



U.S. Department of Transportation
Federal Highway Administration

Turner-Fairbank
Highway Research Center

SAXTON
LABORATORY

Traffic Incident Management Benefit-Cost (TIM-BC) Tool

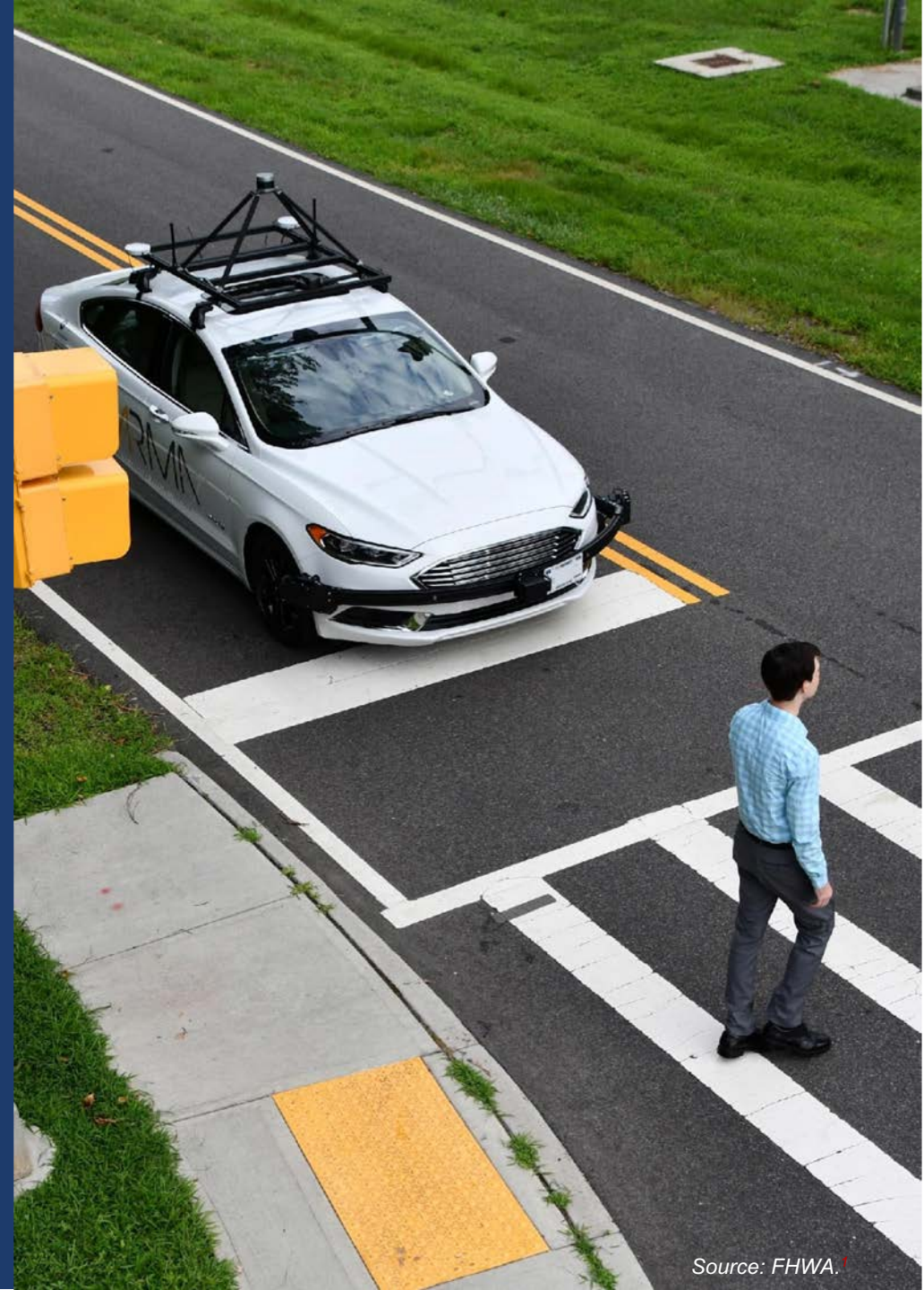
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December 14, 2021



Source: FHWA.



All images source: FHWA.

