Agenda

- 0900 - 0930    Introductions and Opening Remarks
- 0930 – 1015   Operations Planning
- 1015 – 1045   Break
- 1045 – 1215  Operations Control
- 1215 – 1330  Lunch
- **1330 – 1500** Operations Cost Management
  Cost of Delay
- 1500 – 1530  Break
- 1530 – 1630  Operations Management - exercise
- 1630 – 1645  Operations Cost Assessment – explanation
- 1645 – 1700  Summary – Key Takeaways
- 1700    Closing Remarks – ACC Update Information
Operations Cost Management - Objective

- Airline Operations Management focuses on managing the processes to provide the service / product to the customer
- Effective Operations Cost Management must continuously focus on the optimal cost-effective balance between Service and Cost
- The ultimate objective of Operations Planning, Control, and Cost Management is to enable the company to achieve maximum revenue retention with minimum cost or expenditure of resources
Cost Management – Team Discussion

- What are some fundamental requirements to enable effective Operations Cost Management?
  - prioritize 1 - 5
- List some primary Operations Cost Drivers?
  - prioritize 1 – 5
- What are some important operations cost measures?
  - prioritize 1 – 5
- How does your airline measure Cost of Delay?
Effective Operations Cost Management

- **Fundamental Requirements**
  - Integrated Schedule Development / **Planning** process
  - Pro-Active operations **Control** capability
  - Clear identification of management **Responsibility**, **Authority**, and **Accountability** for cost
  - Comprehensive **Measurement** systems to track cost, performance, service, current levels and trends
  - Disruption Analysis (**Root Cause**) and Corrective Action processes to drive Continuous Improvement
What drives Operations Cost???

¬ Major factors which drive airline operations costs include
  ¬ Planning
  ¬ Crew
  ¬ Maintenance
  ¬ Airport Services
  ¬ Irregular Operations (IRROP)
Operations Planning - Cost Drivers

- Schedule Design
  - Marketing Objectives / Schedule Design Complexity
- Asset Management
  - Aircraft Assignment and Utilization
  - Crew Staffing, Training, and Utilization
- Planning Components
  - Blocktime Standard
  - Required Ground Time and Resources
  - Aircraft Maintenance Requirements
  - Schedule Reliability Objectives
  - Schedule Recovery Options
Crew – Cost Drivers

- Schedule reliability
- Fleet complexity
- Base locations
- Crewmember productivity
- Work Rules – regulatory, contractual
- Fleet changes
- Training resources and requirements
Maintenance – Cost Drivers

- Time allocated in schedule
- Schedule Reliability in delivering aircraft to maintenance
- Base locations
- Parts inventory/Supply Chain requirements
- Equipment resources
- Manpower resource distribution
Airport Services – Cost Drivers

- Number of departures / aircraft types
- Number of passengers / connecting passengers / baggage
- Schedule performance / delays / IRROPS
- Schedule complexity / breadth of operations
- Labor productivity / work rules / turnover / training
- Facilities / Gates / GSE
- Technology required
- Customer expectations
- Marketing policies and products
What Costs to Measure?

Common airline cost measures include...
Corporate Operations Cost Measures
Key Performance Indicators (KPIs)

- the most widely used financial metrics for airlines
  - CASM / CASK (Cost per Available Seat mile/Km)
  - CATM / CATK (Cost per Available Cargo Ton mile/Km)
- too broad to be used at operations cost management level
- when analyzing airline operations costs at a high level, typical metrics include, but are not limited to
  - Cost per hour (block or flight)
  - Cost per departure/flight or cycle/take-off
  - Cost per aircraft, per aircraft type/model
  - Cost per FTE (fulltime equivalent employee)
Airline Operations Cost Measures

- Safety - damage, injury, lost productivity rates
- Aircraft utilization per day
- Crew resource utilization per schedule period
- Maintenance Reliability
- Productivity / man hours per service event
- Revenue - % retained, lost
- Cost – ratio of direct to indirect
Operations Function - Cost Measures

- Flight Operations
  - pilots per aircraft, block hours per pilot
  - % actual hours flown vs. available hours

- Technical Operations
  - maintenance reliability
  - maintenance turn-time productivity
  - Check yield, LLP utilization

- Ground Operations
  - cost per station - per departure - per aircraft type
  - scheduled and minimum aircraft turn times (% achieved)
  - productivity per employee
Cost of Irregular Operations

- Vary according to airline’s size, environment, operating strategy
- Significant cost to airlines, passengers, industry related companies
  - major airlines report IRROPS costs from $110 million (USD) to as high as $500 million (USD) per year
  - some of the largest global airlines experience even higher costs
- A general guideline is IRROPS costs equal approximately 4.0% of an airline’s gross revenue
- The potential value to an airline in reducing these costs is quite significant and directly affects airline profitability
Managing IRROPS Cost

- The objectives of an IRROPS cost measurement system are to
  - Determine the cause and total cost of Irregular Operations (IRROPS)
  - Measure the cost and effectiveness of IRROPS mitigation
  - Create capability to target and prioritize areas of improvement
  - Provide immediate operations control and planning feedback
  - Quantify specific IRROP costs for use in future planning & decision-making
Airline IRROP Cause Distribution

- Air Traffic System: 28%
- Weather: 6%
- Air Carrier: 28%
- Late Arrival: 38%
IRROP/Delay Cause
“an industry-old debate”

- “Controllable”
  - As a direct result of company decisions, activities, action or inaction, or performance failure

- “Non-Controllable”
  - Out of direct control of the airline
  - Sometimes included in Rotation or Late Arrival

- Does the passenger or shipper care ???

