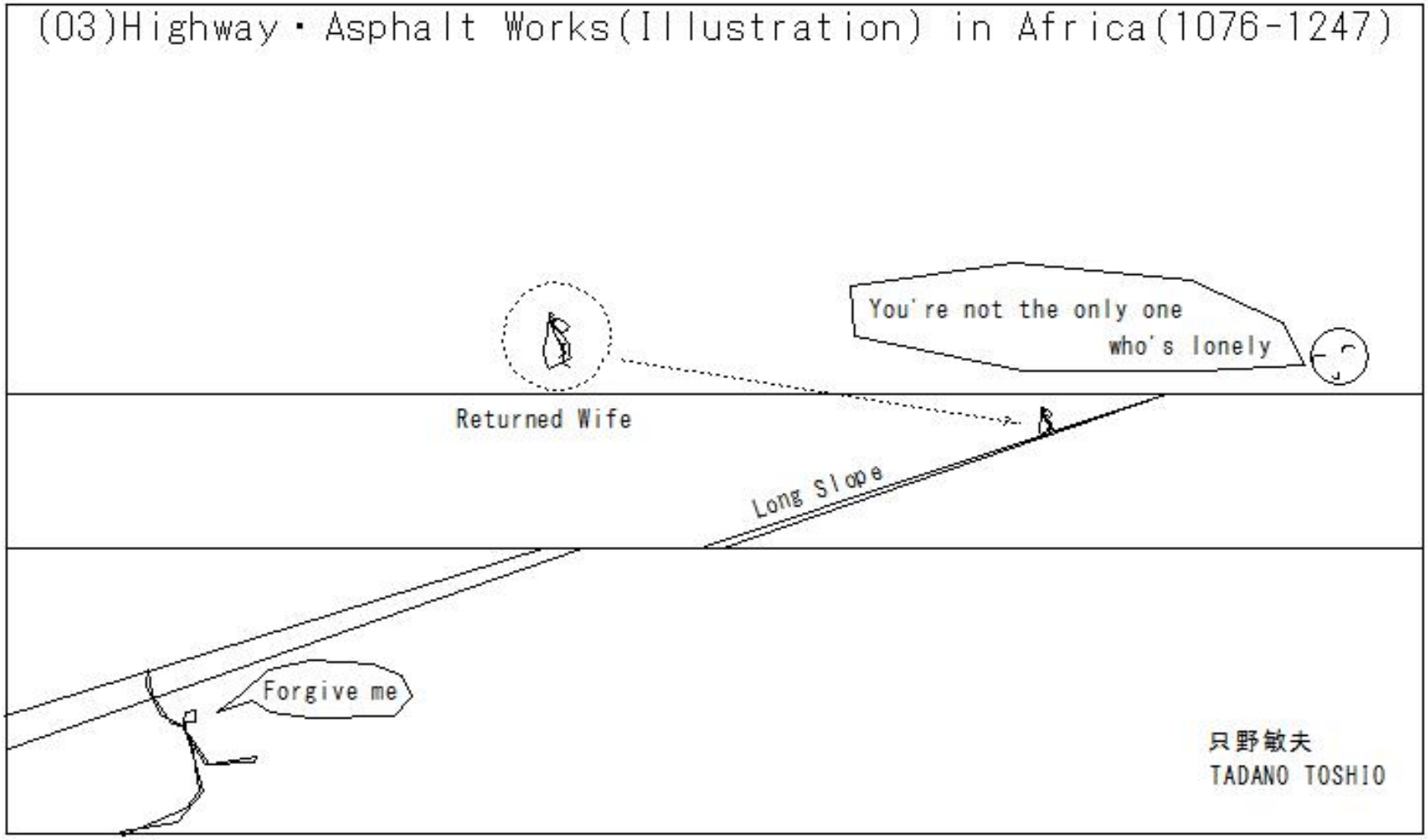
(03)Highway・Asphalt Works(Illustration) in Africa(1076-1247)



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只野敏夫
Tadano Toshio

(H1076)Curve radius	Curve radius
(H1077)Passenger car specifications table	Passenger car specifications table
(H1078)Passenger car specifications table	Passenger car specifications table
(H1079)Passenger car specifications table	Passenger car specifications table
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(H1081)Frequency of driving speed	Frequency of driving speed
(H1082)Truck speed-gradient diagram	Truck speed-gradient diagram
(H1083)Truck speed-gradient diagram	Truck speed-gradient diagram
(H1084)Truck speed-gradient diagram	Truck speed-gradient diagram
(H1085)Travel distance-travel speed diagram	Travel distance-travel speed diagram
(H1086)Traffic capacity - speed	Traffic capacity - speed
(H1087)Width-passing speed diagram	Width-passing speed diagram
(H1088)Width-passing speed diagram	Width-passing speed diagram
(H1089)Slow lane map	Slow lane map
(H1090)Sidewalk width - traffic volume map	Sidewalk width - traffic volume map
(H1091)Parking method diagram	Parking method diagram
(H1092)Parking method diagram	Parking method diagram
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(H1097) Curve radius - Super gradient	Curve radius - Super gradient
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(H1179) Angle measurement	Angle measurement
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(H1202) Overtaking sight distance	Overtaking sight distance
(H1203) Braking and stopping sight distance and minimum overtaking sight distance	Braking and stopping sight distance
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(H1206) Types and structures of pavement on farm roads	Types and structures of pavement
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(H1243) Incomplete cloverleaf-shaped interchange	interchange
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(H1247) mixing work on the way

mixing work on the way

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(H1083)Truck speed-gradient diagram	Truck speed-gradient diagram
(H1084)Truck speed-gradient diagram	Truck speed-gradient diagram
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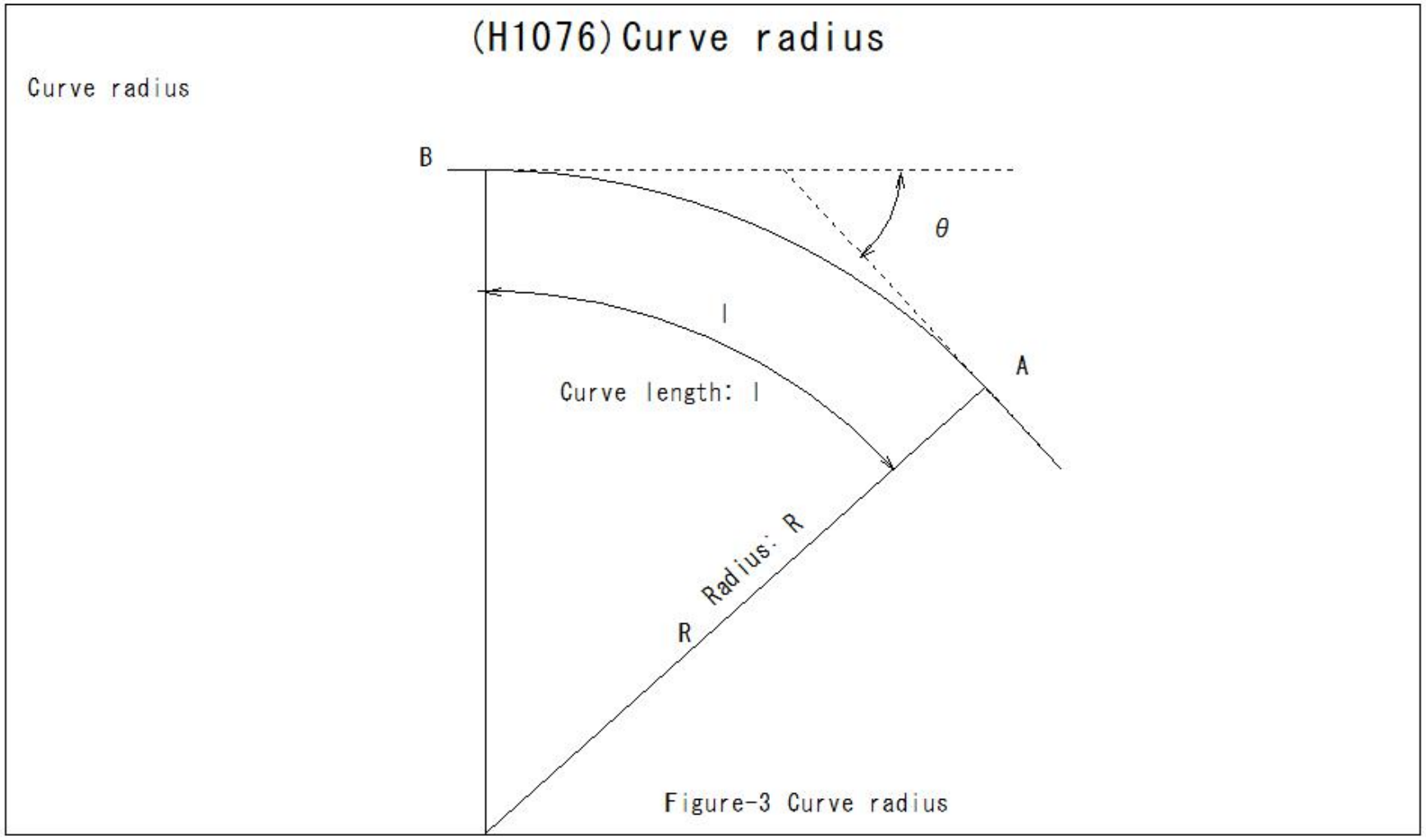
(H1088)Width-passing speed diagram

Width-passing speed diagram

(H1076)Curve radius

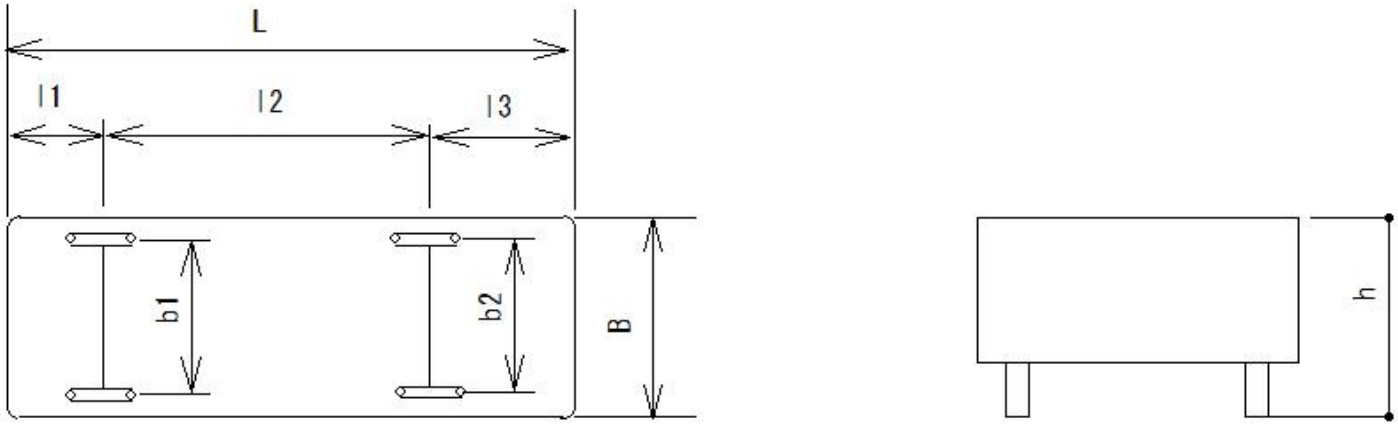


(H1077)Passenger car specifications table

(H1077)Passenger car specifications table

Design

Passenger car specifications table



Small car (Compact cars)

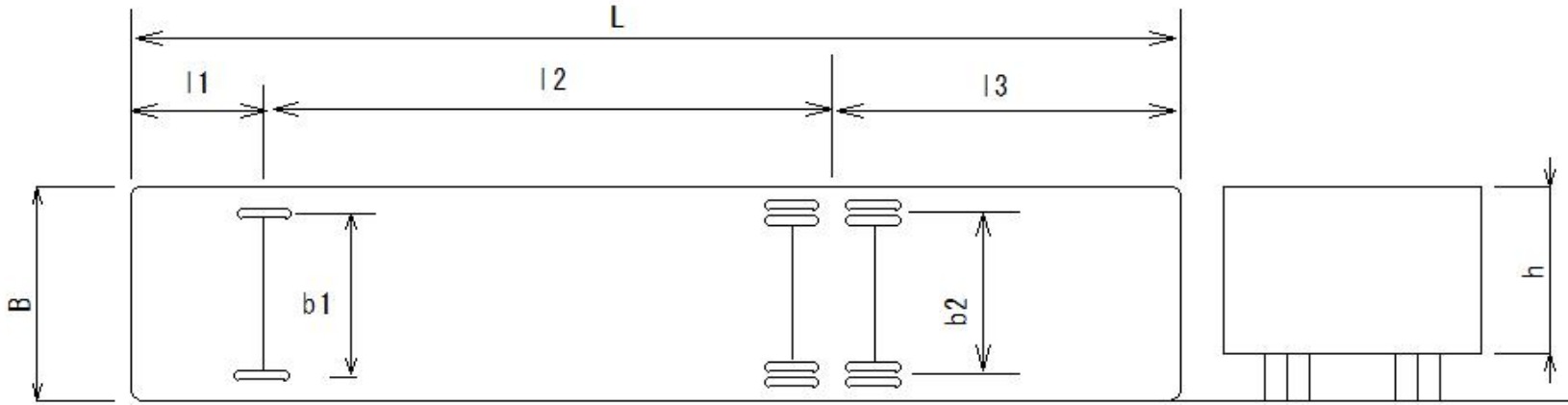
H520

(H1078)Passenger car specifications table

(H1078)Passenger car specifications table

Design

Passenger car specifications table



Truck and bus specifications

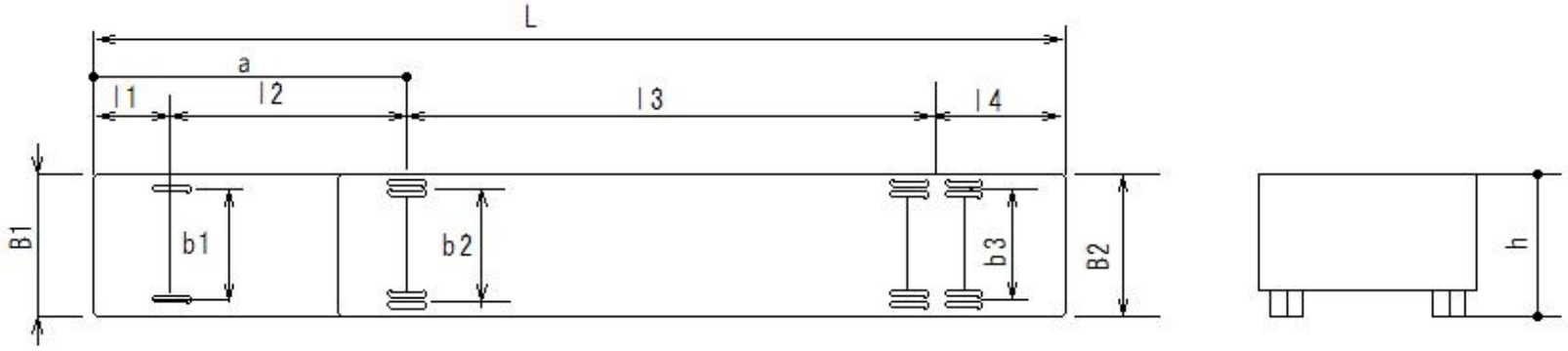
H521
H480

(H1079)Passenger car specifications table

(H1079)Passenger car specifications table

Design

Passenger car specifications table



Semi-trailer Articulated vehicle

H522
H481

(H1080)Frequency of driving speed

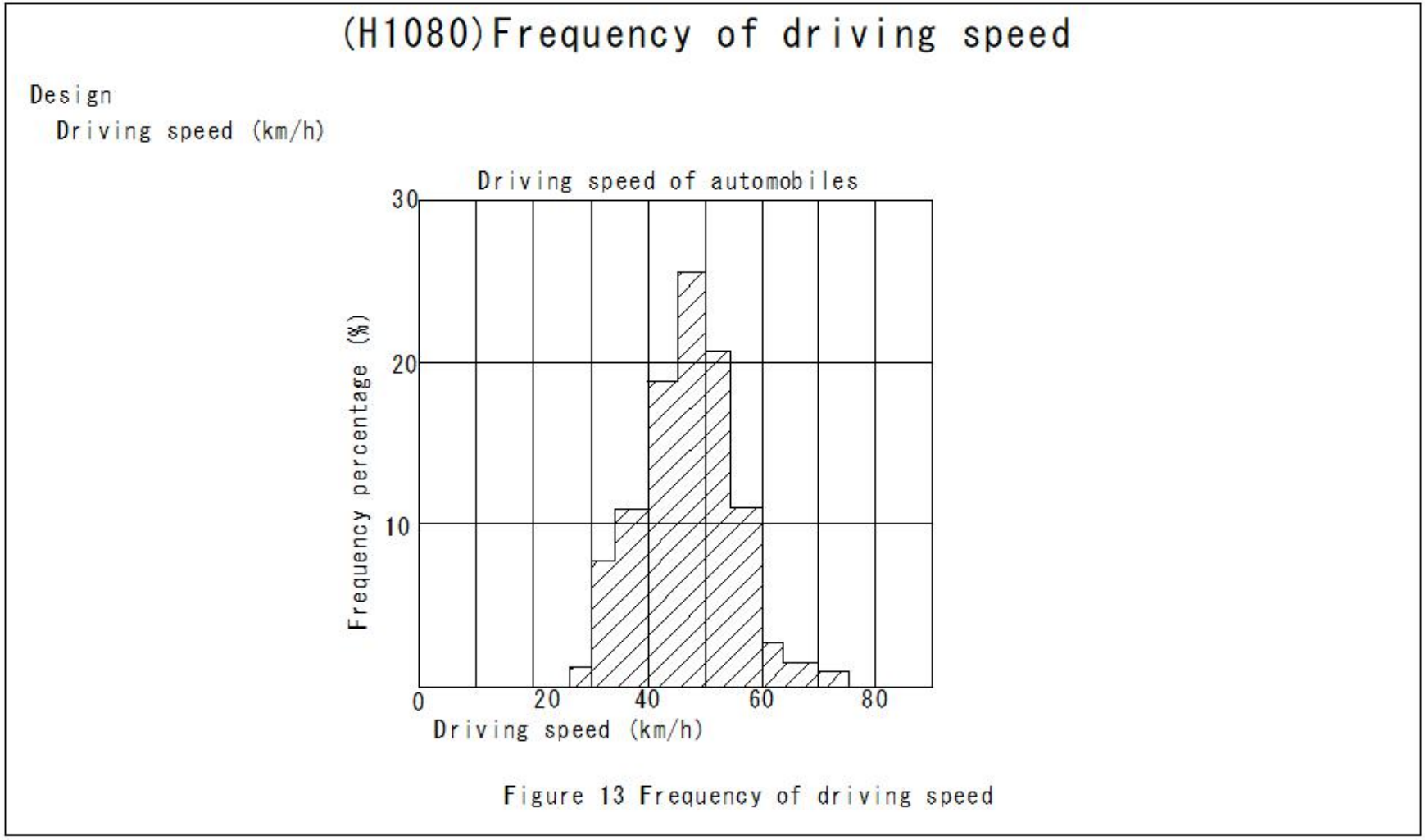


Figure 13 Frequency of driving speed

(H1081)Frequency of driving speed

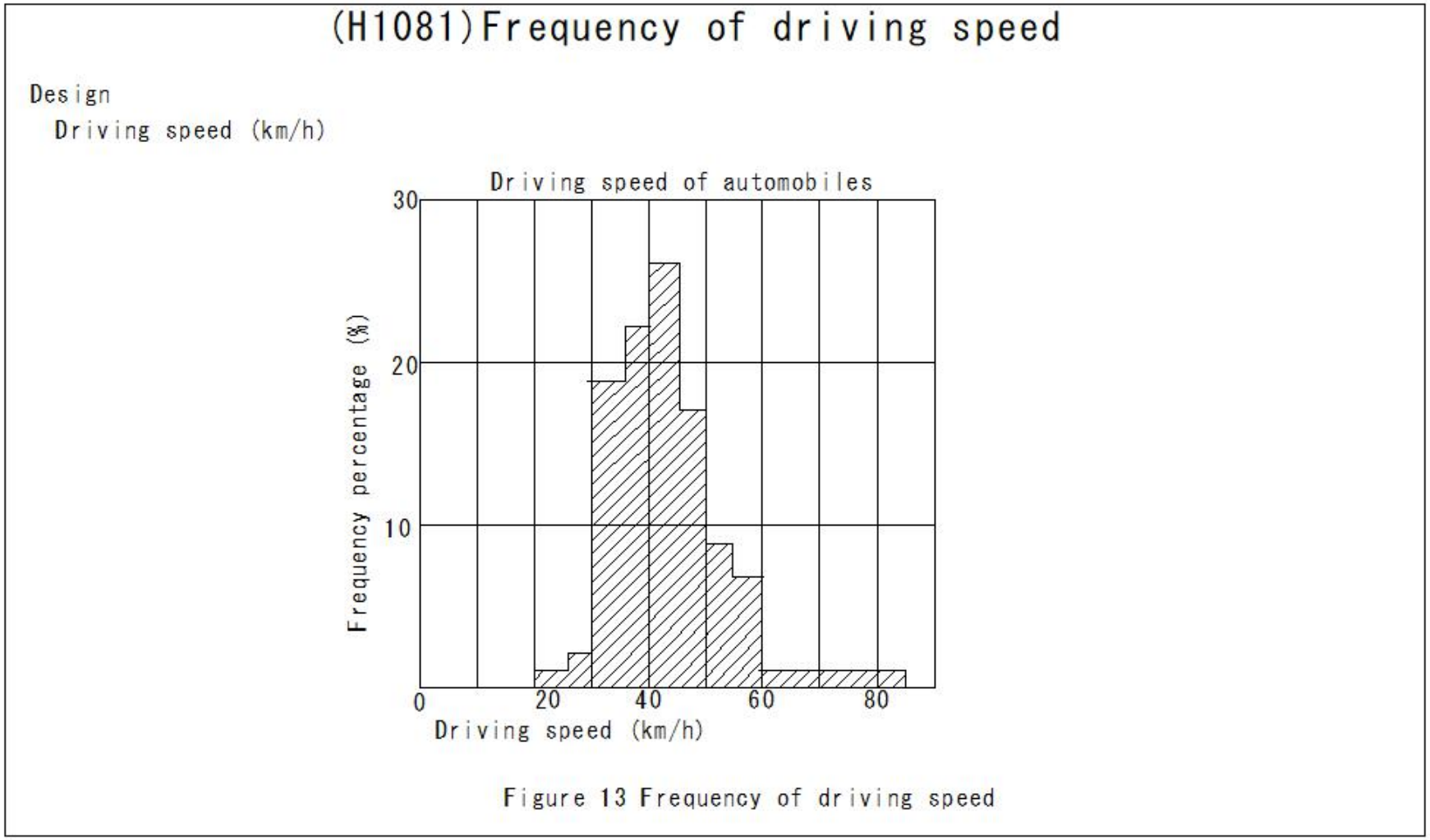


Figure 13 Frequency of driving speed

(H1082)Truck speed-gradient diagram

(H1082)Truck speed-gradient diagram

Design

Driving speed (km/h)

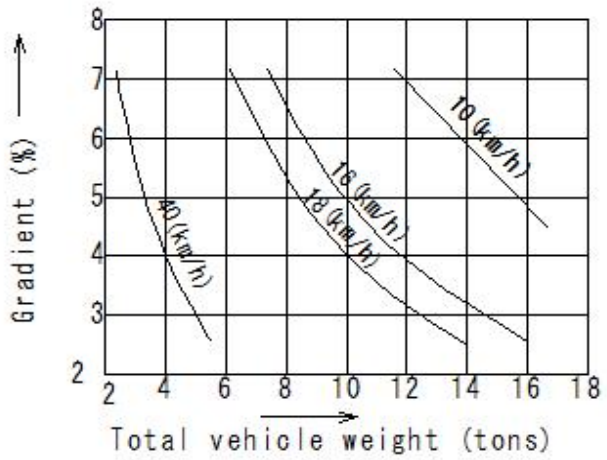


Figure 14 Truck speed-gradient diagram

(H1083)Truck speed-gradient diagram

(H1083)Truck speed-gradient diagram

Design

Driving speed (km/h)

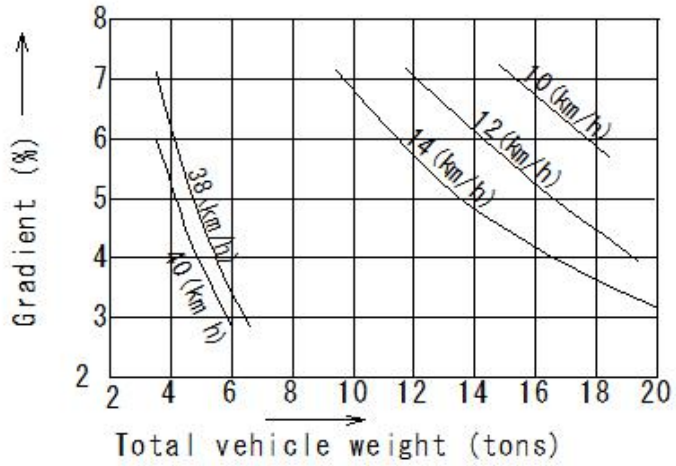


Figure 14 Truck speed-gradient diagram

(H1084)Truck speed-gradient diagram

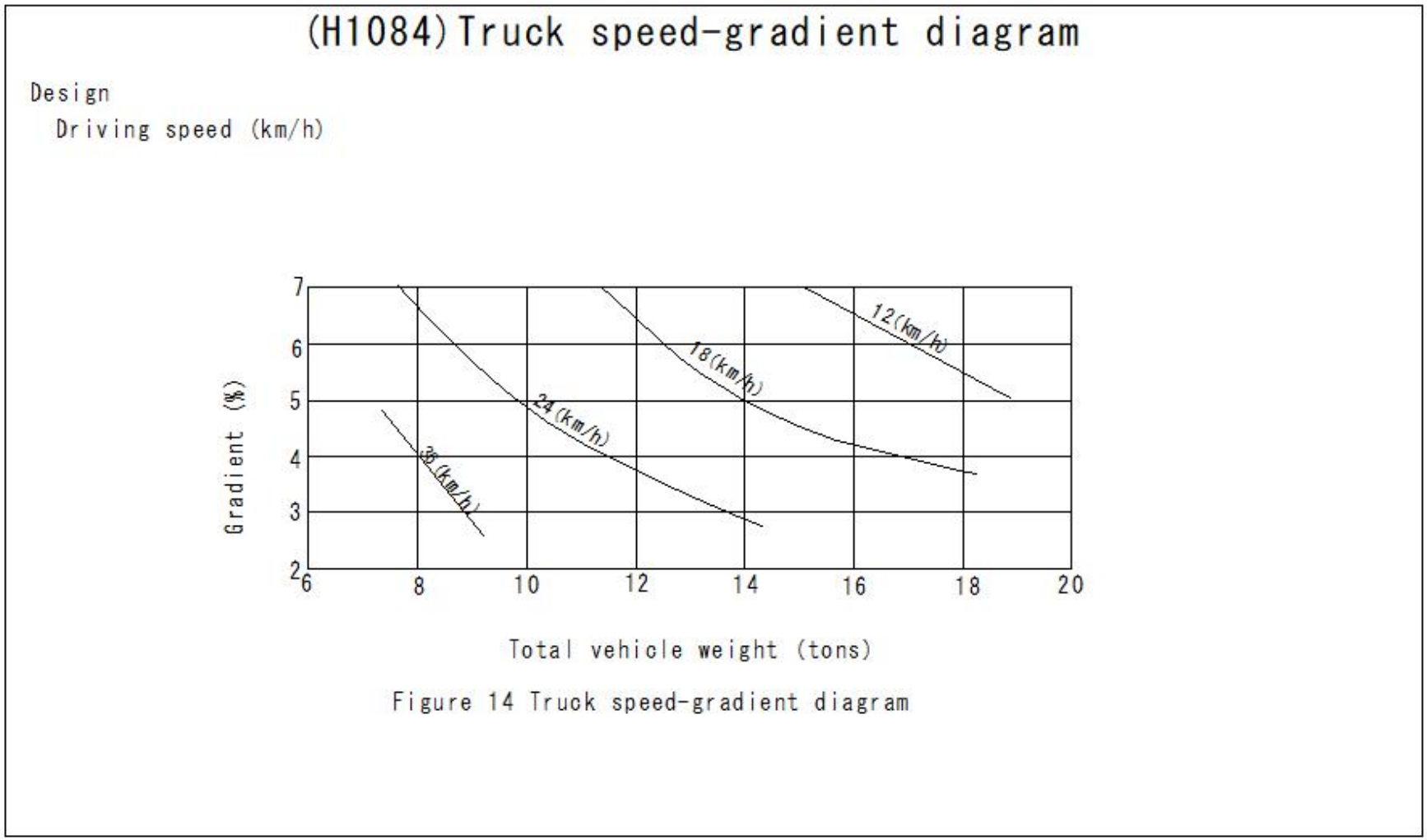


Figure 14 Truck speed-gradient diagram

(H1085)Travel distance-travel speed diagram

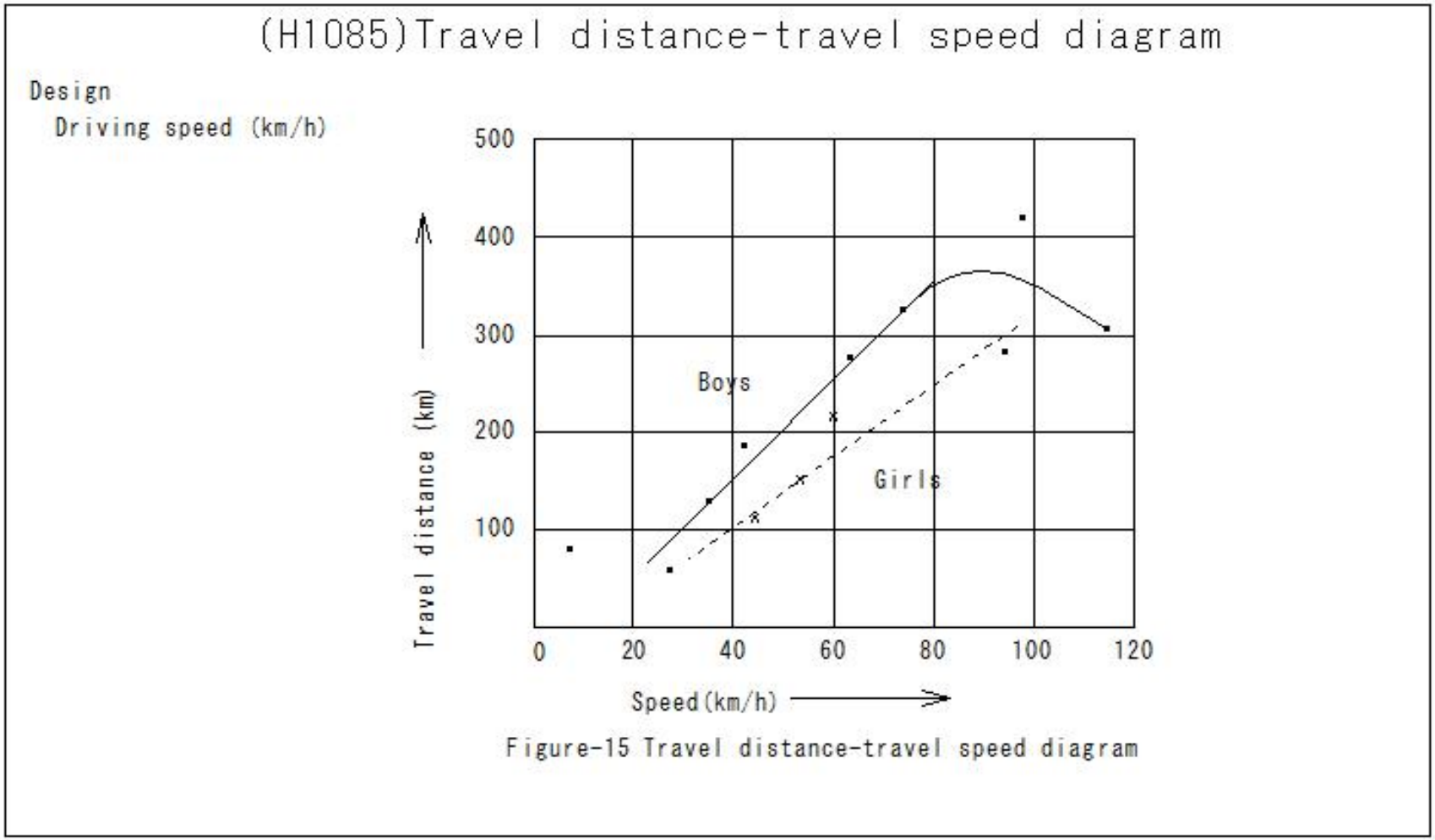


Figure-15 Travel distance-travel speed diagram

(H1086)Traffic capacity - speed

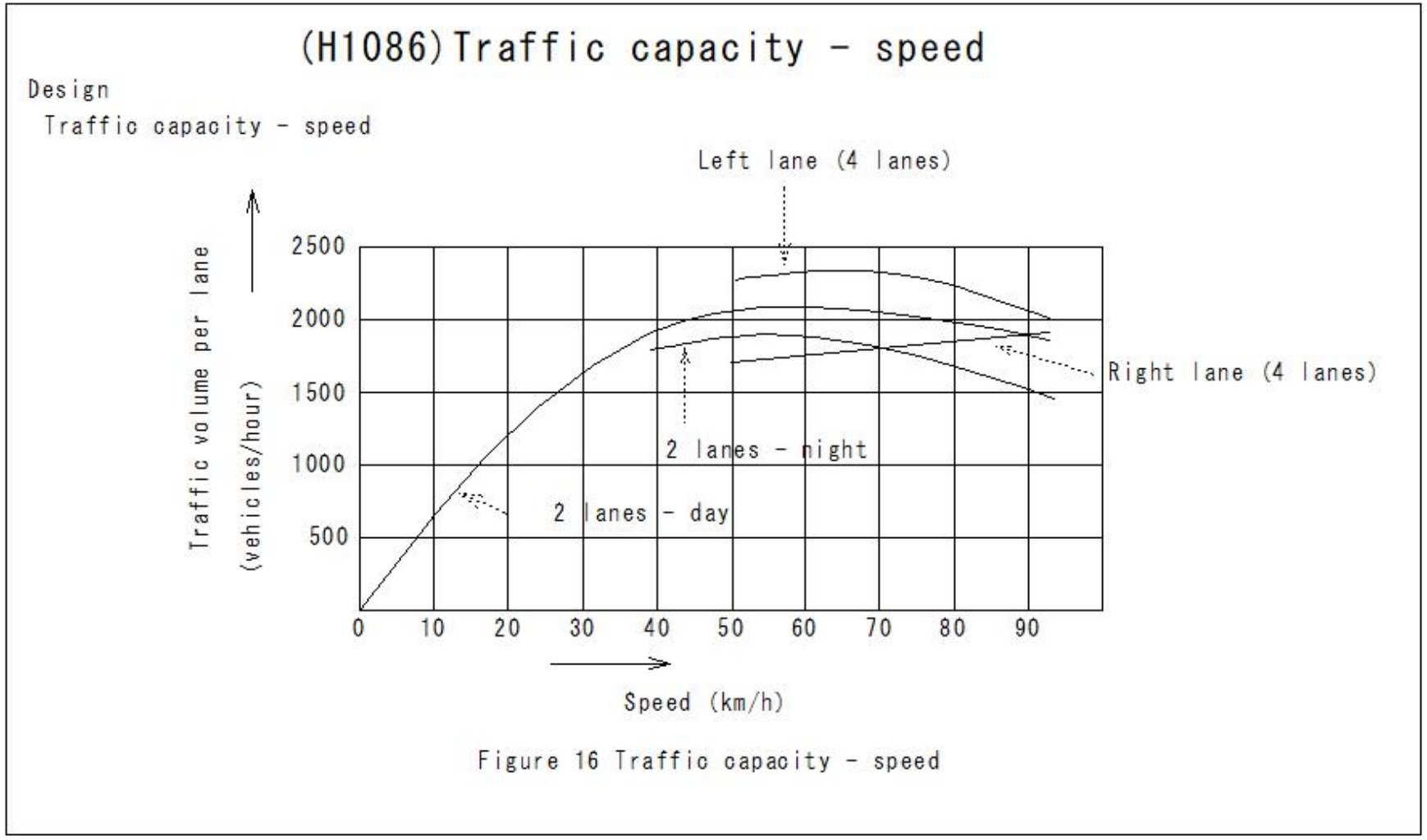


Figure 16 Traffic capacity - speed

(H1087)Width-passing speed diagram

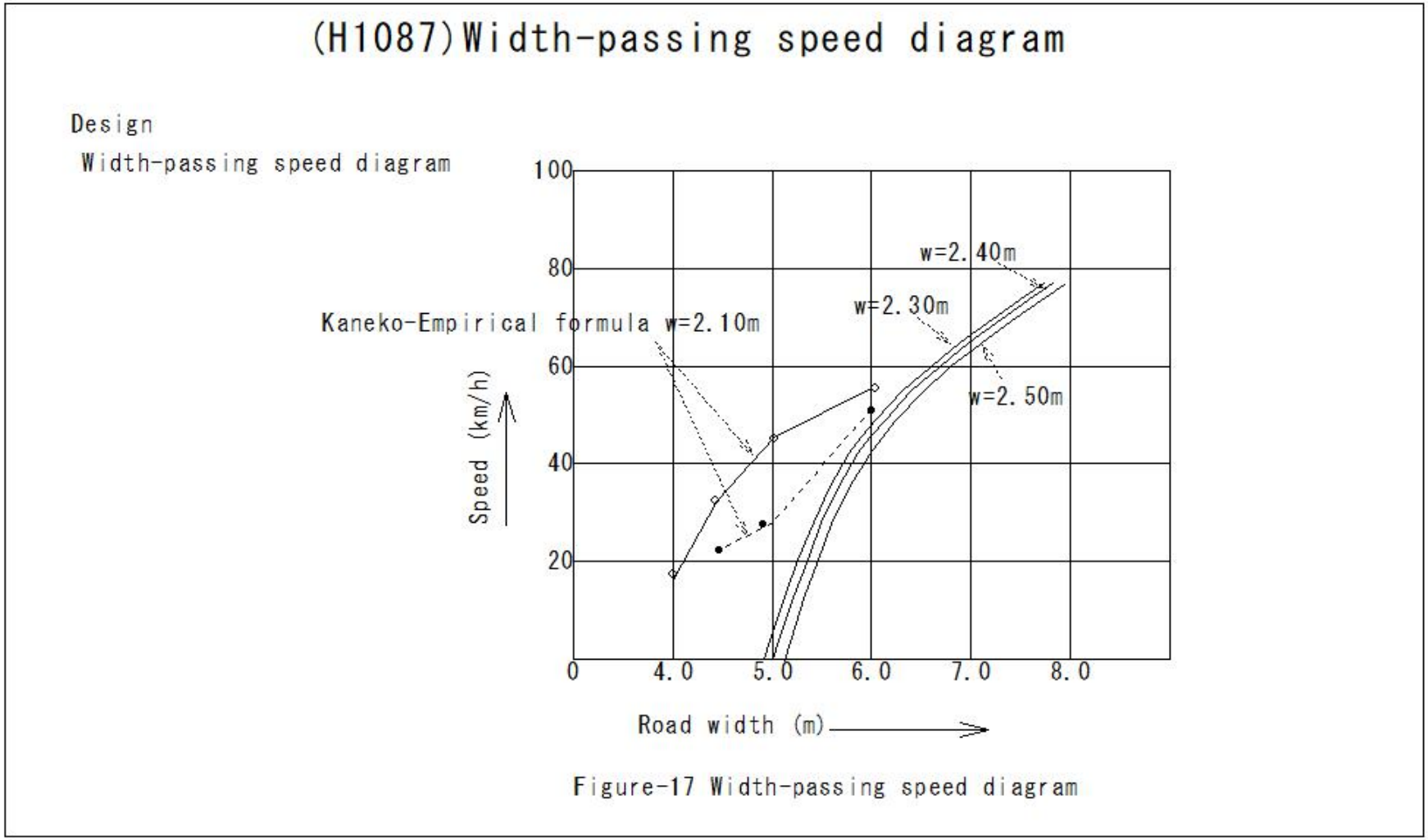


Figure-17 Width-passing speed diagram

(H1088)Width-passing speed diagram

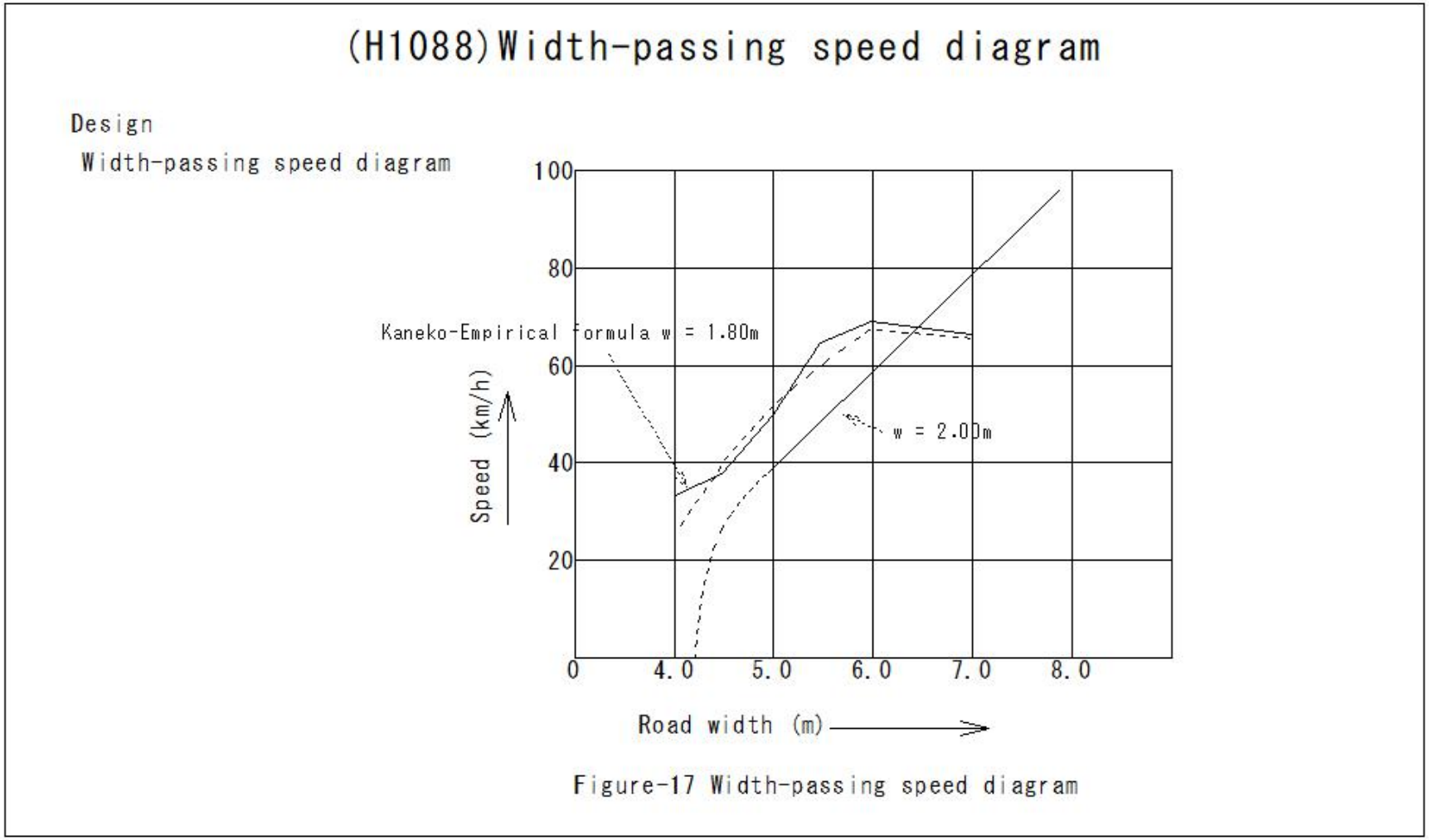


Figure-17 Width-passing speed diagram

(H1089)Slow lane map

Width

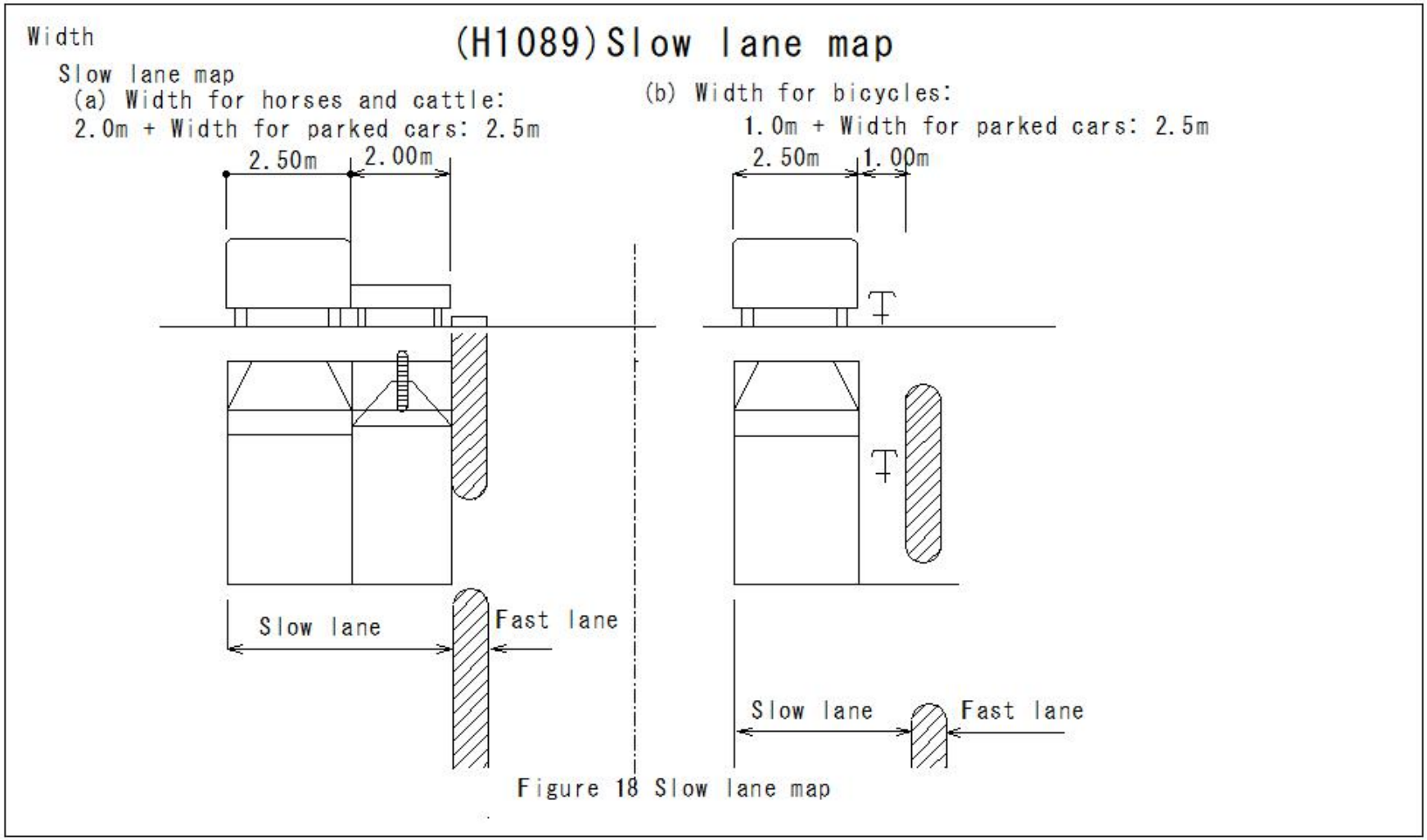


Figure 18 Slow lane map

(H1090)Sidewalk width - traffic volume map

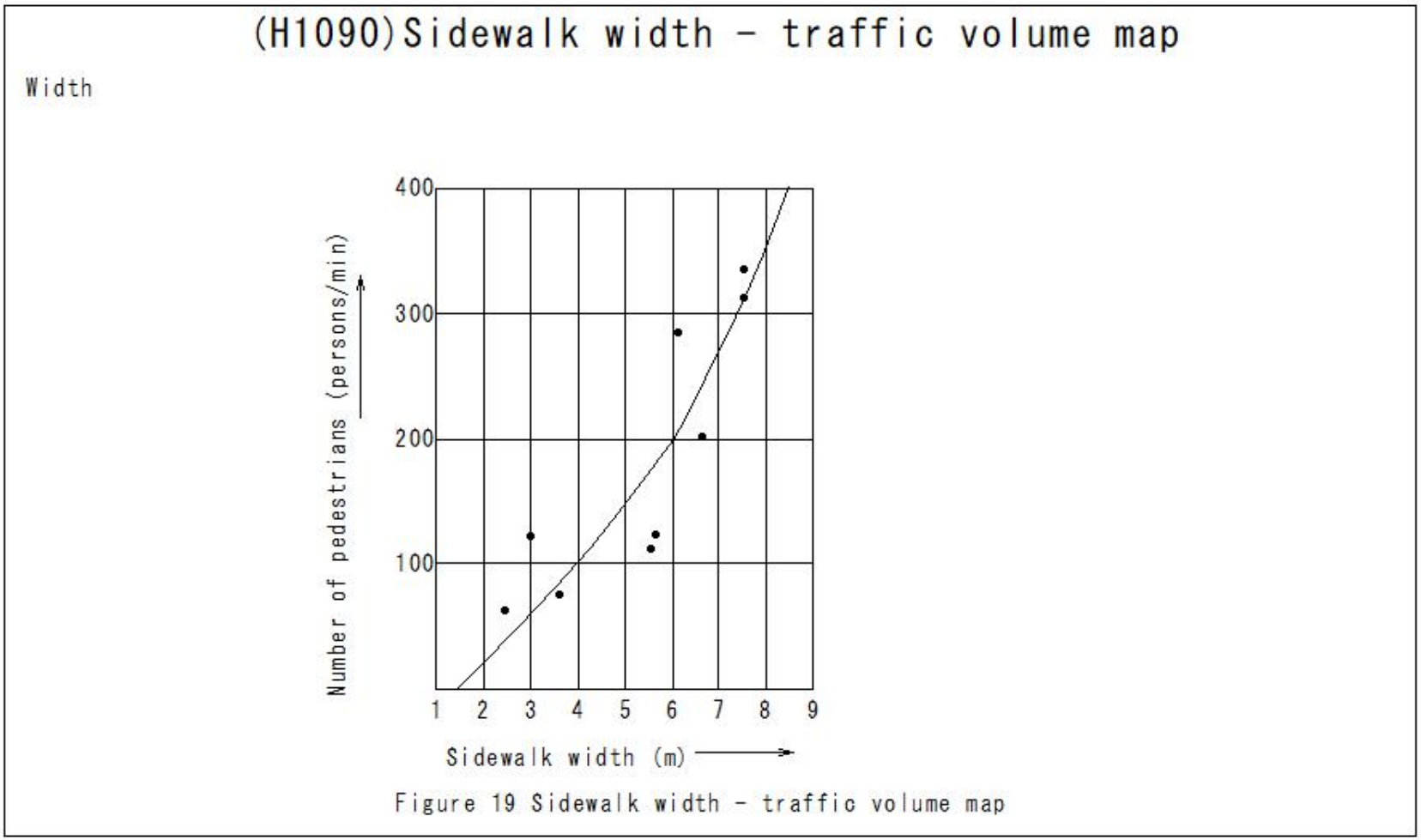
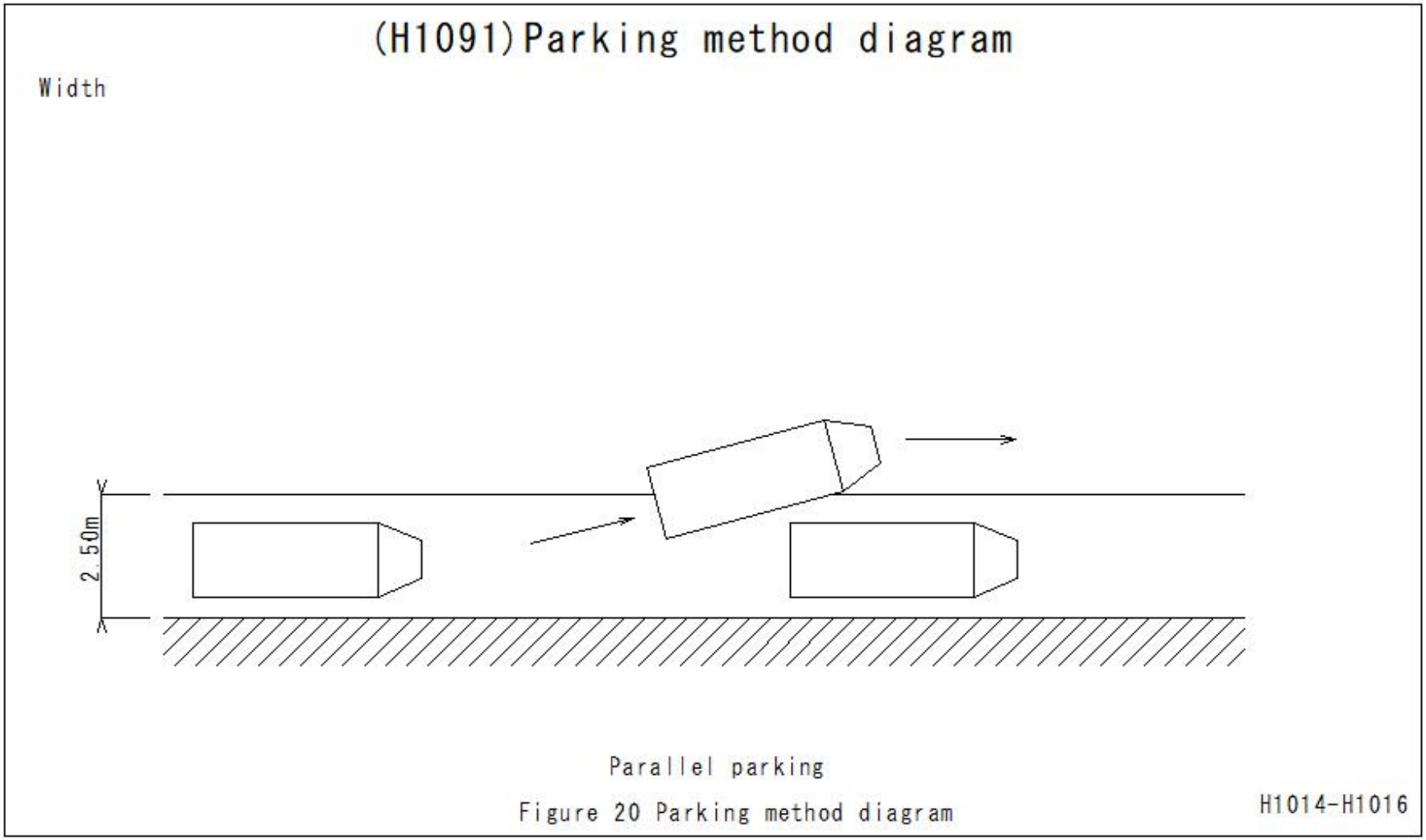
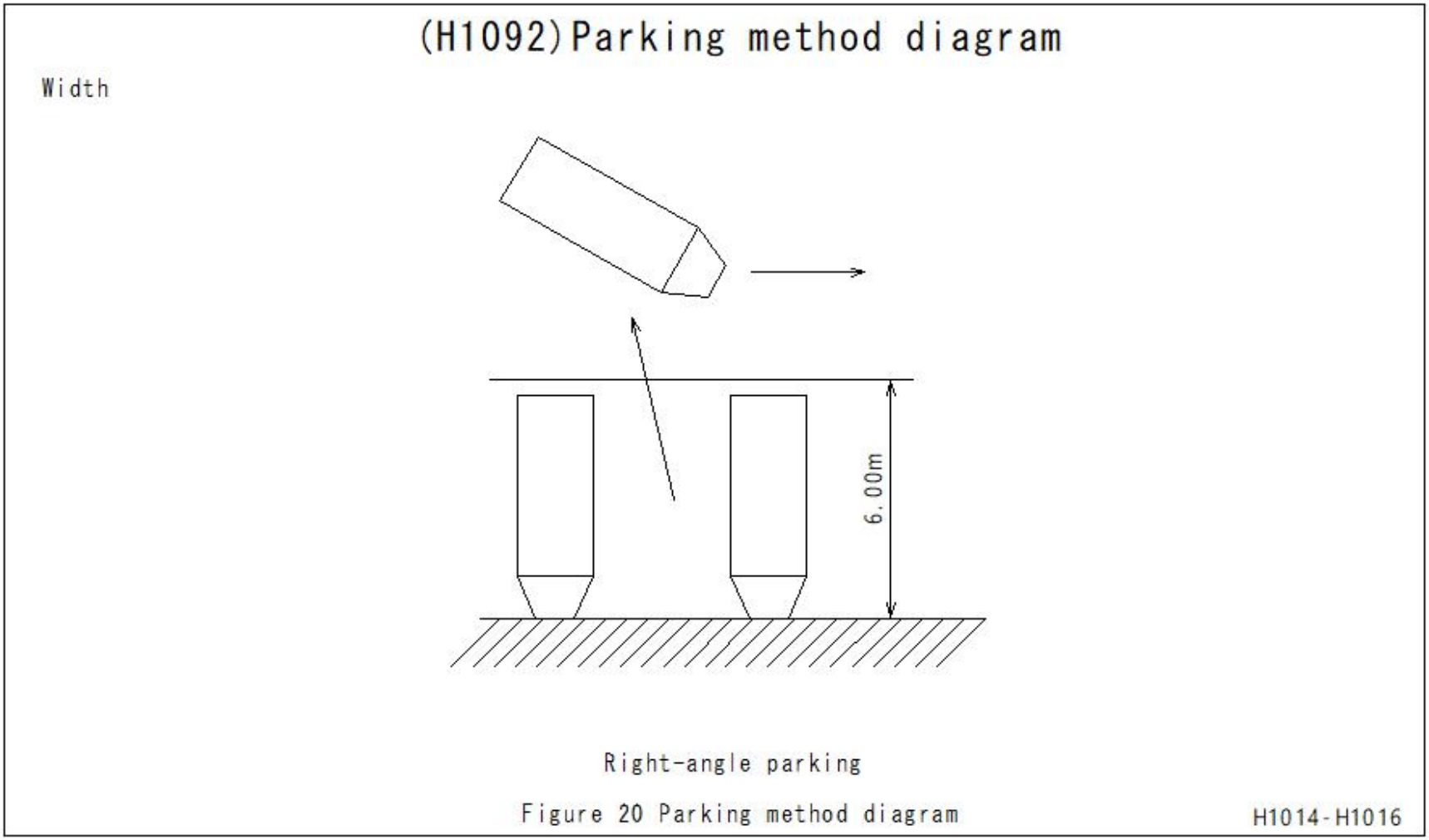


