

IFIP WG 5.7

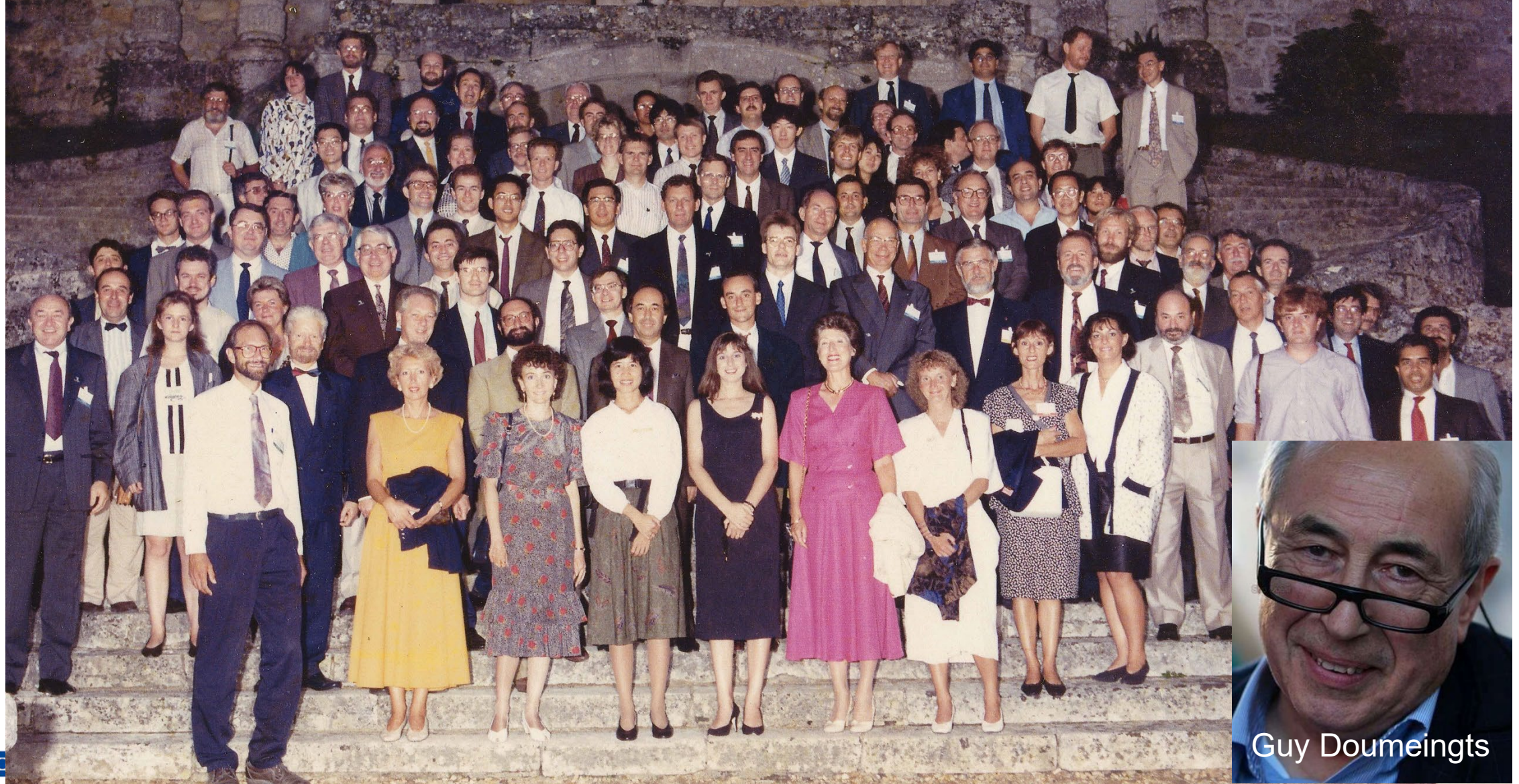
45 years of advances in production management

My IFIP vitae

- GA representative 1982 - 1996
- Chairman WG 5.7, 1978 -1982
- Chairman, TC 5 1983 -1988
- President, 1992 -1995
- IFIP Silver Core, 1983
- IFIP Auerbach Award, Beijing 2000
- Honorary Member, 1997

