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Bodhee Production Scheduler

AI based Dynamic Scheduling

IS YOUR SCHEDULING STRUGGLING TO ALIGN WITH...

FLUCTUATING DEMAND

UNPLANNED MACHINE DOWNTIME

RAW MATERIAL UNAVAILABILITY

SUDDEN MANPOWER SHORTAGES

DUE TO RIGIDITY?

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IT IS PROBABLY BECAUSE YOUR CURRENT SCHEDULING SYSTEMS...
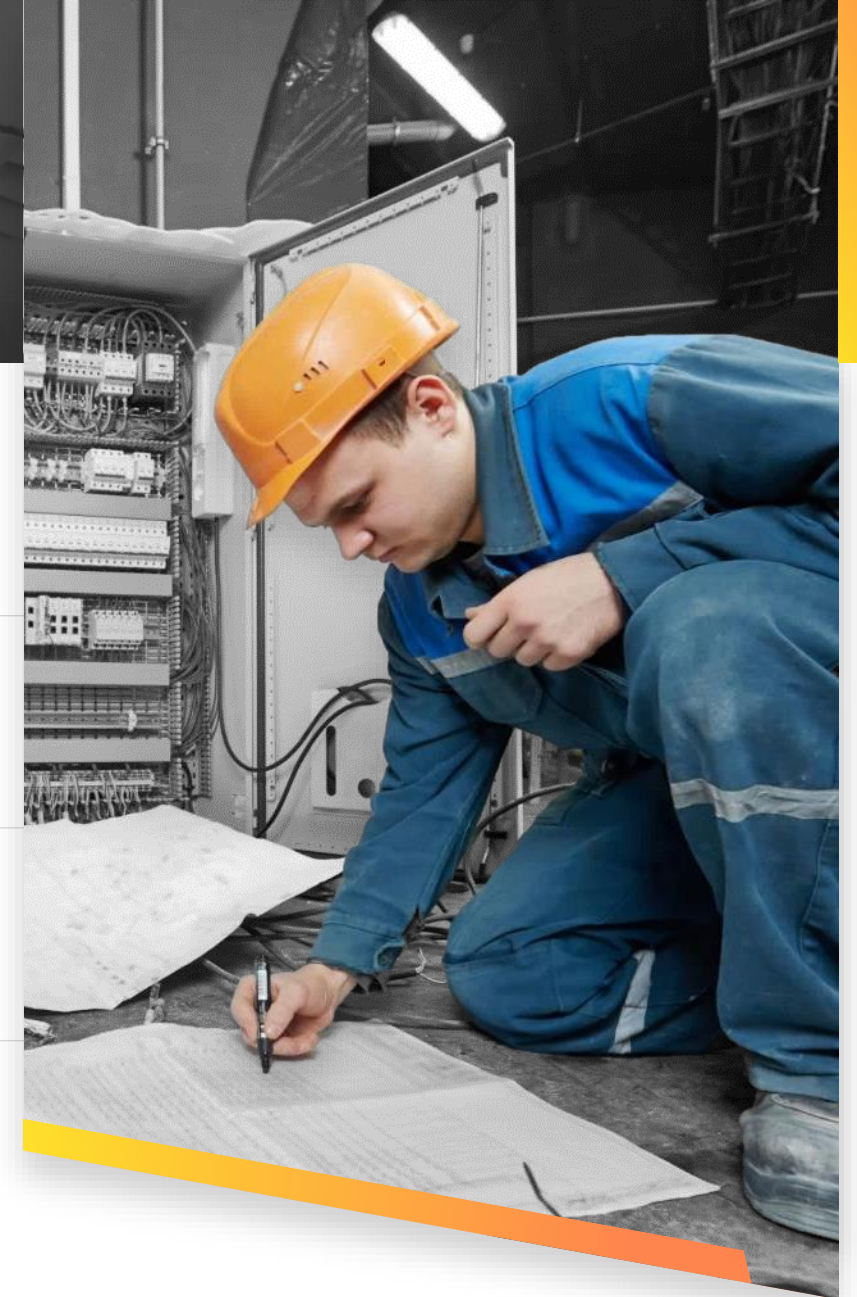
Do not respond to LIVE factory floor data

Cannot manage multiple resource constraints

Do not allow easy updating of sequencing and other master information as per changing priorities

Do not consider indirect tasks and activities while maintaining routing sheets/recipes

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RESULTING IN

THE UNDER-UTILIZATION OF YOUR PRODUCTION CAPACITY
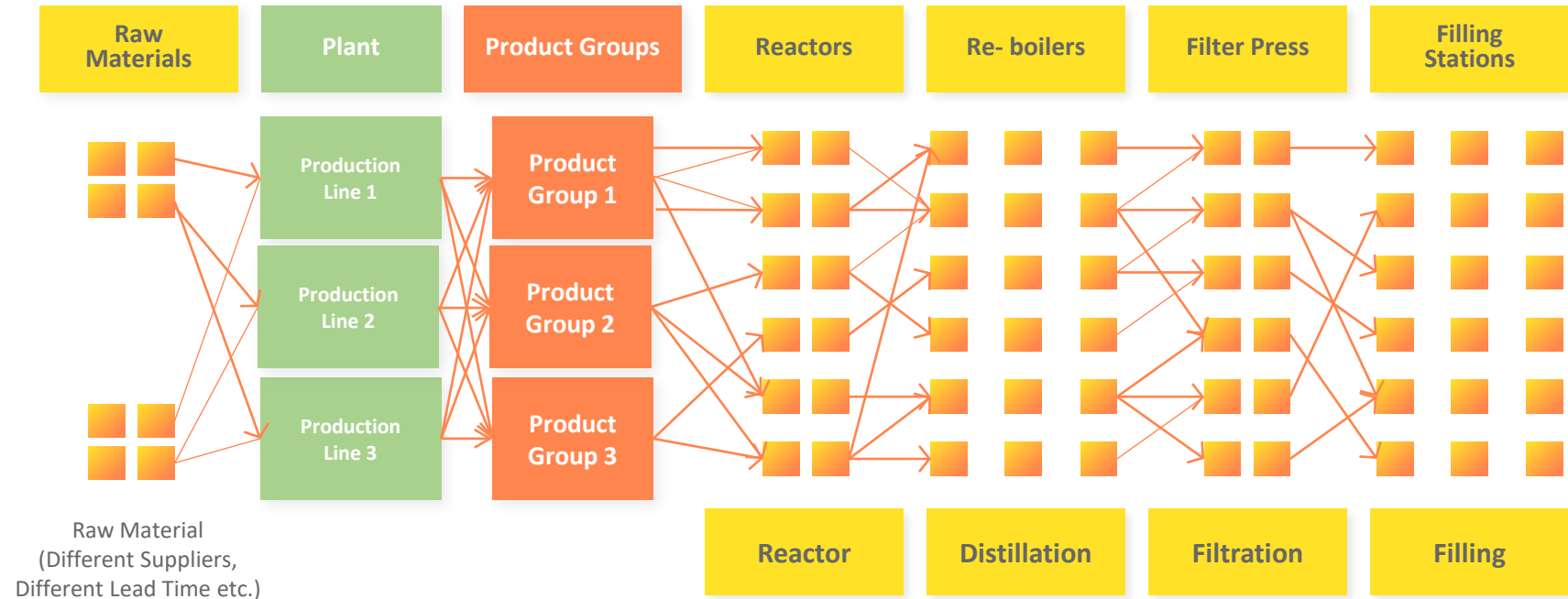
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EXAMPLE OF BATCH SCHEDULING CHALLENGES FOR COMPLEX PROCESSES

