



Changing the Aviation Landscape: Reliability Programs and Cabin Interiors

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Delta TechOps

- The third largest MRO in the world. Largest MRO in North America.
- A \$4 billion production center for Delta Air Lines, employing 11,000+ people.
- A fully-integrated global maintenance organization with an Atlanta-based main operation.
- Supported by the largest and most experienced technical operations workforce in the world.
- Continually improving operational efficiency, utilizing 400+ engineers.
- 95 years of experience.



Supporting Delta Air Lines



DELTA &
DELTA CONNECTION
1300 AIRCRAFT

DELTA &
DELTA CONNECTION
6,000+ DAILY FLIGHTS

11,000+
DELTA TECHOPS
EMPLOYEES

DESTINATIONS
SERVED: **330**

COUNTRIES
SERVED: **64**

80,000+
DELTA EMPLOYEES

192 MILLION
PASSENGERS SERVED

662,000
PASSENGERS FLOWN IN A SINGLE DAY

99.995%
RECORD YEAR-END
COMPLETION FACTOR
(SYSTEM-WIDE)

6,091
FLIGHTS OPERATED
& **5.4**
MILLION MILES FLOWN
SYSTEM-WIDE ON JULY 20, 2018 –
THE BUSIEST DAY OF THE YEAR

143 DAYS
WITHOUT A SINGLE
CANCELLATION ACROSS THE
ENTIRE DELTA SYSTEM,
EXCEEDING 2017'S FULL-YEAR
RECORD OF 90 DAYS

Delta Flight Products

Delta Flight Products (DFP) was established as a Delta subsidiary in 2016 to design, integrate, manufacture and certify aircraft systems, components and modifications.

Engineering

- Mechanical design
- Electrical design
- In-flight entertainment development
- Substantiation and analysis
- Certification

Manufacturing

- Machine shop
- Sheet metal fabrication
- Composite panel fabrication
- Final assembly
- Paint shop
- Electrical fabrication
- Part marking shop

Test Labs

- Flammability testing (FAA approved)
- Static testing (FAA approved)
- Wireless IFE testing (rack room)
- Content integration (studio approved)

In-flight Entertainment

- Software development
- Systems engineering
- GUI design & development
- Hardware development & ATP

Quality System

- AS9100 rev. D registered
- FAA STC Holder (FAR Part 21 Subpart E)
- FAA Production Approval Holder (FAR Part 21.303 PMA)
- Airbus line fit offerable for A220, A330-900neo and A321neo

Product Support

- Field service engineering
- Technical publications and ICAW

Warehouse

- Inventory management
- Kit assembly
- Shipping & receiving



Delta Flight Products

Problem: High on-the-job injury (OJI) rates, caused by excessive forces required to close existing B777 overhead bins.

Solution: A Delta designed B777 bin lift assist (BLA) installation kit. The kit modifies existing bins to reduce the forces needed to close the bins and enhances safety for both passengers and cabin crew.

Two types of electro-mechanical LAU's activate when a pre-determined baggage load is reached to provide an assistive force to close the bin.

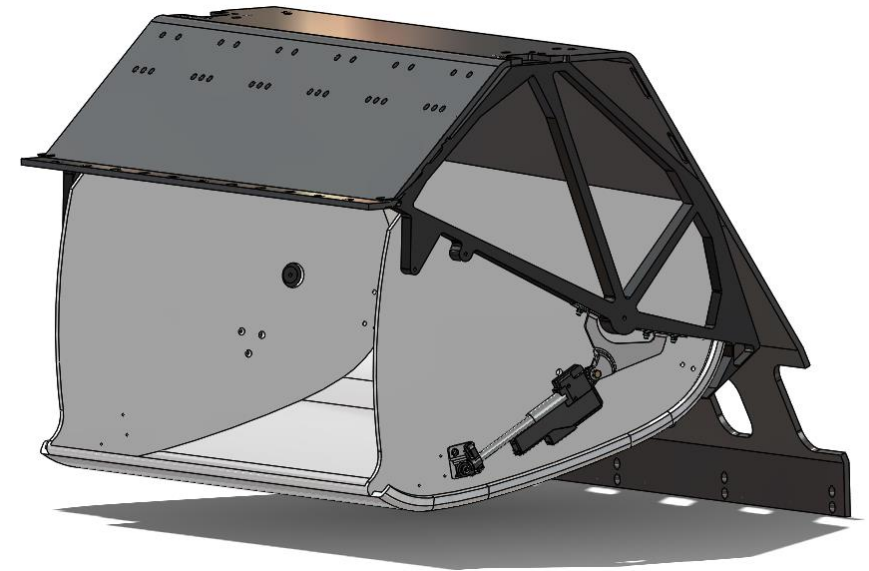


The mod will reduce the lifting/closing force of the bin buckets by approximately **one half**.

