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Group of Experts on Benchmarking Transport Infrastructure Construction Costs

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Item 3 of the provisional agenda

Transport Infrastructure Construction costs:

Presentations of terminologies used

Terminology on Benchmarking Rail Transport Infrastructure Construction Costs

Note by the secretariat

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 UNECE 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 information, i.e. conducting studies, distributing questionnaires, using existing studies and

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national strategies, existing best practices in calculating transport infrastructure construction costs, among others.

II. Terminology

3. Abandon: To cease operating all or part of a route or service, especially with the intent of never resuming it again (4).
4. Abutment: Constitutive element of a bridge. The part at each extremity of the bridge on which the arch of the bridge or the apron rests (2).
5. Access shafts: Shaft providing access to a lower area (2).
6. Adjacent line: A line or siding next to the line you are on (3).
7. Adjacent parking: Parking parallel to the railway track (2).
8. Aggregate and ballast recycling: Aggregates making up the granular layers which form part of civil engineering infrastructures were traditionally extracted from quarries and pits with very negative environmental impacts. Because of this, the use of other types of materials acquired by recycling has been proposed; especially those coming from construction and demolition waste (C&DW's) for example, concrete waste. This way these infrastructures contribute to the reduction of their storage needs avoiding the impact associated with them. The purification of ballast for its reuse on jobs is an on-site recycling example (1).
9. Angle bar: Short pieces of steel used to join together standard sections of rail (usually 39 feet in length). Four bolts, fastened through a pair of holes at each end of the angle bar, are used to join the rails together (4).
10. Apron: Platform constituting the deck of a bridge. This part of the bridge is supported at its extremities by abutments (2).
11. Arched bridge: Bridge resting on one or more arches (2).
12. Armstrong turntable: Any old-style equipment that relies only on manpower to operate (in this case, a turntable). A steam engine that lacks an automatic stoker is sometimes called an "Armstrong" (4).
13. Arrival and departure yard: The aggregate of railway tracks where freight trains from domestic destinations or abroad are gathered upon arrival or before departure (2).
14. Automatic level crossing: Any of the following level crossings:
 - (a) Automatic half-barrier (AHBC);
 - (b) Automatic barrier crossing, locally monitored (ABCL);
 - (c) Automatic open crossing, locally monitored (AOCL);
 - (d) Crossing with red and green warning lights (R/G) (3).
15. Backshop: Facility where heavy repair and rebuilding of locomotives takes place (4).
16. Ballast retaining structure: Installation alongside the railway track for protection against loose chippings (2).
17. Ballast: A layer of material, which usually consists of either crushed rock, cinders, or gravel that is placed upon a railroad right-of-way, which holds railroad ties in place and allows for drainage and runoff. The term is also sometimes used to describe extra weight

added to locomotives. (An SD40-2, for example, can weight anywhere from 150 to 200 tons, depending on the amount of ballast added at the buyer's specifications. The usual method of ballasting is to use thicker sheets of steel to fabricate the frame. Occasionally smaller amounts of weight, usually concrete casting, are added to equalize weight distribution) (4).

18. Barrow crossing: a crossing (often at the end of a platform) for railway personnel to use. Some barrow crossings have white-light indicators which,

- (a) Manned crossing with barriers (MCB);
- (b) Manned crossing with gates (MG);
- (c) Remotely controlled crossing with barriers (RC);
- (d) Barrier crossing with closed-circuit television (CCTV);
- (e) Barrier crossing with obstacle detection (OD) (3).

19. Beanery: A railroad eating house (4).

20. Beliris: Collaboration between the Belgian federal state and the Brussels-Capital Region which is responsible for Mobility and Transport in Brussels (2).

21. Best Available Technologies Technology that, compared to other, similar technology, scores highest from an environmental point of view and in addition, is both affordable and technically feasible (2).

22. Bi-directional line: A line on which the signalling allows trains to run in both directions (3).

23. Block: Usually refers to a particular section of track that is computer-controlled so that trains can be properly, efficiently, and safely operated (4).

