



SOFTWARE SYSTEMS FOR  
**THE DIGITAL  
FACTORY**  
OF TOMORROW

**The Evolution of QMOS Roll Shop Planner**



# At a glance...

- *About Quad Infotech*
- *Quad Infotech Product Offerings*
- *QMOS RSP .Net Evolution*
- *Roll Shop Cost Analysis Tool*

# Quad Infotech / QMOS Background

- Based in Toronto, Canada
- Flagship product: QMOS (QUAD Mill Operating System)
- MES for long products since 1992
- North America's top MES for long steel with 47+ implementations
- Intimate knowledge of the steel process
- An experienced and capable team of engineers with deep knowledge in
  - Steel making
  - Software design and development
  - Project management
  - Business analysis

# Our Focus

- We are a customer centric company. Everything we do is based on the needs of our customers
- As a leading software provider to the steel industry, we are continuously exploring new solutions to enable our customers to stay ahead of the industry
- Our business analysts are process experts in steel manufacturing
- Investments in new technologies and big data in providing value-driven deliverables for our customers
- Strive to be the leader in developing software solutions for the Industry 4.0 Steel Manufacturing

# QMOS Brand

- Most popular MES in the North American Steel Industry
- Present in USA, Canada, Mexico, India

Customer	# of Mills	Integrated Meltshop	SAF Meltshop	Rolling Mill	Post Processing	SAP Interface	Oracle Business
Gerdau	16			X	X		X
Gerdau Special Steel	3			X	X	X	X
Arjas Steel India	1	X			X	X	X
Gerdau Mexico	1			X	X		X
Nucor Steel	15			X	X		X
Commercial Metals	8				X		X
Steel Dynamics	1			X	X		
Velorec (tubes)	1				X		
WMC (Wire Mesh Corp)	1			X	X		

# *THE* MES for Steel

The Most Implemented MES  
for Steel in North America



- End to end process coverage for Melt Shop, Rolling Mill and Finishing and everything in-between
- Full process genealogy
- Integrated quality control
- Planning and scheduling
- Inventory management
- Delay and failure analysis
- Interface with L1 systems
- Operator friendly
- Manufacturing Intelligence and multi-dimensional, drill-down analytics
- 24/7 support

# Quad Product Suite

**QMOS**  
Digital Factory



The only MES that is specifically designed for the Long Steel Industry

**APEX**



Process Intelligence for the Digital Factory of tomorrow

**QMOS DATA SCIENCE**



Machine Learning and Data Driven Optimization

**SCALE HOUSE**



Improve performance and efficiency of your Scale House Operations

**QMOS RECYCLING**



Production Management System for Ferrous and Non-Ferrous Operations

**EnergyMethods**



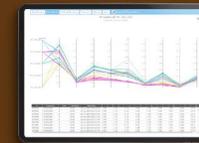
An enterprise Energy Management System for the Steel Industry

