



What ATA Codes Tell Us

Moving Beyond the ATA AutoCoder

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Maintenance Logs: Diamond Mine Of Information

Maintenance data is valuable .

How many airlines are actually
using their maintenance records?

Few to none.



Text Chaos: It's Hard To Extract Information

Having data is not the same as understanding it, and you cannot use data you cannot understand.

In reality, maintenance logs are:

- Unstructured
- Unsearchable
- Unusable

Maintenance
Log

Failure:

during engine crossbleed start with inop apu, #2 engine would not start. after two attempts after fuel added at normal n2, egt auto abort impending hot start flashed and we cut off fuel, ; due to high egt rise. first attempt was around 300 degrees, and second 500 degrees.

Fix:

t/s per fim 80 -05 task 801 egt indication flashing and had automatic shutdown. suspect fail hmu, no parts available.; r and r #2 eng hydromechanical unit (hmu) iaw mt 773 -21-21-10 ops and leak ck good

How Many Ways Can Technicians Spell "Oxygen Light"?

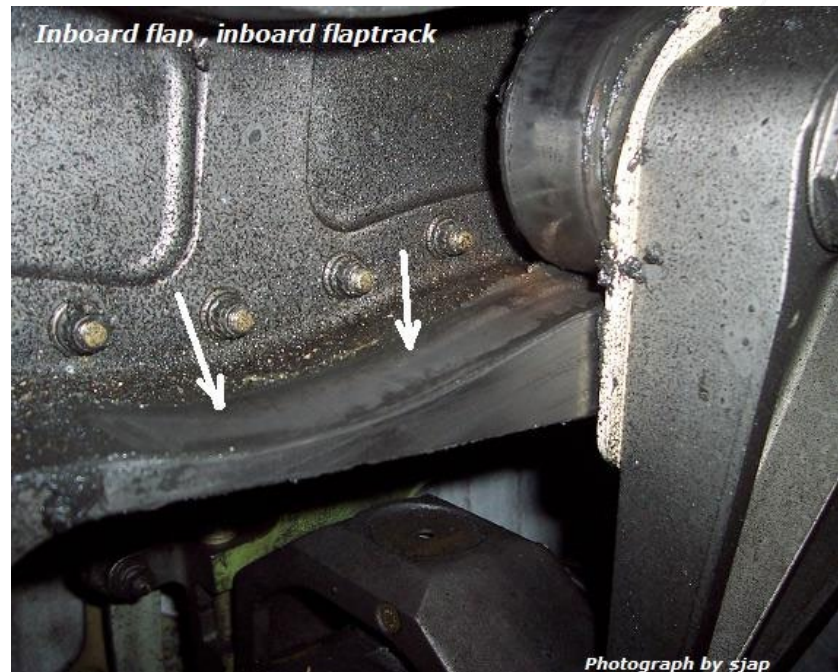
1. o2 light
2. oxygen lght
3. oxy light
4. O2 lite
5. Oxygen lite
- .
- .
45. Oxy It

Flap Fairing Worn: How Many Ways Can It Be Described?



1275 unique ways to say the same thing

- r-wing flap fairing #6 adjustment link bearing worn streamer attached dot# j152 ;
- dot# 16 a-043 lh fwd flap fairing 544ab erroded around fwd fastener holes ;
- wear bushing fwd side at fairing flap support 543bb at lt wing ; 2024-206300
- aft i/b seal on #3 flap track fairing, panel 542bb, worn (marked). ;
- right wing flap support #7 assy access panel#643bb has i/b seal worn ; correction: right wing flap support #7 assy access panel#643bb has o/b seal worn
- right-wing #8 flap fairing: the upper outboard bulb seal is worn.



Perplexity: How Messy Is The Data?

Perplexity = measures uncertainty or unpredictability in data.



=

2,352.5 Perplexity
(This is the “Noise”)

High Perplexity = difficult for algorithms (or even humans) to systematically analyze.

