# The Leading Standard for Line Balancing
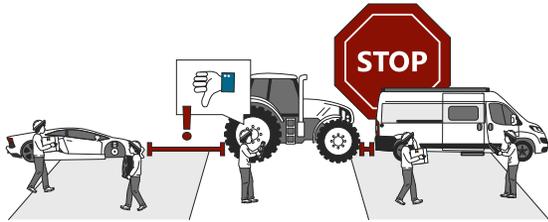
Smooth production in multi-variant assembly lines with less planning effort

# Rethinking Planning – With Heart, Mind, and Algorithm



## The Problem
### Increasing Complexity, Rigid Planning

Increasing number of variants, fluctuating demand, and new cycle concepts are constantly increasing the complexity of production planning.

However, planners continue to lose valuable time with slow, inflexible software.

Decisions remain intransparent, potential untapped. This leads to low efficiency and loss of output.
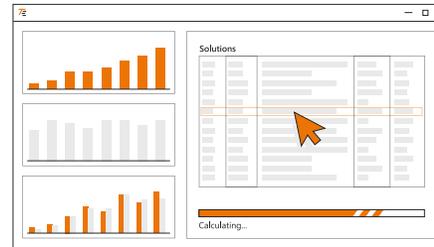


## The Solution
### Innovative Algorithms, Intuitive Software

During their research and practical experience in final assembly back in 2010, founders Dr. Altemeier and Dr. Danne recognized that:

Only modern algorithms can sustainably increase efficiency in variant-rich lines and prevent unit losses.

Since then, over 180 years of experience have gone into the development of TAKTIQ.



## The Impact
### Production Planning Revolutionized Worldwide

Today, manufacturers worldwide rely on what makes TAKTIQ unique:

Complete variant mapping, dynamic assembly rate and utilization calculation, realistic simulations, and interactive and automatic line balancing.

**For greater stability, transparency, and efficiency in production planning.**

# We Are TAKTIQ
## Our Values



### Production Needs no Standstill
That's why we drive innovation forward!

**1**
Year
Development in a month

**15**
Years of innovation and progress



### Appreciative Partnerships
And exchange of experiences with our customers

**6500**
Users

**89**
Well-known customers

**250**
Exchange events per year

### Global Impact
In different variants

**12%**
Greater efficiency

**11**
Manufacturing industries

**50%**
Less planning effort

**18**
Countries in action

**100%**
Greater planning reliability

# Our References & Focus

## Focus

- 20 Sek. – 1 Std. cycle time
- 15 – 1.000 workplaces
- 100 – 2.500.000 tasks
- $10 - 10^{27}$ order variants

## Industries manufacturing With TAKTIQ

| Automotive | Agricultural Machinery |
| Buses | Cranes | Excavator |
| Forklift | Motorhomes |
| Tier 1 Supplier | Transporter |
| Trucks | Vans |

Dethleffs · FENDT · MASSEY FERGUSON · EHG · WESTERN STAR · RR

CAPRON · Audi · BMW · MINI · FELLA · AKKODIS

DAF · EDAG · LAMBORGHINI · PORSCHE · LIEBHERR · AS ARVATO SYSTEMS

Miele · Mercedes-Benz · VW · PICANOL · VALTRA

FREIGHTLINER · HYMER · CLAAS · EvoBus · LAIKA · DAIMLER TRUCK · Baxter · Linde Material Handling

RESRG AUTOMOTIVE · DC SOLUTION · FERCHAU · LEAR · SHACMAN · AGCO · WACKER NEUSON all it takes!
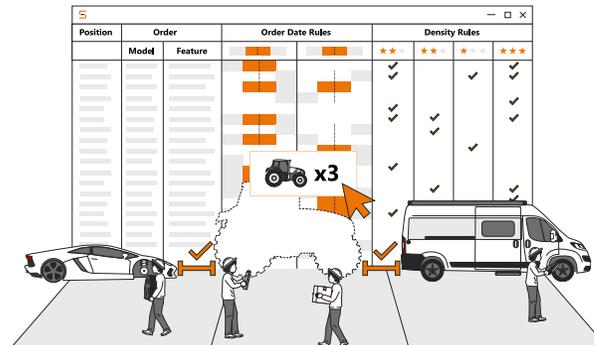
# Two Leading Solutions

Perfectly aligned

Take advantage of the synergies of our software products to raise the efficiency and quality of your planning and production to an even higher level.