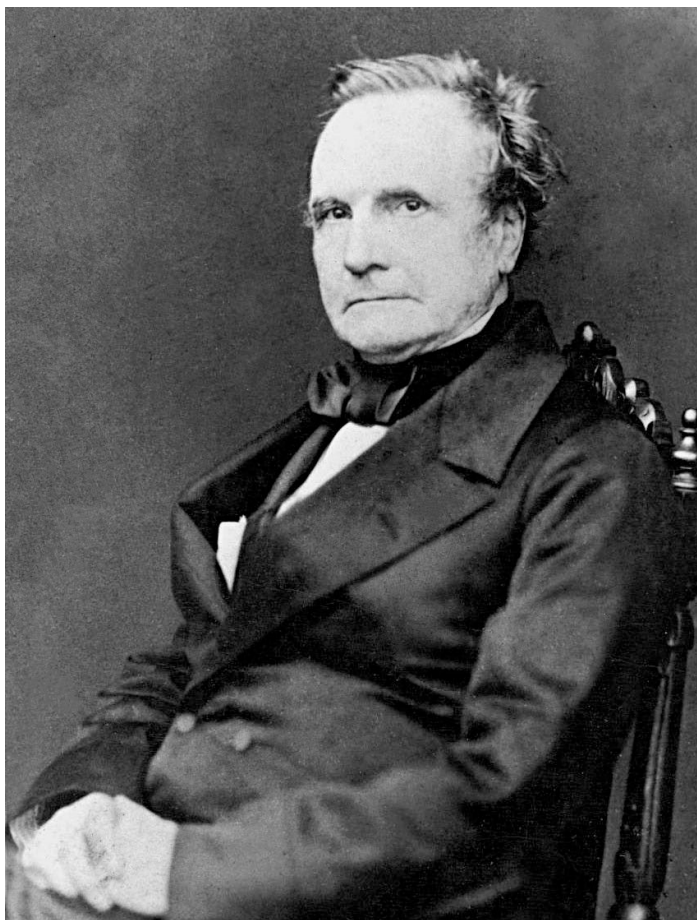


Participants at APMS, Bordeaux 1982

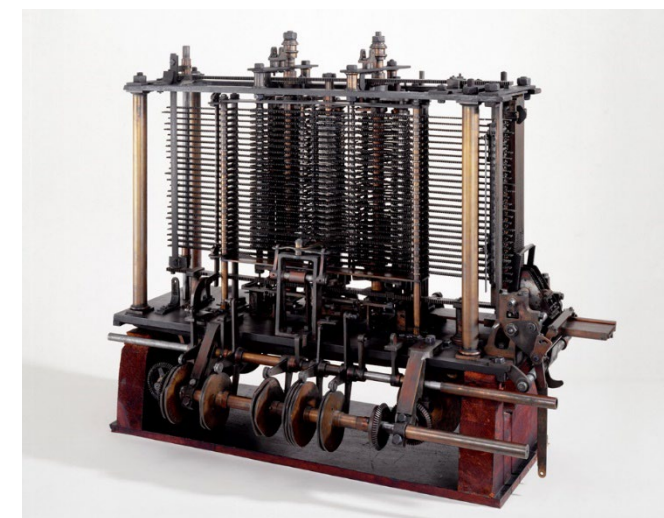
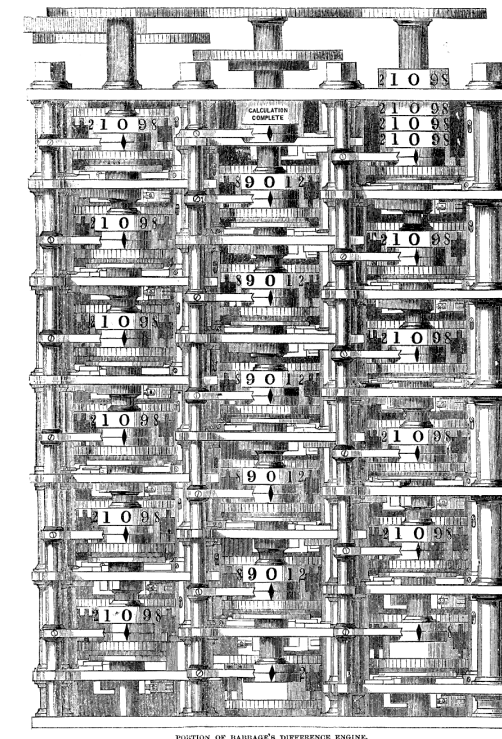


