DYNAMIC WORK LISTS IN A MODULAR ASSEMBLY SYSTEM

Axel Unger
Bertrandt Ingenieurbüro GmbH

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DYNAMIC WORK LISTS IN A MODULAR ASSEMBLY SYSTEM

Technical task:
The new idea is, not to necessarily carry out all partial work sequences, if these results are an advantage for the overall output of the assembly system. The advantage can be that a production job stays in one station for a shorter time and this station is then available earlier for a subsequent production job. The partial work sequences of the first production job that were not completed in this station must then be completed in another station, which in this case is also available for this purpose.

Initial situation:
In a modular assembly system, the semi-finished products are brought from one workstation to the next by a driverless transport system. The route through the assembly system depends on the assembly sequence, the so-called priority graph. This priority graph determines the next work step for the product. The capabilities of the stations then determine in which station the next step can be processed. Such a step can consist of several partial work steps, called partial work sequence. When a workstation is passed through the quantity of partial work sequences to be executed in this station for a production order is first loaded. These are then executed and the machine moves to the next station, etc.

Solution
The above mentioned idea is done according to the procedure described below:
For each production order in a station, first the longest possible list of partial work sequences is determined, which is possible in this station from the capabilities of the station.
After completion of a partial work sequence, a check is made for each production order to determine whether it should remain in the station. This always happens if the next partial work sequence can also be executed in this station, no further production job needs this station and the subsequent partial work sequences cannot be executed in another station or these stations are occupied.
If the subsequent partial work sequence is possible in another station and this station is also ready to accept or promptly ready to accept, and if a request for the current station is made by another production job, the station is released for the subsequent production job. The other station can also be the same station itself. It can therefore make sense for one production job to overtake another.
Once the complete list of partial work sequences has been processed, the next partial work sequence must be executed in another station. Otherwise, the list would not have been the longest possible one. Here, the user selects which of the existing stations can execute the next partial work sequence and from these, the station that is most likely to be ready to receive the job is selected.

Advantages:
By constantly checking the production orders, throughput is optimized and thus increased and machine utilization improved.