Fogningsdagarna 2021, i Eskilstuna 6 - 7 Oktober

- *Value Added Engineering*
- *Digital Solutions for Welding & Cutting*
- *Robot Welding Productivity Improvements*

Dick Skarin, Value Added Engineering Manager-2021-09-28

VALUE ADDED ENGINEERING

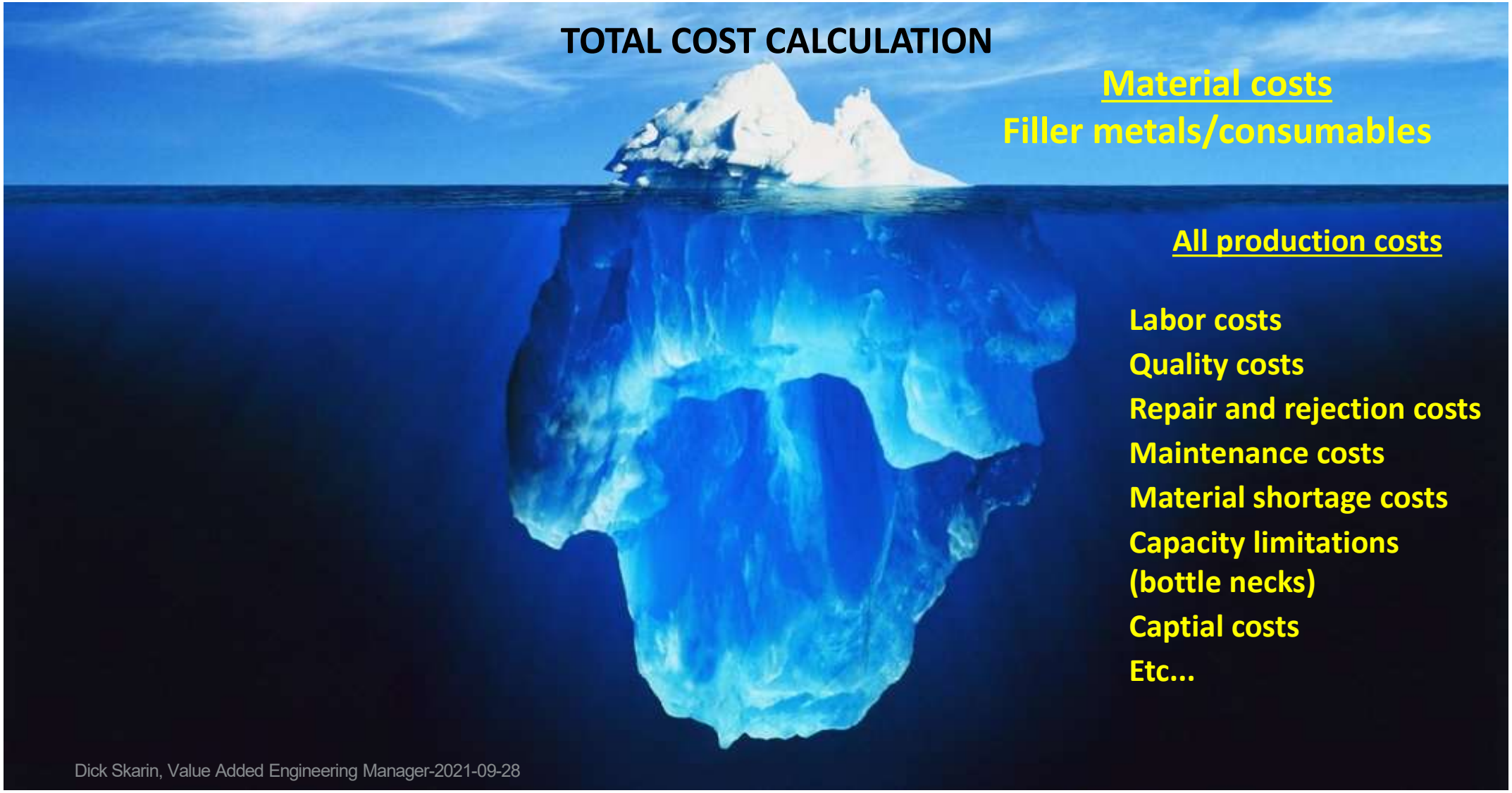
What Is ESAB Value Added Engineering?

