Fundamentals of Road Construction

Lecturer : **Marcin Bilski, BEng, PhD**

Division of Road Engineering
Institute of Civil Engineering
room 324B (building A2)
room K4 (hall A4)
marcin.bilski@put.poznan.pl
bilski.put.poznan.pl

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

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Project 1

The subject of the project lecture:

General information about project.

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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

Example part of project

Primary input technical parameters

Given parameters:

Road class - …
Designed speed – Vp = … **[km/h]**
Operating speed – Vm = … **[km/h]**
Width of a traffic lane – …. **[m]**

Considerations:

1. The road will have only one deflection angle α.

Calculation of clothoid parameter „a"

In the first step You have to declare the radius of horizontal circular curve. According to the proper class of road (table 4), designed speed and declared superelevation you choose the minimum value of radius.
So from now R You can treat as known value.

1. *Dynamics condition:*

$$a_{\min} = \sqrt{\frac{V^3}{K}}$$

V=Vp

$$V_p = 60\frac{km}{h} = 16{,}667\frac{m}{s}$$

$$K = 0{,}7\frac{m}{s^3}$$

K - rate of increase of centrifugal acceleration travelling along curve at constant speed

$$a_{\min} = 81{,}33m$$

2. *Cross deformation condition:*

$$a_{\min} = \sqrt{\frac{R \cdot B(i_o + s)}{2i_d \max}}$$

$i_0 = 2{,}5\%$
$s = 5\%$ (designed superelevation – you can choose freely from suitable table)
$i_d \max = 1{,}6\%$

	0 + 000,00	PPT
+ PPTW1	495,75	
	0 + 495,75	W1
-T0	211,31	
	0 + 284,44	PKP
+ L	102,97	
	0 + 387,41	KKP=PŁK
+ Ł'/2	102,98	
	0 + 490,39	ŚŁK
+ Ł'/2	102,97	
	0 + 593,36	KŁK=KKP
+ L	102,97	
	0 + 696,33	PKP
- T0	211,31	
	0 + 485,02	W1'
+ W1W2	1186,18	
	1 + 671,20	W2
-T0	261,55	
	1 + 409,65	PKP
+ L	121,36	
	1 + 531,01	KKP=PŁK
+ Ł'/2	121,36	
	1 + 652,37	ŚŁK
+ Ł'/2	121,36	
	1 + 773,73	KŁK=KKP
+ L	121,36	
	1 + 895,09	PKP
- T0	261,55	
	1 + 633,54	W2'
+ W2KPT	728,34	
	2 + 361,88	KPT

verification:

$W_1 - W_1' = 2T_0 - 2L - Ł'$

*495,75 – 485,02 = 2*211,31 – 2*102,97 – 205,95*
10,73 = 10,73

$W_2 - W_2' = 2T_0 - 2L - Ł'$

*1671,20 – 1633,54 = 2*261,55 – 2*121,36 – 242,72*
37,66 = 37,66

THANK YOU FOR YOUR ATTENTION

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