Guy Doumeingts

Charles Babbage (1791 – 1871)



- “Father of the computer”
- “Difference Engine” – mechanical special-purpose computer
- “Analytical Engine” – programmable general-purpose computer using punched cards



Early highlights in the history of computing

- Alan Turing publishes his paper on the Turing Machine 1936
- John von Neumann architecture 1945
- First digital electronic computer developed 1936–1939 by IBM
- ENIAC (Electronic Numerical Integrator And Computer) – first electronic general-purpose computer announced
- UNIVAC commercial computer 1950
- Backus presents Fortran 1954
- Murray publishes Cobol 1959
- IBM PC 1981



Paris, June 1959

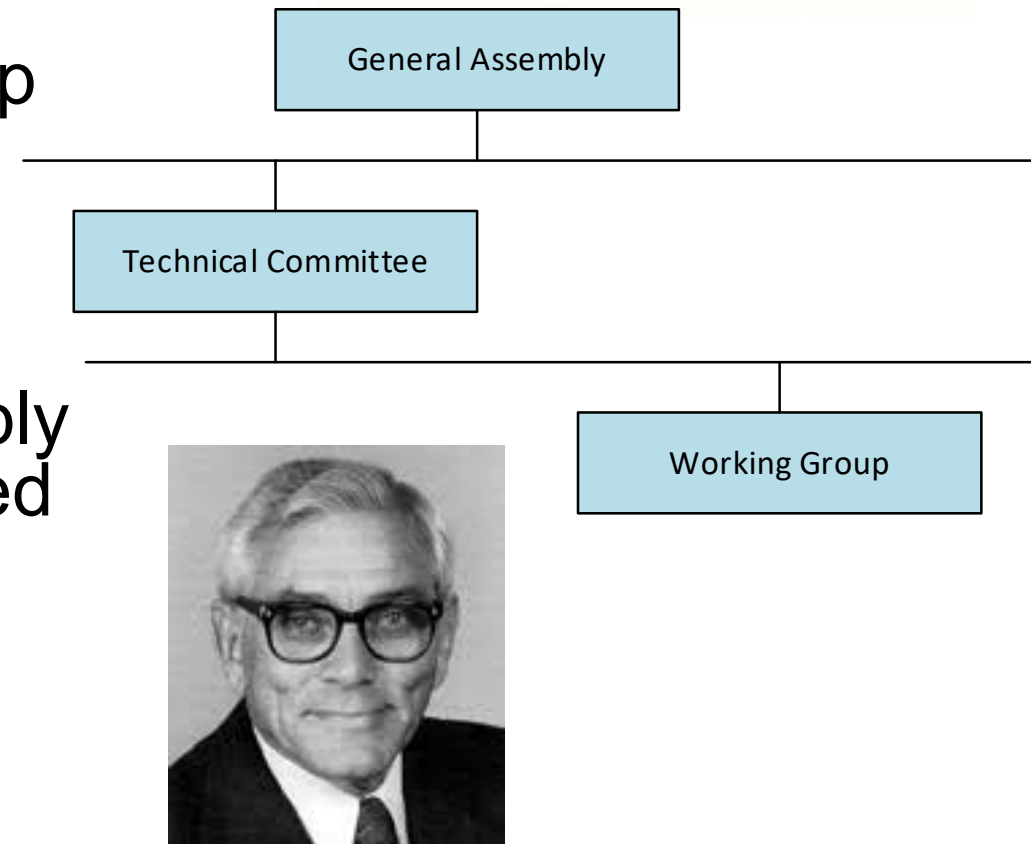


- UNESCO organizes the first International Conference on Information Processing
- Considered as the first World Computer Congress.
- IFIP established under the auspices of UNESCO 1960



What is IFIP?