The ESAB Value Added Engineering is a systematic method of providing the most optimized and cost efficient solution to our customers without sacrificing functionality or quality

An ESAB VAE project always starts with a current state assessment of the customer production method and costs

The ESAB VAE project always ends with delivering a complete technical and economical profitability report to the customer

TOTAL COST CALCULATION



Material costs

Filler metals/consumables

All production costs

- Labor costs
- Quality costs
- Repair and rejection costs
- Maintenance costs
- Material shortage costs
- Capacity limitations (bottle necks)
- Captial costs
- Etc...

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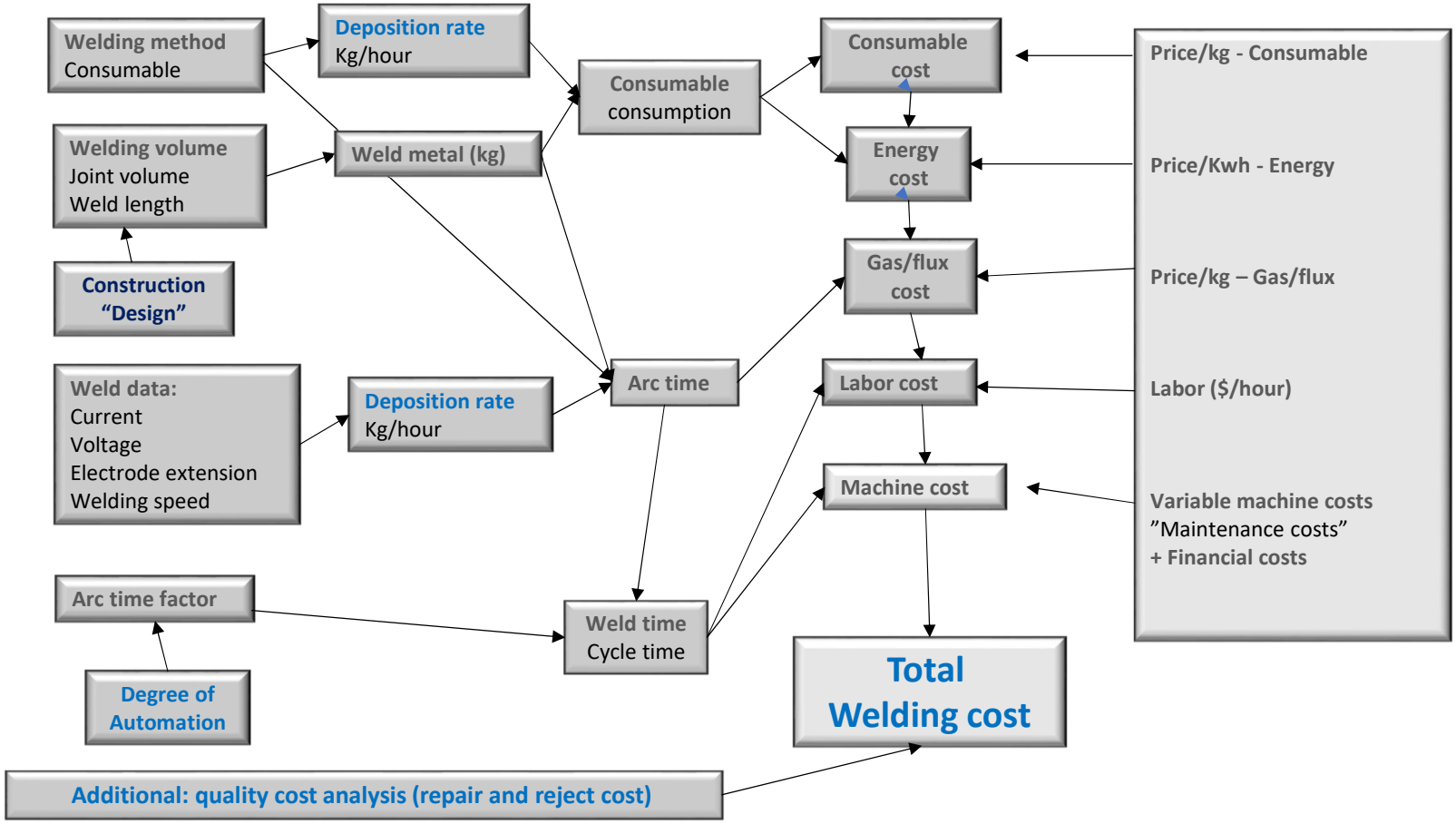
TOTAL COST CALCULATION