- The current scheduling tools don't consider reality/changes of the shop floor viz delays due to machine break-down, resource shortage, Reactor unavailability etc., thus contributing to production losses
- High rate of manual intervention required to generate schedules

Example:
Filtration #10 will be delayed -> Distillation #48 getting delayed -> Reactor #12 cannot be emptied -> Unloading of raw material not possible -> Next batch is delayed

Raw Material
(Different Suppliers, Different Lead Time etc.)

| Raw Materials | Plant | Product Groups | Reactors | Re- boilers | Filter Press | Filling Stations |

Production Line 1 | Production Line 2 | Production Line 3

Product Group 1 | Product Group 2 | Product Group 3

| Reactor | Distillation | Filtration | Filling |

Resulting in suboptimal utilization of manpower and capacity of equipment, besides difficulty in providing delivery on time

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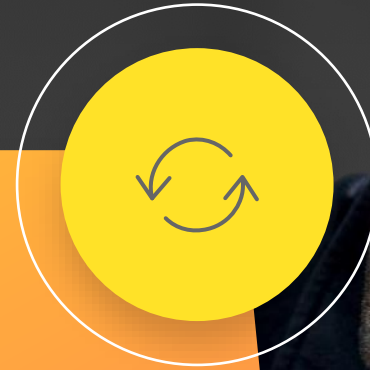
MOVE YOUR SCHEDULING FROM RIGIDITY TO AGILITY

GET ANSWERS TO QUESTIONS LIKE THESE....

" I want to understand the impact of disturbances on the overall schedule

PRODUCTION PLANNER/SCHEDULER

" How do I react to unplanned events and what are my chances of meeting the Production Targets?

PRODUCTION SUPERVISOR

" Am I utilizing my plant capacity optimally? Despite disturbances, how do I achieve my business goals effectively?

PLANT MANAGER

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WITH BODHEE PRODUCTION SCHEDULER YOU CAN

DETECT EVENTS & CONTROL

- Log Events
- Track Progress
- Regenerate Local Schedules
- Standard Dashboards & Reports

MANAGE SCHEDULE DYNAMICALLY

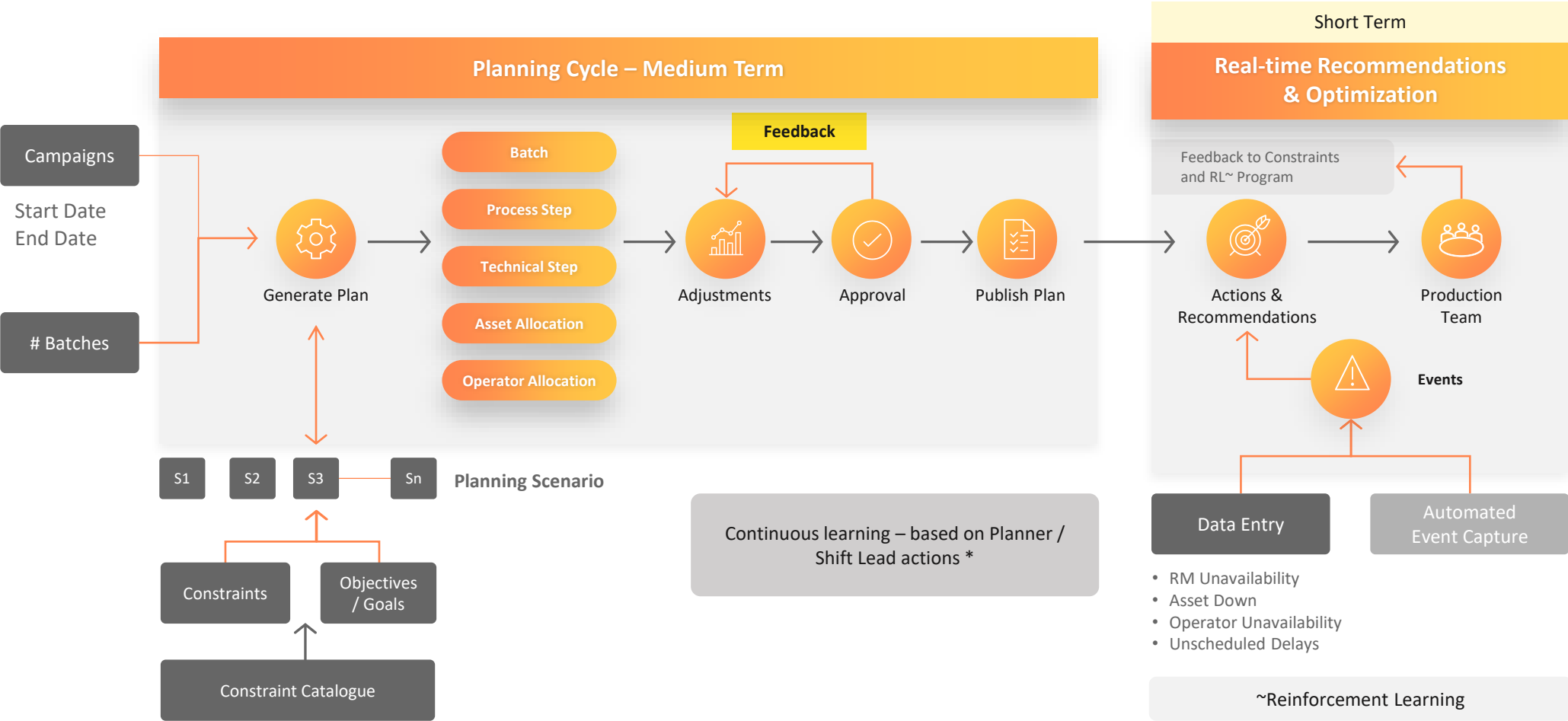- Constraints
- Objectives
- Bottlenecks
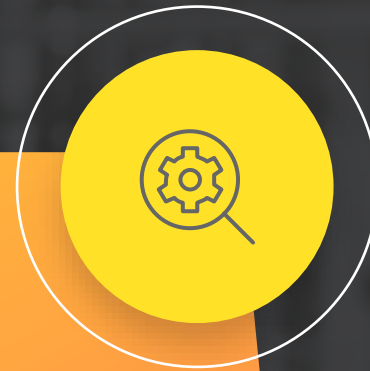- Simulations

