


All-In Airport Cost per Enplanement

ACI-NA Annual Conference & Exhibition
Finance Committee Meeting
Strategic Planning and Performance Management Working Group

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Overview

1. Study Objectives
2. Airline Operating & Delay (AOD) Costs
   - Phases of Flight
   - Aircraft Operating and Delay Statistics
   - Aircraft Operating Costs
   - Fuel Cost Variations by Phase of Flight
3. Airport Costs Paid Directly by Airlines





STUDY OBJECTIVES





Problem Statement

- Traditional cost per enplanement (CPE) is the industry accepted method for comparing airline costs amongst airports

- However, traditional CPE is subject to various “pitfalls” when used for comparison purposes
  - Inconsistent airline rates & charges components (ACI-NA efforts over past several years have improved consistency)
  - Inconsistent in how airlines pay for use of facilities (i.e., non-rate base items such as airline direct operating expenses and special facility debt)
  - Does not capture airline aircraft operating costs while certain airport capital investments are intended to reduce such costs

- Traditional CPE does not measure the “total airport-related” cost to airlines of doing business at an airport





Study Objectives

1. Develop an additional measure that builds on the traditional CPE to better capture the “total airport-related” cost to airlines of doing business at an airport.
2. Develop a metric that considers the return on airport capital investments.
3. Develop a metric that maintains a balance of not being overly complex; yet, is an effective measure that could be used industry-wide.
4. Develop a metric that would be acceptable for use by airport operators, airlines, and other industry stakeholders.
5. **Please note this metric is not intended to replace traditional CPE. It should be viewed only as an optional metric or tool to help calculate additional airline costs not captured by traditional CPE.**





Background

- Approach of including cost of delay into traditional CPE was initiated in 2009 to measure benefits of airfield capital improvements at DFW.
- European delay studies were initially used as a basis for estimating delay costs. These studies provided comprehensive airline cost per minute (in Euros) of delay for various phases of flight.
- Approach was presented to ACI-NA Finance Committee at Annual Conference in October 2011.
- SEA used approach to help present to airlines the impacts of its recent airfield capital program.





Components of Airline Costs at an Airport

#1 Airline Rates & Charges

- Terminal Rents
- FIS Fees
- Baggage System Fees
- Landing Fees
- Gate/Apron Fees
- RON Fees

#2 Airline Operating & Delay Costs

- Total Aircraft Taxi Time Costs (including taxi-in and taxi-out delays)
- Airborne Delays
- Gate Delays

#3 Airport Costs Paid Directly by Airlines

- Terminal Special Facility Debt
- Terminal O&M (Janitorial, Utilities, Etc.)
- Loading Bridges (Capital and O&M)
- Deicing costs
- Baggage Consortium Fees



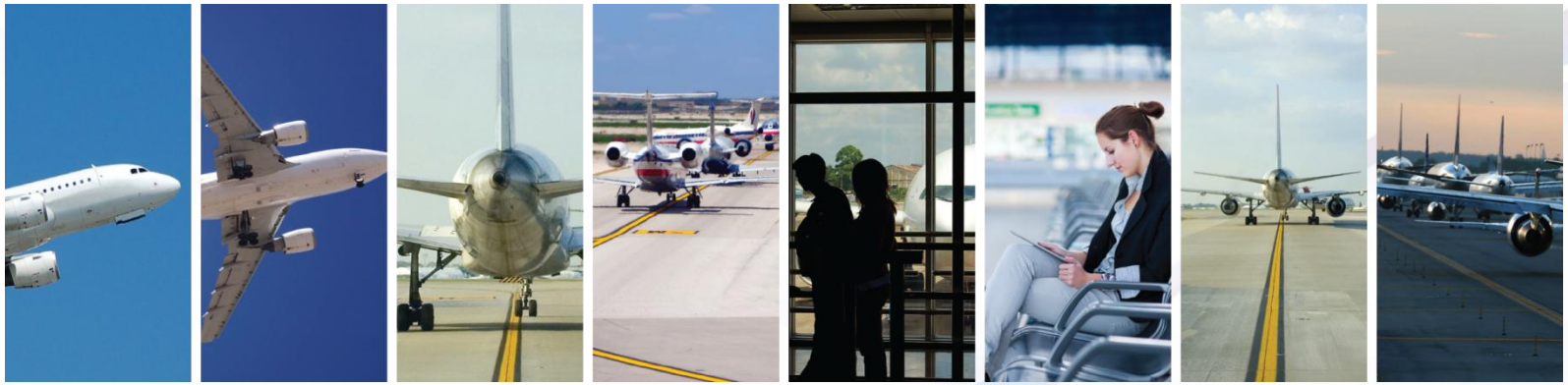


Example of Aircraft Operating Times and Delays by Phase of Flight

Aircraft Arrives

Typical Breakdown of Flight Phases

Aircraft Departs



- Airborne Time
- Airborne Delay
- Unimpeded Taxi In
- Taxi In Delay
- Gate Time
- Gate Out Delay
- Unimpeded Taxi Out
- Taxi Out Delay