How the VAE Team support customers to improve their welding productivity and cost efficiancy in following areas

Process conversion

When and where to shift from manual to mechanized welding?

Process optimization

How to make mechanized or robot welding more effecient?

Quality improvement

What are the saving opportunities from avoiding quality defects?

DIGITAL SOLUTIONS

WELDCLOUD IS ADDRESSING KEY CHALLENGES AFFECTING OUR INDUSTRY **THROUGH DIGITALIZATION**

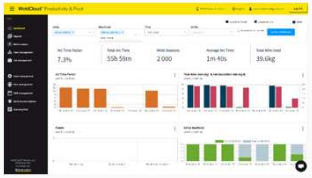
- Productivity bottlenecks
- High costs of poor quality, rework and scrap
- High costs and administration for regulatory compliance and welding documentation
- Equipment failures and downtime
- Difficult to find and retain skilled welders
- Manage large fleets of welders and equipment

DIGITAL SOLUTIONS PRODUCT OFFER SPANS ACROSS WELDING AND CUTTING

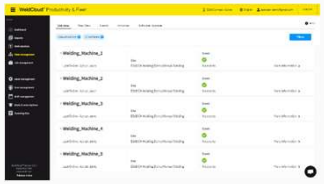
WeldCloud™

NOTES

PRODUCTIVITY



FLEET



The WeldCloud suite of applications, helps you manage and optimize your complete welding workflow.

WELDING ANALYTICS

WeldQAS and WeldScanner provides demanding customers with state-of-the-art on-prem quality control systems

CutCloud

A premier cutting software platform that lets you record, measure, and control your cutting operations with real-time data monitoring

Columbus

A powerful nesting software optimized for plasma, oxy-fuel, laser and waterjet cutting

VALUE ADDED SERVICES

Our senior welding experts provide welding productivity or cost reduction consultations remotely and onsite utilizing WeldCloud and Welding Analytics

OPTIMIZE YOUR ROBOT AUTOMATION WITH

OCTOPUZ

With OCTOPUZ Offline Robot Programming software, you will:

Drastically reduce downtime and lost revenue by programming, while your robots are in production

