

CORE DISCUSSION PAPER
2000/9

**MODELLING PRACTICAL LOT-SIZING PROBLEMS AS
MIXED INTEGER PROGRAMS**

Gaetan BELVAUX¹ and Laurence A. WOLSEY²

February 2000

Abstract

In spite of the remarkable improvements in the quality of general purpose mixed integer programming software, the effective solution of a variety of lot-sizing problems depends crucially on the development of tight formulations for the special problem features occurring in practice.

After reviewing some of the basic preprocessing techniques for handling safety stocks and multilevel problems, we discuss a variety of aspects arising particularly in small and large bucket (time period) models such as start-ups, changeovers, minimum batch sizes, choice of one or two set-ups per period, etc. A set of applications are described that contain one or more of these special features, and some indicative computational results are presented. Finally to show the variety of techniques that are needed, a slightly different (supply chain) application is presented, for which the a priori addition of some simple mixed integer inequalities based on aggregation leads to important improvements in the results.

Keywords: Lot-sizing, Production Planning, Mixed Integer Programming, Valid Inequalities, Reformulation.

¹Cockerill-Sambre, Flémalle, Belgium. E-mail: gaetan.belvaux@cockerill-sambre.com.
Work carried out at CORE.

²CORE and INMA, Université Catholique de Louvain, Belgium. E-mail: wolsey@core.ucl.ac.be

This paper presents research results of the Belgian Program on Interuniversity Poles of Attraction initiated by the Belgian State, Prime Minister's Office, Science Policy Programming. The scientific responsibility is assumed by the authors.