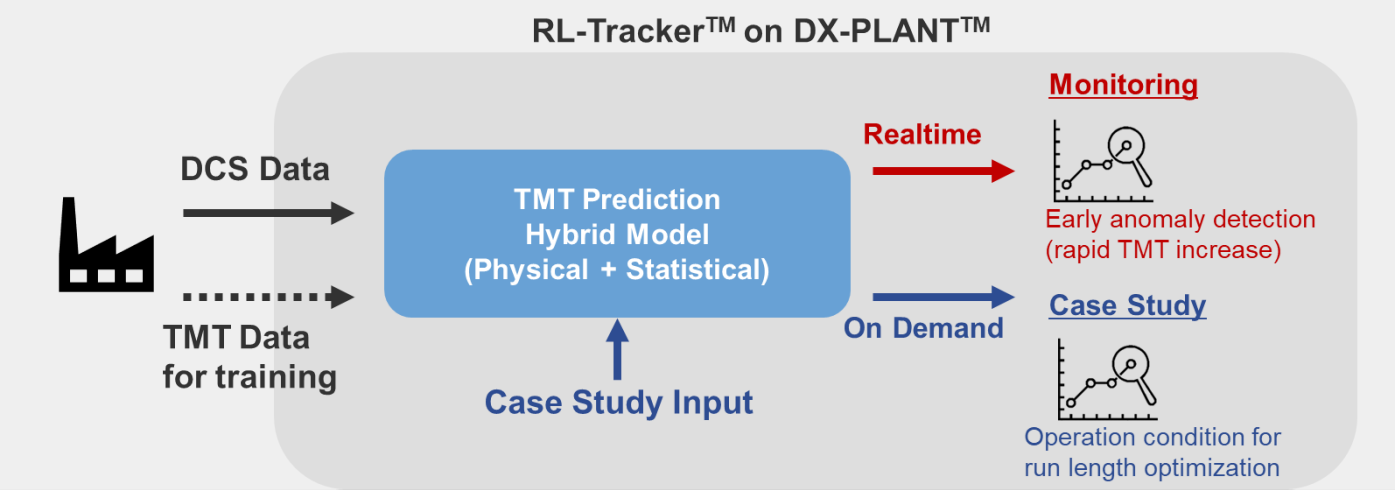
RL-Tracker™

Unlocking Ethylene Plant Productivity: Optimizing Run Lengths

Through DX-PLANT™, TOYO provides solutions for the four fields of engineering (E), operations (O), maintenance (M) and business (B). This system achieves the creation of "Digital Twins" by constructing virtual plant models based on operational data from the actual plant, all within a secure cloud platform. Especially for ethylene plant, **TOYO offers RL-Tracker™ as DX-PLANT™ operation assistance service which transforms your plant's operations and unlock its full potential.**