Flight Phases Inclusion Recommendation

- Based on analyses to date, we recommend including the following flight phases:

	INCLUSION IN ANALYSIS	REASONING
Airborne Delay	✓	Airport configuration and capital investment can impact airborne delay
Taxi In/Out Delays	✓	Airport configuration and capital investment can impact taxi delay
Unimpeded Taxi In/Out	✓	Airport configuration and capital investment can impact unimpeded taxi times
Gate Out Delay	×	Gate out delay is heavily driven by airline policy and operation model









AIRLINE OPERATING & DELAY COSTS

Aircraft Operating and Delay Statistics (Minutes)

Operating and Delay Statistics

- The operating and delay statistics are pulled from the Federal Aviation Administration *Aviation Performance Metrics* (APM) database.
- The APM database is a subsystem of the *Aviation System Performance Metrics* (ASPM) database which provides operational traffic data for 75 airports in the U.S.
- Two subsystems of APM are being used for this analysis, including
  - Airport Analysis database
  - Airport Taxi Times database





Operating and Delay Statistics: DELAY





Aviation Performance Metrics > **Airport Analysis**

My Reports | Output | Dates | Airports | Grouping | Filters | Run

Select Output

Display:
- (•) Analysis : All Flights
- ( ) Analysis : Delayed Flights
- ( ) Analysis : All Flights Comparison
- ( ) Analysis : Delayed Flights Comparison
- ( ) Analysis : EDCT Report

Format:
- (•) HTML
- ( ) MS Excel
- ( ) MS Word
- [ ] No Sub-Totals

Selected options:

Calendar Years : From 2012 To 2012
Facilities : SEA
Display : Analysis : All Flights
Use : Flight Plan
Format : HTML

Operating and Delay Statistics: TAXI





Aviation Performance Metrics > Airport Taxi Times

My Reports | Output | Dates | Airports | Grouping | Run

Select Output

Display:
- (•) Taxi Times : Standard Report
- ( ) Taxi Times : Unimpeded Times Report

Format:
- (•) HTML
- ( ) MS Excel
- ( ) MS Word
- [ ] No Sub-Totals

Selected options:

Calendar Years : From 2012 To 2012
Grouping : Airport
Facilities : SEA
Display : Taxi Times : Standard Report
Format : HTML

Operating and Delay Statistics: EXAMPLE

Calculating Total Aircraft Operating Time

	AVERAGE MINUTES	TOTAL OPERATIONS (ARR OR DEP)	TOTAL MINUTES (000)
Average Airborne Delay	2.58	150,585	388.5
Average Taxi In Time	6.16	150,585	927.6
Average Taxi Out Time	14.05	151,045	2,122.2
Total	22.79	n/a	3,438.3





Source: FAA ASPM Database, June 2013.

Data Limitations

- Does not capture flight cancelations.
- Is delay/operating time properly attributed in certain cases (e.g., flow control delays related to downstream airports)?
- Does not measure delay propagation.
- Data is limited to 75 U.S. airports.









AIRLINE OPERATING & DELAY COSTS

Aircraft Operating Cost

From Operating Minutes to Cost

Airborne Delay (Mins)	Cost of one minute of airborne delay ($)	**TOTAL ANNUAL ARRIVAL COST**
Taxi In Time (Mins)	Cost of one minute of taxi time ($)	
Taxi Out Time (Mins)	Cost of one minute of taxi time ($)	**TOTAL ANNUAL DEPARTURE COST**





Available Cost Data Sources

- Three sources providing the required data at different levels of detail were identified in the process of improving the analysis results:
  - European Airline Delay Cost Reference Value Study
  - Form 41 Financial Data
  - Airlines for America: Aircraft Operating Cost





Airlines for America: AIRCRAFT OPERATING COST

- Airlines for America provides a yearly update of the per-minute cost of delays to U.S. airlines (most recent data: calendar year 2012)

	DIRECT AIRCRAFT OPERATING COST PER BLOCK MINUTE	Δ VS. 2011
Fuel	$39.26	5.3%
Crew - Pilots/Flight Attendants	$16.26	1.7%
Maintenance	$12.02	3.1%
Aircraft Ownership	$7.92	-1.1%
Other	$2.71	5.0%
Total	$78.17	3.5%

Notes:

- Ownership includes costs such as rentals, depreciation and amortization of flight equipment, including airframes and parts, aircraft engines and parts, capital leases and other flight equipment.
- Other: not defined on A4A website but assumed to include miscellaneous expenses such as outside flight equipment.

