

Fundamentals of Road Construction

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Project 2

The subject of the project:
Introduction to road design.

Uczelnia zintegrowana na przyszłość
POWR.03.05.00-00-Z041/17





Poznan University of Technology
Institute of Civil Engineering
Division of Road Engineering

Name and surname: Name and surname
Sustainable Building Engineering first cycle
semester 6
academic year 2020/21

Thematic card of the course
Fundamentals of Road Construction
Design of section of the public road

The data for the design:

The map with contour line in the scale of 1: 5000.

Road class: "Z"

Design speed: 50 km/h

Number of roadway: 1

Number of traffic lanes: 2

Traffic category: KR2

The load-bearing capacity group of the subgrade: G1 (non-shed soil)

Coordinates of the start "A" and end "B" points of the horizontal alignment on MAP no 1:

	X [m]	Y [m]
A	65	1180
B	1820	160

The project should include:

Description part:

1. Technical description.
2. Geometric elements of the horizontal alignment.
3. Mileage of the horizontal alignment.
4. Land leveling log.
5. Geometric elements of the vertical alignment.
6. Example road surface construction.

Drawing part:

1. Indicative plan on a scale of 1: 5000,
2. Longitudinal profile in scale 1: 5000/500.
3. Normal sections on a scale of 1: 50.

Issued date: 2021/03/01 The project completion date: 2021/06/18

The project was issued by: Marcin Bilski, BEng, PhD



1. Technical description

1.1. Subject of the project

The subject of the project is a design of a section of the two way public road characterise by: one roadway, two traffic lines, road class „Z” (a collective), outside built-up areas. The roadway is not limited by a curbs.

1.2. Basis of the project:

- The thematic card of the course „Fundamentals of road construction” and a contour map in the scale of 1: 5000,
- Regulation of the Minister of Infrastructure (Journal of Laws of 2022, item 1518) – in short JoL,
- Notice of the Minister of Infrastructure and Construction (Journal of Laws of 2016, item 124) – in short JoL16,
- Catalog of typical flexible and semi-rigid road surfaces, General Directorate of National Roads and Highways, Warsaw 2014

1.3. Technical parameters of the design road

Table 1. List of technical parameters of the design road

Item	Parameter	Mark	Unit	Value
1	The design speed (JoL §13, Par. 1)	V_p	km/h	50
2	The number of roadways (JoL §15, Par. 1)	-	-	1
3	The number of traffic lanes s (JoL §15, Par. 1)	-	-	2
4	The traffic lane width (JoL §17, Par. 1)	s	m	3
5	The shoulder width (JoL §23, Par. 7)	ρ	m	0,5
6	The traffic lane transverse slope on a straight section of the design road (JoL16 §17, Par. 2)	i_n	%	2
7	The shoulder slope on a straight section of the design road (JoL16 §37, Par. 2)	-	%	6-8

Item	Parameter	Mark	Unit	Value
8	The maximum applied transverse slope on a circular arc in the horizontal alignment	i_0	%	6
9	The greatest permissible additional roadway edge slope (JoL16 §18, Par. 3)	i_{dmax}	%	4
10	The smallest permissible additional roadway edge slope on the section with a transverse slope <2% (JoL16 §18, Par. 3)	i_{dmin}	%	0,3
11	The greatest permissible length of a straight section of the design road in the horizontal alignment (JoL16 §20. Par. 1)	-	m	1000
12	The smallest permissible length of a straight section between curvilinear sections of the same turning angle (JoL16 §20, Par. 1)	-	m	250



Item	Parameter	Mark	Unit	Value
13	The smallest permissible radius of the horizontal arc (JoL16 §21, Par. 3)	-	m	80
14	The allowable increase in centripetal acceleration (JoL16 §22, Par. 1)	<i>k</i>	m/s ²	0,8
15	The minimum permissible slope of the vertical alignment (gradeline) (JoL16 §24, Par. 5)	-	%	0,3
16	The maximum permissible slope of the vertical alignment (gradeline) (JoL16 §24, Par. 2)	-	%	9
17	The minimum permissible radius of a convex vertical curve (JoL16 §24, Par. 7)	-	%	1500
18	The minimum permissible radius of a concave vertical curve (JoL16 §24, Par. 7)	-	%	1000
19	The slope of the embankments and excavations (JoL16 §42, Par. 3)	-	1:n	



