CAMBRIDGE SYSTEMATICS



TransCAD and the SCAG Model

presented to Caltrans District 7 presented by Cambridge Systematics, Inc. Chao Wang, Sean McAtee

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Installing & Running the SCAG Model



Preparing a Computer

TransCAD 6.0,

- » build 9215 or later
- » 64-bit version required

Also install 32-bit for GIS and Office compatibility!

- » TransCAD 7 not supported (yet)
- Minimum System Requirements
 - » 24 GB RAM
 - » 12 CPU cores
 - » 500 GB free on system drive (C:\ Drive)
 - » 800 GB free on model run drive (e.g., D:\ Drive)
 - » 360 GB for model run storage



Requesting the SCAG Model

- Request the model from SCAG
 - » Go to:

http://www.scag.ca.gov/DataAndTools/Pages/Docu ments.aspx

- » Download the Model Data Request Form
- » Fill out and submit as instructed
- Cheryl Leising may be able to provide a Word version that is easier to fill out



Installing the SCAG Model

- Install the User Interface (UI)
 - » Follow Instructions provide by SCAG
 - memo model installation v6.3.doc
 - » You may need administrator privileges
- Copy the model data and model table
 - » Place in a user-specified location
 - Example: D:\SCAG
 - » One directory for each scenario
 - Example: 16R16s3_set7_setting
 - » Model table with scenario information
 - Example: SCAGModelv63q.bin



See Handout





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- Start the Add-In
 - » Tools → Add-Ins → SCAG Model v 6.3
- Setup a Scenario
 - » Click "Setup"
 - » Find the scenario to run
 - Example: 16R16s3
 - Make a copy or work in place But KEEP TRACK
 - » Set the correct directory on your system
 - Check to make sure Input files are shown as "Exists"
 - » Click 'OK' (be patient while the system responds)

Model Scenario Manager									
Scenario 40s3b set7 mar cln 19s3tcm set7 21s3tcm set7 31s3tcm set7 16R16s3_test	Folder D:\Da D:\Da D:\Da D:\Da D:\SC	r sta1\16R40s3b_set7_mar_cln\ sta1\16R19s3tcm_set7\ sta\16R21s3tcm_set7\ sta1\16R31s3tcm_set7\ cAG\16R16s3_set7_setting\	Date Sun I Sat M Sat M Sat M Tue S	Mar 06 201 Mar 12 2014 Mar 12 2014 Mar 12 2014 Sep 20 201	^	Steps Initialization Network Skimming Trip Generation Trip Distribution Modal Split PA to OD Assignment	^ ~ ~		
Scenarios Input Hies Name Highway Master DB Transit RS TAZ_DB CSA_Geography C	Output	t Files Parameters Path networks\Inputs\16r16p_links networks\Inputs\16r16p_route Geography\TAZ_t2.dbd Geography\CSA.dbd	.dbd es.rts	Status Exists Exists Exists Exists Exists	Des Higi Trai TA2 CS/	scription hway network database nsit Route System Z Geography File A Geography File	< <		
Change File	Chan	nge Folder Open			Oł	K Cancel			



Scenarios

- » Manage scenario list
- » Enter a description



cenario	Folde	r	Date			Steps		
0s3b set7 mar cln	D:\Da	ta1\16R40s3b_set7_	mar_cln Sun N	/lar 06 201	.6 (1	Initialization		
8s3 set7	D:\DA	TA\16R18s3_set7\	Fri M	ar 25 2016	i (19	Trip Generation	,	
22s3 set7	D:\DA	TA\16R22s3_set7\	Fri M	ar 25 2016	(20	Trip Distribution		
25s3 set7	D:\DA	TA\16R25s3_set7\	Fri M	ar 25 2016	(20	PA to OD		
l6R16s3_set7_run_cs	C:\SC	AG Training\16R16	s3_set7_: Tue S	ep 20 201	6 (1)	Assignment		
Scenarios Input File	s Dut	out Files Paramete	ers				_	
Name		Path		Status	Descripti	ion	_	
Highway Master DB		networks\Inputs\1	6r16p links.db	Exists	Highway	network database C)r	
Transit RS		networks\Inputs\1	6r16p routes.rl	Exists	Transit R	oute System	-	
TAZ_DB		Geography\TAZ t2.dbd		Exists	TAZ Geography File			
CSA_Geography		Geography\CSA.dbd		Exists	CSA Geography File			
County_Geography	ounty Geography Geography\SCAG County		County.dbd	Exists	County Geography File			
RSA_Geography	eography Geography\RSA.dbd			Exists	RSA Geo	graphy File	-	
District_Geography		Geography\SCAG_	Districts.dbd	Exists	District Geography File			
Speed Table		networks\Inputs\s	peed_table.bin	Exists	Link spe	ed lookup table	-	
Capacity Table		networks\Inputs\c	ap_complex.bi	Exists	kists Link Capacity lookup table			
VDF Table		networks\Inputs\v	df_table.bin	Exists	VDF Para	meters lookup table	-	
MMA Counts Table		networks\Inputs\Screenline_35.b		Exists	Table of screenline traffic cou		ui	
Transit Speed Curve Table netw		networks\Inputs\SpeedCurve.bin		Exists	Auto-to-Transit Speed Curve		1	
Transit Speed Curve Lookuj networks\Inputs\SpdCu			pdCurveLkup.l	Exists	Area-Facility Type Transit Spe			
Mode Table networks\Inputs\modes_networks		nodes_new.bin	Exists	transit mode table				
Mode Xfer Table networks\Inputs\modes_xf		nodes_xfer_nev	Exists	transit m	ode transfer table			
Fare Links Table networks\Inputs\linkfares.b			nkfares.bin	Exists	Link fare	s for mode 12		
Fare Matrix networks\Inputs\farematrix				Exists	Fare Mat	rix for Metrolink and	Π	

Input Files

- » Varies by step
- » List input files
- » Rarely changed, but serves as a good reference
- » You could change filenames, but need to make sure valid files exist



lodel Scenario Manage	er							
Scenario	Folder		Date			Steps		-
40c2h cet7 mar cln	Div Data1\16P40c2	-' ata1\16R40s3h_set7_mar_cln_0		Sup Mar 06 2016 /1		Initializa	ation	
10-2+7	D.\DATA\16018-3		Eni Ma	- 25 2016	1) 0.	Networ	k Skimming	
1853 set/	D:\DATA\10K18s	s_set/\	Fri Ivia	ir 25 2010	(19	Trip Ge	neration	
22s3 set/	D:\DATA\16R22s	3_set/\	Fri Ma	r 25 2016	(20	Modal 9	tribution Split	
25s3 set7	D:\DATA\16R25s3	3_set7\	Fri Ma	r 25 2016	(20	PA to O	D	
16R16s3_set7_run_cs	C:\SCAG Training)\16R16s3_set7_:	Tue S	ep 20 201	6 (1)	Assignr	nent	
Scenarios Input Files	Output Files	arameters						
Name	Path			Status	Descript	ion		*
Highway AM Net	networks\(Dutputs\hnet_an	n.net	Missing	Highway	network	file	
Highway MD Net	networks\(Outputs\hnet_m	d.net	net Missing Hig		Highway network fil		
Highway PM Net	networks\(networks\Outputs\hnet_pm.net		Missing	Highway network file		file	Ε
Highway EVE Net	networks\0	networks\Outputs\hnet_eve.net		Missing	J Highway network file			
Highway NT Net	networks\0	networks\Outputs\hnet_nt.net		Missing	Highway	network	file	
Highway DB	networks\0	Outputs\scag_ne	twork	Missing	Highway	network	database woi	
Transit DB	networks\0	networks\Outputs\scag_netwo			Highway network database			
Transit PK Net	networks\0	Dutputs\tr_pk.tn	w	Missing	transit A	M netwo	rk file	
Transit OP Net	networks\(Outputs\tr_op.tn	w	Missing	transit M	lid-day n	etwork file	
Network Lane Miles A	M Networks	Reports\Network	k_Lane	Missing	AM Netv	vork Lane	e Miles by Faci	
Network Lane Miles P	M Networks	Reports\Networl	k_Lane	Missing	PM Netv	vork Lane	Miles by Faci	
Network Lane Miles N	/ID Networks\I	Reports\Networl	k_Lane	Missing	MD Netv	vork Lane	e Miles by Faci	
Network Lane Miles E	VE Networks\	Reports\Networl	k_Lane	Missing	EVE Netv	vork Lane	e Miles by Faci	
Network Lane Miles N	IT Networks\	Networks\Reports\Network_I		Missing	g NT Network Lane Miles by		Miles by Faci	
Network Capacity Mil	les Alv Networks\	Reports\Network	k_Capi	Missing	AM Netv	vork Cap	acity Miles by	
Network Capacity Mil	les PN Networks\I	Reports\Networl	k_Capi	Missing	PM Netv	vork Capa	acity Miles by	
Network Capacity Mil	les MI Networks\I	Reports\Network	k_Capi	Missing	MD Netv	vork Cap	acity Miles by	
Network Capacity Mil	les EVI Networks\I	Reports\Networl	k_Capi	Missing	EVE Netv	vork Cap	acity Miles by	-
Change File	Change Folder	Open		ſ	0	(Cancel	

Output Files

- » Varies by step
- » List output files
- » Never changed, but serves as a good reference
- Status changes from Missing to Exists when the model is run



OK

Cancel

cenario	Folde	r	Date 🔺		Steps Initialization			
0s3b set7 mar cln	D:\Da	ta1\16R40s3b_set7_mar_cln	Sun Mar 06 2016 (1					
18s3 set7	D:\DA	TA\16R18s3_set7\	Fri Mar 25 20	016 (19	Network Skimming			
22s3 set7	D:\DA	TA\16R22s3_set7\	Fri Mar 25 20	016 (20	Trip Distribution			
25s3 set7	D:\DA	TA\16R25s3_set7\	Fri Mar 25 20	016 (20	Modal Split			
16R16s3_set7_run_cs	C:\SC	AG Training\16R16s3_set7_!	Tue Sep 20 2	2016 (1)	PA to OD Assignment			
Scenarios Input File	s Out	put Files Parameters						
Name		Value		Description				
Initial Time Option		1		1 = Use Obs	: Use Observed Time, 2 = Use Cong			
HSR Flag		1		lag to activate HSR mode for skim				
Shuttle Flag		1		Flag to activ	ate shuttle mode for HSR			
Internal Zones		11267		Internal Nur	mber of Zones			
External Zones		4149		External Nu	mber of Zones			
Air and Port Zones		4192		Final zones	including air and port zon			
Walk Speed		2.5		Walk Speed in mph				
Minimum Walk Time	2	2		Minimum centroid walk time				
Auto Operating Cost		24.92		Auto Opera	ting Cost in Cents/Mile			
Freeway Free Speed A	Additic	5		Speed to ad	d to Posted Speed to estin			
AOC Toll Diversion		24.92,24.92,24.92,24.92,24.92	2	Auto Operating Cost for AM, MD, PM				
Value of Time		9.84		Value of time in Dollars/Hour				
Intrazonal Neighbors	;	1		Number of Intrazonal Neighbor				
Intrazonal Factor	trazonal Factor 0.5			Intrazonal F	actor to calculate Intrazon			
Wait Step Decrement	t	1		Denominato	or decrement in step funct			

Parameters

- » Varies by step
- » List output files
- » Rarely changed and always with extreme caution
- Only change with guidance from the User's Guide, SCAG, or Caliper



The Model Table

- Stores information from the scenarios
- In-Program Demo



Different Run Types

	Feedback	One Loop	Assignment
Run Time	7-10 Days	1-2 Days	< 1 Day
When to Run	 To generate original SCAG model results To test large system wide network changes To test any SED changes To produce a final model dataset after alternatives analysis 	 To test the impacts of small to moderate changes on mode choice This method will reduce but not eliminate oscillation noise Usually only run when we need to understand 	 To test the impacts of small to moderate changes on roadway volumes This method will nearly eliminate oscillation noise

Running for Scenarios

One-Loop Run

- » Run one complete feedback loop, starting with final loop from a full model
- » Can be useful for:
 - Large roadway and/or transit scenarios
- » Comparing directly? Run a 6th loop baseline as well
- Quick Run with network changes only
 - » Trip tables and mode choice does not change
 - » Can be useful for:
 - Testing roadway network changes
 - Running assignment again with select link / zone analysis



Running the SCAG Model

Full Feedback Run

- » Set the model to run "Feedback"
- » Leave starting and ending loops at 1 and 5
- » Make sure the computer can run for 6 to 10 days without interruptions
- » Click 'Initialization'

SCAG	S Planning Model 🛛 🗙
	R
Scenarios 21s3tcm set7 21s2tem set7	<u> </u>
16R16s3_test	×
	Setup
Regional Model (Dnly
Region	
Simple Interface	Advanced Interface
Run	laan @ Eaadhaak
Dry Run	Starting Loop 1 V
Convergenc	e Ending Loop 5 V
20	
	I rip Generation
	Trip Distribution
	Modal Split
	PA to OD
	Assignment
	Utilities
	Model Table
	Quit
	Guit

