



**Automating
the Automation™**

An orange robotic arm is positioned in the top right corner of the slide, appearing to be working on a circuit board.

Take Back Manufacturing

**Shop Floor to Top Floor Automation
Improving Productivity**



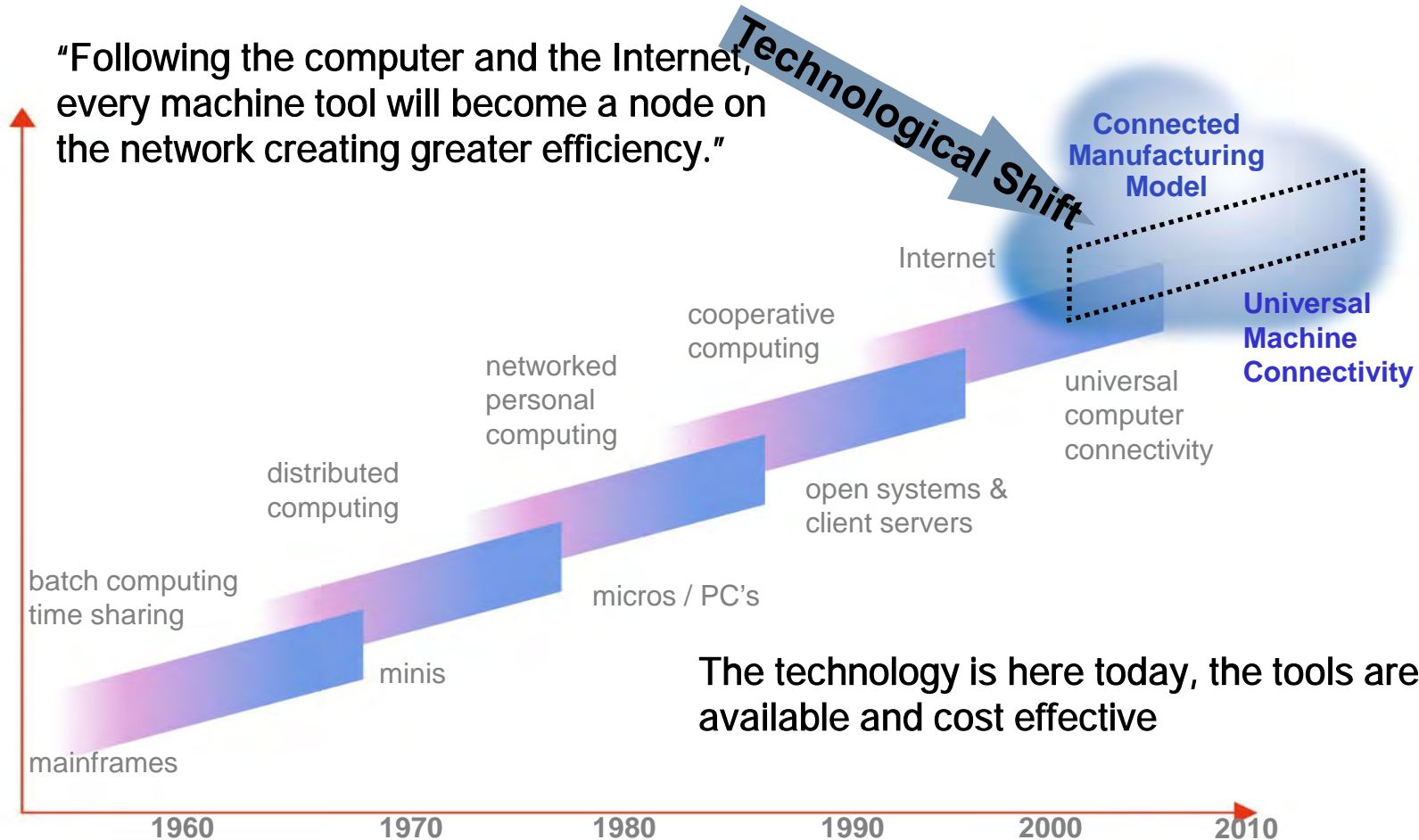
May 24, 2012

Manufacturing Connectivity Solutions™



Connected Manufacturing Evolution

“Following the computer and the Internet, every machine tool will become a node on the network creating greater efficiency.”



The technology is here today, the tools are readily available and cost effective

- **Rising Business Costs – Reducing Operating Costs**
 - # 1 strategic challenge
- **Asset Utilization maximized**
- **Improving Processes**
- **Improving Labor Productivity**
- **Real-time status of production**
- **Data collection accuracy**
- **Flexibility of production is critical**
- **Key Performance Indicators – OEE**
 - Overall Equipment Effectiveness, Benchmark



OEE + DNC

- **Integrated Machine Monitoring & Control**
 - Operator's can manage the machine bed more efficiently
- **Real-time machine visibility with OEE metrics on any Machine**
 - Dashboard for ease of viewing – reduce downtime
 - Minimize rejects – root cause analysis
- **Connect production floor to any ERP system on actual schedule**
 - Data Highway
- **DNC software tools to manage program code, including dynamically**
 - Minimize Changeover
- **Increase Productivity**
 - Embrace Lean Manufacturing



About the OEE Industry Standard

The **OEE Industry Standard** aims to give guidelines how to define OEE in order to find ALL potential losses in effectiveness.

Why?

An average machine in an average factory runs about 35 to 45% OEE. So it is losing 55 to 65% capacity(!) while;

- › not running,
- › running at a reduced speed,
- › or producing products out of spec.

How come than, that the average management reports numbers way over 80%?

It is all a matter of **definition**. What you are not looking for, you will not find.

To really reveal the hidden machines in our factories, ALL losses need to be defined and visualized.



- DISCOVER THE HIDDEN MACHINE! -

Productivity Increases of 10-50%

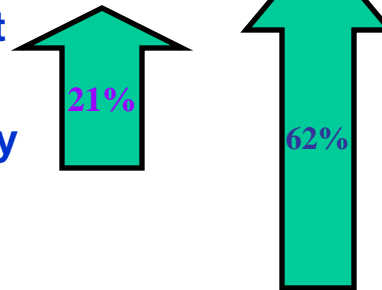
- Reduce Unplanned Downtime
- Reduce Setup and Changeover Times
- Better Management of Resource Allocation, Planning and Scheduling
- Operator Productivity Increases
- Efficiency with Automated Data Collection
- Better Root Cause Analysis
- Improve Quality, Minimize Rejects
- Identify Bottlenecks and Constraints
- Improve On-Time Delivery
- Manage Operations Pre-emptively & Proactively (instead of Reactively) by Real-time visibility
- Measurably Improve Profitability



Productivity Increases:

- Auto industry focused, went to Alberta, better products now 90% oil
- Precision machining company realized a 25% savings on plant
- Aerospace company realized 11% efficiency improvements in first 3 mo.
- 5% increase in productivity on 20 machines is equal to an extra machine.
- 32% faster using Memex products
- We save 3 hours per week per machining center. With 13 machining centers we save 2,000 hrs per year, representing over \$200,000 per year.
- OEE went from 30% to now on average in the 60% range
- Large equipment manufacturer went from 24% to 62% OEE on machines
- Specialty Machining group went from 25% to 60% OEE
- Enterprise aerospace company saw a 25% overall improvement
- By fine tuning setup process went from 410 parts/week to 690, a 68% gain
- Furniture manufacturer 25% improvement, no overtime more production

- Production improvements in the 10% - 50% range*
 - Financial Profit - EBITDA;
 - 10% Operational improvement
 - 20-60% Profit improvement
 - Sales @ current & full capacity
 - Breakeven ROI in < 3 months
- Real-time machine visibility + OEE numbers
 - including alerts: 2 - 5%
- Operator Productivity increases: 1 - 10%
- Reduce Downtime: 3 - 8%
- Minimize Rejects: 2 - 4%
- Root Cause analysis: 2 - 4%
- Value stream data collection & analysis: 2 - 4%
- Labor productivity tracking: 3 - 6%
- Usage-based Preventive Maintenance: 1 - 2%
- Benchmark scheduling & value streaming: 2 - 6%



* Based on customer survey

Lean 6S, OEE, TEEP, TPM, Takt Time, TQM, Kaizen, Continuous Improvement

All methodologies require data to support decision making

Collect actual automated machine data to prove the case

- **Real-time machine visibility with OEE metrics on any Machine**
 - Dashboard for ease of viewing – reduce downtime
- **Connect production floor to any ERP system**
 - Shop Floor to Top Floor
- **Increase Productivity**
 - Embrace Manufacturing Efficiency



If you can Measure it – then you can Manage it

- Identify Constraints
 - Production Counts
 - Scrap & Reject Counts
 - Run/Cycle Times
 - By Shift, work order, product
- Improve Throughput
 - Hidden capacity
 - accurate start/end times
 - uptime analysis - cutting/idle
 - breakdown analysis
 - Quality improvements
- Increase Profitability
 - Focus on bottleneck throughput
 - Accurate data allows for improved employee decisions



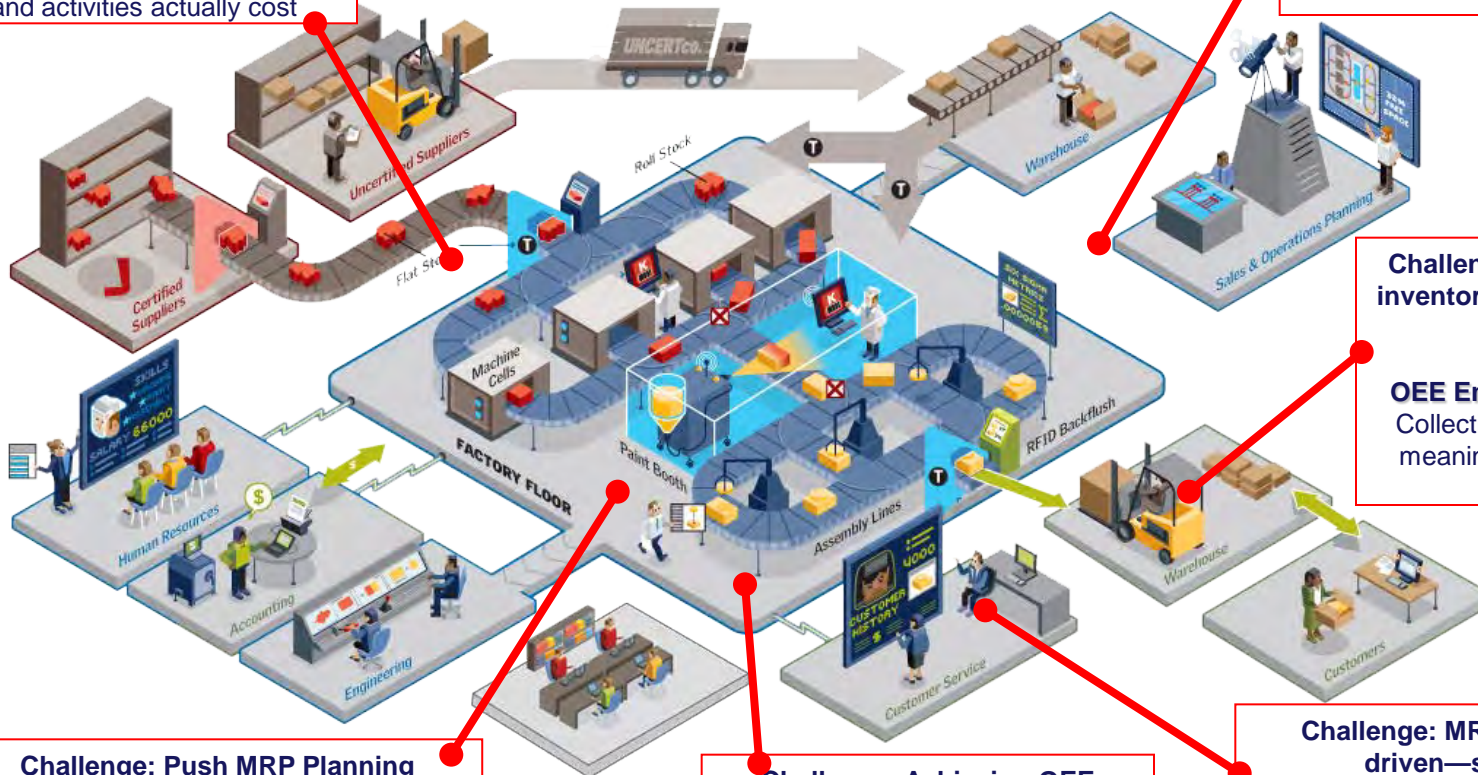
TOC = Theory Of Constraints

Challenge: D.L. and O.H. Absorption Costing

OEE Enabled: Accurate Value Stream cost rollups give more accurate picture of what things and activities actually cost

Challenge: Quality managed by external Inspection Points

OEE Enabled: Quality designed into consistent processes, checked by lean software



Challenge: Push MRP Planning Cycles, Queues

OEE Enabled: Daily demand planning (TAKT Times, Flexible, Throughput-based)

Challenge: Achieving OEE metrics on a consistent basis

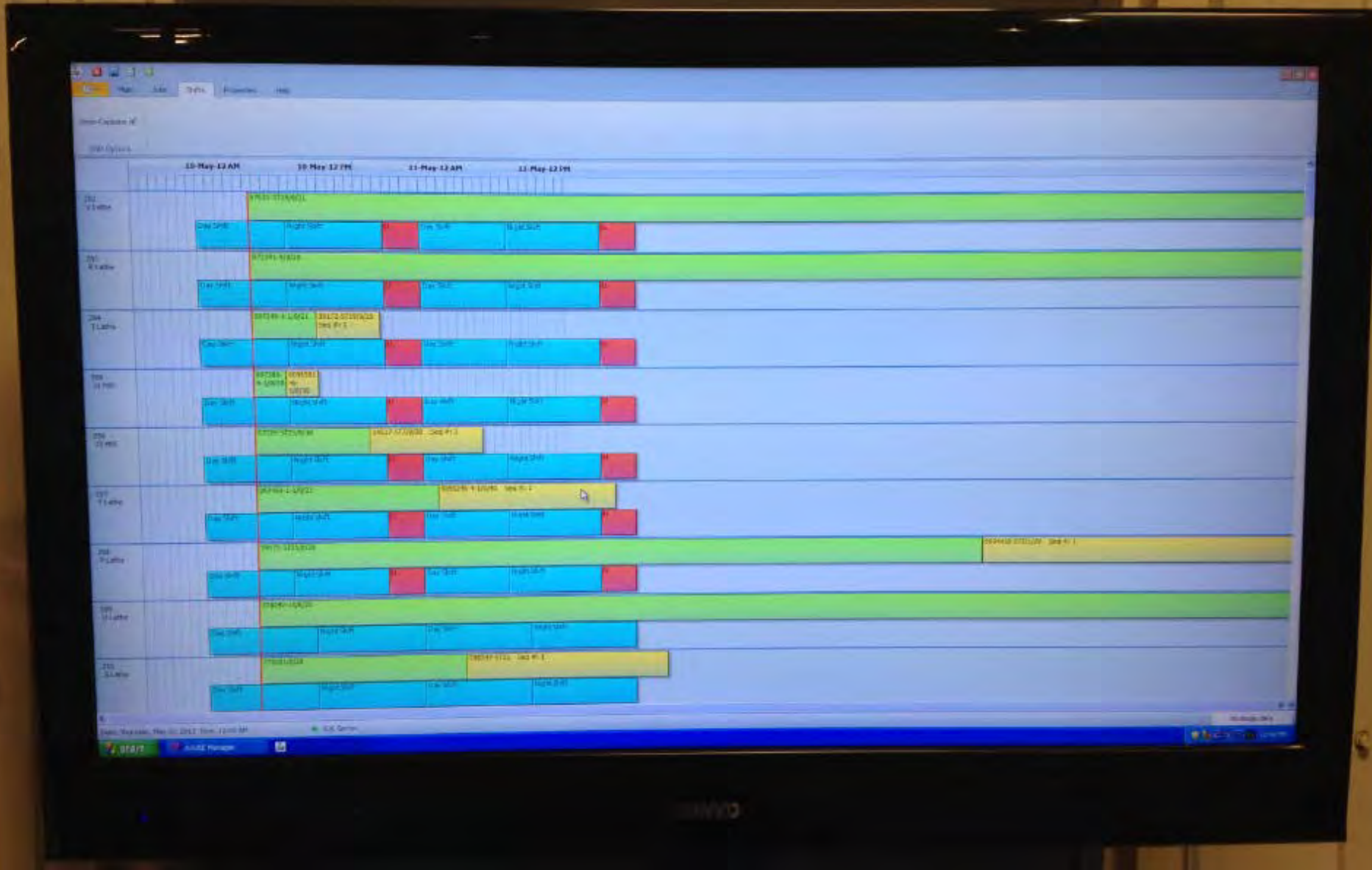
OEE Enabled: Automated Data Collection with Universal Machine Interface

Challenge: MRPII report / expedite driven—sound familiar?