## TAKTIQ

**The Leading Standard for Line Balancing and Maximum Efficiency**

**Experience now**

## SEQUIQ

**The Quickest Order Sequencing for Smooth Production**

**Experience now**

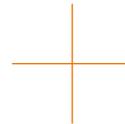# TAKTIQ Modules

Freely combine and Perfectly Align with the Requirements of Your Production

Line Balancing

Process Requirements

Order Program Scenarios

+

Ergonomics

Time Management

Assembly Instructions

Order Preview

Sequence Requirements

# Line Balancing

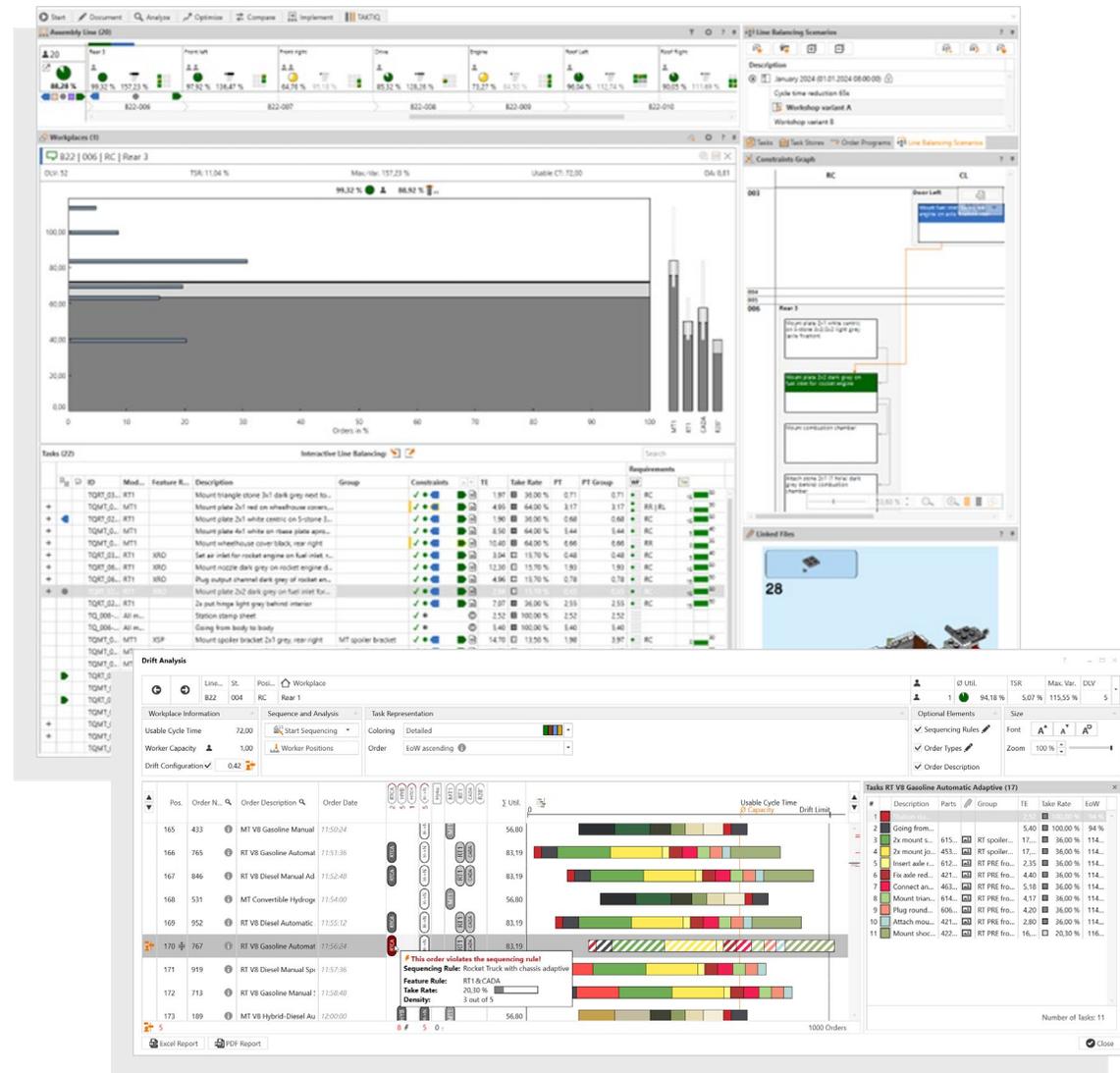Optimally distribute workers and tasks to workplaces for efficient and smooth production