One Loop Run

- ➤ Copy your entire model scenario folder
 » e.g., 16R40s1_set7_setting → 16R40s1_set7_setting_alt1
- Copy the scenario from the scenario manager and point the new scenario to the new folder
- Modify the inputs
 - » Highway network file
 - » Route system File

See network editing module

- » Socioeconomic Data
- Run the Check Network Attributes utility
- Run the Mergenet Run utility
 - » This merges speed feedback results with the modified network



One-Loop run

Edit the scenario (click Setup)

- » Set the Initial Time Option to a value of 2
- » Click OK

Model Scenario Manager									
Scenario 40s3b set7 mar cln 19s3tcm set7 21s3tcm set7 31s3tcm set7 16R16s3_test Scenarios Input Files	Folder D:\Data1\16R40s3b_set7_mar_cln\ D:\Data1\16R19s3tcm_set7\ D:\Data\16R21s3tcm_set7\ D:\Data1\16R31s3tcm_set7\ D:\SCAG\16R16s3_set7_setting\ Output Files	Date ^ Sun Mar 06 201	Steps Initialization Network Skimming Trip Generation Trip Distribution Modal Split PA to OD Assignment	< >					
Name	Value	Descrip	otion	^					
Initial Time Option	2	1 = Use	1 = Use Observed Time, 2 = U						
HSR Flag	+	Flag to	activate HSR mode for						
Shuttle Flag	1	Flag to	activate shuttle mode fc						
Internal Zones	11267	Internal	Number of Zones	<u> </u>					
	4140	F.	INI I 7 7	Ť					
		OI	K Cancel						



One-Loop run

Set the dialog box to:

- » Run Feedback
- » Run loop 6 to 6 (Be careful the dropdowns can change unexpectedly)
- Click the <u>k</u> button next to Initialization
 - » Set steps as shown
 - » Click OK



SCAG	9 Planning Model	×
Scenarios		_
21s3tcm set / 31s3tcm set 7	-	-
I6R I6s3_test		×
	Setup	
Regional Model C	Dnly	
Hegion		
Simple Interface	Advanced Interface	_
Run		-1
⊖ Stage (O Loop • Feedback	┥
	e Ending Loop 6	4
Convergence		
	Initialization	
💼 > 🚍	Network Skimming]
	Trip Generation]
- XX	Trip Distribution	
	Modal Split	
	PA to OD	
	Assignment]
	Utilities	
	Model Table	
	Quit	

One-Loop run

- Click the Initialization button to start the run
 - » This should take about a day to complete
- Did you get an error??
 - » Try closing and restarting TransCAD, then picking up where you left off.
 - » Always double-check feedback settings and active steps before starting a run



Assignment: Network Change

- Copy your entire model scenario folder
 - » Alternate: Just backup the original networks and assign folders
- Modify the input highway network file
 » Remember: keep the route system up to date!
- Run the Check Network Attributes utility





Assignment : Network Change

- Double-check the scenario setup. Change directory or filenames if needed
- Set the model to run only a single stage
- Click 'Initialization'
- When asked if you want to delete all files, click 'No'



Assignment : Network Change

- When initialization completes, click on the solution next to assignment
 - » Set steps as shown
 - » Click OK
- Click 'Assignment' to run traffic assignment
 - » This will take several hours





Map Basics: Visualizing



Working with Layers

- Start by opening a map <u>or</u> a geographic (dbd) layer file
 - » Opening a layer will create a new map and add the layer
 - » Opening a map will load all saved layers, settings, etc.
- Access layers with the layers dialog box (#)



Working with Layers

The Layers Dialog ()





Working with Layers

Layers are drawn from TOP to BOTTOM





Display Manager

- \rightarrow Activate from Map \rightarrow Display Manager
- Quick access to layers, settings, etc.
 - » Right-click for more settings, including make working layer



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Color Theme



Creating Maps

- Create a new map by opening a Geographic File (*.dbd)
- Add more layers if desired
 - » 🛃 then 🛛 Add Layer
- Choose the active layer
 - » Use the dropdown selector
 - » Or use the display manager

File	Edit	t N	Лар	Dat	aview	Selection	Tools	Pr	oceo	lure
D	2			•	TAZ_t1			-		
7.	۳.	ъ	Ъ	₹ ¶	TAZ_t1	links			ø	
.	Map	1 - ~	iz49		toriop.					

- Change the "default" styles for the layers
- Hide or show layers
 - » 🚘 or the display manager



Color and Pattern Themes

- Set feature colors and styles based on attributes
 - » Color Themes () are often used to display facility type on a roadway network
 - » Pattern Themes (Map → Pattern Theme...) is sometimes used to display number of lanes on a roadway network


Color and Pattern Themes

The Settings Tab

olor Theme (Li Settings Styl	es	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
General		
Field	[Road Type]	Save
Method	List of Values	Load
Max Classes	512 2 -	Recalculate
Ignore value Std. Dev. p Brea Trea	er class	above
√ Rou	nd off the values in each c	lass
Incl	ude counts in legend	
ОК	Cancel Apply	Remove Customize

- 1. Choose a field to represent
- 2. Choose a method to create categories and number of classes
- * Use the Load and Save buttons to store and recall settings
 - This is a huge time-saver!



Color and Pattern Themes

The Styles Tab

Color Theme (Layer: 16r16p_links)	8
Settings Styles	
Choose a class	\frown
Other Style)
Centroid Connector	
Copy Pa	ttern
HOT Interstate	ext
HOV Other	
HOV - Interstate	
HOV - Limited Access	
HOV Interstate	
Legend Text	
Centroid Connector 2	
Color Sets	
<< Previous Next >> Swap Start and End	
From to via	•
OK Cancel Apply Remove Cust	tomize

- 1. Choose a style for each class
- 2. Select a legend text for each class
- 3. Choose from predefined color settings if desired



Functional Class

	Primary Facility Type	S	econdary Facility Type		Primary Facility Type		Secondary Facility Type
1	Freeways	10	Freeway	7	Minor Collector	70	Undivided
2	HOV	20	HOV 2			71	Divided
		21	HOV 3+			72	Continuous Left Turn
		22	HOV - HOV Connector			73	Posted Speed 25
3	Expressway / Parkway	30	Undivided			74	Posted Speed 15
		31	Divided, Interrupted	8	Ramps	80	Freeway to Freeway Connector
		32	Divided, Uninterrupted			81	Freeway to arterial
4	Principal Arterial	20	Undivided			82	Arterial to freeway
		41	Divided			83	Ramp Distributor
		42	Continuous Left Turn			84	Ramp from Arterial to HOV
5	Minor Arterial	50	Undivided			85	Ramp from HOV to Arterial
		51	Divided			86	Collector distributor
		52	Continuous Left Turn			87	Shared HOV Ramps to MF
6	Major Col lector	60	Undivided			88	Truck only
		61	Divided	9	Trucks	90	Truck only
		62	Continuous Left Turn	10	D	100	Centroid Connector - Tier 1
		10	طما	20	0	200	Centroid Connector - Tier 2

Source: SCAG Model Documentation, Appendix A



Functional Class

Two Digit FT Codes

- » Contained in AB_Facility_Type and BA_Facility_Type
- » Difficult to use for map editing setup (too many details)
- One Digit FT Codes
 - » Not stored on the network
 - » Can be computed

```
MAP_FT:

if (AB_Facility_Type = 100 or BA_Facility_Type = 100) then 100 else

if (AB_Facility_Type = 200 or BA_Facility_Type = 200) then 200 else

if (AB_Facility_Type = 999 or BA_Facility_Type = 999) then 999 else

if (AB_Facility_Type > 0) then s2i(left(string(AB_Facility_Type), 1))

else s2i(left(string(BA_Facility_Type), 1))
```

Note: We will discuss formulas in more detail in a later section

TransCAD Formulas.txt



Practice 1: Create a color theme for line layer using IFC field

- 1. Open the SCAG Network File (16R16pl_links.dbd)
 - ✓ File→Open, then in the file type dropdown next to 'File name:' select Geographic File(*.cdf,.*dbd) option
 - Browse to the location/folder where the geographic file is located and select the 'abmload.dbd' and click 'Open' button
- 2. Add the MAP_FT Formula Field
 - ✓ Dataview→Formula Fields
 - Open TransCAD Formuals.txt in notepad, then copy the MAP_FT formula
 - Paste the formula and name the formula MAP_FT
 - Click OK

3.

- On the top ribbon, click it is called '
 - it is called 'color theme map wizard'
- 4. It opens up a dialog box with two tabs. In the first tab 'Settings' tab:
 - Select the MAP_FT from the 'Field' drop down options
 - Select the 'List of Values' from the 'Method' drop down options
 - Max. Classes: Use the default value (512)
- 5. Go to the 'Styles' tab
 - Observe the default styles
 - <u>Optional:</u> Set a preferred style for each facility type (we will use a shortcut)
- 6. Go back to the Settings tab, click the Load button.
 - ✓ Choose From Settings File
 - Browse to and select SCAG Training\Settings.stg
 - ✓ Choose MAP_FT and click OK
 - Click OK again to complete the color theme dialog box
- 7. Save the settings (optional, method 1) Skip this step in training.
 - ✓ Tools \rightarrow Geographic Utilties \rightarrow Geographic file
 - Click Save Settings
- 1. Save the settings (optional, method 2) Use this method in training.
 - File –Save As
 - Save a Map file that you can open later with the settings applied

ſ	Formula (Dataview: 16r16p_links)		23
	if (AB_Facility_Type = 100 or BA	_Facility_Type = 100) then 100	ОК
	if (AB_Facility_Type = 200 or BA	_Facility_Type = 200) then 200	Cancel
	if (AB_Facility_Type = 999 or BA	BA_Facility_Type = 999) then 999 s2i(left(string(AB_Facility_Type),	Delete
	else if (AB_Facility_Type > 0) then s2		Verify
	1)) else s2i(left(string(BA_Facility_T	ype), 1))	Node Fields
	Formula Builder	Formula Fields	Sum Fields
	Field List 👻	MAP_FT -	Save
	Operator List 👻	Previous Formulas	Load
	Function List		•
	Values		
r Theme (Layer: 167)	16p_links)		
tings Styles General Field MAP_FT Method List of V Jay Classes 512	r → Save alues → Load		
Options Inore values below	or above		
Std. Dev. per class			
Break at			
Treat zeros a Round off th	s missing values e values in each class		
Include cour	nts in legend		
OK Cancel	Apply Remove Customize	CAMBRIDGE SYSTEMA	

41





- Labels () can be used to show things including:
 - » Traffic Volumes
 - » Number of Lanes
 - » Centroid Numbers
 - » SED/Land Use Data



Labels can be set differently for different selection sets



The Labels Tab

Labels (Layer: 16r16p_links)				
Labels Overlaps Background Callouts				
General				
Field [AB_AMLANES / BA_AMLANIS]				
Position Centered above Load				
Rotation Along line features				
Smart Alignment Stretch Skip Partial Labels				
Allow Duplicates Spacing 0 Inches				
Limit Lines to Characters				
Do not display on the map				
Font				
@SimSun-ExtB Size 12 3				
Agency FB Aharoni Color				
Algerian				
Andalus Format Default -				
Angsana New Line Height 100 🚔 %				
Aparajita				
Arabic Transparent				
Arial le Shows what Label Text will				
OK Cancel Apply Remove				

1. Select the field to use for labels

- 2. Set label placement options
 - » Note the "Allow Duplicates" checkbox

3. Set the label style options



The Overlaps Tab

Labels (Layer: abmload_byr)	
Labels Overlaps Background Callouts	
Overlaps	
Alt. Field None 👻	
Layer Priority 7 (Low)	
Within the layer based on Higher 👻	
values of Length 💌	
Autoscale	
Current Scale 1:611 Clear	
Largest -	
Smallest 👻	
OK Cancel Apply Rem	nove

- Overlapping labels can be allowed if desired
- Different layers can have different priorities
- Autoscale can turn labels on and off automatically



The Background Tab

Labels (Layer: abmload_byr)				
Labels Overlaps Backgr	round Callouts			
Туре	-			
© None	Interstate			
Shadow Halo Frames	Interstate			
Shields	Interstate			
	Interstate			
	Interstate			
	Business Loop/Spur			
	· · ·	-		
OK Cancel	Apply Rem	iove		

Shadows, halos, frames, or shields can be added to labels to create better looking and more informative maps



The Callouts Tab

abels (Layer: abmlo	oad_byr)		X
Labels Overlaps	Background	Callouts	
		Style	
		<u>W</u> idth Hairline	-
		→	
ОК	Cancel	Apply	Remove

Set the default callout style to use when labels are manually repositioned



Practice 2: Add number of lanes labels

TIP

Right click on the gray area of the layout and print to pdf.

