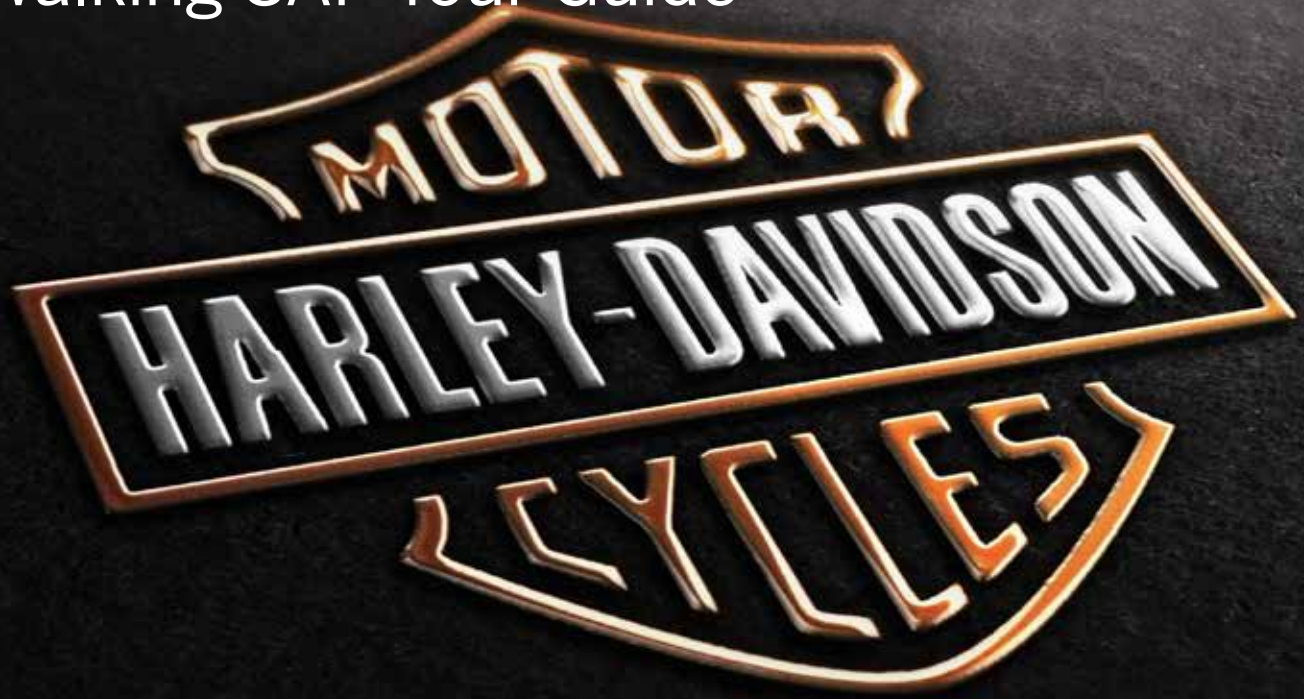# Harley Davidson
Walking SAP Tour Guide

"Four wheels move the body.
