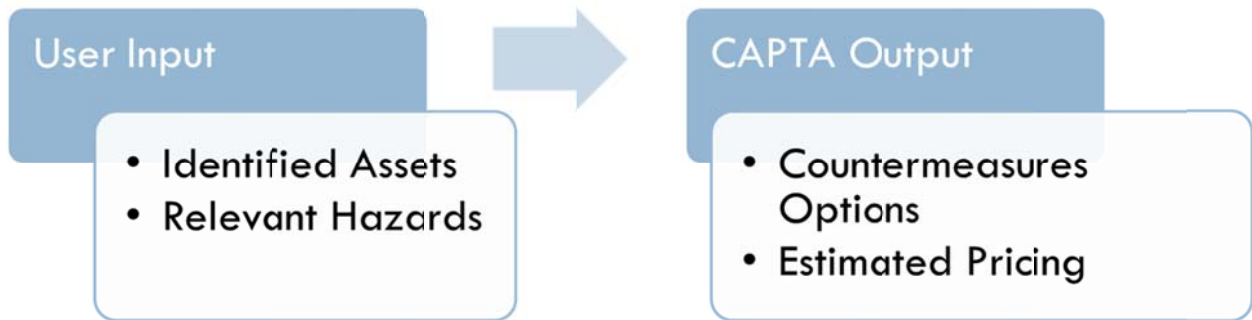


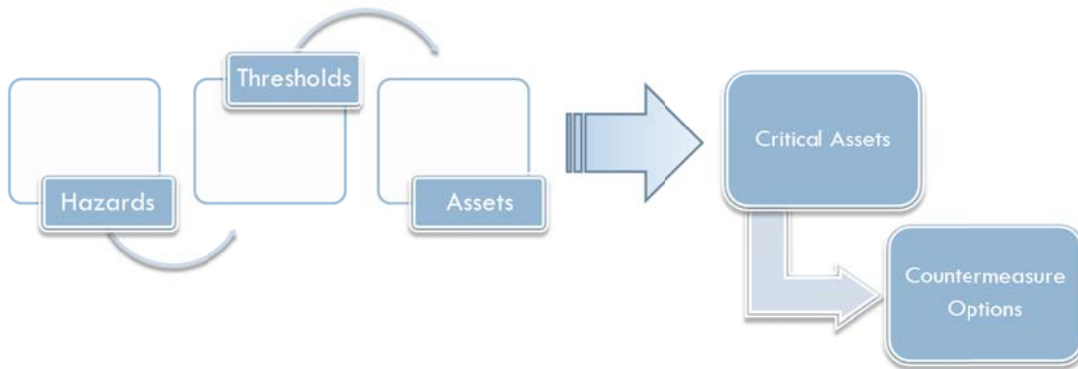
Appendix A: CAPTool Quick Start Guide

CAPTool Overview

In the simplest terms, CAPTool accepts user inputs about assets of interest and relevant hazards and helps planners and asset managers identify countermeasure options and cost estimate for implementing these countermeasures.



The CAPTool process, illustrated below, advances the user through a series of steps that capture relevant input provided by the user and choices made by the user, resulting in a list of selected countermeasures for assets of interest and an order of magnitude cost estimate for implementing these countermeasures.



BASIC Versus EXPANDED CAPTool PROCESS

In the Basic CAPTool process, users accept the default calculations, costs, and assumptions and can arrive at results quickly. Minimum data must be entered. The Expanded CAPTool gives users access to the variables in the entire process, including threshold values and costs of countermeasures, and allows the user to apply individual filters to countermeasure selection.

STEP 1. RELEVANT RISK SELECTION

ASSET CLASSES

- Road Bridges
- Road Tunnels
- Transit Rail Stations
- Transit Rail Bridges
- Transit Rail Tunnels
- Admin/Support Facilities
- Other

HAZARDS

Human Caused

- Small Explosives
- Large Explosives
- Chem/Bio/Rad
- Criminal

Technological

- Fire
- Impact Collision
- Deterioration
- HAZMAT

Natural

- Flood
- Earthquake
- Extreme Weather
- Mud/Landslide

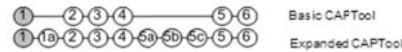
In STEP 1, users identify

- Hazards and threats
- Asset classes

Choose asset classes and hazards based on agency relevance. **SELECT "Y" for each asset class and hazard to include in the CAPTool analysis as illustrated below.**

USEFUL AGENCY INFORMATION

- Hazard maps, historical records and data, pertaining to experienced hazards and threats.
- Other events or disruptions to be included in the analysis such as extreme weather events or earthquakes.