1.4. Horizontal alignment

describe in this point: how many horizontal arcs, which radius of horizontal arcs, how many straight sections of the design road, length the straight sections

1.5. Vertical alignment

describe in this point: how many vertical convex or concave arcs, which radius of horizontal arcs, how many straight sections of the design road, length the straight sections, the slopes of the straight sections

1.6. Road surface construction

describe in this point: flexible or semi-rigid construction of design road chosen from the catalog

1.7. Drainage

describe in this point: the type of ditch used and the slope of the embankment

1.8. The bridge (if present)

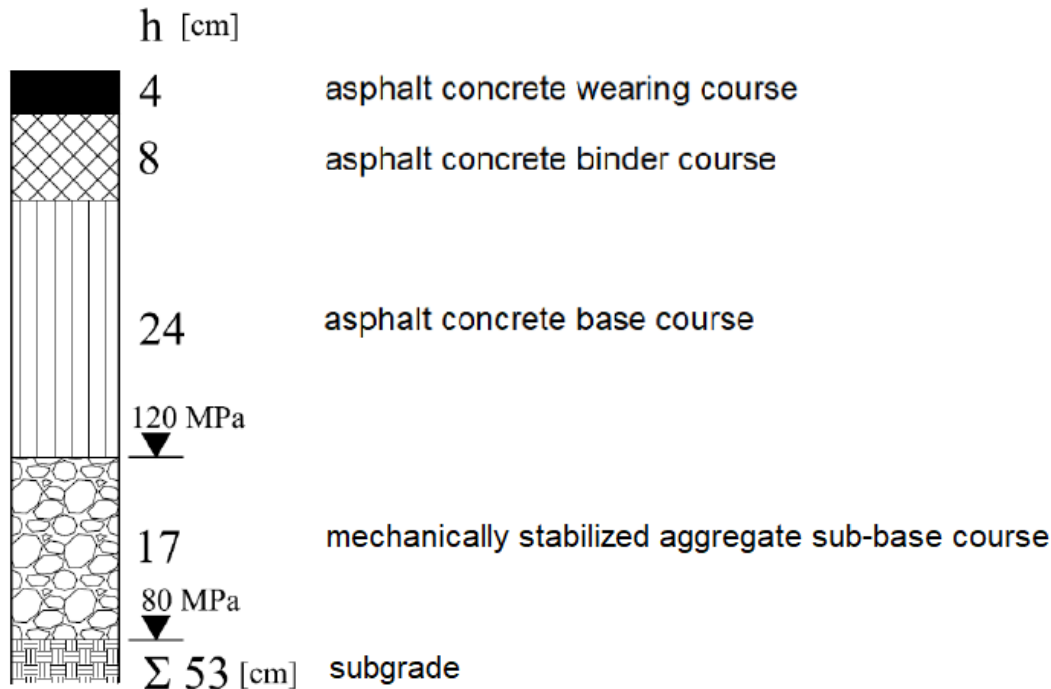
describe in this point: how long is the bridge and the vertical slope of roadway on the bridge

6. Example road surface construction

Design data:

The „traffic category”: KR7

The „load-bearing capacity group of the subgrade”: G1



Flexible and semi-rigid road surface construction from catalog

A) Improved subgrade and bottom layers

KR 5-7					
KR 3-4					
KR 1-2	does not apply	does not apply	does not apply	does not apply	does not apply

