

Process Control Design: Definition and Decisions

CHAPTER

24

24.1 ■ INTRODUCTION

Typically, the starting point for control system design and analysis is a preliminary process design, perhaps with some initial control loops, along with a specification of the desired process performance. This amount of initial information is realistic for existing plants, because the equipment is already in operation when an analysis to improve plant performance is carried out. It is also realistic for new plant designs, because a preliminary process structure (or alternative structures) must be available when dynamics and control are first analyzed.

The required information must be recorded concisely, and the control design form described in the next section is proposed as a format for this record. A great advantage for using this form, in addition to giving excellent documentation, is that it provides a way to begin the design analysis. Often, the design problem seems so big and ill-defined that an engineer, especially one new to the technology, is unsure where to begin. By completing the thorough definition, the engineer begins the problem-solving process, and important issues and potential solutions become apparent.

Potential actions required to achieve the desired process performance include (1) defining the control strategy designs, (2) selecting measured variables and instrumentation (i.e., sensors and final elements), (3) specifying the process operating conditions, (4) making minor process changes such as adding a bypass, selecting an alternative manipulated variable, or changing the capacity of some equipment, or (5) making major process structure changes, such as changing from a packed-bed reactor to fluid-bed reactor. The fifth possibility, involving major process alterations, is