USE OF SYSTEM DYNAMICS PARADIGM FOR SIMULATION BASED ANALYSIS OF CYCLE-TIME IN MOULDING INJECTION MANUFACTURING FOR PLASTIC PARTS

Vasile PUCHIANU[1], Emanuel IANCU[2], Adrian GHIONEA[3], Cătălin ȘTEFAN[4]

Rezumat. *Analiza ciclului operativ în fabricație furnizează o serie de informații privind durata procesului de fabricație a unui produs finit. Lucrarea își propune să folosească metodologia „system dynamics" pentru diagnosticarea duratei ciclului operativ al unui proces de producție piese prin injecție mase plastice. Informațiile furnizate de acest tip de analiză sunt folosite atât în diagnosticarea proceselor cât și în testarea și evaluarea alternativelor de creștere a eficienței fabricației. De asemenea, metodologia propusă poate fi aplicată și în contextul modelării și simulării activităților de reproiectare a fluxurilor materiale.*

Abstract. *The analysis of the cycle-time in a manufacturing environment can provide a variety of useful metrics regarding the time required for completing one unite of production. This article aims to use a system dynamics approach to diagnose the cycle-time related to the production process of injection moulding for plastic parts. The clear, unambiguous cycle-time metrics provided by the analysis can help, both in diagnosing process problems, and in testing and evaluating proposed alternatives to improve the production efficiency. Also, the proposed framework can be applied in a variety of modelling contexts, in a process re-engineering or process improvement effort.*

Keywords: cycle-time, analysis, injection moulding, simulation, system dynamics.

1. Introduction

Inherent to the investigation of the manufacturing cycle-time are a set of activities, from defining the optimum production batch, calculations of the quantity of required parts, pre-production steps and production launching, cycle scheduling, management of production activities with current asset engagement, to the analysis and investigation of material flow.

[1]PhD, Faculty of IMST, Machine and Manufacturing Systems Department, Politehnica University of Bucharest (vasile.puchianu@upb.ro).

[2]PhD, Faculty of IMST, Machine and Manufacturing Systems Department, Politehnica University of Bucharest (iancu.emanuel@gmail.com).

[3]Prof, Faculty of IMST, Machine and Manufacturing Systems Department, Politehnica University of Bucharest (adrianghionea@yahoo.com).

[4]Eng, Faculty of IMST, Machine and Manufacturing Systems Department, Politehnica University of Bucharest (stefan_catalin_611bc@yahoo.com).