



REPUBLIC OF TURKEY
MINISTRY OF TRANSPORT
AND INFRASTRUCTURE



GENERAL DIRECTORATE
of HIGHWAYS

Benchmarking Transport Infrastructure Construction Costs



KGM (KGM)	
Sakarya	32
Manisa	59
Izmir	91

GENEVA

15 -16 JULY 2019

8th Session





OUTLINE

ROAD INFRASTRUCTURE CONSTRUCTION COSTS

- 1. ROAD INFRASTRUCTURE COST STUDIES IN TURKEY**
- 2. TERMINOLOGY ON BENCHMARKING**
- 3. QUESTIONNAIRE ON BENCHMARKING**
- 4. SUGGESTIONS AND CORRECTIONS ON BENCHMARKING QUESTIONNAIRE**
- 5. SUGGESTIONS ON THE CONTENT OF THE REPORT**
- 6. EXPECTED ACCOMPLISHMENTS AT THE END OF BENCHMARKING STUDY**





1. ROAD INFRASTRUCTURE COST STUDIES IN TURKEY

**(BRIEF EXPLANATIONS ABOUT COST
STUDIES IN TURKEY)**





ROAD INFRASTRUCTURE COST STUDIES IN TURKEY

Highways as a sub-sector of transportation system infrastructure, construction costs in Turkey has been studied under three titles.

1. Construction costs of highways
2. Road maintenance costs
3. Roads' superstructure such as bridges and tunnels construction costs



PURPOSE OF ROAD INFRASTRUCTURE COSTS STUDIES

To calculate realized road unit costs and ranges,

To find out which parameters are important to specify costs,

To determine investment and current budget based on more realistic parameters,

To perform benefit-cost analysis based on realistic construction costs, maintenance and operation costs.



1. Construction Costs of Highways

- ❑ Even maintenance cost studies performed each year, the road infrastructure construction cost studies based on actual projects have been performed **every 10 years**.
- ❑ The results of these studies will lead to work rational, cost effective and also will ensure data for planning, budgeting, productivity, strategic planning, privatization, determine performance criteria's etc.



1. Construction Costs of Highways

- ❑ Road projects infrastructure cost have been calculated regarding road standard as
 - ❑ motorways
 - ❑ state roads
 - ❑ provincial roads
- ❑ In addition the investment projects under investment programs have been very different than each other, definition on road construction projects were deemed necessary and were done as
 - ❑ resurfacing
 - ❑ resurfacing by strengthening
 - ❑ pavement replacement
 - ❑ road conditioning
 - ❑ reconstruction
 - ❑ new construction
 - ❑ capacity enlargement



1. Construction Costs of Highways

Resurfacing: Placing a new surface of an existing road in order to service in good condition, to increase skid resistance, to seal by aiming to preserve road from negative atmospheric conditions, to increase driver comfort, to extend pavement life, etc. The aim is not to increase the bearing capacity of pavement however to extend lifetime by preserving the road from bad weather conditions.

Resurfacing by strengthening: Renewing of road surface with reinstalling bituminous layer either by directly or by removing determined depth of pavement by milling in order to increase bearing capacity of road and to eliminate road defects.

Pavement replacement: Renewing of the pavement either by removing the total thickness of all paving layers, existing asphalt layers from an existing roadway or not, and providing a new paved surface without changing capacity or geometry of the road, i.e. without changing subgrade.

Road conditioning: Reconditioning includes improvement of grades, curves, intersections or sight distances in order to improve traffic safety or changing the subgrade to widen shoulders or to correct structural problems in addition to resurfacing or pavement replacement.

Reconstruction: Total rebuilding of both pavement and subgrade of an existing highway. Work which either changes the location of the existing subgrade shoulder points or removes all of the existing pavement and base course for at least 50% of the length of the project. In other words it is the rebuilding of an existing roads' pavement and subgrade to correct road geometry, to increase road safety, to ease maintenance works and to increase preservation.

New construction: Same as reconstruction and also involves the construction of additional through travel lanes beyond the work associated with reconstruction.

Capacity enlargement: There is not any existing road for this kind of project. It is totally new building of a road with all parts; subgrade, pavement, structures, etc.



1. Construction Costs of Highways

- ❑ In addition to road project types explained in previous slide, **project sizes** have been also regarded for construction cost studies of road projects in Turkey.

- ❑ Projects sizes has been regarded as a parameter and taken into consideration as
 - ❑ small size
 - ❑ medium size
 - ❑ large size
 - ❑ mega projects

- ❑ The more complex and difficult to be realized projects are large size or mega projects, on the other hand easy projects in terms of terrain type and projects type are small or medium size projects.



1. Construction Costs of Highways

- ❑ In addition many parameter have been regarded when the costs studies based on size of projects. As an analysis method **descriptive analysis** has been also used.
- ❑ Not only type of project but also
 - ❑ project standards,
 - ❑ pavement type,
 - ❑ project length,
 - ❑ project size (including important bridge length, tunnel, etc.),
 - ❑ construction duration,
 - ❑ degree of urbanization,
 - ❑ bidding type,
 - ❑ terrain type, etc. are regarded as parameters.
- ❑ **Multiple regressions** are applied to data set.
- ❑ The effect of independent variables on dependent variables is analyzed and **stepwise regression** is used.
- ❑ All cost are calculated regarding units as TL/Km (\$/Km) and TL/LanexKm (\$/LanexKm)

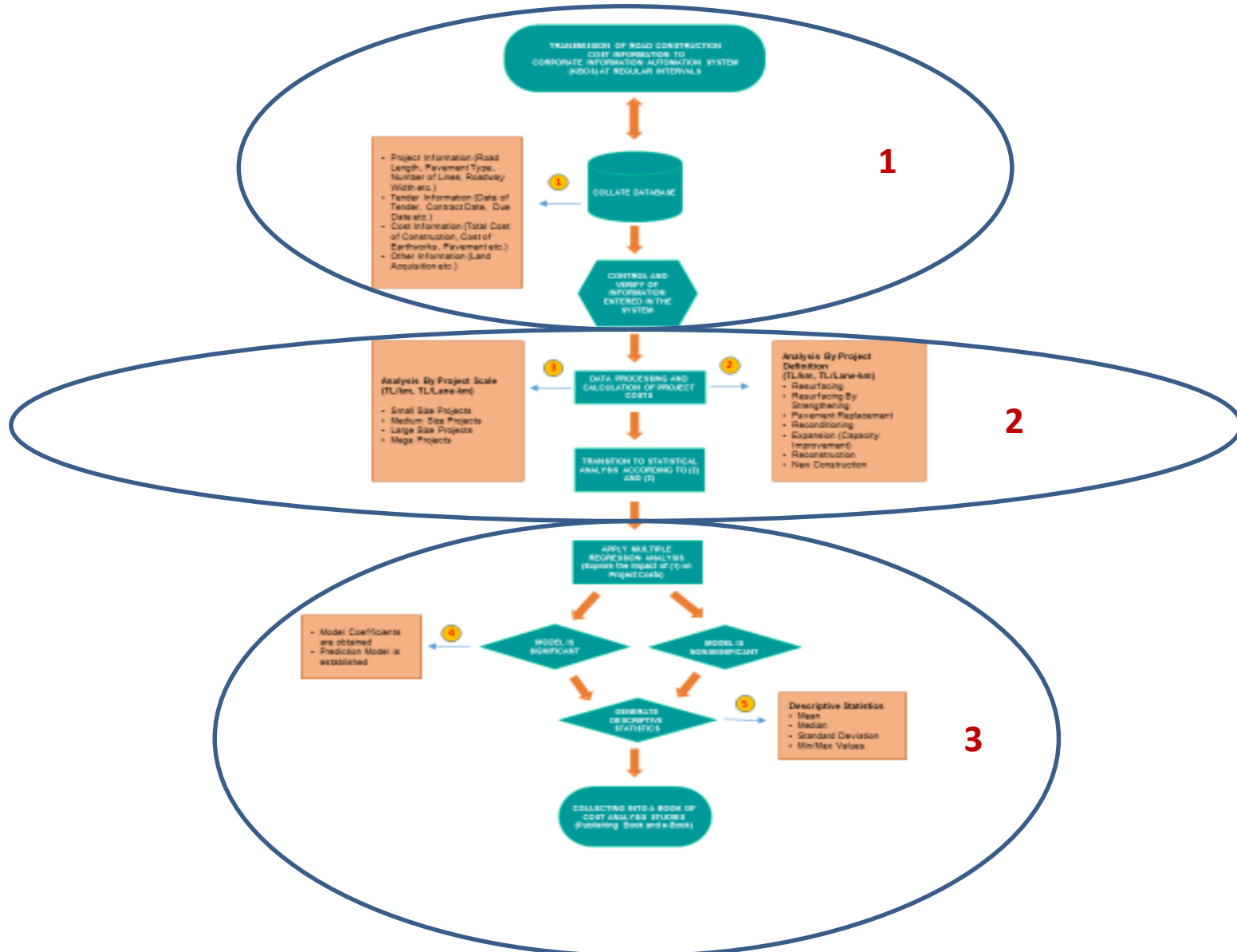


1. Construction Costs of Highways

- ❑ On the other hand land acquisition cost, design cost, environmental mitigation, construction and project management costs are calculated and given as percentages.
- ❑ Construction cost work types as earthworks, superstructures, pavement, bridges and tunnels, miscellaneous have been also calculated and given as percentages.
- ❑ Construction costs are also very different according to whether the projects is passing through urban area or rural area. Degree of urbanization is very important and this parameter is also considered.
- ❑ Cost overruns of road projects have been also analyzed and tried to be explained.



