

Informal document WP.5/GE.4 (2018) No. 2

Distr.: General
20 April 2018

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

Fifth session

Geneva, 1 and 2 May 2018

Item 3 of the provisional agenda

Transport Infrastructure Construction costs: Presentations of terminologies used

Questionnaire on railways and terminology

Submitted by PKP Polish Railway Lines (PKP PLK)

I. Questionnaire on construction, upgrade and renewal costs of railway lines

	<i>construction</i>		<i>upgrade</i>			<i>renewal</i>	
	$V \leq 250$ km/h	$V > 250$ km/h	$V \leq 160$ km/h	$160 < V \leq 200$ km/h	$V > 200$ km/h	$V \leq 160$ km/h	$V > 160$ km/h
preparatory works (trees and bushes removal, demolition etc.) (USD/m ² or USD/km)							
earthworks (USD/ km)							
tracks and track bed (USD/km)							
turnouts (please specify the type, e.g. R300, R500, R1200, one-sided, diamond crossing, rail bed, prestressed concrete, timber) (USD/unit)							
traction electric power engineering (USD/km)							
non traction electric power engineering (USD/km)							
removal of electroenergetic collision (USD/km)							
bridges (please write the type, e.g. span<10m, span=10-30m, span>30m, steel, composite, reinforced concrete) (USD/m)							
tunnels (USD/m)							
viaducts (please specify the type) (USD/m)							
culverts (USD/m)							
retaining structures (USD/m)							
level crossings (please write the type, e.g. category A, B, C, D, E, F) (USD/unit or USD/m ²)							

	<i>construction</i>		<i>upgrade</i>			<i>renewal</i>	
	V≤250 km/h	V>250 km/h	V≤160 km/h	160<V≤200 km/h	V>200 km/h	V≤160 km/h	V>160 km/h
pedestrian passages (footbridges) (USD/m)							
pedestrian passages (tunnels) (USD/m)							
ecopassages (US\$/km)							
platforms (standard platforms, height up to 76 cm) (USD/m or USD/unit)							
platforms (other platforms) (USD/m)							
elevators, escalators, ramps (USD/unit)							
signalling systems							
signal box							
telecommunication and IT							
passenger information system							
lighting installation							
sidings							
marshalling yards							
others (please specify)							

II. Terminology on Benchmarking Rail Transport Infrastructure Construction Costs

A. General terms

1. **railway infrastructure** - consists of the following items, provided they form part of the permanent way, including sidings, but excluding lines situated within railway repair workshops, depots or locomotive sheds, and private branch lines or sidings:
 - Ground area;
 - Track and track bed, in particular embankments, cuttings, drainage channels and trenches, masonry trenches, culverts, lining walls, planting for protecting side slopes etc. passenger and goods platforms; four-foot way and walkways; enclosure walls, hedges, fencing; fireprotection strips ; apparatus for heating points ; crossings, etc.; snow protection screens;
 - Engineering structures: bridges, culverts and other overpasses, tunnels, covered cuttings and other underpasses; retaining walls, and structures for protection against avalanches, falling stones, etc.;
 - Level crossings, including appliances to ensure the safety of road traffic;
 - Superstructure, in particular: rails, grooved rails and check rails ; sleepers and longitudinal ties, small fittings for the permanent way, ballast including stone chippings and sand; points, crossings, etc.; turntables and traversers (except those reserved exclusively for locomotives);
 - Access way for passengers and goods, including access by road;
 - Safety, signalling and telecommunications installations on the open track, in stations and in marshalling yards, including plant for generating, transforming and distributing electric current for signalling and telecommunications; buildings for such installations or plant; track brakes;
 - Lighting installations for traffic and safety purposes;
 - Plant for transforming and carrying electric power for train haulage: sub-stations, supply cables between sub-stations and contact wires, catenaries and supports; third rail with supports;
 - Buildings used by the infrastructure department, including a proportion in respect of installations for the collection of transport charges (4).
2. **infrastructure manager** - any body or firm responsible for the operation, maintenance and renewal of railway infrastructure on a network, as well as responsible for participating in its development as determined by the Member State within the framework of its general policy on development and financing of infrastructure (1);
3. **existing rail system** - the infrastructure composed of lines and fixed installations of the existing rail network as well as the vehicles of all categories and origins travelling on that infrastructure (2);
4. **infrastructure coordinates** - data indicating the location of particular infrastructural elements in a given coordinate system (9);
5. **operation of the railway infrastructure** - train path allocation, traffic management and infrastructure charging (1);