Figure 19 Sidewalk width - traffic volume map

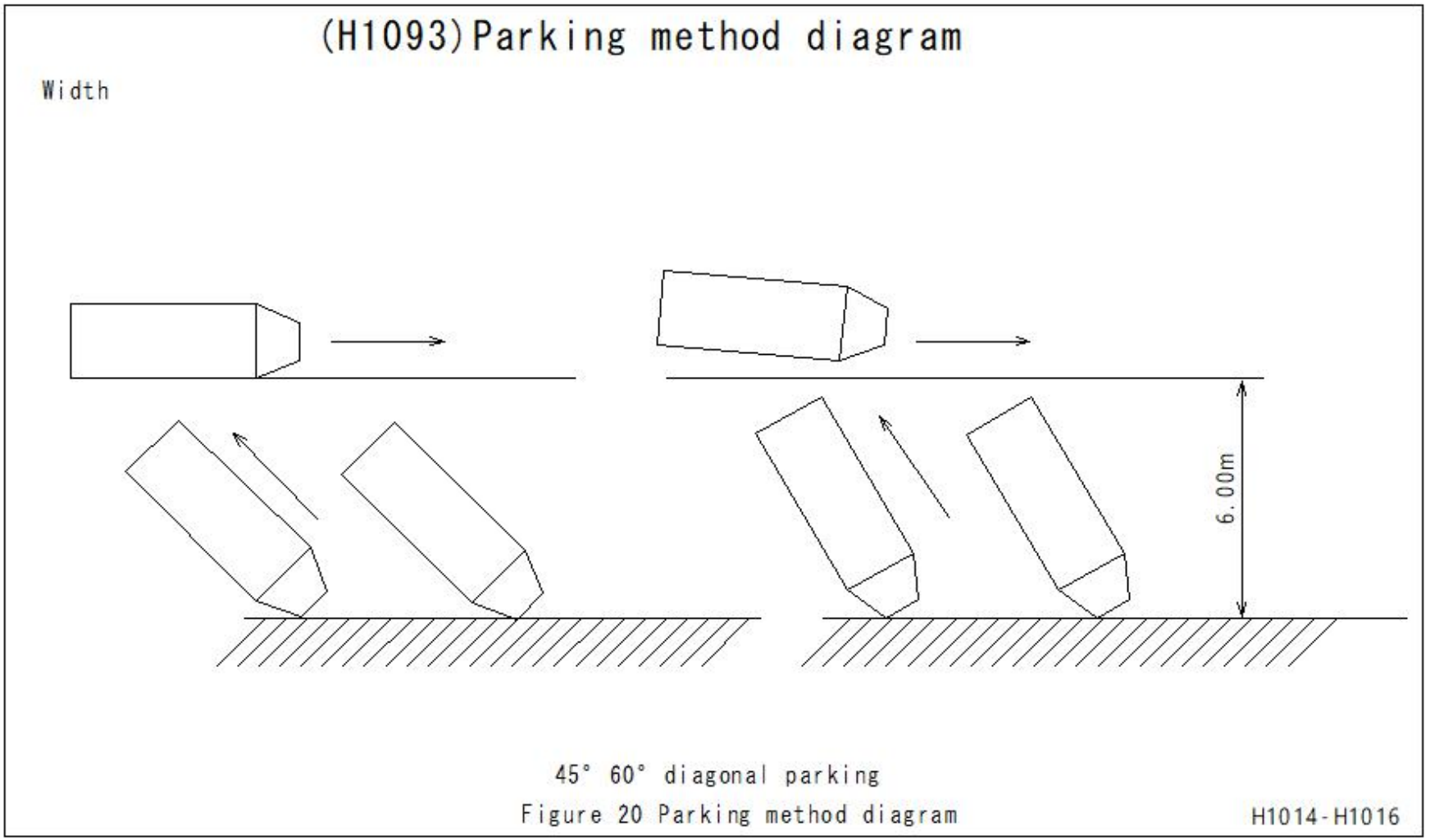
(H1091)Parking method diagram



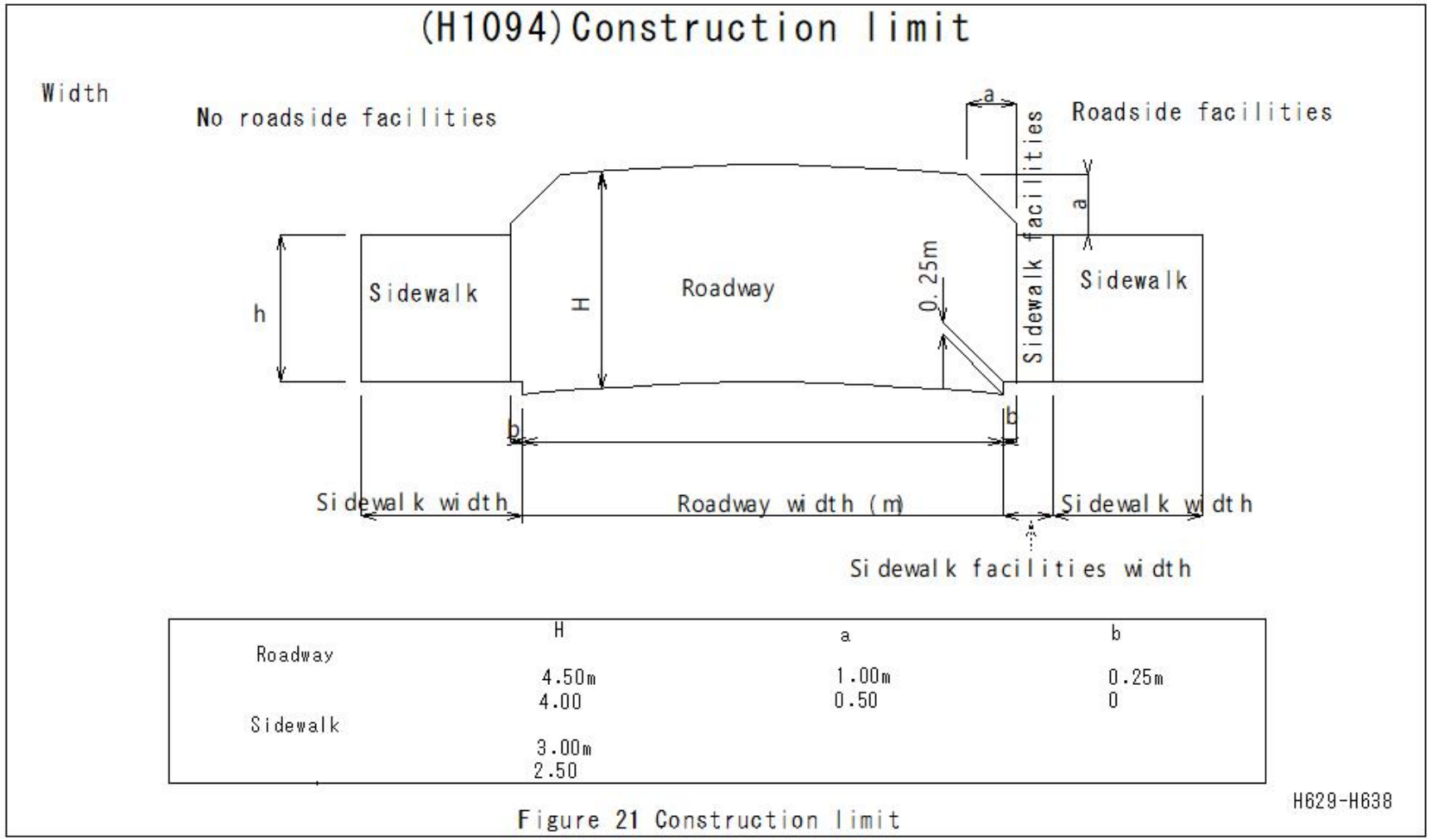
(H1092)Parking method diagram



(H1093)Parking method diagram



(H1094)Construction limit



	H	a	b
Roadway	4.50m	1.00m	0.25m
	4.00	0.50	0
Sidewalk	3.00m		
	2.50		

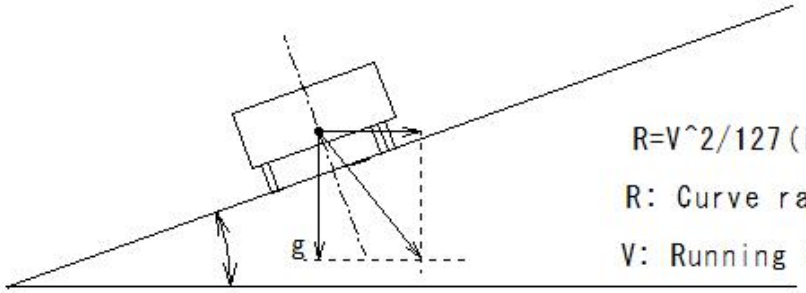
H629-H638

Figure 21 Construction limit

(H1095)Curved running diagram

(H1095)Curved running diagram

Linear



R=V^2/127(i+f)

R: Curve radius (m)

V: Running speed (km/h)

i: Single gradient (%)

f: Friction coefficient

Figure 22 Curved running diagram

H697-H706

(H1096) Degree markings for curves

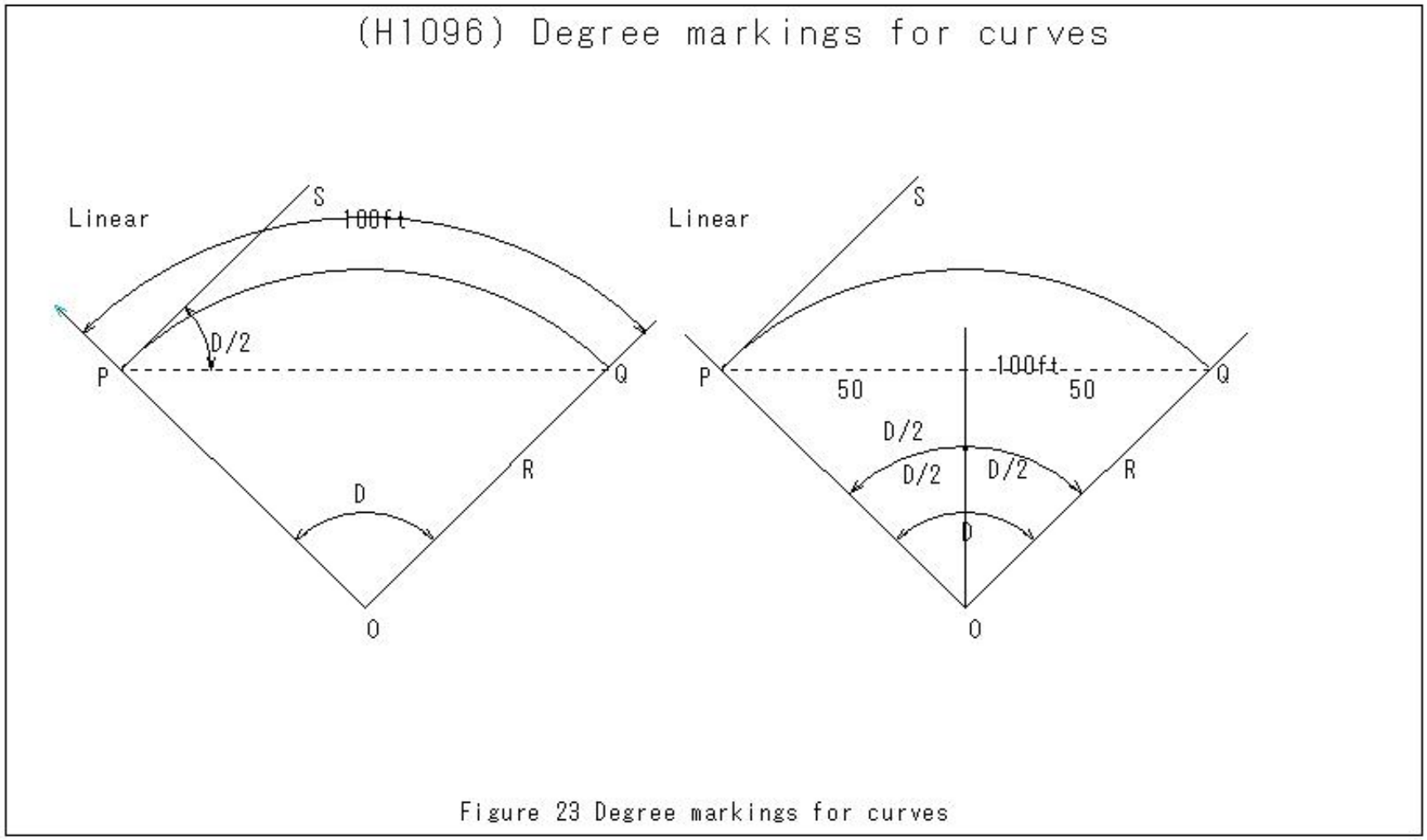


Figure 23 Degree markings for curves

(H1097) Curve radius - Super gradient

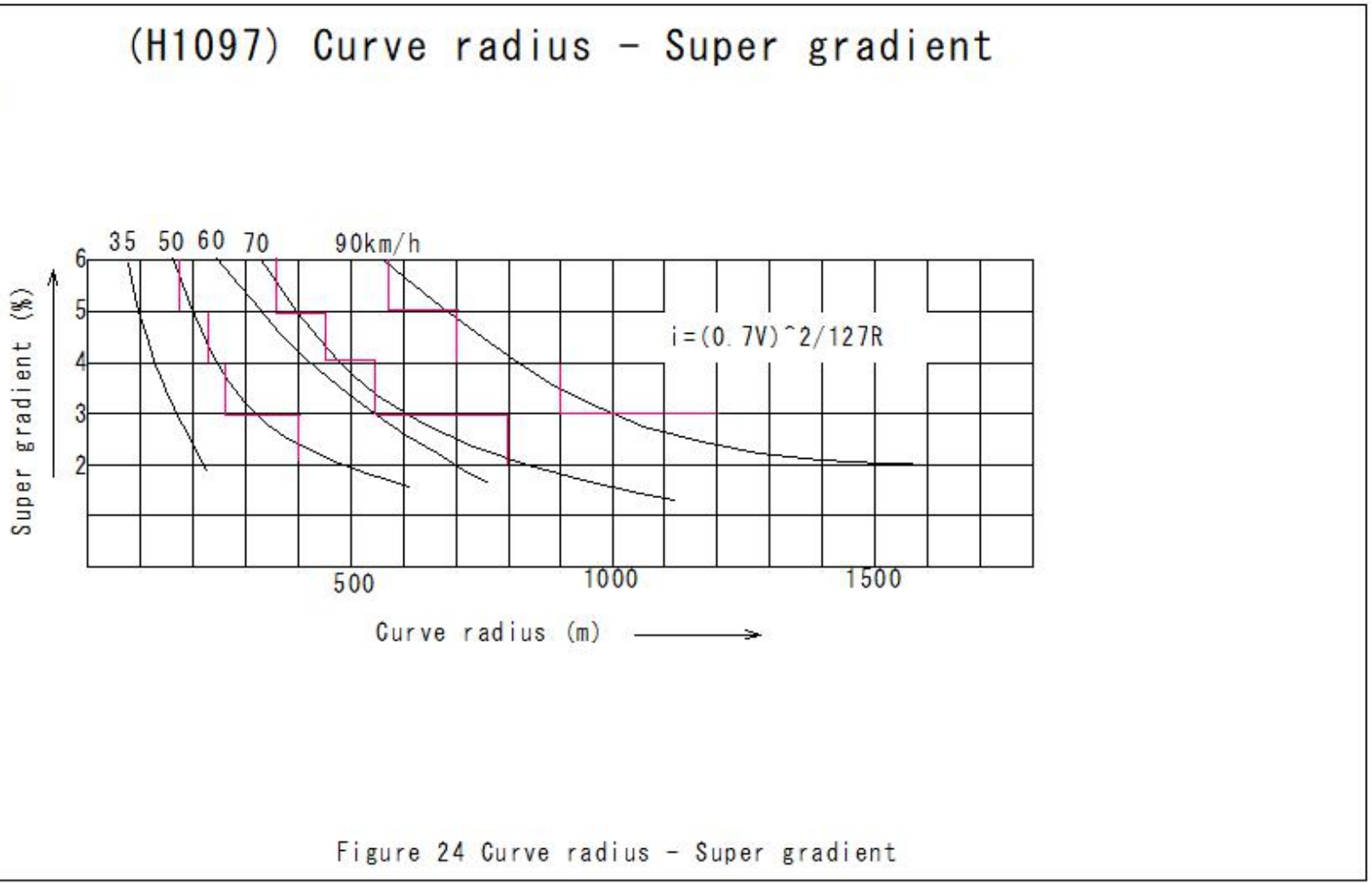


Figure 24 Curve radius - Super gradient

(H1098) Curve length and intersection angle

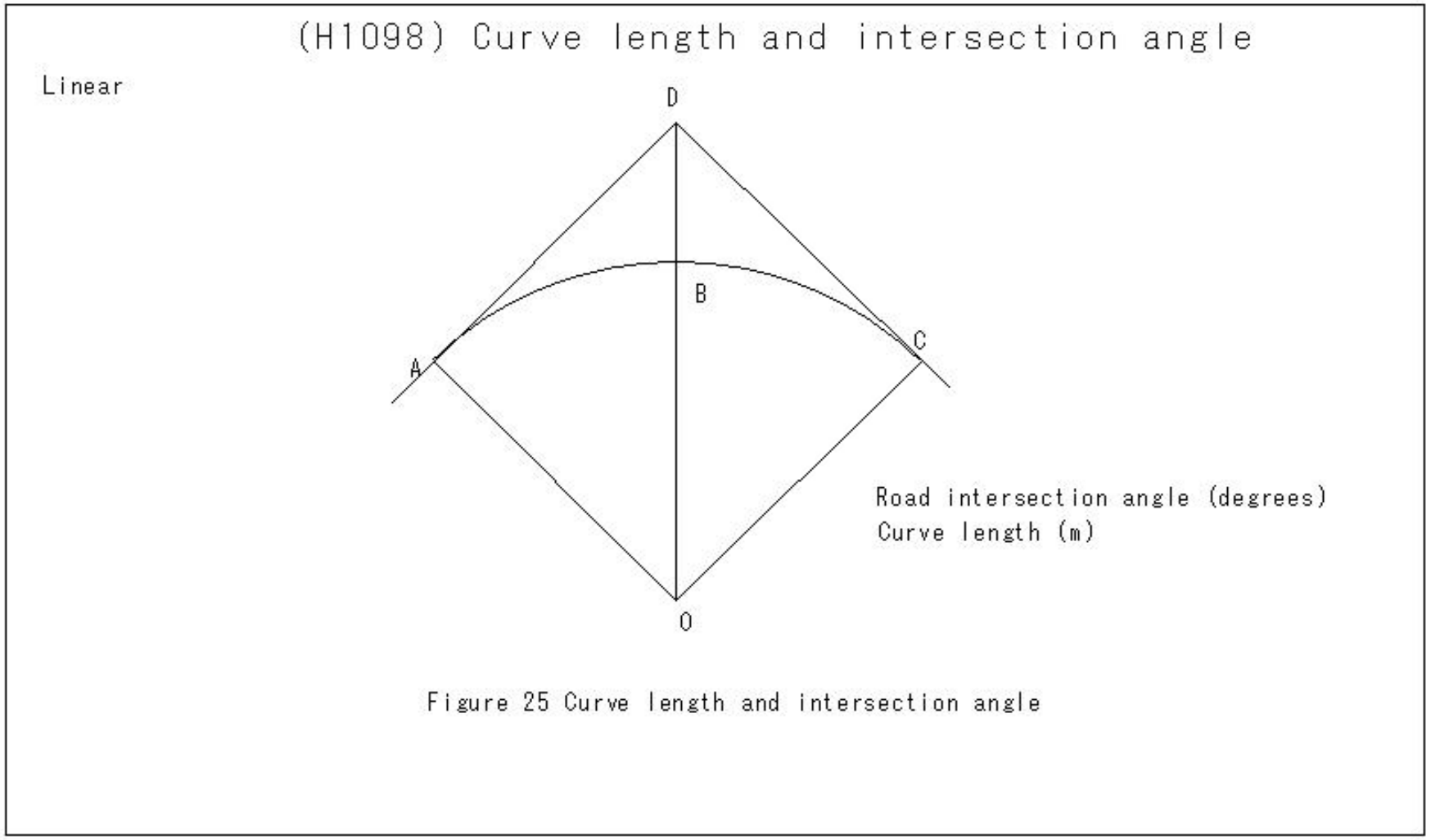


Figure 25 Curve length and intersection angle

(H1099) Intersection Angle

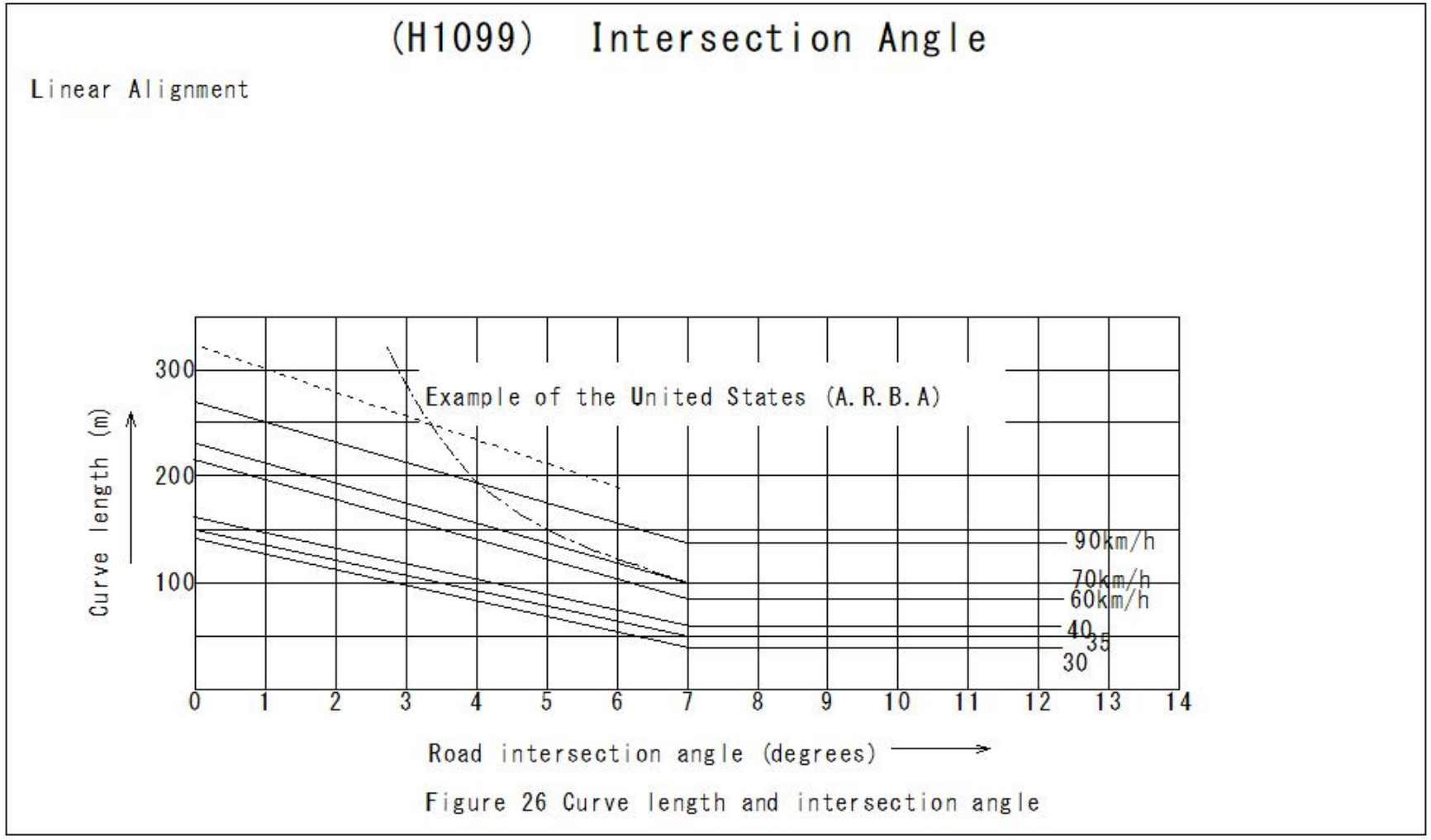
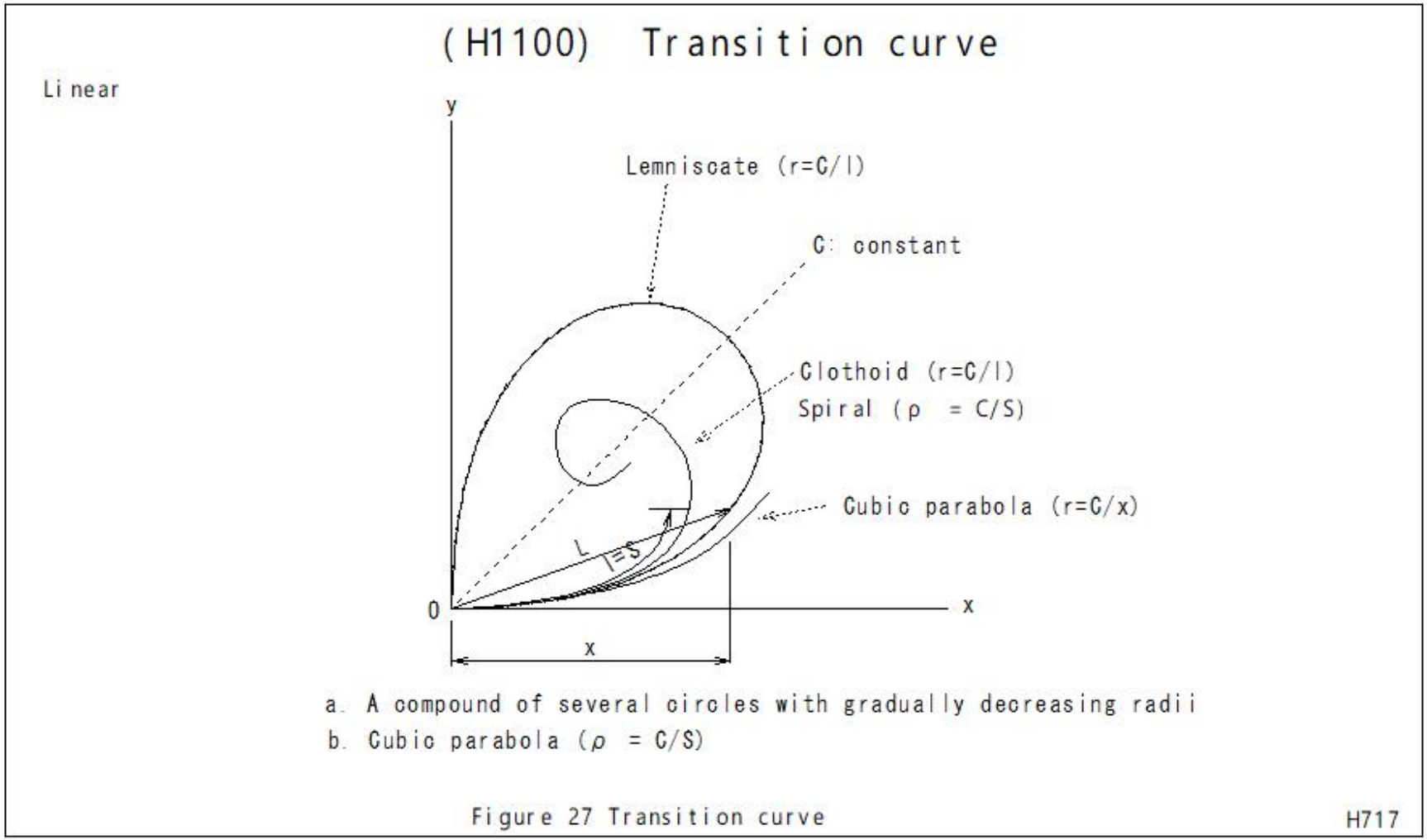


Figure 26 Curve length and intersection angle

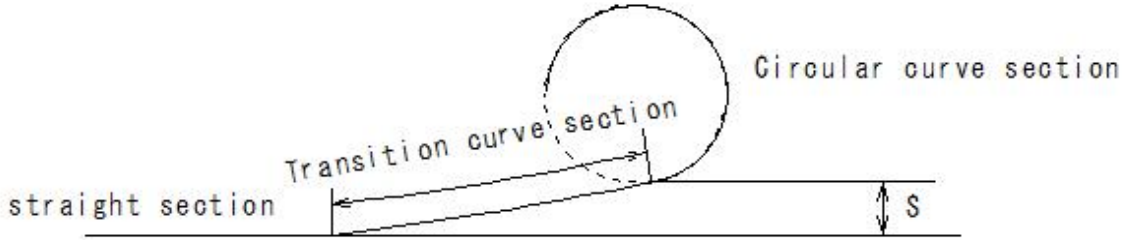
(H1100) Transition curve



(H1101) Amount of transition

(H1101) Amount of transition

Linear



Amount of transition

$s = 1/24 \cdot l^2 / R$

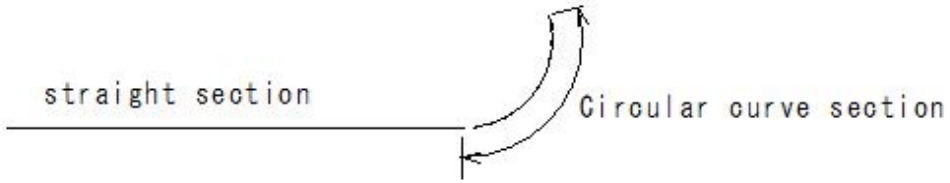


Figure 28 Amount of transition between a straight line and a circle

H723

(H1102) Curve radius - Length of Transition section

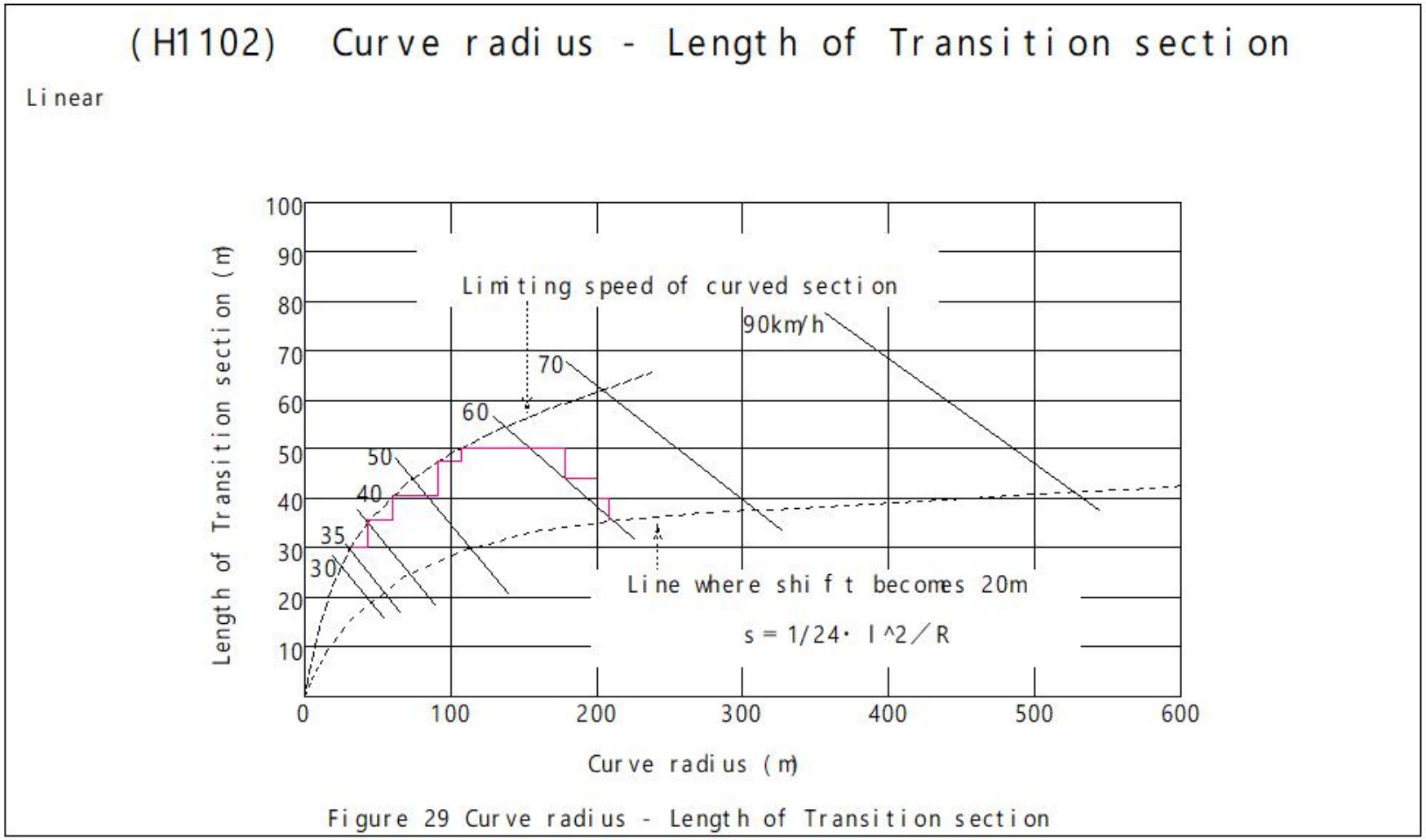
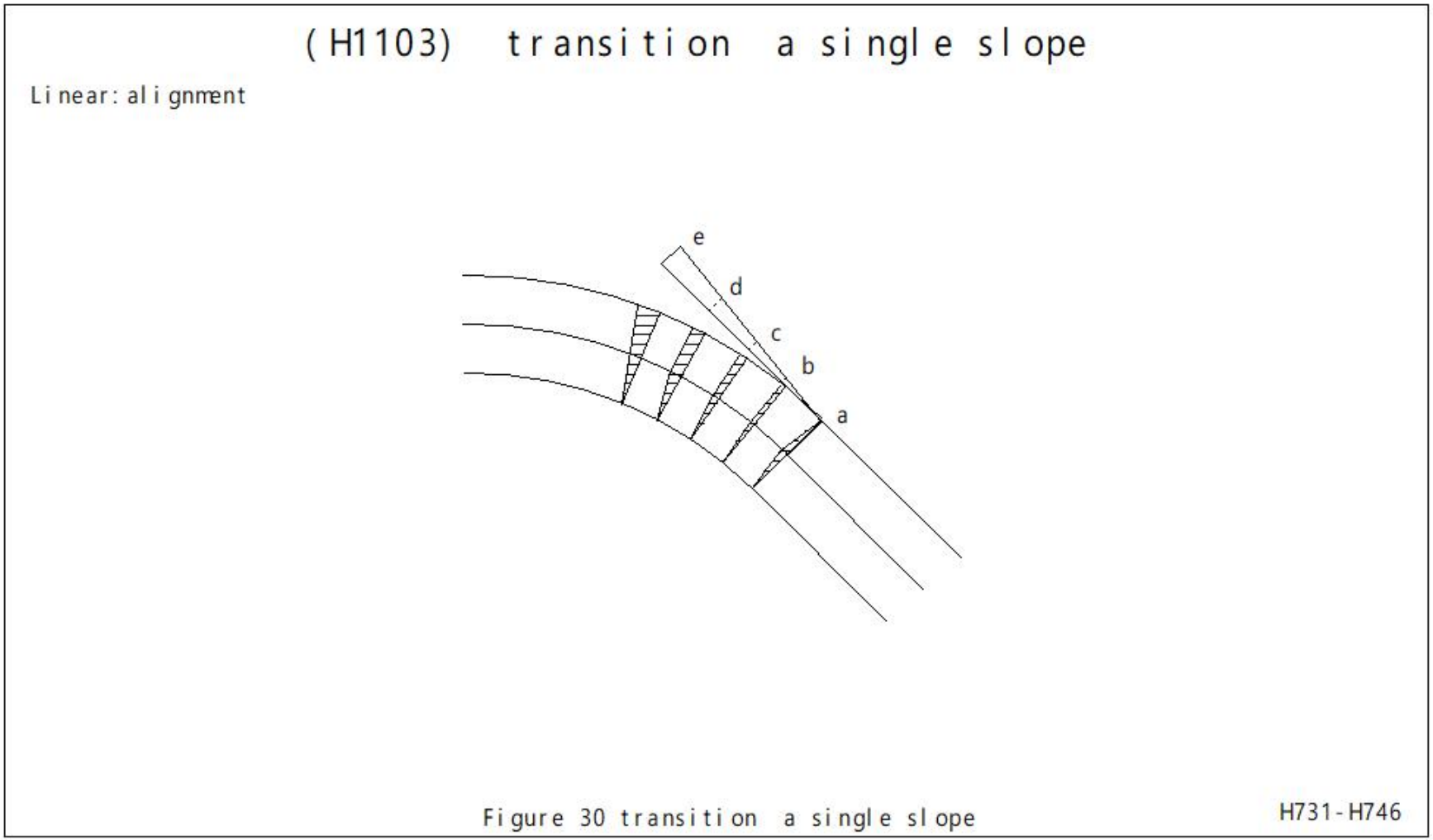


Figure 29 Curve radius - Length of Transition section

(H1103) transition a single slope



(H1104) Widening

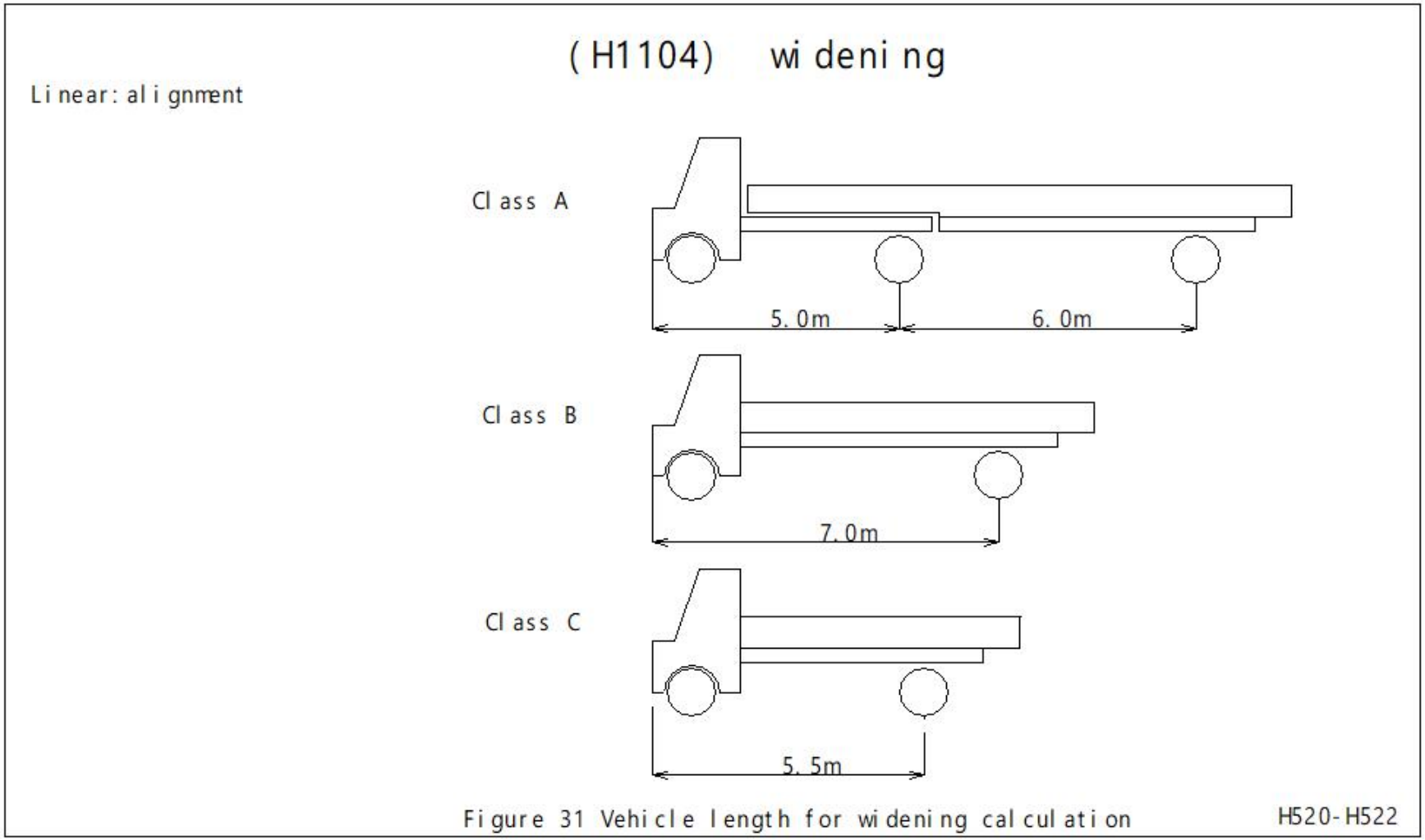
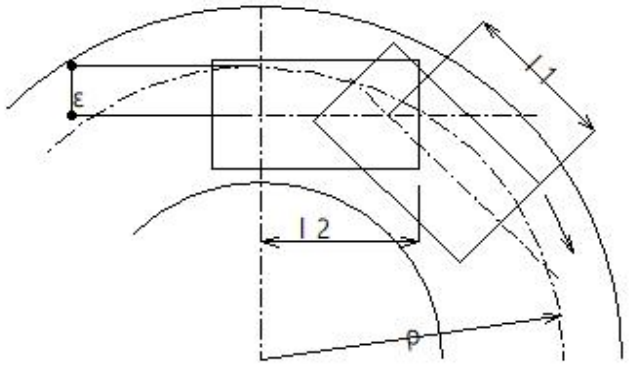


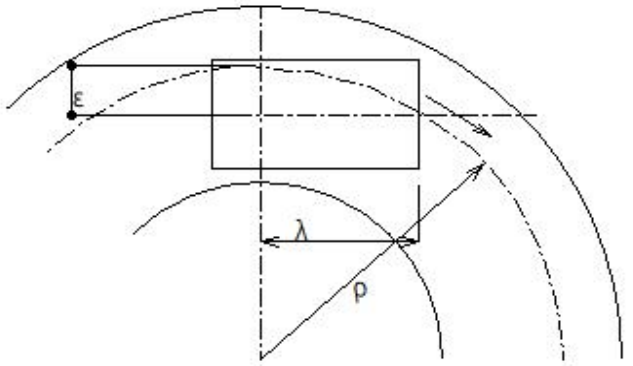
Figure 31 Vehicle length for widening calculation H520-H522

(H1105) widening

Linear: alignment



(a)



(b)

