WORLDWIDE FLIGHT SAFETY CONFERENCE
BANGKOK 2018
27TH – 28TH JUNE

Fuel Management

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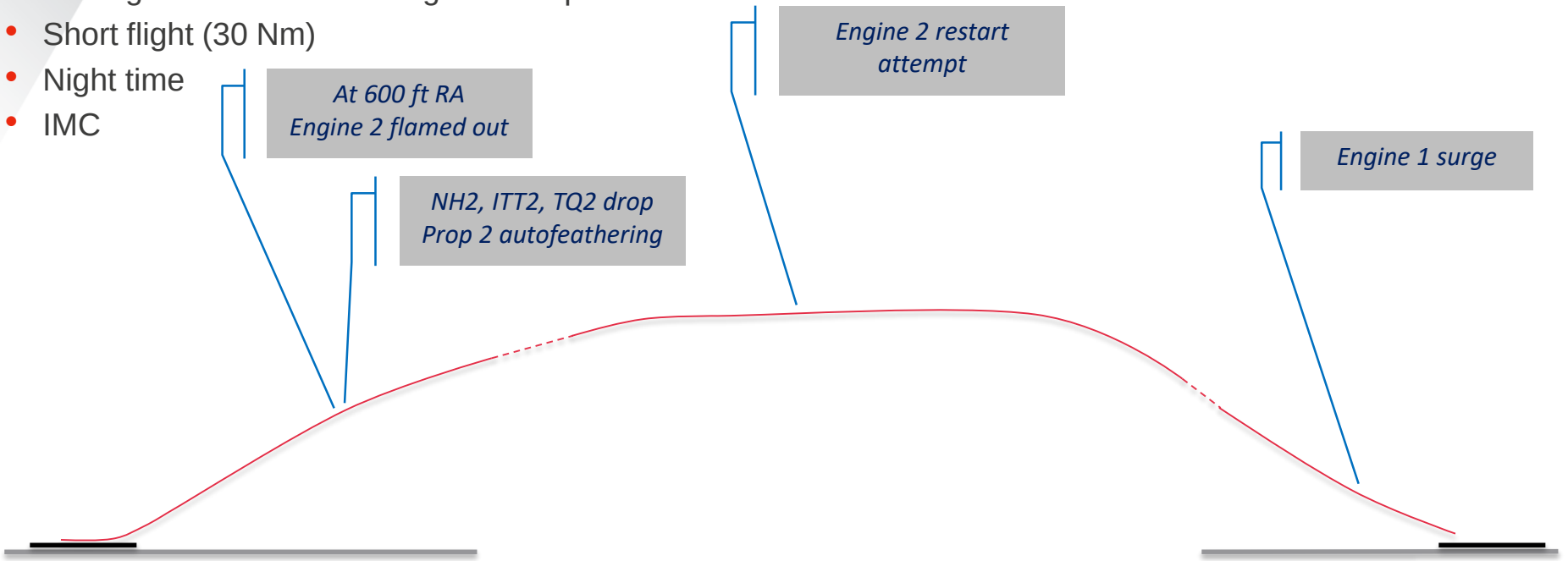
Flight Safety Director
Accident/Incident Investigator

ATR
PROPELLING THE NEXT CONNECTION

Event description

- ATR 42-500 (delivered 1997)
- last leg of an afternoon 5 leg round trip
- Short flight (30 Nm)
- Night time
- IMC



