PROCEEDINGS OF THE
THIRTEENTH INTERNATIONAL
MACHINE TOOL DESIGN AND RESEARCH
CONFERENCE

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THIRTEENTH INTERNATIONAL
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CONFERENCE

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OPENING ADDRESS:

DESIGNING FOR THE CUSTOMER

by

VISCOUNT CALDECOTE*

Machine tools are truly the basis of modern industry and, indeed, of today's civilisation itself, and the potential importance of an international gathering such as this is self-evident and needs no emphasis from me. The programme of papers indicates very clearly too the enormous knowledge and experience of machine tools brought by the delegates to this conference from all over the world, and you will not expect me to try to add to it.

Instead I would like to put before you one or two more general issues which I hope you feel are relevant to the theme of this conference and to your industry.

First, there is the old issue of the relationship between the academic world and the world of industry. There are very different worlds and it is misleading and unhelpful to pretend they are not, even where they appear to be in close contact as they are in the fields which this conference is covering. Universities and colleges are devoted to imparting and increasing knowledge; industry is concerned with producing wealth and profit. To the academic, time and cost have little significance, whereas in industry they are fundamental factors affecting success or failure. But the two worlds have a common interest where new designs and the achievement of higher performance are involved, and they can do much to help and stimulate each other.

Academics can and do make valuable contributions to the development of new products and the improvement of existing ones by analysing the basic principles and providing essential knowledge from research to support development. Industry can provide the resources which stimulate work in universities and colleges and help to maintain a sensible balance between the theoretical and practical. I have seen examples of both here in Birmingham yesterday. Why then does it so often appear that the two worlds are in some way antagonistic or, at best, mutually unsympathetic?

The principal reason, I believe, is that too often neither party takes the trouble to understand the other party's problems and objectives with sufficient care. The results obtained from cooperation are then disappointing and the work ends in recrimination, providing more ammunition for the sceptics. I very much hope, therefore, that in presenting and discussing the papers, and in all the informal but valuable contacts that are made in a conference like this, the academics and the industrialists will seek to bridge this gap and will take the opportunity to gain a better understanding of each other's point of view. In particular

I hope the academics will show that they appreciate industry's interest in the practical outcome of new ideas and knowledge within a realistic time, and at a cost which will be acceptable in the market place in relation to the benefits obtained. On the other side, I hope industrialists will make clear what their problems are not only in general terms, but more precisely in a way which links performance, time and costs, so that the academic who is serious in his wish to contribute may do so with a full appreciation of the whole problem. Thus will greater confidence be established between the two worlds, and this conference will make a valuable contribution to removing the misunderstandings which all too often seem to exist.

Secondly, I would like to make a few comments on the environment in which industry, and particularly your industry, works. Recently machine tool industries in many countries have been through a difficult time because of the low demand for their products. Some of the comments made by those who are concerned for the welfare of your industry give the impression that the rest of manufacturing industry is under some obligation to place orders for machine tools. They seem to forget there are simple reasons why potential customers don't buy. The price-performance relationship is wrong, the delivery unacceptable, the marketing inferior. To be fair to machine tool manufacturers, the economic climate is also an important factor, but too often it seems to me that this is assumed to be the principal, even the only, reason for falling sales, and the cry goes up for government action. Experience in many places suggests that this is seldom effective if the other factors, for which the industry is responsible, are unfavourable; and it is often the beginning of serious long term trouble, as has happened in the world's shipbuilding industry.

So I would like to spend a few minutes looking at those industry factors. At the risk of being accused of stating the obvious, I suggest that the most important factor in any industry is customer relations, commonly called marketing. I hope no-one in these enlightened days confuses this with selling, which is only one element in marketing and will only be successful if it is preceded and followed by other essential marketing activities.

Some delegates to this conference may still believe that the industry's prosperity and successful marketing starts with having the right products; some may even equate 'right' with 'technically most advanced and complex'. The right choice of product is of course

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essential, but it is the end of a long process, and determination of the required performance must be made in relation to price and the timing of introduction to the market, for this is the basis of real prosperity. The process involves discussions with potential customers on their requirements and an understanding of their problems, detailed analysis of the problems and another round of visits to confirm that the deductions are correct. Only then can the specification be firmly settled and the design work go full speed ahead, but even then the new products will not be a success if the time and cost parameters set by the marketing investigations are not maintained. Unfortunately, market conditions and customer requirements do not stand still during the design and development period, so the longer the time between specification and having the new product available for delivery, the greater the risk of failure.

So I suggest that in your work and discussions you would do well to attach at least as great importance to the influence of time and cost as to perfection in design and performance. For it is only when all these are right that the customer will be fully satisfied and the essential element of customer-supplier loyalty be established.

