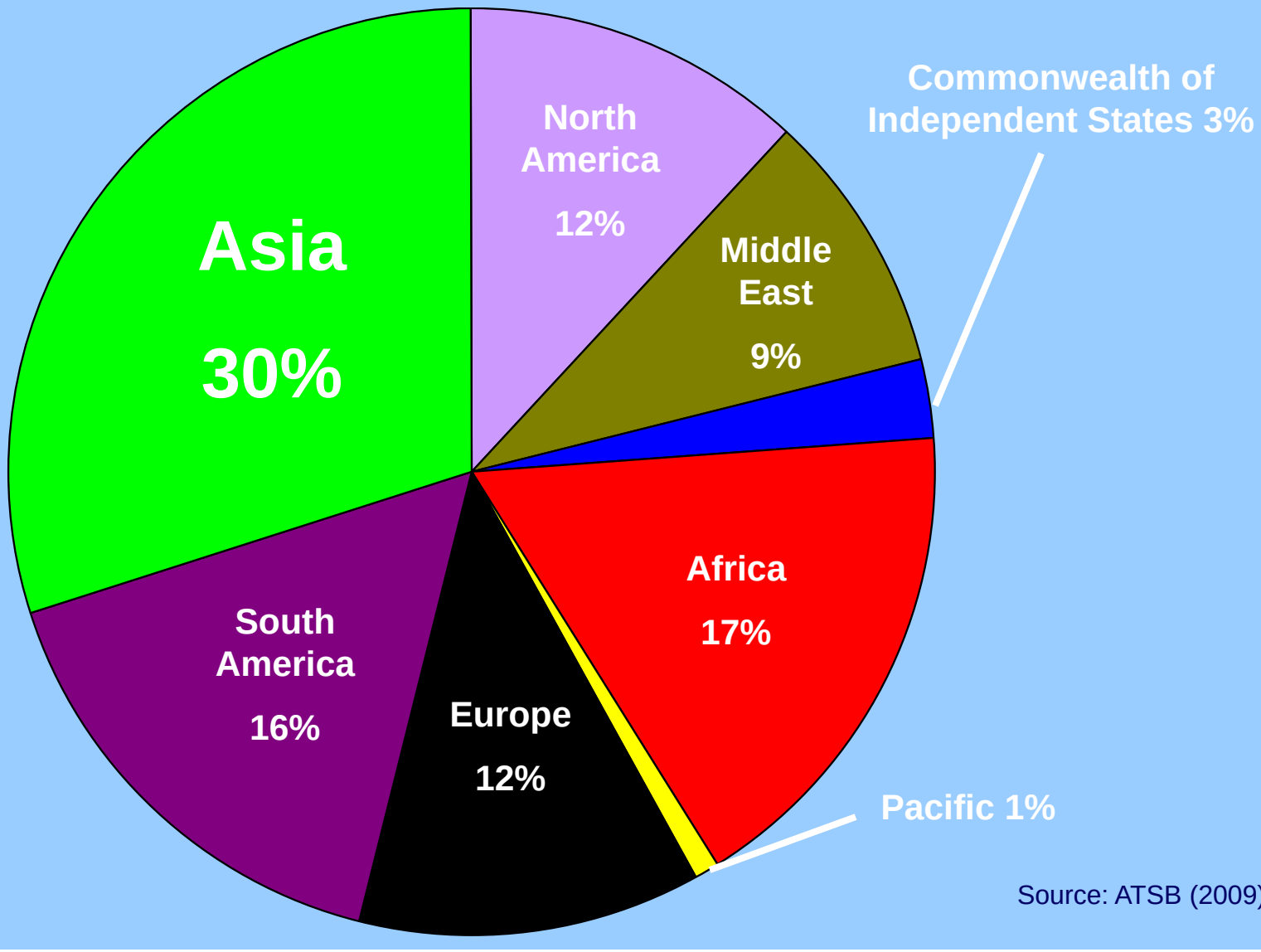
The Pilots' and Airline Operators' Perspective on Runway Excursion Hazards

