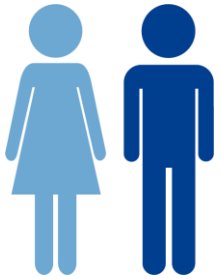
Evolution of MRO Process Using Digital Tools:

Paperless Implementation as an Enabler for Efficient MRO Operations

TechOps MX

Welcome

TechOps MX



1,764
Employees

32
average age

16% 84%

170,000 +
training hours/yr

100 + hours
per employee/yr

264,700
Liters saved
and recycled/yr

REVERSE OSMOSIS
Water purification

3,400
Solar panels

30%
Annual energy
consumption saved

Our Operation

Capacity for **12** continuous lines and growing

2nd largest MRO in Latin America

111 Aircraft delivered last year

Certifications
FAA, DGAC, ANAC, SMS & AS 9110

1.7M+

man-hours

Our Services

- Airframe & Overhaul to Boeing & Embraer aircraft
- Modifications meeting new market demands (Wi-Fi, Cabin Mod.)
- Advanced NDT services
- Capacity to produce 1.7 M hours a year

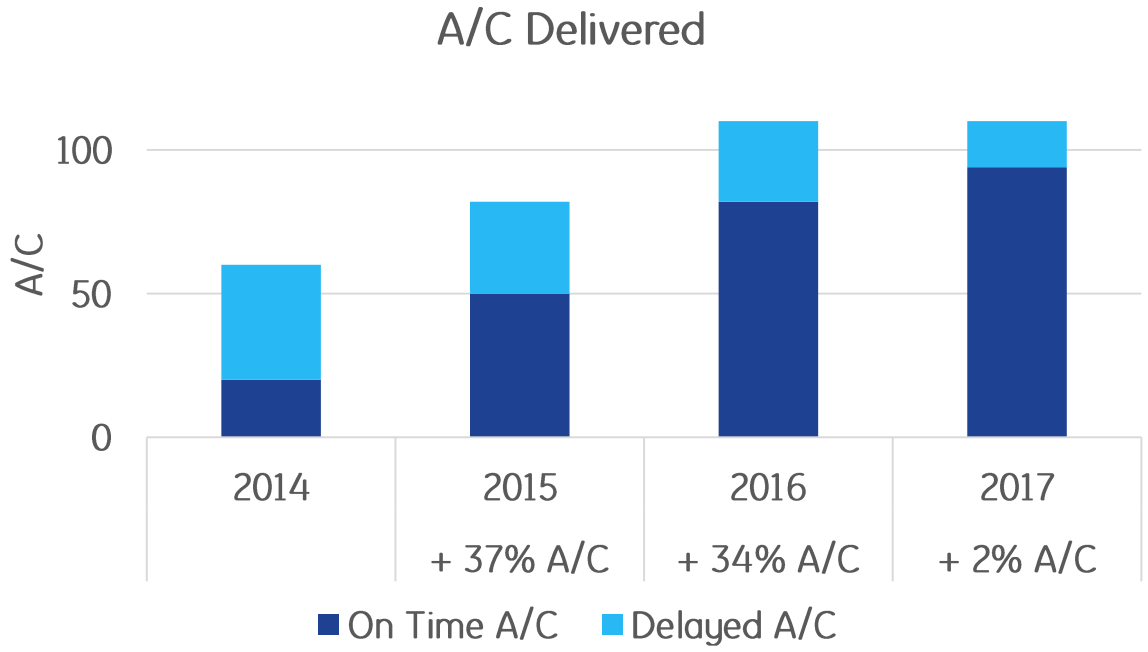
2014 - 2017

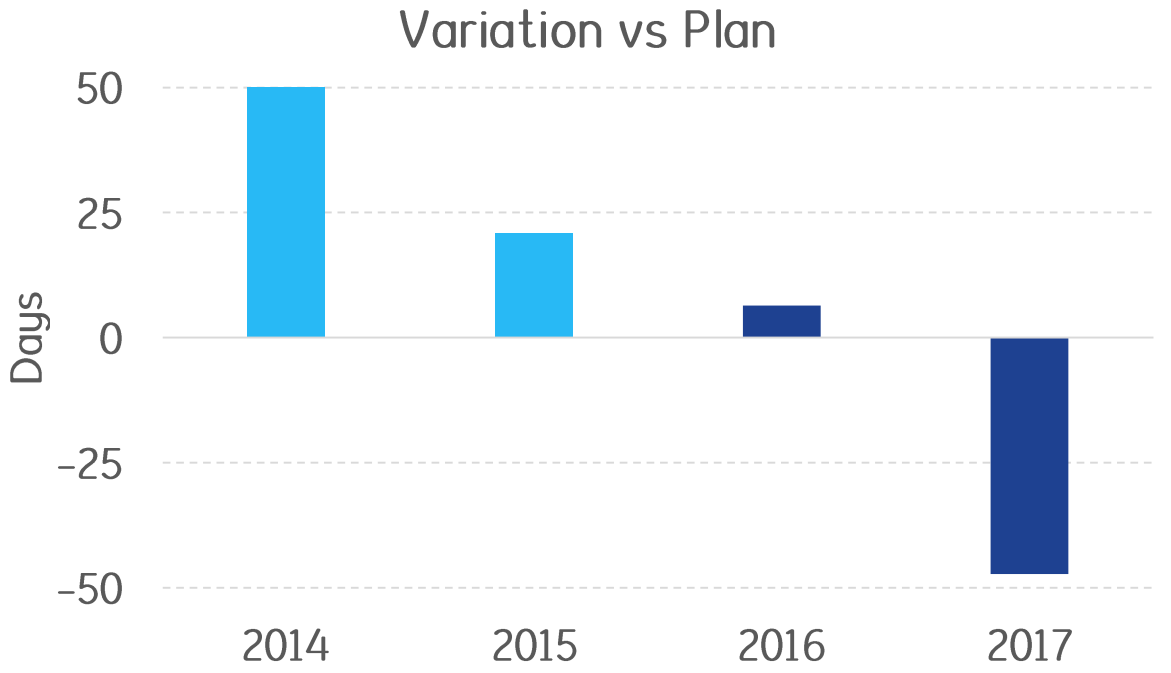
2014

- One (1) of every three (3) Adelivered on time
- 100+ days behind planned TAT
- Struggling to meet customer requirements

2017

- Nine (9) of every ten (10) A/C delivered on time
- 40+ days delivered ahead of plan
- Rhythm on execution
- Plan – Adapt – Overcome