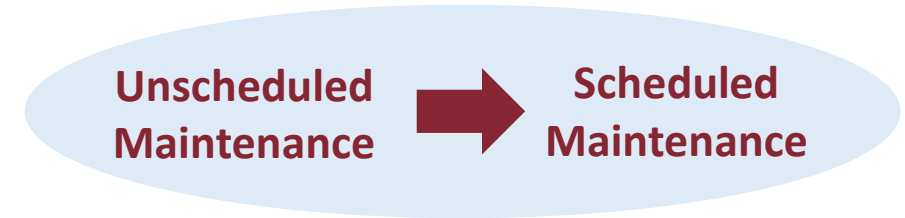
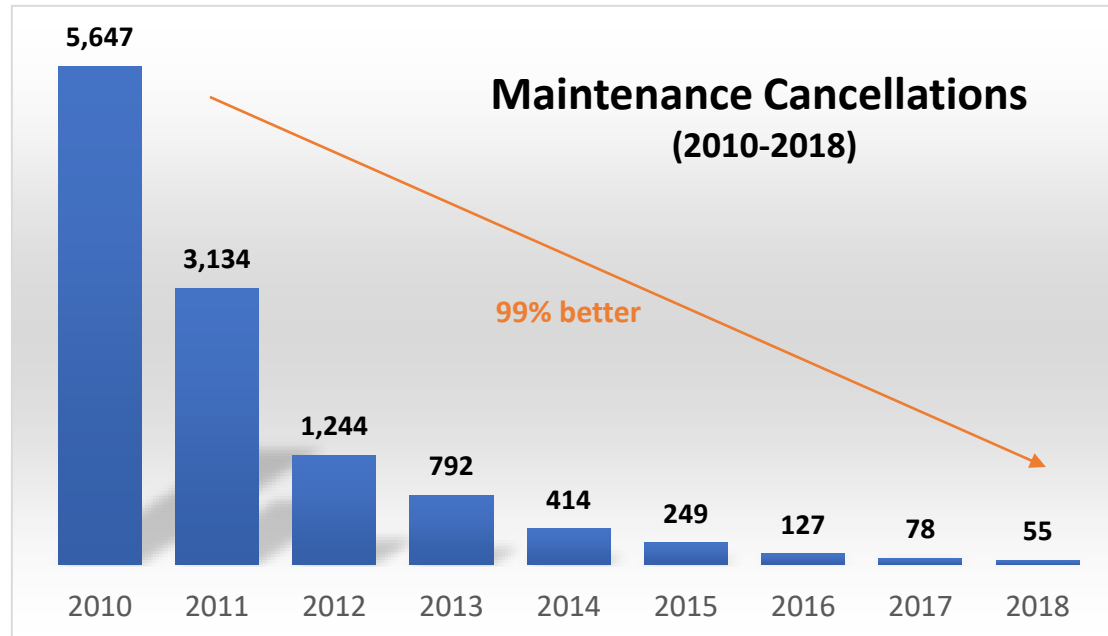
**Numerous bin configurations in a B777
we've accounted for them all...**

ER – Configurations 3, 4, 6, 7, 8

LR – Configurations 1, 2, 3, 4, 5



Reliability Programs & Data Analysis



Key parameters are tracked to proactively mitigate operational effects.

Results in reduction of...

- Delays
 - Cancellations
 - Operational interruptions
-
- ✓ Increased first time fix rate
 - ✓ Reduced No Fault Found (NFF) 95% Success Rate
 - ✓ Material and logistic efficiency gains, reduction in inventory



Reliability Programs & Data Analysis

PREDICTIVE MAINTENANCE ENGINEERING

Example: B737 Air Conditioning Health Management System (ACHMS) – STC

- Pack system is a reliability driver on B737 aircraft
- Customer impact
- Lack of data for developing prognostic solution

Solution: Delta Air Lines developed a method to monitor 737 air conditioning pack system performance by instrumenting both left and right pack systems for the purpose of improving air conditioning system operational reliability through predictive analysis of pack performance.

