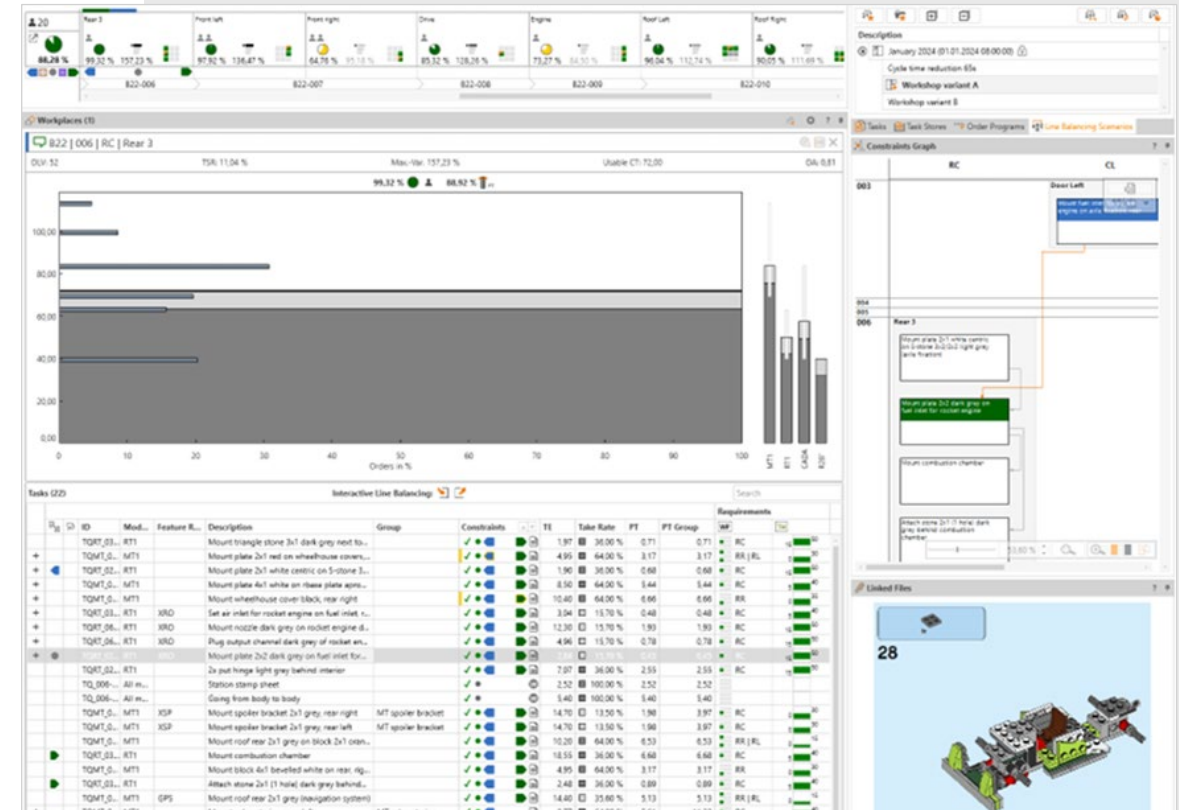




The Leading Standard for Line Balancing

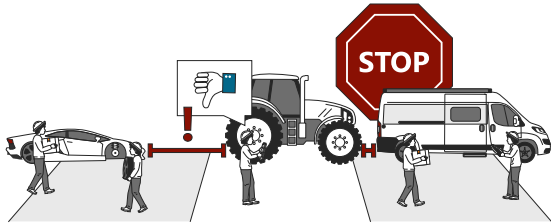
Smooth production in multi-variant assembly lines with less planning effort

Participants:
Kunde 1
Kunde 2
TAKTIQerin



Our Mission

Rethinking Planning – With Heart, Mind, and Algorithm



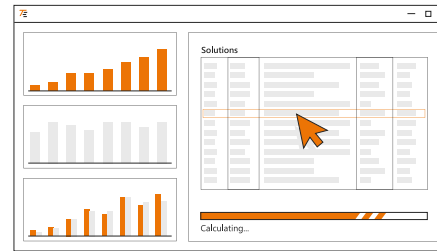
The Problem

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

Global Impact

In different variants

12%

Greater efficiency

11

Manufacturing industries

50%

Less planning effort

18

Countries in action

100%

Greater planning reliability



Appreciative Partnerships

And exchange of experiences with our customers

6500

Users

89

Well-known customers

250

Exchange events per year



Our References & Focus

Focus

- 20 Sek. – 1 Std. cycle time
- 15 – 1.000 workplaces
- 100 – 2.500.000 tasks
- 10 – 10²⁷ order variants

