

Distr.: General
22 January 2020

English only

Economic Commission for Europe

Inland Transport Committee

Working Party on Transport Trends and Economics

Group of Experts on Benchmarking Transport Infrastructure Construction Costs

Tenth session

Geneva, 30–31 January 2020

Item 3 of the provisional agenda

Transport Infrastructure Construction costs:

**Presentation of revised consolidated list of terminologies
on benchmarking road, rail, inland waterways and
intermodal terminals transport infrastructure costs**

Consolidated overview of responses received from Member States regarding the different methodologies used for benchmarking of road, rail and inland waterway infrastructure construction costs

Note by the secretariat

I. Background

1. This document contains in Annex I a set of responses of relevance to road, rail and inland waterways transport listed per country.
2. The Group of Experts will be expected to review this document and, on its basis, agree on how it would want to include this information in its final report.

Annex

Responses of relevance for road, rail and inland waterway transport infrastructure per country

I. How do you go about calculating, forecasting and evaluating transport infrastructure construction costs?

Croatia

The Republic of Croatia plans development of the transport infrastructure network based on the Development transport strategy of the Republic of Croatia 2017–2030. As large infrastructure projects are co-financed under EU funds, we are obliged to prepare feasibility studies and Cost Benefit Analysis (CBA) for the projects. Ex-ante and ex-post evaluation would be performed taking into consideration prepared feasibility study and CBA. Moreover, we prepare cost estimate of our infrastructure projects based on market study and our past experience with similar projects.

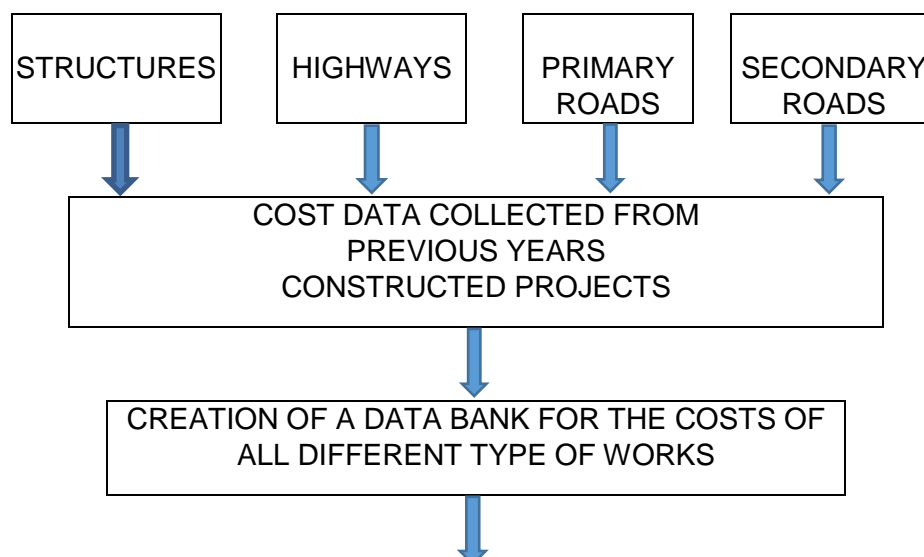
Moreover, construction of transport infrastructure is subject of open international procurement/tender procedures. The price of winning offer as result of market response on the open international tenders determines cost of transport infrastructure.

