

	<p style="text-align: center;"> TECHNICAL STANDARDS DETAILED TECHNICAL CONDITIONS FOR THE CONSTRUCTION OF THE RAILWAY INFRA- STRUCTURE OF THE SOLIDARITY TRANSPORT HUB – DESIGN GUIDELINES </p>	<p style="text-align: center;"> CENTRALNY PORT KOMUNIKACYJNY – SOLIDARITY TRANSPORT HUB POLAND </p>
<p style="text-align: center;"> ul. J. Chłopickiego 50 04-275 Warsaw </p>	<p style="text-align: center;"> VOLUME XIII TECHNICAL SUPPORT FACILITIES </p>	<p style="text-align: center;"> Al. Jerozolimskie 142B 02-305 Warsaw </p>

TECHNICAL STANDARDS
DETAILED TECHNICAL CONDITIONS FOR THE CON-
STRUCTION OF THE RAILWAY INFRASTRUCTURE OF
THE SOLIDARITY TRANSPORT HUB – DESIGN GUIDE-
LINES

VOLUME XIII
TECHNICAL SUPPORT FACILITIES

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The list of volumes constituting the detailed technical conditions for the construction of the railway infrastructure of the Solidarity Transport Hub:

Volume A	Introduction to the STH railway standards
Volume I.1	Railway track – layout geometry
Volume I.2	Railway – design of civil structures
Volume I.3	Railway track – drainage of track layout
Volume I.4	Railway track – gauge
Volume I.5	Railway track – geotechnical investigations and design
Volume II.1	2 x 25 kV 50 Hz AC overhead catenary system and traction power supply
Volume II.2	3 kV DC overhead catenary system and traction power supply
Volume III.1	Engineering structures
Volume III.2	Tunnels
Volume IV	Non-OCL power engineering
Volume V.1	Non-public roads
Volume V.2	Public roads
Volume VI.1	Control command and signalling – basic equipment
Volume VI.2	Control command and signalling – European Train Control System (ETCS)
Volume VII.1	Fixed and wireless communication systems and data transmission
Volume VII.2	Telecommunication systems and telematics
Volume VII.3	Detection of rolling stock failure conditions (DSAT)
Volume VIII.1	Station and railway station buildings
Volume VIII.2	Technical buildings
Volume VIII.3	Structures
Volume VIII.4	Structural landscaping
Volume IX	Measures to minimise environmental impact
Volume X	Conflicts with external networks
Volume XI	Electromagnetic compatibility (EMC)
Volume XII	Railway line guard
Volume XIII	<p>Technical support facilities</p> <p>Contains requirements for designing technical support facilities related to the operation and maintenance of railway infrastructure. Specifies the minimum requirements for the density of the technical support facilities distribution, their layout, connections to the railway network, technical accessories and equipment. It contains functional and social requirements for the buildings comprising support facilities.</p>
Volume XIV	Health and safety support systems for people and property
Volume XV	Survey control
Volume XVI	Railway rolling stock
Volume XVII	Automatic baggage check-in systems
Volume XVIII	Security, protection and cybersecurity integrity requirements

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Revisions of the document “Detailed technical conditions for the construction of railway infrastructure of the Solidarity Transport Hub; Volume VIII; Technical support facilities”.

version	amendments		
1.0.0	Document preparation		
	prepared on: 29.04.2021	approved on: -	valid from: -
1.1.0	Inclusion of material and editorial comments from the Company's letter No. KRI/1901/2021/GB/25		
	prepared on: 10.06.2021	approved on: -	valid from: -
1.2.0	Inclusion of material and editorial comments from the Company's letter No. KRI/2025/2021/NAB.1983/GB/25		
	prepared on: 8.07.2021	approved on: -	valid from: -
1.3.0	Inclusion of material and editorial comments from the Company's letter No. KRI/2658/2021/25/GB		
	prepared on: 5.08.2021	approved on: -	valid from: -
	prepared on:	approved on:	valid from:

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1 Introduction

1.1 Preliminary provisions

- 1) The basis for designing and constructing the facilities included in the document entitled “**Detailed technical conditions for the construction of railway infrastructure of the Solidarity Transport Hub – Volume XIII – Technical support facilities**”, hereinafter referred to as the “Standards”, is the Act of 7 July 1994 – Construction Law (consolidated text: Journal of Laws 1994, No 89, item 414, as amended) [2].
- 2) While preparing the Standards, reference documents have been taking into account that can be found in chapter 7.
- 3) The requirements of the Standards are compliant with the applicable legal requirements for the railway system interoperability in the European Union.
- 4) The Standards were developed taking into account the current state of art in the scope of designing buildings of the technical support facilities.
- 5) In cases not regulated in the Standards, commonly applicable regulations and engineering knowledge should be used.
- 6) Whenever the Standards refer to “STH railway infrastructure”, “STH railway lines”, etc., this should be understood as new railway infrastructure, new railway lines or other civil structures constructed by STH, which may be managed by another railway infrastructure administrator in the future.

1.2 Technical scope

- 1) The standards specify general functional requirements and, if required, supplement the technical requirements applicable in the Polish law for the designing and construction by Centralny Port Komunikacyjny Sp. z o.o., hereinafter referred to as STH, of the structures, equipment and systems of the technical support facilities referred to in point 2).
- 2) Within the meaning of these Standards, the structures, equipment and systems of the technical support facilities include all those civil structures, equipment and systems whose basic functions are related to the processes of construction and maintenance of railway infrastructure.
- 3) The requirements for the technical support facilities referred to in these Standards refer to the areas of activity of at least the following services:
 - a) railway track maintenance services,
 - b) engineering structure maintenance services,
 - c) railway tunnel maintenance services,
 - d) automatic control and telecommunication equipment maintenance services,
 - e) electric OCL equipment and non-OCL power engineering equipment maintenance services,
 - f) winter maintenance services,
 - g) railway rescue services.

1.3 Links to other volumes

The links between this Standards volume and other volumes are presented in Table 1.

Table 1 Links to other volumes of the Standards

Volume No	Volume title	Relation content
I.1	Railway track – layout geometry	Rules for designing the railway track layouts of the technical support facilities (side tracks, railway siding tracks).
I.2	Railway track – construction of a civil structure	Requirements for the structure of the railway track in the areas of technical support facilities.
I.3	Railway track – drainage of track layout	Requirements for drainage of the track layout and the area of the technical support facilities.
III.2	Tunnels	Requirements for structures and rooms related to maintenance of railway tunnels.
IV	Non-OCL power engineering solutions	Requirements for lighting. Requirements for electric points heating equipment (EOR).
V.1	Non-public roads	Requirements for internal roads.
VI	Control command and signalling and ETCS	Requirements for control command and signalling equipment
VII.1	Fixed and wireless communication systems and data transmission	Requirements for communication in the area of the technical support facilities.
VIII.2	Technical buildings	Design requirements for technical buildings.
VIII.3	Structures	Design requirements for loading yards and loading ramps.
VIII.4	Structural landscaping	Requirements for structural landscaping facilities.
XIV	Health and safety support systems for people and property	Requirements for protection of the areas of the technical support facilities (access control, monitoring).
XVI	Railway rolling stock	Requirements for railway rolling stock which may be stored in the technical support facilities, in particular for special rolling stock.

