

Workshop on CAREC Corridors Performance Measurement and Monitoring

Time-Cost-Distance Methodology (TCD) and Issues on TCD Methodology Implementation



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ADB TA 6437

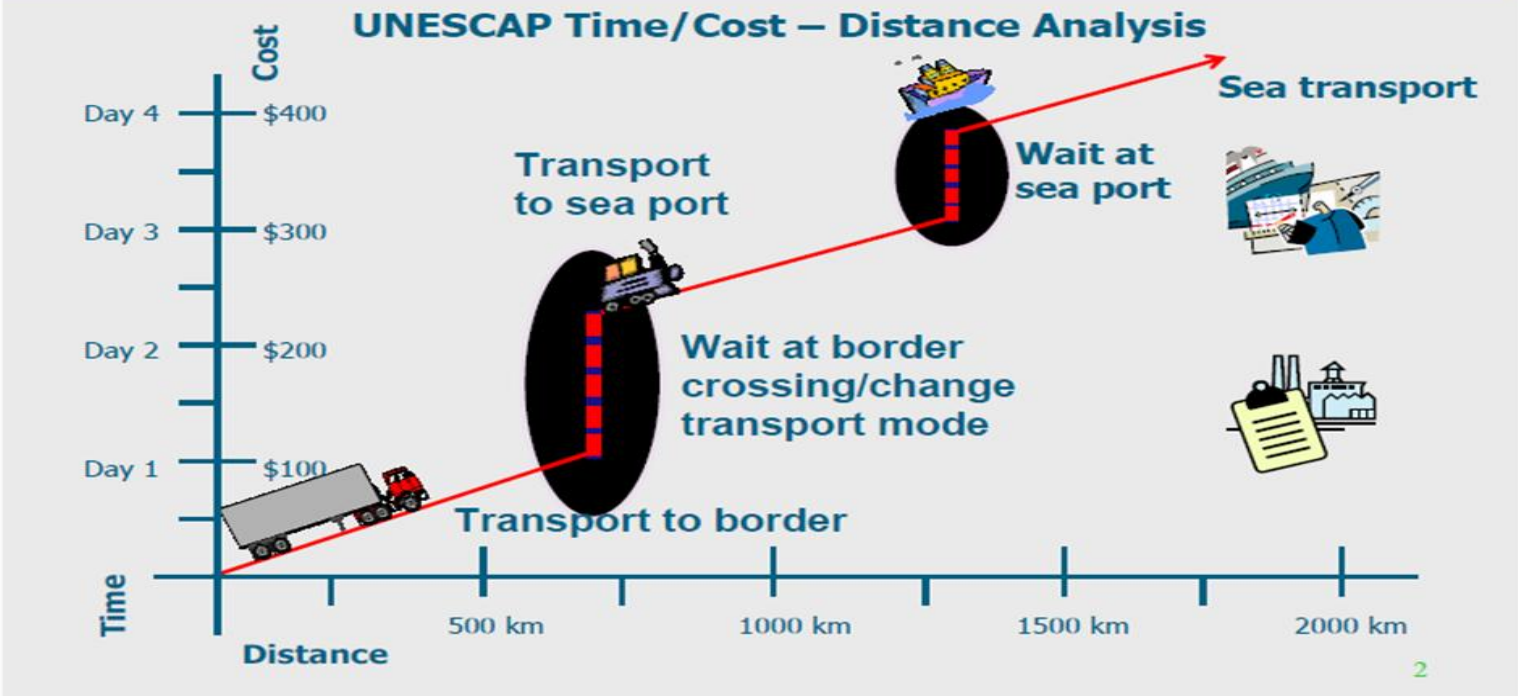


Objectives

1. To introduce the TCD method
2. To understand the use of CAREC Drivers' Form
3. To understand the use of MS Excel Template
4. To interpret the results of the data and graph
5. To practice on the MS Excel Template