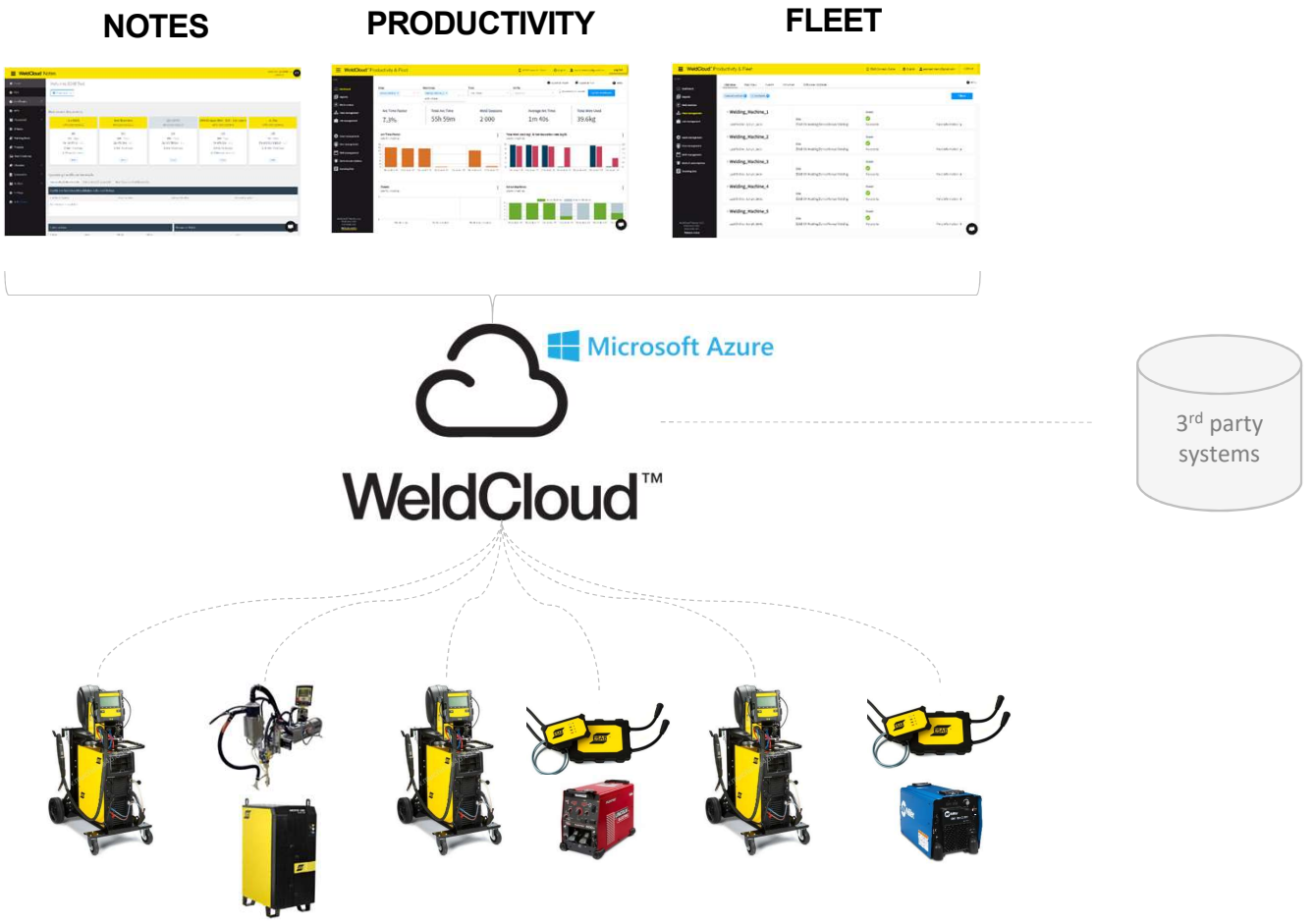
Dramatically reduce the time it takes to program new functions by programming in an exact virtual replica of your robotic system

Eliminate the need to purchase multiple software programs

Work seamless by programming multiple brands together

ESAB

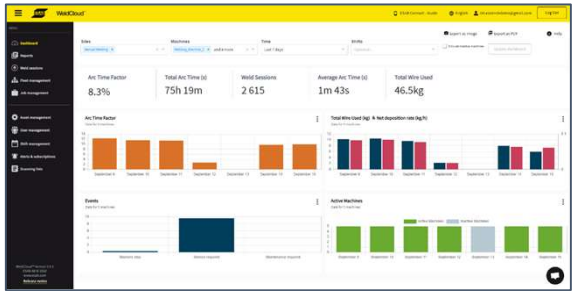
WELDCLOUD ARCHITECTURE

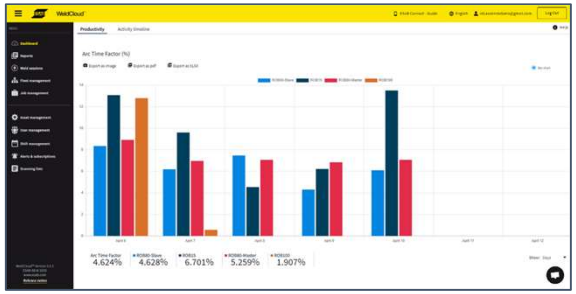


WeldCloud™
Productivity

WELDCLOUD PRODUCTIVITY

ASSESSING AND ANALYSING WELDING PRODUCTIVITY





WHY SHOULD YOU USE IT?

