

INDEX

Abutments, staking 5-4

Accuracies and specifications, traverse 7-12

Accuracy of surveys 1-1

Arc and chord:

Accuracy 3-9

Purpose 3-9

Arc definition, degree of curve 3-4

A.R.E.A 10-chord spiral 3-25

Area computations:

Counting-squares 4-4

Double-meridian-distance 4-6

Geometric 4-4

Planimeter 4-8

Stripper 4-4

Azimuth adjustment 7-7

Azimuth-bearing angle 7-8

Azimuth corrections 7-7

Battens, sewer alignment 6-5

Batter boards:

Building construction surveying 6-2

Sewer alignment 6-5

“Blue-tops” 2-6

Borrow pit layout 4-11

Borrow pits 4-10

Bridge surveying:

- Abutments 5-4
- Foundation investigation 5-2
- Piers 5-6
- Piles 5-7
- Reconnaissance 5-1
 - Access roads 5-1
 - Bridge length 5-1
 - Flow character 5-2
 - Profile 5-2
 - River banks 5-2
 - River bottom character 5-2
 - Use of local materials 5-2
- Soundings 5-2
- Wing walls 5-5

Building construction surveying:

- Batter boards 6-2
- Interior transfer of line and grade 6-4
- Layout 6-2
- Sewer lines 6-4

Calculating a spiral 3-28—3-31

Centerline profile 2-5

Centerline running, road surveys 2-4—2-5

Central angle 3-3

Chief of party, traverse 7-4

Chord definition, degree of curve 3-4—3-5

Chord length 3-5, 3-10

Closed traverse 7-2

Common excavation 4-9

Compound curvature, point of 3-17

Compound curves 3-17—3-20

- Computations 3-20
- Staking 3-20

Connecting diverging tangents 3-23—3-24

Connecting parallel tangents 3-22—3-23

Construction layout surveys 2-5

Coordinate computations 7-10

Culvert layout 2-10

Curves:

Compound 3-1, 3-17—3-20

Elements 3-2—3-4

Formulas 3-6

Horizontal 3-1—3-2

Layout 3-9—3-17

Length 3-3

Reverse 3-17—3-24

Sag 3-35—3-36

Simple 3-1—3-11

Spiral 3-2, 3-24—3-35

Stations 3-1, 3-2

Summit 3-35—3-36

Tables 3-9, 3-11

Through fixed point 3-16—3-17

Vertical 3-35—3-39

Vertical parabolic 3-35

Curvature:

Degree of 3-4—3-5

Point of 3-2

Radius 3-2, 3-4—3-5

Deflection angles 3-5, 3-7

Deflection angles, spiral curve 3-33—3-34

Diverging tangents, connecting 3-23—3-24

Double-meridian-distance method 4-6

Drainage 2-2

Earthwork computations:

Borrow pits 4-10

Counting squares 4-4

Double-meridian-distance 4-6

Geometric 4-4

Importance

Planimeter 4-8

Stripper 4-4

Elevation of sewer grade 6-5

Excavated material 4-9

Exaggerated vertical scale 4-3

External distance 3-3

Field location of compound curve 3-20

Field notes (see appendix B):

Degree of precision 1-1

Recording procedure 1-2

Spirals 3-35

Traverse 7-4, 7-13

Final location survey 2-4

First difference, parabolic curve 3-37

Flow line, sewer 6-5

Formulas:

Compound curve 3-18

Deflection angles 3-6

Simple curve 3-6

Spiral curve 3-27—3-28

Vertical curve 3-36

Forward station 7-3

Full station 3-2

Geometric method 4-4

Grade:

Pole 6-5

Rod 2-6

Sewer 6-5

Stakes 2-6

High point of vertical curve 3-38

Highway spiral lengths 3-28

Inaccessible PC 3-13

Index-4

Inaccessible PI 3-12

Inaccessible PT 3-14—3-15

Instrument operator, traverse 7-4

Instrument setup on a spiral 3-30

Interior transfer of line and grade 6-4

Intermediate setup 3-10

Intersecting angle 3-2

Layout surveys (see Road surveying) 2-5

Length of chords 3-5

Level party 2-4

Leveling:
 Cross section 2-5
 Profile 2-5

Long chord (LC) 3-3

Loose rock, excavation of 4-9

Low point of vertical curve 3-38

Measurements, survey 1-1

Metric system 1-2

Middle ordinate (M) 3-3

Obstacles to curve location:
 Curve through fixed point 3-16
 Inaccessible PC 3-13
 Inaccessible PI 3-12
 Inaccessible PT 3-14—3-15
 Obstacle on curve 3-15
 Terrain restrictions 3-12

