APPLYING AN ENTERPRISE ENGINEERING APPROACH TO ENGINEERING WORK: A FOCUS ON BUSINESS PROCESS MODELING

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Abstract

This article describes the application of an enterprise engineering approach to analyze and redesign a design change process in an engineer-to-order manufacturing plant. Contributions of this article include the development of a framework for enterprise engineering, with an emphasis on the design phase; exploration of business process modeling and the adopted modeling language; and the application of the design steps of the enterprise engineering approach, including process modeling to an actual engineering change order process. In particular, the extended Event-driven Process Chain (eEPC) method was used to create a multidimensional process representation including function, data, organization, and output components. Results of the case application demonstrate the applicability of enterprise engineering and process-modeling activities to non-routine, knowledge-based work.

Introduction

Within manufacturing enterprises, much attention has been given to improving and redesigning production processes. However, many organizations also find that there are significant opportunities for improving non-production processes, such as engineering design and other knowledge-based processes. These types of processes, including developing products and conducting design changes, are critical activities in engineer-to-order enterprises. These activities rely heavily on the knowledge possessed by employees. A large spectrum of changing product requirements frequently creates an unstable or non-routine environment. The performance of product-development and design-change processes is tightly connected to the performance of the entire enterprise system. As part of the *sell-design-procure-manufacture-deliver* chain in engineer-to-order enterprises, these design and development processes contribute directly to the generation of value for the whole business. The complexity and embedded knowledge in these processes require a systematic (re)design approach to develop a high-performance system.

Blanchard and Fabrycky (1998) highlight weaknesses in traditional bottom-up engineering design methods where the effort starts with a set of known elements and a product, system, or process is created through synthesizing a combination of these system elements. In such cases, the desired functional need is very unlikely to be met on the first attempt unless the system is simple. In the enterprise engineering approach described in this article, top-down deployment by means of enterprise models, where details are added gradually and consistently, is prescribed followed by bottom-up validation of content to ensure the actual process, including physical and technological attributes, can be realized. In applying this type of enterprise engineering approach, the use of multidisciplinary project teams, as well as sound modeling languages, can ensure complexity is addressed in the design activities and all critical information from various parts of the organization is obtained.

The purpose of this article is to present an approach that engineering managers can utilize to design or redesign a

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