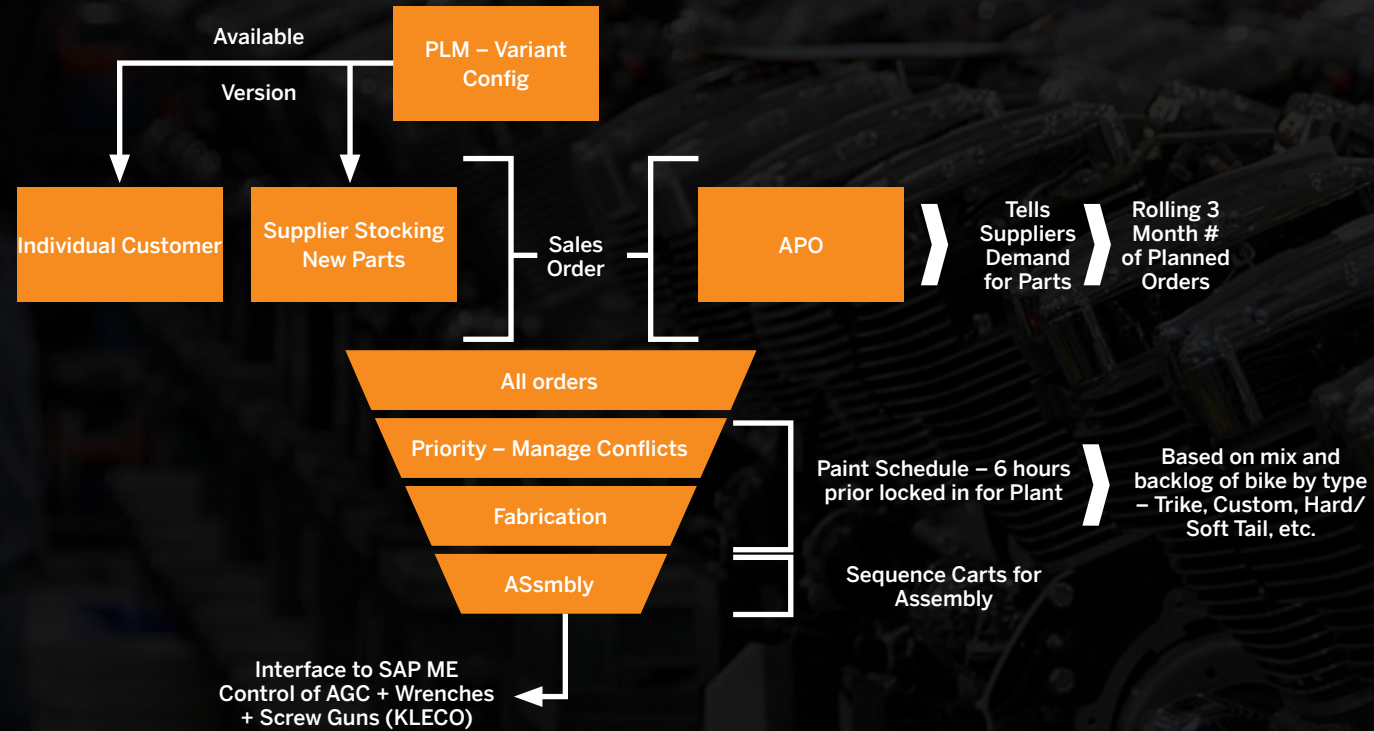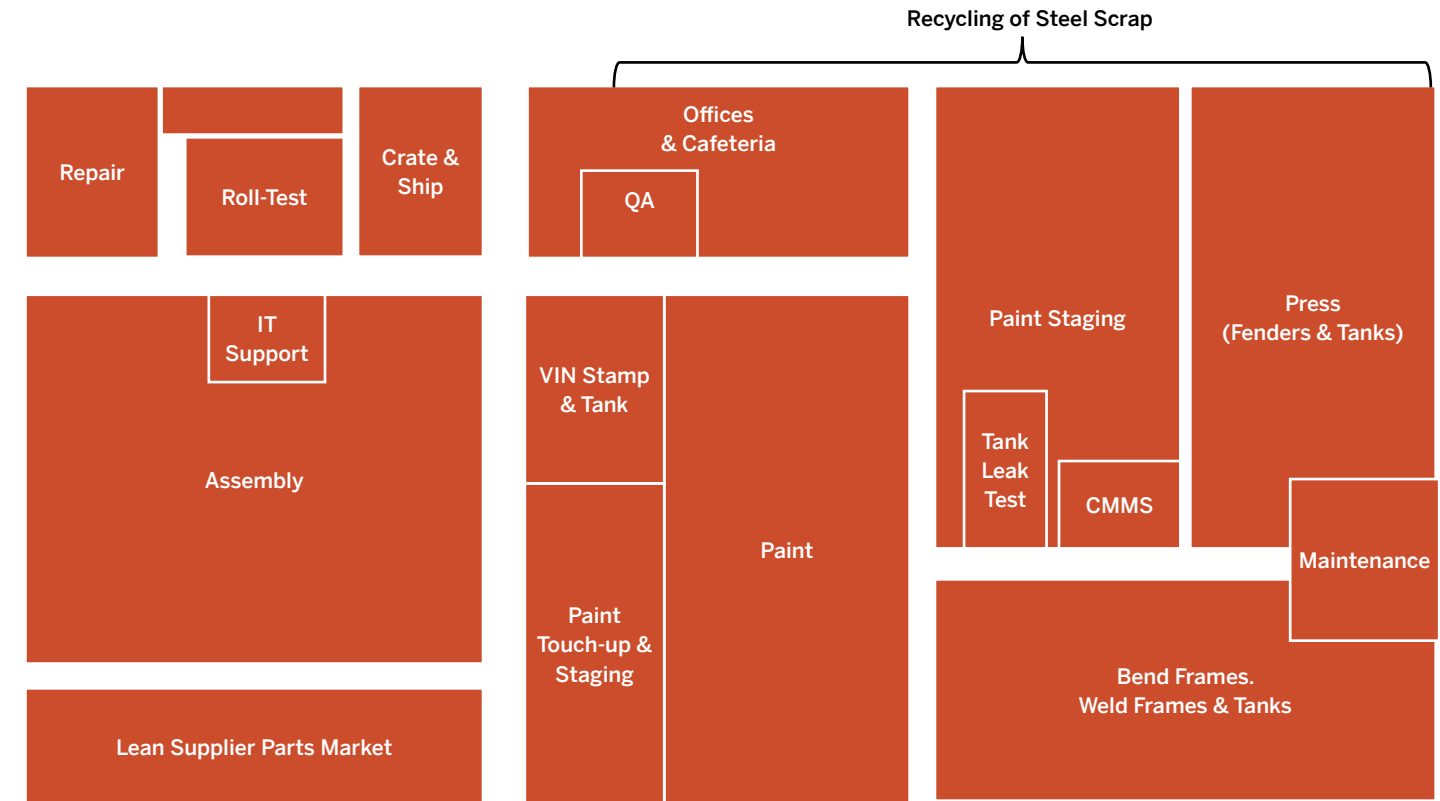Two wheels move the soul."