- Global organization for researchers and professionals working in the field of computing to conduct research, develop standards and promote information sharing
- Isaac L. Auerbach first President
- Any national computer society may apply for membership – membership restricted to one society per country
- Activity: congress, conferences, publications
- Organization



CIRP Delphi Survey 1974



- By 1980, a computer software system for full automation and optimization of all steps in the manufacturing of a part will be developed and in wide use.
- By 1985, full automation and optimization of complete manufacturing plants, controlled by a central computer, will be a reality.
- By 1990, more than 50% of the machine tools produced, will not have a «stand-alone» use, but will be part of a versatile manufacturing system, featuring automatic part handling between stations, and being controlled from a central process computer.

Late 1970ies – CAD/CAM/CIM

- CAD
 - Product modelling
 - Bezier-curves
- CAM
 - Automation of process and operations planning
 - Numerical control of machine tools (PROLAMAT)
 - APT, EXAPT
- CIM
 - Integration concept launched by E. Merchant early 1960ies
- Shift in focus from design and manufacturing technology towards planning and control of operations



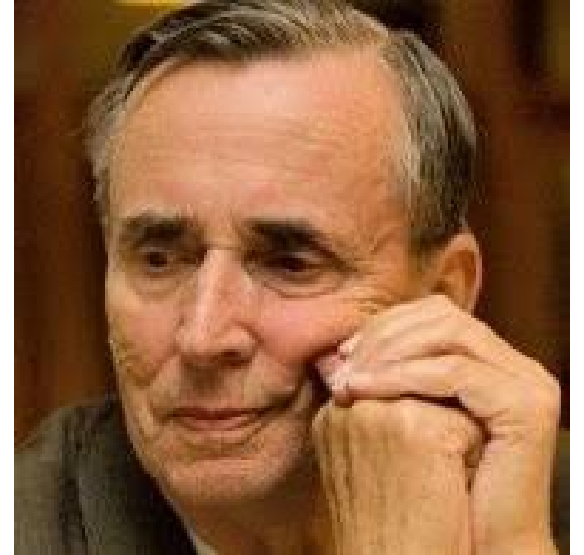
TC 5 in 1978

Computer Applications in Technology

- WG 5.1 Transportation
- WG 5.2 Computer-Aided Design (CAD) founded by Jakob Vlietstra chaired by Ernie Warman
- WG 5.3 Computer-Aided Manufacture (CAM) founded by Jozsef Hatvany chaired by Detlef Kochan
- WG 5.4 Standardized Hardware and Software Techniques
- WG 5.5 Continuous Process Industries
- WG 5.6 Maritime Industries

TC 5 meeting, Grenoble, 1978

- Chairman Jacob Vliestra
- Proposal for a new WG
- Resistance from 5.2 and 5.3
- Strong support from Jozsef Hatvany
- Recommendation to GA to create WG 5.7 Computer-Aided Production Management
- Decided by GA in Oslo, 1978



Jozsef Hatvany

(1926 – 1987)



J. Hatvany

Computer and Automation Institute, Hungarian Academy of Sciences, Budapest, Hungary

József Hatvany

Computer and Automation Institute, Hungarian Academy of Sciences, H-1502, POB 63, Budapest, Hungary

- 1982 PROLAMAT paper “Advanced Manufacturing Systems in Modern Society”
- Cape 83 paper “Dreams, Nightmares and Realities”

This is a phenomenological survey of the history of computer-controlled manufacturing systems over the last thirty years. First, came the *dreams* of the imminent push-button factory, controlled by a central computer. Then, the *nightmare* experiences of the first pioneers, contending simultaneously with inadequate hardware, software, skill, funding, receptivity and their own underestimation of the extra dimension of unprecedented interdisciplinary complexity. Finally today's *realities*: the possibilities opened up by distributed multi-processor systems, by local area networks and by advanced systems synthesis techniques, the limitations imposed by investment, education, employment and environmental considerations.

the management of the second industrial revolution on the national and global level is offered.