Flowchart on Construction Cost Studies of Highways

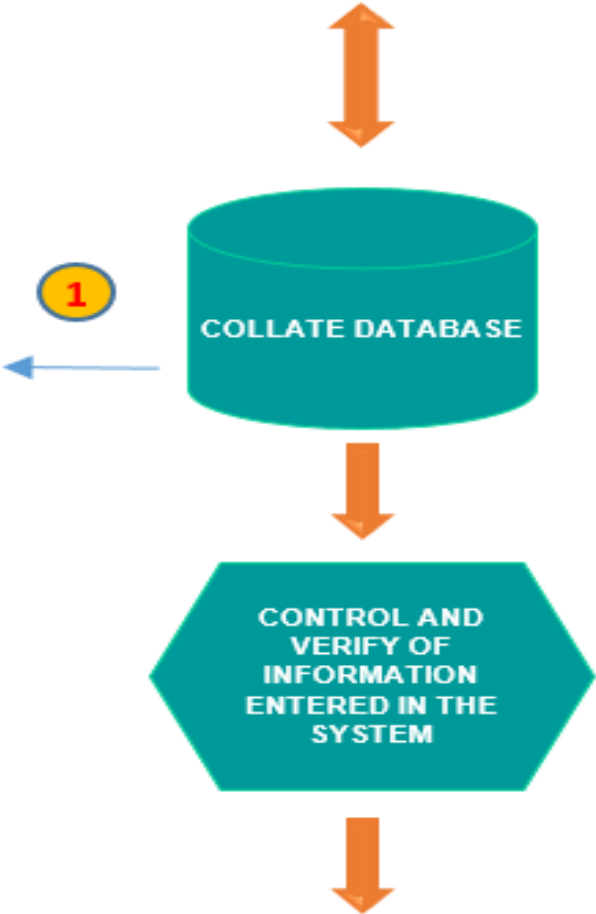




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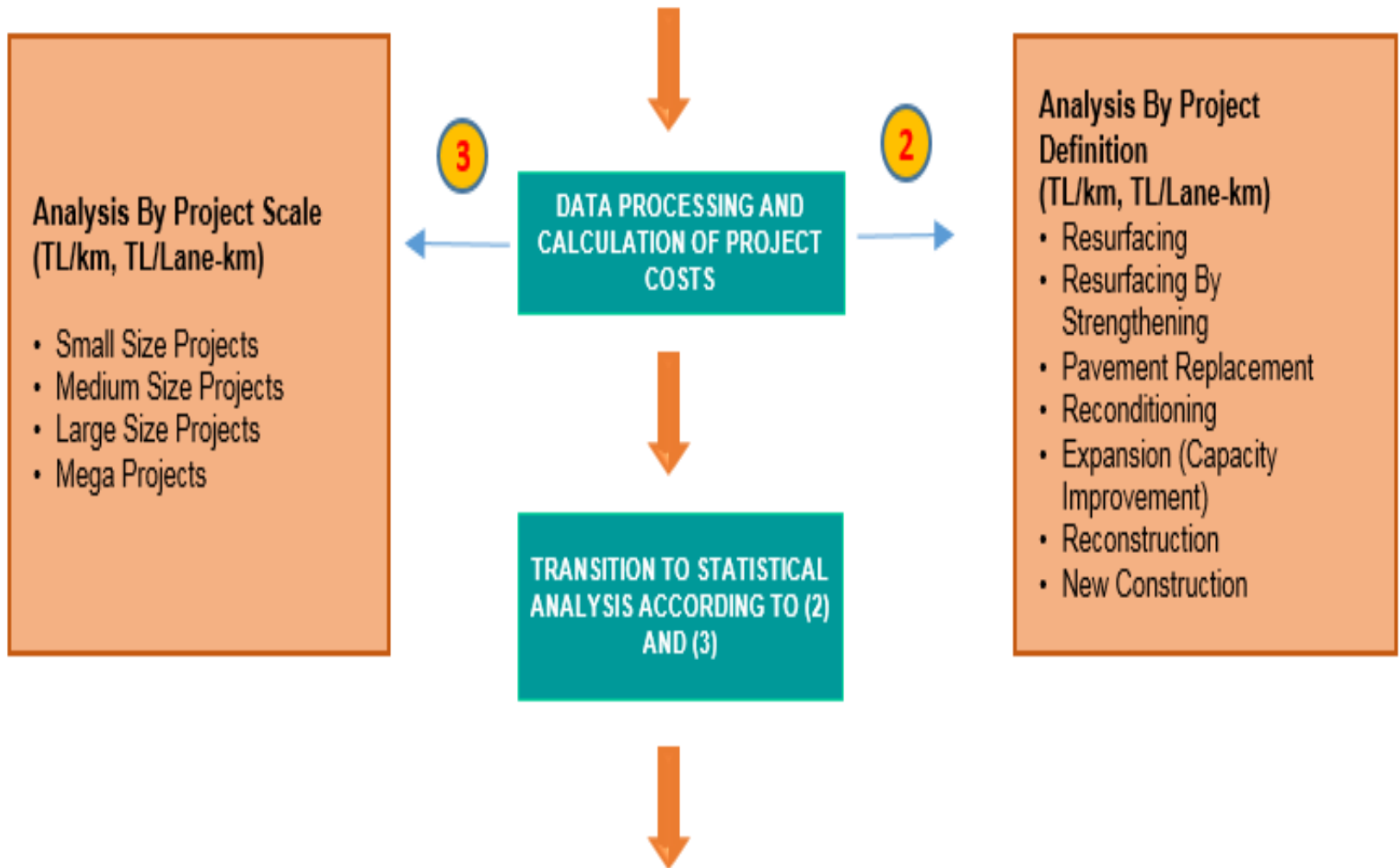
TRANSMISSION OF ROAD CONSTRUCTION COST INFORMATION TO CORPORATE INFORMATION AUTOMATION SYSTEM (KBOS) AT REGULAR INTERVALS

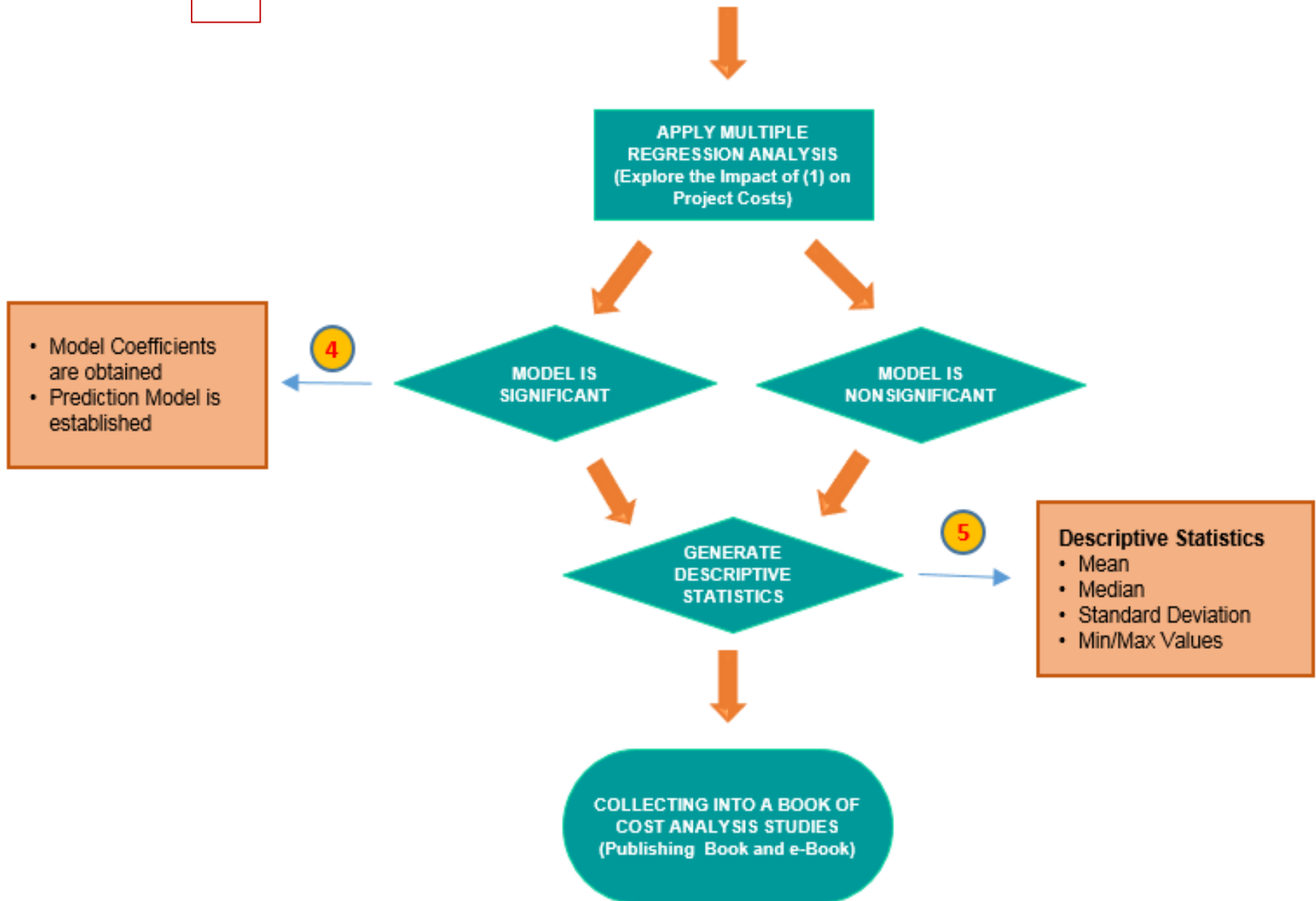
- Project Information (Road Length, Pavement Type, Number of Lines, Roadway Width etc.)
- Tender Information (Date of Tender, Contract Date, Due Date etc.)
- Cost Information (Total Cost of Construction, Cost of Earthworks, Pavement etc.)
- Other Information (Land Acquisition etc.)





