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Economic Commission for Europe**Inland Transport Committee****Working Party on Transport Trends and Economics****Group of Experts on Benchmarking Transport Infrastructure Construction Costs****Fourth session**

Geneva, 16-17 October 2017

Item 3 of the provisional agenda

Transport Infrastructure Construction costs:**Presentations of terminologies used****Terminology/Questionnaire on Benchmarking Intermodal Terminals/Logistics Centres Infrastructure Construction Costs****Note by the Group of Experts****I. Mandate**

1. In accordance with its Terms of Reference, the Group of Experts is expected to complete its work within two years (2016-2018) and to submit a full report of its accomplishments (ECE/TRANS/WP.5/GE.4/2016/1). The Group of Experts shall assist in:

(a) Identify models, methodologies, tools and good practices for evaluating, calculating and analysing inland transport infrastructure construction costs;

(b) 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;

(c) Collect and analyse data in order to prepare a benchmarking of transport infrastructure construction costs along the ECE region for each inland transport mode — road, rail, inland waterways, including intermodal terminals, freight/logistics centres and ports. Analyse and describe the conditions/parameters under which these costs have been calculated on.

2. In carrying out its main tasks, the Group of Experts will, among others, also identify suitable methodological approaches, models and tools for gathering and disseminating

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information, i.e. conducting studies, distributing questionnaires, using existing studies and national strategies, existing best practices in calculating transport infrastructure construction costs, among others.

II. Terminology

3. Technical requirements:
 - (a) Less than 2% of slope;
 - (b) Roads should support mega trucks operations (two lines in each direction, wide enough);
 - (c) Roads should support mega trucks weight (about 5 Tn/sq m);
 - (d) Entrance to plots without any obstacle;
 - (e) Fiber optics to any plot;
 - (f) Energy: supply connection to any plot (50W/m² is commonly accepted in logistic areas) and 30% of energy supply should be renewable (\$/kWh, \$/MWh);
 - (g) Installation of Water installations (or connection to an existing installation);
 - (h) Green areas (regulations require not less than 30% of all land) \$/m²;
 - (i) Other local requirements;
 - (j) The passage of all infrastructure supply circuits should be through the channel. The entire infrastructure should be accessible (\$/Km);
 - (k) Traffic signalization system;
 - (l) Security system (gate control & monitoring & perimeter security) \$ per unit;
 - (m) Smart logistics IT systems \$ per unit or per system (Information Technology solutions, software, hardware, e-document, one window issue, etc.);
 - (n) Railway in logistics platforms and connection to the airport (with railway or roadway) and port (with railway, roadway or inland waterway) \$/km and handling area \$/m².
4. Intermodal Terminal:
 - (a) Land clearing: €/m², Jobs needed to take out the topsoil, Costs per m²;
 - (b) Earth movement: €/m³, Soil movements needed to adapt the land to the requirements. Cost per m³ of soil moved;
 - (c) Gravel Column: €/m³, Technical works in order to increase the carrying capacity of the land. This technical work refers to the injection of gravel columns in the floor. Cost of m³ of gravel injected;
 - (d) Concrete Column: €/m³, Technical works in order to increase the capacity of the land. This technical work refers to the injection of concrete columns in the floor. Cost of m³ of concrete injected;
 - (e) Drain wick: €/m², Technical works in order to increase the capacity of the land. This technical work refers to the injection of drain geotextile in the floor. Cost of m² of geotextile injected;

(f) Preload: €/m³, Technical works in order to increase the capacity of the land. This technical work refers to the placement of lots of soil in the floor waiting for the desired effect. Cost of m³ of soil placed;

(g) Reinforced concrete area: €/m³, Construction of pavement with reinforced concrete.

5. Trucks park:

(a) Land clearing: €/m², Works needed to take out the topsoil. Cost per m²;

(b) Earth movement: €/m³, Soil removal needed in order to form the land based on the requirements. Cost per m³ of soil removed;

(c) Gravel Column: €/m³, Technical works in order to increase the carrying capacity of the land. This technical work refers to the injection of gravel columns in the floor. Cost of m³ of gravel injected;

(d) Concrete Column: €/m³, Technical works in order to increase the capacity of the land. This technical work refers to the injection of concrete columns in the floor. Cost of m³ of concrete injected;

(e) Drain wick: €/m², Technical works in order to increase the capacity of the land. This technical work refers to the injection of drain geotextile in the floor. Cost of m² of geotextile injected;

(f) Reinforced concrete area: €/m³, Construction of pavement with reinforced concrete of the intermodal terminal;

(g) Special Operations/ installations for Dangerous goods: €/m³.