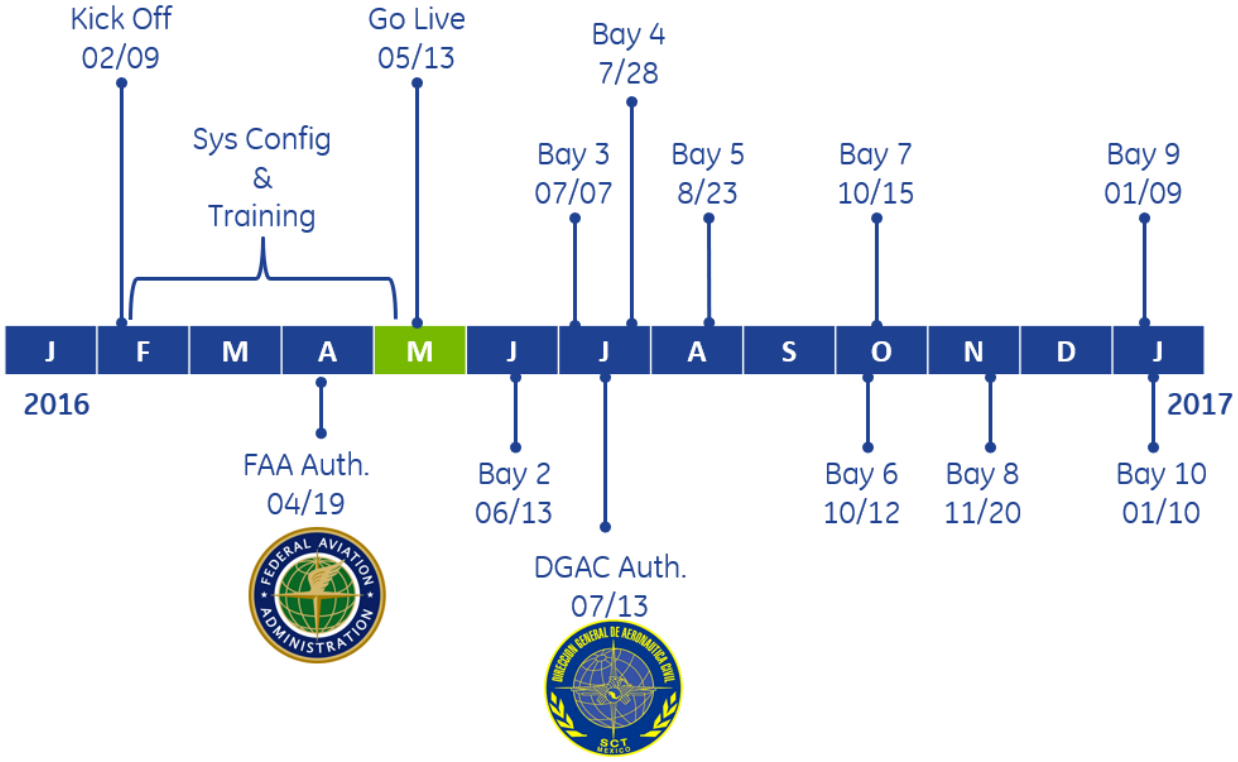




Implementation

FAST

- 14 week implementation to first Line Go Live
- Continuous launch of new lines
- Center on key process
  - Executing to Plan
  - Documenting Maintenance
  - Check Follow up
  - Paperwork Quality & Audit
  - Decision Making
- Cultural change
- Data driven decisions
- Pro-active actions to ensure TAT
- Milestone based planning
- Same information across organization



Before & After EmpowerMX

Area	Before	After
Maintenance	• Paper documentation • Inadequate control on WIP • Card status tracking inefficient & time consuming • Batch evaluation of NRC • Three (3) Systems used to control maintenance • Timely data gathering and analysis	• Electronic Non Routine • Real time follow up on check status & task cards • Mechanics work only assigned work • Real time Non Routine evaluation • Improved Man Hour clock in/out • One single System to control maintenance
Planning	• Activity / Card Count based • Manual update on plan status (MS Project) • Two days avg. to publish a plan revision	• Milestone based project management • Real time update of milestone completion • Milestone Compliance & Root Cause Analysis facilitation