Industries manufacturing With TAKTIQ

Automotive Agricultural Machinery

Buses Cranes Excavator

Forklift Motorhomes

Tier 1 Supplier Transporter

Trucks Vans

Dethleffs

FENDT



EHG



AKKODIS

DAF



LIEBHERR

AS ARVATO SYSTEMS

Miele



Mercedes-Benz



PICANOL

VALTRA



HYMER

CLAAS

EvoBus



DAIMLER TRUCK

Baxter



FERCHAU

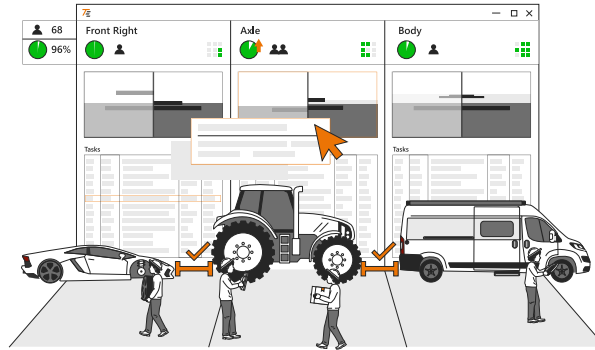
LEAR



TAKTIQ

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

[Experience now](#)



Two Leading Solutions

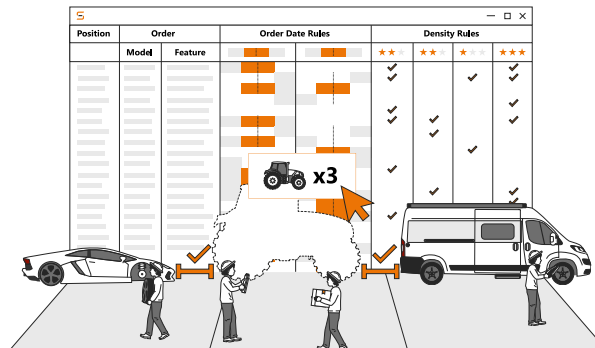
Perfectly aligned

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.

SEQUIQ

**The Quickest Order
Sequencing for Smooth
Production**

[Experience now](#)