1.4 Definitions of terms used

- 1) **Technical support facilities** – civil structures, equipment and systems whose primary functions support railway infrastructure construction and maintenance processes.
- 2) **Permanent technical support facilities** – technical support facilities established for the purpose of maintaining railway infrastructure.
- 3) **Temporary technical support facilities** – technical support facilities established for the purpose of building railway infrastructure, which after completion may – as needed – be removed or reclassified into permanent technical support facilities.
- 4) **Maintenance depot (BU)** – a compact and multifunctional complex of permanent technical support facilities (civil structures, equipment and systems) outfitted with, among others, dedicated railway and road infrastructure, technical facilities and permanently manned staff welfare and administration facilities providing basic functions in the process of railway infrastructure maintenance.
- 5) **Maintenance site (PU)** – a compact complex of elements of permanent technical support facilities (civil structures, equipment and systems) or a separate technical support facility of limited functionality, supporting maintenance depots in the process of railway infrastructure maintenance.
- 6) **Maintenance capacity** – the organizational and technical capacity of a railway manager to maintain its own railway infrastructure in the required (expected) technical condition, including the adopted organization of maintenance: in-house or outsourced.

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2 Essential, basic and general requirements for the STH railway infrastructure

Table 2 defines the link between the detailed technical conditions and the essential, basic and general requirements for the STH infrastructure.

Table 2 Essential, basic and general requirements for the STH infrastructure

sub-chapter of this volume defining detailed technical conditions	essential requirements (Railway Interoperability Directive)						basic requirements	general requirements for the STH railway infrastructure			
	1.1. security	1.2. reliability and accessibility	1.3. health	1.4. environmental protection	1.5. technical compliance	1.6. accessibility		2.1. mechanical resistance and stability 2.2. fire safety 2.3. hygiene, health and the environment 2.4. safety and accessibility in use 2.5. protection against noise 2.6. energy economy and heat retention 2.7. sustainable use of natural resources	3.1. oriented towards the needs of the economy	3.2. orientation towards the needs of passengers	3.3. orientation towards the needs of carriers
3.1	-	-	-	-	-	-	-	-	-	-	-
3.2	-	1.2.1 1.2.3	-	-	-	-	-	-	-	-	-
4.1	-	1.2.1	-	1.4.7	-	-	2.3.1	-	-	-	3.4.1
4.2	-	1.2.1	-	-	-	-	-	-	-	-	3.4.1
5.1.1	1.1.11	-	1.3.3	-	-	-	2.4.1	-	-	-	-
5.1.2	-	-	-	-	-	-	-	-	-	-	-
5.1.3	-	-	-	-	-	-	-	-	-	-	-
5.1.4	1.1.11	-	1.3.3	-	-	-	2.4.1	-	-	-	-
5.1.5	1.1.11	-	1.3.3	-	-	-	2.4.1	-	-	-	-
5.1.6	-	1.2.1	-	-	-	-	2.6.1	-	-	-	-
5.1.7	1.1.8	-	-	-	-	-	-	-	-	-	-
5.1.8	-	-	-	-	1.5.1	-	-	-	-	-	-
5.1.9	-	-	-	-	-	-	-	-	-	-	-
5.1.10	1.1.13	-	1.3.3	-	-	-	2.4.1	-	-	-	-
5.2.1	-	1.2.1 1.2.5	-	-	-	-	-	-	-	-	3.4.1
5.2.2	-	1.2.1 1.2.5	-	-	-	-	-	-	-	-	-
5.3	-	1.2.1	-	-	-	-	-	-	-	-	-
5.4	-	-	-	-	1.5.5	-	-	-	-	-	-
5.5	-	1.2.1	-	-	-	-	-	-	-	-	-
5.6	-	1.2.1	-	-	-	-	-	-	-	-	-
5.7	-	1.2.1 1.2.3	-	-	-	-	-	-	-	-	-
5.8	-	-	-	-	-	-	-	-	-	-	-
5.9	-	1.2.1	-	-	-	-	-	-	-	-	-
5.10	1.1.4	-	-	1.4.7	-	-	2.2.1 2.3.1	-	-	-	-
6	-	1.2.1	-	-	-	-	2.1.1	-	-	-	-

Cybersecurity

Technical solutions which collect, store, process, make available or transmit data ensuring the compliance with essential safety requirements (requirements from 1.1.1. to 1.1.11. specified in Volume A of the STH Railway Standards) and general requirements for the STH railway infrastructure concerning security (requirements 1.1.12. and 1.1.13 specified in Volume A of the STH Railway Standards) should be designed taking into account cybersecurity, i.e. “security of network and information systems”, defined in the Directive concerning measures for a high common level of security of network and information systems across the Union, as follows:

“security of network and information systems” means the ability of network and information systems to resist, at a given level of confidence, any action that compromises the availability, authenticity, integrity or confidentiality of stored or transmitted or processed data or the related services offered by, or accessible via, those network and information systems;

[as defined in Article 4 of Directive 2016/1148]

Cybersecurity includes two types of threats resulting from unauthorised access to the systems/equipment/networks that collect, store, process, make available or transmit data:

1) physical security threats

It is necessary to secure systems/equipment/networks against direct access which could enable causing (intentionally or unintentionally) threats to functional safety.

2) IT security threats

It is necessary to secure systems/equipment/networks against logical access via IT systems/equipment/networks, which could enable causing (intentionally or unintentionally) threats to functional safety.

Cybersecurity defined this way applies both to information systems used for rail transport purposes and to operational systems used for rail transport purposes, but the STH railway standards do not include requirements for information systems, e.g. timetabling systems.

Physical security threats and IT security threats for operational systems for which requirements are defined in the STH railway standards should be addressed by railway operators as part of the risk assessment and by design engineers/manufacturers/contractors as part of threat control. Additionally, it is required for the applied protections to be documented and verified in accordance with the requirements included in Volume XVIII of the STH railway standards.

Cybersecurity within the scope of this volume of the STH railway standards

Currently, in the area covered by this volume of standards, there are no networks and information systems whose security could be endangered. However, it is possible that such networks and information systems or technical solutions that collect, store, process, make available or transmit data may arise. For example, a system of sensors may be used that, through wired or wireless networks, public or non-public networks or directly, will connect to, for instance, an infrastructure manager's system. Then, they should be protected against physical security and IT security threats in a manner compliant with the requirements of the Information Safety Management System (ISMS) implemented by the STH company.

At the same time, it should be kept in mind that the ISMS will be subject to changes because maintaining the required level of cybersecurity is not possible by meeting requirements of the standards once since cybersecurity is a process rather than a state. In order to minimise the number and size of cyber threats, the requirements (obligations) included in the Act of 5 July 2018 on the national cybersecurity system in Chapter 3 for operators of key services, in Chapter 5 for public entities should be continuously observed in operational processes and only digital service providers fulfilling the obligations described in Chapter 4 of that Act should be used.