Investigation findings

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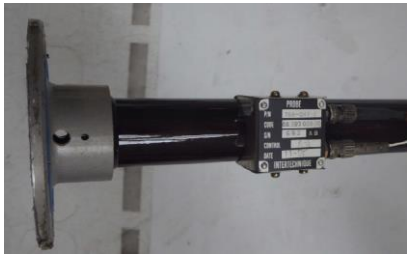
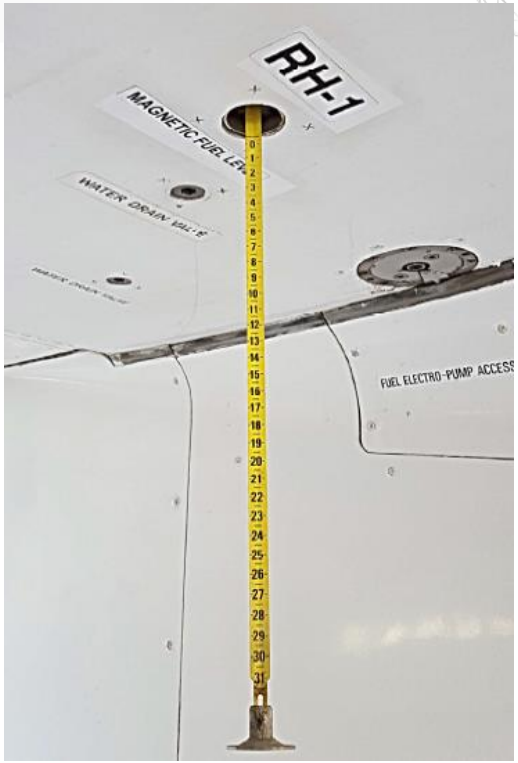
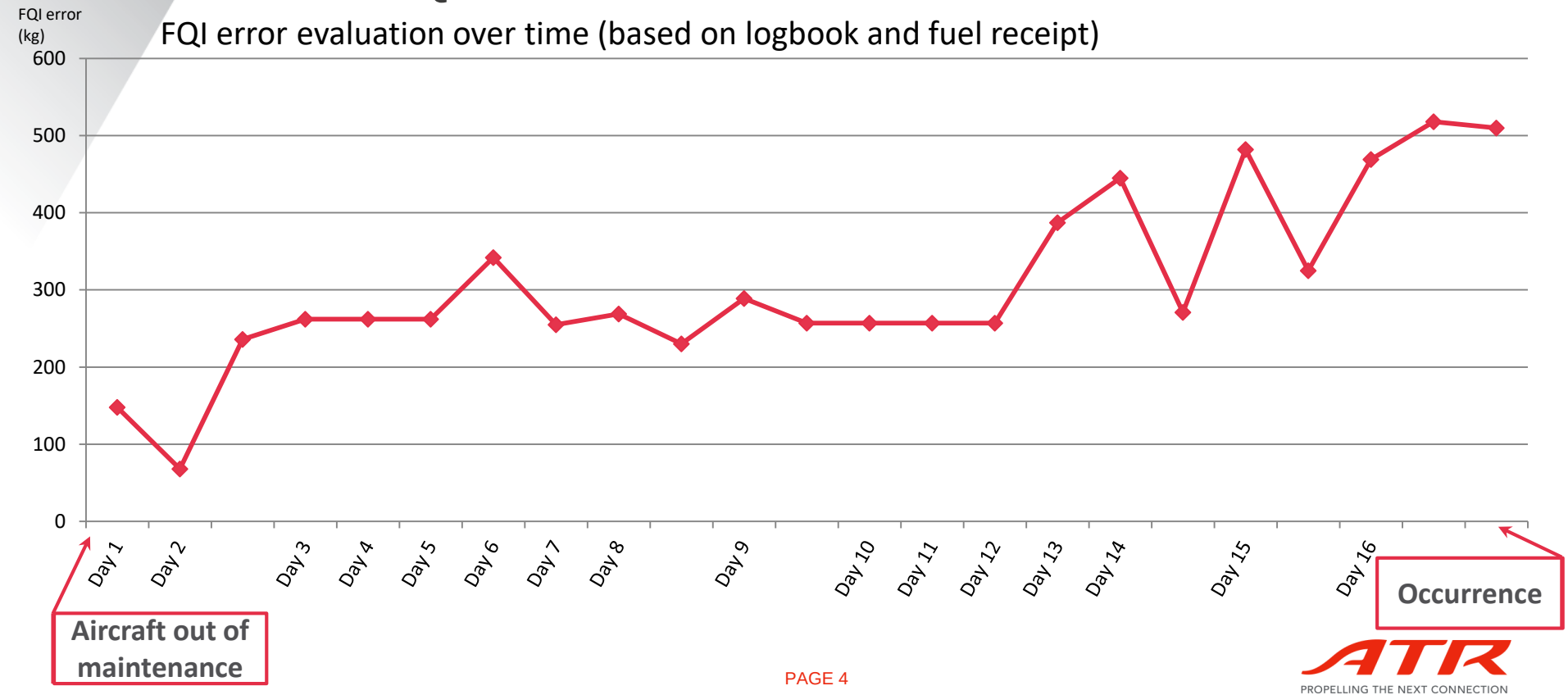


