

ECONOMIC IMPACT STUDY OF CALIFORNIA AIRPORTS

MARCH 1, 2013

Prepared for
California Airports Council

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1. AIRPORT EMPLOYMENT AND SURVEY FINDINGS

1.1 INTRODUCTION

This report details out the economic impacts that annually occur at California's commercial airports. The influence of the aviation industry in California is enormous, and activities taking place at California's airports create significant effects across the rest of the economy. Infrastructure is a backbone to any modern economic system, by enabling efficient trade and movement of people and goods. Airports play a vital role in this system and represent a significant source of employment.

The impacts discussed in this report primarily focus on the direct activities that occur at the airports themselves, the jobs that they create, and the ancillary benefits that they generate through buyer-supplier relationships with other businesses throughout California. It should be noted that this report does not attempt to quantify other impacts that occur as a result of economic activities that are enabled by the availability of air transportation, such as tourism and retail trade conducted using air freight.

1.2 DIRECT EMPLOYMENT GENERATION

In order to quantify the economic effects from California airports, an employment survey was distributed to all of the California Airports Council member airports. The survey asked the respondents to identify the number of workers at each airport, and distribute out these jobs by category, including fixed-based operations, customer service, concessions, maintenance, security, administration, and others.

EMPLOYMENT SURVEY RESULTS

Altogether, ADE received replies from 26 of the 29 commercial airports in California. This includes data from the 10 largest airports for passenger travel. It should be noted that not all of the responses were complete, so the project team used averages from completed surveys to fill in the missing data, where needed.

Based on responses from the surveys, we found a total of 117,273 employees working at the commercial airports. These jobs covered a wide range of different functions. Table 1-1 shows the stated job totals for the responding airports. As expected, the two major international airports in California, Los Angeles and San Francisco, constituted a large portion of the total employment.¹²

¹ The employment total for Los Angeles International Airport (LAX) was based on an approximate badge count provided by LAWA. This employment total differs from the economic impact analysis recently

TABLE 1-1
CALIFORNIA AIRPORT SURVEY FINDINGS
TOTAL ON-SITE JOBS BY AIRPORT LOCATION

Airport	Total Jobs
Arcata Eureka	19
Bakersfield	612
Burbank	2,342
Chico	72
Crescent City	27
Fresno	2,190
Long Beach	1,295
Los Angeles*	50,000
McClellan Palomar	1,447
Merced	58
Modesto	140
Monterey	250
Oakland	7,680
Ontario	2,479
Orange County	3,626
Oxnard	82
Palm Springs	821
Redding	310
Sacramento	3,598
San Diego	5,381
San Francisco*	29,556
San Jose	2,801
San Luis Obispo	101
Santa Barbara	419
Santa Maria	1,310
Sonoma	236
Stockton	421
Total	117,273

Source: ADE, Inc.; data from California airport employment survey.

Notes: LAX and ONT employment are based on the total badged employee count. The employment total for SFO comes from their 2009 economic impact analysis.

In addition to the total jobs by location, the survey also identified the number of jobs for different airport functions. As shown in Table 1-2, the jobs are very evenly distributed across a broad range of on-site activities, with customer service, ground transportation, and cargo operations creating the largest number of jobs.

completed by the LAEDC, “Los Angeles International Airport in 2011.” The LAEDC study used a GIS application to estimate the employment for the LAX property and surrounding areas. ADE used some of the specific sector data cited in the report text, but did not use the same employment totals.

² San Francisco International Airport (SFO) could not provide a current employment total. Because of this, the data for SFO utilizes the detailed information from the economic impact study that the Martin Associates produced on behalf of SFO in June 2009.

TABLE 1-2
CALIFORNIA AIRPORT SURVEY FINDINGS
TOTAL ON-SITE JOBS BY MAJOR ACTIVITY CATEGORY

Airport Function	Total Jobs
Fixed-base operations	9,121
Aircraft maintenance/repair	7,816
Air traffic control	2,589
Security	9,854
Ground transportation	12,024
Administration	6,619
Ground support	8,986
Customer service	19,772
Terminal personnel	6,452
Retail/restaurants	8,277
Cargo operations	10,068
Catering/airline meal preparation	2,821
Other	12,874
Total	117,273

Source: ADE, Inc.; data from California airport employment survey.

Notes: When survey responses were deemed incomplete, the missing data was filled in using averages from the completed surveys. In cases where more detailed determinations could not be made, the jobs were classified as other functions.