ENRICH YOUR MASTER DATA

- Product
- Process Flow
- BOM/Recipe
- Sequencing
- Equipment
- Raw Material
- Manpower
- Skills

USING THE POWER OF AI, IOT & PROCESS DIGITAL TWINS

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PLANNING FLOW WITH BODHEE PRODUCTION SCHEDULER

Planning Cycle – Medium Term

Campaigns
Start Date
End Date
Batches

Generate Plan

- Batch
- Process Step
- Technical Step
- Asset Allocation
- Operator Allocation

Feedback

Adjustments

Approval

Publish Plan

S1 S2 S3 Sn **Planning Scenario**

Constraints Objectives / Goals

Constraint Catalogue

Continuous learning – based on Planner / Shift Lead actions *

Short Term

Real-time Recommendations & Optimization

Feedback to Constraints and RL~ Program

Actions & Recommendations

Production Team

Events

Data Entry

Automated Event Capture

- RM Unavailability
- Asset Down
- Operator Unavailability
- Unscheduled Delays

~Reinforcement Learning

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DETECT EVENTS & CONTROL

DETECT EVENTS & CONTROL

Your Shift Supervisor can have a better control over the shift

✓ Get KPIs at Shift Level

✓ You can add an Operator manually based on the current situation

✓ Schedule by Shifts for your actions

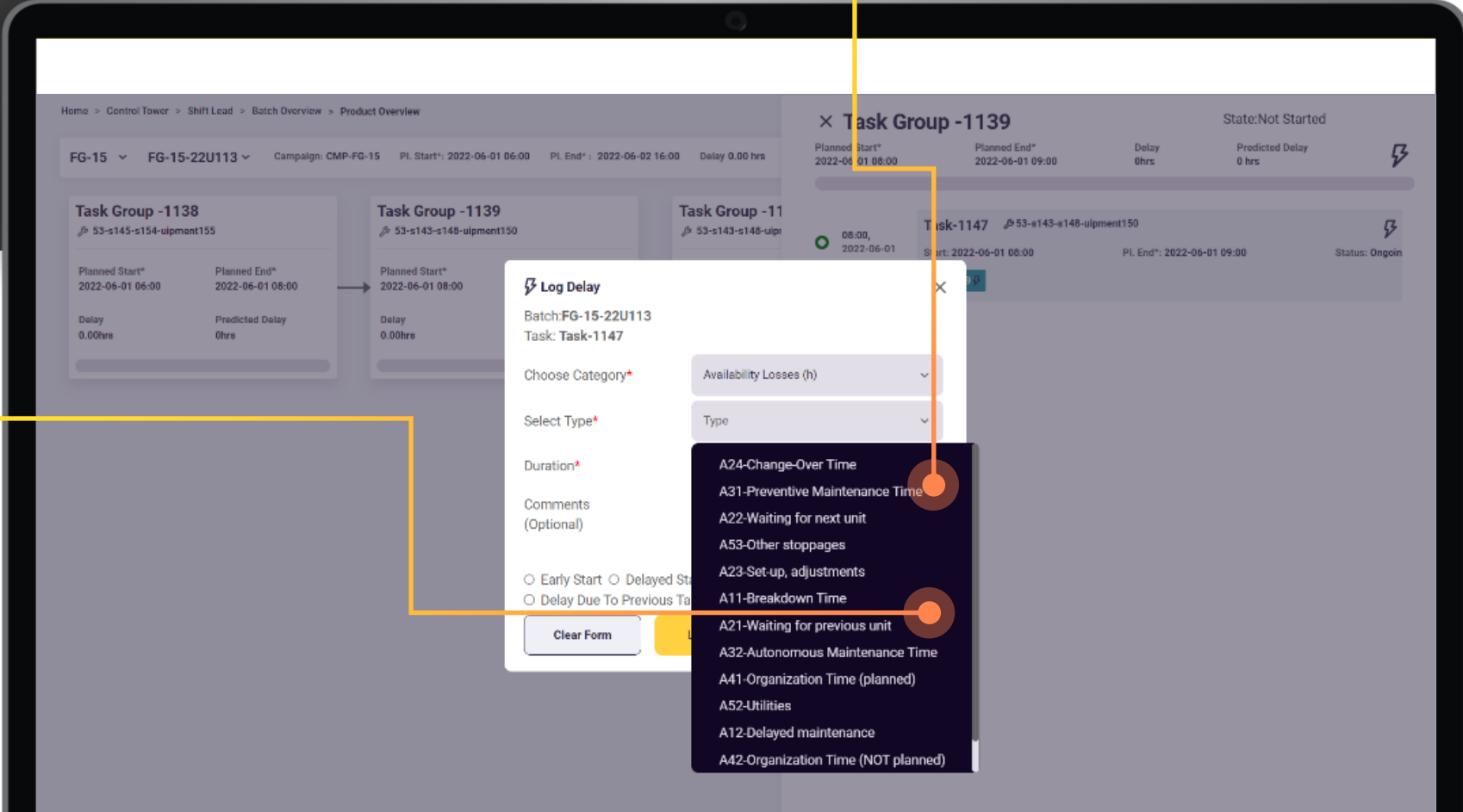✓ Select the Shift to override it by a simple drag operation

DETECT EVENTS & CONTROL

✓ Configurable
Status Information

**Log Events and
Regenerate the Schedule**

These events can be
manually logged or
can be taken directly from
MES/DCS/SCADA/IIoT
Platforms

Home > Control Tower > Shift Lead > Batch Overview > Product Overview

× **Task Group -1139**   State:Not Started

FG-15 ∨   FG-15-22U113 ∨   Campaign: CMP-FG-15   Pl. Start*: 2022-06-01 06:00   Pl. End* : 2022-06-02 16:00   Delay 0.00 hrs

Planned Start*   Planned End*   Delay   Predicted Delay
2022-06-01 08:00   2022-06-01 09:00   0hrs   0 hrs

Task Group -1138   **Task Group -1139**   **Task Group -11**

53-s145-s154-uipment155   53-s143-s148-uipment150   53-s143-s148-uip

○ 08:00,   **Task-1147**   53-s143-s148-uipment150
2022-06-01

Start: 2022-06-01 08:00   Pl. End*: 2022-06-01 09:00   Status: Ongoin

Planned Start*   Planned End*   Planned Start*
2022-06-01 06:00   2022-06-01 08:00   2022-06-01 08:00

Delay   Predicted Delay   Delay
0.00hrs   0hrs   0.00hrs

⚡ **Log Delay**

Batch:FG-15-22U113
Task: **Task-1147**

Choose Category*   Availability Losses (h)   ∨

Select Type*   Type   ∨

Duration*   A24-Change-Over Time

Comments   A31-Preventive Maintenance Time
(Optional)
                        A22-Waiting for next unit

