AFI Flight Operations Safety Awareness Seminar (FOSAS)

Flight Data Analysis (FDA)
Cases Study

ICAO/Airbus
Nairobi, 19-21 Sep. 2017
Agenda

- T-VASIS
- LOC Deviation
- Incorrect Pitch at Takeoff
- CRM Issue
- Runway Excursion
- Speed drop below VLS in GA
Agenda

- **T-VASIS**
- LOC Deviation
- Incorrect Pitch at Takeoff
- CRM Issue
- Runway Excursion
- Speed drop below VLS in GA
Case Study 1

T-VASIS

After a high severity short flare distance event, a Safety analyst opened the associated flight and replayed it.

Distance off center runway THD:
Touch position - 1.11 meters
10 feet to ground - 390 meters
Case Study 1

**Main facts:**
- Unstabilized approach
- Night time
- Manual Flight
- T-VASIS*

- **ILS 16 Approach 3° G/S**
- **GPWS “GLIDE SLOPE” (5 sec)**
- **Low Approach slope (MM at 100ft AAL)**

* T-Visual Approach Slope Indicator System
Case Study 1
## Case Study 1: T-VASIS

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[AIRBUS logo]
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<td>- Crew Redundancy</td>
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<td>- Visual Aids</td>
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<td>- ILS Signal</td>
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<td>Go Around</td>
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<td>- Overshoot/Undershoot (USOS)</td>
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<td>Stability Policy</td>
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<td>Controlled Flight Into Terrain (CFIT)</td>
<td>3A (INTOLERABLE)</td>
<td>- GPWS - Crew Redundancy - Visual Aids - ILS Signal</td>
<td>- SOP: Improved Approach Briefing - Communication on GPWS reliability</td>
</tr>
<tr>
<td>Unstabilized Approach</td>
<td>- Runway Excursion (RE) - Overshoot/Undershoot (USOS) - Abnormal Runway Contact (ARC)</td>
<td>2B (TOLERABLE) 3B (TOLERABLE) 4C (TOLERABLE)</td>
<td>- Go Around - Stabilization Policy</td>
<td>- Information on unstabilized approaches (Improved safety awareness)</td>
</tr>
<tr>
<td>Night Flight</td>
<td>- Crew Fatigue</td>
<td>2B (TOLERABLE)</td>
<td>- Crew Rostering</td>
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<td>Inconsistency between two visual aids</td>
<td>- Misinterpretation</td>
<td>4A (INTOLERABLE)</td>
<td>- Training - Crew redundancy</td>
<td>- Visual Aids Info Reminder (Urgent) - Info to Authorities</td>
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**Notes:**
- 3A (INTOLERABLE) indicates a high risk associated with the hazard.
- 2B (TOLERABLE) indicates a medium risk associated with the hazard.
- 4A (INTOLERABLE) indicates an extremely high risk associated with the hazard.
Case Study 1

T-VASIS

As an Airline, what could be your contribution?

- You could communicate on GPWS reliability to possibly regain the pilot’s confidence in such a case.
- You could provide a note on technical Visual Aids difference (PAPI vs T-VASIS).
<table>
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Case Study 2

Let’s have a look at the following flight and try to understand what happened...
Case Study 2

LOC Deviation

What are your observations?

Could you explain what happened?

What will you do about it?
Case Study 2

LOC Deviation

Locater Deviation 1.37 dots

LEFT

RIGHT

[LANDING]
LOC Deviation

LOC ground signal disruption?

- **Aircraft safety has not been directly impacted**
- Thus, Event 1803 (LOC deviation) can be disregarded and/or deleted from the database,
- nevertheless…

**Operational cleaning ensures that the retrieved events are valuable for analysis and statistics**
Case Study 2

LOC Deviation

As an Airline, what could be your contribution?
Agenda

- T-VASIS
- LOC Deviation
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Case Study 3

Incorrect Pitch at Takeoff
Case Study 3

Incorrect Pitch at Takeoff

CONTEXT:

Mixed fleet A340-300/500 and A330.

Takeoff CONF3 on A340-500 and CONF2 on A340-300

Let’s look at FDA events list…
Case Study 3

Incorrect Pitch at Takeoff

Event 1038: Speed Low in Climb
Case Study 3

Incorrect Pitch at Takeoff

It appears that the event 1038 is affecting more A340 fleet than A330 one.
Case Study 3

Incorrect Pitch at Takeoff

Looking closer to statistics, A340-500 A/C type seems more affected than A340-300 one.

