

Kindly switch off or silent phones

AIRCRAFT INCIDENT AND ACCIDENT INVESTIGATION

OVERVIEW

Presented At The 5th. Aviation Safety Campaign, Nairobi, Kenya
On 12th To 14th June, 2019

By

Chandra Saravanamuthu
Consultant / Auditor / Trainer
Global Aviation Services
Malaysia

Copyrights reserved. To be used only with written permission from Global Aviation Services, Malaysia

A Minute of Silent Prayer

MH370



MH17



JT 610



ET 302



Overview

- Aviation Industry Outlook (20 Year Forecast)
- Ground Accident Prevention (GAP)
- Lapses in Maintenance
- Human Factors in Aviation Maintenance
- Safety Management System
- Composite For Aerospace Application
- Wildlife Management
- Incident and Accident Investigation Techniques

5

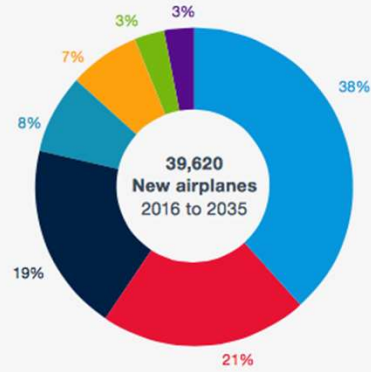
Aviation Industry Outlook 2016 to 2035 – 20 Years

- ❖ Commercial – Passenger / Freighter
- ❖ Private, Corporate or Business
- ❖ Helicopters
- ❖ Special Mission
- ❖ Supersonic
- ❖ Flight Simulators
- ❖ Unmanned Airborne Vehicle



World Fleet Demand

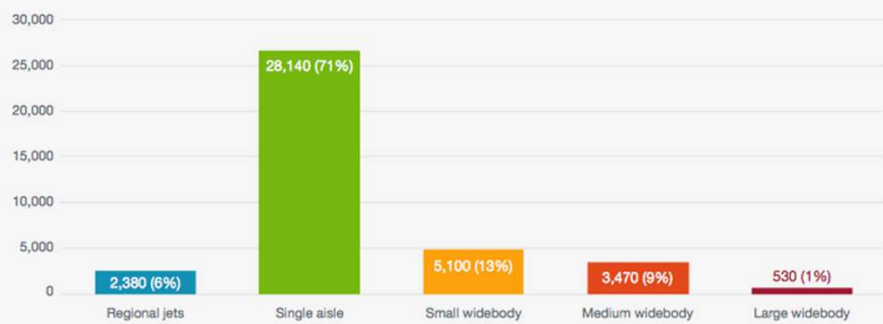
Delivery demand is diverse



Region	New airplanes
Asia	15,130
North America	8,330
Europe	7,570
Middle East	3,310
Latin America	2,960
Africa	1,150
CIS	1,170
Total	39,620

