
BCA Website Update

bca.transportationeconomics.org

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Presentation to TRB Economics Committee, January 2018

Status 2018

- Last major update in 2010
- Review in 2016 identified updates for:
 - (1) available BCA tools
(exclude obsolete or no longer supported tools)
 - (2) assumption factors for beyond just highways
(add ped., bike, marine, air, rail, high speed rail)
- Review in 2018 identified need to widen coverage for policies (re: service delivery, technologies, long-term issues)
- Still need to implement updates on the active website
→ *need volunteers*

Current Web Site

▼ Models

BCA.Net
Cal-B/C
HERS-ST
Israeli Nohal Prat
MicroBENCOST
STEAM
StratBENCOST

▼ Case Studies

CVISN
Truck Bypass
Electronic Toll
Collection
Monorail
Public Transport
Studded Tires
Airport Runway

Done: Multimodal Tools - updated for U.S.

Tools that can be used for Benefit-Cost Analysis anywhere in the US

Free BCA Tools |

Primary Use	Tool (hyperlinked)	Modes/ Uses	Benefit Types	Format	Version	Late Update	User's Guide (hyperlinked)
Capital Projects <i>(INFRA Grant Compliant)</i>	Cal-B/C	H, T	T, C, S, E	Spreadsheet	5.0	2017	Cal-B/C User Guide and Technical Supplements
	BCA.net	H	T, C, S, E, RA	Web-based	2.0	2015	BCA.Net - Highway Project Benefit-Cost Analysis System User's Manual
	MBCA	H, T, R, A, W, N	T, C, S, E, R	Web-based	5.0	2017	Multimodal Benefit-Cost Analysis Tool
	GradeDec	H/R (crossings)	T, C, S, E, N	Web-based	1.0	2015	GradeDec User's Manual
Operations	TOPS-BC	H	ITS, S, M	Spreadsheet	1.2	2016	TOPS-BC Manual
Asset Management	HERS-ST	H	T, C, S, E, R	Downloadable Software	5.0	2013	HERS-ST Highway Economic Requirements System - State Version: User's Guide
	CREAT	GA	RA, EL	Web-based	3.0	2016	CREAT 3.0 Methodology Guide

*Modes: H=highway, T=transit, R=Freight & Passenger Rail, A=aviation, W=Water, N=Non-motorized (ped/bike), GA=general infrastructure
Benefit Types: T=Time, C=(user) Cost, S=Safety, E=Emissions, R=Reliability, N=Network Benefits, ITS=Intelligent Transportation Systems,
S=Signalization, M=Managed Lanes, RA=Risk Assessment, EL=Economic Loss*

Free Supplements for Valuing Wider Societal Benefits in BCA (any mode)

Tool (hyperlinked)	Benefit Types	Format	Updated	User's Guide (hyperlinked)
EconWorks Suite:	A, I, R:	Spreadsheets	2015	EconWorks Suite Users Guides
MOSAIC	A, H, L, Q	Spreadsheet	2015	Mosaic User Guide

Benefit Types: A=Accessibility, H=health, I= Intermodal Connectivity, L=land use, Q=quality of life, R=Reliability

Done: Multimodal Benefit Factors for US

<p>Average Freight Cargo (tons) – the total number of tons of freight per vehicle</p> <p><See note G></p>	<table> <tr> <td>All Trucks</td> <td>24.05</td> </tr> <tr> <td>Rail-freight:</td> <td>3,024</td> </tr> <tr> <td>Aircraft:</td> <td>4.6</td> </tr> <tr> <td>Cargo Aircraft:</td> <td>31.66</td> </tr> <tr> <td>Ship:</td> <td>14,000</td> </tr> <tr> <td colspan="2"><u>Truck Categories</u></td> </tr> <tr> <td>Truck: Tractor Trailer:</td> <td>43.39</td> </tr> <tr> <td>Truck: Light/Medium Duty</td> <td>18.05</td> </tr> </table>	All Trucks	24.05	Rail-freight:	3,024	Aircraft:	4.6	Cargo Aircraft:	31.66	Ship:	14,000	<u>Truck Categories</u>		Truck: Tractor Trailer:	43.39	Truck: Light/Medium Duty	18.05		
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Limitation of Current Website