$\varepsilon = \lambda^2 / 2\rho$

ε : Amount of widening

ρ : Radius of lane center line

Figure 32 Widening calculation diagram

(H1106) compound curve

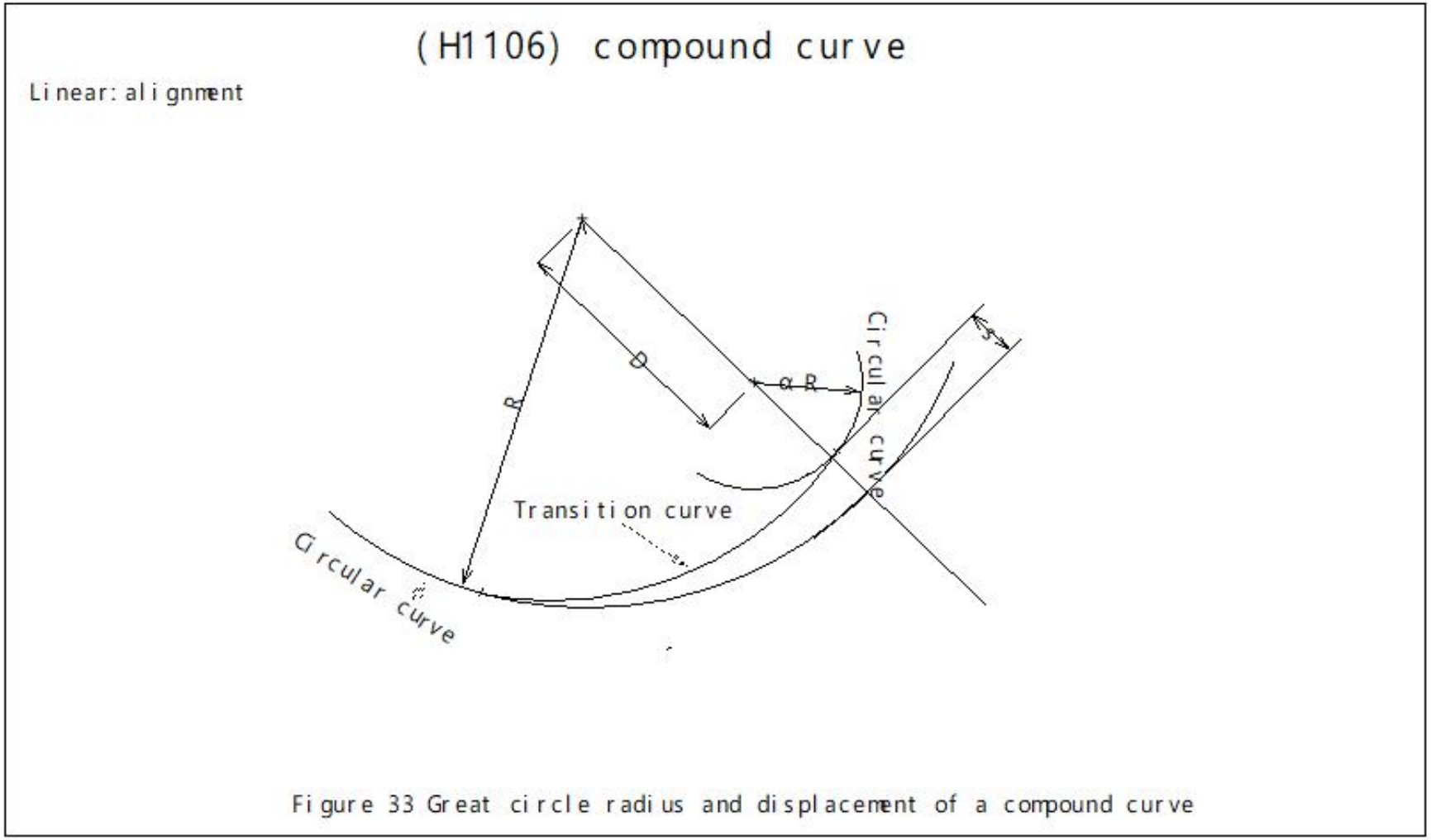


Figure 33 Great circle radius and displacement of a compound curve

(H1107) compound curve

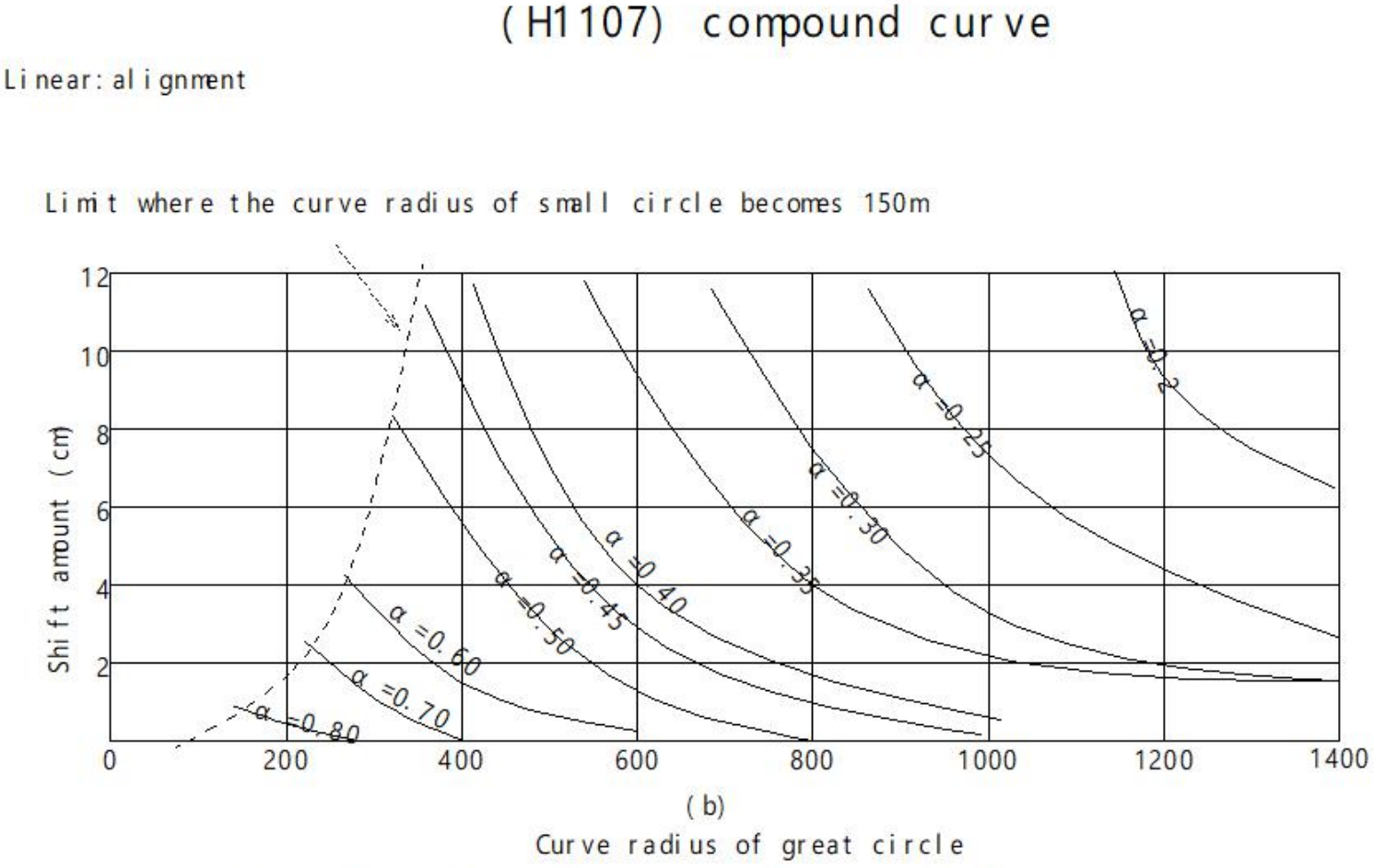


Figure 33 Great circle radius and displacement of a compound curve

(H1108) compound curve

(H1108) compound curve

Linear: alignment

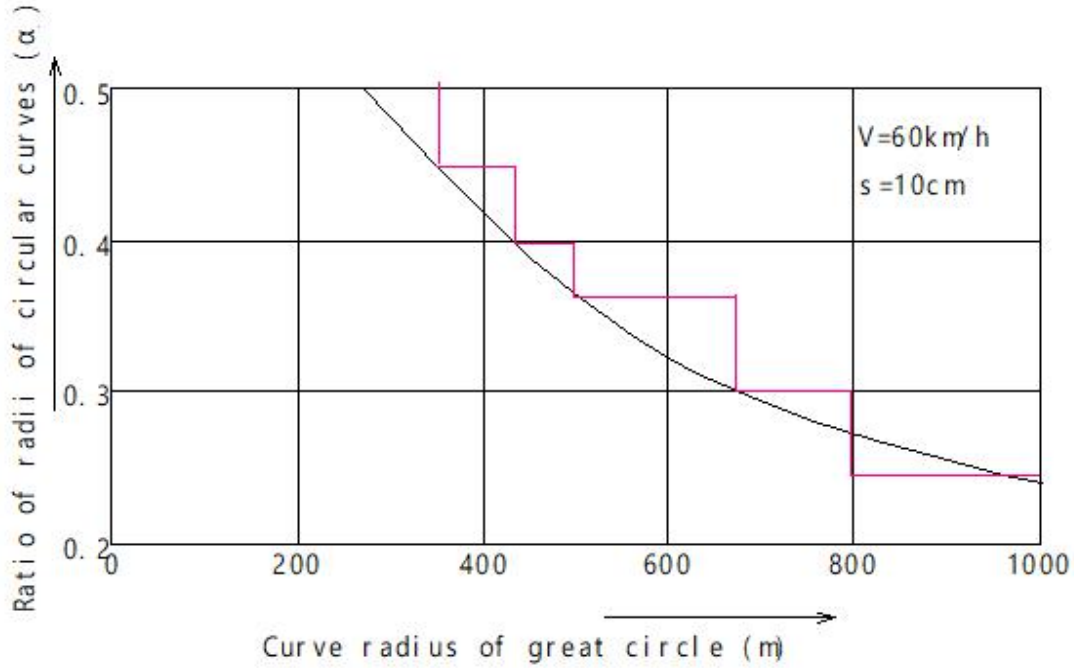


Figure 34 Ratio of radii of compound curves

(H1109) Climbing ability chart

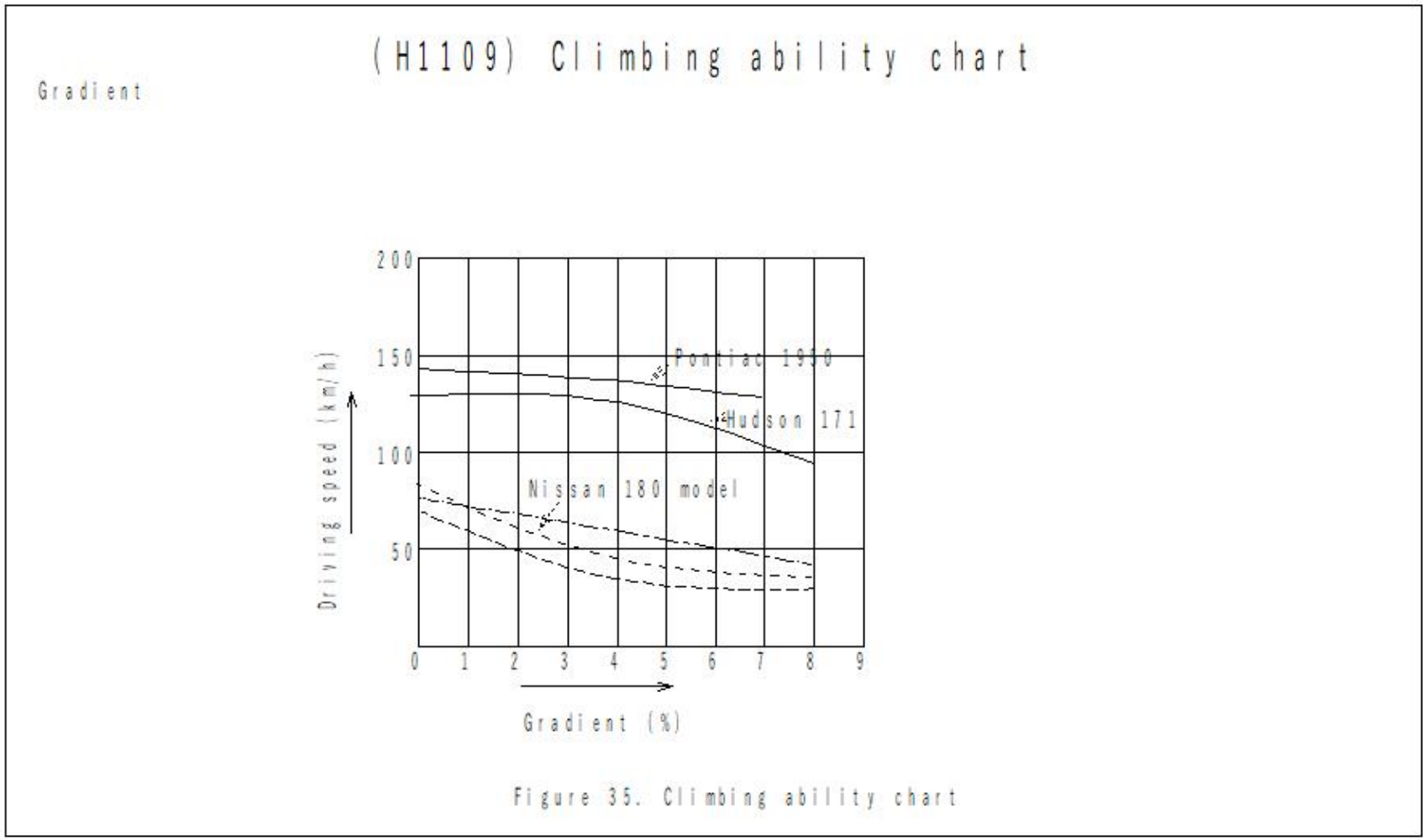


Figure 35. Climbing ability chart

(H1110) Vertical curve

(H1110) Vertical curve

Limit length of longitudinal gradient

Vertical curve

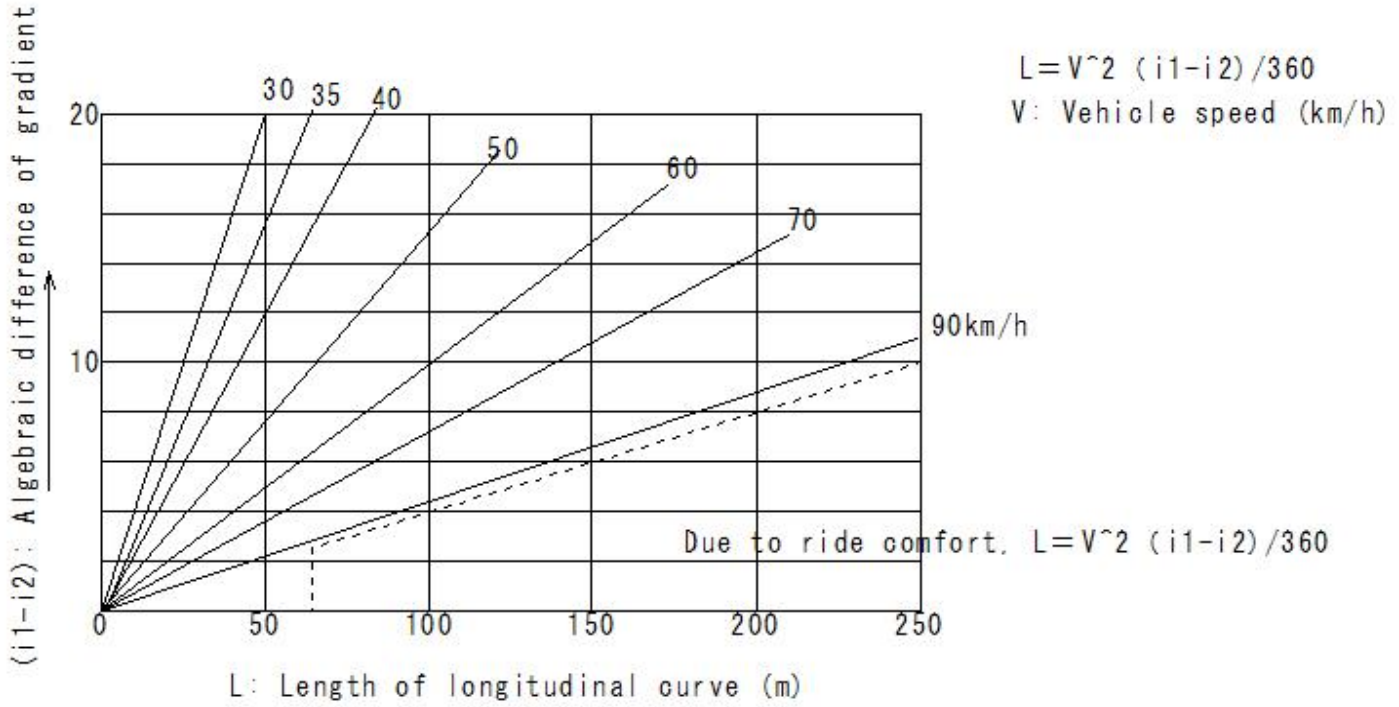
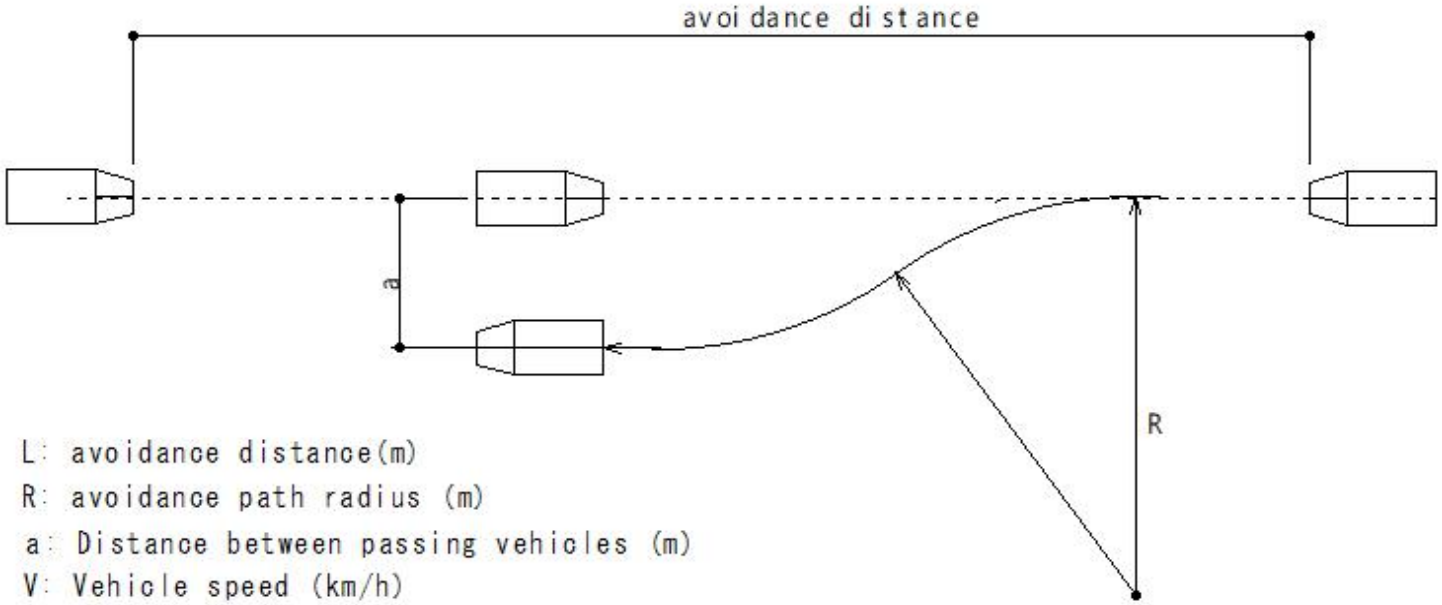


Figure-36: Length of longitudinal curve

(H1111) Sight distance (visible distance)

(H1111) Sight distance (visible distance)

Sight distance (visible distance)



L: avoidance distance(m)
R: avoidance path radius (m)
a: Distance between passing vehicles (m)
V: Vehicle speed (km/h)

Figure 38 avoidance distance

(H1112) Sight distance (visible distance)

(H1112) Sight distance (visible distance)

Sight Distance

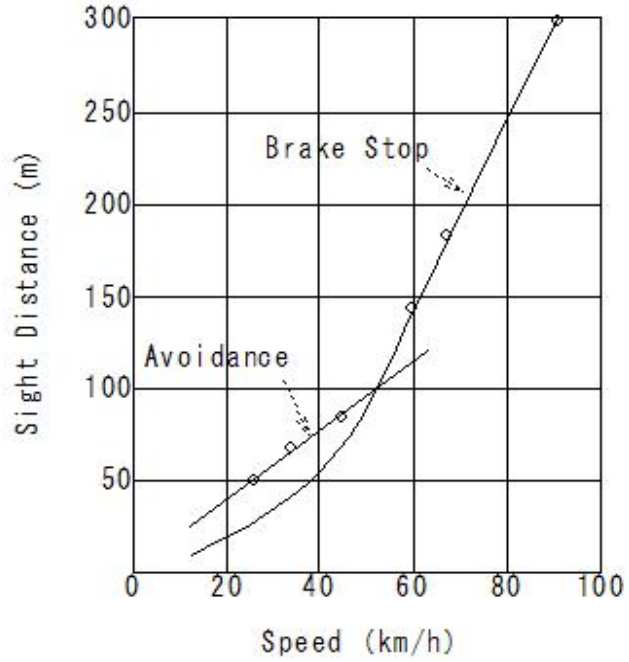


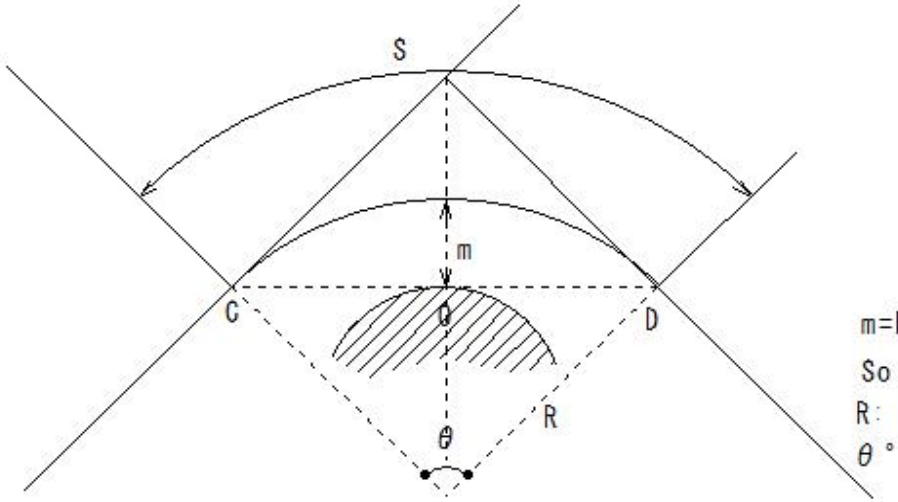
Figure-39 Safety Sight Distance Chart

(H1113) Plane curves and sightlines

(H1113) Plane curves and sightlines

Sight Distance

Ranging for Plane Curves and Longitudinal Curves



$m=R(1-\cos\theta^\circ/2)$

So: Safe viewing distance (m)

R: Radius of curve (m)

θ° : Center angle (degree)

Figure-40 Plane curves and sightlines

H753

(H1114) Longitudinal curves and viewing distances

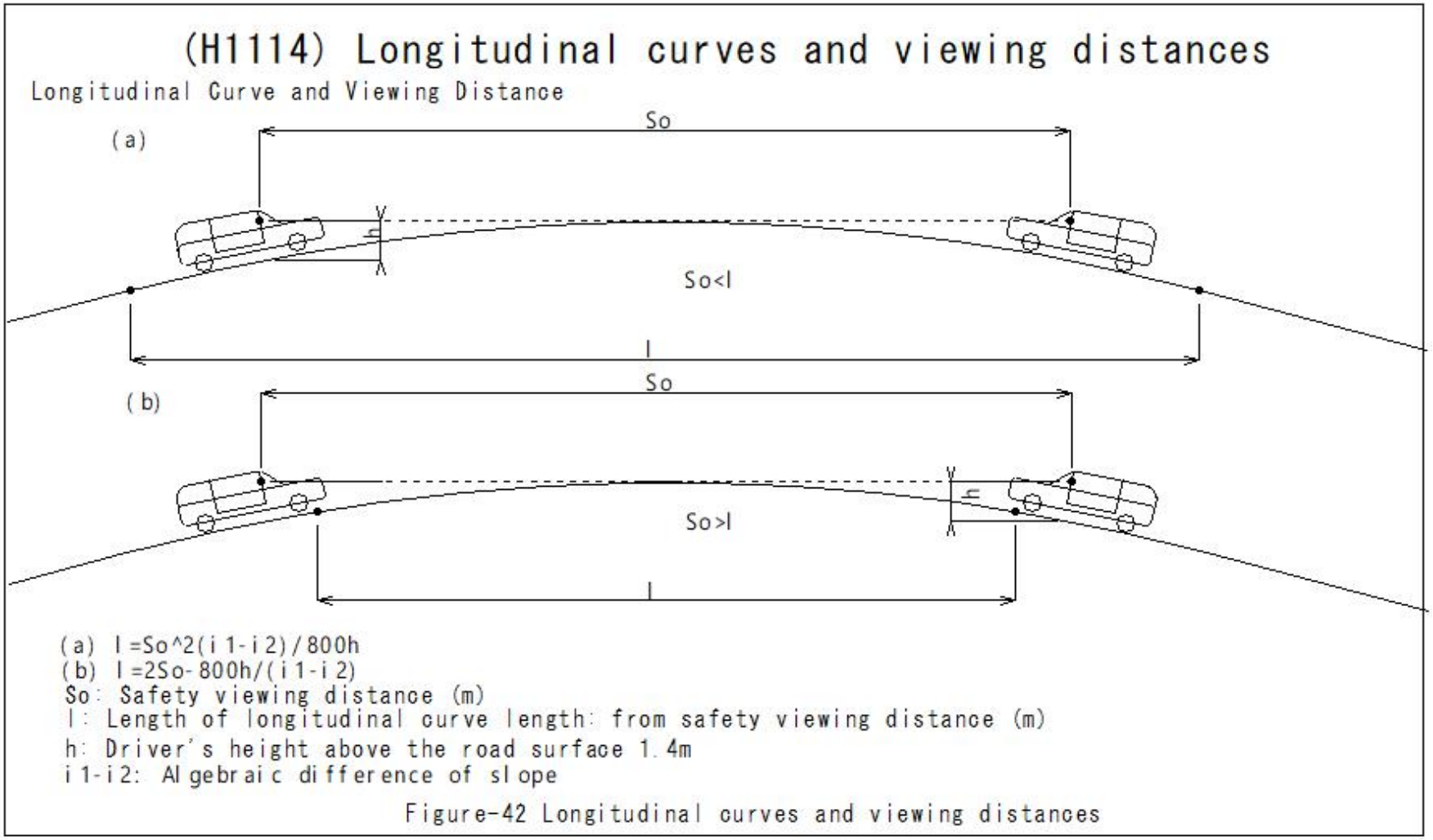


Figure-42 Longitudinal curves and viewing distances

(H1115) sight distance

(H1115) sight distance

sight distance

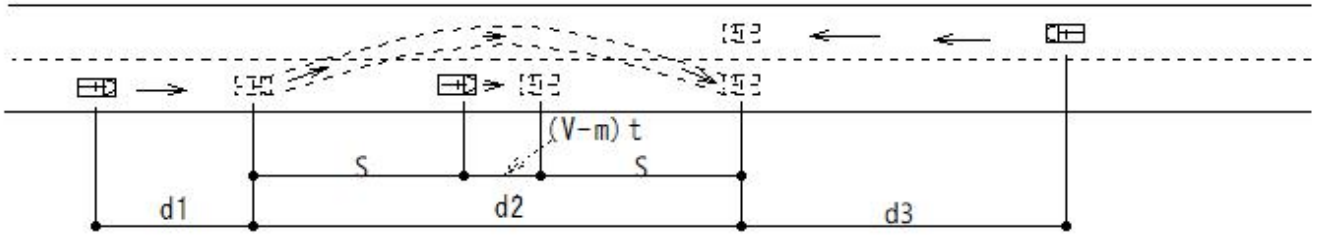


Figure-43 passing sight distance

H758

(H1116) Intersection

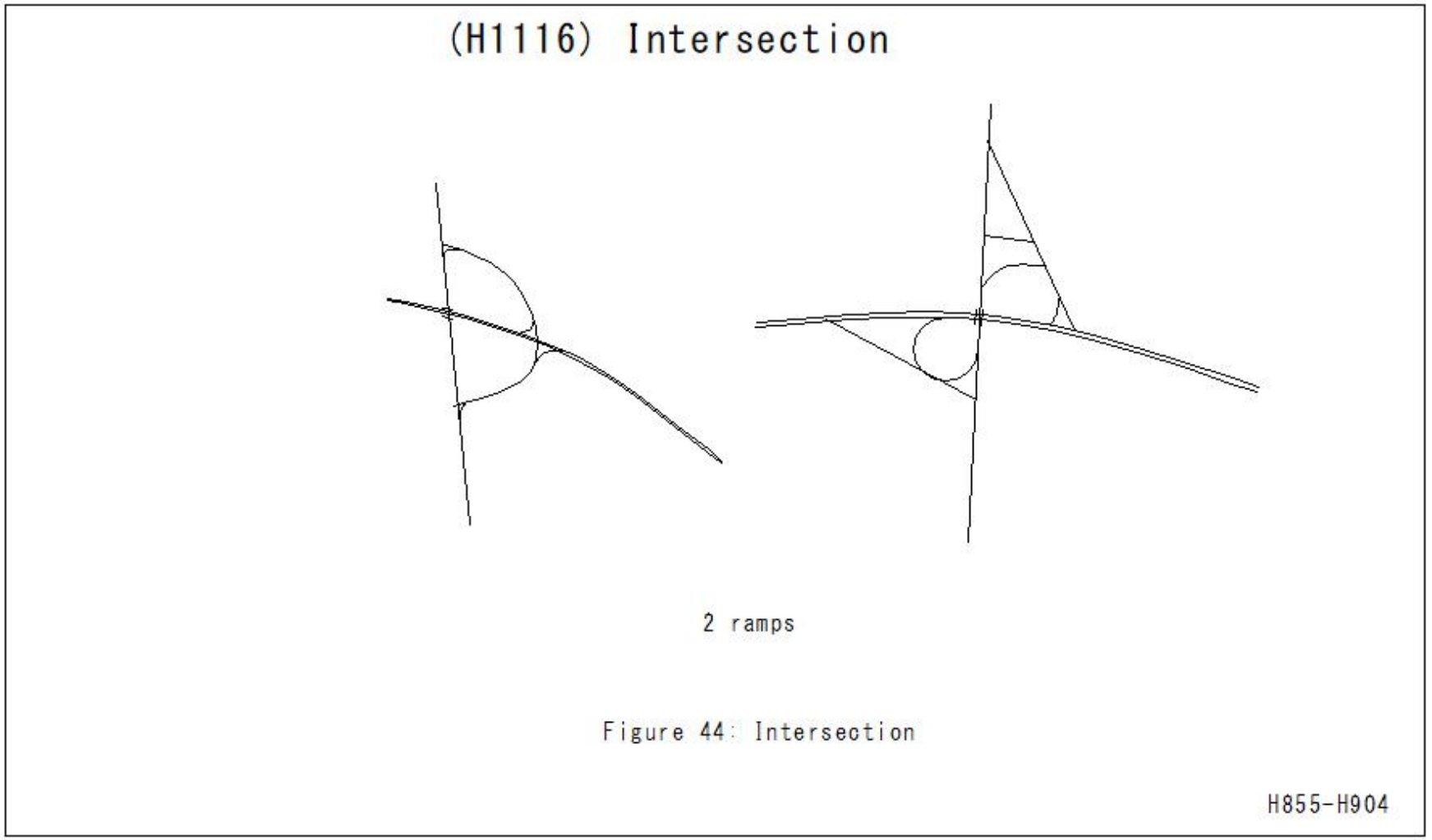


Figure 44: Intersection

H855-H904

(H1117) Intersection

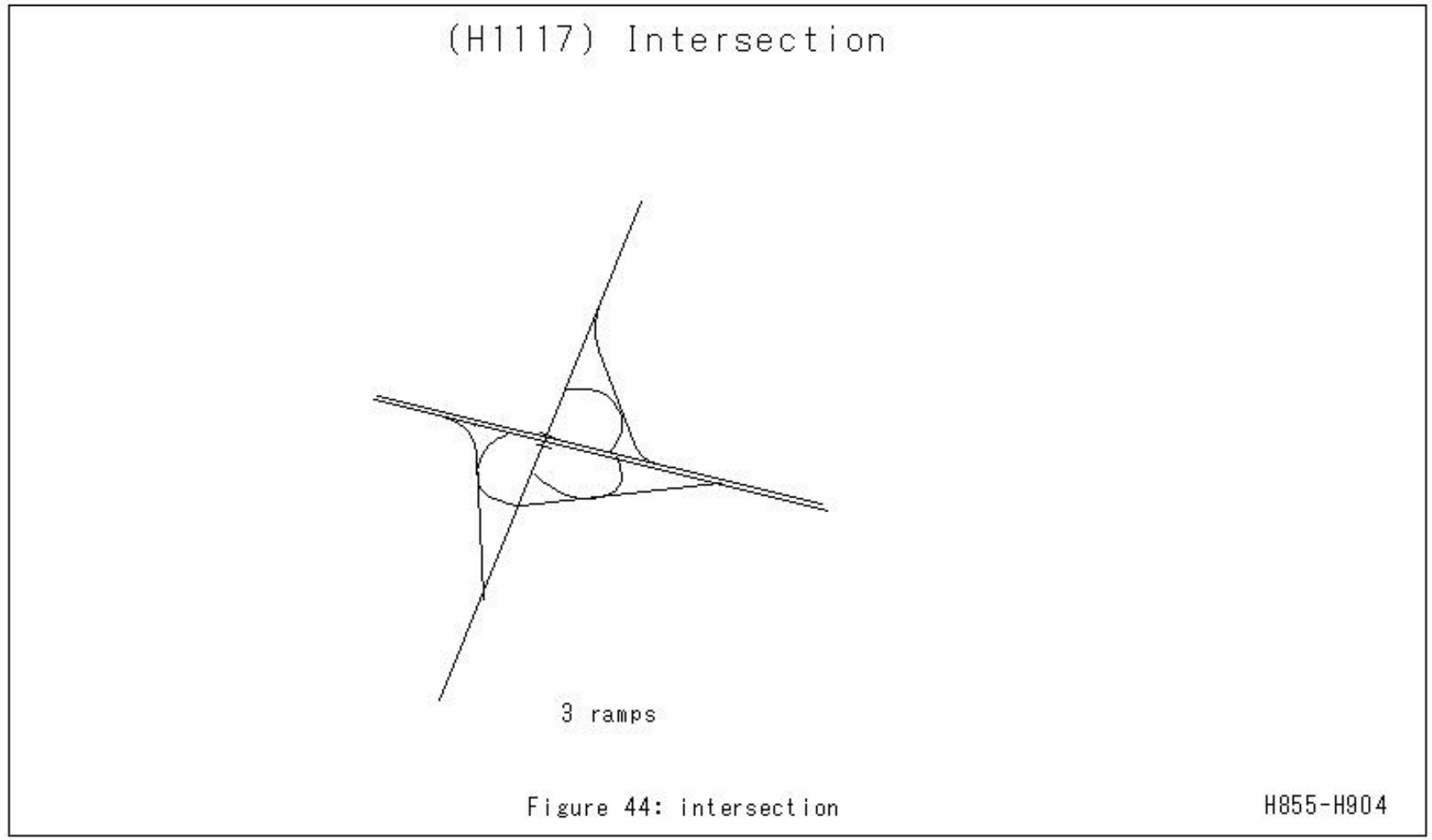
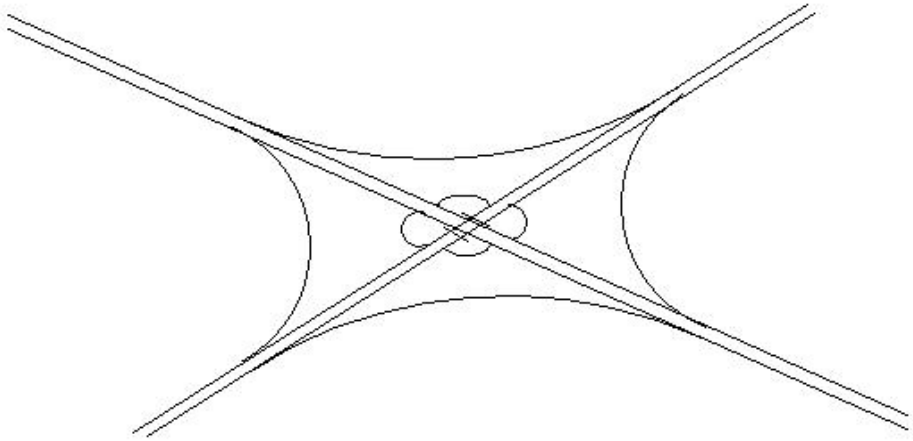


Figure 44: intersection

H855-H904

(H1118) Intersection

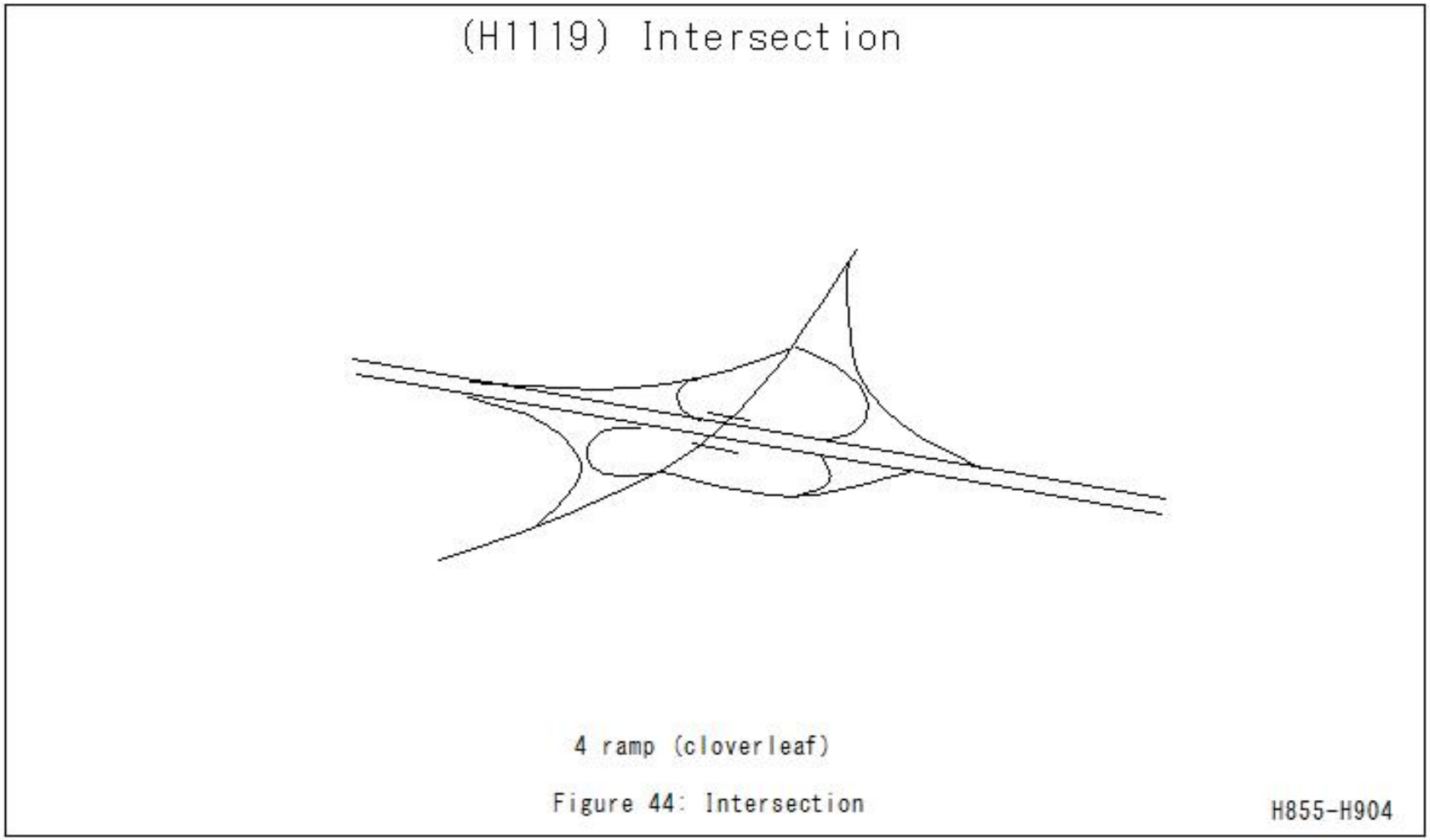


4 ramp (cloverleaf)

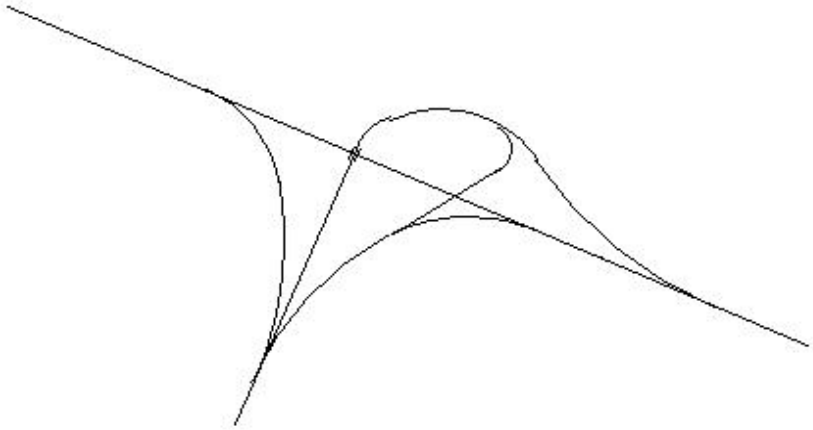
Figure 44: Intersection

H855-H904

(H1119) Intersection



(H1120) Intersection



T-shaped (trumpet)

