

INTERNATIONAL CIVIL AVIATION ORGANIZATION

The Asia-Pacific Regional Runway Safety Seminar (APAC)

21st May – 24th May 2012

Bali, Indonesia

THE AIRPORT OPERATOR'S PERSPECTIVE ON “RUNWAY EXCURSION HAZARDS”

DATO' AZMI MURAD

Malaysia Airports Holdings Berhad

21st MAY 2012



CONTENTS



1. ABOUT MALAYSIA AIRPORTS

2. RUNWAY EXCURSION DEFINITION

2.1 Definition

2.2 Requirements

2.3 Runway Incursion

2.4 Impact Runway Excursion

2.5 Impact of Excursion

3. RUNWAY EXCURSION HAZARDS

3.1 Communication Hazards

3.2 Construction Hazards

3.3 Visibility Hazards

3.4 Airport Hazards

3.5 Operational Hazards

4. RUNWAY SAFETY TEAM



1.

ABOUT MALAYSIA AIRPORTS



OUR VISION

“World Class Airport Business”

OUR MISSION

***“Providing world-class aviation gateways;
managing cost-effective airport network and
services; and exceeding the expectations of
customers, shareholders and other stakeholders”***



AIRPORTS OPERATED BY MALAYSIA AIRPORTS

- 5 International Airports
- 16 Domestic Airports
- 18 STOL Ports



TOTAL : 39

➤ 4 Foreign Airports

OVERSEAS VENTURE:

- Hyderabad International Airport, India
- New Delhi International Airport, India
- Sabiha Gokchen International Airport, Turkey
- Male International Airport, Maldives

Airports operated by the group

- ▲ International Airports
- Domestic Airports
- Short Take-Off & Landing (STOL) Ports



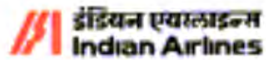
Number of Airlines Operating at KLIA (as at Summer Schedule 2012/2013)

