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Temat badań naukowych: **Modelowanie przepływu strumienia wartości produkcji części lotniczych na elastycznej linii produkcyjnej.**

Abstract

The topic of modelling the flow of the value of the production of aviation parts on a flexible production line or otherwise known as a flexible production system (ESP) is extremely important for the point of view of production plants. The costs associated with the purchase, installation and commissioning are very high, which is why companies that decide to use the ESP line try to use it to the maximum from the very beginning. Lack of knowledge and experience then leads to unintended losses related to not using the full potential of such a flexible production system. Skillful modelling of the production flow in a virtual environment is one way to test various input parameter settings and output parameter control. We call such testing an experiment. The experiment is a research method involving the manipulation of variables in order to measure their effects while controlling other variables that may affect the interpretation of the results (Korzyński M., 2013). This work is a kind of case study of ESP in an aviation company. The paper presents the process of creating a virtual environment of a flexible production line along with the methodology of input and output data verification and model validation. These works were preceded by literature research and then a detailed analysis of the research area. The result of the work is the presentation of a complete virtual model of the ESP line capable of carrying out experiments.

Thanks to the conducted experiments and the selection criteria used, the input variables were tested in a short time. The results of the experiments made it possible to select the most advantageous options and, at the same time, to recommend to the management board which direction to the best choose. At the same time, it did not require stopping the production line and everything took place in a virtual environment similar to the real one. It has been proven that the model is a great tool to support the decision-making process in various management areas of the plant, such as production planning (value stream flow measured by the *Utilization* indicator) or finance (value stream flow measured by *WIP* and *LT* indicators). The knowledge and experience gained during the implementation of this work in the future will allow for the development of further virtual production lines in the company.