A New Formulation of Multi Item Multi Period Capacitated Lot Sizing Problem with Setup Carryover, Inventory and Backorders (MIMPCLSPWSCIB)

RRK Sharma and Syed Moize Ali
Department of Industrial and Management Engineering
IIT Kanpur 208016 India
rrks@iitk.ac.in; moizeali@iitk.ac.in;

Mayank Verma
BARC Mumbai India
mayankverma.p@gmail.com

Priyanka Modi Verma
NITIE Mumbai India
priyankaverma.nitie@gmail.com

KK Lai
President, Chao Yang University of Technology Taiwan
Email: laikk.tw@gmail.com

Abstract

Consider the standard multi-item, multi-period, capacitated lot sizing problem with setup, inventory and backorders (MIMPCLSPWSIB). To this problem we add the issue of setup carry over. This is explained as follows. If an item i is scheduled last in period (t-1), and is scheduled first in period 't', we do not incur setup time and setup cost in period 't'. We incur setup cost and setup time only in period 't-1'. This results in problem MIMPCLSPWSCIB. We give here two formulations of problem MIMPCLSPWSCIB. We discuss the merits of each formulation in this paper.

Keywords
Capacitated Lot Sizing Problem (CLSP), Multi-item and multi-period.

Biographies
RRK Sharma, He is B.E. (mechanical engineering) from VNIT Nagpur India, and PhD in management from I.I.M., Ahmedabad, INDIA. He has nearly three years of experience in automotive companies in India (Tata Motors and TVS-Suzuki). He has 32 years of teaching and research experience at the Department of Industrial and Management Engineering, I.I.T., Kanpur, 208016 INDIA. To date he has written 1195 papers (peer-reviewed (395) /under review (18) / working papers 782 (not referred)). He has developed over ten software products. To date, he has guided 64 M TECH and 21 Ph D theses at I.I.T. Kanpur. He has been Sanjay Mittal Chair Professor at IIT KANPUR (15.09.2015 to 14.09.2018) and is currently a H.A.G. scale professor at I.I.T. Kanpur. In 2015, he received "Membership Award" given by IABE USA (International Academy of Business and Economics). In 2016 he received the "Distinguished Educator Award" from IEOM (Industrial Engineering and Operations Management) Society, U.S.A. In 2021, he received IEOM Distinguished Service Award. In 2019 and 2020, he was invited by the Ministry of Human Resources Department, India, to participate in the NIRF rankings survey for management schools in India. In 2019, he was invited to participate in the Q.S. ranking exercise for ranking management schools in South Asia.

S Moize Ali: He is PhD student at Dept of IME IIT Kanpur. He has 10 publications to his credit.

Mayank Verma: He is an Honours Graduate in Mechanical Engineering and a Ph.D. from IIT Kanpur. He is associated with the Indian Nuclear Industry for the past 20 years. Earlier he worked as a Reactor Engineer, Turbine

Engineer, and Control Engineer in the Main Plant Operations of Rajasthan Atomic Power Station Units-3&4, Nuclear Power Corporation of India Limited (NPCIL). Currently, he is working with the Indian Atomic Energy Regulatory Board (AERB). At AERB, he is Leading the overall Regulatory Oversight of the Kakrapar Atomic Power Project (KAPP-3&4), which is India's first indigenous 700 MWe Pressurized Heavy Water Reactor based Nuclear Power Plant. Being AERB's Project Coordinator and Member Secretary of the Project Design Safety Committee, he is the Nodal Officer playing a lead role in Licensing of KAPP-3&4.

Priyanka Verma: Priyanka Verma is a Faculty Member in Operations and Supply Chain Management area of the National Institute of Industrial Engineering (NITIE), Mumbai. Her teaching and research interest includes Logistics and Supply Chain Management, Optimization, Facility Planning, Project Resilience and Manufacturing Strategy modelling. She has published in journals of repute like International Journal of Production Economics, International Journal of Production Research, Computers and Industrial Engineering, International Journal of Physical Distribution & Logistics Management, Production Planning and Control, to name a few. She has presented her research in National and International conferences organized by PMI, POMS, IEEE, ISDSI, IEOM, ORSI, SOM etc.

KK Lai: He is currently President of CYUT Taiwan. He has numerous publications to his credit.