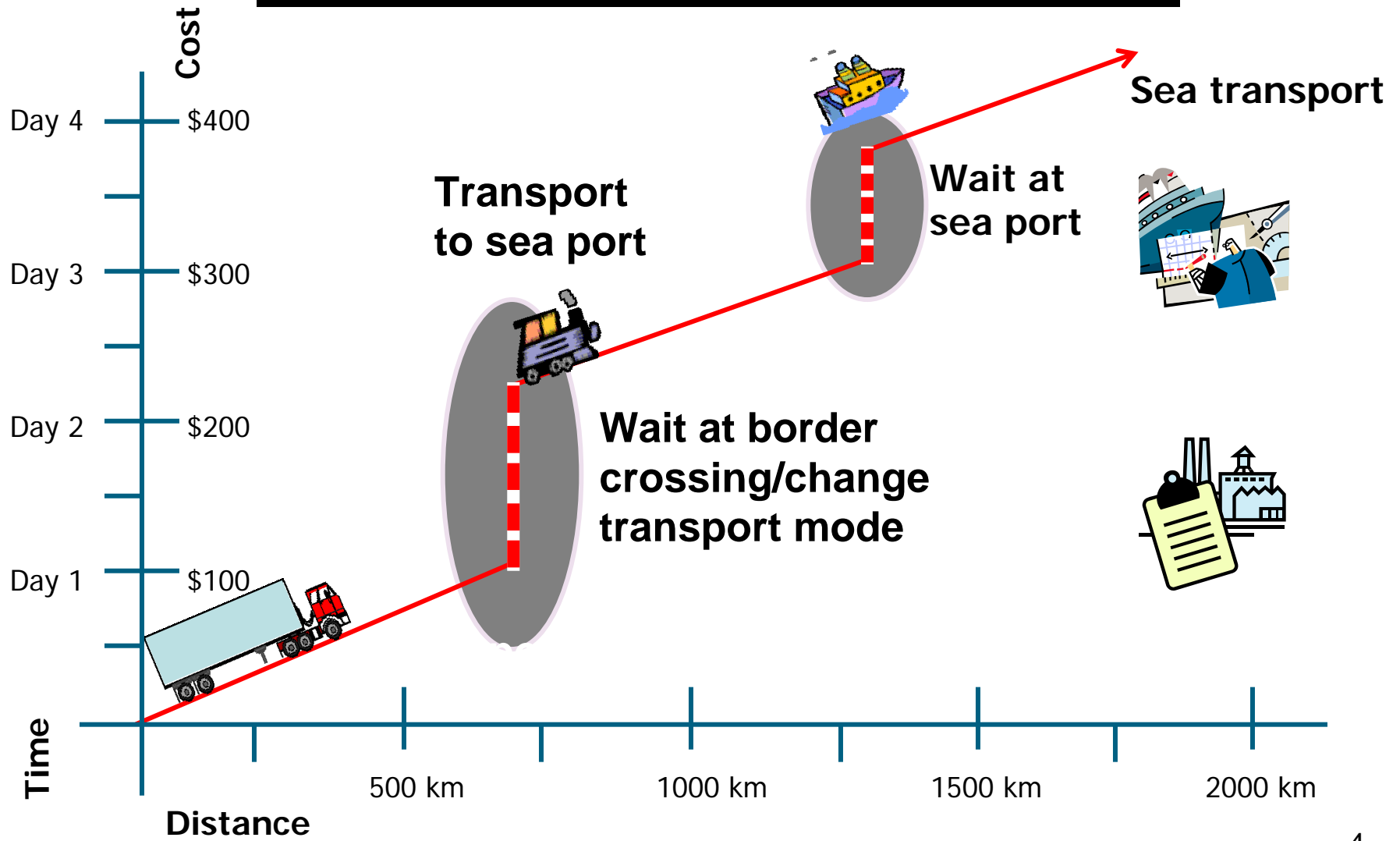
A Tool to Analyse Bottlenecks



Introduction of TCD Method

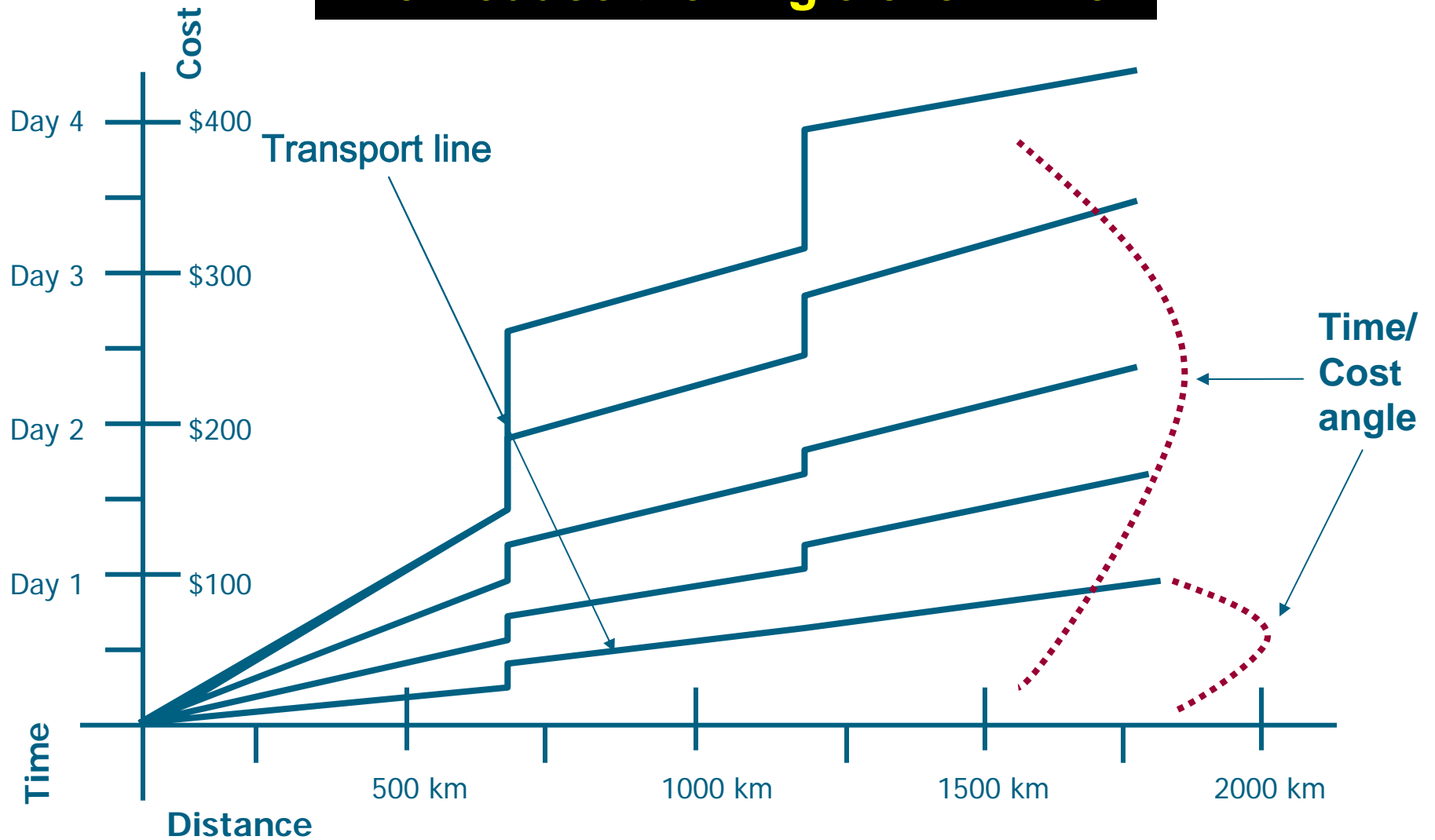


Time/Cost – Distance Analysis



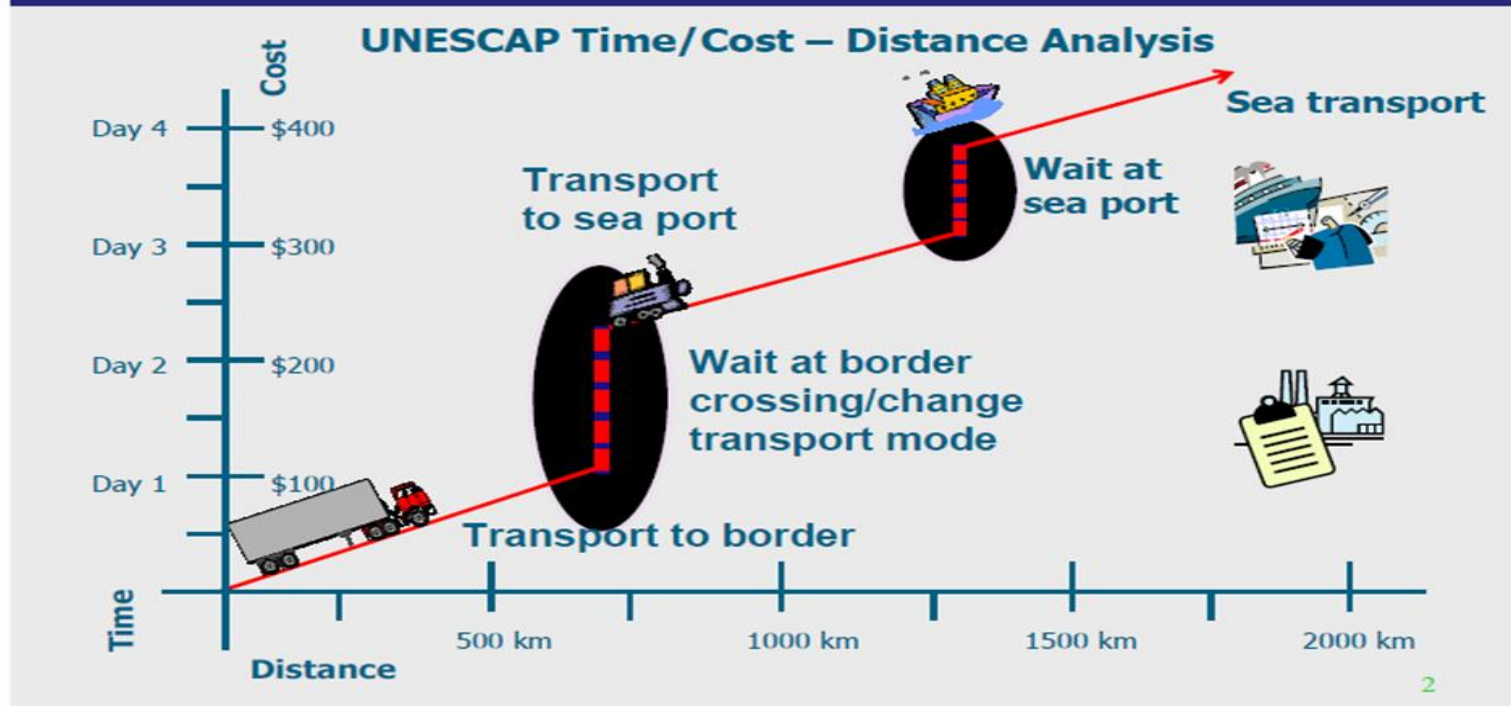


To Reduce the Angle over Time





A Tool to Analyse Bottlenecks



Use of Drivers' Form



DRAFT(Attachment A)

Corridor Performance Measurement and Monitoring Project Data Collector's Form

Please fill out the questionnaire below and return it to _____. Based on the data you submit, we will analyze the reasons for the bottlenecks and constraints to the smooth flow of goods in the region. The results of this analysis will be presented to the public and private sectors who can prepare strategies to remove such bottlenecks/constraints. Thank you very much.