24. Bowl: The primary means of building trains in a yard with hump capability, these tracks are located following it (4).

25. Boxed joints: Rail joints that are located directly across from joints on the other side of the tracks. These are also known as "opposed" or "square" joints (4).

26. Branch line: Place on the railway network where the track splits into various directions (2).

27. Branch line: A secondary railroad line that is not a main line, it also usually receives less maintenance than main lines (4).

28. Bridge deck: Part of the bridge used for traffic (2).

29. Broad gauge: Any track gauge that is greater than 4 feet 8 1/2 inches (4).

30. Bypass: Railway connection (2).

31. Catenary: This is a group of conductor cables from which the engine gets its electrical energy by means of pantographs. Basically, the catenary is made from a carrying cable and one or two contact wires joined together by a suspension rod; the carrying cable is held by cantilever or gantry type suspension elements which are supported on metallic or cement posts aligned in parallel to the track. They are called this because they adopt a catenary shape that is typical of a flexible cable which equally hangs from its ends (1).

32. Catenary: A system of overhead trolley wires that carry electrical current. It is suspended directly above the railroad tracks with aid from wires that are strung along line-side poles (4).

33. CBR test: This test serves to measure the platform's support capacity that is its deformation resistance under loads. In a standardised procedure, the platform delivery on site conditions are brought nearer by the compaction of a sample, with a degree of moisture and energy similar to those that will be applied on site. At the end, the sample is stressed using a cylindrical plunger, measuring the sample's highest penetration pressure. The CBR index reflects in percentages the ratio between this penetration and the one practised on a standard sample to get the same penetration (1).
34. Clearing ballast from the track: This consists in removing part of or all the ballast for its purification and reuse or for its removal or substitution, whatever the case, the splice bars' settling bed must be destroyed to reach a certain depth below it. This can be carried out manually or by using ballast tamping machines, loading the extracted product onto a train with hoppers and conveyor belts situated behind the hoppers. The section rebate of the platform can also be made using the tamping machine (1).
35. Connecting bend: Bend connecting two railways or a railway and a station (2).
36. Continuous welded rail: These are long rail bars welded in a workshop and transported in especially equipped wagons to the location where they are to be laid. Once positioned on the splice bars, these rail sections are welded to the track either by aluminothermy or by mobile welding machines, solving expansion or overload problems by means of special joints, by inserting sections of normal length bars or by means of expansion apparatus at the ends of the rail (1).
37. Continuous welded rail (CWR): Rail laid in lengths of 1,500 feet or so (roughly a 1/4-mile), rather than 39-foot pieces bolted together. Aside from saving railroads millions in maintenance costs and derailments CWR does not buckle, because it resists thermal expansion and contraction. It is also referred to as ribbon rail (4).
38. Continuous welded rails: Rails welded to each other at a length of 300 metres. The absence of joints in continuous welded rails ensures more comfort on the ride and less noise pollution (2).
39. Controlled crossing: Any of the following level crossings:
- (a) Automatic half-barrier (AHBC);
 - (b) Automatic barrier crossing, locally monitored (ABCL);
 - (c) Automatic open crossing, locally monitored (AOCL);
 - (d) Crossing with red and green warning lights (R/G);
 - (e) when lit, indicate to the user that it is safe to cross (3).
40. Controlled siding: A siding where switches and signals are remotely controlled by a dispatcher (4).
41. Corrugation: Damage to the upper side of the rails due to intensive use. Under normal circumstances, a rail is completely level and smooth. Corrugation is the process whereby tiny ridges form on the rail surface, causing vibrations when a train passes over them (2).
42. Covered cutting: Structure in which the tracks are covered by a plate (2).
43. Crossing: Place where train tracks cross (2).
44. Crossing: Commonly known as a diamond, they allow for railroad tracks to intersect each other at any type of angle that does not allow for actually switching on to the other track. It is also the term often referred to the place where highways and railroad tracks meet commonly known as grade crossings (4).

