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West Europe Report

SCIENCE AND TECHNOLOGY

(FOUO 7/82)

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CONTENTS

ELECTRONICS

BRIEFS

SIEMENS, FUJITSU PLANT IN LUXEMBOURG--Japan's largest manufacturer of electronic controls for machine tools, Fujitsu Fanuc, will open a branch factory in Luxembourg in association with Siemens AG. Starting in August, 1982, the factory will produce programing units for numerical controls targeted for sale in EG countries. Siemens will have 25.1 percent participation in the fully automatic factory. Siemens AG, which has worked with Fujitsu Fanuc since 1965, expects to increase its market fraction in Western Europe by participating in the project. [Text] [Duesseldorf VDI-Z in German no 1/2, 1982 p VI] 9160

CSO: 3102/175

INDUSTRIAL TECHNOLOGY

BRITISH GOVERNMENT WILL PROMOTE CAD/CAM

Munich COMPUTERWOCHE in German 22 Jan 82 p 17

[Article: "Mechanical Industry Rides Point for CAD"]

[Text] London--The British market for CAD/CAM will triple in the next three years. According to information from Secretary Kenneth Baker, the British government plans to initiate a support program.

The support program for CAD/CAM systems, which are expected to improve the competitive capability of Great Britain, has a value of 6 million pounds. According to Kenneth Baker, secretary for information technology in the British Ministry of Industry, it includes seminars, information and demonstration symposia and the awarding of financial grants to small and medium-sized businesses which want to acquire a CAD/CAM system. Under the program, each company receives a grant of 2,000 pounds to defray the costs for consultation, research and development associated with installing a CAD/CAM system. The three-year program will start immediately.

According to information from the minister of industry, large astronautics, electrical and electronic companies have worked out figures based on experience which show that the application of CAD/CAM systems in technical development programs can increase the productivity of a design group by a factor of 3.5. Also, certain British industrial branches have shown that a time savings of up to 25 percent can be achieved from the start of product development to production maturity.

The basic equipment of a CAD/CAM installation consists of minicomputer, a data display device or CRT processor and the associated input keyboard. The present price in Great Britain for an installation suitable for a group of 20 designers is about 25,000 pounds. There are, however, higher-capacity installations costing 60,000 to 250,000 pounds. These include zoom effects, more powerful central processors and larger memories.

The total market for CAD/CAM systems, which increased in Great Britain by 88 percent in 1979, expanded by an additional 65 percent in 1980. 1981 is expected to show a further increase of 50 percent. The projected growth rate until 1984 is 44 percent.

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INDUSTRIAL TECHNOLOGY

PREVIEW OF EXHIBITS EXPECTED AT MACHINE-TOOL, ROBOTICS SHOWS

Paris AIR & COSMOS in French 6 Mar 82 pp 28-29

[Article by Nicole Beauclair: "Machine-Tool '82: Three Interdependent Sectors"]

[Text] The 12th French Machine-Tool and Mechanical Equipment Biannual, the Assembly and Fastening Techniques Exhibition and the International Industrial Robotics Exposition will be held simultaneously at the Porte de Versailles next 9 to 17 June. What trends are encountered in these three sectors, as the machine-tool industry awaits application of the restructuring plan of the same name? However it may turn out, the builders are making their technical preparations for this biannual show.

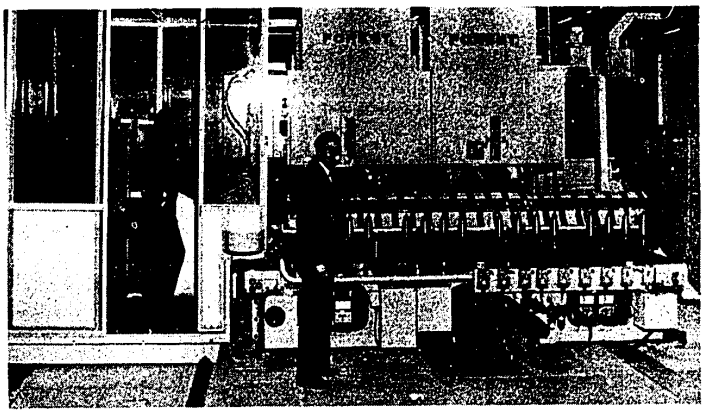
"The French machine-tool industry finds itself today at one of the great turning points of its history." These are the terms in which Michel Courtois, president of the Association of French Machine-Tool Manufacturers (SCFMO), addressed the industrial press on 25 February.

It is difficult to draw up a balance-sheet of the machine-tool industry in a transitional period, and at press time, no official decision had yet been taken regarding the machine-tool development plan, which, as we recall, should make it possible to triple machine-tool production in the next 3 or 4 years.