                        A53-Other stoppages

                        A23-Set-up, adjustments

                        A11-Breakdown Time

○ Early Start ○ Delayed Sta   A21-Waiting for previous unit
○ Delay Due To Previous Ta
                        A32-Autonomous Maintenance Time

                        A41-Organization Time (planned)

Clear Form   A52-Utilities

                        A12-Delayed maintenance

                        A42-Organization Time (NOT planned)

DETECT EVENTS & CONTROL

Get the current status of Production Against the Plan

Events can be logged against each task

![neewee logo]

MANAGE SCHEDULE DYNAMICALLY
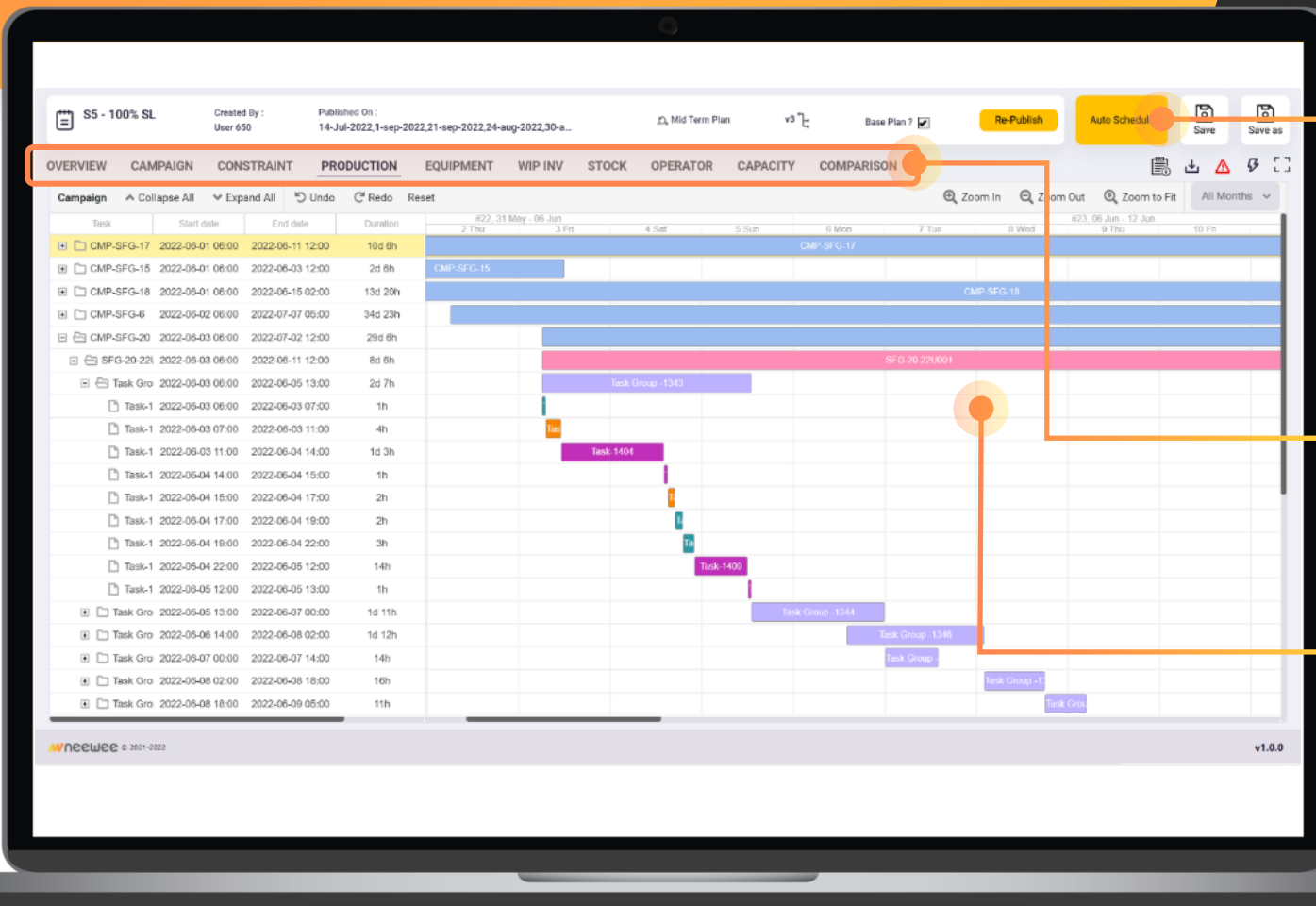
MANAGE SCHEDULE DYNAMICALLY

You pick and choose from the Constraints Catalogue or define a unique constraint specific to your business

Enable/Disable constraints based on scenarios

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MANAGE SCHEDULE DYNAMICALLY

You can generate a schedule by the click of a button

✓ Click the button to Reschedule and automatically update the changes done by the Production Planner/Scheduler
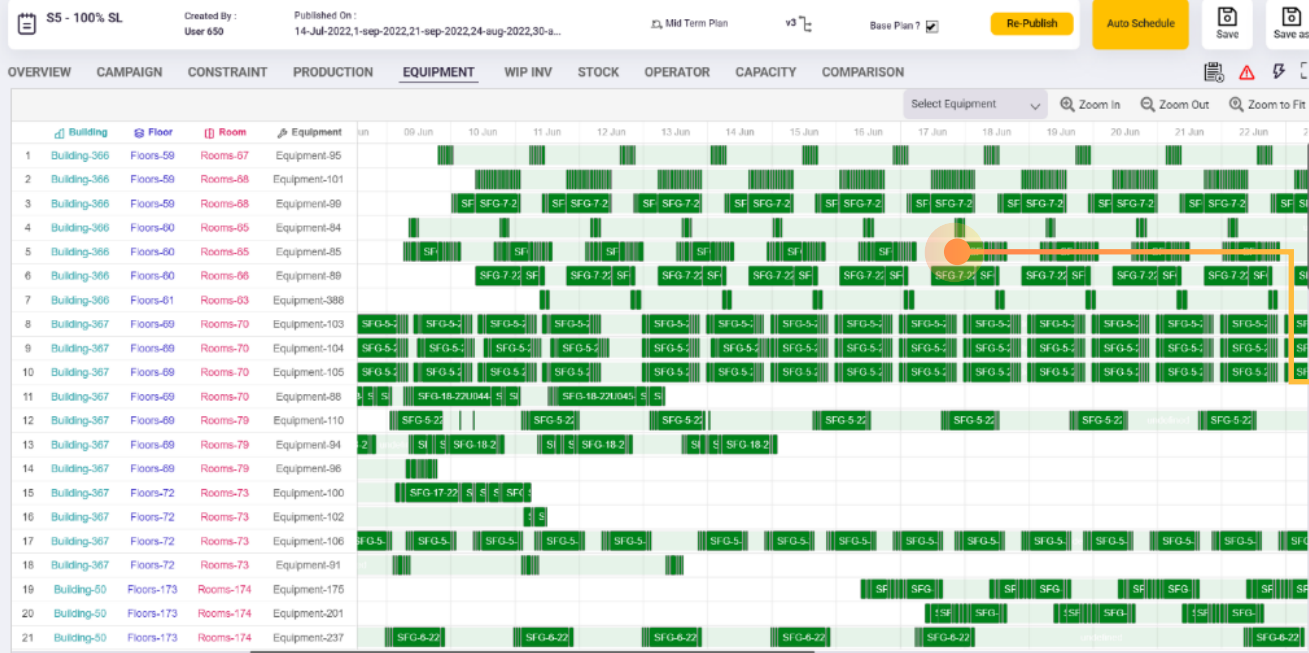
✓ You get different views of the schedule