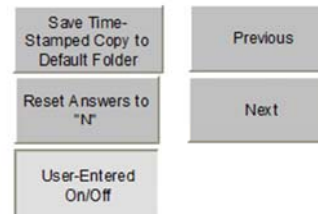


Identify Relevant Risks and Asset Classes

Instructions:

It is highly recommended that you save this as a new project. The "Save" button to the right will rename the file as a time and date-stamped copy to your default folder with the filename: "TransRiskManagementYYYY-MM-DD HH.MM.SS.xls"

For the asset classes of interest, please indicate the threats/hazards that you wish to include in your analysis by toggling the response from "N" to "Y" for each cell. Threat/hazard and asset combinations that are likely to result in serious loss will be considered in subsequent steps. When done, click "Next."



	Road Bridges	Road Tunnels	Transit/Rail Station	Transit/Rail Bridges	Transit/Rail Tunnels	Admin & Support Facilities	Ferry	Fleet
THREATS								
Small Explosives	Y	Y	Y	Y	Y	Y	Y	Y
Large Explosives	Y	Y	Y	Y	Y	Y	Y	Y
Chemical/Biological/Radiological	Y	Y	Y	Y	Y	Y	Y	Y
Criminal Acts	Y	Y	Y	Y	Y	Y	Y	Y
UNINTENTIONAL HAZARDS								
Fire	Y	Y	Y	Y	Y	Y	Y	Y
Struct. Failure	Y	Y	Y	Y	Y	Y	Y	Y
HAZMAT	Y	Y	Y	Y	Y	Y	Y	Y
NATURAL HAZARDS								
Flood	Y	Y	Y	Y	Y	Y	Y	Y
Earthquake	Y	Y	Y	Y	Y	Y	Y	Y
Extreme Weather	Y	Y	Y	Y	Y	Y	Y	Y
Mud/Landslide	Y	Y	Y	Y	Y	Y	Y	Y
ADDITIONAL								
User entered threat/hazard 1	N	N	N	N	N	N	N	N
User entered threat/hazard 2	N	N	N	N	N	N	N	N

CONSEQUENCE

An indication of negative effects from an event on assets of interest, typically people, structures, or equipment. Direct Consequences are loss of life, or injury, to a person or damage or destruction of property. Indirect consequences include adverse social, economic, or psychological effects resulting from an event.

THRESHOLDS

Potentially Exposed Population – number of people at risk, not estimate of actual casualties resulting from the hazard or threat.

Property loss –asset replacement costs.

Mission importance – loss of function and/or transport delays.

STEP 2. CONSEQUENCE THRESHOLDS

In STEP 2, users establish the consequence thresholds for each asset class related to level of risk to the population, property loss or service disruption. The choice of a threshold does not mean that losses below this level are unimportant or inconsequential; it means that losses below this level can be managed operationally and within the existing resources of the agency.

Select consequence thresholds for each asset class for:

- **Potentially Exposed Population**
- **Property Loss**
- **Mission Importance Functions**

The user can alter and adjust the threshold levels in subsequent iterations with the CAPTool to conduct a sensitivity analysis to determine how such changes might affect the number and types of assets that remain on the high consequence list.

USEFUL AGENCY INFORMATION

Agency specific threshold criteria – point that goes beyond the effects of routine disruptions and losses that current preparations and responses are designed to manage.

Establish Consequence Thresholds Instructions
For each asset class, set the appropriate thresholds. When done, click "Next." "Reset" sets all thresholds to their lowest levels.

