Cockpit / Cabin
Smoke Procedures

Customer Services
Introduction

• In 2003, the Airbus “Smoke” Working Group was created to review:
  ‣ Smoke Procedures
  ‣ Cockpit and Cabin Indications
  ‣ Possible Design Improvements

  While ensuring that the procedure’s philosophy remains intact

• The objective of this presentation is to:
  ‣ Review the latest developments
  ‣ Recall the Cockpit/Cabin Smoke Procedure Philosophy
  ‣ Outline the recommendations of the “Smoke” Working Group, and how they will be incorporated in the smoke procedures.
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• Recall of current procedures principles

• Cockpit / Cabin Smoke Procedure Philosophy

• “Smoke” Working Group Recommendations

• Smoke Procedure Updates

• Conclusion
Recall of current procedures principles

• The current Smoke procedures are based on a review made few years ago for the entire Airbus family in order to:

  ▶ Ensure a consistent approach for mixed-fleet airlines.

  ▶ Define common actions to be performed, whatever the smoke origin.

  ▶ Provide crews with a procedure to help them in determining the smoke origin.
Recall of current procedures principles…

- For new Airbus models, **specific cabin crew smoke procedures** were developed for inclusion in the Cabin Crew Operating Manual (CCOM).
Recall of current procedures principles...

CCOM Extract: OVEN SMOKE

- **OVEN DOOR** ....................................................... **CLOSE**
  Do not open the oven door, as this could create an oxygen inflow which could stir up the fire.

- **OVEN CIRCUIT BREAKER** .................................... **PULL**
  The applicable circuit breaker is located on the galley’s centralized electrical panel.

- **ELECTRICAL POWER** .......................................... **OFF**

- **CABIN CREW** .................................................. **INFORM COCKPIT CREW**
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• Cockpit / Cabin Smoke Procedure Philosophy
  » SMOKE/FUMES: Paper Procedure Layout

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Cockpit / Cabin Smoke Procedure Philosophy

• The Airbus Smoke Procedure has implemented a global philosophy, that is applicable to both cabin and cockpit smoke cases.

• This philosophy includes the following main steps:
  ‣ The “Alert” Phase
  ‣ Common Actions
  ‣ Smoke Removal (if dense smoke)
  ‣ Smoke Source Identification
  ‣ Stopping Smoke Emission

The KEY element throughout the procedure: GOOD COMMUNICATION between cabin and flight crews
The “Alert” Phase:

• The alert can be provided by the:
  ‣ ECAM, or FAP warnings for smoke-monitored areas (lavatory, crew rest compartment …)
  ‣ Cabin/Cockpit crew

• In any case (even for smoke-monitored areas), it is essential that the cabin crew estimate and inform the cockpit concerning the:
  ‣ Density of the smoke
  ‣ Severity of situation
Common Actions:

- The following actions should be applied immediately by the flight crew, whatever the origin of the smoke may be, and before trying to identify this origin:
  - Extract smoke overboard
  - Stop smoke re-circulation
  - Isolate potential smoke sources

- The objective of these actions is to avoid any further contamination of the cabin.

- If the faulty equipment has already been identified:
  - Shut it OFF.
Smoke Removal:

- In case of dense smoke, and at any time during the procedure, the flight crew can consider applying the smoke removal procedure:

  - IF DENSE SMOKE, at any time of the procedure:
    - DESCENT for smoke removal
    - SMOKE/TOXIC FUMES REMOVAL
    - ELEC EMER CONFIG

Refer to the end of the procedure to set ELEC EMER CONFIG.
Cockpit / Cabin Smoke Procedure Philosophy...

Smoke Source Identification:

- It is the cockpit/cabin crew’s role to identify the smoke source for both:
  - Smoke-monitored areas
  - Other areas
• Once the source of smoke is identified, the cockpit/cabin crew should apply specific actions to stop the smoke. This includes fire fighting.
  ‣ Example: VCC Smoke

- CABIN CREW ....... INFORM AND COORDINATE WITH COCKPIT CREW
- CC3: PAX SYS SWITCH ............................................................... OFF  
  The PAX SYS switch is located in the cockpit, on the VCC and optionally on the FAP.
- CC1: FIRE FIGHTING PROCEDURE ............................... APPLY  
  CC2 assist.
In case of *cabin* smoke, throughout each step, the *cabin crew* must:

- Monitor cabin events
- Quickly inform the cockpit

Therefore, effective *Cabin / Cockpit Communication* is, KEY to saving precious time, and ensuring that appropriate actions are taken.
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Recommendation N° 1:

- Development of a “Getting to Grips” Brochure containing Cabin Safety Procedures for all Airbus aircraft.
“Smoke” Working Group Recommendations …

• The objectives of this brochure are to:

  ‣ Focus on cabin smoke procedures, and on such other cabin safety issues as: Emergency Evacuation, Bomb On Board…
  
  ‣ Take into account the lessons-learned, by analyzing in-service events.
  
  ‣ Serve as a reminder of the basic principles of crew coordination.
  
  ‣ Re-iterate the need for cabin safety procedures.
  
