TEM for Accident and Incident Analysis

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Overview

- IATA’s Safety goal.
- Threat and Error Management (TEM) for accident analysis.
- IATA’s Safety Data Management Program.
- Safety auditing (IOSA) & accident prevention.
- TEM for incident analysis.
- Integrated Threat Analysis.
IATA’s Safety Goal
Reduction of the Accident Rate
IATA’s Safety Goal

The New 6-point Programme
Threat & Error Management

THREATS

- Threat Management
- Errors
- Error Management
- Undesired States
- Undesired State Management

End State
Accident Analysis
IATA Safety Report
Accident Analysis

Accident Classification TF

- TF comprises safety experts from Member Airlines and aeronautical industry stakeholders.
- TF met in January in GVA to classify 2005 accidents.
- TF also developed prevention strategies.
- TF participated in production of Safety Report.
Accident Analysis
Classification Taxonomy

- Human:
  - Intentional non-compliance.
  - Proficiency.
  - Communication.
  - Procedural.
  - Incapacitation / fatigue.

- Organisational:
  - Management, training, SOPs & checking, cabin, maintenance, ground ops, etc.

- Technical:
  - Engine or gear failure, design issues, etc.

- Environmental:
  - Adverse weather, airport facilities, ATS, etc.
Accident Analysis
Breakdown by Accident Families

- Runway Excursion: 24%
- Ground Damage/Injuries: 0%
- Midair Collision: 0%
- CFIT: 9%
- LOC-I: 11%
- Runway Collision: 1%
- In-flight Damage/Injuries: 0%
- 15%
Top 5 Issues & Prevention Strategies
IATA Safety Report 2005
Top Issues and Strategies

Passenger Fatalities

- <1/4 of all accidents = majority of fatalities.
- Over 50% of fatal passenger flights involved LCC / charter operators.
- Main factors:
  - Flight crew proficiency issues.
  - Inadequate training and standards / checking.

Strategy

- Airlines that join IATA must pass IOSA.
- Existing members must be IOSA accredited by end 2007.
- All types of operators to implement internationally recognised standards.
Top Issues and Strategies

ALA & Runway Excursions

- Over 50% of accidents in ALA.
- Almost 50% of ALA accidents involved a runway excursion.
- Main factors:
  - Flight crew proficiency issues.
  - Adverse weather.
  - Unsuitable overrun areas contributed to severity.

Strategy

- IATA Safety Group launched new section of Six-point Safety Programme to address flying operations issues, including ALA accidents.
Top Issues and Strategies

Cargo Operations

- Represented almost 20% of accidents in 2005.
- Over 50% of cargo accidents involved Part 135 operators, or equivalent.
- Main contributors:
  - Flight crew proficiency issues.
  - Deficient training.
  - Adverse weather.

**Strategy**

- IATA will promote implementation of SMS for cargo operators.
- Launch IOSA for dedicated cargo carriers.
Top Issues and Strategies

Safety in Africa

- 18% of the accidents occurred in the African region.
- Almost 50% were fatal.
- Main contributors:
  - Flight crews’ errors.
  - Deficient organisational safety culture.
  - Poor regulation of the operating environment.

Strategy

- Partnership for Safety Programme to improve operational safety through use of internationally recognised quality audit principles.
Top Issues and Strategies

Ground Damage

- IATA member airlines involved in over 50% of events.
- None were fatal.
- Main factors:
  - Deficient ground operations.
  - Poor oversight of outsourced services.

Strategy

- Implement Ground Damage Prevention Programme to reduce ground accidents and their associated costs by 10% in 2006.
Safety Data Management
Across the Spectrum
Learning from IOSA

Safety Auditing and Accident Prevention
Incident Analysis
STEADES Program
Cabin-related Incidents

Inadverent Slide Deployments

↑ Cost the Industry over $20 million USD per year.
Cabin-related Incidents

Inadvertent Slide Deployments

- Undetermined: 39
- Ad hoc situation: 26
- Door left armed by crew: 7
- Wrong level actioned: 7
- FLT crew omitted door call: 2
- Door re-armed prior to opening: 3
- Environmental conditions: 1
- Multi-tasking/Workload: 3
- Time pressure: 7
- Distraction: 1
- Mixed Fleet Flying: 1
- Fatigue: 2
Cabin-related Incidents
Inadvertent Slide Deployments

- Other: 3
- Re-opening Door: 5
- Reassignment of stations: 1
- Door/system malfunction: 8
- Flight without passengers: 0
- Refuelling with passengers: 0
- Return to Gate: 1
Ground-related Incidents
Collisions with Aircraft
Ground-related Incidents

Collisions with Aircraft

- Other Vehicle/Equipment: 57
- Mobile Stairs: 38
- Tow Vehicle: 12
- GPU: 3
- Air Bridge: 9
- Baggage Loading Equipment: 71
- Loading Equipment/platform: 34
- Catering Vehicle: 17
Ground-related Incidents

Collisions with Aircraft

- Unknown/Unspecified: 79
- Communication Errors: 18
- Marshalling Errors: 11
- A/C Settling: 1
- Limited Manoeuvring Space: 13
- Leaving Equipment within Limit Lines: 8
- Poor Lighting: 9
- Leaving Equipment Unrestrained: 11
- Wind Gust: 14
- Handling Errors: 99
- Equipment Failure/Malfunction: 21
Integrated Threat Analysis
Working with the Airlines & ICAO
Integrated Threat Analysis (ITA)

- A Joint IATA - ICAO Project with Member Airlines.
- Case study: runway excursions – Four-year analysis:
  - 34 ADREP narratives.
  - 36 STEADES narratives.
  - 164 LOSA narratives.
- The “bridge” between ADREP/STEADES & Archie:
  - UAS
    - Long landings.
    - Floated landings.
    - Off centre-line landings.
Threats

Runway Excursions

![Bar chart showing the number of runway excursion events by category. The categories are Other, Airline, and Environmental. The Environmental category has the highest number of events, followed by Airline and then Other. The chart also shows the number of events in Normal Operations, Incidents, and Accidents, with a notable majority in Environmental.]
Environmental Threats

Runway Excursions

- ATC
- Unfamiliar runway
- Terrain
- Airport
- WX

- Normal Operations
- Incidents
- Accidents

Number of Events

TEM for Accident and Incident Analysis 28
Airline Threats

Runway Excursions

- OPS pressure (airline)
  - Normal Operations: 20
  - Incidents: 25
  - Accidents: 26

- Ferry flight

- A/C malfunction
  - Normal Operations: 74
  - Incidents: 80
  - Accidents: 75

Number of Events
Flight Crew Errors
Runway Excursions

![Bar Chart]

- Communication: 7 Normal Operations, 11 Incidents, 32 Accidents
- Procedural: 6 Normal Operations, 17 Incidents, 32 Accidents
- Proficiency: 61 Normal Operations, 72 Incidents, 94 Accidents
Getting the Complete Picture

Runway Excursions

威胁场景 – 事故及事件
- 天气（大雨、雷暴、风切变、顺风）
- 飞机故障，滑行道脱离（RTO）
- 夜间操作

威胁场景 – ITA
- ATC，天气（大雨、雷暴、风切变、顺风、浓雾、结冰、能见度降低）
- 运营压力，飞机故障，RTO
- 夜间操作
Getting the Complete Picture
Flight Data Analysis
Key Message

Global Safety Data Management

Through its valuable sources of safety information (e.g. IOSA), IATA can:

- Break down silos in safety data management and analysis and obtain a complete picture.
- Best determine & prioritise safety concerns for the industry.
- Develop solutions to address issues.
to represent, lead and serve the airline industry