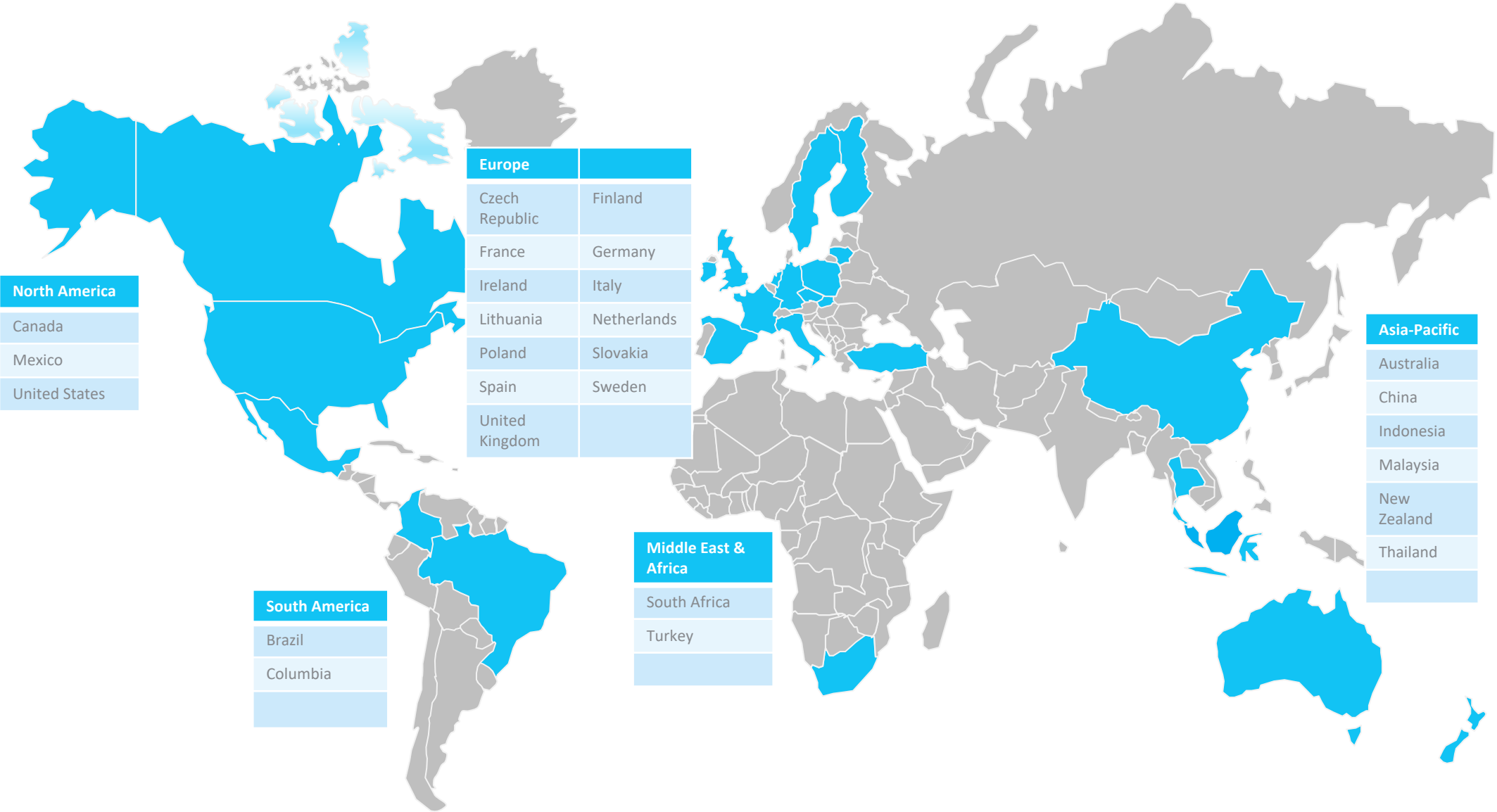


Industry 4.0

Epicor Advanced MES



EPICOR MES AROUND THE WORLD



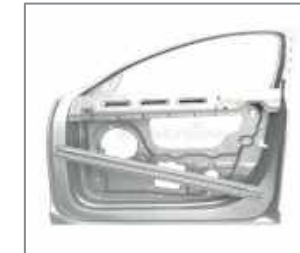
Epicor Advanced MES Overview

Customers	500+	Countries	24+
Languages	21	Connected Machines	> 15,000

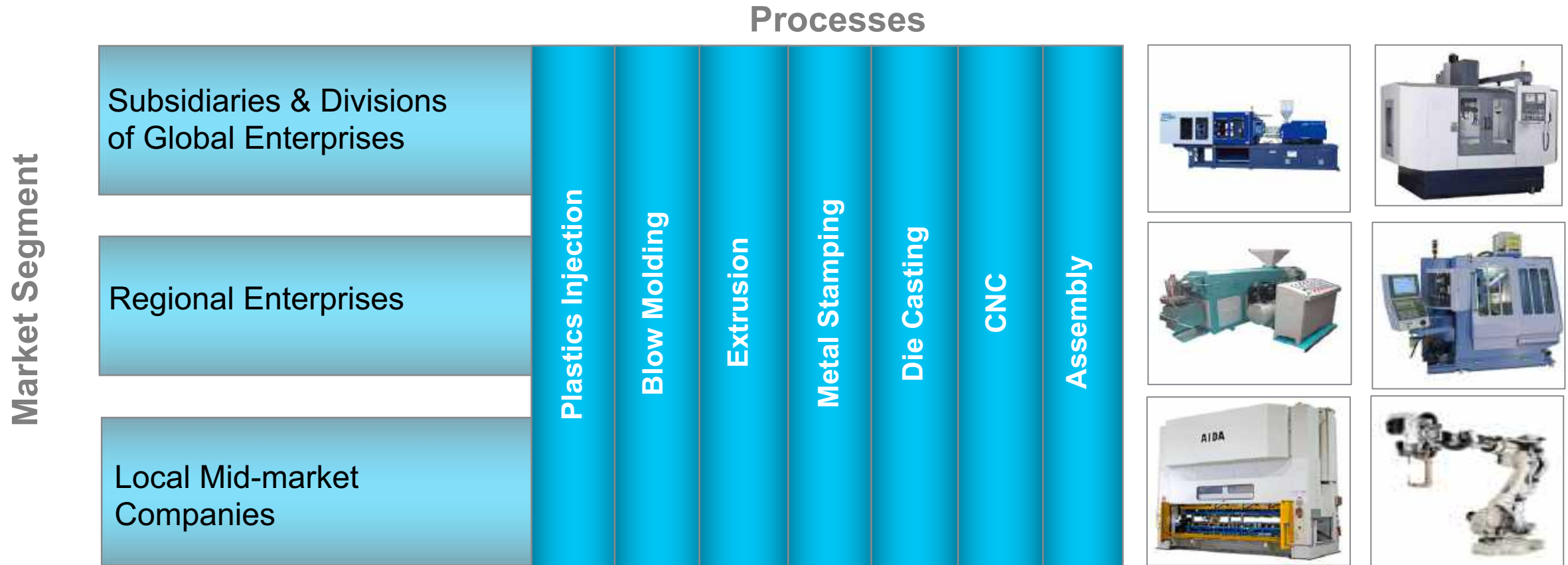


Epicor MES Primary Markets

Market Segment	Markets							
	Subsidiaries & Divisions of Global Enterprises	Plastics & Rubber	Fabricated Metals	Automotive	Fasteners, Valves, Springs	Consumer Goods	Packaged Goods	Food and Beverage
Regional Enterprises								
Local Mid-market Companies								



Epicor MES Primary Processes



Problems We Help Customer's Solve

- ▶ More **capacity** without more assets
 - Find and reduce down time
 - Use that capacity to make more parts or cut costs
- ▶ Improve quality/**reduce scrap**
 - Highlight where your quality losses are occurring
- ▶ Improve product **throughput**
 - Highlight sources of your speed losses and cycle time
- ▶ Improve real-time **scheduling**
- ▶ **Consistent** measurement of metrics like OEE for all equipment
- ▶ See it all in **real-time** to allow immediate action and empower employees to make better decisions



Epicor MES Drives Continuous Improvement at Johnson Controls

“We used to run 3-4% scrap. Last month we were down to 1.37%. You can’t get much better than that; that’s world-class and is largely attributable to Epicor MES. It’s the tool that gives us the numbers we need to make good decisions.”