45. Crossover: Facilitates the movement of rail equipment onto parallel tracks via back-to-back switches (4).
46. Cutting: Area where the tracks are not covered and where they are embedded in a trench (2).
47. Depot: Work post for personnel charged with maintenance of the railway infrastructure (2).
48. Deval test: This test measures the aggregate's resistance to abrasion. In a standardised procedure, pre-set granulometric fractions of ballast or gravel are introduced into two slanted axis rotary cylinders (one of these is filled with water covering the aggregates). The cylinder rotates a set number of revolutions at a set speed and the test finishes by separating and weighing particles of less than 1,6 mm (μ_{ms} and μ_{mh} values in grams) formed during the test. The dry Deval coefficient for ballast is obtained from the $D_s = (2800/m)$ formula and the moist Deval coefficient from the $D_h = (2800/m^1)$ formula (1).
49. Diamond: Similar to a crossing, a situation when two railroad lines cross one another without the means of switching onto the other track (4).
50. Dual control switch: A track switch that can either be operated manually or remotely (by a dispatcher) (4).
51. Ecoduct: Viaduct for wildlife passage across the railway track (2).
52. Electrified tracks: Tracks equipped with a power cable providing electric traction power to the trains (2).
53. Engineering Possession Reminder (EPR): A reminder applied by the signaller to one or more axle counter sections in advance of pre-planned engineering works in order to indicate the area affected. When removed from an axle counter section indicating occupied, this initiates an unconditional reset/restoration of the axle counter without aspect restriction (3).
54. European Train Control System (ETCS): European train control system that can automatically stop a train that neglects a red sign or exceeds the maximum speed limit (2).
55. Exempt railroad crossing: This notice allows for all vehicles to operate over the grade crossing without the need to stop or watch for oncoming trains (4).
56. Fill: A railroad right-of-way formed by levelling a low area to keep the ruling grade manageable (4).
57. Flying junction: Similar to a flyover (below) except that two or more railroad tracks, on at least one line, operate through the junction (4).
58. Flyover: Also known as an overpass/underpass it allows for two intersecting railroad lines to cross one another without the means of a diamond, which would require dispatching and increase transit times (4).
59. Freight axis: Strategic railway line for freight traffic (2).
60. Freight corridor: International freight axis (2).
61. Frog: The area of the track through a switching point that allows for the wheel flange to pass through it (otherwise the wheel would snag the track and derail). Switches are numbered according to the angle of their frogs (so the sharper the curve the less speed it can be taken at). For instance, a Number 20 switch separates the rails one foot for every twenty feet travelled (4).