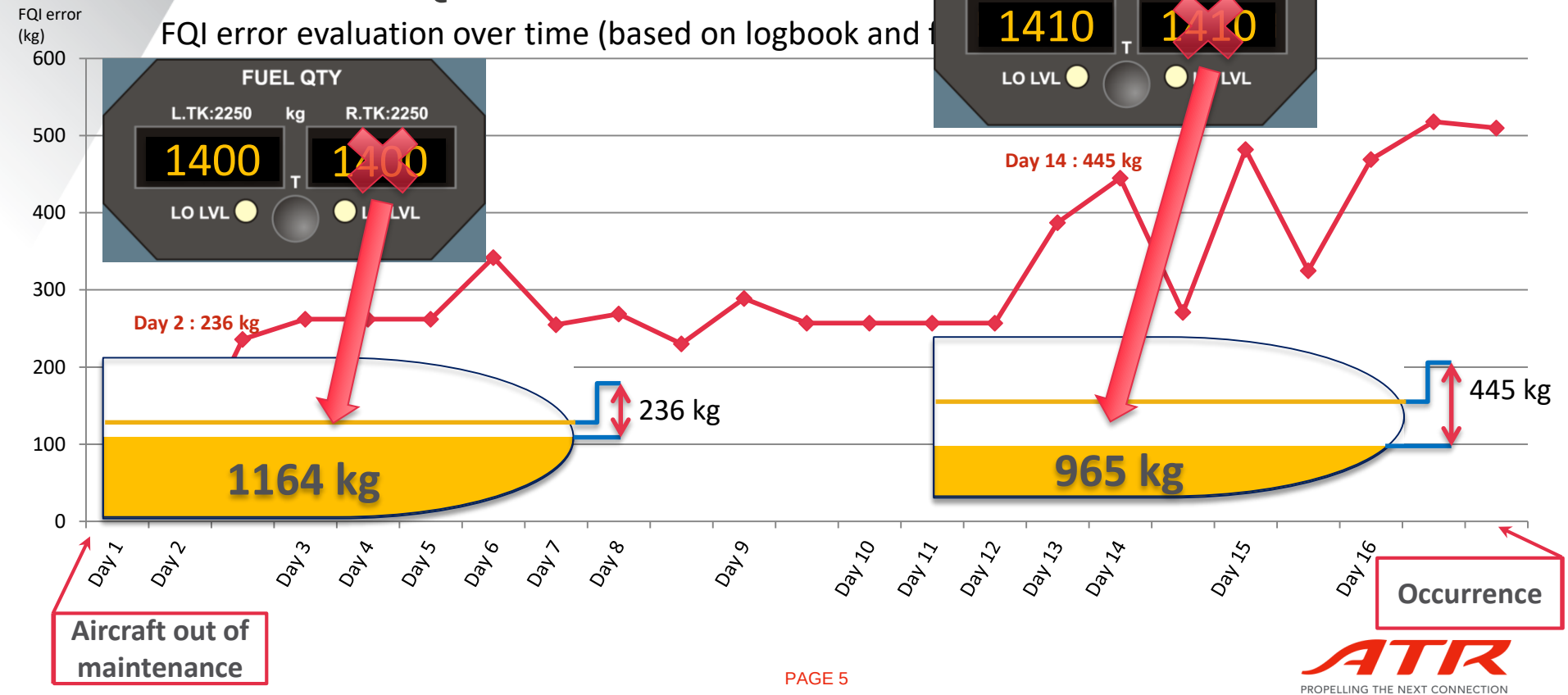


FQI error evaluation



FQI error evaluation

FQI error evaluation over time (based on logbook and f



Regulation requirement

CAT.OP.MPA.150 Fuel policy

(a) The operator shall establish a fuel policy …to ensure that every flight carries sufficient fuel for the planned operation …

