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Design of a period batch control planning system for cellular manufacturing

Riezebos, J.

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**Design of a
Period Batch Control
Planning System
for
Cellular Manufacturing

Jan Riezebos**

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RIJKSUNIVERSITEIT GRONINGEN

**Design of a
Period Batch Control
Planning System
for
Cellular Manufacturing**

PROEFSCHRIFT

ter verkrijging van het doctoraat in de

Bedrijfskunde

aan de Rijksuniversiteit Groningen

op gezag van de

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in het openbaar te verdedigen op

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Promotor

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ISBN 90-367-1341-2

STELLINGEN

behorende bij het proefschrift

Design of a

Period Batch Control

Planning System

for

Cellular Manufacturing

van

Jan Riezebos

4 januari 2001

Een afname in de totale voorraad onderhanden werk kan bereikt worden door het aantal tussenvoorraadposities te laten toenemen.

(Dit proefschrift)

Het pleidooi voor een geringer aantal niveaus in de stuklijst zoals gevoerd in planningsliteratuur m.b.t. groepsgewijze productie¹ houdt onvoldoende rekening met het effect op de performance van het productiesysteem.

(Dit proefschrift) (¹ zie Wemmerlöv [1988: 28], Steudel & Desruelle [1992: 272])

Gebruik van transfer batches in flow shops levert de grootste verbetering van de make span indien gecombineerd met permutation flow shop schedules.

(Dit proefschrift)

De taak van productieplanning wordt niet eenvoudiger door het productiesysteem op te delen in teams.

(Dit proefschrift)

Om te kunnen vaststellen of het wenselijk is een instrument te gebruiken is het noodzakelijk maar niet voldoende om de effectiviteit ervan aan te tonen. Dit geldt zowel voor de doodstraf als voor het in dit proefschrift bestudeerde plannings-instrument PBC.

Het *christmas tree problem* is geen speciaal geval van het *cutting tree* problem.

Management concepten zijn als homeopatische geneesmiddelen: zowel zij die het voorschrijven als die er gebruik van maken wachten wetenschappelijk bewijs van werking en mogelijke bijwerkingen niet af.

Gezien het toenemende aantal publicaties waarin kritiek wordt geuit op de *moderne* sociotechniek is er behoefte aan een *postmoderne* sociotechniek.

Pogingen om op basis van een economische waardering van vrijwilligerswerk en onbetaalde zorgtaken het maatschappelijk belang te duiden nemen ten onrechte het economisch hegemonisme als uitgangspunt.

De bestaansgrond van wetenschap is niet het bevestigen van intuïtie, maar het bevragen ervan.

(n.a.v. H. Mulisch, De ontdekking van de hemel, 1992)

Wetenschap dient niet blindelings te werken aan de grenzen van het weten, maar weet te hebben van de grenzen van haar denkkaders en instrumentarium.

Basisscholen gaan professioneler om met het herkennen en inpassen van over- en onderpresterende hoogbegaafden in hun onderwijssysteem dan universiteiten.

Toepassing van het poldermodel leidt tot vervlakking.

WORD wordt nooit *perfect*.

PREFACE AND ACKNOWLEDGEMENTS

Doing research is an exciting activity. It raises much more questions that remain unanswered, as compared to the actual progress that is obtained. I consider this to be one of the most important contributions of scientific work. We should never stop thinking and raising questions about fundamental choices that are made. In order to determine how to move forward, we have to look back. This thesis is the result of such a backward looking activity. As an assistant professor production management and production system design, I visited many firms that coped with production planning problems. Some of them expected to eliminate these problems by changing their production system into a cellular manufacturing system. Others were disappointed with respect to the results they obtained with their cellular organized production system. I wondered to what extent the production planning systems of firms could be redesigned such that the benefits of cellular manufacturing became within reach. Therefore, I started to study literature on the design of planning systems for cellular manufacturing. Many of these studies pointed towards the work of Burbidge on Period Batch Control (PBC). It is a simple and rather straightforward system, based upon repetition, and easily adaptable to specific situations that require tailor made solutions. Unfortunately, the same holds true for the descriptions of PBC in literature. The main contribution of my research project is to provide a scientific body of knowledge on period batch control planning systems for cellular manufacturing. I have worked on it with enthusiasm and excitement.

Doing research is also a long-term activity. It has taken six years to finish this thesis. The most difficult questions during this time were about the remaining amount of time necessary to finish the thesis, and not only because I didn't know the answer. The main struggle in the research project was to convince myself of the worthiness of this study. I thank my supervisor Gerard Gaalman, for understanding me in these parts of the project as well. He continuously expressed his faith in my ability to finish this thesis. I enjoyed the inspiring discussions and the friendly atmosphere that he created for working at this thesis. I express my thanks to the members of my dissertation committee, Jacob Wijngaard, Nallan Suresh, and Ton de Kok, for their willingness to read the manuscript carefully. It has costed them a lot of time and energy, and I am grateful for their efforts. Peter van Dam and Martin Land often have motivated me to keep on working at the thesis. I am indebted to them and to other -former- members of my department and faculty for stimulating and enabling me to work at this subject.

Invaluable support has been given by people that were not able to understand what I was doing. My parents have stimulated me to develop my abilities and not to forget the relativity of all knowledge that can be gained in this world. Stefan and Menno have shown that it is worthwhile to evaluate learning processes and consider them from another (their) point of view. Lucia has kept an eye on me. I appreciate her sensitivity, sympathy, and loyalty.

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