**QMOS JobAid**



Go paperless with all your forms and job aids

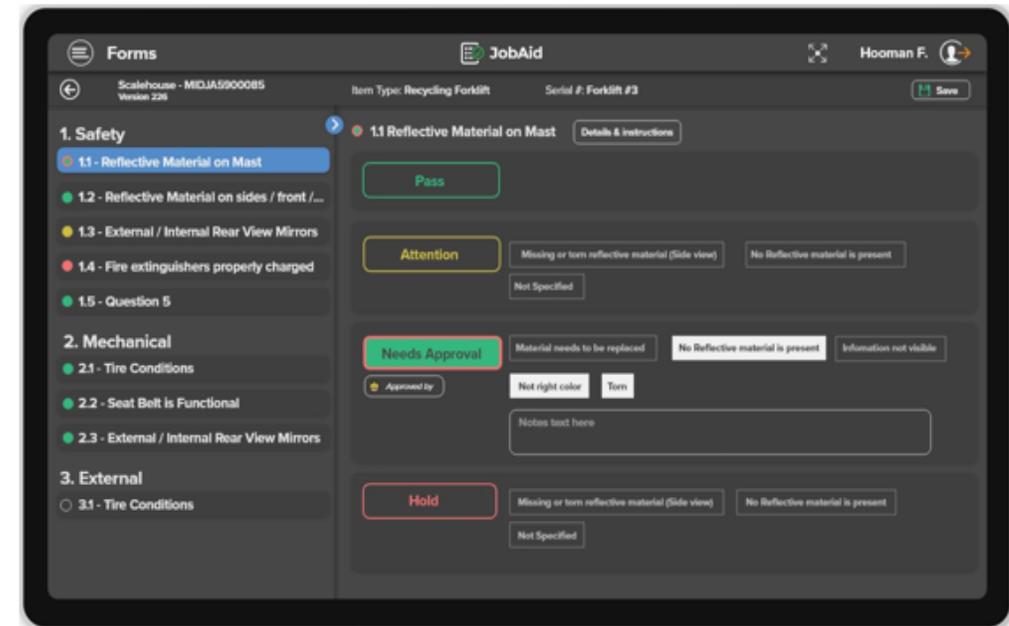
**QMOS R-Factor**



Fully automated Rolling Mill process control feedback system

# Job Aid – Paperless form management

- Fully custom digital forms such as Safety tours, Pre-inspection, Check lists and more
- Form version management
- Issue and failure tracking
- Failure reason tracking
- Equipment health tracking
- Easy to use operator interface
- Operator instructions
- Full history and audit trail
- Tablet friendly
- Automatic work order generation in the ERP or CMMS



The screenshot displays the JobAid mobile application interface on a tablet. The top navigation bar shows 'Forms', 'JobAid', and the user 'Hooman F.'. The main content area is titled 'Scalehouse - MIDJA5900085' and 'Item Type: Recycling Forklift'. The form is structured into sections: '1. Safety', '2. Mechanical', and '3. External'. Under '1. Safety', item '1.1 Reflective Material on Mast' is selected. This item has three status options: 'Pass' (green), 'Attention' (yellow), and 'Needs Approval' (red). The 'Needs Approval' status is currently selected, with a sub-section for 'Approved by' containing 'Not right color' and 'Turn' buttons. Below this, there is a 'Notes text here' input field. The 'Attention' and 'Needs Approval' sections also include radio button options for 'Missing or torn reflective material (Side view)', 'No Reflective material is present', and 'Not Specified'. The 'Hold' status (red) is also visible at the bottom of the form.