 Start with the results from Practice 1 Labels (Layer: 16r16p links) Open the saved map if needed Labels Overlaps Background Callouts General 2. Use the and zoom-in tool () to zoom in to the Field [AB_AMLANES / BA_AMLANES] Save... Position Centered above Load... area of interest Rotation Along line features + Smart Alignment 📃 Stretch 📃 Skip Partial Labels 3. On the top ribbon, click the labels icon (Allow Duplicates Spacing 0 Inches Limit Lines to Characters Select the [AB_AMLANES/BA_AMLANES] field Do not display on the map Font Change the size and color to match your preference Size 12 @SimSun-ExtB ÷ gency FB Aharon Color Change the format to have numbers by comma Algerian Format 12,345 Andalus Angsana New separated Line Height 100 ÷ % AngsanaUPC Aparajita Bold Italic Arabic Transparent ✓ Click 'OK' button Arabic Typesetting le Shows what Label Text will

In training, save the map for future use



Cancel

Apply

Remove

OK

Create Scaled Symbol Theme

(also known as bandwidth map)



Scaled Symbol Themes

- Scaled Symbol Themes (*) are often used to:
 - » Display traffic volumes
 - » Display results of a select link or node analysis





Scaled Symbol Themes

Scaled-Symbol Theme (Layer: abmload_byr)
Settings Styles Choose a field U Dua Fields AB_VMT / BA_VMT AB_VHT / BA_VHT AB_FLOW_EA / BA_FLOW_EA AB_FLOW_MD / BA_FLOW_AM AB_FLOW_MD / BA_FLOW_MD AB_FLOW_PM / BA_FLOW_PM AB_FLOW_EV / BA_FLOW_EV AB_PCE_EA / BA_PCE_EA AB_PCE_AM / BA_PCE_AM AB_PCE_MD / BA_PCE_MD Filter
Symbol Sizes ○ Map Wi <u>z</u> ard
Low Value 0 Size 3 High Value 24265 Size 25
OK Cancel Apply <u>R</u> emove

The Settings Tab

Show directional fields only, or all fields

- Select a field to use
- Specify a scale, or let TransCAD specify one automatically



Create Selection Sets



Selection Sets

- Add additional formatting capability
- Useful for analysis and data processing
- Use the Selection Set Toolbox
 - » Select items with a query
 - » Select items by pointing
 - » View the Selection Settings



- One map can contain many selection sets
 - » Show or hide selected items
 - » Format selected items with different colors, styles, and labels



Practice 3: Create selection sets and color and label them

- Start with the results from Practice 2
 - Open the saved map if needed
- 1. Goto Tools and select 'Selection' or hit F9
 - This will show the selection toolbox shown to the right
 - Click select by condition (\hbar_{k}) to open the query builder
 - ✓ Type in condition: MAP_FT >= 100
 - Type the Set Name (Connectors)
- 2. Change the centroid connector lane labels
 - ✓ Open selection settings (Selection \rightarrow Settings or \$)
 - Choose Connectors, then click Style
 - Set the color to "default gray) this allows the color theme to override
 - Click Labels
 - Set the label to a smaller font size and different color
 - Close the selection settings
- TIP: You can make other changes to multiple different selection sets, or can hide some features altogether!

In training, save the map for future use

	abmload_byr Selection
l	*\$ 🗣 % 🕵 *\$ *\$ 🔍 🖷 웊 📯
l	Selection (0)
L	

Select by Condition (Dataview: 16r16p_links)					
Enter a Condition					
MAP_FT >= 100		ОК			
	Cancel				
		Verify			
Condition Builder	Set Name	Clear			
Field List 👻	Connectors 👻	Clear			
Operator List	Selection Method	Save			
	Create Set 🔹	Load			
Function List 👻	Other Sets				
Values 👻		v			
L	Previous Conditions				
Select from visible features only	MAP_FT > 0	•			



Data Tables ("Dataviews")



Working with dataviews

- Open a dataview for any existing layer ()
- \rightarrow Open a standalone table with File \rightarrow Open
- Add/Remove fields with Dataview → Modify Table » (or m)
 - » Be careful: Changes are permanent once you click "OK"
- Data can be edited directly in the dataview
 - » Be careful: Changes are saved as you go
- \rightarrow Create formula fields with $\frac{\times * \Psi}{m}$
- Right-Click on a column header for more options
 - » Including a formula Fill



Working with Dataviews

Formula Field vs. Add Field & Formula Fill

- » Formula *Fill* adds new data and saves values in the table
- » Formula *Fields* are updated when other values change, but are not stored in the data table
 - Formula fields are stored in a map, dataview (*.dvw), or workspace (*wrk)
- 1. Enter a formula
- 2. Use the Field List to find field names
- 3. Name the formula field

Tip: nz([Field]) converts null values to zero values

Formula (Dataview: OCTA	(_Links)	X
nz(AB_LN_05) + nz(BA_LN_05)		OK
	(1)	Cancel
		<u>D</u> elete
		<u>C</u> lear
		⊻erify
		Node Fields
- Formula Builder	Formula Fields	Save
Field List	TOT_LANES	Load
Operator List	Previous Formulas	
Function List		-
Values of BA_LN_05 💌		

Practice 4: Add total number of lanes in a NEW FIELD

 Start with the results from Practice 3 Open the saved map if needed On the top ribbon, click in the indext and the index and the indext and the indext and the indext and the					Modify Table			 >
 Start with the results from Practice 3 Open the saved map if needed On the top ribbon, click in the links layer dataview table Use Dataview → Modify Table or click Click 'Add Field' Name the field "TOT_LANES" Click 'Add Field "TOT_LANES" Click 'OK' Go to 'Dataview' window Right click the top part of the 'TOT_LANES' field Select the 'Formula' in the fill method options Type: nz(AB_AMLANES) + nz(BA_BALANES) Alternatively you can use the formula builder Click 'OK' button. This fills in two-way number of lanes 					Table Specifications			
 Start with the results from Practice 3 Open the saved map if needed On the top ribbon, click if if					AB_EVE_FX_TOL Real (8 bytes) 1	Width Dec Index Default Format I0 3 None	Display Name	Cance
 Open the saved map if needed On the top ribbon, click is in twill open the links layer dataview table Use Dataview -> Modify Table or click Click 'Add Field' Name the field "TOT_LANES" You can move the field position using Move Up and Move Down buttons to the right Click 'OK' Go to 'Dataview' window Right click the top part of the 'TOT_LANES' field Select the 'Formula' in the fill method options Type: nz(AB_AMLANES) + nz(BA_BALANES) Alternatively you can use the formula builder Click 'OK' button. This fills in two-way number of lanes 	>	Start with the results from Practice 3			BA_EVE_FX_TOL Real (8 bytes) 1	LO 3 None		Add Fie
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 Click 'OK' button. This fills in two-way number of lanes This fills in two-way number of lanes 		 Alternatively you can use the formula builder 	000 1				Node Fields	
This fills in two-way number of lanes Image: state of the s		 Click 'OK' button. 	000 1		Formula Builder	Formula Fields	Sum Fields	
This fills in two-way number of lanes				() A	Field List 👻	Formula	Save	
Function List if (AB_Facility_Type = 100 or BA_Facility_Typ + Values of BA_AMLANES values of BA_AMLANES		 This fills in two-way number of lanes 	1		Operator List 👻	Previous Formulas	Load	
Values of BA_AMLANES Values of BA_AMLANES.					Function List	if (AD Facility Type 100 D	A Facility Top	
Values of BA_AMLANES			ζ ∖		Punction List ▼	IT (AB_Facility_Type = 100 or B	A_racility_typ 🔻	
			50%		Values of BA_AMLANES 👻			



Bonus: Try this example using a formula field instead!

Joining Data



Joining Data

- Layers have an associated data table ()
- Data can be joined () to other tables
 - » Roadway Network + Traffic Assignment results
 - » TAZ layer + Land Use Data
 - » Roadway Network + Lookup Table
 - » More...
- This is how traffic assignment results are viewed in TransCAD
- Fields cannot be added/removed from a joined view



Joining Data

Join 🛛					
Settings Options					
Create Joined View					
Name OCTAM33_TAZ+ZonePABalanced 3					
Joining from (left side of join)					
Table OCTAM33_TAZ					
Field TAZ					
Examples 1, 2, 3, 4, 5, 6, 7, 8, 9, 10					
To (right side of join)					
Table ZonePABalanced					
Field ZONE					
Examples 1, 2, 3, 4, 5, 6, 7, 8, 9, 10					
UK Cancel					

- 1. Select the Primary join table
 - » Be careful: Check the Field
- 2. Select the secondary join table
 - » Be careful: Check the Field
- 3. Create a name for the view, or use the default (do this last)

Tip: You can open a file from the join dialog box

To (right side of join)						
Table	File Open	-				
Field	File Open					
Examples						



Practice 5: Join the TAZ data to the TAZ layer (Tier 1)

- 1. Start with the results from Practice 4
 - Open the saved map if needed
- 2. Add the TAZ layer to the map

 - Click Add Layer
 - Browse to: 16R16s3_set7_setting\Geography\TAZ_t1.dbd
 - Move the TAZs to be drawn first (top of the list)
 - ✓ Click 'Close'
- 3. Open the TAZ Data Table
 - ✓ File → Open
 - ✓ File Type Comma- or Tab-delimited Text
 - Browse to \16R16s3_set7_setting\SED\Inputs\TAZ_t1.dbd\ T1_2016_Control_PolicyA_vi63_013116.csv
 - ✓ Note that this is opened as read-only (all cells are green)
- 4. Create a join from Dataview \rightarrow join or \Im
 - ✓ Set the left side of the join to TAZ_t1, field 'ID'
 - ✓ Set the right side of the join to T1_2016_Control_PolicyA_vi63_01
 - ✓ Set the right side join field to TAZ *NOT TAZPREV
 - Click 'OK', then use "info" to review the data
 - ✓ Warning: Do NOT close the joined view!

Bonus: Create a shading theme with darker colors for more households. Try again for employment



oin					
Settings Options					
Create Join	ed View				
Name	TAZ_t1+T1_2016_Control_PolicyA_vi63_01				
Joining from (left side of join)					
Table	TAZ_t1				
Field	ID 🔻				
Examples	43594000, 43588000, 53995000, 43595000, 538850(
To (right si	de of join)				
Table	T1_2016_Control_PolicyA_vi63_01				
Field	TAZ				
Examples	14000000, 14001000, 14002000, 14003000, 140040(
	OK Cancel				



Printing Maps (Layouts)





- Allow users to create a page to be printed
 - » Set paper size
 - » Set a specific printer PDF writers work best!
- ➤ Created from File → New
- Print maps, drawing items, tables, and insets
- \rightarrow Add titles, legends, etc.
 - » Title / Project reference
 - » Model run source
 - » Model run year
 - » Map created by

- » Date run
 - » Date created
 - » Legend (colors, labels, etc)



Practice 6: Create a Layout with your map

- 1. Start with the results from Practice 5
 - Open the saved map if needed
- 2. Create a new layout using File \rightarrow New or
 - Check the page settings with File \rightarrow Properties or $\circle{2}$
 - Select a printer and page size
 - Set to landsape
 - ✓ Important: Un-check Change size of items when page size changes
- 3. Add your map to the layout using
 - Draw a box to place the map
 - Select Map, check 'Use actual point sizes'
 - Optionally un-check 'Keep map's aspect ratio'
 - Click 'OK'
- 4. Position and edit the legend
 - Use the pointer tool (
 - Drag the legend to a good location
 - Double-click to edit legend text and contents
- 5. Add a legend title
 - Use the 'Freehand Text' tool (A), usually at the bottom of the window
 - Drag a box, then type a title
 - ✓ Use the pointer to reposition, double-clicking to edit

Layout Properties
General
Title Untitled
Stored in: None
Printer
Name: Adobe PDF Properties
Status: Ready
Type: Adobe PDF Converter
Where: Documents*,pdf
Comment:
Page Orientation
Size: Letter Potrait
Dimensions:
1 🚖 Pages Across 1 🚖 Pages Down 💿 Landscape
Change size of items when page size changes
Margins (in inches)
Top 0.250 📩 Bottom 0.250 束 Left 0.250 束 Right 0.250 束
OK Cancel



Highway Assignment



Assignment Results

Basic Volumes

- » Located on the Loaded Network
- » Assign\Output\scag_network_loaded.dbd
- Volume and Travel Time for:
 - » Each Period(AM, MD, PM, NT, EVE)
 - » Total daily

🔣 Dataview1 - 16r16p_li	nks Info			
ID		144312		
BA_SR3GP_LINKCOST				
	ccportzone			
	T2TAZ	5380,600.000		
	AB_AMFLOW	30.000		
	BA_AMFLOW	29.000		
	AB_AMTIME	0.224		
	BA_AMTIME	0.224		
	AB_MDFLOW	48.000		
	BA_MDFLOW	48.000		
	AB_MDTIME	0.224		
	BA_MDTIME	0.224		
	AB_PMFLOW	40.000		
	BA_PMFLOW	38.667		
	AB_EVEFLOW	16.000		
	BA_EVEFLOW	16.000		
	AB_EVETIME	0.224		
	BA_EVETIME	0.224		
	AB_NTFLOW	64.000		
	BA_NTFLOW	64.000		
	AB_NTTIME	0.224		
	BA_NTTIME	0.224		
	AB_DAYFLOW	198.000		
	BA_DAYFLOW	195.667		



Assignment Results

- Detailed Results in a separate table
 - » Join to the network using ID & ID1
 - » By time period or daily
 - » In the assign\Outputs folder
- Processed version in 'emission'
 - » Adjusted as part of SCAG's air quality modeling process
 - » Can be used if desired, but be consistent within a project!