Welcome

WELCOME TO THE PLANT TOUR.

- What you will see.
- About the SAP & Harley relationship.
- Do we have any public press on what Harley has said about SAP?
- Use quotes . . . . .
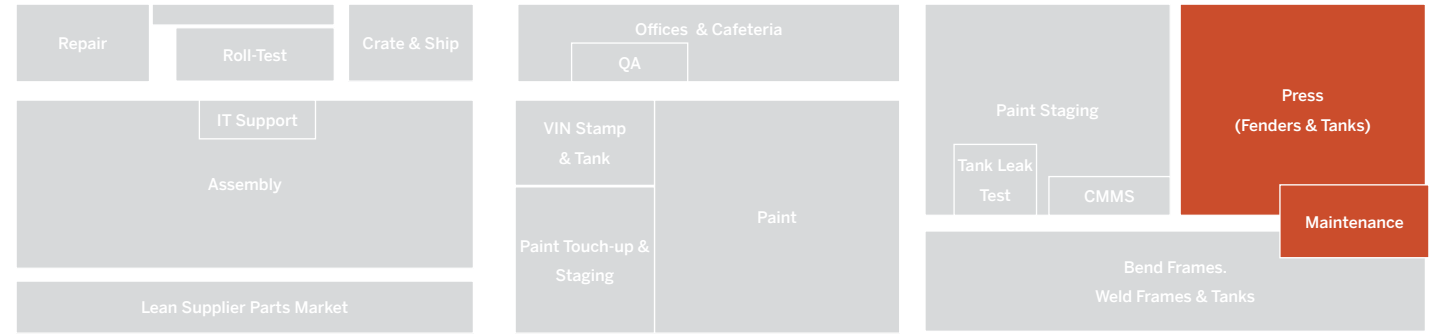- Overview of the solutions Harley has deployed. . . .

TABLE OF CONTENTS

A Day in The Life of an Order

Available

Version

PLM – Variant Config

Individual Customer

Supplier Stocking New Parts

Sales Order

APO

Tells Suppliers Demand for Parts

Rolling 3 Month # of Planned Orders

All orders

Priority – Manage Conflicts

Fabrication

ASsmbly

Paint Schedule – 6 hours prior locked in for Plant

Based on mix and backlog of bike by type – Trike, Custom, Hard/ Soft Tail, etc.

Sequence Carts for Assembly

Interface to SAP ME Control of AGC + Wrenches + Screw Guns (KLECO)

Harley Davidson Plant

Recycling of Steel Scrap

Repair

Roll-Test

Crate & Ship

Offices & Cafeteria

QA

IT Support

Assembly

VIN Stamp & Tank

Paint Touch-up & Staging

Paint

Lean Supplier Parts Market

Paint Staging

Press (Fenders & Tanks)

Tank Leak Test

CMMS

Maintenance

Bend Frames. Weld Frames & Tanks

Repair	Roll-Test	Crate & Ship	Offices & Cafeteria / QA	Paint Staging	Press (Fenders & Tanks)
IT Support			VIN Stamp & Tank	Tank Leak Test / CMMS	Maintenance
Assembly			Paint Touch-up & Staging / Paint		Bend Frames, Weld Frames & Tanks
Lean Supplier Parts Market					

Press (Fenders & Tanks)