TAKTIQ Modules

Freely combine and Perfectly Align with the Requirements of Your Production



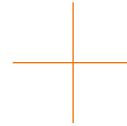
Line Balancing



Process Requirements



Order Program Scenarios



Ergonomics



Time Management



Assembly Instructions



Order Preview



Sequence Requirements

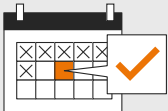


Line Balancing

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



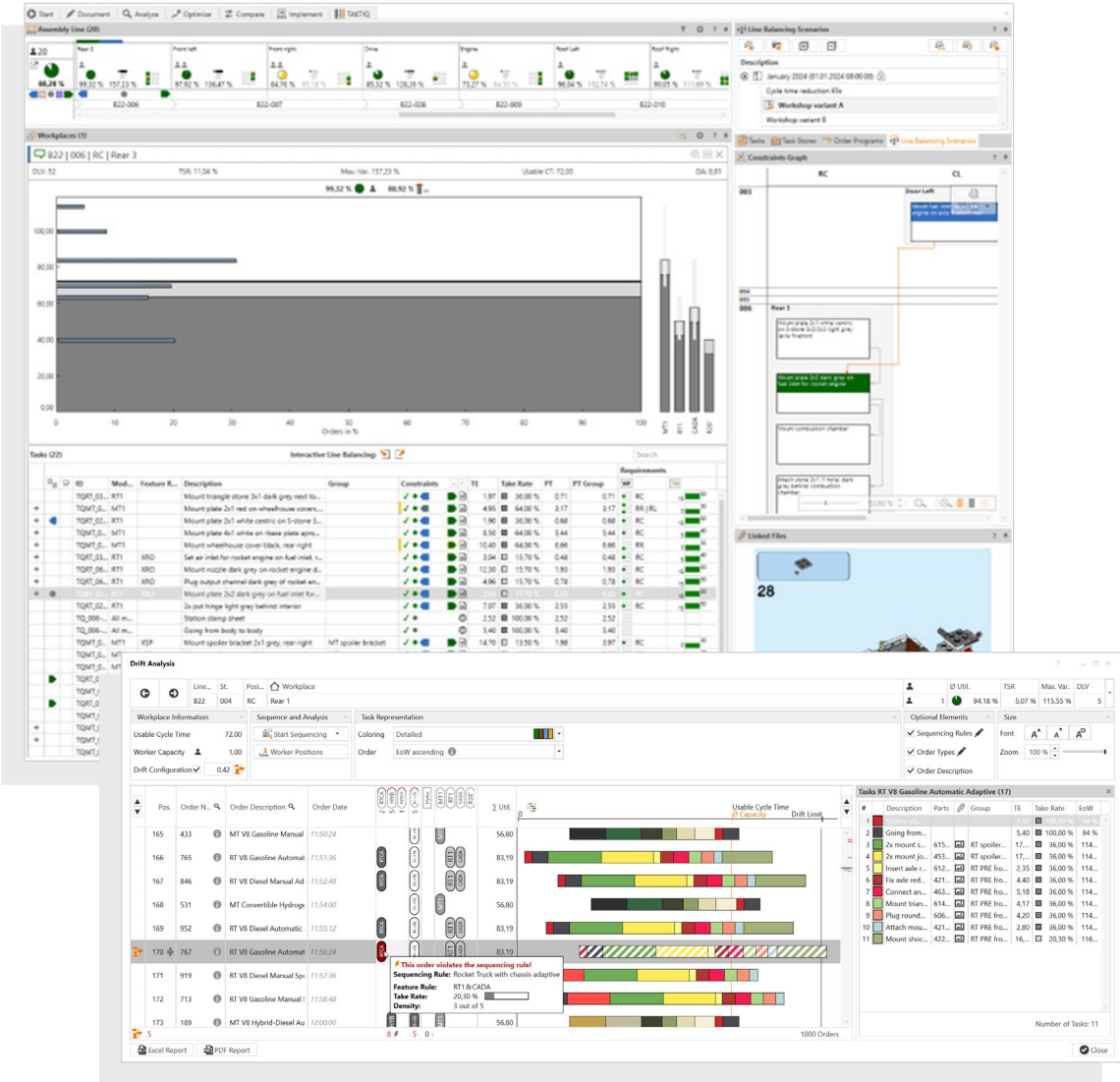
Maximum Efficiency



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



As a standard for line balancing, TAKTIQ already covers many areas of production planning. If you want to go even deeper in adjacent planning areas, you can benefit from our partnerships.

Process Planning



PTC Windchill

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



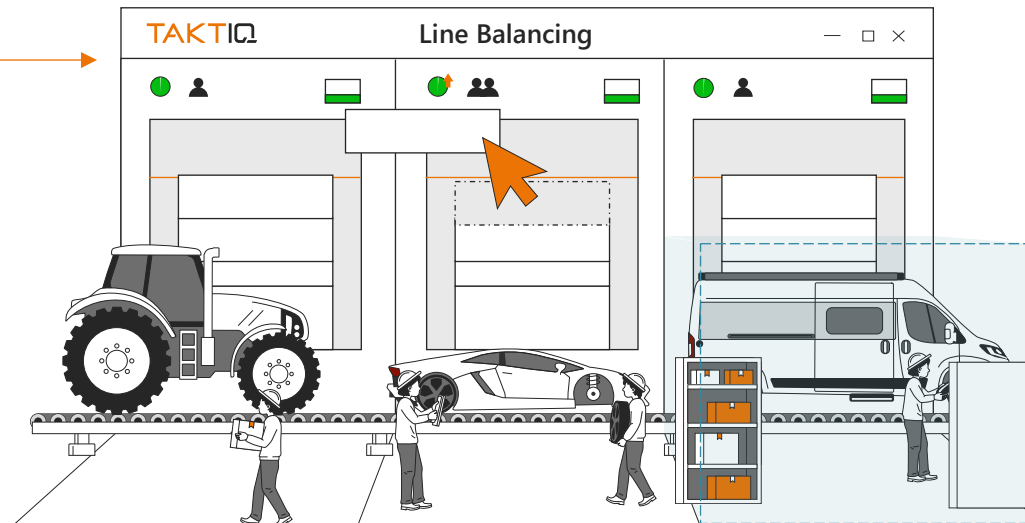
Delmia

Digital planning and production based on the 3DEXPERIENCE platform



TiCon

Detailed time recording and analysis



Workstation Design



Work Designer

Process optimization and ergonomics analysis in 3D



ipolog

3D simulation with logistics planning

Interfaces

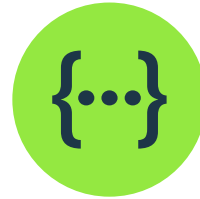
Easily integrate TAKTIQ into your IT landscape



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



Safety and Stability

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



Plan Faster. Respond Smarter.