WG 5.7 first meeting Copenhagen 1979



IFIP

INTERNATIONAL FEDERATION FOR INFORMATION PROCESSING

Date: 1979-09-13

Address reply to: Associate Professor Peter
Falster
Production Engineering
Laboratory NTH-SINTEF
7034 Trondheim-NTH
Norway

MINUTES OF THE 1st MEETING IN IFIP WG 5.7, AUGUST 31, 1979

10.00 hours, ELECTRIC POWER ENGINEERING DEPARTMENT,
TECHNICAL UNIVERSITY OF DENMARK, LYNGBY, DENMARK

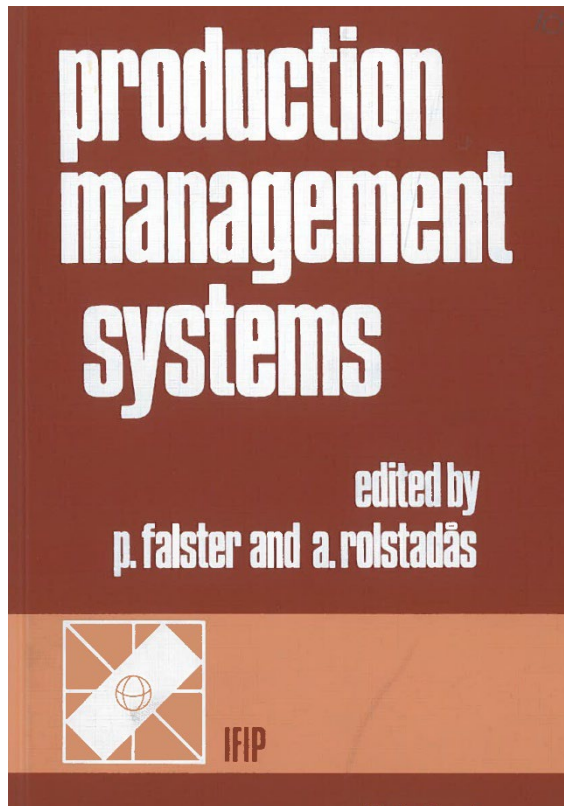
Attendants:	G. Doumeingts	(France)
	P. Falster	(Denmark)
	R.B. Mazumder	(Switzerland)
	E. Printz Moe	(Norway)
	A. Rolstadås, Chairman	(Norway)
	B. Svärdson	(Sweden)
	H. Wildemann	(West Germany)

1. Opening

A. Rolstadås opened the meeting as chairman and welcomed the participants. He gave a short retrospect for the establishment of the working group and expressed his sincere hope for a fruitful work in the group the coming years.

Production Planning and Control in the 80ies

PREFACE



The IFIP Working Group 5.7 on "Automation of Production Planning and Control" was established in the autumn 1978. The working group addresses itself to topics as

- design of and need for new production planning and control systems taking into account new technological and market developments
- standardization of international acceptable terms and phrases
- reduction of costs through development and standardization of techniques, software, and hardware
- development of the international level of know-how

In order to accomplish its scope the working group organized its first workshop to be held in Trondheim, Norway, in September 1980. The workshop was sponsored by the International Federation for Information Processing (IFIP) and the Production Engineering Laboratory, SINTEF-NTH.

The number of participants was 24 primarily coming from the working group but supplemented with invited speakers and people outside the group.

1980 – Opening session

Generation	Type of system	Decade
1	Integrated batch	1960-ies
2	Interactive real time	1970-ies
3	User adaption	1980-ies

- PPC systems in the 80ies completely different
- Market conditions and dynamic environment together with new technology will require systems offering new functions based on new theory
- New ICT technology will enable strongly decentralized systems
- Development costs will be reduced by building prototypes

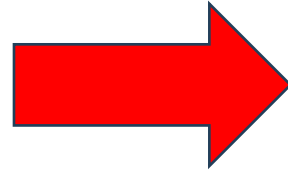
From MRP to ERP

- BOMP - Bill of Material Processor
 - Developed by Gene Thomas at IBM in the 1960-ies
 - Database containing the bill of material for all products and parts
- MRP – Material Requirements Planning
 - Uses BOMP to calculate when and how much of raw materials and purchases has to made based on sales forecasts
- MRP II – Manufacturing Resource Planning
 - Extension of MRP to include all manufacturing resources
- ERP – Enterprise Resource Planning
 - Integrated management of main business processes



The Criticism against MRP

- Inaccurate sales forecasts
- Errors in BOMP
- Estimated lead times often wrong
- Inaccurate inventory level



- Large inventories
- Long throughput times

And then

- Taiichi Ono – Toyota Production system
 - Jidoka and Just in time
 - Kanban – pull rather than push
 - Heijunka and Kaizen
- MIT – The Machine that Changed the World (1990)
 - Lean production
- Eliyahu Goldratt
 - The Goal
 - Theory of constraints
 - Drum – Buffer - Rope



IFIP WG 5.7 contributions

- Brought the advancements in industry into academia
- A forum for discussion and critical reflection
- Built a theoretical foundation in production management
- Research and education
- Conferences to exchange experience between industry and academia
- Journal for publication of research
- Built an international network

Since 1980 the group has grown from 11 to 112 members, 28 honorary members, and 41 candidate members.