2





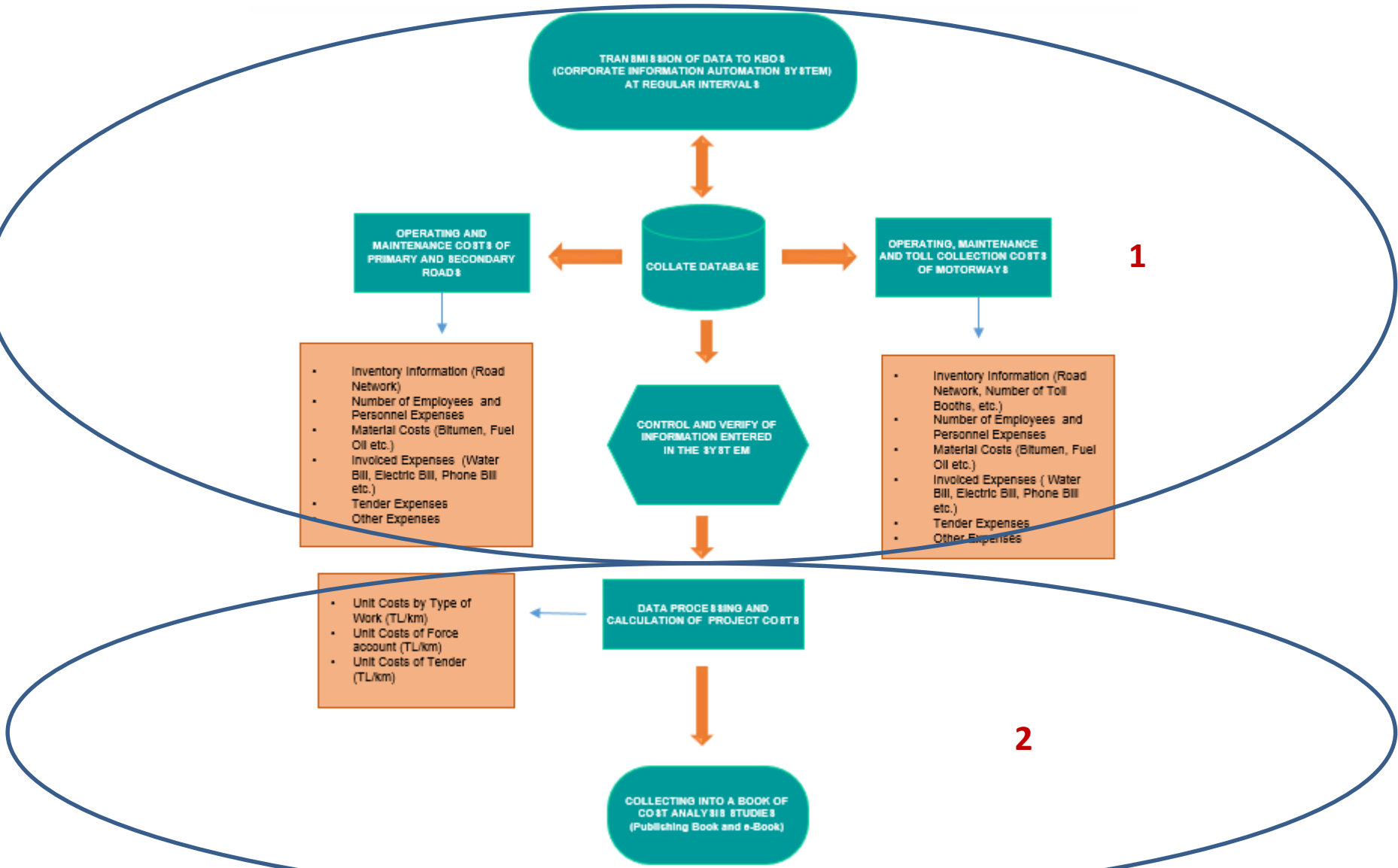


2. Road Maintenance Cost Studies

- ❑ The road maintenance cost study on the other hand is performed **every year**.
- ❑ There is a data base called KBOS where all expenditures are recorded according to **work type, road type, expenditure type**, etc.
- ❑ At the end of each year, maintenance costs and expenditures are calculated from **organizational information automation system** using a software.
- ❑ The results are given as
 - ❑ routine maintenance costs
 - ❑ winter maintenance costs
 - ❑ traffic safety issues costs
 - ❑ toll collection costs
- ❑ At the end of each year not only unit maintenance cost have been calculated, **but also productivity analysis** have been performed.
- ❑ **Cost overruns** reasons for maintenance cost also have been tried to be explained.

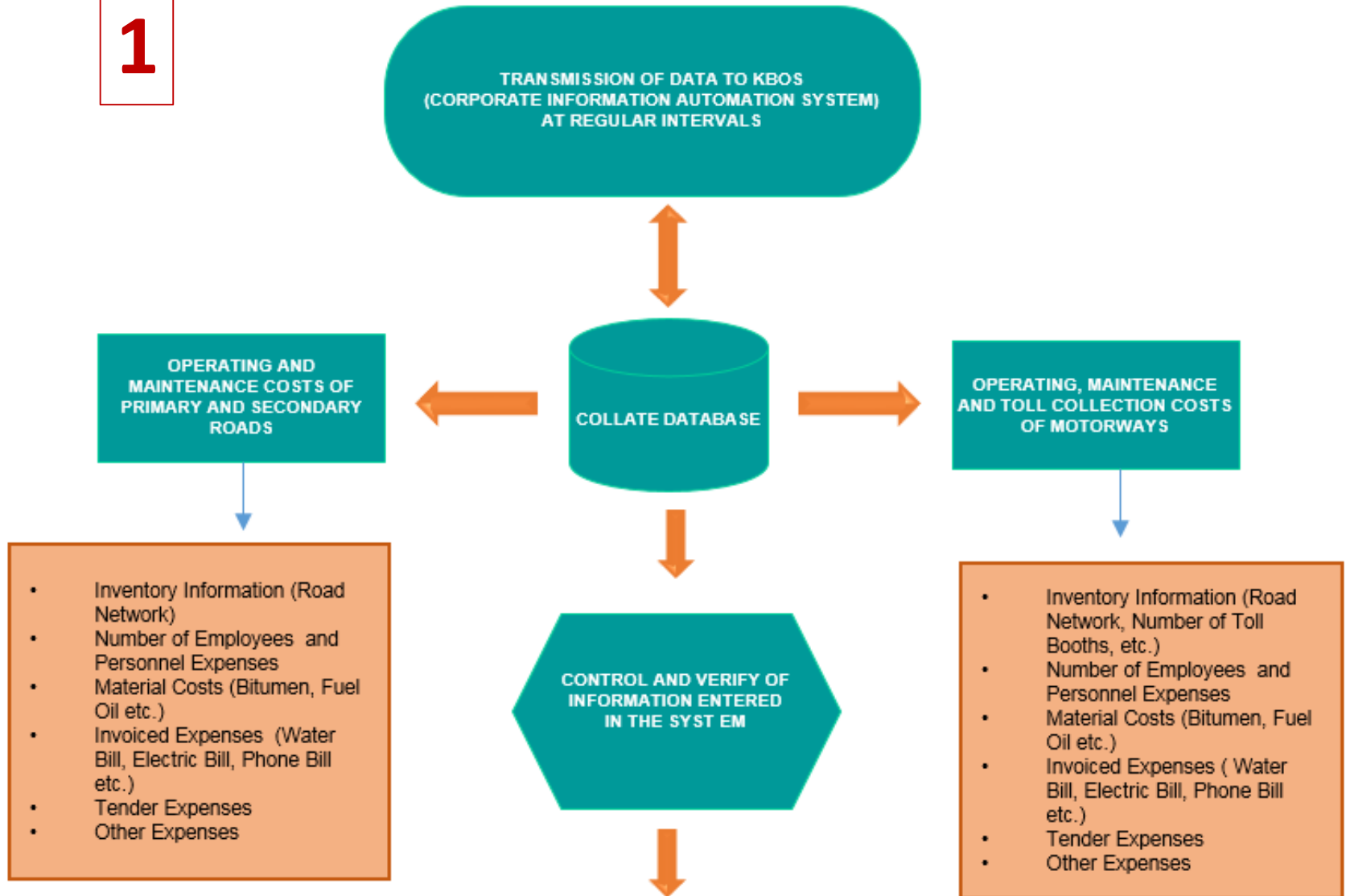


Flowchart on Road Maintenance Cost Studies

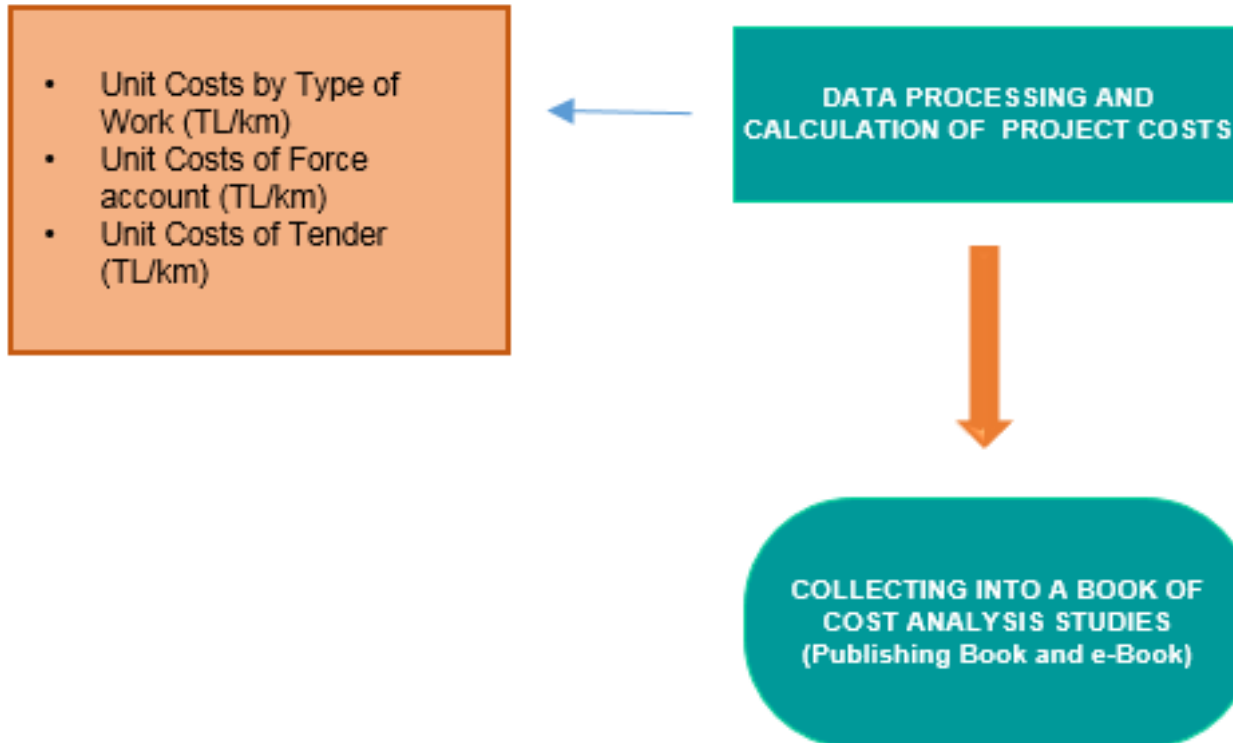




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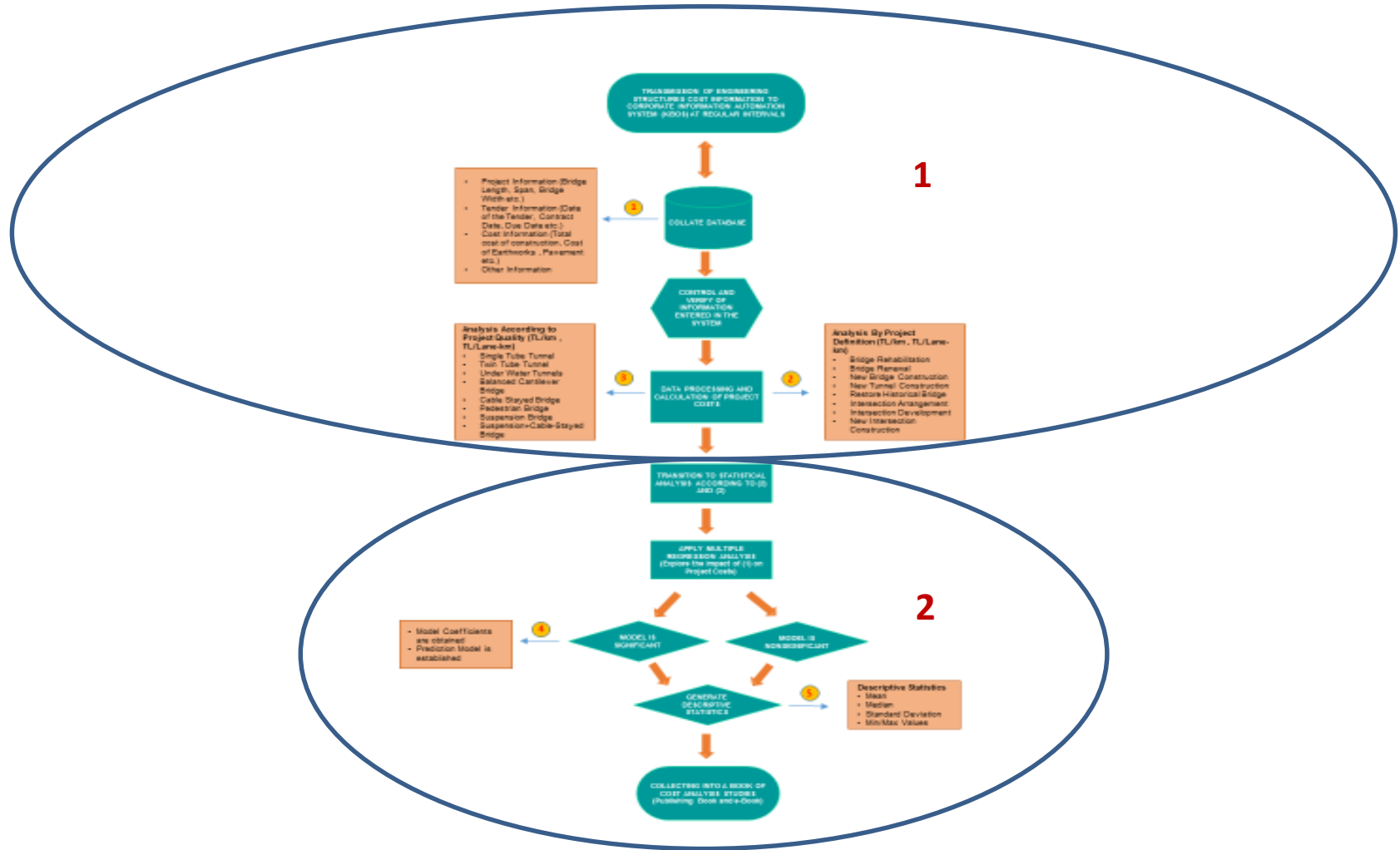