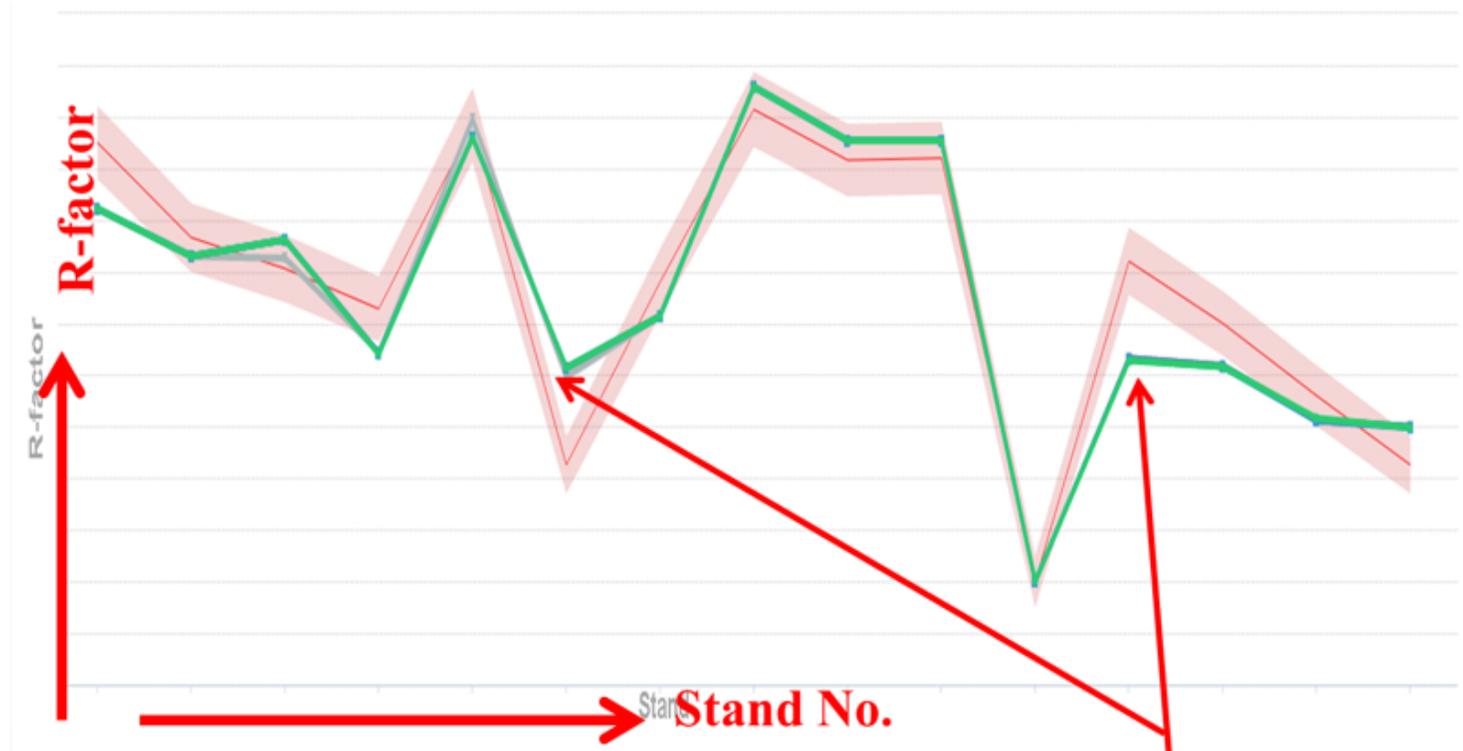
# Rfactor Management System

Safely increase productivity & reduce need to measure hot bars

- Reduced cobbles & out of spec bars
- Setup sheets that reflect how product is actually rolled
- Identify & improve product issues during the shift
- Involve operators in continuous improvement
- Safe & effective training of new operators
- Get the most out of every shift

# Rfactor Management System

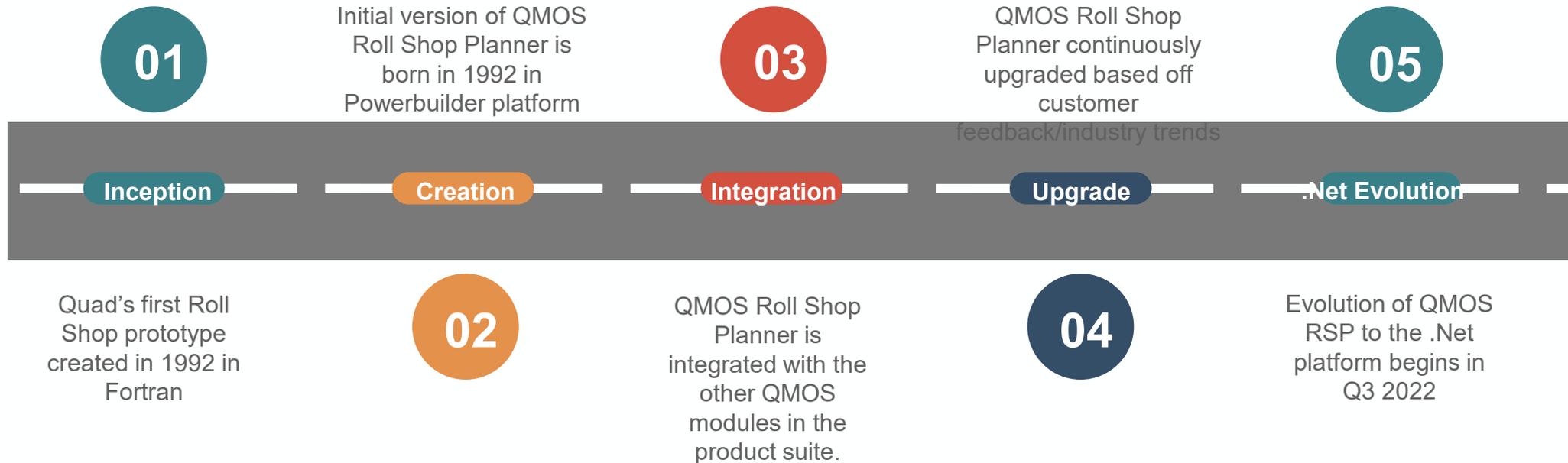
QMOS R-factor System presents R-factors in a meaningful format that Operators can understand & use in real time during the shift to improve shift performance