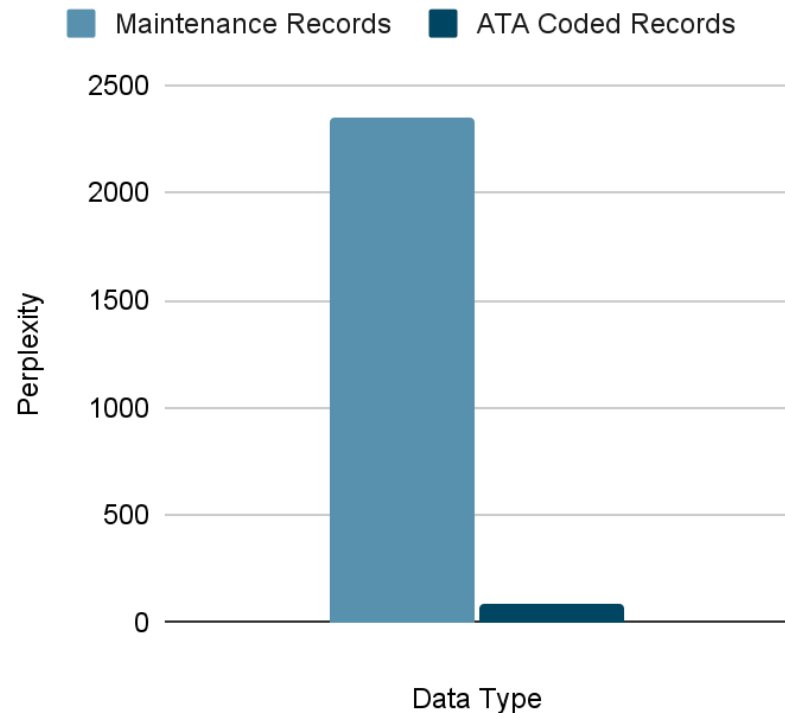
ATA Coding: Can We Reduce The Noise?

YES! With ATA Codes

Instead of thousands of different phrasings for a flap fairing issue, they're all normalized to ATA 5753 (Flap Track Fairings).

This structured coding enables statistical analysis across fleets, supports AI/ML pipelines and makes benchmarking possible.

Perplexity by Data Type



Perplexity Reduction Effect: **Weak Signal**

A single ATA Code does not capture all of the meaningful information available in the data resulting in a **weak signal**.

Entropy reduction effect:

- Reduces uncertainty compared to free text
- Still leaves a wide range of ambiguity (e.g., a ‘Flap Fairing’ entry could mean erosion around bolts, a worn seal, etc.)

What's Missing:

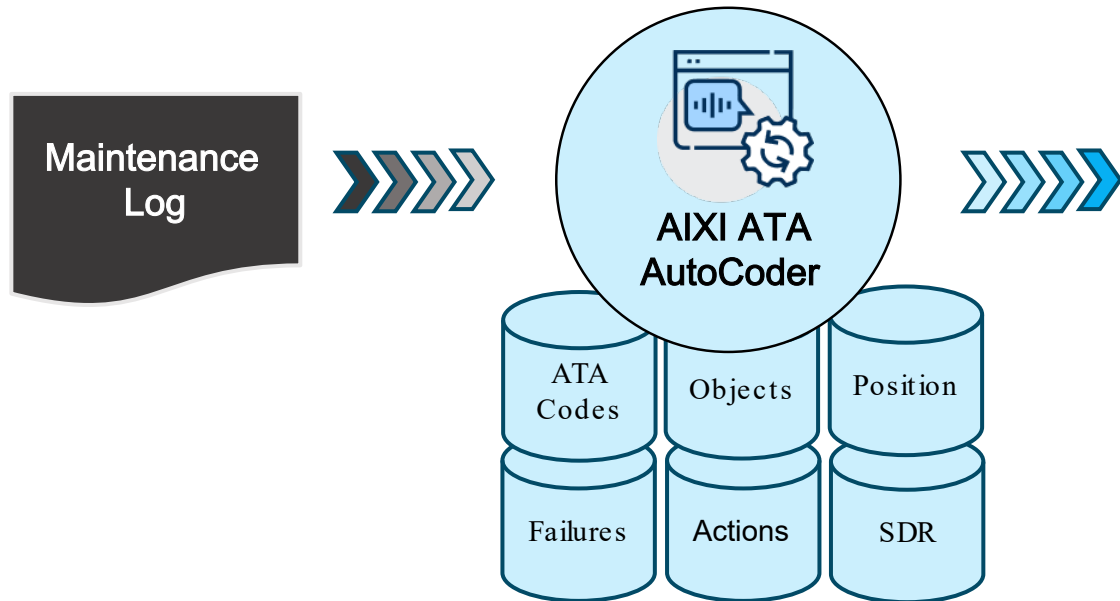
- Component
- how it failed
- how it was fixed

Entropy drops, structure improves, but signal is still coarse.