3. Road Superstructure's Construction Cost Studies

- ❑ The road superstructure construction cost on the other hand is also performed every 10 years regarding completed projects.
- ❑ The superstructures as tunnel and bridges have been regarded and their unit cost as given as TL/m² for bridges and TL/m for tunnels regarding as single tube tunnel and twin tube tunnel.
- ❑ For bridges costs are also subdivided as sub-structure costs and over structure costs.

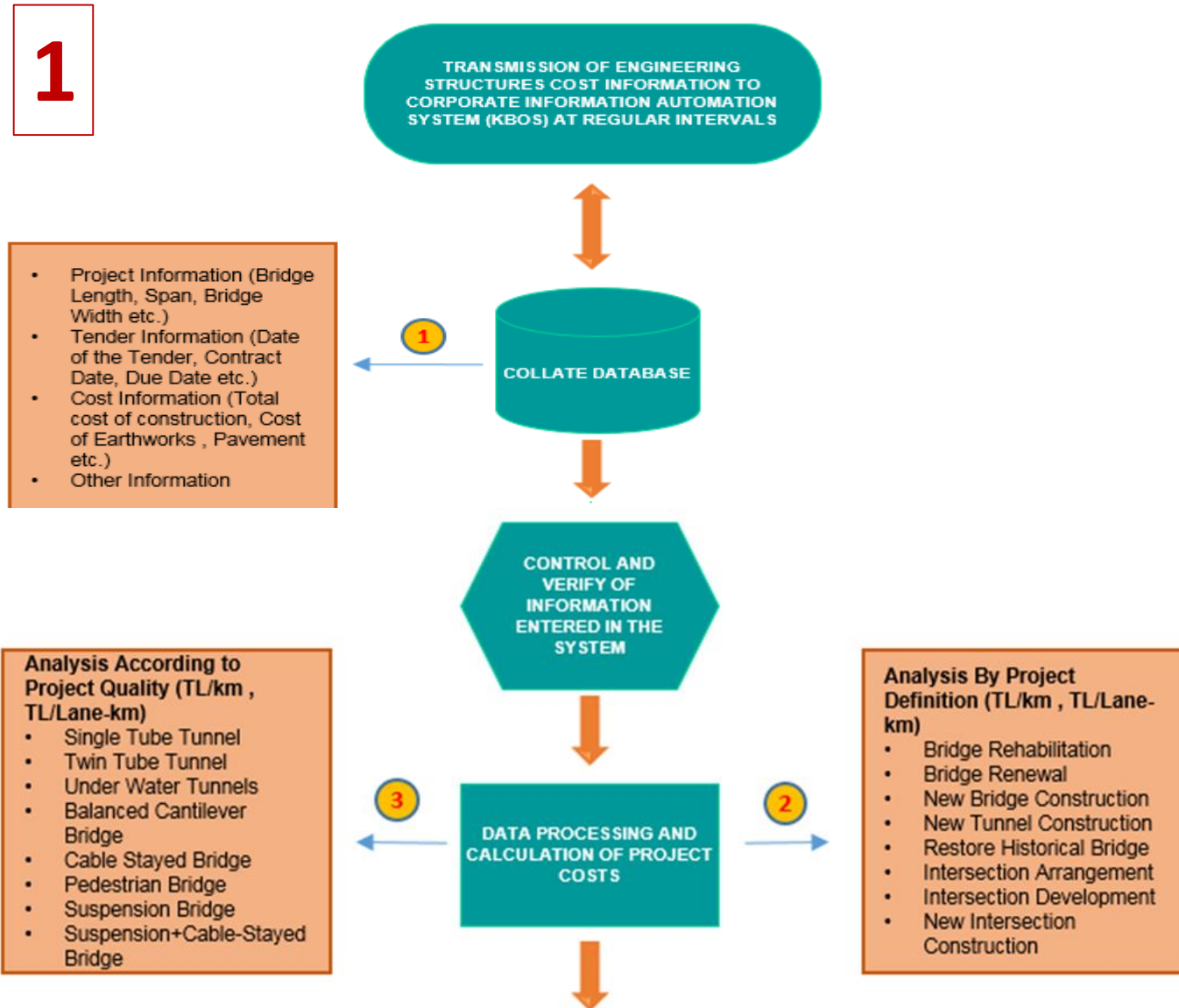


Flowchart on Superstructure Construction Cost Studies of Highways



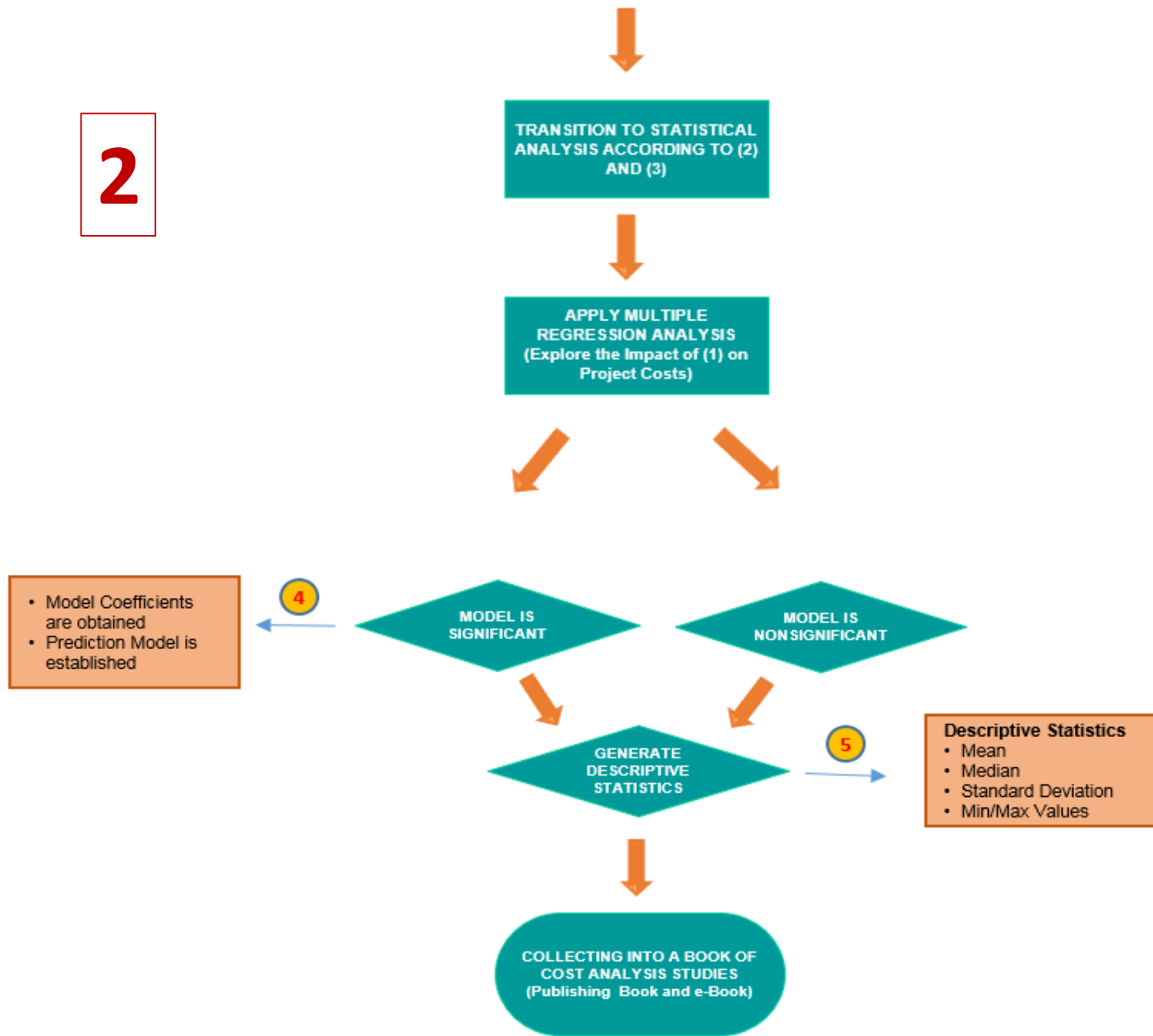


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2. TERMINOLOGY

**(BRIEF EXPLANATIONS OF
STUDIES ABOUT TERMINOLOGY –
WHAT HAVE BEEN DONE UPTO
DATE)**





BRIEF EXPLANATIONS OF STUDIES ABOUT TERMINOLOGY

1th SESSION OF THE
MEETING
(31 Oct-1 Nov. 2016)

- Identify and list terminologies used in the ECE region for construction costs of inland transport infrastructure; if possible, create a glossary of agreed terminologies and related explanations
- Turkey was selected as leading country for road sub-group.

2nd SESSION OF
THE MEETING
(10-11 April 2017)

- Turkey presented a list of terminologies prepared by sub-group and Turkish road experts.
- This list includes terminologies used by different national or international road agencies.
- It was agreed that a more comprehensive list of terminologies for road construction costs will be prepared and submitted as formal document for Group's review at its next session.