It is a software that provides tools for:

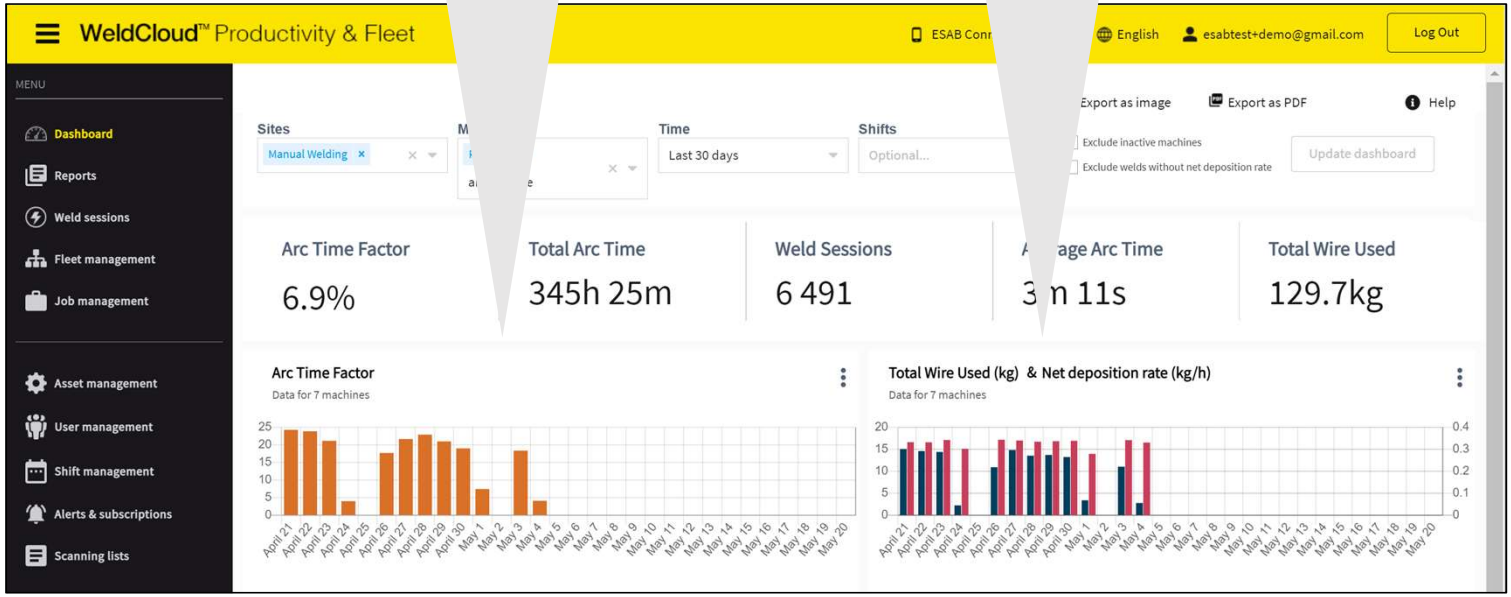
- Improving your welding productivity
- Increase your welding traceability