Dave Rose
Quality Engineer

Company Facts

- ▶ Location: Florence, Kentucky
- ▶ Industry: Manufacturer of plastic battery cases for automotive OEMs and aftermarket
- ▶ Website: www.johnsoncontrols.com

Business Benefits

- ▶ Decreased scrap to 1.37% (reduced start-up scrap by 23% and running scrap by 27% in last 7 years)
- ▶ Decreased machine downtime by 3.1%
- ▶ 13% improvement in conversion cost (cost to make each unit)
- ▶ 8% increase in overall productivity
- ▶ 50% reduction in changeover time
- ▶ Annual cost of quality reduced by \$600,000

Epicor MES Deployment

LAN or WAN



Data Analytics (EDA / Power BI etc.)
Multi-Site View

EPICOR MES SERVER
Microsoft Windows Server
Microsoft SQL Server



QC



MOULDING DEPT



PLANT
MANAGER



PRODUCTION
CONTROL

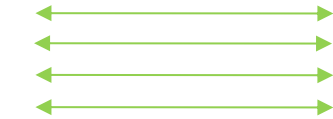
Web HMI



CF-MIU (IoT Device)



Single or Dual Machine MIU
1:1, 2:1 Process Monitoring



Multi-Machine MIU
16:1, 8:1 Production Monitoring



OPC or MT CONNECT

DT Code Entry



Scrap Code / QTY
Entry



“It’s not about data...its about information”

Global Access to Information with a contemporary MES platform



Real-time Production status

Real-Time Display (Epicor Mattec) - [Real-Time Display]

File View Application Help

Machine Number	Machine Description	S/H	Part Number	Help Call	Good	Scrap	Scrap Parts	To Go	Hours To Go	Std Cycle Tim	Actual Speed	Cycle Per Hour	Cycle Eff	Yield Eff	OEE	STD CAV	ACT CAV	Down Description
AINJ03	DMG MORI NT 10	1	CNC-0002		11016	0 %	0	-12526	0:00	1.00	1.0	3600.0	03.4 %	102 %	100.0 %	1	1	
Die Casting - Department																		
01	Techmire 46 NTX	1	MXL FB4552		2034	0 %	2	-27	0:00	25.00	0.9	4000.0	100.6 %	236 %	81.1 %	2	2	
02	Yomato Die Castin	1	1234FC000A50		290	0 %	0	22232	73:21	9.50	30.0	120.0	31.9 %	28 %	23.2 %	1	1	
03	Idra 1600 Ton Hor	1	1234FC000A50		197	0 %	0	7018	23:09	9.50	45.0	80.0	21.3 %	19 %	16.1 %	1	1	
Extrusion - Department																		
EXT01	TSSK Parallel Twin	1	JO-1234		113	69 %	253	-9083	0:00	15.00	5.0	720.0	93.4 %	16 %	0.7 %	1	1	Machine Setup (2
EXT02	Cincinnati Milacro	1	1234FC000A12		187	68 %	403	145469	891:21	15.00	15.0	240.0	62.6 %	29 %	6.1 %	1	1	
EXT03	Cincinnati Milacro	1	1234FC000A13		5944	7 %	473	1226595	232:13	0.50	0.5	7200.0	69.7 %	31 %	15.4 %	1	1	
EXT04	Cincinnati Milacro	1	1234FC000A14		299	9 %	370	149910	1484:08	30.00	30.0	120.0	03.0 %	1 %	0.0 %	1	1	
EXT05	Cincinnati Milacro	1	1234FC000A25		435	27 %	157	108084	320:58	9.50	9.5	378.9	00.7 %	43 %	14.9 %	1	1	
Injection Mold - Department																		
INJM01	Arburg Allrounder	1	PL-0001		4474	0 %	0	3409	4:16	12.00	5.0	720.0	51.9 %	249 %	100.0 %	2	2	
INJM02	Arburg HM50	1	PL-0001		632	0 %	0	8484	16:09	12.00	15.0	240.0	87.8 %	35 %	29.3 %	2	2	
INJM03	Cincinnati Milacro																	None (2053:48)
INJM04	Arburg KS170	1	SBA3-01-SBB		1488	0 %	0	16252	32:21	25.00	30.0	120.0	87.3 %	86 %	86.5 %	4	4	
INJM05	Cincinnati Milacro	1	1234FC000A5	Relief O	1183	1 %	13	-1818	0:00	9.50	9.5	378.9	06.6 %	116 %	98.9 %	1	1	

Real-Time Display | Plant Floor | Dashboard | OEE Target | Hourly Production

Windows Taskbar: C:\Users\Ad..., C:\Users\Ad..., epicor84/P..., GMS - Matte..., Skype for Bu..., IAC Epicor O..., Mattec MES..., Real-Time Di..., Desktop, 12:17 PM 3/6/2020

Process Alerts

Job: J129019

Machine: INJM05
Part: 1234FC000A5
Process Alarm

Summary

Status: **Running Out-Of-Specification**
Part Number: 1234FC000A5

Good Prod.: 1,205
Scrap Prod.: 13
Prod. To Go: 0

Target Parameters Percentage of Nominal

Job Number: J129019

Good Prod.: 1,252
Scrap Prod.: 13
Prod. To Go: 0

Run Time: 03:09
Down Time: 00:00
Hours To Go: 00:00

PARAMETER	LAST VALUE	LSL	NOMINAL	USL	X-1 CL	X-BAR	X+1 CL
Cycle Time	9.5	7.6	9.5	11.4	8.2	9.2	10.2
Fill Time	2.53	2.0	3.0	4.0	2.2	2.5	2.8
Hold Time	3.24	3.0	4.0	5.0	3.1	3.4	3.7
Cushion	0.28	0.0	0.3	0.6	0.3	0.3	0.3
Inject PSI	1925	1,500.0	1,800.0	2,000.0	1,856.8	1,899.5	1,942.3
Hold PSI	795	750.0	800.0	850.0	762.9	780.2	797.6

Parameter Data

Edit Facility (Epicor Matttec) - [Process Sheet]