  ‣ Provide operators with cabin safety guidelines.
  
  ‣ Help implement customized cabin crew procedures, in case of smoke or emergency evacuation.
“Smoke” Working Group Recommendations …

• Cabin Smoke section

› Includes basic rules and practices:
  – Cockpit / Cabin crew communication
  – Cabin Crew Resource Management (CRM)
  – List common actions that are applicable, when smoke/smell is perceptible in the cabin.

› Reviews potential sources of cabin smoke

› Lists all known sources of cabin smoke

› Provides guidelines for recognizing different smoke/fumes and, if possible, their effect.
“Smoke” Working Group Recommendations …

• Cabin Smoke section …

> Provides cabin smoke procedures:
  – For each smoke origin:
    • Identifies all ways of isolating the affected equipment, and
    • Provides an associated strategy to stop the emission of smoke.

> Indicates the location of controls and/or the C/Bs, in terms of cabin panels, not C/B labels.
  – Further customization will be the airline’s responsibility.

> However, covers all standards and options that are proposed by Airbus for all aircraft types.
“Smoke” Working Group Recommendations …

• Fire-Fighting Procedure section
  ‣ Provides general guidelines on how to fight a fire in the cabins of all Airbus aircraft types, with the use of Airbus equipment.

• Emergency Evacuation Procedure section
  ‣ Provides the emergency evacuation procedures, developed for the A340-500/600 and A318 CCOM.

  ‣ Additional emergency procedures, developed in the CCOM, will be incorporated and adapted for all Airbus aircraft types:
    – Examples:
      Depressurization, Bomb-on-Board, Crew Incapacitation…
“Smoke” Working Group Recommendations …

Recommendation N° 2:

• Add the "CKPT/CABIN COM …… ESTABLISH" item for both ECAM and paper Smoke procedure.

→ In case of a smoke warning, the flight crew must contact the cabin crew to:
  – Confirm the warning
  – Improve smoke source determination
  – Evaluate the seriousness of the situation.
  – Follow-up on the smoke dissipation.
“Smoke” Working Group Recommendations …

Recommenda­tion N° 3:

• Change the “LAVATORY SMOKE” color from RED to AMBER:
  ‣ To date, lavatory smoke warnings are often caused by unauthorized smokers.
  ‣ Such, events are so frequent that confidence in the RED warning has decreased.
  ‣ Per Recommendation N° 2, the cockpit crew is now asked to establish communication with the cabin crew.

• Downgrade the LAVATORY SMOKE warning to a caution.

• Validate the change on the ECAM, via a pin-programming.
 Recommendation N° 4:

• Change the FWC logic on single-aisle aircraft, to prevent undue memorization of the “LAND ASAP”.

  ▶ With current FWC standards: If smoke is detected, when on ground, “LAND ASAP” is triggered after takeoff.

  ▶ Some aborted flights have been reported to Airbus.

  ▶ Therefore, “LAND ASAP” memorization will be removed by next FWC Standard.
Recommendation N° 5:

- Improve avionics smoke detection on single-aisle aircraft, by installing a dual loop design.
- Avoid spurious avionic smoke warnings that are triggered on single-aisle aircraft by installing two detectors.
  - On long-range aircraft, two detectors are installed, and there are considerably less spurious warnings.
- Delete the “if perceptible smoke” condition from the AVIONICS VENT SMOKE procedure.
“Smoke” Working Group Recommendations ...

Recomendation N° 6:

- New ECAM Procedure:
  - Title of the procedure has changed to: "AVNCS VENT SMOKE".

- Common procedure for all fly-by-wire aircraft.

- Displays commons actions to:
  - Protect the flight crew
  - Establish COCKPIT/CABIN communications
  - Limit smoke propagation
  - Light the cabin signs
  - Refer to the paper procedure
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• Cockpit / Cabin Smoke Procedure Philosophy

• “Smoke” Working Group Recommendations

• Smoke Procedure Updates (ECAM + Paper)
  ‣ Current Smoke Procedure (ECAM)
  ‣ Smoke Procedure Updates (ECAM)
  ‣ Smoke Procedure Updates (Paper)

• Conclusion
For Single-Aisle Aircraft:

- In case of "SMOKE AVNCS SMOKE", the ECAM SMOKE procedure leads to an EMER ELEC after a 5-minute countdown.

REMINDER

SMOKE AVNCS SMOKE

IF SMOKE AFTER OMNIDOS:
- EMER ELEC GEN1 LINE........ OFF
- EMER ELEC PWR..................MAN ON
- WHEN EMER GEN AVAL
- APU GEN........................OFF
- GEN2...............................OFF
Current Smoke Procedure (ECAM) …

For Long-Range Aircraft:

• The ECAM SMOKE procedure:
  ‣ Already focuses on:
    – Crew protection, and
    – Smoke propagation prevention
  ‣ Already refers to the paper procedure.

