

Upset Prevention & Recovery Training

Mitigating Loss of Control In Flight

Aviation's Most Lethal Threat



**SOUTH AFRICAN
AIRWAYS**



**SFO Brad Bennetts
UPRT Project Manager**



South African Airways UPRT Program



Airplane-Pictures.net

Specialized UPRT Instructor Training



Aviation Performance Solutions (APS)

IDT Recommendations to SAA – Nov 2013

- Develop integrated training program
 - iPad eLearning course
 - Train-the-Trainer
 - Simulator upgrade
- Co-operate with Civil Aviation Authority
- Persue support from Insurers





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Specialized UPRT Instructor Training



Specialized UPRT Instructor Training

July 2013 – Train The Trainer UPRT Program Evaluation
at APS Arizona – 4 Instructors

Sept 2014 – 6 Additional Instructors complete the TTT
program at APS Netherlands

July 2015 – 2 Additional Instructors complete the TTT
UPRT program at APS Netherlands

Specialized UPRT Instructor Training



A319 / A320
4 Instructors



A330 / A340
4 Instructors



B737-800
2 Instructors

Specialized UPRT Instructor Training



Oct to Dec 2014 – Each Instructor completes SIX 4-hour simulator sessions = 24 Hours Simulator Training

IDT UPRT Simulator Tool



Checking of Simulator QTG

- Control Inputs
- Aircraft settings
- Flight Modes
- PFD
- V-n
- Alpha-Beta
- Replay function with audio

SAA UPRT Course Development - Resources



AIRPLANE UPSET RECOVERY
Industry Solutions for Large Single-Wing Turboprop Aircraft Typically Seating More Than 100 Passengers

**Training Aid
Revision 2**

Rev 2_November 2008

Contributors:

- AGX, Inc.
- A.M. Center Associates (Institute for Simulation & Training)
- Air Transport Association
- Airbus
- Air Line Pilots Association
- AirTeam Airways
- Alaska Airlines, Inc.
- All Nippon Airways Co., Ltd.
- Allied Pilots Association
- Alma Airlines, Inc.
- American Airlines, Inc.
- American Trans Air, Inc.
- Ansett Australia
- Bombardier Aerospace Training Center (Regional Jet Training Center)
- British Airways
- Calgan Corporation
- Cathay Pacific Airways Limited
- Comair Airways, Ltd.
- Continental Airlines, Inc.
- Delta Air Lines, Inc.
- Deutsche Lufthansa AG
- EVA Airways Corporation
- Federal Aviation Administration
- FlightSafety International
- Flight Safety Foundation
- Hawaiian Airlines
- International Air Transport Association
- Japan Airlines Co., Ltd.
- Lufthansa German Airlines
- Midwest Express Airlines, Inc.
- National Transportation Safety Board
- Northwest Airlines, Inc.
- Qantas Airways, Ltd.
- SAS Flight Academy
- Southwest Airlines
- The Boeing Company
- Trans World Airlines, Inc.
- United Air Lines, Inc.
- Upset Domain Training Institute
- US Airways, Inc.
- Veridian

AURTA Rev2 - 2008

U.S. Department of Transportation Federal Aviation Administration

Advisory Circular

Subject: Stall and Stick Pusher Training

Date: 8/6/12

Initiated by: AFS-200

AC No: 120-109

Change:

The information contained in this advisory circular (AC) was developed based on a review of recommended practices developed by major airplane manufacturers, labor organizations, air carriers, training organizations, simulator manufacturers, and industry representative organizations. This AC does not provide guidance for full aerodynamic stall training, which industry and government stakeholders are currently developing. Once developed, this AC will be revised to include that guidance.

The goal of this AC is to provide best for pilots, within existing regulations, stall warnings and stick pusher activation (AOA) at the first indication of a stall. Additionally, this AC provides guidance stall and stick pusher event training.

Core principals of this AC include:

- Reduction of AOA is the most
- Evaluation criteria for a recover predetermined value for attained internal variables which affect Operators (SAF O) 10012, Post (PTS) Language "Minimal Low
- Realistic scenarios that could be encountered with the autopilot
- Pilot training which emphasize and execute the stall recovery
- Incorporation of stick pusher in aircraft.

John M. Allen
John M. Allen
Director, Flight Standards Service

**FAA AIC120-109
June 2012**

**EASA SIB 2013-02
January 2013**

Subject: Stall and Stick Pusher Training

Ref. Publications: FAA Advisory Circular 120-109, Doc 10011 AN/506, FAA Aeroplane Upset Re, Aircrew Regulation 1178: Operations Regulations 9 Standards Implementing I

Applicability: Fixed Wing aeroplane ma Organisations

Background: Based on accident review Community regarding loss accident, quite often the p indication of a stall or stc

It is widely recognised the conditions that may lead t an approach-to-stall durin automatic flight. Someim or competencies to appr stick pusher event.

