



ACRP Report #143
Air Cargo Facilities
Development and
Planning Guidelines
(ACRP Project 03-24)



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CDM Smith

ACI-NA
Air Cargo Committee Meeting
Long Beach, CA
October 4, 2015

Today's Presentation

- Study Background
- Study Methodology and Process
- Building Blocks – Data
- Demonstrate Air Cargo Facilities Planning Model



ACRP 03-24: Air Cargo Facilities Development and Planning Guidelines

The **Airport Cooperative Research Program (ACRP)** is an industry-driven, applied research program that develops near-term, practical solutions to problems faced by airport operators. ACRP is managed by the Transportation Research Board (TRB) of the National Academies and sponsored by the Federal Aviation Administration (FAA). The research is conducted by contractors who are selected on the basis of competitive proposals.

- National Academies
 - Transportation Research Board
 - Airports Cooperative Research Program



Study Objectives

- Develop guidelines for air cargo facility planning and development at airports, including collection of necessary data in support of this effort.
- Assist airport operators in crafting effective business policies and development decisions that meet the industry's current and future technological, operational, and security challenges.
- Cost-effective, efficient, and environmentally compatible manner.
- Include updated metrics to help guide the overall air cargo development planning process.
- Beneficiaries: Airport owners and operators, airlines, integrated cargo carriers, developers, financial institutions, and others.

Study Products

- ACRP Report #143: Air Cargo Facility Planning and Development Guidebook
- ACRP Report #143: Air Cargo Facility Planning Model
- ACRP Technical Report: ACRP 03-24 Air Cargo Facility Planning and Development

ACRP 03-24 Panel

- Larry Goldstein – ACRP Project Manager
- Rick Busch – DEN
- Michael Bednarz - PANYNJ
- Jason Bittner – Univ. Wisconsin, WTC
- Robert Caton - ProLogis
- Brandon Fried – Air Forwarders Association
- Curt Heaslet – FedEx Express
- Max Kiesling – Ricondo & Associates
- Three Liasons – FAA, TRB, ACI
- Liying Gu – Airports Council International



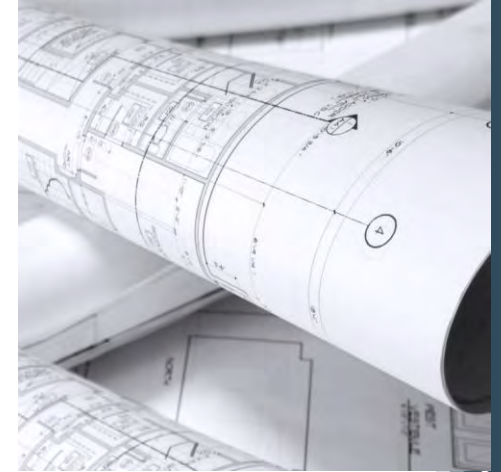
ACRP 03-24: Study Team

- CDM Smith – Prime
- Webber Air Cargo – Deputy PI
- Lynxs Group
- Freidheim Consulting
- RMJ & Associates
- Applied Real Estate Inc.



Guidebook for Air Cargo Facility Planning and Development - Outline

- Chapter 1: Introduction
- Chapter 2: Airports and Air Cargo - Overview
- Chapter 3: Air Cargo Planning Approach and Process
- Chapter 4: Planning Considerations and Metrics
- Chapter 5: Air Cargo Forecasting
- Chapter 6: Sustainability Considerations
- Chapter 7: Security Considerations
- Chapter 8: Funding Strategies
- Chapter 9: Air Cargo Facility Planning Model



Project Cooperation

- Case study airports
 - 15 Participating Airports
 - Survey Completion
 - On site Interviews
 - Management and Tenant visits
- Other airports
 - 16 Participating airports
 - 20 additional invited to participate
 - Survey Completion
 - Tenant surveys



Project Data Collection

- Facilities type, location and layout
 - Multi-tenant
 - Single-tenant
 - Pax airline belly cargo
 - Third party handlers
 - Integrated express
 - Forwarders (off-airport facilities)



Project Data Collection

- Data collected
 - Building size (all cargo buildings)
 - Throughput/cargo traffic
 - Utilization
 - Commodity types
 - Geographic location
 - Type of activity
 - Over 400 cargo units analyzed
 - Domestic and International Gateway Airports



Data Collection, Continued

- Survey Tools
 - Airport Planners Survey
 - Air Cargo Business Surveys
 - Air Forwarder Surveys
- Data Gap Sources
 - Master plans, aerial photography,
 - Web sites, third party providers
 - Roundtable discussions – industry groups, airports



Ratios Matrix

- Matrix development
 - Air cargo facility size
 - Tenant type
 - Average tonnage
 - Commodity types
 - Location
- Through put ratios
- Tons/sf