Part A

Instructions for Part A *(may be filled up by the data collector or transport association liaison officer)*

1. *Shipment Code No.:* This box is to be filled up by the association and is needed for easier consolidation of the data that would be gathered from this survey.
2. *"Nationality of driver" and "Country of vehicle registration"* refer to transport by road only. In case of multimodal transports along the route please indicate the nationalities of all drivers and vehicles involved.
3. *"Pick up start date" and "Delivery date"* refer to the dates when the transport physically leaves its place of departure and when the goods or last batch of goods physically arrive at their destination.
4. *Start and End Odometer Readings:* Please record the odometer reading at the place of origin and at the place of final destination.
5. *Route description:* Please write down, in chronological order, the place of origin, the main cities/towns that were passed, including major junctions and corridor numbers, and then the place of final destination.
6. *Goods:* Please enter the type of goods transported. If there is more than one type of goods, please specify each type.
7. *Quantity:* Please write down the quantity of goods transported. If there is more than one type of goods, please indicate the quantity for each type of good.)

The CAREC drivers' form is modified from the MS Excel template, to simplify data recording for drivers.

There are 10 legs in one **SET** of forms. You can use less than that, or photocopy more if there are many legs in a corridor.



8. "Was the transport performed under an international transit system (e.g. TIR, NCTS)?" Please tick the correct box. Moreover, please specify which international transit system was applied.
9. "Additional information on road transport vehicle" Please provide information on the make and capacity of the transport vehicle

To be filled by Association

Shipment _____ Code _____ No. _____

Nationality of driver: _____ Country of vehicle registration _____

CCP* 1

Record the shipment code number to identify the correct shipment across border.

* **CCP** stands for **Critical Control Points**. These are key validation methods in the entire data collection and analysis process, to detect errors and avoid them from affecting downstream process.



In case of multimodal transportation:

<i>Nationality of Driver</i>	<i>Mode of transportation</i>	<i>Kind of vehicle used</i>

Pick up start date _____ Delivery date: _____

Start Odometer Reading	_____	End Odometer Reading	_____
Length of Vehicle (m)	_____	Number of Axles	_____
		Payload (tons)	_____

Route Description: _____

Goods being transported	Quantity: (Tons)	Delivery date
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Was transport performed under an international transit system (e.g. TIR, NCTS, safe packet, etc)

Yes No

If yes, please specify transit system _____

Additional Information on Road Transport Vehicle

Manufacturer of vehicle: _____

CCP* 2
Record the actual start and end odometer readings for the entire journey

For multiple products, indicate the top 5 products in terms of tonnage in the truck/rail.



Leg 1

To be filled by Association

Shipment _____ Code _____ No. _____

Name of the place and country of your 1st stop _____

Please indicate the following values from previous stop to this stop

Distance (km)	Time (hours, mins)	
←		

Indicate the actual distance from the this leg to next leg, using the odometer.

What mode of transport did you use for this leg?

<input type="radio"/> Road	<input type="radio"/> Rail	<input type="radio"/> Ship	
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This value should be '0' for the LAST leg.

Did you use a container in transporting your cargo in this leg?

Yes No

Why did you stop?

<input type="radio"/> Intermediate Stop	<input type="radio"/> Exit Border	<input type="radio"/> Enter Border	<input type="radio"/> Final Destination
---	-----------------------------------	------------------------------------	---



If the reason for stop is any of the given options (A to N), you just need to put a tick '√' on the option box provided.



What activities did you do at this stop:		
Activity	Duration (Hours, Minutes)	Cost (Local currency)
<input type="checkbox"/> Refuelling		
<input type="checkbox"/> Meals		
<input type="checkbox"/> Rest/Overnight Stay	←	
<input type="checkbox"/> Police Checkpoint		
<input type="checkbox"/> Vehicle Repair		
<input type="checkbox"/> Detour		
<input type="checkbox"/> Escort		
<input type="checkbox"/> Filling up of Documentation		
<input type="checkbox"/> Customs Inspection		
<input type="checkbox"/> Health Inspection		
<input type="checkbox"/> Quarantine		
<input type="checkbox"/> Applying for Visa		
<input type="checkbox"/> Loading/Unloading		←
<input type="checkbox"/> Others, please specify:		

An activity is only valid if it takes at least 15 minutes to complete. If your activity is less than 15 minutes, it is not necessary to record it.

You can record any cost in local currency. If payment made in US\$, please write 'US\$'.



Facilities available at the stop: L

<input type="checkbox"/> Warehouse	<input type="checkbox"/> Container Terminal	<input type="checkbox"/> Trucking Terminal	<input type="checkbox"/> Port
<input type="checkbox"/> X-Ray Machine	<input type="checkbox"/> Electronic Processing	<input type="checkbox"/> Hotel	<input type="checkbox"/> Bank
Others (pls. specify)			

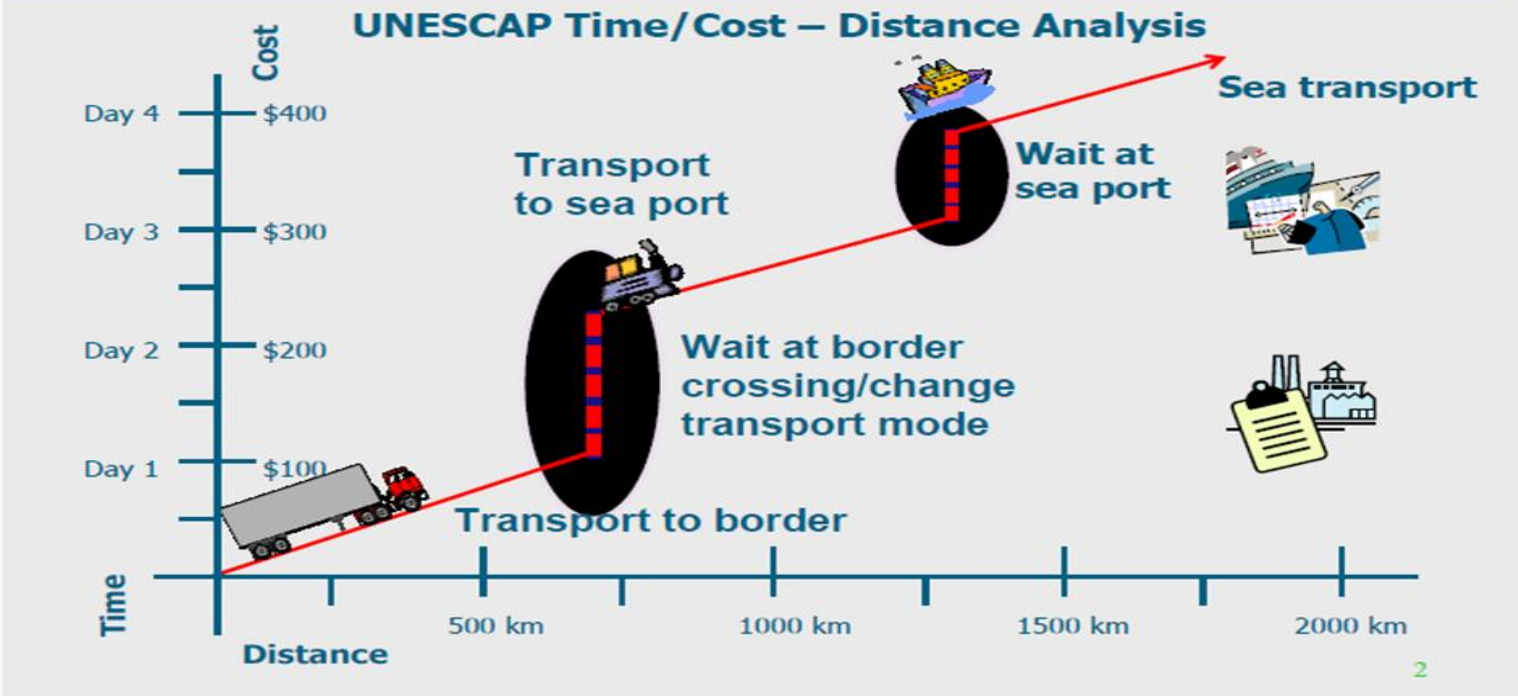
You need to observe the facilities available at each stop. Please tick those facilities you saw.