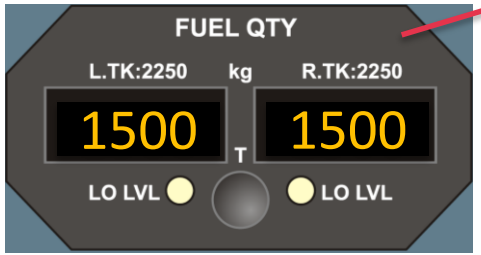
CAT.OP.MPA.260 Fuel and oil supply

The commander shall only commence a flight …when satisfied that the aircraft carries at least the planned amount of usable fuel …to complete the flight safely, taking into account the expected operating conditions.

Fuel check – Tech Log data

PRE-FLIGHT SIGN	FLIGHT NUMB	STATIONS		BLOCK TIME			AIRBORNE TIME			DELAY		LDG	HOT START	FUEL					No OF PAX	KG CARGO
		FROM	TO	OFF	ON	TIME	T/O	LDG	TIME	TIME	CODE			RAMP	USED	REMAINING	PLAN UPLIFT	ACT UPLIFT		
MC	ATR123	TLS	BKK																68	

Fuel check - Refuelling



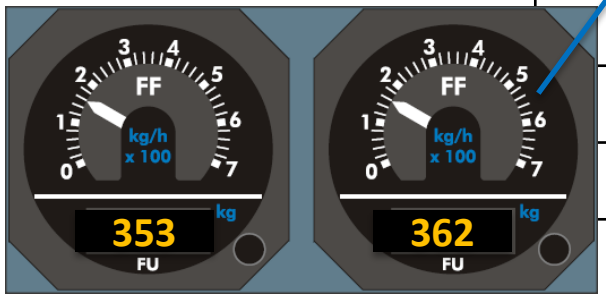
FUEL				
RAMP	USED	REMAINING	PLAN UPLIFT	ACT UPLIFT
3000			1850	1821

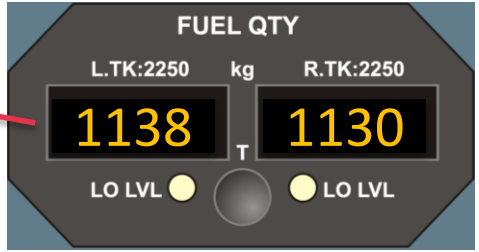
Flight Plan
FUEL REQUIRED FOR THE FLIGHT : 3000 Kg