OEE Enabled: Simple and Visual Signals for work, advance warning to problems, shortages

- **Make visible specific machine status for everyone**
- **Slideshow feature allows for any information screen to be displayed automatically on shop floor displays**



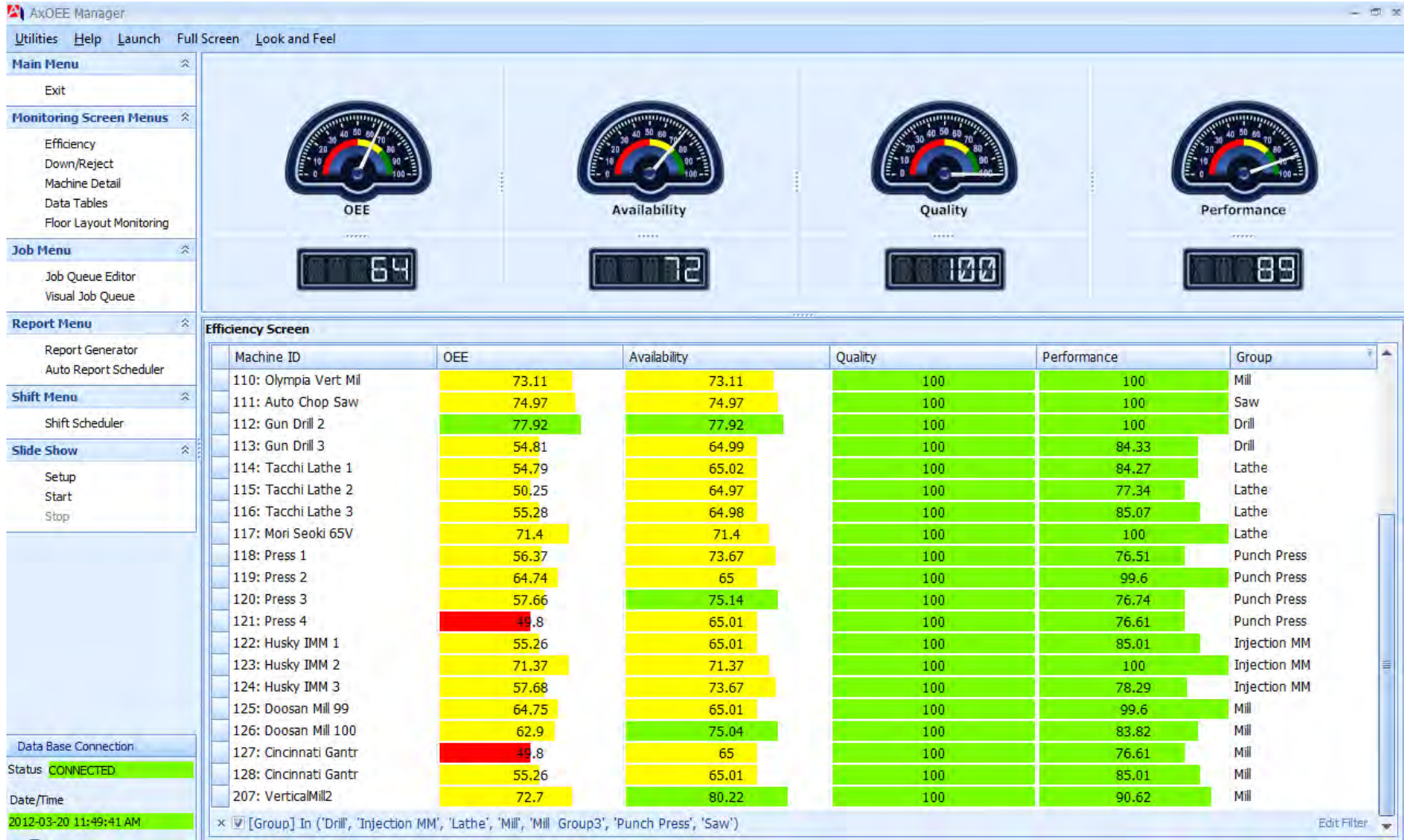


Shop Floor to Top Floor Information ... in Real-Time

Let's Take a Look ...

It's here now!

Visibility – Real-Time Status of Production – Dashboard



Machine Details

Machine Detail Screen

Machine: 100:Vert Mill VM34

Prod ID: Wing Spar - Boeing | Operator: John Rattray - (12)

WO: 2222-01 | Desc: BOEING PART NUMBER 09-098789

Shift Date: 2012-03-20 | Active Shift: 2012-03-20 6:00:00 AM | Start Time: 2012-03-20 5:00:00 PM | End Time:

Current Shift Time/Current Job: 3.94 (hrs) Run, 1.31 (hrs) Down, 126 Times Down, 74.98 Availability, 74.98 OEE

Total Time/Current Job: 3.94 (hrs) Run, 1.31 (hrs) Down, 74.99 Availability

Shift Totals: 10 Parts Made, 0 Rejects, 10 Cycles, 100 Quality

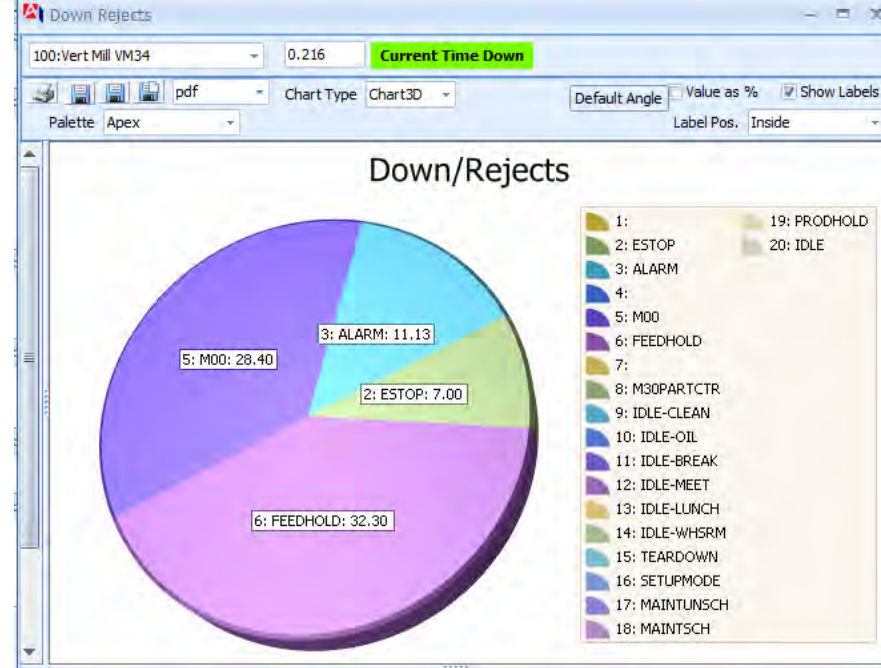
Job Totals: 9999 Parts Required, 10 Parts Made, 0 Rejects, 9552 Parts To Go, 3763.22 Hrs to Go, 4.47 % Completed

In-Cycle Time, Seconds (Down Time Excluded): 91 Standard, 1418.30 Job Avg, 1417.80 Shift Avg, 100 Std Rate %, 100 Performance

Machine Status Connection: CONNECTED 2012-03-12 5:29:08 PM, 0 Down Reason, IN CYCLE

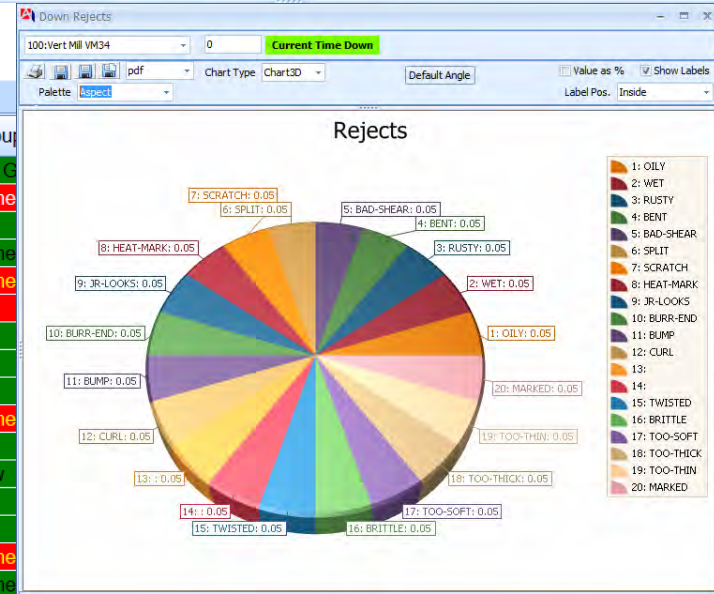
Parts Per Cycle: 1 Max/Default, 1 Current

Cycles Per Part: 0 Max/Default, 0 Current



On Time Delivery | Select Table | New Table | Save Table | Delete Table | Table Edits | Real Time | Master Filter

Machi...	Machine Name	Product ID	Product Description	WO	Parts to go (Job)	CD	Group
100	Vert Mill VM34	Wing Spar - Bo...	BOEING PART NUMBER 09-098...	N/F	9552	0 - IN CYCLE	Mill C
101	Gap Lathe GL54	Lockheed Marti...	JSF - MODEL A - P. NO. 894	N/F	9572	6 - FEEDHOLD	Lathe
102	Gantry Mill M21	GM Torsion Spr	GM - FORWARD ENGINE R. HSG	N/F	3267	0 - IN CYCLE	Mill
103	Mori Seiki Lathe	U12-Roller	Roller (U-12 & larger)	N/F	7442	0 - IN CYCLE	Lathe
104	Tnacci Lathe 22F	U36-Roller	Roller (12-36)	N/F	7282	2 - ESTOP	Lathe
105	Haas Mill 11	A15- Strap	AIRBUS - A380 ENGINE BRACK...	N/F	3198	5 - M00	Mill
106	Doosan Mill 98	Magna Ford FE...	FESM Part, 10 min-75	N/F	8702	0 - IN CYCLE	Mill
107	Doosan Vert Mill	Gear072-P7	Landing Gear - 002- P7	N/F	8700	0 - IN CYCLE	Mill
108	Gun Drill	Airbus - A320 E...	Cowling, 22.5 min- 85	N/F	9569	0 - IN CYCLE	Drill
109	Twin Turret Lath	Gear092-P9	Landing Gear - 002- P9	N/F	9574	2 - ESTOP	Lathe
110	Olympia Vert Mill	Gear102-A0	Landing Gear - 002- A0	N/F	9934	0 - IN CYCLE	Mill
111	Auto Chop Saw	Eaton - Truck M...	Housing Cutoff, 90 min- 75	N/F	9883	0 - IN CYCLE	Saw
112	Gun Drill 2	Gear122-A2	Landing Gear - 002- A2	N/F	9587	0 - IN CYCLE	Drill
113	Gun Drill 3	XXE99-001	SUB-ASSEMBLY - PART 34	N/F	4471	0 - IN CYCLE	Drill
114	Tacchi Lathe 1	FFS99-002	ROCKER COVER BRACKET	N/F	3780	2 - ESTOP	Lathe
115	Tacchi Lathe 2	FFG101-004	WHEEL STUD SUPPORT	N/F	5516	0 - IN CYCLE	Lathe



“Traditional Approach”

Disadvantages:

1. Information not real time
2. Information subject to operator interpretation
3. Prone to Data entry errors
4. Prone to incomplete data input



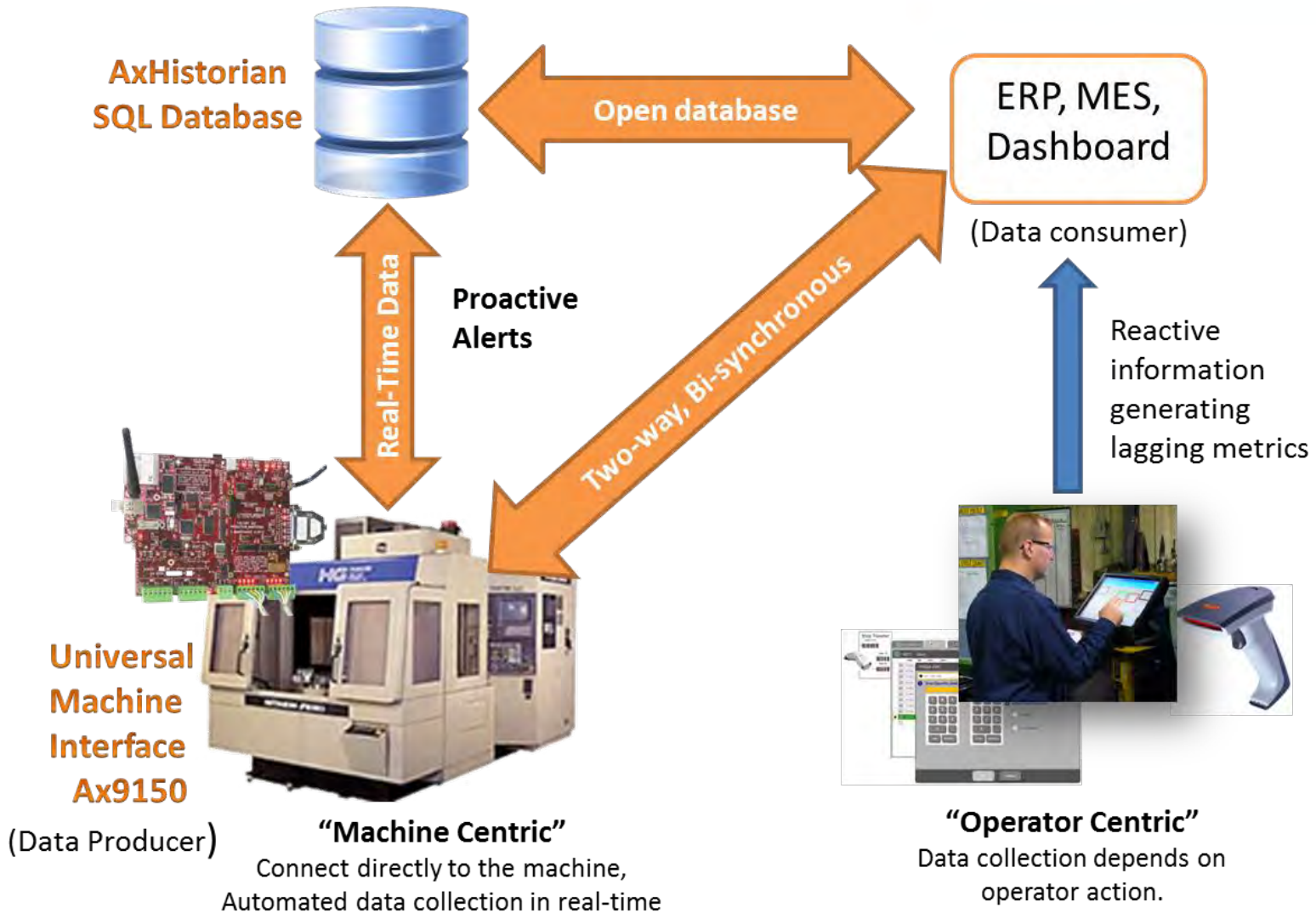
Reactive
information
generating
lagging metrics



“Operator Centric”
Data collection depends
on operator action.

“Automated Approach”

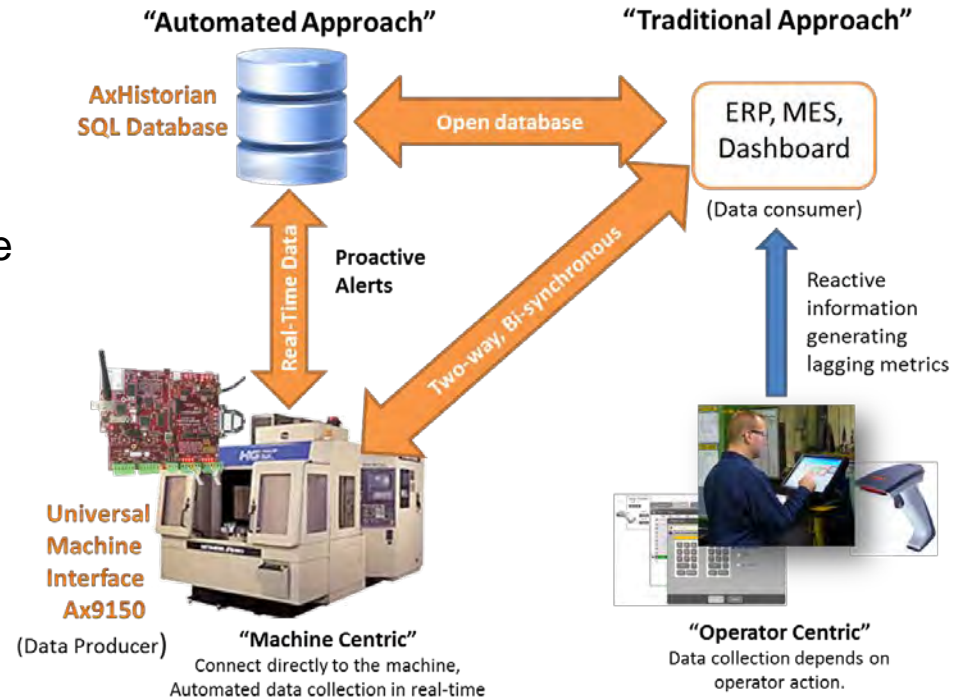
“Traditional Approach”



Advantages of the “Automated Approach”

- Automated data collection from machine
- Accurate and objective information
- Not reliant on operator
- Down Time Log- detailed to the second reporting all down time with reason codes
- Historical data for analysis
- Visibility of machine performance in real-time
- Proactive alerts rather than reactive
- Leading OEE Metrics, automatically
- Minimize “Cultural Impact” on operations
- 20% of cost of PLC based solutions
- No need for barcode scanning (optional)
- Connect to any machine
- Supports OPC standards
- Supports MTConnect standards
- Event monitoring
- Send job/shift completion results automatically back to ERP/MES
- Complement and add value to your application