2. ECONOMIC MULTIPLIER ANALYSIS

2.1 ECONOMIC MULTIPLIER EFFECT DEFINITIONS

An economic multiplier analysis works off of the premise that impacts resulting from a business operation or a work project or a site location (such as an airport) are not limited to the activity that occurs on-site. In order to for an airport to operate, the airport and all of its business tenants need to initiate supplier relationships with other businesses. These suppliers support airport activities by addressing a wide range of needs such as capital equipment, utilities, commodities, business support, and other services. In addition, the employed workers will create economic activity through household spending. A comprehensive documentation of how an economic engine such as an airport impacts a geographic area accounts for how these supplier relationships and household spending by estimating their economic multipliers.

Using an input-output model and other data sources, this section identifies not only the direct effects from these facilities, but the indirect and induced multiplier effects as well. These multipliers result from the aforementioned ancillary economic activity generated by the airport operations. Altogether, these activities represent significant economic activity for California.

IMPACT DEFINITIONS

The analysis calculated the multiplier impacts based on three economic measures – employment, industry output, and labor income. These measures are defined as follows:

- **Employment** indicates the number of jobs supported by airport operations on an ongoing basis. Employment includes both direct on-site airport jobs, and off-site jobs generated through multiplier effects.
- **Industry output** represents the sum of all economic activity generated by airport and ancillary activities. This activity includes all commodity inputs, labor income, property income, and other value added components.
- **Labor income** represents the income generated through both self-employment, and wage-and-salary employee compensation.

The multiplier impacts for these measures come from the Type SAM (social accounting matrix) multipliers. These multipliers include the direct, indirect, and induced impacts. These multiplier descriptions are as summarized below.

- **Direct impacts** represent the jobs and other economic impacts that are directly generated on the airport property on an annual basis. These impacts include jobs that are created at the airport sites.
- **Secondary impacts** represent the jobs and other economic effects that would be generated elsewhere within the regional center boundary as a result of supplier purchases made by a particular business as well as institutional demand (including household purchases resulting from employee and proprietor spending). Supplier

purchases would include consumables, durable goods, and services. Impacts generated through employee spending most typically occur in retail and other local-serving industry categories such as personal services, education, and health care.

2.2 ECONOMIC MULTIPLIER FINDINGS

As indicated in the previous section, the airport employment survey found a total of 117,023 jobs on-site at the responding airports. The survey also identified the employment by major airport function. In order to calculate the multiplier effects, the job counts by airport function were entered into an input-output model. The model uses a dataset that estimates the multiplier impacts across the state of California.

MULTIPLIER EFFECTS: EMPLOYMENT, OUTPUT, AND INCOME

As shown in Table 2-1, the 117,273 jobs identified in the employment survey have a multiplier effect that creates more than three off-site jobs somewhere in California for every job supported at a commercial airport. The supplier relationships needed to keep California’s airports operating, along with the induced effects created by employee and institutional spending, create a total of 268,743 jobs. This is a significant impact, with 386,016 total jobs in California that are supported by airport activities. In addition, this does not even account for the other economic activities that depend on air transportation as an infrastructure asset.

**TABLE 2-1
DIRECT AND MULTIPLIER EFFECTS OF CALIFORNIA AIRPORTS**

Total Economic Impacts	Direct Effect	Multiplier Effect	Total Effect
Employment	117,273	268,743	386,016
Industry Output	\$20,640,549,915	\$42,255,586,899	\$62,896,136,813
Labor Income	\$7,591,108,605	\$15,400,234,006	\$22,991,342,611

Source: ADE, Inc.; data from IMPLAN3 input-output model and California airport employment survey.

The economic value of airport activities is expressed as industry output, and the direct output for the surveyed airports totals \$20.6 billion. The multiplier effect for industry output creates an economic impact of \$42.3 billion. This means that every dollar of economic activity generated at a California airport will more than double that amount across the rest of the state economy. Altogether, the total economic impact of commercial airports in California totals \$62.9 billion, which represents over 1.9 percent of the total industry output in the state.

In addition, the labor income directly generated by airport activity totals about \$7.6 billion. In turn, this supports another \$15.4 billion in multiplier income effects. The total labor income supported by California commercial airports is \$23.0 billion.

MULTIPLIER EFFECTS BY INDUSTRY CATEGORY

As Table 2-2 shows, the multiplier effects created by California’s commercial airports are widely distributed across all industry categories. There are no industry categories unaffected

by the economic impact created by airport activities. The largest employment impact categories include health care, accommodations and food service, retail trade, and the public sector. In terms of industry output, the biggest beneficiary of airport activity in California is manufacturing, with \$8.0 billion in economic value created as a result of California's commercial airports.

