

Contents

Preface	9
Acknowledgements	10
The longtrack skate	11
1. The iron age	12
2. The rocker	14
The flat blade	14
The rockered blade	15
The dial gauge	17
An uniform rocker	18
A variable rocker	20
Rocker, tracking and direction of drive	22
A flat blade upright	22
A flat blade in slanted position	24
A rockered blade	26
A rockered blade inclined to the left	28
How much rocker?	32
Projections of a circle on the surface	33
Circle radius and rocker height	37
Centre line of the rocker circle	39
3. The bend	41
The purpose of the bend	41
Bend model	41
The cones base circle is the outcome of rocker and bend	43
The calculated bend	50
A practice example	52
Bent according to the cone model	54
Proportionally bent according to the cone model	54
Another method	55
Rocker and a “warped blade”	56

4. The push-off	58
Specifications of the skater model	58
The dynamic energetic skate model (DES) by Harold Klaucke	59
Height and lateral movement of the CG	60
Gravity and push-off force	61
Relation between forces and position	63
Skate height and push-off force	64
5. Forces working on the blade	66
Normal force	68
Lateral force	68
Normal force working on the blade	69
Lateral force also working on the blade	70
Result for the blade	72
Measurement results Eline van der Kruk: alternative presentation	73
6. The corner	78
Balance on the straight, thought experiment	78
Balance in the corner, thought experiment	79
Gravity and centrifugal force	80
Forces in balance	81
Several gliding angles at different speeds in the inner corner	82
Position of the centre of gravity	82
Height of the centre of gravity gliding a corner	83
Push-off in the corner	84
Push-off width in the corner	84
Low centre of gravity in the corner	85
Grip in the corner	87
Non perpendicular sharpening	89
Practice	90
Air resistance and ice friction	92
Centre of gravity and centre of push-off pressure in a corner without loss of energy	94
Centre of gravity and centre of push-off pressure in a corner with loss of energy	96
Segmented circle push-off	98
Tangential component in a corner a_t	99
Track of the centre of gravity and the centre of push-off pressure	100
Hypothetical approach of the corner	102

7. Load simulations	104
Forward and backwards displacement of the CG	105
Centre of gravity before or behind the centre of pressure	110
Distribution of push-off force	110
8. Deflection	114
Lateral deflection measurement	116
Measurement summary	117
Deflection during the stroke	118
Combination of measurement results	119
Elasticity and strength of the material used	121
Stress-strain diagram	121
Elastic modulus	124
Appendix A	126
Principle of the rocker gauge	126
Appendix B	132
Approximation of the circle equation	132
Error checking	134
Appendix C	135
Sharpening perpendicular	135
Appendix D	138
Position, speed and acceleration in a corner at uniform angular speed	138
Centripetal acceleration in a corner at uniform angular speed	140
References	143
The authors skate curriculum vitae	144