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3 Classification of the elements of the technical support facilities

3.1 Division and elements of the technical support facilities

- 1) The technical support facilities are divided into permanent and temporary ones.
- 2) The permanent technical support facilities shall consist of the following elements:
 - a) track layout,
 - b) structures and equipment for loading, unloading and storage of construction materials and railway infrastructure elements,
 - c) storage structures and equipment,
 - d) workshop structures and equipment,
 - e) structures and equipment for the storage and maintenance of railway vehicles,
 - f) structures with a social and administrative purpose,
 - g) structures and rooms related to maintenance of railway tunnels,
 - h) road system with parking lots and garage structures,
 - i) other structures and accompanying equipment, the construction of which is necessary or recommended due to the applicable legal requirements, expected increase in the functionality of the technical support facilities or due to ecological reasons,
 - j) systems related to the structures listed in point a)–i).
- 3) Elements of the permanent technical support facilities may operate:
 - a) in compact complexes,
 - b) individually.
- 4) The complexes of the permanent technical support facilities are divided into:
 - a) maintenance depot (BU),
 - b) maintenance sites (PU).
- 5) Individual elements of the permanent technical support facilities operate only as maintenance sites (PU).
- 6) Temporary technical support facilities shall be prepared only for the time and for the needs of the new railway infrastructure construction in accordance with the requirements specified in chapter 6. They may be equipped with temporary or permanent elements (if they are to be part of the permanent technical support facilities in the future) referred to in point 2). After completion of the construction, the temporary technical support facilities shall be removed or permanent technical support facilities shall be established in their place.
- 7) The classification of the elements of the technical support facilities are presented in Table 3.

Table 3 Classification of the elements of the technical support facilities

Elements of the technical support facilities		
Permanent		Temporary
Compact complexes	Individual	
Maintenance depots BU	Maintenance sites PU	

3.2 Functions of the elements of the technical support facilities

- 1) The maintenance depot (BU) should perform at least the following functions:
 - a) ensure access to the railway and road network,
 - b) enable receipt of trains with long rails,
 - c) enable loading, unloading and installation of turnouts,
 - d) enable loading, unloading and storage of ballast, sleepers and other pavement materials,
 - e) enable storage and maintenance of railway vehicles used to maintain the railway infrastructure,
 - f) enable re-railing of small rail vehicles (e.g. inspection vehicles) and rail-road vehicles (PSDs),
 - g) provide space and appropriate conditions for storage of materials and equipment,
 - h) provide space and conditions for performance of workshop works,
 - i) provide appropriate social and administrative conditions for employees.
- 2) The maintenance site (PU) should perform one or more of the selected functions specified in point 1) as needed:
- 3) Structures and rooms related to the maintenance of railway tunnels should also be considered as maintenance sites (PU).
- 4) The temporary technical support facilities should perform one or more of the selected functions specified in point 1) only for the time and purposes of the construction of new railway infrastructure.

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4 Location of the elements of the technical support facilities

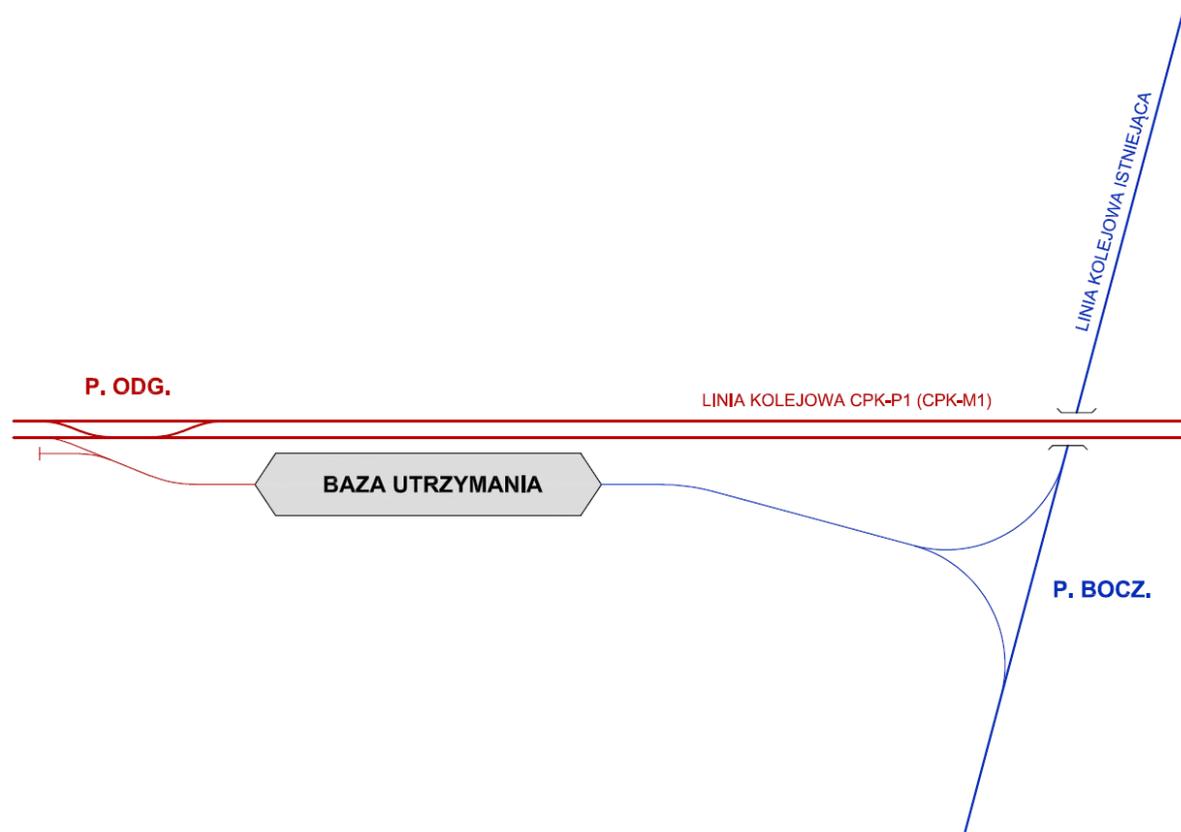
4.1 Planning of arrangement of the technical support facilities elements

- 1) When planning the arrangement of the elements of the permanent technical support facilities on the railway network of the STH, the following aspects should be taken into account:
 - a) the necessity to ensure the expected STH maintenance capacity, depending, among others, on the following factors:
 - infrastructure maintenance plan,
 - track superstructure standard,
 - geometric and kinematic parameters of the track layout,
 - type of railway traffic (passenger, mixed),
 - number and gross weight of trains,
 - size of planned elements of the technical support facilities;
 - b) possibility of connecting the designed elements of the technical support facilities to the railway network and road network in accordance with the requirements specified in chapter 4.2;
 - c) optimisation of local conditions, i.e.:
 - limitation of the scope necessary for performance of earthworks,
 - access to technical infrastructure (power, water supply and sewerage, etc.),
 - minimisation of the scope of expropriation and changes in land use;
 - d) possibility of employing an appropriate number of employees, which is affected, among others, by:
 - location near larger towns,
 - ensuring an acceptable travel time;
 - e) possibility of earlier use of their locations or elements – for the time of construction of the new STH infrastructure – for the purpose of creating temporary technical support facilities, which is mainly related to the necessity to deliver materials and equipment used for construction of the STH railway lines; the following factors should be taken into account here:
 - possibility of connection to the existing railway line,
 - possibility of connection to a public road of appropriate parameters;
 - f) coherence between the railway infrastructure maintenance areas and the control command and signalling areas designated by the LCCs;
 - g) minimisation of construction and maintenance costs throughout the entire life cycle.
- 2) The location of maintenance depots (BU) should be planned in such a way as to achieve the expected maintenance capacity assuming that one maintenance depot (BU) should support the area of the railway network within a radius of not more than 100 km.
- 3) Along the STH railway sections between adjacent maintenance depots (BU), the maintenance sites (PU) ensuring the stoppage of the special rolling stock to maintain the infrastructure should be distributed uniformly assuming that the distance between them or the distance to the nearest maintenance depot (BU) should not be more than 50 km.
- 4) Stations or yards ensuring access to the tracks for maintenance purposes and re-railing of small railway vehicles (e.g. inspection vehicles) and rail-road vehicles (PSD) should be located at each maintenance depot (BU), and additionally at tracks, railway stations or at maintenance sites (PU) at distances not exceeding 5 km. At stations, it is recommended to locate such stations and yards on safety tracks.