Invoice	• Paper bump sheets • User defines O&A Cards • Inefficient tracking of approval process • Time consuming process	• Electronic approval process for NRC with customer reps • System automatically classifies O&A Cards • Real time tracking of Hours approved vs used • Approval status tracking
Quality	• System led to batch Non Routine creation – high WIP • No visibility on buyback requirements • Buyback process avg. time eight Hrs • Missing signatures & date information	• Real time Non Routine creation • Tracking of inspection queue • Buyback process reduced to less than 15 min • No missed fields with e-signature

Planning

Executing to Plan

Before
Activity based
Each line had their own plan
2 days avg. to revise a plan
No link between cards & plan
Multiple revisions on floor
No performance metrics

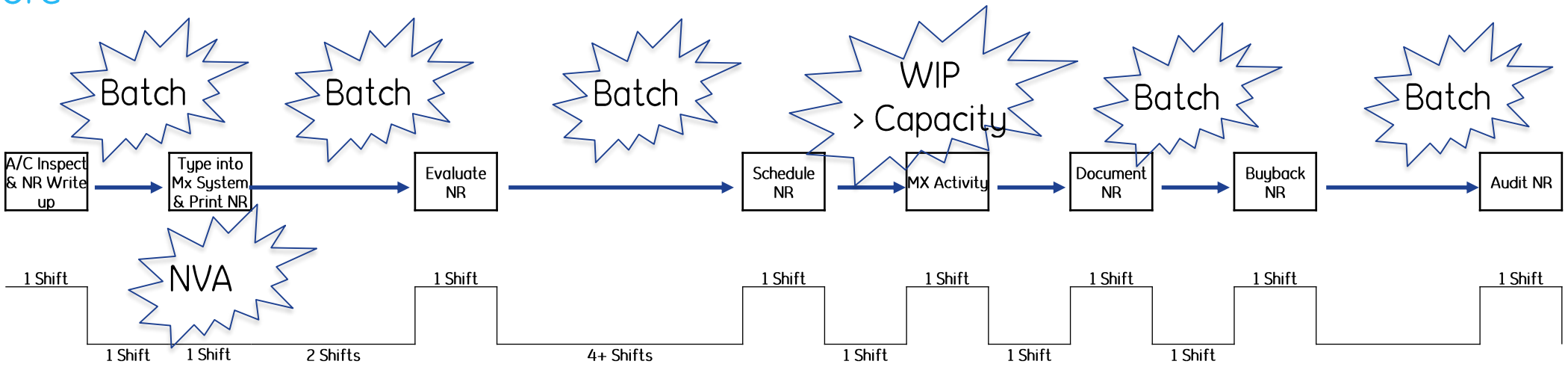
After
Milestone based
Success plans across lines
Hours to revise a plan
Real time updates
Single plan
Milestone compliance & Root cause analysis