Delivery demand is diverse

2016-2035



Boeing 787 Dreamliner



Airbus 220 (CS100 / 130) - Entry Into Service - 2013



50 Years Program

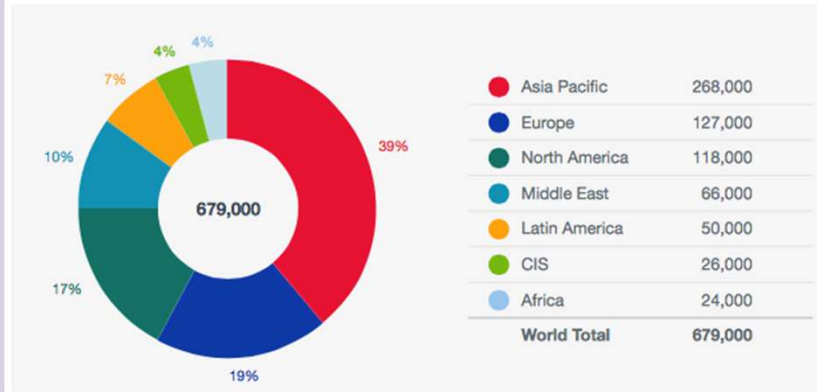
Viking DHC 6-300 - Amphibian



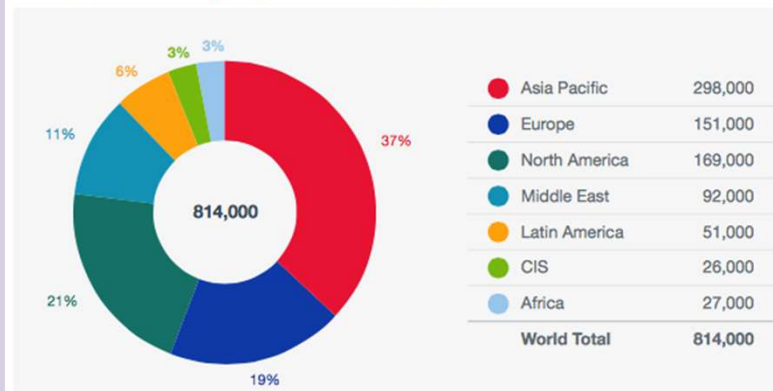
New Pilots by Region: 2016–2035



New Technicians by Region: 2016–2035



New Cabin Crew by Region: 2016–2035



Traveling Public – Travel Fair



Advantages of Composite

- Strength to Weight – high performance for a given weight leads to fuel savings
- Longer life cycles due to higher fatigue strength
- Lower cabin altitude, higher cabin differential resulting in improved humidity
- Improved fire resistance
- Easier to achieve smooth dynamic profiles for drag reduction
- Complex shapes can be made in one manufacturing operation
- Parts count is reduced
- Excellent resistance to corrosion, chemical attack, outdoor weathering
- Laminate patterns and ply buildup can be tailored to give mechanical properties in various directions

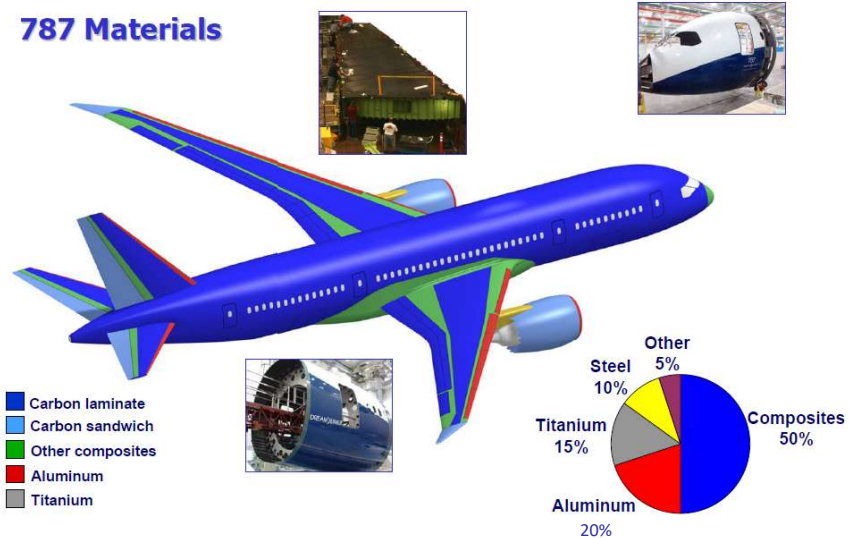
Disadvantages of Composite

- For Sandwich construction
 - Lower industry know-how
 - Moisture/fluid ingress in the core
 - Complexity of analysis
 - Lack of dependable NDI techniques
- For monolithic construction
 - Manufacturing tooling is expensive
 - Lack of dependable NDI techniques
 - Hidden delamination / damage during impacts
- Problems with shipping/storing of big parts
- Longer turnaround times for repairs
- In-situ repairs may not be possible esp. in the cold
- Poses risk for accident investigation
- Recycling of composite is difficult