53	5	=	58
passenger airlines	cargo airlines		

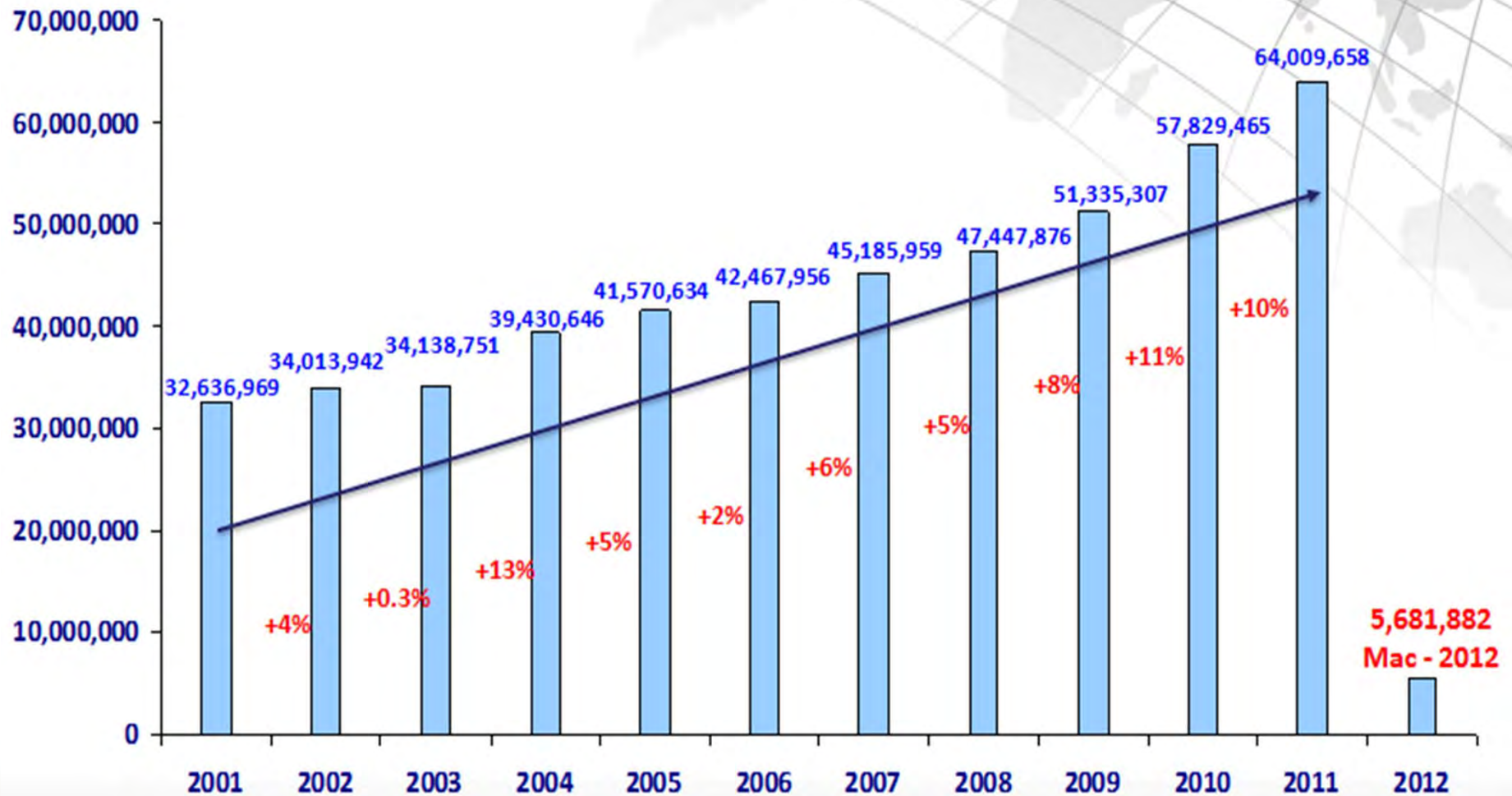
Ground-Handlers in KLIA



OTHER AIRLINES AT KLIA

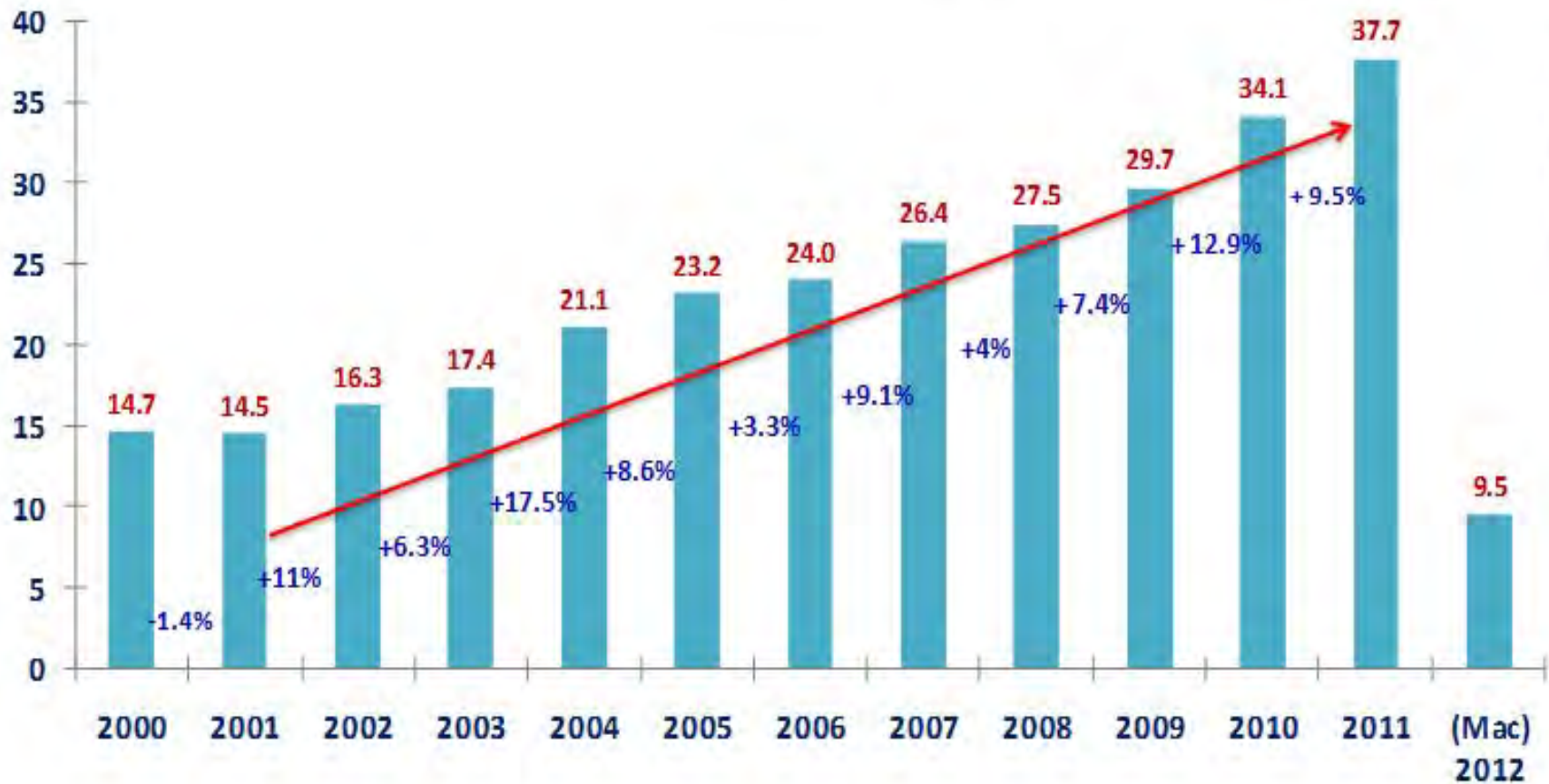


STATISTICS – MAHB AIRPORTS: PASSENGERS (2000-2011)