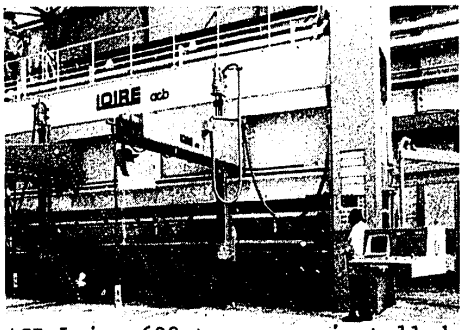
"While some horizontal restructuring measures are practically fully prepared and while certain enterprises have got into line with them, nothing is definite yet," confirmed Jean Chauvet, general director of the SCFMO, "and while definitive measures are awaited, no aid has been furnished yet."

Trends in Evolution of Machine-Tools

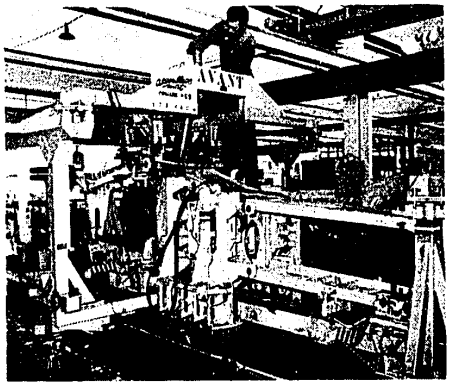
Despite these uncertainties, the 12th French Machine-Tool and Mechanical Equipment Biannual should take place in a favorable context and reflect the growing part played by automation in the industrial sector. Thus a trend that started several years ago will take concrete form with the arrival of digital control, then of tool stores at the machining centers, and robots of all kinds.



TMI V4 3200 milling machine at the Aerospatial plant of Bourges. The originality of the tool store should be noted (Aerospatiale document).



ACB Loire 600-ton press installed in the Aerospatiale plant of St.-Nazaire. This press is used for forming Airbus fuselage panels. (Aerospatiale document)



Machine, in operation in Toulouse, designed for assembly of Airbus jet-engine struts (Michel Isaac photo).

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But in order to succeed in automating the means of production rationally, it was necessary to make the machines and their environment coherent, it was necessary to make the machine, the digital control, the loading-unloading system and the automatic tool-changing compatible, while at the same time obtaining high-quality production.

The contribution of electronis and microprocessor technology has helped a great deal in putting everything together. In the area of turning, this has taken the concrete form of an impressive number of flexible production modules presented by the lathe manufacturers. Some have themselves gone into the designing and fabrication of a robot and its supply system; other have developed their modules with the aid of robotics specialists.

But their lathes are not the only machine-tools worthy of interest. The machining centers are not escaping the automation phenomenon--quite to the contrary, since they have been the precursors by adopting the automatic-changing tool stores. There are very few machining centers not equipped with a palettized table, which permits masked-time loading of work pieces, and also the palettization carrousel, providing for continuous machining for many hours without surveillance.

In terms of flexibility, it appears that four groups should be considered.

First of all, the flexible fabrication module. This is composed of a machine for automatic and continuous fabrication. The continuity is achieved on the basis of a machining center tied to a two-palette to six-palette palettization system or to a CN [digital-control] lathe equipped with an automatic loading-unloading system--in other words, a robot. The module must, of course, have automatic-centering devices, monitoring of tool lifetime, surveillance of tool breakage, an automatic tool-changing system, autodiagnosis, large memory capacity, etc.

In the second phase is the flexible fabrication unit, which, while possessing the same characteristics as the module, runs two or three machines of the same type: two or three palettized machining centers or two or three robotized CN lathes, the purpose of the unit being to do two or three machining operations on the same piece.

The flexible production system, for its part, operates more than three machining centers using a single palettization system linking the machines with one another, the whole being managed from a central computer. This system permits the planning of production from the introduction of the rough piece to its final machining, achieving considerable reduction of machining time as well as a decrease in the quantity of materials in the shop.

Finally, the fourth group inherent in flexible production consists in a complete shop comprising machining centers of more or less large capacities (vertical or horizontal) as well as lathes if production requires them. The entire shop thus constituted is managed from a central computer that keeps track of, among other things, the transport of pieces of different types, management of the tools and their lifetime, changes of tool stores, resharpening, introduction of new data after resharpening, etc.

After this definition of several terms, one easily sees that the 12th Biannual will provide the best occasion for bringing out the flexible machining units and modules, unless certain manufacturers decide to exhibit a flexible mini-shop: machining center and lathe that would have common loading-unloading. We will have confirmation of this only at the opening of the exhibition, and we hope that a French builder will take up this challenge.