Occupied station 7-3

Open traverse 7-2

Organization of traverse parties 7-4

Parabolic curve (see Vertical curve)

Parallel tangents, connecting 3-22—3-23

Piers, locating 5-6

Piles, locating 5-7

Pipe grade 6-6c

Plane table party, road surveying 2-4

Planimeter 4-8

Plus stations 3-2

Point:

Compound curvature 3-17

Curvature 3-2, 3-10

Intersection 3-2

Locating inaccessible 3-12—3-15

Reverse curvature 3-20

Tangency 3-2

Vertical intersection 3-36

Vertical tangency 3-35

Polar planimeter 4-8

Preliminary survey, road 2-3

Profile, centerline 2-5

Radius of curvature 3-2, 3-4—3-5

Railroad spiral lengths 3-28

Rear station 7-3

Reconnaissance:

Access roads 5-1

Bridge length 5-1

Flow character 5-2

Profile 5-2

River bottom character 5-2

River banks 5-2

Index-6

Use of local materials 5-2

Reconnaissance survey (see Road surveying) 2-1

Recorder, traverse 7-4

Reference stakes 2-5

Reverse curve:

Connecting diverging tangents 3-23—3-24

Connecting parallel tangents 3-22—3-23

Point of 3-20

Road surveying:

Alignment markers 2-6

Centerline running 2-4

Cross sections 2-5

Culvert 2-10

Data collection 2-3

Design 2-1

Drainage 2-10

Grade stakes 2-6

Level party 2-4

Maps 2-3

Plane table 2-4

Preparation 2-1

Reference stakes 2-5

Roadway criteria 2-2

Slope stakes 2-7

Topographic party 2-4

Transit stadia 2-4

Traverse party 2-4

Roadway criteria 2-2

Rock excavation 4-9

Rodman, traverse 7-4

Sag curve (see Vertical curve)

Second difference, vertical curves 3-37

Sewer grade 6-6

Sewer lines, building construction 6-5

Short-radius curves 3-1

Side slope 4-3

Sighting cord, sewer alignment 6-5

Simple curves 3-1—3-11

Site layout:

Batter boards **6-2**

Building layout **6-2**

Utilities drainage **6-4**

Slope stakes 2-7

Solid rock excavation 4-9

Sounding, bridge surveying 5-2

Spiral calculations:

Chord length **3-30**

Circular arc **3-30**

Deflection angles **3-30—3-31**

Determining L_s **3-29**

Determining Δ **3-29**

Determining T_s **3-30**

Determining Z **3-30**

Spiral curves:

Elements **3-25—3-27**

Field notes **3-35**

Formulas **3-28**

Staking **3-34**

Intermediate setup **3-33**

Spiral lengths 3-28

Stakes:

Grade **2-6**

Reference **2-5**

Slope **2-7**

Staking spirals 3-34

Station interval 3-36

Index-8

Station, traverse:

Forward 7-3

Occupied 7-3

Rear 7-3

Stripper method 4-4**Subchord lengths, calculating 3-10**

Summit curve (see Vertical curve)

Superelevation 3-24**Survey:**

Accuracy 1-1

Road (see Road surveying)

Survey measurements 1-2**Survey objectives 1-1****Surveyor, construction 1-1****Tangency, point of 3-2****Tangents, connecting:**

Diverging 3-23—3-24

Parallel 3-22—3-23

Tangent distance 3-3**Tapeman, traverse 7-4****Terrain restrictions 3-12—3-16****Topographic party 2-4**

Transition spirals (see Spiral curves)

Transit-stadia party, road surveying 2-4**Trapezoidal method 4-4**

Traverse:

- Accuracy 7-12
- Closed 7-2
- Computations 7-5
- Coordinates 7-10
- Fieldwork 7-3
- Open 7-2
- Organizing party 7-4
- Starting control 7-1
- Types 7-2

Traverse party 2-4, 7-4 — 7-5

Traverse stations:

- Markers 7-4
- Selecting 7-4
- Signals 7-4

Utilities drainage 6-6

Vertical curves 3-35—3-39

- Function 3-35
- Sag 3-35—3-36
- Summit 3-35—3-36

Vertical offset, formula 3-37

Wing walls, staking 5-5