Capture The Signal: Code All Historic Records



All maintenance logs are coded accurately and consistently, making them perfect for analysis or ML/AI ingestion



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unit (hmu) iaw mt 773 -21-21-
10
ops and leak ck good

Failure ATA	80 11
Fix ATA	7321
Object	HMU
Failure	Inop
Action	R & R
Position	#2
SDR	No

Consistent Accurate Data

What can it tell us

Fleet History: Accurate Statistics To Guide AMTs

← // Prescriptive Maintenance

ACN Fault

823

flaps would not extend past 25 deg ;



 New Search

AIRCRAFT INFORMATION

ACN: 823
Model: 800et
Age: 13
In Service: Yes

Last A Check: 09/02/2025
Last B Check: 06/20/2025
Last C Check: 12/08/2023
Last D Check: 11/08/2018









OPERATIONS IMPACT

Fault ATA: [27-51](#)
Repeats **7** 14 30

Delay likelihood: 16.57%
Avg. delay time: 62.1 min

FIXES (FLEETWIDE)


[View MEL](#)

Historic	Fix (68.03%)	Action	Component	Attempted Fix	AMM
26.35%	13.4%	replaced	flap limit sw 	X	27-51
22.3%	12.37%	replaced	fseu 		27-51
14.86%	1.03%	replaced	flap posn ind 		27-51
10.81%	12.37%	replaced	flap elec motor 		27-51
8.11%	11.34%	reset / realigned	t/e flap ctrl sys 		27-51
4.05%	6.19%	replaced	flap lever 		27-51
4.05%	3.09%	c/w	t/e flap ctrl sys 		27-51
3.38%	2.06%	replaced	t/e flap bypass vlv 		27-51

Failure ATA	8011
Fix ATA	7321
Component	HMU
Failure	Inop
Action	R & R
Position	#2
SDR	No

Current Pain Points: Proactive Alerting

MOST REPEATED DEFECTS BY ACN

Rank	ACN 	#Discrepancies	#Delays	Delay (Minutes)	Delay Cost	Cancels	#RTG	#Diversions
1	4867	38	8	407	\$101,700	0	4	0
2	2778	20	2	327	\$81,750	1	1	0
3	5847	26	6	277	\$69,300	0	2	0
4	6062	21	4	260	\$64,950	0	1	0
5	6045	22	2	257	\$64,200	0	1	0
6	7847	40	4	210	\$52,500	0	1	0
7	2883	53	5	194	\$48,450	0	0	0
8	9022	22	5	187	\$46,800	0	2	0
9	1883	17	2	177	\$44,250	0	1	0
10	7887	21	4	148	\$37,050	0	0	0

MOST REPEATED DEFECTS BY ATA

Rank	ATA	Description	#Discrepancies	#Delays	Delay (Minutes)	Delay Cost	Cancels	#RTG	#Diversions
7	59	25-11 flight compartment equipment	378	1	39	\$9,750	0	0	0
8	40	5-51 conditional inspections	297	0	0	\$0	0	0	0
9	40	57-53 wing trailing edge flap (srn)	501	0	0	\$0	0	0	0

And More:

- Validate gut feelings
- Supply chain insights
- Identify problematic maintenance facilities

ACN

MOST REPEATED DEFECTS BY ATA

Description	#Discrepancies	#Delays	Delay (Minutes)	Delay Cost	Cancels	#RTG	#Diversions
non-mechanical events	3497	20	472	\$118,050	0	0	0
tires and wheels	876	16	217	\$54,300	0	0	0
passenger seats	2139	32	613	\$153,300	0	0	0
passenger compartment linings and panels; ng: passenger compartment	1324	2	37	\$9,300	1	0	0
passenger cabin partitions and compartments	1072	15	107	\$26,700	0	0	0
cargo compartment	991	2	43	\$10,800	0	0	0
flight compartment equipment	378	1	39	\$9,750	0	0	0
conditional inspections	297	0	0	\$0	0	0	0
wing trailing edge flap (srn)	501	0	0	\$0	0	0	0



Predictive maintenance is an entire maintenance operation that reduces unplanned downtime and improves reliability by **predicting and correcting failures**

Step 1 - Building Models:

1. Collect, and store data
2. **Clean data**
3. **Collect relevant data to build model**
4. Build models
5. Validate

Step 2 - Predict:

1. Collect, and store data
2. **Clean data**
3. Predict events
4. Do a **prescribed** action
5. Evaluate prediction
6. Learn

Clean data is essential to automate the building of predictive maintenance models



Diapers in our fuel: How SAP almost grounded every plane in America

And More

- Escalations



Thank you!

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