Still in the area of machining by removal of material, considerable development of the electroerosion machine is noted. Without going so far as to review the fundamental principles of this process, it should not be forgotten that it is applied by two methods that result in two very different utilizations. First of all--and this was one of the first applications--there is machining by pressing or recessing: an electrode-tool impresses its form into an electrode-workpiece. Next there appeared machining by wire: a wire-tool cuts into an electrode-workpiece. Electroerosion has undergone a spectacular evolution in recent years, but it has essentially involved mastery of the process and perfecting of it; thus, the current generators have reached a high technical level, and they too have benefited from electronics, and incidentally from digital control, which is now taking charge of--in addition to the spark parameters--the speeds of advance of the electrode-tool for both pressing and cutting.

Electroerosion is a slow process, and therefore, perhaps more than any other process, it needs to be automated to increase output. But there is also another thing to be noted: electroerosion is no longer the appanage of the toolmakers (cutting tools) or of the molders (injection tools, pressure-casting tools). Electroerosion machine-tools are now appearing in production operations, for they make it possible to solve machining problems which, though they could be handled by conventional processes, entailed very high fabrication costs. This is particularly the case in the aeronautical industry, where EDM (Electro-Discharge Machining) machines are appearing for production of pieces considered difficult to machine, either because of their configuration or because of the material to be machined. Rough machining and finish machining by automatic changing of the electrode and digital-control accomodation of parameters, automatic rethreading of wire for series cutting of pieces--it looks as if EDM machines will be adapted for use in phantom work units. The demand seems to be there, and the manufacturers will certainly respond to it at the Biannual.

Deformation of metals raises the same concern to automate production. The working rate of the presses is being increased, but there is also a change in their feed systems: depending on the type of machine, feeding is being done by transfer systems or by robot. Here too, digital control is involved: it makes it possible to control all the parameters, such as high dead center, low dead center, speeds, etc; on folding presses, CN controls the folding angle, the position of the stops. Punching work benefits from digital control as well as from advanced technologies such as laser and plasma techniques.

And Assembly Exhibition

Thanks to the assembly and fastening-techniques exhibition that will take place jointly with the 12th Biannual at the Porte de Versailles, one of the most im-

portant phases in all the construction industries will be taken up this year. In the fields of aeronautics and space, it is well-known that assembly in general is crucial, for screwing, riveting, setting, gluing and welding are not decided on arbitrarily--and even less, the combining of these various techniques for constructing one unit comprising several components that are made monolithic by these very processes.

This sector is being developed because of the aircraft-builders' constant concern to put reliable products on the market while at the same time adhering to cost and energy-saving criteria that inevitably lead to savings of raw materials, implementation of new technologies, and modification of existing components and products. All these developmental trends lead to the designing of machines for different specific types of assembly, and quite naturally, the concern to automate the operations is not neglected.

It is therefore not a simple matter to make choices both at the level of the mode of assembly and as regards its implementation. The exhibition should make it possible to visualize the various solutions proposed to the users, and to enable one to make a judicious choice and to keep better track of the developments in this field, four half-day technical sessions will be held from 14 to 17 June, with these general themes: screwing and bolting; industrial glues and adhesives; fasteners; and automated assembly.

Industrial Robotics

In view of the preceding, one will readily note the predominant position that automation is taking in the transformation sector. Therefore, for the first time in France, industrial robotics will have an international exhibiton that will complement the 12th International Congress on Industrial Robots, to be held not far from the Exposition Park from 9 to 11 June.

Industrial robotics is a fast-developing sector that encompasses both the manipulators (handling arms) and the robots with 6 or 7 degrees of liberty. Between these two extremes lies a whole more or less complex range.

The handling of work pieces is certainly the area that benefits most from the contribution of robotics. In simple handling, there are the robots for loading-unloading of machine-tools (lathes, cutting-stamping presses, molding machines, injection machines), for measuring machines, through end-of-line palettization of work pieces. Furthermore, certain of these robots or palettized systems are integrated with the machines, and direct control of them is done by the machine's CN. Remote manipulators with assisted manual control are used in forges and foundries. Also in the area of handling, there are more and more electrically commanded assembly robots; they are generally found in the electronics and electrical industries.