WE MEASURE THE SHOP FLOOR - YOU MANAGE THE TOP FLOOR



Comprehensive & Historical Analysis

Printed 23/06/2010 at 17:23

Daily Operations OEE Report
Excluding NoShift Down Time

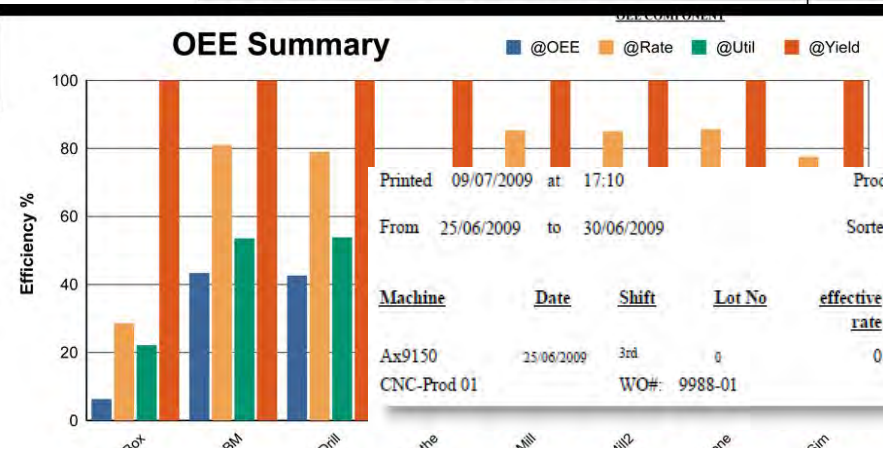
NOTE: Excludes NoShift WOs

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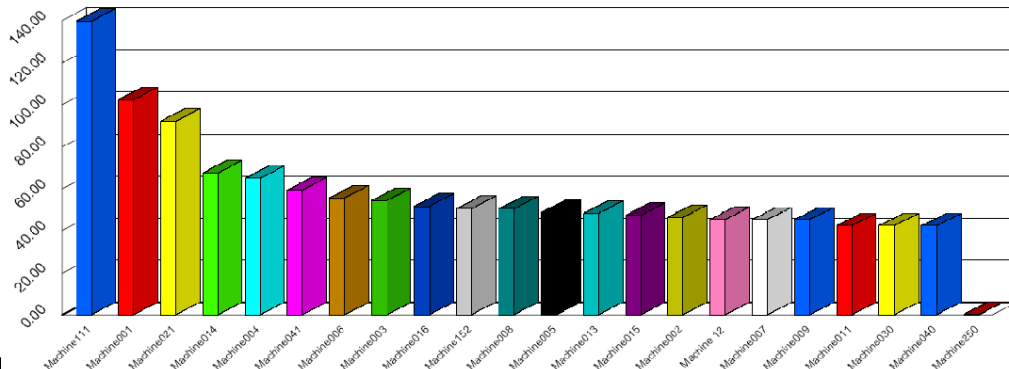
From 01/06/2010 to 20/06/2010

Sorted by Machine Number; Product ID

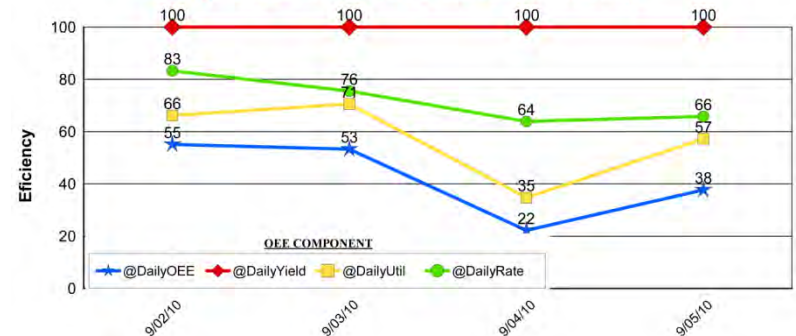
Machine	Date	Shift	Work Order Master WO	Sub WO	Overall Eff%	Total Hours	Run Hours	Down Hours	Mach Hours Util. %	NOTE: 0 Parts = %0 Yield	Std. Cycle Hour	Std. Units /Hour	Shift Units /Hour	Rate Eff%		
89/MACSIM02	6/3/10	1 / 1st	MemexDie1		416.7	0.06	0.04	0.02	66.7	1	100.0	2.67	2.67	16.67	625.0	
Product ID												Parts/Cycle	1			
			10MIN - 75 Util.-Die is	10MIN - 75 Util.-Die												
						3	0.13	0.09	0.04	69.2	3	100.0	30.00	30.00	23.08	76.9
													Parts/Cycle	1		
						2	0.09	0.07	0.02	77.8	2	100.0	31.30	31.30	22.22	71.0

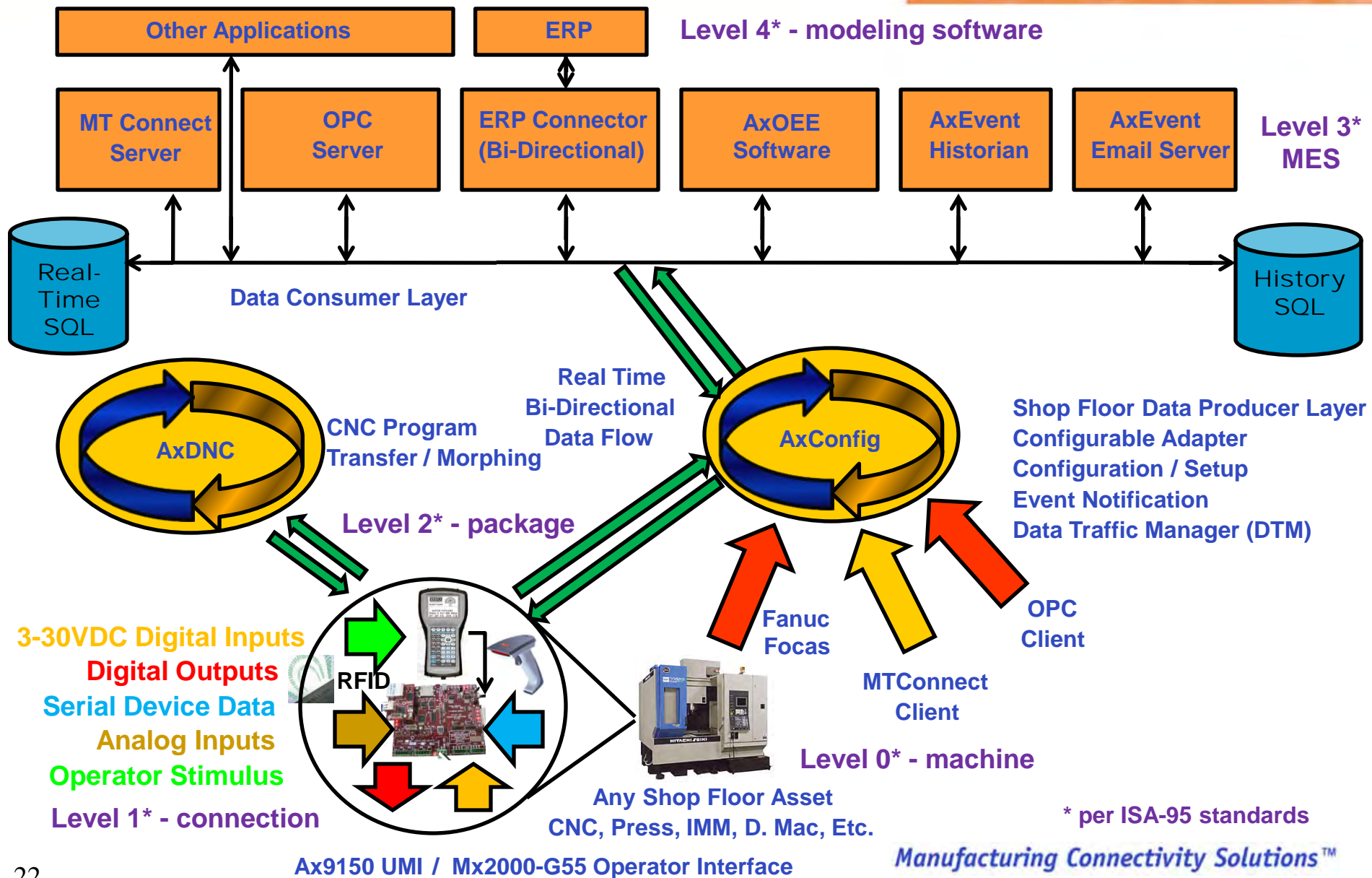


Pareto Down time



Daily OEE & Component Summary





Input / Output Setup

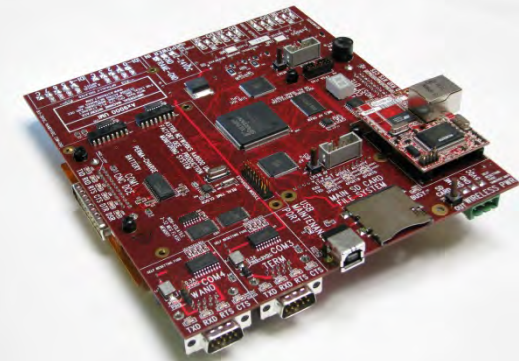
Ladder Editor

#	DBE	EVENT	OUTPUT	INPUTS
1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	XM30X	INCYCLE M01 MO0 SETUPMODE MAINTUNSCH MAINTSCH PRODHOLD E-STOP INCYCLE SETUPMODE MAINTUNSCH MAINTSCH PRODHOLD
2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	E-STOP	INCYCLE ALARM INCYCLE SETUPMODE MAINTUNSCH MAINTSCH PRODHOLD E-STOP ALARM INCYCLE FEEDHOLD SETUPMODE MAINTUNSCH MAINTSCH PRODHOLD
3	<input checked="" type="checkbox"/>	<input type="checkbox"/>	ALARM	INCYCLE ALARM INCYCLE FEEDHOLD SETUPMODE MAINTUNSCH MAINTSCH PRODHOLD E-STOP ALARM INCYCLE FEEDHOLD M01 MO0 SETUPMODE MAINTUNSCH MAINTSCH PRODHOLD
4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	FFEDHOLD	INCYCLE ALARM INCYCLE FEEDHOLD M01 MO0 SETUPMODE MAINTUNSCH MAINTSCH PRODHOLD E-STOP ALARM INCYCLE FEEDHOLD M01 MO0 SETUPMODE MAINTUNSCH MAINTSCH PRODHOLD
5	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MO0	INCYCLE ALARM INCYCLE FEEDHOLD M01 MO0 SETUPMODE MAINTUNSCH MAINTSCH PRODHOLD E-STOP ALARM INCYCLE FEEDHOLD M01 MO0 SETUPMODE MAINTUNSCH MAINTSCH PRODHOLD
6	<input type="checkbox"/>	<input type="checkbox"/>	RUSTY	INCYCLE ALARM INCYCLE FEEDHOLD M01 MO0 SETUPMODE MAINTUNSCH MAINTSCH PRODHOLD E-STOP ALARM INCYCLE FEEDHOLD M01 MO0 SETUPMODE MAINTUNSCH MAINTSCH PRODHOLD
7	<input type="checkbox"/>	<input type="checkbox"/>	M3OPARTCTR	INCYCLE ALARM INCYCLE FEEDHOLD M01 MO0 SETUPMODE MAINTUNSCH MAINTSCH PRODHOLD E-STOP ALARM INCYCLE FEEDHOLD M01 MO0 SETUPMODE MAINTUNSCH MAINTSCH PRODHOLD
8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	M01	INCYCLE ALARM INCYCLE FEEDHOLD M01 MO0 SETUPMODE MAINTUNSCH MAINTSCH PRODHOLD E-STOP ALARM INCYCLE FEEDHOLD M01 MO0 SETUPMODE MAINTUNSCH MAINTSCH PRODHOLD
9	<input checked="" type="checkbox"/>	<input type="checkbox"/>	INSPECTION	INCYCLE ALARM INCYCLE FEEDHOLD M01 MO0 SETUPMODE MAINTUNSCH MAINTSCH PRODHOLD E-STOP ALARM INCYCLE FEEDHOLD M01 MO0 SETUPMODE MAINTUNSCH MAINTSCH PRODHOLD
10	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MEETING	INCYCLE ALARM INCYCLE FEEDHOLD M01 MO0 SETUPMODE MAINTUNSCH MAINTSCH PRODHOLD E-STOP ALARM INCYCLE FEEDHOLD M01 MO0 SETUPMODE MAINTUNSCH MAINTSCH PRODHOLD
11	<input checked="" type="checkbox"/>	<input type="checkbox"/>	BREAK	INCYCLE ALARM INCYCLE FEEDHOLD M01 MO0 SETUPMODE MAINTUNSCH MAINTSCH PRODHOLD E-STOP ALARM INCYCLE FEEDHOLD M01 MO0 SETUPMODE MAINTUNSCH MAINTSCH PRODHOLD
12	<input checked="" type="checkbox"/>	<input type="checkbox"/>	OILING	INCYCLE ALARM INCYCLE FEEDHOLD M01 MO0 SETUPMODE MAINTUNSCH MAINTSCH PRODHOLD E-STOP ALARM INCYCLE FEEDHOLD M01 MO0 SETUPMODE MAINTUNSCH MAINTSCH PRODHOLD
13	<input checked="" type="checkbox"/>	<input type="checkbox"/>	EMPTYBIN	INCYCLE ALARM INCYCLE FEEDHOLD M01 MO0 SETUPMODE MAINTUNSCH MAINTSCH PRODHOLD E-STOP ALARM INCYCLE FEEDHOLD M01 MO0 SETUPMODE MAINTUNSCH MAINTSCH PRODHOLD
14	<input checked="" type="checkbox"/>	<input type="checkbox"/>	LOADRAWMTL	INCYCLE ALARM INCYCLE FEEDHOLD M01 MO0 SETUPMODE MAINTUNSCH MAINTSCH PRODHOLD E-STOP ALARM INCYCLE FEEDHOLD M01 MO0 SETUPMODE MAINTUNSCH MAINTSCH PRODHOLD
15	<input checked="" type="checkbox"/>	<input type="checkbox"/>	TEARDOWN	INCYCLE ALARM INCYCLE FEEDHOLD M01 MO0 SETUPMODE MAINTUNSCH MAINTSCH PRODHOLD E-STOP ALARM INCYCLE FEEDHOLD M01 MO0 SETUPMODE MAINTUNSCH MAINTSCH PRODHOLD
16	<input checked="" type="checkbox"/>	<input type="checkbox"/>	SETUPMODE	INCYCLE ALARM INCYCLE FEEDHOLD M01 MO0 SETUPMODE MAINTUNSCH MAINTSCH PRODHOLD E-STOP ALARM INCYCLE FEEDHOLD M01 MO0 SETUPMODE MAINTUNSCH MAINTSCH PRODHOLD
17	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MAINTUNSCH	INCYCLE ALARM INCYCLE FEEDHOLD M01 MO0 SETUPMODE MAINTUNSCH MAINTSCH PRODHOLD E-STOP ALARM INCYCLE FEEDHOLD M01 MO0 SETUPMODE MAINTUNSCH MAINTSCH PRODHOLD
18	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MAINTSCH	INCYCLE ALARM INCYCLE FEEDHOLD M01 MO0 SETUPMODE MAINTUNSCH MAINTSCH PRODHOLD E-STOP ALARM INCYCLE FEEDHOLD M01 MO0 SETUPMODE MAINTUNSCH MAINTSCH PRODHOLD
19	<input checked="" type="checkbox"/>	<input type="checkbox"/>	PRODHOLD	INCYCLE ALARM INCYCLE FEEDHOLD M01 MO0 SETUPMODE MAINTUNSCH MAINTSCH PRODHOLD E-STOP ALARM INCYCLE FEEDHOLD M01 MO0 SETUPMODE MAINTUNSCH MAINTSCH PRODHOLD

Device Info: Hostname: Wally IP 235, MAC Address: 00:20:4A:9F:C7:D3, Terminal ID: 922, Current Mode: Run Mode, Status: Polling for the current I/O status, Connection: Yes

AxConfig

- Utility Tool
- Signals
- Logic Ladder



In Alarm mode, all green text is “active” or “true” in state.

All normal text is “inactive” or “false” in state.

- Taps into points on the machine not easily discerned to create a valid measurement.
- Electrical Signal Conditioning utility with both hardware and software parameters and timing.
- Unlimited Ladder logic for flexibility.