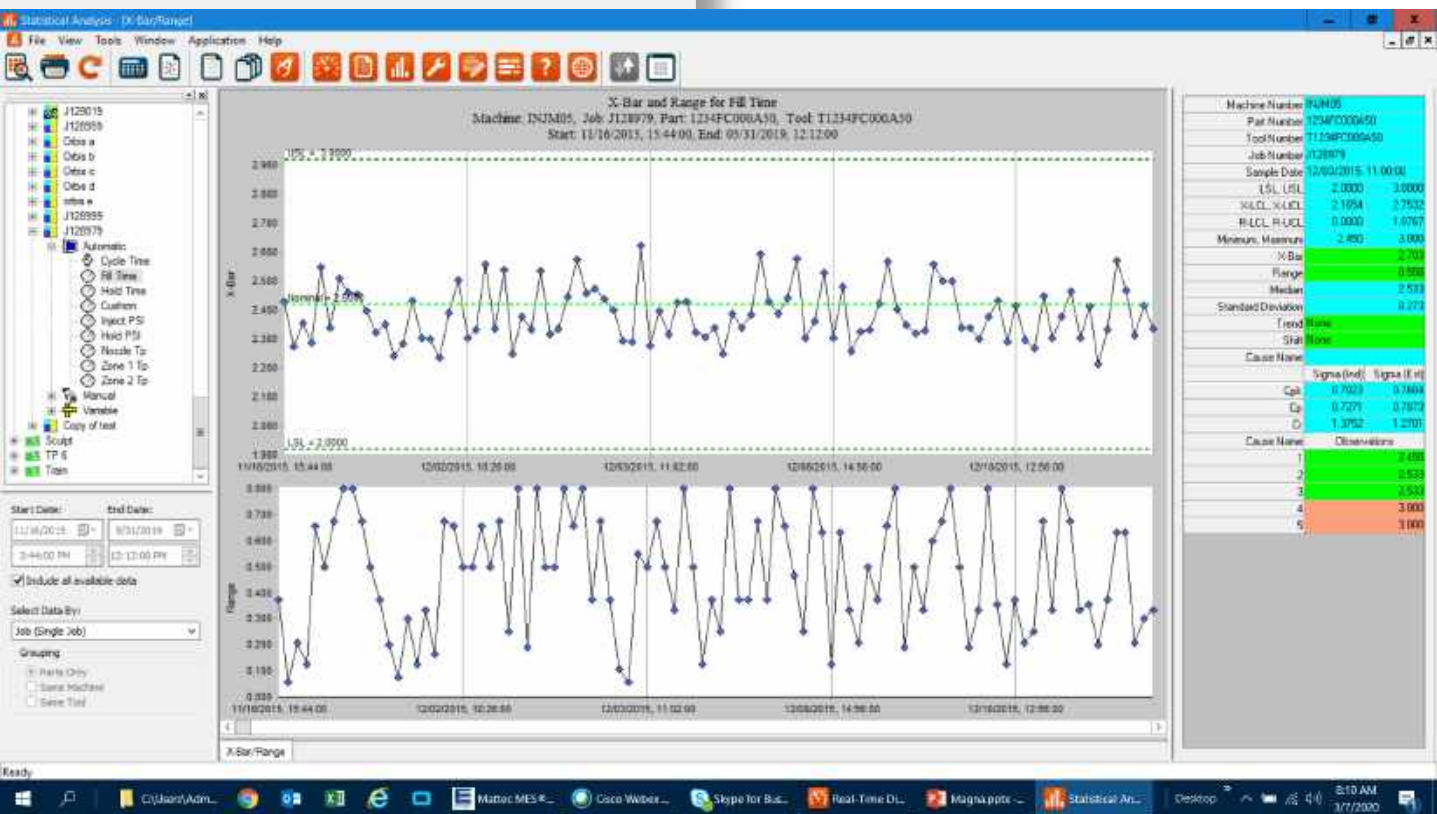
Machine: (PL001 (Auger Around 370 A)) Part ID: PL-0001 (Plastic Beer Cup 12oz) Tool ID: PL-0001-10T (PL-0001 Tool for Op 10)

General Specification Control SPC Settings SPC Enabled Job History

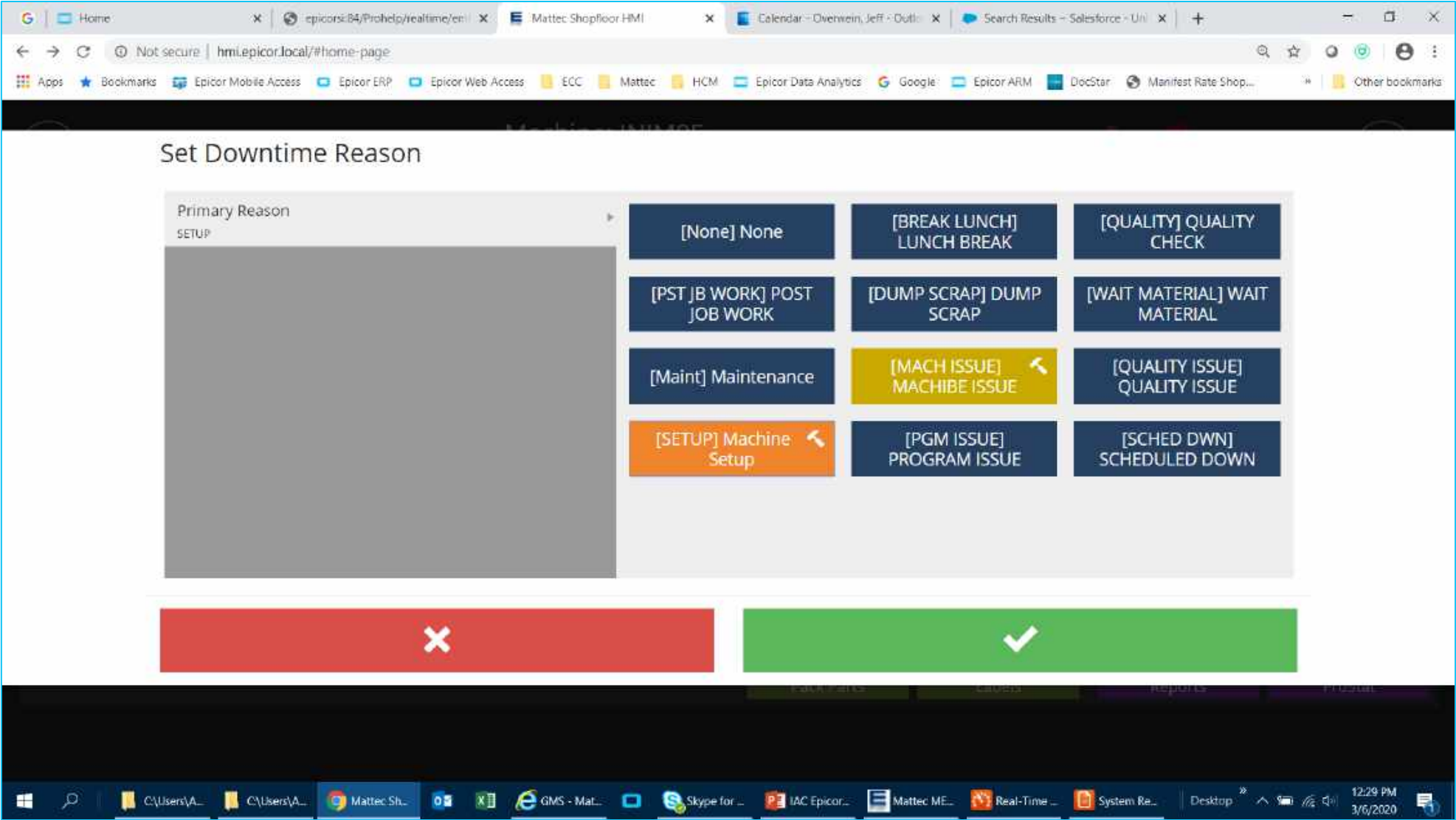
Parameter	SPC Enable	SPC Alarm Control	SPC Alarm Run	Process Alarm Specification	Process Alarm Control	Part Qualification Specification	Part Qualification Control
Cycle Time	<input checked="" type="checkbox"/>	Enabled	Enabled	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Fill Time	<input checked="" type="checkbox"/>	Enabled	Enabled	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Hold Time	<input checked="" type="checkbox"/>	Enabled	Enabled	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Cushion	<input checked="" type="checkbox"/>	Enabled	Enabled	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Inject PSI	<input checked="" type="checkbox"/>	Enabled	Enabled	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Hold PSI	<input checked="" type="checkbox"/>	Enabled	Enabled	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Nozzle Tip	<input checked="" type="checkbox"/>	Enabled	Enabled	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Zone 1 Tip	<input checked="" type="checkbox"/>	Enabled	Enabled	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Zone 2 Tip	<input checked="" type="checkbox"/>	Enabled	Enabled	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Process Sheet