	A	B	C	D	E	F	G
2		RATIO INPUTS (Tons/Square Feet)	Integrated Express	Hub-Integrated Express	Passenger Airline (Belly Cargo)	All Cargo Carriers	Combi Carriers (Passenger and Freighter)
3		Warehouse					
4		Domestic	0.92	1.00	0.64	0.81	0.81
5		International Gateway	0.37	1.00	0.64	0.81	0.81
7		Aircraft Parking Ramp					
8		Domestic	0.40	0.20		0.40	0.40
9		International Gateway	0.40	0.20		0.91	0.91
10		GSE Storage					
11		General (Domestic or Int'l)	0.57	0.20	0.36	1.11	1.11
13		DEFAULT RATIOS BASED ON ACRP 03-24 RESEARCH (Tons / Square Feet)	Integrated Express	Hub-Integrated Express	Passenger Airline (Belly Cargo)	All Cargo Carriers	Combi Carriers (Passenger and Freighter)
14		Warehouse					
15		Domestic	0.92	1.00	0.64	0.81	0.81
16		International Gateway	0.37	1.00	0.64	0.81	0.81
18		Aircraft Parking Ramp					
19		Domestic	0.40	0.20		0.40	0.40
20		International Gateway	0.40	0.20		0.91	0.91
21		GSE Storage					
22		General (Domestic or Int'l)	0.57	0.20	0.36	1.11	1.11
24		RANGE OF TONS/SF BASED ON ACRP 03-24 RESEARCH	Integrated Express	Hub-Integrated Express	Passenger Airline (Belly Cargo)	All Cargo Carriers	Combi Carriers (Passenger and Freighter)
25		Warehouse					
26		Domestic	.46 to 1.84	.40 to 1.80	.32 to 1.28	.41 to 1.63	.41 to 1.63
27		International Gateway	.19 to .74	.40 to 1.80	.32 to 1.28	.41 to 1.61	.41 to 1.61
29		Aircraft Parking Ramp					
30		Domestic	.20 to .8	.15 to .4		.20 to .8	.20 to .8
31		International Gateway	.20 to .8	.15 to .4		.46 to 1.82	.46 to 1.82
32		GSE Storage					
33		General (Domestic or Int'l)	.29 to 1.15	.15 to .4	.18 to .71	.55 to 2.22	.55 to 2.22

Facility Planning Model

- Facility Size Calculator
 - Cargo buildings
 - Apron area
 - Hardstand, GSE Storage
 - Truck parking
 - Truck docks and doors
 - Acreage
 - Long term planning
- Validation process
- Guidelines development

ACRP Report #143 Model Demonstration

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ACRP Report #143 Model Demonstration

- Modeling all air cargo facilities (buildings, apron areas, and vehicle parking) on an airport.
- Modeling a single air cargo facility (building, apron, and vehicle parking) on an airport.
- Modeling an integrated express air cargo hub.
- Determining whether all air cargo facilities currently offer adequate space.
- Determining whether an air cargo facility currently offers adequate space.

ACRP Report #143 Model Demonstration

F11	✕ ✓ <i>fx</i>	
A	B	C
1	ACRP Report 143: Air Cargo Facility Planning Model	
2	Introduction	
3	<p>This model is designed to be used to estimate space utilization for air cargo facilities on airports. The model is flexible in that it can estimate spatial utilization for all cargo areas on an airport as well as specific facilities on an airport. It is designed with two types of airports in mind: airports serving primarily domestic air cargo demand and airports serving international air cargo demand. The latter are considered “international gateway” airports. The purposes of this model include:</p>	
4	• Modeling all air cargo facilities (buildings, apron areas, and vehicle parking) on an airport.	
5	• Modeling a single air cargo facility (building, apron, and vehicle parking) on an airport.	
6	• Modeling an integrated express air cargo hub.	
7	• Determining whether all air cargo facilities currently offer adequate space.	
8	• Determining whether an air cargo facility currently offers adequate space.	
9		
10	Getting Started	
11		
12	<p>Since the model follows the basic structure of an airport master plan several preliminary steps are required for testing the model. Be advised that if data inputs are not readily available significant research may be needed to collect the data prior to entering it into the model. Items needed for air cargo facility analysis include:</p>	

ACRP Report #143 Model Demonstration

17

fx =H7+G7

	A	B	C	D	E	F	G	H	I
		Cargo Building Name	Usage	Tenant Names	Tenant Type	Building/Warehouse Space (sf)	Dedicated Ramp/Aircraft Hardstand Area	Dedicated Ground Support Equipment [GSE] Storage (sf)	Total Apron Area (sf)
2		Building A	Cargo Related	ABC Express	Integrated Express	80,000	200,000	150,000	350,000
3									-
4									-
5									-
6									-
7									-
8									-
9									-
10									-
11									-
12									-
13									-
14									-
15									-
16									-
17									-
18									-
19									-
20									-
21									-
22									-
23									-
24									-
25									-
26									-
27									-
28									-
29	Total				Integrated Express	80,000	200,000	150,000	350,000
30	Total				Passenger Airline Belly Cargo	-	-	-	-
31	Total				All Cargo Carriers	-	-	-	-
32	Total				Third Party Handler	-	-	-	-
33	Total				Combi Carriers (Passenger and Freighter)	-	-	-	-
34	Total				Integrated Express - Hub	-	-	-	-