6. Container freight station (CFS):

(a) General CFS area: €/m³, Handling cargo services (in order to be transported by different transport modes);

(b) CFS area for Dangerous Goods: €/m³, special segregation, separation and handling for certain stowage plan.

7. Warehouses:

(a) General cargo Goods: €/m², Long, middle and short term storage area;

(b) Heat Controlled Goods: €/m², Long, middle and short term storage area for special products;

(c) Separated Goods: €/m², Long, middle and short term products storage area for special products;

(d) Dangerous Goods: €/m², Long, middle and short term storage area for special products;

(e) Goods in Pressured Equipment: €/m², Long, middle and short term products storage area for special products;

(f) Explosive Goods: €/m², Long, middle and short term storage area for special products;

(g) Cold Chain Goods: €/m², Long, middle and short term products storage area for special products;

(h) Handling area: €/m², Quantity of daily loads and unloads;

(i) Loading and Unloading area: €/m², Quantity of daily loads and unloads.

8. Initial Studies:

(a) Demand study: \$/Unit, Analysis of demand in order to determine if the development of the logistics platforms is needed;

(b) Ordination modification: \$/Unit, Works needed in order to modify the urban planning of the nearest city/town to facilitate the development of the logistics platform;

(c) Environment impact: \$/Unit, Works needed to get the administrative approval related to environmental impacts;

(d) Archaeological requirements: \$/Unit, Works needed to get the administrative approval related to archaeological requirements;

(e) Other administrative approvals: \$/Unit, Works needed to get the complete administrative approval.

9. Land Acquisition:

(a) Land Purchase: \$/m², Cost (per m²) of land acquisition (cost for the preparation of the relevant documents is included);

(b) Expropriation: \$/m², Cost (per m²) of land acquisition by expropriating the land (cost for the preparation of the relevant documents is included);

(c) Renting: \$/m²/year, Cost (per m² and per year) of land acquisition by renting the land (cost for the preparation of the relevant documents is included).

10. Engineering tasks:

(a) Project: \$/Unit, Writing of the engineering project;

(b) Construction Permit: \$/Unit, Cost of licences (all taxes paid to start the construction works);

(c) Works Management: \$/Unit, Cost of engineering works during the construction phase.

11. Land formulation:

(a) Land clearing: \$/m², Works needed to remove the topsoil. Cost per m²;

(b) Earth movement: \$/m³, Soil movements needed to form the land based on requirements. Cost per m³ of soil removed;

(c) Gravel Column: €/m³, Technical works in order to increase the carrying capacity of the land. This technical work refers to the injection of gravel columns in the floor. Cost of m³ of gravel injected;

(d) Concrete Column: €/m³, Technical works in order to increase the capacity of the land. This technical work refers to the injection of concrete columns in the floor. Cost of m³ of concrete injected;

(e) Drain wick: €/m², Technical works in order to increase the capacity of the land. This technical work refers to the injection of drain geotextile in the floor. Cost of m² of geotextile injected;

(f) Preload: \$/m³, Technical works in order to increase the carrying capacity of the land. This technical work refers to the placement of lots of soil in the floor waiting for the desired effect. Cost of m³ of soil placed;

(g) Peripheral fence: \$/m, Peripheral fence used to ensure safety of the logistics centre. Cost of lineal meter of fence.

12. Internal Roads:

- (a) Asphalt Road: \$/m², m² of asphalt road, including all the sub-layers needed;
- (b) Concrete Road: \$/m², m² of concrete road, including all the sub-layers needed.

13. Pavements:

- (a) Pedestrian pavement: \$/m², m² of pedestrian pavement. These pavements cannot support truck circulation. Cost per m² of pavement;
- (b) Plot access pavement: \$/m², m² of pedestrian pavement. These pavements should support truck circulation. Cost per m² of pavement.