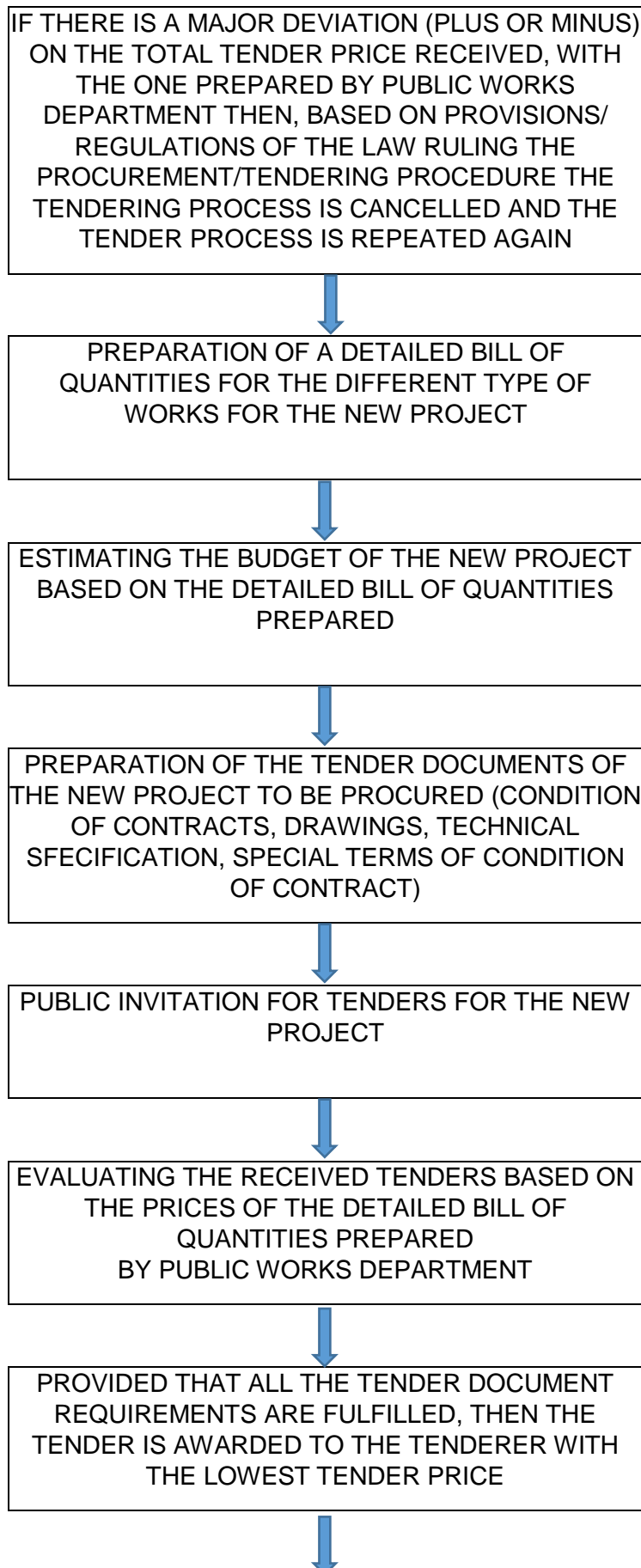
Strategic infrastructure projects for inland waterway transport in Croatia are planned within the framework of the Transport Development Strategy of the Republic of Croatia (2017–2030). Large infrastructure projects are usually co-financed by EU funds, so costs are calculated and forecast made in accordance with the prescribed methodology. For this purpose, FS and CBA are made, usually with several variants. The costs are estimated on the basis of market conditions within the project documentation. Besides, construction of transport infrastructure is subject to open international public procurement procedures. The price of the winning offer, as result of market response on the tender, determines cost of transport infrastructure.

Cyprus

Cost data are collected from the previous years constructed/completed projects for all different type of works in structures, highway (including various works: earthworks, drainage, traffic management, health and safety etc.); consequently, a data bank is created based on the cost data.

Flow chart indicating the process for the evaluating, calculating and analyzing the Road Transport infrastructure construction cost along with the Tendering Procedure.