Comments: _____

Do give as much details as possible for the journey and stop. Examples are "road blocks" etc.



A Tool to Analyse Bottlenecks



Use of MS Excel Template



Microsoft Excel - EN_0807_TCD Black Sea Caravan_Part 1 until 27 April 2007 incl. cost

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	A	B	C	D	E	F	G	H	I	J	K	L	M
1			Black Sea Ring Highway Caravan										
2			Questionnaire for Application of UNESCAP Time/Cost-Distance Model										
3													
4													
5		a	Date of questionnaire completion:		30-Aug-07								[date of filling out the questionnaire]
6		b	Route description:		Istanbul (Turkey), Samsun (Turkey), Trabzon (Turkey), Batumi (Georgia), Poti (Georgia), Yerevan (Armenia), Baku (Azerbaijan), Novorossiysk (Russia), Rostov-on-Don (Russia), Taganrog (Russia), Mariupol (Ukraine), Melitopol (Ukraine), Odessa (Ukraine), Chisinau (Moldova), Bucharest (Romania), Constantza (Romania), Haskovo (Bulgaria), Sofia (Bulgaria), Nish (Serbia), Belgrade (Serbia), Tirana (Albania), Edirne (Turkey), Komotini (Greece), Alexandroupolis (Greece), Istanbul (Turkey)					[detailed route description]			
7		c	Goods:		not specified								[type of good(s) transported]
8		d	Quantity:		not specified								[TEU]
9		e	Nationality of driver:		12 drivers from Albania, Armenia, Azerbaijan, Bulgaria, Georgia, Greece, Moldova, Romania, Russia, Serbia, Turkey and Ukraine					[Only applicable when road]			
10		f	Country of vehicle registration:		not specified								[Only applicable when road]
11		g	Effective date of transport start:		19-Apr-07								[date when transport leaves the place of departure]
12		h	Effective delivery date of goods:		28-May-07								[date when transport reaches the final destination]
13		i	Was the transport performed under an international transit system (e.g. TIR, IICTS)?		not specified								[yes/no, please specify the type of international transit system applicable]
14		j	Overall distance of route:		2494								km
15		k	Overall costs:		20,790.07								USD
16		l	Overall duration:		9.15								days
17													
18													
19													
20													
21													

PART A - General Questions / PART B - Route / Graph Time-Distance / Graph Cost - Distance / Graph - All-in-One / Graph Average Speed

Indicate the key cities / border posts for the entire journey

Record distance, cost and time for the entire journey

The worksheets "Part A - General Questions" and "Part B - Route" require your input information. Please fill out the highlighted cells only.



Distance to Next stop.



Microsoft Excel - EN_0807_TCD Black Sea Caravan_Part 1 until 27 April 2007 incl. cost

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R11 Exit Border Crossing

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD				
				LEG 1			LEG 2			LEG 3			LEG 4																					
3	Place of departure	Name of city:	Belgrade	Parking Area on Highway Belgrade-Nis			Kragujevac			Zakumsko																								
4		Name of country:	Serbia	Serbia			Serbia			Serbia																								
5	Mode of Transport		road	road			road			road																								
6	Distance to next stop		80 km	42 km	269 km	1 km																												
7	Duration of travel		1 hrs 15 min	0 hrs 45 min	6 hrs 30 min	0 hrs 15 min																												
8	Costs per leg (while en route, in USD)		\$477.20	\$357.90	\$1,262.20	\$4.66																												
9	Place of next stop	Name of city:	Parking Area on Highway Belgrade-Nis	Kragujevac			Zakumsko			Bijelo Polje																								
10		Name of country:	Serbia	Serbia			Serbia			Montenegro																								
11	Reason for stop		Place of departure			Intermediate Stop			Exit Border Crossing			Entry Border Crossing																						
12	Description of stop	Activity A at stop	Type of activity	Duration	Costs	Type of activity	Duration	Costs	Type of activity	Duration	Costs	Type of activity	Duration	Costs																				
13		Waiting time*	4 hrs 0 min	\$0.00	Overnight stay (incl. accomodation and dinner)	9 hrs 15 min	\$629.00	Waiting time barrier	hrs 15 min	\$0.00	Waiting time barrier	1 hrs min																						
14		Activity B at stop	Parking fees, Highway tools, Customs formalities at the departure	0 hrs 0 min	\$512.00					Crossing procedures for loaded truck	hrs 30 min	\$0.00	Crossing procedures for loaded truck	2 hrs min																				
15		Activity C at stop		hrs min	\$0.00						hrs min	\$0.00																						
16		Activity D at stop		hrs min							hrs min	\$0.00																						
17		Activity E at stop		hrs min							hrs min	\$0.00																						
18		Activity F at stop		hrs min							hrs min	\$0.00																						
19		Activity G at stop		hrs min							hrs min	\$0.00																						
20			4 hrs 0 min	\$512.00	9 hrs 15 min	\$629.00	0 hrs 45 min	\$0.00	6 hrs 0 min																									
21	Description of actions taken (e.g. procedures, formalities applicable to the section of the route).		Initial departure time at 16:15 pm			To reach Kragujevac: Leaving the Highway, following a 2 lanes road			Start again at 7:30 am			BCP organized for goods and passengers for lane for trucks exit, 1 lane for passengers exit for trucks entry, 1 lane for passengers entry office for passports registration served by 1 computers (police officers are collecting pas from both exit/entry lanes and enter the offic																						
22			Modern parking with all facilities: fuel, restaurant, toilets, etc.			Night rest in Motel			Brief intermediate stops at Cacak (km 177) and Novi Pazar (km 310)																									
23			*Wait for truck and leader in charge with customs formalities			Cost of fuel/leg= 60km x 12.25trucks x 380/100km x 1USD/= 279.30USD			BCP organized in containers; 1 lane for exit, 1 lane for entry																									
24						Cost at final tools at 100km=200km x																												

PART A - General Questions | PART B - Route | Graph Time-Distance | Graph Cost - Distance | Graph - All-in-One | Graph Average Speed | Data Average Speed | Graph - Time comparison

Do not enter the cost per leg. The cost will be captured under 'Activities'.