✓ The Planner/Scheduler can override the schedule generated by Optimizer with a simple drag action
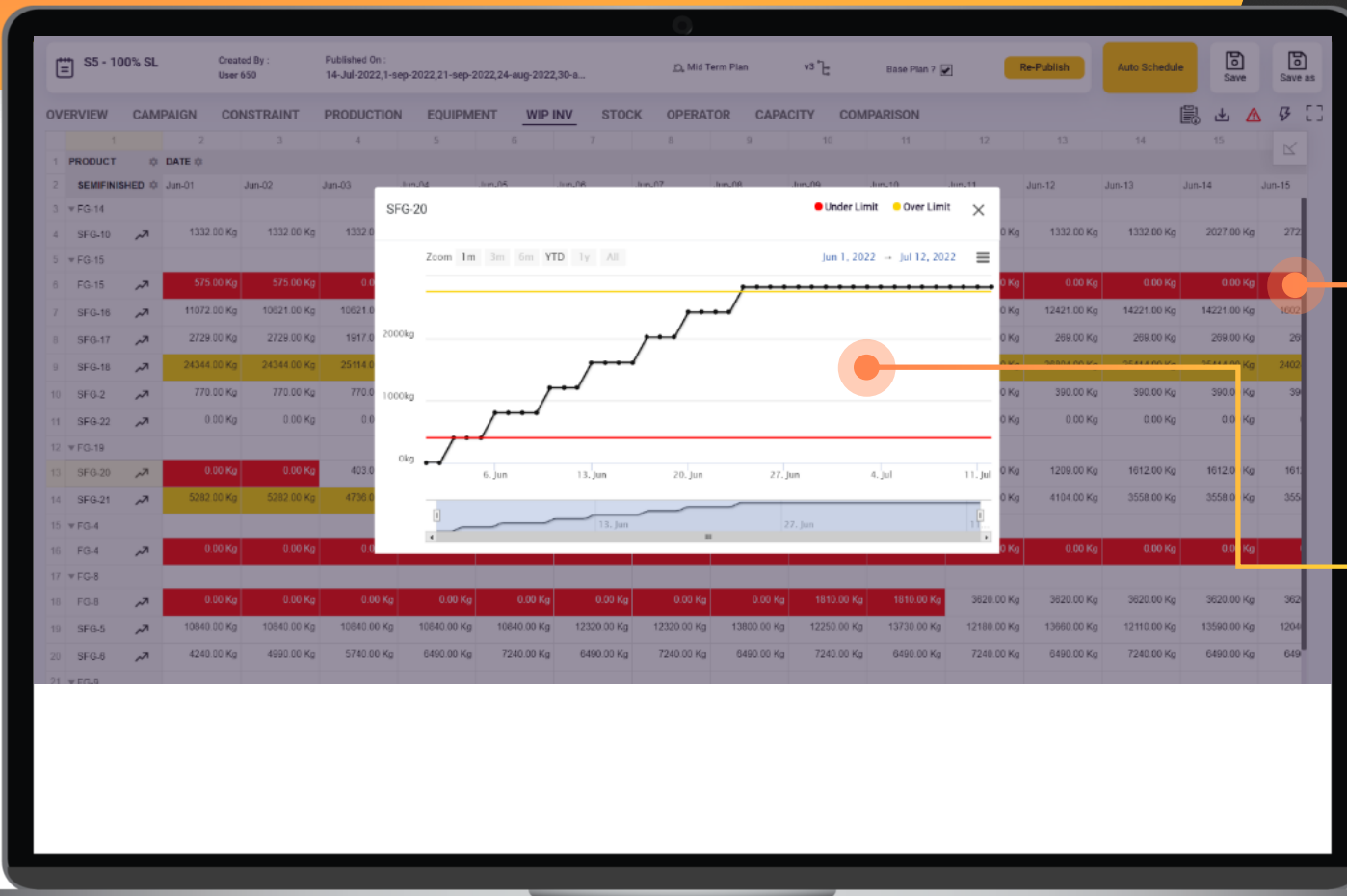
MANAGE SCHEDULE DYNAMICALLY