Assignment Results

Detailed Results include:

- » Basics:
 - Total Flow
 - Flow by class (e.g., drive alone, shared ride, truck)
 - Travel time and speed (congested time by period)
- » Extras / Statistics:
 - VMT (called V_Dist_T)
 - VHT
 - Volume to Capacity Ratio ("VOC")
 - PCE Values
- » Select Link / Zone Results
 - Only present if mode was run with assign\Inputs\SelectLink.qry



Practice 7: Review Assignment Results

- 1. Open the output roadway network
 - ✓ Use File → Open
 - Browse to Assign\Outputs\scag_network_loaded.dbd
 - Review the built-in assignment results
- 2. Open the detailed assignment results
 - ✓ Use File → Open
 - Browse to Assign\Outputs\day_flow.bin
- 3. Create the join from Dataview \rightarrow Join or 3
 - Left side: link layer and 'ID'
 - Right side: day_flow and 'ID1'
 - Click 'OK'
 - Remember: Do not close the joined view.
- 4. Use the info tool to review the results

Challenge: Apply what you've learned

5. Label the links with the % share of vehicles that are "Drive Alone" (Hint: create a formula field)

6. Try creating a bandwidth (scaled symbol) theme showing directional volume (hint: Use 🔆)



More on Networks and Zones



User Variables

Creating your own variables

- » Additional fields can be added to links & nodes layers
- » Field names can contain spaces and numbers, and do not have a practical limit to the number of characters
- » HOWEVER...


User Variables

Creating your own variables

- » Example Varaibles:
 - TCR Segment Number
 - Air Quality Project Link ID
- » It is preferable to:
 - Avoid using spaces
 - Avoid starting a field name with a number
- » If these guidelines are followed, compatibility with other GIS programs will be improved
 - Field names that do not follow these guidelines will have truncated or confusing names when exported to a shapefile



Centroids

Centroids are special nodes that are linked to socioeconomic data

- » SCAG's Model has three tiers of TAZs
 - Tier 1: Least amount of detail
 - Tier 2: More detail
 - Tier 3: Used for subarea models.
- » TAZ numbers match the TAZ layer, data tables, and matrices
 - Sometimes, files use sequential TAZ numbers instead!





Centroids

Nodes are identified as centroids using the following rules:

Field Name	Contents	
Tier1TAZ	User friendly nested TAZ ID number	
Tier2TAZ	(sequenced by county, type, etc)	
ZoneType_Tier1	Internal, External, Airport, or Seaport	
ZoneType_Tier2		
Internal_sequence_id_T1	TAZ numbers used internally by	
Internal_sequence_id_T2	users	



Tiered TAZ Structure

Tier 1 Zones 4,192

- » Used in traffic assignment
- » Results in 17.5 *million* cells per matrix

Fun with Math:
Why these models take so long $\frac{4,192}{11,350} = 2.7$ $\frac{17.5 m}{128.9 m} = 7.3$ $2.7^2 = 7.3$

Tier 2 Zones 11,350

- Used in trip generation, distribution, and mode choice
- » Results in 128.9 *million* cells per matrix



Routable Roadway Networks



- By themselves, geographic files are not "routable"
 - » A network file (.net) must be created before certain actions can be done
 - The SCAG Model creates this automatically
 - » To increase efficiency, only selected variables are contained in the network file
- The routable network can also include turn penalties and prohibitions
 - » By default, the SCAG model does not use turn penalties



- ➤ Create a routable network using Networks/Paths → Create
- For a working network, only length needs to be included
 Other variables as necessary
- ➢ Networks/Paths → Settings can be used to change additional network properties



Shortest Paths

- » Use Networks\Paths → Shortest Path to see how TransCAD routes traffic based on time, length, and turn penalties
- » A ".net" network is required (Optional in TransCAD6)
 - In TransCAD 6, a using .net network will allow more functionality
- » The network must contain all variables of interest
 - More variables can be added to the network later if needed



Routing on the Network

Shortest Paths

» The shortest path is based on the selected variable

missing, close the

- » Other variables can be tracked, or "Skimmed" along the way
 If this button is
- No ".net" file?
 - » On-the-fly pathbuilding when no ".net" network is open
 toolbox, open a .net file, and reopen the toolbox
 - Turn penalties not applied
 - Not possible to "skim" other variables
 - Useful for quick and easy tests





Practice: Shortest Paths

- 1. Close all files and start with a clean workspace
- 2. Open the output roadway network
 - ✓ Use File → Open
 - Browse to Assign\Outputs\scag_network_loaded.bin
 - Review the built-in assignment results
- 3. Create a ".net"network
 - Include FreeTime, AMTIME, and MDTIME
 - ✓ These are directional fields
- 4. Find the shortest path between two points
 - Try using intermediate points to find the difference between the shortest and next shortest path
 - ✓ Build a path through a centroid connector
- 5. Select centroid nodes

82

82

- ✓ Tier1TAZ > 0 or Tier2TAZ > 0 (node layer)
- ✓ Use Networks/Paths → Settings to identify centroid connectors in the network file
- 6. Try to build a path through a centroid connector
- 7. Discussion: How might this tool be useful?
 - ✓ For model troubleshooting
 - To answer policy questions



Turn Penalties

Example only: The SCAG model doesn't currently use turn penalties, but they can be added manually if needed

- Turn penalties and Prohibitions
 - » Turn penalties are stored in a table (.BIN)
 - » This table can be viewed in a dataview
 - » Turn penalties are most easily managed using TransCAD's Turn Penalty Toolbox:
 - Add, Delete, or review turn penalties
 - Enter a turn penalty value in minutes
 - Create a turn prohibition by leaving the penalty value blank

➤ Load into a network from Networks/Paths → Settings



Turn Penalties

Turn penalties and Prohibitions

- » Networks/Paths → Turn Penalty Toolbox
- » Links will be colored to indicate turn penalties
- » Available turn penalties
 will be shown in green or
 blue
- » The selected turn penalty will be shown in red
 - Solid = From
 - Dash = To



Turn Penalties

Applying to a Network

- » Apply .bin file turn penalties from Network → Settings
- » If you are using the turn penalty toolbox, penalties are applied to the network as you go
 - Turn penalties are applied to the network with the green light
 - You can ignore this error if a "net" file is not open and you will apply the ".bin" file later





Creating a skim matrix

» Build shortest paths between all zone pairs

Input

Settings

Store Results

- Technically: Builds shortest paths between two sets of selected nodes
- » Allows user to specify attributes to "skim" along the paths
- » Saves results in a zone to zone matrix file
- Accessed from Networks/Paths \rightarrow **Multiple Paths**



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Practice: Shortest Path Matrix

- 1. Start with the workspace from the previous practice
- 2. Select Tier 1 Zones
 - ✓ Select by the condition: Tier1TAZ > 0
 - Name the set Tier1TAZ
- 3. Create a skim matrix between all zone pairs
 - Find the shortest FF time
 - ✓ Skim length, AM, and MD time
 - Review the warnings and/or report
 - Investigate one or two warnings
- 4. Compare results to the interactive pathfinder for a selected zone pair



Roadway Network Editing



Warning: Make a backup copy first!

- » There is an "Undo" function in TransCAD
- » Edits are made directly to the network file: You can't close without saving to discard changes

The Undo function in TransCAD 5+ makes network editing less risky

» Network files sometimes become corrupt





Backing up the Roadway Network

Method 1 (recommended):

- » Open the network in TransCAD
- » Use Tools → Geographic Utilities → Geographic File
- » Click **Archive** to save in a zip file

Method 2 (advanced):

- » Close all files in TransCAD
- » Create a zip file with the line layer and route system files
- » Make sure to get <u>all</u> related files





Once you have made a backup, you can:

- » Edit attributes of existing links
- » Change data for a specific year or for multiple years and alternatives
- » Add new links, delete existing links, or realign existing links
- » Add data for a year not yet included in the network



- Edit attributes of existing links
 - » Display settings can assist with editing
- Additional labels and/or themes can be useful
 - » Label # of lanes or other values
 - Show Topology (2)
 to see AB vs. BA



Network Topology

Show topology to identify AB and BA directions



To identify one-way roads, use the DIR field:

- » 0: Two-way travel
- » 1: A → B travel
- » -1: B → A travel



Edit attributes of existing links – Method 1

- » To make most edits, use the information tool (1) and edit text in the form that appears
- » Changes can be undone
 - Each edit action creates an undo point
- » You can select and fill multiple links with the information tool
 - Multiple values can be filled by right-clicking on row names

📕 Dataview1 - Ne	twork Info			
ID	4627	4927	4573	~
Length	0.03	0.02	0.03	
Dir	-1	-1	-1	
STREETNAME	HARRIS	HARRIS	HARRIS	
STREETTYPE	ST	ST	ST	
Dir_10	-1	-1	-1	
FT_10	3	3	3	
AT_10	2	2	2	
AB_LN_10				
BA_LN_10	2	2	2	
CTLMED_10				
SPLM_10	30	30	30	
FFOR_10				
AB_FBAM_10				
BA_FBAM_10				
AB_FBOP_10				
BA_FBOP_10				
SUB_REGION	1	1	1	
Functional_Class	Minor Collectors	Minor Collectors	Minor Collectors	Minor
DOT_ROUTE	0	0	0	
	0	0		>.



Network Editing Alternate Method

Edit attributes of existing links Alternate Method



- » Use the map editing toolbox (🔏)
- » Use the Edit Line Attributes (👩) button
 - Operation of this tool is similar to using the information button
- » Edits are saved when the green light (5) is clicked
- » Use the red (불) light to cancel all unsaved edits
- » The Undo function will undo all edits that are saved at once with the green light



What Fields do I Edit???

- » Facility Type
 - Facility type identifier
- » Lanes
 - Directional number of lanes, by time period
 - Aux. lanes (freeway links only)
- » Direction
- » Area Type
 - Use nearby links as a guide
- » MODE
 - 2 for most links (other values are for transit)
- » Other fields as necessary



What Fields do I Edit ??? (cont'd)

- » Toll coding guidelines
 - Use TOLL, Toll_flag
 - See assign\inputs\toll_hot_penalty for toll and express lane coding details

See the SCAG Model User's Guide for more guidance



Practice: Network Editing

- Open the input network file
- Make a backup copy of this network in a folder called "Backup"
 - » Use Tools → Geographic Utilities → Geographic File and archive the network
 - » Add the date to the backup filename
 - » Edit the original network file
- Try using the different editing approaches to:
 - » Change the facility type
 - » Widen a Road



Practice: Network Editing

- Show Topology on the network
- Change a roadway to represent a different number of lanes in each direction
- Change a different roadway to a one-way road
 - » 0 = Two-Way
 - » 1 = A to B
 - » -1 = to A







Adding new links

- » Use the map editing toolbox (🔏)
- » Add links using Add Line (
 - To work properly, links must be connected at nodes
 - Existing links may need to be split
 - Avoid splitting links if possible
- » Make sure that links are connected by:
 - Saving edits
 - Moving a node around do all of the attached links move with it?
 - Canceling the edit



Adding New Links

- » New links need new data!
- » Copy data from an existing link with similar characteristics
 - Use the Edit Link Attributes () button
 - Click/shift-click on the new link(s)
 - Shift-click on the similar old link
 - Right-click on the data for the "old" link and choose "Copy Values"
- » Splitting/Joining Links
 - Check the split/join settings
 - Use the split/join tools (++ ++)
 - New/moved links may be connected at new nodes
 - Check data on split/joined links



Map Editing

Keeping Transit up to date

- » Always add the route system to the network before making edits (link additions, splits, or joins)
- Add the route system from networks\Inputs
 Note: Make sure to choose the Route System file type
- » Make the route system active after every few edits
- » TransCAD will prompt and update the transit network based on your changes







Practice: Network Editing

- Continue editing the input network
- Add, delete, and realign some links
 - » Show topology: Note that the way a new link is created defines its AB direction
- Copy link values from an old road to newly created links
- Split and join links
 - » look at the data that appears on each half
 - » Look at the network editor settings (🔀)



Things to keep in mind:

- » When splitting links, make sure the data on both pieces still makes sense
- » When adding new roadways, adjust centroid connectors if necessary
- » Adding detail or making corrections?
 - You may need to make edits to base and forecast networks



Working with Matrices



Matrix Files

Contain zone to zone data

- » Trip tables
- » Shortest Paths ("Skims")
- » Mode shares, logsums, etc
- Tend to be very large files
 - » Real numbers = Big files
 - » Compression reduces file size and increases access speed
 - CPU Speed > Disk Speed





Matrix Files

Matrix Cores

- » One file, multiple tables
- » Add/Delete/Rename Cores (∉)
- » Select the active core

Tools Procedures	Network
DA	-
J DA	
SR2 HOV	
SR3 HOV	
IP LHDT	
)0 MHDT	21
HHDT	
SR2 NONHOV	Ľ
SR3 NONHOV	U
0 00 0 01	5






Show row/columnations

- » Sum, min, max, etc.
- » TransCAD 5.4
- » Sort by matrix marginals
- » Store marginals in a tab ()
- Get overall matrix statistics with Matrix Statistics (
- ➤ Compare all core values in a single cell
 > Right-click → Info
- QuickSum () Adds a new core with the sum of all existing cores in the file





Practice: Matrix Files

- Open the PK Person trip distribution results
 » Also open the input PK PA Balanced Table
- Copy/Paste trip generation and distribution data into Excel
 - » Use Matrix → Statistics () to identify the total for each matrix core
 - » Use Dataview → Summary Statis S() to get the total balanced Ps and As
 - » Verify that trip generation and distribution are consistent
- Use the QuickSum tool () to create a total core
 - » Re-summarize the matrix
 - » Verify that the QuickSum core is the sum of core totals



- Matrix Calculations
 - » Matrix → Fill 🗞
- Single Value
 - » Simple add/subtract/clear/replac
- Cell by Cell
 - » Compute values from two or more matrix cores
- Formula
 - » Mix operators and use functions
- Vector Multiply
 - » Multiply by a row or column from a dataview

Fill Matrix: Person Trip Tab	ole - PK		x
Single Value Cell by Cell	Formula Vecto	or Multiply	
Method to Fill Matrix HB	0		
Add matrices	Multip	oly matrices	
Subtract matrices	Divide matrices		
Matrices to Use (Addition	n)		
Matrix File	Matrix	Factor	+
			×
Cells to Fill			
I I I	Highlighted	Diagonal	
Treat missing v	alues as zeros		
		ОК	Cancel



Practice: Matrix Files

- Continue with the previous workspace
- Add a "MyTest" core to the matrix file
- Fill MyTest with the sum of HBSc + HBU + HBS + HBSR + HBO
 - » Use both Cell by Cell and Formula
- Add a column to the PA dataview
 - » Fill the column with 1
 - » Set a few rows to 0 or 0.5
- Try vector multiplication
 - » How are row and column multiplication applied?