14. Conduits:

- (a) Rain water drainage conduit: \$/m, Conduits that guarantee the drainage of rain water. Cost of lineal m of conduit;
- (b) Dark water conduit: \$/m, Conduits for dark water. Cost per lineal m of conduit;
- (c) Potable water conduit: \$/m, Conduits for potable water. Cost per lineal m of conduit;
- (d) Low-tension line conduit (480 v): \$/m, Conduits for low-tension electrical line. It does not include the cables. Cost per lineal m of conduit;
- (e) Medium-voltage line conduit (480 v-20 kv): \$/m, Conduits for medium-tension electrical line. It does not include the cables. Cost per lineal m of conduit;
- (f) High-tension line conduit (>20 kv): \$/m, Conduits for high-tension electrical line. It does not include the cables. Cost per lineal m of conduit;
- (g) Telecommunication conduit: \$/m, Conduits for telecommunication lines. It does not include the cables. Cost per lineal m of conduit;
- (h) Telephony conduit: \$/m, Conduits for telephone lines. It does not include the cables. Cost per lineal m of conduit;
- (i) CCTV conduit: \$/m, Conduits for CCTV installation. It does not include the cables. Cost per lineal m of conduit;
- (j) Optical fibber conduit: \$/m, Conduits for Optical Fibber installation. It does not include the cables. Cost per lineal m of conduit;
- (k) Fire prevention conduit: \$/m, Conduits for Fire Prevention installation. It usually uses water from tanks. Cost per lineal m of conduit.

15. Cables:

- (a) Low-tension electrical cable: \$/m, Low-tension electrical cable installed in the logistic area. Usually a line needs more than 1 cable. Cost per lineal m of cable;
- (b) Medium-voltage electrical cable: \$/m, Medium-tension electrical cable installed in the logistic area. Usually a line needs more than 1 cable. Cost per lineal m of cable;
- (c) High-tension electrical cable: \$/m, High-tension electrical cable installed in the logistic area. Usually a line needs more than 1 cable. Cost per lineal m of cable;

(d) Multimode optical fiber: \$/m, Multimode fiber optics cable installed in the logistic area. Usually each cable has more than 1 fiber (typically, 16 or 32). Price by lineal m of cable;

(e) Monomode optical fiber: \$/m, Monomode fiber optics cable installed in the logistic area. Usually each cable has more than 1 fiber (typically, 16 or 32). Cost per lineal m of cable;

(f) Telephone cable of pair: \$/m, Telephone cable of pairs installed in the logistic area. Usually each cable has more than 1 pair (typically, 32). Cost per lineal m of cable.

16. Roads installation:

(a) Road Paint: \$/m², All the signalling painting in the roads. Cost per m² of paint;

(b) Pedestrian cross-roads: \$/m², Pedestrian cross-roads. Usually are elevated from roads, in order to help the accessibility and the speed control of trucks. Cost per m² of pedestrian cross-road;

(c) Sign Posts: \$/unit, All the sign-posts needed in the logistic area to control the internal circulation. Cost per sign post installed;

(d) Streetlights: \$/unit, All the streetlights installed in the logistic area. Cost per streetlight.

17. Potable water supply:

(a) Deposit: \$/m³, If needed, deposit of potable water to supply to the area. Cost per m³ of deposit;

(b) External conduit: \$/m, Connection from the logistic area to external point of connection (given by local water company supplier). Cost per lineal m of conduit;

(c) Connection valve: \$/Unit, Connection valves installed in the logistic area. Cost per valve installed;

(d) Check valve: \$/Unit, Check valves installed in the logistic platform. Cost per valve installed;

(e) Pumping: \$/Unit, If needed, pump system of potable water. Cost per system installed.

18. Power supply:

(a) Power station transformer: \$/Unit, Power station transformer installed in the logistic area. Cost per unit installed;

(b) Low-tension electrical panel: \$/Unit, Electrical panel installed in the logistic area. Cost per unit installed;

(c) Power sub-station: \$/MW needed, Construction (or payment) of sub-station needed to guarantee the power supply. Cost per MW needed in the logistic area and used in the sub-station.