Overview



Project Overview

- ▶ Goal:
 - ▷ Improve the TIM-BC tool developed through FHWA Office of Operations Research and Development.¹
 - ▷ Make the tool more useful to TIM and other relevant communities.
- ▶ Objectives:
 - ▷ Raise awareness of the tool in relevant communities.
 - ▷ Identify and prioritize potential improvements to the tool.
 - ▷ Facilitate constant engagement between user, researcher, and developer communities.



Project Overview

- ▶ Approaches:
 - ▷ Engage stakeholders through webinars, interviews, and workshops.
 - ▷ Make the tool open-source.
 - ▷ Develop complete and clear documentation for end users, researchers, and software developers.

- ▶ Status:
 - ▷ Publish source code—completed.
 - ▷ Publish confluence space—completed.
 - ▷ Conduct interviews and workshop discussions on improvements—planning.

TIM-BC Tool Overview



Tool Capabilities:

- ▶ Benefit and cost estimation for a range of TIM strategies.
- ▶ Evaluation of monetary value of TIM programs.
- ▶ Estimation of benefits in terms of:
 - Travel delay.
 - Fuel consumption.
 - Emissions.
 - Secondary incidents.

Source: FHWA¹.



TIM-BC Tool Overview

Features include:

- ▶ Tool is simple to use.
- ▶ Data requirements are less intense than those of previous generations of tools.
- ▶ Estimation methodologies are standardized and universal.

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Traffic Incident Management Benefit-Cost Tool

Measure the mobility, safety, and environmental
benefits of TIM programs

Safety Service Patrol ▶ LAUNCH	Driver Removal Laws ▶ LAUNCH	Authority Removal Laws ▶ LAUNCH	Shared Quick-Clearance Goals ▶ LAUNCH
Pre-established Towing Service Agreements ▶ LAUNCH	Dispatch Colocation ▶ LAUNCH	TIM Task Forces ▶ LAUNCH	SHRP2 Training ▶ LAUNCH

Source: FHWA

TIM-BC Tool Overview



- ▶ Intended Usage:
 - ▶ Assess proposed expansion of existing TIM programs.
 - ▶ Assess the value of creating a new TIM program.
 - ▶ Compare alternatives.

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Traffic Incident Management Benefit-Cost Tool

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Source: FHWA



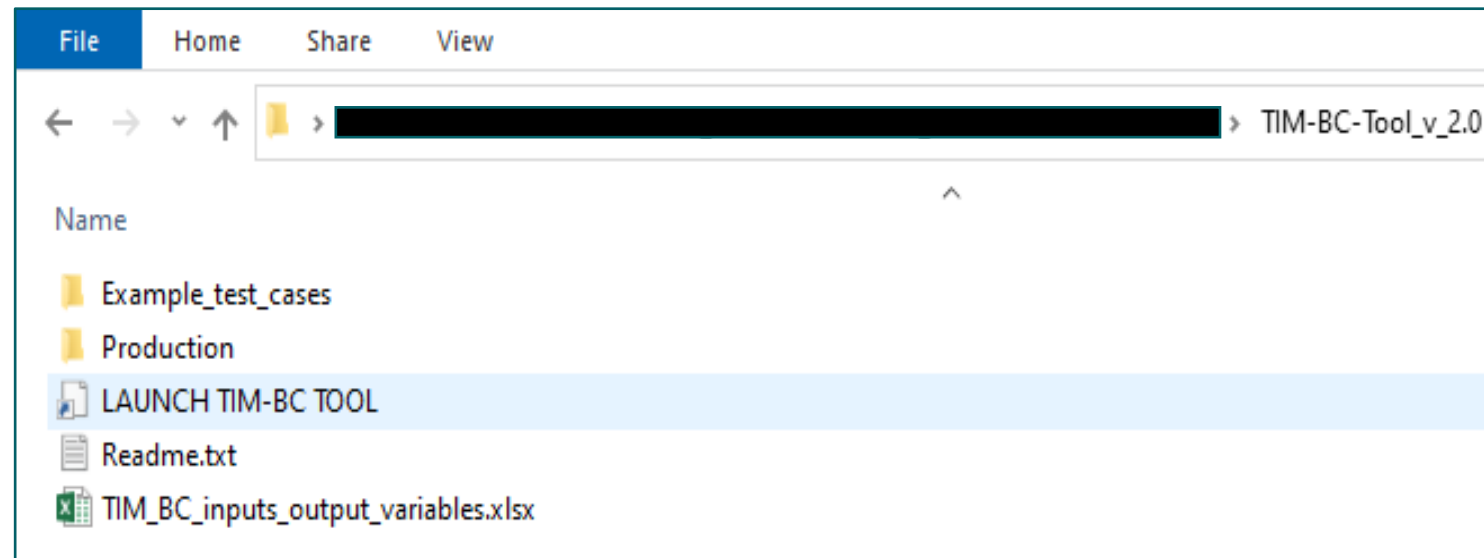
All images source: FHWA.

