Chapter 15
Strategic Development of Automobile New Manufacturing Management Technology

ABSTRACT

The author considers the importance of strategic development for the new manufacturing management technology as the intelligence productivity improvement based on Advanced TPS employing NJ-AGPM. In this chapter, particularly, the author focuses on the typical dual technologies: (1) creation of the Working Value Evaluation Model (WVEM) to improve the performance of labor and (2) developing intelligence operators by employing the Human Integrated Assist System (HIA) based on the knowledge which could get it with WVEM. The author has verified the effectiveness of WVEM and HIA at an advanced car manufacturer Toyota and others.

INTRODUCTION

The Japanese manufacturing industry is now developing global production by establishing production sites in various countries. High quality assurance is regarded as the strong point of manufacturing in Japan (Abegglen, 1958). However, this situation is under threat (Hunt, 1991; Gabor, 1990). Therefore, the author considers it vital to make production operators more independent and creative in addition to their engineering capabilities and skills so as to become an "intelligence operator" for developing NJ-AGPM (New Japan Automobile Global Production Model) based on Advanced TPS (Amasaka, 2007; Amasaka and Sakai, 2011) (Refer to Chapter 5, 6 and 7).

To create products with superior quality, cost, and delivery (QCD) characteristics, the most important task for manufacturers is raising the quality of labor work performed by on-site operators (job performance), thus boosting the value of company labor employing typical dual technologies.

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First, in this chapter, the author takes a fresh perspective on the issue, placing importance on the performance of labor itself developing Advanced TPS (Amasaka, 2007; Amasaka and Sakai, 2011). The author then identifies the relevance of key causal factors contributing to that performance. Having collected this information, the author then creates the Working Value Evaluation Model (WVEM) for labor valuation by using statistical science that allows manufacturers to visualize the performance of labor (Uchida et al., 2012) (Refer to Chapter 7).

Concretely, this model systematically covers 18 key factors, and is made up of five core models: reducing fatigue, preventing illness, comfort, knowledge and ability, organizations and roles/responsibilities (Amasaka, 2015, 2017, 2018, 2020).

Second, in a strategic development of Advanced TPS, the author considers the need to make production operators achieve challenges and creation in addition to engineering capabilities and skills so as to become "intelligence operator".

Concretely, in the wake of the recent rapid expansion of globalization, short-term training of production operators is an especially critical issue, particularly for ensuring productivity at the start-up of local production. To deal with this issue, it is urgent to apply this system to analyze the factors that contribute to the variations in the skill acquisition level of local operators. This is done with a view to establishing a training method that can support them to stably perform work despite the differences in their ability.

Specifically, in view of the need to develop a new creative human-oriented production system for meaningful working, the author constructs the Human Integrated Assist System (HIA), for creative, meaningful working leading to intelligence productivity improvement. It supports autonomous development of "*kaizen*" as the core of this system for the global production strategy (Sakai and Amasaka, 2008; Amasaka, et al., 2008, 2015, 2017, 2018, 2020).

CREATION OF A WORKING VALUE EVALUATION MODEL (WVEM)

Problems in Working Environments of Manufacturing

As a large manufacturing country, Japan is actively expanding its business overseas. On the other hand, the falling birth rate and the aging population are becoming serious problems in Japan (Kimura, 1999). Young people are said to have veered away from the manufacturing industry so the industry is now facing a shortage of workers. To cope with these problems, Japanese companies have eliminated hard labor in the working environment, and streamlined workplaces through the 5S (Seiri (tidiness), Seiton (orderliness), Seisou (cleanliness), Seiketsu (standardization) and Shitsuke (discipline)) (Toyota and Toyota Kyushuu, 1994; Sakai and Amasaka, 2005, 2006).

In the local manufacturing environment, however, the increase in the number of temporary workers and the acceptance of foreign trainees have caused a decline in autonomy in the workplaces, and workers have had difficulty in finding the value in working in such environments (Amasaka, 2003; Amasaka and Sakai, 2011). In such surroundings, there is an urgent need to help workers find meaning in their jobs and acquire high-level skills (Yamaji and Amasaka, 2007, 2008). If you look overseas, a new research field called Gerontechnology began in the Europe where, like Japan, the aging population has grown (Kinnunen-amoroso et al, 2009). In Gerontechnology, physical and mental aspects of old people are studied. Although Gerontechnology has yielded some results scientifically, it is still not applicable in an actual working environment.