Ready



Multi level downtime reason capture



Job Data

The screenshot displays the Job Data HMI interface for Job J129019. The interface is divided into several sections: a top header with job information, a left sidebar with navigation options, and a main content area with data tables and a right sidebar with action buttons.

Job Information:

- Machine: INJM05
- Part: 1234FC000A5
- Job Number: J129019
- Tool Number: T1234FC000A5
- Lot Size: 15,000

Production Data Table:

	SHIFT	JOB	TO GO
TOTAL PROD.	1,345	17,011	0
GOOD PROD.	1,332	16,967	0
SCRAP PROD.	13	44	
PACKED PROD.	0	3	14,997
MACHINE CYCLES	1,345	17,011	
CYC. OUT-OF-SPEC	1,158	10,685	
RUN TIME	03:21	42:45	00:00
DOWN TIME	00:00	00:00	
DOWN COUNT	0	2	

OEE Data Table:

	SHIFT	JOB
OEE	99.0%	99.7%
CYCLE EFFICIENCY	106.7%	106.6%
YIELD EFFICIENCY	116.0%	116.0%

Setup Data Table:

	STD.	ACTUAL
TOTAL CAVITIES	1	1
PARTS PER CASE	60	
SETUP TIME	03:00	
TEAR DOWN TIME	03:00	

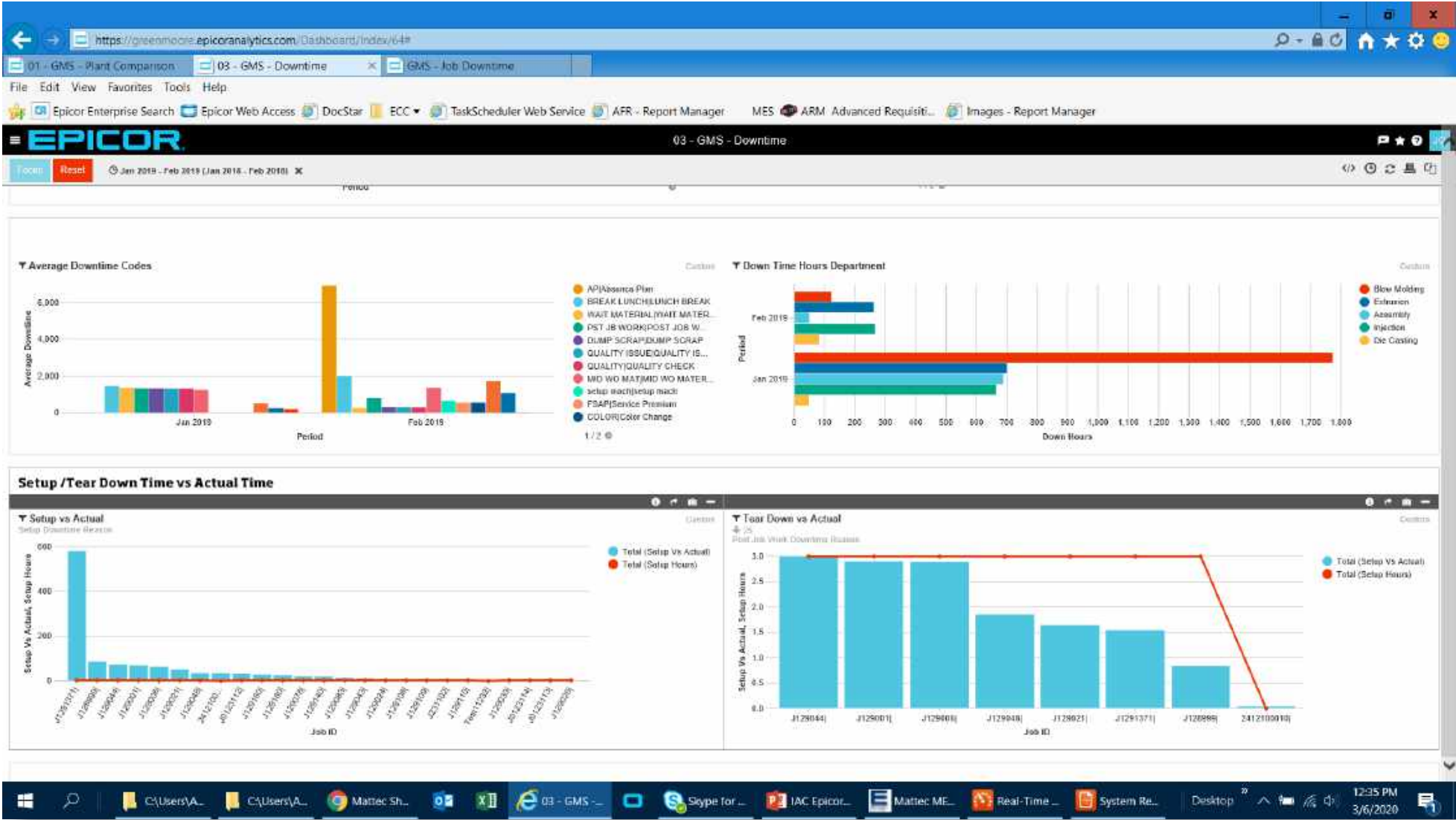
Right Sidebar Buttons:

- Setup Sheet
- Web Setup
- Materials
- Job Settings

Taskbar:

The Windows taskbar at the bottom shows the following open applications: C:\Users\A..., C:\Users\A..., Chrome, Mattec Sh..., Outlook, Excel, Edge (03 - GMS...), Skype for..., IAC Epicor..., Mattec ME..., Real-Time..., and System Re... The system clock indicates 12:39 PM on 3/6/2020.