Figure 44. Three-dimensional intersection

(H1121) Intersection

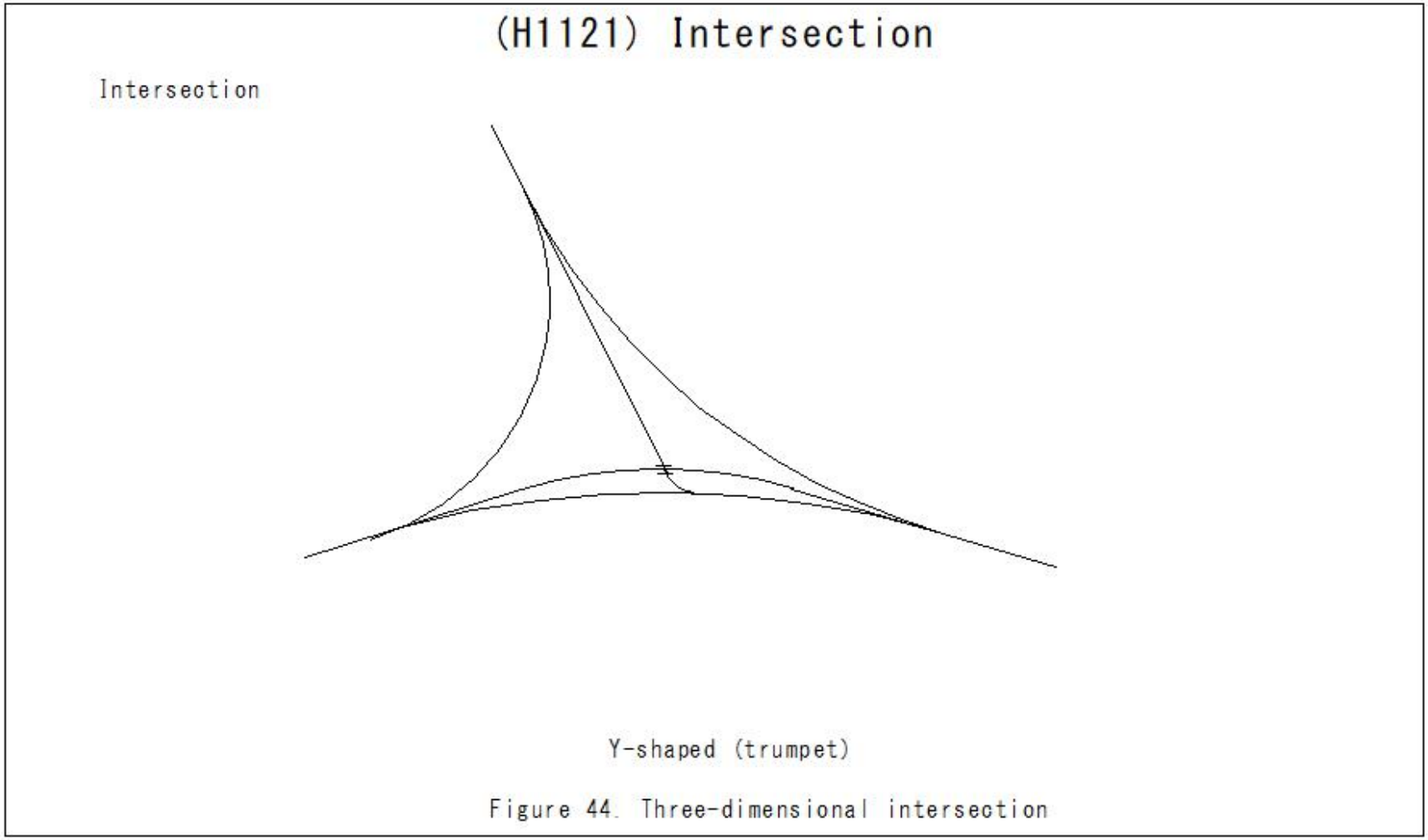


Figure 44. Three-dimensional intersection

(H1122) Intersection

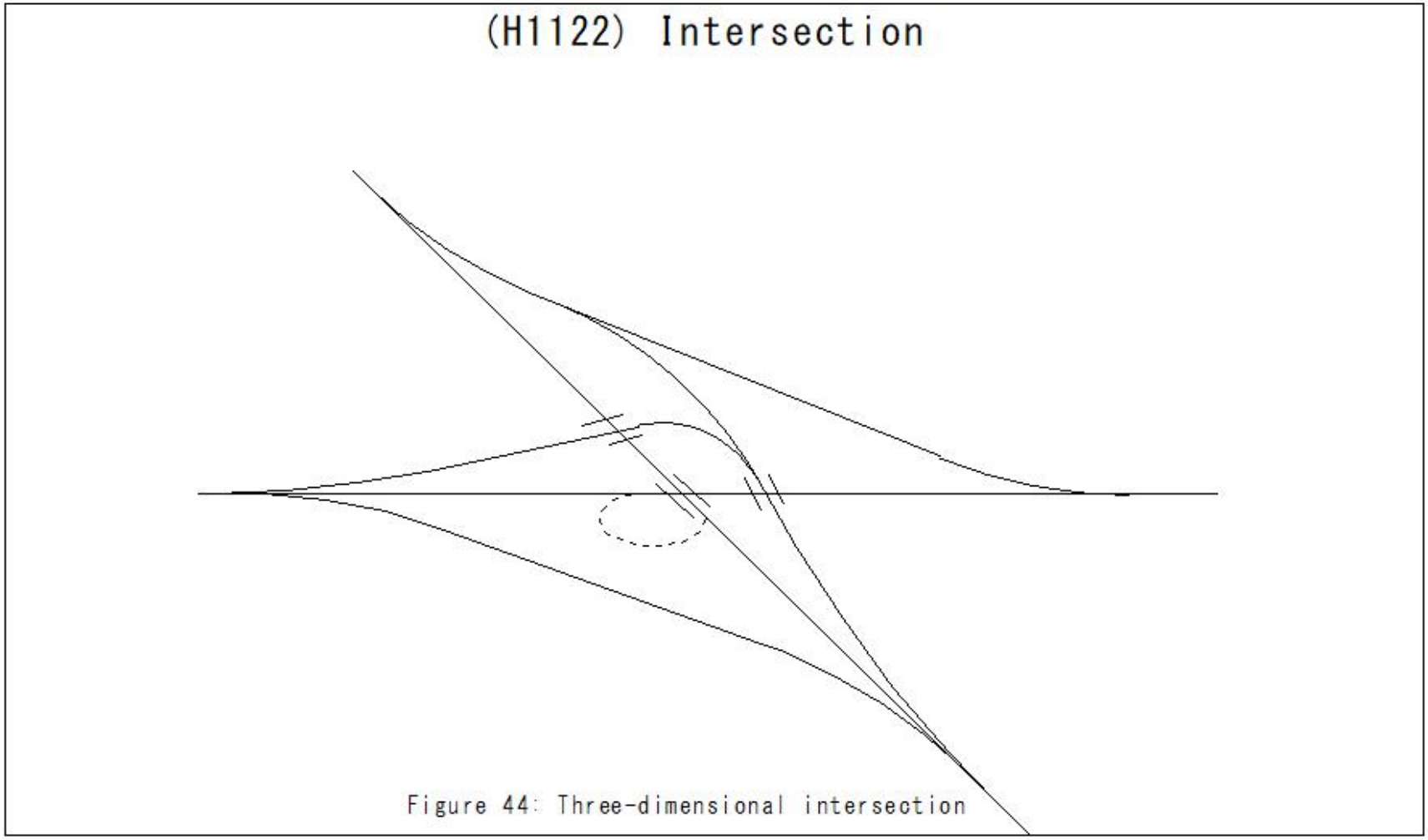


Figure 44: Three-dimensional intersection

(H1123) Intersection

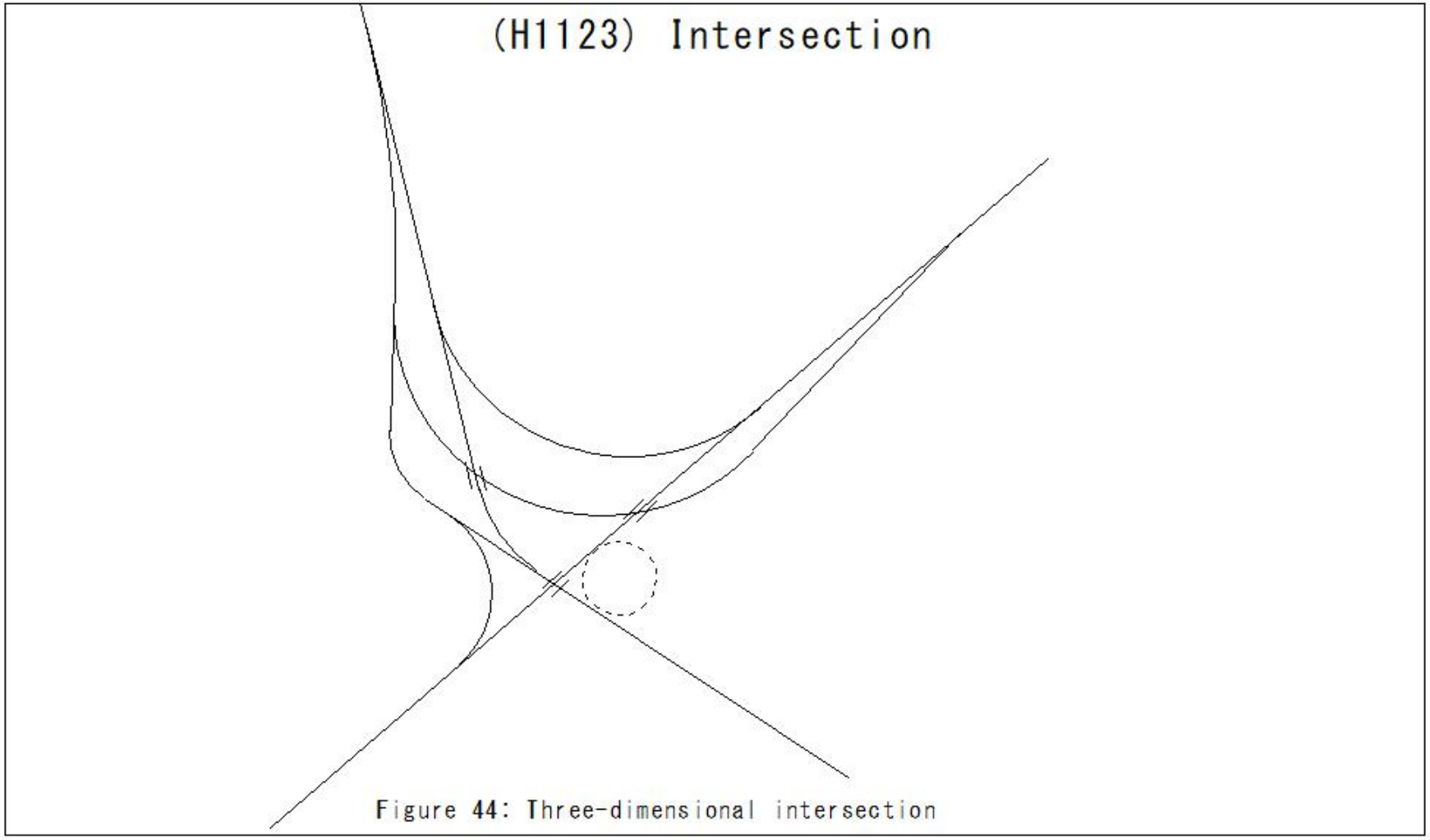


Figure 44: Three-dimensional intersection

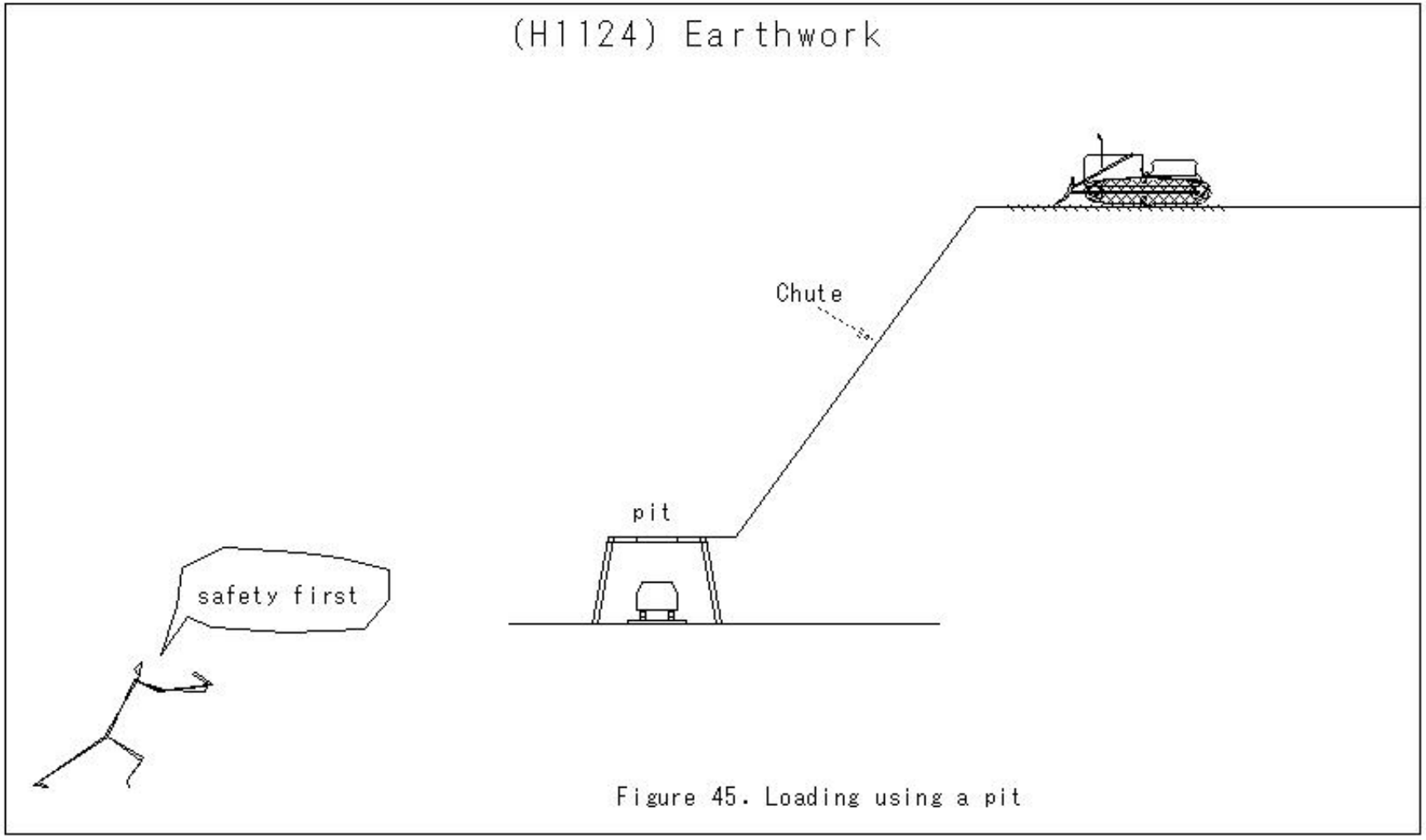


Figure 45. Loading using a pit

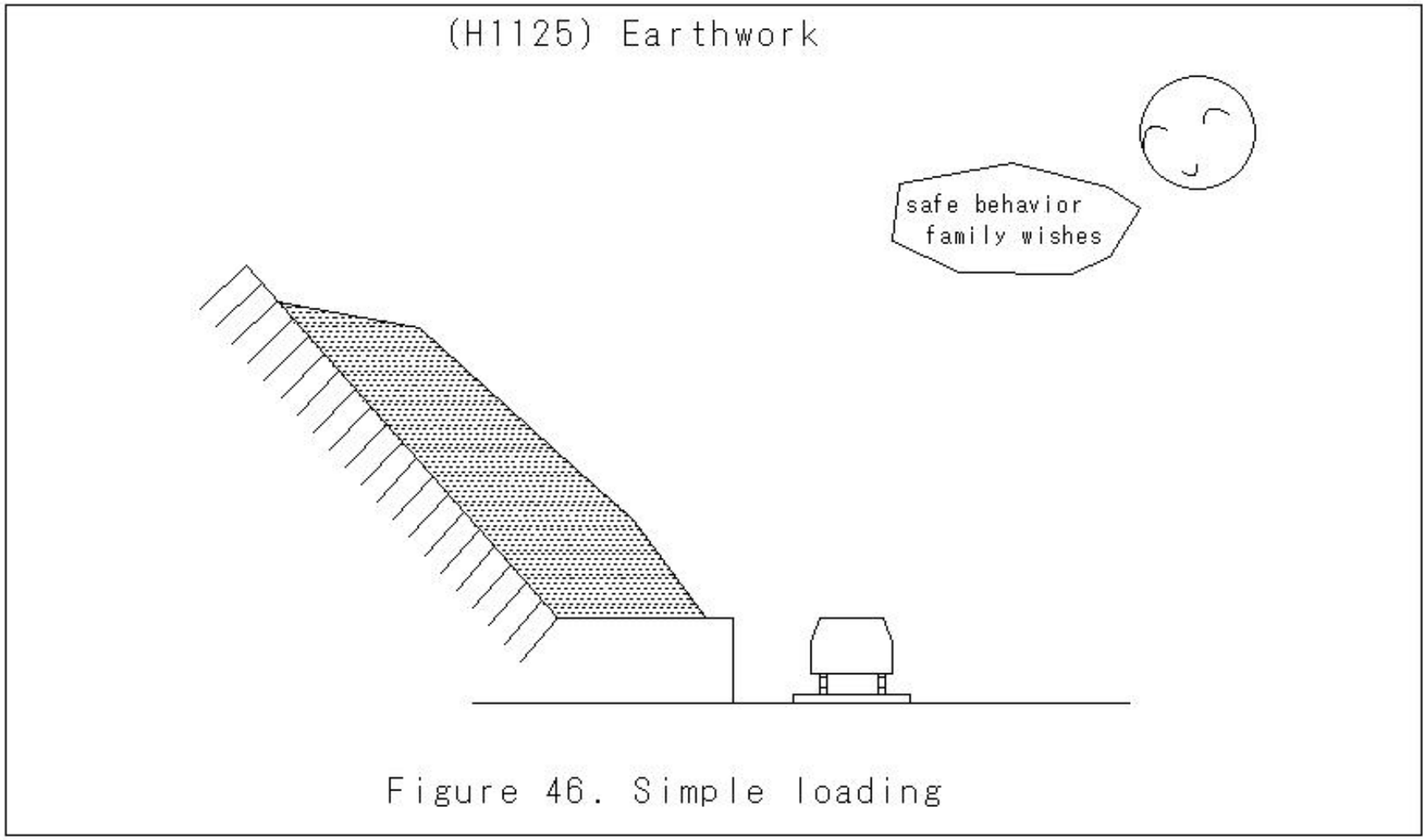


Figure 46. Simple loading

(H1126) Earthwork

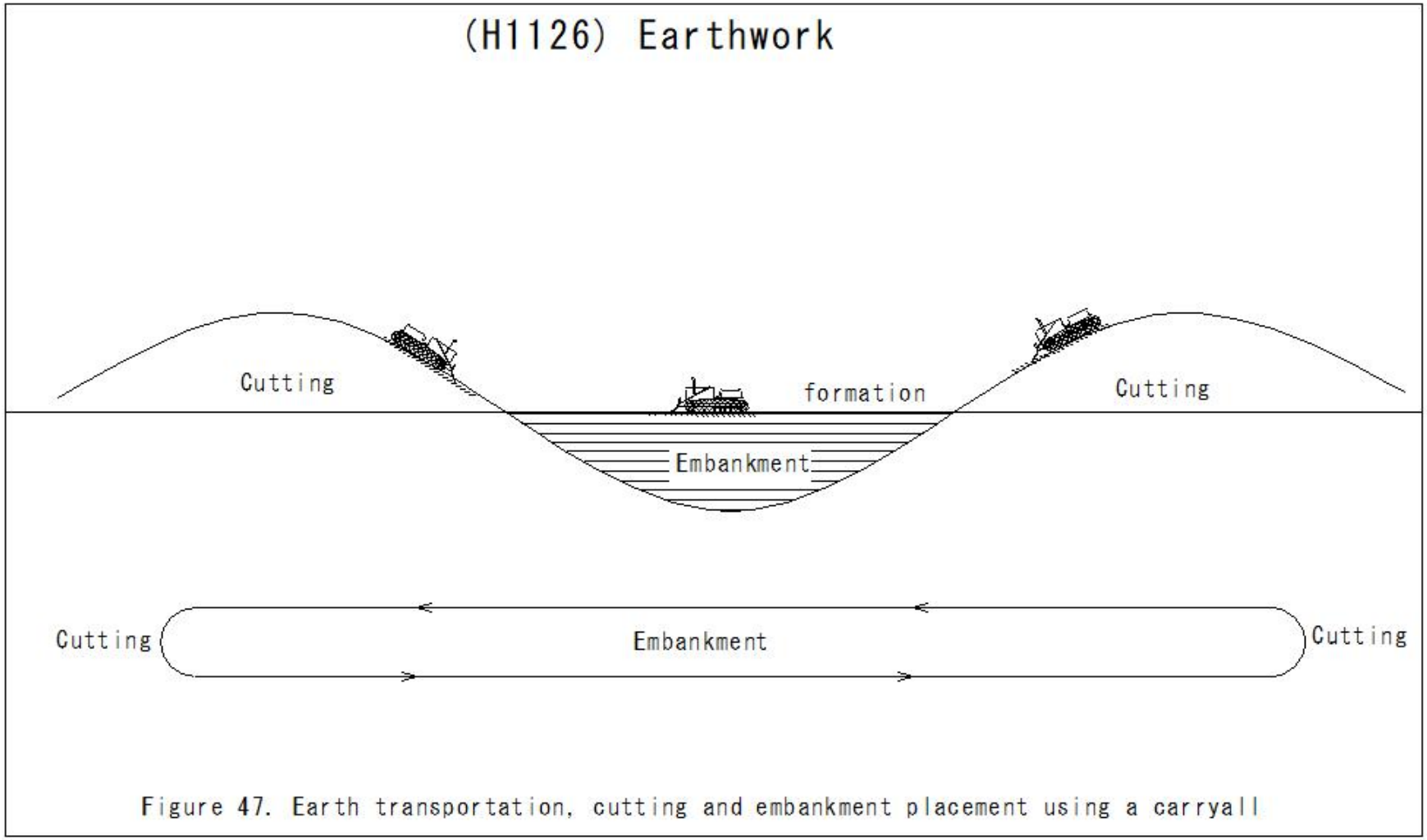


Figure 47. Earth transportation, cutting and embankment placement using a carryall

(H1127) Drainage

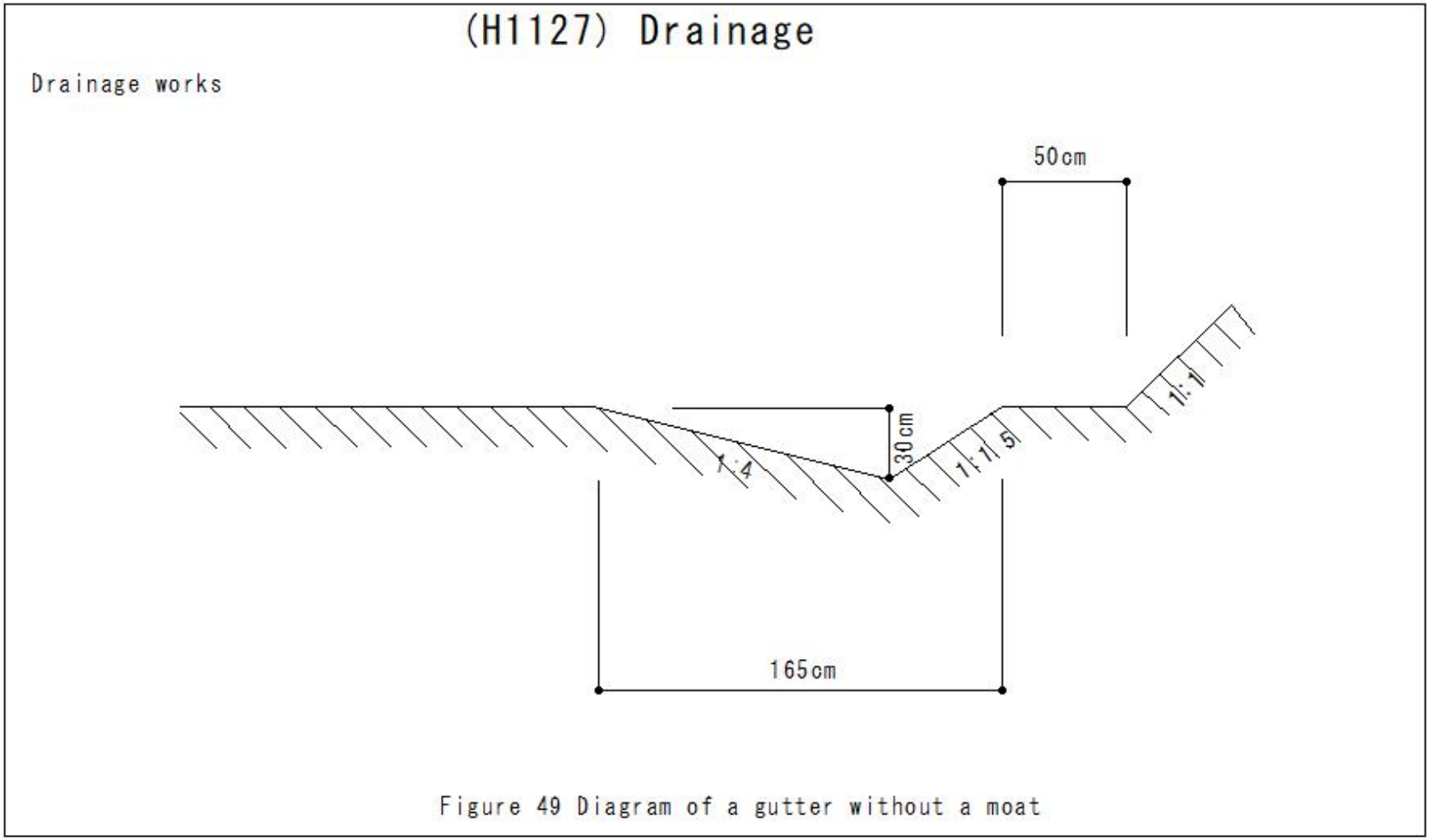


Figure 49 Diagram of a gutter without a moat

(H1128) Drainage

(H1128) Drainage

Drainage works

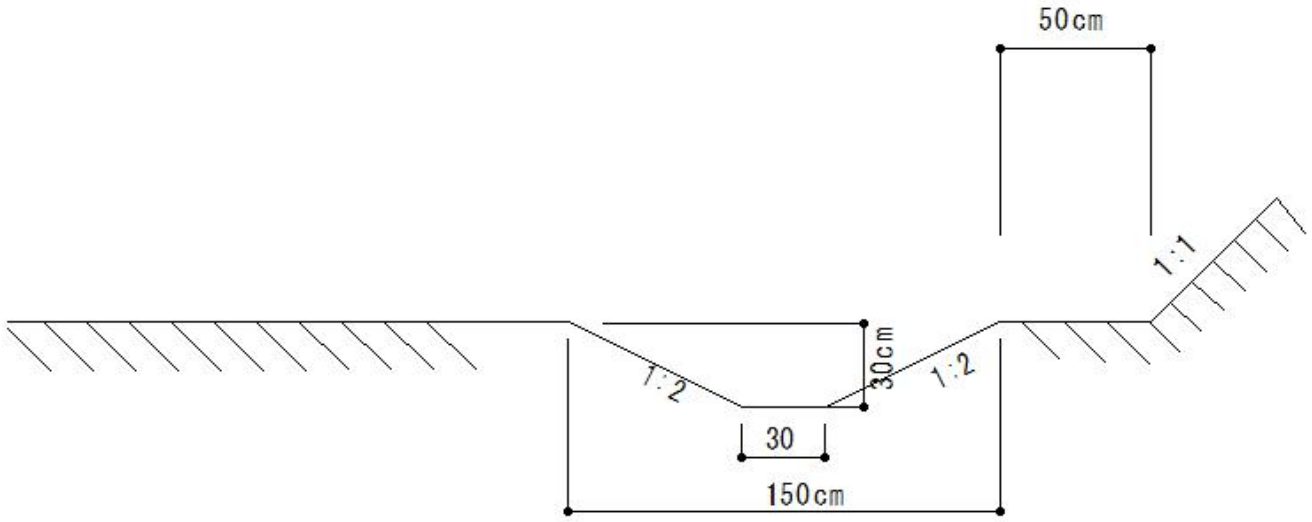


Figure 49 Diagram of a gutter without a moat

(H1129) Drainage

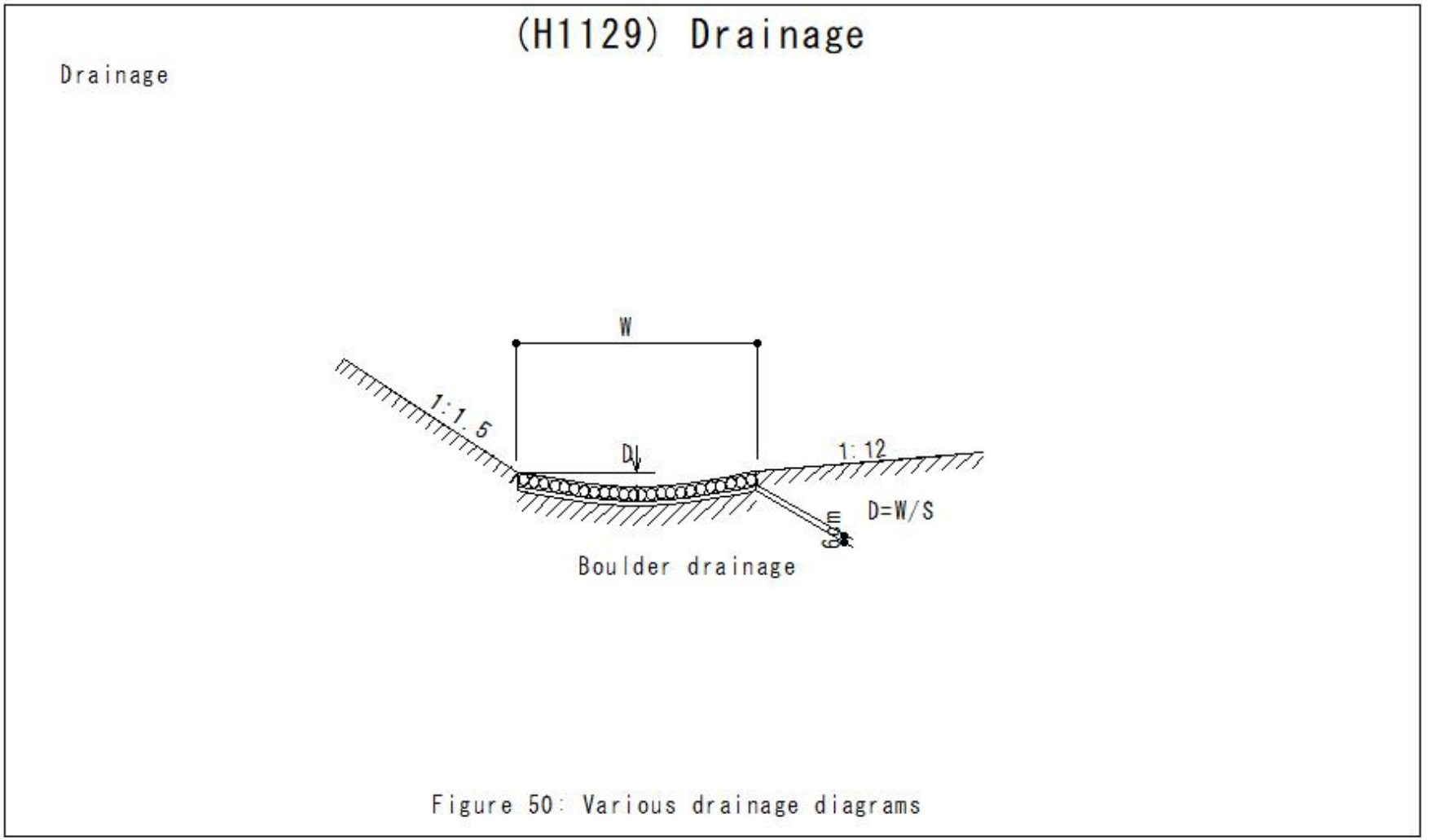


Figure 50: Various drainage diagrams

(H1130) Drainage

Drainage

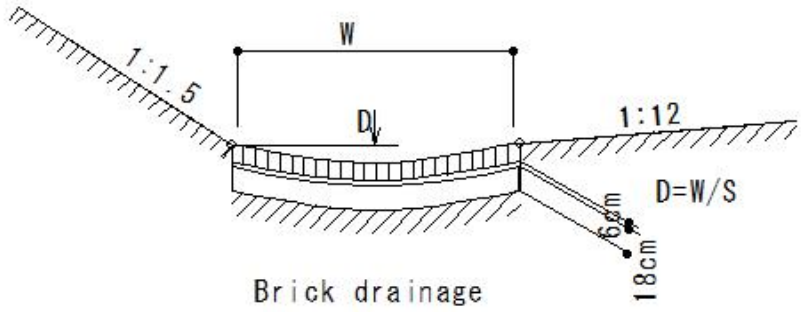
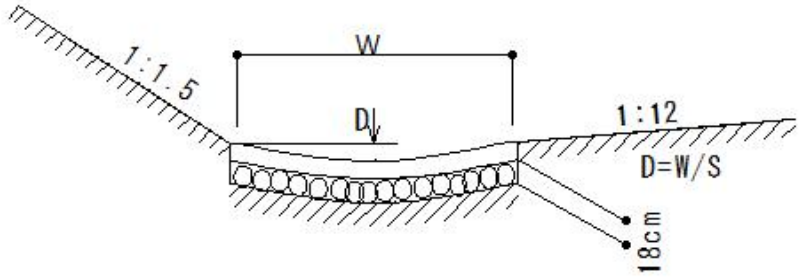


Figure 50: Various drainage diagrams

(H1131) Drainage

Drainage

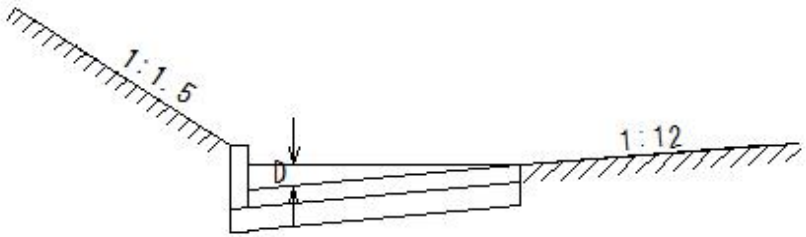


Concrete drainage

Figure 50: Various drainage diagrams

(H1132) Drainage

Drainage



Concrete drainage

Figure 50: Various drainage diagrams

(H1133) Drainage

Drainage works

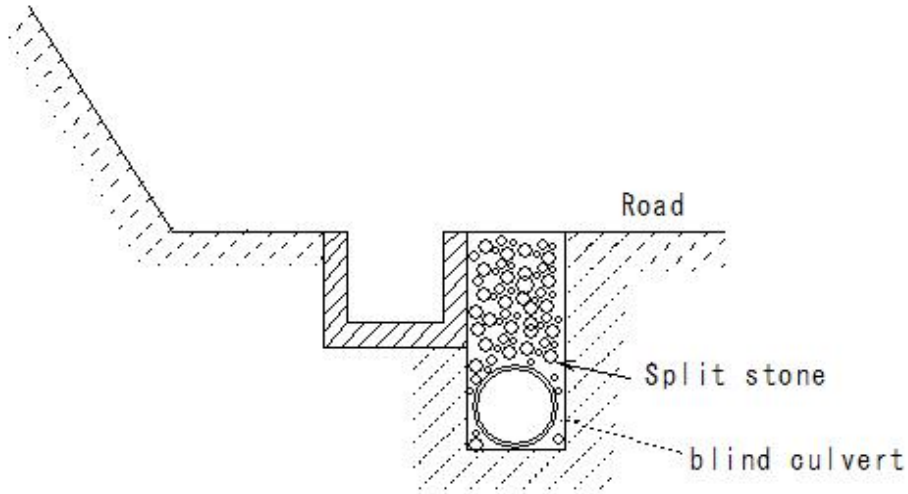
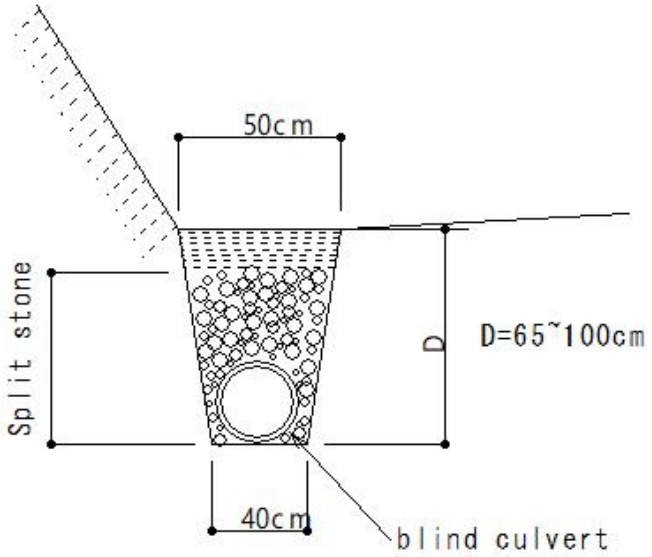


Figure 51 Longitudinal blind culvert diagram

(H1134) Drainage

Drainage works



(b)

Figure 51 Longitudinal blind culvert diagram

(H1135) Drainage

Drainage works

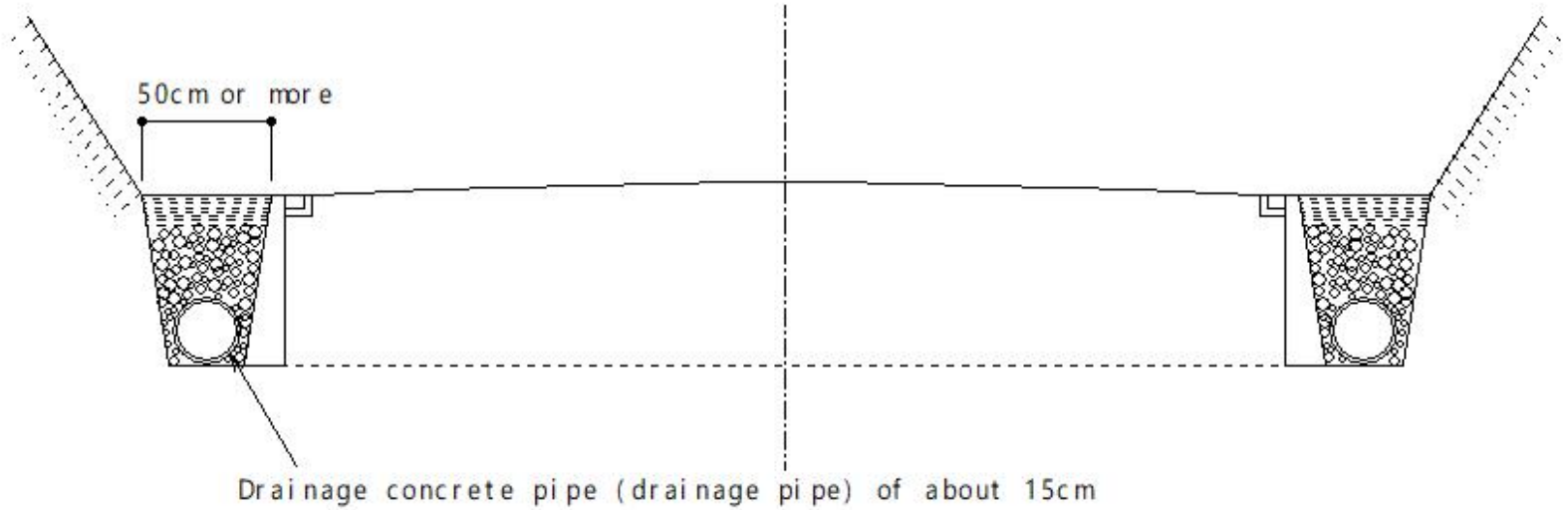


Figure 52 Longitudinal blind culvert diagram

(H1136) Drainage

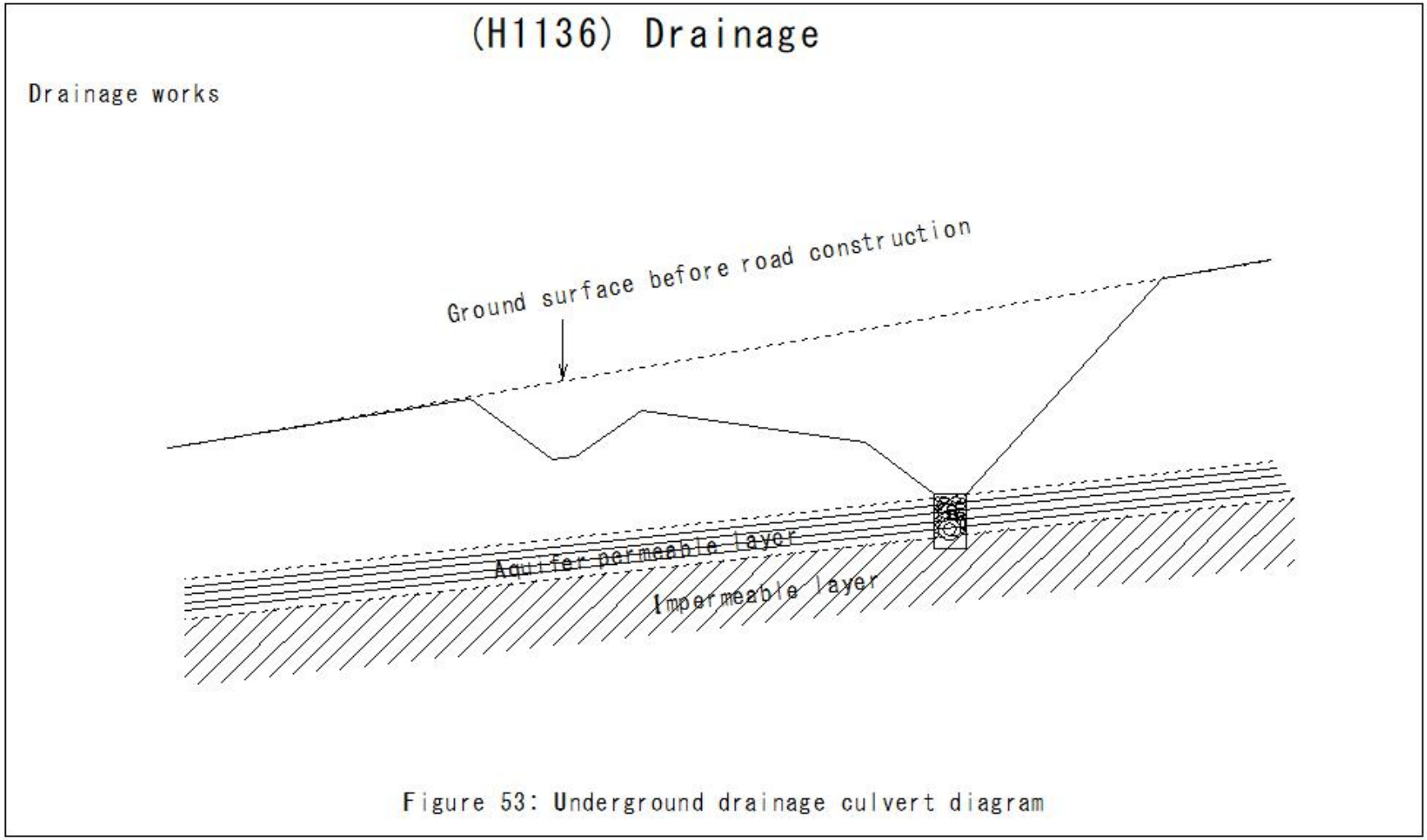
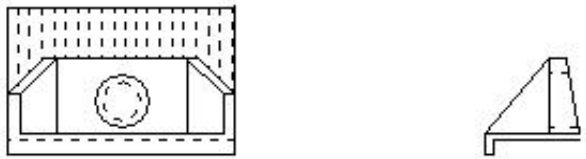
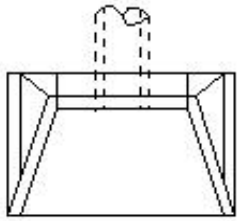


Figure 53: Underground drainage culvert diagram

(H1137) Drainage

Drainage works





Drainage works

Figure 54: Ditch diagram

(H1138) Drainage

Drainage works

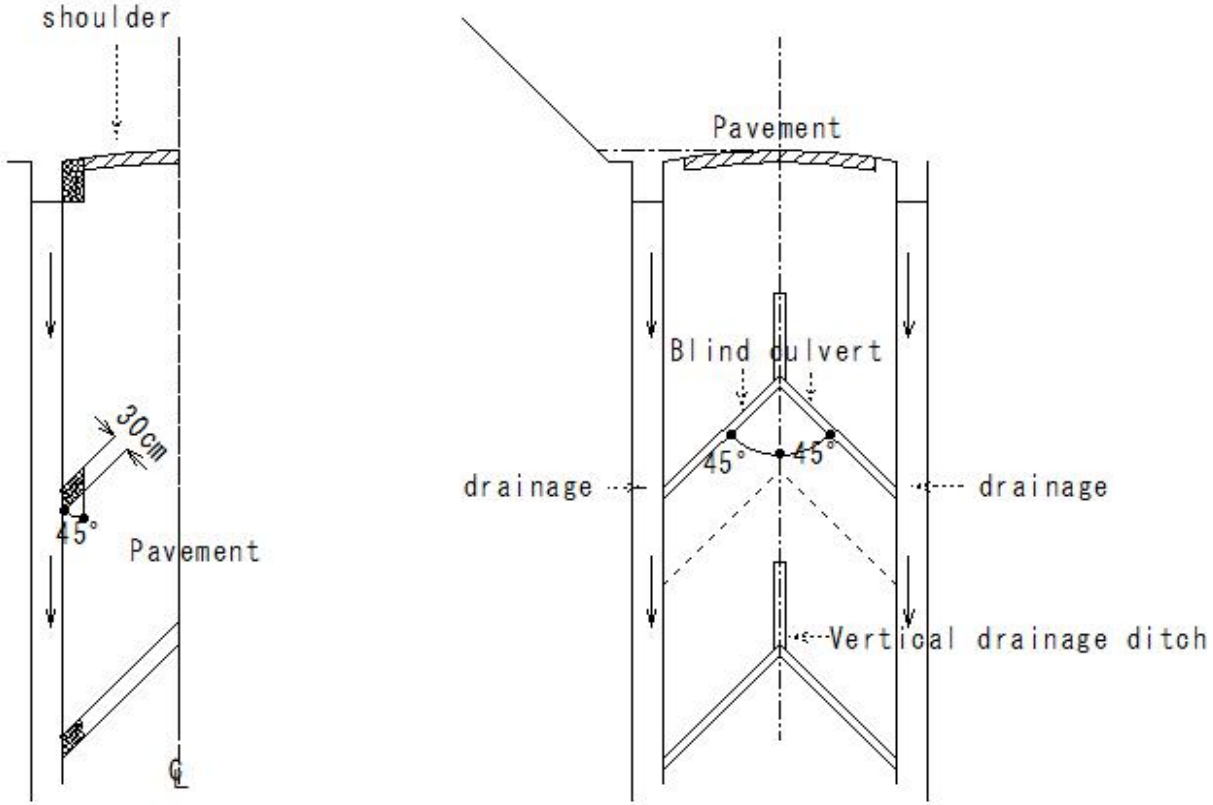


Figure 55 Drainage of paved roads

(H1139) Retaining wall

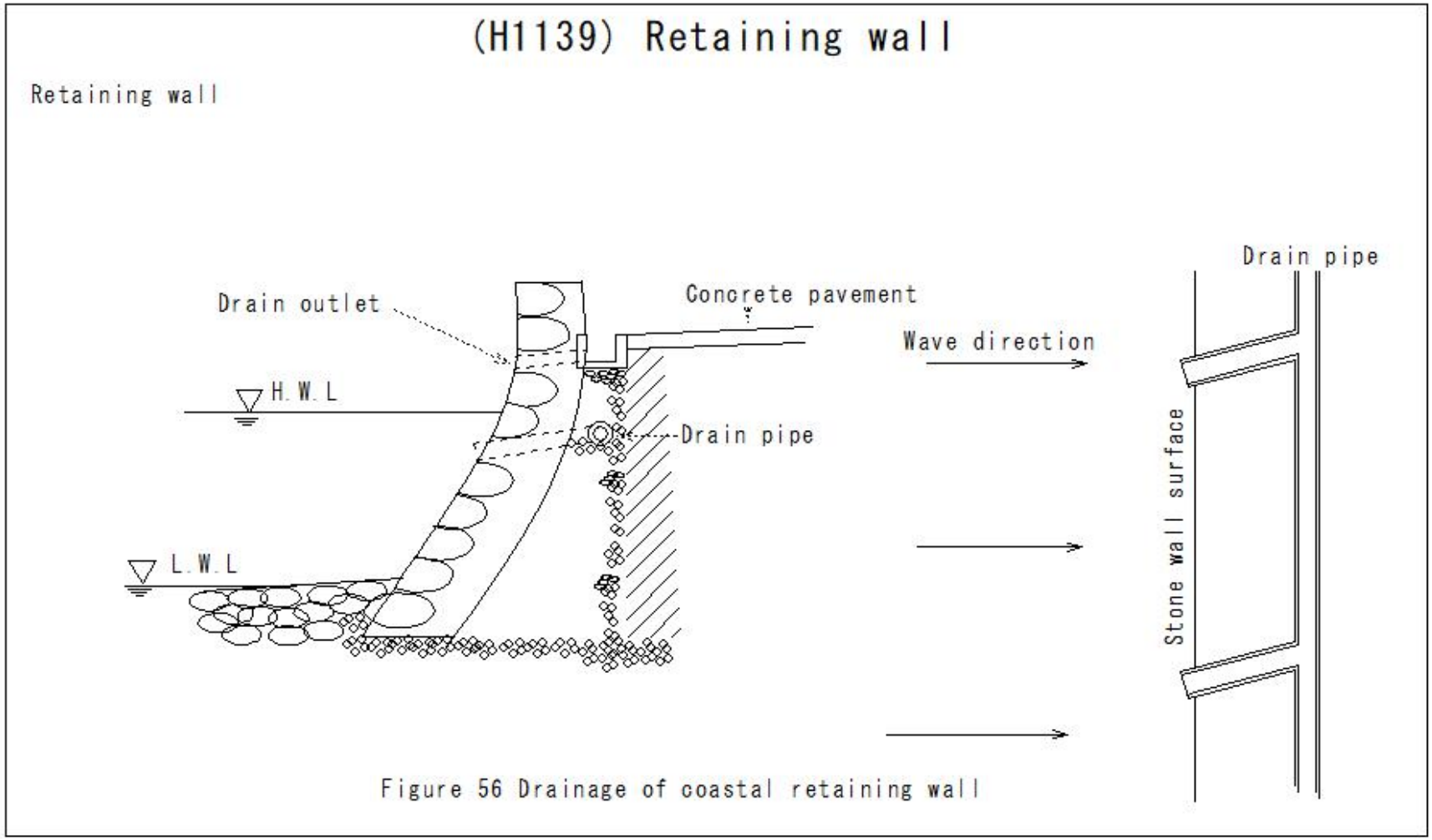


Figure 56 Drainage of coastal retaining wall

(H1140) Retaining wall

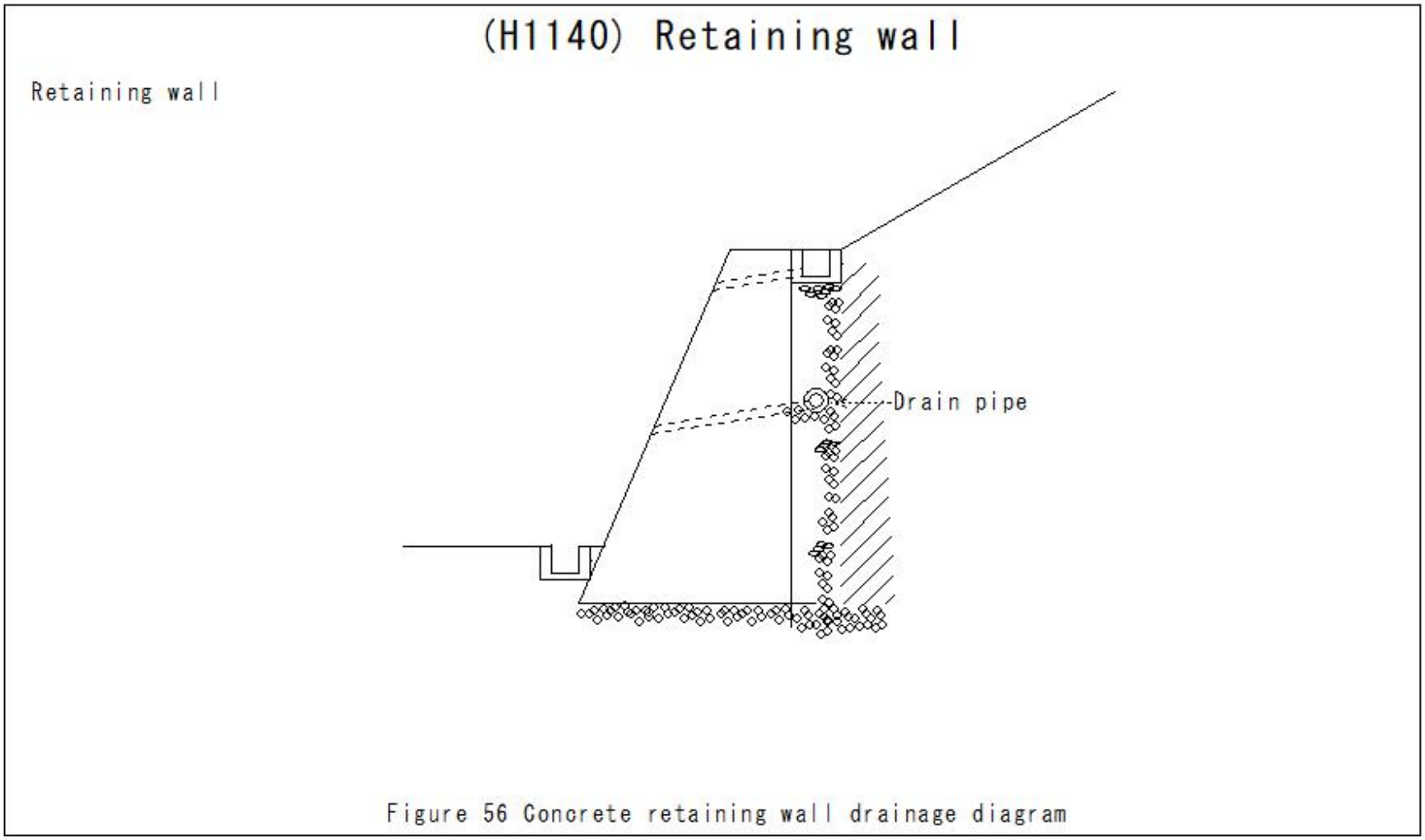
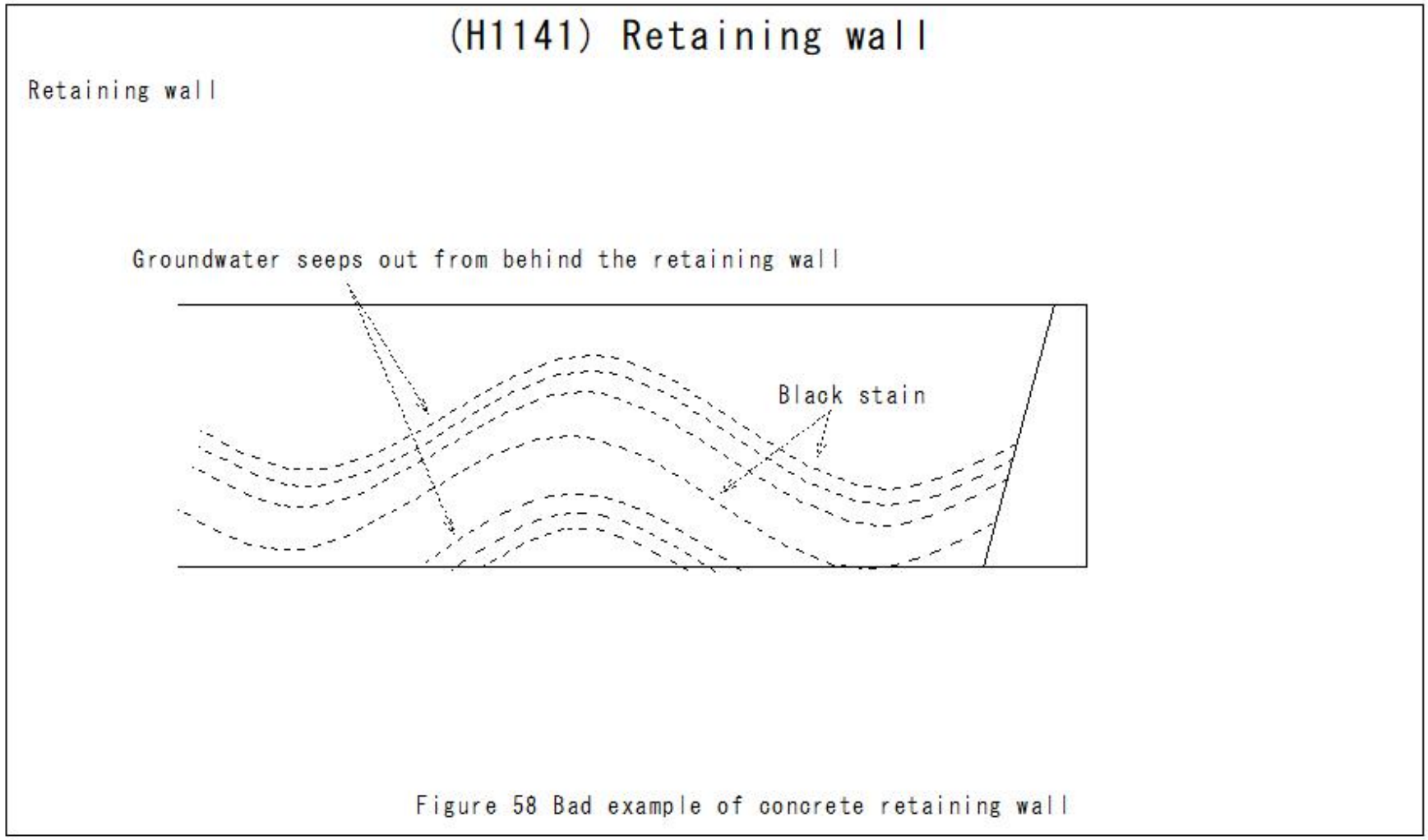