NOTES: As at Mac 2012, pax movement = 5,681,882 mp

STATISTICS – KLIA: PASSENGERS (2000-2011)



**NOTES: As at MAC 2012 pax movement = 9,534,751mp
(an increased by 6.8% as compared to year 2011)**

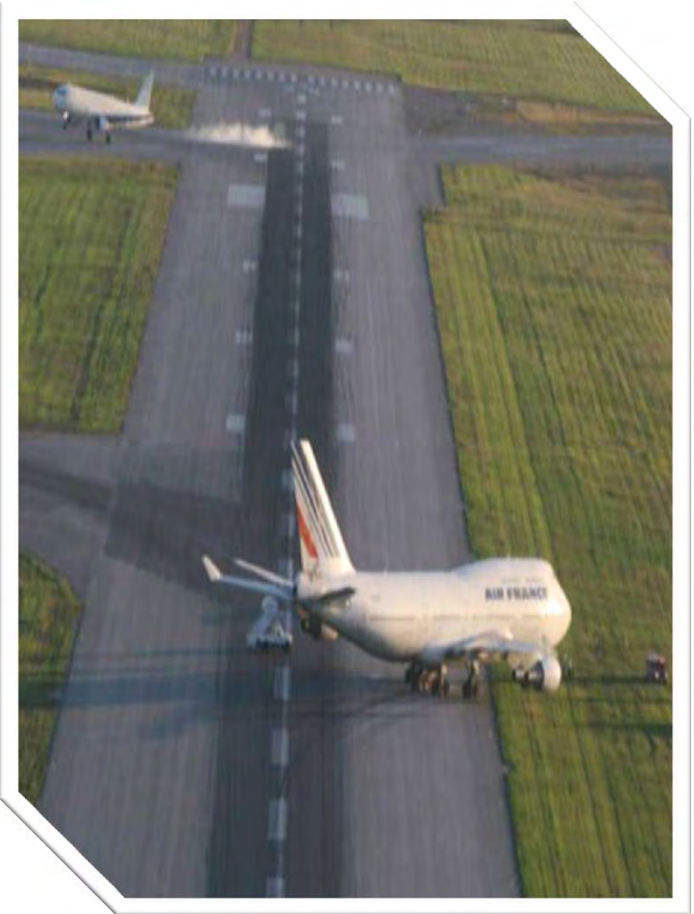
2.