62. Gauge: The inside width of a railroad track. Here in the U.S. the Standard Gauge is 4 feet 8 1/2 inches (4).
63. Geosynthetics: These are materials manufactured with polymers (mainly polypropylene but also polyester, polyethylene and others) whose use implies technical and economical improvements in transport infrastructure's and geotechnical and hydraulic work's environmental projects, fulfilling the following functions: separation, reinforcement, filtration, drainage and formation of waterproof barriers. They also carry out other secondary functions such as covering, erosion and vegetation control. The following basic types of geosynthetics can be recognised: geotextiles, geomeshes, geomembranes, geomattings, geocells and geocomposites (1).
64. Geotextiles: These are continuous or short fibre geosynthetic materials, mainly prepared in the form of woven or un-woven sheets, for their use as an auxiliary element between the infrastructure's platform layers. These materials have the following mechanical and hydraulic functions: stopping the different composition layers' materials from mixing, reinforcement due to their tractive resistance, a waterproof membrane protection against shear failure, a support for coverings, filtration allowing water to pass through them but not fines and drainage when they are arranged in very thick layers. They are used amongst other applications for railway work as a sub-base substitute or complement (1).
65. Goods line: A line that has not been signalled to the standard required for running passenger trains (3).
66. Grade: The slope or angle of the railroad right-of-way. It is based on percentages so if the ruling grade for a rail line or section of railroad track is 2 per cent that means that the right-of-way rises roughly two feet per every one-hundred feet travelled. As an example 2 per cent is a somewhat steep climb and railroads try to keep their ruling grades no greater than this (although it does happen with railroads operating lines that reach up to 3 per cent to 4 per cent) (4).
67. Grade-separated branch line: Place where two railway tracks branch out at separate levels (e.g. track A runs under track B). This is often achieved through a viaduct (2).
68. Grade-separated crossing: Switching complex at two different levels allowing for the elimination of bottlenecks in rail traffic (cf., grade-separated interchange) (2).
69. Green embankment: Green zone blocking a specific area from sight (2).
70. Ground throw: A manual device to operate switches that is roughly the same height as the rail-head (4).
71. GSM-R: Digital communication network reserved for railway companies (2).
72. Guard rail: Usually placed on bridges one or two rails are placed inside the running rails to prevent railroad equipment from tumbling completely off of the right of way when it derails (4).
73. Guideway: envelope this is the shape of the track on the ground and on which the railway is settled. Its layers are of a standard composition, resistance and dimensions depending on various parameters: ground (embankment or trench), number of tracks (single or double), surroundings (town or rural), track curvature (curved or straight), line speed and others (1).
74. Helper district: A segment of railroad line with steep grades that must use extra locomotives to negotiate the train over it (4).
75. High iron: Slang term for a main line or main track as iron was once the main material used in the construction of rails (4).

76. High-speed railway: These are rails designed and built for commercial speeds of 250-350 km/h, to which new elements have been incorporated to the traditional technology on the track as well as in the tractive and trailing material, therefore requiring more demanding work and maintenance requirements. The limit of the high-speed commercial train, for cost reasons, seems to be 300 km/h as by passing from a speed of 300 km/h to 500 km/h this means multiplying the capacity by more than 4 times, as the air resistance is proportional to the speed cube (1).
77. Hot box detector (HBD): A heat sensor that warns of hot boxes and are found along a railroad line (4).
78. Hot box: An overheated wheel bearing, which if left undetected, can burn off and cause a derailment (4).
79. House track: A siding track running near a station that allows for either passengers or freight to be unloaded (very common in the older days of railroading) (4).
80. Hump yard: Classification yards where strings of freight cars are slowly pushed over a hump, or small hill, and properly organized according to whatever precedent the railroad has them planned for. Once the single car reaches the top of the hill, or hump, it coasts under its power into the bowl until it reaches the proper yard track, via a computer-controlled switch, it is designated for (4).
81. Hydraulic tunnels: Tunnels intended for hydraulic infrastructure (2).
82. Infrastructure fee: Fee paid to Infra Manager by railway operators for the use of the railway infrastructure (2).
83. Interchange track: A simple length of track, usually a siding, where two railroads interchange cars (4).
84. Jointed rail: Rail in standard sections (usually 39 feet) that was bolted together, as opposed to continuously welded rail (4).
85. Junction: The area where two or more rail lines meet or intersect (4).
86. Kiss & Ride: Provision for short-term parking at a station or stop (2).
87. Lead (pronounced "leed"): A track which connects a group of tracks to a main line (4).
88. Level branch line: Place where two railway lines branch out at the same level (2).
89. Level crossing: Place where the public road crosses a railway track (2).
90. Level crossing: Any manned, automatic, controlled, or open crossing (3).
91. Liberalisation of the railway sector: Opening up of the railway traffic market. Several companies will be allowed to arrange train traffic in Belgium, thus creating a competitive market (2).
92. Light rail: A term referring to rail transit, it usually consists of a single powered car or small consist with a single operator that uses overhead catenary (electricity) for power. Normally this type of transit system is found in cities and towns (usually operating directly on the streets) and is very similar to the trolley systems of old (4).
93. Logistic Centres for Infrastructure (LCI): Centre which organises personnel and material resources required for maintenance and repairs of the infrastructure in a certain zone (2).
94. Los Angeles test: this test measures the aggregate's resistance to impact and serves, amongst other things, to set the characteristics of the ballast and gravel for the railway