HARLEY DAVIDSON MANUFACTURING PROCESS

- Steel rolls are cut and pressed
- Cycle counts are captured for dyes and presses for maintenance tracking purposes
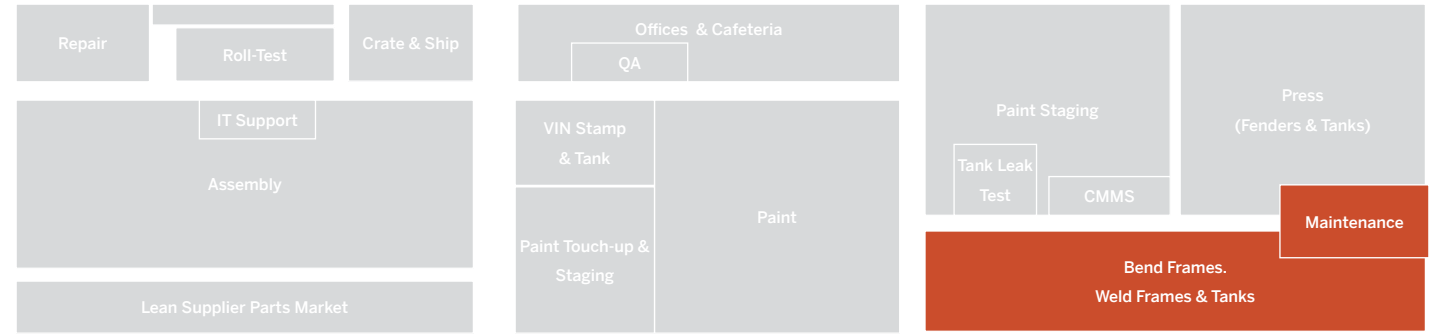- Steel inventory is pulled based on schedule – not schedule adherence

BUSINESS ISSUE

- Operated based on an assumed schedule – no real-time feedback
- Unsure of how much to produce
- Steel inventory is pulled based on schedule not actual schedule adherence which caused excess inventory

SAP SOLUTION: SAP MANUFACTURING INTEGRATION AND INTELLIGENCE (SAP MII)

VALUE FOR HARLEY

- Real-time visibility into inventory and schedule attainment (SAP MII)
- · Integration to Plant Maintenance for maintenance of dyes and presses (SAP MII_
- · Track press quality based on benchmark using SPC/SQC – non-conformance, weld defects, and patterns to reduce scrap (SAP MII)

Repair	Roll-Test	Crate & Ship		Offices & Cafeteria			Paint Staging		Press (Fenders & Tanks)

Facility layout diagram:
- Repair
- Roll-Test
- Crate & Ship
- IT Support
- Assembly
- Lean Supplier Parts Market
- Offices & Cafeteria
- QA
- VIN Stamp & Tank
- Paint Touch-up & Staging
- Paint
- Paint Staging
- Tank Leak Test
- CMMS
- Press (Fenders & Tanks)
- Maintenance
- Bend Frames. Weld Frames & Tanks

Frames

HARLEY DAVIDSON MANUFACTURING PROCESS

- Frames and tanks arrive
- Frames are bent and the tanks are welded onto the bent frames

BUSINESS ISSUE

- Lack of visibility from shop-floor to the enterprise
- Inability to track non-conformance, weld defects, or patterns
- Excess inventory stemming from weld wire consumed inventory, which was not captured in real-time
- Manually intensive process to move the right frames and tanks to the correct location based on schedule

SAP SOLUTION: SAP MII, RFID TAGS

VALUE FOR HARLEY

- Real-time visibility into weld wire inventory and schedule attainment (SAP MII)
- Integration to Plant Maintenance for maintenance (SAP MII)
- Track weld quality non-conformance, weld defects, and patterns to reduce scrap. In some weld cells, the non-conformance is captured automatically and in others through manual entry. (SAP MII)
- Post-weld, RFID tags are applied to the tanks and fenders for tracking (RFID tags)

Layout diagram blocks:

- Repair
- Roll-Test
- Crate & Ship
- IT Support
- Assembly
- Lean Supplier Parts Market
- Offices & Cafeteria
- QA
- VIN Stamp & Tank
- Paint
- Paint Touch-up & Staging
- **Paint Staging**
- **Tank Leak Test**
- **CMMS**
- Press (Fenders & Tanks)
- Maintenance
- Bend Frames. Weld Frames & Tanks
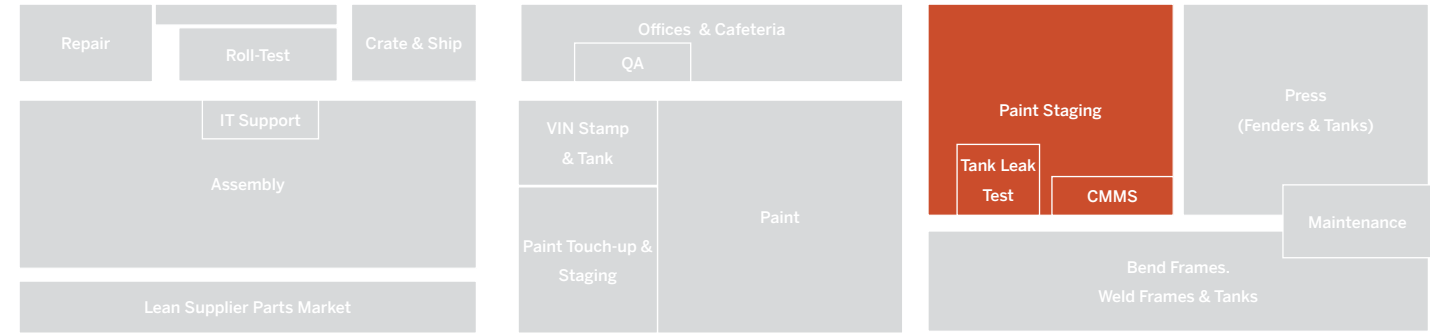
Paint Staging