"If you can't measure it, you can't improve it" cit. Lord William Thomson Kelvin

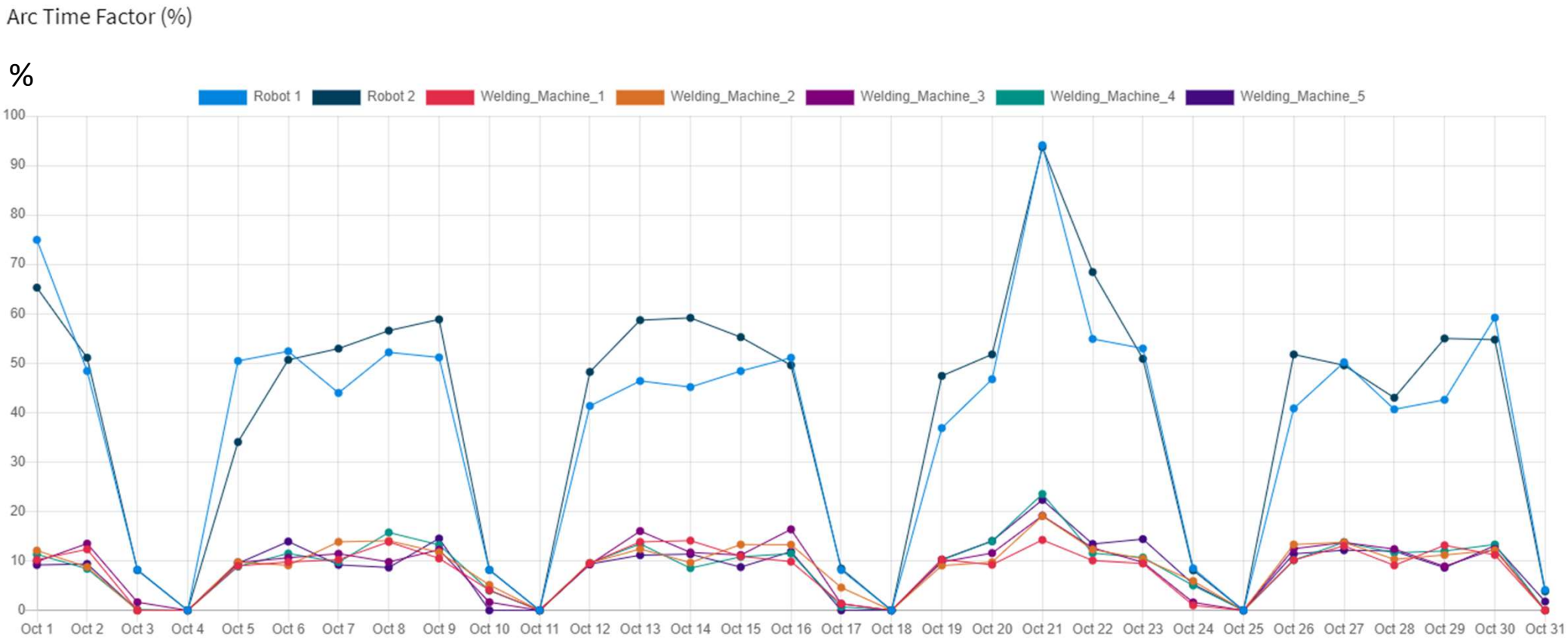
IDENTIFY BOTTELNECKS & MEASURE CURRENT PERFORMANCE

Arc time factor (%) = $\frac{\text{Total arc time}}{\text{Total available working time}}$

Net deposition rate (kg/h) = $\frac{\text{Weld metal deposited in weld joint}}{\text{Welding time}}$