BRIEF EXPLANATIONS OF STUDIES ABOUT TERMINOLOGY

3rd SESSION OF THE
MEETING

(10-11 July 2017)

- The Group considered document ECE/TRANS/WP.5/GE.4/2017/1 on terminologies used in the Economic Commission for Europe (ECE) region for construction costs of Road infrastructure prepared by the road team of experts led by the Turkish road transport expert.
- The Group welcomed the presentation of the delegation of Turkey on **seven core definitions** and related references and decided:
 - (a) to accept these definitions as presented;
 - (b) to delete the references to the life-time of each defined project;
 - (c) to include the definition of a “new construction” as provided by the delegation of Turkey in a revised document on definitions for the next session.



BRIEF EXPLANATIONS OF STUDIES ABOUT TERMINOLOGY

4th SESSION OF THE
MEETING
(16-17 Oct. 2017)

- The Group considered document ECE/TRANS/WP.5/GE.4/2017/1/Rev.1 on terminologies used in the Economic Commission for Europe (ECE) region for construction costs of road infrastructure prepared by the road team of experts led by the Turkish road transport experts.
- The Turkish delegates had already prepared an updated version of those terminologies which included many additions and some deletions.
- The number of the terminologies proposed was increased from 121 terminologies to 249.
- The Group requested the secretariat to prepare a second revision version of ECE/TRANS/WP.5/GE.4/2017/1 for the next session.



BRIEF EXPLANATIONS OF STUDIES ABOUT TERMINOLOGY

5th SESSION OF THE
MEETING
(30-31 Jan. 2018)

- The Group reviewed the revision two of formal document ECE/TRANS/WP.5/GE.4/2017/1 which includes the agreed terminologies on road construction costs.
- The Turkish delegates had already prepared an updated version of those Documentation: ECE/TRANS/WP.5/GE.4/2017/1/Rev.2
- The representative of Turkey provided a presentation on some additions and corrections that should be incorporated in the list of terminologies.
- **Not yet a latest version prepared and updated by secretary which includes Turkish experts corrections and addition on ECE/TRANS/WP.5/GE.4/2017/1/Rev.2**



1

However the terminology list corrected during the fourth session was sent by secretary to UN member countries to make corrections, additions and suggestions on the list.

2

Therefore it was expected during sixth and seventh sessions corrections and additions made by UN member countries would have been discussed and finalized during those sessions but not realized yet.



3. QUESTIONNAIRE

**(BRIEF EXPLANATIONS OF
STUDIES ABOUT QUESTIONNAIRE
– WHAT HAVE BEEN DONE UPTO
DATE)**





BRIEF EXPLANATIONS OF STUDIES ABOUT QUESTIONNAIRE

1th SESSION OF THE
MEETING

(31 Oct-1 Nov. 2016)

- Collect and analyze data in order to prepare a benchmarking of transport infrastructure construction costs in the ECE region for each inland transport mode – road, rail, inland waterways.
- Turkey was selected as leading country for road sub-group.
- Benchmarking transport infrastructure construction costs collection methodology is decided as preparing questionnaire.



BRIEF EXPLANATIONS OF STUDIES ABOUT QUESTIONNAIRE

2nd SESSION OF
THE MEETING
(10-11 April 2017)

- The secretariat kindly invited experts from Governments to prepare presentations for Group's next sessions in order to collect National good practices on calculating transport infrastructure construction costs and include them in the final report of the Group.
- The representative of road sub-group (Turkey) presented the main concerns and considerations while calculating the road construction costs and parameters that should be used. The Group agreed on many issues mentioned in the report.
- The group decided that a formal document should be prepared for Group's next session that would accommodate a draft questionnaire in order to collect road construction costs. The road sub group and its Leader State (Turkey) should provide the content of this questionnaire.



BRIEF EXPLANATIONS OF STUDIES ABOUT QUESTIONNAIRE

3rd SESSION OF
THE MEETING
(10-11 July 2017)

- The Group considered document ECE/TRANS/WP.5/GE.4/2017/2, welcomed the presentation of the delegation of Turkey on the questionnaire on benchmarking road transport infrastructure costs and approved the questionnaire subject to some changes mentioned in the report.
- The road experts' sub-group agreed to transmit to the secretariat the amended and final version of the questionnaire approximately two weeks after the session. The Group requested the secretariat to take the necessary action to distribute the questionnaire to UNECE member States as soon as possible thereafter with a deadline for replies of end of September 2017.



BRIEF EXPLANATIONS OF STUDIES ABOUT QUESTIONNAIRE

4th SESSION OF THE
MEETING
(16-17 Oct. 2017)

- Documentation: ECE/TRANS/WP.5/GE.4/2017/2/Rev.1
- The Group considered document ECE/TRANS/WP.5/GE.4/2017/2/Rev.1, which includes the questionnaire for the road transport infrastructure benchmarking study prepared by road transport sub group led by Turkey. Also it welcomed the presentation of the delegation of Turkey who actually filled in the draft questionnaire and presented the results to the Group.
- The Group appreciated the efforts of the Turkish delegation because this pilot use of the questionnaire provided to them a better view of what the results from this exercise would be and what they should probably add in order to increase the value that the collected data would bring to the users. The Group decided that an extra column should be added in the questionnaire with the title “length of regarded projects (km)”.
- The Group also recalled that at its previous session had requested the secretariat to take the necessary action and distribute the questionnaire for road transport to UNECE member States as soon as possible thereafter with a deadline for replies of end of September 2017.



BRIEF EXPLANATIONS OF STUDIES ABOUT QUESTIONNAIRE

5th SESSION OF THE
MEETING

(30-31 Jan. 2018)

- Road transport: leading country is Turkey; both draft terminology and benchmarking study questionnaire have been prepared, discussed and agreed during Group's sessions. Both the questionnaire and the list of terminologies have already been sent through diplomatic channels to all ECE member States.



1

However questionnaire corrected during the fourth session was sent by secretary to UN member countries to fill.

2

Therefore it is expected during eight session corrections made by lead country Turkey during sixth session and if any corrections and additions made by UN member countries would have been discussed and finalized.



BRIEF EXPLANATIONS OF STUDIES ABOUT TERMINOLOGY AND QUESTIONNAIRE

8th SESSION OF THE MEETING

(15-16 July 2019)

- Draft terminology about roads prepared by road transport leading country Turkey were discussed and agreed during Group's sessions. First replies on road terminologies already sent through diplomatic channels to all ECE member States shall be overviewed during eight session.
- Since experts corrections and suggestions on road terminologies during fifth sessions were not regarded on ECE/TRANS/WP.5/GE.4/2017/1/Rev.2 should not be forgotten as a reminder to secretary.



4. SUGGESTIONS AND CORRECTIONS ON BENCHMARKING QUESTIONNAIRE

**(RECOMENDED DURING FOURTH SESSION OF
THE MEETINGS BUT NOT APPROVED YET)**





Social and Economic Indicators

GNP (US \$) (end of 2016)		
POPULATION (end of 2016)		
GNP Per Capita (US \$) (end of 2016)		
Surface Area (Km2)*		
Density (end of 2016) Person/m2		
LENGTH OF ROADS (end of 2016) (Km)	High Classified Roads (HCR)-MOTORWAYS	
	Medium Classified Roads (MCR)-PRIMARY ROADS	Single Carriageway
		Double Carraigeway
	Medium Classified Roads (MCR)- SECONDARY ROADS	Single Carriageway
		Double Carraigeway
	OTHER ROADS	Single Carriageway
		Double Carraigeway
	Length of Bridges (end of 2016) (m)	
Length of Tunnels (end of 2016) (m)**		
HCR_Motorways per 1000 Km2 (end of 2016)		
MCR_Primary Roads per 1000 Km2 (end of 2016)		
MCR_Secondary Roads per 1000 Km2 (end of 2016)		
ANNUAL INVESTMENT BUDGET OF ROADS (US \$) (2016 Fiscal Year)		
ANNUAL ROAD INVESTMENT BY PPP (US \$) (Average of the last five years 2012-2016)		
Annual Investment Budget of Roads as Percentage of GNP (%) (including yearly PPP investment)		
ANNUAL CONSTRUCTED ROADS IN LENGTH (KM) (end of 2016)		
ANNUAL CONSTRUCTED DOUBLE CARRIAGEWAY ROADS IN LENGTH (KM) (Average of the last five years 2012-2016)		
ANNUAL CONSTRUCTED SINGLE CARRIAGEWAY ROADS IN LENGTH (KM) (Average of the last five years 2012-2016)		
ANNUAL CONSTRUCTED TUNNELS IN LENGTH (M) (Average of the last five years 2012-2016)**		
ANNUAL CONSTRUCTED BRIDGES IN LENGTH (M) (Average of the last five years 2012-2016)		
Design Cost as Percentage of Construction Cost (%) (end of 2016)		

Unit for density should be changed from Person/m² to Person/Km²

* Lakes and dams are excluded from the surface area.

** All tunnels are converted to single tube tunnels.



Motorways and Expressways are High Capacity Roads therefore they are double carriageway roads. As Turkey our suggestion is to delete Motorways-Expressways rows from all work items. In addition Expansion (Capacity Improvement) work title row should be deleted from single carriageway roads benchmarking table sheets.

Construction Costs of Asphalt Roads

SINGLE CARRIAGEWAY ASPHALT ROADS					
ROAD INFRASTRUCTURE CONSTRUCTION COSTS (2016 Prices) (US \$/Km) (For Asphalt Roads)					
COUNTRIES					
Work Title	Road Class	MAXIMUM	AVERAGE	MINIMUM	LENGTH OF REGARDED PROJECTS (Km)
Resurfacing	HCR_Motorways-Expressways				
	MCR_Primary Roads				
	MCR_Secondary Roads				
Resurfacing by Strengthening	HCR_Motorways-Expressways				
	MCR_Primary Roads				
	MCR_Secondary Roads				
Pavement Replacement	HCR_Motorways-Expressways				
	MCR_Primary Roads				
	MCR_Secondary Roads				
Reconditioning	HCR_Motorways-Expressways				
	MCR_Primary Roads				
	MCR_Secondary Roads				
Reconstruction	HCR_Motorways-Expressways				
	MCR_Primary Roads				
	MCR_Secondary Roads				
Expansion (Capacity Improvement)	HCR_Motorways-Expressways				
	MCR_Primary Roads				
	MCR_Secondary Roads				
New Construction	HCR_Motorways-Expressways				
	MCR_Primary Roads				
	MCR_Secondary Roads				

Construction Costs of Asphalt Roads

SINGLE CARRIAGEWAY ASPHALT ROADS					
ROAD INFRASTRUCTURE CONSTRUCTION COSTS (2016 Prices) (US \$/Km) (For Asphalt Roads)					
COUNTRIES					
Work Title	Road Class	MAXIMUM	AVERAGE	MINIMUM	LENGTH OF REGARDED PROJECTS (Km)
Resurfacing	MCR_Primary Roads				
	MCR_Secondary Roads				
Resurfacing by Strengthening	MCR_Primary Roads				
	MCR_Secondary Roads				
Pavement Replacement	MCR_Primary Roads				
	MCR_Secondary Roads				
Reconditioning	MCR_Primary Roads				
	MCR_Secondary Roads				
Reconstruction	MCR_Primary Roads				
	MCR_Secondary Roads				
New Construction	MCR_Primary Roads				
	MCR_Secondary Roads				



5. SUGGESTIONS ON THE CONTENT OF THE REPORT





TABLE OF CONTENTS

- **Introduction**

The introduction sets the scene for the main body of the report. The aims and objectives of the report should be explained in detail. Any problems or limitations in the scope of the report should be identified, and a description of research methods should be included

- **Literature Review (National and International Experiences)**

All countries and national organizations who made presentation is supposed to sent 1 page or at list several paragraphs which explains their experience about the study they are doing on benchmarking transportation infrastructure construction costs to secretary)

Also survey of publications similar to benchmarking study should be summarized

- **Methodology (Way of work)**

Information under this heading may include: a list of main terminology, how it is structured and agreed, and also information on detailed terminology covering list; explanations of procedures how the data is collected and relevant questionnaire is structured, including sources of data and details of any necessary data collection procedures; reference to any problems encountered and subsequent changes in procedure.