Shows if any stands are out of spec

# QMOS Roll Shop Planner

A quick look at the evolution of QMOS Roll Shop Planner over the years



# QMOS RSP .Net Evolution: Why??

- ❑ Change in platform(.net vs PowerBuilder) enables Quad to leverage latest technologies and frameworks
- ❑ Redesigned, modern screens to aid in better user experience and intuitiveness
- ❑ Improved screen processing times as a result of code re-engineering
  - Processing will now mostly occur at the database level, allowing for data to be processed behind the scenes and effortlessly refreshed and shown on multiple instances of the same screen with no adverse effects to operations

# QMOS RSP .net Evolution: How??

- ❑ QMOS RSP Evolution Project began officially at Quad Infotech in Q3 2022
- ❑ Dedicated scrum team focused on delivery of new .net RSP screens(UI/UX designer, 3 business analysts, 3 .net developers, RS product owner, RS scrum master)
- ❑ .net development of main RSP screens projected to be completed by end of Q2 2023

# QMOS RSP Allocate screen (Current)

File RSP Favorite Edit Mill Window Help

QMOS RSP 20.0

Roll Set: 01-001/002 Mill Size: HS4! Stand: 1 Amt Off: 9.000  
 DWG: 1C V 01 Desc: 1 STD. (NEW-HEX-OVAL)

Consign     New     Old    Status: Assigned  
 Roll Barrel Dwg    Material:     Allocate  
 Mill size    Hardness: Min  Max     Retrieve  
 Item    Roll Diameter: Min .000 Max .000  
 Specs

Scrap     Old     Broken     New  
 Date Removed: 10/04/2022    Remove  
 Reason:     Remove All