Matrix Indices ()

- View only a subset of a matrix file
 - » Use a selection set to identify rows/columns to view
 - » The matrix will be "shrunk"
 - » Row/Column marginals will reflect the smaller matrix

Change ID numbers

- » Use a dataview as a correspondence table
- » Example:
 - SCAG has both TAZ IDs and sequential TAZ Ids
 - Different matrix indices have the same number of rows/columns, but different row/column IDs



Practice: Matrix Files

- Start with the previous workspace
- Create Orange County indices
 - » OCZones
 - » NotOC
 - » Check the Excel file to identify the OC county code
- Summarize trips to, from, and within Orange County
 - » Trip-Ends vs. Trips
- Create a formula field: TAZ + 1000
 - » Create an index called BigZones
 - » Include all zones, but change ID numbers



Aggregate Matrices

- » Squeeze a matrix, summing within districts or superzones
- » Matrix → Aggregate
- » Requires dataview
- » Rows, Columns, or both
- Disaggregate Matrices
 - » Matrix \rightarrow Disaggregate
 - » Requires a specially designed dataview
 - Multiple rows for some exi rows/columns
 - Unique sub-zone field

ZONE	NewID	Percent
1	101	.20
1	102	.20
1	103	.60
2	2	1.00
3	301	.30
3	302	.70



Practice: Matrix Files

- Aggregate the PA table to counties
 - » Compare results to to/from/within OC from the previous practice
- Disaggregate 5-10 TAZs
 - » Create a new TAZ correspondence table
 - Work in Excel, or copy the PA table and work directly in TransCAD
 - In TransCAD, use Edit → Add Records to add new rows
 - » Run the matrix disaggregation function
 - » Look at pre- and post- disaggregation data
 - row and column totals
 - Individual cell values



Exporting / Importing

- > Matrix → Import
 - » Format 1:
 - Good for databas work

			Export to a Ta	ble with One I	Record for Each	
4 5	- 6 - 16		Ocell, with a Cell, with a Cell, with a Cell	field for each	n matrix	
2 24 25	26		Row in ma	trix		
3 34			Column in	matrix		
Row	Col	Matrix1				
1	4	14	Matrices to Inc	lude		
1	6	16	Select All	HBSc		
2	- 5	24		HBU		
2	6	26		HBS		
3	5	35		HBSR		
3	6	36		HBO M/DO		-
	8	20	•			
					ОК	Cancel
						10.000

- » Format 2/3
 - OK for manual wold





Using GISDK

- » Much easier when running multiple calculations
- » Straightforward syntax
- Important Functions
 - » OpenMatrix: Open a matrix File
 - Creates a matrix handle (e.g., mat)
 - » CreateMatrixCurrency: Identify core and indices
 - Creates a matrix currency (e.g., cur)
 - » CreateMatrixCurrencies: Access all cores conveniently
 - Creates a list of matrix currencies (e.g., curs.Core1, curs.Core2)



Matrix Operations (:=)

- » Treat matrices like simple variables
- » Cur1 := cur2 + cur3 / 2
- Closing matrix files
 - » Set all matrix handles and currencies to null
 - » Especially important in loops
 - » All matrix files are closed when a macro completes
 - Exception: the matrix has been opened in a view
 - » Good Practice: Keep track of matrix variables and set them to null on completion





```
Macro "Example"
                       //Define the path and filename
                       mat file = "C:\\OCTAM Training\\dst\\TestMat.mtx"
                       //Open the matrix
                       mat = OpenMatrix(mat file, ) //(filename, "True"/"False" to open
mat = OpenMatrix(mat file, ) //(filename, "True"/"False" to open
mat = OpenMatrix(mat file, ) //(filename, "True"/"False" to open
mat = OpenMatrix(mat file, ) //(filename, "True"/"False" to open
mat = OpenMatrix(mat file, ) //(filename, "True"/"False" to open
mat = OpenMatrix(mat file, ) //(filename, "True"/"False" to open
mat = OpenMatrix(mat file, ) //(filename, "True"/"False" to open
mat = OpenMatrix(mat file, ) //(filename, "True"/"False" to open
mat = OpenMatrix(mat file, ) //(filename, "True"/"False" to open
mat = OpenMatrix(mat file, ) //(filename, "True"/"False" to open
mat = OpenMatrix(mat file, ) //(filename, "True"/"False" to open
mat = OpenMatrix(mat file, ) //(filename, "True"/"False" to open
mat = OpenMatrix(mat file, ) //(filename, "True"/"False" to open
mat = OpenMatrix(mat file, ) //(filename, "True"/"False" to open
mat = OpenMatrix(mat file, ) //(filename, "True"/"False" to open
mat = OpenMatrix(mat file, ) //(filename, ) //
                        //Add a new core called HBNW
                       AddMatrixCore(mat, "HBNW")
                        //Access the matrix cores using default indices
                        curs = CreateMatrixCurrencies(mat, , , ) //(matrix handle, row
                        //Add HBSc, HBU, HBS, HBSR, and HBO
                        curs.HBNW := nz(HBSc) + nz(HBU) + nz(HBS) + nz(HBWR) + nz(HBO)
                       //Close the matrix file
                       mat = null
                       curs = null
    EndMacr
```

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Practice: Matrix Files

- Close all files in TransCAD
- Copy the Peak PA matrix to TestMat.mtx
- Write a script to:
 - » Open TestMat
 - » Add a HBNW core
 - » Fill the HBNW core with all HBNW trip purposes

Extra Credit

- » Add a second core called Temp
- » Fill the Temp core with HBS * 2 HBO * 0.5





Advanced Topics



Advanced Topics

Matrix Files and OD Tables

- » Matching matrix files to zones/centroids
- » Visualizing trip table data
 - Desire Lines
- Setting up Select Link and Zone Analysis
 - » Creating a query file
 - » Running assignment only with select analysis activated
- Routable Networks
 - » Creating and updating a ".net" Network
 - » Interactive pathbuilding

Basic Scripting

- » Batch Recorder
- » Simple Macro Creation



Thank You!



Examples





Year 2035 Alternative 5C: Select Link Analysis Daily HHDTs

Southbound 710 Freeway Long Beach Blvd. Location (Pair A)

* Example only: not meant for reading the text in PowerPoint presentation format



126



Year 2035 Alternative 5C: Select Link Analysis Daily HHDTs

Long Beach Blvd Location Bandwidth HHDT Volumes

* Example only: not meant for reading the text in PowerPoint presentation format



Household And Employment Growth



Household And Employment Growth



Travel Patterns



Today

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Travel Patterns



Future



Traffic Volumes And Congestion



Today

Travel Times				
From/To	Today	2030	Increase	
Fort Collins to Denver	73 Minutes	119 Minutes	46 Minutes (63%)	
Fort Collins to Greeley	37 Minutes	49 Minutes	12 Minutes (32%)	
Greeley to Loveland	29 Minutes	39 Minutes	10 Minutes (34%)	
Berthoud to Windsor	24 Minutes	37 Minutes	13 Minutes (54%)	

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Traffic Volumes And Congestion



Future

Travel Times				
From/To	Today	2030	Increase	
Fort Collins to Denver	73 Minutes	119 Minutes	46 Minutes (63%)	
Fort Collins to Greeley	37 Minutes	49 Minutes	12 Minutes (32%)	
Greeley to Loveland	29 Minutes	39 Minutes	10 Minutes (34%)	
Berthoud to Windsor	24 Minutes	37 Minutes	13 Minutes (54%)	



Where Does The Traffic Go?



Intersection LOS



Traffic Impact Analysis



* Example only: not meant for reading the text in PowerPoint presentation format



136



DEIS Results: I-25 Daily Traffic Volumes Comparison

Legend

Existing (Year 2005) Daily Traffic Counts, in thousands

2030 No-Action Daily Volumes, in thousands

2030 Package B Daily Volumes, in thousands

2030 Package A Daily Volumes, in thousands

information, cooperation, transportation,

EIS

NORTH I-25

Sources: 2005 Traffic Counts: North I-25 Travel Demand Forecast Model Runs. January 2007

Example only: not meant for reading the text in PowerPoint presentation format

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* Example only: not meant for reading the text in PowerPoint presentation format





NOTE: All Trips Summary (HBW + Other trips purposes combined)

* Example only: not meant for reading the text in PowerPoint presentation format

Thank you!



More Topics

- GISDK
- > MMA
- Select link/zone analysis
- Subarea analysis
- ODME
- Model estimation
- Other planning functions



Route Systems



Route System Components




» Travel Time and Distance» Walk and Drive Access





- » Centroids linked to Trip Data
- » Nodes linked to Stops
- » Nodes identified as Park and Rides





- » Routes follow roadway links
 - Roadways
 - Centroid Connectors (possible, not recommended)
 - Transit only links (e.g., rail, BRT)
- » Routes use link data
 - Travel Time
 - Distance
- » Routes are stored in a ".rts" file





- Route Stops are stored in a pair of geographic files
 - » managed from the route system
 - » Physical Stops are common to all routes crossing a node
 - One required for each direction
 - » Route Stops are specific to one and only one route
 - Must be associated with a physical stop



Route/Network Link

- The Route System is linked directly to the Roadway Network by Complete Filenames
- If the network is moved or renamed, The Route System will fail to open unless:
 - » The roadway network is opened first, or
 - » The route system is re-linked to the roadway network



Route/Network Link

Re-establishing a Link:

- » Route Systems \rightarrow Utilities \rightarrow Move
 - Open the dbd file, choose this menu item, then choose a route system
- Checking the Link
 - » Close all files
 - » Open the route system in TransCAD
 - » Verify that the expected network has been loaded



- Start by opening the <u>input</u> route system
 - » Make sure the correct line layer has been opened
- Create a working ".net" network
 - » Use default settings
 - » Save this in the input directory
 - » Use a temporary filename (e.g., net.net)
- Start the Route Editing Toolbox
 - » Route Systems → Editing Toolbox

Note – Check the active layer as you try each step



Route System Display

- Many routes can use the same corridor
- Edit route styles () to
 - » Show Side by side
 - » Show Topology
- Use selection sets to show only a set of routes
- Use screen real estate wisely



Example Editing Workspace





Example Editing Workspace



Map scale: 1 Inch = 0.55401 Miles (1:35,102)

(-117.223862, 34.101084)

Network: None

- Select a route to edit
- Edit route name
 - other route info can be edited with the standard info tool
- Add or delete a route
- Solution & Copy a route or add the reverse of a route
 - Realign a route
- Extend a route or fill in a gap
 - Delete a section of a route
- Add, delete, or move route stops
- Save or cancel changes





- Routes are usually edited by drawing paths
 - » Click from node to node along a route
 - » Only a few nodes along the route must be selected
- Potential Problem: A route does not take the shortest path between two nodes:
 - » Change from Shortest Path to Click Links
 - » Link mode can be especially helpful on freeways



Add stops to each route

- » Manage both physical and route stops
- Stops must be adjacent to a node
- Be consistent
 - » Multiple routes with identical service should have identical stop placement





Practice: Route Editing

- Verify the link
- Make some Changes:
 - » Adjust a route headway
 - » Add a new route
 - » Add and/or remove route stops
 - » Add a new Park and Ride



Transit Networks



Transit Networks

Contain all mode and pathbuilder settings

- » Mode.bin table contains mode-specific information
- » Modexfer.bin contains mode-to-mode values
- » Connection between link/node layers
 - Stops tagged to node
- In-program:
 - » Create a new transit network
 - » Review transit network settings
 - New network
 - Batch-created network



Transit Networks

Pathbuilding

- » Build transit paths based on network settings
 - Interactive: Test specific paths and try various pathbuilder settings
 - Skim: Build zone-to-zone paths



Practice: Transit Networks

- Create a new transit network based on the route system
 - » Review settings
 - » Build a few paths interactively
- Change the transit network to a generated file
 - » Build similar paths how are they different?
 - » Try changing network settings and observe how paths change
 - Combination factor
 - IVTT/OVTT weights



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TransCAD and the SCAG Model

presented to Caltrans District 7 presented by Cambridge Systematics, Inc. Chao Wang, Sean McAtee

November 1st and 2nd 2016



Preparing a Computer

> TransCAD 6.0,

- » build 9215 or later
- » 64-bit version required
- » TransCAD 7 not supported (yet)
- Minimum System Requirements
 - » 24 GB RAM
 - » 12 CPU cores
- » 500 GB free on system drive (C:\ Drive)
- » 800 GB free on model run drive (e.g., D:\ Drive)

Also install 32-bit for GIS and Office compatibility!