19. Rain drainage:

(a) Pumping: \$/Unit, If needed, pumping system to guarantee the rain drainage. Cost per unity installed;

(b) Fat separators: \$/Unit, Installation of fat separators to avoid that truck fat go to rain drainage. Cost per unity;

- (c) Storm tank: \$/Unit, Storm tank is a tank that can collect rain water during a time to avoid rising. Cost per unity installed;
- (d) Existing courses canalising: \$/m², Canalising of existing courses in the land selected to developing the logistic platforms. Cost per m² of canalising.
20. Dark water treatment:
- (a) Treatment system: \$/eq people, Installation of treatment system to adapt the dark water to the current regulation. Cost of equivalent people served by the treatment system;
- (b) Pumping: \$/Unit, If needed, pumping system to guarantee the circulation of dark water. Cost per unity installed.
21. Technical and Social facilities:
- (a) Hotels and Restaurants and other Social facilities: \$/Unit, hotels, restaurants, resting area, training centre, hairdresser, sewer, etc.;
- (b) Technical support and trade area: \$/m², wheels, wires, mechanics, painting, maintenance, technical consulting, etc.;
- (c) Administration and commercial offices: \$/Unit, Customs, standards and permission issues; freight forwarding, transportation offices; insurance, banks and other commercial offices, etc.;
- (d) Other facilities: \$/m², support services for the companies in logistics platform.
22. Garbage treatment plant: \$/m³, solid and liquid waste management area after certain amount.
23. Telecom supply:
- (a) Outside telephone pair panel: \$/Unit, Outside telephone pair panel installed (where any customer is connected to the telecom company). Cost per unit installed;
- (b) Monomode optical fibber interconnection panel: \$/Unit, Interconnection panel of monomode optical fibber. Cost per unit installed;
- (c) Optical fibber repeater: \$/Unit, Signal repeater of monomode optical fibber. Cost per unit installed;
- (d) Interconnection panel of multimode optical fibber: \$/Unit, Interconnection panel of multimode optical fibber. Cost per unit installed;
- (e) Signal repeater of multimode optical fibber: \$/Unit, Signal repeater of multimode optical fibber. Cost per unit installed.
24. Fire prevention:
- (a) Fire tank: \$/m³, Water tank used to supply water to the fire prevention network. Cost per m³ of tank;
- (b) Check valve: \$/Unit, Valves installed to guarantee the separation of sector in the fire prevention network. Cost per valve installed;
- (c) Fire prevention pumping: \$/Unit, Pump system that guarantees the pressure of water in the fire prevention network. Cost per pump system installed;
- (d) Firework vehicle: \$/Unit, rescue beginning time shall be less than 5 minutes.

25. Green areas:

- (a) Transplant: \$/Unit, any transplant needed from the original land to the logistic area. Cost per transplant done;
- (b) Topsoil movement: \$/m³, Topsoil moved to the green areas. Cost per m³ of topsoil moved;
- (c) Gardening: \$/m², Gardening jobs needed to finalized the green areas. Cost per m² of green area adapted;
- (d) Irrigation network: \$/m, Network of pipes need to guarantee the irrigation in the green areas. Cost per lineal meter of pipe installed;
- (e) Irrigation tank: \$/m³, Tank to collect rain and other kind of water to avoid the irrigation with potable water. Cost per m² of tank installed;
- (f) Irrigation pumping: \$/Unit, Pump system to guarantee the pressure needed in the irrigation network.

26. CCTV:

- (a) Fixes digital cam: \$/Unit, Fixed digital cam installed in the logistic area. Cost per unit;
- (b) Domo cam: \$/Unit, Domo cam installed in the logistic area. Cost per unit;
- (c) Digital recorders: \$/Unit, Digital recorders with more than 14 days of autonomy. Cost per digital recorder installed;
- (d) Control room: \$/Unit, Control room completely equipped (monitors, tables, chairs, etc.). Cost per control room installed.

27. Access control:

- (a) Access control barrier: \$/Unit, Automatic Barrier for the access control system. Cost per Access control barrier installed;
- (b) Plate recognition: \$/Unit, Plate reader system in order to control the access of vehicles in the logistic area. Cost per Plate reader installed;
- (c) Logical of access control: \$/Unit, Set of computers, routers, etc. installed to implement the logical of the access control. Cost per system installed.
