

Foreword

Today's global supply chains are getting more and more complex. At the same time, the demand on customer service and the cost pressure continue to increase. In this challenging environment, production control strategies (PCS) play a major role. They manage the physical material flow on the shopfloor and are therefore a key driver for delivery performance, inventory levels, and ultimately production cost.

Identifying and customizing suitable control strategies is a challenging task, especially when production systems have to cope with variable demands, forecast error, and unstable processes.

The focus of this book lies on helping companies with complex and discrete production systems to tailor a production control strategy to their needs. Thereby, the mutual merits of "push" and "pull" systems are taken into account, leading to hybrid strategies. Consequently, the book addresses practitioners who are interested in looking behind the scenes and into the physics of production control.

A real-life case study demonstrates the practical applicability of the presented framework. I would like to thank the company and the involved managers for enabling this cooperation.

Moreover, I would like to express my gratitude to Prof. Dr. Hans-Otto Günther and PD Dr.-Ing. Knut Alicke for their support, our fruitful discussions, and for being inspirational mentors.

I would also like to thank my family for their constant support and understanding during the creation of this book. I dedicate this book to them.

Munich, Germany

Christoph Karrer

Customers require on-time delivery at a minimal cost. As a result, companies are constantly under pressure to cut costs and uphold high levels of service. A major factor for success in achieving these objectives is the right production control strategy, one in which two approaches compete in practical application – push and pull.

In push systems, external signals trigger production orders; these signals typically take the form of sophisticated, detailed, planning and scheduling algorithms in environments with integrated planning systems. A pull system initiates a production

order internally. The consumption of parts of the next step in the value chain triggers the release of a signal (for example, a Kanban card), which is then translated into a production order.

Both production control approaches have clear benefits and disadvantages, and should, therefore, be combined. Many companies have already implemented pull systems as a part of their Lean manufacturing philosophy; this control strategy is easy to apply, and it limits work in process. Companies with strong planning systems prefer push systems to, for example, leverage the forecast. Unfortunately the push and pull approaches are often applied in a very dogmatic way that does not capture the benefits of either.

In his excellent book, Christoph Karrer presents a method for combining the two approaches. He provides a sound theoretical foundation for verifying the benefits of using a fraction of the existing forecast to control the production system. The results are promising; cost and inventory can be reduced significantly, and a high level of service retained. The beauty of his approach is its relative simplicity in practice – there is no need for system investment or radical changes in production control. In addition, the Kanban system – often already in place – can be leveraged in order to implement the approach.

Karrer's book is aimed at practitioners who contend with high fluctuations in demand and who would like to further reduce their costs after implementing a lean or an integrated planning system. His approach is a breakthrough – it combines Lean manufacturing ("pull") and "algorithmic" detailed planning and scheduling ("push"), and will further boost system performance.

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The quest for a good production control strategy (PCS) is as old as industrial production. Extensive research in the field has led to many innovations that enable today's production systems. The availability of affordable computer technology, which led to the introduction of IT-based planning systems, was an important milestone. Another important step was marked by the diffusion of the Lean manufacturing philosophy from Toyota, comprising the famous Kanban control system. However, due to the large variety of existing control strategies and the complexity of today's industrial practice, it is difficult for practitioners to select and continuously update their PCS.

The engineering framework presented in this book offers valuable support. The strength of the approach is its integrated and practice oriented perspective. The problem is approached from a systems engineering angle, taking findings from current research into account. The resulting strategies combine merits of "push" and "pull" systems and yet remain in line with the philosophy of Lean manufacturing.

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