Source: http://www.airlines.org/Pages/Annual-and-Per-Minute-Cost-of-Delays-to-U.S.-Airlines.aspx

AOD Source for Cost

- Based on analyses to date, we recommend the following that aligns with study objectives:

	RECOMMENDED SOURCE	COMMENT
Crew	A4A Costs	Pilot costs available from Form 41 / flight attendants costs would need to be estimated
Maintenance	A4A Costs	Airframe, engine, materials, overhauls, flight equipment
Aircraft Ownership	A4A Costs	Depreciation and amortization
Other	A4A Costs	No detail provided but included for consistency with airlines methodology
Fuel	Form 41/Other	Needs further analysis. Described in detail in the next slides









AIRLINE OPERATING & DELAY COSTS

Fuel Cost Variations by Phase of Flight

Cost Components for AOD Analysis

- Among all direct operating cost components, fuel is assumed to be the only variable component based on the phase of flight, as presented below:

	VARIES BY PHASE OF FLIGHT	VARIATION
Fuel	Yes	Fuel Flow Varies with Engine Thrust Settings
Crew	No	Assumed to remain constant through flight
Maintenance	No	Assumed to remain constant through flight
Aircraft Ownership	No	Assumed to remain constant through flight
Other	No	Assumed to remain constant through flight

- The fuel burn rate has the greatest cost impact by phase of flight.
- Costs other than fuel are assumed to remain constant for the purpose of the AOD analysis.





Source: Ricondo & Associates, Inc., April 2013.

Cost Components: Fuel Variation

- To avoid under- or overestimating the cost of fuel at the airports included in the study, the cost is estimated separately for the different phases of flight.
- Data for fuel consumption estimates for **jet aircraft** was obtained from the **ICAO Agency *Aircraft Engine Emissions Databank*** (updated January 2012)
- Data for fuel consumption estimates for **turboprop aircraft** was obtained from manufacturers data sheets
- **Average cost of fuel per gallon for CY 2012 was obtained from BTS: $2.96 per gallon** (all US Carriers with $20 million or more in annual revenues)





Sources: ICAO Aircraft Engine Emissions Databank, January 2012; Airline Fuel Cost and Consumption, Bureau of Transportation Statistics; Ricondo & Associates, Inc., April 2013.

Cost Components: FUEL VARIATION

- An average cost of fuel per minute (for taxi and approach) was estimated based on the aircraft mix recorded in the Form 41 T100 database for CY 2012 for all airlines.
- The average cost per minute was estimated as follows:
  - Taxi Phase (7% thrust): $10.78
  - Approach Phase (30% thrust): $29.72

Sources: ICAO Aircraft Engine Emissions Databank, January 2012; Airline Fuel Cost and Consumption for CY 2012, Bureau of Transportation Statistics; Ricondo & Associates, Inc., April 2013.





AOD Cost by Phase of Flight Summary

- Summary of AOD Analysis Costs (CY 2012)

	TAXI COST PER MINUTE SUMMARY	AIRBORNE COST PER MINUTE SUMMARY
Fuel	$10.78	$29.72
Crew	$16.26	$16.26
Maintenance	$12.02	$12.02
Aircraft Ownership	$7.92	$7.92
Other	$2.71	$2.71
Total	**$49.69**	**$68.63**

Sources: ICAO Aircraft Engine Emissions Databank, January 2012; Airline Fuel Cost and Consumption, Bureau of Transportation Statistics; Airlines for America, June 2013; Ricondo & Associates, Inc., April 2013.





AOD CPE: EXAMPLE

	AVERAGE MINUTES	TOTAL OPERATIONS (ARR OR DEP)	TOTAL MINUTES (000)	COST PER MINUTE	TOTAL COST (MILLIONS)
Average Airborne Delay	2.58	150,585	388.5	**$68.63**	**$26.7**
Average Taxi In Time	6.16	150,585	927.6	**$49.69**	**$46.1**
Average Taxi Out Time	14.05	151,045	2,122.2	**$49.69**	**$105.5**
Total	22.79	n/a	3,438.3	**n/a**	**$178.2**
			Divided by Total Enplanements (millions)		**16.6**

Total Aircraft Operating & Delay CPE **$10.73**





Source: FAA ASPM Database, June 2013.