**TABLE 2-2
MULTIPLIER EFFECTS BY NAICS CODE**

NAICS Code	Industry Description	Employment	Industry Output	Labor Income
11	Agriculture, Forestry, Fishing and Hunting	1,333	\$199,851,995	\$55,007,472
21	Mining, Quarrying, and Oil and Gas Extraction	905	\$329,927,517	\$85,850,427
22	Utilities	598	\$677,815,912	\$94,096,973
23	Construction	6,921	\$948,505,162	\$444,611,628
31-33	Manufacturing	11,082	\$8,038,055,273	\$984,274,640
42	Wholesale Trade	8,554	\$1,749,154,988	\$689,625,529
44-45	Retail Trade	22,266	\$1,594,794,407	\$823,229,245
48	Transportation and Warehousing	17,782	\$2,179,693,935	\$1,117,198,233
51	Information	5,220	\$2,044,298,370	\$572,103,721
52	Finance and Insurance	13,740	\$3,540,586,372	\$1,076,117,485
53	Real Estate and Rental and Leasing	14,488	\$5,410,491,141	\$394,282,336
54	Professional, Scientific, and Technical Services	18,731	\$2,646,009,115	\$1,467,193,942
55	Management of Companies and Enterprises	2,493	\$522,630,989	\$271,452,257
56	Administrative and Support and Waste Management and Remediation Services	17,530	\$1,307,538,194	\$648,724,978
61	Educational Services	6,091	\$417,605,221	\$236,513,405
62	Health Care and Social Assistance	27,966	\$3,040,380,433	\$1,707,915,057
71	Arts, Entertainment, and Recreation	6,075	\$457,929,482	\$196,737,440
72	Accommodation and Food Services	27,906	\$1,882,260,038	\$783,371,408
81	Other Services (except Public Administration)	15,527	\$1,172,057,785	\$621,531,888
92	Government and Non-NAICS	43,536	\$4,096,000,568	\$3,130,395,939
	Total	268,743	\$42,255,586,899	\$15,400,234,006

Source: ADE, Inc.; data from IMPLAN3 input-output model and California airport employment survey.

APPENDIX A: METHODOLOGY

AIRPORT EMPLOYMENT SURVEY

In conjunction with California Airports Council staff, ADE distributed an employment survey form to the managers at California's 29 commercial airports. After follow up contacts by CAC, the survey was filled out and returned by a total of 26 airports. The survey form and instructions distributed to the airports is attached to this document as Appendix B.

Respondents were asked to fill out the survey to the best of their knowledge, and some of the survey responses did not provide full data. In subsequent follow up contacts, respondents were asked to provide a sum total if they could not identify the jobs by detailed category.

For the 10 largest commercial airports, ADE filled in the missing data by using the average distributions of jobs for those airports that provided more complete data. Los Angeles and Ontario airports provided the overall count of badged employees for each airport. The distribution by function used the overall average distribution of jobs for the other eight large airports. In addition, it should be noted that San Francisco International Airport did not have an updated employment count available, so they provided a 2009 economic impact study done on behalf of the airport by Martin Associates. The employment count for SFO reflects the 2009 data.

ECONOMIC MULTIPLIER ANALYSIS

The total direct employment count comes straight from the airport employment survey. For every airport, ADE was able to obtain at least a sum total of the on-site jobs for each of the responding airports. These jobs were categorically assigned by major airport function.

The application used to interpret the data and generate the impact calculations is the IMPLAN3 input-output model. This application calculates impacts and buyer-supplier relationships for 440 individual industry and commodity categories. The industry classification system used in the IMPLAN model roughly approximates, but still differs significantly from the commonly used North American Industry Classification System (NAICS). Each of the job totals for the airport functions represented in the employment survey were assigned a NAICS code and accompanying IMPLAN code. Table A-1 shows the job count by airport function, and the codes assigned to those categories. These jobs were entered into the IMPLAN3 model to calculate the multiplier effects.

**TABLE A-1
ON-SITE JOBS BY AIRPORT FUNCTION BY NAICS AND IMPLAN CODE**

Airport Employment	Direct Jobs	NAICS Codes	IMPLAN Codes
Fixed-base operations	9,121	48819	338
Aircraft maintenance/repair	7,816	48819	338
Air traffic control	2,589	488111	338
Security	9,854	561612	387
Ground transportation	12,024	485, 5321	336, 362
Administration	6,619	48811	338
Ground support	8,986	481	332
Customer service	19,772	481	332
Terminal personnel	6,452	481	332
			320-330,
Retail/restaurants	8,277	44-45, 722 481112,	413
Cargo operations	10,068	481212	332
Catering/airline meal preparation	2,821	72232	413
Other	12,874	481, 48811	332, 338

Source: ADE, Inc.; data from California airport employment survey.