» 360 GB for model run storage

Requesting the SCAG Model

- Request the model from SCAG
- » Go to:
 - http://www.scag.ca.gov/DataAndTools/Pages/Docu ments.aspx
- » Download the Model Data Request Form
- Fill out and submit as instructed
- Cheryl Leising may be able to provide a Word version that is easier to fill out

Installing the SCAG Model



SCAG Model File Structure



SCAG Model File Structure



SCAG Model File Structure 16R16s3_set7_setting (Continued) 1 merim For internal model use mspit Mode Choice Model mspit Mode Choice Model Metworks Roadway network files (Key Inputs ODTable Vehicle Trip table matrices (Key Outputs TarscAD Logging Information

SCAG Model File Structure



SCAG Model File Structure



SCAG Model File Structure



SCAG Model Scenarios

SCAG Model File Structure







SCAG Model Scenarios



SCAG Model Scenarios

Scenario 40:38 set7 mar ch 18:d set7 20:d set7 20:d set7 18:400, set7 mar cs 5cenarios Input Nes	Felder Des D.12etat/U64803b_pet7, mer,chi Sen Dir.22et7, Sent2,	Mar 66 2054 a Mar 65 2054 a Mar 35 2054 d Tay 2 2056 p Tay 2 2056 p	 Parameters » Varies by step » List output files
Name Induitives Option HCR Flag Shuttle Flag Shuttle Flag Shuttle Flag Shuttle Flag Shuttle Flag Shuttle Flag Shuttle Flag Shuttle Flag Shuttle Flag	Value 1 1 1 1 1207 4349 4322	Description 3 = Use Observed Times, 2 = Use Cong Plag to activate HSR mode for deliverei Plag to activate HSR mode for HSR Internal Number of Zones Enternal Number of Zones Enternal Number of Zones	Rarely changed – and always with extreme caution
Walk Speed Minimum Walk Time Auto Operating Cost Freeway Free Speed & AOC Tot ID humono Value of Time Intracenal Neighbors Intracenal Factor Web Step Decement	25 2 NA2 5856 5 NA2(NA2)NA2(NA2)NA2 0A 0A 1 0.5 1	Web Speed in reph Minimum control walk time And Operating Cost in Centry Mile Speed to additis Public Speed to estin Anto Operating Cost for ANA MO, PM, Walk of them in Defact/Naur Number of Instance Milespheres to Desaminator decrement in step fund	» Only change with guidance from the User's Guide, SCAG, or Caliper
47		OK Cancel	

The Model Table

- Stores information from the scenarios
- In-Program Demo

Different Run Types

	Feedback	One Loop	Assignment
Run Time	7-10 Days	1-2 Days	< 1 Day
When to Run	To generate original SCAG model results To test large system wide network changes To test any SED changes To produce a final model dataset after alternatives analysis	 To test the impacts of small to moderate changes on mode choice This method will reduce but not eliminate oscillation noise 	To test the impacts of small to moderate changes on roadway volumes This method will nearly eliminate oscillation noise
19		CA	MBRIDGE SYSTEMATICS



One-Loop Run

» Run one complete feedback loop, starting with final loop from a full model

- » Can be useful for:
- Large roadway and/or transit scenarios
- » Comparing directly? Run a 6th loop baseline as well

Quick Run with network changes only

- » Trip tables and mode choice does not change
- » Can be useful for:
 - Testing roadway network changes
 - · Running assignment again with select link / zone analysis

ATICS

Running the SCAG Model

Full Feedback Run

- » Set the model to run "Feedback" » Leave starting and ending
- loops at 1 and 5
- » Make sure the computer can run for 6 to 10 days without interruptions
- » Click 'Initialization'

Rut O Shape O Long I Dy Non Stating × * Constant Constant

One Loop Run

- Copy your entire model scenario folder
- Modify the inputs
 - » Highway network file
 - » Route system File
 - » Socioeconomic Data
- Run the Check Network Attributes utility
- Run the Mergenet Run utility
 - » This merges speed feedback results with the modified network

One-Loop run

- Edit the scenario (click Setup)
- » Set the Initial Time Option to a value of 2



One-Loop run



One-Loop run

- > Click the Initialization button to start the run » This should take about a day to complete
- Did you get an error??
- » Try closing and restarting TransCAD, then picking up where you left off.
- » Always double-check feedback settings and active steps before starting a run

Assignment: Network Change

- Copy your entire model scenario folder
 Alternate: Just backup the original networks and assign folders
- Modify the input highway network file » Remember: keep the route system up to date!
- Run the Check Network Attributes utility



Assignment : Network Change

 Intelligence

 Image: Constraint of the const

- Double-check the scenario setup. Change directory or filenames if needed
- Set the model to run only a single stage
- Click 'Initialization'
- When asked if you want to delete all files, click 'No'

Assignment : Network Change



Map Basics: Visualizing

Working with Layers Start by opening a map or a geographic (dbd) layer

- file • Opening a layer will create a new map and add the layer
 - Opening a map will load all saved layers, settings, etc.
- \rightarrow Access layers with the layers dialog box (\swarrow)



Working with Layers



Working with Layers



Display Manager



Color Theme

Creating Maps

- Create a new map by opening a Geographic File (*.dbd)
- Add more layers if desired
 - » 🛃 then 🛛 Add Layer
- Choose the active layer

 File Lift Map Datasies Selection

 Image: Selectio
 - » Use the dropdown selector
 » Or use the display manager
- Hide or show layers
- » 🛃 or the display manager

Color and Pattern Themes

- Set feature colors and styles based on attributes
 - » Color Themes () are often used to display facility type on a roadway network
 - » Pattern Themes (Map → Pattern Theme...) is sometimes used to display number of lanes on a roadway network

Color and Pattern Themes





Functional Class

	7 Minor Collector		
1 Freeways 2 HOV	10 Freeway		70 Undwided
	20 HOV 2		71 Divided
	21 HOV 3+		72 Continuous Left Turn
	22 HOV - HOV Connector		73 Posted Speed 25
3 Expressway / Parkway	30 Undivided		74 Posted Speed 15
	31 Divided, Interrupted	8 Ramps	80 Freeway to Freeway Connecto
	32 Divided, Uninterrupted		81 Freeway to arterial
4 Principal Arterial	20 Undivided		82 Arterial to freeway
	41 Divided		83 Ramp Distributor
	42 Continuous Left Turn		84 Ramp from Arterial to HOV
5 Minor Arterial	50 Undivided		85 Ramp from HOV to Arterial
	51 Divided		86 Collector distributor
	52 Continuous Left Turn		87 Shared HOV Ramps to MF
6 Major Col lector	60 Undivided		88 Truck only
	61 Divided	9 Trucks	90 Truck only
	62 Continuous Left Tum	100	100 Centroid Connector - Tier 1
Source: SCA	G Model In. Appendix A	200	200 Centroid Connector - Tier 2

Functional Class



Practice 1: Create a color theme for line layer using IFC field

- Open the SCAG Network File (16R16pl_links.dbd) 1.
 - File → Open, then in the file type dropdown next to 'File name:' select Geographic File(*.cdf,.*dbd) option \checkmark
 - Browse to the location/folder where the geographic file is located and select the 'abmload.dbd' and click 'Open' button

Colo

- Add the MAP FT Formula Field 2.
 - Dataview→Formula Fields \checkmark
 - Open TransCAD Formuals.txt in notepad, then copy the MAP_FT formula \checkmark
 - Paste the formula and name the formula MAP FT
 - Click OK

3.

- On the top ribbon, click
 - it is called 'color theme map wizard'
- It opens up a dialog box with two tabs. In the first tab 'Settings' tab: 4.
 - Select the MAP_FT from the 'Field' drop down options \checkmark
 - Select the 'List of Values' from the 'Method' drop down options \checkmark
 - Max. Classes: Use the default value (512) \checkmark
- Go to the 'Styles' tab 5.
 - Observe the default styles \checkmark
 - Optional: Set a preferred style for each facility type (we will use a shortcut) \checkmark
- Go back to the Settings tab, click the Load button. 6.
 - Choose From Settings File
 - Browse to and select SCAG Training\Settings.stg
 - Choose MAP FT and click OK \checkmark
 - Click OK again to complete the color theme dialog box
- Save the settings (optional, method 1) Skip this step in training. 7.
 - ✓ Tools \rightarrow Geographic Utilities \rightarrow Geographic file
 - Click Save Settings
- Save the settings (optional, method 2) Use this method in training. 1.
 - File –Save As \checkmark
 - Save a Map file that you can open later with the settings applied

Formula (Dataview: 1	6r16p_links)	23
if (AB_Facility_Type	if (AB_Facility_Type = 100 or BA_Facility_Type = 100) then 100		
if (AB_Facility_Type	if (AB_Facility_Type = 200 or BA_Facility_Type = 200) then 200 else if (AB_Facility_Type = 999 or BA_Facility_Type = 999) then 999 else if (AB_Facility_Type > 0) then s2i(left(string(AB_Facility_Type),		
if (AB_Facility_Type			
eise if (AB_Facility_Type			
1)) else s2i(left(string(E	BA_Facility_1	Гуре), 1))	Node Fields
Formula Builder		Formula Fields	Sum Fields
Field List	•	MAP_FT	- Save
Operator List	•	Previous Formulas	Load
Function List	•		•
Values	-		
Settings Styles General Field MAP_FT Method List of Values Max Classes 512 Options Ignore values below or above Std. Dev. per class Break at Treat zeros as missing values	Save Load ecalculate		
Round off the values in each class Include counts in legend OK Cancel Apply Remove	Customize	CAMBRIDGE SYSTEM	ATICS

41



Automatic Labels



Labels can be set differently for different selection sets

Automatic Labels



Automatic Labels



Automatic Labels



Automatic Labels



Practice 2: Add number of lanes labels

TIP

Right click on the gray area of the layout and print to pdf.

1.	 Start with the results from Practice 1 ✓ Open the saved map if needed 	Labels (Layer: 16r16p_links)
2.	Use the and zoom-in tool (${f Q}$) to zoom in to the area of interest	General
3.	 On the top ribbon, click the labels icon () Select the [AB_AMLANES/BA_AMLANES] field Change the size and color to match your preference Change the format to have numbers by comma separated Click 'OK' button 	Position Centered above Load Position Along line features
In tr	aining, save the map for future use	Aharoni Algerian Andalus Angsana New Angsana WPC Aparajita Arabic Transparent Arabic Typesetting Arial IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII
		OK Cancel Apply Remove





Scaled Symbol Themes

- Scaled Symbol Themes (%) are often used to:
 - » Display traffic volumes



Scaled Symbol Themes





Practice 3: Create selection sets and color and label them

- Start with the results from Practice 2
 - Open the saved map if needed
- 1. Goto Tools and select 'Selection' or hit F9
 - This will show the selection toolbox shown to the right
 - Click select by condition (\hbar_{k}) to open the query builder
 - ✓ Type in condition: MAP_FT >= 100
 - Type the Set Name (Connectors)
- 2. Change the centroid connector lane labels
 - ✓ Open selection settings (Selection \rightarrow Settings or \$)
 - Choose Connectors, then click Style
 - Set the color to "default gray) this allows the color theme to override
 - Click Labels
 - Set the label to a smaller font size and different color
 - Close the selection settings
- TIP: You can make other changes to multiple different selection sets, or can hide some features altogether!

