ACRP Synthesis 13: Effective Practices for Preparing Airport Improvement Program Benefit-Cost Analysis

Steven Landau and Glen Weisbrod

Economic Development Research Group, Inc.
Steven Landau
Co-Principal Investigator

• Vice President and Aviation Practice Leader of Economic Development Research Group

Glen Weisbrod
Co-Principal Investigator

• President and Founder of Economic Development Research Group
ACRP Synthesis 13 Topic Panel

Woods Allee, Denver International Airport
Rob Brancheau, Orlando International Airport
Scott J. Bascom, Vermont Agency of Transportation
Jeffrey Cohen, University of Hartford
Mitchell Holmes, PBS&J, Fort Worth, TX
R. Douglas Trezise, Ricondo & Associates, Inc. Chicago
Larry Weber, Oregon Department of Aviation
Alex Zaslov, Simat, Helliesen & Eichner, Inc., Washington, DC
Joseph Hebert, Federal Aviation Administration (Liaison)
Robert Samis, Federal Aviation Administration (Liaison)
Christine Gerencher, Transportation Research Board
Gail Staba, ACRP Senior Program Officer
ACRP Synthesis 13: Effective Practices for Preparing Airport Improvement Program Benefit-Cost Analysis

- Define and describe benefit assessment techniques used by airports as well as other modes
- Highlight best practices and identifies inconsistencies of how benefits are calculated and where there is confusion in the FAA benefit-cost guidance.
- Focus on GA and small commercial airports
- Published 2009
Approach

- Literature review to define benefit – cost analysis
- Examine benefit – cost guidelines for all U.S. modes
- Review of 117 benefit-cost studies submitted to FAA for AIP grants from 1998 through 2008, including in depth review of 24 BCA studies, with FAA evaluations, correspondence with proponents & multiple submissions
- Identify proposed airport improvements and reviews similarities and differences of how benefits and costs are calculated for each type of improvement
- Case studies of funded projects, using documentation and interviews with airport managers, consultants who prepared BCA studies and (current and former) FAA staff
Hubs are 4% of NPIAS Airports and account for 60% of BCAs Submitted
Relievers & GA are 85% of NPIAS Airports and Account for 22% of BCAs Submitted

<table>
<thead>
<tr>
<th>Airport Class</th>
<th>Total NPIAS Airports</th>
<th>BCAs Submitted</th>
<th>BCAs Accepted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hub</td>
<td>139</td>
<td>71</td>
<td>46</td>
</tr>
<tr>
<td>Other Commercial</td>
<td>360</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>Reliever &amp; GA</td>
<td>2,831</td>
<td>26</td>
<td>14</td>
</tr>
<tr>
<td>Totals</td>
<td>3,330</td>
<td>117</td>
<td>70</td>
</tr>
</tbody>
</table>
Typical FAA Processing of BCA Submissions

- Project Proponent (airport & consultant)
  - Agree on base case
  - Airports Division (APP-500)
    - Policy Office (APO 200) for BCA Review
    - Airports Division for Decision

APO 200 may point out flaws in BCA to APP 500, which then communicates these flaws to proponent. Iterations of the BCA may ensue.
BCA Studies by Project Type

N = 117
BCA Studies by FAA Disposition

- Pending - Ongoing FAA Review
- Reviewed and Resubmitted
- Not Accepted
- Withdrawn
- Rendered No Objection
- Made Exempt
- Regional Decision
- Partially/Conditionally Accepted
- Accepted

N = 117
Benefit Measures in BCAs Reviewed

N = 24
FAA Disposition of BCA Studies by Airport Class

N = 117
Outcomes of Reviewed Projects

<table>
<thead>
<tr>
<th>Disposition</th>
<th>BCAs Reviewed</th>
<th>% of Total Submitted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accepted</td>
<td>16</td>
<td>67%</td>
</tr>
<tr>
<td>Partially/Conditionally Accepted</td>
<td>2</td>
<td>8%</td>
</tr>
<tr>
<td>Regional Decision</td>
<td>2</td>
<td>8%</td>
</tr>
<tr>
<td>Withdrawn</td>
<td>2</td>
<td>8%</td>
</tr>
<tr>
<td>Not Accepted</td>
<td>1</td>
<td>4%</td>
</tr>
<tr>
<td>Pending - Ongoing FAA Review</td>
<td>1</td>
<td>4%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>24</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>
Case Study Project Examples