track's settling layers. In a standardised procedure, pre-set granulometric fractions of the ballast or gravel are introduced into a horizontal axis rotary cylinder. The cylinder rotates a set number of revolutions at a set speed and the test finishes by separating and weighing particles of less than 1,6 mm (?m' value in grams) formed during the test. The Los Angeles coefficient for ballast is obtained from the $LA = (100 * m / 5000)$ formula (1).

95. Main line, or Main track: The principle railroad track that connects two points it usually also includes sidings, spurs, and yards at a number of different locations to serve train meets, customers, and / or hold freight cars (4).

96. Maintenance: A location defined in a train operator's Contingency Plan with the facilities to repair or replace specified items of defective on-train (3).

97. Maintenance of way: The repair and maintenance of a railroad right-of-way (4).

98. Maintenance point: Place where maintenance works are being executed (2).

99. Marshalling station: Station where freight containers are being arranged to form complete freight trains. It is the place where cars are being separated and connected to the right train, ensuring that the containers reach the correct destination (2).

100. Marshalling yard: Aggregate of railway tracks where freight containers are being arranged to form complete freight trains. It is the place where cars are being separated and connected to the right train, ensuring that the containers reach the correct destination (2).

101. Mechanical weed control: Removal of weeds by means of a mowing machine without the use of chemicals such as herbicides (2).

102. Movable-point frog: The "new" frog it allows for the wheel flange to be constantly supported through a switch rather than the opening that occurs in standard frogs to allow flanges to pass through freely (i.e., the gap is eliminated). It also allows for higher speeds through a crossing of at least 70 mph (4).

103. MOW: Maintenance-of-Way (4).

104. Multimodal: Hub where various transport modes come together (2).

105. Narrow gauge: Any track gauge that is less than the Standard Gauge of 4 feet 8 1/2 inches (4).

106. No-block line: A line on which the signaller does not monitor the condition of the block section (3).

107. Noise nuisance maps: Maps showing the noise pollution caused by the railway (2).

108. Operating rod: The manually or mechanically operated bar at a switch which allows the switching points to be moved into either the main route position or diverging route position (4).

109. Overhead catenary: Power cables above the railway tracks. Trains receive their driving power from contact with these cables (2).

110. Planning permit: Licence required for the construction of infrastructure (2).

111. Plant: A shortened version of the "interlocking plant" term, which efficiently controls the movements and operations of all of the switches, signals, and controlling mechanisms at a particular junction of railroad tracks (4).

112. Platform Railway bed: Area that accommodates the railway infrastructure (2).

113. Pound (rail): The unit of measure of rail size is weight per yard. For instance, 120-lb rail gets its weight designation because every three feet of rail weighs roughly 120 lb. (4).