TABLE OF CONTENTS

- **Results (Collected Data and Findings)**

This section should include a summary of the collected data and findings of the benchmarking together with any necessary diagrams, graphs or tables of gathered data.

- **Discussion**

- **Conclusions**

- Recommendations for action
- Suggestions for further research

- **References**

- **Appendices**



- ❑ The questionnaire results allow to create a database for road infrastructure construction costs according to road classification and work type. However there is a question **how these data should be presented and illustrated**. Also other question is **how these data should be analyzed**.
 - ❑ Data would be presented as a list of benchmarking costs according to countries by work type and by road type.
 - ❑ These data also would be presented as a table or graph showing the list of averages of all countries.
 - ❑ Other presentation may be list of averages of investment costs by work and road class type according to UN regions or UNECE regions according to study covering geographical area such as Europe, Asia, America, Central Europe, Central Asia, Africa, North America, South America, Baltic Countries, Caucasian Counties, etc.
 - ❑ Data also allow us to check whether there is a relation between per km costs and countries population, density, land square, GNP and other economic and social indicators.

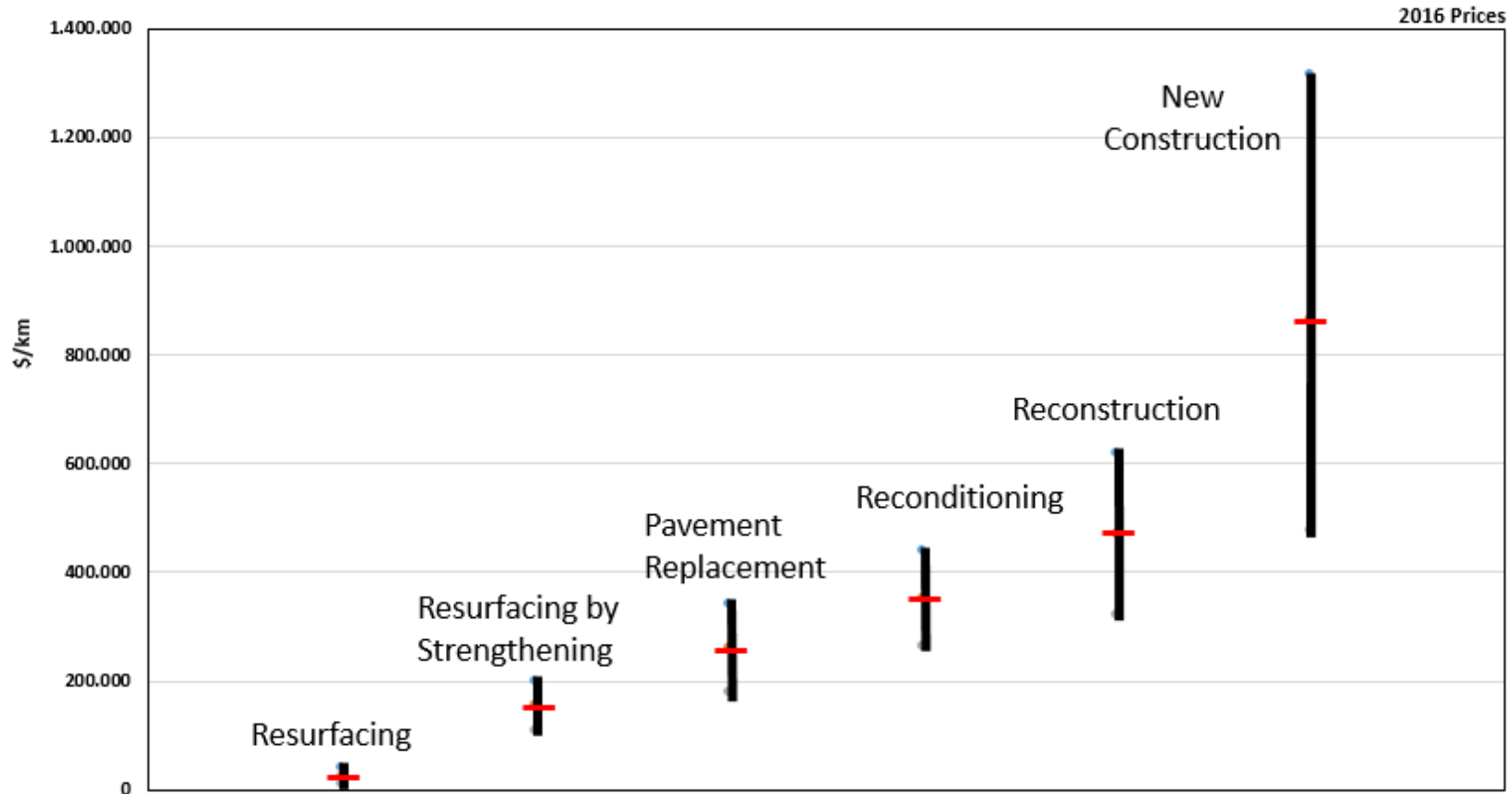


SAMPLE GRAPHS

(AVERAGE AND RANGE OF ACTUAL ROADS WORKS COSTS FOR TURKEY)



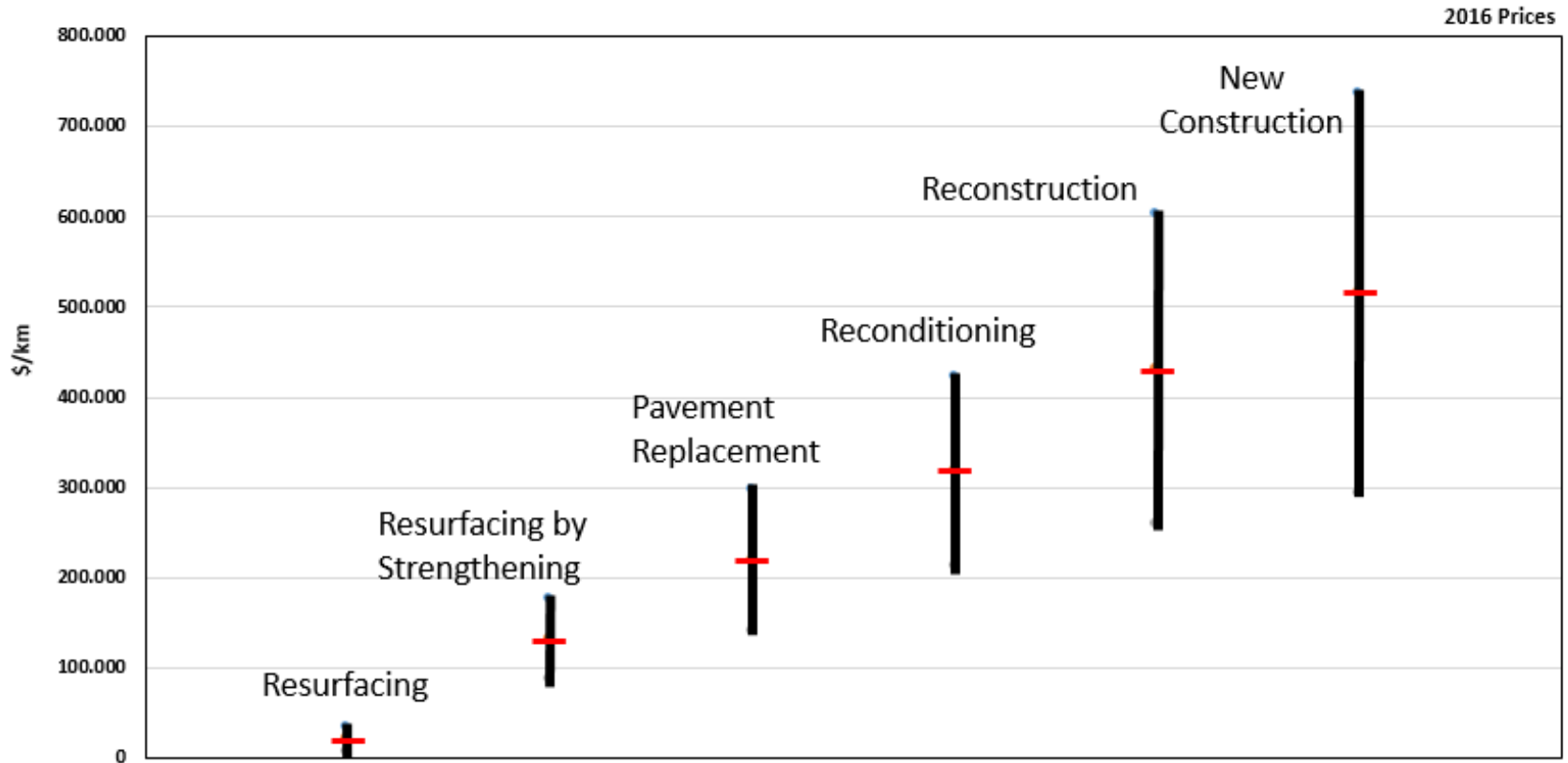
CONSTRUCTION COSTS OF SINGLE CARRIAGEWAY ASPHALT ROADS (US \$/Km) PRIMARY ROADS



MAXIMUM	38.768	198.862	341.566	437.571	616.823	1.314.653
AVERAGE	23.615	153.628	258.958	350.850	467.679	864.903
MINIMUM	8.461	108.394	176.349	264.130	318.534	475.697