TECH LOG
FUEL REMAINING AFTER PREVIOUS FLIGHT : 1150 Kg

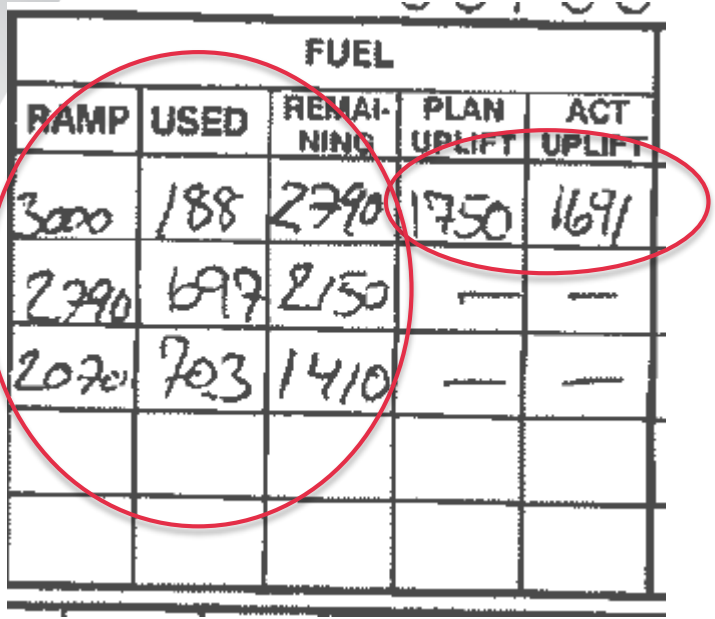
Fuel check – After the flight

FUEL				
RAMP	USED	REMAINING	PLAN UPLIFT	ACT UPLIFT
3000	715	2268	1850	1821

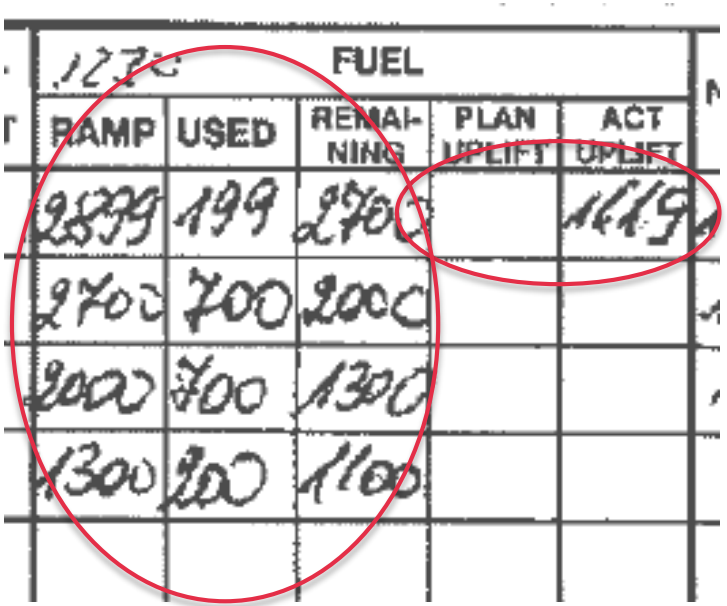




Logbook extracts



FUEL				
RAMP	USED	REMAI-NING	PLAN UPLIFT	ACT UPLIFT
3000	188	2790	1750	1691
2790	697	2150	—	—
2070	703	1410	—	—



FUEL				
RAMP	USED	REMAI-NING	PLAN UPLIFT	ACT UPLIFT
2899	199	2700		1619
2700	700	2000		
2000	700	1300		
1300	200	1100		

Logbook extracts

FUEL				
RAMP	USED	REMAI-NING	PLAN UPLIFT	ACT UPLIFT
2500	737	2300	1800	1432

1

Δ = 168 Kg

FUEL				
RAMP	USED	REMAI-NING	PLAN UPLIFT	ACT UPLIFT
3000	188	2790	1750	1691

2

Δ = 59 Kg

QUIZ : WHICH ONE(S) ARE ACCEPTABLE?

FUEL				
RAMP	USED	REMAI-NING	PLAN UPLIFT	ACT UPLIFT
2830	146	2600	1930	1753

3

Δ = 177 Kg

1150 FUEL				
RAMP	USED	REMAI-NING	PLAN UPLIFT	ACT UPLIFT
2830	192	2600	1680	1469

4

Δ = 211 Kg

Logbook extracts

FUEL				
RAMP	USED	REMAI-NING	PLAN UPLIFT	ACT UPLIFT
2500	737	2316	1800	1632

1

Δ = 168 Kg

FUEL				
RAMP	USED	REMAI-NING	PLAN UPLIFT	ACT UPLIFT
3000	188	2790	1750	1691

2

Δ = 59 Kg

Some examples of criteria found in some airlines OM:
If **<u>Δ > 3% of fuel uplift</u>**, or **<u>Δ > 60 kg per fuel tank</u>**, the crew should ask for a maintenance check of fuel actual quantity