- 5) In the event that the designed STH line is to connect to another planned STH line, the possibility of establishing a common depot (BU) for both adjacent lines in a location and with a size ensuring the capacity needed to maintain all those lines or their adjacent parts.
- 6) In cases where the designed STH rail line connects on both sides with the lines of external managers, a separate maintenance depot (BU) shall be designed for it in a location and with a size ensuring the capacity needed to maintain the designed line.

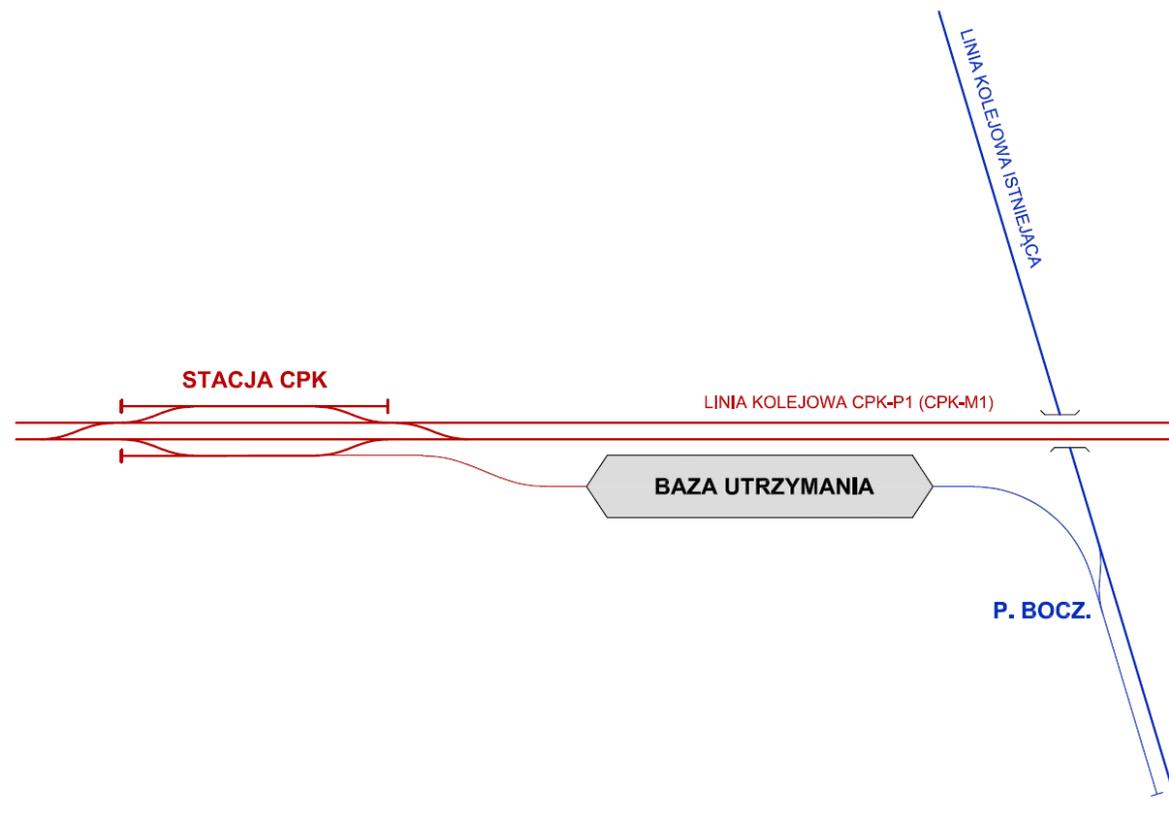
4.2 Connection of the elements of the technical support facilities with the rail and road network

- 1) Maintenance depots (BU) on railway lines of categories CPK-P1 and CPK-M1 should be located in such a way that each depot has at least one connection to the designed STH railway line and at least one connection to the existing railway line, i.e.:
 - a) in places where passages of STH railway lines over or under the existing railway lines are designed (Figure 1, Figure 2),
 - b) in places where the STH railway lines are designed in the vicinity of the existing railway lines without intersection (Figure 3),
 - c) on short railway lines (links) connecting STH railway lines with the existing railway lines (Figure 4).
- 2) It is recommended to locate the maintenance depots (BU) on the railway lines of categories CPK-P2, CPK-P3, CPK-M2 and CPK-M3 in the vicinity of the railway junctions so as to ensure at least one, technically and operationally convenient connection of the depot with the designed STH railway line.
- 3) Maintenance sites (PU) equipped with their own track layout are recommended to be located:
 - a) at commercial and technical stations located on STH railway lines (Figure 5, Figure 6, Figure 7),
 - b) at junction signal boxes with a bi-directional traffic function located on STH railway lines (Figure 8).
- 4) Maintenance sites (PU) not equipped with their own track layout are recommended to be located:
 - a) in the area of turnout heads (e.g. turnout assembly yards),
 - b) in the area of engineering structures (e.g. at the abutments of large bridges or at tunnel entrances and exits).
- 5) It is recommended that maintenance depots (BU) and maintenance sites (PU), including stations for the re-railing of small rail vehicles (e.g. inspection vehicles) and rail-road vehicles (PSD) on safety tracks, be located in such places of the station track layout which are less exposed to unplanned entry of the train during normal operation.
- 6) It is allowed to construct maintenance depots (BU) and maintenance sites (PU) in locations other than those recommended in point 1)–5), only if, for technical, organizational or economic reasons, it is not possible to use the recommended locations.
- 7) The elements of the permanent technical support facilities should be located so as to ensure the shortest possible connection with the public road of the required load-bearing class.