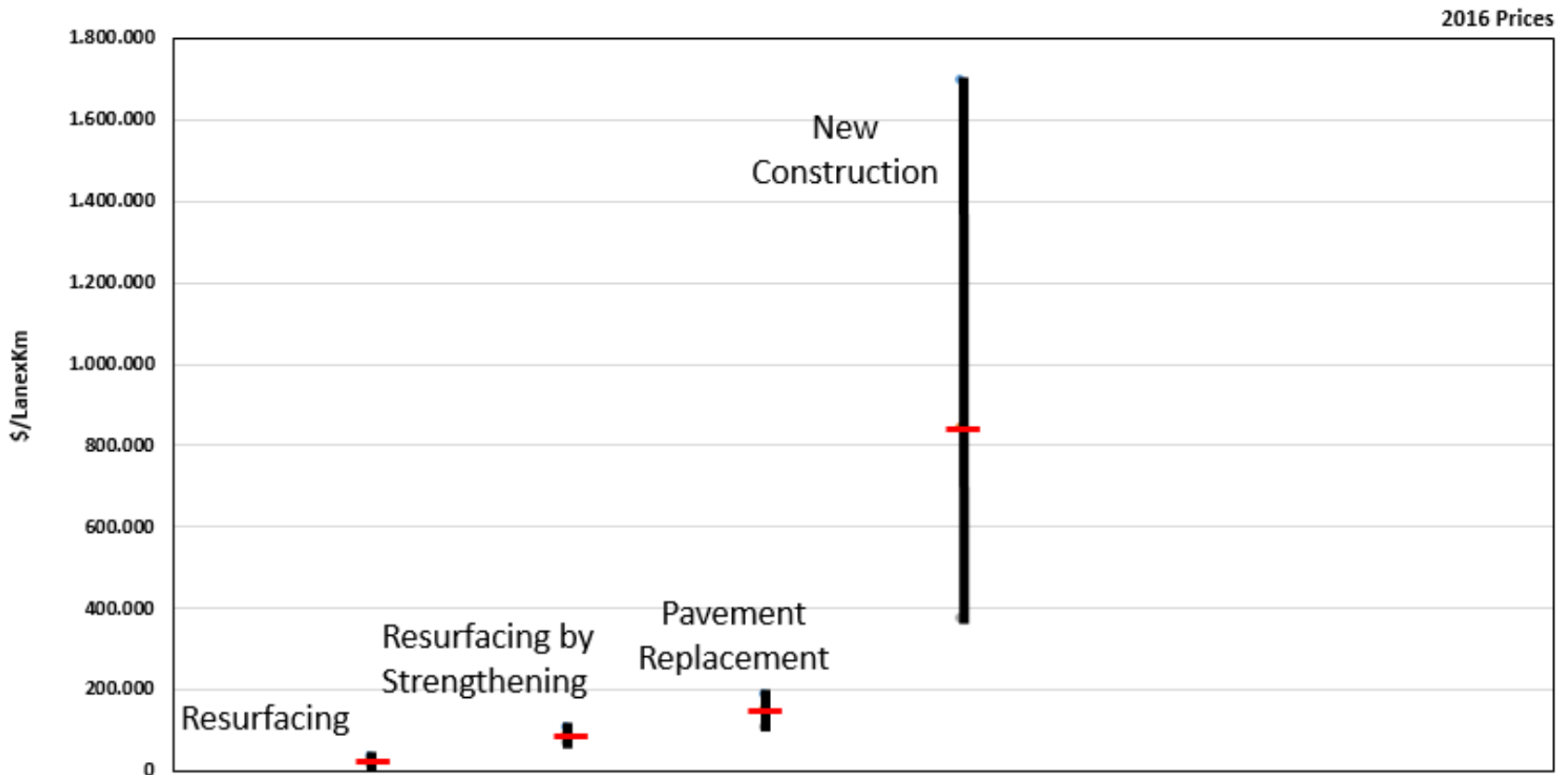
CONSTRUCTION COSTS OF SINGLE CARRIAGEWAY ASPHALT ROADS (US \$/Km) SECONDARY ROADS



MAXIMUM	35.000	175.932	298.250	423.395	602.647	737.087
AVERAGE	20.885	131.324	219.665	318.076	430.926	515.563
MINIMUM	6.769	86.716	141.079	212.757	259.204	294.040



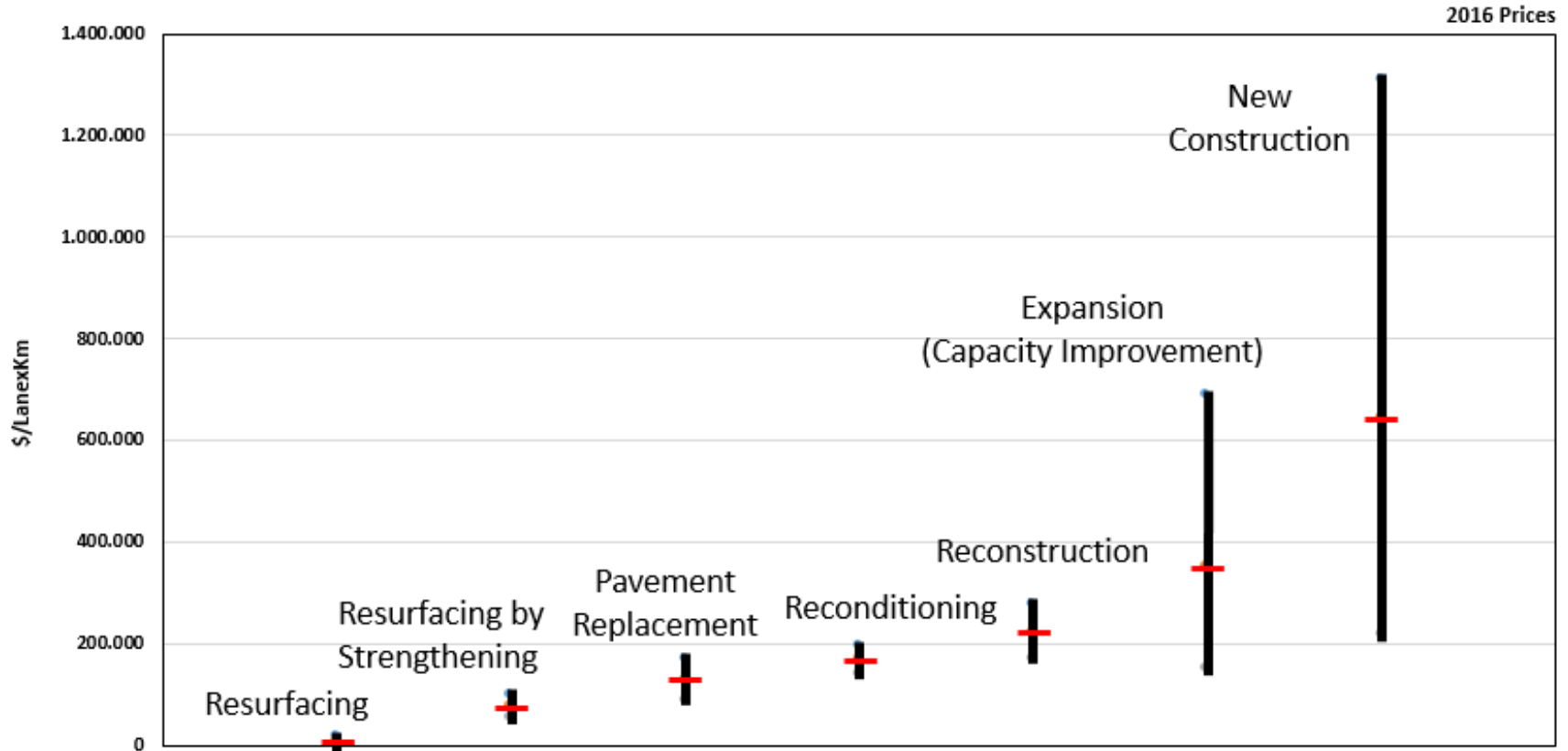
CONSTRUCTION COSTS OF DOUBLE CARRIAGEWAY ASPHALT ROADS (US \$/LanexKm) MOTORWAYS-EXPRESSWAYS



MAXIMUM	32.045	105.163	186.709	1.696.339
AVERAGE	23.726	85.100	146.259	841.578
MINIMUM	15.684	65.037	105.809	371.013



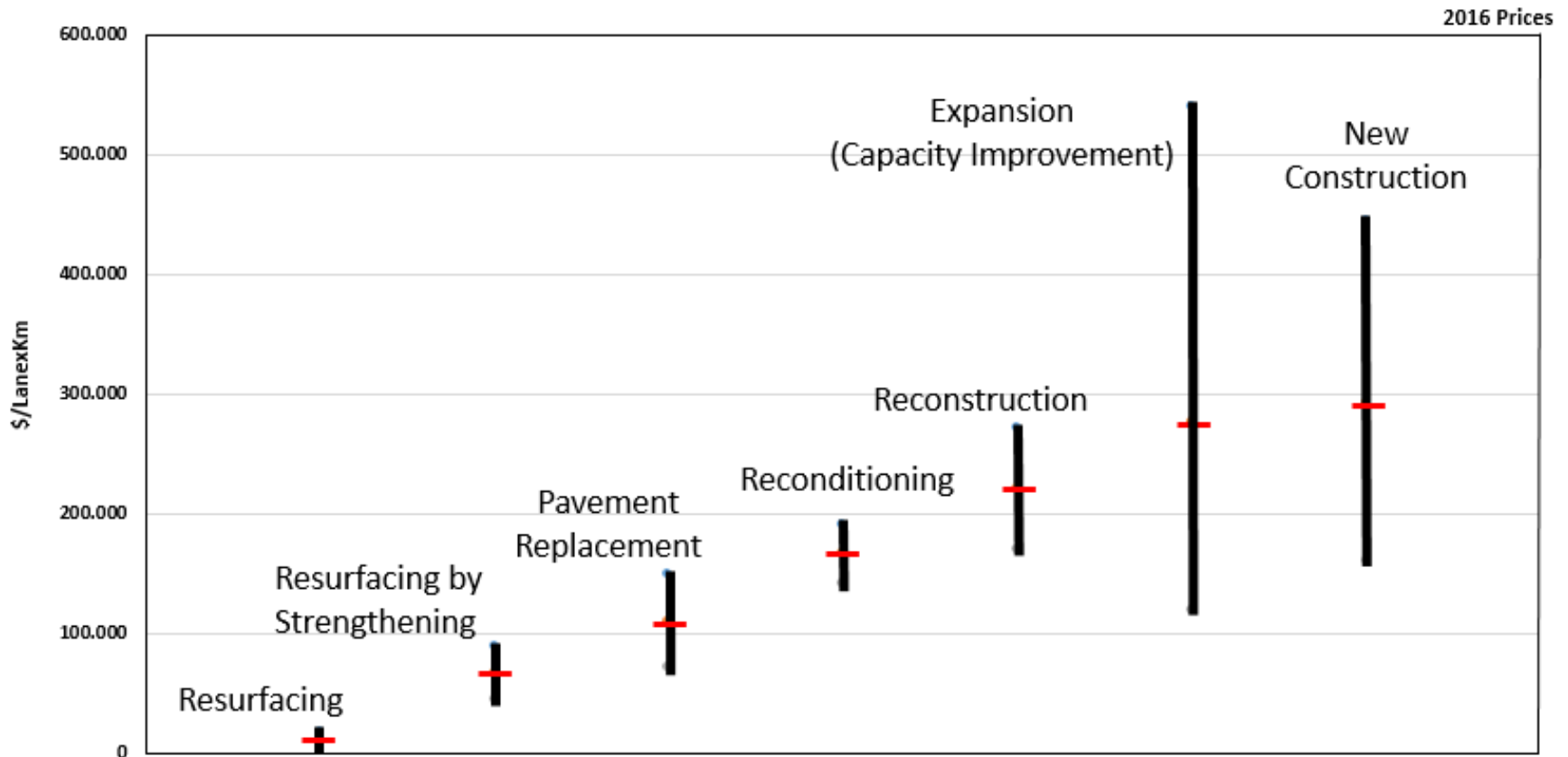
CONSTRUCTION COSTS OF DOUBLE CARRIAGEWAY ASPHALT ROADS (US \$/LanexKm) PRIMARY ROADS



