

Author's Accepted Manuscript

Minimizing the number of stations and station activation costs for a production line

Sergey Kovalev, Xavier Delorme, Alexandre Dolgui, Ammar Oulamara



www.elsevier.com/locate/caor

PII: S0305-0548(16)30255-6
DOI: <http://dx.doi.org/10.1016/j.cor.2016.10.007>
Reference: CAOR4105

To appear in: *Computers and Operation Research*

Received date: 4 January 2016
Revised date: 17 October 2016
Accepted date: 18 October 2016

Cite this article as: Sergey Kovalev, Xavier Delorme, Alexandre Dolgui and Ammar Oulamara, Minimizing the number of stations and station activation cost for a production line, *Computers and Operation Research* <http://dx.doi.org/10.1016/j.cor.2016.10.007>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain

Minimizing the number of stations and station activation costs for a production line

Sergey Kovalev¹, Xavier Delorme², Alexandre Dolgui³ and Ammar Oulamara⁴

¹*INSEEC Business Schools Lyon, 25 rue de l'Université, 69007 Lyon, France, e-mail:*

skovalev@inseec.com

²*École des Mines de Saint-Étienne, LIMOS UMR CNRS 6158, 158 cours Fauriel, 42023*

Saint-Étienne Cedex 2, France, e-mail: delorme@emse.fr

³*École des Mines de Nantes, IRCCYN, UMR CNRS 6597, La Chantrerie, 4, rue Alfred Kastler*

- B.P. 20722, F-44307 Nantes Cedex 3, France, e-mail: alexandre.dolgui@mines-nantes.fr

⁴*University of Lorraine, Ile de Saulcy, 57045 Metz, France, e-mail: ammar.oulamara@loria.fr*

Abstract

In the problem under study, a paced unidirectional machining line, consisting of a number of stations, has to be configured to produce parts of several types. A given set of operations is required for each part type and the same operation can be required for different part types. Re-assignment of operations, when switching from one part type to another, is not allowed. All operations assigned to the same station are performed simultaneously. The objective is to assign operations to stations in order to minimize the number of stations and the station activation costs, with respect to precedence and zoning constraints. The two objectives are considered in a lexicographic order, the former being the primary objective. Activation costs refer to the costs induced by the energy consumption, equipment maintenance, setup activities or labor requirement which occur whenever a station is used. Computational complexity for various special cases is established. Heuristic algorithms, integer linear programming formulations, and computer experiments are presented. Instances of practical dimension, with 40 to 80 operations, are solved in an hour on a conventional computer.

Keywords: Line balancing; Scheduling; Computational complexity; Integer linear programming; Heuristics.

Download English Version:

<https://daneshyari.com/en/article/4959167>

Download Persian Version:

<https://daneshyari.com/article/4959167>

[Daneshyari.com](https://daneshyari.com)