Do record as much details as possible



Time

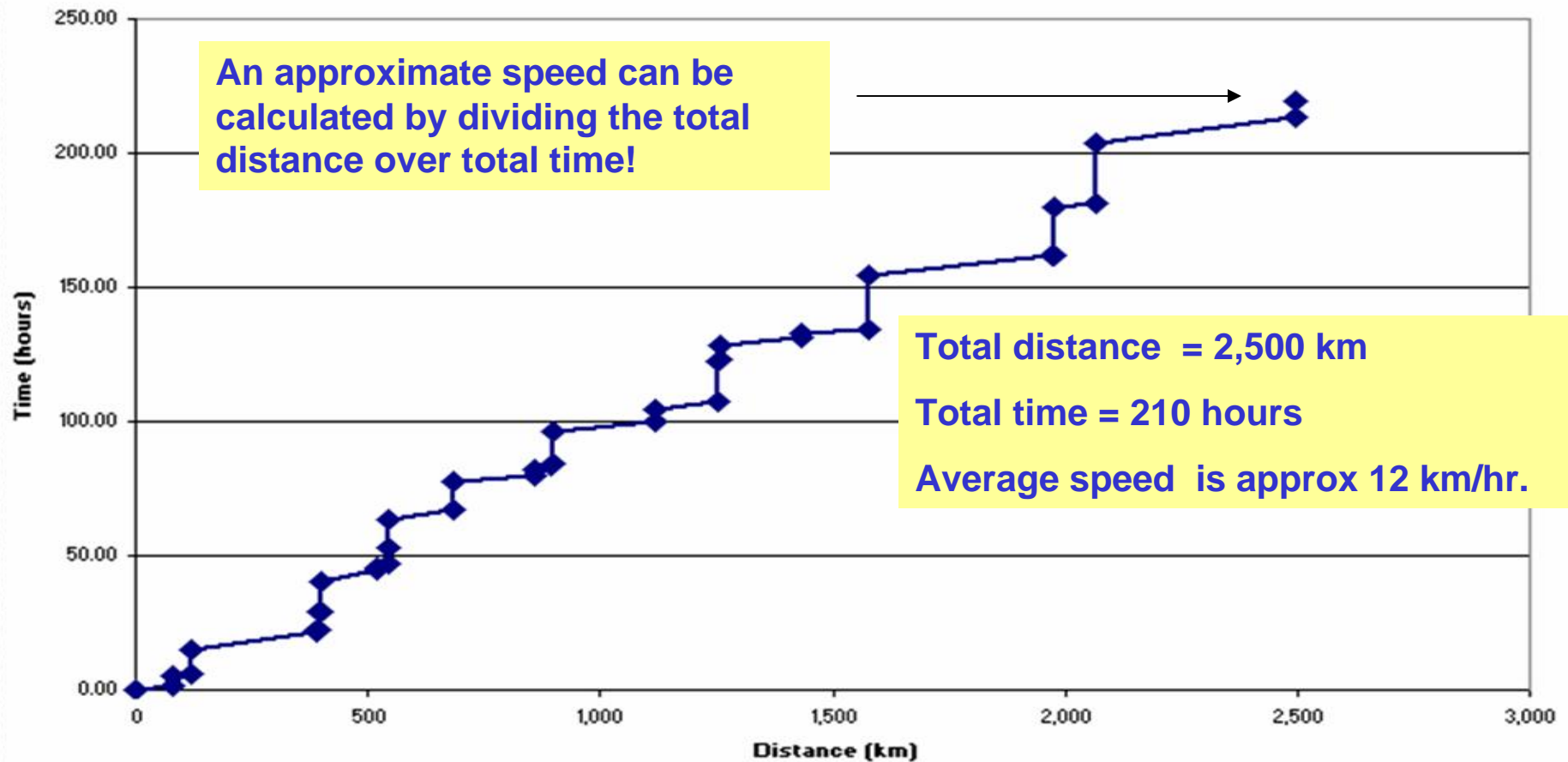


Chart Area.

The time-distance chart is automatically plotted.

Analyze those vertical lines for bottlenecks!