Report Generator

Report Date Selection: Start Date, End Date

Selection Criteria: Shift Name, Machine Number, None

Available Reports: DownTimes w Pareto.rpt, Kerno_OEEInfo.rpt, Kerno_OEESum.rpt, Kerno_Prod

Sorting/Subtotal: Show Detail Records, Show Subtotals

AxOEE Manager

Utilities Help Look and Feel

Main: Exit

Units: Efficiencies, Down/Reject, Machine Detail, Data Tables

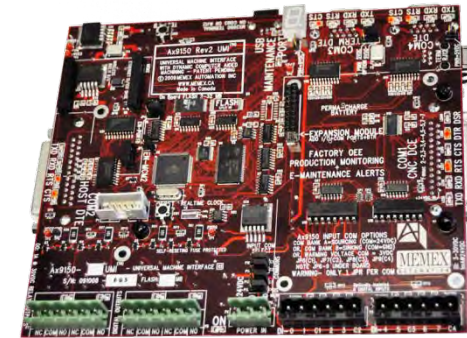
Gauges: OEE (50), Utilization (69), Yield (100), Std Rate (73)

Machine	OEE	Utilization	Yield	Standard Rate	Group
101: TestSim02...	49.99	65	100	76.9	Mill
104: TestSim05...	49.94	65	100	76.83	Mill
106: TestSim07...	50	65	100	76.92	Lathe
107: TestSim08...	49.95	65	100	76.86	Lathe
108: TestSim09...	49.98	65	100	76.88	Lathe
109: TestSim10...	49.98	65	100	76.9	Drill
110: TestSim11...	50	75	100	66.66	Lathe
111: TestSim12...	49.99	75	100	66.65	Lathe
112: TestSim13...	49.85	75	100	66.46	Lathe
114: TestSim15...	49.81	75.01	100	66.41	Lathe

[x] [Group] In ('Drill', 'Lathe', 'Mill') Edit Filter

Complete Productivity Solution

- Hardware - Ax9150
- Software - AxOEE



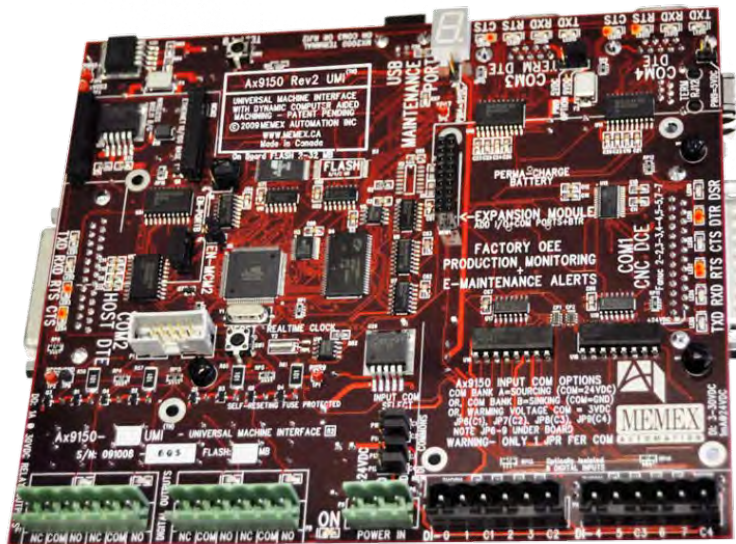
Universal Machine Interface
Shop Floor Router in each
machine feeds the OEE
Software Server

Visibility → Real-Time Status of Production Enables Proactive Control

***A Proven Platform for Plant-wide Productivity
By Connecting every Machine for Monitor & Control with OEE + DNC***

Ax9150 UMI Features:

- Local CNC Flash Memory
- Supports all makes + models of machines
- Powered by machine (12-24V)
- Magnetic mount for easy installation
- 8 - 24 Inputs + 4 Digital Outputs
- Integrated OEE + DNC for robust monitor & control
- Provides access to work orders loaded from any ERP
- Alerts to your email, PDA or Phone
- Onboard DNC option & extensive firmware
- Embedded OEE (Overall Equipment Effectiveness)
- Ethernet connectivity and wireless option
- OPC capable connections
- Machine Monitoring & Adaptive Control



Ax9150 UMI OEE+DNC Benefits

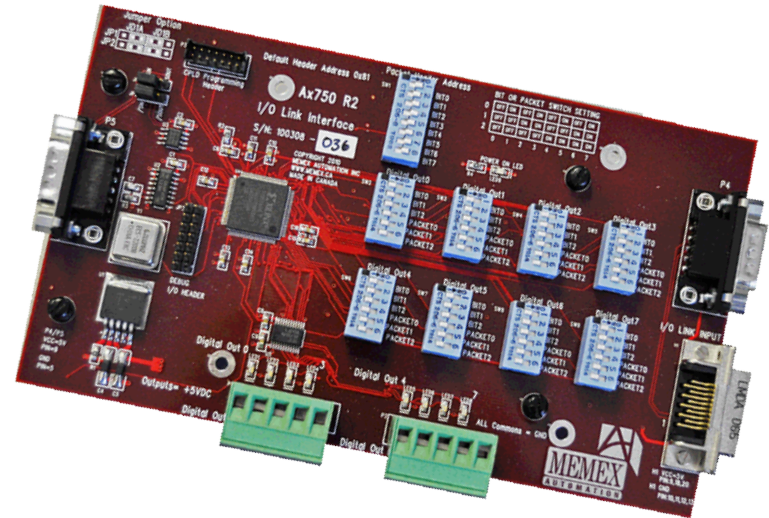
- ⇒ Overall Equipment Effectiveness metrics (**OEE**)
- ⇒ “File Messaging System” (FMS) enables **flexibility**
- ⇒ **Reliable** — Up to 2 GB of Non-volatile flash storage
- ⇒ **Preserves all Machine Monitoring data** on the Ax9150 UMI in the event of a network failure.
- ⇒ Machine Monitoring — **real time** cycle status right out of the box
- ⇒ Capability to **capture data** for shop floor measurement systems (MES, PDM, ERP, etc)
- ⇒ **Additional serial port** for peripherals such as hand held terminal, gauges, RFID or a barcode reader (dependent on configuration).
- ⇒ 100BaseT Ethernet port + **Wireless** option
- ⇒ **Adaptive Control** capability (let the system work for you — help automate your automation)
- ⇒ **Bar Code** support available
- ⇒ Operates **independent** of the corporate network.
- ⇒ **Visibility** to DNC process — see the file when dripfeeding
- ⇒ **Onboard DNC** functionality (get, put and dripfeed locally)
- ⇒ **Modify Code** on the fly with DNC software
- ⇒ **Bulletproof** DNC - even if the network totally collapses.

Ax650 MCI & Ax750 I/O Link Boards

Ax750 I/O Link - Fanuc Interface Board

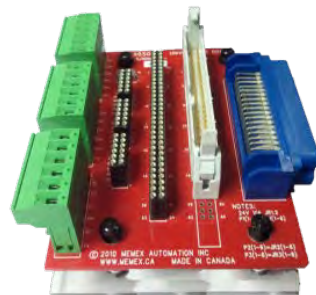
For any Fanuc CPU Controller with serial I/O Link
(16, 18; M or T or any I series; 16i, 18i, 21i, 31i, etc.)

- Designed to passively monitor any Fanuc Serial I/O bus
- A natural complement to Memex Ax9150 UMI for OEE+DNC
- Fits to any Fanuc controller with a serial I/O link



Ax650 Machine Control Interface Board

- I/O Link for any Controller for NC/CNC Machine Tools
- A quick and easy way to find and monitor signals of a machine
- Monitor any signal from the machine non-intrusively
- Designed to passively monitor any Controller's I/O



Interface Boards

- Dramatically reduce installation time.
- Simplify connectivity of many controls
- Active, non-intrusive data collection

MT Connect Compliant Boards Ax650 MCI & Ax750 I/O Link

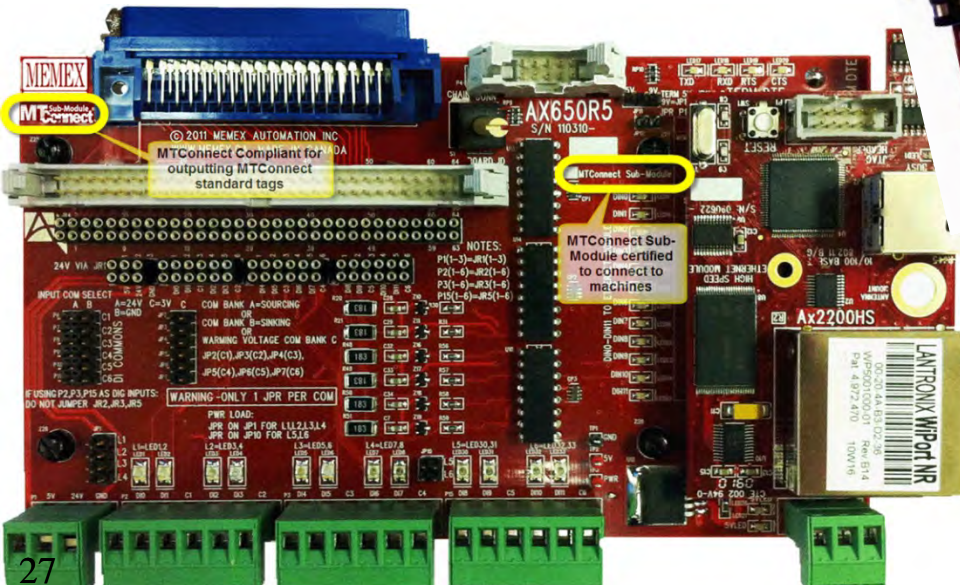
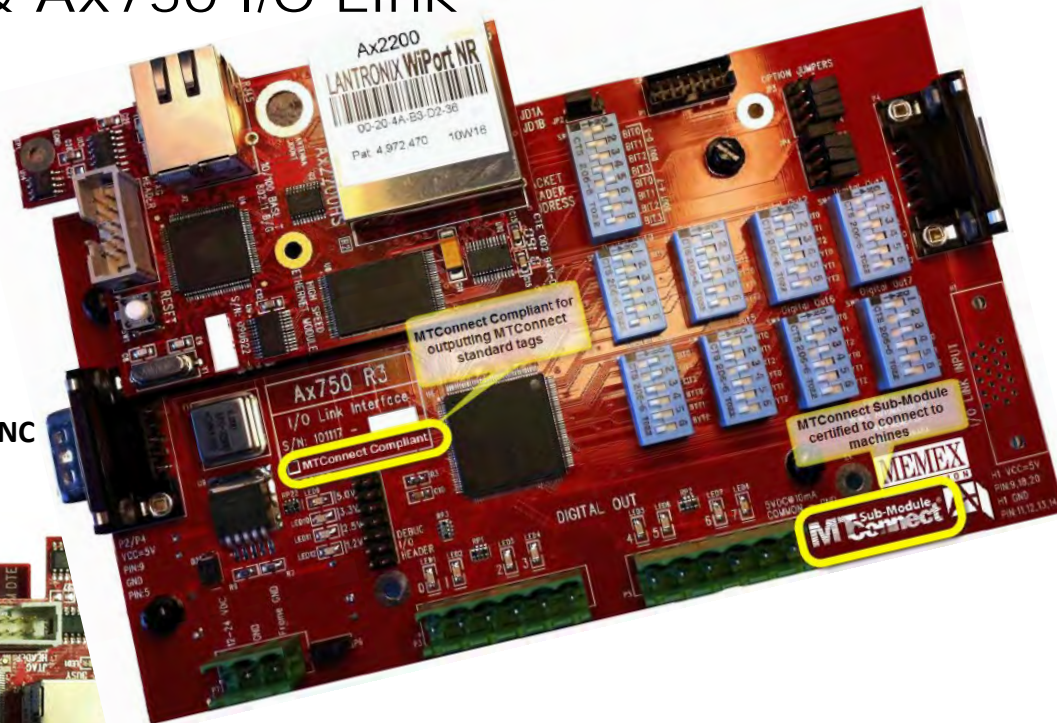
Interface Boards

- Dramatically reduce installation time.
- Simplify connectivity of many controls
- Active, non-intrusive data collection

Ax750 I/O Link - Fanuc Interface Board

For any Fanuc CPU Controller with serial I/O Link

- Designed to passively monitor any Fanuc Serial I/O bus
- A natural complement to Memex Ax9150 UMI for OEE+DNC
- Fits to any Fanuc controller with a serial I/O link



Ax650 Machine Control Interface Board

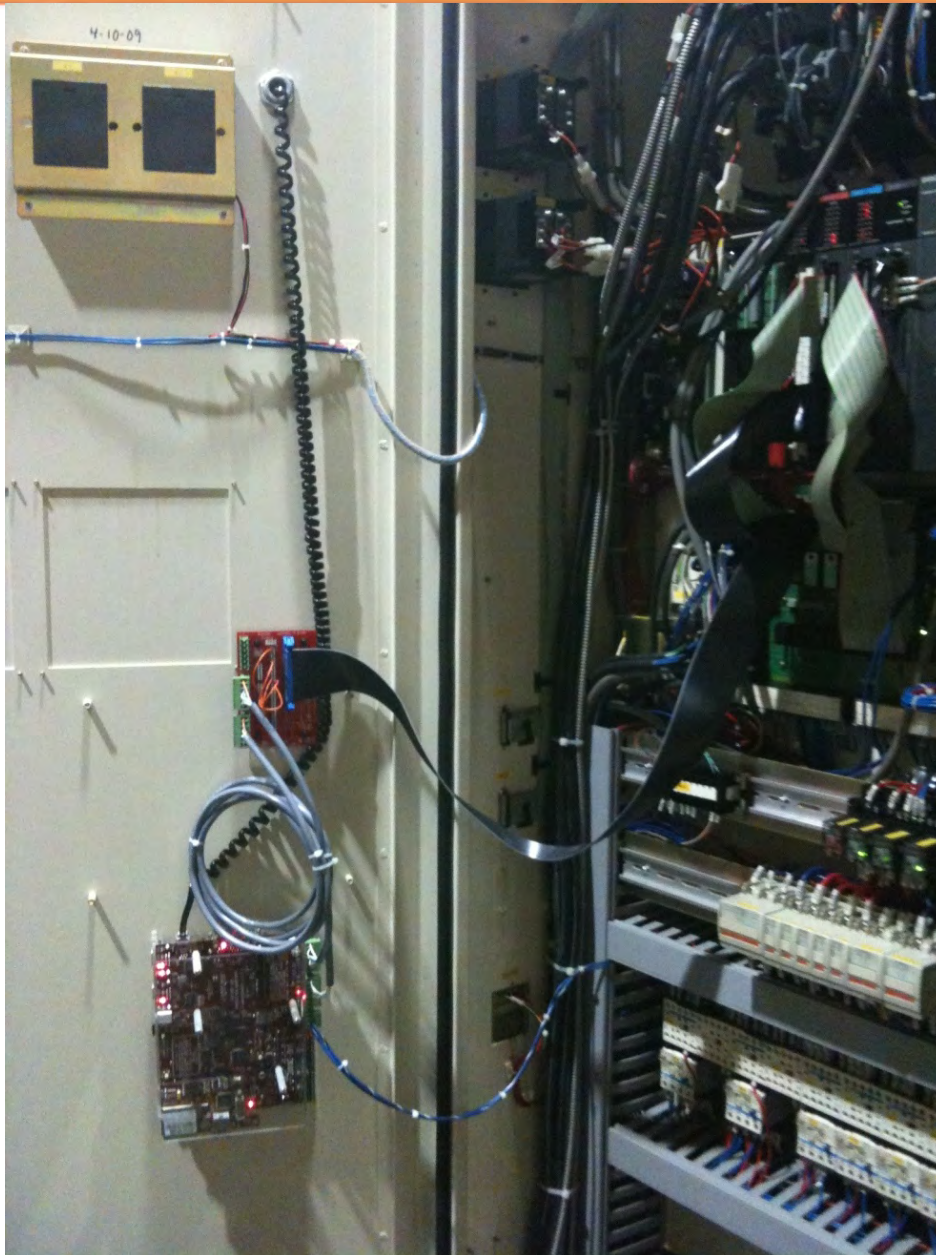
- I/O Link for any Controller for NC/CNC Machine Tools
- A quick and easy way to find and monitor signals of a machine
- Monitor any signal from the machine non-intrusively
- Designed to passively monitor any Controller's I/O