BEFORE THE NEW TENDER PROCESS BEGINS
THE PUBLIC WORKS DEPARTMENT
INVESTIGATES THE FACTORS/REASONS WHICH
HAVE INFLUENCED THE TENDER PRICE
DEVIATION. ALL THE NECESSARY REMEDIAL
MEASURES WILL BE TAKEN BEFORE THE NEW
TENDERING PROCEDURE BEGINS AGAIN

Latvia

The procedure how the executors of construction works have to calculate construction costs for all types of structures including engineering structures is stipulated in the Resolution of the Cabinet of Ministers No. 239 “Regulations on Latvian Construction Norm 501-17 "Order of Determining Construction Costs””. Construction costs include costs for construction materials, work costs, rent of construction equipment and machinery, labour costs, wear of equipment (depreciation), overhead costs and profit, as well as, other costs related to construction (e.g. clearing of construction site, relocation of utilities).

Planned construction costs are determined basing on the prices of similar works defined in other concluded construction contracts, forecasts of macro-economic development indexes, changes in the construction market of transport infrastructure and its development forecasts, as well as, foreseen conditions of construction contract.

Poland

The planned cost of construction work is calculated using the index method as the sum of the products of the price index and the number of reference units, according to the formula:

$$WRB = \sum WCi \times ni$$

where:

WRB - value of planned cost of construction work;

WCi - price index of the i-th cost component;

ni - the number of reference units for the i-th cost component.

The basis for calculating the planned value of construction work is:

- (a) statement of work;
- (b) price indices.

Cost components are determined taking into account the structure of the classification system of Common Procurement Glossary, using, depending on the scope and type of construction work covered by the contract, the groups, classes or categories of work referred to in the Common Procurement Glossary.

If the work contract includes construction within the scope of the Construction Law, the cost components must correspond at the very least to the groups of work covered in the Common Procurement Glossary and include:

- (a) cost of site preparation work;
- (b) cost of construction work for basic facilities;
- (c) cost of installation work;
- (d) cost of finishing work;
- (e) cost of work related to land development and construction of ancillary facilities.

The price index of a given cost component is determined on the basis of market data or in the absence of such data - on the basis of commonly used catalogues and price lists.

The number of reference units is determined based on the statement of work.

Where there is not a single suitable price index, these costs should be calculated to produce an individual cost estimate.

When preparing the cost estimate, you can make use of currently available publications.

The estimate may also be prepared based on cost analysis of completed order parts thereof and on the basis of individual analyses.

Sources of information for individual collection

data can be:

- (a) concluded agreements or contracts;
- (b) prices from current publications, guides, catalogues, and offers;
- (c) prognostic data in the area of shaping prices.

Sweden

Trafikverket uses four different methods or approaches depending on stage in the processes of inquiry, planning or production.

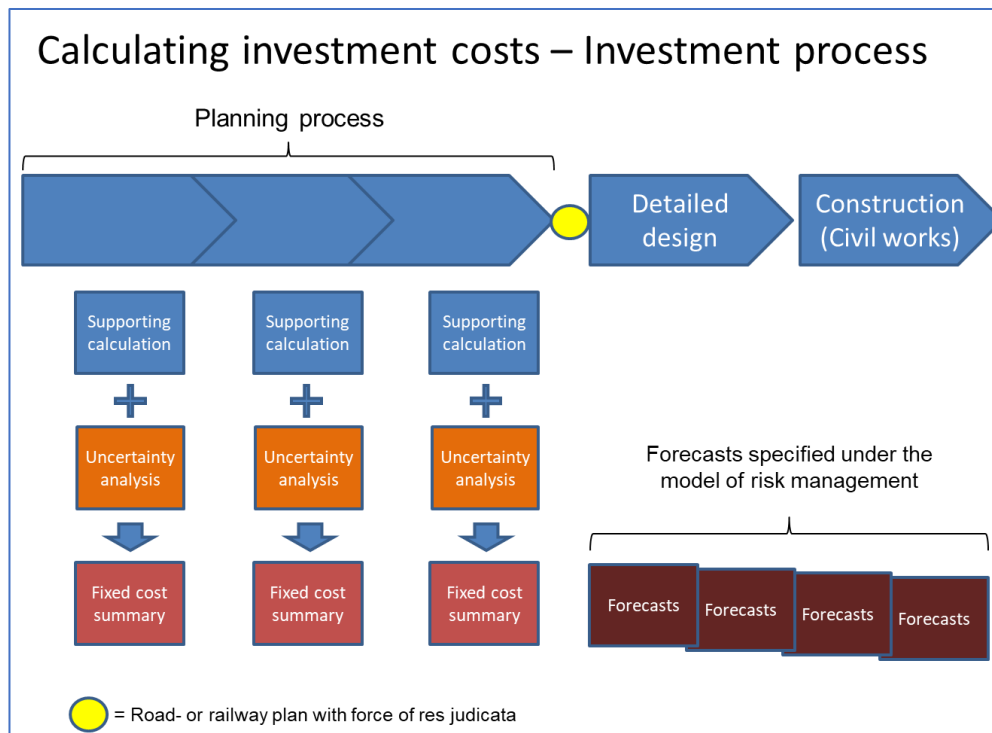
(a) In the early stages of the planning process a study of strategic choice of measures are conducted wherein rough cost estimations based on a relatively small numbers of items with the aim of capturing the largest items of costs are made. These items are quantified, and the corresponding cost are evaluated by analysing key figures from previously completed construction project. For internal use, there are templates available with and without pre-filled values.