MAXIMUM	19.384	99.431	170.783	196.907	277.571	690.907	1.310.338
AVERAGE	11.807	76.814	129.479	169.275	223.638	352.232	644.577
MINIMUM	4.231	54.197	88.174	141.643	169.705	150.879	216.472



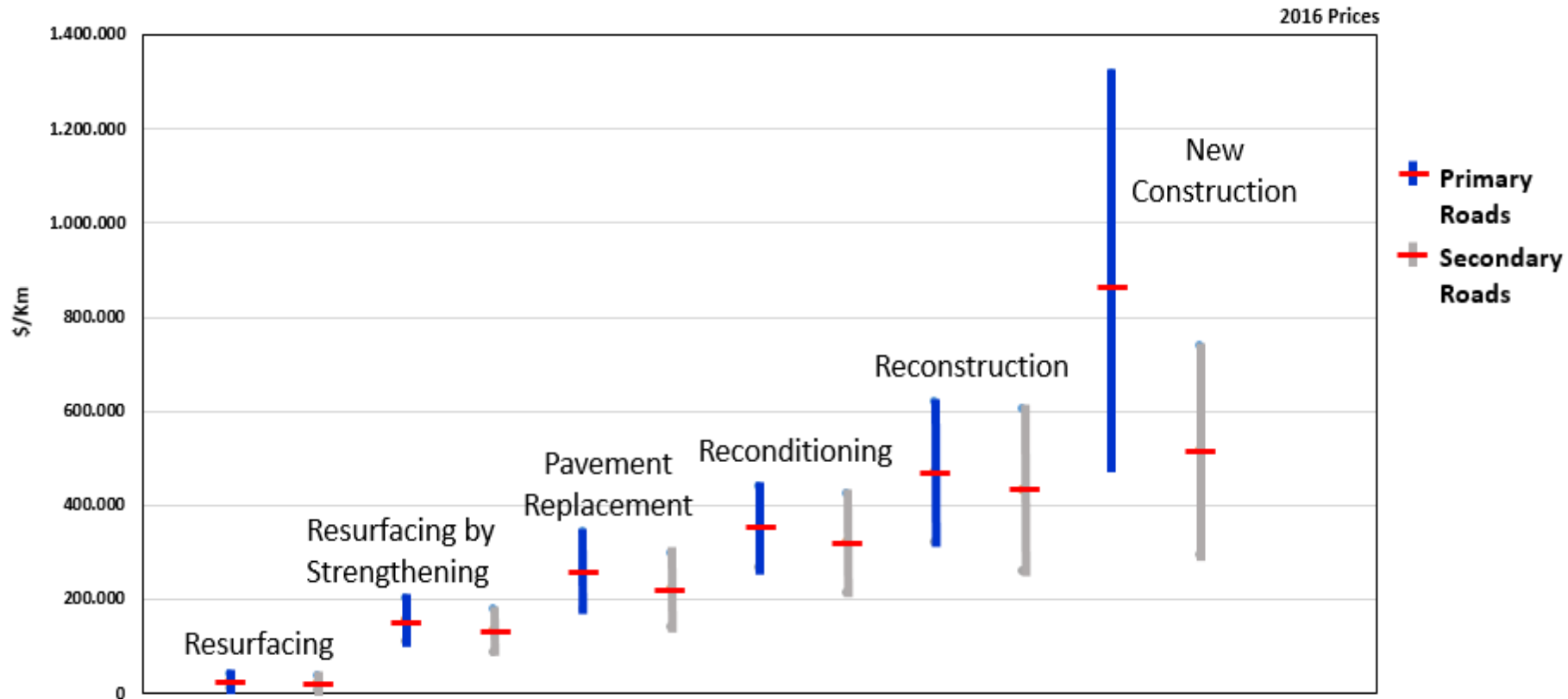
CONSTRUCTION COSTS OF DOUBLE CARRIAGEWAY ASPHALT ROADS (US \$/LanexKm) SECONDARY ROADS



MAXIMUM	17.500	87.966	149.125	190.528	271.191	539.963	443.721
AVERAGE	10.442	65.662	109.832	165.836	220.198	275.279	291.922
MINIMUM	3.385	43.358	70.540	141.143	169.205	117.917	160.557



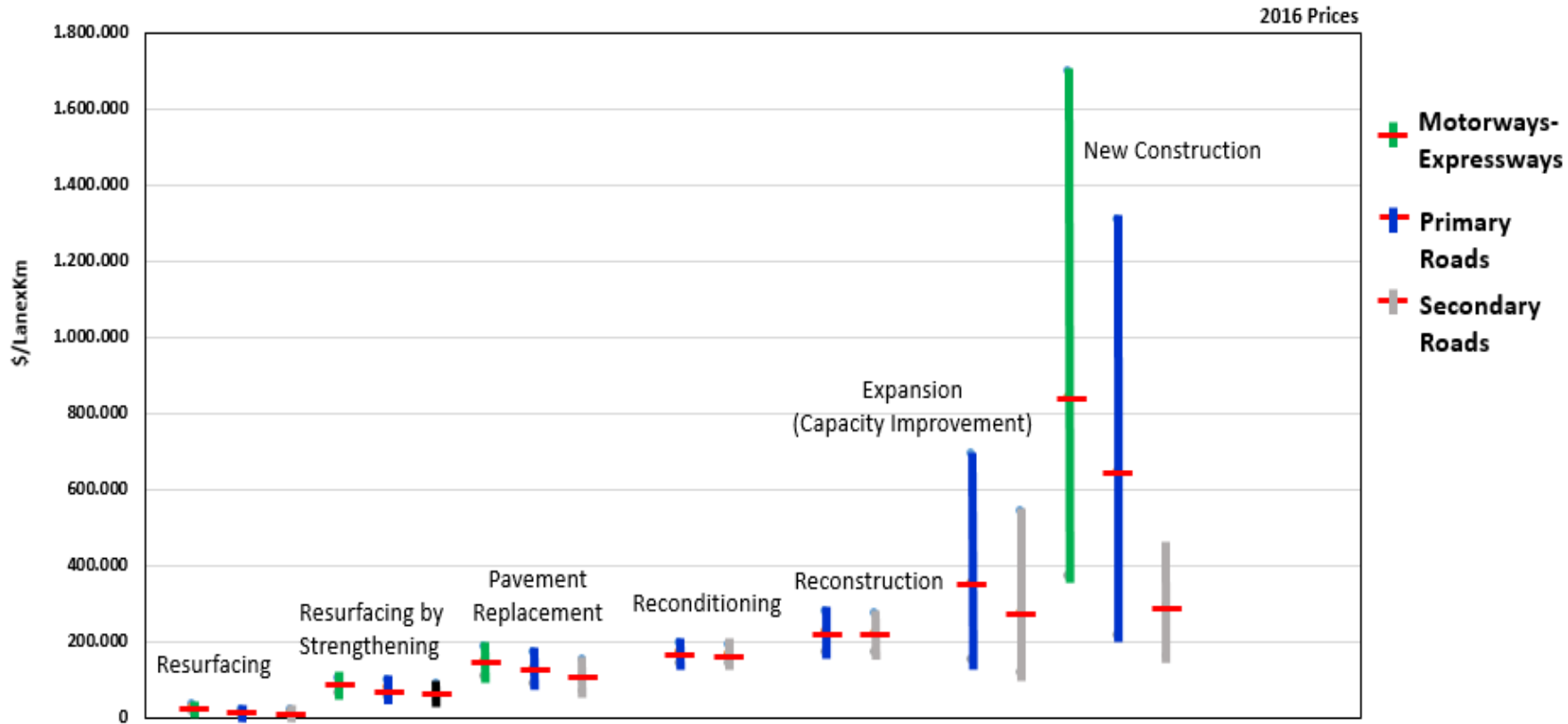
CONSTRUCTION COSTS OF SINGLE CARRIAGEWAY ASPHALT ROADS (US \$/Km)



MAXIMUM	38.768	35.000	198.862	175.932	341.566	298.250	437.571	423.395	616.823	602.647	1.314.653	737.087
AVERAGE	23.615	20.885	153.628	131.324	258.958	219.665	350.850	318.076	467.679	430.926	864.903	515.563
MINIMUM	8.461	6.769	108.394	86.716	176.349	141.079	264.130	212.757	318.534	259.204	475.697	294.040



CONSTRUCTION COSTS OF DOUBLE CARRIAGEWAY ASPHALT ROADS (US \$/LanexKm)



MAXIMUM	32.045	19.384	17.500	105.163	99.431	87.966	186.709	170.783	149.125	N.A	196.907	190.528	N.A	277.571	271.191	N.A	690.907	339.963	1.696.339	1.310.338	443.721
AVERAGE	23.726	11.807	10.442	85.100	76.814	65.662	146.259	129.479	109.832	N.A	169.275	165.836	N.A	223.638	220.198	N.A	352.232	275.279	841.578	644.577	291.922
MINIMUM	15.684	4.231	3.385	65.037	54.197	43.358	105.809	88.174	70.540	N.A	141.643	141.143	N.A	169.705	169.205	N.A	150.879	117.917	371.013	216.472	160.557



**SIMILAR GRAPHS MIGHT BE
DONE FOR CONCRETE ROADS.
SINCE WE DO NOT HAVE ANY
CONCRETE ROADS IN TURKEY
GRAPHS FOR CONCRETE
ROADS COULD NOT BEEN
PREPARED.**



6. EXPECTED ACCOMPLISHMENTS AT THE END OF BENCHMARKING STUDY





EXPECTED ACCOMPLISHMENTS

- ❑ The agreed terminology allow to the UNECE region countries to understand each other mutually and to set out a classification list of road infrastructure projects
- ❑ By this study a common terminology will be in hand for the follow-up studies and for sector
- ❑ The benchmarking questionnaire results allow to create a database for road infrastructure construction costs according to road classification and work type. By this way sector will have a good database in hand
- ❑ The questionnaire result allow us to have database for the regional construction costs benchmarks

THANK YOU FOR YOUR ATTENTION

Gökhan MACİT
Leyla ÜNAL

GENERAL DIRECTORATE OF TURKISH HIGHWAYS
Ministry of Transport and Infrastructure