

Sequencing Using Surrogate Values on Paced Assembly Lines

By Faisal S. Alfaiz

Candidate for Master of Science in Industrial Engineering

Major Professors: Dr. David S. Kim and Dr. Hector A. Vergara

Abstract

On a paced mixed-model assembly line various product variants are assembled in the same sequence of serially arranged workstations that make up the line. The goal is to assemble the products with the lowest cost possible while meeting demand requirements. Since the work content of product variants may differ at each workstation, the sequence of jobs assembled on the line can have a significant impact on line performance.

Job sequencing has been studied extensively. A majority of the published research assumes that job processing times are deterministic and known. In this research, job sequencing on assembly lines is examined when job processing times are not known and are replaced by fixed scale surrogate values. The surrogate values represent the expert judgment of engineers, managers, and operating personnel. Designed experiments were conducted to examine surrogate value properties and their effect on job sequence performance (makespan and number of work overload situations).

Results indicate that the use of surrogate values as an alternative to job processing times performs well in certain assembly system environments. Although job sequences obtained using surrogate values might not perform as well as sequences obtained using job processing times, these times are often not known. Thus the use of surrogate values can be an effective substitute for job processing times when sequencing jobs.

Friday, March 16, 2018

4:30 p.m., Valley Library 1420

School of Mechanical, Industrial
and Manufacturing Engineering



Oregon State
University