114. Proctor test: The infrastructure's ground layers should be compacted to avoid them settling under the action of the loads supported, adjusting the energy and type of compaction, the ground's moisture and the layers' thickness to reach a compaction degree. The Proctor test standardises the compaction conditions, checking at the end of the process the dry density obtained with samples of various moisture content and obtaining the dry-moisture/density content curve, whose maximum reveals the degree of moisture for optimum compaction. A variation of the test that uses 4,5 times more compaction energy is known as the modified Proctor' (1).
115. Public railway platform: Off-loading quay for freight trains where external companies load containers, large mixed cargo and bulk goods from train cars onto lorries (2).
116. Rail dampers: A means to reduce the noise caused by passing trains, rail dampers are attached to the rails to reduce vibrations when a train passes over them (2).
117. Rail gauge: This is the minimum boundary of the platform and maximum boundary of the rolling stock. It is a notion whose purpose is to define boundaries allowing the circulation of the rolling stock so that it does not encounter railway installation obstacles. It has a double concept: an obstacle gauge applied to the infrastructure and rolling stock gauge that refers to its housing. The rolling stock gauge should always be less than the infrastructure one (especially in tunnels, bridges and walls) (1).
118. Rail joints: The continuity of the consecutive bars on the same rail is achieved by welding or connections ensuring the continuous beam working of each rail at ground level or at an elevated level. It should have a similar deformation resistance to that of the rail that it connects, impeding relative movements of the lateral and vertical ends but allowing for expansion. This can be a mechanical connection using flanges which are concordly or alternately arranged between both rails, either supported on the splice bar or suspended between consecutive splice bars (1).
119. Rail lubricator: Devices mounted along the rails in areas of high curvature that apply lubricant to the flanges of locomotives and cars of passing trains to reduce both flange- and rail-wear (4).
120. Rail yards: The aggregate of railway tracks where trains are gathered (2).
121. Rail: The standard steel-fabricated structure that railroads use to operate over. Today the structure is known as "T"-rail as it is formed in roughly an upside-down "T" shape to provide for maximum support. Once made from standard 39-foot sections today rails are fabricated in 1/4-mile sections (up to 1,500 feet) and then welded together to form continuous welded rail (CWR) that is much stronger, reliable, and cheaper to maintain than jointed rail (4).
122. Railway branch line: Place on the railway network where the track splits into various directions (2).
123. Railway cuttings: Excavations accommodating railway tracks (2).
124. Railway equipment: Equipment necessary for trains to operate: tracks, overhead wiring, sleepers, signals, etc. (2).
125. Railway operators: Companies that arrange and control train traffic on the railway network (2).
126. Railway rail: This is the longitudinal element of the track in contact with the rolling stock's wheels that defines the running surface by means of unidirectional guidance and transmitting the loads to the splice bars or railway, as well as serving as electrical conductors. It is made from iron or steel and is characterised by the section's shape (the

most used is the flat-bottomed type) and weight by linear metre, the heavier the load it has to support the bigger it is. It is manufactured in limited longitudinal bars that are welded or joined together by flanges, being fixed to the splice bars with different types of fastenings (1).

127. Railway superstructure: This notion recognises the group of track elements that are found above the formation layer that culminates the platform. It therefore includes the settling layers, splice bars, rails and track apparatus (1).

128. Railway track: This is a group of elements that hold and guide the rolling stock by transmitting the wheels' load to the platform. The classical track is made up of two rails supported on a layer of ballast of variable thicknesses and separated from the platform by a sub-base, whose relative inclination and separation are kept by splice bars. The ballast and the splice bars can be substituted by concrete shields to which the rails are fixed, or these are separated by means of transverse stiffeners (1).

129. Railway track conservation: This process includes three main actions: normal maintenance which is the renovation of the track which means the systematic substitution of the track's elements that are subject to wear or ageing, or due to improvements in the track's performance, proceeded with a complete or partial renovation that only effects the rails, splice bars or ballast all being large improvement operations. One of the most important maintenance operations is correcting the level, which in the majority of cases is carried out by mechanical tamping using tamping machines that raise the track and tamp until it has reached its ultimate position (1).

130. Receiving yard: The destination for arriving trains carrying cars to be sorted or classified (4).

131. Reinforced cuttings: Excavation for later placement of foundations. Reinforcing panels placed against the walls of the excavation prevent the structure from collapsing (2).

132. Remote control signal box: Unstaffed signal box that in emergencies, can be controlled from another signal box (2).

133. Retaining walls: Wall that can withstand the pressure of higher ground. It allows for construction of a steep wall on a hill without a risk of the earth subsiding (2).

134. Ribbon rail: Also known as continuous welded rail (CWR), rail laid in lengths of 1,500 feet or so (roughly a 1/4-mile), rather than 39-foot pieces bolted together. Aside from saving railroads millions in maintenance costs and derailments CWR does not buckle, because it resists thermal expansion and contraction. It is also referred to as ribbon rail (4).