RUNWAY EXCURSION DEFINITIONS

2.1

RUNWAY EXCURSION DEFINITION

- ICAO – A veer off or overrun off the runway surface.
- An *incident involving only a single aircraft, where it makes an inappropriate exit from the runway.*



RUNWAY EXCURSION DEFINITION

FAA's definition of a runway incursion is *"any occurrence in the airport runway environment involving an aircraft, vehicle, person, or object on the ground that creates a collision hazard or results in a loss of required separation with an aircraft taking off, intending to take off, landing, or intending to land."*

The ICAO Air Navigation Commission's working definition of a runway incursion is *'any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle or person' on the protected area of a surface designated for the landing and takeoff of the aircraft.'*

REQUIREMENTS

I. OPERATIONS OF AIRCRAFT

Annex 6 – Requires *Operators* to *establish* and *maintain* an *accident prevention* and *flight safety program*.

II. AIR TRAFFIC CONTROL

Annex 11 – Requires *States* to *implement safety programs* and *ATS providers* to *implement safety management system*.

III. AERODROMES

Annex 14 – Requires *Aerodrome Operators* to *implement SMS* as *part of the certification process of an aerodrome* and *recommends* the same for *already certified Aerodromes*.

2.3

RUNWAY INCURSION

*“the INCORRECT PRESENCE of
....aircraft, vehicle
or man”*



2.4

IMPACT ON RUNWAY EXCURSIONS



IMPACT OF EXCURSION

- **Loss of Life**
- **Property Loss**
- **Runway Closed**
- **Airport Closed**
- **Flight Diversion**
- **Legal Issue**
- **Image of Airlines & Airport**
- **Inconvenience to Pax**
- **Loss of Revenue for Airlines**

3.

RUNWAY EXCURSION HAZARDS

3.1

COMMUNICATION HAZARDS

- **Non effective relay of runway conditions**
 - Reports of runway condition
 - Competency of staff experience
- **Failure to notify closure of runway/taxiway**
 - Emergency closure can cause aircraft to enter before marker boards are placed.
 - NOTAM-ed but pilot may not have read it



3.2

CONSTRUCTION HAZARDS

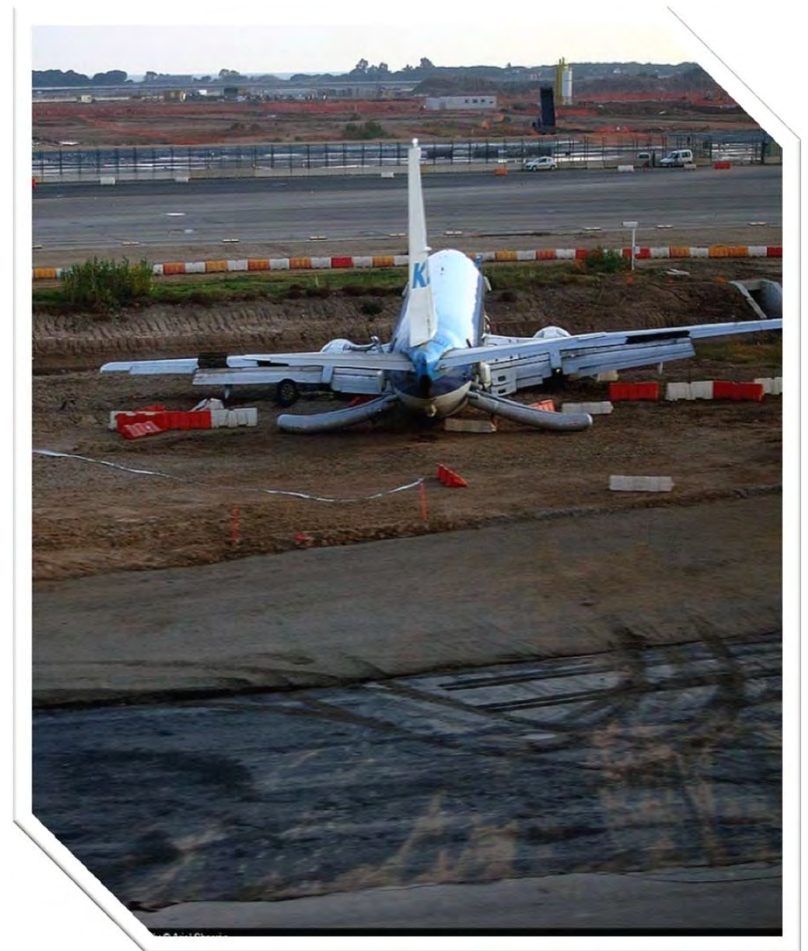
- **Modified “effective operational runway length” data that is not accurately published**
 - **Calculation of *TORA, TODA, LDA, ASDA* by *Airport Operator*;**
 - ***Aircraft miscalculate load or aircraft performance*;**
 - ***Weather* condition, *wind*, *temperature* and *humidity*.**