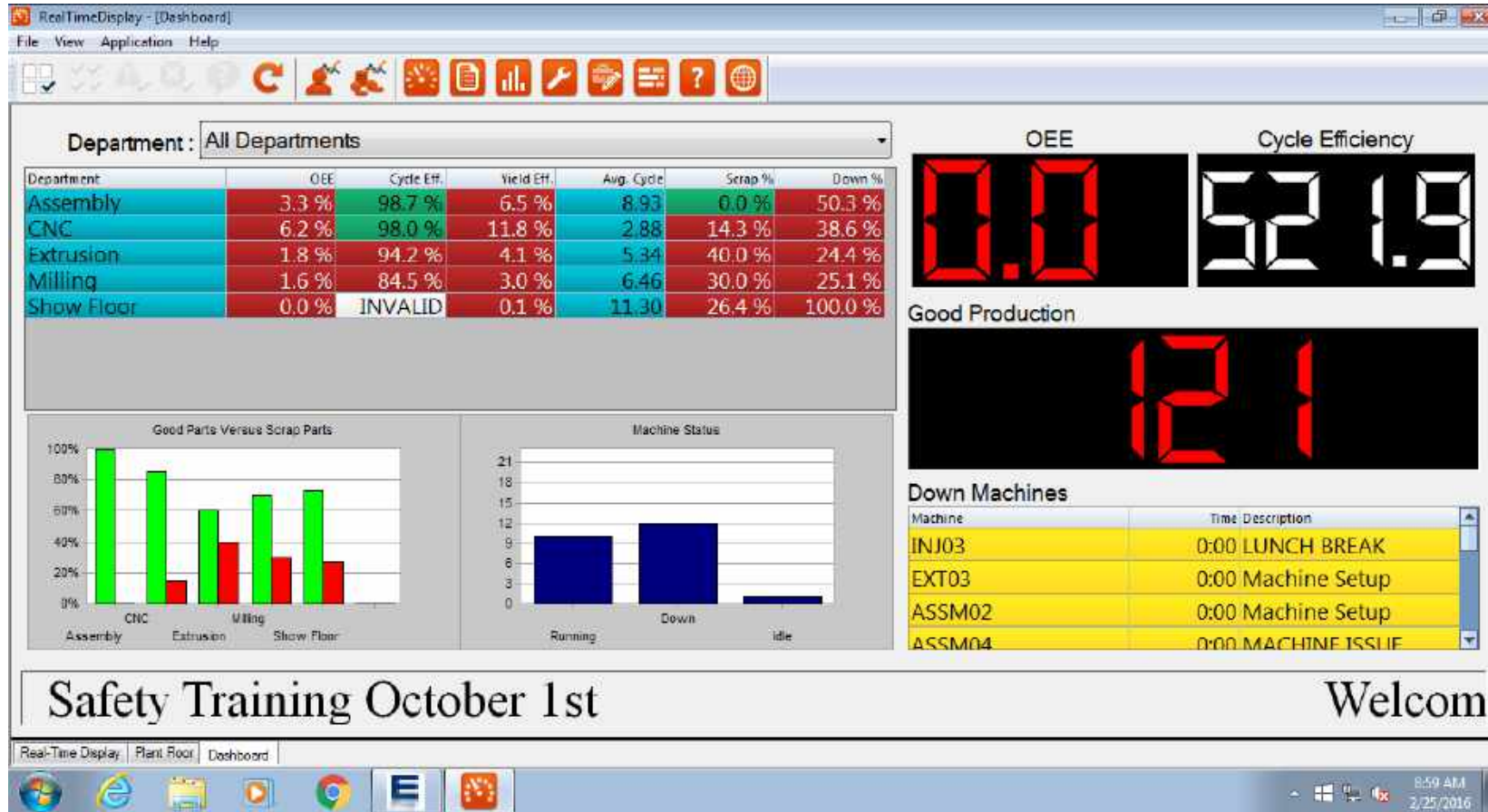
Custom Dashboards with Epicor Data Analytics



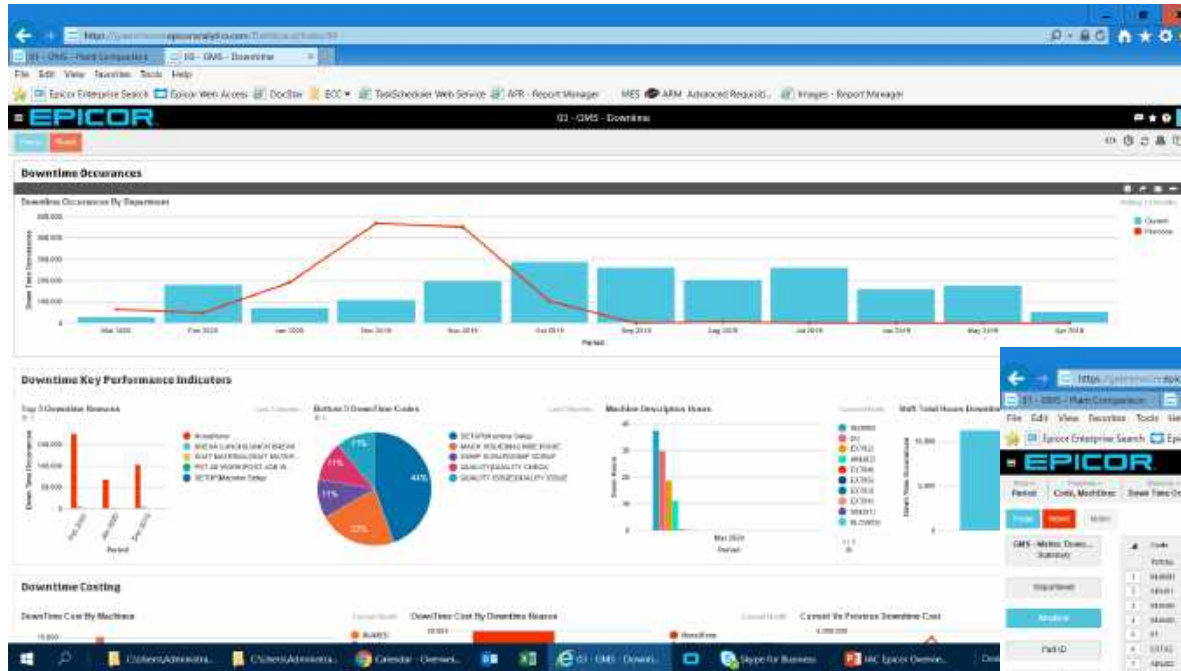
Real-time dashboards designed for Overhead displays