Cost

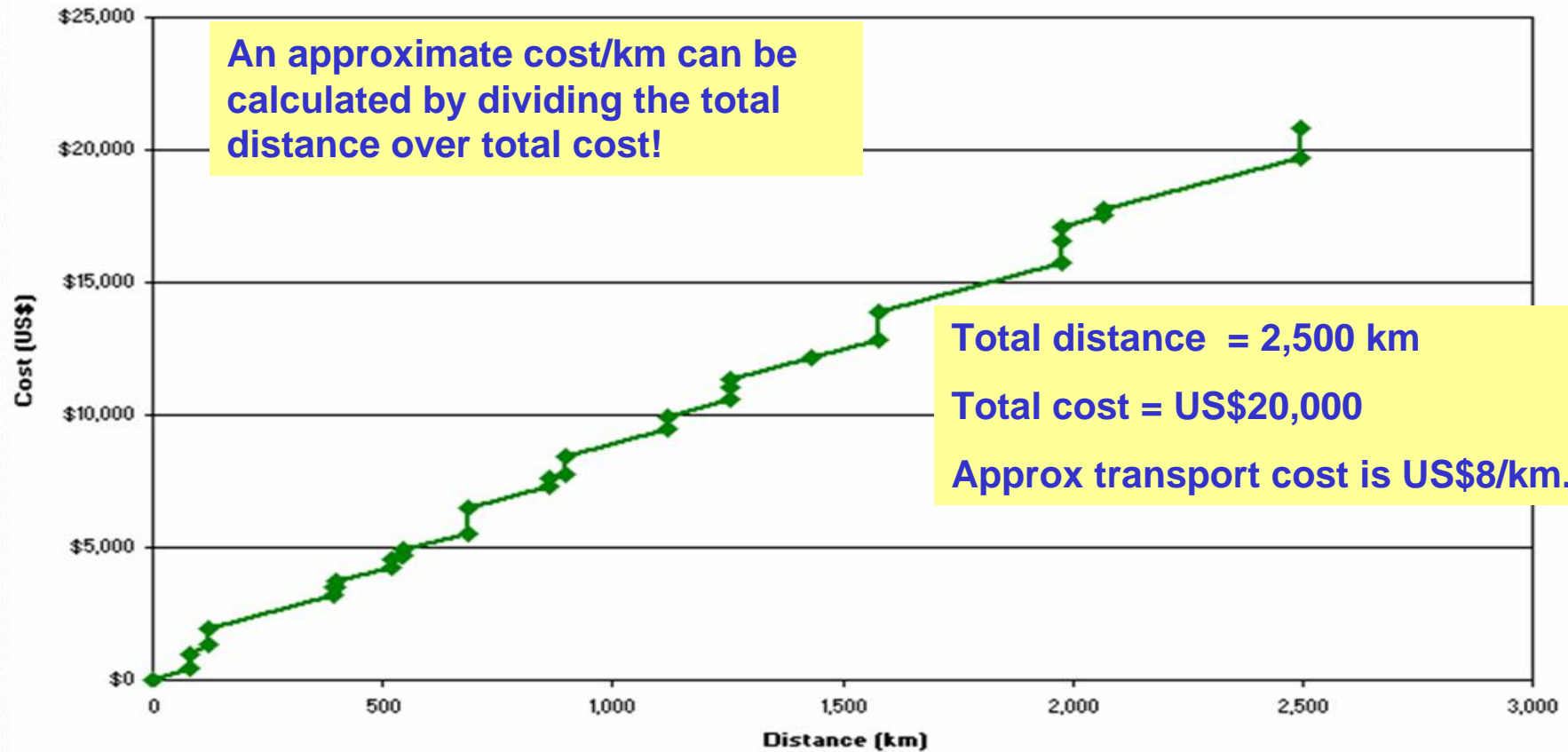


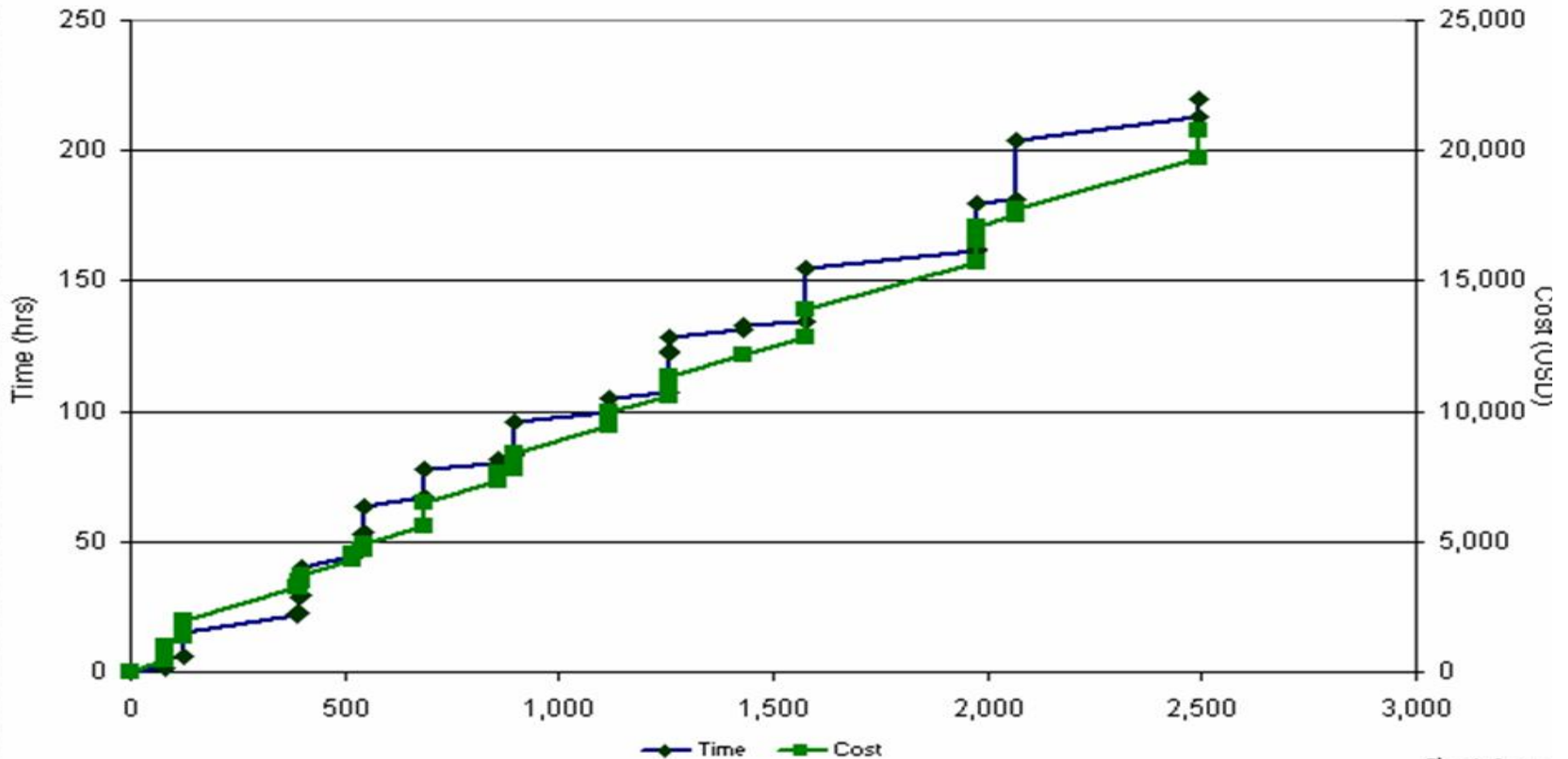
Chart Area

The cost chart is automatically plotted.

Analyze those vertical lines for bottlenecks!



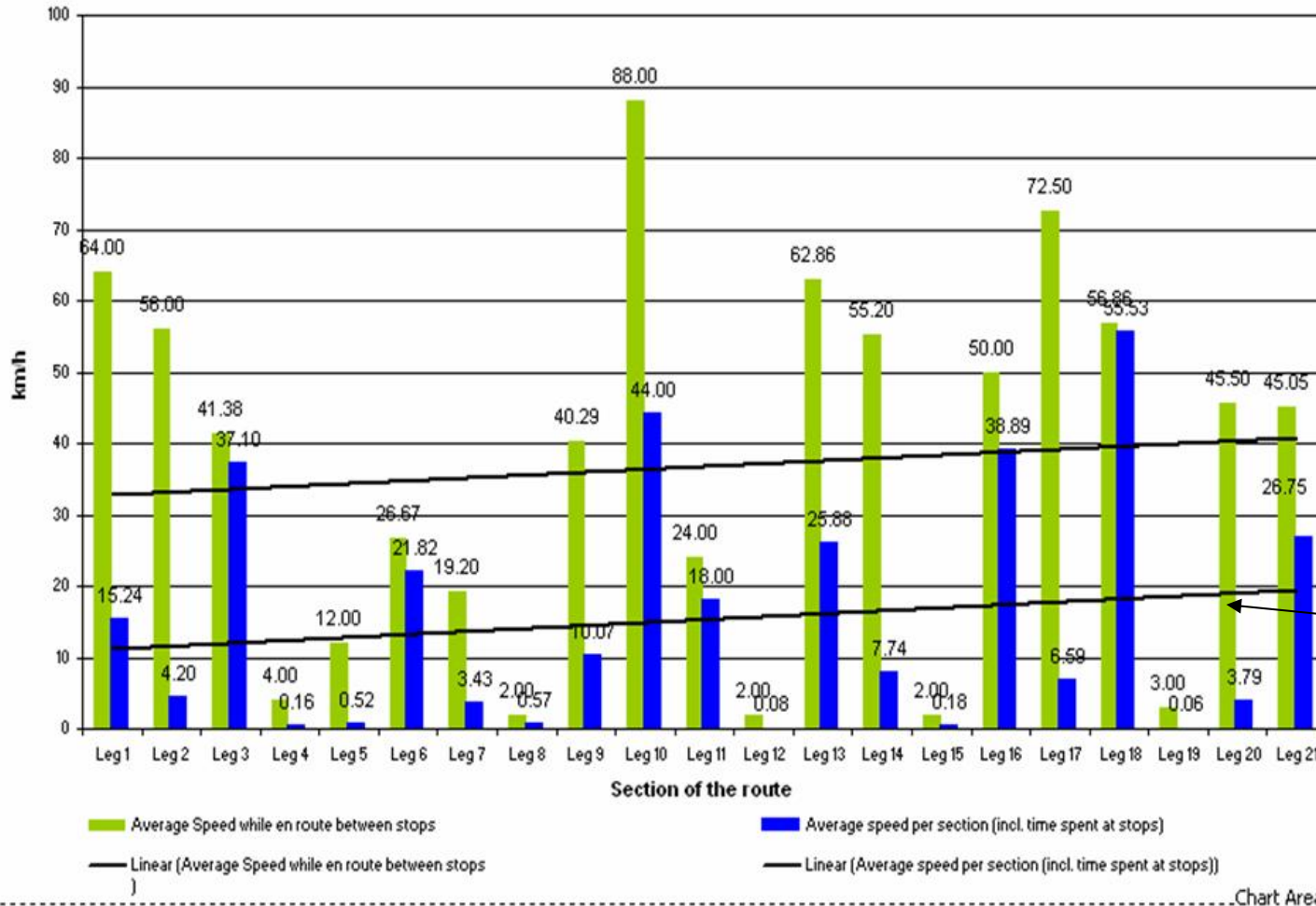
Time/Cost-Distance Model: Black Sea Ring Highway Caravan (Section 1)



Both the time and cost curves should have the same location for each vertical lines. (unless one has zero value).