3.2

CONSTRUCTION HAZARDS

- **Location of construction equipment may impact the severity of an excursion event**
 - Displaced threshold on runway
 - Displaced threshold on the graded/strip of runway
 - The type of equipment
 - The hazard lights
 - The Taipei accident



3.3

VISIBILITY HAZARDS

- **Heavy fog on ground level**
 - Fog inversion
- **Open burning by neighboring countries**
 - Haze
- **Heavy torrential thunderstorm**
 - Reduced Visibility
 - Cross winds
 - Downdrafts



VISIBILITY HAZARDS

- **Position of the sun vs the human eyes**
 - Reflection of the sun on wet surfaces blinds the human eyes
- **Access to site**
 - Soft ground within runway strip impede AFRS ability to reach location within 3 minutes of excursion site
 - No perimeter road for secondary access

3.3

VISIBILITY HAZARDS

- **Inhospitable terrain**
 - Runway in valley surround by hills/buildings
 - Steep approaches due to terrain/trees
- **Runways not constructed and maintained to maximize effective friction and drainage**
 - De-rubberize when it reaches 0.53 mu
 - **KLIA Maintenance level (0.53 mu) VS ICAO (0.43 mu)**
 - Grip Tester or Saab Runway Friction Tester
 - Grease Patch Test
 - Depth of water
 - 3mm over 1.5 m
 - 2.5 – 3cm over 45m