Category	Critical Threshold	Explanation
ROAD BRIDGE	Potentially Exposed Population: 0 Property Loss: \$5,000 Mission Importance: Level I	Potential: exposed population threshold Replacement cost Den and percentile for ADT * Detour Length
	Level I: 20000 Level II: 50000 Level III: 241000	Restore Defaults The default threshold values for ADT * detour length are taken from the 75th, 85th, and 95th percentiles for the U.S. If these are inappropriate for your state, enter different values in the appropriate fields to the left.
ROAD TUNNEL	Potentially Exposed Population: 0 Property Loss: \$5,000 Mission Importance: Yes	Potential: exposed population threshold Replacement cost Do you consider all road tunnels to be mission critical?
TRANSIT/RAIL STATION	Potentially Exposed Population: 0 Property Loss: Yes Mission Importance: Yes	Potential: exposed population threshold Do you consider below-ground stations to be mission critical? Do you consider all transfer stations to be mission critical?
TRANSIT/RAIL BRIDGE	Potentially Exposed Population: 0 Property Loss: \$5,000 Mission Importance: 0	Potential: exposed population threshold Replacement cost What % of ridership does a bridge need to serve in order to be mission critical?
TRANSIT/RAIL TUNNEL	Potentially Exposed Population: 0 Property Loss: \$5,000 Mission Importance: 0	Potential: exposed population threshold Replacement cost What % of ridership does a tunnel need to serve in order to be mission critical?
ADMIN & SUPPORT FACILITIES	Potentially Exposed Population: 0 Property Loss: \$5,000 Mission Importance: Yes	Potential: exposed population threshold Replacement cost Do you consider all administrative and support facilities to be mission critical?
FERRY BOATS	Potentially Exposed Population: 0 Property Loss: \$5,000 Mission Importance: Yes	Potential: exposed population threshold Replacement cost Do you consider all ferry boats to be mission critical?
TRANSIT FLEETS	Potentially Exposed Population: 0 Property Loss: \$5,000 Mission Importance: Yes	Potential: exposed population threshold Replacement cost Do you consider all transit fleets to be mission critical?

STEP 3. DESCRIBE ASSETS/ASSET CLASS INVENTORY

ASSET CLASSES

- Road Bridges
- Road Tunnels
- Transit Rail Stations
- Transit Rail Bridges
- Transit Rail Tunnels
- Admin/Support Facilities
- Other

In STEP 3, users enter all the assets and asset classes to be considered by the CAPTool into the appropriate transportation mode sheet. The modes are those selected in Step 1.

For each asset class (on separate spreadsheets per asset class) enter the assets or groups of assets into the spreadsheet.

The inputs for road bridges/tunnels contain a user input for cable stay and suspension bridges. These highly individual structures require specific replacement cost data. Note that buildings are only critical if the user marks them as such in the last column.

Once the data for each asset class has been entered, click CALCULATE CRITICALITY. CAPTool then calculates which of the assets/asset classes exceed the thresholds chosen by the user.

The screenshot displays the CAPTool interface for Step 3. It includes a navigation menu at the top, a 'Specified Thresholds' table, a 'ROAD BRIDGES' spreadsheet, and a 'CRITICALITY' page.

Specified Thresholds:

Specified Thresholds	Value
Potentially Exposed Population	25
Property Loss	\$5
Mission Importance	Le

ROAD BRIDGES Spreadsheet:

Asset ID	Quantity	ADT	Length (ft)	Lanes	Detour (mi)	Replacement Cost Per Asset (Optional)	Manually mark as critical
Bridge 1	2	2000	5000	8	50		No
Bridge 2	3	2000	3000	2	50		No

CRITICALITY Page:

Potentially Exposed Population	Property Loss	Mission Importance	Manual Override
Y	Y	Y	

USEFUL AGENCY INFORMATION

Road Bridges/Tunnels

- Annual average daily traffic (ADT)
- Length & Number of Lanes
- Detour mileage
- Type of construction material
- Cable stay or suspension?