Average speed on route: Black Sea Ring Highway Caravan (Section 1)



The Excel automatically plots the graph.

Note : The green line is always longer or as long as the blue line.



The average speed concept is incorrect here.



Microsoft Excel - EN_0807_TCD Black Sea Caravan_Part 1 until 27 April 2007 incl. cost

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		C	D	E	F
		From	To	Average Speed while en route between stops	Average speed per section (incl. time spent at stops)
3	Leg 1	Belgrade	Parking Area on Highway Belgrade-Nis	64.00	15.24
4	Leg 2	Parking Area on Highway Belgrade-Nis	Kragujevac	56.00	4.20
5	Leg 3	Kragujevac	Zahumsko	41.38	37.10
6	Leg 4	Zahumsko	Bijelo Polje	4.00	0.16
7	Leg 5	Bijelo Polje	Bijelo Polje - Fuel Station	12.00	0.52
8	Leg 6	Bijelo Polje - Fuel Station	Podgorica	26.67	21.82
9	Leg 7	Podgorica	Bozaj	19.20	3.43
10	Leg 8	Bozaj	Han I Hotit	2.00	0.57
11	Leg 9	Han I Hotit	Durres Port Re Parking	40.29	10.07
12	Leg 10	Durres Port Re Parking	Podgorie	88.00	44.00
13	Leg 11	Podgorie	Kapshtice	24.00	18.00
14	Leg 12	Kapshtice	Kristallopigi	2.00	0.08
15	Leg 13	Kristallopigi	Thessaloniki - Centre	62.86	25.88
16	Leg 14	Thessaloniki - Centre	Promachon	55.20	7.74
17	Leg 15	Promachon	Kulata	2.00	0.18
18	Leg 16	Kulata	Sofia - Ring Road	50.00	38.89
19	Leg 17	Sofia - Ring Road	Plovdiv - Centre of Town	72.50	6.59
20	Leg 18	Plovdiv - Centre of Town	Ruse	56.86	55.53
21	Leg 19	Ruse	Giurgi	3.00	0.06
22	Leg 20	Giurgi	CETA Company	45.50	3.79
23	Leg 21	CETA Company	Husi	45.05	26.75
24	Average speed on overall route:			36.79	15.27
26				* Between departure to arrival	**Between departure to arrival including time spent at stop before next departure

Be careful when interpreting the average speed in this table.



Average Speed – A Common Mistake

Example

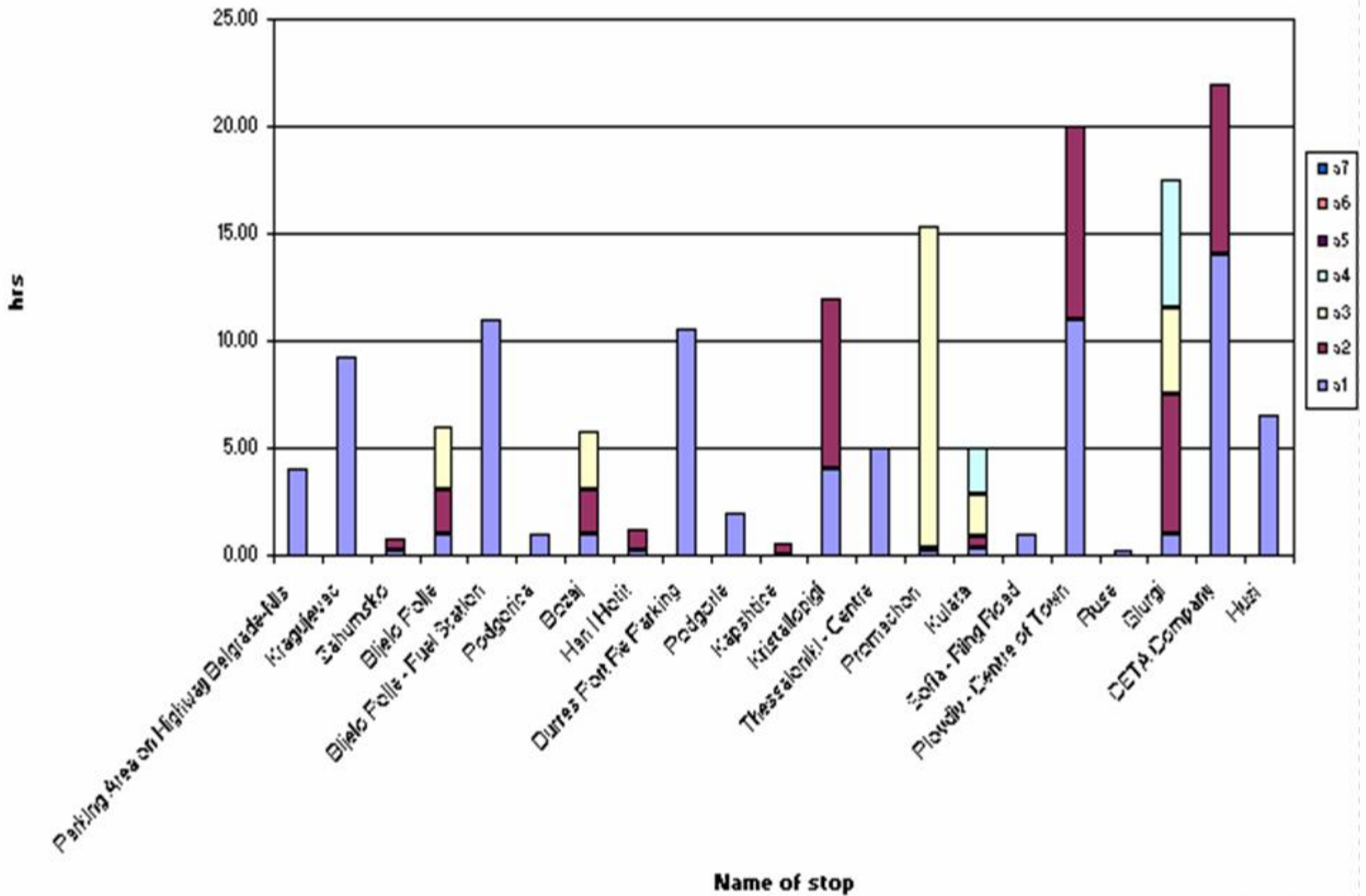
	Distance	Time	Average Speed
Leg 1	100 km	45 min	133.33 km/h
Leg 2	200 km	2 hr 15 min	88.88 km/h
Total	300km	3 hrs	

Correct Approach :

