

Using the B&R SYSTEM 2005 in FIPFG Gasket Technology

FIPFG stands for "formed in place foam gasket". In other words, the gasket material is applied directly where it is needed. A whole row of problems in the automobile, electronic or packaging industry could not be mastered without this demanding but extremely economical technology. The company "EDF Polymer Applikation" - a middle sized company in Hörbranz am Bodensee - makes use of the performance of the B&R SYSTEM 2000.

To apply chemical gasket material directly where it is needed, EDF has developed a machine that mixes the chemical components for the gasket material and applies it precisely along the contour of the work piece. To solve the problems of CNC control and daisy-chained machine control, EDF chose the system that best fulfilled the requirements - the B&R SYSTEM 2005 with integrated CNC and

PCC (Programmable Computer Controller) functions. Deterministic multitasking guarantees reproducible gasket flow. The commands "pour on" or "pour off" that are generated by the CNC program must be able to be reproduced with the same times for each piece and an access time of less than 4 msec (valve control).

Visualization. Another requirement was a shared visuali-

zation system for the CNC section and the machine section that would be very difficult to handle with two separate systems.

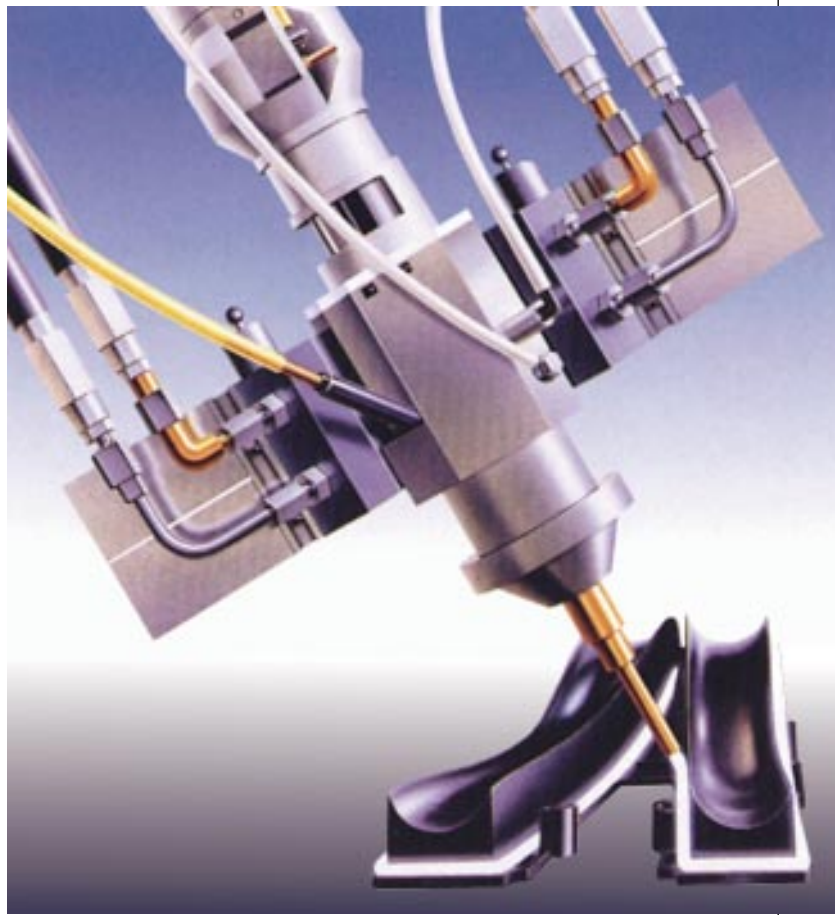
Machine Variants. Two machine variants with different visualization (PC based visualization and lower cost visualization) and partially different structures had to be satisfied with the same software. In addition to technical programming

steps (conversion sets and available hardware recognized automatically), EDF is able to offer its customers, a system based on a modular platform.