HARLEY DAVIDSON MANUFACTURING PROCESS

- Paint colors are batched based on schedule
- Prior to painting a tank leak test is performed

BUSINESS ISSUE

- Lack of real-time visibility into production and schedule – at the time a 3.5 week window
- Unable to prioritize based on orders – for example premium vs. regular
- Missing integration of CMMS for quality tracking which resulted in islands of information

SAP SOLUTION: SAP MII, CMMS

VALUE FOR HARLEY

- Integration to paint scheduling based on locking in schedule in 6 hour windows (SAP MII)
- Integration to CMMS for quality checks (SAP MII)
- Integration into tank leak test results – providing real-time visibility to schedule attainment (SAP MII)
- Checks on bends in bars/frame (CMMS)
- Measures jig setup and accuracy in bend (CMMS)
- Integration with CMMS tracks maintenance for PM (CMMS)

Repair	Roll-Test	Crate & Ship		Offices & Cafeteria		Paint Staging	Press (Fenders & Tanks)
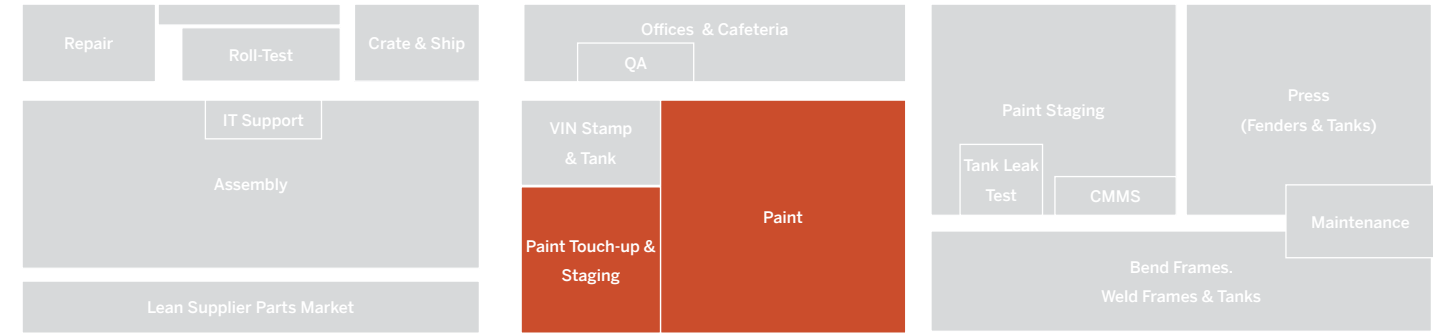
Paint/Paint Touchup Staging
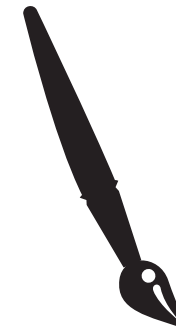
HARLEY DAVIDSON MANUFACTURING PROCESS

- Paint schedule and batching – managed outside SAP – a black box
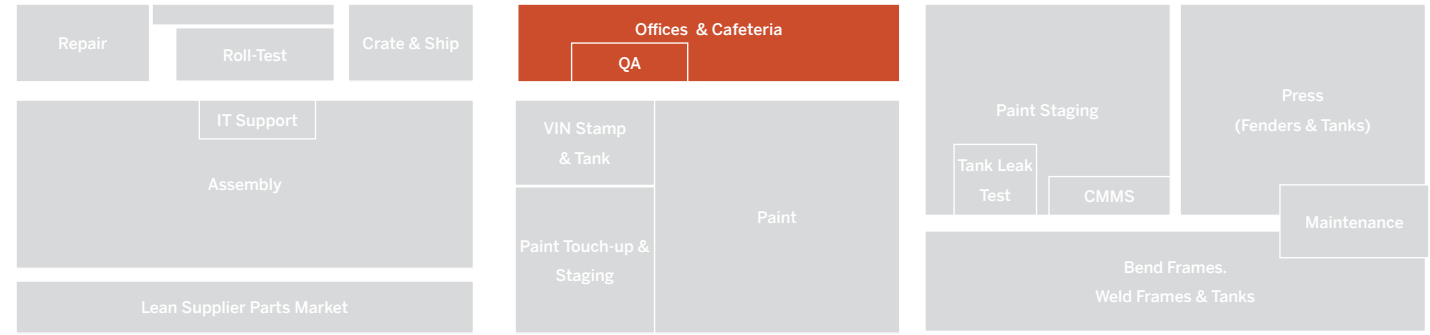- Paint touch up and staging is based on quality inspections

