Production Area QC: Automating Processes to Improve Quality and Efficiency

SPEDE Technologies

Key Benefits of Automating

1. Automate or control redundant tasks that cause operator errors

2. Simplify procedures to reduce labor, inefficiency

3. Software-enforced Standard Operating Procedures (SOPs) ensure consistent performance and account-ability -- every line, shift, day

4. Real-time 20/20 visibility into operations, including WIP, Production, Packaging, Labeling, Shipping

5. Automatically create detailed serialized Traceability records – backward/ forward

SPEDE Solutions Automate These Processes

1. WIP Components Tracking

2. Parts Identification

3. Parts Counting

4. Serialized Parts Labeling

5. Detecting Good Parts vs. Scrap

6. Production Reporting

7. Packing Containers/ Dunnage

8. Container Labeling

9. Parts Tracking

10. Shipping

11. Traceability – RAW, WIP, FIN

12. For Honda – Small Lot Store, Honda Batch

SPEDE
*Technologies*

Technology is Key to QC

SPEDE WiFi Solutions integrate a wide variety of technologies:

- Production Machine PLCs

- Vision Sensors

- Conveyors/ Diverters

- Weigh / Count Scales

- USB Camera systems

- OCR

- 2D Encoders, Etchers, Scanners

- Label Printers

- Touchscreen PC browser

- WiFi and Wired networks

- Interfaces to Host ERP, EDI, RAS, OEE systems

Vision Technology can ensure that Finished Parts are accurately Identified, Counted and Packed

Overview of SPEDE Automated Solutions
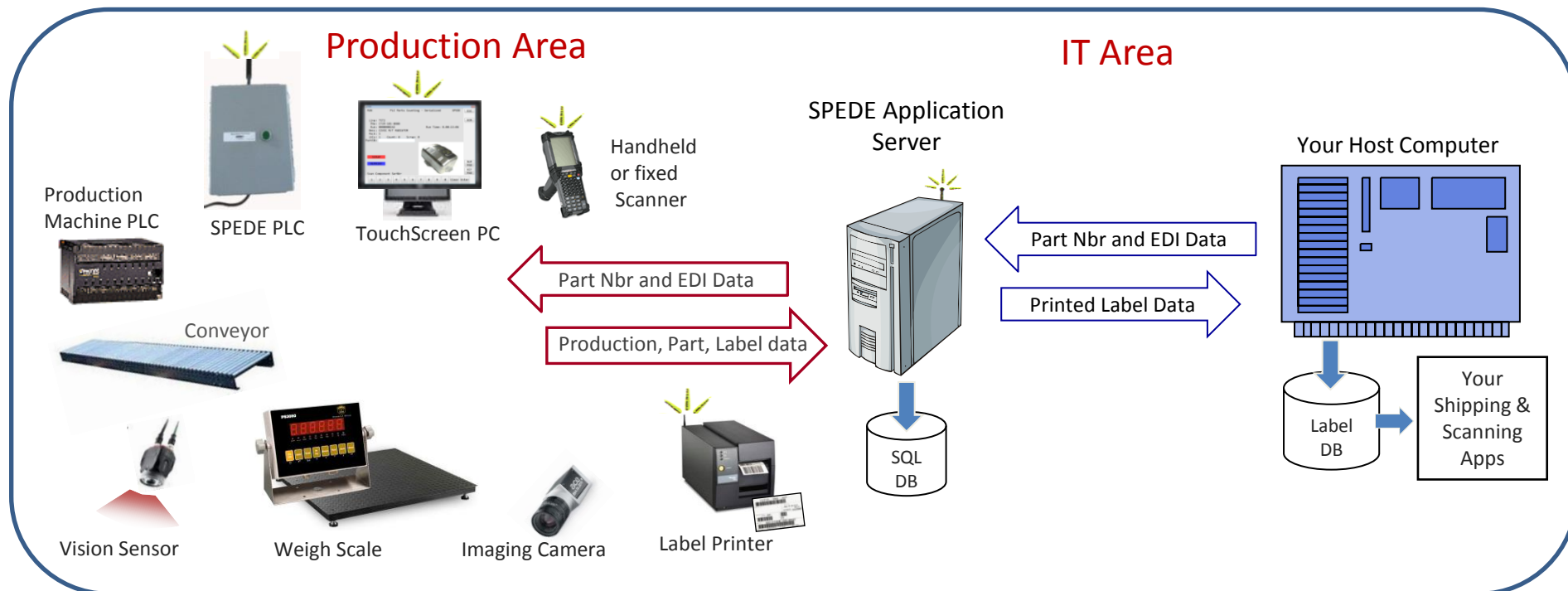
SPEDE Apps Interface to and Control Production Area Devices

- PLC, Touchscreen PC, Handheld Scanner, Vision Sensor, Scale, Printer, Imaging Camera

Prints Labels + Collects OEE Data

- Gets label data from host ERP, EDI, Release Accounting
- Time-stamps & logs printed label data, piece count, scrap & cycles data into SQL DB
- Printed Label Data is available to Host systems for Parts Traceability, OEE analysis, Shipping, etc.

