

# LEAN DESIGN AND MANAGEMENT FOR MANUFACTURING ENTERPRISE LIFECYCLE

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## ABSTRACT

Most enterprises inducting lean production were confined by the innate limitations of existing production systems, which make it difficult to fulfill lean production comprehensively. To solve this problem, the theory of lean design and management for the manufacturing enterprise lifecycle was proposed. First, the necessities of lean design were analyzed and its theoretical system was established; second, the principles, process, methods and tools for lean design was introduced. Techniques and theories such as lean production, facility layout, system simulation and simultaneous engineering were integrated to support the implementation of lean design and management; finally, a case study of a cold-rolling enterprise was analyzed.

**Keywords:** lean design, lean production, lifecycle, simulation, manufacturing enterprise, production system

## I. INTRODUCTION

Nowadays, the study and practice of “lean” have already extended from the production domains to other stages such as product development and sales. Theories such as Lean Supply Chain, Lean Six Sigma and Lean Product Development were proposed. For example, James Morgan and Jeffery liker [1] summarized the product development way in Toyota Corporation, and proposed a system model of Lean Product Development which integrated people, process and tools. Scholars in China also suggest that it is necessary to extend the application scope of lean. For instance, Yongsheng Gu [2] proposed lean factory and technique design for the automobile engine enterprise; Haicheng Yang [3] suggested lean concept should be extended from manufacturing to every steps and processes of design stage in order to form a superior plan; Tianbing Zhang [4] introduced the route of applying lean product design and how to choose proposal to avoid wasting.

However, few research focus on establishing a complete theoretical system of lean design and management for manufacturing firms which integrates product development, factory design and production; in the term of depth, further research is still necessary for concrete principle, process and available tools for lean design; in the term of time, previous research could be more systematical if they take manufacturing enterprise