Figure 56 Concrete retaining wall drainage diagram

(H1141) Retaining wall



(H1142) Retaining wall

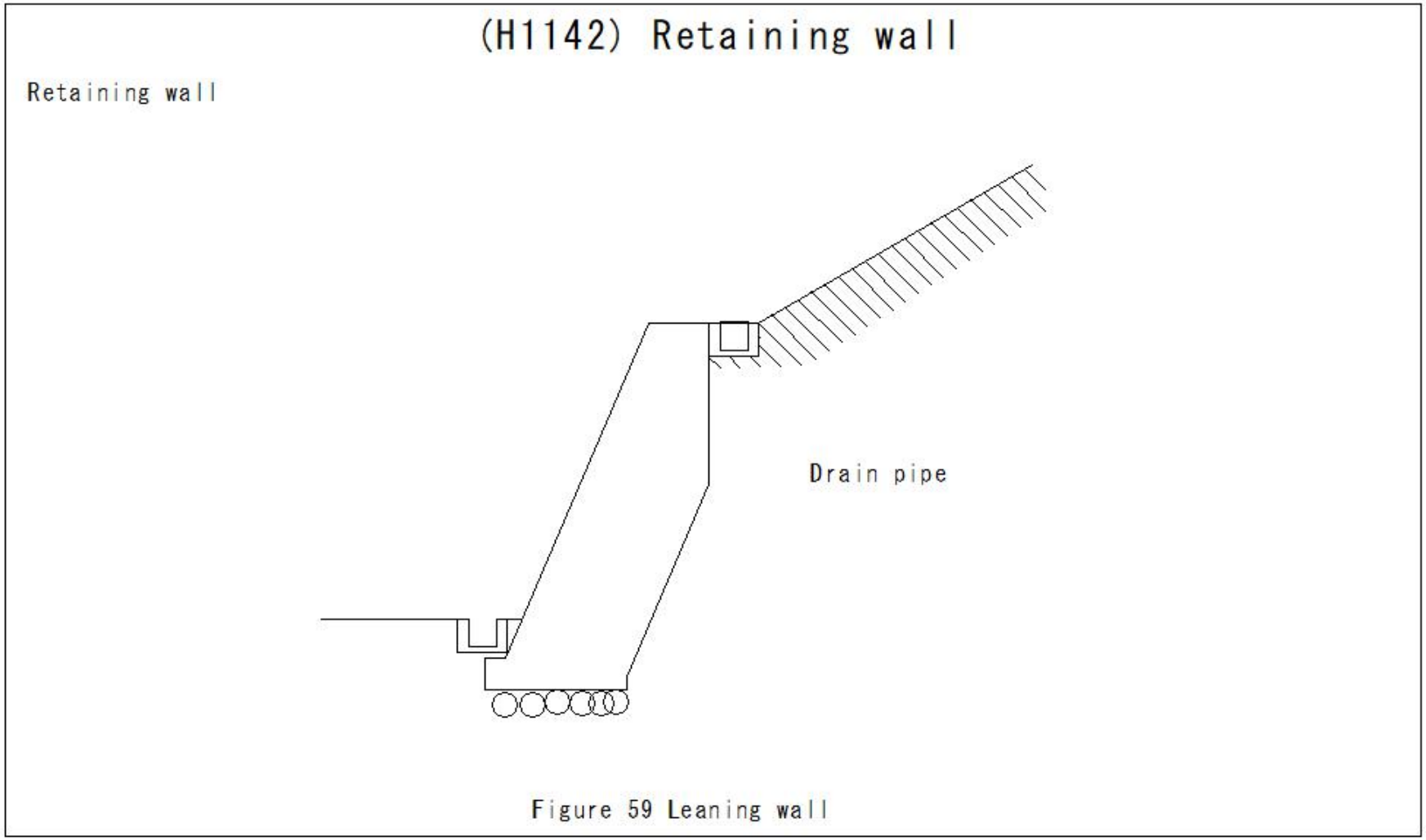


Figure 59 Leaning wall

(H1143) Retaining wall

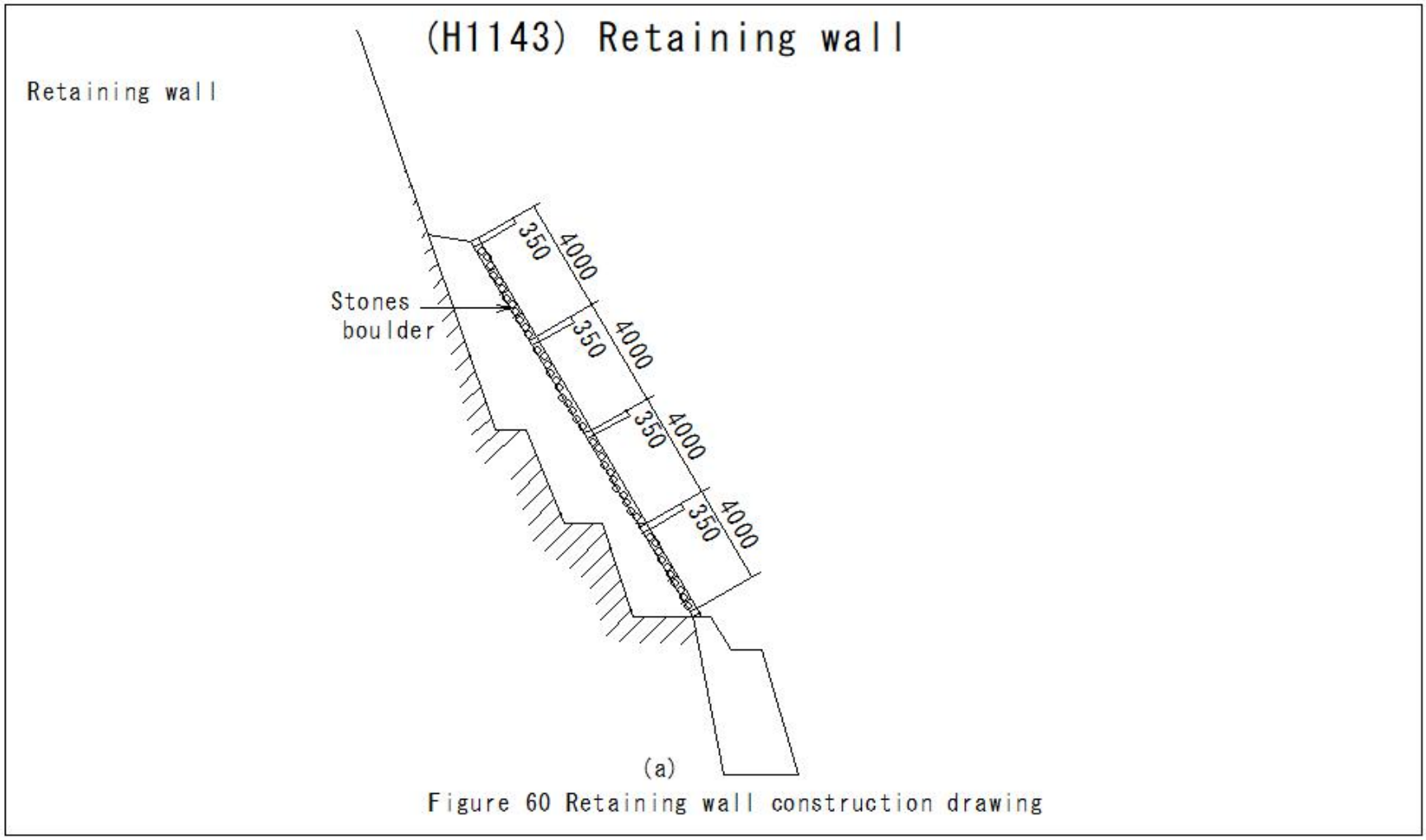
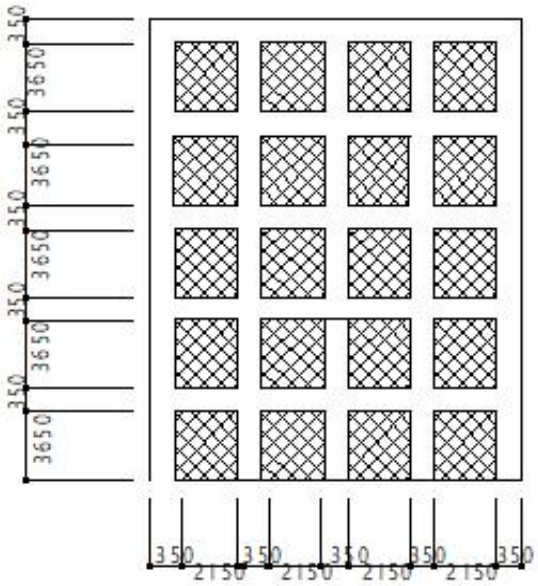


Figure 60 Retaining wall construction drawing

(H1144) Retaining wall

Retaining wall



(b)

Figure 60 Retaining wall construction diagram

(H1145) Retaining wall

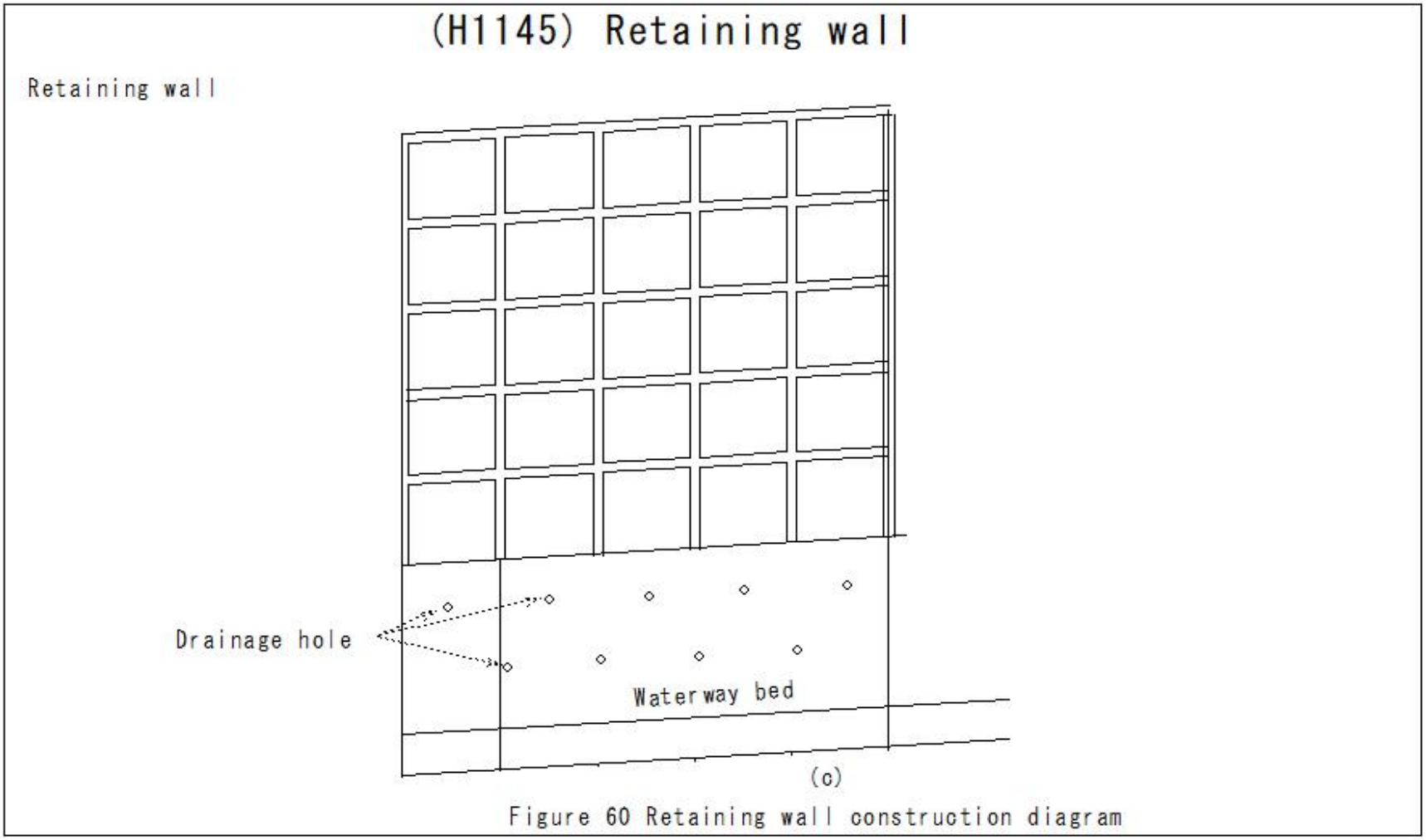


Figure 60 Retaining wall construction diagram

(H1146) Bituminous pavement

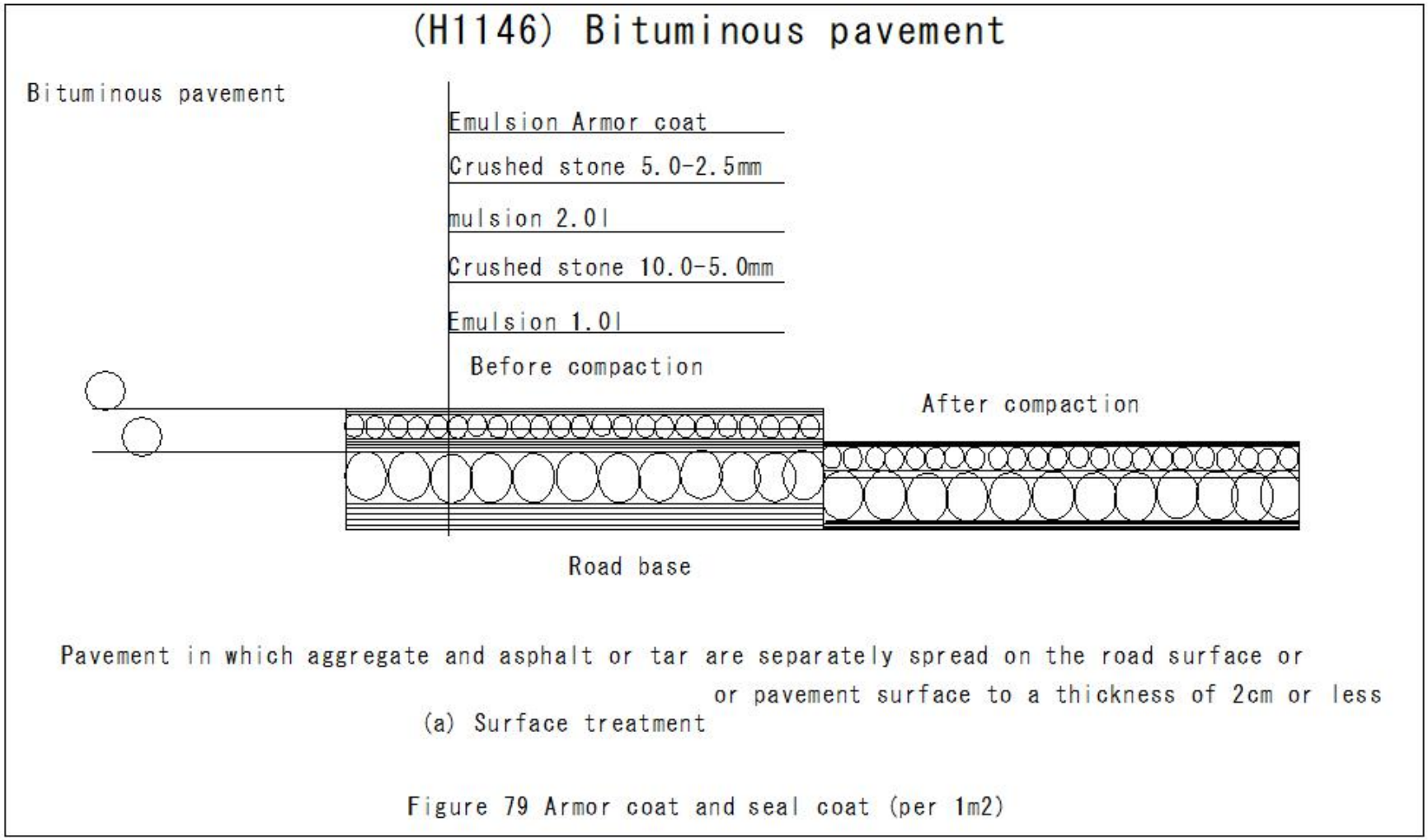
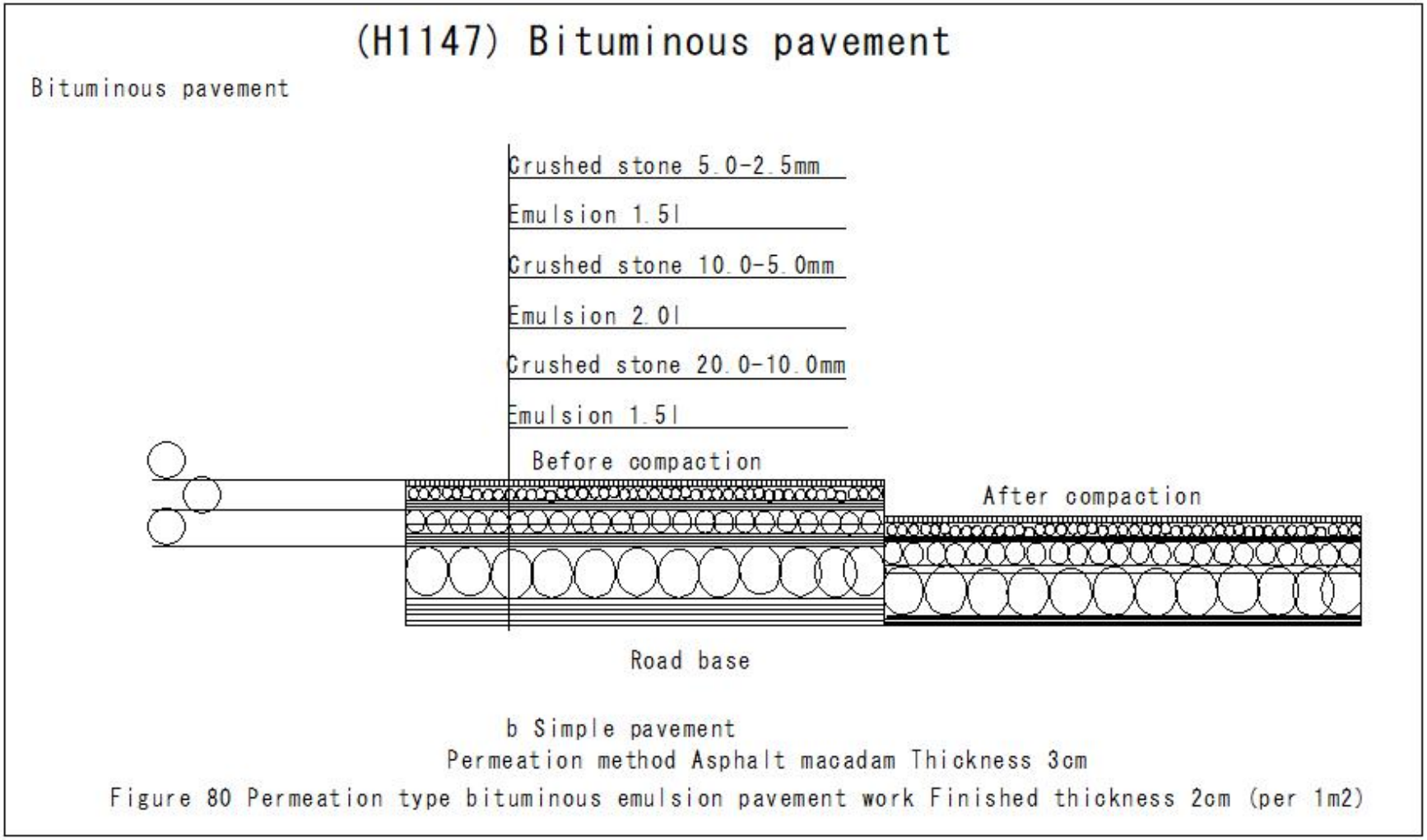


Figure 79 Armor coat and seal coat (per 1m2)

(H1147) Bituminous pavement



b Simple pavement

Permeation method Asphalt macadam Thickness 3cm

Figure 80 Permeation type bituminous emulsion pavement work Finished thickness 2cm (per 1m2)

(H1148) Bituminous pavement

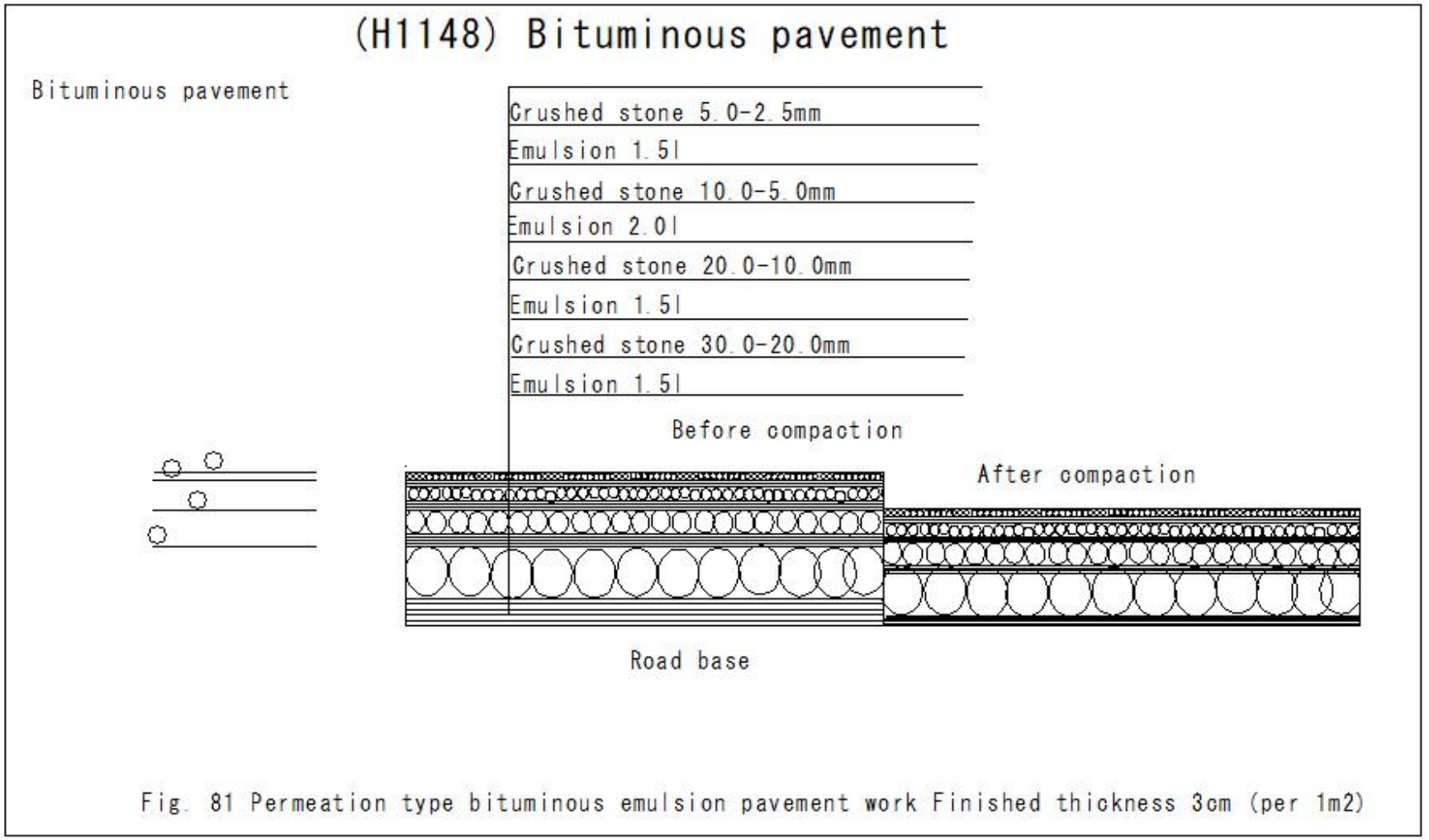


Fig. 81 Permeation type bituminous emulsion pavement work Finished thickness 3cm (per 1m2)

(H1149) Bituminous pavement

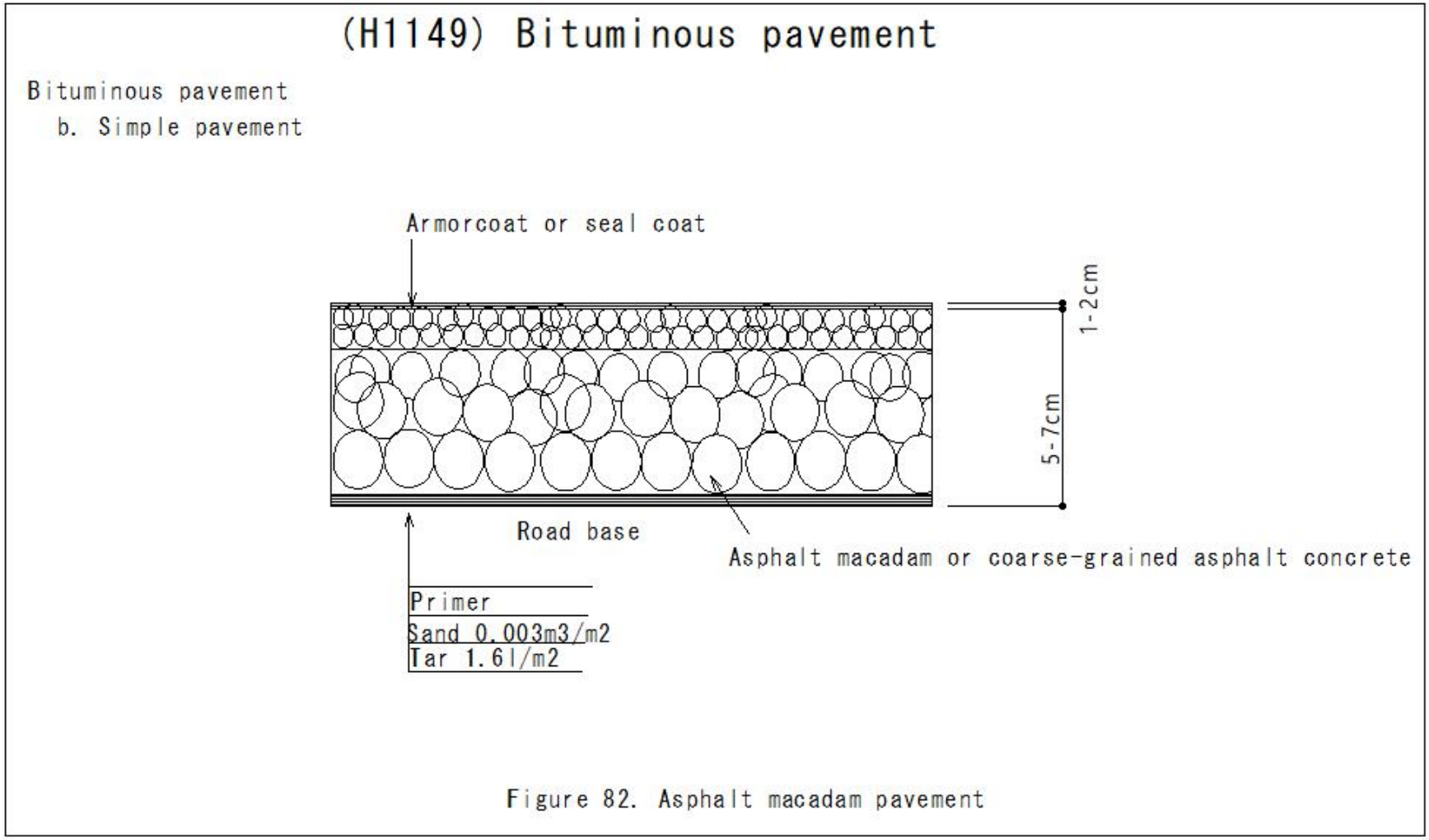


Figure 82. Asphalt macadam pavement

(H1150) Bituminous pavement

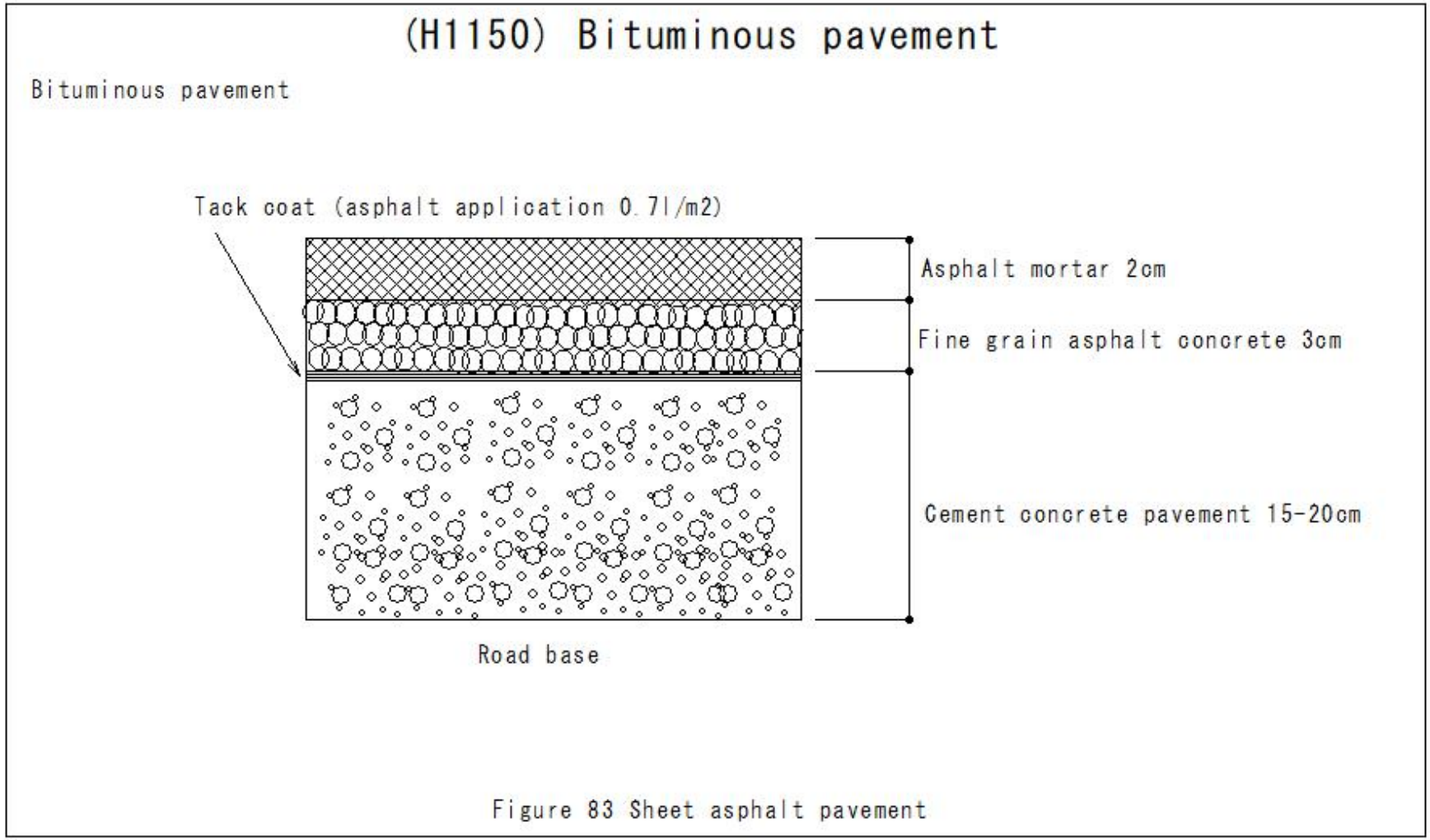


Figure 83 Sheet asphalt pavement

(H1151) Bituminous pavement

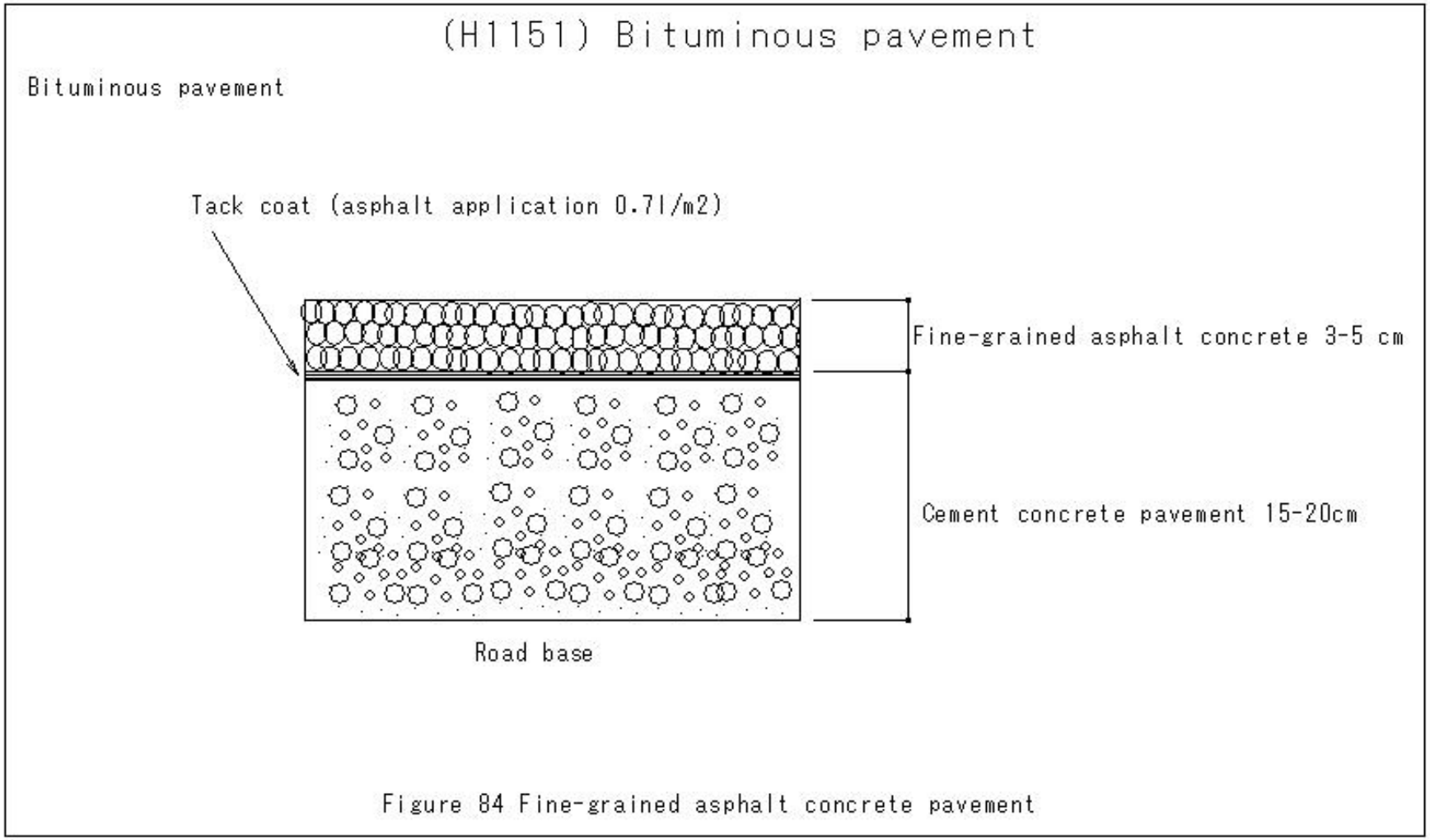


Figure 84 Fine-grained asphalt concrete pavement

(H1152) Bituminous pavement

(H1152) Bituminous pavement

Bituminous pavement

Warbit pavement

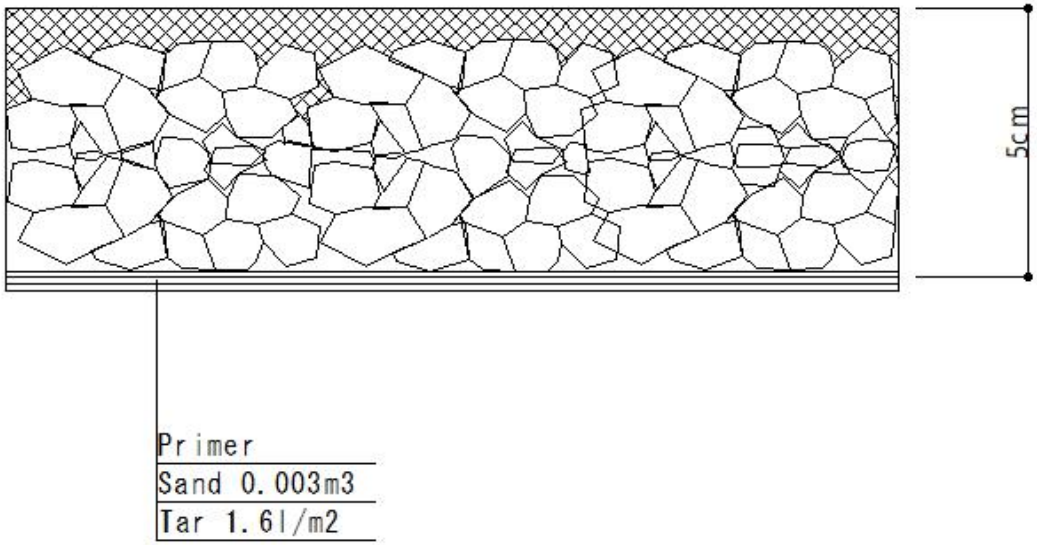
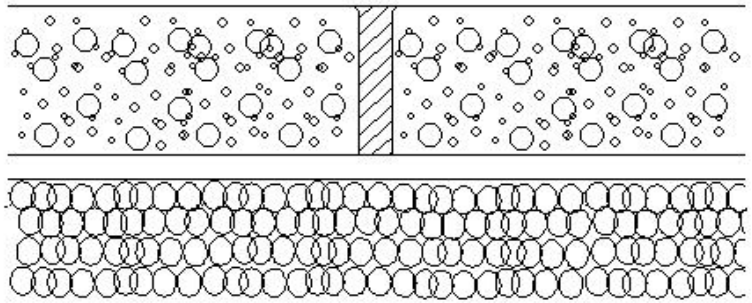


Figure 85 Warbit pavement

(H1153) Concrete paving

(H1153) Concrete paving

Concrete paving

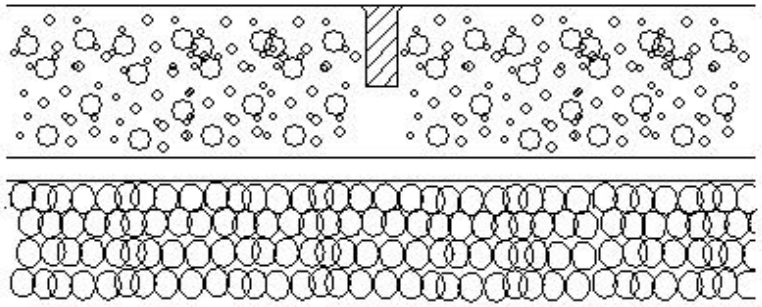


Butt joint

Figure 88 Types of joints

(H1154) Concrete paving

Concrete paving



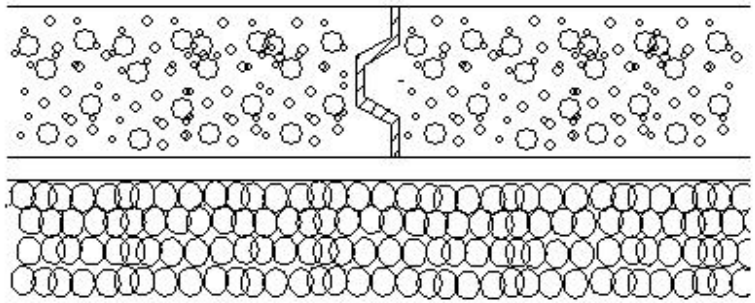
Blind joints

Figure 88 Types of joints

(H1155) Concrete paving

(H1155) Concrete paving

Concrete paving



K joints

Figure 88 Types of joints

(H1156) Concrete paving

(H1156) Concrete paving

Concrete paving

Joint arrangement

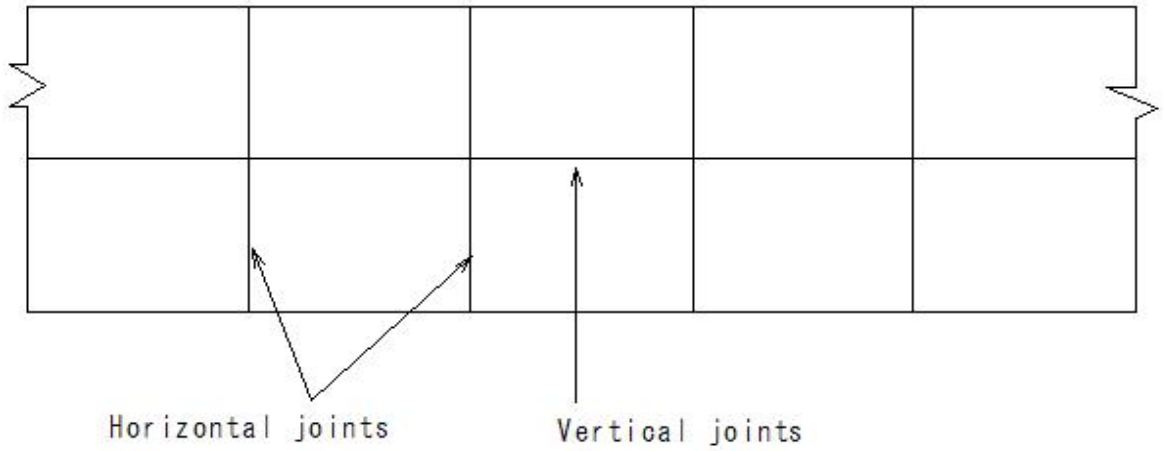


Figure 89 Types of joints

(H1157) Concrete paving

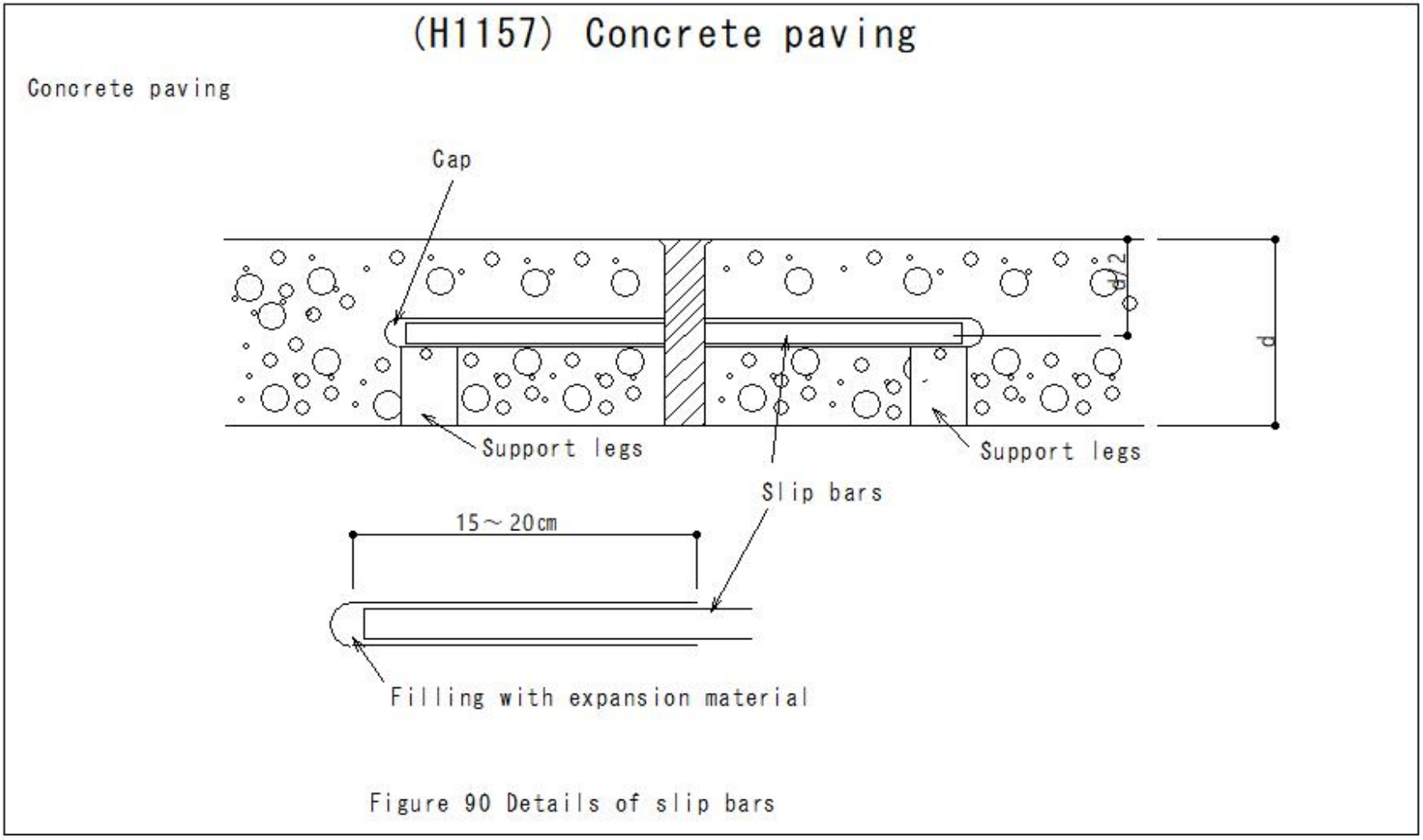


Figure 90 Details of slip bars

(H1158) Block paving

Block paving

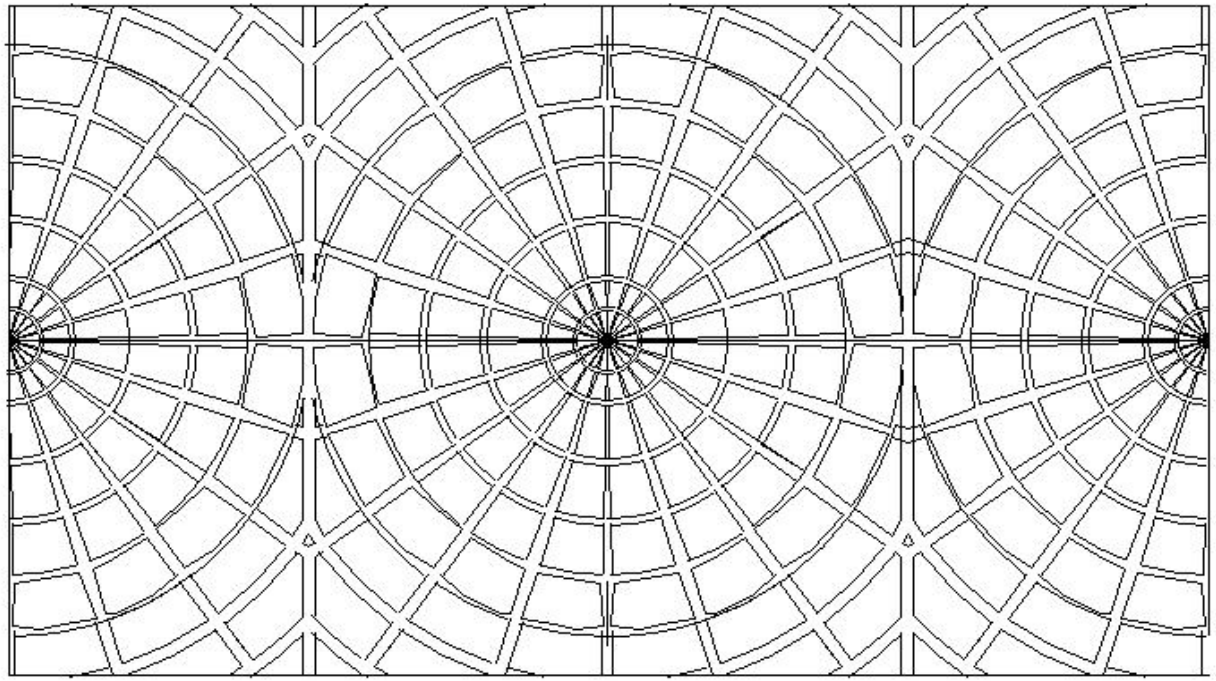


Figure 92 How to lay out small paving stones

(H1159) Block paving

(H1159) Block paving

Block paving

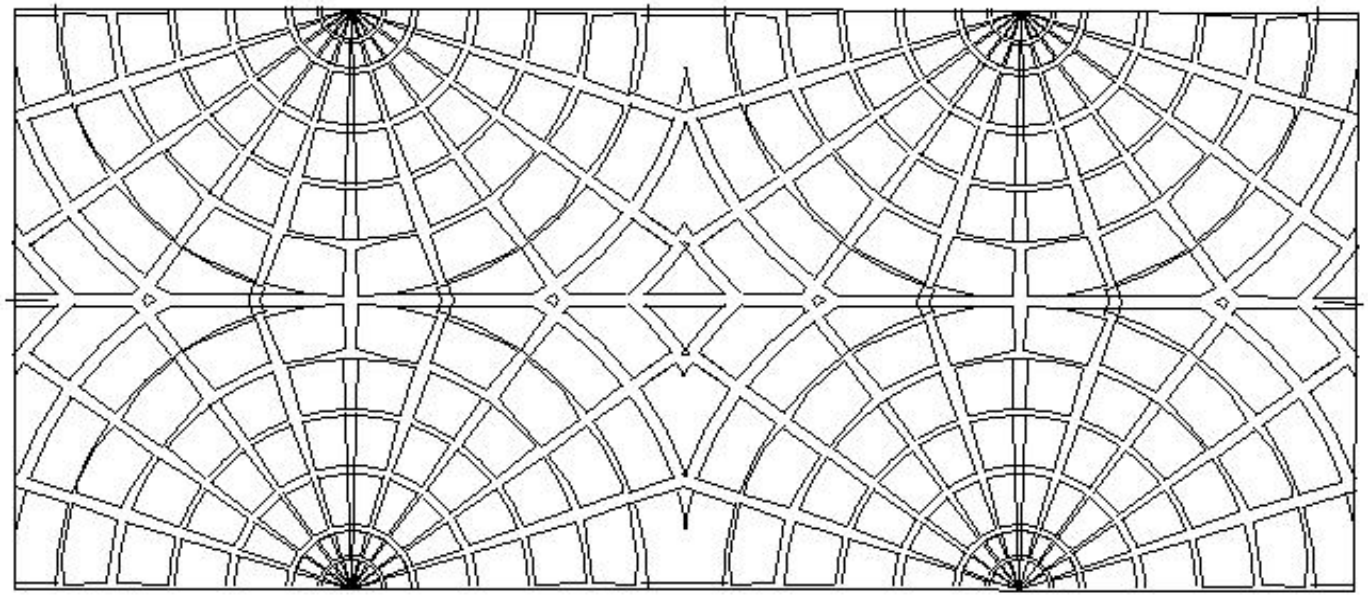


Figure 92 How to lay out small paving stones

(H1160) Asphalt plant

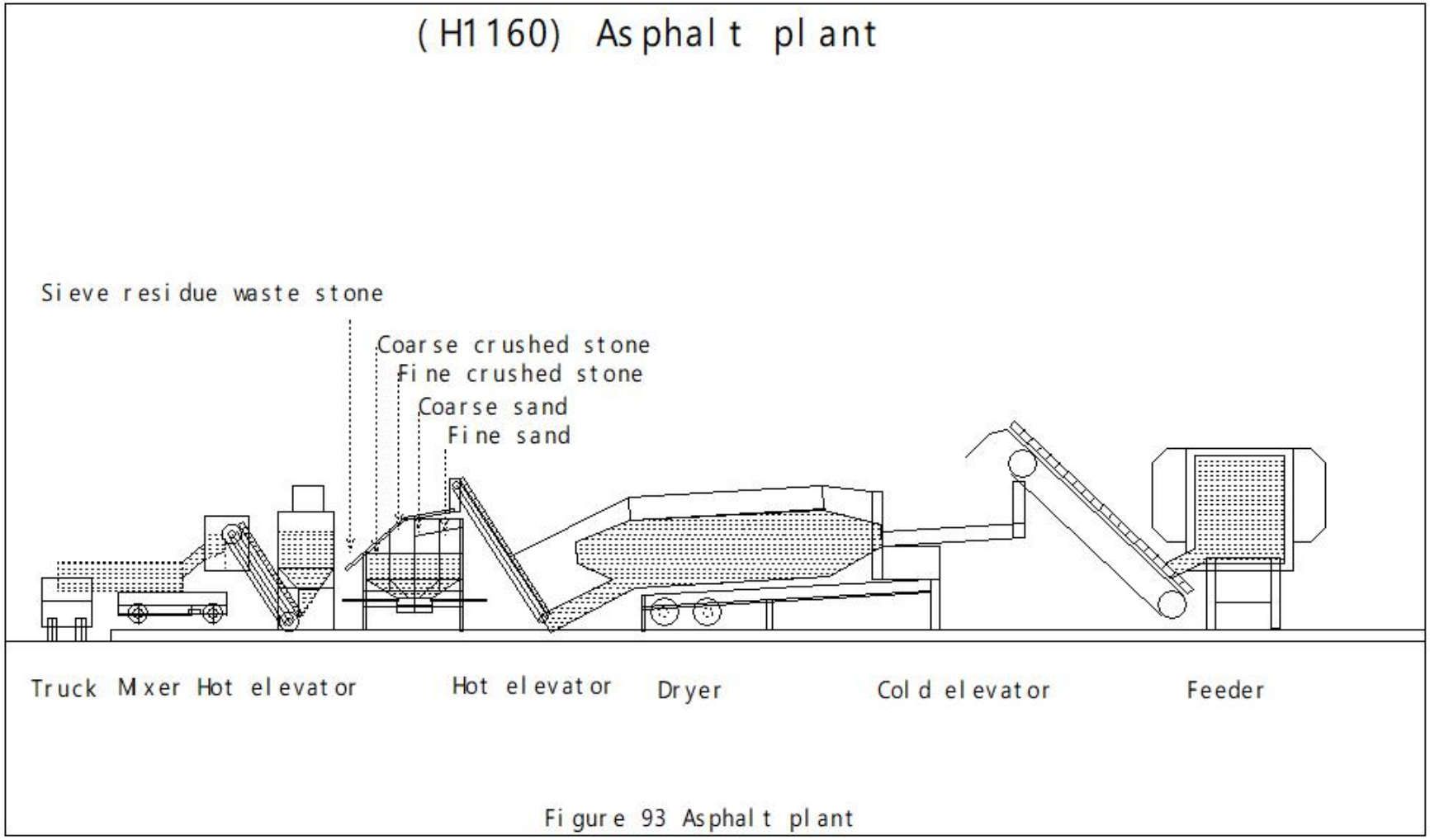
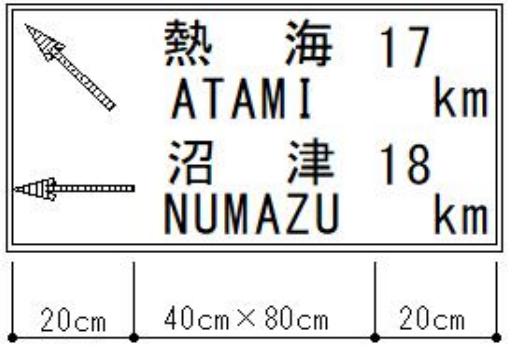


Figure 93 Asphalt plant

(H1161) Sign

Sign



(a) Direction and distance

Figure 104 Guide sign

(H1162) Sign

Sign

(40cm×62cm)