Maximum Efficiency

Smooth Production

Reduced Planning Effort

# Your Benefits

Line Balancing with TAKTIQ

## Valuable Information in Seconds

- Interactive and automatic line balancing

- Calculate, simulate and evaluate alternative planning scenarios extremely quickly (> 1,000,000 solutions in 5 seconds)

- Compare different cycle times and line balancing solutions

- Consider multiple order programs (variants and mix) and evaluate utilization and added value

- Flexible variant linking with any feature rules (And, Or, Not, Bracketing)

## One Tool for Everything

- Documentation, simulation and optimization in one

- Integrated planning with additional modules: Time Management, Ergonomics, Order Preview, Order Sequencing and more

## Convince Yourself Today

Try your free demo now or book your free live-demonstration at taktiq.de/experience

## Ensure Feasibility

- Evaluate variants and production times in detail

- Use extensive analysis functions and visualized key figures (time spread, drift, …)

## Learn Quickly, Plan Intuitively

- Clear and easy to understand visual representations

- Modern user-friendly interfaces

- Automatic workshop protocols and reports

- Smooth multi-user planning with time versioned plan states (when using a server)

## Permanent Technical Pioneer

- You always remain highly innovative through our agile development process

- Regular updates with new features are inspired by impulses from our customers

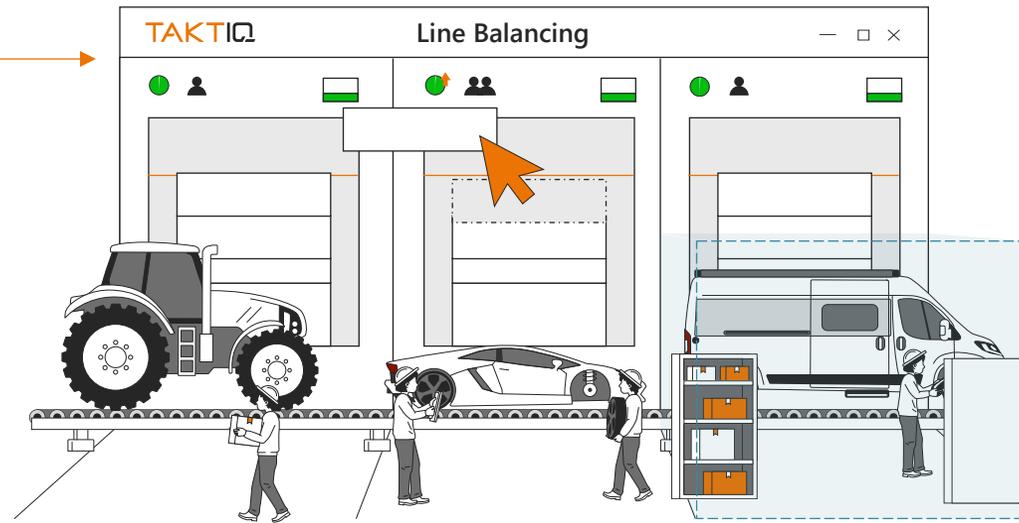# TAKTIQ
## Partner

### Process Planning

**PTC Windchill**
Product lifecycle management in 3D and with real-time data

**Delmia**
Digital planning and production based on the 3DEXPERIENCE platform

**TiCon**
Detailed time recording and analysis



**TAKTIQ** — Line Balancing

### Workstation Design

**Work Designer**
Process optimization and ergonomics analysis in 3D

**ipolog**
3D simulation with logistics planning

# Interfaces

Easily integrate TAKTIQ into your IT landscape



### Excel Im-/Export

Want to **test everything** first before investing in a long-term interface?

Simply export our Excel template directly from TAKTIQ, enter your data in the marked columns, and import it back in. We're happy to help!

### Standard Interfaces

Connect your IT landscape **yourself, quickly and easily** with TAKTIQ thanks to our standard interfaces.

With our sample interfaces, your IT colleagues can already get an idea of the scope and structure.

Interface

### Additional Interfaces

We already have interfaces to systems such as **TiCon, ema, ipolog, Windchill, Dassault, SAP**, and also customer-internal systems.

We are also happy to program an interface for **halocline, Siemens Teamcenter**, and other systems upon request.

# Leading Manufacturers Rely on TAKTIQ

And these are the reasons