Potential Opportunities for Further Refinement

- Airport-specific aircraft fleet mix
- Propagation of delay
- Coordinate with A4A to better understand their methodology on aircraft operating cost data
- Coordinate with FAA/ATC on flow control delay attribution





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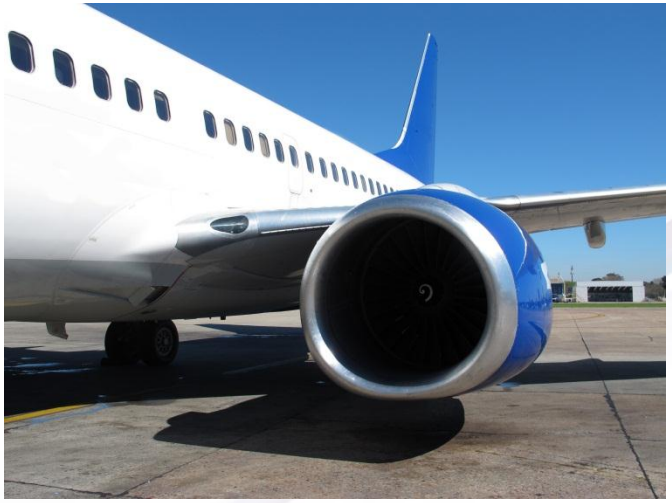
Airport Costs Paid Directly by Airlines
Data gathering is a challenge

- Different sources
  - Airlines (hub vs. non-hub)
  - Different areas within airlines
    - O&M
    - Debt Service
  - Airline consortiums
- Various airline/airport responsibilities



Airline Direct Costs
Where to Start

- ACI Annual Benchmarking Survey
  - General Tab (Capital)

Airport Assets - Who Paid for/Financed Facilities (Airport or Airlines)

		% OF CAPITAL COSTS PAID BY AIRPORT*	% OF CAPITAL COSTS PAID BY AIRLINE
G28	Terminals)	100%	0%
G29	Baggage System	100%	0%
G30	Ramp Equipment (e.g., tugs, not jet bridges)	60%	40%
G31	Common Use Systems (CUTE/CUSS)	40%	60%
G32	Information Display Systems (FIDS/GIDS)	100%	0%
G33	Parking Facilities	100%	0%
G34	Police Vehicles & Equipment	100%	0%
G35	ARFF Vehicles & Equipment	100%	0%

		OWNED BY AIRPORT	OWNED BY AIRLINES	TOTAL
G36	Number of loading/jet bridges	155		155
G37	Number of passenger gates	155		155

Note: Since Airports do not know the exact capital cost that was paid by the Airlines, the percentage placed in this column should be based on approximate percent of facility space/assets paid for by the Airport (includes grants PFCs)

For example, if the airport (or its parent organization) paid for/financed three of four terminals, then you would enter 75%.

* Includes FAA grants





Airline Direct Costs
Where to Start

- ACI Annual Benchmarking Survey
  - General Tab (O&M)





G40 Airport share of terminal operating costs:

Percent of Operating Cost Paid by Airport (0% to 100%)*

Terminals/ Concourses (e.g., Terminal A)	Terminal Sq. Ft.	Janitorial Services	Facilities Maintenance	Loading/Jet Bridge Maintenance	Baggage Maintenance and Operations	Ramp Operations	Common Use CUTE/CUSS Maintenance	Information Display (FIDS/GIDS) Maintenance
Terminal A	1,100,924	0%	0%	0%	0%	0%	0%	0%
Terminal B	941,409	100%	100%	100%	100%	100%	100%	100%
Terminal C	1,003,537	0%	0%	0%	0%	0%	0%	0%
Terminal D	2,226,650	100%	100%	100%	100%	100%	100%	100%
Terminal E	1,059,422	100%	100%	100%	100%	100%	100%	100%
Totals	**6,331,942**	**67%**	**67%**	**67%**	**67%**	**67%**	**67%**	**67%**

Airline Direct Costs - Sources of Data

- Some airports report this data (ATL)
- Studies
  - Oliver Wyman May 2013 governance study for CLT
- Contact
  - Airport colleagues
  - Airline reps
  - Former airline employees
- Benchmarks
  - Airport specific (assume airline costs are % of airport costs)
  - General benchmarks (e.g., operating costs per jet bridge)

Proposed Next Steps

- **JULY 2013: Presentation: ACI-NA CFO Summit**
- **AUGUST 2013: Address Comments from Summit**
- **SEPTEMBER 2013: Presentation: Finance Committee Meeting at ACI-NA Annual Conference & Exhibition**
- **FOURTH QUARTER 2013: Submit Final Whitepaper to ACI-NA**





Comments and Suggestions

We appreciate your time and would like to give you an opportunity to provide comments and suggestions at:





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