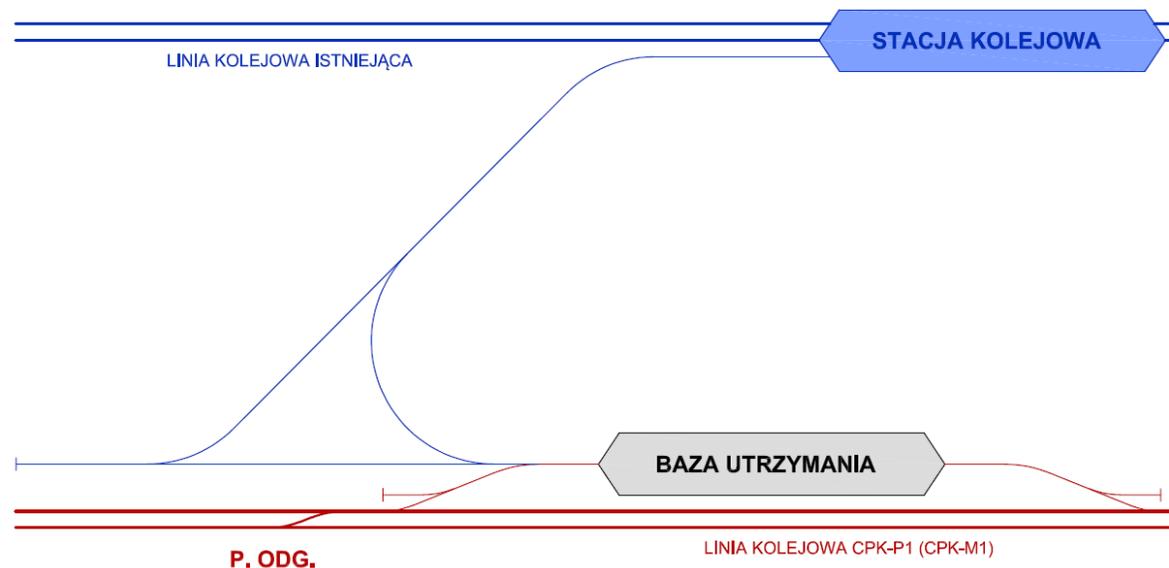
PL	EN
LINIA KOLEJOWA ISTNIEJĄCA	EXISTING RAILWAY LINE
P. ODG.	JUNCTION SIGNAL BOX
LINIA KOLEJOWA CPK-P1 (CPK-M1)	STH-P1 (STH-M1) RAILWAY LINE
BAZAUTRZYMANIA	MAINTENANCE DEPOT
P. BOCZ.	SIDING SIGNAL BOX

Figure 1 Connection of the maintenance depot (BU) with the railway network in the area of intersection of the designed STH line with the existing line (model: Nouâtre-Maillé, France)



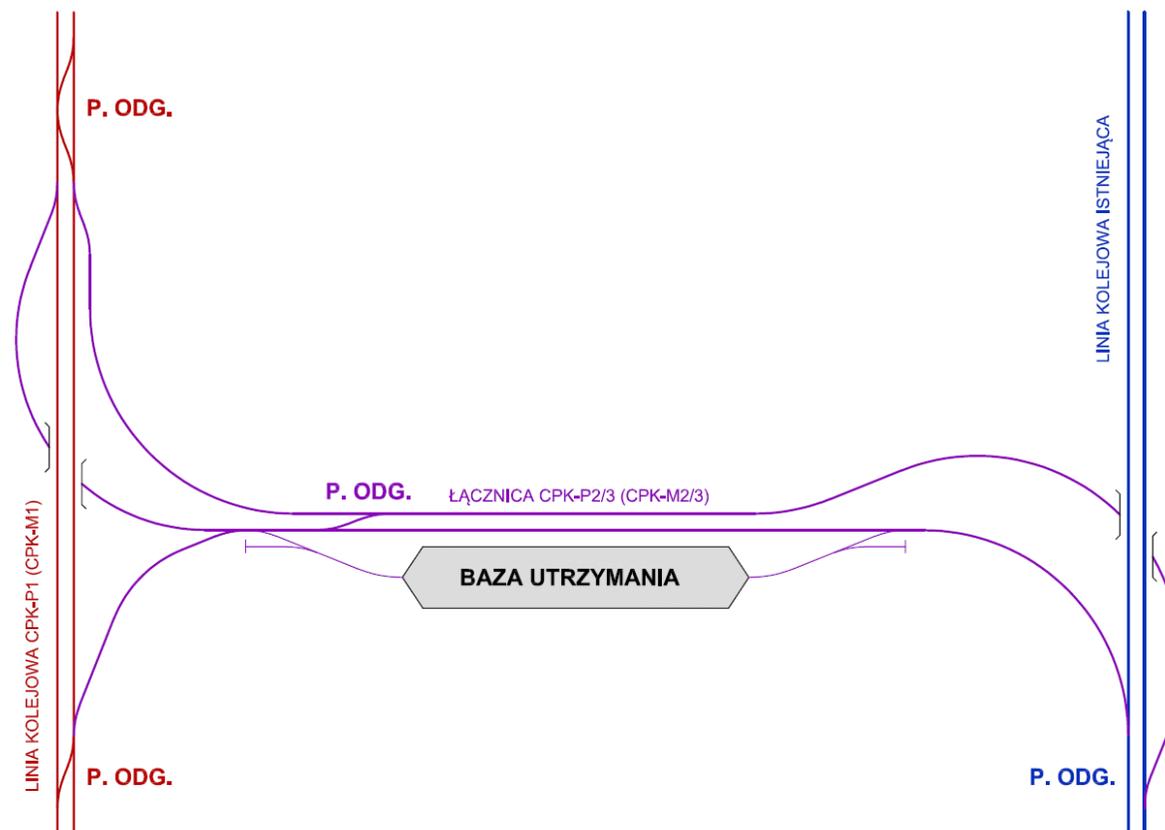
PL	EN
LINIA KOLEJOWA ISTNIEJĄCA	EXISTING RAILWAY LINE
STACJA CPK	STH Station
LINIA KOLEJOWA CPK-P1 (CPK-M1)	STH-P1 (STH-M1) RAILWAY LINE
BAZA UTRZYMANIA	MAINTENANCE DEPOT
P. BOCZ.	SIDING SIGNAL BOX

Figure 2 Connection of the maintenance depot (BU) with the railway network in the area of intersection of the designed STH line with the existing line (model: Villarrubia, Spain)



PL	EN
LINIA KOLEJOWA ISTNIEJĄCA	EXISTING RAILWAY LINE
STACJA KOLEJOWA	RAILWAY STATION AREA
P. ODG.	JUNCTION SIGNAL BOX
BAZA UTRZYMANIA	MAINTENANCE DEPOT
LINIA KOLEJOWA CPK-P1 (CPK-M1)	STH-P1 (STH-M1) RAILWAY LINE

Figure 3 Connection of the maintenance depot (BU) with the railway network in the area of the designed STH line proximity to the existing line (model: Villognon, France)



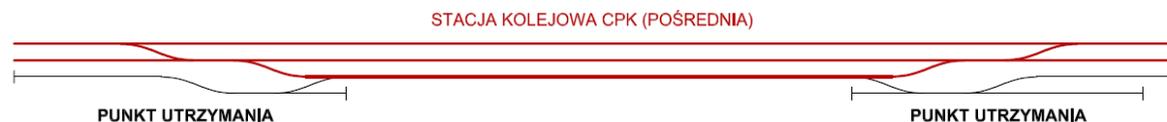
PL	EN
P. ODG.	JUNCTION SIGNAL BOX
LINIA KOLEJOWA CPK-P1 (CPK-M1)	STH-P1 (STH-M1) RAILWAY LINE
ŁĄCZNIKA CPK-P2/3 (CPK-M2/3)	RAIL LINK CPK-P2/3 (CPK-M2/3)
BAZA UTRZYMANIA	MAINTENANCE DEPOT
LINIA KOLEJOWA ISTNIEJĄCA	EXISTING RAILWAY LINE

Figure 4 Connection of the maintenance depot (BU) with the railway network – connection to the rail link (model: Laval, France)



