Computer Control Of BATCH Processes

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FOREWORD

With the advent of computer-based process control systems, it has become viable — if not vital — to consider using these control systems for more than just continuous control functions. Many repetitive, sequential control actions now being performed manually can be implemented in computer software and automated. Automation can often bring about control improvements not possible with manual or non-computer control schemes.

One of the largest classes of processes that can be operated with computerized, sequential controls is the BATCH process. This book attempts to provide a grounding in the realities of BATCH process control to the engineer faced with implementing a computer-based process control system.

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W. T. Shaw

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INTRODUCTION

Computer-based control technology is here to stay and will become the predominant tool for the process engineer in years to come. Computers offer a means of implementing control schemes not possible using conventional analog technology. Because BATCH processes tend to have many non-continuous operations, are often controlled on a complex decision tree, and require a wide range of data, BATCH processes tend to be well suited for computerization.

But just because a computer could be used to contol a BATCH process doesn't mean that going to a computer-based control system is a good idea. And just because you have a computer, you shouldn't assume that it's easy to implement a computerized BATCH control system. There are a lot of things to consider when deciding whether to go to a computer-based control system for any BATCH process. This book attempts to cover the gamut of topics that a process engineer must address, from justifying a computer to installing it in the plant.

For those without a background in BATCH processes, Chapter 1 introduces BATCH concepts and terminology, such as recipes, sequence logic, devices, units, and steps. Chapter 2 discusses the ways computers fit into BATCH process control. Topics include how to interface the computer with the process, how a computer performs continuous control, and so on. Chapters 3, 4, and 5 examine the functions involved in purchasing and installing a computerized BATCH process control system. Chapter 3 offers a brief comparison of computerized control versus conventional control, then explains how to specify a BATCH process for computer control, and computer system training, testing, installation, and maintenance. Chapter 4 details the installation of a control computer in a harsh, plant environment. Chapter 5 describes procedures for developing BATCH programs (sequence logic) which execute in the installed computer to control the process. Appendix A presents a simplified example BATCH process — the bakery batter line — to show the process and control definitions required to support a computerized BATCH control system. Appendix B is a collection of typical BATCH programming language commands, with a brief explanation of each. Few references are

made in this book to specific computer-based products that have been, or are, available on the market. Rather, most discussions reference a "composite" control system that encompasses the important aspects of all major products.

It is our hope that this text provides sufficient information to permit any control engineer to be a "knowledgable" buyer when required to implement a computer-based BATCH control system.

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