Daily Rhythm & Timely Decisions to meet TAT

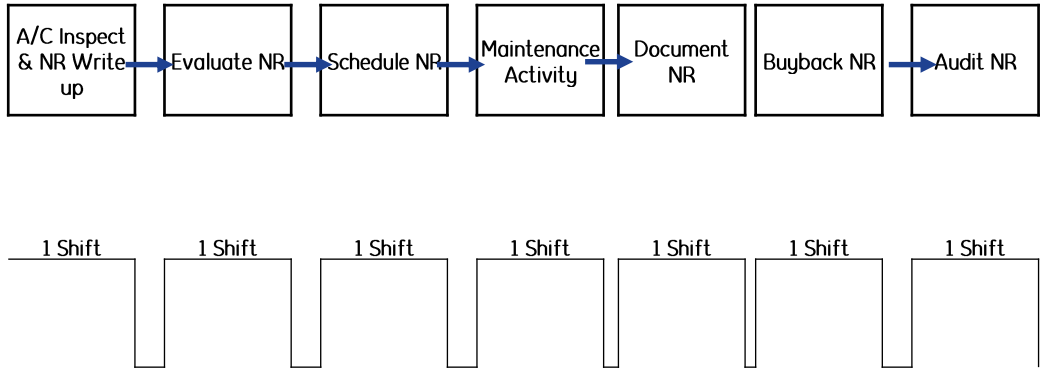
Maintenance

Inspection log book and holding cards

Before



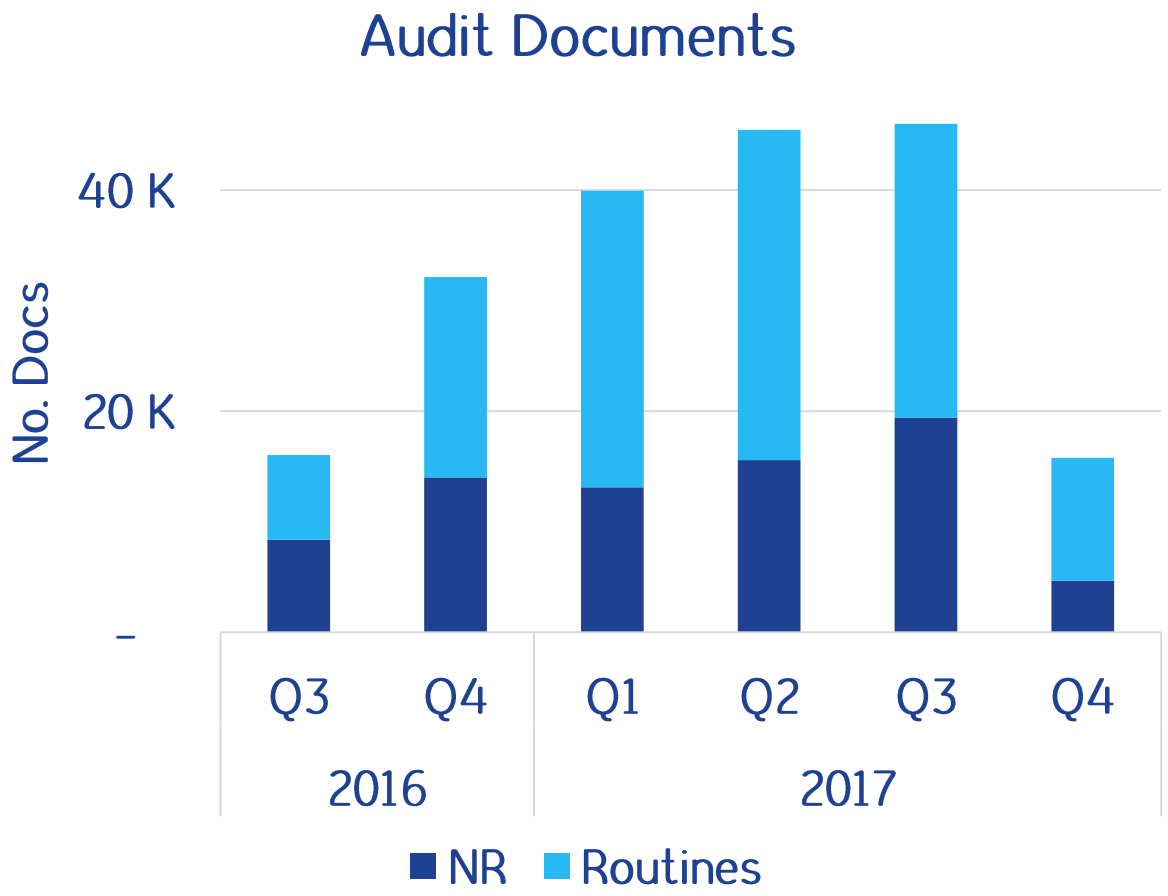
After



- Improved flow of documents
- No Batching of documents
- Improved flow of documents
- Theory of Constraints principles
  - Controller WIP
  - Increased throughput