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6 Advantages of SPEDE Automation

1: Error Prevention

- Identify good parts vs. scrap / divert the scrap

- Validate the correctness of a part at packing

- Validate the correctness of a machine tool at set-up

- Prevent mis-labeling of parts /containers

- Prevent scrap parts from being shipped

- Prevent incorrect parts / quantities in shipments

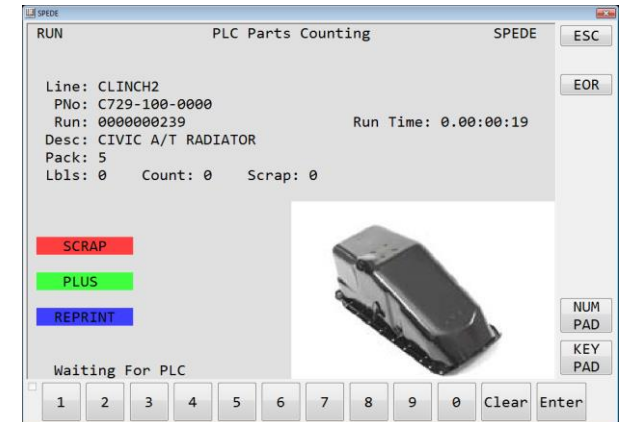- Prevent dunnage and kitting errors – under/ over packed

A Vision Sensor can detect the missing parts in this Jack Kit
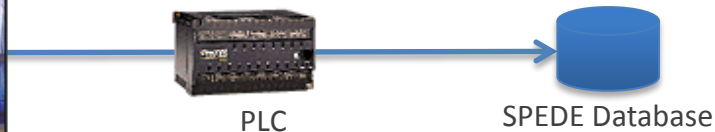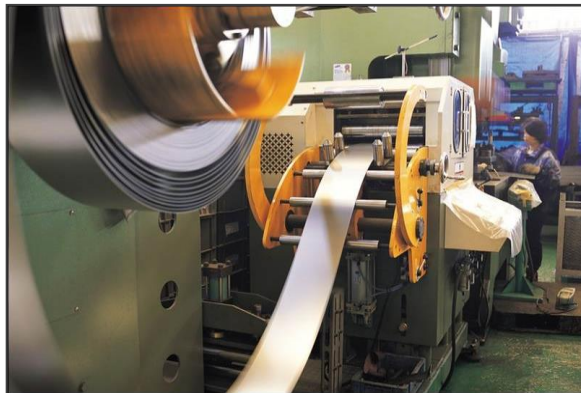
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6 Benefits of SPEDE Automation

2. Real-time Production Data

- For analyzing efficiency, monitoring actuals vs scheduled
- Use TouchScreen PC at line-side to view / edit
- Real-time piece counts, label status and run data
  - o Automatically counts both Good and Scrap pieces
  - o Automatically sends production data to your host systems


```
SPEDE
RUN              PLC Parts Counting          SPEDE    ESC

Line: CLINCH2                                         EOR
 PNo: C729-100-0000
 Run: 0000000239                  Run Time: 0.00:00:19
Desc: CIVIC A/T RADIATOR
Pack: 5
Lbls: 0      Count: 0      Scrap: 0


  SCRAP

  PLUS
                                                     NUM
  REPRINT                                            PAD
                                                     KEY
                                                     PAD
  Waiting For PLC
   1   2   3   4   5   6   7   8   9   0  Clear Enter
```

Line-side Touchscreen PC Displays Real-time
Parts Counting Data

PLC   SPEDE Database

Part Nbr	Description	Run Nbr	Start	Stop	Elapsed	Scrap	Good	Containers
C729-103-0000	ACCORD M/T RADIATOR	000012001	08:03:22	12:01:10	03:57:48	11	200	40
C729-103-0000	ACCORD M/T RADIATOR	000012004	13:01:06	17:38:57	04:37:51	19	240	48
C729-103-0000	ACCORD M/T RADIATOR	000012007	18:20:07	23:30:45	05:10:38	9	260	52
					13:46:17	39	700	140
C729-101-0000	CIVIC M/T RADIATOR	000012012	07:58:26	12:10:00	04:11:34	13	180	36
C729-101-0000	CIVIC M/T RADIATOR	000012016	13:12:35	17:28:20	04:15:45	8	160	32
C729-101-0000	CIVIC M/T RADIATOR	000012017	19:00:05	23:40:10	04:40:05	11	205	41

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6 Benefits of SPEDE Automation

3: Accurate Packing and Labeling

Automates the Processes of Identifying, Packing, Labeling Parts

- PLC supplies the part number / run data / count
- Counts only "good" pieces toward a pack count