In training, save the map for future use

abmload_byr Select	ion 🗵
	» 🔧 🛧 🔍 🌇 😓 📯
Selection (0)	•

Select by Condition (Dataview: 16r16	ōp_links)	23
Enter a Condition		
MAP_FT >= 100		ОК
		Cancel
		Verify
Condition Builder	Set Name	
Field List 👻	Connectors 👻	Clear
Occurtor List	Selection Method	Save
Operator List 👻	Create Set 👻	Load
Function List 👻	Other Sets	
Values 👻		-
	Previous Conditions	
Select from visible features only	MAP_FT > 0	•





Working with dataviews

- Open a dataview for any existing layer (III)
- ➢ Open a standalone table with File → Open
- Add/Remove fields with Dataview → Modify Table » (or m)
- » Be careful: Changes are permanent once you click "OK"
- Data can be edited directly in the dataview
 Be careful: Changes are saved as you go
- Create formula fields with 2
- Right-Click on a column header for more options
 Including a formula Fill

Working with Dataviews

- Formula Field vs. Add Field & Formula Fill
 Formula Fill adds new data and saves values in the table
- Formula Fields are updated when other values change, but are not stored in the data table
 - · Formula fields are stored in a map, dataview (*.dvw), or workspace (*wrk)
- 1. Enter a formula
- 2. Use the Field List to find field names
- 3. Name the formula field
- Tip: nz([Field]) converts null values to zero values



Practice 4: Add total number of lanes in a NEW FIELD

		Modify Table	 X
		Table Specifications	6
		Field Name Type Width Dec Index Default Format Display Name	ОК
		AB_EVE_FX_TOL Real (8 bytes) 10 3 None	Cancel
	Start with the results from Practice 3	BA_EVE_FX_TOL Real (8 bytes) 10 3 None	Add Field
		AB TOLLV EVE T Real (8 bytes) 10 3 None	Dron Field
	 Open the saved man if peeded 	BA TOLLV EVE T Real (8 bytes) 10 3 None	erep ried
	• Open the saved map it needed	AB_NT_PM_TOI Real (8 bytes) 10 3 None	Move Up
		BA_NT_PM_TOI Real (8 bytes) 10 3 None	Move Down
1	On the ten ribbon click 📰 it will open the links laver	AB_NT_FX_TOLI Real (8 bytes) 10 3 None	
1.		BA_NT_FX_TOLI Real (8 bytes) 10 3 None	Attach Code
	daataview table	AB TOLLV NT T Real (8 bytes) 10 3 None	Drop Codes
		BA TOLLV NT T Real (8 bytes) 10 3 None	Export Codes
		TOT_LANES Real (8 bytes) 10 3 None	
2	Use Dataview \rightarrow Modify Table or click		Aggregation
۷.	BKITOT LANES MAP ET	Field Description	-
		Record Information	
	Name the field "TOT_LANES"	Add Records Settings	
	000 1		
	✓ You can move the field position using Move Up and Move [™]		
	Down buttons to the right 000 - 1		
	✓ Click 'OK' 000 - 8		
	000 1 Fill	Method	
	000 1		
3.	Go to 'Dataview' window	Single Value	
-	000 - 1	Comment Open 1	
	Pight click the ten part of the 'TOT LANES' field	Sequence Start I Step I	
	 Right click the top part of the TOT_LANES field 1 	Formula	
	✓ Select 'Fill' 000 1 1 0	Ta Formula (Dataview: 1br1bp_links)	
	000 1	nz(AB AMLANES) + nz(BA AMLANES)	
	\checkmark Select the 'Formula' in the fill method options		
		Cancel	
		Delete	
	• Type: Tr2(AB_AMILANES) + Tr2(BA_BALANES) 000 - 1	Clear	
	 Alternatively you can use the formula builder 1 	venty	
		Node Fields	
	✓ Click 'OK' button	Formula Builder Formula Fields Sum Fields.	
		A Formula Save	
	v This his in two-way number of lanes	C Operator List Previous Formulas Load	
	\$	Function List • if (AB_Facility_Type = 100 or BA_Facility_Typ •	
	5 \ II		
		Values of BA_AMILANES	
	۲ کار ا		



Bonus: Try this example using a formula field instead!



Joining Data

- > Layers have an associated data table (III)
- \rightarrow Data can be joined ($_{
 m sec}$) to other tables
 - » Roadway Network + Traffic Assignment results
 - » TAZ layer + Land Use Data
- » Roadway Network + Lookup Table
- » More...
- This is how traffic assignment results are viewed in TransCAD
- Fields cannot be added/removed from a joined view

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Joining Data



Practice 5: Join the TAZ data to the TAZ layer (Tier 1)

- 1. Start with the results from Practice 4
 - Open the saved map if needed
- 2. Add the TAZ layer to the map

 - ✓ Click Add Layer
 - Browse to: 16R16s3_set7_setting\Geography\TAZ_t1.dbd
 - Move the TAZs to be drawn first (top of the list)
 - ✓ Click 'Close'
- 3. Open the TAZ Data Table
 - ✓ File → Open
 - ✓ File Type Comma- or Tab-delimited Text
 - Browse to \16R16s3_set7_setting\SED\Inputs\TAZ_t1.dbd\ T1_2016_Control_PolicyA_vi63_013116.csv
 - ✓ Note that this is opened as read-only (all cells are green)
- 4. Create a join from Dataview \rightarrow join or \Im
 - ✓ Set the left side of the join to TAZ_t1, field 'ID'
 - ✓ Set the right side of the join to T1_2016_Control_PolicyA_vi63_01
 - ✓ Set the right side join field to TAZ *NOT TAZPREV
 - Click 'OK', then use "info" to review the data
 - ✓ Warning: Do NOT close the joined view!

Bonus: Create a shading theme with darker colors for more households. Try again for employment



loin	X
Settings Op	tions
Create Join	ed View
Name	TAZ_t1+T1_2016_Control_PolicyA_vi63_01
Joining from	m (left side of join)
Table	TAZ_t1
Field	ID 🗸
Examples	43594000, 43588000, 53995000, 43595000, 5388500
To (right si	de of join)
Table	T1_2016_Control_PolicyA_vi63_01
Field	TAZ 🗸
Examples	14000000, 14001000, 14002000, 14003000, 1400400
L	OK Cancel





Layouts

- Allow users to create a page to be printed
 Set paper size
 Set a specific printer PDF writers work best!
- Print maps, drawing items, tables, and insets
- Add titles, legends, etc.
 - » Title / Project reference » Date run
- » Model run source
- » Model run year» Map created by
 - ated by Legend (colors, labels, etc)
 - CAMBRIDGE SYSTEMATICS

» Date created
Practice 6: Create a Layout with your map

- 1. Start with the results from Practice 5
 - Open the saved map if needed
- 2. Create a new layout using File \rightarrow New or \square
 - Check the page settings with File \rightarrow Properties or $\circle{2}$
 - Select a printer and page size
 - Set to landsape
 - ✓ Important: Un-check Change size of items when page size changes
- 3. Add your map to the layout using
 - Draw a box to place the map
 - Select Map, check 'Use actual point sizes'
 - Optionally un-check 'Keep map's aspect ratio'
 - Click 'OK'
- 4. Position and edit the legend
 - Use the pointer tool (<a>b
 - Drag the legend to a good location
 - Double-click to edit legend text and contents
- 5. Add a legend title
 - Use the 'Freehand Text' tool (A), usually at the bottom of the window
 - Drag a box, then type a title
 - ✓ Use the pointer to reposition, double-clicking to edit

Layout Properties
General
Title Untitled
Stored in: None
Printer
Name: Adobe PDF Properties
Status: Ready
Type: Adobe PDF Converter
Where: Documents*,pdf
Comment:
Page Orientation
Size: Letter Portrait
Dimensions:
1 🖶 Pages Across 1 🚔 Pages Down 💿 Landscape
Change size of items when page size changes
Margins (în inches)
Top 0.250 🚖 Bottom 0.250 🚖 Left 0.250 🖨 Fight 0.250 🚖
OK Cancel





Assignment Results

Basic Volumes

- » Located on the Loaded Network
- » Assign\Output\scag_network_loaded.dbd
- Volume and Travel Time for:
 » Each Period (AM, MD, PM, NT, EVE)
 - » Total daily



Assignment Results



Assignment Results

- Detailed Results include:
 - » Basics:
 - Total Flow
 - Flow by class (e.g., drive alone, shared ride, truck)
 - Travel time and speed (congested time by period)
 - Extras / Statistics:
 - VMT (called V_Dist_T)
 - VHT
 - Volume to Capacity Ratio ("VOC")
 - PCE Values
 - » Select Link / Zone Results
 - Only present if mode was run with assign\Inputs\SelectLink.qry

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Practice 7: Review Assignment Results

- 1. Open the output roadway network
 - ✓ Use File → Open
 - Browse to Assign\Outputs\scag_network_loaded.bin
 - Review the built-in assignment results
- 2. Open the detailed assignment results
 - ✓ Use File → Open
 - Browse to Assign\Outputs\day_flow.bin
- 3. Create the join from Dataview \rightarrow Join or 3
 - Left side: link layer and 'ID'
 - Right side: day_flow and 'ID1'
 - Click 'OK'
 - ✓ Remember: Do not close the joined view.
- 4. Use the info tool to review the results

Challenge: Apply what you've learned

5. Label the links with the % share of vehicles that are "Drive Alone" (Hint: create a formula field)

6. Try creating a bandwidth (scaled symbol) theme showing directional volume (hint: Use 🔆)





User Variables

Creating your own variables

- » Additional fields can be added to links & nodes layers
- » Field names can contain spaces and numbers, and do not have a practical limit to the number of characters

» HOWEVER…

User Variables

Creating your own variables

» It is preferable to:

- Limit field names to 10 characters
- Avoid using spaces
- Avoid starting a field name with a number
- » If these guidelines are followed, compatibility with other GIS programs will be improved
- Field names that do not follow these guidelines will have truncated or confusing names when exported to a shapefile

Centroids

- Centroids are special nodes that are linked to socioeconomic data
 - » SCAG's Model has three tiers of TAZs
 - Tier 1: Least amount of detail
 - Tier 2: More detail

• Tier 3: Used for subarea models. » TAZ numbers match the TAZ

layer, data tables, and matrices

 Sometimes, files use sequential TAZ numbers instead!

THE Humbers instead.



Centroids

Nodes are identified as centroids using the following rules:

Field Name	Contents
Tier1TAZ	User friendly nested TAZ ID numbers
Tier2TAZ	(sequenced by county, type, etc)
ZoneType_Tier1	Internal, External, Airport, or Seaport
ZoneType_Tier2	
Internal_sequence_id_T1	TAZ numbers used internally by
Internal_sequence_id_T2	TransCAD – but important to model users

Tiered TAZ Structure





Routable Networks

- By themselves, geographic files are not "routable"
 - » A network file (.net) must be created before certain actions can be done
 The SCAG Model creates this automatically
 - The SCAG Model creates this automatically
 To increase efficiency, only selected variables are
- contained in the network file
- The routable network can also include turn penalties and prohibitions
- » By default, the SCAG model does not use turn penalties



- For a working network, only length needs to be included
 Other variables as necessary
- ➤ Networks/Paths → Settings can be used to change additional network properties

Routable Networks

- Shortest Paths
 - » Use Networks\Paths → Shortest Path to see how TransCAD routes traffic based on time, length, and turn penalties
 - » A ".net" network is required (Optional in TransCAD 6)
 - In TransCAD 6, a using .net network will allow more functionality
 - The network must contain all variables of interest
 More variables can be added to the network later if needed



Routing on the Network

- Shortest Paths
 - » The shortest path is based on the selected variable
 » Other variables can be tracked, or "Skimmed"

along the way



Practice: Shortest Paths

- 1. Close all files and start with a clean workspace
- 2. Open the output roadway network
 - ✓ Use File → Open
 - Browse to Assign\Outputs\scag_network_loaded.bin
 - Review the built-in assignment results
- 3. Create a ".net"network
 - Include FreeTime, AMTIME, and MDTIME
 - ✓ These are directional fields
- 4. Find the shortest path between two points
 - Try using intermediate points to find the difference between the shortest and next shortest path
 - ✓ Build a path through a centroid connector
- 5. Select centroid nodes

82

82

- ✓ Tier1TAZ > 0 or Tier2TAZ > 0 (node layer)
- ✓ Use Networks/Paths → Settings to identify centroid connectors in the network file
- 6. Try to build a path through a centroid connector
- 7. Discussion: How might this tool be useful?
 - ✓ For model troubleshooting
 - To answer policy questions





Routable Networks

Creating a skim matrix
 Build shortest paths between all zone pairs

 Technically: Builds shortest paths between two sets of selected nodes

 Allows user to specify attributes to "skim" along the paths

 Saves results in a zone to zone matrix file
 Accessed from Networks/Paths + Keiter and the paths
 Accessed from Networks/Paths + Keiter and the paths



Network Editing



Network Editing

- Once you have made a backup, you can:
- » Edit attributes of existing links
- » Change data for a specific year or for multiple vears and alternatives
- » Add new links, delete existing links, or realign existing links
- » Add data for a year not yet included in the network

Network Editing

- Edit attributes of existing links » Display settings can assist with editing
- Additional labels and/or themes can be useful
- » Label # of lanes or other values
- » Show Topology (🤧) to see AB vs. BA

Network Topology

Show topology to identify AB and BA directions



- To identify one-way roads, use the DIR field:
- » 0: Two-way travel
- » 1: A → B travel
- » -1: B → A travel

Network Editing

Edit attributes of existing links – Method 1 » To make most edits, use the information tool (1) and edit text in the form that appears » Changes can be undone Each edit action creates an undo poin » You can select and fill multiple links with the information tool Multiple values can be filled by right-clicking on row names i i i i i i i i i i i i i i i i



Practice: Network Editing

- Open the input network file
- Make a backup copy of this network in a folder called "Backup"
 - » Use Tools \rightarrow Geographic Utilities \rightarrow Geographic File and archive the network
 - » Add the date to the backup filename
 - » Edit the original network file
- Try using the different editing approaches to:
 - » Change the facility type
 - » Widen a Road