Machine Description

**Makino Pro 5 PC Based Control
(Fanuc 310i – AO5) with an
Ax750 I/O Link & Ax9150 UMI**

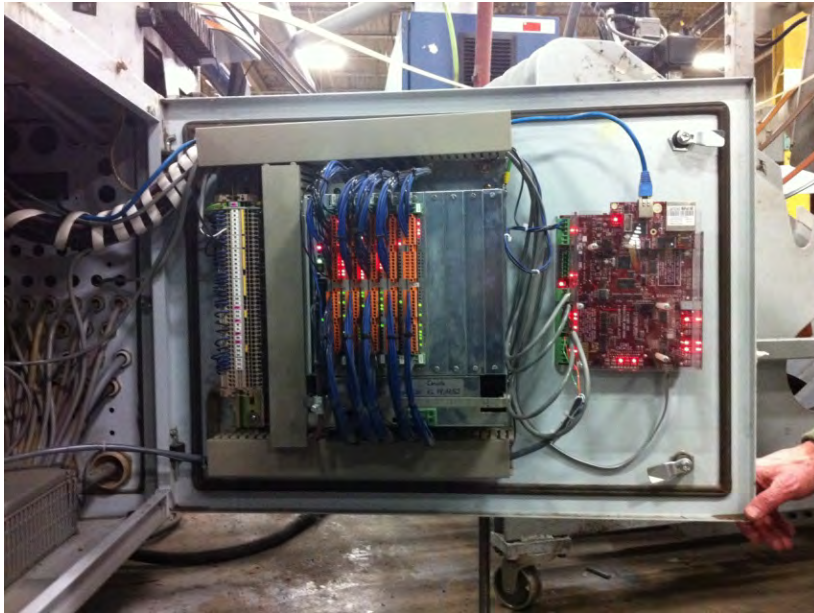




Machine Description

**Toshiba VBM - Tosnuc 888 Control
with an Ax9150 UMI & Ax650**

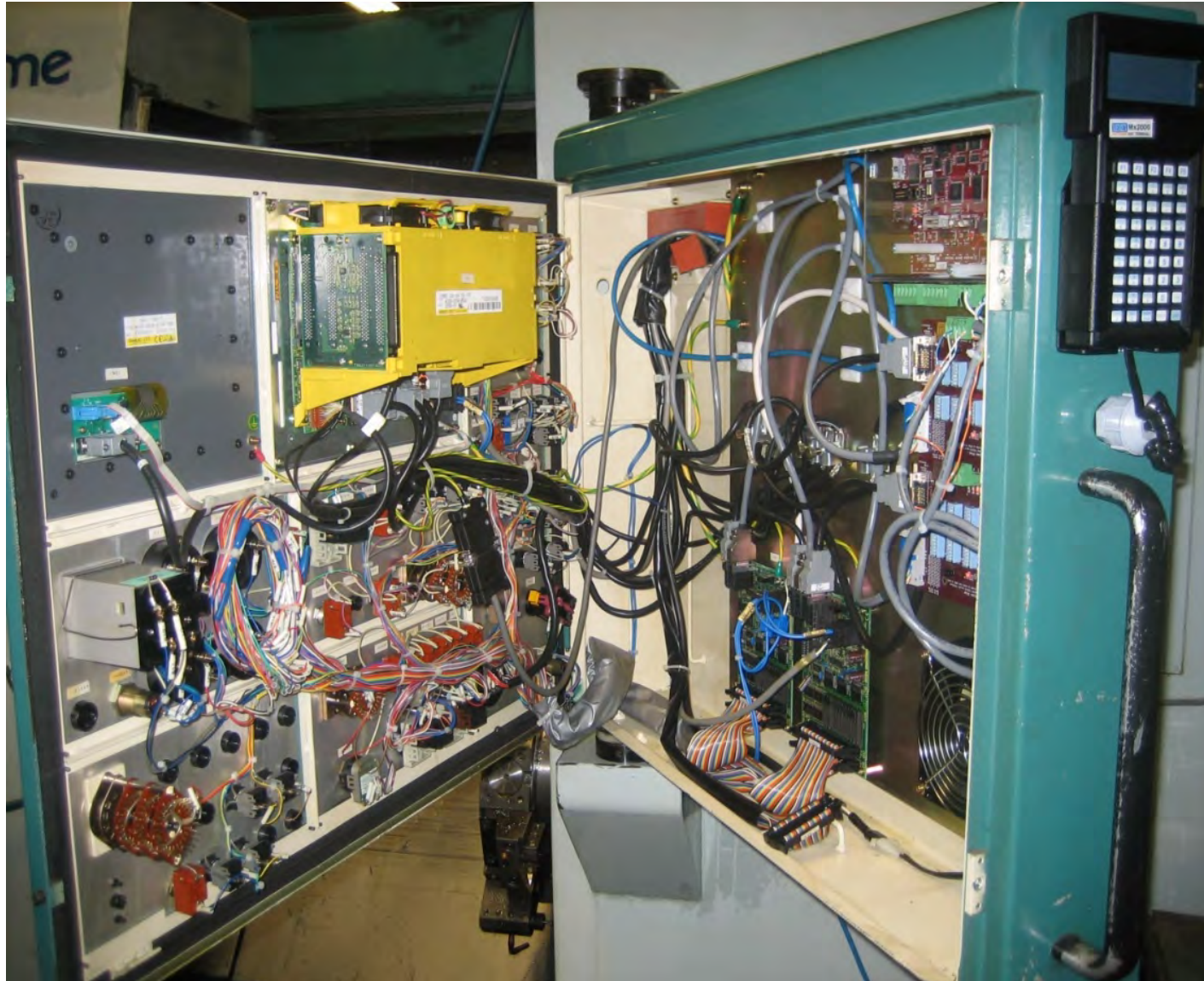




Machine Description

**Homag Edge Bander Machine
with an Ax9150 UMI & Mx2000 HMI**





Machine Description

**Fanuc 21i – tt
(Mori-Seiki lathe)
With an Ax9150 UMI
& Mx2000 HMI &
2 - Ax750 I/O Link
boards**

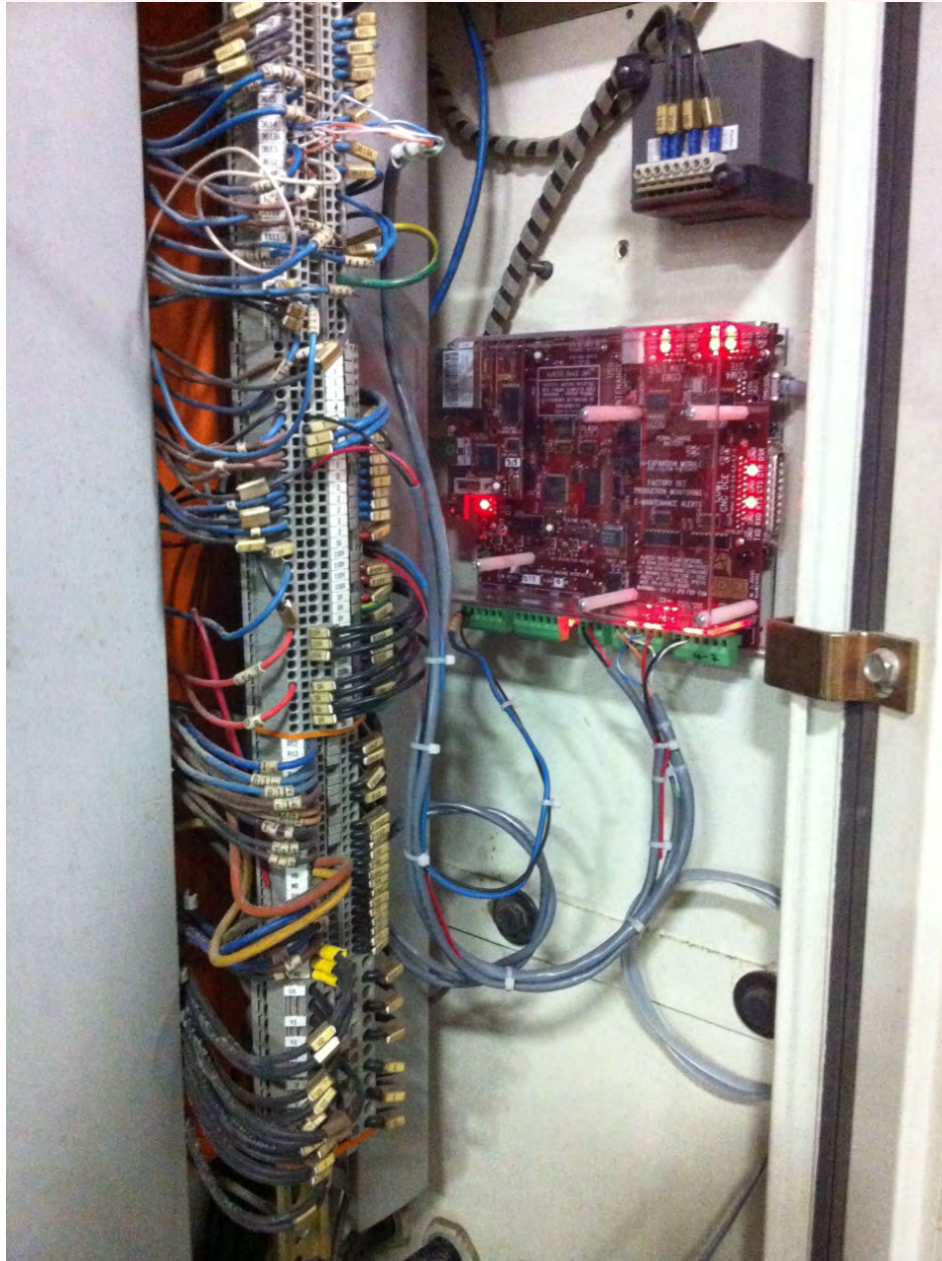
Customer Installations



Machine Description

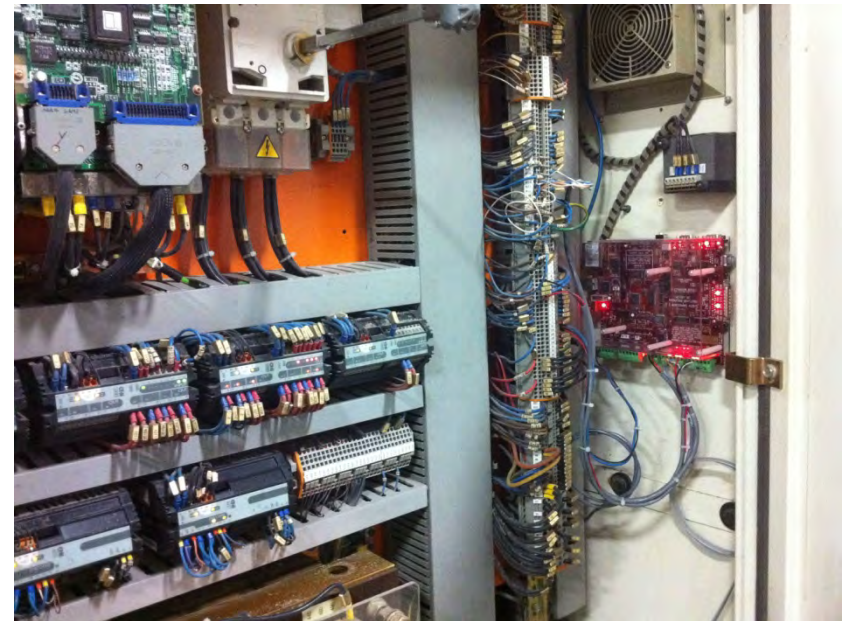
**Fanuc 18t Control on a O-M VBM
With an Ax750 I/O Link & Ax9150
UMI & Mx2000 HMI**





Machine Description

**WNT 2000 Panel Saw with an
Ax9150 UMI & Mx2000 HMI**





Machine Description

**Fanuc 18i – M with JD1A or JD1B with
an Ax9150 UMI & Ax750 I/O Link**



Customer Installations

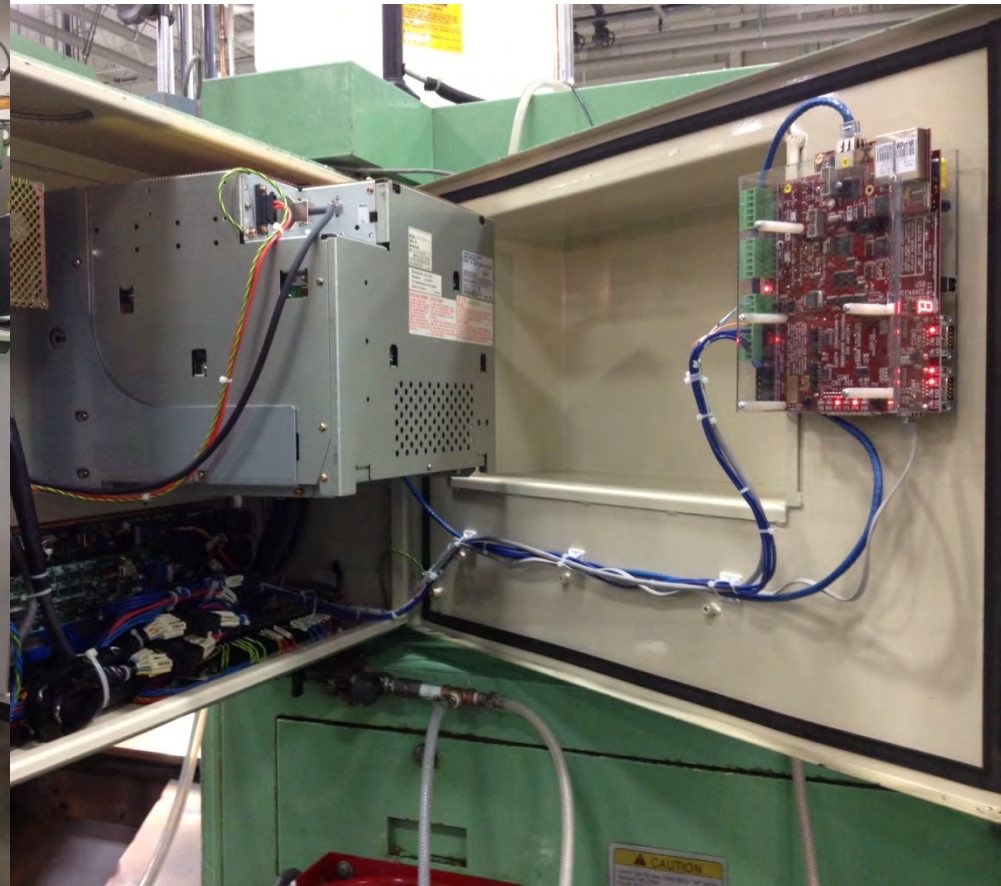


Machine Description

**Matsurra 640M
Milling Machine
with an
Ax9150 UMI &
Mx2000 HMI**

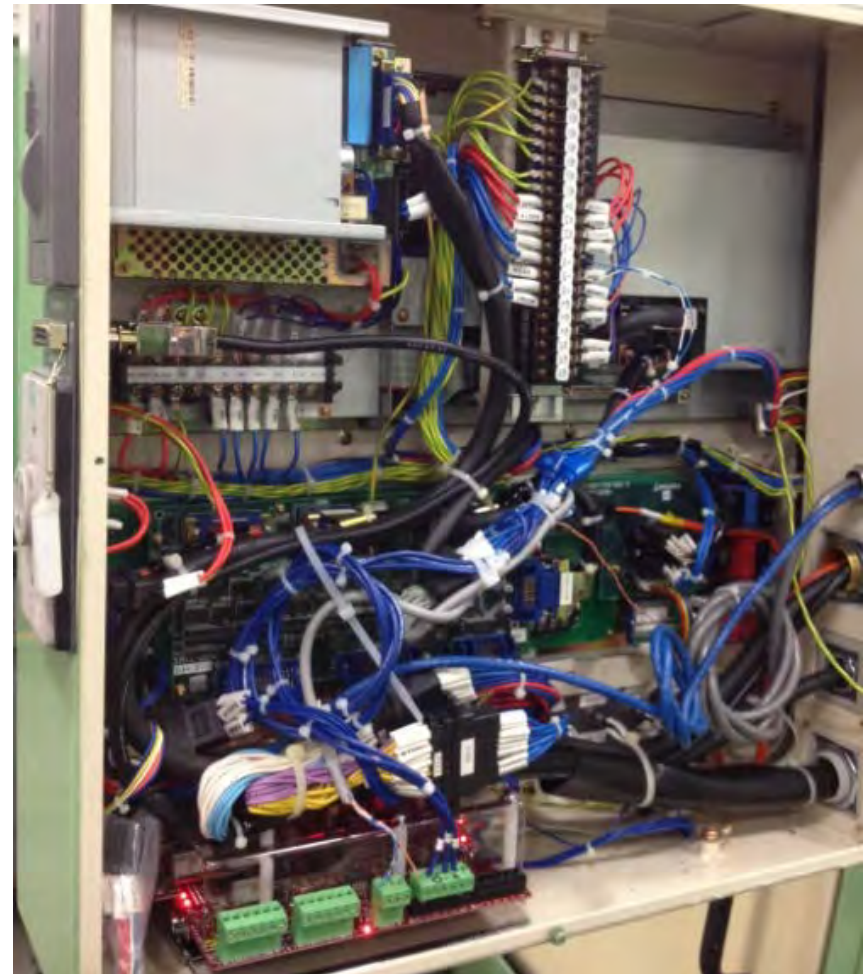
Machine Description

**Okuma LB25 with OSP-7000L Control
Ax9150 UMI & Mx2000 HMI, ~ 1 hour install**



Machine Description

**Okuma LB400 with OSP-U100L Control
Ax9150 UMI & Mx2000 HMI, ~ 1 hour install**



Machine Description

**Lewis 200T Rubber Injection Press
Ax9150 UMI, Mx2000 HMI & Bar Code Reader**



Operator Interface (HMI)



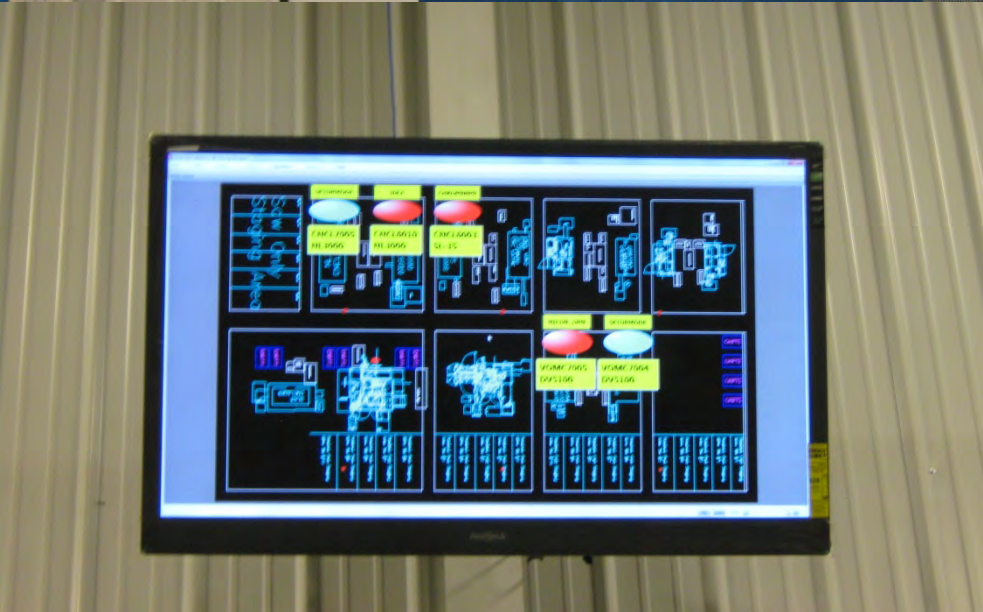


ROCK
CENTER
WITH BRIAN WILLIAMS

to be featured
on



**The Memex Productivity Solution
an integral part of Vermeer's
aggressive productivity
enhancements**



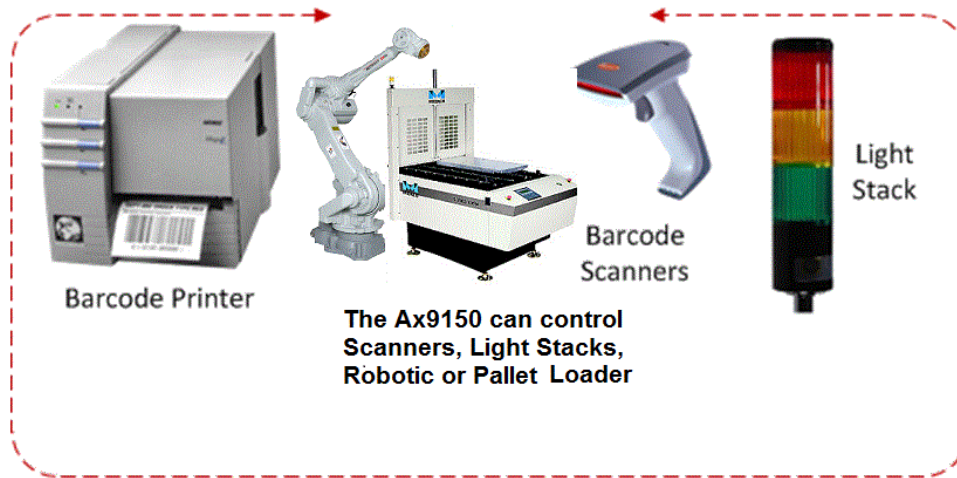
Tablets can be very useful in a mobile dynamic environment.