Transit Bridges & Tunnels

- Maximum car occupancy
- Type of construction material (steel vs. concrete)
- Square footage

Transit/Rail Stations

- Maximum occupancy
- Above or below grade indicator
- Transfer point indicator

Administration & Support Facilities require:

- Square footage & Maximum occupancy
- Replacement cost

Ferries

- Maximum occupancy & Maximum number vehicles loaded

Fleets

- Maximum number of vehicles & Maximum occupancy
- Replacement cost of individual vehicles

STEP 4. CRITICAL ASSETS DISPLAY

ASSET CLASSES

- Road Bridges
- Road Tunnels
- Transit Rail Stations
- Transit Rail Bridges
- Transit Rail Tunnels
- Admin/Support Facilities
- Other

HAZARDS

Human Caused

- Small Explosives
- Large Explosives
- Chem/Bio/Rad
- Criminal

Technological

- Fire
- Impact Collision
- Deterioration
- HAZMAT

Natural

- Flood
- Earthquake
- Extreme Weather
- Mud/Landslide

In STEP 4, the user views the “high consequence” assets arrayed against the hazards and threats to which they are vulnerable.

CAPTool has combined results from steps 2 and 3 to identify the assets and asset classes that exceed one or more consequence threshold. These assets and asset classes are presented in columns on the same page as the rows of hazards and threats, located in the first column.

USEFUL AGENCY INFORMATION

Critical agency specific assets not listed using the current CAPTool threshold criteria to be included as either a manual override or by adjusting threshold criteria. designed to manage.

		Basic CAPTool		Expanded CAPTool												
		1	2	3	4	5	6	1	1a	2	3	4	5a	5b	5c	6
CRITICALITY	Potentially Exposed Population		Y	Y	Y	Y	Y									
	Property Loss			Y	Y	Y	Y									
	Mission Importance															
	Manual Override	Y										Y				
RELEVANT THREATS/HAZARDS	Small Explosives															
	Large Explosives	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Chemical/Biological/Radiological	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Criminal Acts	X														
	Fire	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Struct. Failure	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	HAZMAT	X														
	Flood															
	Earthquake	X	X	X	X	X	X	X	X	X	X	X				
	Extreme Weather	X			X	X	X	X	X	X			X	X	X	X
	Mud/Landslide	X			X	X	X									
	User entered threat/hazard 1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	User entered threat/hazard 2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

STEP 5. COUNTERMEASURE OPPORTUNITIES

In Step 5, CAPTool displays the potentially effective countermeasures that have been deemed appropriate and likely to assist in mitigating the consequence to the specific asset or asset class for the selected hazards.

The options are shown using a color code to indicate countermeasures considered to be highly or moderately effective: gold for high effectiveness, yellow for medium effectiveness.

For each asset, enter the quantity of potential countermeasure you want to include in the budget analysis. If you want to examine an asset in further detail, set the asset and click on the ANALYZE ASSET button.

ASSET CLASSES

- Road Bridges
- Road Tunnels
- Transit Rail Stations
- Transit Rail Bridges
- Transit Rail Tunnels
- Admin/Support Facilities
- Other

HAZARDS

Human Caused

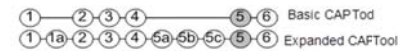
- Small Explosives
- Large Explosives
- Chem/Bio/Rad
- Criminal

Technological

- Fire
- Impact Collision
- Deterioration
- HAZMAT

Natural

- Flood
- Earthquake
- Extreme Weather
- Mud/Landslide



Select Candidate Countermeasures
Instructions
 The following is a list of countermeasure opportunities for each critical asset – orange indicates medium effectiveness and red indicates high effectiveness.

To analyze an asset more closely, click on the name of the asset in row 15, and then click "Analyze Asset." A new sheet will pop up that details the effectiveness of the countermeasure against every relevant threat and hazard. The sheet will also tell you how many units of countermeasures you have selected so far for the asset, and the estimated cost.

To add units of countermeasure, enter the desired number of units into any cell. Alternatively, the "Analyze Asset" sheet also has a field for adding units of countermeasure.

When you are satisfied with your CM allocation, click "Continue."