Have a bird's eye view on Equipment

✓ Color Coding helps planners identify over-allocation easily

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MANAGE SCHEDULE DYNAMICALLY
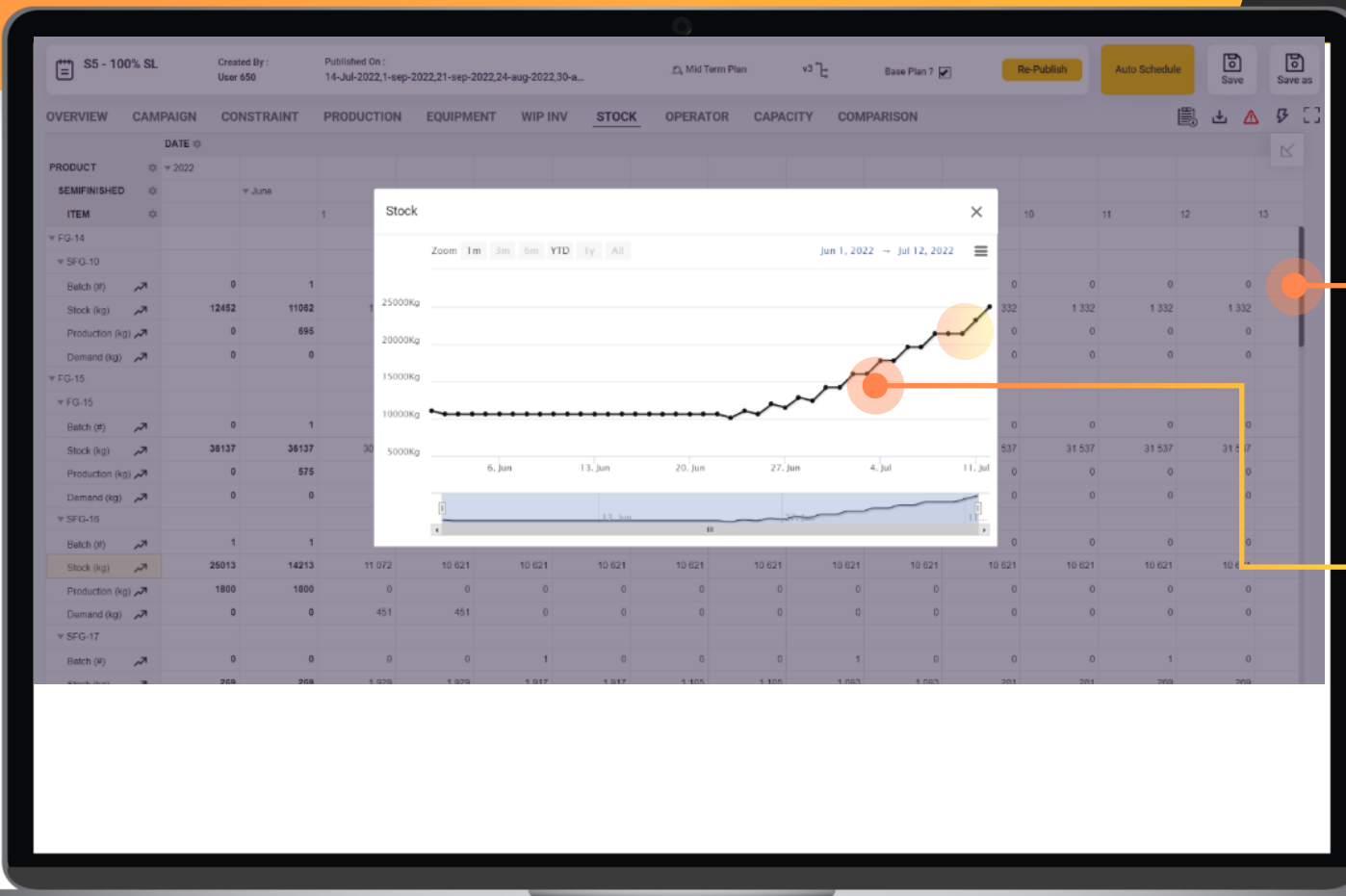
You WIP is under your control now

✓ Higher WIP clearly indicated by the color code

✓ Intuitive Graphs for faster actions

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MANAGE SCHEDULE DYNAMICALLY

Know your Stocks for the Plan

✓ Stocks indicated by the color code
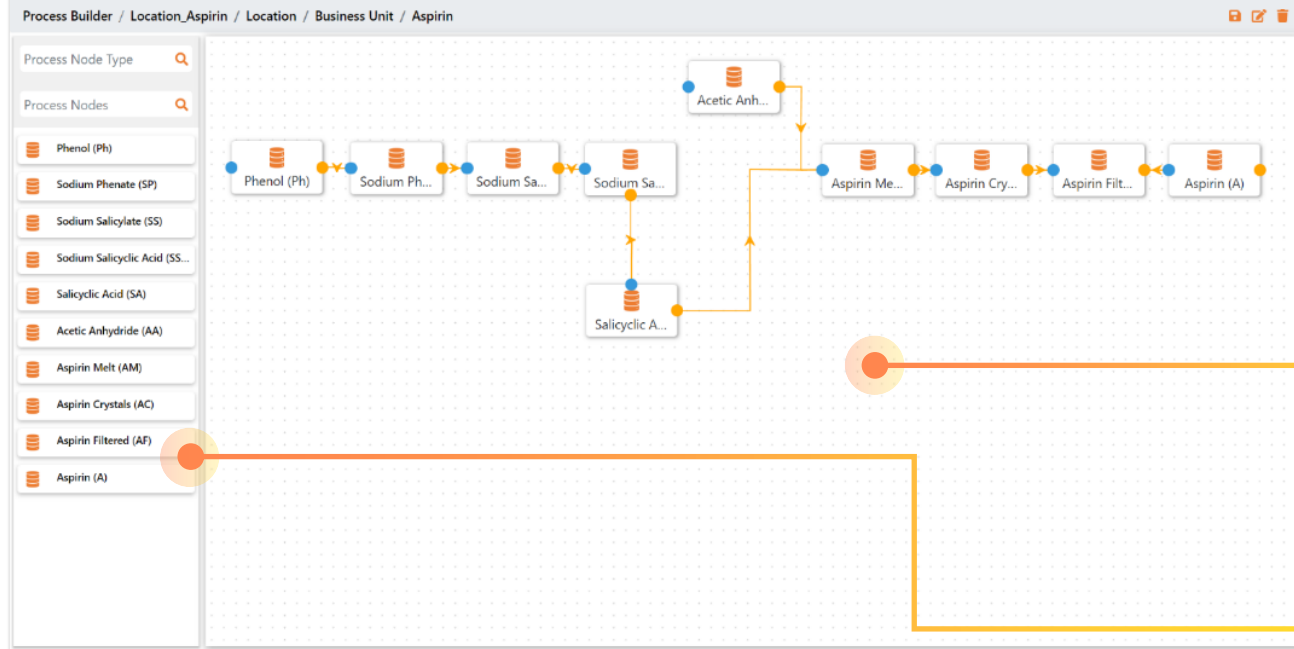
✓ Intuitive Graphs provide actionable insights