135. Section: Railway track between two locations (e.g. between two stations) (2).

136. Semi-covered cutting: Partly covered railway excavation. The semi-covered cutting resembles a 'half open' tunnel (2).

137. Settling layers: These layers include the layer of ballast and the sub-base. Their purpose is to spread the concentrated loads that they receive from the splice bars and transmit them to the platform. The layer of ballast cushions the vibrations transmitted by the splice bars and contributes to the track's longitudinal and transverse stability, and the sub-base protects the platform from erosion and at the same time avoiding the ballast layer's contamination. The settling layers' thickness is mainly determined by the platform's geotechnical characteristics (1).

138. Shoofly: Temporary track constructed to allow trains to pass around an obstacle that blocks movement on the main track, usually as a result of maintenance or an accident/derailment (4).

139. Shunt movements: Moving trains or cars on a certain railway terrain, for instance: turning a locomotive; train arrangement; adding cars, etc. (2).
140. Shunting: Moving trains or cars on a certain railway terrain, for instance: turning a locomotive; train arrangement; adding cars, etc. (2).
141. Siding: A line on which vehicles are marshalled, stabled, loaded, unloaded or serviced clear of a running line (3).
142. Siding: An additional track found to the right or left of the main line that allows for trains to operate more efficiently over a line whereby they can "pull over" to allow another train to pass (4).
143. Sidings: The aggregate of railway tracks where trains are gathered (2).
144. Signal boxes: Control centre for coordination of train traffic. This is where the signals and switches of a specific railway network region are being controlled in order for trains to safely and quickly reach their destination (2).
145. Signal cabin: Control centre for coordination of train traffic. This is where the signals and switches of a specific railway network region are being controlled in order for trains to safely and quickly reach their destination (2).
146. Signalling equipment: Technology that provides the required instructions to the train drivers for safe driving. The light signals and signs form part of the signalling equipment (2).
147. Signals: Signals are located alongside the train track and give certain orders to the train driver. We distinguish light signals (comparable to traffic lights) and signs indicating the allowed speed (2).
148. Single line: One line is available for movements in both directions (3).
149. Sleepers: Wooden or concrete beams that carry the rails (2).
150. Slip switch: The combination of a diamond crossing of two tracks including a connecting track that allows for the movement between the two through tracks (4).
151. Sound absorbing cassettes: Screens placed alongside the tracks to absorb noise, thus reducing noise pollution for local residents (2).
152. Sound barrier screens: Screens placed alongside the tracks to absorb noise, thus reducing noise pollution for local residents (2).
153. Sound barrier walls: Walls placed alongside the tracks to absorb noise, thus reducing noise pollution for local residents (2).
154. Sound-absorbing embankment: Sound-absorbing embankment alongside the railway track (2).
155. Splice bar: This is the element on which the rails are supported and fastened and which they transversally bridge. The rails are joined to the splice bars by means of a fastening system; at the same time these rest on a layer of ballast to which they transmit the rail's loads. Splice bars can be wooden, metallic or cement. The cement ones can be of the bi-block style with two cement fingers under the track bridged by a steel bar, or of the one piece mono-block style. They can be substituted by pre-stressed or post-tensioned sheets of cement (1).
156. Split the switch: The result of a freight car's trucks following opposite rails (i.e., one follows the main line the other the diverging track), the car is said to have split, or "picked" the switch (4).