Foundry Number	Item Id	Item	Roll Diameter	Material	Hardness	Mill Size	Width	Location	Row	Supplier	Roll Status	Roll Barrel Drawing	Ver.	Position	Blank Diameter	New Diameter	Scrap Diameter	% Remain	Tons Rolled	Purchase Cost	Current Value
1640959	370G2ULTX-109	375mm ULTIMA X SD>=45	370.000	Ultima II CCDPLX		G2S	650	STD 12 RACK #1	B	British Rollmaker	New	7A		1B	370.000	370.000	310.000	100.0%		8,920.80	8,920.80
1640962	370G2ULTX-109	375mm ULTIMA X SD>=45	370.000	Ultima II CCDPLX		G2S	650	STD 12 RACK #1	B	British Rollmaker	New	7A		1B	370.000	370.000	310.000	100.0%		8,920.80	8,920.80
1674649	350G1CCSGA-1	350mm CC DUPLEX SGA IRON ROLLS. SD>=60	350.000	CCSGA		G1S	600			British Rollmaker	New				350.000	350.000	.000	100.0%		1,804.75	1,804.75
1675640*	360G2CCSGP-11	360mm G2S CCDUPLEX SGP IRON ROLLS.	360.000	SGP		G2S	650			British Rollmaker	New				360.000	360.000	.000	100.0%		2,279.82	2,279.82
1675694	350G1CCSGA-1	350mm CC DUPLEX SGA IRON ROLLS. SD>=60	350.000	CCSGA		G1S	600	NEW ROLL RACK#:	G	British Rollmaker	New				350.000	350.000	.000	100.0%		1,804.75	1,804.75
1675915	370G2CCSGP-11	370mm G2S CCDUPLEX SGP IRON ROLLS.	370.000	S.G.P.		G2S	650			British Rollmaker	New				370.000	370.000	.000	100.0%		2,309.01	2,309.01
1675916	370G2CCSGP-11	370mm G2S CCDUPLEX SGP IRON ROLLS.	370.000	S.G.P.		G2S	650			British Rollmaker	New				370.000	370.000	.000	100.0%		2,309.01	2,309.01
1675917	370G2CCSGP-11	370mm G2S CCDUPLEX SGP IRON ROLLS.	370.000	S.G.P.		G2S	650			British Rollmaker	New				370.000	370.000	.000	100.0%		2,309.01	2,309.01
1675918	370G2CCSGP-11	370mm G2S CCDUPLEX SGP IRON ROLLS.	370.000	S.G.P.		G2S	650			British Rollmaker	New				370.000	370.000	.000	100.0%		2,309.01	2,309.01
1676599	720R0NODP-105	720mm NODULAR STATIC CAST SGP IRON ROLLS. DWG: P-117218	750.000	S.G.P.		CTS750	500			British Rollmaker	New			1B	750.000	720.000	.000	104.2%		5,000.00	5,000.00
1676600	720R0NODP-105	720mm NODULAR STATIC CAST SGP IRON ROLLS. DWG: P-117218	750.000	S.G.P.		CTS750	500			British Rollmaker	New			1B	750.000	720.000	.000	104.2%		5,000.00	5,000.00
1676602	720R0NODP-105	720mm NODULAR STATIC CAST SGP IRON ROLLS. DWG: P-117218	750.000	S.G.P.		CTS750	500			British Rollmaker	New			1B	750.000	720.000	.000	104.2%		5,000.00	5,000.00
1676606	720R0NODP-105	720mm NODULAR STATIC CAST SGP IRON ROLLS. DWG: P-117218	750.000	S.G.P.		CTS750	500			British Rollmaker	New			1B	750.000	720.000	.000	104.2%		5,000.00	5,000.00
1676807	360G1CCSGA-1	360mm G1S CCDUPLEX SGA IRON ROLLS.	360.000	CCSGA		G1S	600	NEW ROLL RACK#:	E	British Rollmaker	New				360.000	360.000	.000	100.0%		2,189.50	2,189.50
1681152	390G1CCSGA-1	390mm G1S CCDUPLEX SGA IRON ROLLS.	390.000	CCSGA		G1S	600			British Rollmaker	New				390.000	390.000	.000	100.0%		2,464.12	2,464.12
1681153	390G1CCSGA-1	390mm G1S CCDUPLEX SGA IRON ROLLS.	390.000	CCSGA		G1S	600			British Rollmaker	New				390.000	390.000	.000	100.0%		2,464.12	2,464.12
1681564	330G1CCSGA-1	330mm CC DUPLEX SGA STEEL SD>=45	330.000	CC SGA		G1S	600			British Rollmaker	New				330.000	330.000	.000	100.0%		1,546.00	1,546.00
1681565	330G1CCSGA-1	330mm CC DUPLEX SGA STEEL SD>=45	330.000	CC SGA		G1S	600			British Rollmaker	New				330.000	330.000	.000	100.0%		1,546.00	1,546.00
1681567	340G1CCSGA-1	340mm CC DUPLEX SGA STEEL SD>=48	340.000	CCSGA		G1S	600			British Rollmaker	New				340.000	340.000	.000	100.0%		1,389.93	1,389.93
1681568	340G1CCSGA-1	340mm CC DUPLEX SGA STEEL SD>=48	340.000	CCSGA		G1S	600			British Rollmaker	New				340.000	340.000	.000	100.0%		1,389.93	1,389.93
1685820	520RGCCSGP-1	520mm CCDUPLEX SGP IRON ROLLS.	520.000	CC SP WOD - RR455		HS455	750			British Rollmaker	In Use				520.000	520.000	.000	100.0%		3,265.00	3,265.00
1686268	360G2CCSGP-11	360mm G2S CCDUPLEX SGP IRON ROLLS.	360.000	SGP		G2S	650			British Rollmaker	New				360.000	360.000	.000	100.0%		2,350.56	2,350.56
1686970	330G1CCSGA-1	330mm CC DUPLEX SGA STEEL SD>=45	330.000	CC SGA		G1S	600			British Rollmaker	New				330.000	330.000	.000	100.0%		1,867.64	1,867.64
1686971	330G1CCSGA-1	330mm CC DUPLEX SGA STEEL SD>=45	330.000	CC SGA		G1S	600			British Rollmaker	New				330.000	330.000	.000	100.0%		1,867.64	1,867.64
1686972	330G1CCSGA-1	330mm CC DUPLEX SGA STEEL SD>=45	330.000	CC SGA		G1S	600			British Rollmaker	New				330.000	330.000	.000	100.0%		1,867.64	1,867.64
1686973	330G1CCSGA-1	330mm CC DUPLEX SGA STEEL SD>=45	330.000	CC SGA		G1S	600			British Rollmaker	New				330.000	330.000	.000	100.0%		1,867.64	1,867.64
1686974	330G1CCSGA-1	330mm CC DUPLEX SGA STEEL SD>=45	330.000	CC SGA		G1S	600			British Rollmaker	New				330.000	330.000	.000	100.0%		1,867.64	1,867.64
1686975	330G1CCSGA-1	330mm CC DUPLEX SGA STEEL SD>=45	330.000	CC SGA		G1S	600			British Rollmaker	New				330.000	330.000	.000	100.0%		1,867.64	1,867.64
1686976	330G1CCSGA-1	330mm CC DUPLEX SGA STEEL SD>=45	330.000	CC SGA		G1S	600			British Rollmaker	New				330.000	330.000	.000	100.0%		1,867.64	1,867.64