ENRICH YOUR MASTER DATA

ENRICH YOUR MASTER DATA

You can Create, Modify & Delete the hierarchy of process flows

✓ Establish & Edit relationships for steps with Properties

The relationship depth can go up till infinity thanks to robust data architecture
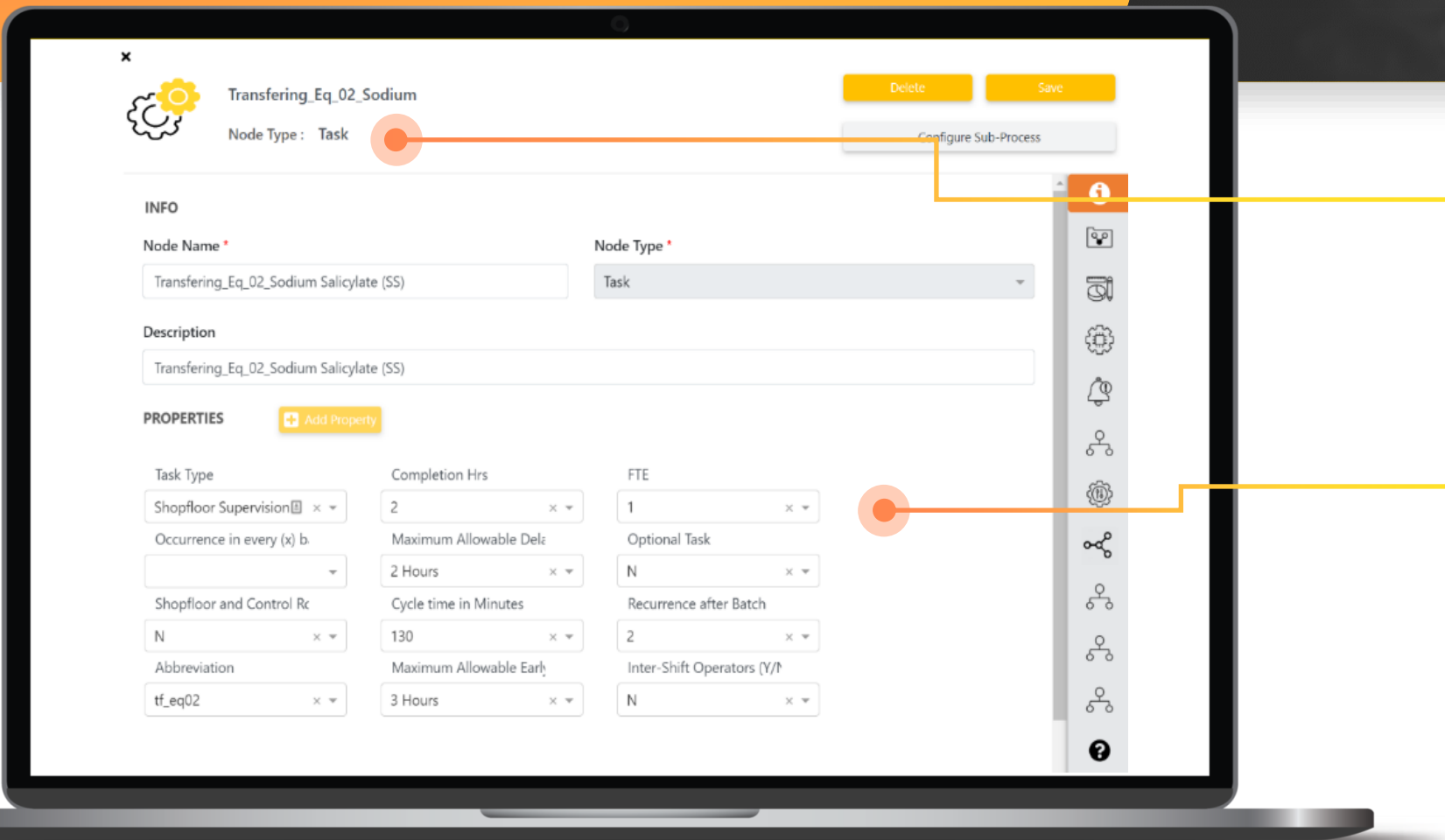
Alternatively, you can get these uploaded from the backend as well.

✓ Easy Drag & Drop Configuration for

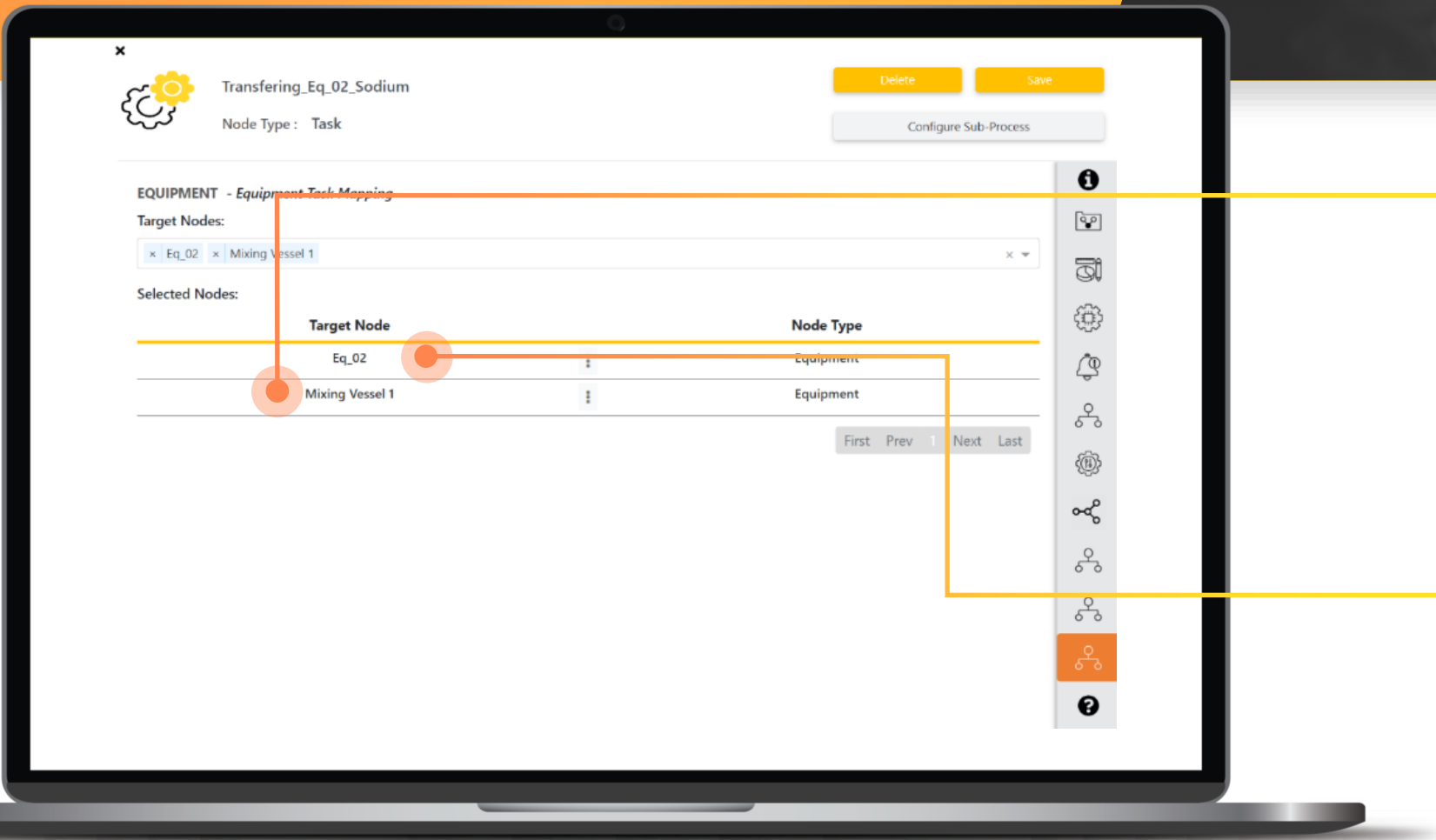• Equipment
• Human Resource
• Skills

ENRICH YOUR MASTER DATA

Use Out-of-the-Box Node Types and custom-define the nodes to suit your business needs.