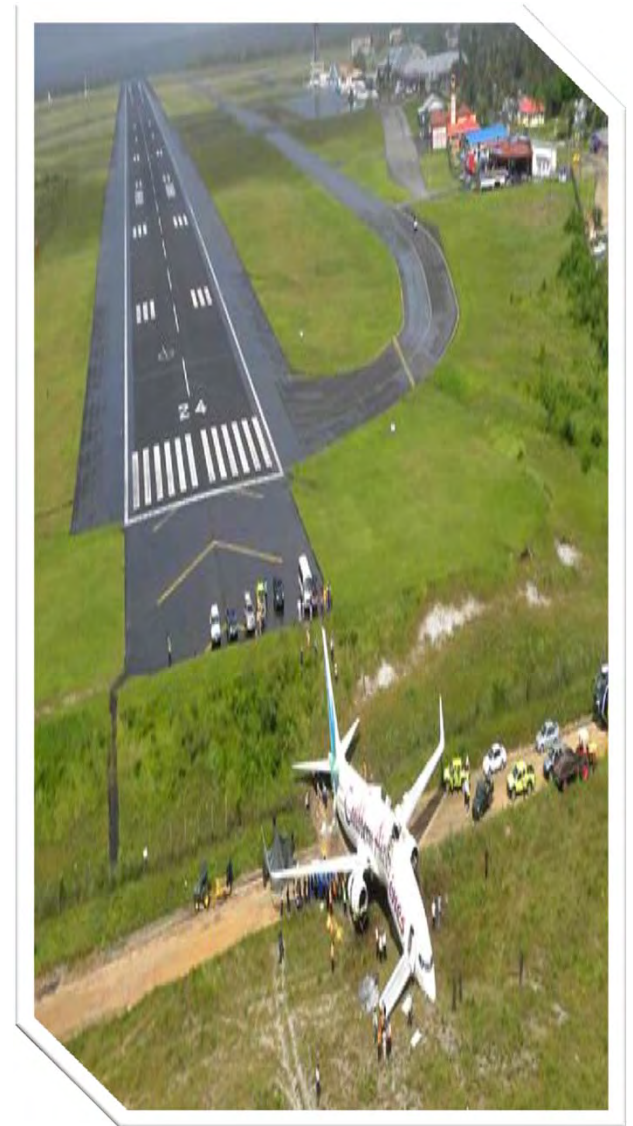


3.4

AIRPORT HAZARDS

Runway Pavement Conditions :-

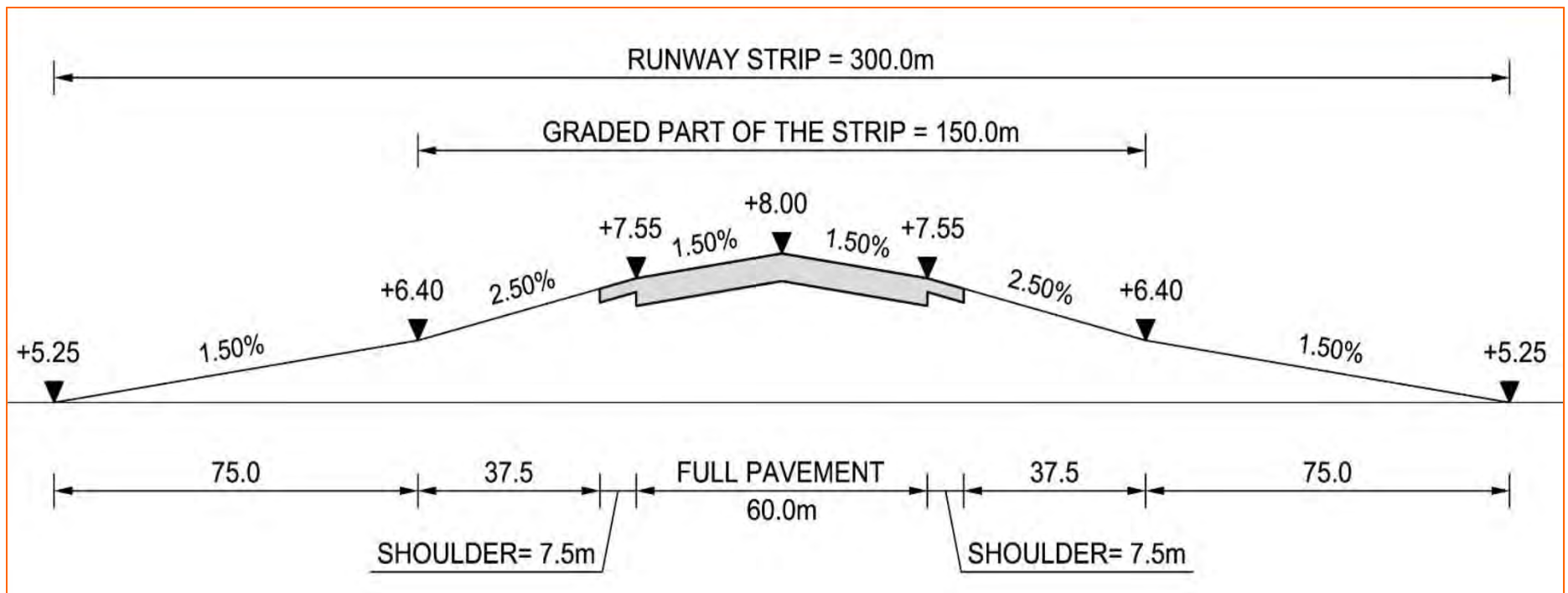
- **Markings on Runway – clear & visible**
 - Standardize quality paint
 - Frequency of painting
- **Airfield Ground Lightings**
 - Performance Management – Intensity
- **Airport Pavement Management System (APMS)**
 - Predictive & Preventive Maintenance Program
 - Data Collection
 - Rehabilitation
 - Reconstruction



