ADVANCES IN MANUFACTURING TECHNOLOGY II

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Edited by P F McGoldrick

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The Consortium of Heads of University and Polytechnic Departments of Production Engineering (COPED)

The Consortium is an independent body and was established at a meeting held at the Loughborough University of Technology on 17th February 1978. Its main aim is to promote production engineering education, training and research. To achieve this the Consortium maintains a close liaison with those Government Departments and other bodies concerned with the initial and continuing education and training of professional engineers and responds to appropriate consultative and discussion documents and other initiatives. It organizes and supports national production engineering education and research conferences and symposia. The Institution of Production Engineers, with whom there is a close working arrangement, undertakes the secretarial duties.

The Consortium consists of the Heads of those university and polytechnic departments or sections whose first priority is to production engineering and who have a direct responsibility for running Honours degree courses in the field of production engineering.

To Paddy and GG – with much love

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Peter F McGoldrick

Contents

CAD

CIM and Expert Systems

Simulation

Automation

Robots and Assembly

Work Design and Organization

Computer Aided Production Management

Production Economics

Manufacturing Systems

Processes

Human Factors

Introduction

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The contributions offered to this Third National Conference demonstrate that research in production is very much alive. The considerable numbers of papers on robotics, automation and flexible manufacturing systems, together with those in production control and quality matters, demonstrate that there is much work going on in our colleges, polytechnics and universities related to modern methods of manufacture.

The future of manufacture undoubtedly hinges on better control. Control over the supply and movement of materials is now keenly sought. Control over manufacturing equipment is also a goal, not just to maintain quality but to give flexibility in sequence and quantity.

None of these objectives for improved performance is entirely a technical matter, although there is an increasing technical ability to influence all of them. To achieve their potential, they depend on competent people at all levels. Discussion with alert managers soon reveals that this is one of their major concerns. Either the people they have require more training, or they cannot hire the people with the abilities they need. This applies at all levels, and the availability of people with competence in manufacture is particularly low.

However, it isn't only a shortage of people with the necessary skills which exercises the alert senior manager. He is well aware that industrial relations are in a state of flux, and that he is increasingly dependent on the willingness and dedication of the people employed. This requires major developments in management relationships, in the structure of the organization, the distribution of authority and the work people do. 'Blue' and 'white' collar distinctions are increasingly irrelevant – although many will fight to keep the distinction regardless of their effect on the business.

The creation of acceptable working conditions, whilst exploiting new technologies to serve – indeed to create – an increasingly varied market, is a major challenge. The 'niche' strategies so successfully exploited by several of our competitors, with a world market orientation, *can* give us an industry which will support us. If it does not there is no other way in which our living standards can be maintained; but there is little doubt that it can be done, if we have the people to do it.

So, why are there so few papers that address these problems? We all know that production is a systems matter, not just a technological fix. Where are the papers,

and the research, which brings the human organization into the problem?

Much of this work is now done by industrial sociologists or occupational psychologists. Most of them work from departments which are remote from engineers, and have less opportunity to understand the technologies involved. Should we not be making special efforts to join with them to develop a greater sophistication in socio-technical systems analysis and design? Is it not important that we think more clearly about those 21st century adults? They will be educated, know more of the world than we do, have choices in what they do – can we afford to present a life in industry as a poor choice against all the other ways of earning a living? Can we run modern industry on the disadvantaged and the otherwise unemployable?

When I make this plea for more joint research, it is not more case studies that are needed. Our social science colleagues have done an excellent job here. Nor do we need too much more 'action research'. This has been going on for half a century or more – and what more needs doing has to be well focused and controlled. What we do need are some bold attempts to develop, from what exists, some design and implementation procedures for new work organizations, with reliable measures of costs and benefits.

There are a few examples in the literature of such design procedures, but there are fewer examples of evaluation methods. Too often costs are equated only with increased output or labour savings. The valuable asset of an improved orientation to the work and the quality is ignored, even though it is the very aspect of the change which makes it successful. The major benefits of an organization where a number of key objectives are common to all employees are that problems are dealt with and overcome because it is seen to be to everyone's benefit to do these things.

To some, this request to extend our research area to include work organization may seem like special pleading. Of course there are other areas of production which need more work: where is the research on dynamic measurement, adaptive control for quality, ceramic processing, on-line data collection for real time production control? The list is almost endless. But important though these are, and vital though it is that we must bring research results forward into practice, all of this is in the context of a modern Britain. If we do not have an industry which matches its work experiences with the experiences of the society around it, we will be fighting a losing battle. Some do consider that we should down-grade society until it matches what industry has to offer – but we do not live in isolation from the rest of the world, so we experience a 'brain drain', leaving us with a reduced proportion of the best and brightest in the remaining population.

We are left, then, with few other choices; we design industry to suit the people we need, or have a less efficient, and therefore declining, industry. Perhaps it is time to go and have a coffee break with some social scientists?