Analyze Asset Filter Countermeasures
 Clear All Countermeasure Quantities Next

Color Key Medium Effectiveness High Effectiveness

		Road Bridges					Road Tunnels					
		Fair St. Bridge	Peck Bridge	Broad Bridge	Shaw Bridge	High Bridge	Little River Bridge	McDonald Bridge	Walker Tunnel	Downtown	Past Road Bridge Tunnel	Woodbury Bridge Tunnel
Physical Security Countermeasures	Lighting	2	2	22	2	2	22	2	2	2	2	2
	Barriers & Berms											
	Fences											
	CCTV											
	Intrusion Detection Devices											
Access Control Countermeasures	Physical Inspection of asset											
	ID Cards											
	Biometrics											
	Background Checks											
	Metal Detectors											
	Restricted Parking											
	Random Inspections	1	1	1	1	1	1	1	1	1	1	1
	Visible Badges											
	Limited Access Points											
	Visitor Control & Escort											
Asset Design/E	Locks											
	Explosive Detection											
	Establish Clear Zones											
Operational Countermeasures	Visible Signs											
	Seismic Retrofitting											
	Fire Detection & Suppression	1	1	1	1	1	1	1	1	1	1	1
	Encasement, Wrapping, Jacketing											
	Patrols											
	WX/Seismic Information											
	Intelligence Networking											
	HAZMAT Mitigation											
	Security Awareness Training											
	Emergency Response Training											
	Emergency Evacuation Planning											
	Planned Redundancy (e.g., detours)											
	Public Information and Dissemination											

STEP 6. RESULTS SUMMARY

In STEP 6, CAPTool provides the user with a one-page summary of consequence- based results and countermeasure combinations across multiple modes of transport. The summary is provided by asset category with optional spreadsheets available for individual assets.

SAVE RESULTS OPTIONS

Save Results Only – Saves results of Summary Report.

Save Time-Stamped Copy - Saves copy

1 2 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 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

Basic CAPTool
 Expanded CAPTool

Return to Beginning
 Edit Countermeasure Selection
 Save Results Only
 Save Time-Stamped Copy to Default Folder

Report Date and Time:
 9/19/2008 21:00

Summary Report
 Click Heading for Detailed Expenditure Report

	Road Bridges	Road Tunnels	Transit/Rail Stations	Transit/Rail Bridges	Transit/Rail Tunnels	Admin & Support Facilities
Relevant Risks						
Small Explosives			X			X
Large Explosives	X	X	X	X	X	X
Chemical/Biological/Radiological	X	X	X	X	X	X
Criminal Acts	X	X	X	X	X	X
Fire	X	X	X	X	X	X
Wreck/Failure	X	X	X	X	X	X
HAZMAT	X	X	X	X	X	X
Flood	X	X	X	X	X	X
Earthquake	X	X	X	X	X	X
Extreme Weather	X	X	X	X	X	X
Wreck/Inside	X	X	X	X	X	X
User entered threat at hazard 1	X	X	X	X	X	X
User entered threat at hazard 2	X	X	X	X	X	X
Thresholds						
Potentially Exposed Population	Persons	Persons	Persons	Persons	Persons	Persons
	200	101	100	200	200	101
Priority Loss	Damage	Damage	Below Ground Stations Capable	Damage	Damage	Damage
	\$101,699,661	101,699,661	Yes	\$100,004,750	100,004,750	\$101,699,468
Mission Importance	ADOT - Demand Length Demand Percentile II	Road tunnels critical?	Transit Stations Critical?	% of relevant threats causes mission criticality	% of relevant threats causes mission	Facilities critical
		No	Yes	20	20	No
Counts						
# of Unique Critical Assets	7	4	0	0	0	10
# of Unique Countermeasures	3	3	0	0	0	0
Total # of Countermeasures	68	16	0	0	0	0
Expenditures						
Physical Security Countermeasures (100)	\$610.2	\$90.4	\$0.0	\$0.0	\$0.0	\$0.0
Access Control Countermeasures (100)	\$210.0	\$120.0	\$0.0	\$0.0	\$0.0	\$0.0
Asset Design/Engr Countermeasures (100)	\$3,219.9	\$1,840.0	\$0.0	\$0.0	\$0.0	\$0.0
Operational Countermeasures (100)	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Other Countermeasures (100)	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Total Countermeasure Expenditures (100)	\$4,040.1	\$2,050.4	\$0.0	\$0.0	\$0.0	\$0.0
Totals						
Physical Security Countermeasures	\$720,600					
Access Control Countermeasures	\$330,000					
Design/Engr Countermeasures	\$5,029,912					
Operational Countermeasures	\$0					
Other Countermeasures	\$0					
Overall Total	\$6,090,501					