Prevents Mis-labeling of Parts that Look Alike

Interfaces to Scales

- To Receive Accurate Piece Counts / Weights
- To trigger a container label when count/ weight is correct

Interfaces to Vision Sensors

- To count and verify the manufactured part is "good"
- To verify dunnage layer is correct
- To verify all components are in a Kit

Prints serialized label automatically

- When pack count/dunnage is correct
- Host ERP / EDI supplies label data
- Actual weights are collected and stored with label data in SPEDE SQL label database

Weigh Scale Can Trigger Labels to Print

SPEDE Technologies

6 Benefits of SPEDE Automation

4: Automatic Traceability by Component / Part / Container

- A serial number is linked to each Part's production data:
  - Production Machine, Run Date, Shift, Operator, Lot, Location, etc.
  - Container Serial Number(s) in which the Part was packed
  - All other Serialized Parts in a generalized Container

- Provides Traceability by Part, Lot, Container, Line, Run Date, etc.

- Forward Traceability from Production out to Customer

- Backward Traceability from Production back to Receiving, Raw Components, Supplier

Printed By: Dan Worthington
Report Date: 01/08/2013
Report Time: 08:35:00
Page: 1 of 1

Container Trace: 0319804-05088465

Part Nbr	Description	Run Nbr	Line Nbr	Create Date	Create By	Qty	Item S/N
C729-101-0000	CIVIC M/T RADIATOR	000012001	CLINCH2	11/05/2012	JSMITH	5	AB879762351
							AB879762352
							AB879762353
							AB879762354
							AB879762355

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6 Benefits of SPEDE Automation

4: cont'd: Serialized Traceability

- Part Serialization
    - Etching, labeling or 2D at line-side
    - Reading Part serial nbrs at each station

- Container Label Serialization

- WiFi handheld and forklift scanners can scan label at Shipping for traceability from production to Customer

- Enables focused recalls to a specific Lot / Container / Part Serial Nbr

Laser etching 2D Serial Number

Vision Scanner reading 2D Serial Number

Serialized Internal Labels

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5: Process Control and Accountability

- All SPEDE operations require the Associate to sign-in

- All transactions are retained and accessible in the SQL Txn DB

Sample Manufacuring Metrics Report

	OEE %	Earned DL Hrs	Actual DL Hrs	Net Var.	Labor Prdvty %	Mach. Util %	F.G. Scrap %	In-Proc. Scrap %
All Department Total(s)	83.4%	853	1,013	(160)	84.2%	87.8%	2.0%	1.0%

Total Parts	Good Parts	Scrap Parts	Available Time	Unscheduled Down Time	Machine Hours Worked	Actual Downtime Hours	Earned Machine Hours
28,304	27,583	721	261	20.05	229.42	66.02	223.53

Actual Man Hours	Man Hour Downtime			(S) Finished Scrap $	(SM) Misc Scrap $	(I) In-Proc Scrap $	Total Scrap $
770	242			$4,035.74	($59.51)	$2,076.35	$6,052.58

	Utilization %		Good Part %		Machine Efficiency %		Total Production $
OEE Factors:	87.8%	*	97.5%	*	97.4%		$205,285.19

	OEE %	Earned DL Hrs	Actual DL Hrs	Net Var.	Labor Prdvty %	Mach. Util %	F.G. Scrap %	In-Proc. Scrap %
5515 Crankshaft	95.2%	141	168	(27)	83.8%	82.3%	0.6%	0.2%

Total Parts	Good Parts	Scrap Parts	Available Time	Unscheduled Down Time	Machine Hours Worked	Actual Downtime Hours	Earned Machine Hours
885	880	5	21	2.92	17.28	6.72	20.11

Actual Man Hours	Man Hour Downtime	Shift Count		(S) Finished Scrap $	(SM) Misc Scrap $	(I) In-Proc Scrap $	Total Scrap $
121	47	3.00		$253.62	$0.00	$108.44	$362.06

	Utilization %		Good Part %		Machine Efficiency %		Total Production $
OEE Factors:	82.3%	*	99.4%	*	116.4%		$44,890.02

Typical Production Data stored in DB:
- Part Number
- Operator Nbr
- Shift, Date, Time
- WO Nbr
- Lot Nbr
- Machine Cycles, Cycle Timestamp
- Part Count: Good, Scrap, Re-work
- Machine Stats & Metrics, etc.

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6 Benefits of SPEDE Automation

6: Enables and Simplifies Honda MPR Compliance

- Pre-production
- Process Set-up
- Production / WIP
- Re-pack / Re-label
- Small Lot
- Pass thru
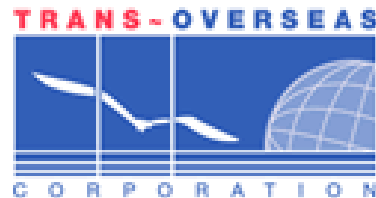- Shipping
- Accountability & Traceability

Meet a Few SPEDE Customers...

For More Information …

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