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



Efficiency at a New Level

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



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.



Flexible and Future-Proof

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



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



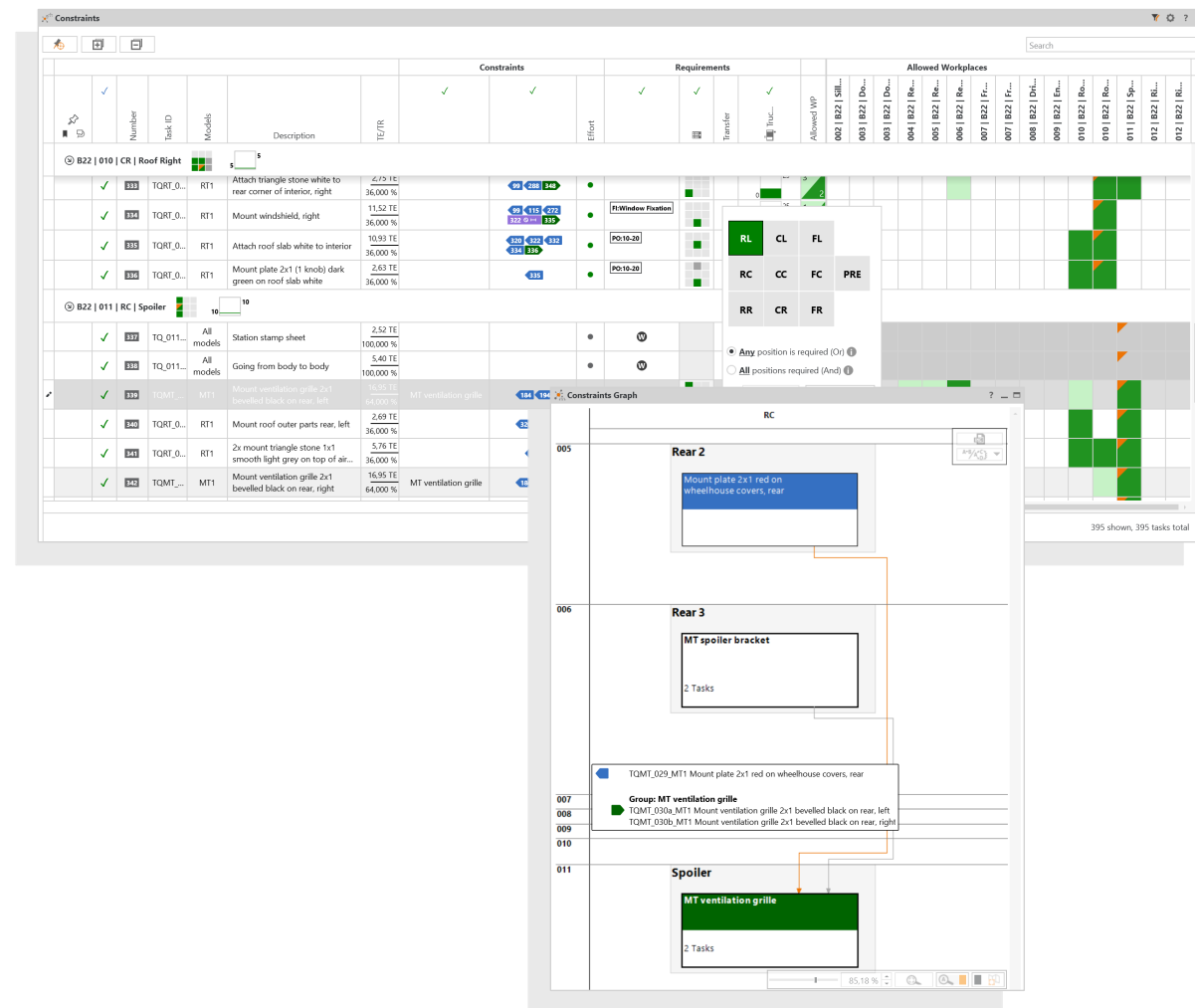
Identify More Potential



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

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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