Documents Quality & Audit

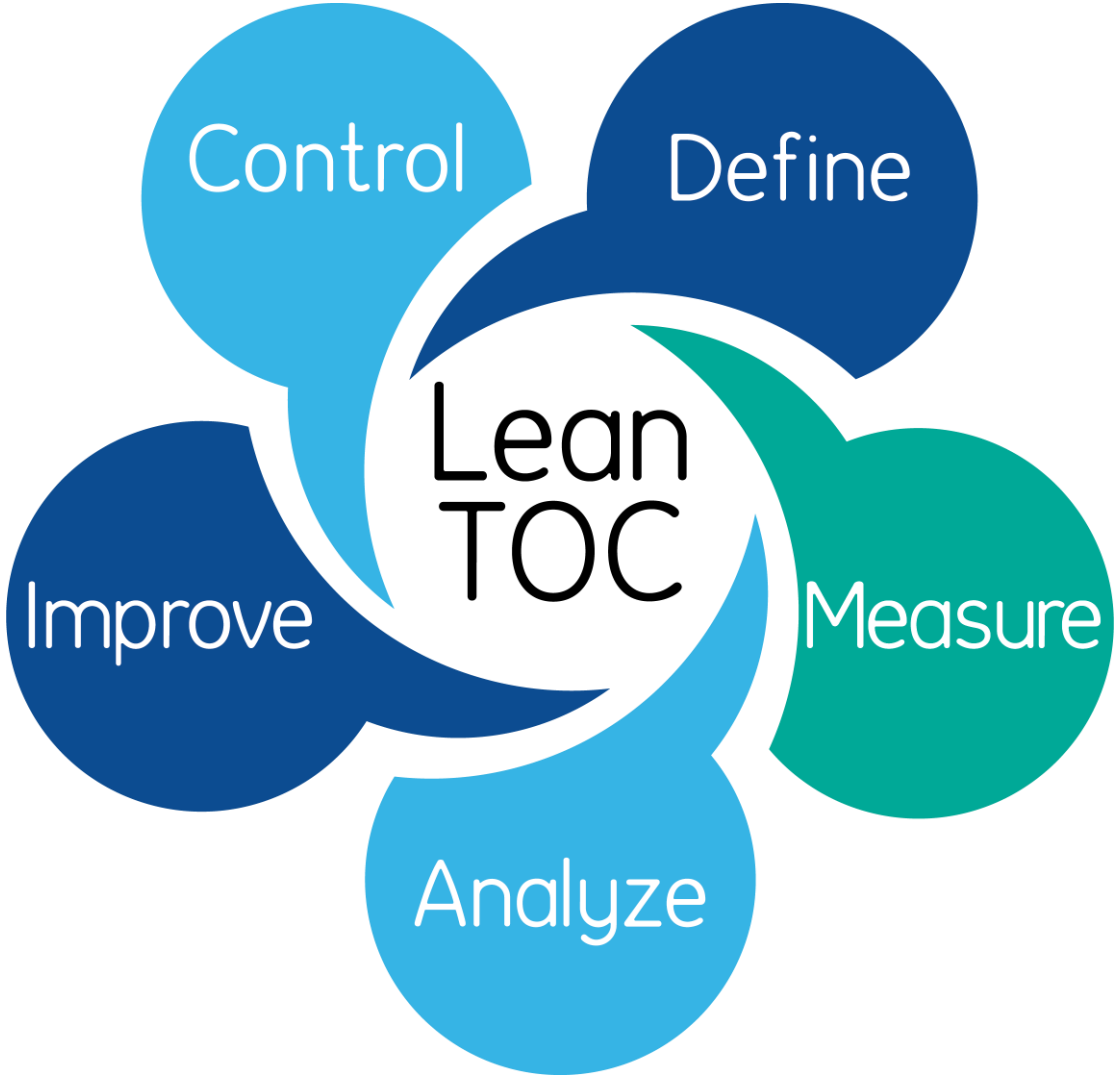
- On a 737 Heavy check NR
  - 4.5K WIP = 9K signatures + 6K mandatory fields
- Electronic Signature guarantees
  - Employee number, License & Date stamp
- Audit centered on content of the document
- Reduction of 3 days on completing audit
- Quality Improvement programs



