Product report: Qualicision Functional Decision Design Scheduling Engine (QFDDs)

Integration of KPI-oriented process optimisation

Modern production is changing and increasingly demands self-organisation at shop floor level. Physical production structures need to become more flexible and be supported by driverless transport systems. Flows of information and material are to run in parallel with each other wherever possible, while the variety of KPIs and the resulting interdependencies between the options for controlling production processes is steadily growing.

The KPI-oriented optimisation software Qualicision from PSI FLS Fuzzy Logik Systeme GmbH allows key performance indicators (KPIs) to be mastered for individual targets in production by integrating decision-making expertise into business processes.

Controllability of alternatives

In manufacturing companies such as those in the automotive industry, interactions of the production processes optimised with Qualicision are recorded based on process data in impact matrices during the optimisation of production sequences. Subsequently, a conflict and compatibility analysis uses these matrices to calculate, which alternatives are to be selected in order to achieve as precisely as possible the previously defined process targets. The number of possible control options thus remains controllable in relation to the optimisation of the KPIs.

KPI-oriented shop floor optimisation

The Qualicision Functional Decision Design Engine (QFDD) supports KPI-oriented planning with the integrable scheduling component QFDDs for shop floor optimisation. QFDDs can be integrated into surrounding infrastructure and administration systems, such as ERP or PPS. Orders for the manufacturing process, for example, are managed in the ERP system and made available to the QFDDs for detailed planning of machine utilisation, taking into account the required

optimisation priorities or KPIs, such as short order lead time, maximum utilisation, minimal setup times, order priorities, delivery dates, or minimum stock levels.

The utilisation plan generated with QFDDs is then provided to the surrounding system for further processing.

Optimisation results in the KPI Viewer.

Goal achievement using a learning algorithm

Qualicision also supports the user with an integrated learning algorithm to find the appropriate priority settings for the KPIs by running analyses by systematically changing the priority settings and optimising machine utilisation based on different KPIs, with the intention to meet the KPI goals as accurately as possible. The results of the KPI optimisation, based on the KPI priority sets calculated by Qualicision, can be displayed in the KPI Viewer. The maximum achievable characteristics per KPI that can be reached during the learning phase are shown in the red area. To help select a specific priority setting, the planner can set a wish pattern (see yellow area), and the corresponding optimal priority setting is displayed automatically (see green area).
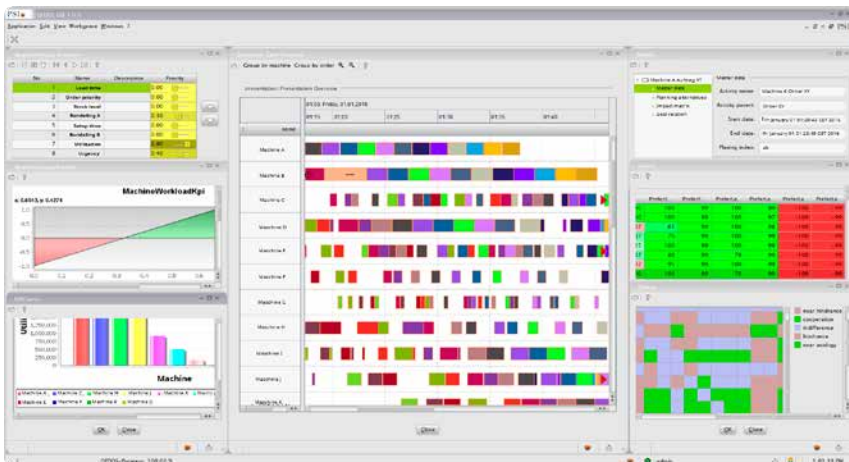
KPI-oriented machine utilisation plan.

The modern, user-friendly GUI of QFDDs uses the PSI Java-based Framework (PJF), and makes it easier to adapt optimisation strategies in line with current target requirements, both online and taking into account real-time situations on the shop floor. Thanks to implementation in PJF, QFDDs can be integrated into all tools of the PSI Software Group.

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