

HIGHWAY PROJECT CALCULATIONS

Prof. Dr. Murat YAKAR
Instructor Atilla KARABACAK

2023



HIGHWAY PROJECT CALCULATIONS

ISBN: 978-625-8101-38-6

© 1. Edition Mayıs 2023

© Copyright 2023, ATLAS AKADEMİ

All rights of this edition belong to Atlas Akademi.

Without the written permission of the publisher, all or part of the book may be electronic, mechanical
It cannot be printed, published, reproduced or distributed by photocopying.

CERTIFICATE NO: 49704

Cover & Composition
Atlas Akademi

Print and Binding
Dizgi Ofset
Yeni Matbaacılar Sitesi Konya
Tel: 0332 342 07 42

LIBRARY INFORMATION CARD

Authors:

YAKAR, Murat
KARABACAK, Atilla

Keywords:

Preliminary gradeline, Deflection angle, Stopping and Passing Distace,
Horizontal Geometry, Vertical Geometry, Superelevation, Kilometer
Calculation, Coordinate calculation, Area calculation with crossection,
Area calculation,Volume calculation.



Akademi Mah. Yeni İstanbul Cad.

No: 22 Selçuklu / KONYA

Tel: 0332 241 30 59

PREFACE

This book covers the Universities, such as Survey Engineering, Civil Engineering, Map and Cadastro Technician, Civil Technician and Transportation Technician etc. Road Project, Road Design etc. which are taught in the departments. Designed for use in classes. Since the road project is related to other engineering fields, it can be used as a source book for those who want to benefit from it in all engineering fields.

The road project is an engineering in itself, and its calculations are generally used in cartography and calculations specific to the road. We tried to collect the most used calculations for the road to be designed in this book. We explained the most used accounts in the book with Example applications.

In our book, we have benefited from the books, lecture notes and articles of many valuable teachers, and foreign sources have been scanned, thank you to all of them. We hope that the book will contribute to students, users and our profession.

Atilla KARABACAK - Murat YAKAR
Mersin – 2023

CONTENTS

PREFACE	iii
CONTENTS	v
INTRODUCTION	1
1. PRELIMINARY GRADELINE	3
2. CALCULATION OF DEFLECTION ANGLE	9
3. STOPPING AND PASSING SIGHT DISTANCES	17
3.1. Stopping Sight Distance	17
3.2. Passing Sight Distance (PSD).....	21
4. HORIZONTAL CURVE	29
4.1. Simple Horizontal Curves	29
4.2. Minimum Curve Radius	32
4.2. Combined Horizontal Curve.....	33
5. KILOMETER CALCULATION	43
6. SUPERELEVATION.....	53
6.1. Transition Length at Curve.....	69
6.2. Transition Curve Superelevation Transition Length	86
6.3. Transition Curve	88
6.3.1. Transition Curve Length.....	90
6.3.2. Clotoid	93
6.4. Extending Curves	100
6.5. Sight Distances on Curves	103
7. VERTICAL GEOMETRY	107
7.1. Calculation of Grade Slopes and Intermediate Point Levels	109
7.2. Vertical Curves	115
7.2.1. Length Determination on Vertical Curves	117
7.3. Vertical Curve Calculation in Parabolic Curves	139
8. COORDINATE CALCULATION	151
8.1. Coordinate Calculation (X and Y) in Alignment and Simple Horizontal Curves.....	151
8.2. Elevation Calculation (Z)	153

9. AREA CALCULATION FROM THE SECTIONS	173
9.1. Area Calculation by Cross Method	173
9.2. Area Calculation from Coordinate Values.....	174
10. VOLUME CALCULATIONS	183
REFERENCES	195