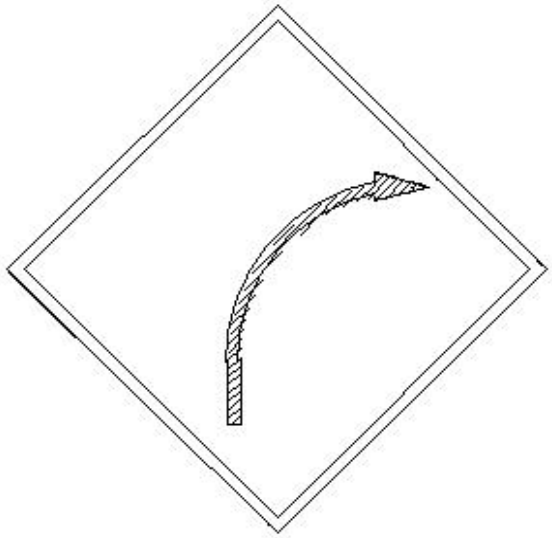
(b) Direction and distance

Figure 104 Guide sign

(H1163) Sign

(H1163) Sign

Signs



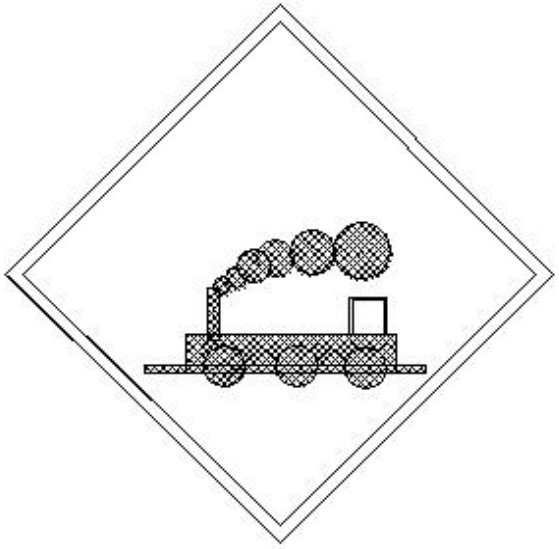
(a) Right (or left) bend

Figure 105 Warning sign

(H1164) Sign

(H1164) Sign

Signs



(b) Railroad crossing ahead

Figure 105 Warning sign

(H1165) Sign

(H1165) Sign

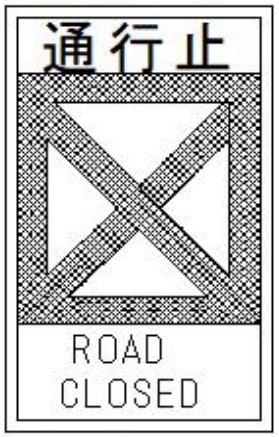
Signs

(c) Danger

Figure 105 Warning signs

(H1166) Sign

sign



(68cm×40cm)

(a) closed for traffic

Figure-106 Prohibition sign

(H1167) Sign

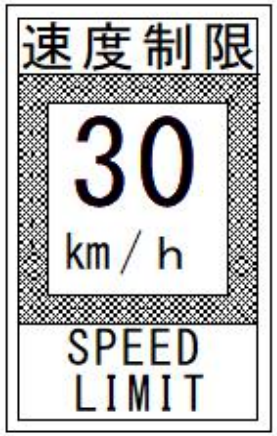
sign

(b)NO PARKING

Figure-106 Prohibition sign

(H1168) Sign

sign

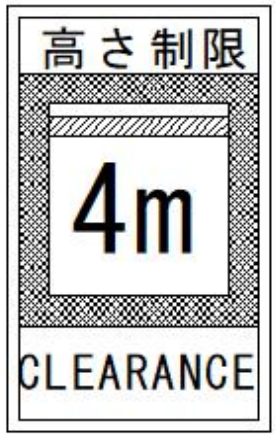


(a) SPEED LIMIT

Figure-107 Guidance sign

(H1169) Sign

sign

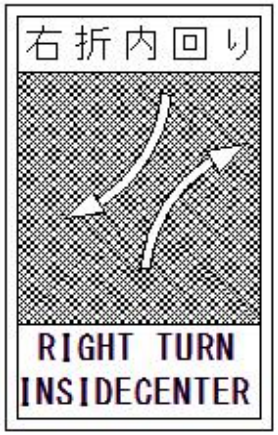


(b) Height limit

Figure-107 Guidance sign

(H1170) Sign

sign



(c) Right turn inside

Figure-107 Guidance sign

(H1171) Sign

(H1171) Sign

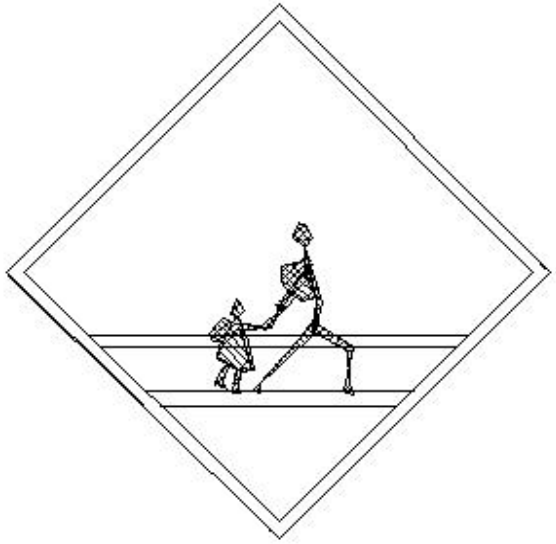
sign

(d) Stop

Figure-107 Guidance sign

(H1172) Sign

Signs

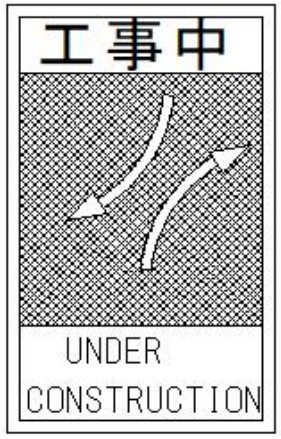


(a) Crosswalk

Figure 108 Guidance signs

(H1173) Sign

sign



(b) Under construction

Figure-108 Instruction sign

(H1174) Angle measurement

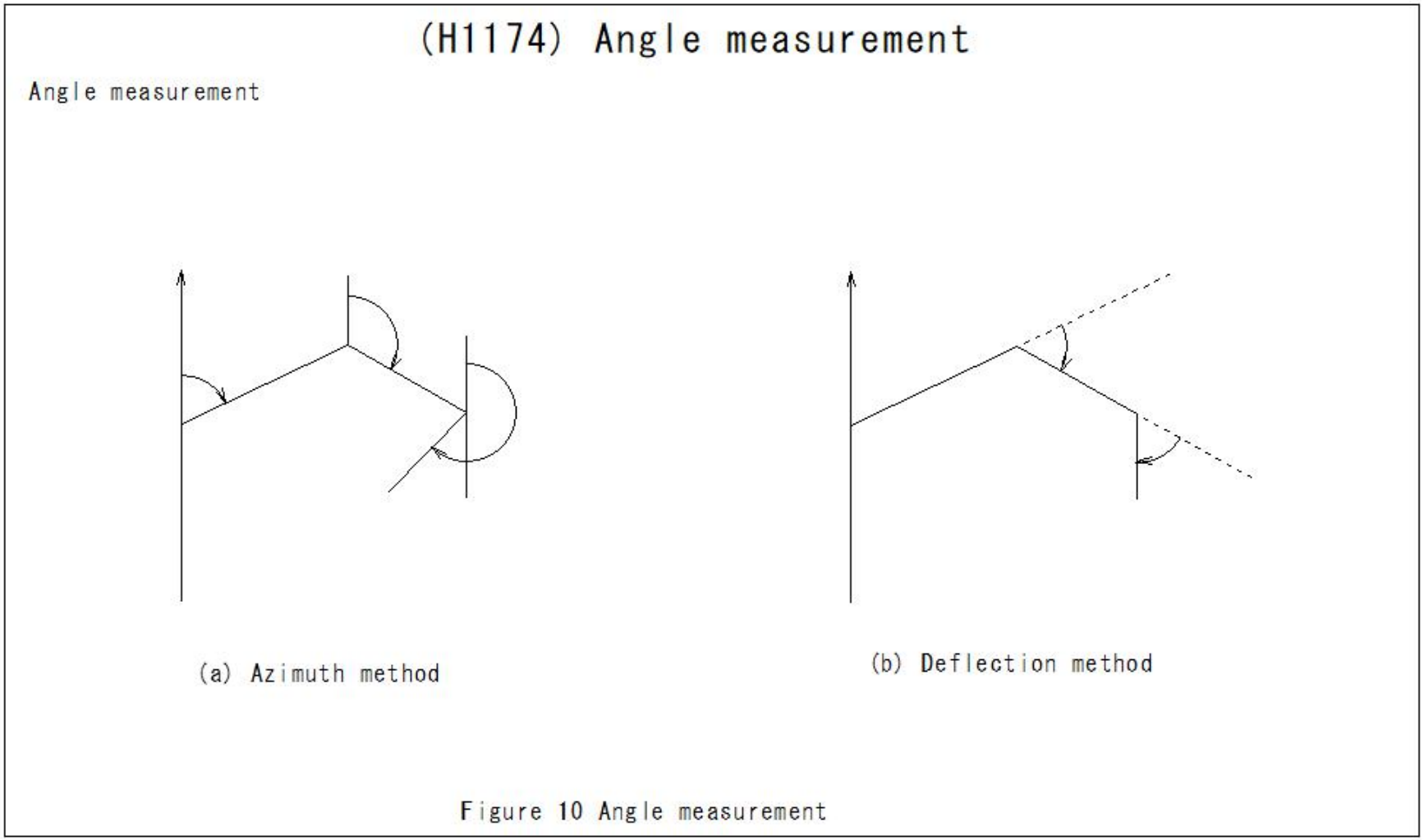
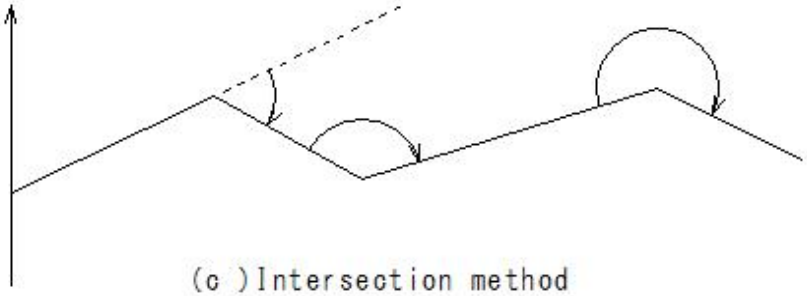


Figure 10 Angle measurement

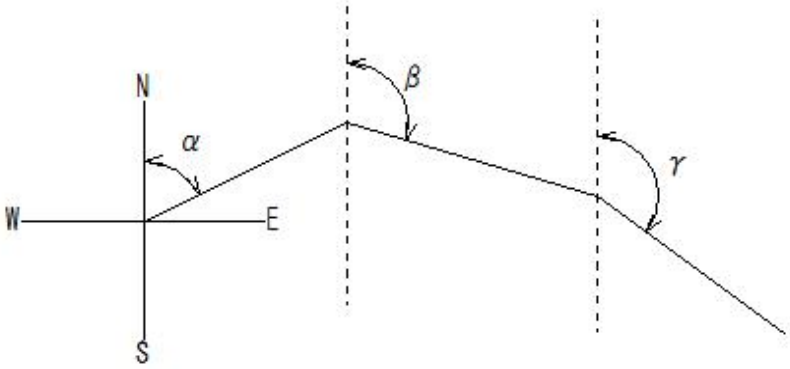
(H1175) Angle measurement

(H1175) Angle measurement

Angle measurement



(c)Intersection method



α β γ : Azimuth angle

Figure 11 Azimuth angle

Figure 10 Angle measurement

(H1176) Angle measurement

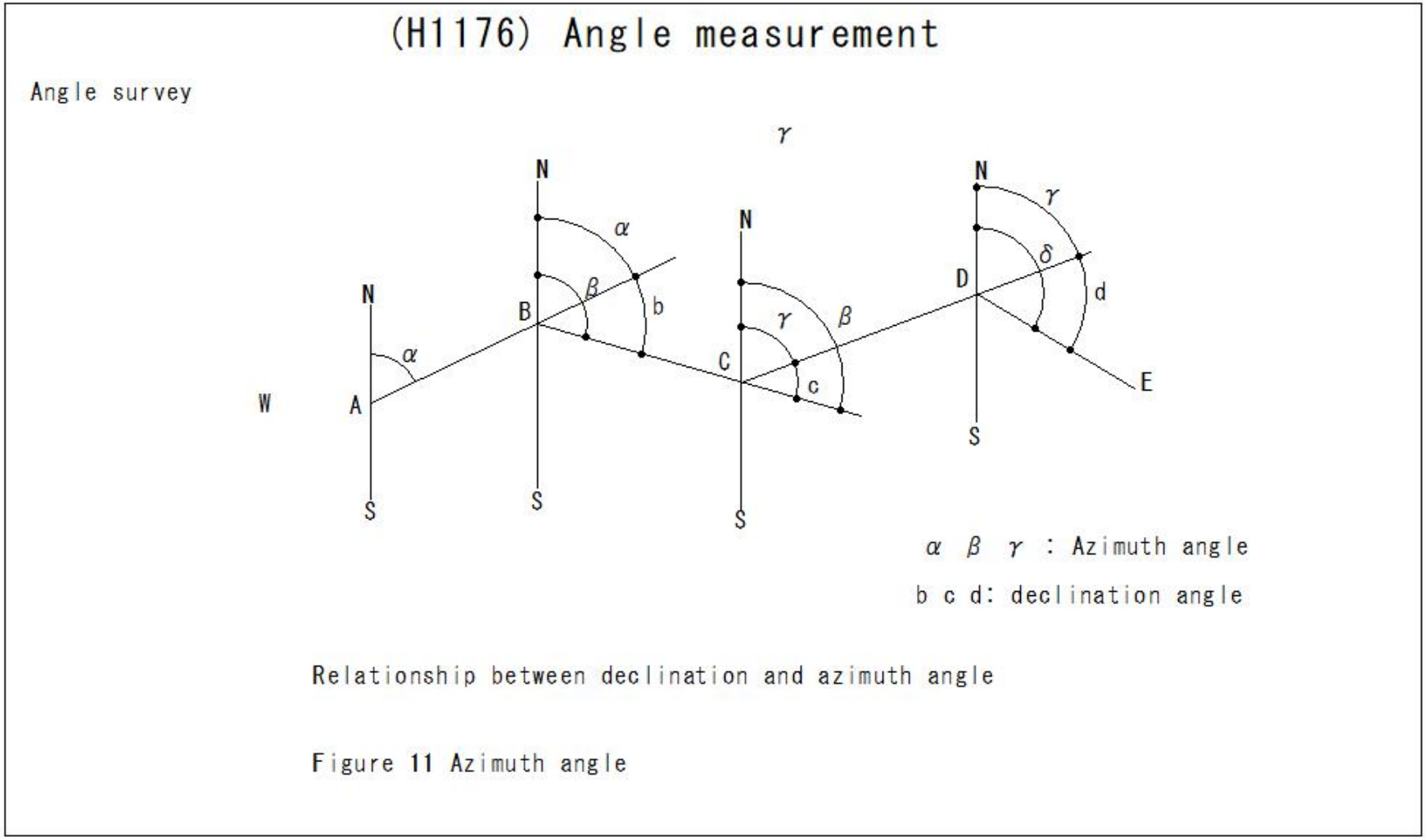
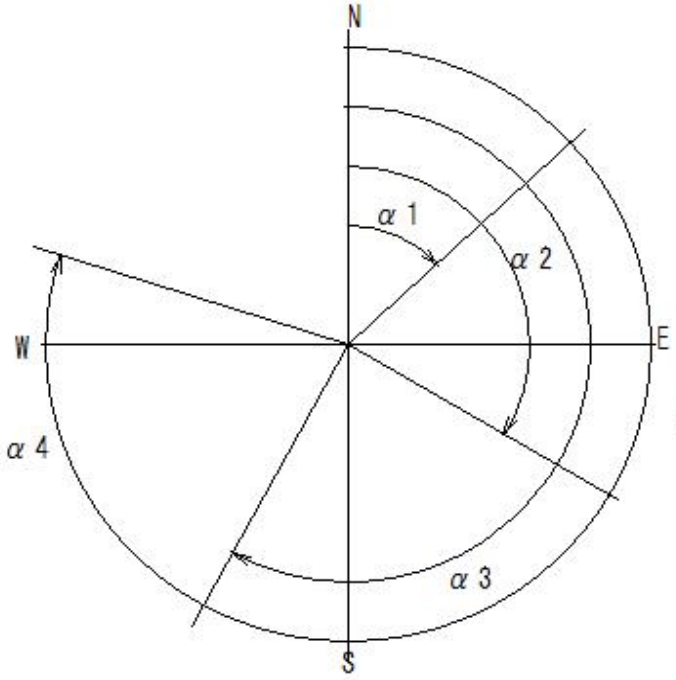


Figure 11 Azimuth angle

(H1177) Angle measurement

Angle survey



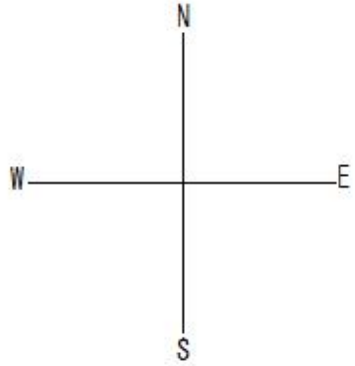


Figure 12 Azimuth angle and direction

Figure 13 Azimuth angle and direction

(H1178) Angle measurement

(H1178) Angle measurement

Angle measurement

Table 1: Azimuth angle, direction

Azimuth angle	Direction
90° ＞α1＞0	Nα1E
180° ＞α2＞90°	Sα2E (180-α2)
270° ＞α3＞180°	Sα3W(α3-180)
360° ＞α4＞270°	Nα4W(360-α4)

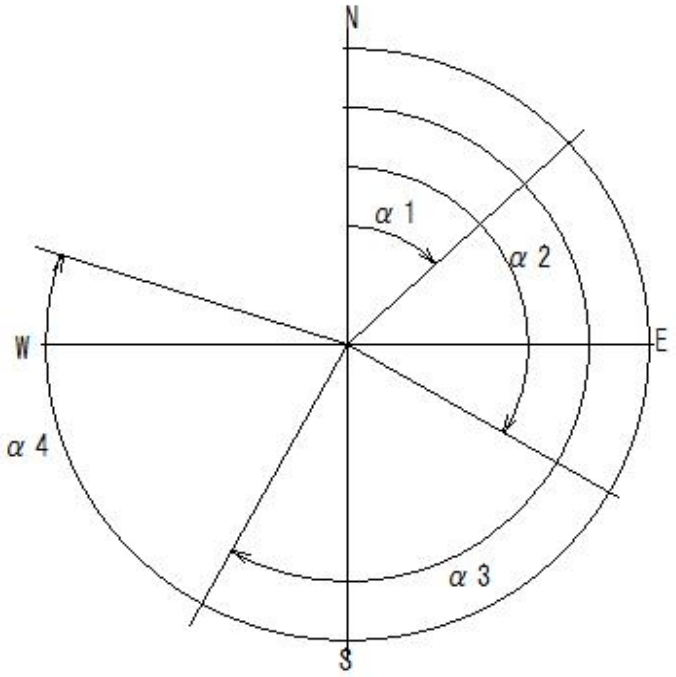


Figure 13 Azimuth angle and direction

(H1179) Surveying curves

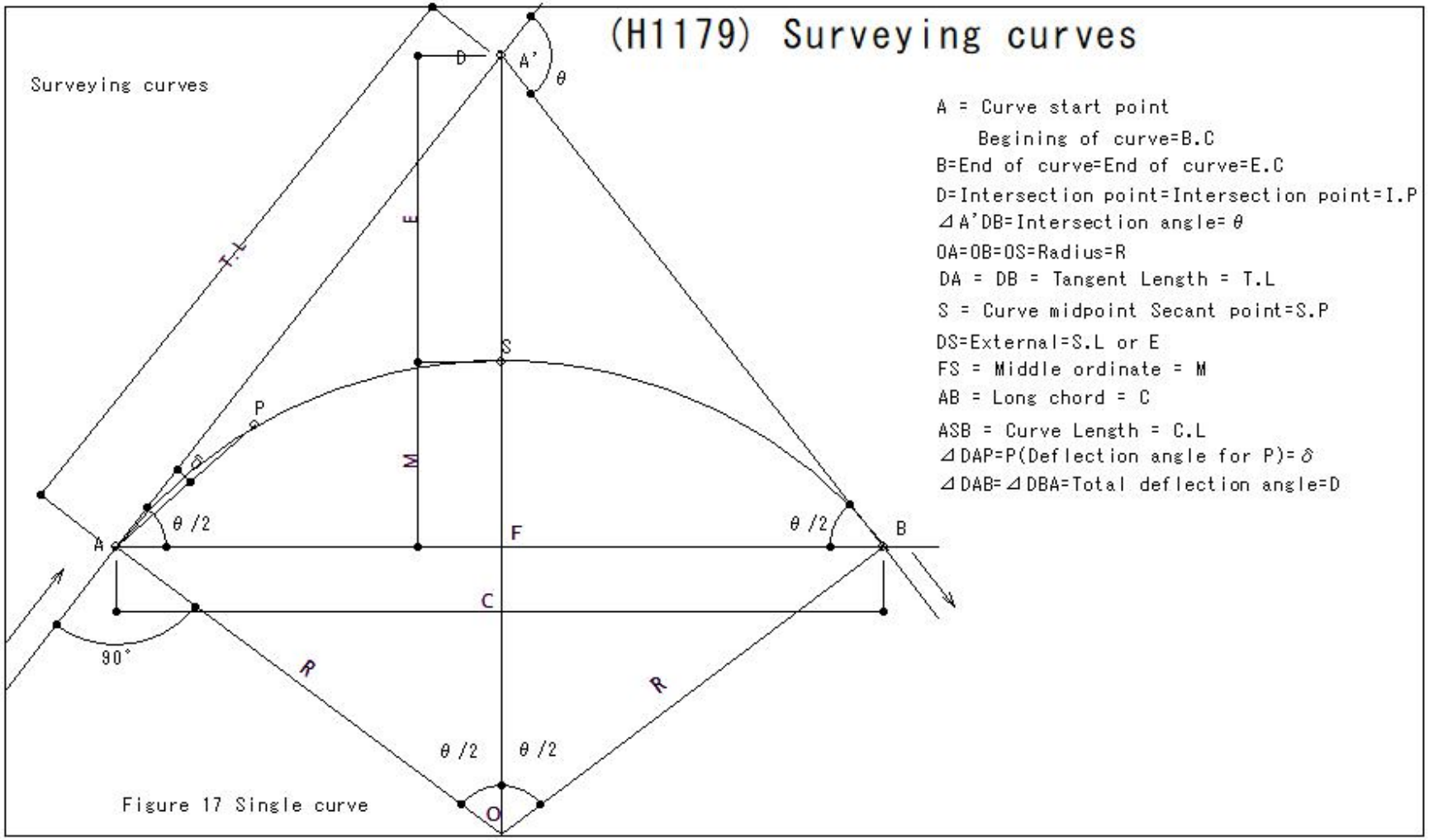
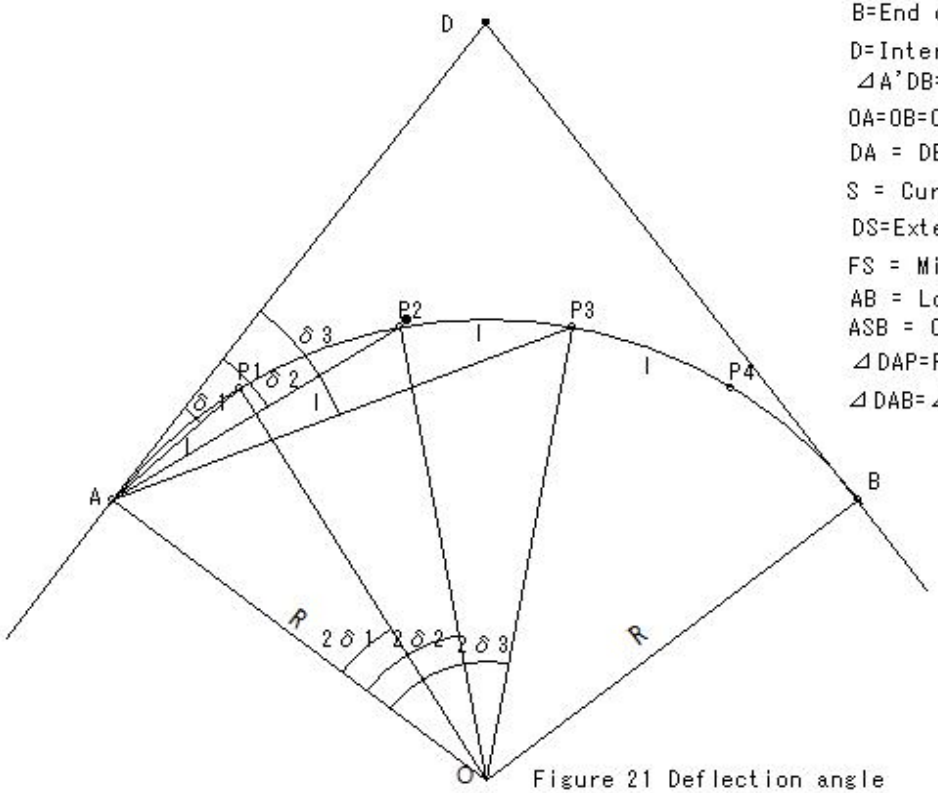


Figure 17 Single curve

(H1180) Surveying curves

(H1180) Surveying curves

Surveying curves



A = Curve start point

Begining of curve=B.C

B=End of curve=End of curve=E.C

D=Intersection point=Intersection point=I.P

⊿A'DB=Intersection angle= θ

OA=OB=OS=Radius=R

DA = DB = Tangent Length = T.L

S = Curve midpoint Secant point=S.P

DS=External=S.L or E

FS = Middle ordinate = M

AB = Long chord = C

ASB = Curve Length = C.L

⊿DAP=P(Deflection angle for P)= δ

⊿DAB=⊿DBA=Total deflection angle=D

$\delta 1 = 1718'87 \times AP1/R$

$\delta 2 = 1718'87 \times AP2/R$

$\delta 3 = 1718'87 \times AP3/R$

AP1＝P1P2＝P2P3＝I

$\delta 2 = 2\delta 1$　$\delta 3 = 3\delta 1$

Figure 21 Deflection angle

(H1181) Angle measurement

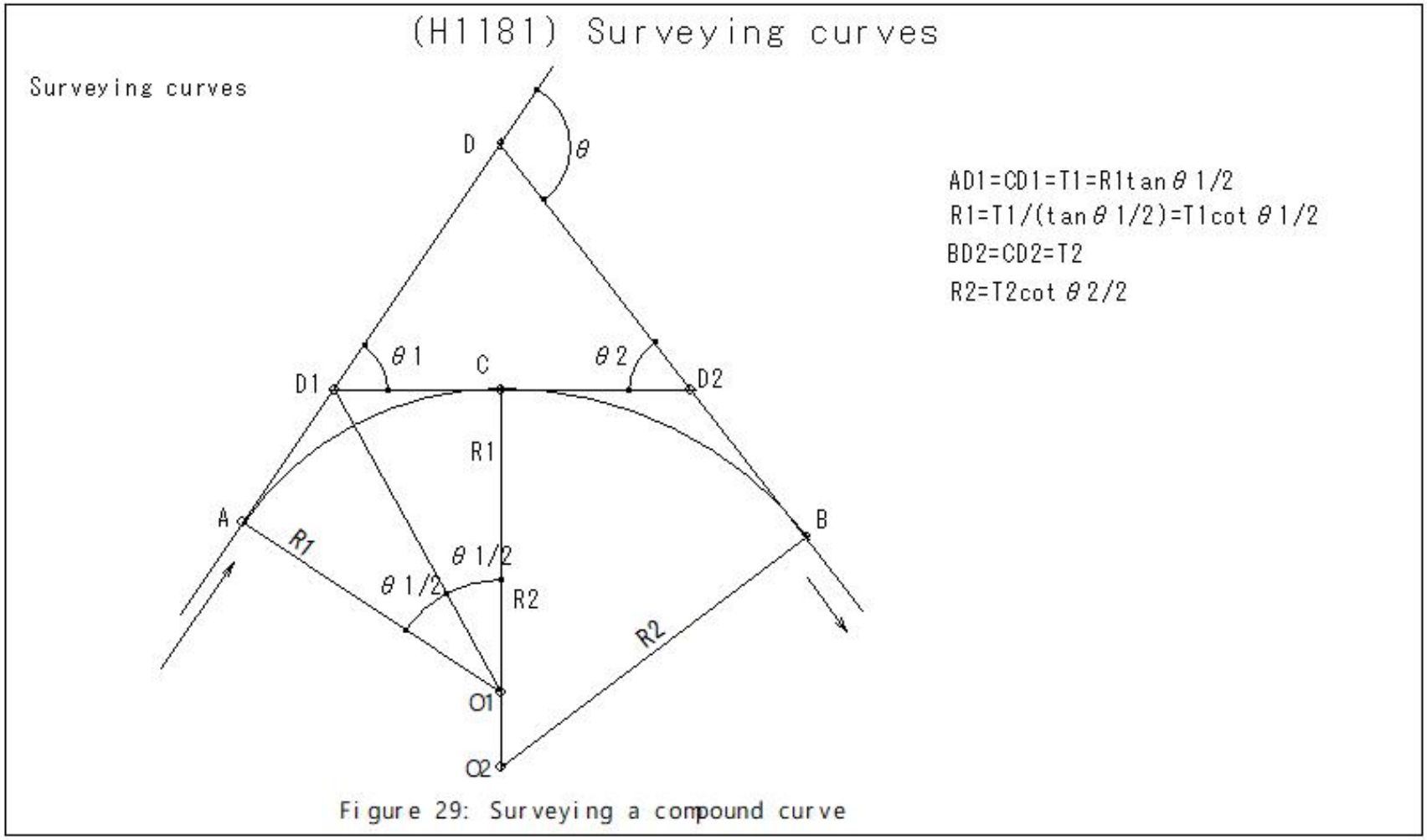


Figure 29: Surveying a compound curve

(H1182) Surveying curves

(H1182) Surveying curves

Surveying curves

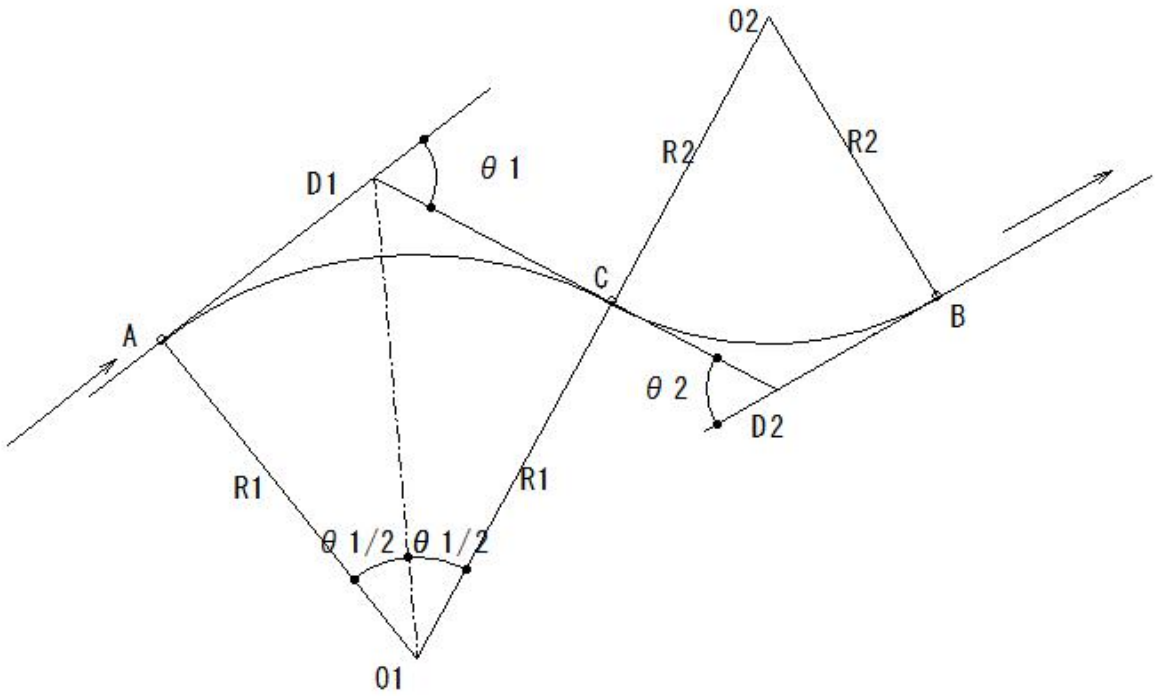


Figure 29 Reverse curve

(H1183) Surveying curves

(H1183) Surveying curves

Surveying curves

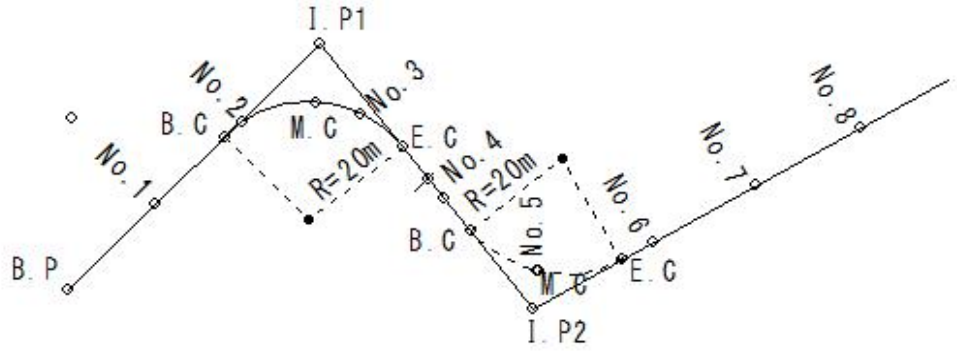
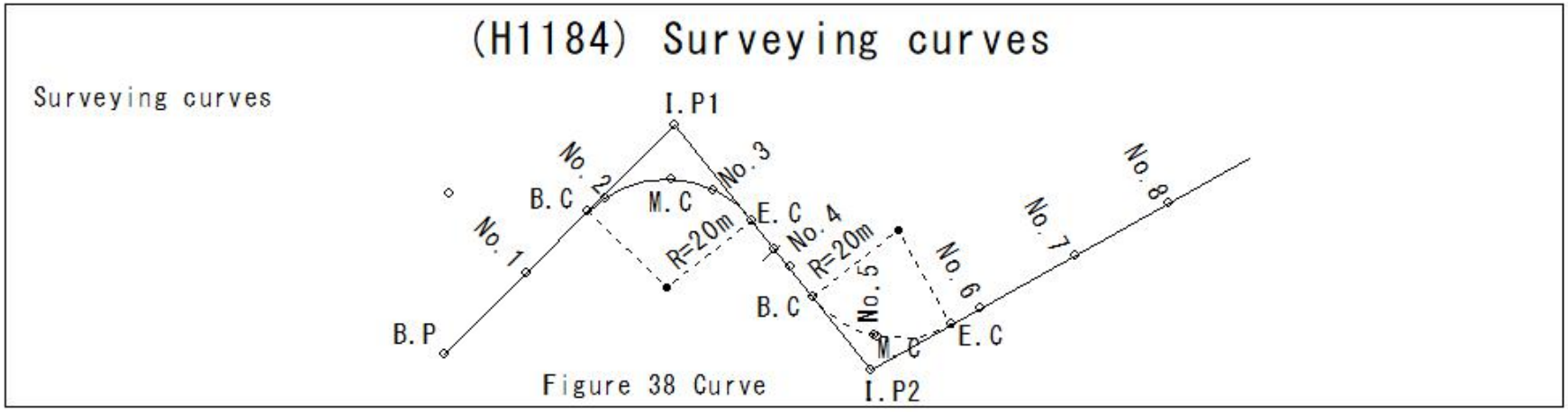


Figure 38 Curve

(H1184) Surveying curves



Stations

Station (I.P)	Horizontal Distance (H.D)	Azimuth (B.A)	Intersection (I.A)	Radius (R)	Tangent length (T.L)	secant length (S.L)	Curve length (C.L)	types	Distance	additional distances
B.P								B.P		
								No.1		
								B.C		
								No.2		
I.P1								M.C		
								No.3		
								E.C		
								No.4		
								B.C		
								No.5		
IP2								M.C		
								E.C		
								No.6		

(H1185) Surveying curves

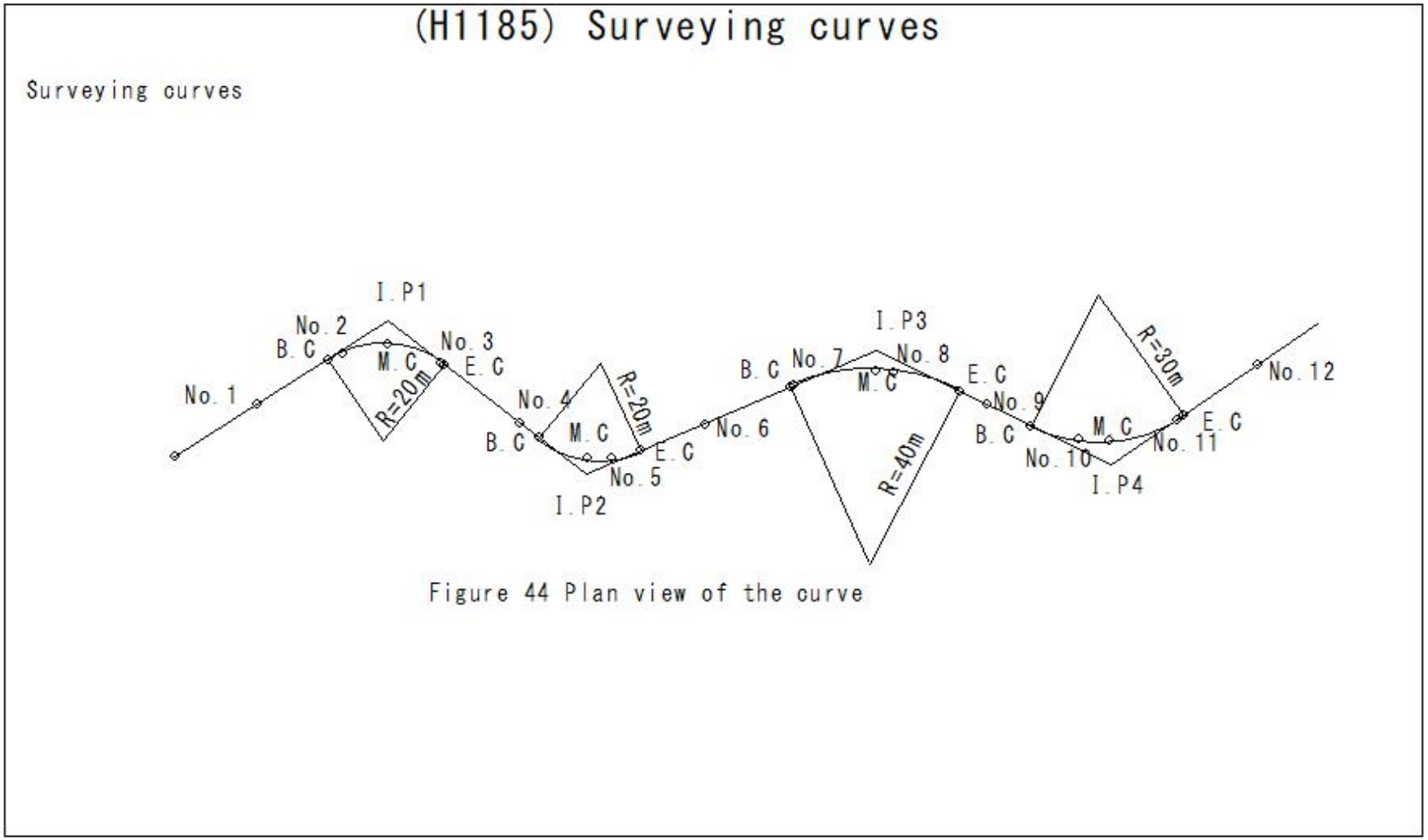


Figure 44 Plan view of the curve

(H1186) Surveying curves

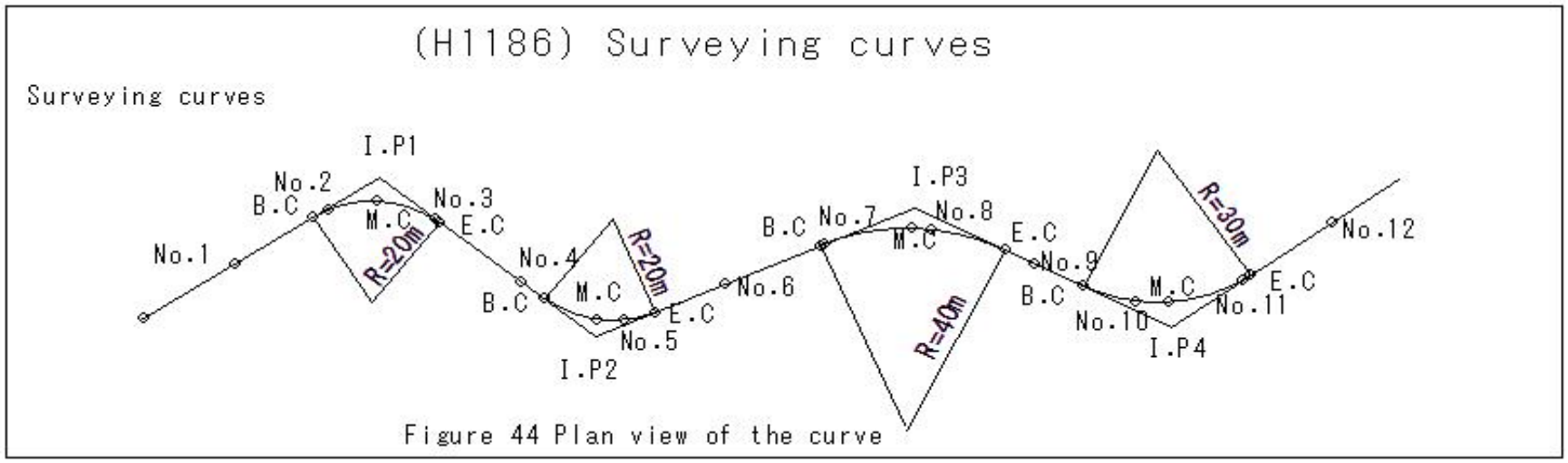


Figure 44 Plan view of the curve

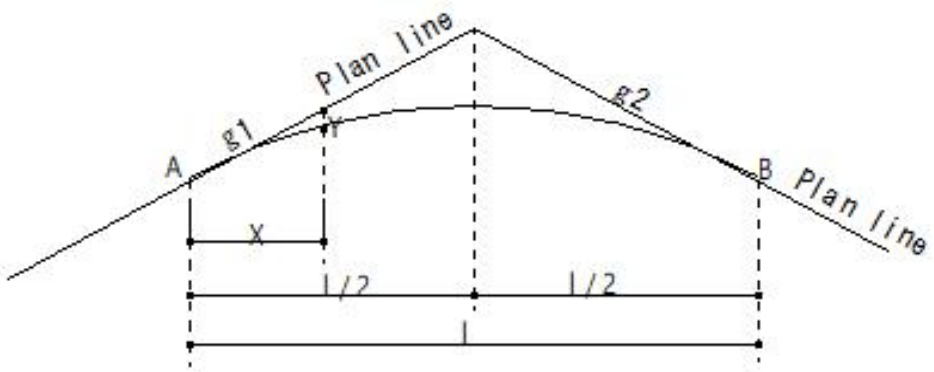
Curve Table

Station (I.P)	Horizontal Distance (H.D)	Azimuth (B.A)	Intersection (I.A)	Radius (R)	Tangent length (T.L)	secant length (S.L)	curve length (C.L)
I.P1							
I.P2							
I.P3							
I.P4							
I.P5							

(H1187) Surveying curves

(H1187) Surveying curves

Surveying curves



Y=X^2(g1-g2)/2l

l=Vertical curve installation section (m)

X=Horizontal distance of start point A or end point B (m)

Y=Vertical distance at distance X (cm)

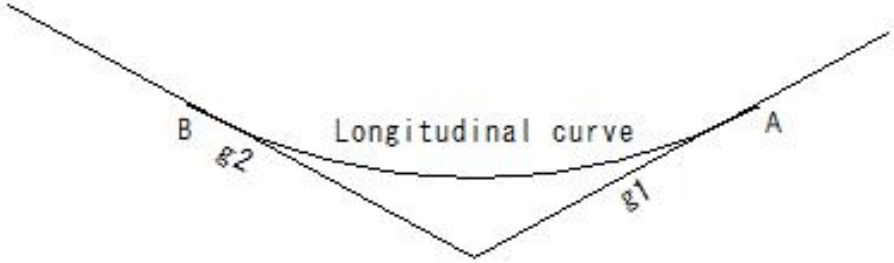


Figure 46 Longitudinal curve

(H1188) Surveying curves

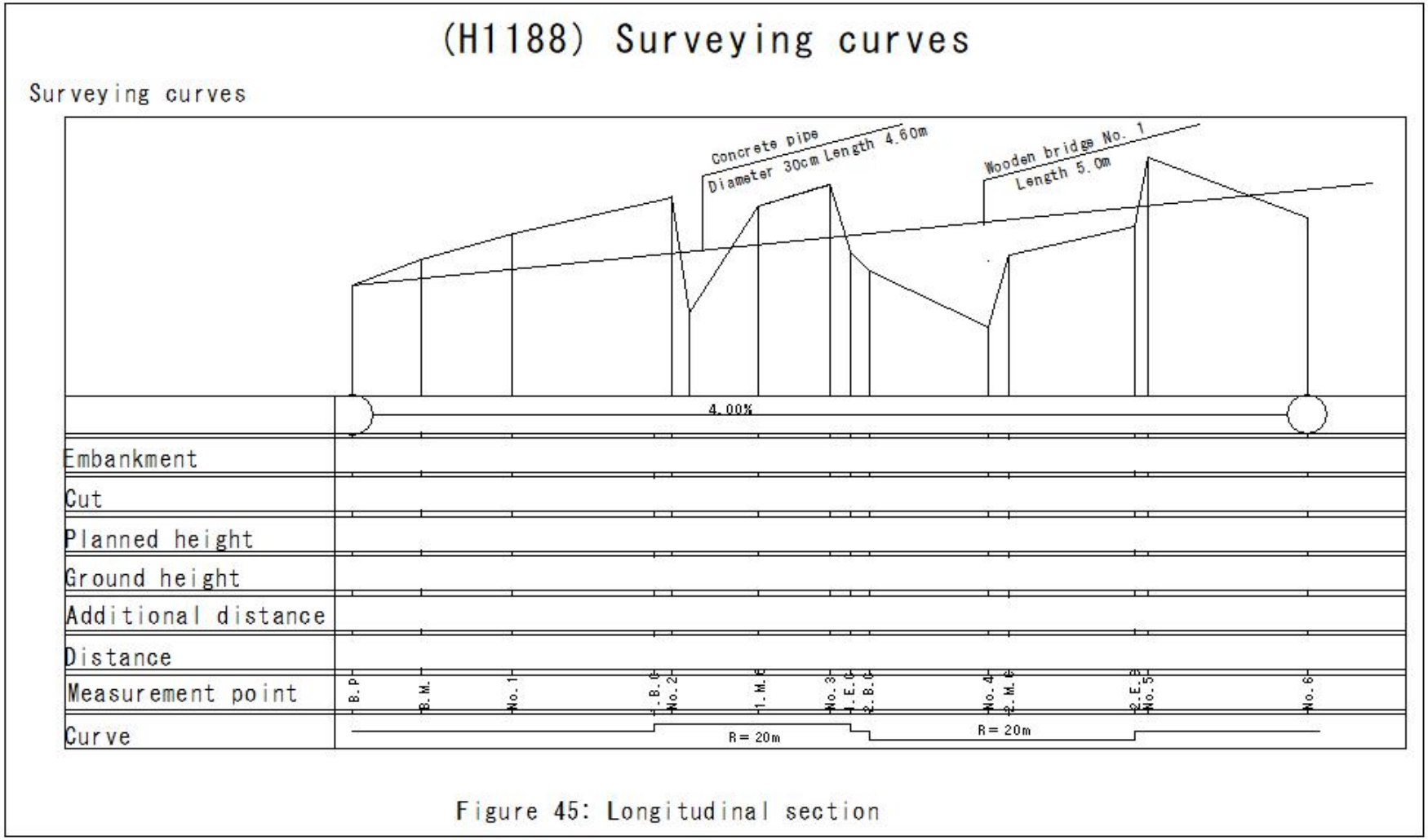
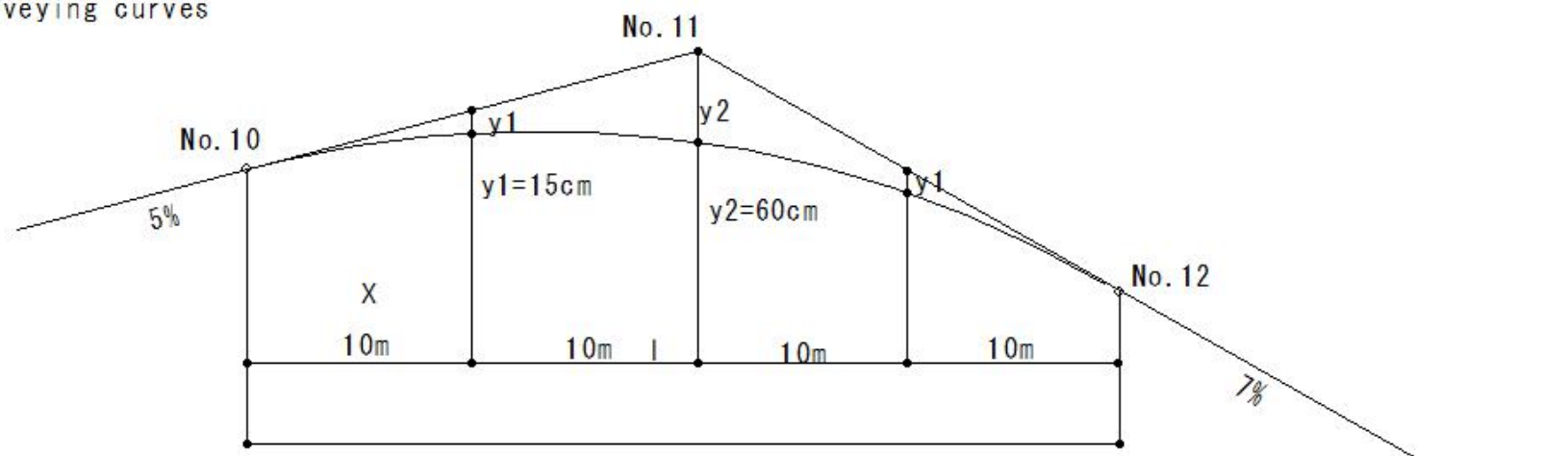