Public Investment Project – compare benefits to investment cost for built structures and systems (focus on capital + operating costs)

Current Web Site

▼ Calculation Issues	▼ Costs
▶ Valuing Benefits	Initial Costs
Inflation	Continuing Costs
Discounting	Rehabilitation Costs
Transfers and Double Counting	End of Project Costs
Joint and Sunk Costs	
Uncertainty	
Sensitivity Analysis	

*...This coverage does not work when considering **policies** regarding regulation towards new service delivery models, technology systems or long-term social decision issues.*

New Application #1 – Service Delivery

Policy & Regulations regarding new forms of **service delivery**

e.g., Sharing Economy (bike share, car share, ride share, transportation network companies – car/driver matching)

- Private investments in lieu of public investments, or...
- Shared resources replace capital investment in dedicated fleets.
- Availability/convenience factor (not time/cost).

...There may be no public investment

...cost reduction effects on resource use and productivity

...private vs. public provider issues



▼ **Costs**

Initial Costs

Continuing Costs

Rehabilitation Costs

End of Project Costs

→ There is a growing literature on these topics; we need to reflect it in our web site.

New Application #2 – Technologies

Policy & Regulation regarding new technologies
e.g., Autonomous Vehicles (driverless car mobility services, driverless or connected truck platoons)

- Private investments in lieu of public investments;
- Economies for service providers & shippers (beyond normal traveler time/cost);
- Scalability benefits; overcome driver shortages.

...There may be no public investment

...private sector productivity is a benefit

...safety concerns need to be benchmarked

...sometimes distributional equity issues

▼ Benefits

- ▶ Travel Time
- ▶ Vehicle Costs
- ▶ Safety
- ▶ Emissions
 - Greenhouse Gases
- ▶ Induced Travel
- ▶ Travel Time Reliability
- ▶ Noise
 - Construction
 - Disbenefits
 - Habitat and Water Quality
 - Economic Effects
 - Community Impacts
 - Parking Costs
 - Equity and Option
 - Value Benefits

→ There is a growing literature on these topics; we need to reflect it in our web site.

New Application #3 – Long Term Issues

Consideration of social decision factors involving time

- **Resilience** - ability for access and mobility to continue despite unexpected occurrences (*e.g., system failure caused by weather, terrorism, equipment*).
- **Sustainability** – ability for access/mobility, economy, quality of life and environment, to continue for future generations.

...Motivation and assumed benefit is avoidance of unacceptable conditions for society in the future, rather than travel time and cost valuation.

...Traditional risk rates and discount rates may not adequately reflect threshold or inter-generational effects.

▼ Types of Measures

Benefit–Cost Ratio
Net Present Value
Cost Effectiveness
Internal Rate of Return
Payback Period
Graphical
Representation

→ There is a growing literature on these topics; we need to reflect it in our web site.

Examples: reports/ studies to guide us

- Extreme Weather & Climate Change – NCHRP Project 20-101 (2017)
- Sustainability – Foresight Series, NCHRP Report 750, v.4 (2014)
- Resilience for Ports – NCFRP Report 30 (2014)
- Resilience for Transit – TCRP Project A-41 (2017)
- Resilience for Airports – ACRP Project 2-74 (2018)
- TNCs & Airport Parking – ACRP Project 03-47 (2018)
- TNCs & Public Transportation - TCRP J-11/Task 26 (2018)
- Carsharing – TCRP Report 108 (2016)
- P3 for Transit – TCRP Report 191
- Technology-Enabled Services – TRB SR 319 (3016)
- Cost of Carbon Value – USDOT's BCA Resource Guide (2016)
- Safety/Health Value – Harvard School of Public Health (2017)

Next Steps

- Appoint a subgroup to implement the past updates on tools and cost/benefit factors
- Appoint a subgroup to implement a coverage page for each of the new dimensions (policies, technologies, time factors), to include benefit & cost valuation methods and literature.
- Update the methodology for projects to acknowledge the difference between BCA for projects vs. BCA for policies.
- Other suggestions from earlier meetings: LinkedIn group and/or Web discussion platform.

→ **Discussion...**