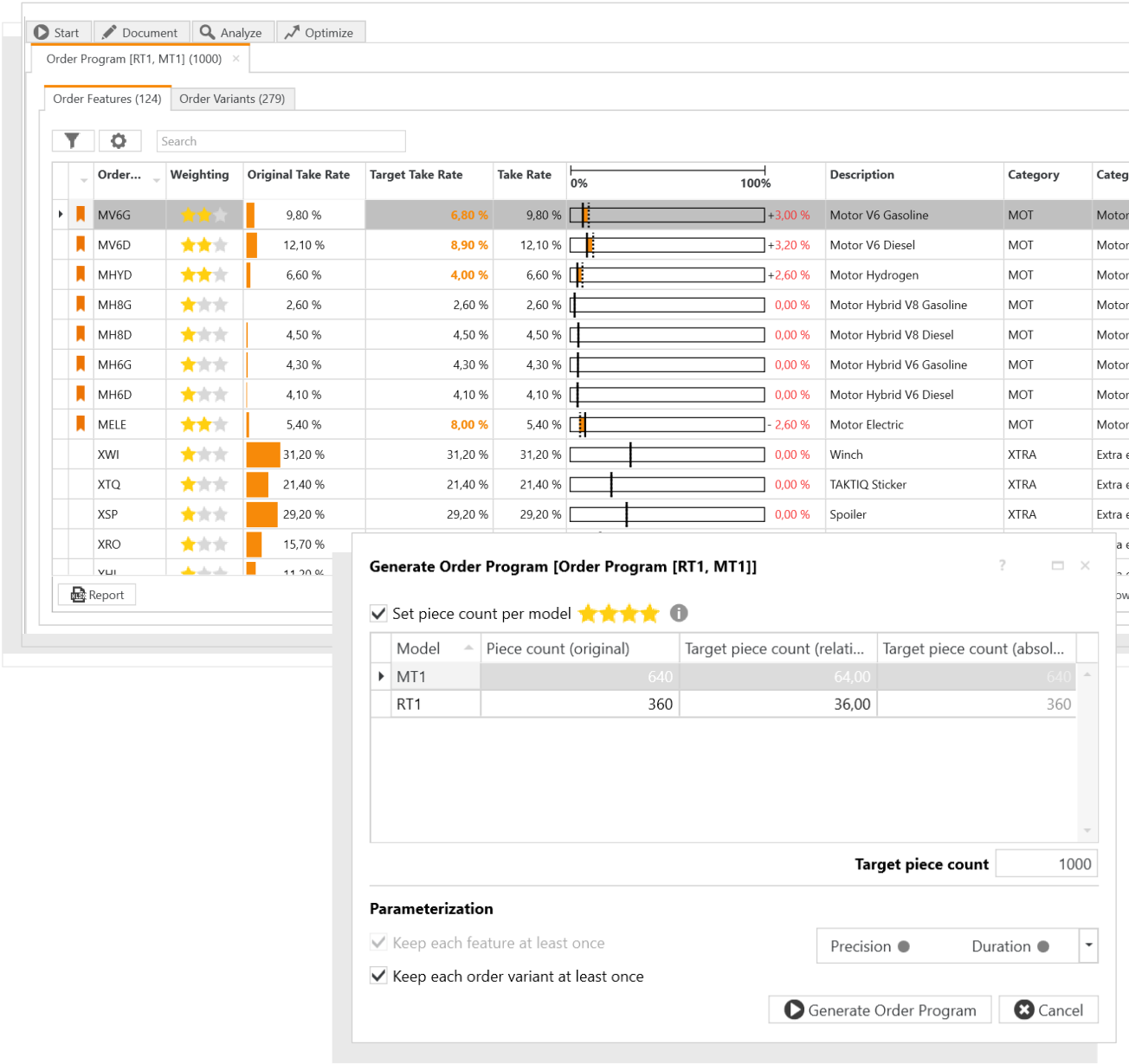
Generate Order Programs Close to Reality



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



Ergonomic Strains

Workplace / Task	Description	Linked Models	Feature Rule	Require...	Is co...	Duration	Take Rate	Planne...	Posture	Trunk Rotation	Trunk tilt	Reach	Grip type	Fin
	Fix tank with screws				!	2.70		0,49						
	Visual control of the assembly work				!	0.54		0,10						
⊙ TQMT_009f1.MT1	Mount block 4x2 black (tank gasoline) o...	MT1	FGAS			11,16	18,40 %	2,05			-23°			
	Insert tank				!	5.76		1,06		-15°				
	Remove 3 screws from container				!	2.16		0,40						
	Fix tank with screws				!	2.70		0,50						
	Visual control of the assembly work				!	0.54		0,10			-23°			
⊙ TQMT_009e1.MT1	Mount block 4x2 black (tank gasoline for...	MT1	FGHY			6,98	6,90 %	0,48						
	Place tank (small) and snap into place				!	3.78		0,26						
	Apply lubricant													
	Pull up hose and attach to tank													
	Visual control													
	Refill lubricant													
⊙ TQMT_009d.MT1	Mount block 4x2 black (batter													
	Place battery													