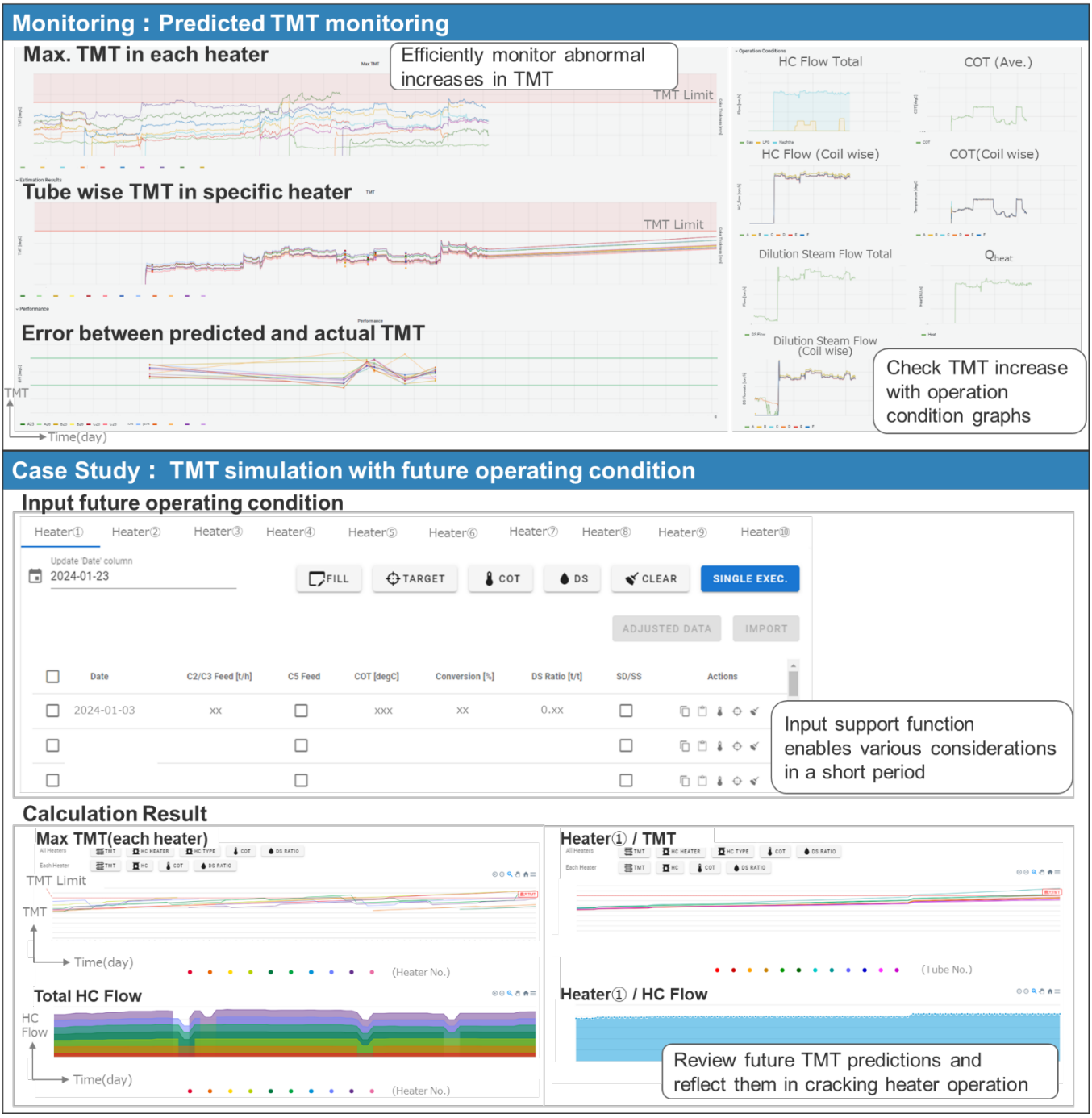
RL-Tracker™ is DX-PLANT™ web-based application for ethylene cracking heater operation. RL-Tracker™ predicts the TMT (Tube Metal Temperature) used as an indicator for decoking in ethylene cracking heater. The TMT prediction model is hybrid model (Physical and Statistical). The model is created by training of past operational data (DCS data and measured TMT values), and TMT is predicted based on given input to the prediction model.

RL-Tracker™ consists of "Monitoring" and "Case Study" operation modes.
"Monitoring" operation mode provides continuous TMT prediction based on DCS real time input. It enables early anomaly detection (abnormal rapid TMT increase).
"Case Study" operation mode provides on demand TMT prediction based on users input for future operation condition. Its enables to discover operation condition for run length optimization.



Client Requirements	• Monitor TMT constantly to avoid unplanned decoking without increasing the frequency of on-site TMT measurements. • Operate the ethylene cracking heaters based on TMT conditions not with a fixed run length, aiming to maximize production. • Reduce the effort involved in operation planning.
Challenges	• Need to grasp TMT in real-time without increasing on-site TMT measurement tasks. • Seek an easy and quantitative understanding of changes in TMT and run length based on operational conditions.
Solution (RL-Tracker™)	• Predict and visualize TMT in real-time based on DCS data. • Predict and visualize future TMT and run length based on operational conditions such as raw material input.
Value	• Minimization of production losses by avoiding unplanned decoking. • Reduction in effort due to decreased frequency of on-site TMT measurements. • Maximization of production through operational plans based on data-driven analysis. • Streamlining operational planning, leading to a reduction in effort.

RL-Tracker™ User Interface Overview



Tailoring to plant owners' specific needs and operational realities, TOYO considers additional features for RL-Tracker™. As an example of an additional feature, we would like to introduce the automated calculation functionality implemented in the "Case Study" operation mode.

Automatic Adjustment of Raw Material Input:
This feature automatically suggests the raw material input amount that will not exceed the TMT threshold until the scheduled decoking date, if the TMT exceeds the threshold before the planned date. This function helps reduce the burden of operation planning.

Automatic Adjustment of COT (Cracking Furnace Outlet Temperature):
This functionality calculates COT based on raw material input and severity conditions. For instance, if you need to adjust the raw material input while maintaining a constant severity, this feature automatically calculates the required operating conditions for COT. COT is input automatically, allowing users to start TMT prediction simulations promptly.

COT: Coil Outlet Temperature　　HC: Hydrocarbon　　TMT: Tube Metal Temperature

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