Operator focused dashboards



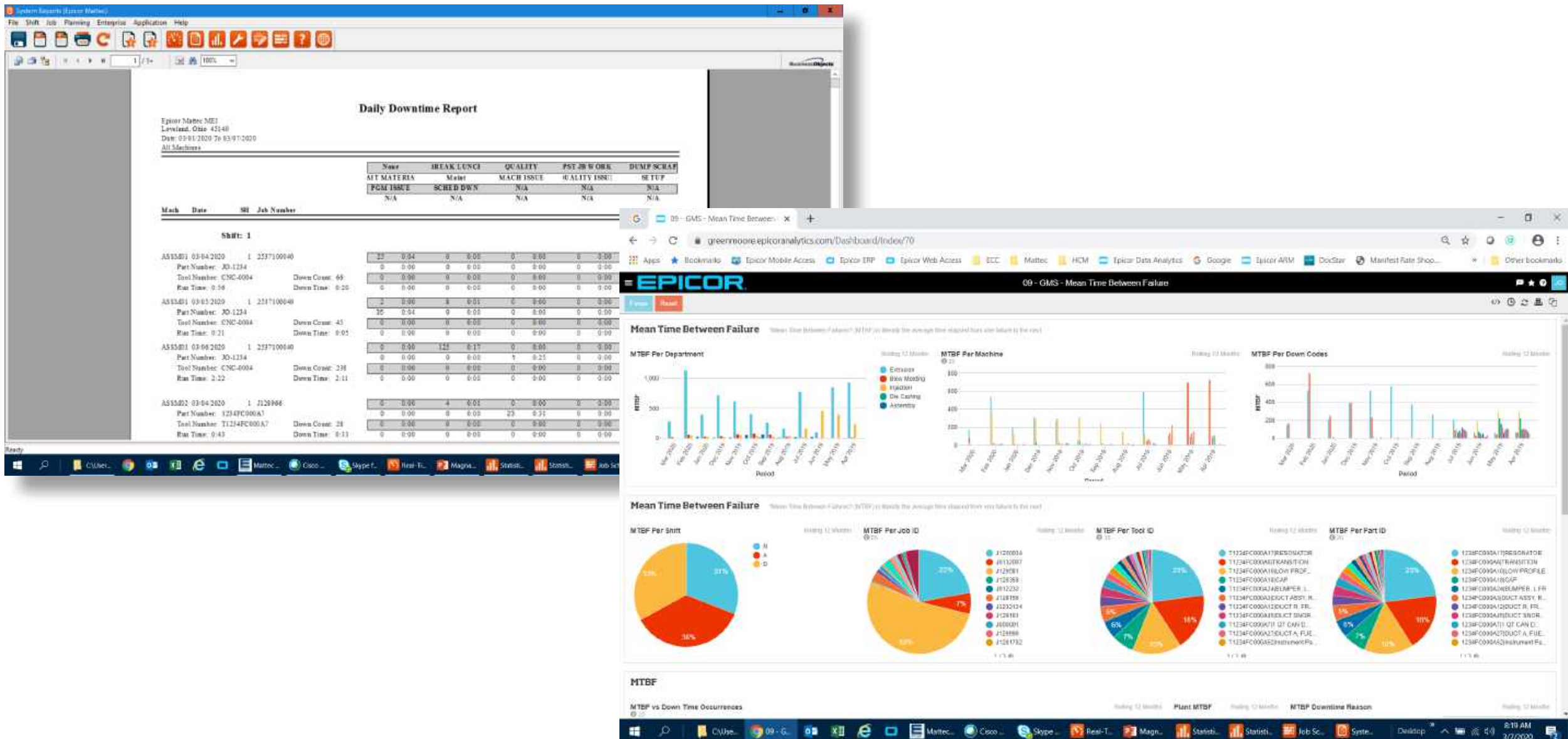
Downtime Tracking



The screenshot displays the Epicor GMS - Material Downtime table. The table lists materials and their associated downtime data across several columns.

Code	Description	Yield (Down Time Occurrences)	Total (Down Time)	Total (Down Time)	Max 2018 (Down Time Occurrences)	Max 2018 (Down Time Cost)	Max 2019 (Down Time)
100000	100000	100000	100000	100000	100000	100000	100000
100001	100001	100001	100001	100001	100001	100001	100001
100002	100002	100002	100002	100002	100002	100002	100002
100003	100003	100003	100003	100003	100003	100003	100003
100004	100004	100004	100004	100004	100004	100004	100004
100005	100005	100005	100005	100005	100005	100005	100005
100006	100006	100006	100006	100006	100006	100006	100006
100007	100007	100007	100007	100007	100007	100007	100007
100008	100008	100008	100008	100008	100008	100008	100008
100009	100009	100009	100009	100009	100009	100009	100009
100010	100010	100010	100010	100010	100010	100010	100010
100011	100011	100011	100011	100011	100011	100011	100011
100012	100012	100012	100012	100012	100012	100012	100012
100013	100013	100013	100013	100013	100013	100013	100013
100014	100014	100014	100014	100014	100014	100014	100014
100015	100015	100015	100015	100015	100015	100015	100015
100016	100016	100016	100016	100016	100016	100016	100016
100017	100017	100017	100017	100017	100017	100017	100017
100018	100018	100018	100018	100018	100018	100018	100018
100019	100019	100019	100019	100019	100019	100019	100019
100020	100020	100020	100020	100020	100020	100020	100020