3.4

AIRPORT HAZARDS

- **Runway curvature**
 - **Cambered or Single Cross Fall**
 - **1.5% slope for Runway**
 - **2.5 slope for runway shoulders**
 - **2.5 slope for runway strip**



3.4

AIRPORT HAZARDS

- **Runway Grooving**
 - **Groove VS Un Groove**
 - Efficient water dispensation
 - Reduced aqua planning
 - Increase runway friction
- **Runway porosity**
 - **Porous Asphalt**
 - Water seeps thru' quickly
 - Requires efficient sub soil drainage
 - Otherwise, runway remains damp after rain
 - Dirt particles may clot up porosity
 - KLIA does not have porous asphalt



3.4

AIRPORT HAZARDS

75mm Polymer Modified Wearing Course	Grey
75mm Polymer Modified Binder Course	Light Grey
100mm Crack Relief Layer (CRL)	Black
450mm Cement Treated Base (CTB)	Light Orange
400mm Improved and Natural Subgrade	Yellow

Runway Crack Relief Layer

- Any Runway Distress is transferred/absorbed;
- Help maintain runway surface in good condition;
- Extend the Runway's lifespan;
- Our current feature in KLIA

CROSS SECTION OF RUNWAY CRACK RELIEF LAYER



CH 0.150 3mR



2 CH 0.450 3mR



CH 1.400 5mL

3.5

OPERATIONAL HAZARDS

- **Failure To Use Wind-Preferential Runways**
 - Change of Wind direction/traffic
- **Inadequate Runway Length**
 - Shorten runway
- **Runway Conditions**
 - Obliterated/faded marking
 - AGL- Performance Management
 - Climatic condition cause moss to cultivate on runway
 - Weekly runway friction test for KLIA
(Maintenance Level 0.53μ Vs ICAO Level 0.43μ)



3.5

OPERATIONAL HAZARDS

- **Inappropriate obstacle assessment**
 - Hills, Trees, Building, etc
- **Proper graded runway strip**
 - to allows aircraft to go steer back into runway
 - B737-800 veered off during thunderstorm



3.5

OPERATIONAL HAZARDS

Rescue Operations by AFRS KLIA

- **Effective Emergency Respond Plan**
 - Table talk exercise yearly
 - Crash Practice Exercise once in 2 years

- **Adequate Training for Emergency Respond**
 - Competency test yearly both physical & paper

- **Appropriate Respond vehicles**
 - Right equipment for the right job –land/sea
 - Durable, fast & responsive to terrain KLIA

- **Appropriate equipments**
 - Right Tools for the job



4.

RUNWAY SAFETY TEAM

RUNWAY SAFETY TEAM

- **The Objective**
 - to *improve safety on runway* and airport surface.
- **The Plan**
 - *Collect and analyze* runway safety data;
 - *Check compliance with SARPs*;
 - *Develop initiatives to improve* runway safety;
 - *Identify potential new technologies* that may *reduce the possibility* of a *runway excursion/incursion*;
 - Local Hotspot Charts;
 - *Combined team effort to better understand* operational difficulties and *suggest areas for improvement*.

RUNWAY SAFETY TEAM

- **The Team**
 - **Aerodrome operator;**
 - **Airlines or aircraft operators;**
 - **Air traffic service provider;**
 - **Pilot and air traffic controller association;**
 - **Other groups with a direct involvement in runway operations.**

- **May 2006, Malaysian Safety Action Plan**
 - **Implemented**

- **The Goal**
 - **To improve safety on airport surface.**

Safe from the start.
Safe 'til you stop.

SmartRunway™ ▶
SmartLanding™ ▶

Thank you