6. **development of the railway infrastructure** - network planning, financial and investment planning as well as the building and upgrading of the infrastructure (1);
7. **interoperability** - the ability of a rail system to allow the safe and uninterrupted movement of trains which accomplish the required levels of performance (3);
8. **interoperability constituents** - any elementary component, group of components, subassembly or complete assembly of equipment incorporated or intended to be incorporated into a subsystem, upon which the interoperability of the rail system depends directly or indirectly, including both tangible objects and intangible objects (3);
9. **technical specification for interoperability (TSI)** - a specification by which each subsystem or part of a subsystem is covered in order to meet the essential requirements and ensure the interoperability of the Union rail system (3);
10. **standard** - a technical specification, adopted by a recognised standardisation body, for repeated or continuous application, with which compliance is not compulsory (5);
11. **international standard** - a standard adopted by an international standardisation body (5);
12. **European standard** - a standard adopted by a European standardisation organisation (5);
13. **harmonised standard** - a European standard adopted on the basis of a request made by the Commission for the application of Union harmonisation legislation (5);
14. **national standard** - a standard adopted by a national standardisation body (5);
15. **national rules** - all binding rules adopted in a Member State, irrespective of the body issuing them, which contain railway safety or technical requirements, other than those laid down by Union or international rules which are applicable within that Member State to railway undertakings, infrastructure managers or third parties (2);
16. **conformity assessment** - the process demonstrating whether specified requirements relating to a product, process, service, subsystem, person or body have been fulfilled (2);
17. **conformity assessment body** - a body that has been notified or designated to be responsible for conformity assessment activities, including calibration, testing, certification and inspection; a conformity assessment body is classified as a 'notified body' following notification by a Member State; a conformity assessment body is classified as a 'designated body' following designation by a Member State (2);
18. **kind of traffic** - different types of traffic may use the railway network: freight and passenger are the main types of traffic. Passenger traffic may itself be subdivided into fast passenger traffic (in particular, high-speed rail) and slow passenger traffic (local/regional traffic). Mixed-traffic operation has been the historic norm for most railways. Segregation of passenger and freight flows can be achieved in different ways; in the past, separation was mainly achieved by running passenger trains during the day and freight at night. Today, dedicated corridors (e.g. high-speed lines for passengers, and freight routes parallel to new lines) are more in favour, as freight trains are in direct competition with road transport (9);
19. **high speed passenger services** - passenger rail services operated without intermediate stops between two places separated at least by a distance of more than 200 km on specially-built high-speed lines equipped for speeds generally equal or greater than 250 km/h and running on average at those speeds (1);

B. Terms related to infrastructure investments

20. **construction of the railway infrastructure** - civil engineering, signalling, electrification, telecommunications, plant and electrical distribution and related computer systems (8);
21. **upgrade of the railway infrastructure** - major modification works to the infrastructure which improve its overall performance (1);

22. **renewal of the railway infrastructure** - major substitution works on the existing infrastructure which do not change its overall performance (1);
23. **maintenance of the railway infrastructure** - means works intended to maintain the condition and capability of existing infrastructure (1);
24. **evolution of the infrastructure** - changes brought to the infrastructure such as new track, signalling, etc. (9);
25. **investment** - any use of resources intended to increase future production output or income; laying out money or capital in an enterprise with the expectation of profit; the spending of money on stocks and other securities, or on assets such as plant and machinery. Investment in rail infrastructure: for example, modernising signalling, building new lines, electrifying existing lines, improving railway station facilities, etc. (9);
26. **investment expenditure** - comprises the total expenditure (in respect of staff, and goods and services provided by third parties) in connection with the construction, extension, reconstruction and renewal of infrastructure installations, including incidental expenses and research costs connected with such work (4);
27. **construction site** - place on which a building is under construction; or a place where something is being built or repaired (9);
28. **engineering works** - technical works on the rail track, including construction and alteration. Other meaning: a factory producing engineered products (9);
29. **infrastructure works schedule** - predefined schedule of planned infrastructure works (maintenance, renewal, upgrading) (9);
30. **installation** - act of putting a process / technical equipment / software program into use (9);
31. **installations** - a system of machinery or other apparatus set up for use, for example 'electrical and mechanical installations used for signalling', 'electrical installations used for supplying power to vehicles' (9);
32. **major planned works** - scheduled engineering works which might be expected to cause disruption to the normal operation of train services (9);
33. **possession** – when a section of track is required for maintenance, repair or renewal and when trains cannot run, it is handed over by the operators to the engineers, who take "possession". Special protective measures are used to prevent access by unauthorised trains. The Engineer may run his own trains within the limits of the possession but no other trains are allowed to run within it and comprehensive safety regulations ensure that these conditions are maintained. When the track is returned to the operators, the engineers "give up possession" (8);
34. **project at an advanced stage of development** - any project the planning or construction stage of which has reached a point where a change in the technical specifications may compromise the viability of the project as planned (2);
35. **feasibility study** – a structured process that identifies the engineering options and their implications including environmental issues. It culminates in a feasibility report and a design development (and, sometimes, implementation) proposal (8);
36. **Environmental Impact Assessment** – the ongoing identification of environmental factors to determine the past, current and potential impact (positive or negative) of an organisation's activities on the environment. This process includes the identification of the potential regulatory, legal and business exposure, as well as health and safety impacts and environmental risk assessment (8);
37. **public private partnership** - a binding arrangement between public bodies and one or more undertakings other than the main infrastructure manager of a Member State, under which the undertakings partially or totally construct and/or fund railway infrastructure, and/or acquire the right to exercise any of the functions listed in point (2) for a predefined period of time. The arrangement may take any appropriate legally binding form foreseen in national legislation (1);