AutEC Manager

50 73 100 68

Machine ID	OEE	Availability	Quality	Performance	Group
100: Vert Mill VM34	71.59	71.59	100	100	Mill Group3
101: Gap Lathe GL...	73.77	77.68	100	95	Lathe
102: Gentry Mill M21	85.74	95	100	95	Mill
103: Mori Seiki Lathe	66.24	73.6	100	90	Lathe
104: Tnacci Lathe ...	71.34	73.63	100	96.89	Lathe
105: Haas Mill 11	63.42	73.63	100	86.12	Mill
106: Doosan Mill 98	74.59	75.07	100	99.37	Mill
107: Doosan Vert ...	74.58	75.05	100	99.37	Mill
108: Gun Drill	68.08	74.83	100	90.99	Drill
109: Twin Turret L...	77.82	75.01	100	103.75	Lathe
110: Olympia Vert ...	38.91	75.61	100	51.46	Mill
111: Auto Chop Saw	68.94	74.97	100	91.96	Saw
113: Gun Drill 3	60.48	74.62	100	81.05	Drill
114: Tacchi Lathe ...	6.72	75.66	100	107.9	Drill
115: Tacchi Lathe 2	31.23	71.27	100	8.88	Lathe
116: Tacchi Lathe 3	55.06	73.68	100	74.73	Lathe
117: Mori Seoki ESV	64.98	64.98	100	100	Lathe
118: Press 1	8.25	78.85	100	60.98	Punch Press



Workstations running the OEE Dashboard client



WO101701

PART NUMBER: REV.: P.O. #: CUST3345 P.O. QTY: 9999 JOB#: 101701

PART NAME	CUSTOMER	Barton transmission	MATERIAL FURNISHED BY
QTY	DUE	QTY	DUE
MATERIAL CALL OUT:	Aluminum	# OF SCRAP PCS.	INSP. STAMP
SIZE:		INSP. STAMP	DATE
SPECIAL PLANNING:		INSP. STAMP	KEY EVAL Y OR N



COMMENTS/CHANGES	 WO101705	Customer/Purchase Order No. SEPT33456	XYZ Precision Production Traveler
SOC REQUIRED		Part Number Kraft - Pre-Pack 07	
QTY DEPT		Date 2011-06-30	
		Work Order Number / Line Number 101705 / ID208	

Op #	Task
10	Receive Raw Material
20	Inspect Raw Material Drawing XYZ-D2
30	
40	
50	
60	
70	

JOB NUMBER 101703	ABC Company 123 Main St. Anytown, USA 800-555-1234 www.abccompany.com	SHOP TRAVELER MACHINE 208
SERIAL NUMBER		REVISION: B DATE: 2011-06-30
P.O. # 00-97966	CUSTOMER: Real world	PART NAME: Prepackager
PART NUMBER: Gear092-P9		
	 WO101703	



Barcode Scanners

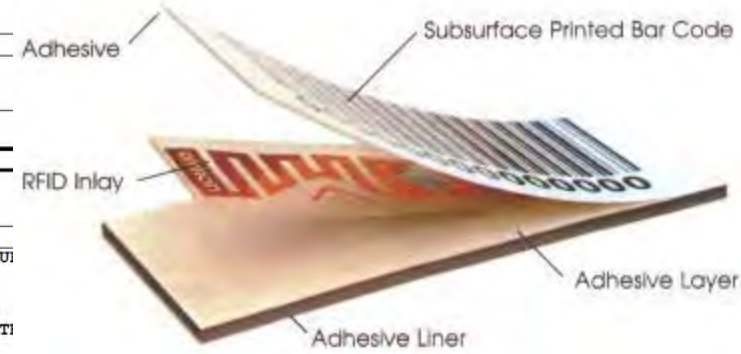


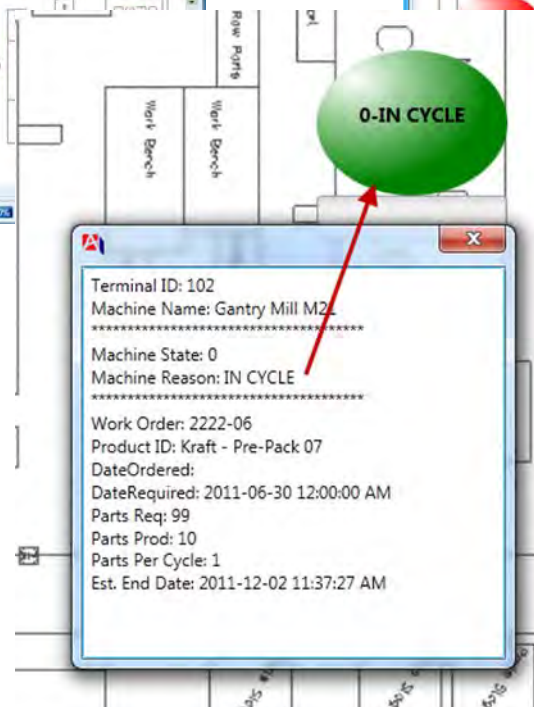
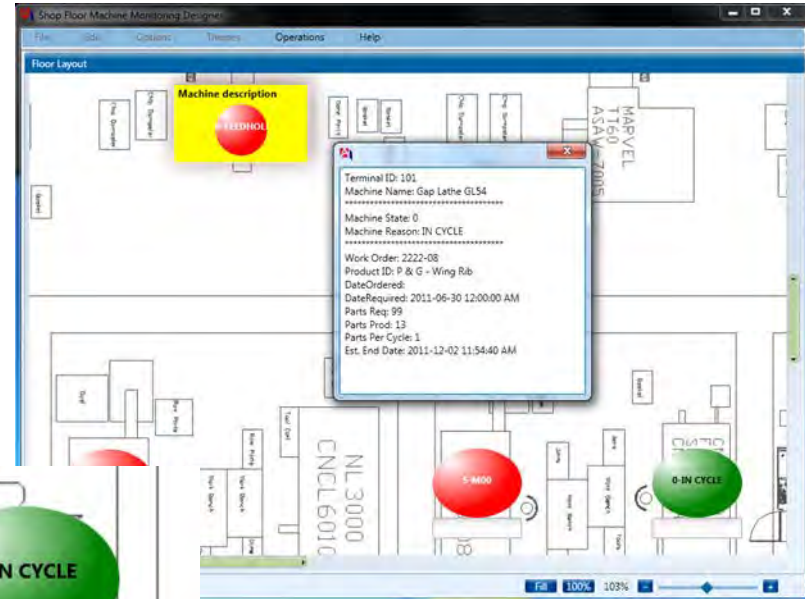
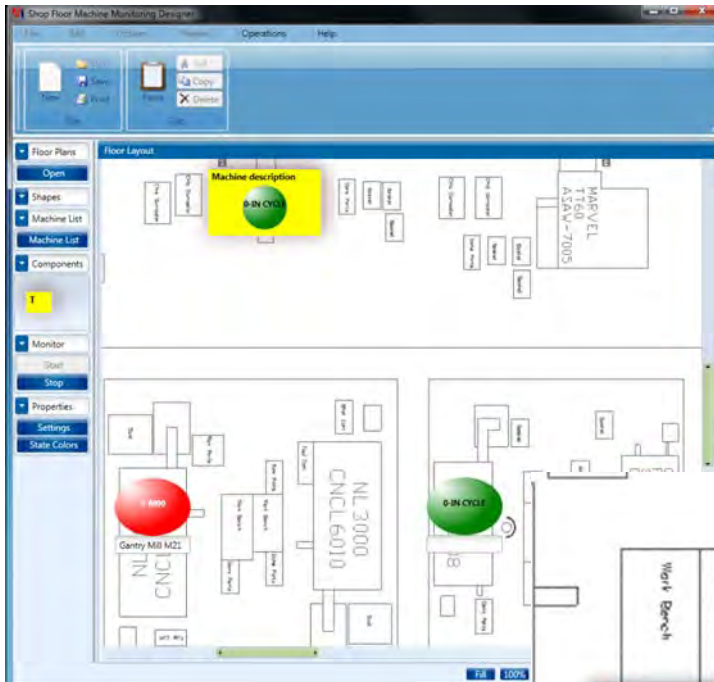
QTY REQ: 999
PLANNED BY:
PLAN REV 1

THIS PART I PROCESS, IN MANUFACTURE REQUIRED TO PLAN REQUIR AMENDMENTS, & IT'S DERIVATIVES

COMPLETE:	DUE DATE:
EN APPROVAL:	
E	REVISED BY:

CRITICAL TRACEABLE. MANUFACTURE PER SPEC #0001
 NCE/SAFETY CRITICAL PARTS ARE ABC COMPANY. ANY CHANGES TO T RANGE APPROVAL
 NS MUST USE THE LATEST REVISION, DERS OF APPLICABLE SPECIFICATIONS





**Real time
shop floor
visibility**

Asset Tracking



Active Hand Held Reader



Passive Hand Held Reader



Passive RFID Portals



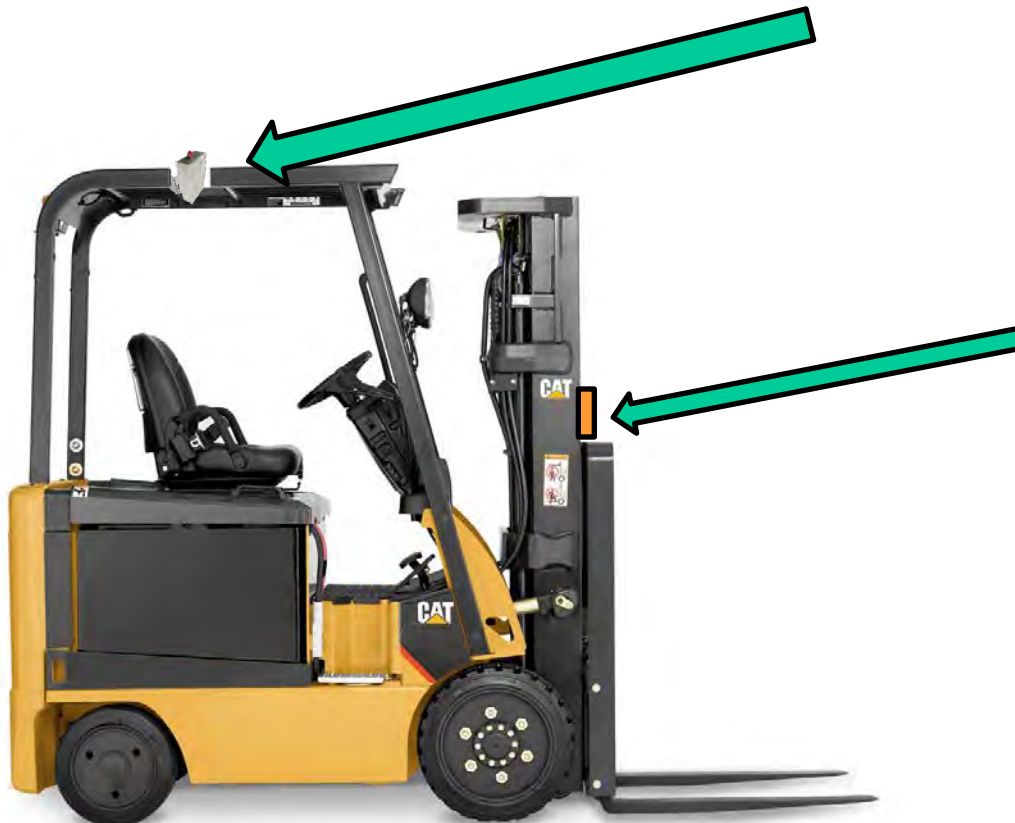
Active Locator



Listener- AP



Active RFID Asset Tags



Once a Lift truck is installed with an asset tag and locator, it will be visible at any time in the system.



- With an Active RFID tag attached to each bin or pallet, they become visible to the system.
- Materials are associated with the tagged bin/pallet and therefore their location is tracked.

Operator Panel (HMI)



10 11 2011 10:11:07
FW↓ DNC↑↑ OEE↓

Running Screen V2

WO#/JOB	Good Part	Util
000000 No Operator Code	123776	0
ProdID	Reject Part	100
Product	24	
M/C State: SETUPMODE	Parts/Shift	
Est Time to Go > 2.46667 (Minutes)	123800	
Prod Std Time to Go >	Parts/JOB	
	123800	
	Parts To Go	
	199	
	Std Cycle 87	
	Avg Cycle 88	

100

50

0

Good Part

Reject Part

Down Reason

Change Mode

MORE ▶

Productivity Increases

- Improve manufacturing productivity with real-time monitoring of production.
- Minimize unproductive labor with automated data collection and reporting.
- Improve inventory accuracy
- Give accurate delivery dates with visual production scheduling and job tracking.
- Identify problems fast, before production or quality suffers, with real-time displays.
- Link shop floor to any ERP - business system two-way link, to improve accuracy of information.
- Real-time Machine Detail lets you zero in on problems.



OEE = % Performance x % Availability x % Quality

Productivity Increases

- Real-time monitoring of every production machine prevents problems from occurring.
- Eliminate manual data entry.
- Schedule and track job progress at individual machine level...in real-time.
- OEE Software is scalable and cost-effective you install only the capability you need.
- OEE Software is practical because it was designed by and for manufacturing users.
- Connect to any machine on the shop floor.
- Real-time display screens Data Tables as you run your business – your own KPI or OEE.



Productivity Increases

- Determine real Job Standards to help improve your Job costing.
- Analyze causes for Downtime and Rejects then eliminate them.
- Preventive Maintenance scheduling based on real run time and cycle count data, rather than calendar.
- Visual, “drag and drop” production scheduling and Job tracking based on actual shop floor conditions.
- Machine operating history in detail with a “paperless” Strip Chart.
- Shift scheduling the way you run your plant.
- Monitor production schedule remotely or in multiple locations.
- Real-time Process Variable monitoring prevents problems and can control complex machines with programmed logic.
- Analyze operator and maintenance staff performance.



ACHIEVING Businessexcellence
Business Excellence brings you the real-life achievements of world class companies from across the globe.

Canadian METALWORKING

AEROSPACE
engineering & manufacturing

"Aerospace Components Maker Rejects Low Productivity"

"Shop Floor to Top Floor Automation in Real-Time"

"Tracking Machine Utilization the Memex Way"

"Improving Overall Equipment Effectiveness With Lean and Value-Stream Mapping"

"Real-time Shop Floor Data Increasing Important as Manufacturing Returns to Growth"

"Automate Your Automation"

"Internetworking The Factory Floor"

"Measuring the Effectiveness Of Your Mold Machining Operations"

"The Advantages of Migrating from Serial to Ethernet Communications on the Shop Floor"

"MTConnect Forming Working Group on Best Practices"

"CTMA Tour Memex Customer with OEE + DNC"

"Real-Time Performance drives Food Manufacturing Efficiency"

"Memex Automation Typically Delivers Twenty Percent Increased Plant Floor Efficiency"

"Memex Universal File Server Improves CNC Machine Tool Productivity Introduction"

"Overall Equipment Effectiveness in Food Production"

"Technology helps Canadian aerospace firm cruise to success"

"Automation Software In Real-Time Improves Manufacturing Productivity"

"Executives Sustain Manufacturing by Reducing Labor Costs"

"Memex Mission Is to Save Manufacturing by Increasing Efficiency Typically 5 to 20%"

Canadian **PLANT**
INSIGHTS AND STRATEGIES FOR INDUSTRY LEADERS

AMERICAN MACHINIST

MANUFACTURING & SUPPLY CHAIN
industry blog

Plant Automation.com
A VertiMarkets Marketplace for Industry Professionals

AvaLAN
WIRELESS

QUALITYDIGEST

SAE Vehicle Engineering

Articlesbase
Free Online Articles Directory

MOLDMAKING TECHNOLOGY
DESIGN, BUILD, MANAGE

411 AccountingSoftware.com

itbusiness.ca
Business Advantage through Technology

The Food & Beverage Journal

TAG44
WWW.TAG44.COM

AmericaFront.com
international news network

CTMA
CANADIAN TOOLING & MACHINING ASSOCIATION

International
Food Safety & Quality Network

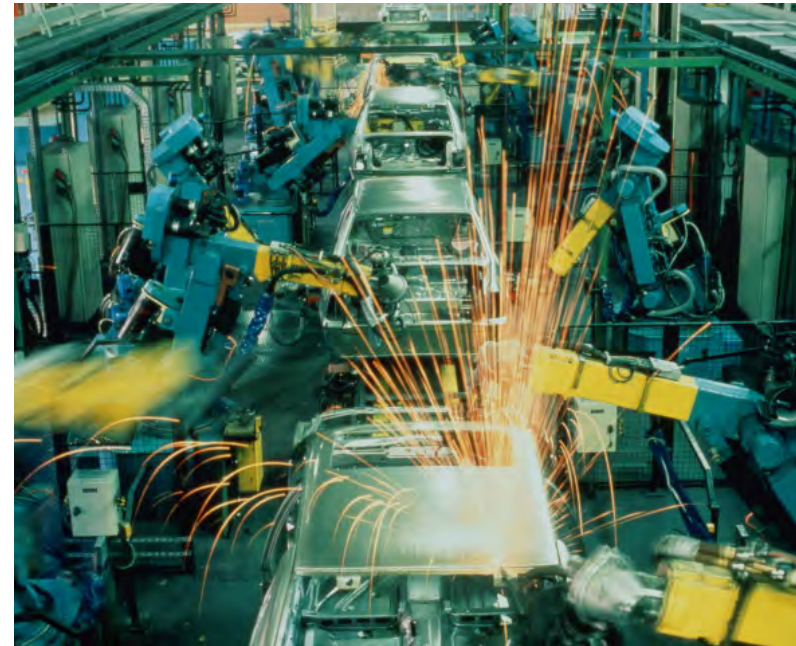
CMA

Certified Management Accountants™

- ✓ **Real-time machine monitoring (OEE + DNC):**
 - ✓ **Cost-effective, Fast ROI**
 - ✓ **Practical (automated + standardized)**
 - ✓ **Proven System means minimum risk**
 - ✓ **Enterprise Scalable**
- ✓ **Enables Lean Manufacturing**
- ✓ **Leverages existing infrastructure**
- ✓ **Enhances Competitiveness**

Next Step?