### Focused. Innovative. Leading.

With in-depth knowledge and practical expertise, we support manufacturers as partners. By focusing on line balancing, we are constantly driving innovation.

### Safety and Stability

Dynamic utilization simulation and previews help you avoid bottlenecks and keep your production stable.

### Flexible and Future-Proof

Our established solution integrates seamlessly, remains adaptable to future requirements, and impresses with its rapid responsiveness.

### Plan Faster. Respond Smarter.

By using intelligence and automation in the planning process, you save valuable time and increase your responsiveness.

### Transparency at Every Stage of Planning

Complete variant mapping and dynamic take rate and utilization calculations form the basis for stable, data-driven decisions.

### Efficiency at a New Level

Automatic or interactive – modern line balancing ensures maximum efficiency and harmony in production.

### Working Easily and Happily

High accessibility and supportive workflows create a user experience that motivates and inspires.

# Process Requirements

Record line balancing requirements (predecessors, heights, working positions, tools) to ensure feasible solutions



Identify More Potential

Ensure Feasibility

Enable Interactive and Automatic Line Balancing

# Your Benefits

With TAKTIQ Process Requirements

## Optimize Production Even Further

- Identify optimization potentials more easily (reduce walking distances, avoid height changes, identify redundant tools)
- Speed up workshops and avoid overlooked requirements
- Use suggestion mechanisms and automatic line balancing
- Identify and resolve limiting constraints

## Simple Maintenance, Great Benefits

- Easily maintain detailed requirements (height, working position, tools, ...)
- Manual and automatic task shifts meet all requirements
- Pre-evaluate investments in additional tools, shopping cart concepts and rebuilds

## Convince Yourself Today

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## Objective Feasibility Check

- Clearly define requirements and always comply
- Live feedback on compliance and violation of maintained constraints
- One-click simulation across multiple scenarios
- Avoid discussions

## Everything in Sight

- Height profile in assembly line clearly visualized
- Directly detect conflicts in assembly areas
- Interactive constraints graph visualizes relationships between tasks
- Recognize and resolve large task groups and limiting constraints

## Collect and Secure Knowledge Centrally

- Document production knowledge directly and pass it on easily
- Train new colleagues more quickly

# Order Program Scenarios

Analyze order programs in detail as well as generate and simulate them based on sales forecasts