38. **contracting entity** - a public or private entity which orders the design and/or construction or the renewal or upgrading of a subsystem (2);

C. Types of lines

39. **railway line** - one or more adjacent running tracks forming a route between two points. EC Decision of 15 September 2011 on the common specifications of the register of railway infrastructure: a sequence of one or more sections, which may consist of several tracks (9);
40. **line classification / line designation** - lines are classified into various categories according to a number of technical factors (9);
41. **conventional railway line** - all railway lines that are not classified as ‘dedicated high speed lines’ or ‘upgraded high speed railway lines’ (9);
42. **dedicated line** - a rail link used exclusively by one type of traffic (freight or passengers) (9);
43. **high speed line** - specially built high-speed lines equipped for speeds generally equal to or greater than 250 km/h or specially upgraded high-speed lines equipped for speeds of the order of 200 km/h (2);
44. **dedicated high speed railway line** - a line specially built to allow traffic at speeds generally equal to or greater than 250 km/h for the main segments. High speed lines may include connecting lines, in particular connecting segments into town centre stations located on them, on which speeds may take account of local conditions (9);
45. **upgraded high speed railway line** - a conventional line specially upgraded to allow traffic at speeds of the order of 200 km/h for the main segments (9);
46. **main railway line** - main inter-city and other main passenger or freight route available for rail services. Main railway lines comprise the high-speed railway lines and important major conventional railway lines as defined by national or international authorities (9);
47. **major artery** - a main route operated by the Infrastructure Manager (9);
48. **secondary line** - a secondary line (or branch line) is a line of less importance than a main line (or trunk line) (9);
49. **branch line** – track carrying trains from the mainline to destinations on lower priority routes than the mainline (8);
50. **feeder line** - branching part of a railway network that merges with the main line, thus bringing traffic to it. On Rail Freight Corridors (RFC), any path/path section prior to reaching an operation point on a RFC (feeder path). The feeder path may also cross a border section which is not a part of a defined RFC; it is the opposite of an 'outflow path' (outbound path). Also called a branch line (9);
51. **trunk line** - the line that is the main route on a railway (9);
52. **outflow line / path (outbound line/path)** - any line/path section leaving a Rail Freight Corridor (RFC) at an operation point, for example to serve a terminal, industrial site, shunting or marshalling yard, or connect with another line. The outflow line / path of a Rail Freight Corridor may also cross a border section which is not a part of a defined RFC. It is the opposite of a 'feeder line / path' (9);
53. **single-track, single line** - where traffic in both directions shares the same track (9);
54. **double-track line** - a railway line in which one track is provided for each direction of travel (9);
55. **broad-gauge line** – a track wider than the standard gauge of 1435mm (8);
56. **line section** - part of a line in which the traffic mix and/or the number of trains, the infrastructure and signalling conditions do not change fundamentally. EC Decision of 15 September 2011 on the common

specifications of the register of railway infrastructure): 'section of line' means the part of line between adjacent operational points and may consist of several tracks (10) (9);

57. **section** - railway track between two locations (e.g. between two stations) (13);

D. Railway networks

58. **network** - the lines, stations, terminals, and all kinds of fixed equipment needed to ensure safe and continuous operation of the Union rail system.