# QMOS RSP Allocate screen (Evolution)

Roll Shop Planning - Allocate QMOS Danilo C.

Search:  Roll Set ID:  Advanced Search

Roll Set: Roll Set ID: 01-001/002 Mill Size: HS455 Stand: 1 Amt Off: 9.000 V: 01 DWG: 13A3 Desc: Small Near Squares Edger 13-17,13-36,13 Remove All Find Rolls

Pos.	Roll	Diameter	Foundry No
Top	01-004	520.000	--
Middle	01-005	520.000	J09505 <span>Remove</span>
Bottom	01-006	520.000	J09506 <span>Remove</span>

Roll Shop Planning - Allocate QMOS Danilo C.

Allocating Roll Barrel Dwg Item Mill Size Specs Confirm

Status: All Roll Diameter: Min.  Max.   
 Material: Select Hardness: Min.  Max.  Apply Filter

Foundry Number	Item ID	Item	Roll Diameter	Material	Hardness	Mill Size	Width	Location	Supplier	Roll Status	Roll Barrel Drawing	Blank Diameter	New Diameter	Pos.
J09504	520RGCCSGP-101	520mm Sand Springs CPM9V	520.000	CPM 9V	30	HS455	750	Roughing Rack #03	HBI-HEBEI	In Use		520.000	520.000	Middle
J09505	520RGCCSGP-105	520mm CCDuplex SGP Iron Rolls	520.000	CPM 9V	30	HS455	750	Roughing Rack #10	HBI-HEBEI	In Use	1C	520.000	520.000	Bottom
J09506	520RGCCSGP-103	520mm CCDuplex SGP Iron Rolls	520.000	CPM 9V	30	HS455	750	Roughing Rack #18	HBI-HEBEI	New		520.000	520.000	--
J09509	520RGCCSGP-104	520mm CCDuplex SGP Iron Rolls	520.000	CPM 9V	30	HS455	750	Roughing Rack #05	HBI-HEBEI	New		520.000	520.000	--
J09508	520RGCCSGP-102	520mm Sand Springs CPM9V	520.000	CPM 9V	30	HS455	750	Roughing Rack #22	HBI-HEBEI	New		520.000	520.000	--
32538	520RGCCSGP-110	520mm CCDuplex SGP Iron Rolls	520.000	CPM 9V	30	HS455	750	Roughing Rack #06	HBI-HEBEI	New		520.000	520.000	--
32539	341RGCCSGP-122	341mm Sand Springs CPM9V	341.000	CPM 9V	30	HS455	750	Roughing Rack #07	HBI-HEBEI	New		520.000	520.000	--
1685821	480RGCCSGP-100	480mm Sand Springs CPM9V	480.000	Nodular Iron	30	G25	750	Roughing Rack #11	HBI-HEBEI	New		520.000	520.000	--
1685822	442RGCCSGP-118	442mm CCDuplex SGP Iron Rolls	442.000	CCSGA/SGP	30	G25	750	Roughing Rack #15	HBI-HEBEI	New		520.000	520.000	--

# QMOS RSP Work Order Planning – Current vs Evolution

QMOS RSP 7.0.0

Work Order : 13972    Roll Barrel Drawing : 1C    V: 01

Priority : 0    Description : 1 STD. (NEW-HEX-OVAL)

Roll Set ID : 01-001/002    Stand ID : 1    New Diameter : 520.000

Foundry No.: 1685820 / 32537    Average Amt off : 9.000    Average Diameter : 520.000

Job Plan : 1 STAND FLAT BTM OV/    Diameter Details    Scrap Diameter : 221.000

WO Fixed Note :

WO Note :

Roll Barrel Note :

