

## Product review: Tuning Dashboard for planning in PSImetals

### Planning as intuitive as driving: select, run, outperform!

The optimisation algorithms in many of PSImetals planning system used around the world are aligned exactly to each customer's unique needs, such as service maximisation, inventory minimisation or the reduction of in-plant transportations. However, the growing complexity of today's supply chain networks combined with rising fluctuations in demand and supply underline the need for flexible and intuitive planning. In analogy to pre-set car engine tuning modes (e.g. comfort, sport, economy), PSI develops the new PSImetals Tuning Dashboard which the planner can use to easily and quickly change the algorithm behaviour, including faster “what-if” simulations and adjustable priorities. Furthermore, the qualitative analysis of tuning parameters by complementary advanced fuzzy technology allows planners to control optimisation in alignment with their business KPI targets.

Planning optimisation in metals production needs to consider multiple sites layouts and production routings, technical constraints of various production equipment, as well as logistical constraints and market priorities. These constraints often enter in conflict: for instance, maximising campaign sizes against on-time order fulfillment. Such conflicting objectives must be balanced whilst taking business priorities of each plant into account. This is achieved by the use of dedicated tuning multipliers which are now embedded in the PSImetals optimisation algorithms. Fine-tuning the planning algorithms is very complex and has, so far, required a high level of user expertise due to:

- a high number of multipliers that can be considered in the objective functions of the various algorithms
- an unclear relative weight of the different business constraints based on the values given to those tuning multipliers

Knowing what to modify in order to drive the optimisation result in a given direction is quite challenging from a user's viewpoint. This is where the new PSImetals Tuning Dashboard comes into its own.

#### Intuitive management of customised tuning profiles

The PSImetals Tuning Dashboard offers an easy-to-use view for setting and adjusting planning algorithms on the basis of different KPI targets or simulation scenarios.

With the help of modern charts and GUI controls, the planner can easily define and manage various tuning profiles and corresponding multipliers as well as business targets based on KPIs:



*How would you like to plan today? As easy as you decide for you car driving mode you will be able to switch the direction of your planning.*

- Tuning profiles contain a predefined or user-specific set of tuning multiplier values, corresponding to specific business objectives or target business KPIs' values.
- KPIs represent target values for measuring the quality of a plan. KPI target

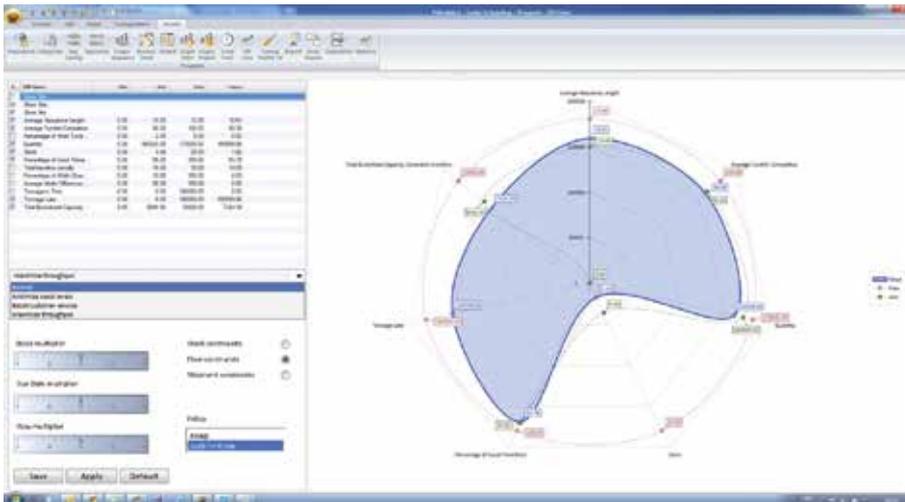
values (e.g. 85 % for OTIF—on time in full) can be given as input to drive the tuning optimisation.