TIM-BC Tool Demonstration

Install and Launch the Tool



- ▶ Download the tool from <https://www.fhwa.dot.gov/software/research/operations/timbc/>.¹
- ▶ Unzip the downloaded file “TIM-BC-Tool_v_2.zip.”
- ▶ Double click the shortcut “LAUNCH TIM-BC TOOL” under the unzipped root folder “TIM-BC-Tool_v_2.0.”



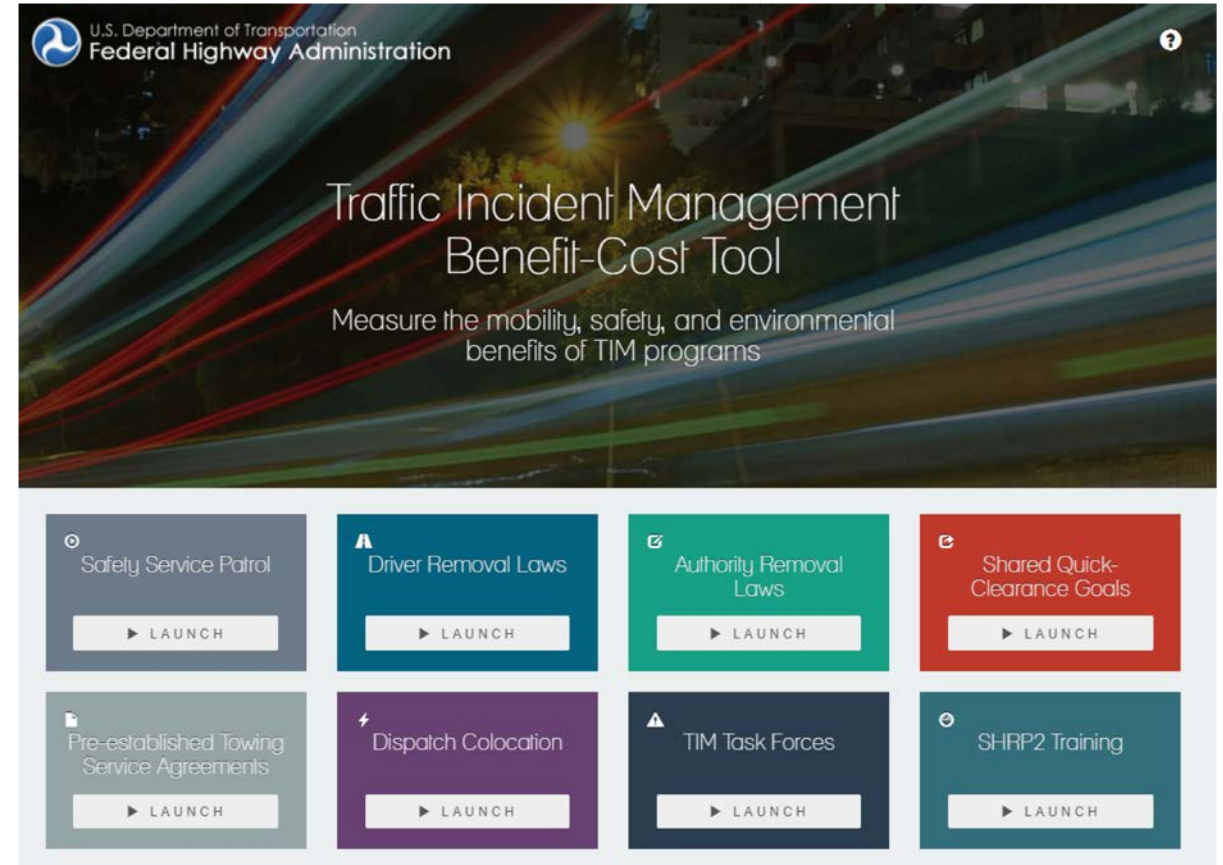
Source: FHWA.

