



Centre of Excellence in Supply Chain Management

## 8<sup>th</sup> Workshop on Logistics and Supply Chain Management

Louvain School of Management  
Université Catholique de Louvain

**November 26th, 2008**

Facultés Universitaires de Saint Louis, Brussel

### PROGRAM

- 12:30 - 13:00 Sandwiches in the meeting room
- 13:00 - 13:40 **Said Dabia,**  
*“A Dynamic Programming Approach to the Multi-Objective Time Dependent Single VRP with Both Transportation and Time Limitations”*  
Technische Universiteit Eindhoven, The Netherlands
- 13:40 - 14:20 **José Antonio Larco,**  
*“Goals and Deadlines for Production Efficiency and Flexibility”*  
Rotterdam School of Management, The Netherlands
- 14:20 - 14:40 Break
- 14:40 - 15:20 **Alina Curseu,**  
*”Periodic-review Lost-sales Inventory Models with Batch Ordering and Handling Costs”*  
Technische Universiteit Eindhoven, The Netherlands
- 15:20 - 16:00 **Marco Bijvank,**  
*“Periodic Review Lost-sales Inventory Models with Constant Lead Times of any Length”*  
Vrije Universiteit Amsterdam, The Netherlands
- 16:00 – 16:40 **Morteza Pourakbar,**  
*“Inventory Control of Spare Parts in The Final Phase”*  
Erasmus University Rotterdam, The Netherlands
- 16:40 Closing words, date for next seminar

## **Summary of Abstracts**

### *A Dynamic Programming Approach to the Multi-Objective Time Dependent Single VRP with Both Transportation and Time Limitations*

Said Dabia

#### **Abstract**

Despite its practical importance the single vehicle routing problem has received little attention in literature. Moreover, multi-objective cost functions are rarely dealt with. Furthermore, due to road congestion, travel times are hardly time-independent making the day-to-day planning harder. In this paper, we consider a single vehicle routing problem with both transportation and time limitations. We assume a time-dependent environment where travel costs change over time. A vehicle with fixed and finite capacity has to fulfill customers' dynamic demand. The vehicle is only available for a limited time and it can be dispatched at different moments. At customers, soft time windows are imposed. Contrary to most of the literature, we consider a multiple objective cost function. Our aim is to schedule the vehicle such that the its total travel time and lateness are minimized, and its capacity utilization is maximized. On top of that the dispatching time should be decided on. The system is modelled as a multi-criteria time dependent knapsack problem. A pseudo-polynomial algorithm based on a dynamic programming (DP) formulation is used to compute the set of non-dominated routes. Furthermore, an approximate DP based algorithm with provable approximation guarantee is developed. The approximate algorithm reduces the computation time considerably. Finally, numerical examples are showed and the most interesting insights are discussed.

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### *Goals and Deadlines for Production Efficiency and Flexibility*

J.A. Larco, K.J. Roodbergen, M.B.M. de Koster, J. Dul

#### **Abstract**

In this paper we show the potential usefulness of goal-setting for enhancing production efficiency and capacity flexibility. To achieve this, we build a model consistent with current empirical results of goal-setting that is capable of making testable predictions regarding the workspace of workers while under the influence goals. We provide some recommendations for setting goals to achieve enhanced productivity and cope with fluctuating demand.

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### *Periodic-review Lost-sales Inventory Models with Batch Ordering and Handling Costs*

A. Curşeu, T. van Woensel, N. Erkip and J.C. Fransoo

#### **Abstract**

We consider a retailer who manages the inventory of a single item, facing stochastic demand and periodically reviews its stock for replenishment. The replenishment lead time is assumed to be less than the review period length and excess demand that cannot be satisfied immediately from stock on hand is lost. Furthermore, the retailer replenishes its stock in pre-packed form, with fixed, exogenously determined sizes. Using Markov Decision Processes, we explore the behavior of optimal control policies under the long-run average cost criterion. We consider fixed and variable costs, depending on the number of case packs and consumer units. The optimal policy is shown to be rather complex and in particular, the effect of the case pack size on the optimal policy and cost is investigated. In a numerical study, we compare the performance of a real-life heuristic policy, the  $(R,s,nq)$  policy, against the optimal policy and find that it generally performs badly in an environment where there is a positive replenishment cost (such as grocery retailing, due to handling costs). Finally, we present a new policy, which shows close to optimal performance on preliminary testing.

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### *Periodic Review Lost-sales Inventory Models with Constant Lead Times of any Length*

Marco Bijvank and Soren G. Johansen, University of Aarhus, Denmark.

#### **Abstract**

In almost all literature on inventory models with lost sales and periodic reviews the lead time is assumed to be an integer multiple of the review period. In a lot of practical settings this restriction is not satisfied. We develop a model allowing constant lead times of any length. Such a model can be used to determine the optimal length of the review period. We consider pure and restricted base-stock policies. Based on our numerical results we conclude that the latter policy, which imposes a restriction on the maximum order size, performs almost as well as the optimal policy. We also propose an approximation procedure to determine the base-stock levels for both policies with closed-form expressions.

## *Inventory Control of Spare Parts in The Final Phase*

Morteza Pourakbar, Rommert Dekker and Hans Frenk

### **Abstract**

We consider an appliance manufacturer problem of controlling the inventory of spare parts in the final phase. This phase begins when the production of the part is discontinued and ends when the last service contract expires. To meet the demand, all previous works consider repair of the defected part. But in this work we also consider the possibility of an alternative policy such as swapping the defected product with a new one. We develop an optimal solution approach to find final order quantity and time to switch to the alternative policy simultaneously.