The network shall include the following elements:

- specially built high-speed lines equipped for speeds generally equal to or greater than 250 km/h; (b) specially upgraded high-speed lines equipped for speeds of the order of 200 km/h;
- specially upgraded high-speed lines which have special features as a result of topographical, relief or town-planning constraints, to which the speed must be adapted in each case. This category includes interconnecting lines between high-speed and conventional networks, lines through stations, accesses to terminals, depots, etc. travelled at conventional speed by 'high-speed' rolling stock;
- conventional lines intended for passenger services; (e) conventional lines intended for mixed traffic (passengers and freight);
- conventional lines intended for freight services;
- passenger hubs;
- freight hubs, including intermodal terminals;
- lines connecting the abovementioned elements.

This network includes traffic management, tracking and navigation systems, technical installations for data processing and telecommunications intended for long-distance passenger services and freight services on the network in order to guarantee the safe and harmonious operation of the network and efficient traffic management (2);

59. **corridor** - a major railway line along a geographical route (9);

60. **freight corridor** - all designated railway lines, including railway ferry lines, on the territory of or between Member States, and, where appropriate, European third countries, linking two or more terminals, along a principal route and, where appropriate, diversionary routes and sections connecting them, including the railway infrastructure and its equipment and relevant rail services.' (7);

61. **RNE network** - the RailNetEurope railway network is the sum of all the rail networks of RNE Members, totalling well over 250 000 km. RNE itself does not own or manage any rail network. There is also a virtual network of One-Stop-Shops (representing all Members' networks) which facilitates network access for any kind of international rail services operated by Railway Undertakings (9);

62. **connected rail/railway networks** - neighbouring networks (9);

63. **cross-link** - a national or international railway link connecting two adjacent corridors (9);

E. Railway subsystems related to infrastructure

64. **subsystems** - the structural or functional parts of the Union rail system (2);

65. **infrastructure** - the track, points, level crossings, engineering structures (bridges, tunnels, etc.), rail-related elements of stations (including entrances, platforms, zones of access, service venues, toilets and information

systems, as well as their accessibility features for persons with disabilities and persons with reduced mobility), safety and protective equipment (2);

66. **energy** - the electrification system, including overhead lines and the trackside electricity consumption measuring and charging system (2);
67. **trackside control-command and signalling** - all the trackside equipment required to ensure safety and to command and control movements of trains authorised to travel on the network (2);
68. **operation and traffic management** - the procedures and related equipment permitting coherent operation of the various structural subsystems, during both normal and degraded operation, including in particular train composition and train driving, traffic planning and management (2);
69. **telematics applications** - this subsystem comprises two elements:

applications for passenger services, including systems which provide passengers with information before and during the journey, reservation and payment systems, luggage management and management of connections between trains and with other modes of transport; applications for freight services, including information systems (real-time monitoring of freight and trains), marshalling and allocation systems, reservation, payment and invoicing systems, management of connections with other modes of transport and production of electronic accompanying documents (2);

F. Terms related to linear infrastructure

70. **superstructure** - 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 (14);
71. **substructure** – the track substructure includes the formation, ballast and any geotextile, geogrid, blanket (8);
72. **track** - a pair of rails over which rail borne vehicles can run. EC Decision of 15 September 2011 on the common specifications of the register of railway infrastructure: any track used for train service movements (passing loops and meeting loops on plain line or track connections only required for train operation are not published) (9);
73. **track bed** - zone containing railway infrastructure used by trains (13);
74. **sub-ballast** – any material of superior character, which can be spread on the finished subgrade of the roadbed, to provide better drainage, prevent upheaval by frost and better distribute the load over the roadbed (8);
75. **subgrade** – the prepared surface of the natural ground or upper surface of fill material (8);
76. **blanketing** – a layer under the ballast to stop clay and soil seeping through (8);
77. **ballast** – selected material placed on the sub grade to support and hold the track with respect to its alignment within the bounds of specified top (vertical) and line (horizontal). Ballast preferably consists of accurately graded hard particles, normally stone, easily handled in tamping, which distribute the load, provide elasticity, drain well and resist plant growth. Generally, ballast must consist of broken stones. Granite is a very suitable material thanks to its toughness (8);
78. **ballast mat** – a 50 to 70mm thick elastomer mat placed under the normal track ballast on top of a rigid slab or on top of the sub grade to absorb vibration and to assist drainage. Normally, the ballast mat is placed on an intermediate layer of sand (8);
79. **ballast cleaning** – the removal of existing ballast using a machine which grades the excavated ballast, returns good stone to the track and takes fine stone and spoil for disposal (8);
80. **tamping** – process that pushes ballast under sleepers (see also Regulate) to fill voids so as to maintain the correct geometry of the track (8);
81. **ballast tamping** – compacting ballast under the sleepers to maintain the line and top of track (8);