Home Screen of the TIM-BC Tool



Select a module:

- ▶ Safety Service Patrol (SSP).
- ▶ Driver Removal Laws.
- ▶ Authority Removal Laws.
- ▶ Shared Quick-Clearance Goals.
- ▶ Preestablished Towing Service Agreements.
- ▶ Dispatch Co-location.
- ▶ TIM Task Forces.
- ▶ Strategic Highway Research Program 2 training.



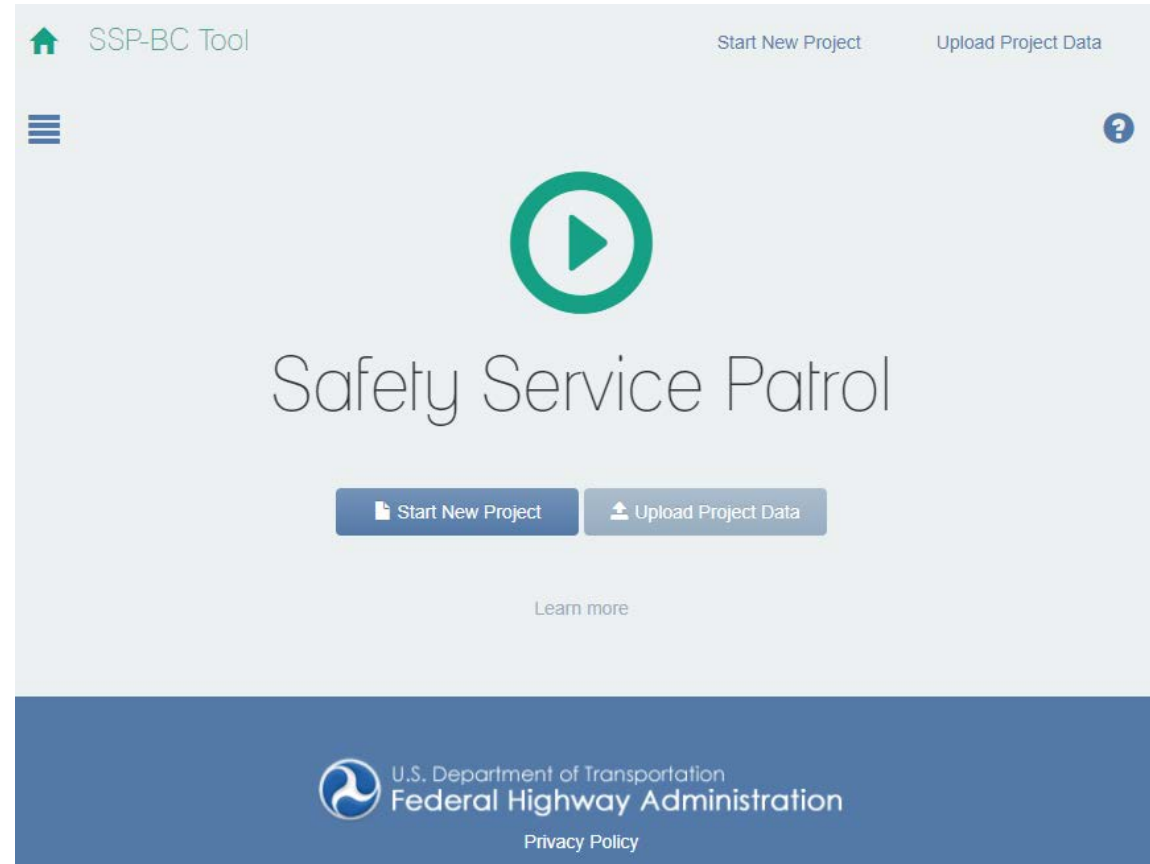
Source: FHWA

Example BC Estimation: Safety Service Patrol¹



Home screen for Safety Service Patrol (SSP) BC Module:

- ▶ Select Start New Project button for a new SSP BC estimation project.
- ▶ Select Upload Project Data to load data.