BUSINESS ISSUE

- Lack of inventory visibility and rework times – essentially an independent not integrated operation

SAP SOLUTION: SAP MII

VALUE FOR HARLEY

- Provide inventory visibility, rework times etc. for staging for fabrication (SAP MII

Repair	Roll-Test	Crate & Ship		**Offices & Cafeteria**			Paint Staging		Press (Fenders & Tanks)
IT Support				**QA**					
Assembly			VIN Stamp & Tank		Paint	Tank Leak Test	CMMS		Maintenance
			Paint Touch-up & Staging						
Lean Supplier Parts Market						Bend Frames, Weld Frames & Tanks			

Offices & Cafeteria

HARLEY DAVIDSON MANUFACTURING PROCESS

- Area that provides performance management dashboards
- Utilized by shop floor personnel including shift supervisors, team leads etc.

BUSINESS ISSUE

- No real-time live data feedback on performance metrics

SAP SOLUTION: SAP MII

VALUE FOR HARLEY

- Gain insight into KPIs and order status (SAP MII)

SAMPLE PERFORMANCE MANAGEMENT DASHBOARDS

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Diagram boxes:
- Repair
- Roll-Test
- Crate & Ship
- Offices & Cafeteria
- QA
- IT Support
- VIN Stamp & Tank
- Paint Staging
- Press (Fenders & Tanks)
- Assembly
- Tank Leak Test
- CMMS
- Maintenance
- Paint Touch-up & Staging
- Paint
- Lean Supplier Parts Market
- Bend Frames, Weld Frames & Tanks

VIN Stamp & Tank

(01)04601234567893
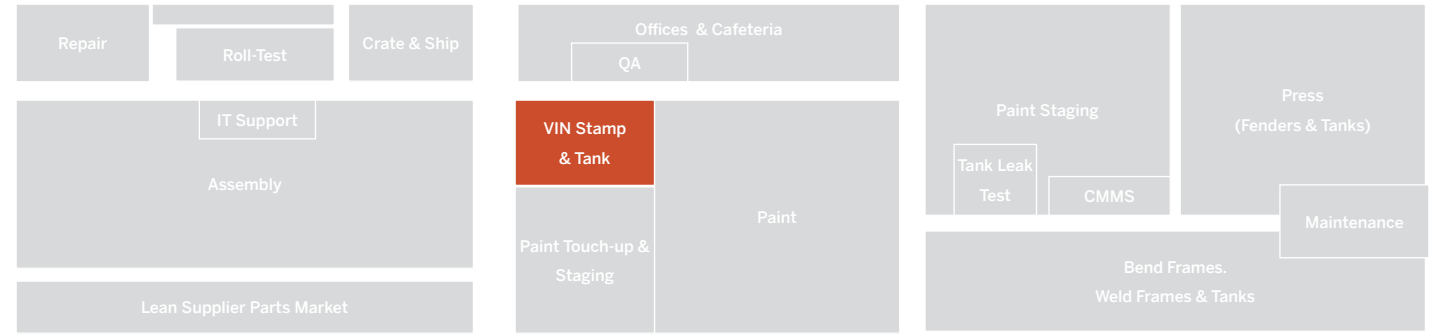
HARLEY DAVIDSON MANUFACTURING PROCESS

- Stamps VIN to the frame
- Start of the use of carts to transport components to the work cells
- Tank sub-assembly as well as electric components, caps etc. built

BUSINESS ISSUE

- No ability to optimally schedule production

SAP SOLUTION: SAP ME, SAP MII, AUTOMATED GUIDED CARTS (AGCS)