ACRP Report #143 Model Demonstration


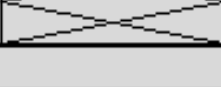

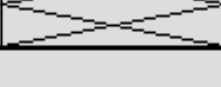
B9		Tonnage Market Share (US Tons)				
	A	B	C	D	E	F
1		Annual Tons - Base Year				
2		2014				
3						
4						
5						
6		Total Annual Tonnage (In US tons)				
7		66,000.0				
8						
9		Tonnage Market Share (US Tons)			Annual Tonnage	
10						
11		Integrated Express	100%		66,000.0	
12						
13		Passenger Airline Belly	0%		0.0	
14						
15		All Cargo Carriers	0%		0.0	
16						
17		Third Party Handler	0%		0.0	
18						
19		Combi Carriers (Passenger and Freighter)	0%		0.0	
20						
21		Integrated Express Hub	0%		0.0	
22						
23			100%		66,000.0	
24						

ACRP Report #143 Model Demonstration

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	A	B	C	D	E	F	G	H
2		RATIO INPUTS (Tons/Square Feet)	Integrated Express	Hub-Integrated Express	Passenger Airline (Belly Cargo)	All Cargo Carriers	Third Party Handler	Combi Carriers (Passenger & Freighter)
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7		Aircraft Parking Ramp						
8		Domestic	0.40	0.20		0.40	0.40	0.40
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13		Integrated Express	Hub-Integrated Express	Passenger Airline (Belly Cargo)	All Cargo Carriers	Third Party Handler	Combi Carriers (Passenger & Freighter)	
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ACRP Report #143 Model Demonstration

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International Gateway	.20 to .8	.15 to .4		.46 to 1.82	.46 to 1.82	.46 to 1.82
GSE Storage						
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M28

	A	B	C	E	F
2				Default	
3			Warehouse to Truck Parking Ratio	Warehouse to Truck Parking Ratio	
4			1.8	1.8	
5		Buildings <50,000 sf	1.8	1.8	
6		Buildings 50,000 to 99,999 sf	1.7	1.7	
7		Buildings 100,000 to 199,999 sf	1.2	1.2	
8		Buildings >200,000 sf	1.4	1.4	
9					
10					
11					
12					
13					
14					
15					

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ACRP 03-24:

Air Cargo Facilities Calculator

10/2/2015

USE THIS REPORT FOR DOMESTIC AIRPORTS									
Air Cargo Facilities Size Calculator		Baseline	Forecasted Year 5 Annual Tonnage	Forecasted Year 10 Annual Tonnage	Forecasted Year 20 Annual Tonnage	Baseline	Forecasted Year 5 Annual Tonnage	Forecasted Year 10 Annual Tonnage	Forecasted Year 20 Annual Tonnage
	Tonnage	66,000	70,000	77,000	87,000	66,000	70,000	77,000	87,000
DOMESTIC AIRPORTS	Year	2014	5-Year	10-year	20-year	2014	5-Year	10-year	20-year
Integrated Express Carriers									
	Existing Space	Required Space to Meet Demand	Forecasted Required Space	Forecasted Required Space	Forecasted Required Space	Base Year Difference	5-Year Surplus or Deficient Space	10-Year Surplus or Deficient Space	20-Year Surplus or Deficient Space
Cargo Building Space (sf)	80,000	71,739	76,087	83,696	94,565	8,261	3,913	(3,696)	(14,565)
Aircraft Ramp area (sf)	200,000	165,000	175,000	192,500	217,500	35,000	25,000	7,500	(17,500)
Paved GSE Storage (sf)	150,000	114,840	121,800	133,980	151,380	35,160	28,200	16,020	(1,380)
Total Apron (sf)	350,000	279,840	296,800	326,480	368,880	70,160	53,200	23,520	(18,880)
Truck and Auto Parking (sf)	75,000	131,115	139,061	152,968	172,834	(56,115)	(64,061)	(77,968)	(97,834)
Total Space in Square Feet (sf)	505,000	482,694	511,948	563,143	636,279	22,306	(6,948)	(58,143)	(131,279)
Total Space in Acres	11.6	11.1	11.8	12.9	14.6	0.5	(0.2)	(1.3)	(3.0)
General Purpose Carriers									
	Existing Units	Required Units to Meet Demand	Forecasted Required Units	Forecasted Required Units	Forecasted Required Units	Base Year Difference (Units)	5-Year Surplus or Deficient Units	10-Year Surplus or Deficient Units	20-Year Surplus or Deficient Units
Total Truck Docks/Doors	54	48	51	56	63	6	3	(2)	(9)
Number of Landside Truck Docks/Doors	40	36	38	42	47	4.1	2.0	(1.8)	(7.3)
Number of Airside Truck Doors	14	12	13	14	16	2.0	1.3	0.1	(1.8)

CDM Smith Air Cargo Practice

- Air Cargo Facility Planning
- Air Cargo Forecasting
- Air Cargo Market Demand Studies
- Statewide Air Cargo System Plans
- Intermodal Studies
- Special Studies

