

Affordable Automation in the System Part Production

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The International Symposium on Automation and Robotics in Construction (ISARC) has been convened at the right time. The construction industries are actually in a difficult stage of reorganization and is looking for new orientations. It is evident, that only low-cost construction with a high degree of modern logistics and automation still allows affordable constructions. We are the designers in a team of pioneers, who took into operation the first CAD/CAM-controlled element slab plant worldwide in March 1986 with the company Lösch at Bad Dürkheim.

Please let me show you our list of references with some pictures of the different stages of automation as an introduction to the subject of my lecture. My subject today are not the technical possibilities, but projects which are still affordable in consideration of decreasing sales and increasing flexibility.

You have seen in the reference list, that automation and robot application had a triumphant progress. It includes 24 element slab plants, 12 multifunctional plants for slab and wall elements, and 7 CAD/CAM-controlled plants for industrial construction and special elements. Several companies realized, after having planned a first CAD/CAM-controlled production with us, two or three other production plants with us.

An excellent example is the company Fuchs. In February 1992 the company Fuchs erected the first element slab plant, in December 1992 the second one followed and in April 1994 the third one. In July 1996 a production plant for wall and special elements has been taken into operation, and in March 1997 a complete solid house production. With regard to the solid house production, the CAD/CAM-idea achieved very positive influences on the production of three-dimensional elements, the so-called Fuchs-modules.

At the beginning of automation 12 years ago the product was the focus of our consideration, but this approach is no longer sufficient for our today's customers. Our customers have to think about the customers of their customers, who had to suffer no increase of their real wages since about 4 years and who cannot expect any increase thereof in the next future. This means, that only such competitor will survive, who makes the best and the cheapest offer under these conditions, which allows the orderer to calculate his investment. These preconditions, which have never before occurred in this strength, are ruling on today's and future proprietors of a CAD/CAM-controlled plant.

As you see from the reference list, we as the „midwife“ of the automatic precast plant, were quite spoiled in the beginning. In 1993 8 plants designed by us have been taken into operation. After dramatical changes it is today even difficult, to realize a design order after the second or third draft with the appertaining investment study. We are looking together with our customer for a solution with a profitable design approach and with prospects oriented towards the customer, a solution, which integrates the technical progress, but which can at the same time be justified economically and can be afforded by the customer. Our customer allows to base the calculation on a two-shift operation. Also he allows as our planning partner up to 550 shifts per year with a net working time of 7 hours per shift. However, with regard to the flexibility he has to claim the highest standards in order to utilize the full capacities of the production, but also to offer a logistic and low-cost construction period to his customers. This includes already to involve outscore partners in order to present an offer adapted to the market demands.

After this description of the actual situation from our point of view I want to present you our considerations concerning the subject of this symposium. Actually we are planning for a medium-sized company, being family-owned for more than 100 years and whose owner has studied construction and applied economics. He wants to meet his very complex tasks, which are however limited to the region, on a new terrain and under the todays market conditions. His company philosophy says: „We resolve the construction-related problems of our customers.“ This means, that the company advises its customers from the economical and architectural point of view, it plans, produces, and erects with own as well as with outsourcing products and services.

Based on traditions and experiences, the company is cautious with regard to sales expectations. Since 1992 they work with a well-known CAD-system which supports the complete project from the acquisition-supported design over the integrated planning up to the precast element drawing. The employees of the company are already engaged in the approach. The products must be considered as a result of the comprehensive, already mentioned company slogan. The own production is equipped for large high-quality elements. The complete three-dimensional sector is performed by outsourcing partners, which are integrated in the data network, according to logistic points of view. This means that even in case of relatively low sales expectations, the company is able by use of modern technologies to present to its customers low-cost offers and high-quality services with competitive terms of delivery.

The precast plant, performing the production, is designed for elements with a maximum length of 12.5 m, a width or height of 3 m and a thickness of max. 500 mm. The produced elements are transported by crane only once and are immediately packed into easy-to-mount logistic packages. The production is made on pallets, which are moved to the different work stations by means of a shelf operator unit. The control of production steps, such as formwork, reinforcing, casting is performed by a master computer. The complete plant, which is already prepared for a later expansion, must not exceed the costs of DM 5 million in the first construction phase.

The aim of my lecture is to take away the fear of the economic risks of a responsibly designed automation and robot application, if it is integrated in the comprehensive own considerations for the future by stepwise and cautious application.