Welding is one of the special fields for robots. First to come were the spot-welding robots, replacing the transfer machines specific to a product, or if the welding was done manually, the robot made it possible to improve the working conditions. More recently, the arc-welding robots were developed. Application of paints is certainly one of the special fields for the robots with 6

or 7 degrees of liberty, as are also fin-removal, cutting or polishing--tasks that can be automated by robot. In these latter cases, the robot is equipped with a tool that moves with the shape of the pieces being worked on (welding, painting, cutting, polishing, etc). These robots are called "advanced," and there are said to be 650 of them in France.

As one sees, the interaction among the three shows that will take place from 9 to 17 June can only be beneficial and represents the majority of the means of production necessary to all industrial sectors.

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TRANSPORTATION

ROLLS-ROYCE SEEKS AMERICAN PARTNER FOR RJ-500 ENGINE

Paris AIR & COSMOS in French 6 Mar 82 p 9

[Article: "Rolls-Royce Seeks U.S. Partner for RJ-500"]

[Text] Ralph Robins, Rolls-Royce commercial director, announced last week that his company is conducting negotiations with both Pratt & Whitney and General Electric in an effort to bring a third partner into the RJ-500 program. Rolls-Royce officials hope that a decision will be possible before the end of the month. Robins explained that developments costs of new engines are between $1.5 billion and $2 billion. This means that launching a new program is beyond a single manufacturer's financial means. Rolls-Royce has also held discussions with French officials about expanding participation in the RJ-500 program.

Rolls-Royce and its Japanese partners--Kawasaki, Mitsubishi, and Ishikawajima-Haruma--have each already spent 20 million pounds sterling in designing and building two technology demonstrators. The first such prototype engine recently began its tests in England. The second is to begin its tests in Japan within a few days. But the total cost of the RJ-500 development program is between 750 million and 1.1 billion pounds sterling. To finance its share--at lease 250 million pounds sterling--Rolls-Royce will have to call upon its owner, the British government, but the latter will first have to be convinced of the project's profitability.

The fact is that three British firms are simultaneously seeking government assistance: Rolls-Royce for the RJ-500, British Aerospace for the A320, and Westland for the WG.30. In a speech to the SBAC [Society of British Aerospace Companies], Norman Lamont, the secretary of state for industry, summarized the government's attitude toward these requests as follows: "The government has, in fact, indicated it is prepared to consider any request for support in the form of investments reimbursable by payment from sales earnings. It has also clearly indicated it would do this by taking into account its resources available at the time the request is submitted, and also the merits of the project under consideration."

Rolls-Royce was nationalized 11 years ago after the dismal bankruptcy of the former Rolls-Royce Company. The firm has been in the red during the past few years, and last year the government "poured" some 50 million pounds sterling

into the company. Rolls officials expect the company to begin showing a profit once again by 1983. Nevertheless, the government is not planning to denationalize it in the near future. Lamont said he considered this to be a long-range goal. According to him, the financial assistance given Rolls-Royce during the period April 1981-April 1983 will total 364 million pounds sterling.

To be denationalized, Rolls-Royce will first have to increase its productivity. To this end it will have to reduce its employee force again by 6,000 persons this year after having already slashed it by 6,000 during the past 15 months. Robins estimated the market for the RB-211 and RJ-500 engines at 5,000 units over the next 25 years.

The American engine manufacturers, Pratt & Whitney and General Electric, are pondering the feasibility of launching a new technology 10-ton-thrust powerplant. Pratt & Whitney seems to be more prepared to proceed with such a project than does General Electric. In the event of a cooperation agreement on development of a 10-ton-thrust engine, it would be surprising, however, to see one of the two major American engine manufacturers allow Rolls-Royce to be the prime contractor.

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TRANSPORTATION

BRIEFS

ATR-42 PROGRAM--Following the official signing of necessary agreements, Aeritalia has moved rapidly into the initial production phase of the French-Italian ATR-42 [commuter transport] program at its plants in Pomigliano d'Arco near Naples. This phase is scheduled to end in June with the aircraft's structural drawings. Cutting of metal will begin on 1 July. Completion of the overall drawings is scheduled for March 1983. Full-size wooden mock-ups are under construction at Aeritalia's plants and will be used to test the flight compartment's internal space and layout. They will be shipped to Toulouse [Aerospatiale] in September. Aeritalia is also currently building a class 1 mock-up of the aircraft's section 15 which houses the landing gear well, plus a class 2 (metal) mock-up of section 11 (flight deck). This mock-up of the forward part of the aircraft will be shipped to Toulouse on 15 June. First flight of the first aircraft is still targeted for August 1984, with certification expected 1 year later. By that time, six ATR-42's will have been built. Delivery of the second aircraft is planned for November 1984. [Text] [Paris AIR & COSMOS in French 6 Mar 82 p 9] [COPYRIGHT: A. & C. 1982] 8041

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