Export Import

Ergonomic Evaluation

Line: 822 | 007 | FL | Post: Front left | 120° | 97.92 % | 136.47 % | 25.0

Total Result: 25.00 Points

Total Body = **Posture** + **Action Forces** + **Loads** + **Extra Points**

25.0 = 15.0 + 4.5 + 5.5 + 0.0

Forces = **Posture** + **Extra Points** + **Organization** + **Upper Limbs**

0.3 + 0.0 + 0.0 + 10.5 = 11.8

General

Physical Hierarchy: 822 | 007 | FL
Organizational Hierarchy: Assembly | 3626 | 8 | 2
Description: Front left

Force percentile: P40 (for execution)
Gender: Mostly men

Gross Shift Duration (Min.): 480.0
Breaks/Shift (Min.): 10.0 (1.0 Break(s))
Net Shift Duration (Min.): 470.0
Capacity (TE): 144.0
Piece Count in Reference Shift: 195.0

Postures

Description	Norm. Duration	Base Posture	Trunk Rotation	Trunk Bending	Reach
Standing upright with support	56.8 s 60 s	2 Points	6.3 Points	3 Points	1.8 Points
Sitting upright	3.2 s 60 s	0 Points			1.8 Points
		2.0 Points	6.3 Points	3.0 Points	3.6 Points
					15.0 Points - 15 Points

Action Forces

Info

Intensity Evaluation

⊙ Finger Forces

Thumb to four fingers | 45.0 N | Static | 1.0 s | 36.9 % | 2.6 Points

⊙ Arm Forces

Standing bent | B- (forward) | 70 N | Dynamic | 0.8 s | 1.9 Points

Standing strongly bent | B- (forward) | 100 N | Dynamic |

Standing strongly bent | B- (forward) | 70 N | Dynamic |

Standing bent | A+ (up) | 55 N | Dynamic |

Export Close



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



Automatic Line Balancing

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

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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



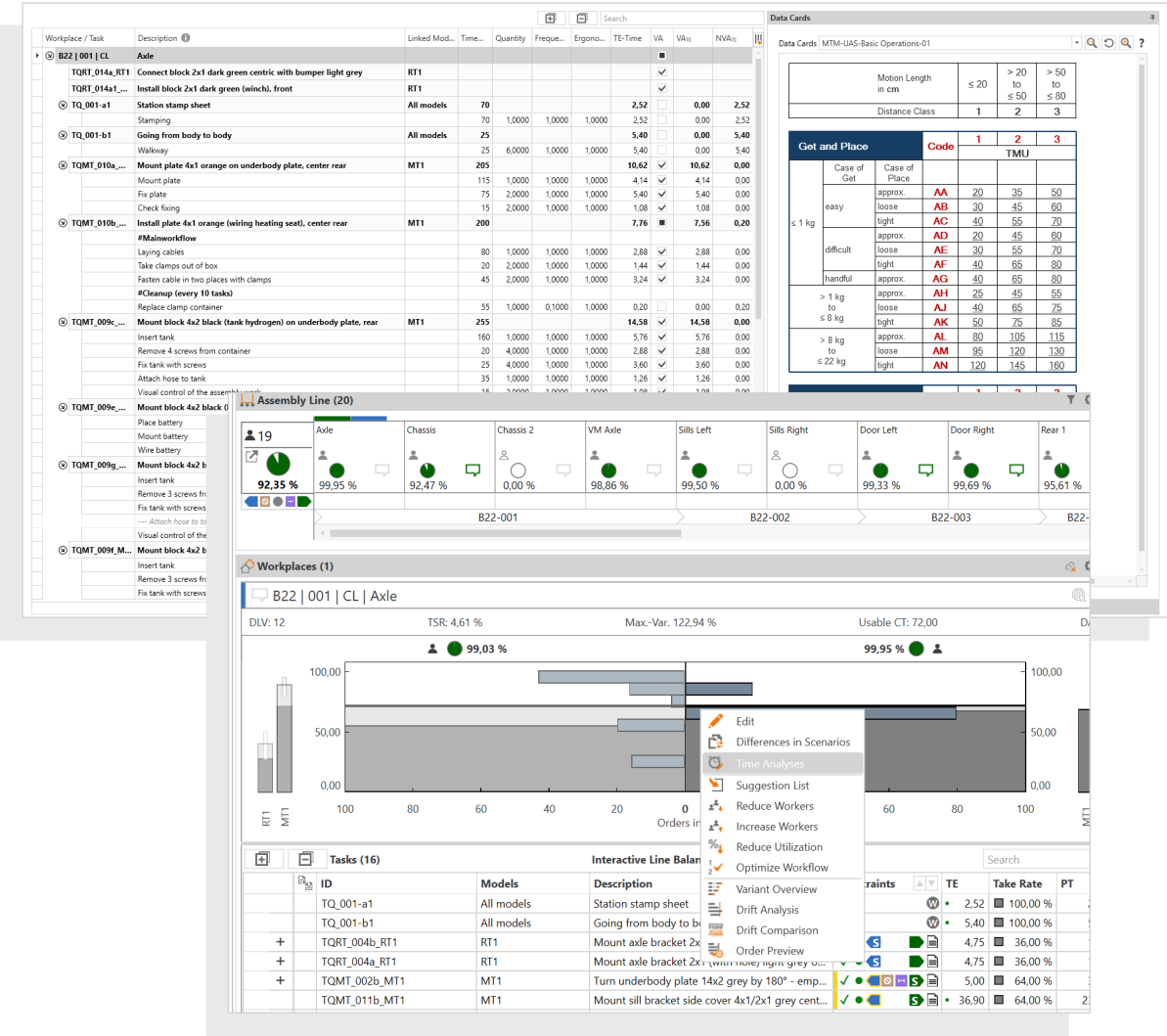
Time Management and
Line Balancing in One