Stall and approach to stal reduction of the Angle of I response when confronte

Description: Based on these findings, i pusher training was devel with the participation of th recommended practices c manufacturers, pilot train

MANUAL ON AEROPLANE UPSET PREVENTION AND RECOVERY TRAINING

NOTICE TO USERS

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Approved by the Secretary General
And published under his authority

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INTERNATIONAL CIVIL AVIATION ORGANIZATION

**ICAO Doc 10011
February 2014**

Upset Recovery Training Limitations

- Airbus **Flight Control Laws and Protections** – Recognition and Avoidance, Improving manual handling skills
- Inability to simulate low-angle of **attack sustained unloading-G** for flight conditions critical to effective upset recovery training,
- Inability to **present physiological G-awareness cues**.
- Fidelity Limitations: The simulator cannot realistically simulate the forces **of high sideslip angles**.



SAA Upset Recovery Training Objectives



- Better understanding of Aerodynamic principles
- Application of flight controls
- Recognize situations that may lead to aircraft upsets so that they may be prevented.
- Recognize and confirm an aircraft upset.
- Confidence in maneuvering the aircraft.
- Develop Skills for recovery



- 32 Page SAA UPRT Student Manual

Airplane Upset Recovery

2-Hour Classroom Briefing



1. Background
2. Objectives
3. Limitations
4. Definition
5. Causes
6. General Flight Dynamics – Incl. Airbus Video
7. High Altitude Operations
8. **APS All Attitude Upset Recovery Strategy™**
9. Review of Airbus Flight Control Laws and Protections

SAA UPRT Course Description

4-Hour Dedicated UPRT Simulator Session:

- **RECOGNITION**
- **AVOIDANCE**
- **RECOVERY**



STARTLE!

SAA UPRT Course Description

Recurrent Training:

- Dedicated Simulator Handling Session Per Year



Simulator Exercises:



Handling Exercises

Performance Evaluation Exercises

AURTA Training Exercises

Line Orientated Scenario Based Training

Handling Exercises



Low and High Altitude Handling Exercises:

- Maneuver Margins
- Thrust Available
- High Alt Slowdown & Use of VS Climb Mode
- Pitch vs Performance (ROC & ROD)
- Maneuver Stability
- High Altitude Approach to Stall Recognition and Recovery

Performance Evaluation Exercise



- Roll rate with full aileron/spoiler input
- Roll rate with rudder input
- Pitch change using stabilizer trim only
- Pitch change with the use of thrust adjustments
- Pitch change with the use of speedbrakes

Performance Evaluation Exercises

(Continued)

- Yaw motion and resultant roll due to asymmetric thrust in Normal Law with autopilot off
- Yaw motion and resultant roll due to asymmetric thrust in Direct Law with autopilot off
- Approach to stall recovery using only pitch control

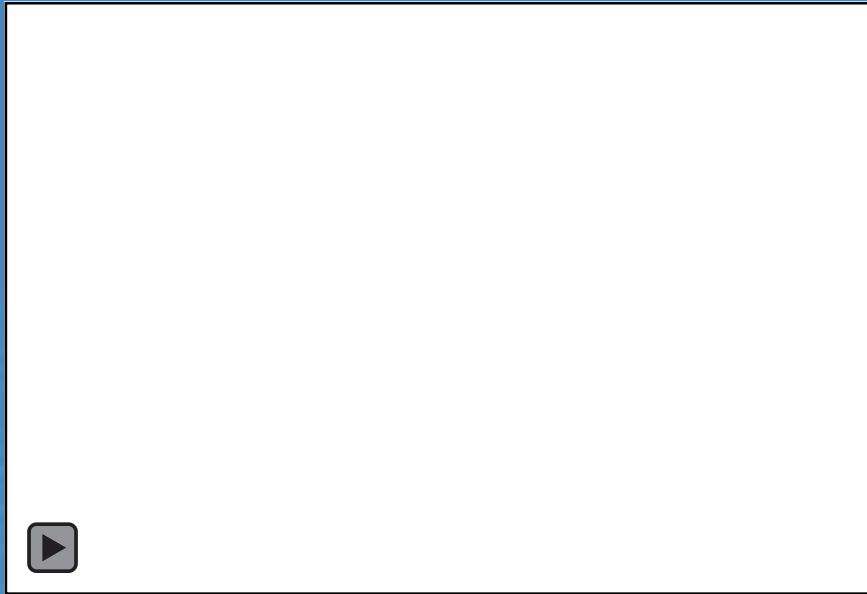
AURTA Training Exercises

Exercise 1 –Nose High Characteristics

Iteration 1: Use of Nose-down Elevator

Iteration 2: Use of Bank Angle

Iteration 3: Thrust reduction on Underwing Mounted Engines



AURTA Training Exercises (Continued)

Exercise 2 – Nose – Low Characteristics

Iteration 1: Nose low Overbanked Recovery

Iteration 2: Accelerated Stall Demonstration

Line Orientated Scenario Training Exercises



Exercise 3 – Recovery from Upset After Take Off

Exercise 4 – Unreliable Airspeed (loft)

Exercise 5 – Approach to Stall in Landing Configuration (loft)

*Exercise 6 – Inadvertent Alpha Floor Activation at LOC Intercept
(Evidence Based)*

Exercise 7 – Practice using all techniques

Any Questions ?



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