

# **Preface**

## **On the Way to Environmental Friendly Production**

Environmental consciousness is nowadays playing a growing role in production and logistics. Planning, developing, and controlling of manufacturing processes and technologies should not only support the goal of high productivity but should also respond to the need of resource and energy conservation and pollution prevention. Environmental awareness is driven mainly by the scarcity of natural resources and by more strict legal regulations. The modern enterprise policy should look at the relations between economic actions and ecological consequences.

Ecoproduction is a new business approach which focuses on the most efficient and productive use of raw materials and natural resources in order to minimize footprints on the natural environment. This book aims to provide the state of the art as well as new ideas of the environmental conscious operations management. The contributors present in the individual chapters problems related to: eco-friendly production technologies; recycling and waste reduction. Scope of the topics discussed in this book also covers pollution prevention, and energy efficiency. Authors describe problems of information management in complex systems.

This book presents both emerging theoretical methods as well as business practices. It might be interesting both for researchers and practitioners. Contributors present and discuss the tools, methods, and applications to make manufacturing operations environmentally friendly and conform to environmental regulations. Case studies are provided to guide readers in areas outside their expertise.

In this monograph the emphasis is placed on three main areas:

- sustainability and life cycle management;
- environmental friendly resource management in production;
- information systems and information management supporting sustainability.

The aim of the first chapter is to examine the various challenges of requirements management regarding the challenge of Product Life Cycle Management. Authors present an interesting integration framework explaining how to manage requirements information throughout the whole product life cycle.

The second chapter is dedicated to sustainability issues in different countries in Asia and Oceania region. Author compares a number of criteria to identify the risks and opportunities of innovative development of these countries. An integrated sustainability model based on Sustainable Development Index and Developmental Risk Index is described.

The next chapter aims to introduce the concept of strategic eco-controlling. Applying the strategic planning and controlling systems to support decision making concerning sustainable development and environmental protection. The potential of business intelligence application for supporting eco-controlling is examined.

Environmental proactivity is one of the key aspects related to corporate social responsibility of companies. In the two subsequent chapters authors analyze whether through a higher environmental proactively orientation companies might generate added value. Two industries (ceramic industry and food industry) are taken in consideration to examine the theoretical concepts. Authors perform quantitative analyses to find out main obstacles and benefits of proactive approach.

In the second part of this book emphasis is placed on effective resource management. Increasing scarcity of resources and high energy costs have led to an increasing importance of the utilization level monitoring. Despite the big number of projects and research in this area, there is still a lack of practicable support for small and medium enterprises (SME).

The opening chapter in this part aims to prove relevance of environmental problem in production management and to propose indicators to assess the efficiency of environmental friendly production.

The subsequent chapter highlights the problem of waste management on the shop floor. Authors present the organizational and technological conditions influencing the waste generation. The detailed case study of medium size company from packing sector is provided.

The next two chapters describe the problem of sustainable orientation in maintenance management. Sustainable maintenance is a new challenge for industrial companies. It requires continuous development and constant improvement of maintenance processes, increasing operational excellence and safety of operations, and infrastructure. The theoretical studies are concluded with case study in glass processing company.

The problem of energy efficiency is described in the chapter “Framework for Controlling Energy Consumption of Machine Tools”. Authors present the results of research project focused on communication mechanisms in production systems and working machines in order to assess energy consumption values automatically and coherently on all required levels.

The problems of energy management are continued in the chapter “Mobile assistance for energy-efficient production—Scenario parameters and system impact”. It describes scenarios to integrate mobile and stationary devices for energy-efficient operation within the framework of order-related manufacturing. Authors identify stakeholders, who may influence energy-efficiency measures in a manufacturing system.

The chapter “Scheduling a Single Mobile Robot Incorporated into Production Environment” focuses on mobile robots which will automate extended logistics tasks in production facility. Mobile robots are more flexible to perform certain tasks such as transporting and feeding materials, pre-assembly, or quality inspection at different workstations. Using such mobile robots can lead to increase in production efficiency. Authors present the benefits of better resource allocation by application of mobile robots.

The topic is continued in the next chapter “Declarative approach to cyclic scheduling of multimodal processes” where authors present a novel approach for scheduling analysis employing the declarative modeling.

The last part of this book covers information systems and information management supporting sustainability. In the opening chapter authors present the research related to the applicability of software technologies for simulation in green production and logistics. Six specialist simulation packages are evaluated in detail regarding defined “green criteria”. The chapter is concluded with case study in medium size food company.

The next chapter considers an organization’s environmental impact assessment with respect to a water resource. It investigates formal approaches to temporal monitoring design. The focus is on efficient data collection and analyses. Authors explain how the proposed approach can be incorporated into an organization’s environmental information system.

In the subsequent chapter the conception of interactive information and decision support system for urban and industrial air quality management is presented. The emphasis of the project AirWare system developed within Eureka WEBAIR is on real-time analysis and multi-media information. The proposed solution integrates meteorological data and forecasts, air quality, and emission monitoring from distributed mobile sources via the Internet.

The chapter “Organizational Learning and Environmental Engineering with Special Focus on Health Care” combines research on environmental engineering, environmental management systems and learning organizations in context of hospital organizations. The author explains how the implementation of environmental engineering could be a possibility to extend organization’s environmental awareness.

The last chapter describes complementary information systems on research in Europe on ICT for environmental sustainability. The authors explain the result of EC financed project ICT-ENSURE regarding its goal, contents, functionality, and mutual interaction of the information systems.

This monograph provides a broad scope of current issues important for the development of Ecoproduction. It is a composition of theoretical trends and practical applications. The advantage of this book is presentation of practical application from number of different countries and industries.

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