- Macro-tuning parameters relate to a specific business dimension of a plan (e.g. throughput maximisation). They are directly connected to the corresponding set of multipliers impacting the objective function of the planning algorithm. Changing the value of the macro tuning parameter will automatically change the values of its underlying tuning multipliers.

As an example a “boost customer service” tuning profile could be defined, aimed to maximise the service level, measured by the OTIF KPI. If such a profile is activated, the corresponding multipliers are automatically adjusted in the background so that due date violations are minimized by the algorithm. The weighting of major constraints within this profile can be easily adjusted by scaling the appropriate macro-tuning parameters. Other possible profiles could be: minimise inventory, maximise plan throughput or line schedule length, maximise the hot charging rate, etc.

#### Simple comparison of planning scenarios

Once a tuning profile has been selected (standard or custom) and the corresponding set of macro-tuning parameters has been adjusted (optional) in the Dashboard, the user can execute the profile directly from the view. The plan results will be displayed in the KPI view, together with optionally preset min./target/max. values. After saving the plan results



The PSImetals Tuning Dashboard with the selected tuning profile and associated macro-tuning parameters (left) as well as corresponding KPI target values versus actual planning values (right)

and KPIs, the user can re-run the solver based on other available tuning profiles and compare the results of multiple simulations in the KPI view.

#### Parameter evaluation with Qualicision®

Mathematically, Qualicision® is based on complementary advanced fuzzy logic. It recognises conflicting objectives in pro-

cess data and balances them out. Qualicision® is used as an optimisation and decision logic in complex processes. As a component of the PSImetals Tuning Dashboard, Qualicision® provides the user with semi-interactive support, enabling him to adjust the tuning parameters in the best way possible and thus to achieve business objectives.

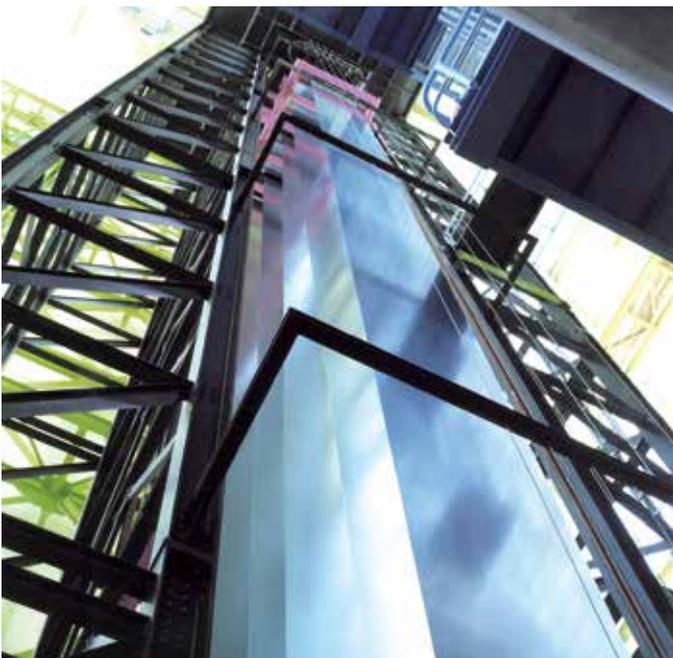
Qualicision® is used as an offline support tool to optimise the fine-adjust-

ment of PSImetals planning and to configure the best tuning profiles. Based on the selected possible values for the given macro-tuning parameter, multiple solver runs are performed and stored. Each run results in specific values for a given set of output KPIs. Based on all these runs Qualicision® helps the user in finding the optimal tuning parameter values that would lead to his target output KPIs.

With the new Tuning Dashboard, PSImetals improves the level of usability and interactivity for the customer: each planner will be able to adapt planning strategies according to his given targets, despite the complexity of the optimisation models in the background. 

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Campaign size maximisation versus on-time order fulfilment: the new PSImetals Tuning Dashboard can balance out conflicting targets with the simple selection of pre-set tuning profiles in relation to the given business goals.