WG 5.7 activities

- Conferences
- IFIP state-of-the-art books
- International journal, 1989
- Joint research (FOF), 1989
- Special Interest Groups

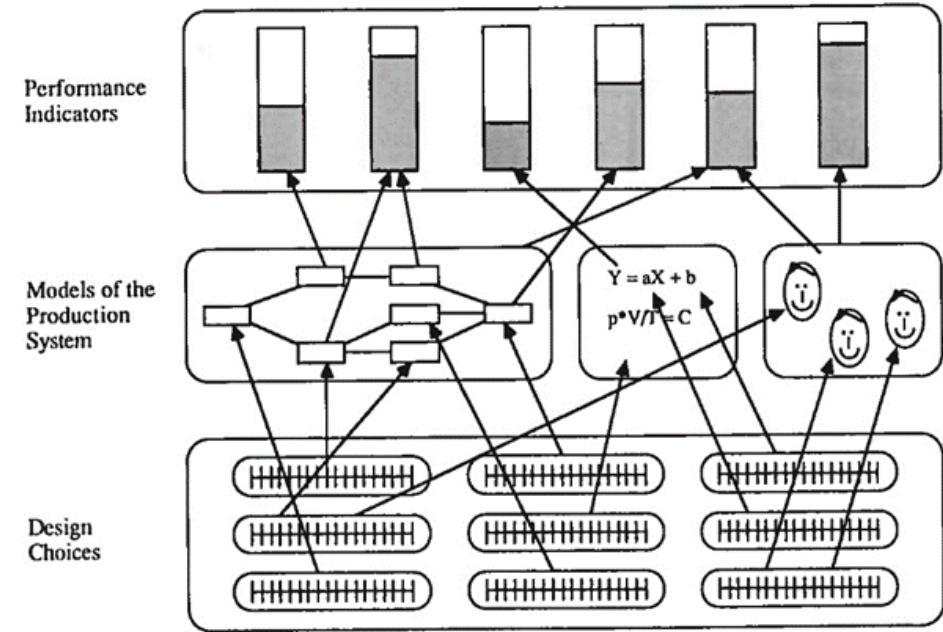


Photo: Mentz Indergaard/NTNU

APMS 2023

IFIP International Conference;
Advances in Production Management Systems

***“Production Management Systems for
Responsible Manufacturing, Service, and
Logistics Futures”***

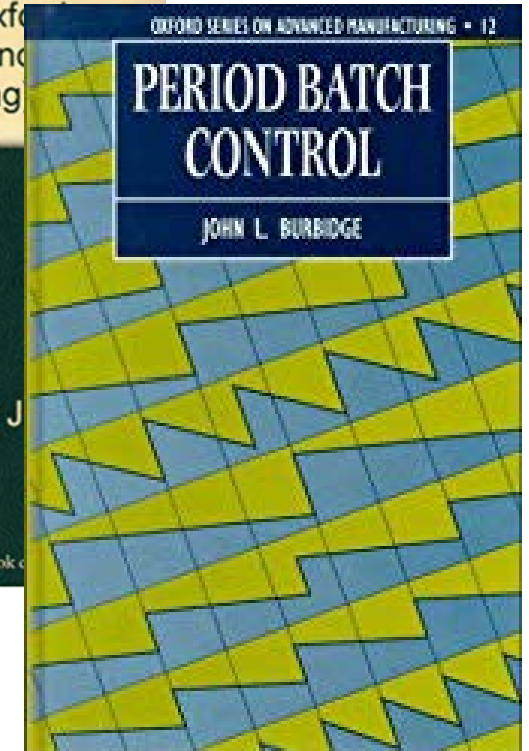
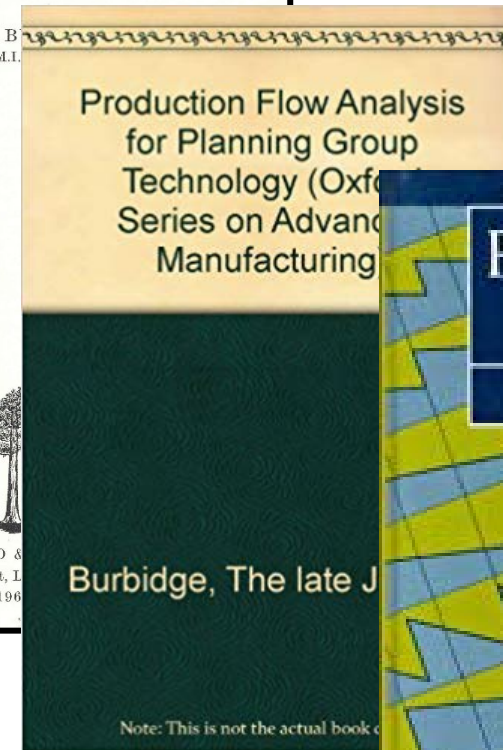
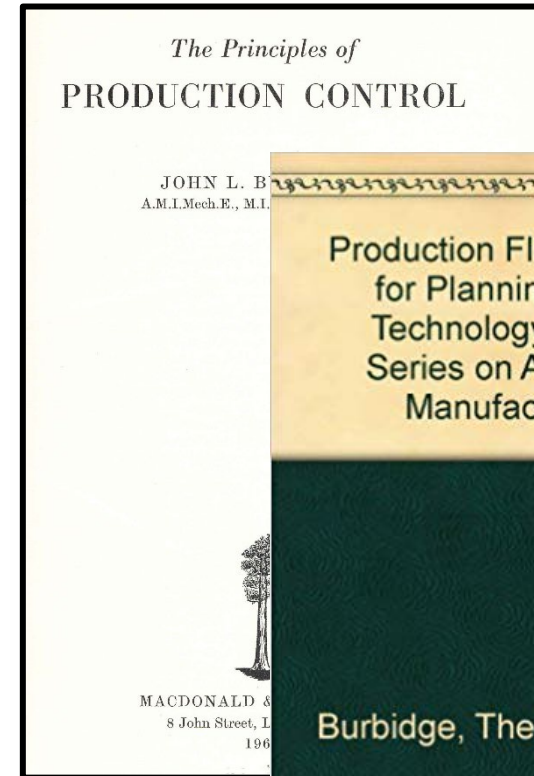
Marco Garetti Doctoral Workshop

- Provides Ph.D. students with the opportunity to discuss their research and receive feedback and exchange ideas
- Ph.D. students submit a proposal up to 15 pages
- The objective of the proposals is to explain general research questions and outline the approach as well as the current status of the research.
- The texts are not published in the proceedings but can be considered for a possible submission to a journal.



John L. Burbidge (1914-1994)

- The Principles of Production Control 1962
- In strong opposition to MRP
- PFA and PBC
- Burbidge Award 1995
 - Author(s) of the best paper
 - Person(s) that made the best presentation.