(b) In the next phase of the planning process (preliminary studies of a number of possible alternatives → railway/road study of one proposed alternative), two methods are used. First, a so-called supporting calculation is conducted. In general, these types of estimations are conducted by external consultants and are based on traditional methods for estimating construction costs (i.e. quantity * prices per item). The template used allows for triple estimations.

(c) In addition to the supporting calculation, a separate evaluation is made using the successive principle method. The evaluation is based on an analysis of uncertainty that is conducted by a balanced and competent analysis group. This group makes forecasts of the final investment cost. Moreover, they identify and evaluate uncertain items that are important with respect to cost. The method is used to evaluate the uncertainty of the investment cost.

(d) Based on the result from the two underlying evaluations mentioned above, the final evaluated expected total costs are documented in the template summary of total cost. The summary of total cost is conducted based on the supporting calculation and the result from the analysis of uncertainty to ensure a common layout and transparency for any given stage of the planning process. The documents are later used to follow up the actual final cost compared to the estimated costs.

When a project enters the phases detailed planning and construction, the calculation process goes on to ongoing forecasting work.



Turkey

By means of:

- Feasibility studies
- Official unit prices and unit price analysis (updated annually for all kinds of construction works)
- Similar infrastructure construction projects previously realized

II. How do you compare transport infrastructure construction costs over time and normalize these costs by region/ time?

Croatia

We conduct ex-post evaluation of transport infrastructure construction cost after few years of projects finalisation.

Moreover, we carefully follow changes of construction market in order to obtain the best value for invested money, including changes depending on global financial market flows and crises as well.

The costs of inland waterways construction – critical sectors - can't be compared because each location is specific. In general, costs are defined through public procurement procedures/tenders, in accordance with operational construction plans. The planned costs of transport infrastructure construction are being monitored through the estimated prices on the market at the time of the call for tenders and through ex-post evaluation after the project is completed.

Cyprus

The prices collected on the data bank are re – evaluated over time taking into consideration major issues that can affect the prices like deviation on the cost of labour, petrol, inert materials, construction steel, VAT (Value added tax) etc.

The prices collected on the data bank are taking into account the region/part of the Country from where the information on the previous years completed Projects are collected.

Latvia

To compare the construction costs the following indicator is used: changes of the average costs for the reconstruction of one km of 7.5 m wide asphalt pavement in several years. These costs include those works, the cost of which constitutes the major part of project cost. Unit prices for specific works are average prices offered by contractors in construction tenders in respective years. Costs are not determined for each region specifically, they are determined for the whole Latvia.