Proof of Concept



The First Step

MEMEX AUTOMATION Automating the Automation
OEE+DNC Software • CNC Memory • Machine Monitoring

Trial Pilot for Machine Monitoring

Improve Manufacturing Productivity

Memex understands the need to be able to "visualize" how our machine monitoring system works, relating it to your plant and specific machine or work cells. To that end we have found the best way to experience machine monitoring and OEE data collection is to physically connect our machine monitoring solution to one of your machines & see it in operation directly.

Memex offers a Trial Pilot program in preparation of your planned plant installation project to ease your assessment of the viability and business benefits of our machine monitoring solution. It is a pre-packaged trial pilot program involving our industry leading Universal Machine Interface hardware and latest generation OEE Productivity software as well as remote installation support services to make it work. The trial pilot process allows you to experience our system dynamically, in anticipation of your larger plant operation. When you choose to proceed with a larger plant installation project, 100% of the cost of the pilot is credited to future purchases.

Typically, our customers utilize our machine monitoring OEE solution to increase productivity and efficiency, improve floor anytime between 10 and 25%. This is accomplished by leveraging real-time data to drive your continuous improvement initiatives.

The terms for our trial pilot are as follows:

1. Memex will provide you with a trial pilot kit.
2. We will provide you with a system to make CNC Software (if applicable).
3. We will provide you with a copy of our OEE or CNC Software (if applicable).
4. We will provide you with a copy of our software that allows connection to your machine.
5. We will provide you with a copy of our software that allows connection to your machine.
6. We will provide you with a copy of our software that allows connection to your machine.
7. We will provide you with a copy of our software that allows connection to your machine.
8. We will provide you with a copy of our software that allows connection to your machine.
9. We will provide you with a copy of our software that allows connection to your machine.
10. We will provide you with a copy of our software that allows connection to your machine.

Installation support provided by Memex:
Telephone and internet based support.
Delivery will be in 2-3 weeks so as to allow everyone time to set-up the project.
60 day duration to review our product and assess the benefits.
Should on-site services be requested for initial installation, time & travel expenses will be billed.
\$5,000 deposit, pre-paid, which will be 100% credited to the future cost of the project.
60 day block guarantee will apply if the equipment is returned within the 60 day timeframe & the machine monitoring solution fails to deliver the anticipated benefits by mutual agreement.

You, the Customer are responsible for the following:

1. Providing access to a machine to connect our monitoring equipment to.
2. Designate a Project Leader and allocate a machine maintenance resource to assist in installation.
3. Provide a Computer with Windows 7 or Microsoft 7 operating system and up to date service packs.
4. Ethernet connection at the machine and the computer and access to the internet, for remote support.
5. Provide reasonable production testing information such as production standards.
6. Defining a scope of measurement to assess the success of the trial pilot.
7. Outfitting the process to deploy this technology in a larger project post the plant and/or company.

Consideration should be given to the types of things to be monitored, up to 8 digital inputs.
Typically, we can monitor hardwired inputs (2-30 VDC) such as In Cycle, Alarm, E Stop, Feed Hold, M00 - Block Stop, M01 - Optional Block Stop, M02 - End of Program, M30 - Call Sub-Program, Part Complete, Part Good and Part Rejected, Repeat Reason Code.
Standard reporting, dashboard and normal machine monitoring functionality is included.

We can likely track and/or configure machine functional information that may be desired, such as running too slow alarms, program minimum alarms and report choice all with our utilities and the software, which will be part of the standard trial pilot. Should any specific functionality beyond our standard be required, such as ERP interface, special reporting, implementation, we would be pleased to access those as part of the larger complete installation project.

At the end of the trial pilot, the equipment to be returned to Memex or retained as part of a larger project. To proceed and explore the benefits of machine monitoring, please contact the Memex Sales team

MEMEX AUTOMATION
Manufacturing Connectivity Solutions
Memex Automation Inc. 3425 Harvester Road, Suite 200, Burlington, Ontario L7N 3N1 Canada
Phone: (905) 635-1540 Toll Free 866-573-3092 sales@memex.ca www.memex.ca

MEMEX AUTOMATION Automating the Automation
OEE+DNC Software • CNC Memory • Machine Monitoring

Lean Implementation Solution Road Map

A 12 Step process to Increase Manufacturing Efficiency in the Plant Using Lean Six-Sigma Principles

Plan

1. The Customer and Memex will:
 - Pick a machine to implement the pilot project
 - Typically, this would be a critical machine in the plant case scenario requiring detailed analysis.
2. Install Memex equipment and start a pilot project.
 - See the pilot trial project installation plan of responsibilities document

Availability Metric Analysis

Capture utilization data for action by manufacturing engineers.

The Manufacturing Engineer and Memex will:

3. Choose downtime reason codes and put in the system.
 - Develop the information for a "before" scenario.
4. Collect data for typically one to five days.
 - Dissect the data so it is meaningful.
 - Pareto's with sub-pareto's for graphical representation

The Manufacturing Engineer and Lean Specialist will:

5. Analyze and interpret the data, propose a solution, using Lean techniques.

MEMEX delivers reports, see the area that needs investigation.

MEMEX AUTOMATION
Memex Automation Inc. 3425 Harvester Road, Suite 200, Burlington, Ontario L7N 3N1 Canada
Phone: (905) 635-1540 Fax: (905) 631-9640 sales@memex.ca www.memex.ca

60 days of improved Efficiency

- **More value than buying a new machine.**
 - By measuring RPM – Real-time Performance Management
- **Increase capacity 10+%, saves machines, space, labor & more.**
 - Increase profitability 60+%
- **Competitive advantage, retain and capture more customers**
 - Validation, traceability, efficiency, accurate data, lower costs.
- **Visibility for everyone means better performance**
 - Culture of efficiency means extend job security
- **For every day you wait – it is money not recovered = lost.**

RPM + Financial OEE = WIN – WIN – WIN

Win  **Lower customer prices**

Win  **Increase company profits**

Win  **Extend Job security**



Thank You



A Proven Solution



Case Study

Aerospace



Lean Implementation Precision Machining

Company Profile

Acotec S.L. is a European company dedicated to the manufacture of precision aeronautical components. An experienced and quality focused enterprise. Acotec has established itself as a leader in aerospace manufacturing. Their innovative production processes have propelled them into the vanguard of the European aeronautical manufacturing industry. Acotec is a high demand, fast cost provider to notable aerospace companies such as Airbus, EADS, Cass. Composites International S.A., CESA and AC aerospace s.a. and Indra.

Business Situation

operations, using their delivery system for 1 system for 10 in Spain, or on client



Case Study

Tosoh SMD, Inc.

Improving Machine Utilization with Automated OEE



Company Profile

Tosoh SMD is "The Global Leader in Target Technology" as demonstrated in China City, China, and in a leading plant in their industry with many thousands of visitors to manufacturers in the semiconductor, display, solar, and large scale coating markets. Through advanced engineering and state-of-the-art equipment, they provide quality products for leading manufacturers worldwide. Tosoh is a high value manufacturer with an extraordinary reputation for leading manufacturing excellence. Tosoh is a high value manufacturer with an extraordinary reputation for leading manufacturing excellence. Tosoh is a high value manufacturer with an extraordinary reputation for leading manufacturing excellence.

Business Situation

The company supplies specialty materials marketed to a high degree of reliability. As they are the market leaders in their industry, with many thousands of visitors to manufacturers in the semiconductor, display, solar, and large scale coating markets. Through advanced engineering and state-of-the-art equipment, they provide quality products for leading manufacturers worldwide. Tosoh is a high value manufacturer with an extraordinary reputation for leading manufacturing excellence. Tosoh is a high value manufacturer with an extraordinary reputation for leading manufacturing excellence.

Technical Situation

There was an older collection system in place on the shop floor to track any loss of material. The company supplies specialty materials marketed to a high degree of reliability. As they are the market leaders in their industry, with many thousands of visitors to manufacturers in the semiconductor, display, solar, and large scale coating markets. Through advanced engineering and state-of-the-art equipment, they provide quality products for leading manufacturers worldwide. Tosoh is a high value manufacturer with an extraordinary reputation for leading manufacturing excellence. Tosoh is a high value manufacturer with an extraordinary reputation for leading manufacturing excellence.

Solution

To improve efficiency, machine utilization, ensure quality and maximize the OEE systems were an ideal choice as the main inherent risk in tracking any loss of material. The company supplies specialty materials marketed to a high degree of reliability. As they are the market leaders in their industry, with many thousands of visitors to manufacturers in the semiconductor, display, solar, and large scale coating markets. Through advanced engineering and state-of-the-art equipment, they provide quality products for leading manufacturers worldwide. Tosoh is a high value manufacturer with an extraordinary reputation for leading manufacturing excellence. Tosoh is a high value manufacturer with an extraordinary reputation for leading manufacturing excellence.



Case Study

Precision Machining

Rose Integration

Improving Overall Plant Efficiency with Automated OEE

Company Profile

Rose Integration is a major supplier of precision machined components and complex mechanical assemblies to the defense and aerospace markets. With their headquarters residing in Carleton Place, Ontario, Rose Integration is able to manufacture and distribute many different types of components that are able to be used in the Defense/Security, Mining and Aerospace, Rail and Communications markets, all the while maintaining their reputation for having a high quality product and demonstrating excellent product traceability. Founded in 1980, Rose Integration operates 24/7 and is centrally located to serve their customers in Ontario, Quebec, and Northeastern U.S. They are certified to quality standards AS9100 Revision C and ISO 9001.

Business Situation

Rose Integration is well known throughout the industry for machining medium to high complexity components and specializes in working with difficult and rare materials such as Monel, Inconel, titanium, and Titanium. Each job at Rose Integration undergoes a stringent quality assurance process to assure accuracy and precision to the client's specifications. This process begins with Advanced Quality Planning (AQP), and continues through in-process inspections, ending with a final inspection. Rose Integration has made sure that Continuous Improvement has become an integral part of their quality culture. They have adopted the philosophy of "support the internal Customer", as the machine operator is most important and therefore the focal point of efficiency of the entire plant.

Technical Situation

Rose Integration was a traditional manufacturing company that had 30 machines all



Case Study

Large Equipment

Vermeer Corporation

Improving Machine Utilization with Automated OEE

Company Profile

Vermeer Corporation is considered one of the greatest contributors to the industrial and agricultural industry. With its inception in 1948, this family owned business based out of Iowa, began to manufacture a multitude of machines which would ease the amount of manual labor required in the agricultural industry. In 1971, Gary Vermeer invented the first large round baler, revolutionizing how they would be harvested. As the decades progressed, the demand for agricultural and industrial equipment increased, and Vermeer met the demands of their customers with vigor. They manufacture machines ranging from wood chippers to log grinders, from round balers to surface mining equipment, from tractors to horizontal directional drills, all the while maintaining their worldwide reputation for innovation and quality. Currently, Vermeer has operations in not only the U.S., Netherlands, Brazil, Germany, Singapore and China, manufacturing a wide variety of equipment for more than eight dozen industries worldwide.

Business Situation

To compete in a global market, Vermeer decided to embrace the Lean philosophies and Continuous Improvement initiatives as core disciplines in their relentless search for improvement and cost reduction - a journey that began in the mid-80s. Lean supporters at Vermeer were faced with the task of streamlining operations between the seven production facilities on Vermeer Road located in Pella, Iowa, US. This included identifying the bottlenecks to the process of manufacturing, implementing any changes needed to foster improvements, and optimizing an capacity to improve efficiencies. Over time, each facility had evolved in its operation as separate business units. The new approach was to revitalize the overall enterprise by grouping operations into more logical cells to reduce redundancy and improve the flow of work. Vermeer anticipates that within the next few years, their capacity may account for 50% of their revenue, so it was vitally important that their manufacturing operations run as smoothly as possible.

Technical Situation

As Vermeer began making changes throughout their operations, they realized that there was a lack of visibility on their shop floor. They were using the Kanban system, which provided a daily requirement of parts to be machined, or a product to be assembled, but it lacked the incentive to drive manufacturing and meet the demands of customers in a timely fashion. They had no formal system in place that could accurately measure productivity, labor utilization, output of machines, and facilities in general. From a management perspective, there were no reporting metrics or quantitative tools of efficiency. One of the requirements for the new system was that it must be an enterprise based system utilizing the latest software tools and built on a robust scalable database driven platform. It was to be deployed across the enterprise to provide a standard monitoring and reporting tool for reliable, effective feedback to Lean and Continuous Improvement initiatives.

Solution

The Vermeer mandate to Lean philosophy and Continuous Improvement, reducing waste, and improving quality, could only be realized through effective observation and response. Vermeer champions recognized that to manage for efficiency, they had to first measure actual events at the machine. They estimated that there was vast potential for improvement, but without immediate data as proof, they were challenged at promoting management adoption of initiatives. Vermeer then underwent a formal buying process, looking very carefully at the many automated data collection products and their suppliers, with their main interest being in how they would be able to track the Utilization metrics of OEE (Overall Equipment Effectiveness). The company that would fit all of the Vermeer



Case Study

Aerospace

Improving Machine Utilization with Automated OEE

Company Profile

Héroux-Devtek is considered to be a leading provider in the manufacturing of landing gear for aircraft products worldwide. With their headquarters residing in Longueuil, Quebec, Héroux-Devtek has an efficient location across North America which enables them to design and manufacture aircraft landing gear, air-structure and other industrial components. Their near office is a platform of completed activity - the centralized, internet driven networked control the flow of information via Enterprise Resource Planning systems (ERP), and accounting systems networked directly to the machines all help run the international aerospace and industrial process.

Business Situation

Héroux-Devtek is a company who is constantly optimizing its precision manufacturing and design engineering capabilities in order to produce highly reliable products and tested articles for its customers in the global aerospace and industrial sectors. This optimization is done in terms of efficiency on the shop floor. In order to meet the demand to run smoothly to deliver both quality air and a method of measuring machine utilization as a factory floor as they had in their front off

Technical Situation

For Héroux-Devtek, the cost of raw iron is essentially the same for all machines. The biggest differentiator between the machines being used were very high in communicating with each other. Her increase efficiency in all areas of mach

Solution

The goal of Héroux-Devtek was to improve its problems in real-time. The MEMEX OEE system with full transparency of OEE provided, but ultimate decision Héroux-Devtek decided to install Mer plants, with three more plants to install

Solution

MEMEX OEE and DNC products are software, high speed network connectivity, Web-based control that all tool is monitored from any networked

Technical Situation

Global Wood operates CNC panel saws, drilling and routing machines, and edge banding machines with material collection systems in conjunction with operators with data collection in each operation. The ability to track machines was limited to manual collection of data. Each operator and plant manager was required to manually enter data into a spreadsheet.

Solution

Global Wood recognized that to manage for efficiency they had to first measure actual events. They undertook a major OEE initiative. They also realized that by tracking efficiency in the shop, there would be a room for further improvement. The initial pilot was very successful, so the factory committed further to roll out the solution across the entire plant. And in only a short time, the factory committed further to roll out the solution across the entire plant. And in only a short time, the factory committed further to roll out the solution across the entire plant.

Solution

Global Wood selected a pilot project with one machine at its main plant and very quickly saw improved results in the overall OEE efficiency. They also realized that by tracking efficiency in the shop, there would be a room for further improvement. The initial pilot was very successful, so the factory committed further to roll out the solution across the entire plant. And in only a short time, the factory committed further to roll out the solution across the entire plant.