Event 1038 A330 Vs A340

<table>
<thead>
<tr>
<th></th>
<th>A340-500</th>
<th>A340-300</th>
<th>A330</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low ratio</td>
<td>0.377</td>
<td>0.039</td>
<td>0.0033</td>
</tr>
<tr>
<td>Low count</td>
<td>126</td>
<td>42</td>
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</tr>
<tr>
<td>Medium ratio</td>
<td>0.173</td>
<td>0.0060</td>
<td>0</td>
</tr>
<tr>
<td>Medium count</td>
<td>13</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>High ratio</td>
<td>0.025</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>High count</td>
<td>2</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Number of Flights</td>
<td>394</td>
<td>334</td>
<td>608</td>
</tr>
</tbody>
</table>

Event Count:
- FAP CONF
- A340-500
- A340-300
- A330
Case Study 3

Incorrect Pitch at Takeoff

FDA statistics show the following trends:

- **Event 1038** affects **more the A340 fleet** than the A330 fleet

- **Event 1038** concerns **more the A340-500 type** than A340-300 type.

Therefore, what could we do?

- Transmission to AIRBUS for deeper analysis.
Case Study 3

Incorrect Pitch at Takeoff

→ Performance studies: 15° pitch > equilibrium 12.5° pitch

Answer from AIRBUS:

Before 15°, now 12.5°
Case Study 3

Incorrect Pitch at Takeoff

- SOP updated

<table>
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</table>
| **ROTATION**.............ORDER
**ROTATION**.............PERFORM |

- At VR, initiate the rotation with a positive sidestick input to achieve a continuous rotation rate of about 3 °/s, towards a pitch attitude of 12.5 °.
- Minimize lateral inputs on ground and during the rotation, to avoid spoiler extension. In strong crosswind conditions, small lateral stick inputs may be used, if necessary, to aim at maintaining wings level.
- After lift-off, follow the SRS pitch command bar.
Case Study 3

Incorrect Pitch at Takeoff

As an Airline, what could be your contribution?

- You could share the “WHY” with the pilot’s community
- You could follow-up Airline’s SOP update in accordance with the latest Airbus recommendations.
Agenda

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Case Study 4

CRM Issue

- The departure is flown manually by the First Officer
- Let’s look at the flight replay with FDA tool

<table>
<thead>
<tr>
<th>SID</th>
<th>RWY</th>
<th>Routing</th>
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<tbody>
<tr>
<td>CHARLIE 12</td>
<td>12L</td>
<td>Climb on 121° heading to 3000’, then vectoring enroute by BAHRAIN Approach.</td>
</tr>
<tr>
<td>CHARLIE 30</td>
<td>30R</td>
<td>Climb on 301° heading to 3000’, then vectoring enroute by BAHRAIN Approach.</td>
</tr>
</tbody>
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Case Study 4

**CRM Issue**

What are your observations?

- **Slat speed exceeded**:
  - Request maintenance inspection

Could you explain what happened?

- **Dual Stick input**:
  - Ask for a Flight Crew interview or Report…
  - Communication to Pilot’s community, Training, …

What will you do about it?

- **Use of automation (Policy)**:
  - Communication to training department…
  - Golden Rules reminder
Let’s have a look at the following flight within FDA tool…
Case Study 5

- Deviation above G/S (1000-300ft)
- Rate Of Descent High in Approach (from 1000-500ft)
- Speed High in approach (1000ft)
- Deviation above Glide slope (1000-300ft)
- Rate Of Descent High in Approach (below 500ft)
- GPWS Warning (below 500ft)
- Height Low at Threshold

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Case Study 5

Runway Excursion

What are your observations?

▶ An unstabilized approach is observed with a lot of flight parameters deviations (speed, G/S, V/S, etc)

Could you explain what happened?

▶ FDA allowed the Airline to realize that some crews do not demonstrate the minimum required handling skills level…

• FDA analysis could also be completed by a flight crew report and/or a crew interview

What will you do about it?

• Training concern?
Agenda

- T-VASIS
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Case Study 6

Speed Drop below VLS in GA
Case Study 6

**Speed Drop below VLS in GA**

**CONTEXT:**

A/C type: A330

Flight phase: Approach

Configuration: CONF3, Speed brakes extended and L/G down

Let’s have a look at the following flight within FDA tool...
Case Study 6

**Speed Drop below VLS in GA**

What are your observations?  
Go Around was performed without TOGA selection, not following Airbus SOP (Thrust levers still in CLB detent)

Could you explain what happened?  
FDA allows Airline to take into consideration that some pilots did not properly understood the Go Around philosophy and associated SOP.

What will you do about it?  
Reminder of standard Go-Around Procedures must be considered (e.g. Briefing note, refresher training for Flight crew, …)