

Preface

Due to changing conditions in politics and laws, energy-saving products and technologies get increasingly important. A major future challenge is to generate economic growth while reducing the input of resources. Besides economic objectives, energy efficiency is currently getting significant for the competitiveness of industrial enterprises. Therefore, professional and methodical competencies for planning and operating energy-efficient factories are required. The field of factory planning bears a special responsibility since decisions during early planning phases mainly influence the relevant characteristics of factories in terms of energy efficiency.

Systematically considering energy efficiency as an objective during factory planning requires suitable methods and tools that support planning participants in identifying improvement opportunities. This topic is addressed by the author of this dissertation thesis, Ms. Manuela Krones. The focus of the thesis is to develop and apply a method for identifying energy efficiency measures for factory systems based on qualitative modeling. The developed method provides qualitative description concepts for factory planning tasks and energy efficiency knowledge as well as an algorithm-based linkage between these measures and the respective planning tasks. The application of the method is guided by a procedure model, which allows a general applicability in the manufacturing sector. It should be emphasized that the object area of factory systems is explained systematically and on a high level of detail, which is framed by comprehensible examples. The validation by means of two case studies demonstrates the applicability of the method in various planning areas. The method leads to the desired results in terms of energy efficiency improvements while the effort for the application is reduced. Furthermore, the case studies highlight the importance of cooperation between planning participants in order to increase energy efficiency.

Ms. Krones has excelled in describing relevant aspects clearly and understandingly to the reader. She systematically analyzes and describes theoretical approaches, suitable description concepts, and mathematical contexts. Based on that, the methodical contribution is developed and explained in detail with a close reference to the practical usage.

This thesis provides a significant impact on research and practice in the area of factory planning with regard to energy efficiency and gives an excellent support for scientists and practitioners in this field.

Prof. Dr.-Ing. Egon Müller

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Krones, M.

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