



MOBILE AUTOMATION

TECHNOLOGY FOR PAVING

23rd of January 2020

Nkodemus Gehl

Product Manager Paving Quality Systems

MOBAjourney

- **2012** Inside Sales
- **2015** Project and Product Management
- **2017** Product Management Pave-TM
- **2019** Product Management Paving Quality Systems



moba-automation.com

mobacommunity.com

moba-platform.com



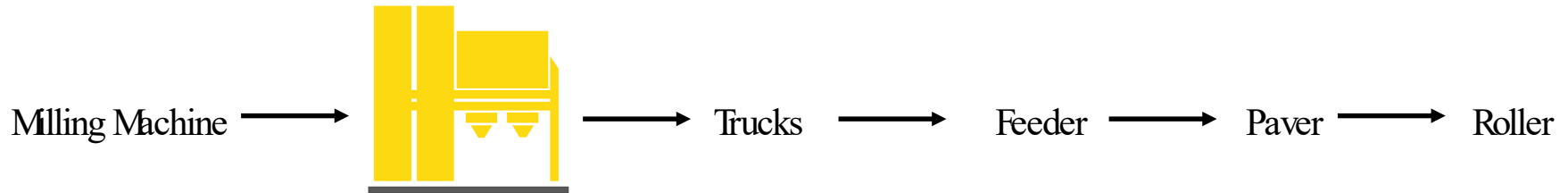
+40 YEARS OF EXPERIENCE IN MOBILE AUTOMATION

- ✓ Made in Germany
- ✓ Positioned internationally
- ✓ Expertise and know-how
- ✓ High qualified employees
- ✓ Modern technologies and products
- ✓ 14 Subsidiaries in Key Markets
- ✓ 600 Employees
- ✓ 3 Main business areas