Hardware. The controller consists of a B&R SYSTEM 2005 with NC154 Axis Controller and an expansion unit. The visualization is taken care of with PANELWARE operator panels or a PROVIT 4000 Industrial PC.

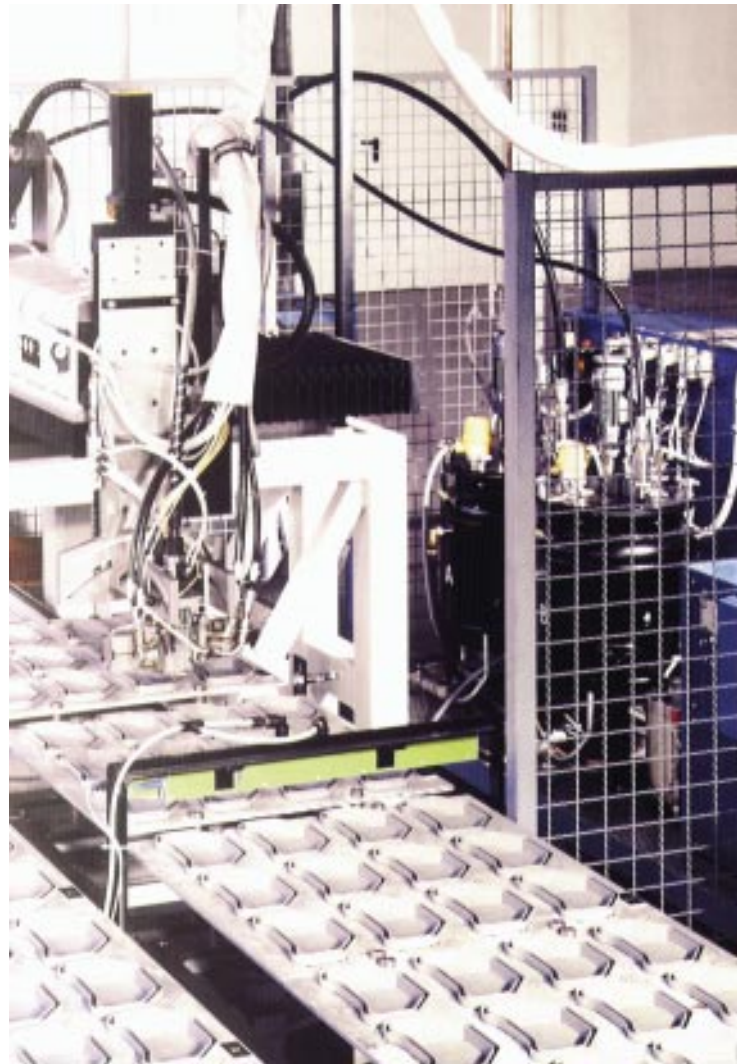
CNC. The NC154 Axis Controller works with an input counter frequency of 150 to 600 kHz. It allows a set change time of 6 msec, a set preparation time of less than 40 msec and provides local program memory for up to 100 CNC programs (presently 120 KBytes RAM).

CNC Program Management. Since the RAM in the NC154 is not battery buffered, a copy of the NC154 program is kept in RAM in the CPU which is copied automatically to the NC module at each power-on.



B&R SYSTEM 2005

FIPFG machines are used in many different industries



PANELWARE Solution (Low Cost Variant). CNC programs available in DIN code can be edited or created with a line editor via PANELWARE. Program management takes place in the CPU. The programs contained in the CPU correspond to the ones in the NC154. A maximum of 100 CNC programs can be managed. When more program memory is used (e.g. 1 MByte), a section of the available memory can be used as CNC mass memory for more than 100 CNC programs.

Saving / Archiving Data. In order to allow data to be saved and programs to be managed externally, PC programs are made available by B&R that allow an upload or download of the CPU. With a text editor, programs created in or loaded to an external PC program can be changed or saved.