REPORTS TO SEE ARC TIME FACTORS OVER TIME



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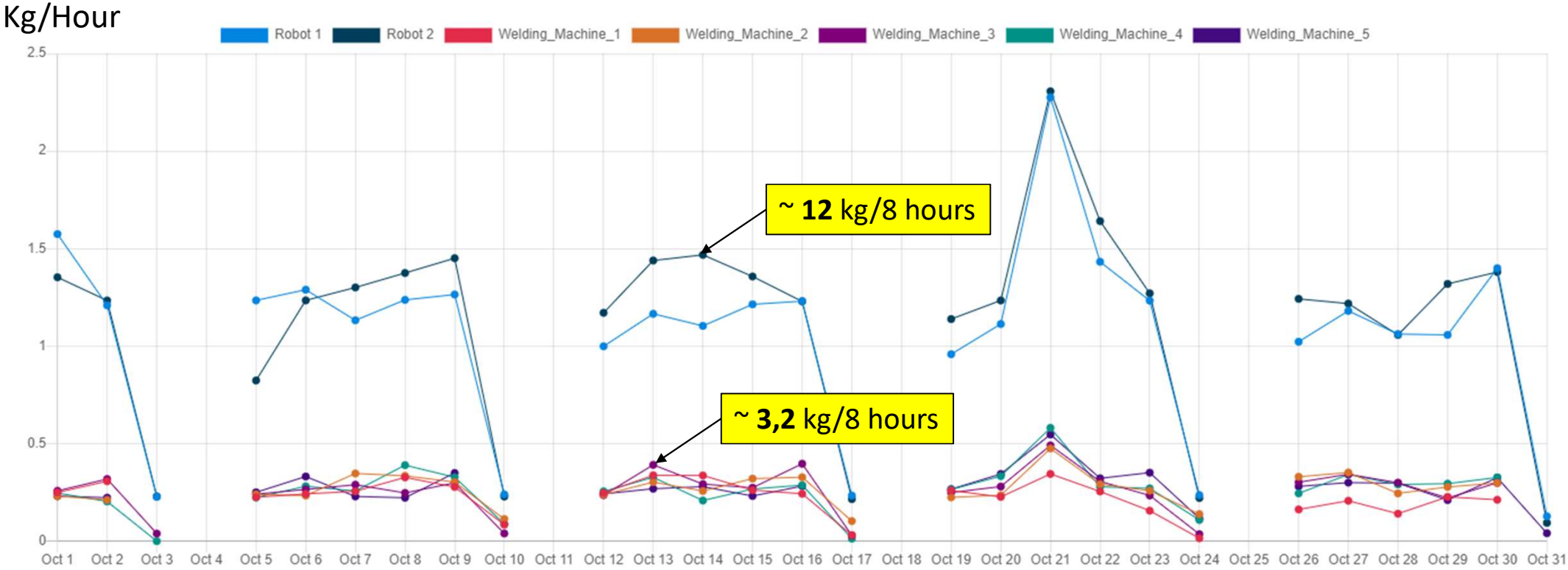
REPORTS TO SEE ARC PRODUCTION NET DEPOSITION RATES OVER TIME

Production Net deposition rate = Net Deposition rate * Arc Time Factor



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IDENTIFY IMPROVEMENT OPPORTUNITIES

Examples of Productivity Issues in Manual welding

- Not optimized material flow
- Material shortage at the welding station
- Too much or unnecessary grinding operations
- Too much spatter cleaning, due to use of low quality wire
- Variable part tolerances on ingoing materials, leading to gaps between plates that need to be filled by the welder
- Not optimized tacking fixtures
- Shortage of available tools leading to waiting times
- Waiting for available lifting crane or forklifts

Improvement opportunities in…

- Welding Procedures
- Welding materials and suppliers
- Better part tolerances
- Internal factory logistics
- Pre-welding activities
- Welding station layout
- Post welding activities
- Mechanised welding
- Robotised welding
- …..

WELDCLOUD PRODUCTITY HELPS LEADING AXLE SUPPLIER ADR GAIN 400 HOURS OF PRODUCTIVITY PER MONTH AT POLAND FACILTY

- ADR specializes in the manufacturing of braked axles, suspensions and “bogies for leading heavy trailer and agricultural machinery manufacturers
- **Installed 30 Aristo Mig 5000iw** inverter-based welding systems with embedded WeldCloud communication modules
- By using the analytic dashboards available in WeldCloud Productivity, the company was able to **gain an additional 400 hours of arc-on time per month,** by themselves
- *“The analytic capabilities of WeldCoud helped us evaluate our heavy production processes. After the first year of monitoring, we achieved a 19% reduction in downtime by optimizing our welding practices.”*