Generate Order Programs Close to Reality

Increase the Quality of Analyses

Extreme Responsiveness

# Your Benefits

With TAKTIQ Order Program Scenarios

## Interactive and Live

- Adjust feature frequencies without having to edit individual order variants
- Automatic check of buildability rules when manually changing variants
- Simultaneous adjustment of several take rates and total number of orders
- Split order programs easily according to rules

## Many Options, Easy Navigation

- Create features and use them for optimization or analysis as desired
- Sort order features into categories and easily find them again

## Convince Yourself Today

Try your free demo now or book your free live-demonstration at taktiq.de/experience

## Plan Realistically

- Simulation based on different forecasts
- Detailed analysis of order variants incl. frequencies and correlation of features
- Buildability always guaranteed, as only existing order variants are used

## Record-Breaking Processing Power

Mathematical optimization technology generates order program according to targets with minimum deviation

## Perfect Addition

Evaluate the effect of alternative order programs in combination with the modules line balancing and optimal sequencing rules

# Ergonomics

Determine and optimize ergonomic load per worker and perform live ergonomics assessment during line balancing

Certified Ergonomics

Maximum Efficiency & Ergonomics

Rapid Revaluation

approved by
MTM ASSOCIATION

# Your Benefits

With TAKTIQ Ergonomics

## Established Standards

- Assessment of ergonomic loads of workers by EAWS® or individual assessment methods of our customers.
- First company to be officially certified as EAWS® compliant by the German MTM Society

**approved by**
**MTM ASSOCIATION**

## Automatic Line Balancing

Automatic line balancing procedures take ergonomic limit values into account (point or traffic light system)

## Convince Yourself Today

Try your free demo now or book your free live-demonstration at taktiq.de/experience

## Realizable Workshop Results

- Integrated evaluation of ergonomics when developing new line balancing solutions.
- Better solutions and shorter planning time through direct live assessment of the ergonomic impact of each change (shift of tasks, order program, cycle time or shift schedule change)

## Interactive Line Balancing

- Suggestions for shifting tasks with live calculation of resulting ergonomic effects.
- Achieve highest efficiency & ergonomic goals!

## Faster (Re)Evaluation

- Documentation of ergonomic loads at the tasks level and simultaneous assessment of ergonomics at the workplace level
- Reuse of all determined ergonomic loads at tasks

# Time Management

Define time requirements for tasks easily with time analyses building blocks and recognize added value

Time Management and Line Balancing in One

Time Analyses Building Blocks Defined Centrally

Clear and Understandable

# Your Benefits

With TAKTIQ Time Management

## Uniform Time Measurement

- Define modules and analyses centrally and use them on tasks
- Set performance levels and bonuses and deductions centrally
- Make value creation transparent through value added and non-value added
- Analyze frequency of use and proportions of time blocks

## Faster to the Goal

- Combined use of estimation times and time analyses
- Fast identification of missing time analyses and active estimation times
- Transparent and comprehensible presentation

## Convince Yourself Today

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## Work Simpler

- Easy maintenance both at the task and across a workplace or the entire line
- Fast reuse of blocks that were used last or frequently
- Drag & drop of blocks to new time analyses lines
- Format comments and headings within time analyses
- Clear selection of blocks from customizable data cards

## Define Own Standards

Working with any (also individual) modular systems (e.g. UAS)

## Live Adjustment

Live update of all time analyses in case of adjustments of time analyses building blocks

# Assembly Instructions

Communicate planning results to production via Excel or PDF and train workers with digital assembly instructions in TAKTIQ