Technologies in Asphalt Paving

MOBASolutions

Workflow



FOCUS ASPHALT PAVING



- ✓ Evenness
- ✓ Stability
- ✓ Durability
- ✓ Density

High Quality Pavement

Reaching planned lifespan

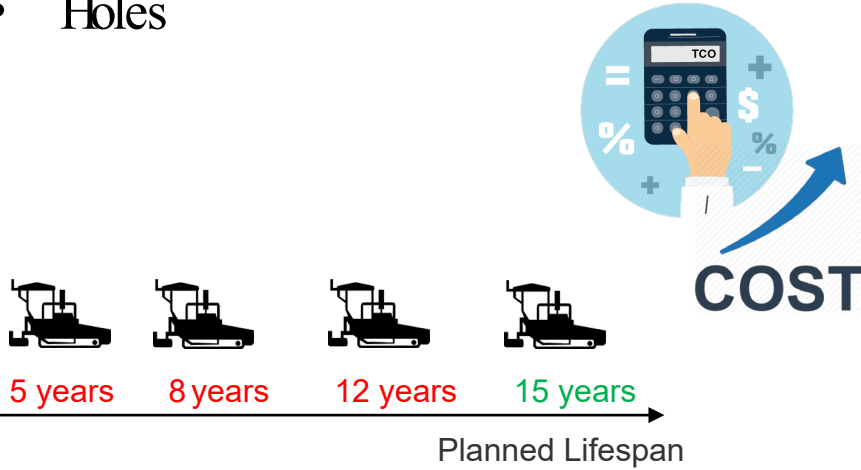
Tasks of a road

- ✓ Nice User Experience
- ✓ Reaching the Lifespan
- ✓ Fullfil Safety Aspects



Reality

- Cracks
- Waves
- Segregation
- Holes



Eveness



CHALLENGES REGARDING EVENESS



MATERIAL QUALITY



LEVELING OF THE ROAD



UNEVEN GROUND

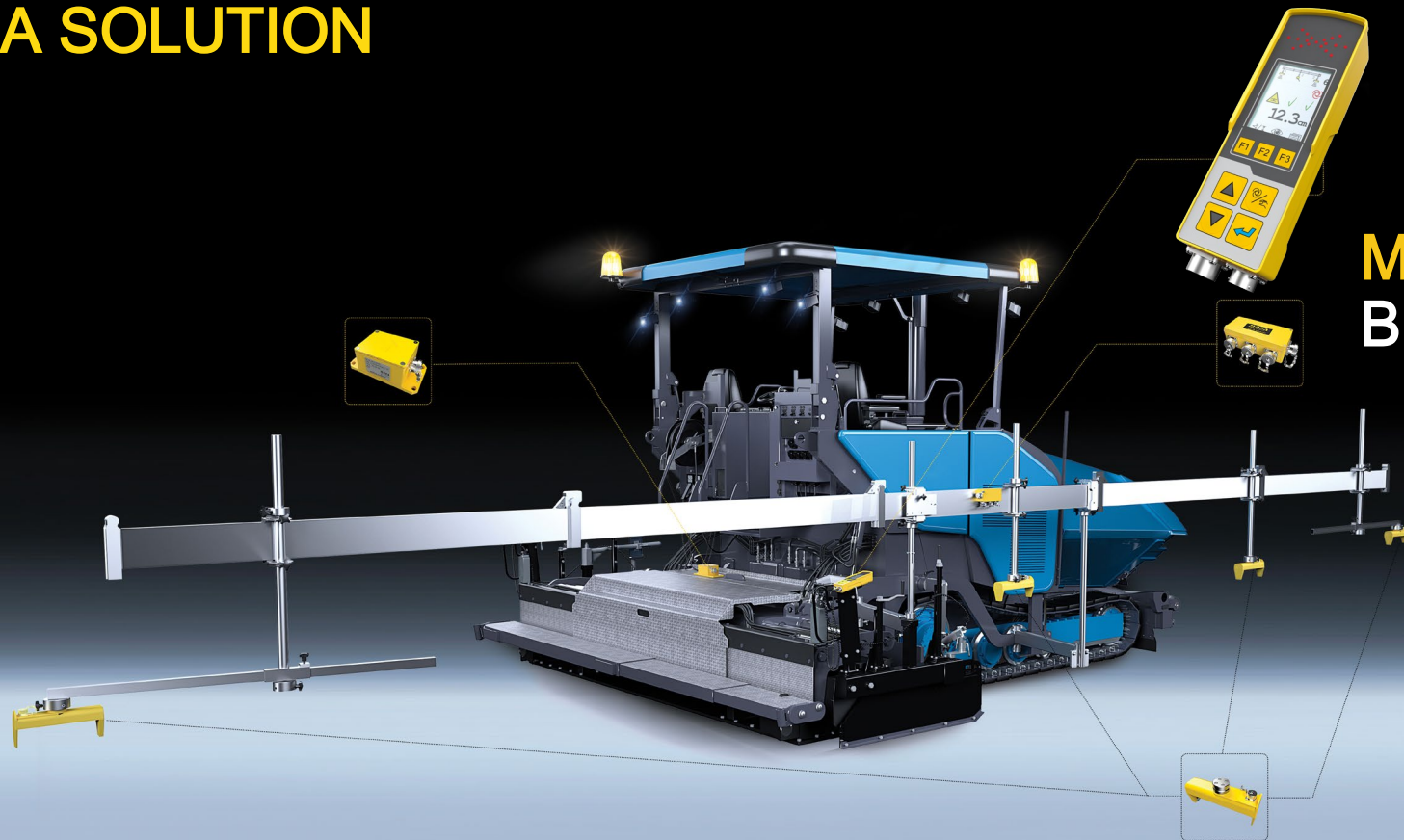


EXPERIENCE



FILLING LEVEL OF MATERIAL

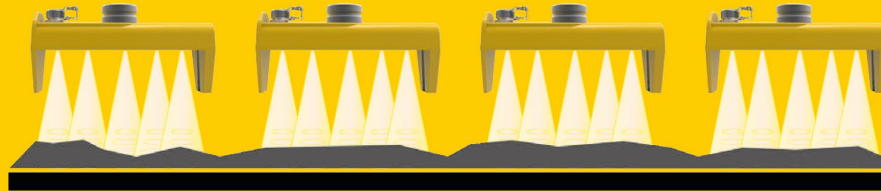
MOBA SOLUTION



MOBATIC
BIG SONIC

REGULATION

Long DISTANCE averaging via $= \frac{SKI1 + SKI2 + SKI3 + SKI4}{4}$