- Better to spend the time and effort to “fix the cause” of the IRROP rather than “fixing blame”
IRROP Cost Management Process

- Root Cause Analysis and Allocation of impact on
  - schedule performance
  - operational cost
- Option Analysis
  - resources
  - time
  - schedule adjustment
- Coordinated Cost / Benefit Review
- Implementation of indicated changes
- Track Results
Root Cause Analysis

- Identify the problem
- Analyze problem to determine root cause of problem
- Develop corrective action plan
- Act to correct cause of problem and prevent reoccurrence
- Measure results
## The Five-Whys Worksheet

<table>
<thead>
<tr>
<th>Defect (or Error)</th>
<th>Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>Why-1: Why did THE DEFECT occur?</td>
<td>Late loading bags</td>
</tr>
<tr>
<td>Why-2: Why did THAT occur?</td>
<td>Connecting bags not tagged properly</td>
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<tr>
<td>Why-3: Why did THAT occur?</td>
<td>Previous station out of bag tags</td>
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<tr>
<td>Why-4: Why did THAT occur?</td>
<td>Bag tags not ordered</td>
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<tr>
<td>Why-5: Why did THAT occur?</td>
<td>Clerk on maternity leave</td>
</tr>
<tr>
<td>Why-6: Why did THAT occur?</td>
<td>Lack of station procedure manual and staff replacement planning</td>
</tr>
</tbody>
</table>

The cause of one “why?” is the basis for the next “why?”; keep asking “why?” until the root cause is uncovered.

### Departure delays every night

To Find Root Cause

Ask “Why” at least 5 times

*Airline Cost Conference*  
*Geneva*  
*25-27 August 2014*
Cause and Effect

Ishikawa Fishbone

Delay Flight

Process & Procedures
- Unclear procedures
- Poor Processes

People
- Training
- Insufficient Staffing

Materials
- Bag Tags

Equipment
- Belt Loading Equipment
- Baggage Carts

Airline Cost Conference
Geneva

25-27 August 2014
IRROPS – Cost Components

- **Passenger** – lost revenue, OAL expense, trip interruption expenses, reservation expense, denied boarding compensation, frequent flyer payout
- **Crew** – re-patterning, lost time, overtime, premium pay, accommodations
- **Maintenance** – missed opportunities, wasted resources, parts shipments
- **Labor** – mechanic and ground service agent overtime
- **Fuel** – congestion, holding, additional flying
- **Other** – catering, time sensitive material, landing fees, navigation charges
IRROPS Cost Distribution

- Revenue/Psgr: 40%
- Crew: 12%
- Fuel: 12%
- Labor/OT: 12%
- Maintenance: 24%
- Other: 2%
Measuring IRROPS Cost

- Calculating the cost of Delays, Diversions and Cancellations is very complicated due to complexity of airline operations
  - The cost of a delay or disruption varies significantly by type of delay, length of delay, and circumstances of delay
  - The cost of a cancellation in the first bank of operation for the day can be much greater than an end-of-day RON cancellation
  - A delay into a “hub” bank is significantly more disruptive than a “hub” outbound delay, or to an O&D operation
  - A diversion to an off-line alternate can be far more expensive than a diversion to a close-in, on-line alternate
Operations Cost Management Approach

- Focus on Delays, Diversions, Cancellations
  - Gather data to define IRROPS activities and related component costs
  - Identify actual costs where possible (ie: fuel, landing fees, hotels)

- Develop an activity-based IRROPS Cost Model
  - Assign specific function cost centers (ie: crew, maintenance)
  - Identify fixed and variable costs within each center
  - Allocate or Weight costs where applicable

- Target / prioritize efforts to achieve maximum cost impact

- Measure improvements and related cost reduction
Dimitrios Tziortzis
Air Canada

- Cost of Delay Measurement
- He will send some slides
COST OF DELAY MODEL

Finance

22 August 2014
# Cost of Delay Unit Grid

## Cost of delays per delay minutes by asset type

<table>
<thead>
<tr>
<th></th>
<th>001-015</th>
<th>015-030</th>
<th>030-060</th>
<th>060-120</th>
<th>120-300</th>
<th>300-360</th>
</tr>
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<tbody>
<tr>
<td><strong>Gate</strong></td>
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</table>
**Methodology**

- Worked in congruence with the various AC stakeholders (i.e. SOC, Fops, etc.) to derive a unit cost model