Save Time in the Long Run

Secure and Pass On Knowledge

Generate Work Instructions Automatically

| | | | | |
|---|---|---|---|---|
| ➕ = savety | Ⓠ = quality | ⚠ = archive | **CC** = critical features | **SC** = significant features |
| 👁 = visual | ✋ = touch | = touch with caution | ✏ = marker | = function |

| = positioning | =noise | ✠ = measure | = start/end |
|---|---|---|---|

| No. | Task Description | Symbol | Part No. | Reference | Position | Picture Index (Photo) | Tool |
|---|---|---|---|---|---|---|---|
| 10 | Check the connection of the module connectors of the cable channel with the markers | Ⓠ | | | 0° | | |
| 20 | Check whether the column seal is correct with the markers | | | | | | |
| 30 | Check whether the fuse is connected to the ambient lighting | | | | | | |
| 40 | Change of position from position A to C | | | | | | |
| 50 | Check the presence and conformity of the assembly of the left dashboard clips<br>Install the left fan<br>Clad the panel<br>Assemble the c<br>Assemble t<br>Check the | | | | | | |
| 60 | Check the p<br>Install the ri<br>Clad the pa<br>Assemble t<br>Assemble t<br>Check the p | | | | | | |

## Digital Assembly Instructions

| Line... | St. | Posi... | Workplace |
|---|---|---|---|
| B22 | 001 | PRE | VM Axle |

Autoplay

### Options

Font Size:

Media Display Time (Sec.): 3

View Options

| Description | Is Visible | Highlighted |
|---|---|---|
| Description | ✓ | ✓ |
| Group | ✓ | |
| TE | ✓ | |
| Take Rate | ✓ | |
| Models | ✓ | |
| Engines | ✓ | |
| Feature Rule | ✓ | |
| Variant Split Feature Rule | ✓ | |
| Task comment | ✓ | |
| Constraints comment | ✓ | |
| Assembly Usage Description | ✓ | |

Reset Layout

### Master Data

Description: **Plug fixation black into block 2x1 (2 holes) light grey, front left**

Group: RT PRE axle front left
TE: 11,50 (VA: 11,50, NVA: 0,00)
Take Rate: 36,00 %
Models: RT1

### Linked Files

1:1

1/1 TQRT-007.png   Open

Linked Files   Time Analyses

### Tasks

| # | | Description | Parts | 📎 | Group | TE | Take Rate | EoW | Models | Feature Rule |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Yes | Station stamp sheet | | | | 2,52 | 100,00 % | 99 % | All models | |
| 2 | Yes | Going from body to body | | | | 5,40 | 100,00 % | 99 % | All models | |
| 3 | Yes | Prepare spoiler base plate 6x2 black | 379526 | | MT PRE spoiler | 4,90 | 13,50 % | 192 % | MT1 | XSP |
| 4 | Yes | Mount cover plate 4x2 smooth white on spoiler base plate 6x2 black | 4560178 | | MT PRE spoiler | 22,68 | 13,50 % | 192 % | MT1 | XSP |
| 5 | Yes | Place sticker TAKTIQ | | | MT PRE spoiler | 10,00 | 6,40 % | 199 % | MT1 | XSP & XTQ |
| 6 | Yes | Turn spoiler module upside down 180 degrees | | | MT PRE spoiler | 21,84 | 13,50 % | 192 % | MT1 | XSP |
| 7 | Yes | Mount spoiler hinge 2x1 black on spoiler module, left | 4515368 | | MT PRE spoiler | 12,24 | 13,50 % | 192 % | MT1 | XSP |
| 8 | Yes | Mount spoiler hinge 2x1 black on spoiler module, right | 4515368 | | MT PRE spoiler | 12,24 | 13,50 % | 192 % | MT1 | XSP |
| 9 | Yes | Turn spoiler module back by 180 degrees | | | MT PRE spoiler | 22,68 | 13,50 % | 192 % | MT1 | XSP |
| 10 | Yes | Mount ventilation grille 2x1 bevelled black on spoiler module, right | 4541191 | | MT PRE spoiler | 14,50 | 13,50 % | 192 % | MT1 | XSP |
| 11 | Yes | Mount ventilation grille 2x1 bevelled black on spoiler module, left | 4541191 | | MT PRE spoiler | 14,50 | 13,50 % | 192 % | MT1 | XSP |
| 12 | Yes | Plug fixation black into block 2x1 (2 holes) light grey, front left | 417171... | | RT PRE axle front left | 11,50 | 36,00 % | 187 % | RT1 | |
| 13 | Yes | Plug axle suspension black onto fixation black, front left | 6280394 | | RT PRE axle front left | 16,00 | 36,00 % | 187 % | RT1 | |
| 14 | Yes | Insert axle into block 2x1 (2 holes) light grey, front left | 6083620 | | RT PRE axle front left | 12,18 | 36,00 % | 187 % | RT1 | |