Source: FHWA¹.

SSP BC Estimation Example



- ▶ Enter project name.
- ▶ Input project details.
 - ▷ State.
 - ▷ Number of Segments (highway segments in TIM program).
 - ▷ Study period duration in months.
 - ▷ Annual Total Program Cost.

The screenshot shows the top navigation bar with 'SSP-BC Tool', 'Save Project Data', 'Start New Project', and 'Upload Project Data'. Below the navigation bar is a hamburger menu icon and a help icon. The main content area displays the project name 'SSP example BC estimat' with a close button (X). Below the project name are two buttons: 'Edit Project Details' and 'Upload Project Data'.

The screenshot shows the same top navigation bar. Below the navigation bar is a hamburger menu icon and a help icon. The main content area displays the project name 'SSP example BC estimation project'. Below the project name are four input fields: 'State' (Alabama), 'Number of Segments' (1), 'Study period duration in months' (12), and 'Annual Total Program Cost' (0). A 'Calculate' button is located to the right of the 'Annual Total Program Cost' field. At the bottom, there are two navigation buttons: 'Project Name' and 'Segment Input'.

Source: FHWA¹.

SSP BC Estimation Example



- ▶ Input segment information:
 - ▶ Roadway Geometry.
 - ▶ DRL (TIM) Program Information.
 - ▶ Incident Information.
 - ▶ Traffic (and weather) Information.
- ▶ Calculate BC ratio by inputting data into all four blocks to meet minimum requirements (indicated by the block header turning green).

DRL example BC estimation project

Segment:
Segment 1
Enter Segment Name
Select Region

Roadway Geometry

SEGMENT LENGTH IN MILES: 0
NUMBER OF RAMPS: 0
NUMBER OF TRAFFIC LANES BY DIRECTION: 2
GENERAL TERRAIN: Flat
HORIZONTAL CURVATURE: Straight

DRL Program Information

OPERATION TIME:
 AM Peak
 PM Peak
 Weekday Off Peak
 Weekend

PROJECT SAVINGS:
PROPORTION: 50
COMPLIANCE RATE (BEFORE): 0
COMPLIANCE RATE (AFTER): 50
AVERAGE SHORTENED INCIDENT DURATION: 5

Traffic Information

POSTED MAINLANE SPEED LIMIT (MPH): 0

Time	Traffic Volume (VEH/H/Lane)	Truck Percentage (0-25)
AM PEAK	0	0

Weather Information (ensure selections add up to 100%)

WEATHER: Select Type
PERCENTAGE (0-100): 0

Incident Information

AM Peak

Incident Blockage Severity	Average Incident Duration (Minutes)	Number of Incidents
Shoulder Blockage	0	0
One Lane Blockage	0	0

PERCENTAGE OF ESTIMATED SECONDARY INCIDENTS (enter as 0-100): 0

Buttons: Calculate Ratio, Reset Information

Source: FHWA¹.

SSP BC Estimation Example



- ▶ Project output:
 - ▶ Summarizes the calculated benefits elements and BC ratio of the SSP program.
 - ▶ Includes the following benefits:
 - DELAY SAVINGS (HOURS).
 - FUEL (GALLONS) savings.
 - SECONDARY ACCIDENTS (for prevention).
 - Emissions reductions (metric tons), including HYDROCARBONS, CARBON MONOXIDE, and others.
 - ▶ Exports PDF reports with the results.

SSP-BC Tool

Save Project Data Start New Project Upload Project Data

test06

Segments:

Select All Select None

testSegment01

PRODUCE REPORT

Savings

Study period duration: 6 months

DELAY SAVINGS (HOURS):	53669.76	<input checked="" type="checkbox"/>
FUEL (GALLONS):	-36.96	<input checked="" type="checkbox"/>
SECONDARY ACCIDENTS:	5.09	<input checked="" type="checkbox"/>
HYDROCARBON (HC, MT):	0	
CARBON MONOXIDE (CO, MT):	-0.02	
NITROGEN OXIDE (NOx, MT):	0	
CARBON DIOXIDE (CO ₂ , MT):	-0.37	
SULFUR OXIDE (SOx, Grams):	-0.01	

BENEFIT-COST RATIO OF CHOSEN FACTORS:

18.43

Source: FHWA¹.