Sweden

After an infrastructure construction project is completed, the final costs are analysed in comparison to previous evaluated costs. Both evaluations and final costs specifies by a common structure.

<i>Block</i>	<i>Name</i>
1	Project administration
2	Inquiry and planning
3	Design
4	Acquisition of land and property
5	Environmental measures
6	Contract works – Earth works
6.1	Earth works
6.2	Structures
6.3	Tunnels
7	Contract works - Railway
7.1	Track works
7.2	Electrical works
7.3	Environmental measures
7.4	Telecommunication works
8	Unique measures and archaeology
9	Delivery and end of project
10	Overall uncertainty (only budget)

All figures are converted to comparable price levels using indices.

This common structure makes it possible to aggregate several projects and do benchmarking between different project, regions etc.

The followed-up investment costs from major infrastructure construction projects are compiled and categorized in an Excel-sheet, thus allowing for usage in evaluation of future projects.

Turkey

Official deflator coefficients are published in our country for each sector (tourism, agriculture, mining, energy, transportation ...). This calculation is based on the monetary value of all goods and services produced in an economy. Thus, predictive approaches can be made for year-based and sector-based.

In addition; various parametric assumptions, depending on the terrain conditions for regional differences, provide useful results in practice.

III. How do you make sure that the mechanism you use to calculate and assess transport infrastructure costs also serve as a tool for costs control?

Croatia

The prepared feasibility studies and Cost Benefit Analysis are subject of ex-post control few years of projects finalisation.

In the inland waterway sector, this is ensured in a way that besides the construction of transport infrastructure, we also contract the supervision of the execution of works subject to control by supervising engineers, of which they issue reports.

Cyprus

Based on the information collected on the data bank, the Budget of the New Project is calculated through a detailed Bill of Quantities of all the works to be executed.

The correctness of the estimated budget is almost sure because a) is based on the collected costs on the data bank of the recently constructed/completed projects (taking into account also the region of the project) and b) the relevant corrections are made on these costs based on the deviation on cost of labour, petrol, inert materials, VAT, etc.

Latvia

Cost control mechanism in road construction sector is not established.

Sweden

The common structure described above is used throughout the whole investment process.

Turkey

Since transportation investments are affected by many parameters in practice, it is not easy to reach the precise results with preliminary evaluation and calculation mechanisms. Comparative data and analytical approaches are used to reach the nearest predictive approaches.

IV. Do you use different cost calculation and evaluation methodologies for construction in different modes? If yes, please explain.

Croatia

The methodology for calculating and evaluating the construction of transport infrastructure for certain modes is applied in compliance with the regulations relating to different sources of financing. During the preparation of project documentation, variant solutions are being presented and cost estimates are given depending on the type of water structures. The final assessment of an eligible water structure is influenced by price, environmental impact and efficiency.

Cyprus

Generally, the same process is used for all modes; however, there are cases in the Road Transport infrastructure projects that the method of DBFO (Design, Build, Financing and Operating) or DB (Design and Build) is used.

These methods are used for a very special and expensive Projects like the construction of the Airports, Desalination Plants etc.

Latvia

This question does not fall under the responsibility of “Latvian State Roads”.

Sweden

The analysis of uncertainty is generally not conducted for project with an expected total cost below SEK 25 million. The level of ambition with respect to the size of the analysis group and length – in days – of the analysis-workshop is adapted to the size and complexity of the project. Generally, projects with an expected total cost above SEK 500 million, requires a larger analysis group, more experienced facilitators and a two-day analysis-workshop.

Turkey

We use different cost calculation and evaluation methodologies when we encounter technical risks about the following situations;

Soil characteristics and properties of the project area (ground water level, weak soils, liquefaction risks, in needs of rehabilitation etc.);

Similar previous projects carried out under similar terrain and climate conditions (flat terrain, sloping-steep terrain, hydrologic data etc).