Number of Tasks: 23

Close

# Your Benefits

With TAKTIQ Assembly Instructions

## Easily Train Production

- Autoplay for qualification with images and videos
- Flexible customization of the interface and displayed attributes as needed
  (shown content, font sizes, image representations)

## Customize to Own Needs

- Individual format template with e.g. company- and country-specific language, design, logos
- Completely individual specifications of attributes (torques, tools, icons for sensitive or dangerous activities, etc.) as well as information on the document (inspector, version, releaser, etc.)
- Placement of images on extra pages according to specifications

## Convince Yourself Today

Try your free demo now or book your free live-demonstration at taktiq.de/experience

## Generate Work Instructions Automatically

- Automatic adjustment of assembly instructions after moving tasks or adjusting tasks and workplaces
- Constantly updated illustration of the sequence at the workplace by linking tasks with images
- Summary and highlighting of attributes and cells automatically in the document
- Export to Excel or PDF according to individual specifications

## One Time Effort, Every Time Benefit

- Information on tasks automatically moves with them when they are moved
- Linked files are available during scheduling, training and export instructions

# Order Preview

Secure quantities and ensure smooth production through early detection of bottlenecks and better control of short-term capacity measures
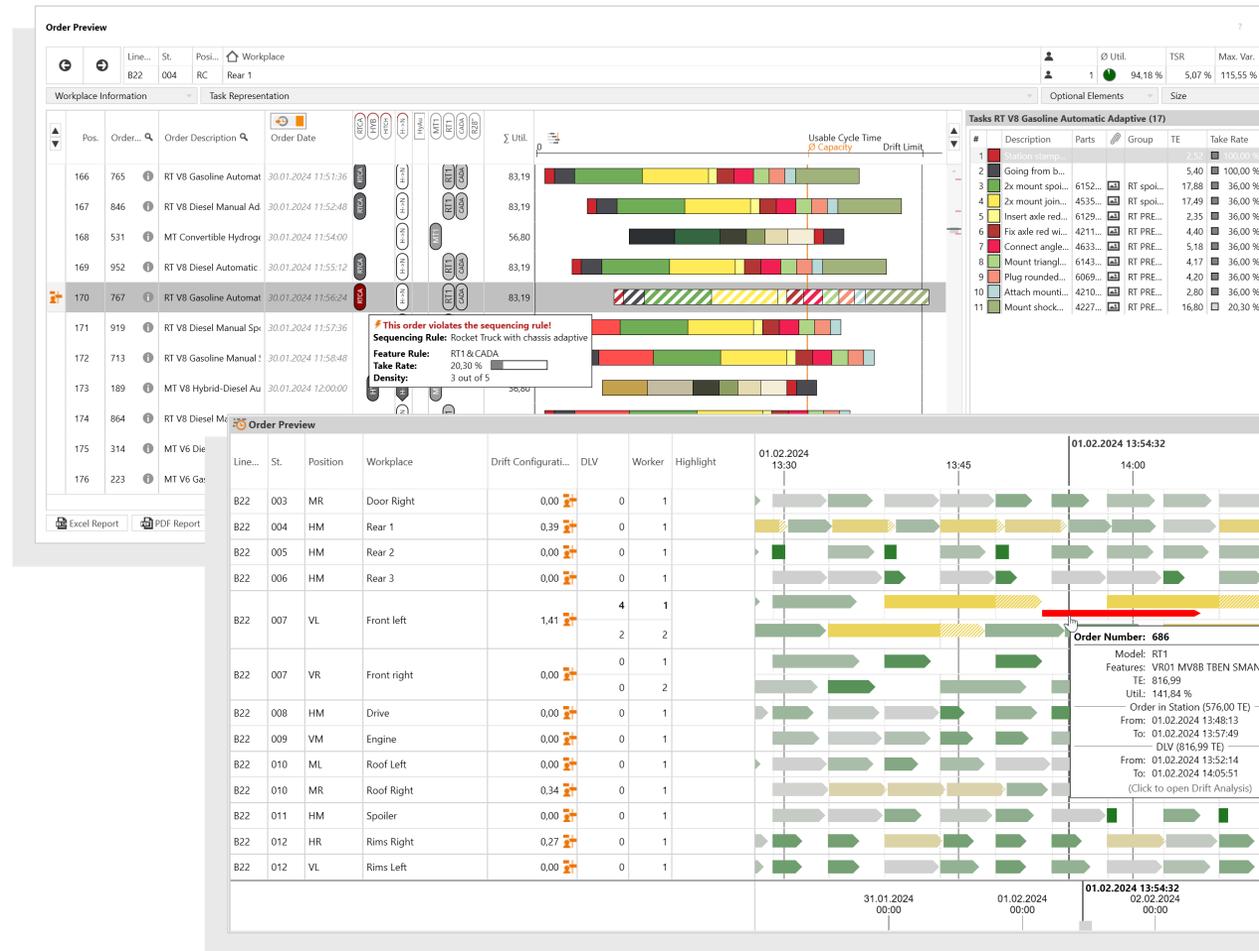
Avoid Bottlenecks