Practice: Network Editing

- Show Topology on the network
- Change a roadway to represent a different number of lanes in each direction
- Change a different roadway to a one-way road



Network Editing

- Adding new links
- » Use the map editing toolbox (🚮)
- » Add links using Add Line (
 - To work properly, links must be connected at nodes
- Existing links may need to be split
- Avoid splitting links if possible
- » Make sure that links are connected by:
- Saving edits
 - Moving a node around do all of the attached links move with it?
 - Canceling the edit



Practice: Network Editing

- Continue editing the input network
- Add, delete, and realign some links
 - » Show topology: Note that the way a new link is created defines its AB direction
- Copy link values from an old road to newly created links
- Split and join links
 - » look at the data that appears on each half
- » Look at the network editor settings ()



- Things to keep in mind:
 - » When splitting links, make sure the data on both pieces still makes sense
 - » When adding new roadways, adjust centroid connectors if necessary
 - Adding detail or making corrections?
 You may need to make edits to base and forecast
 - networks



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TransCAD Tools for Caltrans District 7

presented to Caltrans District 7 presented by Cambridge Systematics, Inc. Sean McAtee & Chao Wang

November 1st and 2nd of 2016

Agenda

Data Extraction for the Air Quality Analysis (Day 1)

- » Overview
- » Input and Output
- » Demonstrations and Exercises
- » Discussions on improving the tool

Transportation Concept Reports (Day 2)

- » Discussions on TCR report needs
- » Discussions on designing the tool



SR - 118



Flow Chart

Data Extraction for the Air Quality Analysis

Prepare Input Files (Project links and associated information) Convert Excel files to Bin files **Extract Traffic Assignment Results** (Using the GISDK script) Copy CSV files to Excel template files Formatted AQ Data to be transferred to the AQ Analysis Staff





Input

The input file contains

- » Project link number
- » TransCAD link ID
- » Topological direction
- » Link length
- » Route number
- » Facility type
- » Post Mile etc.

The order of the records







Four CSV Files

- » Two freeway csv files, one for each direction
- » One ramp csv file
- » One arterial csv file

Copy to the Excel Template File

» Copy values only



Exercise 1: Run the AQ Tool

Install the AQ Tool (TransCAD Add-ins) Run the tool Examine the results



Exercise 1-1: Install the AQ Tool

- Step 1: In TransCAD, click Tools \rightarrow Setup Add-Ins
- Step 2: In the Setup Add-ins window
 - » Click the button "Add"
 - » For Settings → Type, select "Dialog Box"
 - » For Settings → Description, enter a description of the tool
 - » For Settings → Name, enter "Air Quality Data Extraction" (must be exactly the same, case sensitive, no quotation marks)
 - » Click the "Browse" button to specify the UI Database, which is "d7_airquality_dataextraction.dbd" in the folder of "\Tool".
 - » Click the "OK" button to close the window.



Exercise 1-2: Run the AQ Tool

- Step 3: Select the tool from Tools \rightarrow Add-Ins
- Step 4: Specify the inputs and output folder, and click "Run" to run the tool
 - » Project Link ID file is "\Input\Project Link List for SR-118.bin"
 - » SCAG Traffic Assignment Folder is "\Files_from_D7\2035Bld Alt 2\Assign\Outputs\"
 - » Output Folder is "\Output\"

Cal	trans D7 Air Quality Data Extraction	
	Select Files or Folders	
	Project Link ID File: C:\Uv1\Input\Project Link List for SR-118.bin Browse	
	SCAG Traffic Assignment Folder: C:\U <mark>.les_from_D7\2035Bld Alt 2\Assign\Outputs\</mark> Browse	
	Output Folder: C:\U\AirQuality\AQ_Data_Extraction_v1\Output\Browse	
	Run Quit]

Exercise 2: Create the Final Output

Copy the results to the template Check the results



Exercise 2: Create the Final Output

- Step 1: Make a copy of the template and rename it
 - » The template file is \Input\Air Quality with Soundwall Data1_Template.xlsx
- Step 2: Open the csv files* in Excel and copy <u>values</u> to the corresponding spreadsheet in the Excel file from Step 1
 - » E.g. copy the content (without the first row) in "Project Link List for SR-118_Route118_East.csv" to the spreadsheet of "Freeways East" in the Excel file from Step 1
 - » When copy from the CSV file, use the following tips to select the content faster
 - Click on Cell A2 (first column second row to leave out the title row), then use Ctrl + Shift + → (pressing three keys together) on the keyboard to select all columns, then use Ctrl + Shift + ↓ to select all rows from Row 2.
 - » When paste to the Excel file, paste values only to preserve the format in the Excel file. To do that, right click the cell where you want to paste in Excel and choose 12 in the popup window.



Exercise 3: Prepare Input Files

- Add records
- Remove records
- Re-order records

Export to CSV files, correct the files in Notepad++

Export to Bin files and modify the data type in TransCAD



Exercise 3-1: Add Records

- Step 1: In Excel, open the project list file and go to the spreadsheet "Fwy+Arterial-Sort"
 - » The project list file is \Input\Preparation\Project Link List for SR-118 Working File.xlsx
- Step 2: In TransCAD, open the highway network, navigate to the east end of SR-118
 - The highway network is \Files_from_D7\2035Bld Alt 2\networks\Inputs\15t35nb_links.dbd



Exercise 3-1: Add Records

Step 3: add the two highlighted links to the end of the Excel file opened in Step 1. The critical attributes are: SCAG_Link_ID, Facility_Type and Direction, which are shown below. Try and see if you can get such information from the TransCAD network.



ID	Project_Link_Number	Topology	SCAG_Link_ID	Length	Route_Number_Street_Name	Facility_Type	Direction
300	300	AB	2667607	0.682121	118	FwyMF	Eastbound
301	301	AB	2679024	0.136594	COCHRAN ST	Secondary Arterial	Eastbound



Exercise 3-2: Drop Records

Step 1: Open the warning message file

- » This file was generated by the AQ tool, and it is \Output\Air Quality Data Extraction Warning Message.txt
- Step 2: Based on the warning message file, remove duplicate records in the project list Excel file, which is the file opened at Step 1 of Exercise 3-1.
 - » We should investigate why we have duplicate records in the project list. But as an exercise, just keep the first record of each group of duplicate records.



Exercise 3-3: Re-order Records

- Re-order the records in the project list Excel file opened at Step 1 of Exercise 3-1. The project link list should be ordered to facilitate the communication. Some general rules are:
 - » For freeway links, list the links following the flow direction. For example, for the west bound of SR-118, list the farthest east link first, then links to its west.
 - » For ramp links, group the links by the interchange they serve. List the ramp links for the farthest west interchange first if the ramps are serving a east-west bound freeway, or the farthest south interchange first if the ramps are serving a north-south bound freeway. Within each group, list the ramp links following a clockwise order with the ramps to the north listed first.
 - » For street links, group the links by street. List the farthest west street first if the streets are intersecting with a east-west bound freeway, or the farthest south street first if the streets are serving a north-south bound freeway. Within each group, list the links following the west to east order, or the south to north order.
 - » Users can create new fields in the project list Excel file to help order the records.



Exercise 3-4: Export to CSV Files

- Step 1: Save the spreadsheet "Fwy+Arterial-Sort" as a CSV file (Comma-delimited)
- Step 2: In Notepad++, open the CSV file from Step 1, and modify the file so that each line starts with the ID number
 - » In the example shown below, delete the line breaks that are highlighted

25,136,AB,100213,0.148957,First St.,Secondary Arterial,Northbound,0,,,,,"Off Ramp from Eastbound SR-118/ Northbound /Northbound First St. Onramp to Eastbound SR-118",,"Southbound First St. Onramp to Eastbound SR-118",FALSE 26,137,AB,100214,0.026584,First St.,Secondary Arterial,Northbound,0,,,,Southbound First St. Onramp to Eastbound SR-118,,"Southbound First St. Onramp to Westbound SR-118",FALSE 27,138,AB,100216,0.08549,First St.,Secondary Arterial,Northbound,0,,,,"Southbound First St. Onramp to Westbound SR-118", Northbound First St. OnRamp to Westbound SR-118, FALSE 28,139,AB,126629,0.032878,First St.,Secondary Arterial,Northbound,0,,,,Northbound First St. OnRamp to Westbound SR-118,,Offramp from Westbound SR-118,FALSE 29,140,AB,126625,0.008892,First St.,Secondary Arterial,Northbound,0,,,,,Offramp from Westbound SR-118,,Innovators Way/Simi Town Center Way,FALSE



Exercise 3-5: Export to BIN Files

- Step 1: In TransCAD, open the CSV file created in Exercise 3-4
- Step 2: Save it as a BIN file
- Step 3: Close all files in TransCAD
- Step 4: In TransCAD, open the BIN file generated at Step 2.
- Step 5: Click Dataview → Modify Table to bring up the "Modify Table" window.
- Step 6: Change the type for fields "ID", "Project_Link_Number" and "SCAG_Link_ID" from Character to Integer (4 bytes)

Gold Name	Tuno	Midth	Deei	Index	Default	Format	Display	ОК
	Character	51	Deci	Index	Derault	None	Display	Cance
D Project Link Number	Character	24				None	_	Cance
	Character	52		<u> </u>		None		Add Fie
CAG Link ID	Character	7		<u> </u>		None		Drop Fie
enath	Real (8 bytes)	15	4			None		Movel
Route Number Street Name	Character	22				None	-	Marco
Solity Type	Character	23		<u> </u>		None		Move Do
aciiity_Type	Character	12				None		Attach Co
Solity Type Order	Character	22				None		
	Character	23		<u> </u>		None		Drop Coo
tamp_servinginterchange	Character	10		<u> </u>		None		Export Co
	Character	10				None	_	Accordent
Namp_ServingDir	Character	24				None	-	Aggregat
Degin_or_Link_PostMile	Character	24				None		
Ted of Liels DestMile	Character	00				None		
nd_of_Link_Postiville	Character	3		<u> </u>		None		
and_or_Link_Description	Character	69				None	_	
um Penalized	Character	/				None		
()		1					P.	

Exercise 3-5: Export to BIN Files

Reference for data type

Туре	Contents
Real (8 bytes)	Numbers (with decimals) ranging from -1.7E+308 to 1.7E+308; the smallest absolute value being 2.3E-308
Real (4 bytes)	Numbers (with decimals) ranging from -3.4E+38 to3.4E+38; the smallest absolute value being 1.2E-38
Integer (4 bytes)	Whole numbers between -2,147,483,646 and 2,147,483,647
Integer (2 bytes)	Whole numbers between -32,766 and 32,767
Integer (1 byte)	Whole numbers between 0 and 254
Character (string)	Letters, symbols, and numbers



Discussions





CAMBRIDGE SYSTEMATICS



TransCAD Tools for Caltrans District 7

presented to Caltrans District 7 presented by Cambridge Systematics, Inc. Sean McAtee & Chao Wang

November 1st and 2nd of 2016





Access Database for Transportation Concept Reports (TCRs)

- » Discussions on TCR report needs
- » Discussions on designing the tool



Improvements to the AQ Tool

- Automate the process to select project links
 - » Fully automated, or
 - » Interactive
- Extract link information from the network automatically, such as the length, and facility type etc.
- Check for errors



Flow Chart

Access Database for TCRs





Flow Chart

TranCAD Tool for TCRs





TCR Output

1 Basic System Operations

For Model Base Year and Model Plan Year

- » Daily total vehicle flow
- » Level of Service (LOS)
- » Daily vehicle miles traveled (VMT)


TCR Output

2 Model Plan Year Concept Summary

For Model Plan Year Only

- » Daily total vehicle flow
- » Peak hour directional split
- » Peak hour total flow (both directions)
- » Peak hour truck vehicle flow (both directions)
- » Peak hour truck percent
- » V/C ratio and LOS
- » Total lanes
- » Lanes required to achieve LOS D and LOS F0



TCR Output

3 Base Year Truck Volumes by TCR Segment

From Counts, not from Model

- » Total Vehicle Annual Average Daily Traffic (AADT)
- » Total truck AADT
- » Truck percent
- » 5+ Axle truck AADT
- » 5+ Axle truck percent

	Gifrans	Base Year	200	8 Trucl	k Cou	nt Da	ta
	CHERSTATE CALIFORNIA 5	TCR Segment Number	Total AADT	Truck ADT	Daily Truck Percent	5+ Axle Truck ADT	5+ Axle Trucks as Pct of All
		1	193,667	16,216	8.4%	6,394	39.4%
		2	221,200	17,713	8.0%	7,201	40.7%
		3	238,750	17,129	7.2%	7,339	42.8%
		4	235,250	15,654	6.7%	7,917	50.6%
		5	241,250	14,980	6.2%	8,780	58.6%
		6	256.250	15,587	6.1%	9,366	60.1%

TCR Details

- Conventional Highway vs. Freeway State Routes
- Determination of Peak Hour and Peak Direction
- Average Travel Demand Volumes weighted by Link Length

$$V = \frac{\sum_{i=1}^{n} l_i \cdot v_i}{\sum_{i=1}^{n} l_i}$$



Discussions