157. Spring switch: A spring-mounted track switch that automatically returns to the normal position when the final car passes over it. This type of switch saves time by not needing to be operated manually (4).
158. Spur: A short stretch of track splitting from the main line which is normally used to serve either customers or store equipment (4).
159. Standard gauge: The track gauge used throughout North America and most of Europe of 4 feet 8 1/2 inches, which is the measurement between the inside of the two rails (4).
160. Station Terminal: depot, yard or halt (3).
161. Stock rail: The rail against which the point of a switch rests (4).
162. Stub switch: A track switch in which the rails of the single-track end of track move sideways to meet the two (sometimes three) pairs of rails from the other end. Stub switches are long since obsolete, replaced by the conventional switch with movable tapered rails called points (4).
163. Support wall: Wall that can withstand the pressure of higher ground. It allows for construction of a steep wall on a hill without a risk of the earth subsiding (2).
164. Switch: Railway element that, in accordance with its position, leads trains from one track onto another (2).
165. Switch: As a noun the term that refers to track equipment that allows for cars to move, or crossover, from one track to another. The verb meaning of this term refers to shuffling or moving rail cars, usually within a yard (also called marshaling) (4).
166. Switchback: A track setup whereby a reserve move is made to negotiate very steep grades that is usually performed by using back-to-back switches (4).
167. Tangent: The term for straight track (4).
168. Team track: A historical term that carries on today as a rail siding for general use by freight shippers. It was originally named for the teams of horses that once pulled the wagons to pick up and deliver the freight (4).
169. Tell-tale: A device that was once placed along the track to warn crew members operating a top freight cars of a moving train that a low structure was eminent down the line. Once crew members no longer operated on top of moving freight trains these were abolished (4).
170. Third rail: A rail that runs parallel to the main running tracks whereby locomotives or powered rail cars pick up, via "shoes," electricity for power. Third rails are essentially the same as overhead catenary in that it is a device for locomotives or powered rail cars to pick up needed electricity (4).
171. Throwbar: A bar underneath the ties of a turnout to which the points are attached and which moves the points (4).
172. Tie: The component of railroad infrastructure that holds the rails in place and supported by the surrounding ballast. Ties are usually made of either wood, concrete, or newer composite materials (4).
173. Toad crossing: Place where toads can safely cross the railway tracks (2).
174. Torpedo: A small explosive charge that can be clamped to the top of the rail, which is used as a warning device to crews as it detonates upon impact with the locomotive wheels (4).

175. Track bed: Zone containing railway infrastructure used by trains (2).
176. Track gauge: The distance between the two rails. Here in the U.S. and North America the gauge, known as Standard Gauge, is 4 feet 8 1/2 inches (4).
177. Traffic control: National control centre for coordination of train traffic (2).
178. Train path: Railway network capacity allocated to a specific train, equivalent to a 'slot' in aviation (2).
179. Trestle: A structure that spans a short distance (usually a stream or overpass that uses timbers or steel for supports) (4).
180. Trough bridge: Bridge with U-shaped diameter (2).
181. Turnout: Another term for a railroad track switch (4).
182. Turntable: A rotating structure that swivels in a 360 degree radius that either turns locomotives in the opposite direction or diverts them onto a different track (4).
183. Underpass: Passenger passageway underneath the railway track for safe railway crossing (2).
184. Union station: A railroad station that was used by multiple railroads which was typically also funded jointly by the railroads which used it (4).
185. Unstaffed stops: Station without service counters or railway personnel (2).
186. Viaduct: Traffic bridge connecting two points of the same height (2).
187. Viaduct: Long bridge structures that span land areas, usually constructed of arches and heavy, reinforced concrete (4).
188. Welded-in switches: Switches that are welded into the rails so as to avoid joints (2).
189. Wye: A triangular arrangement of tracks forming the letter "Y", typically used for turning railroad cars and locomotives (4).
190. Yard: The aggregate of railway tracks where trains are gathered (2).
191. Yard ladder: An angled track which connects a grouping of tracks that make up the yard tracks (4).
192. Yard: Usually a large series or groupings of tracks that allows for either the storage of railroad cars or to be held for a short time to build future trains (4).
193. Yard-limit board: A trackside sign which marks the boundary of yard territory and rules (4).

III. References

- (1) Fundación Laboral de la Construcción, www.fundacionlaboral.org/en/foundation/about-us 2016.
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- (4) www.american-rails.com/property.html.