

Incorporating Ergonomics into Supply Chain Systems

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Abstract

This paper proposes and discusses the theoretical concepts of relevance to ergonomics which is mostly macroergonomics in the supply chain systems. The macro-ergonomics which is known as sociotechnical system tries to involve its role into today's biggest issue in manufacturing global management which is called the supply chain management. The supply chain management has a close relationship with macro-ergonomics since both concern a system of organization, people, technology, information and other resources. Some case studies are discussed and summarized in this paper. In addition, a conceptual model of ergonomics supply chain is also proposed. Strategically, this work will help to broaden understanding of importance of ergonomics to boost supply chain performance drivers in order to gain efficiency and responsiveness in meeting company's competitive strategy.

Keywords: ergonomics, macro-ergonomics, sociotechnical, supply chain management, performance drivers

1. Introduction

The purpose of this paper is to discuss some theoretical concepts of relevance to ergonomics in the domain of manufacturing processes to enhance the effectiveness and efficiency of the supply chain systems. At the beginning, ergonomics has been regarded as a discipline focusing on how to design comfortable chair to the users, to design convenient workstations, or other work system which is called human and machine interface. Substantially, this view has been already known as micro-ergonomics; the basic discipline of ergonomics. However, few years later, ergonomics has shifted and become a discipline in meeting consumer's needs. In recent years, the changes of focus of ergonomics have been increasing significantly. This metamorphosis was proven by the milestones of ergonomics. In the 50's ergonomics was known as military ergonomics, 60's as industrial ergonomics, 70's as customer and service ergonomics, 80's as computer ergonomics, and at the beginning of 90's and year 2000 ergonomics is famous as cognitive and macro-ergonomics [10].

According to the increased changes in technology and innovation, the discipline of ergonomics has become more complicated. More recently, the application of ergonomics has been too wide. It is a must for ergonomists to take parts in solving today's complicated problems. Therefore, it is much more important to look into deeper and broader the application of ergonomics, which is known as macro-ergonomics. The context of macro-ergonomics is not only focusing on human and machine itself, but also how the interactions between human and their sociotechnical issues. In other words, the macro-ergonomics will be more dealing with complicated environmental issues. With respect to the supply chain systems, macro-ergonomics should be regarded as one of contributors to the significance of supply chain performances. It is because there will be roles of humans/operators, procedures, machines, information and other components in a particular supply chain system. A brief explanation of components of supply chain system is provided in Section 2. In other words, supply chain is regarded as socio-technical system since it is very complex organization where involving the interaction between people and technology. Thus, it is applicably needed how to involve ergonomics in the supply chain system such as how to design a comfortable work station, how to interact between operators comfortably, how to manage a good flow of information, how to achieve high productivity with safety consideration etc in order to achieve high level of performance in the supply chain system. However, there is no a formal approach or methodology to incorporate ergonomics (micro-ergonomics and macro-ergonomics) in the supply chain system. Therefore, to fill in this niche, this paper proposes a