82. **bearer** – timber (or concrete) transverse sleeper supporting the rails in switch and crossings (8);
83. **bearing platform** – the top surface of an abutment or pier upon which the superstructure span is placed and supported (8);
84. **sleeper** – wood, concrete or steel object that holds the rails apart and supports the track on the ballast (8);
85. **permanent way** – generic term for the structure of the railway track, referring to the rails, sleepers ballast, any blanketing material (including geo-textiles) and associated drainage. The term "permanent" arose to distinguish it from the temporary track laid during the construction of the railway (8);
86. **permanent way component** – a constituent part of the structure of the track including assembly tools and fixtures (but excluding permanent signalling equipment other than stretcher bars of turnouts or points), track ballast and sub-ballast material or drainage (8);
87. **slab track** – a form of railway track comprising a concrete base to which the base plates carrying the rails are secured. It eliminates the need for individual "sleepers", also known as direct fixation track. Systems include arrangements where a bi-block sleeper in anti-vibration 'boots' is cast into the concrete bed (8);
88. **turnout** – the trackwork element where a track divides into two. A turnout normally has two positions, normal and reverse. The rails are specially shaped to allow a smooth transition from the main track to the diverging track. The switch rails of the turnout are operated by the point motor or machine and guide the wheels to the reverse or normal direction. The crossing allows the wheels to cross the stock rails (8);
89. **switches and crossings (S&C)** – the specially designed rail components allowing trains to change tracks. Any track elements which are not plain line (8);
90. **welded vee** – two pieces of rail with parts of the head and foot removed by machining placed either side of a filler plate so as to form a weld preparation, welded using the electroslag welding process and subsequently machined to the drawing requirements (8);
91. **gauge** - the maximum dimensions of trains that a specific route can allow; in other words, the profile through which a railway vehicle and its loads must pass, taking into account tunnels and track side obstacles (9);
92. **narrow gauge** – a gauge narrower than standard gauge (8);
93. **platform** - a flat area where passengers wait for their train, can board their train at the beginning of their journey, and leave their train when they arrive. For goods, this area is usually known as a 'dock' (9);
94. **axle load** - a critical measure of infrastructure physical capacity and strength: it is the total permitted weight of a loaded rail wagon or a locomotive divided by the number of axles on the piece of rolling stock; in other words, the pressure exerted by the weight of each wheelset of a railway vehicle on the track; theoretically, assuming that the load is evenly distributed, the gross weight of a vehicle divided by the number of axles (9);
95. **electrified tracks** - tracks equipped with a power cable providing electric traction power to the trains (13);
96. **electrification system** - a way of supplying electric power to electric locomotives or multiple units (9);
97. **catenary** – the catenary wire or cable (also known as the messenger wire) carries the contact wire by means of dropper wires. The term was chosen because the catenary wire assumes more or less the shape of the curve adopted by a suspended chain or wire (8);
98. **catenary system** – generalised term used to describe the whole overhead line equipment (8);
99. **compound catenary** – an overhead line arrangement which includes a catenary wire, auxiliary wire and contact wire linked by droppers (8);
100. **contact wire** – the overhead wire touched by an electric train's pantograph in order to draw power (8);
101. **maximum current drain from the overhead power lines** - the maximum power that can be drawn from the power supply that is available on a particular route (9);

- 102.**overhead power line / overhead line equipment** - an overhead power line is an electric power transmission line suspended to towers or poles. Overhead line equipment includes the wires and associated equipment (fittings, insulators and other attachments), suspended over or adjacent to the railway line, for supplying electricity to electric trains (9);
- 103.**power supply** - a source of electrical power. A device or system that supplies electrical or other types of energy to an output load or group of loads is called a power supply unit or PSU (9);
- 104.**traction current** - electric current supplied for the purpose of electric traction, collected either by pantograph from the overhead supply, or by collector shoe from the third rail (e.g. in the UK). It is an additional service to be supplied upon request to the Railway Undertaking where the Infrastructure Manager offers this service, but the use of electrical supply equipment for traction current, where available, belongs to the minimum access package (9);