Stability



CHALLENGES REGARDING STABILITY

5 cm

10 cm

18 cm

Paving Direction

10km

MOBA SOLUTION

PAVEM



FEATURES



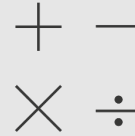
MEASUREMENT



VISUALIZATION



Data Storage



Calculation

HIGHER QUALITY

COST EFFICIENCY

**INCREASED
PRODUCTIVITY**

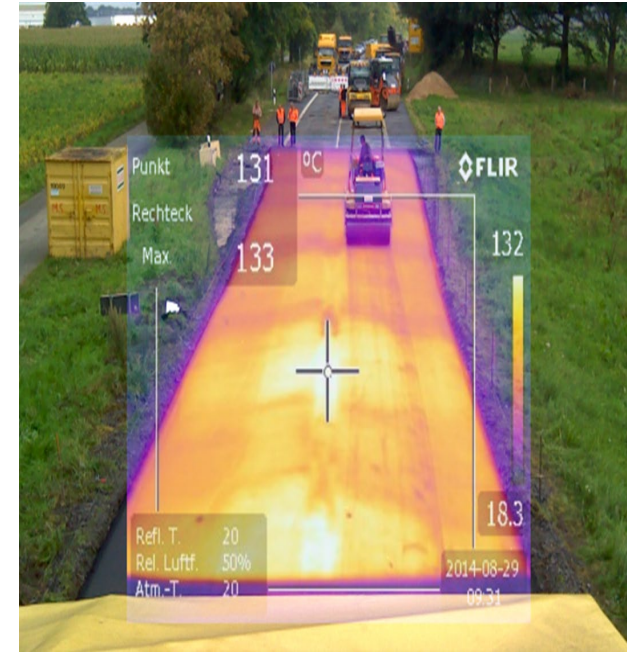
**FULLY AUTOMATED
MEASUREMENT**

Durability

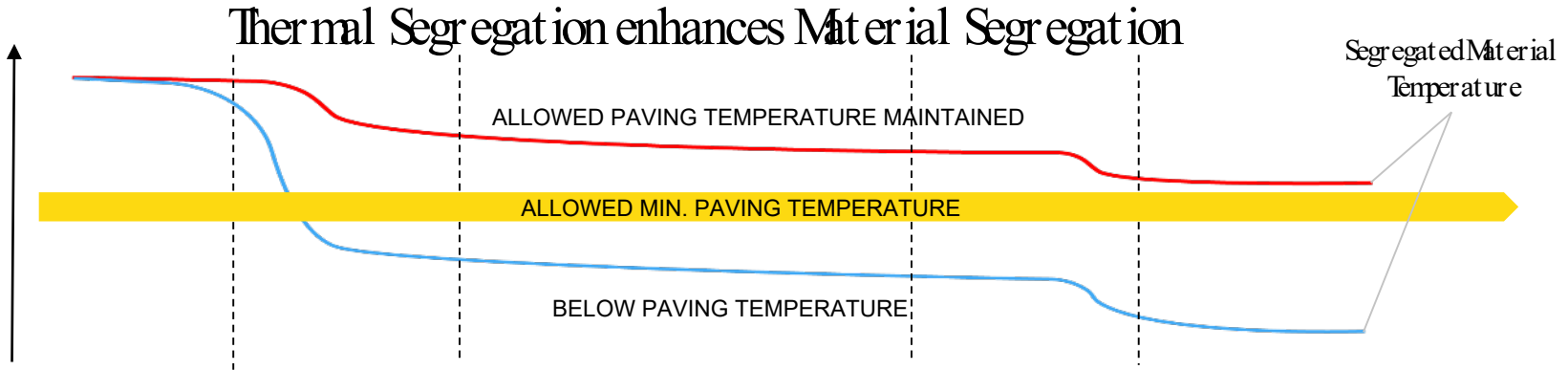
THERMAL SEGREGATION

What is thermal segregation

“is defined as temperature differences in the hot mix asphalt (HMA) mat as it is placed and is a potential cause of premature failure in asphalt roads. It can cause a significant reduction in pavement life due to low density from cold spots in the HMA mat.”