55% Avg. Docs Error Reductions

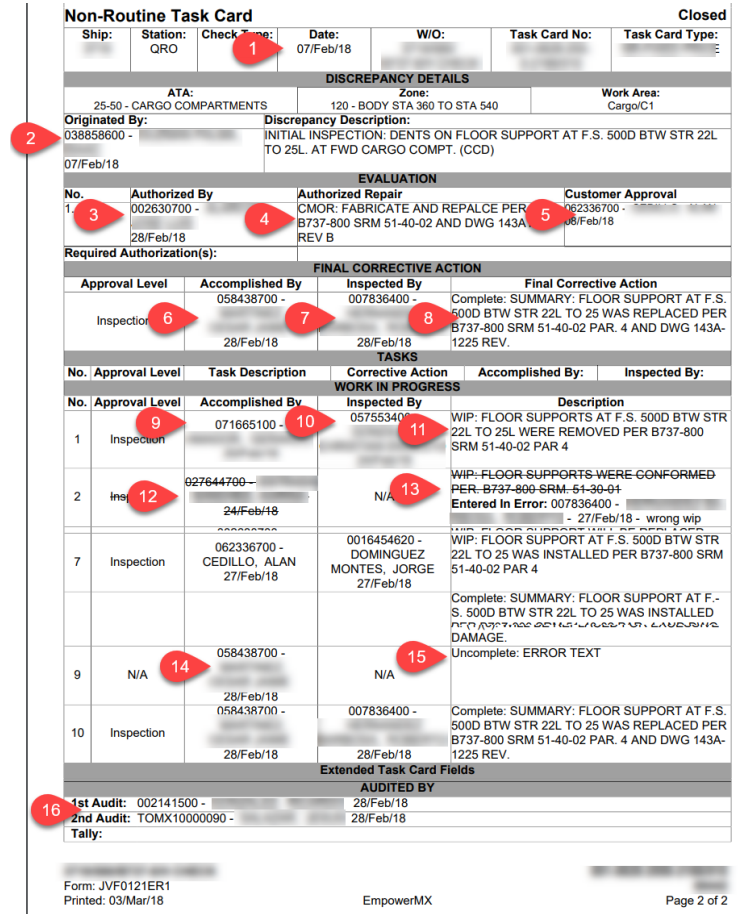
Decision Making – Information Driven

- Information a key asset to organization success
- Capability to obtain timely & accurate information
- Most important what to measure
- Measurements will drive organization
- Tell reality of your company
- Drive continuous improvement efforts
- Define, Measure, Analyze, Improve and Control (DMAIC) & Theory of Constrains (TOC) based projects



Process Analysis

- Digital documents provide a reliable source of information
  - Time stamps automatically set
  - Record of users who perform transactions
  - 120+ data points per NRC & 100+ for Technicians
  - Information available once operation is performed
- Data for analysis and decision making
  - Downloadable to Excel
- Key to continuous improvement efforts
- TOMX using 150+ reports in all departments
  - One single source