G. Terms related to nodal infrastructure

- 105.**connected facility** - a facility connected to the main railway network, such as a terminal, port or light maintenance depot. Such facilities are connected to rail transport, are provided by ports, terminals and other service suppliers, and lie outside the main railway network. Includes 'additional services' and 'ancillary services' (9);
- 106.**rail-related services and facilities** - the services facilities to which a Railway Undertaking may need to have access in order to be able to operate a given train (9);
- 107.**terminal** - a terminal is any passenger station, freight or parcels depot. CAUTION: 'terminal' here means the place where passenger journeys or freight transits may start or end, rather than the end of the railway itself. Definition in REGULATION (EU) No 913/2010, Art. 2 2(c) : 'the installation provided along the freight corridor which has been specially arranged to allow either the loading and/or the unloading of goods onto/from freight trains, and the integration of rail freight services with road, maritime, river and air services, and either the forming or modification of the composition of freight trains; and, where necessary, performing border procedures at borders with European third countries.' The Regulation also specifies (Art.18) that 'The management board [of the freight corridor] shall draw up, regularly update and publish a document containing ... the list and characteristics of terminals, in particular information concerning the conditions and methods of accessing the terminals'. Under EU legislation, Railway Undertakings shall be entitled to have access to terminals. Supply of services shall be provided in a nondiscriminative manner, and requests by Railway Undertakings may only be rejected if viable alternative under market conditions exist (9);
- 108.**intermodal terminal** - place equipped for the transshipment and storage of intermodal transport units (ITUs) between modes, one of which is rail. TAF TSI definition: 'Location which provides the space, equipment and operational environment under which the loading units (freight containers, swap bodies, semi-trailers or trailers) transfer takes place.' (11);
- 109.**freight terminal** - station where handling of goods takes place (goods are loaded on, or unloaded from, transport vehicles). May also include shunting of rail vehicles (wagons) between trains, without any (un)loading. May include open access and privately-owned industrial tracks, tracks of warehouses, loading places, Ro-La loading places, container loading places, loading areas and trans-shipment sidings (9);
- 110.**yard** - functional structure for train arrivals/departures, and in some cases, parking and/or shunting operations (9);
- 111.**marshalling yard** - station or part of a station especially equipped with a number of tracks or other equipment for railway vehicle marshalling (switching) operations. [Sometimes referred to as classification yard.] General definition: railway facility equipped with tracks with special layout and technical facilities, where sorting, formation and splitting-up of trains takes place; wagons are sorted for a variety of destinations, using a number of rail tracks. There are 3 types of marshalling yards: flatshunted yards, hump yards and gravity yards. From a shunting point of view, both flat shunting and hump shunting may be in use; from the track position point of view, track can be parallel, continuous or mixed; from the point of view of technology: it can be automated

- (central switching, time and target braking), power operated (partial central switching, use of rail brake, drag shoes), or manually operated (local switching). In Sweden, 'train formation location' is the general term for locations (stations) where trains are formed and unformed. This can refer either to freight or passenger trains and there are two types of train formation locations: marshalling yards and other station yards. Marshalling yards have the following four features: - lead track - automated switching - hump with entry and/or exit group - direction tracks (11);
112. **siding** – railway set by an infrastructure manager which is directly or indirectly connected with a railway line, used to perform loading, maintenance, or parking operations of railway vehicles or movement and entering of railway vehicles into operation on a railway network (12);
113. **private siding** - track or set of tracks which are not managed by the infrastructure manager but are linked up with the track of an infrastructure manager so that: a) Railway transport operators or supportive functions can perform necessary activities b) Industrial, commercial or port, etc. establishment or group of establishments can be served by rail without transshipment (9);
114. **maritime and inland port facilities** - a location on a coast, lakeshore or inland waterway, where freight can be transferred from ship to land or vice versa. It includes: port areas, equipments or infrastructures normally used for, or in connection with, the provision of loading/unloading services for goods, cargo handling, handling of shipping traffic and facilities for ferryboat services (9);
115. **passenger stations, their buildings and other facilities** - a railway passenger station is 'a place on a railway line where trains regularly stop so that passengers can get on or off.' Under DIRECTIVE 2012/34/EU, Annex II, 2. (a) it is one of the services to be supplied to the RUs by the IM, 'including travel information display and suitable location for ticketing services' (9);
116. **passenger terminal** - a passenger 'terminal' or 'terminus' is a station for passengers at the end of a railway line (9);
117. **refuelling facilities** - this is an area which provide fuel for diesel locomotives and Diesel Multiple Units. In EU legislation, it is described as a service to be supplied to the Railway Undertaking as part of 'Track access to services facilities and supply of services'. This request of the Railway Undertaking may only be rejected if viable alternatives under market conditions exist (9);
118. **station/railway station** - terminal, depot, yard or halt. A place where trains stop, or where loading and unloading occurs, and where assistance may be available. Also a place where there can be points (facing or trailing) that make it possible for the train to use different routes. A railway establishment which is either open or not to the public, generally staffed and which is designed for one or more of the following operations: - formation, dispatch, reception and temporary stabling of trains - stabling and marshalling of rolling stock - boarding and alighting of passengers - generally, where open to public, providing facilities for the purchase of tickets - loading and unloading of goods (9) (11);
119. **terminus station** - the railway station at the end of the physical railway line. It is materially impossible for trains to drive through a terminus station to another station (9);
120. **through station** - a station from which trains can depart in more than one direction (9);
121. **joint railway station** - junction station between railway companies, the operation of which is governed by an agreement between the States or companies concerned (9);
122. **terminal platform** - a terminal platform is a platform from which trains can only depart in one direction. A terminal station is a station consisting of terminal platforms (9);
123. **through platform** - a platform where trains may arrive from one direction and depart in the other (9);
124. **nodes** - a network connection point or a point where the network can be joined. In railway terms this often refers to train stations (9);