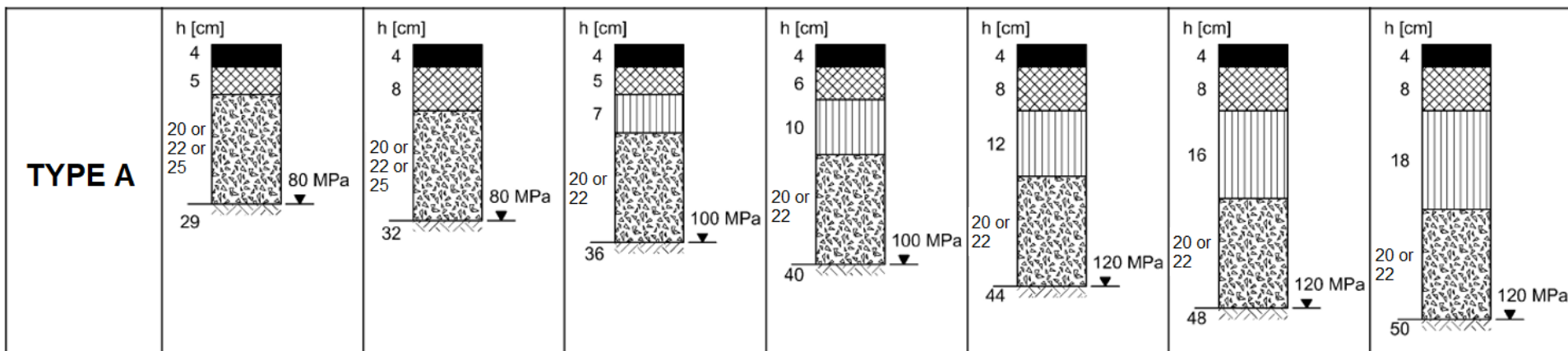
Legend:

	aggregate stabilized with hydraulic binder sub-base course
	mechanically stabilized aggregate sub-base course
	aggregate anti frost layer
	stabilized with hydraulic binder improved subgrade
	mechanically stabilized improved subgrade
	E ₂ parameter value






Flexible and semi-rigid road surface construction from catalog

B) Upper layers

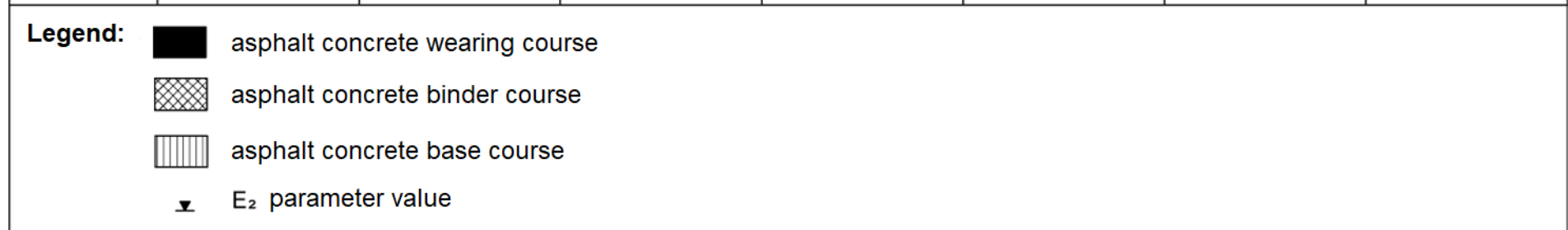
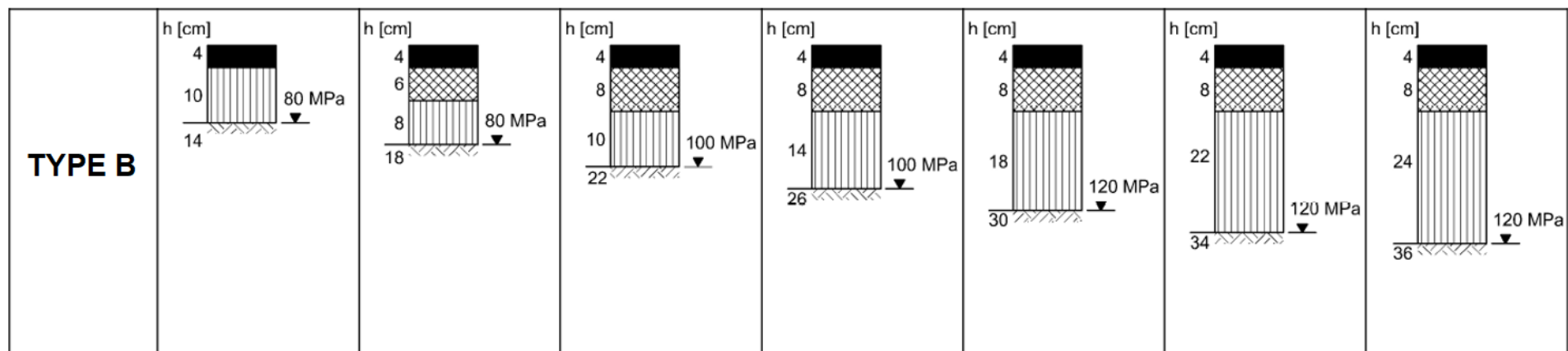
Traffic category	KR1	KR2	KR3	KR4	KR5	KR6	KR7
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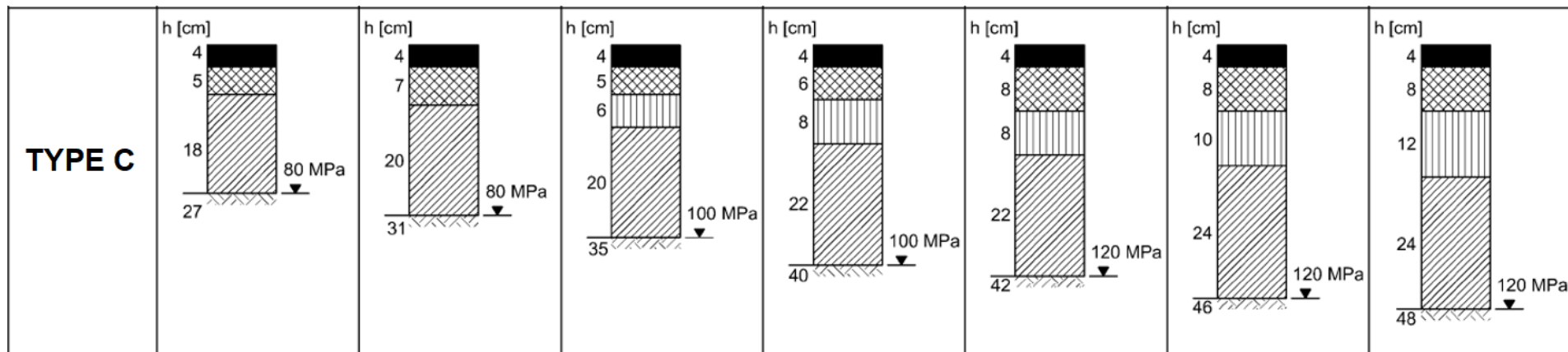
Legend:

-  asphalt concrete wearing course
-  asphalt concrete binder course
-  asphalt concrete base course
-  mechanically stabilized aggregate base course
-  E_2 parameter value






Traffic category	KR1	KR2	KR3	KR4	KR5	KR6	KR7
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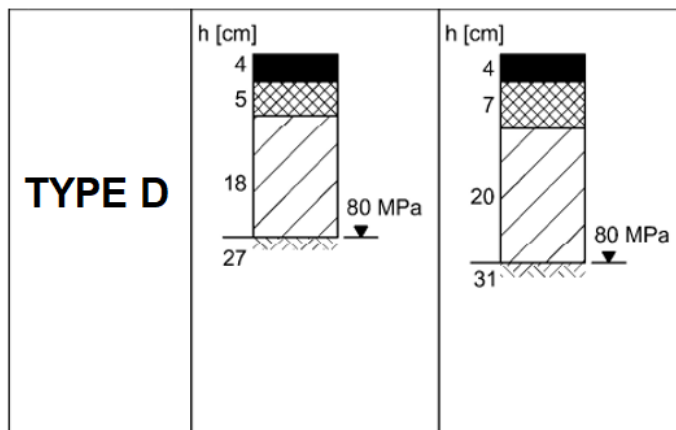
Traffic category	KR1	KR2	KR3	KR4	KR5	KR6	KR7
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





Legend:

-  asphalt concrete wearing course
-  asphalt concrete binder course
-  asphalt concrete base course
-  aggregate stabilize with a hydraulic binder base course
-  E₂ parameter value

Traffic category	KR1	KR2
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- Legend:**
-  asphalt concrete wearing course
 -  asphalt concrete binder course
 -  soil stabilized with a hydraulic binder base course
 -  E_2 parameter value

THANK YOU FOR YOUR ATTENTION

Uczelnia zintegrowana na przyszłość
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