

## **Abstract of Doctoral Thesis**

# **Research on the effects of psychological and physical factors on workers' productivity**

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The increasing sophistication and complexity of technology has increased the physical risks and psychological stress faced by workers. This study discussed the psychological and physical factors that affect workers in a labor-intensive work environment, and quantified work awareness and workload for productivity.

In the first half of this paper, labor productivity perceptions were investigated among construction workers of different ages. Relationships between health risk indicators by heart rate and Body Mass Index (BMI), feelings of safety in the work environment, job satisfaction, proactive work behaviors, intrinsic and extrinsic work motivation, work skills, and productivity awareness were analyzed. Workers were assessed in two groups at ages when Japan's economic conditions changed. Older workers had an increased health risk, which negatively affected their motivation at work and their perception of workplace safety and their perception of productivity. The results are useful for labor management in construction projects and to understand the differences in awareness among workers' age groups.

In the latter part of this paper, we devised a model that measures the workload of construction workers from their age, physical activity, and WBGT (Wet Bulb Globe Temperature) of the work environment in order to easily estimate the health risk. In the estimation results, the correct discrimination rate of the judgment model for health risk was 89.2%. The results suggest that the health risk of workers is judged with high probability in an environment where it is difficult to measure the subjects' heart rate in advance.

In this study, it was shown that it is possible to understand the productivity perception of workers of different age groups and to estimate the health risk from the workload by practical means. These results contribute to the understanding of workers' work awareness and work motivations.