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

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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



Generate Work Instructions Automatically



20



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

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Generate Work Instructions Automatically

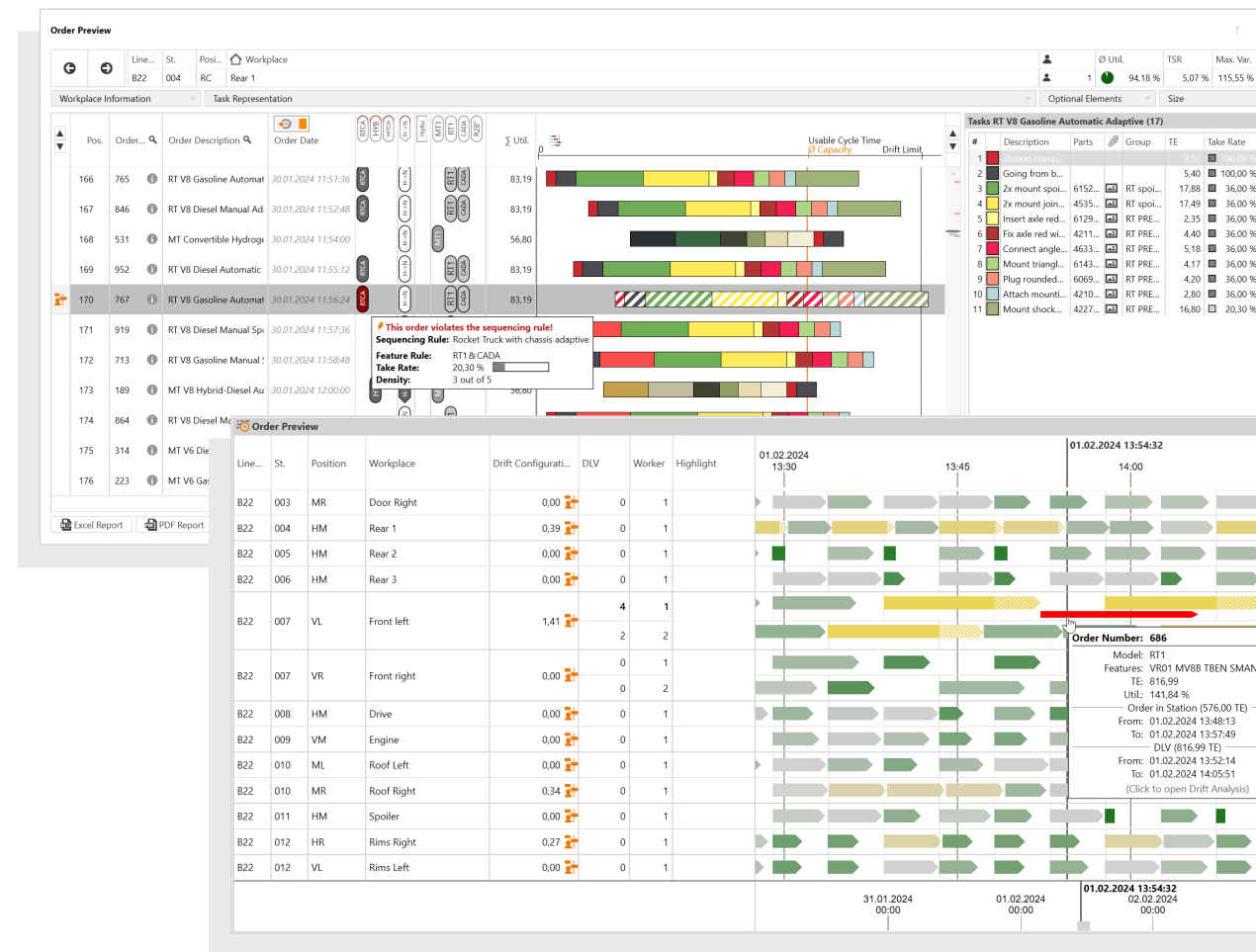
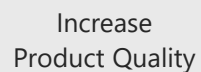
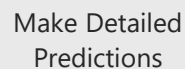
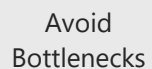
- Automatic adjustment of assembly instructions after moving tasks or adjusting tasks and workplaces
- Constantly updated illustration of the sequence at the workplace by linking tasks with images
- Summary and highlighting of attributes and cells automatically in the document
- Export to Excel or PDF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



