typical computer network in a modern roll shop, we see something like Figure 1. A standard Ethernet network connects all grinders to a central server where information regarding each machine's grinding activities is kept in a single standard database. Note that grinders from different manufacturers can be connected to a single network, and data from such grinders can be treated uniformly inside the system, although this usually requires some customization work to be performed. As shown in Figure 1, a roll shop network usually fits into a broader network at each customer site where other complex systems communicate with each other.