ABSTRACT

LAMTO WIDODO. Autopoietic Concept on Ergonomics of Worksystem (Case Study: Sugar Cane Industry). Under advisory of BAMBANG PRAMUDYA, SAM HERODIAN, and M FAIZ SYUAIB.

Sugar factory is one of industry that involves multiple parties as stakeholders. The design of work system should consider all interests, to ensure the sustainability of the system itself. Optimum conditions can be achieved by designing work system based on ergonomic considerations. In the concept of ergonomic, human beings are positioned as the center of the design process. Humans have the capacity and limitations and should be considered since the beginning of the design process. This concept is known as fit the job to the man. In preliminary studies, found several phenomena that deviate from this concept. In many ways, people can improve their skills so they can adapt to the workload and working environment. This study combines deductive and inductive methods, combined with some relevant philosophical outlook. Field research was conducted in two industries namely PG Jatitujuh Cirebon and PG Bungamayang Lampung. This study focused on the work of manual harvesting systems, transportation and milling sugarcane. The results showed that some parameters are less ergonomic working conditions, workload values are categorized between moderate to very severe, the contradiction between workload and perception of the operator and the phenomenon of adaptation of workers to harvest and transport worksystem manual. The workload of worker cutting transport was measured based on increase of the ratio of heart rate (IRHR), which compares the heart rate at work and at rest. Regression curve of IRHR vs experiences on morning harvesting follow the function $Y= -0.105 \ln(X) + 1.7484$; for morning transporting $Y= -0.046\ln (X) + 1.7323$ ; for afternoon harvesting $Y= -0.063 \ln(X) +1.5482$, and for afternoon transporting $Y= -0.044 \ln(X) + 1.595$. Differences of the slope of the regression curve shows that the level of adaptation required by the workers on the harvesting longer than transporting. This is due to cut sugar cane requires greater physical energy and skill. Novice workers learn to be able to cut the cane with a limit of 50-10 cm above the ground, in an upright cane conditions, collapsed or angled, even crossing each other. The results indicate that with increasing experience, response to fatigue and workload tends to decrease. This process can be explained by the concept of autopoietic, which is each component in a system will make the process of self-organizing. This adaptation process is one of the autopoietic mechanism. To adapt to the harvesting and transporting jobs, workers may take between 6-10 years experience.

Keywords: worksystems, manual harvesting, transporting, milling, ergonomic, adaptation, autopoietic