H. Engineering structures

125. **bridge** - a structure that is built over a river, road, or railway to allow people and vehicles to cross from one side to the other (15);
126. **accommodation bridge** – a bridge connecting two areas of land which were under common ownership but separated when the railway was built (8);
127. **accommodation crossing** – as for accommodation bridge, but by using a foot crossing over the railway rather than a bridge (8);
128. **culvert** – small bridge or pipe carrying a stream under a railway or road (8);
129. **tunnel** – a structure provided to allow a railway line to pass under higher ground, and which has been excavated without disturbing the surface of that ground (8);
130. **passage** - any route, other than a road, provided for the passage of people, animals, vehicles or machinery (3);
131. **viaduct** – a multi-span bridge structure (8);
132. **ecoduct** - viaduct for wildlife passage across the railway track (13);

I. Terms related to railway safety and signalling

133. **European Railway Traffic Management System (ERTMS)** - a major industrial project being implemented by the European Union, which will serve to make rail transport safer and more competitive. It is made up of all the train-borne, trackside and lineside equipment necessary for supervising and controlling, in real-time, train operation according to the traffic conditions based on the appropriate Level of Application (9);
134. **European Train Control System (ETCS)** - this component of ERTMS guarantees a common standard that enables trains to cross national borders and enhances safety. It is a signalling and control system designed to replace the several incompatible safety systems currently used by European railways. As a subset of ERTMS, it provides a level of protection against over speed and overrun depending upon the capability of the line side infrastructure (9);
135. **hot (axle)box / hot axlebox detector (HABD)** - device located on the side of the track that can detect the presence of a hot box and identify its position, and alerts the signalling staff, who can then take measures to either slow down or stop the train safely. A 'hot box' is a wheel bearing or axlebox which has become overheated; in extreme circumstance, it may melt or catch fire and cause derailling (9);
136. **signalling system** - a system used to control railway traffic safely, essentially to prevent trains from colliding. The main purpose of signalling is to maintain a safe distance at all times between all trains on the running lines. The secondary aim - particularly today - is to make the best use possible of the railway infrastructure, so that the total throughput of trains meets business requirements. There are 'fixed block signalling systems' and the more modern 'moving block signalling systems', which increases line capacity (9);
137. **interlocking** – in signalling, a system to prevent the setting up of conflicting routes by logically linking points and signal operation. At first interlocking of actions was achieved mechanically through the locking frame, then electro-mechanically by relays in the signal box. Now, interlockings are largely computerised using a two in three voting system, diverse hardware and software or protocols. Also note the term SSI (solid state interlocking). Computer hardware and software must be safety approved (8);
138. **balise** – track mounted device for communicating with passing trains. Most are mounted on a sleeper in the middle of the track. We distinguish inductive and radio based balises, active and passive balises and intelligent and dumb balises. All balises transmit or transmit and receive information in the form of telegrams (8);
139. **Automatic Train Control system** – system, where the train receives data at all times in order to maintain the correct speed and prevent trains from passing stop signals if the driver should fail to react (9);
140. **Automatic Half Barrier crossing (AHB)** – type of level crossing with warning lights and half barriers, for use on railway lines where train speeds are no greater than 160 km/h. The operation of these is controlled by the approaching train, potentially using a level crossing predictor system where trains operate at several

different speeds. The crossing sequence must start a minimum of 27 s before the arrival of the train at the crossing. The barriers are raised immediately after the passage of the train, unless another train is approaching (8);