Figure 45: Longitudinal section

(H1189) Surveying curves

(H1189) Surveying curves

Surveying curves



Calculation example

g1: Uphill gradient +5%

g2: Downhill gradient -7%

g1-g2=5-(-7)=12%>5%

l=40m

l/2=20m　　Y=X^2(g1-g2)/2l

X1=10m Y1= (10^2/80) ×(g1-g2)＝15cm

X2=20m Y2= (20^2/80) ×(g1-g2)＝60cm

Figure-47 Longitudinal section

(H1190) Surveying curves

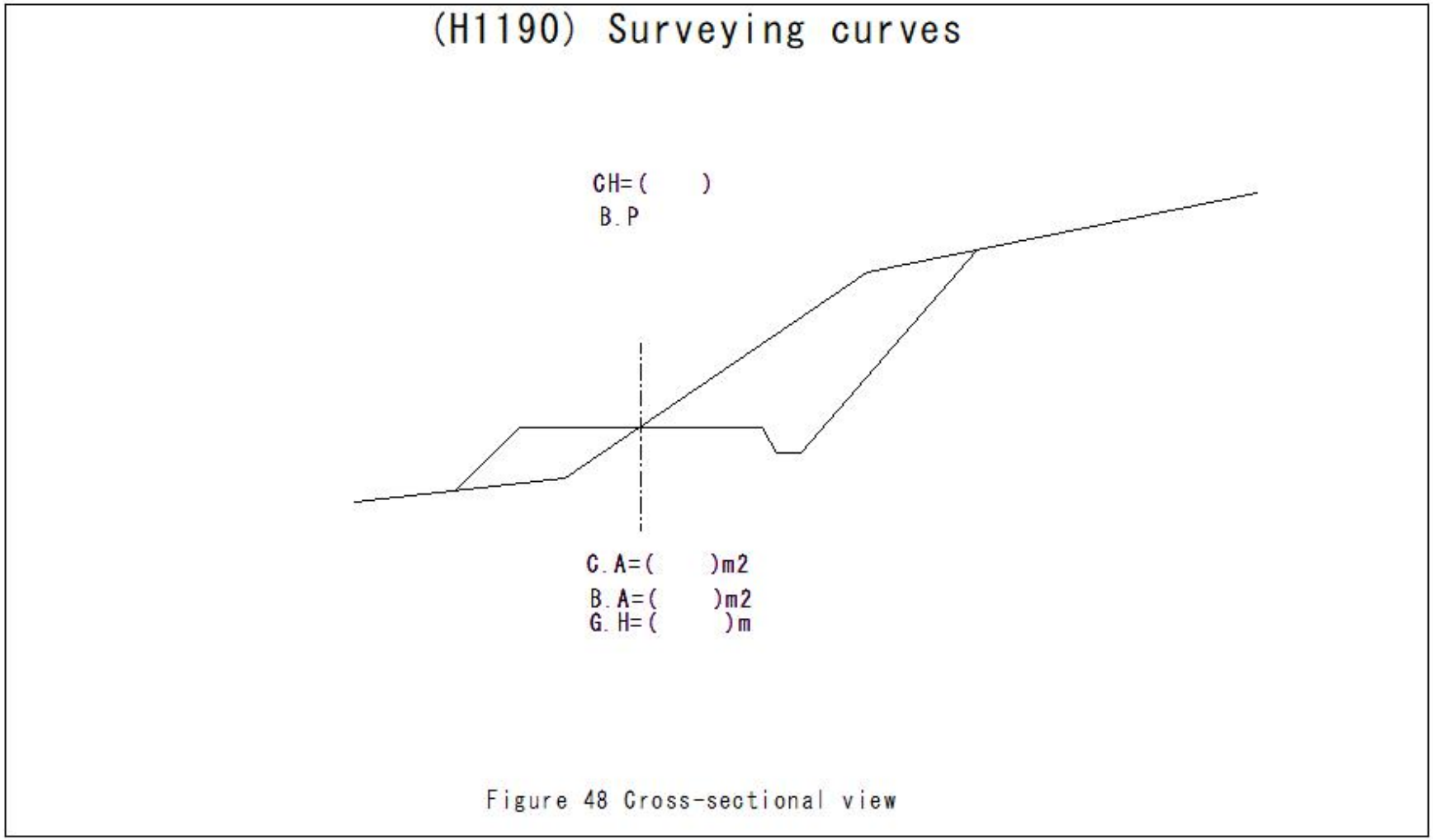


Figure 48 Cross-sectional view

(H1191) Surveying curves

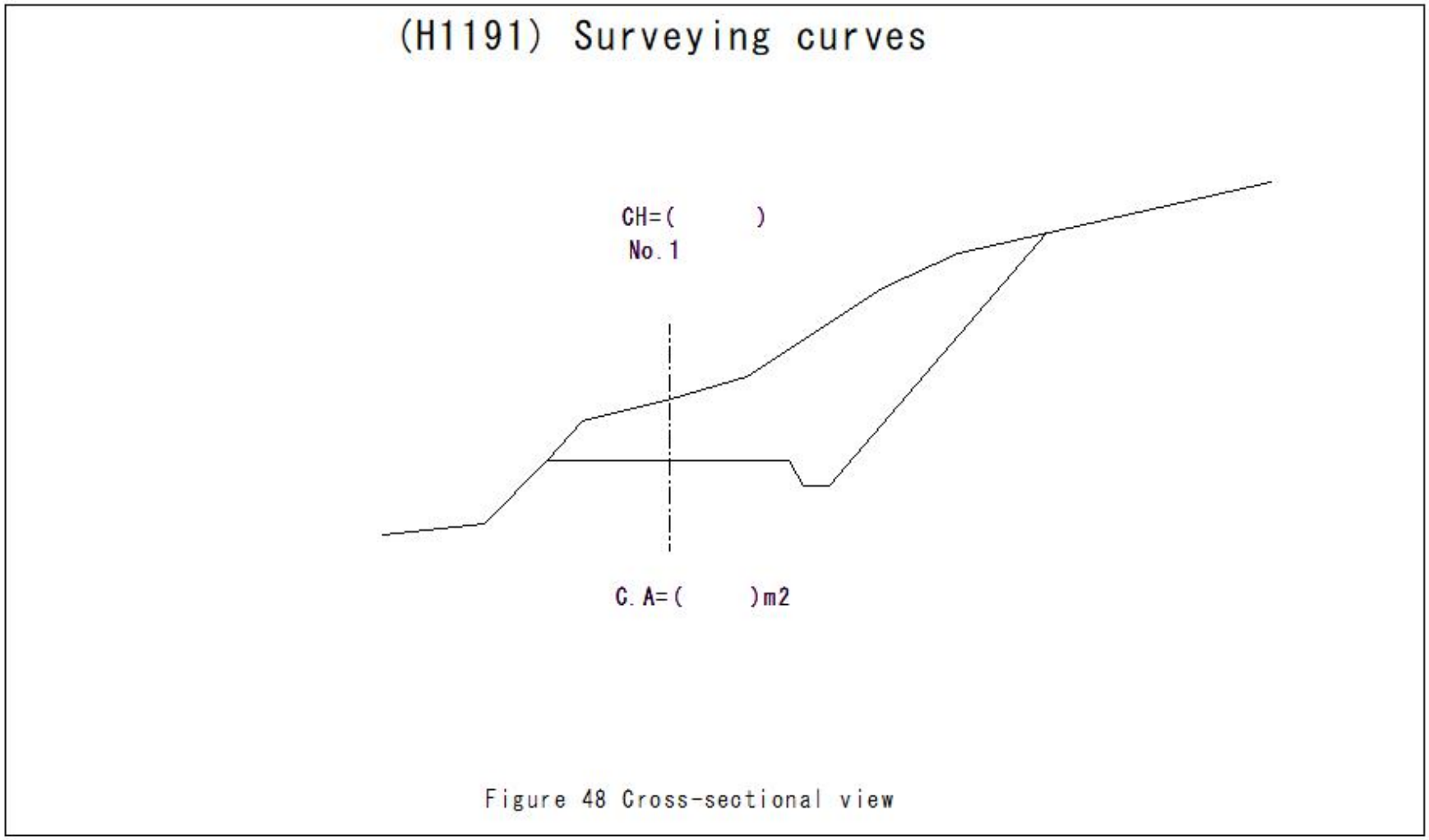


Figure 48 Cross-sectional view

(H1192) Surveying curves

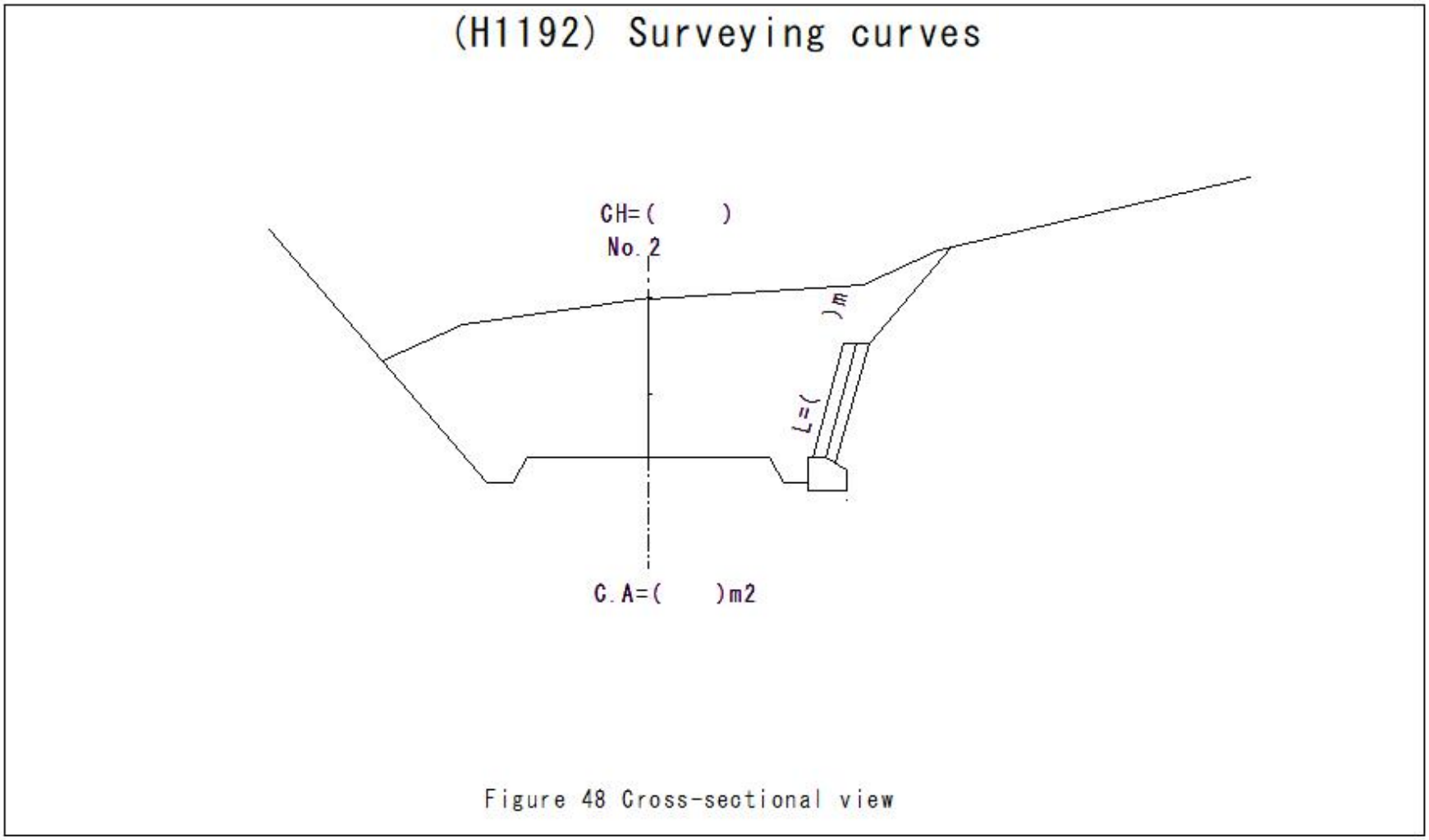


Figure 48 Cross-sectional view

(H1193) Surveying curves

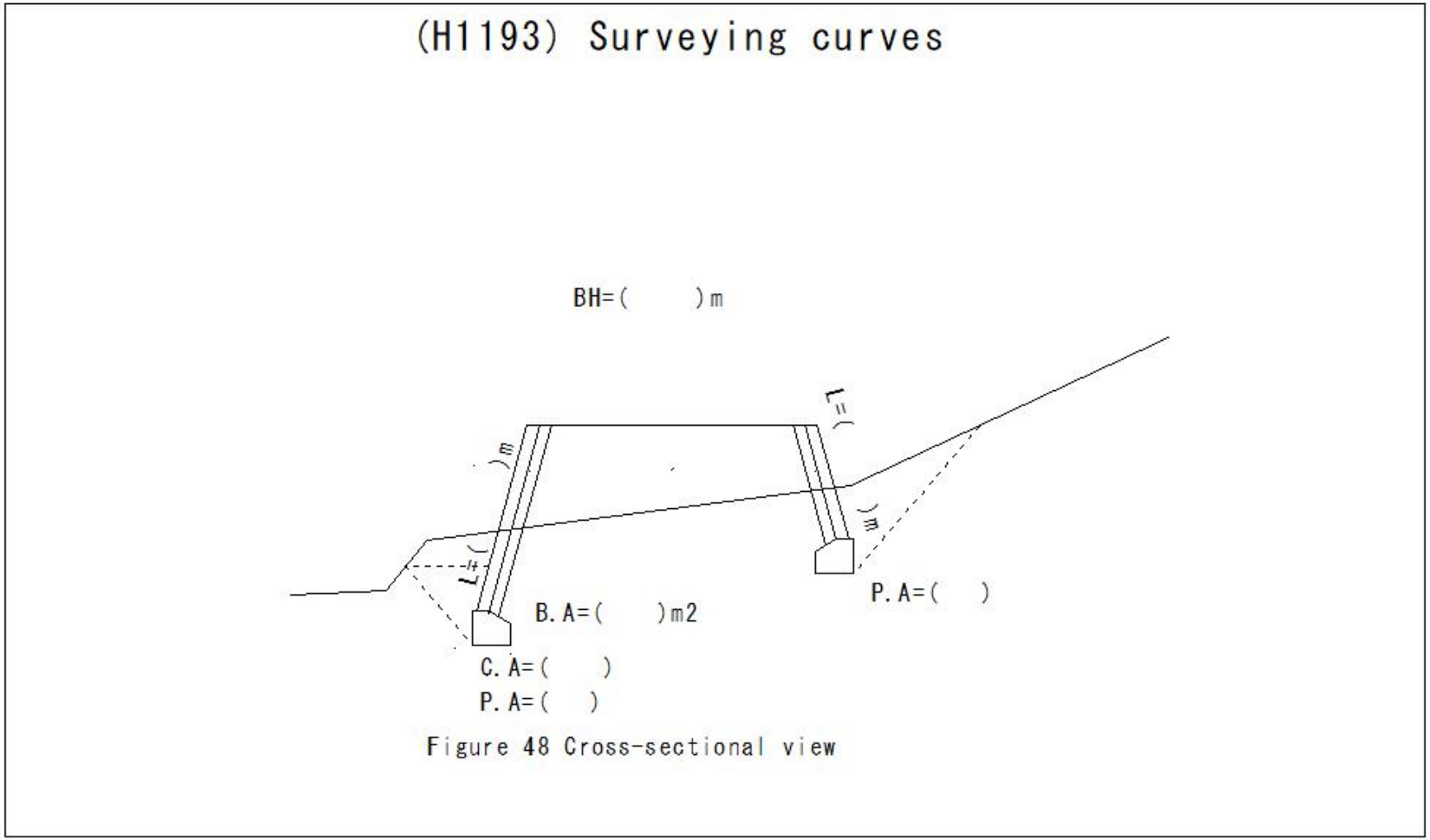
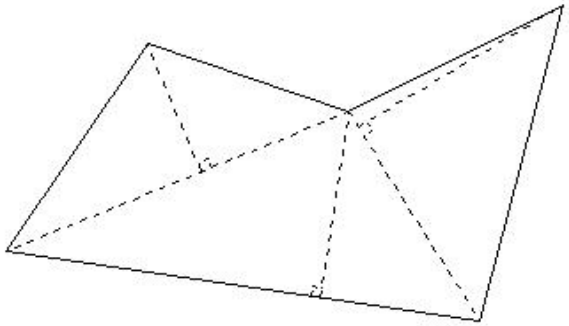


Figure 48 Cross-sectional view

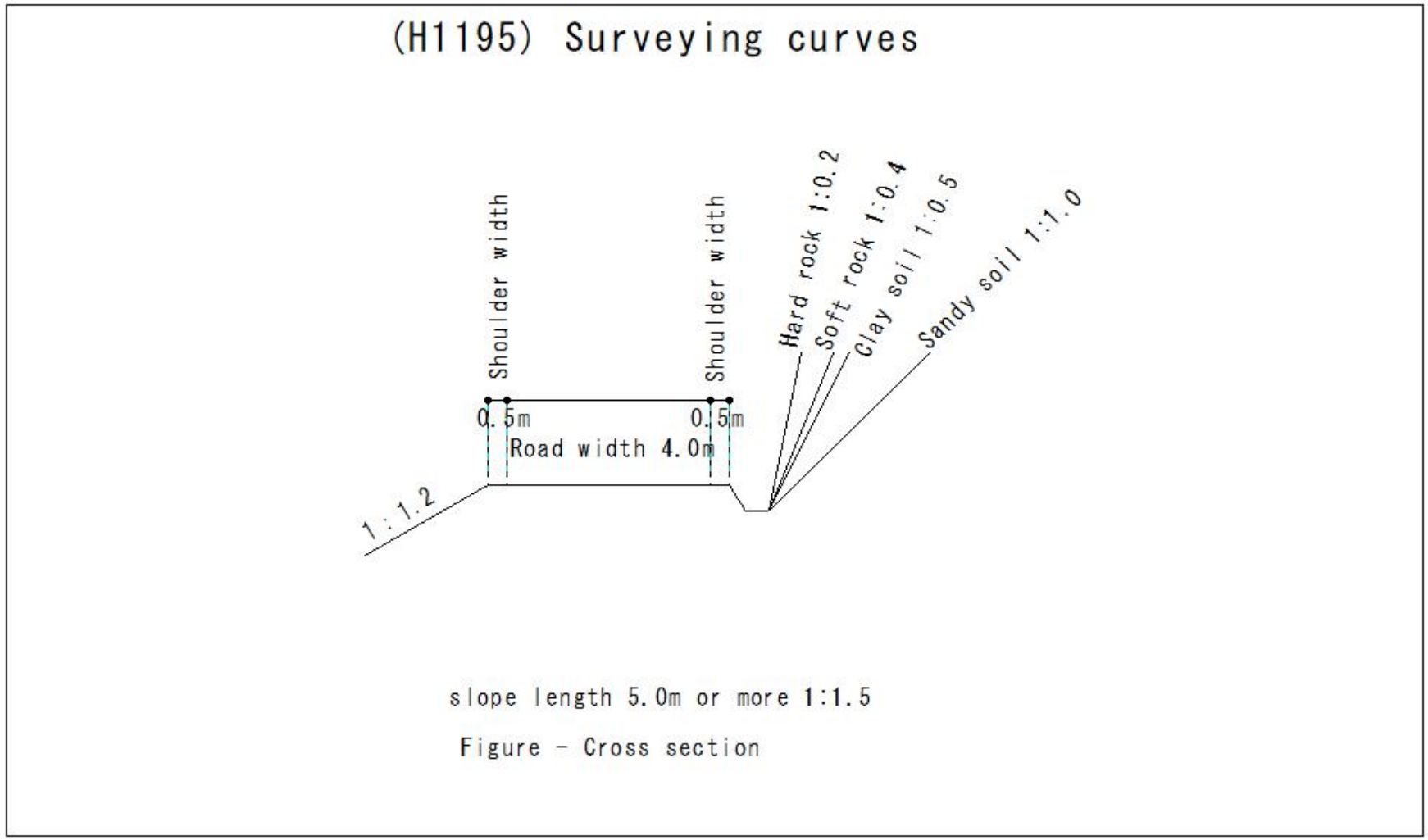
(H1194) Surveying curves



base and height
Triangulation

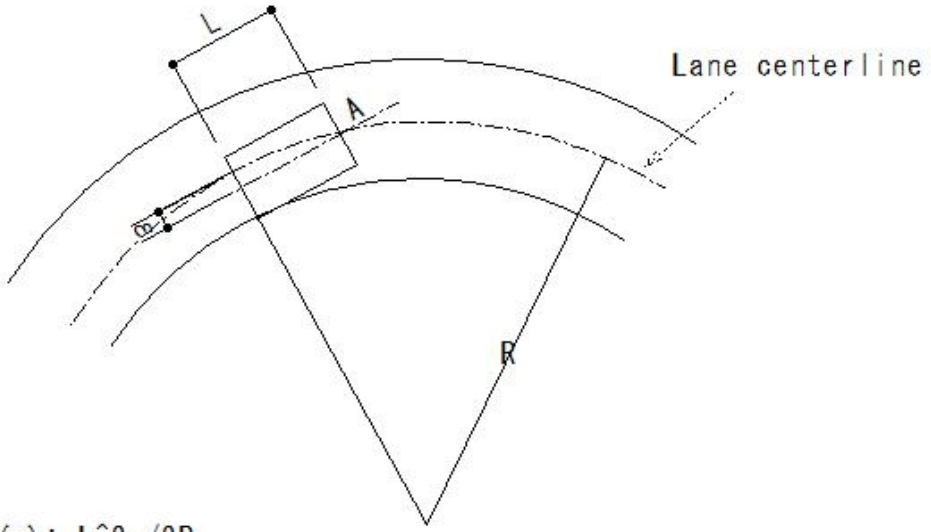
Three-slant method(Triclinic)
Figure 49 Cross section - area measurement

(H1195) Surveying curves



(H1196) Curved section widening

Curved section widening



ε : Amount of widening (m): L^2 /2R

L: Length of vehicle

L1: Distance from the front of the semi-trailer to the second axle (m)

L2: Distance from the second axle of the semi-trailer to the last wheel (m)

R: Radius of lane centerline (m)

Amount of widening for normal cars ε =L^2 /2R

Amount of widening for semi-trailers ε =L1^2+L2^2/ (2R)

Figure 13-7 Curved section widening

(H1197) Curved section widening

(H1197) Widening of curved sections

Farm roads

Table 13-9 Widening of curved sections

Curve radius (m)	Width per lane (m)
100 or more but less than 150	0.25
55 or more but less than 100	0.5
40 or more but less than 55	0.75
30 or more but less than 40	1
25 or more but less than 30	1.25
20 or more but less than 25	1.5
18 or more but less than 20	1.75
15 or more but less than 18	2

(H1198)　Plane linear element

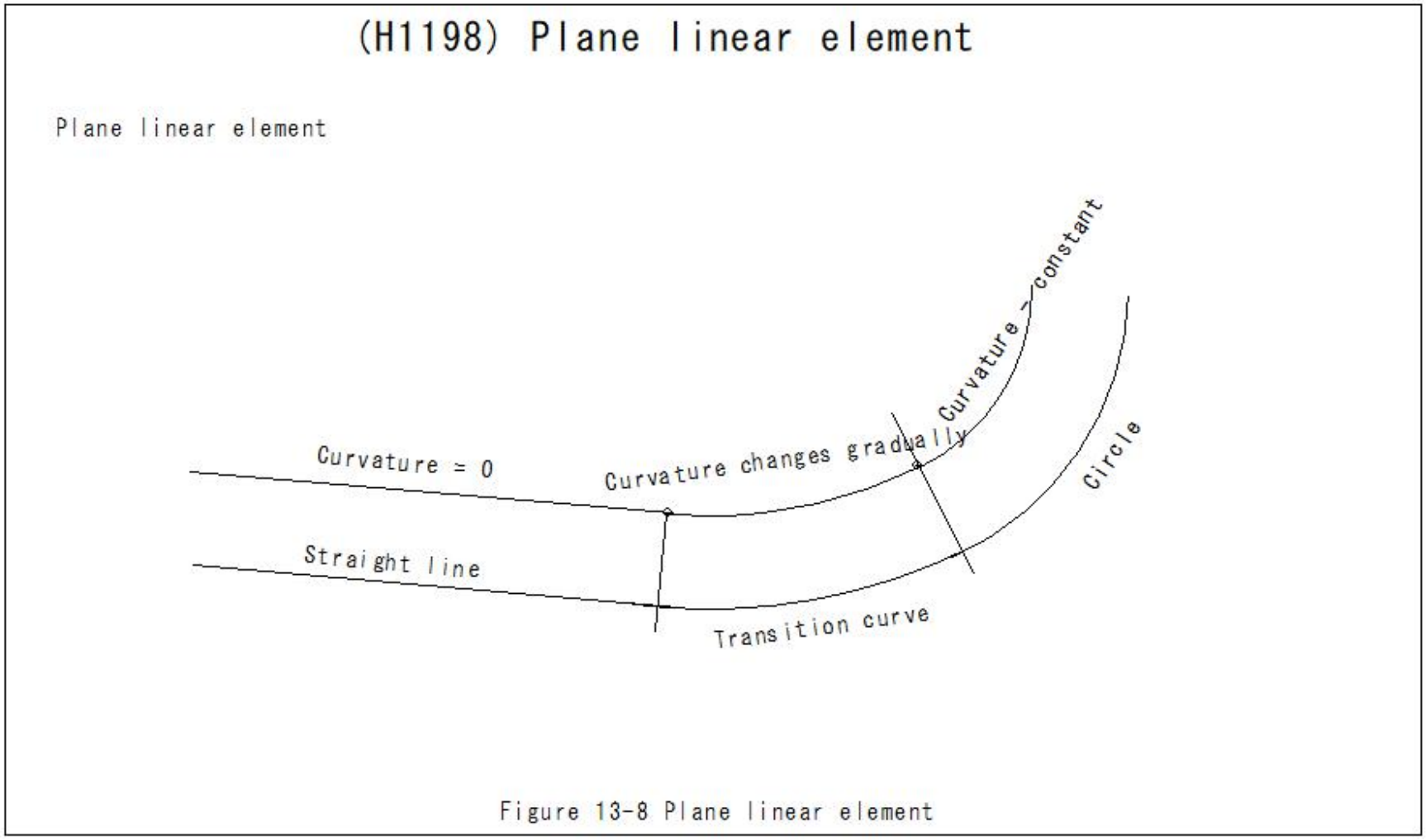
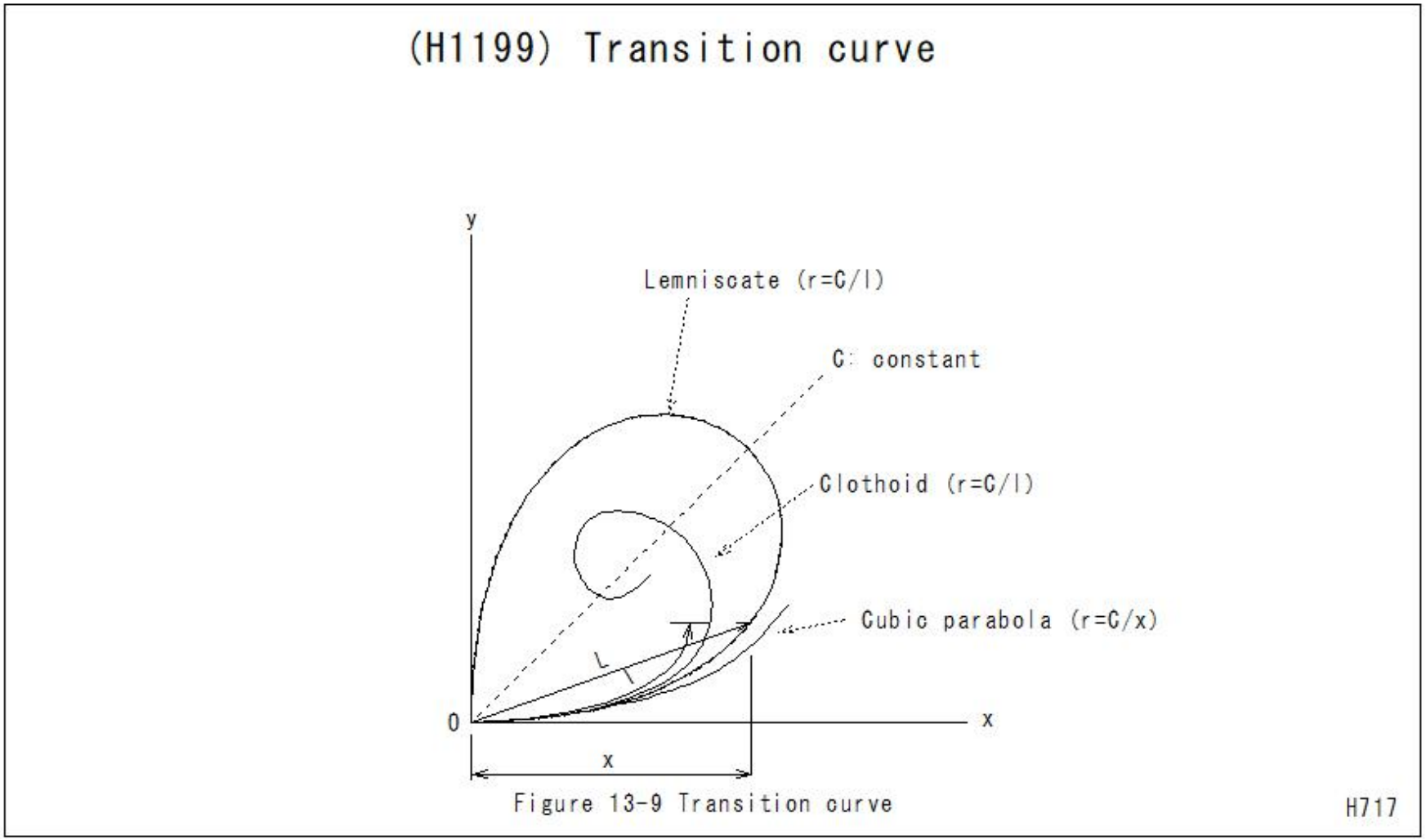
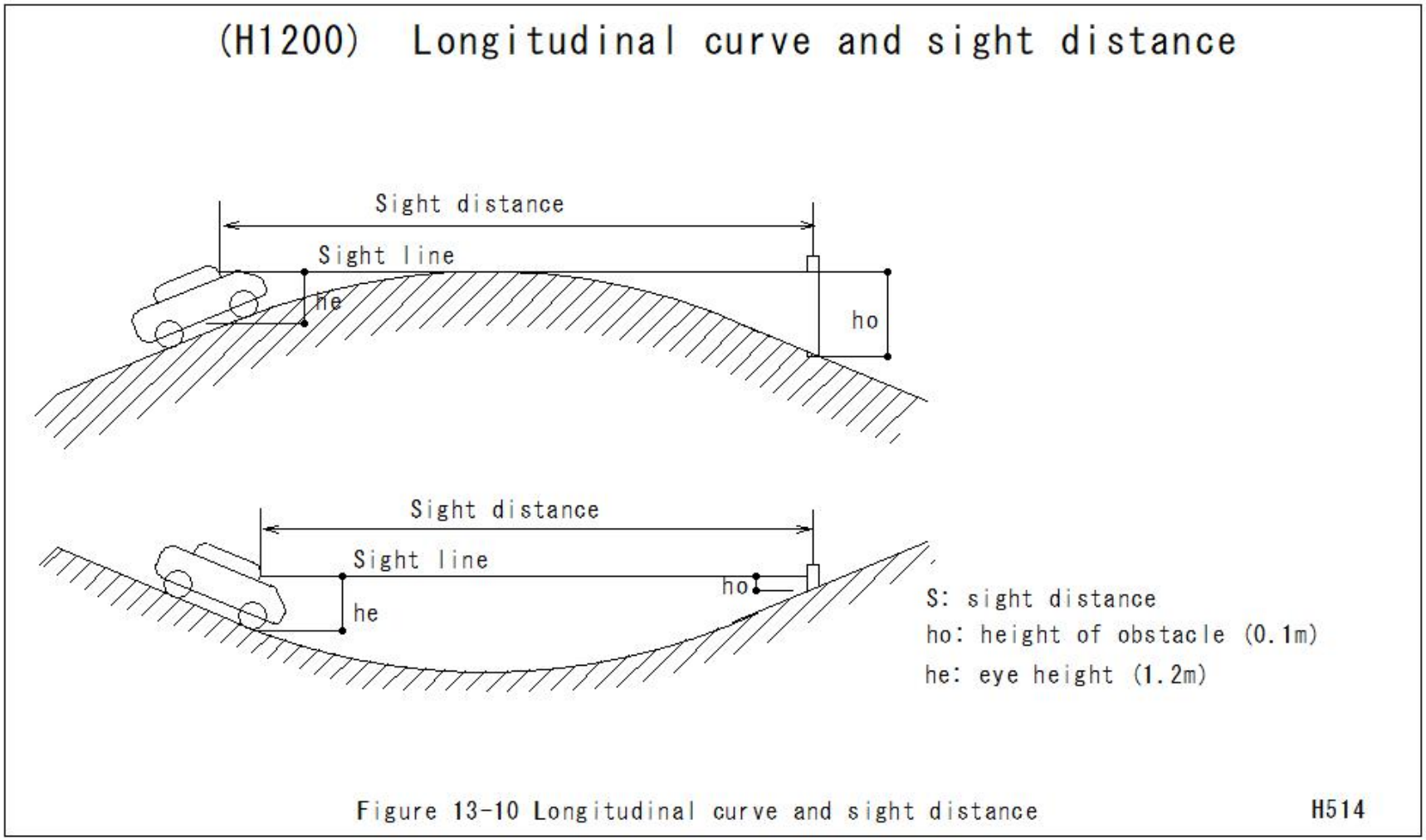


Figure 13-8 Plane linear element

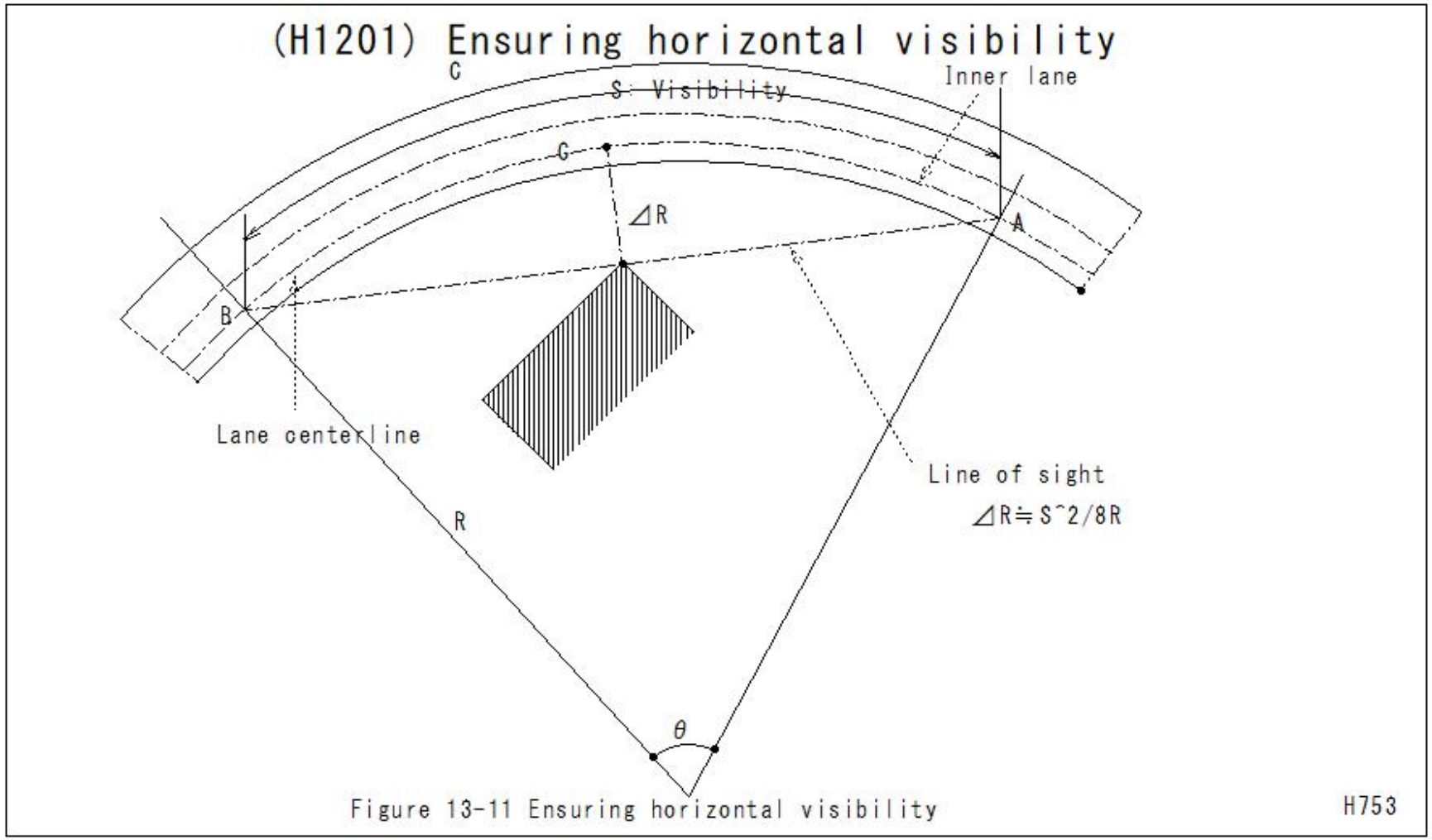
(H1199) Transition curve



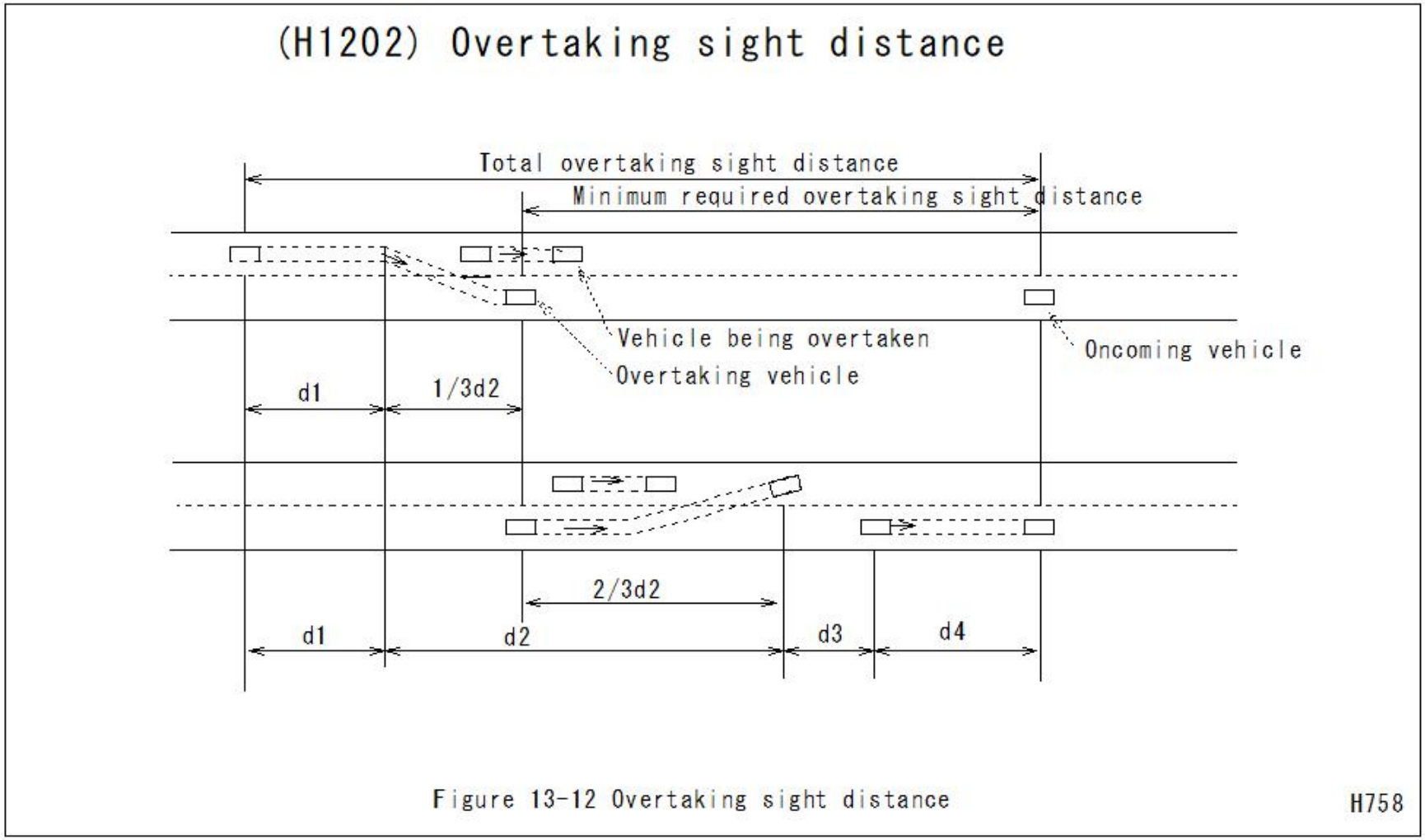
(H1200) Longitudinal curve and sight distance



(H1201) Ensuring horizontal visibility



(H1202) Overtaking sight distance



(H1203) Braking and stopping sight distance and minimum overtaking sight distance

Table 13-17 Braking and stopping sight distance and minimum overtaking sight distance

Design speed (km/h)	Braking and stopping sight distance (m)		Minimum overtaking sight distance 2/3d2+d3+d4 (m)
	1 lane road, green	2 lanes road	
50		55	200
40	80	40	150
30	60	30	100
20	40	20	70

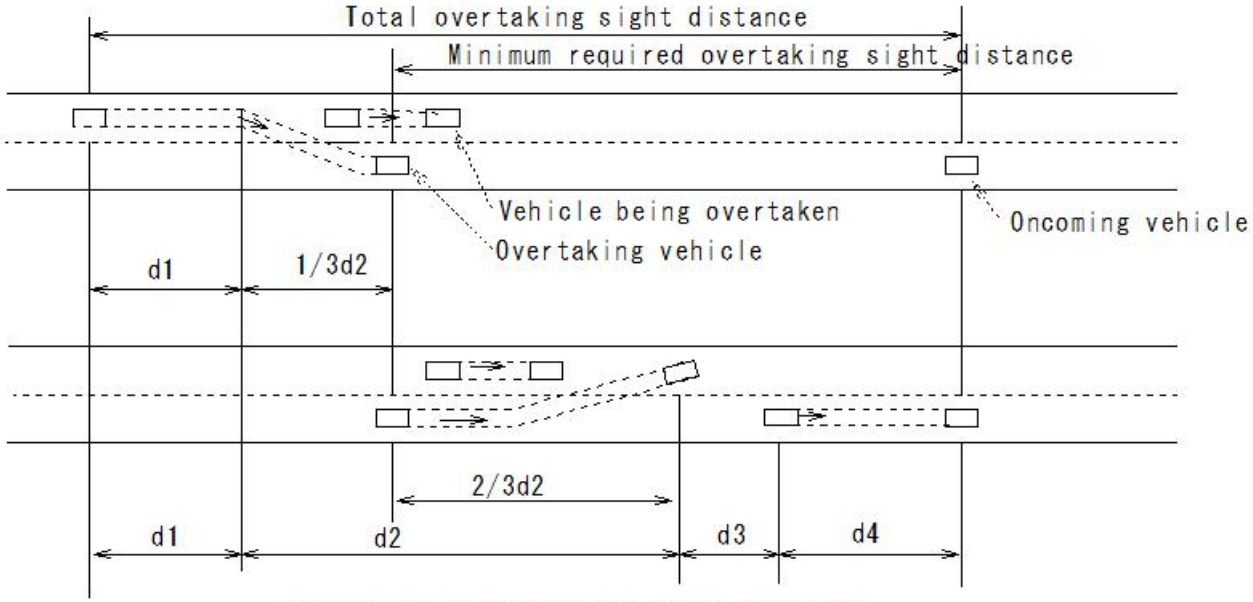


Figure 13-12 Overtaking sight distance

H1202

(H1204) Corner cutting of farm roads

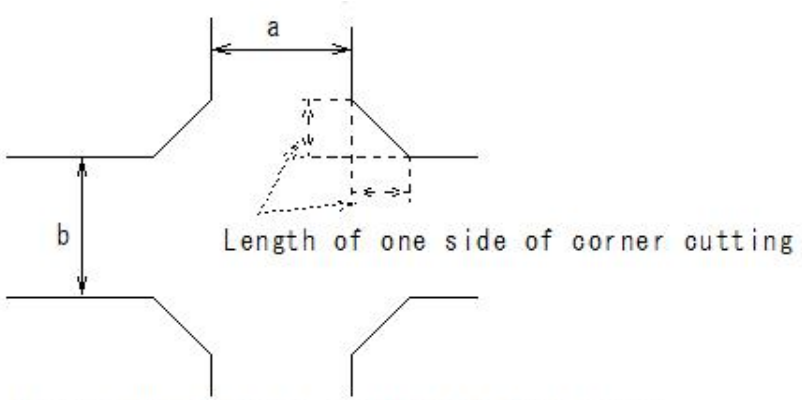


Figure 13-13 Corner cutting of farm roads

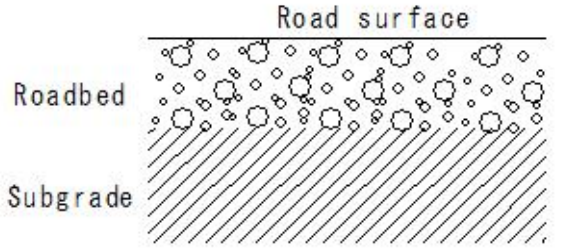
Table 13-18 Length of one side of corner cutting

Road width of intersecting road (m)		a		
		3	4	5
b	3	2.0	1.5	1.0
	4	1.5	1.0	0.5
	5	1.0	0.5	0.0