Make Detailed Predictions

Increase Product Quality

# Your Benefits

With TAKTIQ Order Preview

## React Early

- Live calculation of expected order dates based on real dates
- Feedback from external system or manual specification
- Alert support personnel in a targeted and timely manner

## Accurately Predict the Timing and Content of Bottlenecks

- Pre-calculate order deadlines at each station, taking into account plant structure, shift schedules, break times and disruptions
- Calculate expected drift limit violations based on individual drift configuration per workplace

## Work and Navigate Intuitively

- Update view live based on current time
- Automatically enter at the beginning of the shift with the appropriate data
- Flexible zoom of the view
- Display detailed contents and drift behavior of an order on demand
- Overview through individually marked order types

## Integrate Data Easily

Integration into MES systems for the transfer of real dates

## Beautiful To Look At

Visualization of the detailed drift behavior per workplace

## Convince Yourself Today

Try your free demo now or book your free live-demonstration at taktiq.de/experience

# Sequence Requirements

Create sequencing rules analytically,
verify and optimize effectiveness



Optimal Production Sequences

Smooth Order Scheduling Process

Increased Responsiveness

# Your Benefits

With TAKTIQ Sequence Requirements

## Valuable Information in Seconds

- Simulate 1000 order schedules in a few seconds
- Evaluate expected impact of rule sets on sequencing and on bottlenecks in production
- Obtain well-founded predictive ability for "what-if" scenarios

## Interactive Rule Derivation

- Recognize control-relevant order features and feature combinations for program planning and sequencing
- Derive distance rules automatically
- Recognize control-relevant orders and automatically describe them with rules
- Recognize maximum take rate for critical features

## Convince Yourself Today

Try your free demo now or book your free live-demonstration at taktiq.de/experience

## Get an Overview and Use It

- Transparency about limit values of your own production
- Recognize and react to bottlenecks and potentials at an early stage

## Reduce Rules, Increase Quality

- Avoid unnecessary rules with overlap and impact analyses
- Rule sets can always be sequenced

## Making Versatile Use of Findings

Receive recommendations for adjustments to line balancing and sequencing parameters

# TAKTIQ

# Achieve Harmony in Your Production!

Thank you for your attention

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On LinkedIn you will find the latest updates on TAKTIQ.

Simply scan and follow