Daily/ Weekly Reports

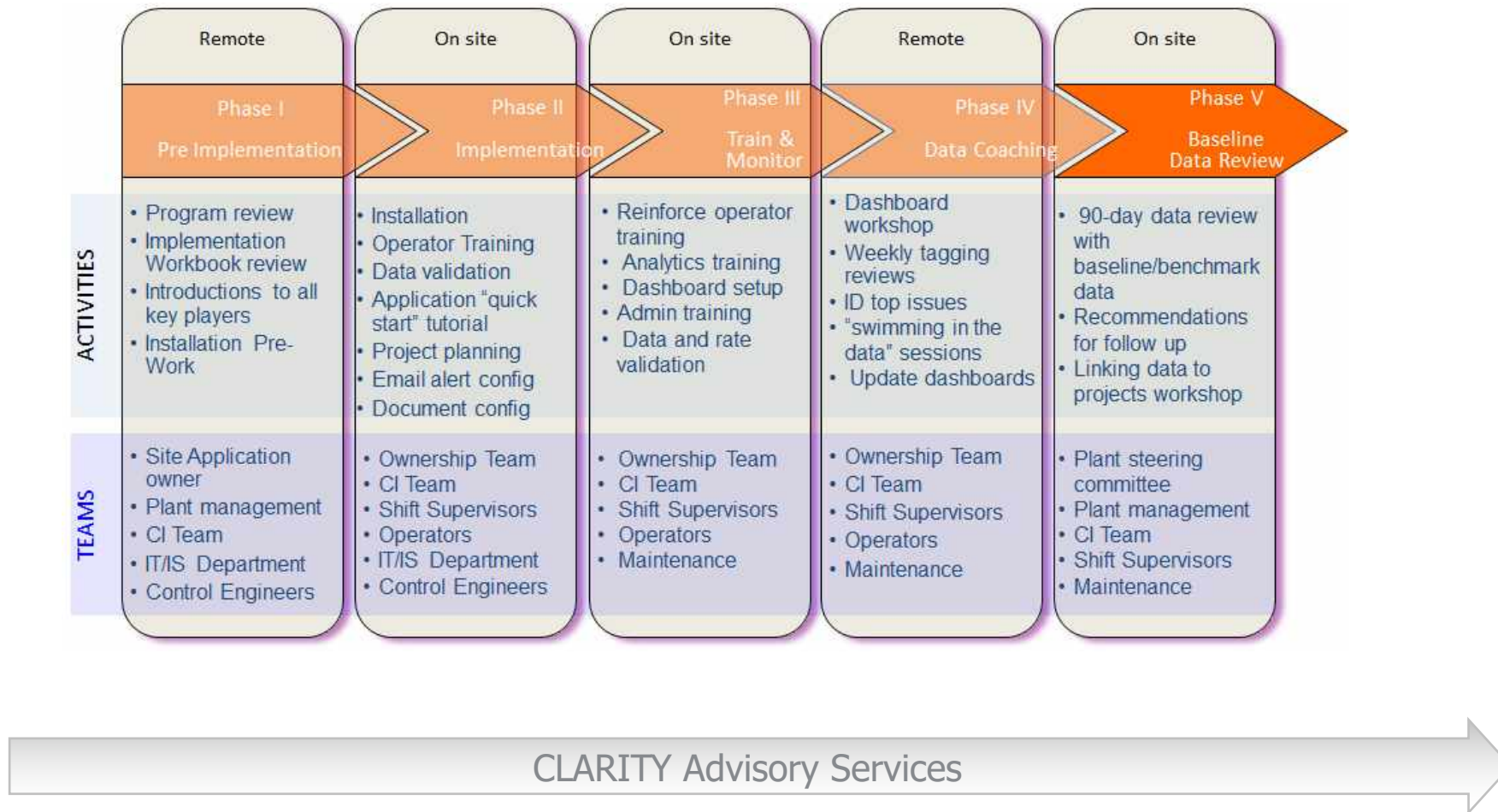




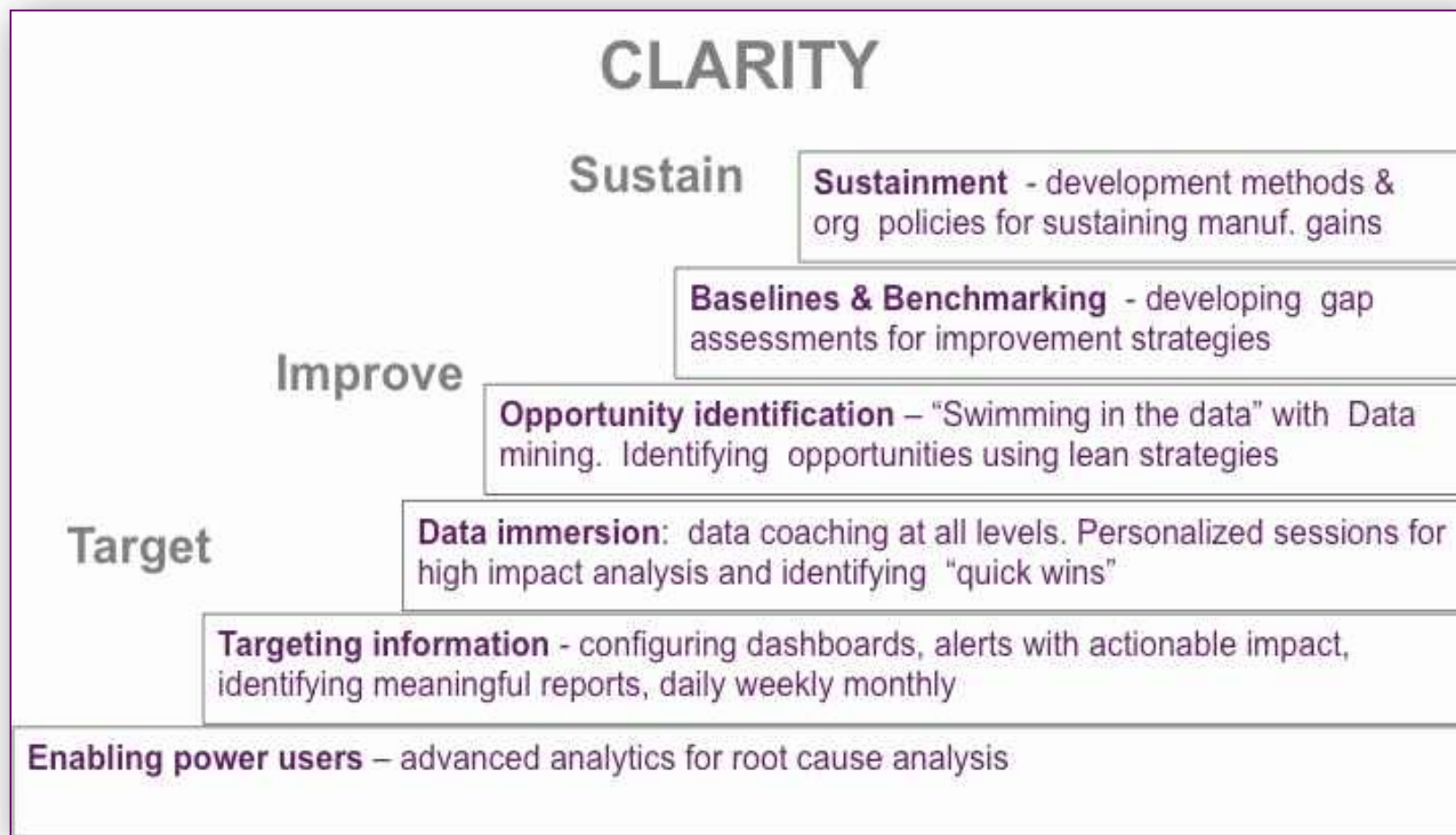
Sage Clarity – Your Advanced MES Partner

CLARITY: More than just technology...

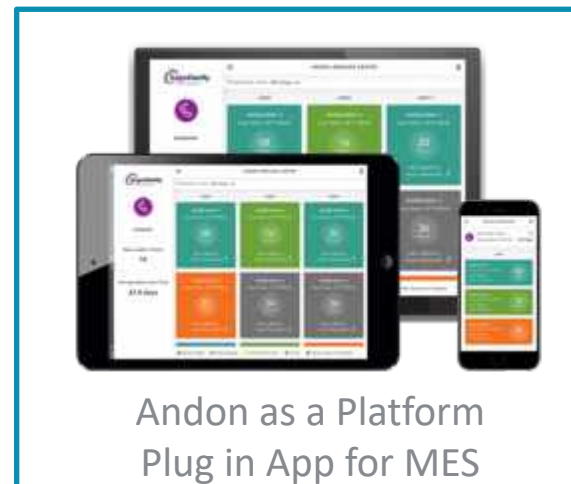
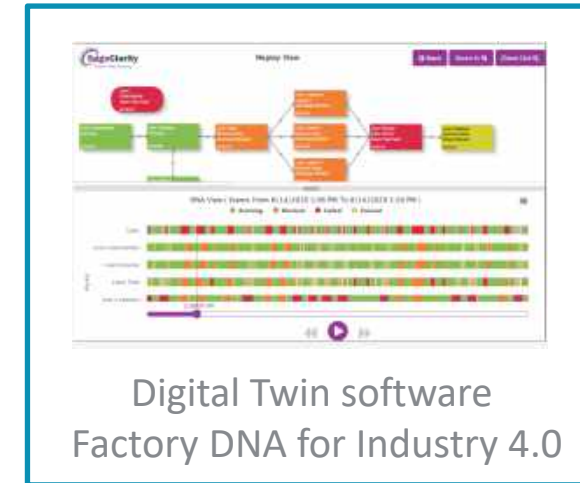
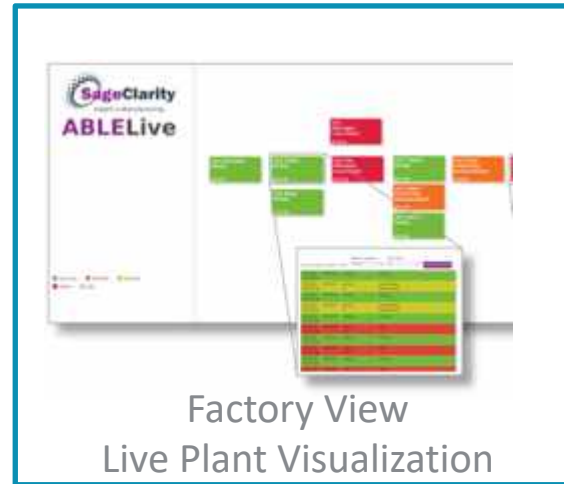
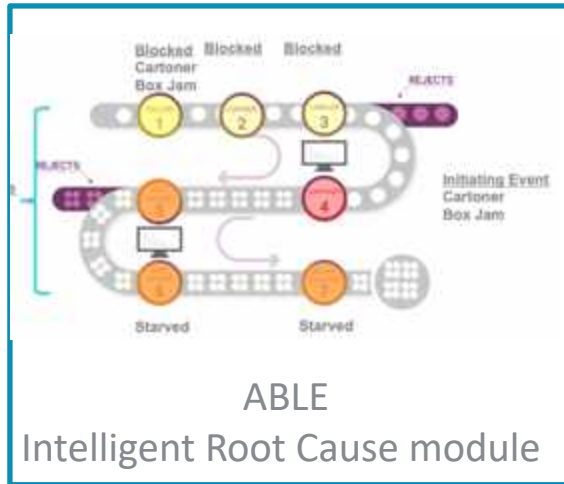
A unique deployment methodology to drive fast results