Non-Routine Task Card — Closed

Ship:	Station:	Check Type:	Date:	W/O:	Task Card No:	Task Card Type:
[redacted]	QRO	[redacted]	07/Feb/18	[redacted]	[redacted]	[redacted]

DISCREPANCY DETAILS

ATA:	Zone:	Work Area:
25-50 - CARGO COMPARTMENTS	120 - BODY STA 360 TO STA 540	Cargo/C1

Originated By:	Discrepancy Description:
038858600 - [redacted] 07/Feb/18	INITIAL INSPECTION: DENTS ON FLOOR SUPPORT AT F.S. 500D BTW STR 22L TO 25L. AT FWD CARGO COMPT. (CCD)

EVALUATION

No.	Authorized By	Authorized Repair	Customer Approval
1	002630700 - [redacted] 28/Feb/18	CMOR: FABRICATE AND REPALCE PER B737-800 SRM 51-40-02 AND DWG 143A REV B	062336700 - [redacted] 06/Feb/18

Required Authorization(s):

FINAL CORRECTIVE ACTION

Approval Level	Accomplished By	Inspected By	Final Corrective Action
Inspection	058438700 - [redacted] 28/Feb/18	007836400 - [redacted] 28/Feb/18	Complete: SUMMARY: FLOOR SUPPORT AT F.S. 500D BTW STR 22L TO 25 WAS REPLACED PER B737-800 SRM 51-40-02 PAR. 4 AND DWG 143A-1225 REV.

TASKS

No.	Approval Level	Task Description	Corrective Action	Accomplished By:	Inspected By:

WORK IN PROGRESS

No.	Approval Level	Accomplished By	Inspected By	Description
1	Inspection	071665100 - [redacted]	057553400 - [redacted]	WIP: FLOOR SUPPORTS AT F.S. 500D BTW STR 22L TO 25L WERE REMOVED PER B737-800 SRM 51-40-02 PAR 4
2	~~Inspection~~	~~027644700 - [redacted] 24/Feb/18~~	N/A	~~WIP: FLOOR SUPPORTS WERE CONFORMED PER. B737-800 SRM. 51-30-01~~ **Entered In Error:** 007836400 - [redacted] - 27/Feb/18 - wrong wip
7	Inspection	062336700 - CEDILLO, ALAN 27/Feb/18	0016454620 - DOMINGUEZ MONTES, JORGE 27/Feb/18	WIP: FLOOR SUPPORT AT F.S. 500D BTW STR 22L TO 25 WAS INSTALLED PER B737-800 SRM 51-40-02 PAR 4
				Complete: SUMMARY: FLOOR SUPPORT AT F.S. 500D BTW STR 22L TO 25 WAS INSTALLED [redacted] DAMAGE.
9	N/A	058438700 - [redacted] 28/Feb/18	N/A	Uncomplete: ERROR TEXT
10	Inspection	058438700 - [redacted] 28/Feb/18	007836400 - [redacted] 28/Feb/18	Complete: SUMMARY: FLOOR SUPPORT AT F.S. 500D BTW STR 22L TO 25 WAS REPLACED PER B737-800 SRM 51-40-02 PAR. 4 AND DWG 143A-1225 REV.

Extended Task Card Fields

AUDITED BY

1st Audit: 002141500 - [redacted] 28/Feb/18
2nd Audit: TOMX10000090 - [redacted] 28/Feb/18
Tally:

Form: JVF0121ER1 — EmpowerMX — Page 2 of 2

Manage Ad Hoc Reports

Search Criteria — Search | Reset

Report Name/Description:

By Report Area: Component Removal Info; AML Info; Core Bill of Work Work Order; Core Task Card; User Info

Report Type: Predefined; User Defined

Created By: Search by user login or name...

(or) Assigned To User: Search by user login or name...