PL	EN
PUNKT UTRZYMANIA („MAŁA BAZA“)	MAINTENANCE DEPOT (“SMALL DEPOT”)
STACJA KOLEJOWA CPK (POŚREDNIA)	STH RAILWAY STATION (INTERMEDIATE)

Figure 5 Large maintenance site (PU) connection to the intermediate station (model: Campegine, Italy)



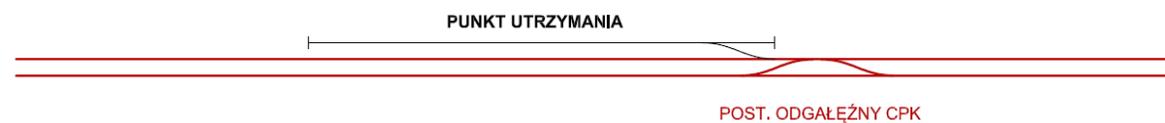
PL	EN
PUNKT UTRZYMANIA	MAINTENANCE SITE
STACJA KOLEJOWA CPK (POŚREDNIA)	STH RAILWAY STATION (INTERMEDIATE)

Figure 6 Maintenance site (PU) connection to the intermediate station (model: Asnières-sur-Nouère, France)



PL	EN
PUNKT UTRZYMANIA	MAINTENANCE SITE
STACJA KOLEJOWA CPK (POŚREDNIA)	STH RAILWAY STATION (INTERMEDIATE)

Figure 7 Maintenance site (PU) connection to the intermediate station (model: Asnières-sur-Nouère, France)



PL	EN
PUNKT UTRZYMANIA	MAINTENANCE SITE
POST. ODGAŁĘŻNY CPK	STH JUNCTION SIGNAL BOX

Figure 8 Maintenance site (PU) connection to a junction signal box with a bi-directional traffic function (formula: Miribel, France)

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5 Requirements for the elements of the permanent technical support facilities

5.1 General requirements for the complexes of the permanent technical support facilities

5.1.1 Division of the complexes of the permanent technical support facilities into areas

- 1) Due to safety conditions and functional reasons, the complexes of the technical support facilities should be divided into the following areas:
 - a) staff welfare and administration – intended for all employees and visitors,
 - b) technical – separated in spatial and functional terms from the staff welfare and administration area, intended only for employees participating in the process of maintenance of the railway infrastructure or the technical support facilities itself.
- 2) The following should be located in the staff welfare and administration area:
 - a) structures for staff welfare and administration purposes,
 - b) road system and parking areas related to the operation of the structures referred to in letter a).
- 3) The following should be located in the technical area:
 - a) track layout,
 - b) structures and equipment for loading, unloading and storage of construction materials and railway infrastructure elements,
 - c) structures and equipment for the storage and maintenance of railway vehicles assigned to a given depot,
 - d) storage structures and equipment,
 - e) workshop structures and equipment,
 - f) road system, parking areas and garage structures,
 - g) other structures performing the functions related to the maintenance of railway infrastructure and meeting the auxiliaries of the complex of permanent technical support facilities.

5.1.2 Design of tracks and track substructure in the complexes of technical support facilities

The requirements for the design of the tracks and the track substructure of technical support facilities are specified in Volume I.2 of the Standards entitled: “Railway track – construction of a civil structure”.

5.1.3 Drainage of the complex of technical support facilities

- 1) Drainage for the structures included in the complex of technical support facilities should be designed in accordance with the rules applicable to such structures.
- 2) Detailed requirements for drainage of the complex of technical support facilities are presented in Volume I.3 of the Standards entitled: “Railway track – drainage of the track layout”.

5.1.4 Overhead catenary system on the tracks of technical support facilities

The tracks of technical support facilities should be non-electrified.

5.1.5 Lighting of the complex of technical support facilities

- 1) Internal roads, railway tracks, loading ramps and loading yards belonging to the technical support facilities should be illuminated to the extent enabling performance of night work.

- 2) Detailed requirements for lighting are presented in Volume IV of the Standards entitled: “Non-OCL power engineering”.

5.1.6 Electric points heating (EPH)

- 1) Turnouts used in the area of the technical support facilities should be equipped with electric points heating equipment (EPH).
- 2) Detailed requirements for electric points heating equipment (EPH) are presented in Volume IV of the Standards entitled: “Non-OCL power engineering”.

5.1.7 Control command and signalling on the tracks of technical support facilities

Control command and signalling on the tracks of technical support facilities should be designed according to the rules specified in Volume VI of the Standards entitled: “Control command and signalling and ETCS”.

5.1.8 Communication and ICT networks within the complex of technical support facilities

- 1) Access to railway communication should be provided within the entire area of the complex of technical support facilities.
- 2) Access to the wireless Internet network (Wi-Fi) should be provided within the entire area of the maintenance depot (BU) and, where necessary, in the maintenance site area (PU) inside and outside the structures.
- 3) Detailed requirements for the equipment and systems of communication and ICT networks are specified in Volume VII.1 of the Standards entitled: “Fixed and wireless communication systems and data transmission”.

5.1.9 Technical buildings

Technical buildings in the area of the technical support facilities shall be designed in accordance with the principles specified in Volume VIII.2 of the Standards entitled: “Technical buildings”, in compliance with the functional requirements specified in this Volume of Standards in points 5.4,5.5,5.6,5.7 and 5.9.

5.1.10 Fencing of the complexes of technical support facilities, access control and monitoring

- 1) The area of the complex of technical support facilities should be completely fenced (also from the side of the railway line) and equipped with railway and road entry gates.
- 2) Access to the entire complex of technical support facilities should be controlled.
- 3) If necessary, additional areas (e.g. structures or rooms) available to a limited extent, i.e. to persons with separate authorisations (e.g. only for selected and properly trained personnel), should be separated within the complex of technical support facilities.
- 4) The area of the complex of technical support facilities should be fully monitored, both outside and inside the buildings.
- 5) Detailed requirements for access control and monitoring equipment and systems are specified in Volume XIV of the Standards entitled: “Health and safety support systems for people and property”.

5.2 Track layouts of technical support facilities

5.2.1 Connection of the railway track layouts of technical support facilities with the railway network

- 1) The railway track layout of technical support facilities may include:
 - a) side station tracks,
 - b) station siding tracks,
 - c) line siding tracks.
- 2) Track layouts of maintenance depots (BU) should be designed as:
 - a) station sidings – if the depot is connected to a railway station,
 - b) line sidings – if the depot is connected to a junction signal box or siding signal box.
- 3) Each maintenance depot (BU) should have:
 - a) at least one connection with the STH railway network designed in such a way that taking into account the track connections at the operating control point and the applicable operating regulations, it is possible for the rolling stock to exit the depot for each railway line at which this control point is located,
 - b) in the case of railway lines of categories CPK-P1 and CPK-M1 – at least one connection to the existing railway network.
- 4) Track layouts of maintenance sites (PU) should be designed as:
 - a) side station tracks – if the site is connected to the railway station, if its track layout is intended only for temporary standstill of the railway rolling stock,
 - b) station sidings – in case of connection of the site to the railway station, if large-scale manoeuvres are planned on its track layout (i.e. which may significantly overburden the LCC rail traffic controller on duty), e.g. related to loading works,
 - c) line sidings – if the depot is connected to a junction signal box or siding signal box.
- 5) Each maintenance site (PU) should have at least one connection with the STH railway network designed in such a way that taking into account the track connections at the operating control point and the applicable operating regulations, it is possible for the rolling stock to exit the site for each railway line at which this control point is located,