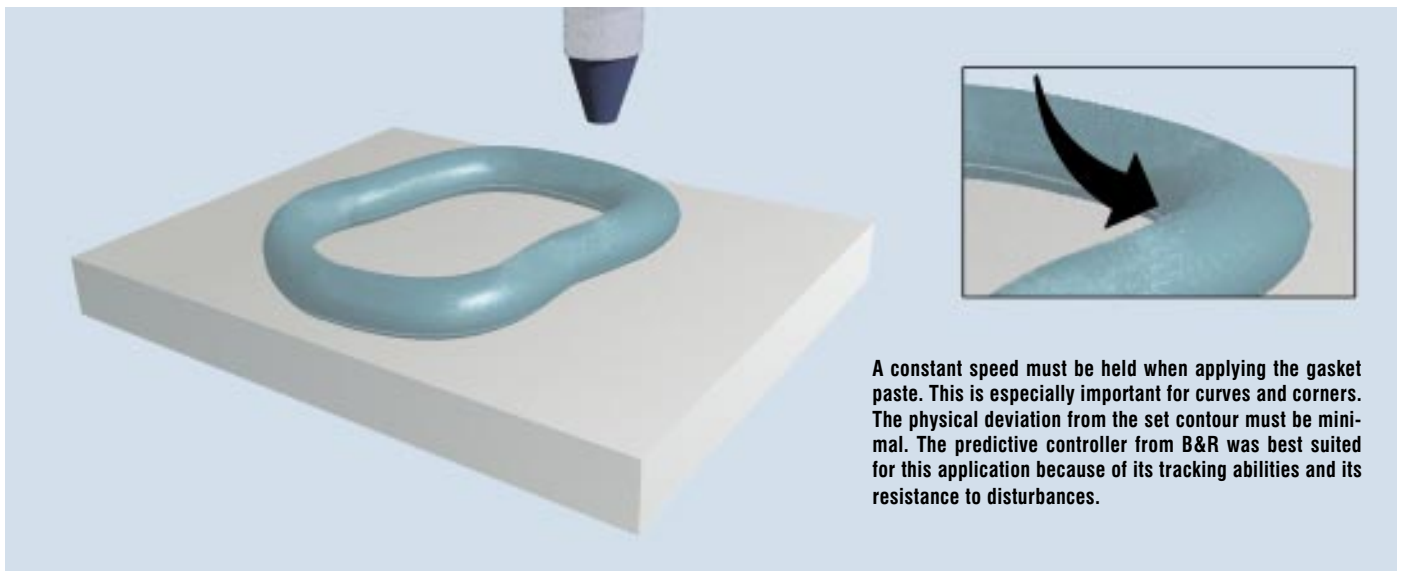
PROVIT 4000 Solution (PC Variant). A text editor is available based on windows visualization that allows CNC programs to be edited easily in DIN code. The complete program management takes place on the PC (hard disk). The programs desired on the controller are marked and transferred to the CPU and also automatically to the NC154 with a single key stroke. Naturally, programs can be loaded or saved on disk.

Visualization Functions. The user can edit CNC programs, monitor operation data (e.g. axis coordinates) or display and set parameters (e.g. axis or path parameters) with the visualization device. Additional functions such as displaying text messages for disturbances, man-

aging parameter tables or online language selection are now being developed.

Teach-Mode. Editing program coordinates via Teach-Mode is planned for the middle of 1996. With a Teach-Box (coupled via the CAN interface), the

CNC can be controlled by hand and, if the CNC is in the correct position, the axis coordinates can be transferred to the active program line with a single key stroke. This visualization solution will be implemented for both types of visualization. ■



A constant speed must be held when applying the gasket paste. This is especially important for curves and corners. The physical deviation from the set contour must be minimal. The predictive controller from B&R was best suited for this application because of its tracking abilities and its resistance to disturbances.