Roll Set Note :

Issue Date : 10/04/2022    Planned Duration : .00

Due Date :

Start Date : 10/4/2022    Actual Duration : .00

Completion Date :

Work Order Status : In Progress

Roll Shop Planning - Work Order

View / Edit Work Order    Turn    Priority    Create W.O.    Save

Work Order: 13005    Priority: 7

Employee: Danilo C.    W.O. Status: In progress    Duration: 18h

Issue Date	Start Date	Due Date	Comple. Date
12/10/2021	12/11/2021	01/05/2022	--

Roll Set ID: 01-001/002

Foundry No: J09504 / J09505 / J09506    Stand ID: 4

Roll Barrel Drawing: 4D - 4STD RNDS & EDGR (75mm CTR) - V: 01

Diameter Details:

Pos.	Roll	Foundry No	New	Collar	Current	Scrap
T	01-001	J09504	370		355	310
M	01-002	J09505	370		355	310
B	01-003	J09506	370		355	310

Job Plan: 2x1x1/8" Channel    Procedure

History:

Date	Diameter	Event
Jan 18 2020	350	Work Order
Sep 02 2020	335	Work Order
May 25 2021	310	Work Order
Feb 09 2021	290	Roll Barrel Drawing Change
Dec 12 2021	250	Selected Work Order

WO Fixed Note: 2x1 CH  
Be aware of the possibility of under cutting at the drive side of the top roll pass. Check that the insert seats are tight.

WO Note:

Roll Barrel Note:

Roll Set Note: Use rough sprayweld process.

# QMOS RSP Work Order Turn Results – Current vs Evolution

File RSP Favorite Edit Mill Window Help

Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Q11 Q12 Q13 Q14 Q15 Q16 Q17 Q18 Q19 Q20 Q21 Q22 Q23 Q24 Q25 Q26 Q27 Q28 Q29 Q30 Q31 Q32 Q33 Q34 Q35 Q36 Q37 Q38 Q39 Q40 Q41 Q42 Q43 Q44 Q45 Q46 Q47 Q48 Q49 Q50 Q51 Q52 Q53 Q54 Q55 Q56 Q57 Q58 Q59 Q60 Q61 Q62 Q63 Q64 Q65 Q66 Q67 Q68 Q69 Q70 Q71 Q72 Q73 Q74 Q75 Q76 Q77 Q78 Q79 Q80 Q81 Q82 Q83 Q84 Q85 Q86 Q87 Q88 Q89 Q90 Q91 Q92 Q93 Q94 Q95 Q96 Q97 Q98 Q99 Q100

Work Order Labor Roll Set Turn Lathe

Work Order : 13972 Roll Barrel Drawing : 1C V: 1  
 Priority : 0 Description : 1 STD. (NEW-HEX-OVAL)  
 Roll Set ID : 01-001/002 Stand ID : 1 New Diameter : 520.000  
 Foundry No.: 1685820 / 32537 Average Amount off : 9 Current Diameter : 520.000  
 Diameter Details Scrap Diameter : 442.000

Pos.	Roll No.	Foundry No.	Turn Dia.	Hardness	Date Turn	Location	Row	Note
T	01-002	1685820	519.500	.0	10/4/2022	IN RTA		
B	01-001	32537	519.500	.0	10/4/2022	IN RTA		

Ready [17:50:28 - 10/4/2022]

Roll Shop Planning - Turn QMOS Roderick S.

**Work Order Result**

Foundry No	New	Collar	Amt. Off	Current	Scrap	Duration:
J09504	520		15	355	310	06.00