Session 3

Presentation 1

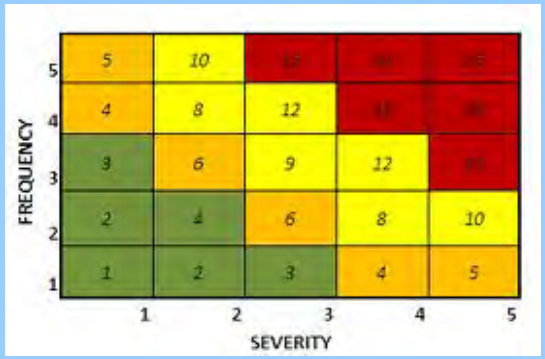

SINGAPORE AIRLINES
Lion

Runway Excursions by Continent



Source: ATSB (2009)

Threats



- **Weather**
  - Actual conditions
  - Information *(Lacking or inaccurate)*
- **Systems**
  - Aircraft
  - Operator
  - ATC
  - Airport Operator/Management
- **Performance**
  - Aircraft
  - Crew *(Fatigue)*
- **Crew Technique/Decision Making.**

Adapted from FSF ALAR Briefing Note 8.1 – Runway Excursions and Overruns

Weather

Facts:

- 37% of all identified factors in runway excursions
- 68% of all landing excursions

Hazards:

- Wet / Contaminated runways
- Tailwind *(increased groundspeed)*
- Crosswind *(unusual sight pictures)*
- Reduced Visibility *(Loss of SA)*
- Windshear / Microburst.

Data extracted from WAAS published by Ascend and ATSB (2009)

Systems

Aircraft:

- Anti-Skid *(Aquaplaning - 43%)*
- Asymmetric thrust
- System failure *(brake, spoiler, reverser,…)*

Operator:

- Supporting Policies
- No fault go-around policy ???
- SOP's *(stabilised approach, support process etc)*
- Training *(requirements versus real life)*
- Remove conflicts and misunderstandings.

Data extracted from WAAS published by Ascend and ATSB (2009)

Systems
(con't)

ATC:

- Unstablised Approaches
- Timely Information *(Wind conditions - UNI Air flight BR 806)*
- Accurate Information *(Braking Action)*
- Communication *("Take first ….", "Expedite…", Congestion,…)*
- Traffic Management

Airport Operator:

- Airfield maintenance *(Rubber deposits, signage, construction,...)*
- Airport design *(Runway design / restrictions, road orientation, lighting….)*
- Post event mitigation *(Rescue vehicle access, Arrestor systems)*
- Airport Aids *(Precision approaches, Visual aids e.g. VASI, PAPI).*

Example

ATSIC Air Traffic Services Information Circular
Aerodrome and ANS Regulation Division

CAAS Civil Aviation Authority of Singapore

Number: 01/2012 **Issued: 1 Mar 2012**

UNSTABLE APPROACHES

1 Introduction

1.1 Safety statistics have shown that unstable approaches accounted for about 15% of all missed approaches recorded at Changi Airport in 2011.

1.2 Unstable or unstabilised approach is one during which an aircraft does not maintain at least one of the following variables stable; speed, descent rate, vertical/lateral flight path and in landing configuration. For this reason, an approach should be stabilized at a specified height between 1,500 ft and 500 ft above ground level, otherwise a go-around should be considered by the pilot. In a de-stabilised approach, the rapidly changing conditions of the aircraft may lead to loss of control, resulting in landing long or at excessive speeds. These may result in runway excursion or over-run or worse.

2 Purpose

2.1 This Air Traffic Services Safety Information Circular (ATSIC) is issued to the ANS Division for the purpose of bringing to staff attention, the safety issues linked to unstable approaches and how ATC can play its part to reduce the numbers of unstabilised approaches by mitigating the causes.

3 Scope

3.1 This ATSIC is addressed to the Director (ATS) and intended for dissemination to all air traffic controllers.

4 How Air Traffic Control (ATC) can help

4.1 Modern aircraft are designed to have highly efficient low drag aerodynamic characteristics. Whilst this helps to reduce fuel consumption, it requires longer distances for descent and deceleration for the aircraft's energy to be dissipated appropriately during the approach and landing phase. Therefore, the aircraft must meet certain criteria on approach to be able to land safely.