Print Sheet to Default Printer		Print Sheet to Adobe PDF		MEMEX AUTOMATION	Input Current Values	Proposed New Calculated Values	Delta / Shift / Machine	Delta - Totals / Year / All Machines	Cost Savings on an Annual Basis	
SMALL	MEDIUM	LARGE								
Choose your level of Incremental Change										
OEE ROI Calculator										
GENERAL INFORMATION:										
Days / week plant is in operation					7					
# of Shifts / Day worked					3					
# of Hrs / shift worked					8					
# of Machines in enterprise connected to Memex					40					
Estimated # of Operators on the Shop Floor for # of machines being Monitored					40					
Estimated True Cost per Hr (Operator, Overhead, and Machine amortization, in Dollars)					\$145.00					
Estimated Hourly Labour cost per Operator (Burdens In)					\$40.00					
Estimated Gross Profit per Part Made (in Dollars)					\$5.00					
Estimated Annual Gross Revenue (in Dollars)					\$60,000,000.00					
Estimated Annual Expenses (in Dollars)					\$54,000,000.00					
AVAILABILITY or UTILIZATION:					95.5%					
Number of coffee Breaks / Shift - NOT INCLUDED IN OEE CALCULATIONS					2					
Duration of coffee Breaks (Minutes) - NOT INCLUDED IN OEE CALCULATIONS					10					
Duration of Lunch Breaks (Minutes / Shift) NOT INCLUDED IN OEE CALCULATIONS					15					
Estimate of Unplanned Downtime per shift (Minutes / Shift, per Machine)					20					
Estimate of Avg Setup Time / Job (Included in OEE Calculation)					0					
Estimate of # of Jobs per shift, per machine					1					
QUALITY:					95.2%					
Estimate # of Good parts made per Shift (Average Shift in any week)					200					
Estimate # of Total parts made per Shift (Average Shift in any week)					210					
PERFORMANCE or AVERAGE STANDARD RATE:					87.5%					
Estimate of Max. Output of parts / shift (@100%, No Downtime Accounted for) - Average					240					
Estimate of Actual Output of Parts / Shift - Average					210					
CALCULATED OEE % (Availability X Quality X Performance)					79.6%					
Typical improvement Areas - across the enterprise (Based on Actual Memex Deployments and relevant customer feedback)					Estimated % increase Expected					
					SMALL	MEDIUM	LARGE			
Shop Floor Visibility - Via email alerts and enterprise					1.00%					
Operator Productivity Increases - Manager					1.00%					
Reduction of Downtime - Adoption of Lean					0.50%					
Minimize Rejects - Root Cause Analysis - Thresholds					0.50%					
Labor Productivity Tracking (By product / Category)					0.50%					
Usage based Preventative Maintenance - Cycle					0.00%					
Reduction in Setup time - Can measure consumed vs. allotted, React quickly to offside conditions					0.00%					
Totals										
ROI is Based on a Small Incremental change in Enterprise Wide OEE										
Existing Gross Revenue (As input above)					\$60,000,000					
Existing Expenses (As input above)					\$54,000,000					
Existing EBITDA Profit (Revenue - Expense)					\$6,000,000					
Increase in Gross Revenue (Based on increased capacity attributed to OEE improvement)					\$1,745,834					
Decrease in Total operating Expenses Due to savings attributed to OEE improvement)					-\$42,224					
Increase in EBITDA Profit Due to Increased Revenue and Decreased Expenses					\$1,788,058					
Cost of a Memex System - Installed per Machine - Average					\$5,995					
Total cost of Deployment (Based on # of Machines)					\$239,800					
Savings attributed to OEE centered Continuous Improvement					\$1,319,864					
# of Weeks till return of entire Investment in memex Technology is achieved					9.4					
Instructions: To model and calculate your specific unique ROI value equation utilizing Memex's leading edge UMI based, OEE centered Technology, simply key in the areas colored in Purple (Column A) with the data requested. For a quick view of the associated benefits expected, either click on the "SMALL", "MEDIUM", or "LARGE" buttons located at the top right (Cell A1), or located in cell A28 to preload the Blue Area (Column A) with (3) typical pre-defined incremental OEE Improvement datasets. If you wish to model your own dataset, simply key the data into the Blue area. The % resultant changes will be shown in Green and Red in Column H. The Associated Cost reduction benefits in Dollars are shown in Green in Column J. Total Savings are shown in Cell B46, along with # of Weeks to full payback, in Cell B47. If Gross revenue and expense numbers were provided, true OEE adoption benefits can be seen in Cells B/C 41 to 43 in Dollars and Percentages.										
					97.5%	2.0%				
					19.6	-0.4	291	\$42,224		
Units ----> Total DT in Min / Shift						Reduction in Min / Mac / Shift	Total Hrs / Yr Saved	Cost Impact in Dollars / Yr		
					95.7%	0.5%				
					201.1	1.0	45864	\$229,320		
Units ----> New Good Parts / Shift						Increase in Good Parts / Shift	Increased Qty Good Qty parts / Yr	Cost Impact in Dollars / Yr		
					89.5%	2.0%				
Units ----> New # of Parts / Shift						Increase in Parts Produced / Shift	Increased Qty Parts / Yr	Cost Impact in Dollars / Yr		
					214.8	4.8	209664	\$1,048,320		
					83.5%	4.0%	SMALL OEE INCREASE	\$1,319,864		
					OEE Area Affected					
					Utilization	Performance	Quality			
					1.00%					
					0.50%	1.00%				
						0.50%				
							0.50%			
					0.50%	0.50%				
					0.00%					
					0.00%					
					0.00%					
					2.0%	2.0%	0.5%			
					2.91%					
					-0.08%	Dollars / Percentage	New Available Capacity, Equated to Dollars)			
					29.80%	Dollars / Percentage - (Based on Capacity)				
Unit Price per Machine										
Total Savings Based on Small Incremental Change										
					Profitability Increase		Weeks for Payback			

Assumptions

Expected Efficiency Improvement

\$ Savings

OEE Increase

Profitability Increase

Weeks for Payback

- 1992 Co-Developed Bubble Memory Replacement for Fanuc 6/9/11/12
- 1993 Created Fanuc 0 & 10 CMOS Memory Upgrades
- 1994 Created the first High Speed Loader for Fanuc 6
- 1995 First Released the popular Mx1000 BTR
- 1996 Enabled a Network connection to Fanuc 6/11 – Invested in Spectrum
- 1997 Started Successful Caterpillar Flexible Manufacturing Retrofit
- 1998 Developed Fanuc 16/18 Memory Upgrades - Also Started retrofitting
- 1999 First CNC Web Connection – Joined OMAC
- 2000 Developed advanced DNC with R&D efforts
- 2001 Became one of the Largest DNC Vendors in North America
- 2002 Memex focuses on Research & Development
- 2003 Memex launches its Mx1100 Universal Machine Tool Interface
- 2006 Memex invents Dynamic Computer Aided Machining
- 2007 Memex invents Tool Tip Automation
- 2008 Astrix Group of companies formed - assets together, MTConnect TAG
- 2009 Launch of Integrated OEE+DNC machine monitoring and control
- 2010 MTConnect leads in connecting legacy machine tools
- 2011 Launched new AxOEE enterprise solution
- 2012 Memex enters its accelerated Commercialization Phase

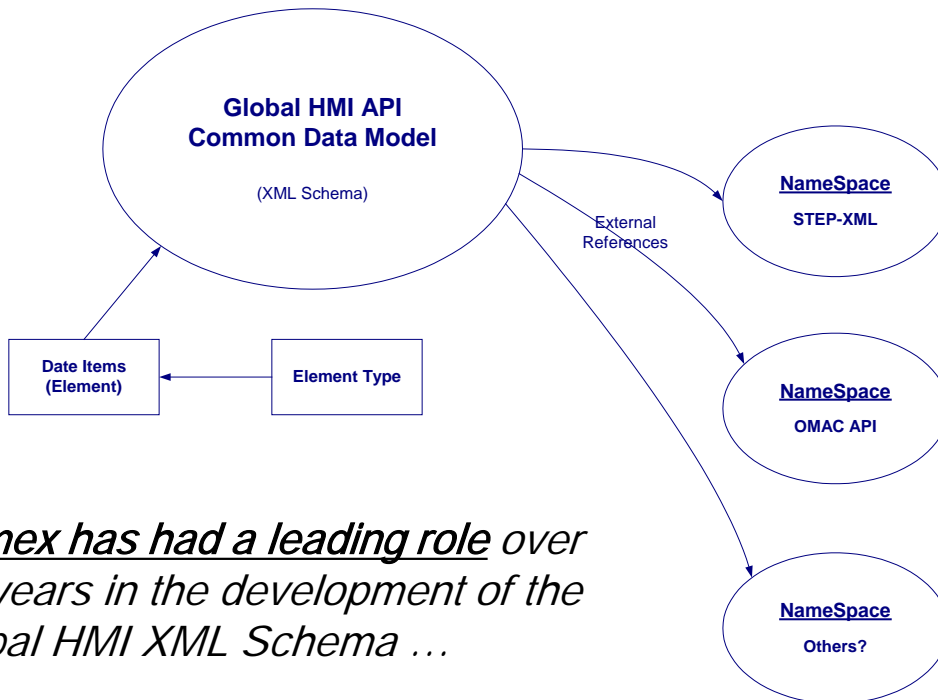


Leaders in Connectivity



Open
Modular
Architecture
Controls

OMAC
USERS GROUP



Memex has had a leading role over the years in the development of the Global HMI XML Schema ...

Group	Data item	Data type or Element type
TranslationalAxis	current_position	length_measure
	jog_speed	Linear_velocity_measure
	Servo ON status	Boolean
	Stroke_limit or travel_limit	length_measure
	programmed_strokelimit	length_measure
	current_limit	current_measure
	progammed_current_limit	current_measure
RotationalAxis or Spindle	current_velocity	angular_velocity_measure
	current_position	plane_angle_measure
	target_velocity	angular_velocity_measure
	current_limit	current_measure
	programmed_current_limit	current_measure
AxisGroup	feedrate	Linear_velocity_measure
Workpiece	origin	CoordinateFrame
	offset	CoordinateFrame
Tool	offset	CoordinateFrame
ON_OFF_Device	Spindle_clamp_state	Boolean
	Tool_clamp_state	Boolean
	Flood_coolant_state	Boolean



For Immediate Release: September 18, 2010

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MTConnect® Institute Announces Legacy Machine Tool Connectivity Working Group

MTConnect® Institute Announces Legacy Machine Tool Connectivity Working Group

Chicago, Il. ... Today at the International Manufacturing Technology Show, the MTConnect® Institute proposed the establishment of the Legacy Machine Tool Connectivity Working Group (WG). This group will be essential in addressing the very important issue of providing best practices and overall guidance for the physical connectivity of the thousands of legacy machine tools in manufacturing shops around the globe. **The group will be lead by David McPhail, President & CEO Memex Automation Inc., and John Turner, Director of Technology for FA Consulting and Technology, as the co-chairs and consist of manufacturing equipment providers, ISVs, consultants, and users.**

Dave Edstrom, President and Chairman of the Board for the MTConnect Institute stated, "This proposed





Steelcase
Steelmasters
Samuel Steel
Steel Centres Machinery
Steel Fabricating & Welding Co. Inc.
Steelfabco
Bay City Steel Company Ltd.
National Steel Car Ltd.
Arcelor-Mittal
Summo Steel
Metal Components Inc.
Metalumen Mfg. Inc.
Senior Flexonics - Metalfab Division
Templeton & Sons Metal Products
Triple Metal Products Ltd.
Aar-Kel Moulds Ltd.
AG Anderson Ltd.
Eastern Mould & Die Co. Ltd.
Phillips Tool & Mould
Cincinnati Mold Incorporated
Hi-Tech Mold & Eng., Inc.
Metric Mold Inc.
Mold-Masters Ltd.
Precision Mold & Tool
Romeo Mold Technologies
Sagittarius Mold Inc
Snider Mold Co. Ltd.
Superior Mold & Die
Wentworth Mold Inc.

A&E Precision Machining Limited
AJ Machine & Mfg. (1982) Ltd.
Arvin Special Machinery Ltd.
Bidwell Machining Inc.
Black Diamond Machining Inc.
Champion Road Machinery Co. Ltd.
Cool Cut Machining Enterprises
Eagle Tool & Machine Company
Harvard Machine Ltd.
Hopkins Machine Corporation
J & R Machine Company
Jarco Machine Products
JRBS Machine Inc.
K.L.P. Machining
Keldco Machine Works Ltd.
National Feed Screw and Machinery
New West Machine Tool Corp.
Nirmal Machine & Tool
O'Hara Machine & Tool
Paragon Machine
Perth Precision Machining & Mfg.
Peyton Machine & Tool Co.
Royal City Machine Ltd.
Stahl Machine - Thermoform Concepts
Starke Machine Co.
Victor Machine & Mfg Ltd
Virginia Machine & Supply Co., Inc.
Williams Machineworks Inc.
Yamazen Machine Tools

Aerospace



Major Aerospace Companies use our OEE + DNC Solution now ...

- **Common interface – reduced maintenance (designed for the factory floor)**
- **Every machine a node on the corporate network**
- **Link to ERP and other MES systems**
- **Enable “broadband on the factory floor”**

This Memex OEE + DNC solution addressed the root problem in our industry – closed hardware & software architectures.

The Universal Machine Interface addresses this fundamental problem in a cost effective way for all controls...





Manufacturing Connectivity Solutions™

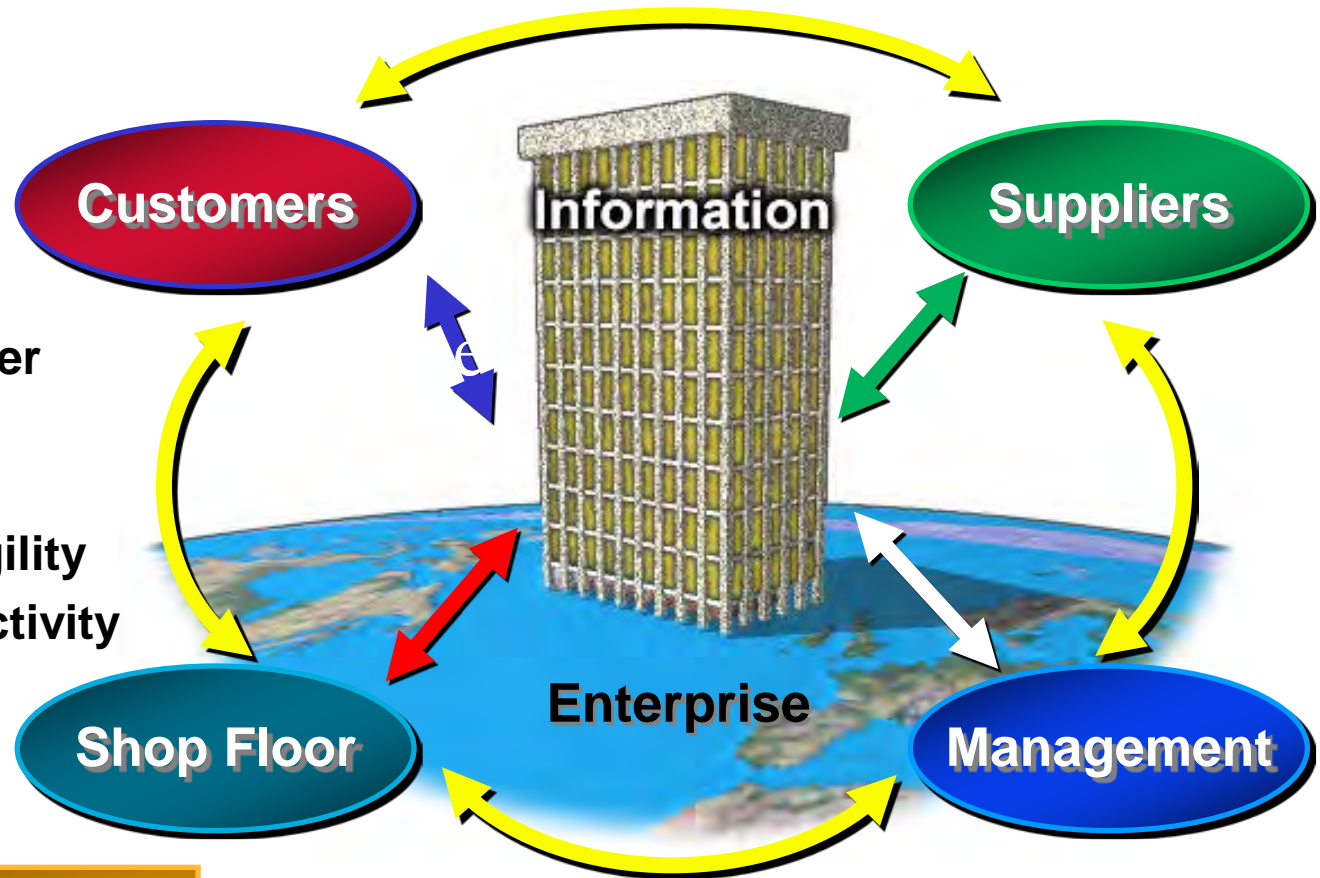
- **“Productivity growth is the cornerstone of economic growth and wealth creation.”**
 - **Fraser Institute**
- **“Much lag in productivity can be traced to a lack of ICT (Information and Communications Technology) in companies, and can account for 60% of productivity gap.”**
 - **U of T & London Business School**
- **“Manufacturers often lack the metrics required to assess their organization’s productivity, and fail to make these measures visible even when they’re available.”**
 - **Grant Thornton, Profitability via Productivity paper.**

➔ Productivity *directly* affects Profitability

The Drive Towards Connectivity

Drivers Include:

- Higher customer satisfaction
- Lower costs
- Competitive agility
- Greater Productivity



**Ubiquitous Connectivity
where the Business
Runs on the Network**

Overall Equipment Effectiveness

OEE % = Availability x Performance x Quality

Shows group or plant output as a percentage of maximum capacity

World Class = 85% (= 95% x 95% x 95%)

It is not uncommon to > 90%!

Availability %

Percentage of scheduled time that the operation is actually operating.

Availability % = Run Time / Scheduled Time

Performance %

Speed at which the Work Center runs as a percentage of its designed speed or ideal cycle time or most often considered the “Standard”.

Performance % = (Parts Made x Standard) / Run Time

Quality %

Good Units produced as a percentage of the Total Units Started.

Quality % = Good Units / Units Started