17

Boeing 787 – Composite Application

787 Materials



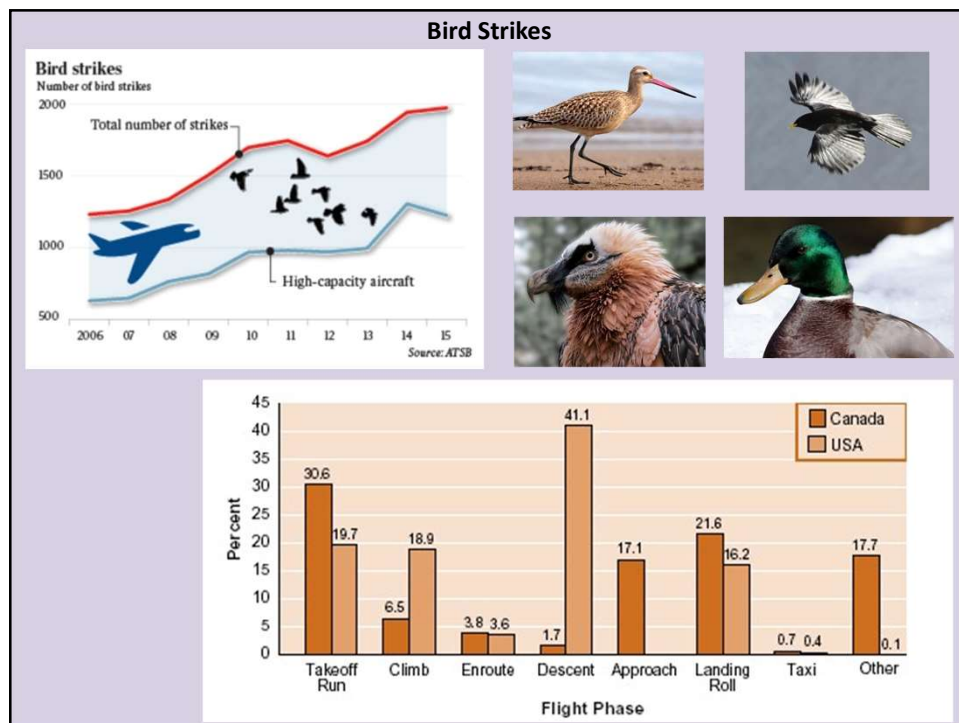
18

Safety Management System

- Safety
 - the state in which the risk or harm to persons or property damage is reduced to, and maintained at or below, an acceptable level through a continuing process of hazard identification and risk management
- Management
 - Allocation of resources
- System
 - Organized set of processes and procedures

Aviation Safety System Elements

- | | |
|---------------------------------------|-------------------------------------|
| 1. Hazard Identification | 6. Accident Response Planning |
| 2. Risk Management | 7. Accident/Incident Investigation |
| 3. Safety Education & Training | 8. Audits/Surveillance |
| 4. Safety Action Group | 9. Analysis |
| 5. Distribution of Safety Information | 10. Recognition Programs/Motivation |



Africa Spends Sh 1B On Bird Strikes Control

Bird strikes pose a major risk to aircraft taking off and landing and can result in possible injury or loss of life to passengers and crew.

A meeting of aviation experts from Kenya, Uganda, Tanzania and Zambia in Kenya's Lakeside city of Kisumu heard that at the very least, aircraft involved in bird strikes are grounded until repairs are done.

Kenya Airport Authority (KAA) and National Birdstrike Committee organised the three-day meeting, which concluded last Friday.

The theme for this year's symposium was, "Wildlife Hazards, Land use and Aviation Safety: Impact, challenges and opportunities for synergy."

KAA Manager Wildlife Control George Amutete said the main objective of the symposium was to facilitate exchange of aviation wildlife hazard information, enhance capacity, discuss upcoming trends and innovations within the industry and create a strong network among stakeholders.

He said such strategies would help reduce wildlife strikes within the East African aviation industry.

Causes of Accidents

- Human Factors (80-90%)
 - Physiologic Issues
 - Hypoxia
 - Toxic agents
 - Pressure
 - G-LOC
 - Spatial Orientation
 - Controlled Flight into terrain
 - Vision related
 - Midair collision
 - Bird strike
 - Medical Causes
 - Physical conditions
 - Cardiac
 - Neurologic
 - Endocrine
 - Drug/Alcohol
 - Psychological
- All other causes (10-20%)
 - Mechanical/Maintenance
 - Engineering
 - Weather
 - Other

21st Century Worldwide Accidents

- . Controlled Flight Into Terrain-38%
- . Spatial Disorientation—36%
- . In-flight Fire—4%
- . Midair Collision-3%
- . Ground Collision-3%
- . Mechanical/Maintenance-2%
- . Engineering-2%
- . Weather-2%
- . Hijack/Sabotage-2%
- . Drugs & Alcohol 6-9%
- . Medical-2%



Information & Investigation

- | | |
|--|---|
| <ul style="list-style-type: none"> • Organization <ul style="list-style-type: none"> – Operations – Structure – Power plant – Human factors/medical – Aircraft Systems – ATC – Weather – Maintenance | <ul style="list-style-type: none"> • Source of information <ul style="list-style-type: none"> – Crash site – Wreckage – Witnesses – Rescue, firefighting personnel – Survivors – ATC – Flight Data Recorder – Weather data – Radar – Morgue • Final Report <ul style="list-style-type: none"> – Cause – Recommendations |
|--|---|

Scene Hazards

- Sharps
 - Aircraft structure
 - Damaged aluminum
 - Composite fibers & matrix
 - Boron, graphite, epoxy
 - Damaged → skin irritation
 - Burned → inhalation hazard
 - Cargo
 - Occupants
 - Fractured bones
 - Commingled a/c parts
- Environment
 - Heat/cold, weather
 - Sun exposure
 - Site terrain, water
 - Infectious diseases
- Explosive hazards
 - Pressure vessels
 - Tires, struts
 - Ballistic chutes
 - Inflatable restraints
 - Cargo
 - Ordnance
- Chemical hazards
 - Fuels
 - Hydraulic fluids
- Stressors
 - Physiological, psychological