TEMPERATURE IN THE PAVING PROCESS



CHALLENGES REGARDING THERMAL SEGREGATION



MATERIAL QUALITY



MATERIAL TRANSPORT



PAVING TEMPERATURE

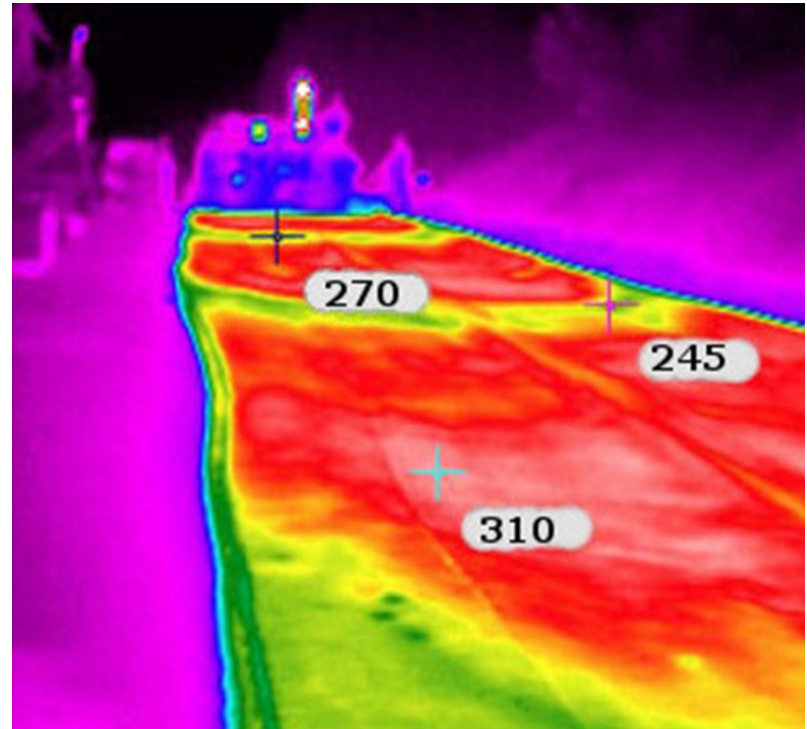
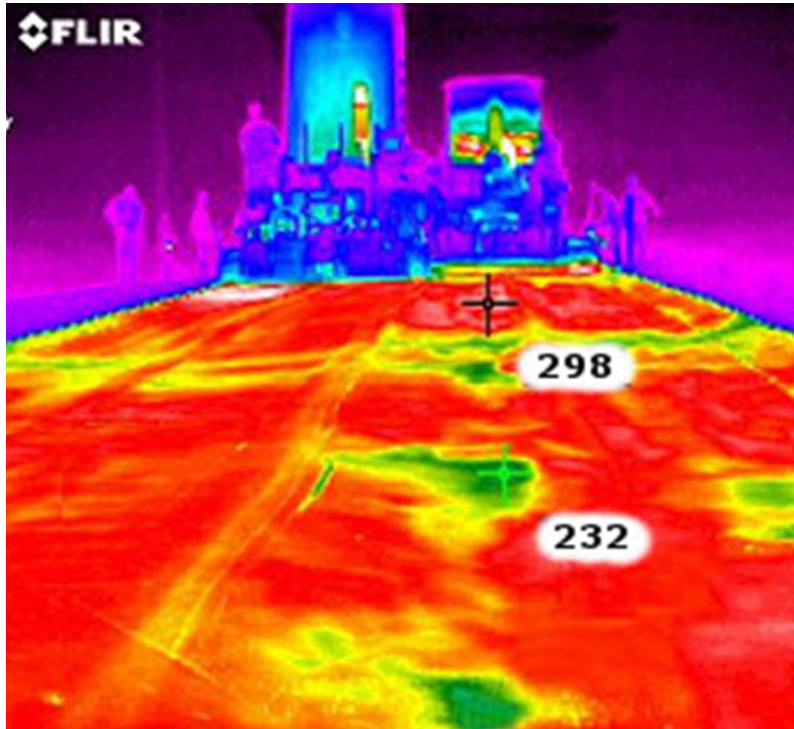