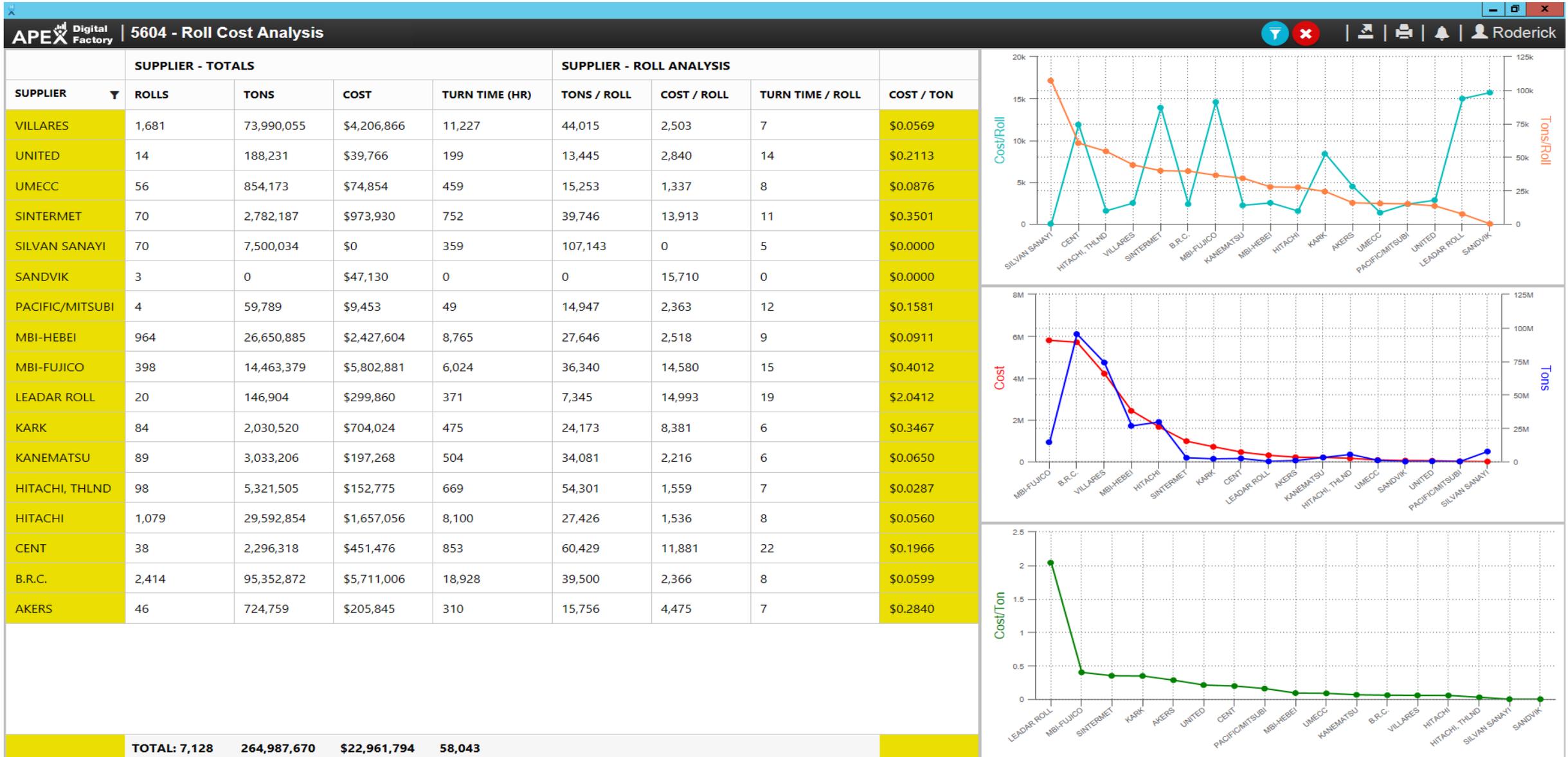
Pos: Top Roll: 01-004 Lathe ID: Program: Tool: Offset:  
 HERKULES CNC ROL TURNING 4DsR0.cod 3eSr0.cod 50.000

Procedure 1: Dressing T - Dressing standard mill rolls Complete

Employee Name	Date	Hours	Amt. Off	Turn Diam.	Hardness	Location	Row	Note
Danilo Castor	09/22/2022	04:00	50.000	307.000	700	EDGERS	A	It needs double attention next time
Yuhan Wang	09/23/2022	02:00	50.000	307.000	700	EDGERS	A	Type Note

Procedure 2: New Set T - Turn new set rolls complete

# Roll Shop Cost Analysis



# Our Goal

To be the leading provider of cutting edge steel manufacturing software  
in the age of industry 4.0

Additional focus on:

- Roll Shop Analytics
- Preventative forecasting
- Process optimization
- Operator mobility, collaboration and communication
- Cutting-edge technologies

# Thank You!

## Questions?

Presented by: **Roderick Sandiford Jr.**  
**Director of Rolling and Finishing Operations**