*Delay model items investigated*

<table>
<thead>
<tr>
<th>Item</th>
<th>Data Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crew - Pilots</td>
<td>Net Line/ PBS</td>
</tr>
<tr>
<td>Crew - Flight Attendants</td>
<td>Net Line/ PBS</td>
</tr>
<tr>
<td>Customer Inconvenience</td>
<td>Based on SOPs from ACpedia</td>
</tr>
<tr>
<td>Airports, ACM- Overtime</td>
<td>TruTrack</td>
</tr>
<tr>
<td>Maintenance (non-labor)</td>
<td>PBH engines/components (air-delay driven)</td>
</tr>
<tr>
<td>Pax Revenue</td>
<td>Limited impact due to delays</td>
</tr>
<tr>
<td>Cargo Revenue</td>
<td>Limited impact due to delays</td>
</tr>
<tr>
<td>Jet &amp; APU fuel</td>
<td>SOC / Fuel Efficiency</td>
</tr>
<tr>
<td>PAWOBs</td>
<td>RL -62, -63 &amp; -53 Reports</td>
</tr>
<tr>
<td>Aircraft Ownership</td>
<td>N/A</td>
</tr>
<tr>
<td>Airports Planning</td>
<td>Recovery Crews Alert Cost</td>
</tr>
</tbody>
</table>
### Methodology Con’t

<table>
<thead>
<tr>
<th>Item</th>
<th>Process</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crew – Pilots and Flight Attendants</td>
<td><strong>Cost of Productive Flying + Costs specifically attributed to the operation (excl. vacation training etc..) → Cost to run the operations including Overtime and draft premium → “Cost to run the operations” adjusted for recovered Flying and Sick factor of 75% to get the Cost of Delays</strong></td>
<td><strong>Cost of delays per delay minutes by asset type</strong></td>
</tr>
<tr>
<td>Customer Inconvenience (meals, hotels, transportation, MCOs)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Airports and ACM Overtime (OT)</td>
<td><strong>SOPs from ACpedia</strong></td>
<td></td>
</tr>
<tr>
<td>Jet &amp; APU Fuel</td>
<td><strong>TruTrack OT Hrs excl. sick &amp; unrelated items</strong></td>
<td></td>
</tr>
<tr>
<td>PAWOBs</td>
<td><strong>SOC Fuel efficiency Eng. &amp; APU fuel burn per min for additional delay minutes</strong></td>
<td></td>
</tr>
<tr>
<td>Maintenance (non-labor)</td>
<td><strong>Calculation of total GL $ expenses for Mishandled bags and volumes from RL -62, 63 &amp; 53 Reports</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>PBH $ cost per incremental air delay minute</strong></td>
<td></td>
</tr>
</tbody>
</table>
Gate cost build up

Gate unit cost impact by length of delay

- Cust. Inconv.
- APU Burn
- PAWOBs
- Crews Alert
- Ground Crew
- FA Crew
- Flight Crew

- Color intensity reflects an increasing higher level of unit cost
  i.e. Crews Alert unit cost flat across all the length of delays

The duration of a delay has a major impact on the overall delay costs of a particular item.
**Delay Model Usage**

- Increase planning accuracy
  - controllable vs uncontrollable costs
  - budget buffers
  - realistic reserves
- Improve response and reactivity
- Specific measures can be planned in advance and implemented “day off” to help avoid controllable delays
- Clear visibility on delay impact can provide a baseline for effective counter measures
- Areas where the cost delay model is primarily used:
  - **ACM Maintenance** – cost-benefit analysis and justification for approval of funds in regards to various on time performance initiatives
  - **Airports** - Clear visibility on delay impact can provide a baseline for effective counter measures; improve operational decision-making process
  - **Legal Department** – Used to calculate damages
  - **Financial justification for capital or operational spend**
  - **Prioritization of Projects**
Operations Performance Improvement

Fundamental Question for Performance Improvement in Safety, Service, Operations Reliability, or Cost

“What will Change”

- Time – blocktime, ground time
- Resources – staffing, equipment, aircraft, technology
- Financial – compensation, purchase, lease, contract
- Training – curriculum, content, quality, time
- Planning – integration, communication, coordination
- Leadership/Management/Supervision – personnel, experience, expertise, involvement
Operations Cost Management Assessment
Planning & Control

Does your airline have

- a fully Integrated Schedule Planning process?
- a process to track and validate planning components?
- a structure to manage & control daily & near-term deviations from plan?
- a process to determine associated delay cause and cost impact?
- a process to identify and measure who in the organization is directly responsible for managing each cost?
- a corporate operations Reliability or Punctuality program and culture?
Operations Cost Management - Challenge

- “what is cost of current state?”
- “what needs to change?”
- “what is the Cost/Benefit of the change?”
- “how can we measure the change?”
- “What will Change”
Summary

- **Effective Operations** Planning, Control, and **Cost Management** must continuously seek the optimal cost-effective balance between

  - operations reliability
  - service quality
  - cost management
  - revenue maximization
to represent, lead and serve the airline industry

Thank you!