  ***Daniele Radrizzani**, Plant Manager and Member of the Board, ADR.*
- *“With WeldCloud, I can control production in real time and react quickly to unjustified interruptions at work”*

  ***Jacek Nowacki**, Production Director at ADR Polska*

POTENTIAL COST SAVINGS IF IMPROVING ARC TIME FACTOR & NET DEPOSITION RATE

- Annual cost savings per welding station -

	Low improvement	Medium improvement	High improvement
MANUAL WELDING	**€5 000** *Arc Time Factor improvement 10% to 11%*	**€14 000** *Arc Time Factor improvement 10% to 13%*	**€30 000** *Arc Time Factor improvement 10% to 20%*
ROBOTIC WELDING	**€8000** *Net Deposition Rate improvement by 5%*	**€25 000** *Net Deposition Rate improvement by 20%*	**€60 000** *Net Deposition Rate improvement by 60%*

*Calulated with production cost: Manual Welding **€35/hour***

*Calulated with production cost: Robotic Welding **€70/hour***

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Robot Welding Improvement Success Stories

CASE STUDY

SWIFT ARC TRANSFER

High speed rotational arc welding process with excellent penetration.

Automotive and Mobile Machinery Industry

Case Study
Sub-Supplier X

Industry Segment
Mobile Equipment, Tier 1

Application
Two robots welding cross-members

Challenge
Improve productivity without reducing quality

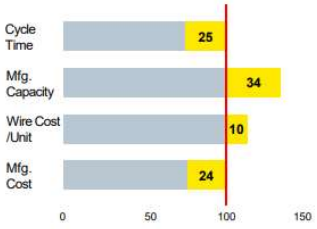
PRODUCT OR PROCESS IMPROVEMENT

Existing Process
- Autorod 12.64 1.2 mm solid wire
- Robotic spray arc welding process

The ESAB Solution
- 1.0 mm Aristorod 12.50 a non-copper coated wire
- Robotic ESAB SAT™ process

Impact of Solution
- ✓Less spatter
- ✓Improved penetration and throat depth
- ✓Higher productivity, 4 kg/h*2 to 6,4 kg/h*2
- ✓Acceptable hardness levels

RESULTS



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CASE STUDY

COREWELD 46LS

Metalcore welding wire with high gap bridging, high deposition and low silica.

Mobile Machinery Industry, SE

Case Study
Sub-Supplier X

Industry Segment
Mobile Equipment

Application
Construction vehicle components

Challenge
Improve productivity without reducing quality

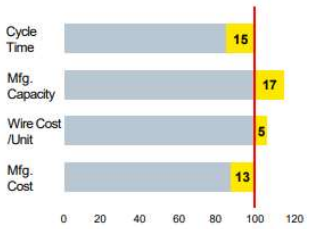
PRODUCT OR PROCESS IMPROVEMENT

Existing Process
- Robotic spray arc process, multi layer (6 passes)
- 1.2 mm Competitor metal cored wire

The ESAB Solution
- Robotic spray arc process, multi layer (6 passes)
- 1.2 mm Coreweld 46LS metal cored wire

Impact of Solution
- ✓Reduced weld size meeting the required throat depth
- ✓Maintained critical toe angle for fatigue
- ✓Reduced silica islands, eliminating inter-pass cleaning
- ✓Reduced spatter

RESULTS



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CASE STUDY

SWIFT ARC TRANSFER

High speed rotational arc welding process with excellent penetration.

Compact Machine Industry

Case Study
Customer X

Industry Segment
Compacting machines

Application
Robot welding of compacting sub-supplies

Challenge
Improve productivity without reducing quality

PRODUCT OR PROCESS IMPROVEMENT

Existing Process
- 1.2 mm solid wire
- Robotic spray arc welding process

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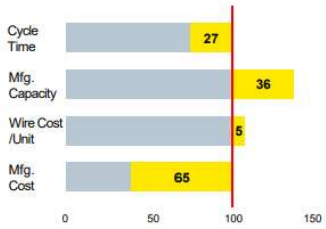
RESULTS



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