MACHINES

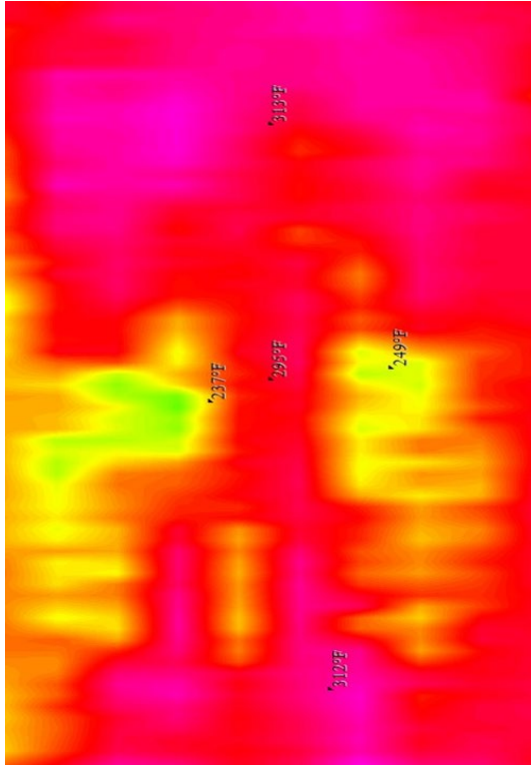


EXPERIENCE

Understanding the effects



Short Term Results



Long Term Results



MODULARITY
FOR MORE FLEXIBILITY

PAVER



FEATURES



MEASUREMENT



VISUALIZATION



MOBA Cloud



Analysis

PAVING PROCESS MEASUREMENT

- High precision measurement of the material temperature for detecting thermal segregation
- Realtime capturing and analysis of temperature values

ENVIRONMENTAL VISUALIZATION

- Displays thermal profile of the road
- Visualization of thermal material properties for detection of thermal segregation

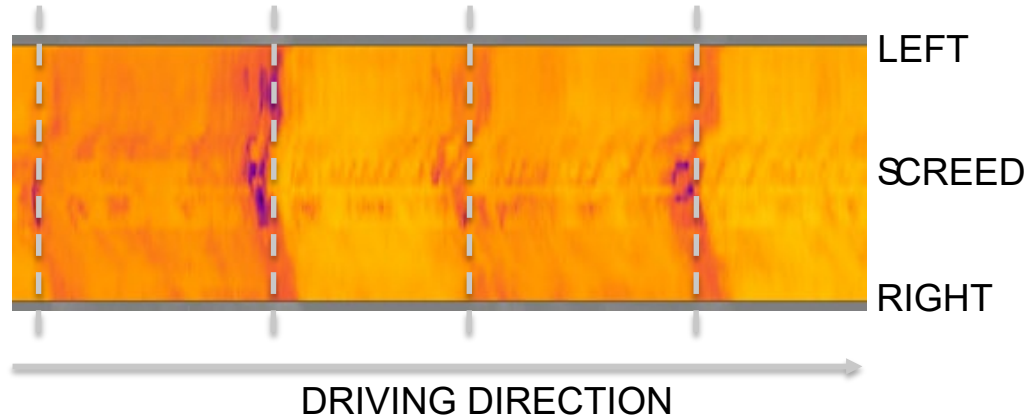
LIVE UPLOAD TO THE CLOUD

- Upload data into MOBA cloud
- Open / Standard interfaces for 3rd party solutions like VEDA or job site logistic solutions

OPEN INTERFACE

- Analyse the data in the PPM Pave Project Manager
- Create reporting from the analyzed data

VISUALIZATION



DETECTION OF

- TRUCK LOADS
- PAVER STOPS
- PAVER SPEED
- HOMOGENITY
- MATERIAL FLOW

Density

COMPACTION

CHALLENGES REGARDING COMPACTION



STIFFNESS VALUE

The operator can only estimate, known from experience, how stiff the road is.



COMPACTION

The operator can only estimate, known from experience, how high the compaction of the road is.

15

PASS COUNTING

The operator has to count how often the road has been compacted.



FUEL CONSUMPTION

Inefficient, not monitored compaction has a higher fuel consumption due to unnecessary passes.



POSITION OF THE MACHINE

The operator can only visually estimate the position of the compactor.



ASPHALT TEMPERATURE

During asphalt compacting you can't measure the temperature without instruments. Compacting with the wrong asphalt temperature results in a bad compaction result.

MOBA SOLUTION

MC A000



FEATURES



MEASURE THE IMPORTANT DATA MONITORING OF THE DATA UPLOAD TO THE CLOUD

- | | | |
|---|--|--|
| <ul style="list-style-type: none"> ▪ ICV „intelligent compactors“ ▪ Temperature ▪ Amplitude ▪ Frequency ▪ Position | <ul style="list-style-type: none"> ▪ Displays actual values on screen ▪ Monitors target values ▪ Displays position on screen ▪ Displays temperature profile on screen ▪ Displays other compactors on screen (fleet) | <ul style="list-style-type: none"> ▪ Upload the data via GSM ▪ View the data at the computer ▪ Analyze the data at the office |
|---|--|--|

