## Midwestern Region

# Faster, Better, and Cheaper

## Integrated flow improvement techniques offer American National Can unlimited improvement opportunities.

Elaine J. Labach, Ph.D.

Robert K. Hall, American National Can's (ANC) time-based strategy manager who led the recent AME workshop in Rosemont, IL on "Time-Based Continuous Improvement Process" described his company's manufacturing excellence process. ANC's systematic method aims for continual improvement in the total manufacturing operation with little capital expense. The means: involving all employees in solving problems, eliminating wasteful costs, reducing leadtime, and improving quality.<sup>1</sup>

ANC's process involves three elements: Employee Involvement, Total Quality Control, and Flow Improvements. This last element, Flow Improvements, captures many characteristics that a traditional quality improvement process might not incorporate. These techniques go beyond traditional JIT and include the added techniques of setup reduction, Total Productive Maintenance, value-added mapping, and time-based purchasing. They improve flow (thereby eliminating waste) and reduce leadtimes so that operations can be "better, faster, and cheaper." ANC's Corrective Action Teams (CATs — employee problem solving teams) attack waste through the company's quality improvement process.

### Setup Reduction

Using setup reduction to attack slow changeover times is recommended as a first step, since reduced lot sizes (feasible with shorter setups) are necessary for the other JIT improvement techniques.

ANC involves employees in setup reduction through CATS. This process includes analyzing the existing setup through videotaping, measuring, and setting improvement targets.<sup>2</sup> Hall recommended setting 50 percent improvement targets to start, and noted that setup times can be reduced from 50-94 percent when fully implemented over several years' time. Figure 1 shows some of ANC's improvements in reducing setup times.



Figure 1. Examples of results achieved at various ANC plant sites through setup reduction. Results shown represent a 4-12 month horizon.

#### **Total Productive Maintenance (TPM)**

A fundamental TPM objective is elimination of major equipment losses (such as breakdowns, jams, and start-up losses) which constrict process flow and increase leadtimes. TPM seeks to measure and improve overall equipment effectiveness through its entire life cycle, involving all employees. Through CAT activities, ANC empowers employees with autonomous maintenance (routine maintenance performed by equipment operators) and provides skill training in improvement tools (Pareto problem, "ask why," window analyses, CEDAC — cause and effect diagram with the addition of cards, and P-M analy $sis)^3$ 

Fifteen ANC plants are using TPM concepts. One of these sites reported a 38 percent improvement in productivity, and 60 percent and 64 percent reductions in accidents and breakdowns, respectively, within six months of TPM start-up.

### Value-Added Mapping (VAM)

Process mapping was originally developed by Geary Rummler during the 1960s. It enables manufacturers to rationalize process flow and eliminate all forms of waste associated with material/transaction handling. VAM is extremely versatile, and can be used to simplify any business process, system, or procedure. There are two primary mapping techniques of the VAM process:

1. Relationship mapping seeks to diagram the functional relationships of a business (for example, how customer orders are processed). Relationship maps

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## **Event Reports**

## "Baseline" Relationship Map



## "Target" Relationship Map



**Figure 2.** This figure illustrates baseline and target maps which, in this example, identify performance gaps in processing a customer order.

should be used at the organizational or systems level (see Figure 2).

2. Time-function mapping (process mapping) takes a process perspective and diagrams how the product or transaction flows over time through various functional areas (see Figure 3).

Both maps are comparable to flowcharting, with nodes indicating activities and arrows showing flow direction. Two versions of these maps are shown: baseline (current flow) and target (goal). Gaps and disconnects<sup>4</sup> can be identified for elimination through this mapping process. Once the target has been achieved through CAT involvement and the VAM process, the old target becomes the new baseline, and the process is repeated.<sup>5</sup>

The VAM process also includes costtime profiling which represents the buildup of cost over time for a product or service as it is processed. Through the use of VAM techniques, 50-92 percent leadtime reductions have been documented in ANC manufacturing, design, and administrative applications.

<sup>1</sup>Robert K. Hall, *It's Back to Basics with the Time-Based Continuous Improvement Process*, an American National Can internal publication, August, 1989.

For more information on the footnotes, readers may contact Robert K. Hall directly for copies of his articles at the following address: Robert K. Hall, American National Can Company, Mail Suite 11M, 8770 West Bryn Mawr Avenue, Chicago, IL 60631-3542.

<sup>2</sup>Robert K. Hall, *Setup Reduction*, an American National Can internal publication, 1989.

<sup>3</sup> P-M analysis is an improvement technique developed to promote thorough elimination of defects attributable to chronic causes. The letter "P" represents physical conditions (phenomena, physical, problem) and the letter "M" denotes factors (mechanism, machinery, manpower, material) so that a condition-factor analysis can be made. Referenced in Robert K. Hall's article. *TPM: Total Productive* 

## "Baseline" Time Function Map



## "Target" Time Function Map



**Figure 3.** Time-function maps are used to identify areas for leadtime reduction. This example shows that 46 days can be eliminated for a product which requires printing and extruding operations.

*Maintenance*, an American National Can internal publication, July, 1990, p. 5.

<sup>4</sup> Disconnect is a term used in VAM to define any missing, unneeded, illogical, deficient, confusing, extraneous, mis-directed, non-value-adding, redundant, unnecessary, poorly performing, untimely, substandard, insufficient, unspecified, inappropriate, or miscommunicated input or output on the baseline relationship or time-function maps, as referenced by Robert K. Hall in *Value-Added Mapping*, an American National Can internal publication, January, 1991, p. 9.

<sup>5</sup> Robert K. Hall, *Value-Added Mapping*, an American National Can internal publication, January, 1991.

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