- GA runway extension to serve corporate jets. Partially accepted by FAA.
- Proposed new small hub to consolidate commercial service of two airports. Not accepted by FAA.
- Reliever runway extension to better serve a reliever regional airport for corporate jets. Accepted by FAA.
- Small Hub to develop new (replacement) runway to meet rise in forecast aviation demand. Accepted by FAA.
- GA runway extension to allow reliable operation of larger aircraft to improve response to oil spills in the LA Gulf. Accepted by FAA.
- GA runway extension to improve airport ability to facilitate just-in-time deliveries to local manufacturers. Accepted by FAA.
Expanding the Aviation Community

FAA acknowledges that aviation dependent activities may be a valid basis for Benefit – Cost Analysis.

Demonstrated by favorable consideration of the:

1. Economic necessity for just-in-time deliveries to manufacturers off-airport; and

2. Economic benefit of cleaning up oil spills in the Louisiana Gulf.
Discount Rate Set BCA Hurdle

- Example: Sum of Nominal Costs equals $13,900,000 and sum of nominal benefits equals $28,000,000.

<table>
<thead>
<tr>
<th>Discount Rate</th>
<th>PV Benefit*</th>
<th>PV Costs*</th>
<th>NPV*</th>
<th>BC Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>10%</td>
<td>$10,925</td>
<td>$ 7,346</td>
<td>($3,579)</td>
<td>0.67</td>
</tr>
<tr>
<td>7%</td>
<td>$11,700</td>
<td>$10,549</td>
<td>($1,151)</td>
<td>0.90</td>
</tr>
<tr>
<td>5%</td>
<td>$12,267</td>
<td>$13,368</td>
<td>$1,401</td>
<td>1.11</td>
</tr>
<tr>
<td>3%</td>
<td>$12,881</td>
<td>$17,985</td>
<td>$5,104</td>
<td>1.40</td>
</tr>
</tbody>
</table>

*All dollars are in thousands
Net Benefit Value Differs from Benefit/Cost Ratio

<table>
<thead>
<tr>
<th>Project</th>
<th>PV of Benefit*</th>
<th>PV of Cost*</th>
<th>Net Present Value (Benefit–Cost)*</th>
<th>B/C Ratio (Benefit/Cost)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>$36</td>
<td>$30</td>
<td>+$6</td>
<td>1.2</td>
</tr>
<tr>
<td>B</td>
<td>$ 3</td>
<td>$ 1</td>
<td>+$2</td>
<td>3.0</td>
</tr>
<tr>
<td>C</td>
<td>$ 8</td>
<td>$10</td>
<td>-$2</td>
<td>0.8</td>
</tr>
</tbody>
</table>

* Figures are in Millions
BCA Guidance Varies by Mode
Values of Passenger Time Vary by Mode

(*) indicates that values increase annually with inflation
Other Differences Across Modes

- **FAA mandates a discount rate 7% rate**
  - Other modes allow lower rates based on more recent conditions

- **FAA guidance explicitly permits consideration of “hard to quantify benefits”**
  - Unlike other modal guidance documents.

- **Safety benefits are handled differently in aviation BCA guidance than in any other modal guidance.**
  - Primarily because aviation crashes are extremely rare; however, when they occur, they can be very costly.

- **Aviation guidance concerning freight delay includes: (1) the value of tied up inventory, (2) spoilage and (3) logistical bottlenecks**
  - Most highway-related guidance documents define freight time savings only in terms of the cost of operator and vehicle time. Logistics costs are recognized as a legitimate element of truck and rail freight in BCA guidance posted by the FHWA Office of Freight.
For additional information:

ACRP Synthesis 13: Effective Practices for Preparing Airport Improvement Program Benefit-Cost Analysis

http://www.trb.org/Publications/Blurbs/161751.aspx

- Steven Landau  
  o SLandau@edrgroup.com
- Glen Weisbrod  
  o GWeisbrod@edrgroup.com