FUEL				
RAMP	USED	REMAI-NING	PLAN UPLIFT	ACT UPLIFT
2830	146	2600	1930	1753

3

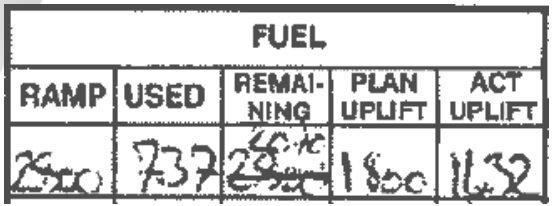
Δ = 177 Kg

1150 FUEL				
RAMP	USED	REMAI-NING	PLAN UPLIFT	ACT UPLIFT
2830	192	2600	1680	1469

4

Δ = 211 Kg

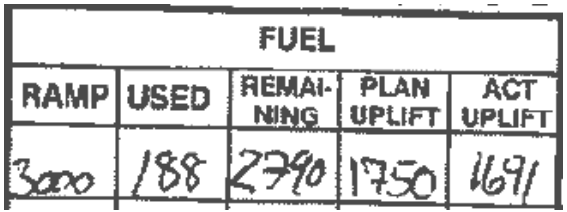
Logbook extracts



FUEL				
RAMP	USED	REMAI-NING	PLAN UPLIFT	ACT UPLIFT
2500	737	2300	1800	1632

1

Δ = 168 Kg

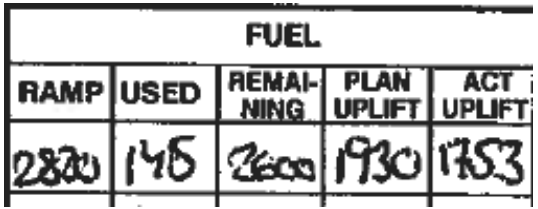


FUEL				
RAMP	USED	REMAI-NING	PLAN UPLIFT	ACT UPLIFT
3000	188	2790	1750	1691

2

Δ = 59 Kg

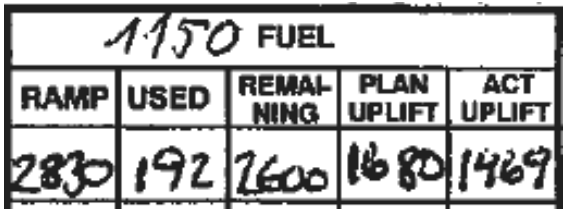
FCOM provides figures of the accuracy of the FQI (PRO.NOP.NSU.28.3):
Δ > 120 kg for the total fuel uplift is in excess of the FQI accuracy, hence not acceptable.



FUEL				
RAMP	USED	REMAI-NING	PLAN UPLIFT	ACT UPLIFT
2830	146	2600	1930	1753

3

Δ = 177 Kg



1150 FUEL				
RAMP	USED	REMAI-NING	PLAN UPLIFT	ACT UPLIFT
2830	192	2600	1680	1469

4

Δ = 211 Kg

FQI error evaluation

Key messages

- The OM should provide clear guidance for fuel management
- Provide user friendly logbook
- Always compute / compare information from
  - Fuel quantity indicator
  - Fuel tanker receipt
  - Fuel used
- Trigger maintenance check as necessary

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REFERENCE SLIDES

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Appendix – 3 A/C configuration for Low Level alert

Single fuel measurement and alerting system

- The low level alert is triggered from the measured quantity. No other alert.

- ATR 42-300
- ATR 42-500 and 72 without MFC STD 4

MFC STD 4 specific configuration

- The low level alert is triggered from the measured quantity.
- The absence of high level in the feeder tank triggers FUEL on CAP without any local alert

- ATR 42-500 and 72 with MFC STD 4 (MOD 4571, 4599, 4569)

Independent alerting system

- The low level alert is triggered either from the measured quantity or from the absence of high level in the feeder tank

- ATR 42-500 since MSN 561 (post MOD 4650)
- ATR 72 since MSN 529 (post MOD 4686)

Upgrade possible for ATR 42-500 and 72 through

SB ATR42-28-0033 and SB ATR 72-28-1022