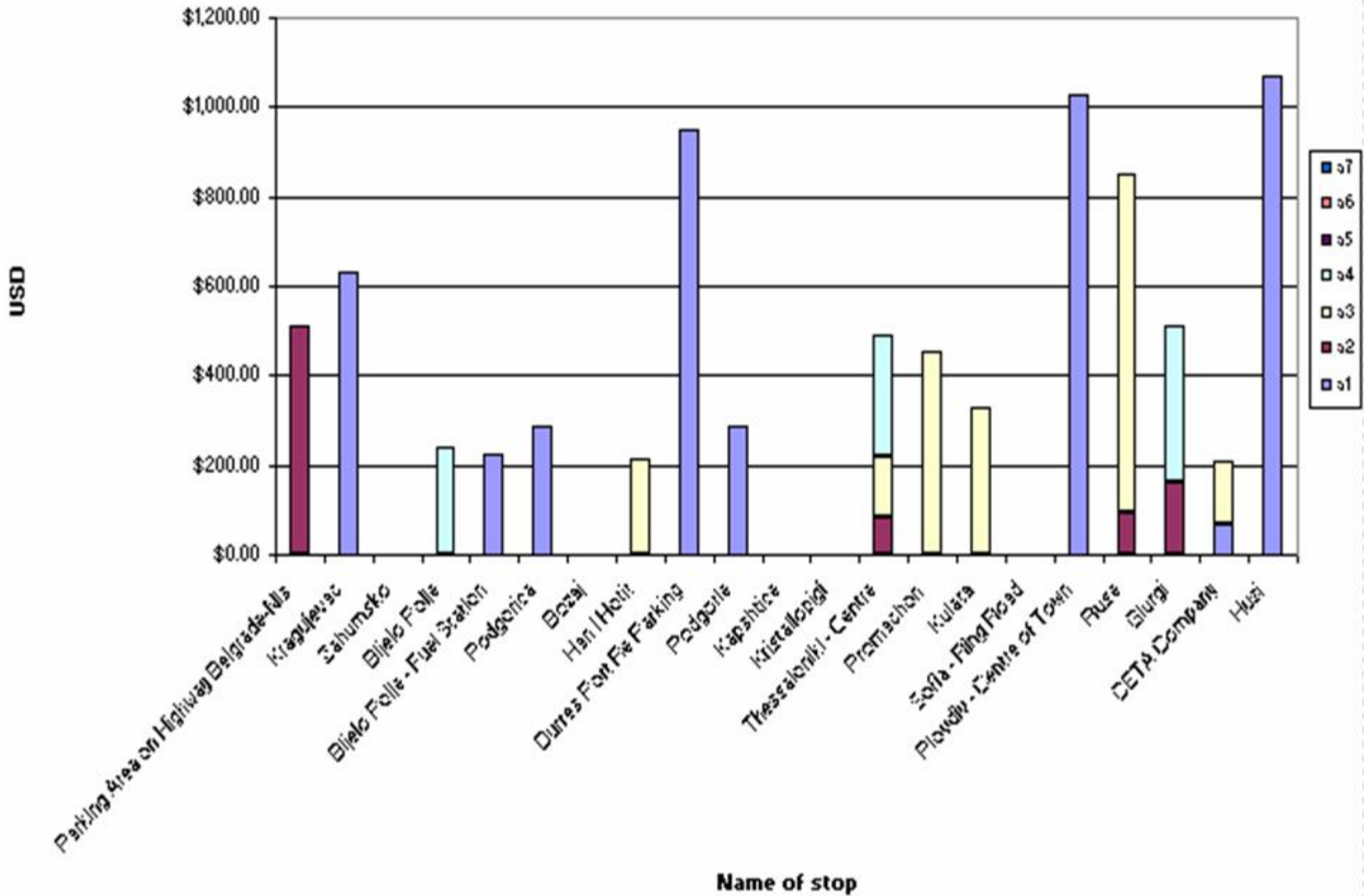
Average speed Total distance/total time = 100 km/h

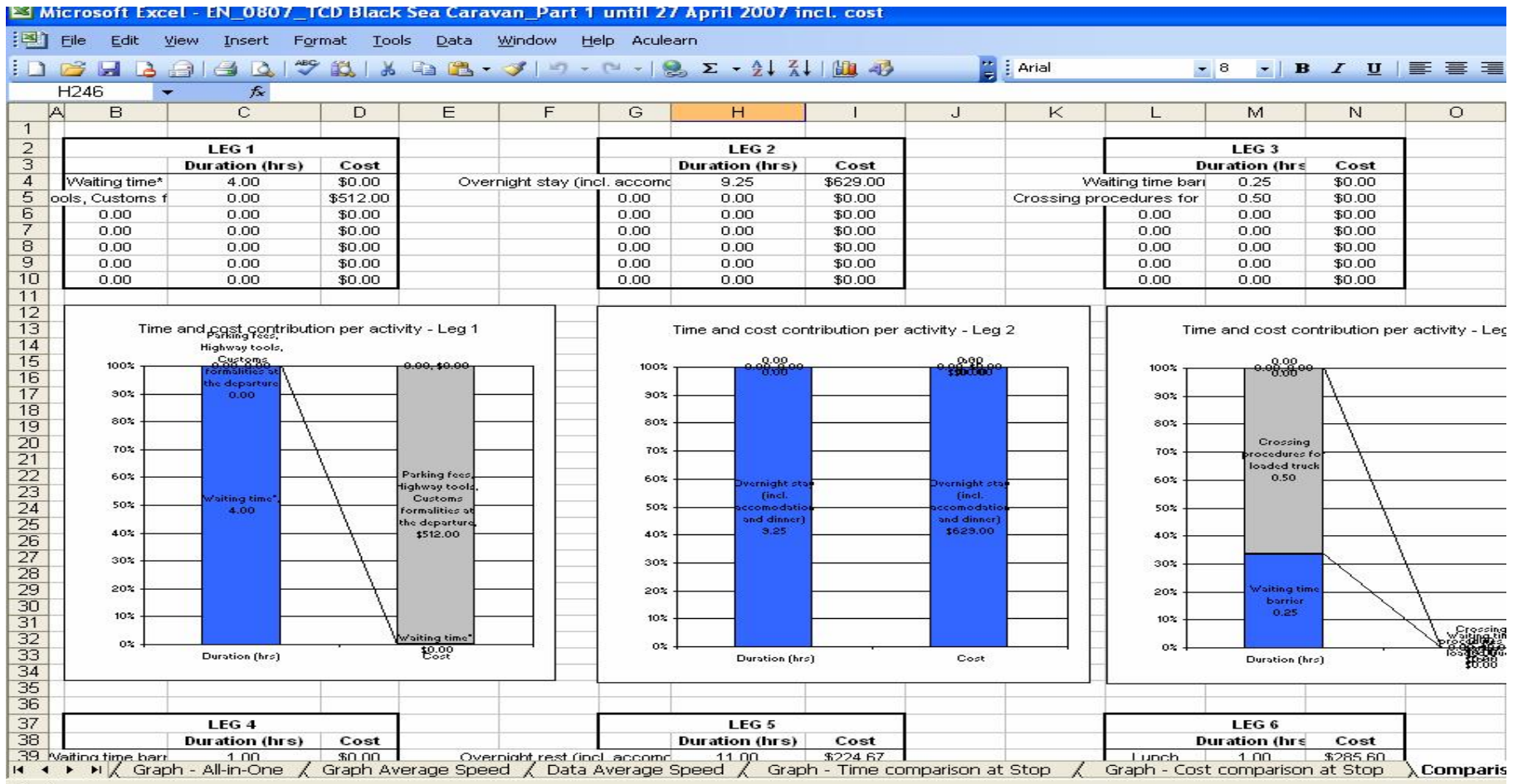
*Do not take the average of the total averages. **WRONG!***

Comparison of time spent at each stop: Black Sea Ring Highway Caravan (Section 1)



Comparison of cost spent at each stop: Black Sea Ring Highway Caravan (Section 1)





Review the breakdown at each stops for analyzing the causes.