VALUE FOR HARLEY

- Provides the routing and the execution control for the build process, tracking the build, and recording any non-conformance (SAP ME)
- Provides the real-time connectivity for inventory as well as coordination of the delivery of parts (SAP MII)
- Provides information to the automated guided carts (AGCs). VIN # is added to the cart and the route is pulled from PP and integrated with SAP ME eventually through SAP MEIN I. Information is provided to the cart to load and move the frames and the tank pieces to the appropriate location to be welded in place. (AGCs)
- Monitor AGC battery levels and light sensors (monitoring movement) and tracks based on VIN #

17
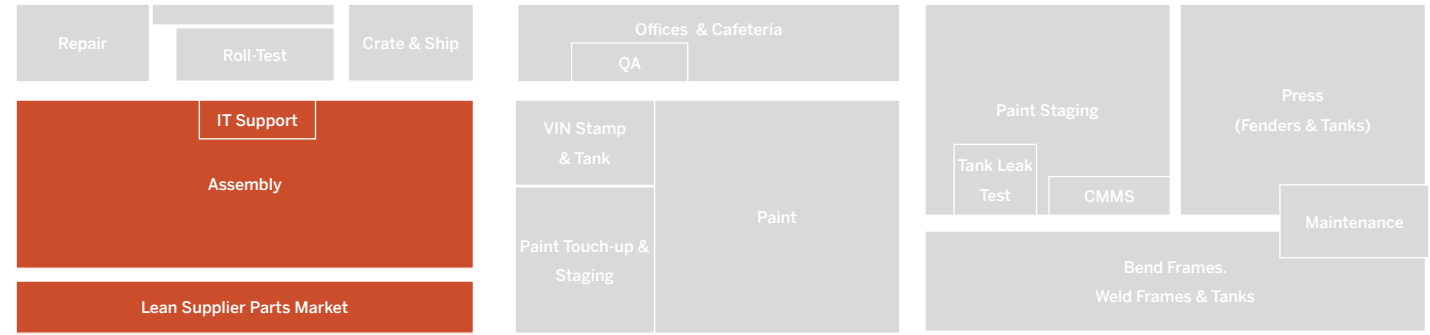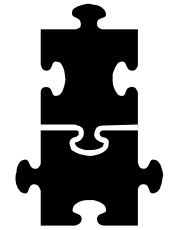
Assembly

HARLEY DAVIDSON MANUFACTURING PROCESS

- Bikes are assembled onto the frames with the tanks – belt, engines, sub-assemblies etc.
- Different work cells along the assembly line manned by operators with terminals are shown orders and order execution process
- IT support is available to provide any manual overrides etc. to help drive order execution

BUSINESS ISSUE

- Inability to optimally schedule and execute production, including capturing non-compliance, genealogy tracking etc.

SAP SOLUTION: SAP ME, SAP MII

VALUE FOR HARLEY

- Consoles provide the routing and the execution control for the build process, tracking the build, and recording inventory consumption in real-time as well as any non-conformance (SAP ME)
- Time clock integration for labor tracking (SAP ME, SAP MII)
- Andon Board signal functionality is used at each work cell - each work cell plays a unique song when there is an issue (SAP MII)
- Provides the co-ordination of the lean supplier parts needed for assembly together with SAP ME – MEINT (SAP MII)

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- Production Order (Shop)
- Planned Order (Repetitive
- Order Changes
- Services Order (RMA)
- Material/Classifications
- Serial Number (Product)
- BOM
- Routing
- Operation
- Work Center
- HR User W/Certification
- Inventory[1] Receipt W/Batch
- Inventory[1] Reservation
- Inventory[1] Locations
- Equipment Scheduled Downtime
- Quality Inspection Lot
- Work Instructions
- Alternate Components
- Phantom BOM Components
- Co- and By-Products

ME 6.1

SAP Enterprise Resource Planning

SAP

PLant Maintenance
Inventory and Warehouse Management
Quality Management
Master Data Authoring and Engineering Change Mgmt
Production Planning

SAP Manufacturing Execution

SAP

WIP (Lot and Serial #) Tracking and Genealogy
Manufacturing Process Control
Defect Tracking and Resolution
Data Collection
Labor Trading

- Production/Planned Order Yield Confirmation
- Production/Planned Order Scrap Confirmation
- Production/Planned Order Backflush
- Service Order Yield Confirmation
- Component Goods Movement
- Parent Batch Number
- Quality Notifications
- Equipment Unscheduled Down-time
- Equipment Usage
- Inventory[1] Return
- Inventory[1] Scrap
- Inventory[1] Unreserved
- Inventory[1] Locations
- DC Batch And Batch Characteristics
- Serial Number (Components)
- Quality Inspection Lot Results
- Direct Labor
- Routing

*Inventory is referred to as Floor Stock in SAP ME

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| Repair | Roll-Test | Crate & Ship | | Offices & Cafeteria | | Paint Staging | | Press (Fenders & Tanks) |