IFIP state-of-the-art books 1988



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PPC

Editor: Professor Bjørn Andersen,

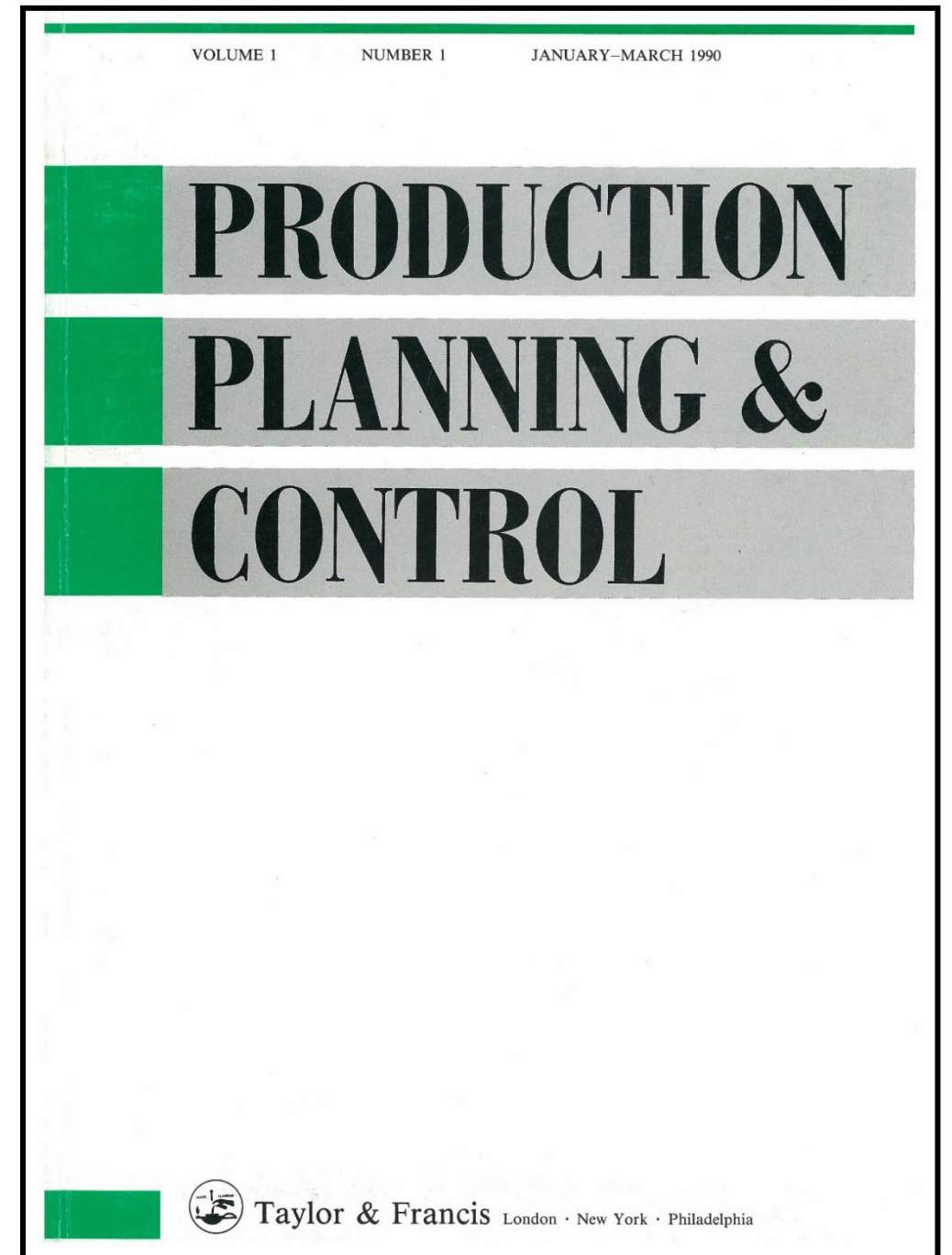
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526K annual downloads/views



Joint projects



Factory of the Future: Towards an integrated theory for one-of-a-kind production

- Integration of several fragmented theories about the (re)design of production systems
- The theoretical framework consists of three views: the workflow view, the resources view, and the organizational/decisional view
- The design framework consists of a connectance network of design choices (DC's), performance indicators (PI's), and relationships between DC's and PI's.

First Special Interest Group

Experimental Interactive Learning in Industrial Management

At the APMS 1993, Athens, Greece, Professor Jens Ove Riis organized a workshop and exhibition of games as part of the activities of IFIP WG 5.7. This meant the birth of the idea to form a SIG in the field.



- First workshop at Aalborg University, 1994
- Chairpersons:
 - 1993-1999 Professor Jens Ove Riis at Aalborg University
 - 2000-2015 Professor Riitta Smeds, Aalto University
 - 2016- Lecturer Nick Szirbik, University of Groningen
 - Jannicke Baalsrud, KTH

Co-Designing Serious Games

15th IFIP WG 5.7 SIG workshop, Aalto University, 2011



Some reflections

- Unlike many of the other groups, why has WG 5.7 survived?
 - Ability to renew both with respect to membership, organization and activity
 - Need for a forum for research, publication and international cooperation
- Will it still survive?
 - Twin transition focus
 - Social media visibility
 - Connection to industry
- Why is it needed?
 - A guaranty for a high scientific standard
 - Future industry is dependent on the research and education in production management