I have been particularly interested to see that the subject of this conference is 'Machine Tool Design and Research' and that there is no mention of Development — that difficult process of turning a design into a fully proved and reliable product. But this is no criticism, for just as good marketing is the basis for a correct specification, so competent research is an important element in good design and forms a basis from which sound development can go forward within the planned time and cost. As I indicated earlier, this is the area where the specialised knowledge of research workers in universities and colleges can be of the utmost value in supplementing the knowledge of experienced designers, and in helping them to gain a complete understanding of the basic principles affecting new design features, the lack of which can cause much trouble during development. But even though there is no direct reference to development in this conference, design itself cannot and must not take place without consideration of cost, and it is therefore surprising that amongst the ninety-odd papers being presented during the next three days, only one mentions cost in its title. Perhaps others will bring in this factor, but I must admit that the titles of the papers do not encourage me to expect that many will do so. This is I think unfortunate, partly because it is unrealistic, and partly because it gives ammunition to those who seek to emphasise the gap in understanding between the academic world and industry.

Another aspect of marketing which is directly connected with design relates to reliable and efficient performance, not only over the working life of the product, but particularly in the initial period after installation. Industry invests in machine tools in order to meet an identified production requirement, and the moment from which reliable production starts is of the utmost importance. There is nothing more infuriating than when the installation of a new

machine tool is followed by a long period of faulty operation. This is usually attributed to so-called teething trouble, which is a euphemism for bad installation arrangements. A good design should be easy to install, with a high degree of confidence that, provided instructions have been followed and prescribed tests made — and these should be as straightforward as possible — the machine will start its production work without further delay. It is wise to remember that every new feature added to a design increases the chance of trouble after installation, and special attention must be given to these problems if customer satisfaction is to be maintained.

But let us assume that you have done your market survey efficiently and produced a product which can be sold at an attractive price; still the selling has to be effective too. A good time to buy new machine tools is in a period of recession, to be ready for the upturn when it comes, as surely it will. This suits the machine tool industry, too, because not every company has resources to be able to buy, and so there will always be plenty of orders when the boom comes. The problem is to even out the flow of orders. I will leave aside the ingenious schemes that have been put to governments, such as the Swedish scheme for tax-free credits which can subsequently be released for buying machine tools. These have their place and are important, but how much better for the industry to stand on its own feet and sell its products on their merits. To do that in times of low activity it is useless for salesmen to peddle their wares to production engineers and works managers who will send them on their way empty handed because existing equipment can already produce more than is needed. The place to sell in these circumstances is the managing director's office, but the economic case will have to be convincing, and it will be the design that gives the best value for money which will win and not the one with the most advanced features. Similar considerations apply to the university research worker who seeks to persuade industry to develop and market the design which he has already proved. In my experience this approach to the top management is hardly ever made, and I would recommend that you, industry and university alike, do all you can to get in to put your case at the top, but concentrate on the financial advantages which your novel design features can bring rather than the ingenuity of the features themselves. Of course, you must not omit first to make sure that your product is well known and that its good features are understood by the customer's experts, the works managers and production engineers; but my plea is that you do more than win that battle, for the war is to be won higher up.

Finally, I would like to end on a more philosophical note. The machines which you design will form part of a production complex made up of people and equipment in widely varying ways. At present, all over the free world there are signs that people are becoming alarmed at the impact on their lives of new machines and advancing technology. It is becoming increasingly obvious that prosperity is inadvisable and that it is not practicable — certainly not in a free society and probably not on a world scale — for

affluence and satisfaction with life to exist alongside poverty and frustration. So the benefits of increasing output per person employed, through the use of ever more ingenious and productive machines, is beginning to follow the law of diminishing returns. It is therefore necessary when designing new products and production systems to consider not only the machine output but the output of the man-machine complex, taking into account job satisfaction and all that goes with it.

You may feel that this is outside your sphere, that your task is to do research and design better machines, and that it is someone else's job to deal with these wider human problems. My own view is that none of us has the right to opt out of these problems. Already we are reaching a situation in which specialists in many fields have the knowledge and skill to alter our lives by making it possible to do things now which have been impossible in the past. But those who

determine how this new knowledge is to be used — the politicians and industrialists — are often sadly lacking in understanding of the basic principles behind the new knowledge of the specialists. So, I believe, it is the duty of all of us — not least, of you, who are involved in designing the basic tools of modern industry — to do what we can to take account of the effect of our work on the community around us, and not to dig our heads into the sand of our own back garden and expect others to sort out these important human problems.

Now it is high time for me to stop and allow you to get on with the serious business of the conference. I hope that what I have said may at least remind you that there is more in 'Machine Tool Design and Research' than the acquisition of more and more specialist knowledge.

I hope you have a very successful and happy conference.