Layout blocks:
- Repair
- Roll-Test
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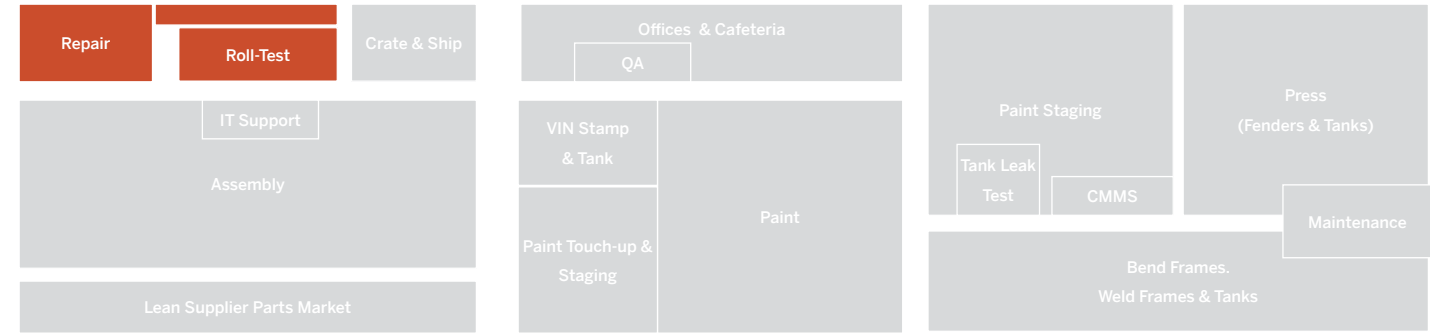
Repair and Roll-Test

HARLEY DAVIDSON MANUFACTURING PROCESS:

- The assembled bikes are provided a roll-test and repaired based on any non-compliance

BUSINESS ISSUE:

- This capability did not exist. Typically bikes were randomly pulled off the lines and test-driven by operations folks – identified area of risk for insurance etc.

SAP SOLUTION: SAP ME

VALUE FOR HARLEY:

- Provides the test sequences for any non-compliance testing (SAP ME)
- Provides the sequences for repair on any identified non-compliance (SAP ME)
- Inventory, genealogy, labor tracking etc. all done as part of the execution

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Repair	Roll-Test	**Crate & Ship**		Offices & Cafeteria			Paint Staging		Press (Fenders & Tanks)
IT Support			QA					
Assembly			VIN Stamp & Tank	Paint	Tank Leak Test	CMMS		Maintenance
			Paint Touch-up & Staging					
Lean Supplier Parts Market						Bend Frames. Weld Frames & Tanks		
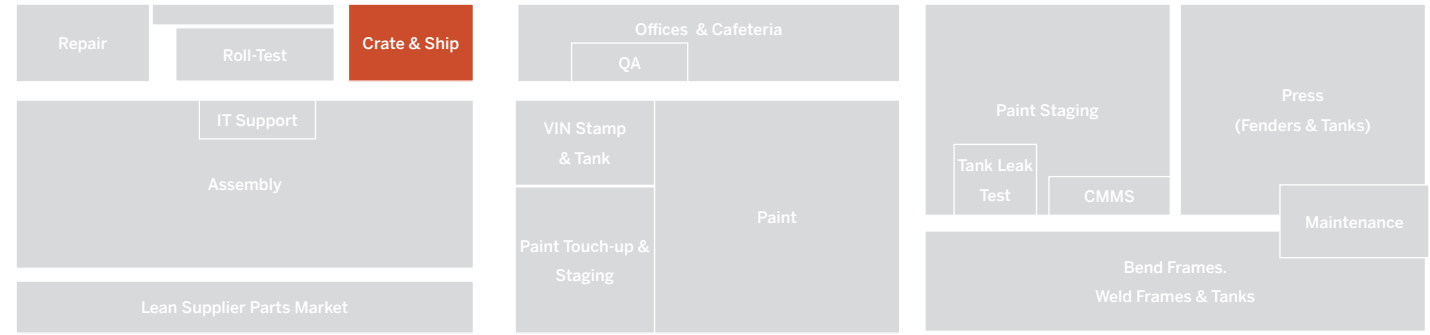
Crate & Ship

HARLEY DAVIDSON MANUFACTURING PROCESS:

- Final bike/trike is crated and shipped

BUSINESS ISSUE:

- Lack of visibility of which VIN #s going to which trucks
- Inability to optimize by grouping based on vehicle type, location etc.

SAP SOLUTION: SAP ME

VALUE FOR HARLEY:

- End-to-end tracking of the finished bike through manufacturing based on VIN# (SAP ME)

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