CLARITY Drives OEE Improvement

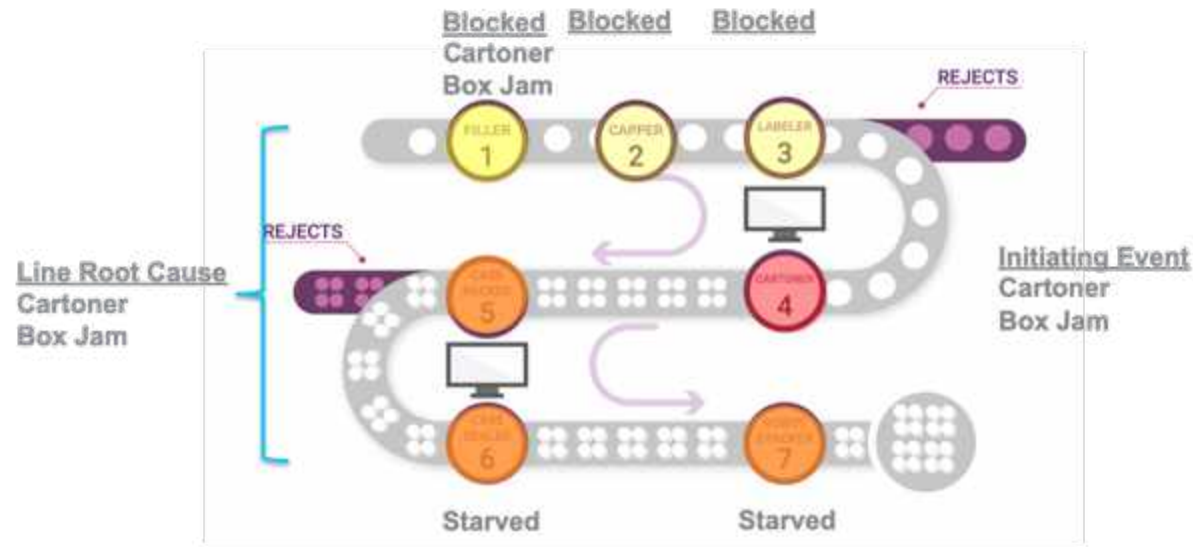


Industry 4.0 MES Eco system products for Advanced MES:



ABLE – IOT

Intelligent Root Cause Analysis



Key Features/Benefits

- Modular modeling of machine centers, each with simple logic engine to determine state
- Models line flow to determine root cause
- Supports a corporate PLC standardization strategy
- Simplifies data acquisition & control architectures
- Enterprise configurations that can be copied from line to line and plant to plant.
- **Improves Fidelity of data by 20%**
- **Reduces integration costs up to 50%**

Factory View

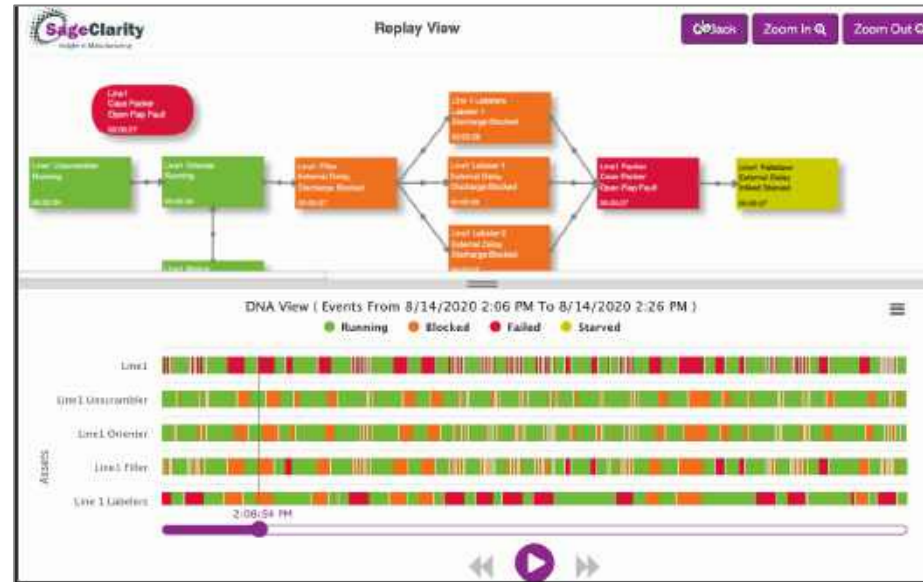


Key Features/Benefits

- Live Plant Views
- Message Broker technology
- Data Logging capability for validation
- Great visualization for ANY manufacturing plant
- Can be integrated into plant floor HMIs

Digital Twin

Digital Replay



Key Features

- ✓ Ability to create Digital Twins from real-time Manufacturing data
- ✓ Fast forward / rewind / pause through production sequences
- ✓ Multiple data streams replayed in sync
- ✓ Use for production line modeling with more accurate representations of performance
- ✓ Diagnose problems. "The press crashed last night...we lost a drive belt". What led to the crash?

Next Gen Andon



Key Features/Benefits

Features

- ✓ Track issues related to Safety, Quality, Maintenance, engineering, etc.
- ✓ Smart Alerting technology
- ✓ Work flow to drive follow up
- ✓ Integrate machine related and non machine related issues

Typical uses

- ✓ NCR (Non conformance) Reporting
- ✓ Safety Incident reporting
- ✓ Downtime Andon alerts and follow up
- ✓ Quality issue follow up
- ✓ Warehouse escalations

Mobile OEE



Key Features/Benefits

Features

- ✓ Enterprise Roll up across sites
- ✓ Drill down by plant / line
- ✓ YTD, MTD, WTD reporting
- ✓ “Mobile First” design
- ✓ Metric apps for OEE, OTIF, Quality, etc.

Key Points

- ✓ Fills the mobile strategy for manufacturing companies
- ✓ Can be configured as a Single app or as multiple apps
- ✓ Can be used to bring real-time visibility to key manufacturing metrics

Industry 4.0 meets Advanced MES with Sage Clarity

- ✓ Thought leadership and domain expertise in the world of MES
- ✓ A deep feature rich set of modules integrations and plug-in applications to expand the MES footprint
- ✓ Capabilities to help drive:
 - ✓ IIOT data collection strategies
 - ✓ Meaningful User Interfaces
 - ✓ Purpose Built applications
- ✓ A global partner to help accelerate & deliver a visionary EPCIOR MES roadmap.



For additional information

- ▶ Advanced MES Contact:
 - Sage Clarity
 - John.oskin@sageclarity.com
 - 773-910-0217