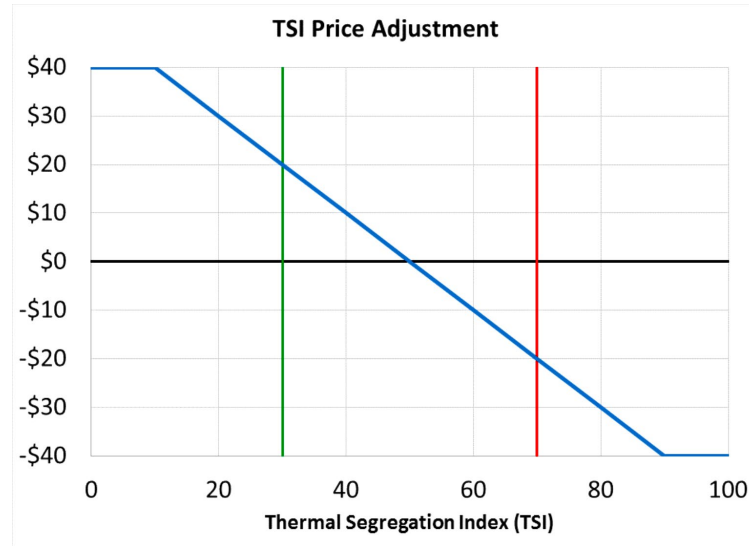
- ✓ Evenness
- ✓ Stability
- ✓ Durability
- ✓ Density

Documentation of the Jobsite as a proof of quality



Return of Investment

$$\text{MPA.TSI}_0 = (50 - \text{TSI}) \times 0.025 \times \$40$$

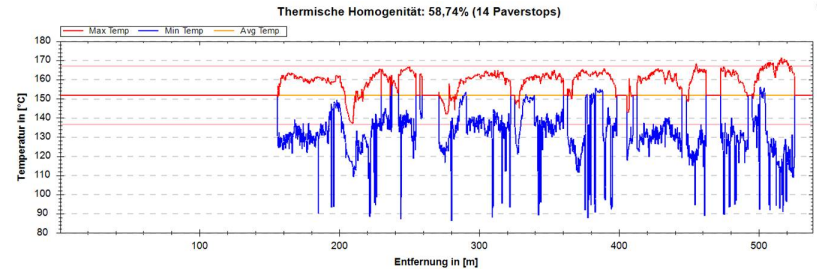
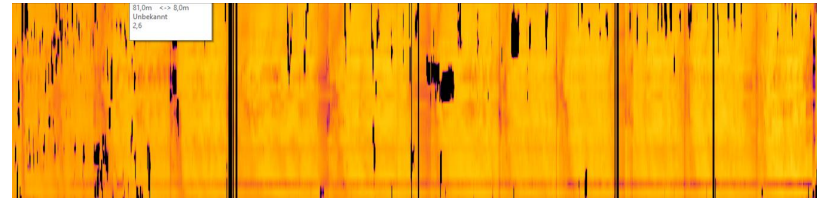


Example for 50mand per working day of 2400m

Screed width 5m - speed 5m/min

PaveProjectManager

	TSI	Quality Index	50m	2400m
50 €	0	100%	78,13 €	4.200 €
45 €	10	90%	56,25 €	3.780 €
35 €	20	80 %	32,81 €	2.940 €
25 €	30	70%	15,63 €	2.100 €
15 €	40	60%	4,69 €	1.260 €
0 €	50	50%	0 €	0 €
15 €	60	40%	- 4,69 €	- 1.260 €
25 €	70	30%	- 15,63 €	- 2.100 €
35 €	80	20%	- 32,81 €	- 2.940 €
45 €	90	10%	- 56,25 €	- 3.780 €
50 €	100	0%	- 78,13 €	- 4.200 €



Bonus: 1.698 €

BENEFITS



HIGHER QUALITY



COST EFFICIENCY



INCREASED PRODUCTION



FULLY AUTOMATED
MEASUREMENT



LESS WEAR AND
OPERATING COSTS



SHORTER
CONSTRUCTION TIME



MANUFACTURER
INDEPENDENT SYSTEMS

THANK YOU FOR YOUR ATTENTION

Please visit our new website or follow us on our social media channels.

www.mobautomation.com
www.mobacommunity.com



MOBA WORLDWIDE



ADDRESS

MOBA Mobile Automation AG
Kapellenstraße 5
65555 Limburg / Germany