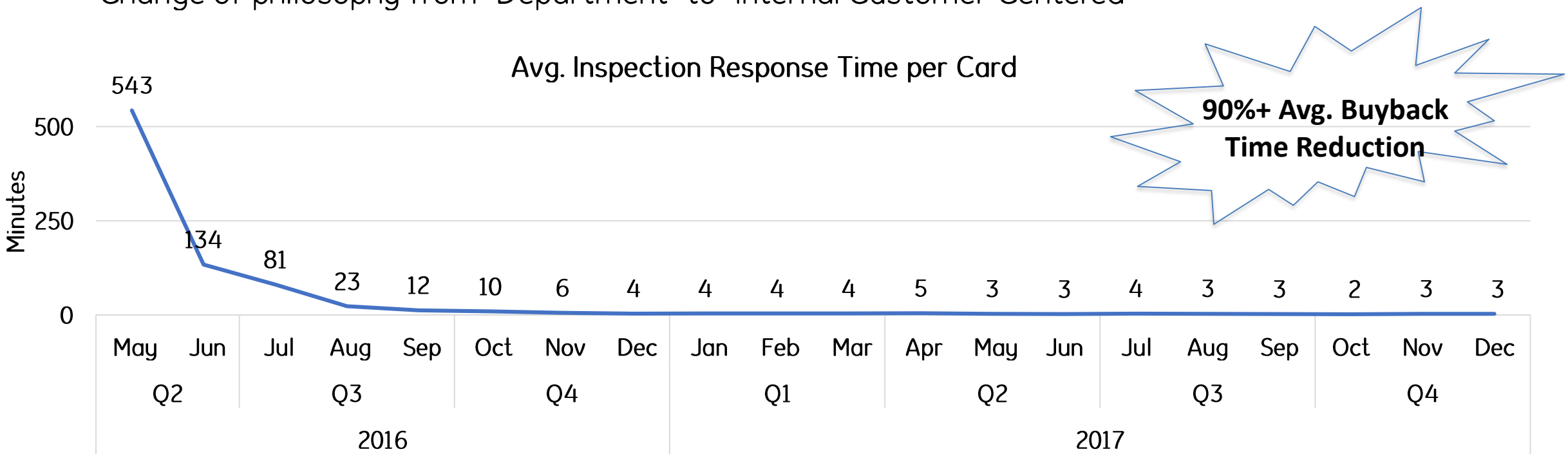
(or) Assigned To Group: Search by group name...

Search Results — Create Ad Hoc Report

Report Name	Report Description	Report Area	Predefined
43890	43890	Core Material	No
AWR After initial	NRC written after initial	Core Task Card	No
AWR Manhours	Report on AWR hours authorized vs real	Core Task Card	No
Active Users	Report to list all users.	User Info	No
Aircraft Redelivery	List of task cards and status for leasor representatives Owner: Juan Ignacio	Core Task Card	No
All Cards - Hours	All cards in a check with estimated hours	Core Task Card	No
All Task Card Info	Desc	Core Task Card	No
Attachments	Cards with Attachment indicator	Core Task Card	No
Attachments finance	Attachments on task cards	Core Task Card	No
Audit & Tally Times	Report on how long it takes to perform audits and tally	Core Task Card	No
Audit Aging Report RTL GAM	Detail on Audit for Return to Leasor GAM to check aging of cards Owner: Juan Ignacio	Core Task Card	No
Blend Out Delta	Blend Out Delta	Core Task Card	No
Bottle Neck - WIPS	WIPS for bottle neck analysis	Core Task Card WIPS	No
Bottle neck analysis	Bottle neck analysis	Core Task Card	No
Budget vs Estimated by Skill	Budget vs Estimated by Skill	Task Card Labor Summary	No
Budget vs Estimated by Skill v01	Budget vs Estimated by Skill with operator 6 Mro approval details	Task Card Labor Summary	No
Buy Back time	Query the DTM of when a WIP was performed and buy back signed by inspector	Core Task Card WIPS	No
Buy back information	Cards waiting for buy back	Core Task Card	No
C Check Analysis	C Check Analysis Owner: Juan Ignacio	Core Task Card	No
CPAX Activities DLS	List of All Tasks from DLS which involves works at CPAX	Core Task Card	No

Inspection log book and holding cards

- TOC applied to identify activities blocking more throughput in the process
- Cards were waiting for buyback attention for more than 1 work shift
- Actions taken:
  - Inspectors were removed from activities non-core to their role
  - Dynamic allocation of inspectors based on workload of each line
  - Change of philosophy from "Department" to "Internal Customer Centered"



Results

Results

9 of 10	Aircrafts delivered on Time
40+	Day delivered before Plan
30%	Avg. reduction in time to close a card
55%	Average reduction in paperwork errors
1	Additional line without adding HC

THANK YOU!
TechOps
MX