141. **Automatic Level Crossing** – includes AHB, ABCL, AOCL and AOCL level crossings plus those protected by miniature red/green warning lights (8);
142. **Automatic Open Crossing, Locally monitored (AOCL)** – a type of level crossing without barriers on the Network Rail system where operation of the warning lights is triggered by the train. It also differs from the AHB system in that there is a white light, at braking distance from the crossing, to indicate to the train driver that the crossing has engaged the closing sequence correctly (8);
143. **Train Protection System (TPS)** - a system that helps to enforce obedience to signals and speed restrictions (3);
144. **operational traffic management system** - a traffic control-command and supervision/management system, such as ERTMS in the railway sector (9);
145. **Safety Management System** – a proven system which, when followed, enables a company to perform tasks safely, at all levels of the organisation. The system to achieve this blends personnel, resources, policies and procedures together. Such a system must also recognise instances when it is inadequate to requirements and generates change to the system to correct the deficiencies (8);
146. **road** - any public or private road, street or highway, including adjacent footpaths and bicycle lanes (3);
147. **level crossing** - any level intersection between a road or passage and a railway, as recognised by the infrastructure manager and open to public or private users. Passages between platforms within stations are excluded, as well as passages over tracks for the sole use of employees (3);
148. **passive level crossing** - a level crossing without any form of warning system or protection activated when it is unsafe for the user to traverse the crossing (3);
149. **active level crossing** - a level crossing where the crossing users are protected from or warned of the approaching train by devices activated when it is unsafe for the user to traverse the crossing.

Protection by the use of physical devices includes:

- half or full barriers,
- gates.

Warning by the use of fixed equipment at level crossings:

- visible devices: lights,
- audible devices: bells, horns, klaxons, etc.

Active level crossings are classified as:

- manual: a level crossing where user-side protection or warning is manually activated by a railway employee.
- automatic with user-side warning: a level crossing where user-side warning is activated by the approaching train.
- automatic with user-side protection: a level crossing where user-side protection is activated by the approaching train. This shall include a level crossing with both user-side protection and warning.
- rail-side protected: a level crossing where a signal or other train protection system permits a train to proceed once the level crossing is fully user-side protected and is free from incursion (3).

III. References

- (1) DIRECTIVE (EU) 2016/2370 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 14 December 2016 amending Directive 2012/34/EU as regards the opening of the market for domestic passenger transport services by rail and the governance of the railway infrastructure;
 - (2) DIRECTIVE (EU) 2016/797 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 11 May 2016 on the interoperability of the rail system within the European Union;
 - (3) DIRECTIVE (EU) 2016/798 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 11 May 2016 on railway safety;
 - (4) REGULATION (EEC) No 2598/70 OF THE COMMISSION of 18 December 1970 specifying the items to be included under the various headings in the forms of accounts shown in Annex I to Council Regulation (EEC) No 1108/70 of 4 June 1970;
 - (5) REGULATION (EU) No 1025/2012 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 25 October 2012 on European standardisation, amending Council Directives 89/686/EEC and 93/15/EEC and Directives 94/9/EC, 94/25/EC, 95/16/EC, 97/23/EC, 98/34/EC, 2004/22/EC, 2007/23/EC, 2009/23/EC and 2009/105/EC of the European Parliament and of the Council and repealing Council Decision 87/95/EEC and Decision No 1673/2006/EC of the European Parliament and of the Council;
 - (6) DIRECTIVE 2008/57/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 17 June 2008 on the interoperability of the rail system within the Community;
 - (7) REGULATION (EU) No 913/2010 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 22 September 2010 concerning a European rail network for competitive freight;
 - (8) University of Birmingham and Network Rail Railway Lexicon Mk 24, February 2011;
 - (9) RailNetEurope (RNE);
 - (10) International Union of Railways (UIC);
 - (11) Eurostat/ITF/UNECE, RNE;
 - (12) Polish Office of Rail Transport;
 - (13) Infrabel, www.infrabel.be/en;
 - (14) Fundación Laboral de la Construcción, www.fundacionlaboral.org/en/foundation/about-us 2016;
 - (15) Cambridge Dictionary.
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