5.2.2 Track layout geometries and connections of tracks to technical support facilities

- 1) Track layout geometries and connections of tracks to technical support facilities included in the technical support facilities should be designed according to the rules applicable to side tracks in accordance with Volume I.1 of the Standards entitled “Railway track – layout geometry”.
- 2) The layouts and usable lengths of the tracks of technical support facilities shall be designed in accordance with the requirements presented in point 3) as well as with the following factors taken into account:
 - a) expected length of manoeuvre sets that may move on a particular track (especially in the case of cargo tracks intended for handling transport of pavement materials, including transport of long rails),
 - b) expected number and length of railway machines that may be stored on a given track (particularly important in the case of parking and service tracks),
 - c) expected type of manoeuvre works performed on a particular track,
 - d) functionality of the entire railway track layout of technical support facilities,
 - e) possibility of further extension of technical support facilities.
- 3) The designed track layouts of maintenance depots (BU) should include at least:
 - a) access tracks ensuring the required connections of the maintenance depot with the railway network, referred to in chapter 5.2.1 point 3),
 - b) 1 cargo track for trains transporting ballast, sleepers and other pavement materials; the length of the track should enable accommodation of a manoeuvre train set with a length of 500 m,
 - c) 2 cargo and staging tracks for trains transporting long rails; the length of each track should enable accommodation of a manoeuvre train set with a length of 560 m,
 - d) 1 cargo track for trains transporting elements of high-speed turnouts; the length of the track should enable the accommodate a manoeuvre train set with a length of 300 m,
 - e) 1 or 2 staging tracks with a length enabling accommodation of an entire or manoeuvre train set divided into two parts with a length of 750 m,
 - f) staging tracks with a length enabling all railway vehicles permanently allocated to a given depot to be stored and a 250 m reserved for temporary storage of railway vehicles not permanently allocated to the depot,
 - g) 1 service track with a length enabling accommodation of a 150 m long manoeuvre train set.
- 4) The maintenance site (PU) track layouts shall be designed as required, depending on the purpose of the maintenance site (road machinery parking, loading works, etc.).
- 5) Subject to point 4), it is recommended to assume the following usable lengths of tracks:
 - a) at least 450 m for tracks where manoeuvre sets with pavement materials are to be handled,
 - b) at least 150 m for tracks intended for temporary parking of special rolling stock (e.g. during breaks between night works),
 - c) at least 150 m for access tracks to the maintenance sites, if additional manoeuvres are planned on them and it is not possible to use side station tracks.
- 6) It is recommended that the maintenance site (PU) connections to the station track layouts are designed on the right side of the entry throats (Figure 9).
- 7) It is recommended that the maintenance depot (BU) track layout provides the possibility to rotate railway vehicles, e.g. by using a triangle or a track loop. In particular, it is recommended to perform this function by appropriately shaping and connecting the access tracks.

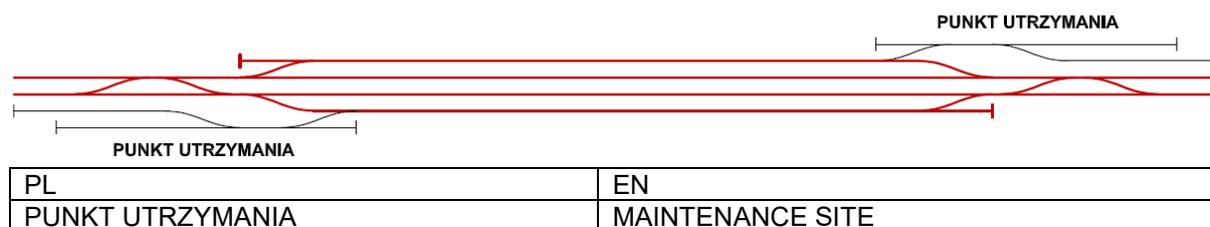


Figure 9 Recommended locations of maintenance sites (PU) – on the right side of the entrance throats

5.3 Structures and equipment for loading, unloading and storage of construction materials and railway infrastructure elements

- 1) Each maintenance depot (BU) should be equipped with:
 - a) loading yard with a length of the loading front of at least 400 m intended for loading, unloading and storage of ballast, sleepers and other pavement materials; the loading yard should be located in the vicinity of the loading track referred to in chapter 5.2.2 point 3) letter b);
 - b) a front-side platform with a length of the side loading front of at least 60 m, located at the loading yard for loading, unloading and storage of ballast, sleepers and other pavement materials, in the vicinity of the loading track referred to in chapter 5.2.2 point 3) letter b);
 - c) railcar weighing station;
 - d) truck weighing station.
- 2) Optionally, a maintenance depot should be equipped with:
 - a) a yard with dimensions of at least 400 m × 10 m for loading, unloading and storage of railway rails; the yard should be located in the vicinity of two loading and unloading tracks (or between them) for trains with rails referred to in chapter 5.2.2 point 3) letter c), in such a way that it is possible to install a crane system with a maximum length of 360 m (25 spans every 15 m) in case it is necessary to store long rails at the depot for a long time;
 - b) a yard of at least 300 m × 15 m for the pre-assembly of high-speed turnouts; the yard should be located in the vicinity of the loading track for loading and unloading of elements of high-speed turnouts referred to in chapter 5.2.2 point 3) letter d), so that it is possible to install gantry cranes.
- 3) Maintenance sites (PU) shall be equipped with structures and equipment for loading, unloading and storage of construction materials and infrastructure elements as required.
- 4) The exact surface area of the loading and storage yards and ramps should be selected according to the assumed maintenance capacity of the STH company.
- 5) Loading yards and ramps in the area of technical support facilities should be equipped with electrical systems and connections enabling performance of works with the use of electric tools supplied with a three-phase current.
- 6) Loading yards and ramps in the area of technical support facilities should be equipped with water supply systems and connections enabling access to running water and sewerage network.
- 7) Detailed requirements for yards and loading ramps are specified in Volume VIII.3 of the Standards entitled "Structures".

5.4 Structures and equipment for the storage and maintenance of railway vehicles

- 1) Railway vehicles which may be stored in maintenance depots include, among others:
 - a) normal rolling stock:
 - locomotives,
 - freight train cars,
 - social train cars;
 - b) special rolling stock:
 - diagnostic and inspection vehicles,
 - machines for railway construction works, including, but not limited to, tamping tools, ballast regulators, cleaning machines,
 - vehicles for maintenance of railway infrastructure in winter season,
 - vehicles for maintenance and repair of the overhead catenary system,
 - vehicles for maintenance and repair of engineering structures,
 - vehicles for maintenance and repair of railway tunnels,
 - rail cranes,
 - motor trolleys,
 - railway and road vehicles (PSD), including, but not limited to, diggers, loaders, two-way digger-loaders,
 - railway rescue vehicles.
- 2) It is recommended that the service space of each maintenance depot (BU) should consist of at least:
 - a) free-standing single-track service hall with dimensions of at least 70 × 15 m,
 - b) 60 m long railway and road inspection channel (in the hall referred to in letter a)),
 - c) refuelling station with a tank with a capacity ensuring operation of all vehicles assigned to a given depot for 60 hours,
 - d) stations for re-railing of small rail vehicles (e.g. inspection vehicles) and rail-road vehicles (PSDs).