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





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

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

Convince Yourself Today

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

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

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



Sequence Requirements

Create sequencing rules analytically,
verify and optimize effectiveness



Optimal Production
Sequences



Smooth Order
Scheduling Process



Increased
Responsiveness

Sequencing Rules

05.02.2024 19:23:15 - 08.02.2024 06:15:45 (90 Orders)

Density | Neighborhood | Block | Capacity | Exclusion

Search

Active

No.

Short Descr.

Description

Feature Rule

Density

Take Rate

Tension

Uniform Distribution

Uniform Distribution-Rate

Weighting

Violations

Comment

☐

1

WSPO

Steering Wheel Sport

WSPO

1 out of 2

25,56 %

0,51

☒

79,10 %

★☆☆☆☆

-Inactive-

☒

2

RTCA

Rocket Truck with chassis adaptive

RT1 & CADA

3 out of 5

21,11 %

0,35

☐

-

★☆☆☆☆

0

☒

3

HYB

Hybrid

EGHY | EDHY

1 out of 2

20,00 %

0,40

☐

-

★☆☆☆☆

0

☒

4

VB

V8 Gasoline/Diesel/Hybrid

MVB8D | MVB8G | MH8BD | MH8BG

3 out of 4

53,33 %

0,71

☐

-

★☆☆☆☆

0

☒

5

HITCH

Hitch

XHI

1 out of 2

10,00 %

0,20

☒

71,60 %

★★★★★

0

Number of Rules: 5, Violations: 0

Edit Multiple Rules Simultaneously

Active

Weighting

Uniform Distribution

edit for

Selected

All

Start Sequencing

Create

Export

Derive Sequencing Rules

Line...

St.

Posi...

Workplace

Ø Util.

TSR

Max. Var.

DLV

Drift...

Capa...

Usabl...

B22

004

RC

Rear 1

1

94,18 %

5,07 %

115,55 %

11

0,42

72,00

72,00

Derivation Options

Allow 8t-Connections

Include Negation

Multiple Rules

Focus on fast results

	Density	Feature Rule	Controlled Orders	Unnecessarily contr. Orders	Tension	Ø DLV	WC-DLV
	-	Without Sequencing Rules	-	-	-	30	107
	2 out of 5	R28S VR05 VR01 VR07 VR03	36,00 %	0,00 %	0,90	0	30
	2 out of 3	CADA R28S	51,70 %	0,00 %	0,78	1	49
			36,00 %	0,00 %	0,72	2	45
			36,00 %	0,00 %	0,54	10	99
			51,70 %	0,00 %	0,69	16	94
			51,70 %	0,00 %	0,65	23	95
	3 out of 4	R28S VR05 VR01 VR07 VR03	36,00 %	0,00 %	0,48	23	107

Add more restrictive sequencing rule

Add less restrictive sequencing rule

Add manually defined sequencing rule: 4 out of 5

Generate

Close



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



Achieve Harmony in Your Production!

Thank you for your attention

TAKTIQ GmbH & Co. KG

Am Hoppenhof 32

33104 Paderborn

+49 5251 68262-00

kontakt@taktiq.de

taktiq.de

Did you know?

On [LinkedIn](#) you will find the latest updates on TAKTIQ.

Simply scan and follow

