

# DIN EN 13107:2015-09 (E)

## Safety requirements for cableway installations designed to carry persons - Civil engineering works

---

Contents		Page
Foreword .....		5
1 Scope .....		8
2 Normative references .....		8
3 Terms and definitions .....		9
4 Units and symbols .....		9
5 General requirements .....		10
5.1 Application of this standard .....		10
5.2 Safety principles .....		10
5.3 Safety analysis .....		10
5.3.1 Reliability differentiation .....		10
5.3.2 Design situations .....		10
5.3.3 Design working life .....		10
5.3.4 Durability .....		10
6 Combinations of actions and safety measures .....		11
6.1 Combinations of actions .....		11
6.2 Safety measures .....		11
7 Actions and environmental influences .....		11
7.1 General .....		11
7.1.1 Principal classifications .....		11
7.1.2 Characteristic and representative values of actions .....		12
7.1.3 Environmental influences .....		12
7.2 Actions for aerial ropeways .....		12
7.2.1 General .....		12
7.2.2 Permanent actions .....		13
7.2.3 Variable actions .....		13
7.2.4 Accidental actions .....		17
7.2.5 Other actions and effects .....		19
7.3 Actions for funicular railways .....		19
7.3.1 General .....		19
7.3.2 Permanent actions .....		19
7.3.3 Variable actions .....		20
7.3.4 Accidental actions .....		22
7.3.5 Other actions and effects .....		24
7.4 Actions for ski-tows .....		24
7.4.1 General .....		24
7.4.2 Permanent actions .....		24
7.4.3 Variable actions .....		25
7.4.4 Accidental actions .....		27
7.4.5 Other actions and effects .....		29
8 Limit states .....		29
8.1 General .....		29
8.2 Limit state design .....		30

<b>9</b>	<b>Verifications .....</b>	<b>30</b>
9.1	General .....	30
9.2	Design values of actions .....	30
9.3	Verification of ultimate limit state .....	31
9.3.1	General .....	31
9.3.2	Verification of static equilibrium and strength (ground, components) .....	31
9.3.3	Combination of actions .....	32
9.3.4	Partial factors .....	33
9.4	Verification of serviceability limit state .....	34
9.4.1	General .....	34
9.4.2	Verification of serviceability limit states .....	34
9.4.3	Combination of actions .....	34
9.4.4	Deformations .....	35
9.4.5	Rotations .....	35
9.4.6	Vibrations of work platforms .....	36
9.5	Verification of fatigue .....	37
9.5.1	General .....	37
9.5.2	Fatigue loading .....	38
9.5.3	Fatigue loads for continuous circulation .....	38
9.5.4	Fatigue loads for monocable group ropeways and group aerial ropeways .....	39
9.5.5	Fatigue loads for double cableway installations .....	39
9.5.6	Fatigue loads for funicular railways .....	40
9.5.7	Fatigue resistance .....	40
9.5.8	Verification .....	40
9.6	Fire design verifications .....	41
<b>10</b>	<b>Type of construction .....</b>	<b>42</b>
10.1	Concrete structures .....	42
10.1.1	General .....	42
10.1.2	Foundations .....	42
10.1.3	Bridges of funicular railways and ski-tows .....	42
10.1.4	Structures subjected to fatigue .....	42
10.2	Steel structures .....	42
10.2.1	General .....	42
10.2.2	Steel grade and quality .....	43
10.2.3	Bridges of funicular railways and ski-tows .....	43
10.2.4	Structures subjected to fatigue .....	43
10.3	Composite steel and concrete structures .....	43
10.4	Timber structures .....	43
10.5	Geotechnical construction works .....	44
10.6	Seismic design .....	44
10.7	Aluminium structures .....	44
10.7.1	Buildings .....	44
10.7.2	Structures subjected to fatigue .....	44
<b>11</b>	<b>Components .....</b>	<b>44</b>
11.1	Foundations - General .....	44
11.2	Spread foundations .....	44
11.2.1	Verification of ultimate limit state for spread foundations .....	44
11.2.2	Verification of the serviceability limit state for spread foundations .....	46
11.3	Deep foundations - anchors and piling .....	46
11.4	Railings, balustrades, and barriers .....	47
11.4.1	General .....	47
11.4.2	Railings in public areas .....	47
11.4.3	Railings in work areas .....	47
11.5	Connection between steel line support structure and foundation .....	48
11.6	Line structures of funicular railways .....	48
11.6.1	Track .....	48
11.6.2	Track infrastructure .....	48
11.6.3	Track superstructure .....	48
11.6.4	Bridges .....	49
11.6.5	Tunnels and galleries .....	49

11.7	Bridges for ski-tows .....	49
12	Protection of workers .....	49
12.1	General .....	49
12.2	Work platforms .....	49
12.3	Access to work platforms .....	50
12.4	Gangways for return stations .....	50
12.5	Rope lifting devices and roller batteries .....	50
12.6	Running rails for carriers .....	51
12.7	Provisions for load handling devices .....	51
12.8	Handling devices for drive elements .....	51
12.9	Anchor points for tensioning ropes .....	51
	<b>Annex A (normative) Documentation .....</b>	<b>52</b>
A.1	General .....	52
A.2	General data .....	52
A.3	Technical documents .....	52
A.3.1	General .....	52
A.3.2	Utilization plan (requirements specification) .....	52
A.3.3	Project principles / Specifications / Technical Report .....	53
A.4	Verifications and calculations .....	53
A.4.1	Verifications .....	53
A.4.2	Calculations .....	53
A.4.3	Plans .....	54
A.5	Records .....	54
	<b>Annex B (informative) Extracts from the EN 1990:2002 .....</b>	<b>55</b>
B.1	General .....	55
B.2	Terms and definitions .....	55
B.3	Safety principles (essential requirements) .....	57
B.4	Safety analysis .....	57
B.4.1	Reliability differentiation [EN 1990:2002, 2.2] .....	57
B.4.2	Durability [EN 1990:2002, 2.4] .....	58
B.4.3	Design situations [EN 1990:2002, 3.2] .....	59
B.5	Safety measures .....	59
B.5.1	Assumptions [EN 1990:2002, 1.3] .....	59
B.5.2	Further safety measures .....	59
B.5.3	Quality management [EN 1990:2002, 2.5] .....	60
B.6	Fundamentals for limit state design .....	60
B.6.1	General [EN 1990:2002, 3.1] .....	60
B.6.2	Ultimate limit states [EN 1990:2002, 3.3] .....	60
B.6.3	Serviceability limit states [EN 1990:2002, 3.4] .....	61
	<b>Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of EU Directive 2000/9/EC relative to cableway installations designed to carry persons .....</b>	<b>62</b>
	<b>Bibliography .....</b>	<b>65</b>