5.5 Storage structures and equipment

- 1) The storage space of maintenance depots (BU) should be organized in the form of free-standing storage halls, optionally equipped with bridge cranes.
- 2) The storage space of maintenance sites (PU) is organized as required. It is recommended to use economical and multifunctional solutions, e.g. modular facilities.
- 3) The storage space should allow for the space necessary for the services listed in chapter 1.2 point 3).

5.6 Workshop structures and equipment

- 1) The workshop space of the maintenance depots (BU) should be organized in the form of:
 - a) free-standing workshop buildings,
 - b) free-standing workshop halls.
- 2) In justified cases, e.g. due to limited availability of land area, it is allowed to separate the workshop space in the structures for the storage and maintenance of railway vehicles or in storage structures provided that proper ergonomics of work is guaranteed and OH&S and fire protection requirements are maintained.

- 3) The workshop space of the maintenance sites (PU) is organized as required. It is recommended to use economical and multifunctional solutions, e.g. modular facilities.
- 4) The workshop space should allow for the space necessary for the services listed in chapter. 1.2 point 3).

5.7 Structures for staff welfare and administration purposes

- 1) The staff welfare and administration space of the maintenance depots (BU) should be organized in the form of a separate welfare and administrative building.
- 2) The organization of the welfare and administration space of the maintenance depot (BU) should include:
 - a) an office part for administrative employees, including:
 - office premises,
 - archives and warehouses;
 - b) office and welfare parts for maintenance personnel, including:
 - office premises,
 - accommodation space,
 - archives and warehouses;
 - c) work area for maintenance personnel, including:
 - women's and men's locker rooms,
 - shower rooms and toilets for women and men,
 - amenity rooms for temporary stay of employees in work clothing and footwear during field work;
 - d) technical support room (technical room);
 - e) common space, including:
 - entrance, lobbies, corridors,
 - reception and waiting room,
 - security post,
 - office and conference room,
 - rest area,
 - kitchen,
 - warehouses,
 - toilets for women, men and people with disabilities,
 - women's and men's locker room,
 - server room and technical rooms.
- 3) The welfare and administrative buildings of the maintenance depots (BU) should be designed and constructed in such a way that their design and the manner of installation enable functional reorganization of their interior, e.g. by changing the layout of partition walls.
- 4) Possible welfare and administration space of the maintenance sites (PU) shall be organized as required. It is recommended to use economical and multifunctional solutions, e.g. modular facilities.

5.8 Structures and rooms related to maintenance of railway tunnels

Requirements for structures and rooms related to maintenance of railway tunnels are specified in Volume III.2 of the Standards entitled "Tunnels".

5.9 Road system with parking lots and garage structures

- 1) Access to all facilities within the maintenance depots (BU) and maintenance sites (PU) shall be possible by passenger cars and trucks through a network of internal roads of appropriate parameters.
- 2) The maintenance depots (BU) should be equipped with parking lots available to the employees of technical support facilities and visitors, located in the welfare and administration area.
- 3) Number of parking spaces on parking lots referred to in point 2) should be adapted to the maximum number of persons present in technical support facilities, taking into account the normal organization of their work. The calculations should take into account the increased number of employees when starting and completing individual changes.
- 4) Upon agreement with the relevant STH discipline unit coordinating the design, it is possible to limit the number of parking spaces in relation to the number indicated in point 3) provided that the location of support facilities guarantees convenient access by means of public transport or access by means of collective plant communication shall be ensured for employees of support facilities.
- 5) Separate parking spaces or garage stations, as appropriate, shall be provided in the technical area for all commercial road vehicles performing functions related to the transport of employees or the transport of materials and tools.
- 6) Parking spaces and garage spaces within the maintenance sites (PU) shall be arranged as required.
- 7) Detailed requirements for non-public roads in the area of the technical support facilities are specified in Volume V.1 of the Standards entitled: "Non-public roads".

5.10 Other facilities and accompanying equipment

- 1) When designing the elements of technical support facilities, it is necessary to provide for the location of additional structures and accompanying equipment, the construction of which is necessary or recommended due to:
 - a) applicable legal requirements (e.g. fire, sanitary, water, etc.),
 - b) improvement of the functionality of technical support facilities,
 - c) striving to maintain climate neutrality.
- 2) The structures and equipment referred to in point 1), including, among others:
 - a) fire water tanks – if it is not possible to use external water supply network for fire protection purposes,
 - b) holding tanks for liquid waste – if it is not possible to connect the structures of technical support facilities to the external sanitary sewerage network or due to their insufficient parameters,
 - c) on-site waste water treatment plants – if it is not possible to connect to the external sanitary sewerage network or due to their insufficient parameters,
 - d) retention tanks and treatment equipment (e.g. sedimentation tanks, separators) – collecting rainwater from drainage systems,
 - e) heat pumps, gas tanks, solar collectors – generating heat for the needs of technical support facilities,
 - f) structures and equipment used to generate electricity from renewable energy sources, e.g. photovoltaic panels, wind turbines,
 - g) landscaping structures.
- 3) Landscaping structures in the area of technical support facilities referred to in point 2) letter g) should be designed in accordance with the principles specified in Volume VIII.4 of the Standards entitled: "Landscaping structures".
- 4) Plantings should be planned and taken into account already at the design stage of the entire complex of technical support facilities, with particular consideration of the routes of the designed networks.

In general, plantings should be carried out in the welfare and administration area. Possible plantings in the technical area should be carried out only if necessary and in such a way that in no case the safety conditions are worse and the process of work performed in this area is not hindered.

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6 Requirements for the elements of temporary technical support facilities

- 1) The basic elements of the temporary technical support facilities include:
 - a) temporary track layouts
 - b) temporary storage yards,
 - c) temporary loading ramps,
 - d) temporary internal roads.
- 2) Elements of temporary technical support facilities may have a structure simplified in relation to the one required for permanent support facilities, provided, however, that appropriate strength requirements are met for mechanical loads and impacts from moving railway and road vehicles and stored materials.
- 3) When initially planning temporary technical support facilities intended for storage of ballast pavement materials, their surface area can be estimated in accordance with a conversion factor of 1500 m² per 1 km of the newly constructed double track line.

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7 Reference documents

7.1 EU legal documents

- [1] Rozporządzenie Komisji (UE) nr 1299/2014 z dnia 18 listopada 2014 r. dotyczące technicznych specyfikacji interoperacyjności podsystemu "Infrastruktura" systemu kolei w Unii Europejskiej

7.2 Legal documents of the Republic of Poland

- [2] Ustawa z dnia 7 lipca 1994 r. – Prawo budowlane (Dz. U. z 1994 r. Nr 89, poz. 414, z późn. zm.)
- [3] Rozporządzenie Ministra Transportu i Gospodarki Morskiej z dnia 10 września 1998 r. w sprawie warunków technicznych, jakim powinny odpowiadać budowle kolejowe i ich usytuowanie. (Dz. U. z 1998 r. Nr 151, poz. 987, z późn. zm.)
- [4] Rozporządzenie Ministra Infrastruktury z dnia 12 kwietnia 2002 r. w sprawie warunków technicznych, jakim powinny odpowiadać budynki i ich usytuowanie (t.j. Dz. U. z 2019 r. Poz. 1065, z późn. zm.)

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