

## Applications of Dynamic Simulation

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### Abstract

Applications of dynamic simulation today span R&D, Design, Operations, and Training. Proper implementation of dynamic simulation can deliver substantial benefits including tighter design, reduced project cycle time, smoother start-ups and optimized production. Because many of the existing dynamic simulation tools are time-consuming and difficult to use, these benefits are often not fully achieved. In this paper we identify the major areas of application for dynamic simulation, outline the important issues and potential benefits within each area, and provide a profile of a dynamic simulation tool that removes the barriers-to-use, and allows the benefits of dynamic simulation to be more fully realized.

### Introduction

Applications for dynamic simulation can be found in virtually all areas of process engineering. The tangible benefits of using dynamic simulation can be seen in tighter design, reduced project cycle times, smoother start-ups, and optimized production. These benefits are typically derived from improved process understanding. With all the advantages of dynamic simulation, it is sometimes surprising to discover resistance to its use. This resistance is understandable, however, when we examine the background and nature of many of the existing dynamic simulation tools.

Due to the unique combination of computer programming, numerical integration, modeling, and sophisticated chemical and thermodynamics skills required, dynamic simulation has remained largely in the hands of "experts" over the years. Additionally, because of the extremely large number of calculations that dynamic simulations require, these simulations have been reserved for very large and powerful main-frame or mini-computers. As such, only the most complex and challenging of process designs seemed to warrant the use of dynamic simulation. Today however, thanks to advancements in computer hardware and software technology, such as Object-Oriented Programming [7], and the development of new ways of packaging dynamic simulation [2,3], this technology

