The user-friendly interface allows you to define your own properties and configure each of the process points quickly.
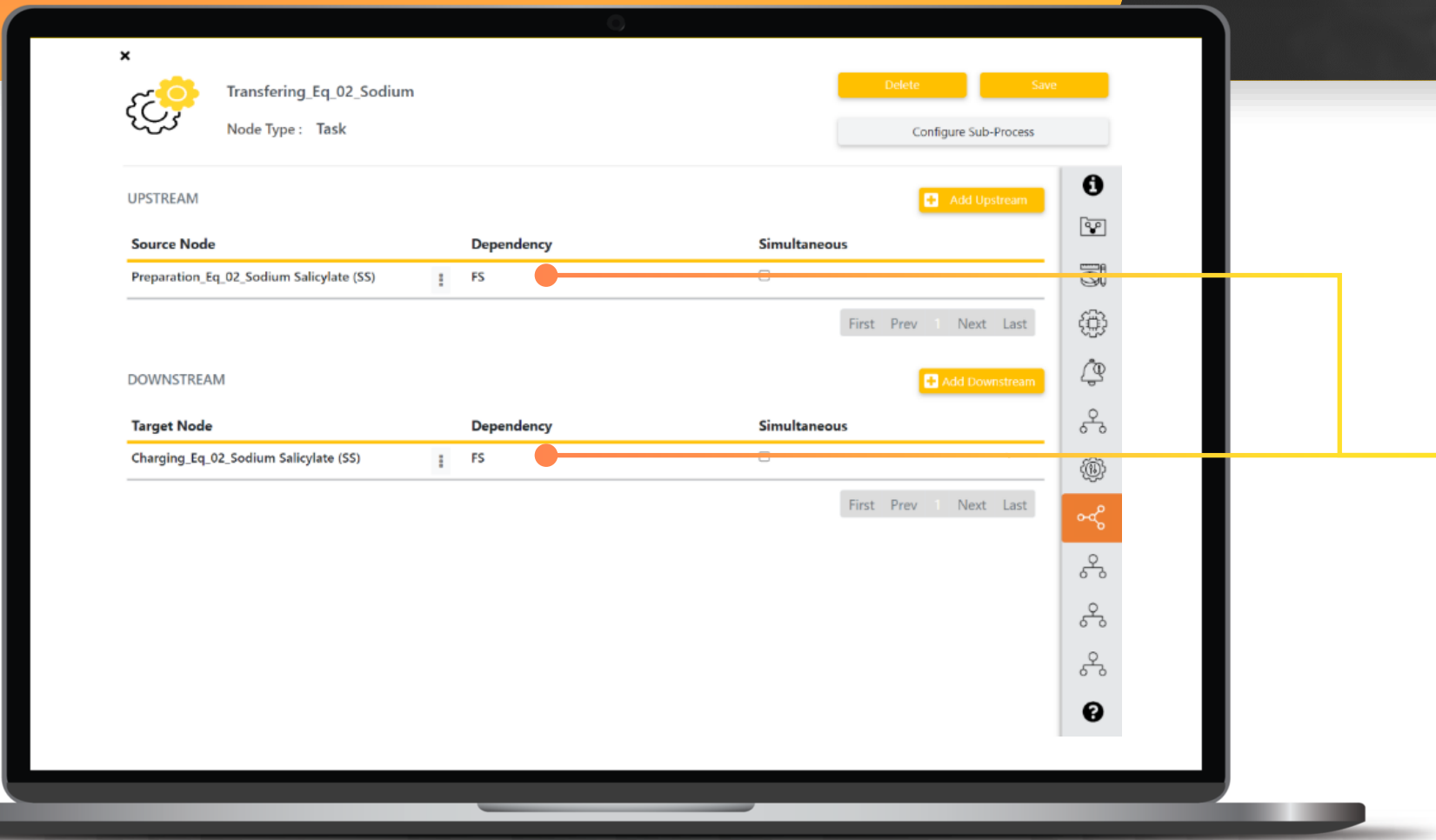
ENRICH YOUR MASTER DATA

You can define Task-to-Equipment Relationships, a crucial data point for consideration while generating a schedule according to equipment availability.

You can flexibly link the same equipment with multiple tasks and vice versa for the appropriate utilization of resources.
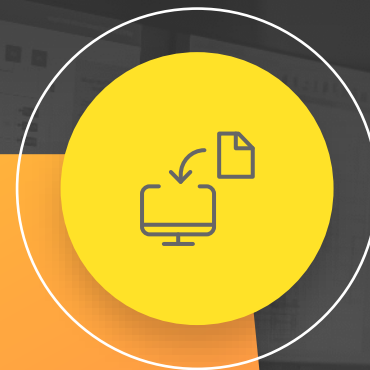
ENRICH YOUR MASTER DATA

You can perform sequencing of Tasks and define upstream as well as downstream relations

The relationship types can be changed based on process changes easily. The repository includes various industry standard methods such as SS, FS+X etc.

DATA REQUIREMENTS & CONNECTIVITY

DATA REQUIRED

Material and Demand Parameters

Parameter	Likely Information Source
• Lead times by RM	
• Existing inventory	
• Safety stock	
• Bill of material	ERP
• Demand, orders and backlog details	
• Pricing / Cost details	

Other Parameters

Parameters	Likely Information Source
• Process unit capacity	From the Subject Matter Experts (SMEs)
• Production unit routing	Production team
• Asset's current state details	Assets / Servers / Middleware
• Production constraints	SAP / Planning System / SMEs
• Cost and pricing details	Planning System/SMEs
• Constraint definitions	Planning team / Production team
• RM/SM quality	Lab systems / Excels / Manual logs

Real Time Production Parameters ▲ **Current Production/Batch Status, Asset Availability, Maintenance Schedule, Current Quality Parameters, Resource Availability etc.**

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CONNECTIVITY METHODS

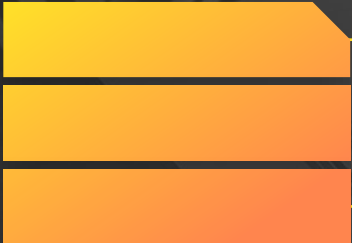|	
SAP Connectivity via SOAP/REST/BAPI/RFC	EXCEL/CSV UPLOAD
Other ERP Connectivity via SOAP/REST/JDBC	DATA ENTRY FORMS
OSI PI	OPC/UA
SAP MII PICO	MQTT

BUSINESS IMPACT & DIFFERENTIATIONS

BUSINESS BENEFITS

Capacity Utilization Improves by

20-30%

Working Capital Reduces by

10-15%

Cycle Times Reduce by

8-10%

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DIFFERENTIATION

Easy and Visual Master Data Enrichment for Optimized Schedules **01.**

Reactive to Shopfloor Events **02.**

Indirect Events considered in Schedule Generation **03.**

Personalization of Master data by lines rather one size fits all approach **04.**

Schedule Generation at Appropriate Grain **05.**

AI Based Algorithm for Global Optimization thus eliminating the need for traditional heuristics such as Backward and Forward Scheduling **06.**

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WHO WE ARE

Trusted by Global Manufacturing Leaders
for Delivering the Promised **Industry 4.0 ROI**

THANK YOU

connect@neewee.ai

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