ATSIC Air Traffic Services Information Circular
Aerodrome and ANS Regulation Division

CAAS Civil Aviation Authority of Singapore

4.2 Whilst the pilot has a major role in the energy management of the aircraft in flight, ATC can assist to mitigate the risk associated with unstable approaches, by adhering to good control practices as follows:

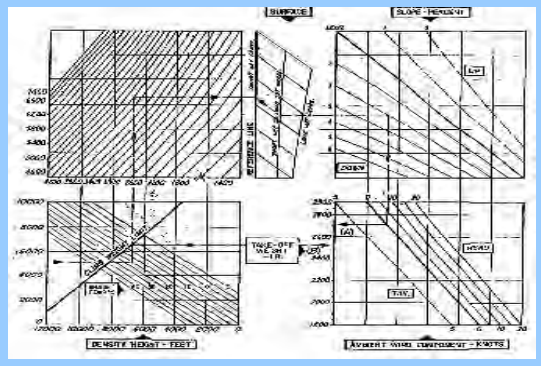
- Providing sufficient track miles for the flight crew to achieve the correct vertical profile during descent;
- Avoiding unnecessary or last-minute change of runway. This can significantly affect track mileage to touchdown and can increase the workload for the pilots. There may not be sufficient time for the crew to re-plan the approach;
- Avoiding unnecessary changes in the type of approach, particularly from precision to non-precision approach. A non-precision approach would require the aircraft to be stabilized in the landing configuration by the final approach fix and requires more preparation and planning by the crew;
- Providing vectors that allow the correct descent profile to be flown in relation to the Instrument Landing System (ILS). Avoid vectoring the aircraft to intercept the glide path before the localizer. Such vectors would often results in aircraft flying through the glide path;
- Providing accurate track distance to touchdown. This helps the flight crew to calculate their descent and speed profile; and
- Appropriate use of speed control. This helps the crew to manage the aircraft's energy and its descent profile.

5 Queries

5.1 If there are any queries with regard to this ATSIC, please address them to:

Mr Sebastian Lim
Head (ATSSO)
Aerodrome and ANS Regulation Division
Civil Aviation Authority of Singapore
Email: sebastian_lim@caas.gov.sg

Performance



Aircraft:

- System Failure / Malfunctions
- Dispatched induced *(Planning or MEL)*
- Performance charts *(Factored ???)*

Crew:

- Inaccurate performance calculation *(Factors considered)*
- Incorrect performance entries *(Finger Trouble)*
- Distractions *(What's next ???)*
- Expectations *(Bias)*
- Fatigue.

Crew

Technique:

- Unstable Approaches - **46%** *(Fast, High, Long, Off centre)*
- Crosswind *(Technique and/or Visual illusion)*
- Use of reduced flap settings and idle reverse thrust
- Braking *(Late or Limited)*
- Standard Calls *(Speed, System failures,…)*
- Use of non precision approaches / visual approaches / circling
- Flight Monitoring / Support Process.

Data extracted from WAAS published by Ascend and ATSB (2009)

Crew
(Con't)

Decision Making:

- **MIS-PERCEPTION OF RISKS** *(recognition, bias,…)*
- Landing off a unstabilsed approach
- Failure to carry out a go-around
- Lack of adherence to SOP's
- Acceptance of late runway change
- Acceptance of difficult ATC instructions
- Press on-its
- Fatigue
- Overriding a SAFE decision.

What can WE do ?

Tripartite

- Shared Responsibility *(we are all stakeholders)*
- Understand the issues *(Operator, ATC and Airport Management)*
- Education

Airport Management

- Inclusion of RESA's into airport design
- Invest in new technologies (DTG, *EMAS, Contaminant measuring or removal…)*

ATC

- Remove surprises
- Accurate / Timely Information *(Runway conditions, Help build the picture,…)*

Operators

- Strong supportive policy and guidance for Crew
- Safety is an investment *(Management, Training, Promotion).*


Australian Government
Australian Transport Safety Bureau
ATSB TRANSPORT SAFETY REPORT
Aviation Research and Analysis Report – AR-2009-018(2)
Final
Runway excursions
Part 2:
Minimising the likelihood and consequences of runway excursions
An Australian perspective