REMEMINDER
Smoke Procedure Updates (ECAM)

For Single-Aisle and Long-Range Aircraft:

• Addition of the “CKPT/CAB COM.... ESTABLISH” line to the ECAM Procedure.
Smoke Procedure Updates (ECAM) …

For Single-Aisle and Long-Range Aircraft:

• Addition of the “CAB SIGNS.... ON” line (SEAT BELTS and NO SMOKING) to the ECAM procedure.
Smoke Procedure Updates (ECAM) …

For Single-Aisle:

• The AVNCS VENT SMOKE ECAM procedure, now refers to the SMOKE/FUMES Paper procedure…
Smoke Procedure Updates (ECAM) …

For Single-Aisle Aircraft only:

• The SMOKE ECAM procedure will no longer refer to EMER ELEC CONFIG
“Common actions”

**DENSE SMOKE recommendations**

**SMOKE ORIGIN Research**

**Electrical Emergency Configuration Procedure**

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**SMOKE / FUMES**

- LAND ASAP
  - OXY MASK (if RQRD) ………………ON/100%/EMERG
  - CKPT/CABIN COMM ………………..ESTABLISH
  - VENT EXTRACT………………………………OVRD
  - CAB FANS……………………………………OFF
  - GALLEYS……………………………………OFF
  - CAB SIGNS ………………………………ON

  - IF FAULTY EQUIPMENT IDENTIFIED
    - FAULTY EQUIPMENT………………………ISOLATE

  - IF DENSE SMOKE, at any time of the procedure:
    - DESCENT for smoke removal….………...INITIATE
    - SMOKE/TOXIC FUMES REMOVAL proc……..APPLY
    - ELEC EMER CONFIG…………...………….CONSIDER

  - IF AIR COND SMOKE SUSPECTED:
    - APU BLEED……………………………………OFF
    - PACK 1……………………………………………………………………..OFF
    - PACK 2……………………………………ON
    - SMOKE/TOXIC FUMES REMOVAL…………………………………….. CONSIDER

  - IF CAB EQUIPMENT SMOKE SUSPECTED:
    - EMER EXIT LT……………………………………ON
    - COMMERCIAL……………………………………OFF
    - SMOKE/TOXIC FUMES REMOVAL…………………………………….. CONSIDER

  - IF AVIONICS/COCKPIT SMOKE SUSPECTED:
    - AC BUS 1+1 can be shed as follows:
    - AC BUS 2+3 can be shed as follows:

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**TO SET ELEC EMER CONFIG:**

- ELEC EMER PWR…………………………….MIN ON
- AVIONICAL ELECTRICAL:
  - JEBL 1-1………………OFF
  - JEBL 1-2………………OFF
  - JEBL 1-3………………OFF
  - JEBL 1-4………………OFF

- ELEC EMER PROCEDURE WITHOUT PERFORMING THE GEN RESET.
Apply this procedure in case of perceptible FUMES or SMOKE smell.

If AVIONICS VENT SMOKE has been triggered go directly down to the line.

LAND ASAP

-OXY/MASK (if RQRD) ............................................ON/100%/EMER
-CKPT / CABIN COM ...........................................ESTABLISH
-VENT BLOWER ....................................................OVRD
-VENT EXTRACT ....................................................OVRD
-CAB FANS ............................................................OFF
-GALLEYS ...................................................................ON
-CAB SIGNS ...............................................................ON

• If Faulty Equipment identified
  -FAULTY EQPT ....................................................ISOLATE

If DENSE SMOKE, at any time of the procedure:

-EMER EXIT LT .........................................................ON
-SMOKE / FUMES REMOVAL .....................................APPLY
-ELEC EMER CONFIG ............................................CONSIDER
Smoke Procedure Updates (Paper) …

For Single-Aisle and Long-Range Aircraft:

- Architecture unchanged

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Smoke Procedure Updates (Paper) ...

For Single-Aisle and Long-Range Aircraft:

• Only a few changes to the SMOKE REMOVAL Procedure:

  ‣ OXY MASK ........................................ ON/100%/EMERG
  ‣ SEATBELT / NO SMOKING ..........................ON

– The above lines have been deleted from the SMOKE REMOVAL procedure to avoid redundancy with SMOKE/FUMES and AVNCS VENT SMOKE procedures.
Summary of Smoke Procedure Updates

- Pilots refer to the **SMOKE/FUMES** paper procedure:
  
  - With new FWC standard:
    - After AVNCS VENT SMOKE ECAM warning,
    - If smoke has been detected by Cabin/Flight crew, without ECAM warning;
  
  - With “old” FWC standard:
    - Same as today, according to the airline policy.

Paper procedure improvement is also applicable for old FWC standards.
Summary of Smoke Procedure Updates …

ECAM
« AVIONICS VENT SMOKE »
PROCEDURE
Summary of Smoke Procedure Updates …

CREW PERCEPTION

SMOKE REMOVAL PROCEDURE

SMOKE/FUMES PROCEDURE
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Conclusion

• Airbus continues to work on enhancing smoke protection procedures via:
  ➢ System improvements: FWC, consolidated detection
  ➢ Standardization of the smoke procedure philosophy for the entire Airbus family of aircraft.
  ➢ The development of new dedicated and detailed cabin crew procedures.

• The same philosophy will apply to the A380.

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