The input-output matrices that form the main database come from the 2009 Bureau of Labor Statistics dataset, and the analysis used an individual dataset for the state of California. These matrices contain the assumptions regarding economic output per employee, the amount of commodity input that is purchased locally, and the production functions, which define the inputs and supplier services for each industry category.

The economic impacts estimated by the model fall into one of three categories -- direct, indirect, and induced. The report combines the indirect and induced impacts and refers to them as “multiplier effects.” These impacts are calculated on the basis of annual impacts. In this analysis, direct impacts represent the estimated jobs, labor income, and industry output that result directly from the airport activities. Indirect impacts represent the estimated effects that result from demand for commodities and services provided by suppliers. Examples of supplier industries include business services, food products, and other equipment. Induced impacts represent the potential effects resulting from institutional spending that includes the household spending at local businesses by the workers. These impacts generally affect retail businesses, health services, public services, and personal services providers.

The input-output model data file for California contains default assumptions regarding the economic relationships between different industries. In particular, the default data contains an estimate for the average industry output and labor income per employee for every industry category represented in California.

APPENDIX B: AIRPORT EMPLOYMENT SURVEY

Airport Employment	Direct Jobs	
1) Fixed-base operations		
2) Aircraft maintenance/repair		
3) Air traffic control		
4) Security		
5) Ground transportation		
6) Administration		
7) Ground support		
8) Customer service		
9) Terminal personnel		
10) Retail/restaurants		
11) Cargo operations		
12) Catering/airline meal preparation		
13) Other		
Notes:		
Airport Total	0	
Other Tenants on Airport Property	Direct Jobs	Square Footage*
Industrial		
Distribution		
Retail/Food Service		
Business Park/Office		
Lodging		
Notes:		
Tenant Total	0	
Total	0	

CALIFORNIA AIRPORTS ECONOMIC IMPACT STUDY

AIRPORT DATASHEET INSTRUCTIONS

Thank you for assisting us in our effort to document the economic impacts of airport operations in California. The datasheet is designed to separate different parts of the airport operations so that the impact calculation can better reflect the characteristics of your particular facility. For ease of data entry and analysis, please use the attached Excel file. If you have any questions about this study, please contact Doug Svensson or Peter Cheng of Applied Development Economics at (925) 934-8712.

AIRPORT EMPLOYMENT

This section covers those jobs that are directly generated by the airport operations. This would include any tenant or other leased operations that occur on-site. The descriptions for the job categories are listed below. If detailed job descriptions are not available, then those jobs should be assigned to line 13 (Other).

1. Fixed-base operations

This would apply to the jobs created by general aviation operators.

2. Aircraft maintenance and repair

This includes any maintenance and repair operations that occur at the airport, including contract operations and maintenance facilities directly operated by commercial and cargo airlines.

3. Air traffic control

This category includes all government and private sector personnel involved in the air traffic control operations.

4. Security

This includes all federal, local, and private sector workers involved in airport security. Police personnel should only include that work directly at the airport site.

5. Ground transportation

This category includes any personnel based at the airport, including car rental, transportation arrangement, and similar functions. It would not include any vehicle operations that are based off-site.

6. Administration

This includes all personnel involved in airport administration.

7. Ground support

This category includes the personnel involved in runway operations and baggage handling.

8. Customer service

This category includes the personnel that are involved in customer service functions, such as airline service/check-in desks, skycaps, and information desk personnel.

9. Terminal personnel

This would include any additional support personnel for terminal operations such as maintenance workers.

10. Retail/restaurants

This category includes any employment generated by retail store tenants, personal service providers (such as shoe shine and massage), and restaurant/food service operators.

11. Cargo operations

This category includes all dedicated cargo operations that are based on-site.

12. Catering/airline meal preparation

This includes any operations involved in preparation for in-flight meals and other catering services. This does not include any restaurant tenants.

13. Other

This category would include any jobs at the airport that do not fit the other categories. This also includes any jobs where detailed descriptions are not available.

OTHER TENANTS ON AIRPORT PROPERTY

These categories include any tenant businesses that are on the airport property, but might not be involved in aviation-related activities. Please fill this area out to the best of your knowledge. If job information is unavailable, then please fill in the square footage column. Square footage would include the leasable area for any tenant buildings on the airport property.

AFTER COMPLETING THE DATASHEET

When you have finished filling out the datasheet, please e-mail the Excel file back to us at pcheng@adeusa.com. If you prefer to enter the data as a written form, you may either fax (925-934-2402) or scan the information over to us.