(H1205) Types and structures of pavement on farm roads

(H1205) Types and structures of pavement on farm roads

Farm roads



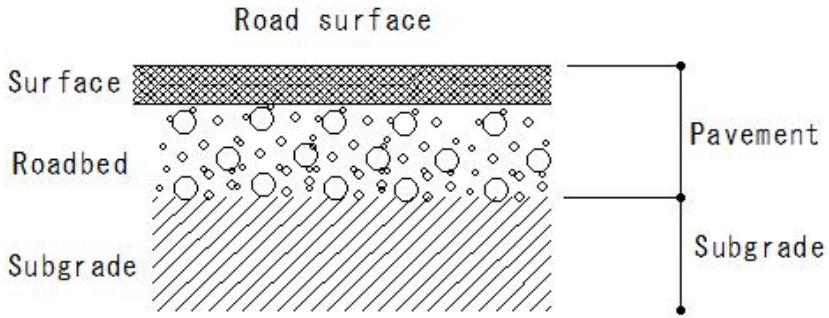
(a) Soil-based pavement

Figure 13-14 Types and structures of pavement on farm roads

(H1206) Types and structures of pavement on farm roads

(H1206) Types and structures of pavement on farm roads

Farm roads



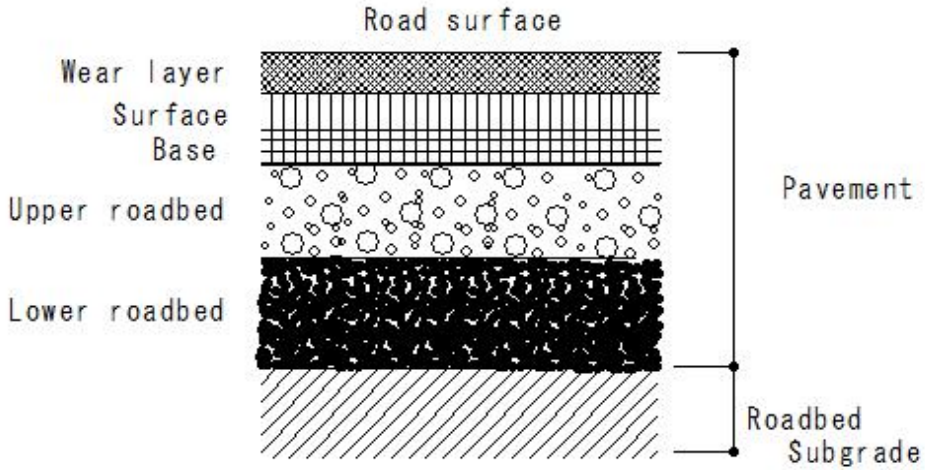
(b) Simple pavement

Figure 13-14 Types and structures of pavement on farm roads

(H1207) Types and structures of pavement on farm roads

(H1207) Types and structures of pavement on farm roads

Farm roads



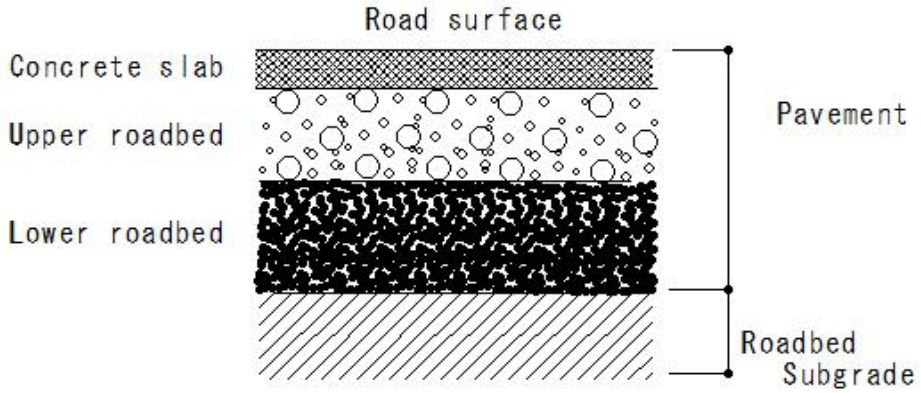
(c) Asphalt pavement

Figure 13-14 Types and structures of pavement on farm roads

(H1208) Types and structures of pavement on farm roads

(H1208) Types and structures of pavement on farm roads

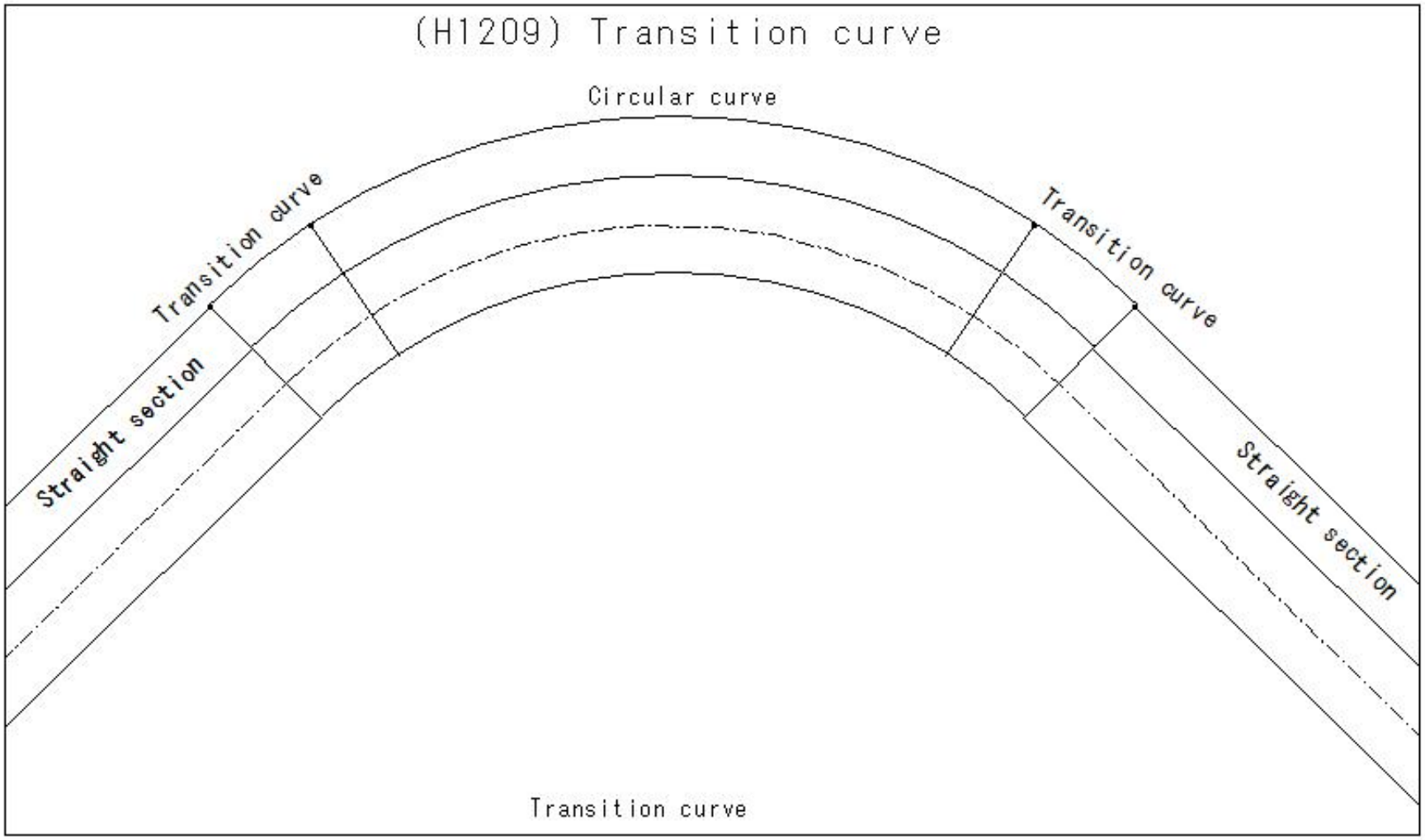
Farm roads



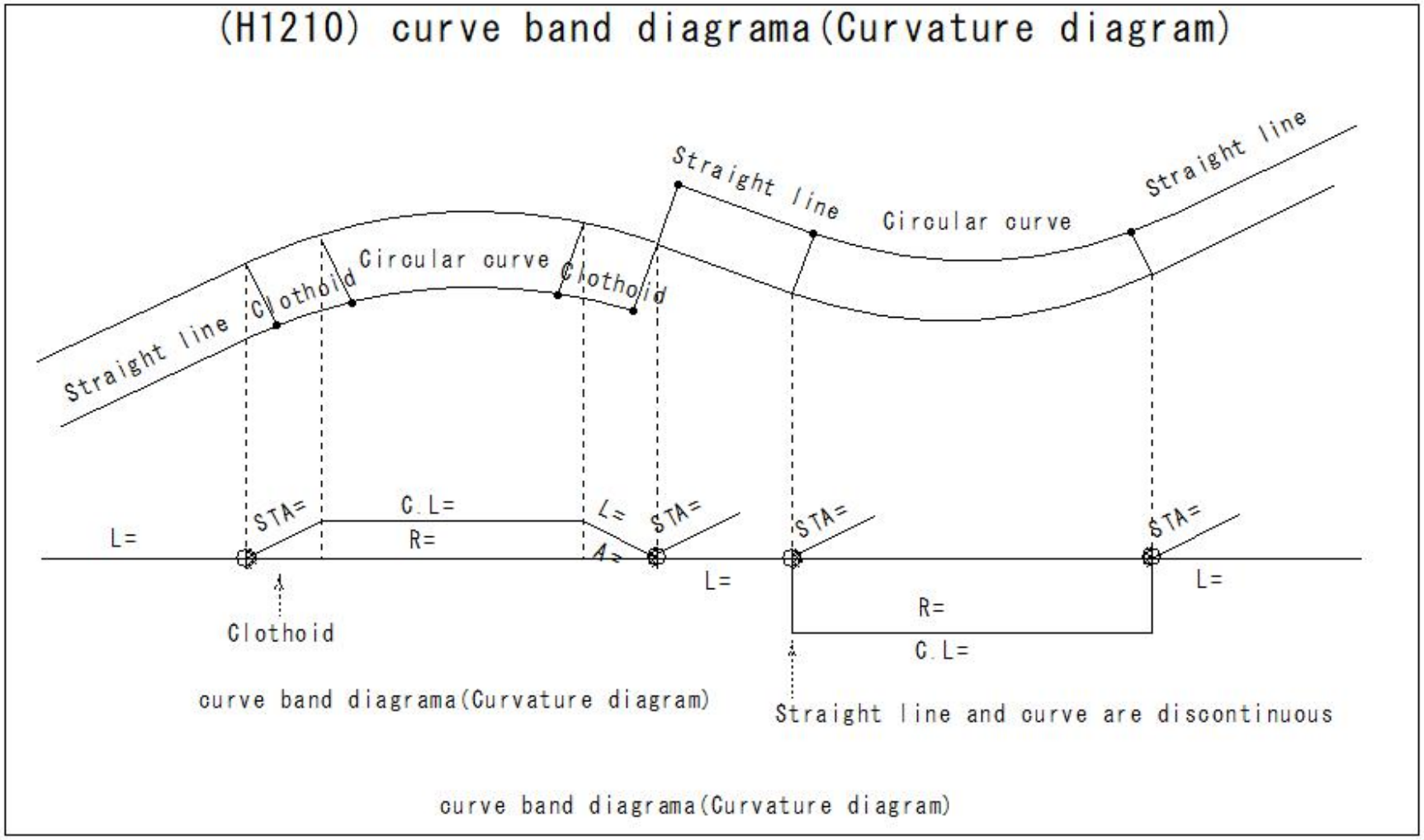
(d) Concrete pavement

Figure 13-14 Types and structures of pavement on farm roads

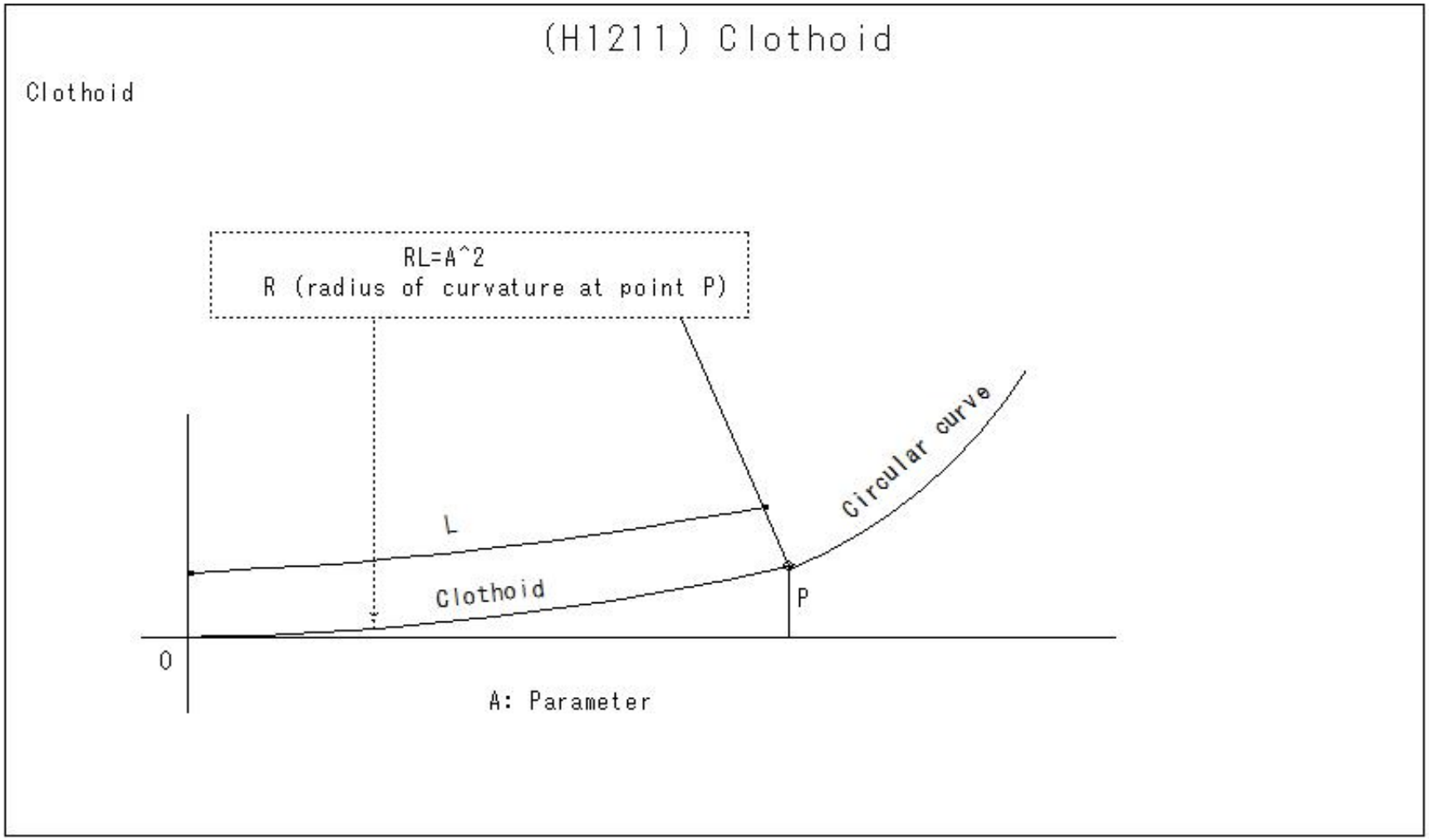
(H1209) Transition curve



(H1210) curve band diagrama(Curvature diagram)



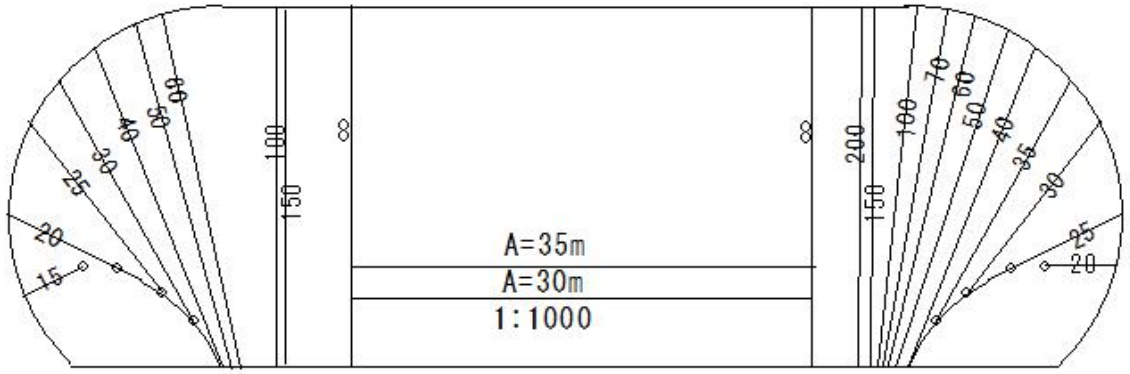
(H1211) Clothoid



(H1212) Clothoid

(H1212) Clothoid

Clothoid ruler

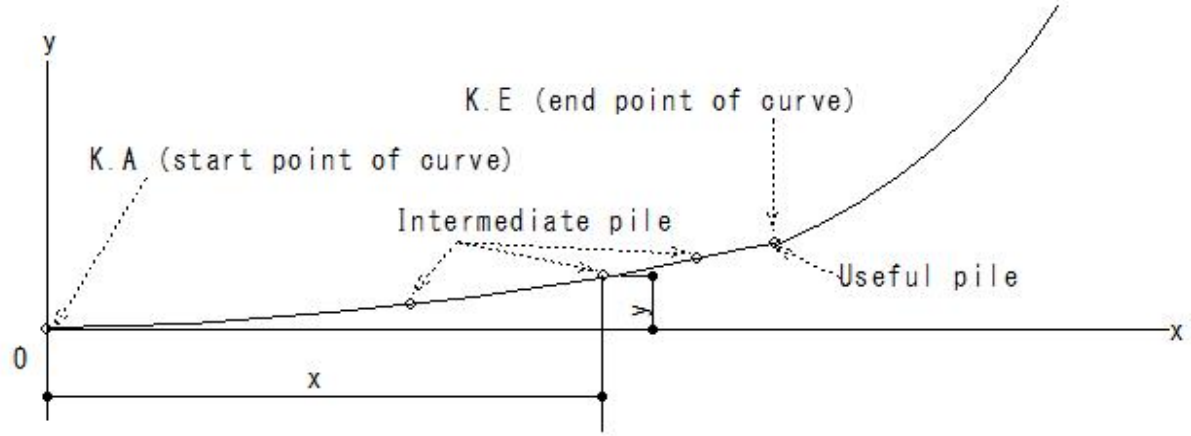


A: Parameter

(H1213) Clothoid

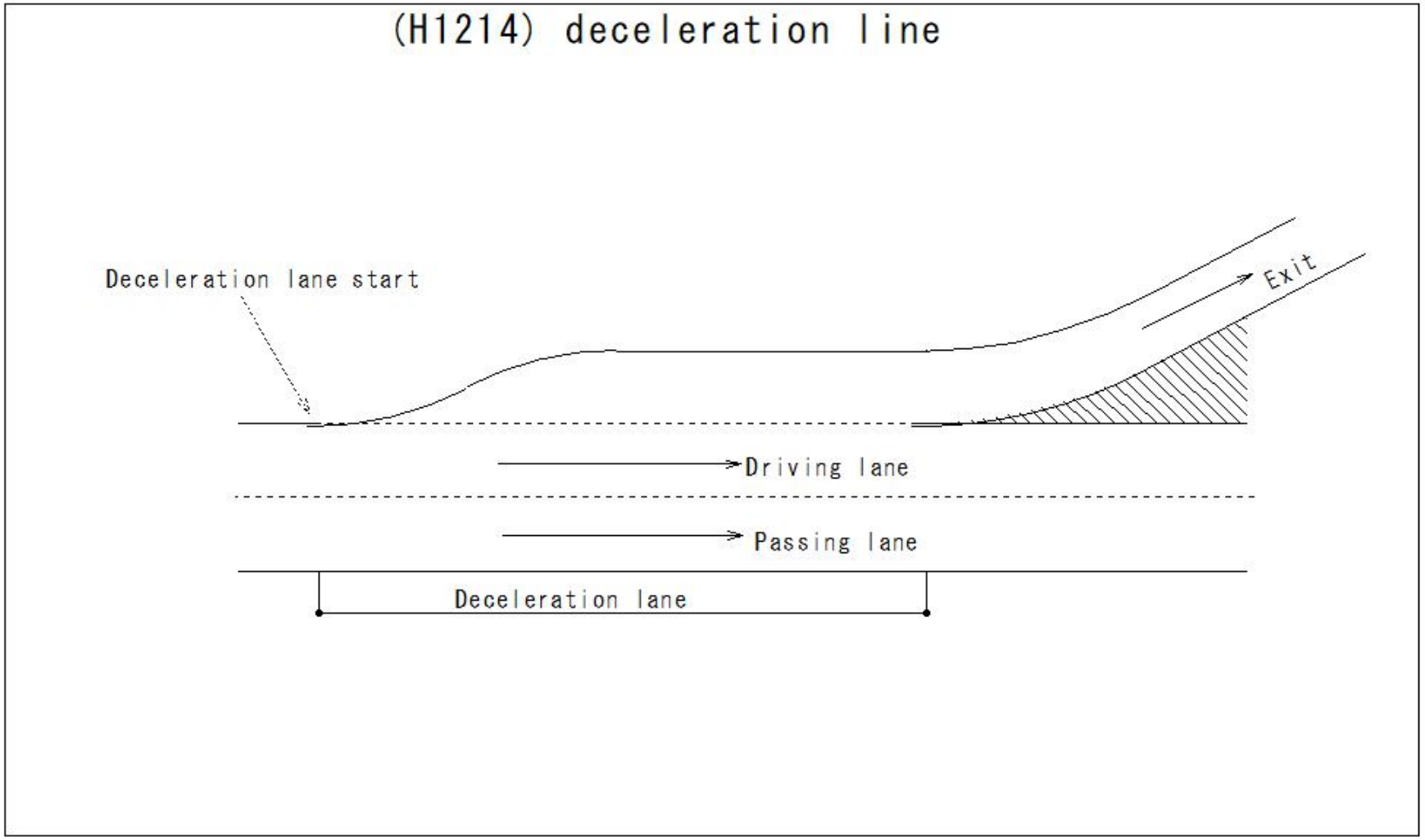
(H1213) Clothoid

Clothoid installation method

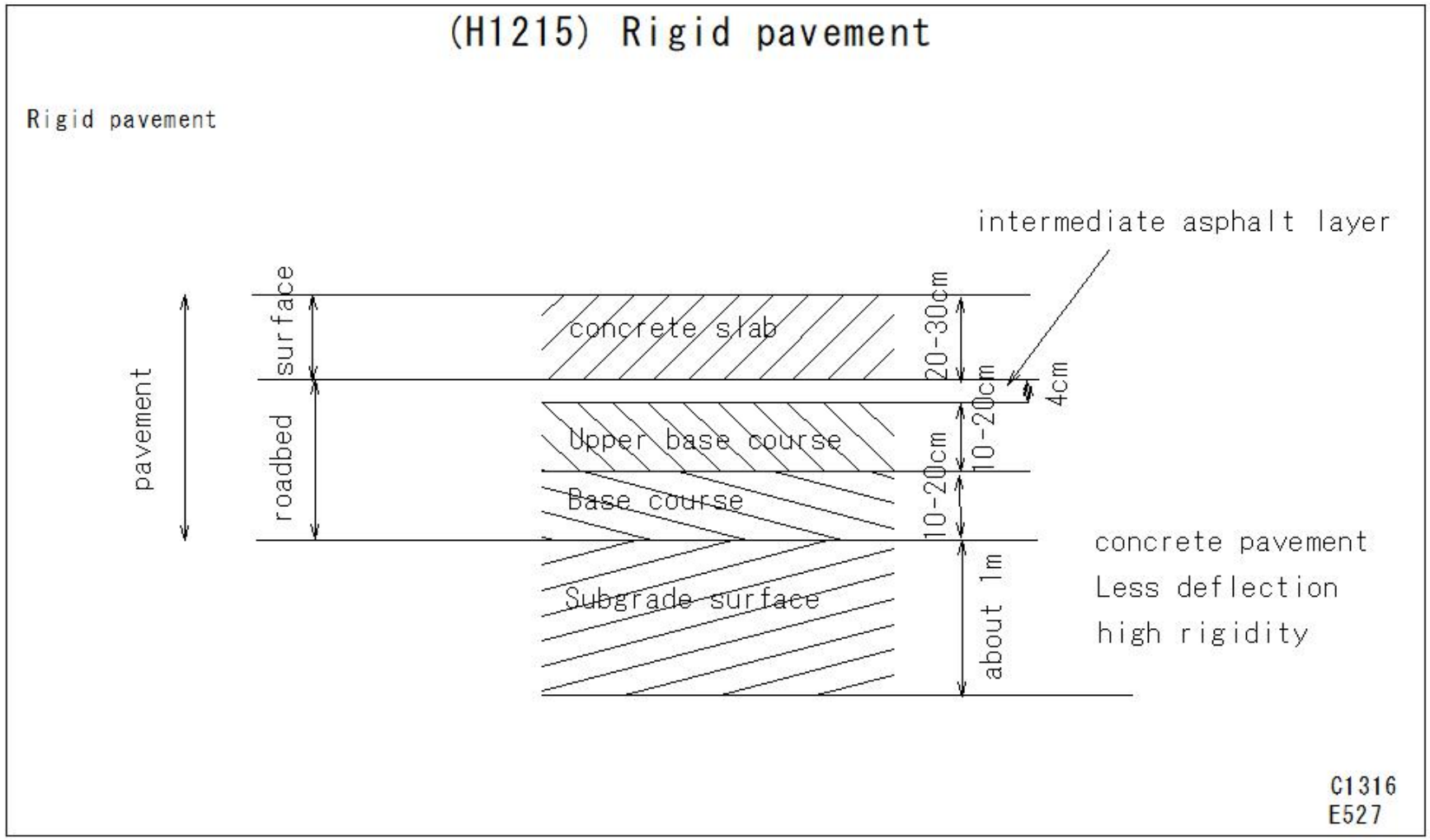


Clothoid installation method

(H1214) deceleration line



(H1215) Rigid paving



(H1216) sight distance

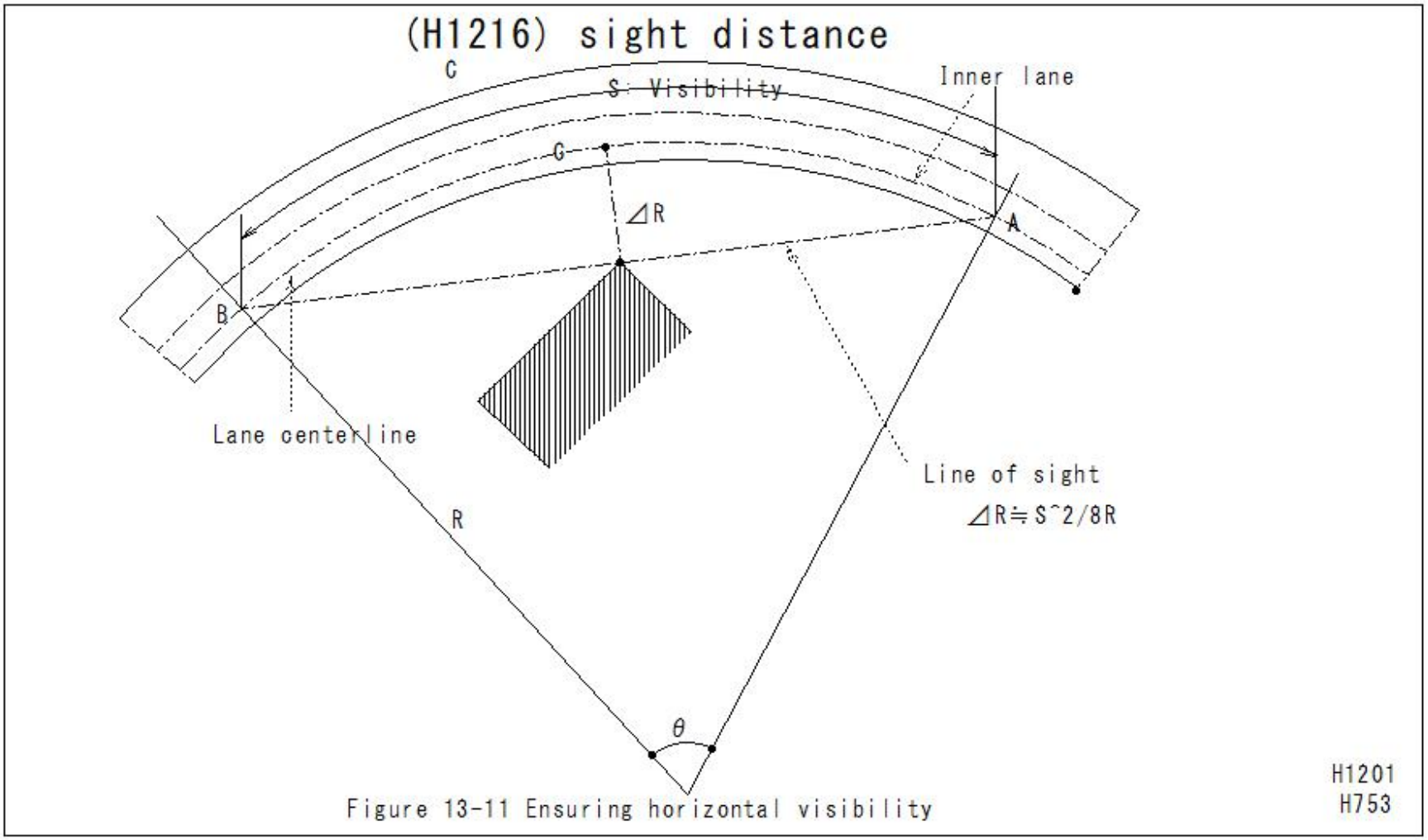


Figure 13-11 Ensuring horizontal visibility

(H1217) sight distance

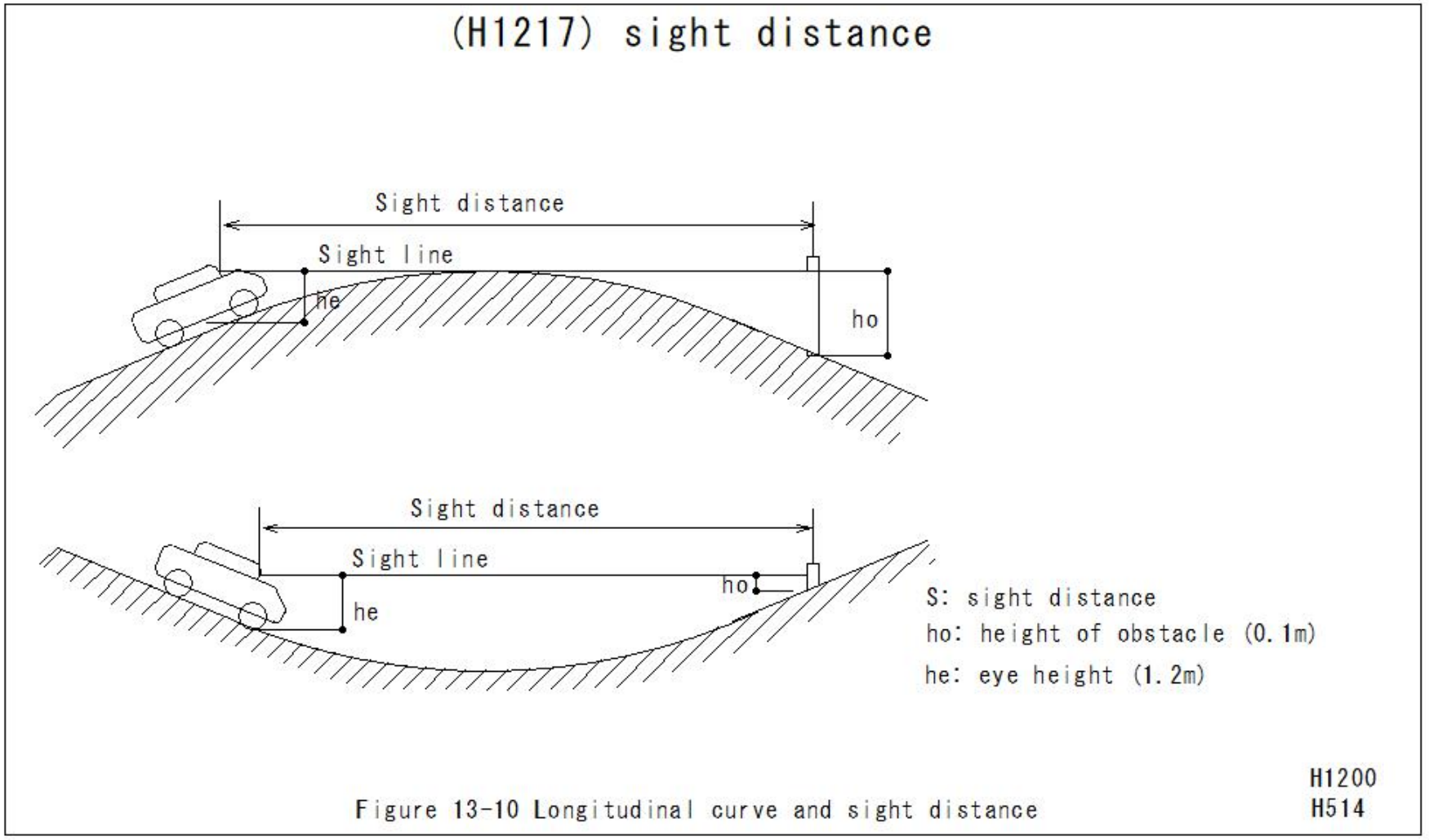
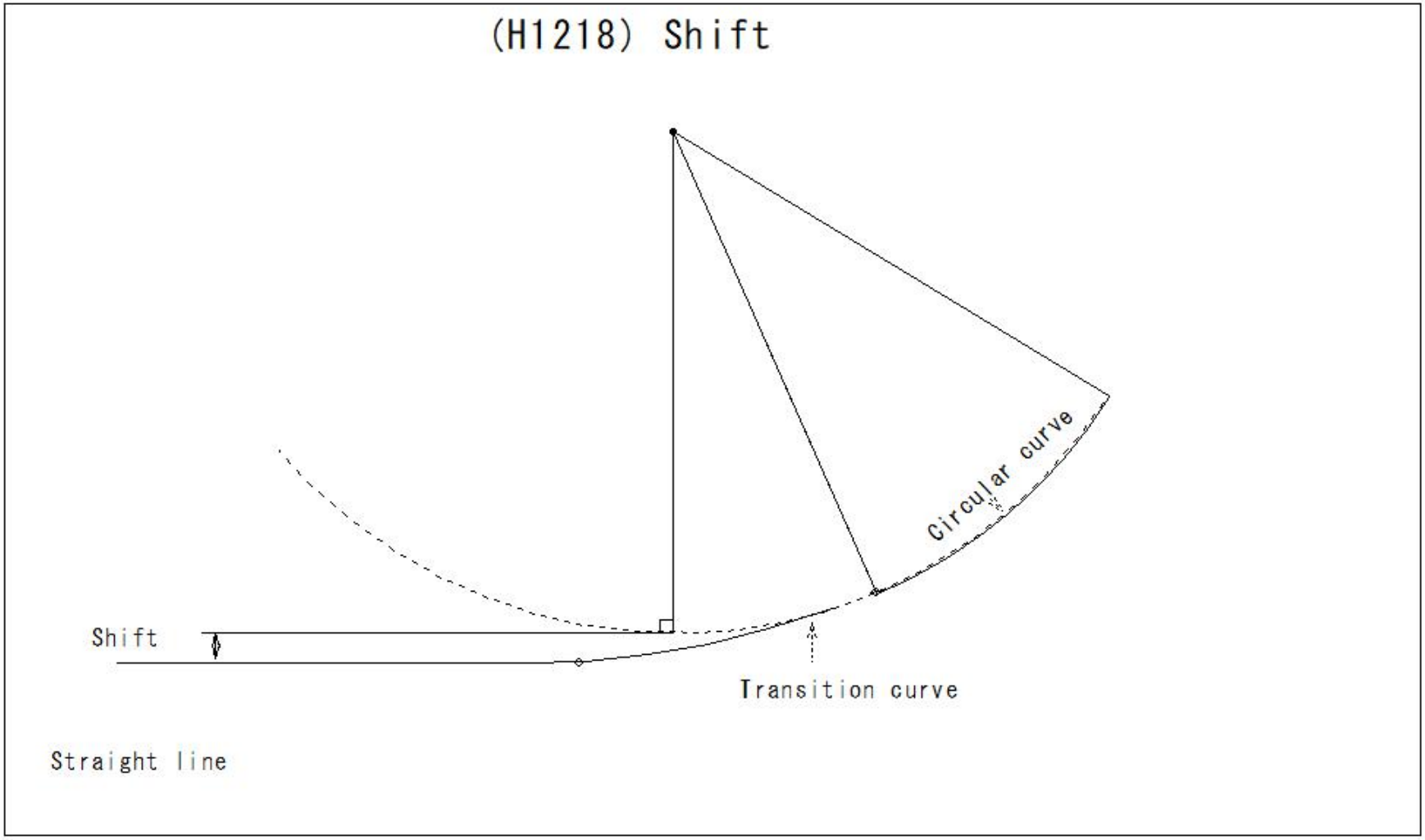


Figure 13-10 Longitudinal curve and sight distance

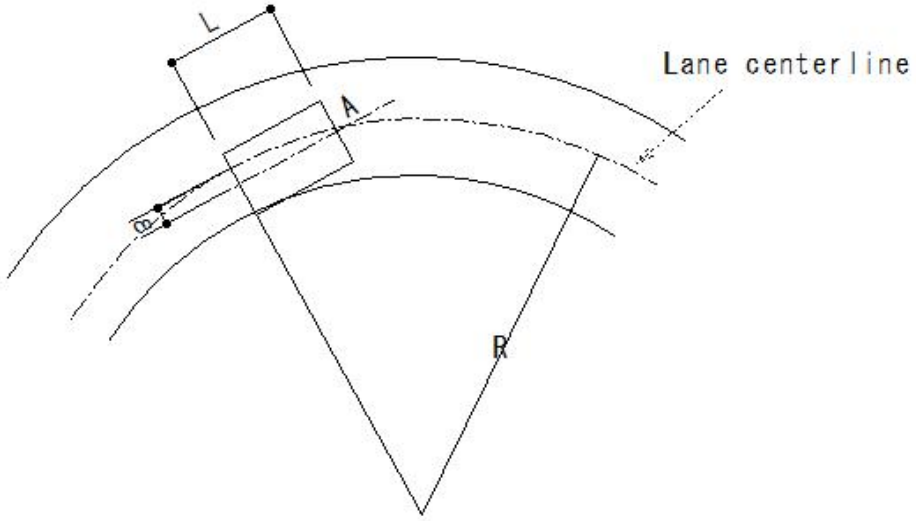
(H1218) Shift


(H1218) Shift
Circular curve
Shift
Transition curve
Straight line

(H1219) Slack

(H1219) Slack

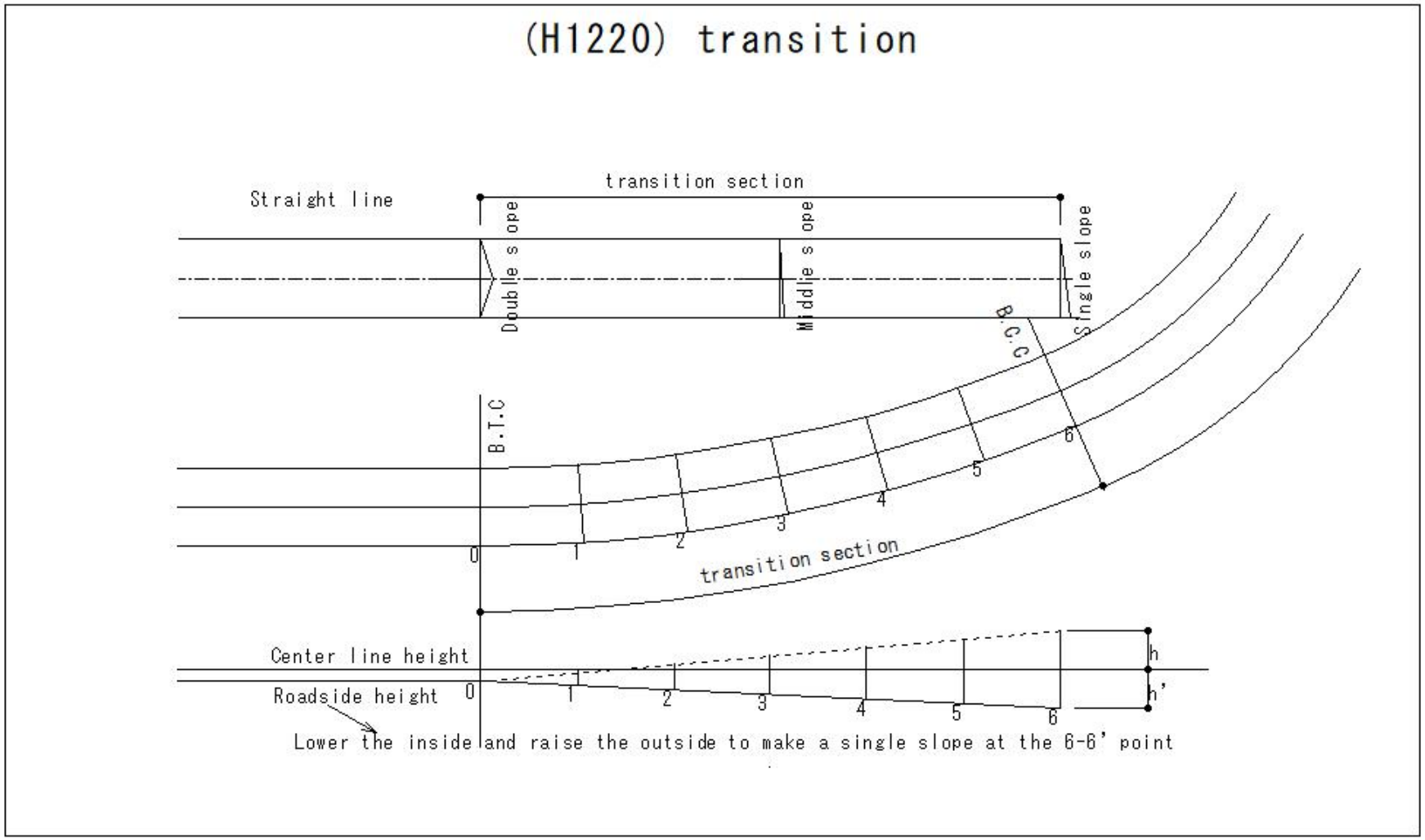
Curved section widening



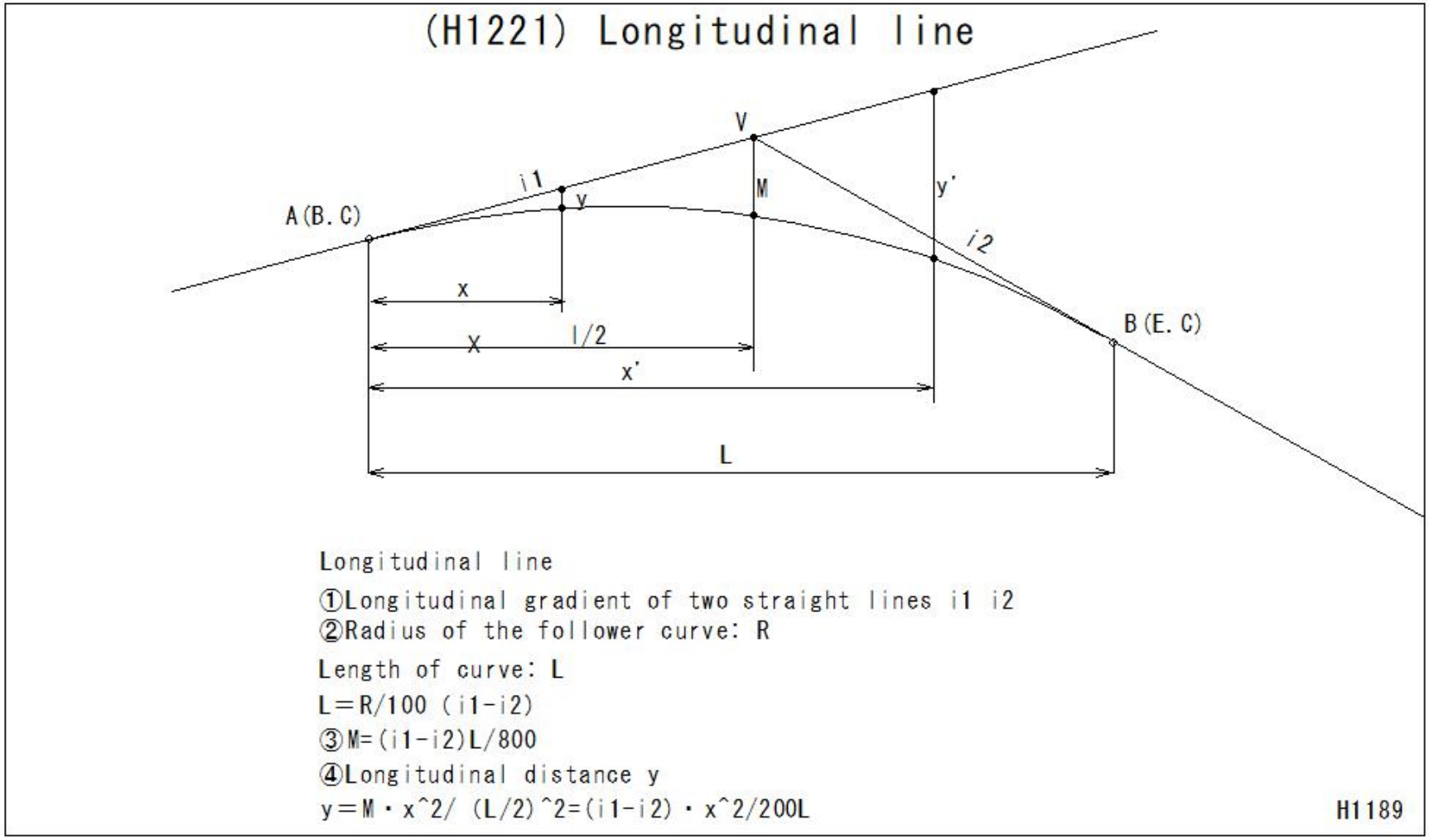
ε : Amount of widening (m) : L^2 /2R
R: Radius of lane centerline (m)
L: Length from front end of car to rear axle (m)

H1196

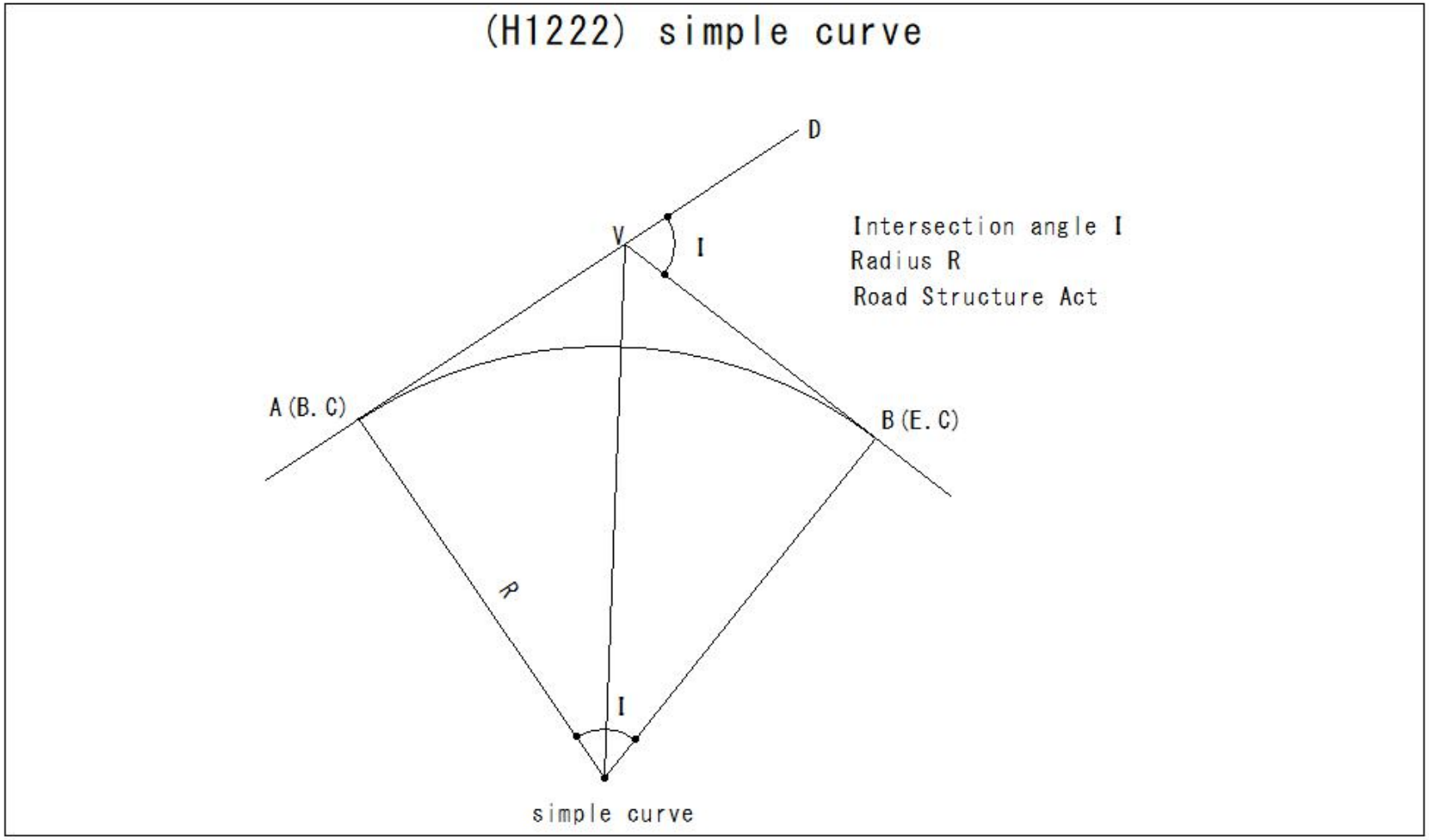
(H1220) transition



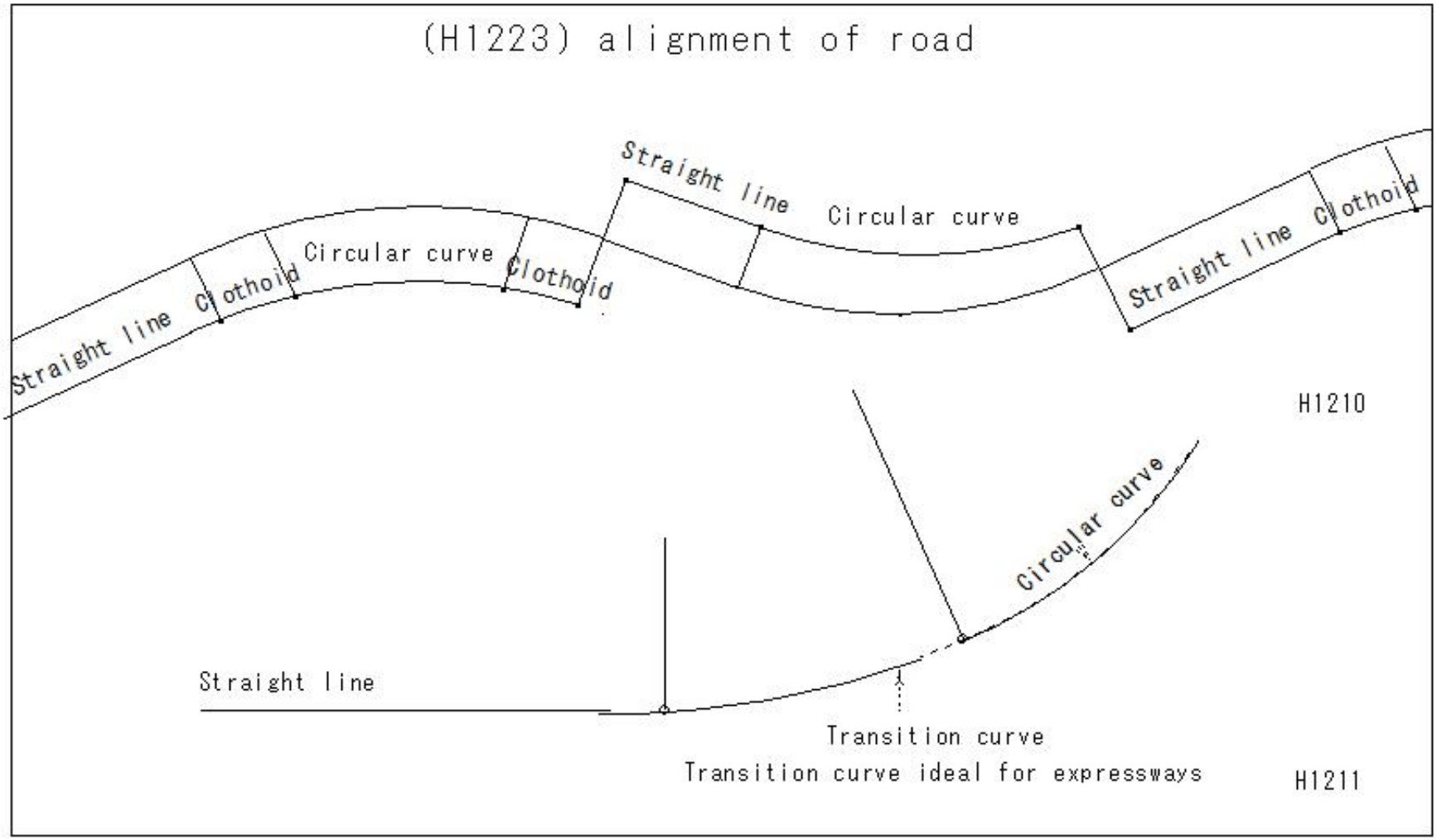
(H1221) Longitudinal line



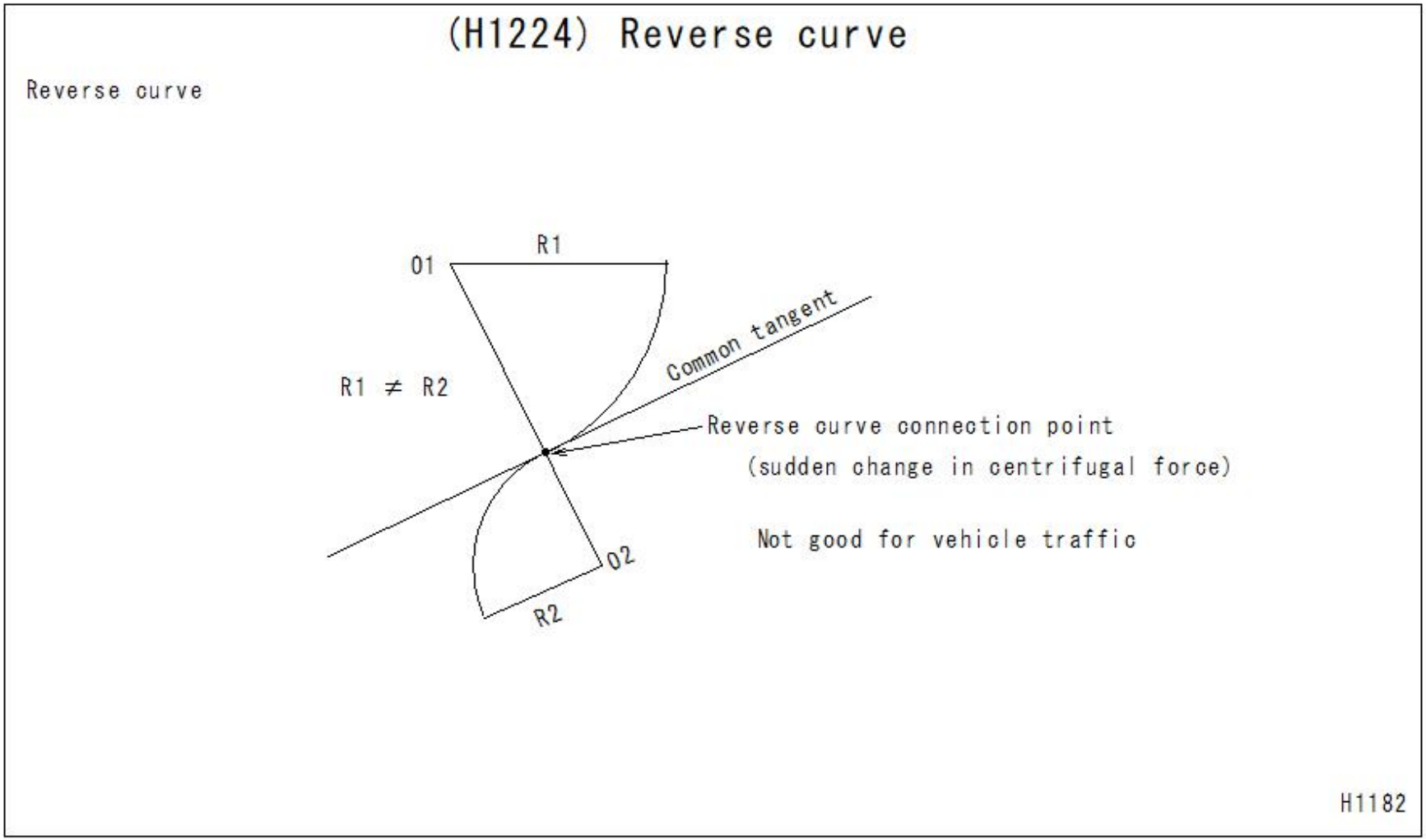
(H1222) simple curve



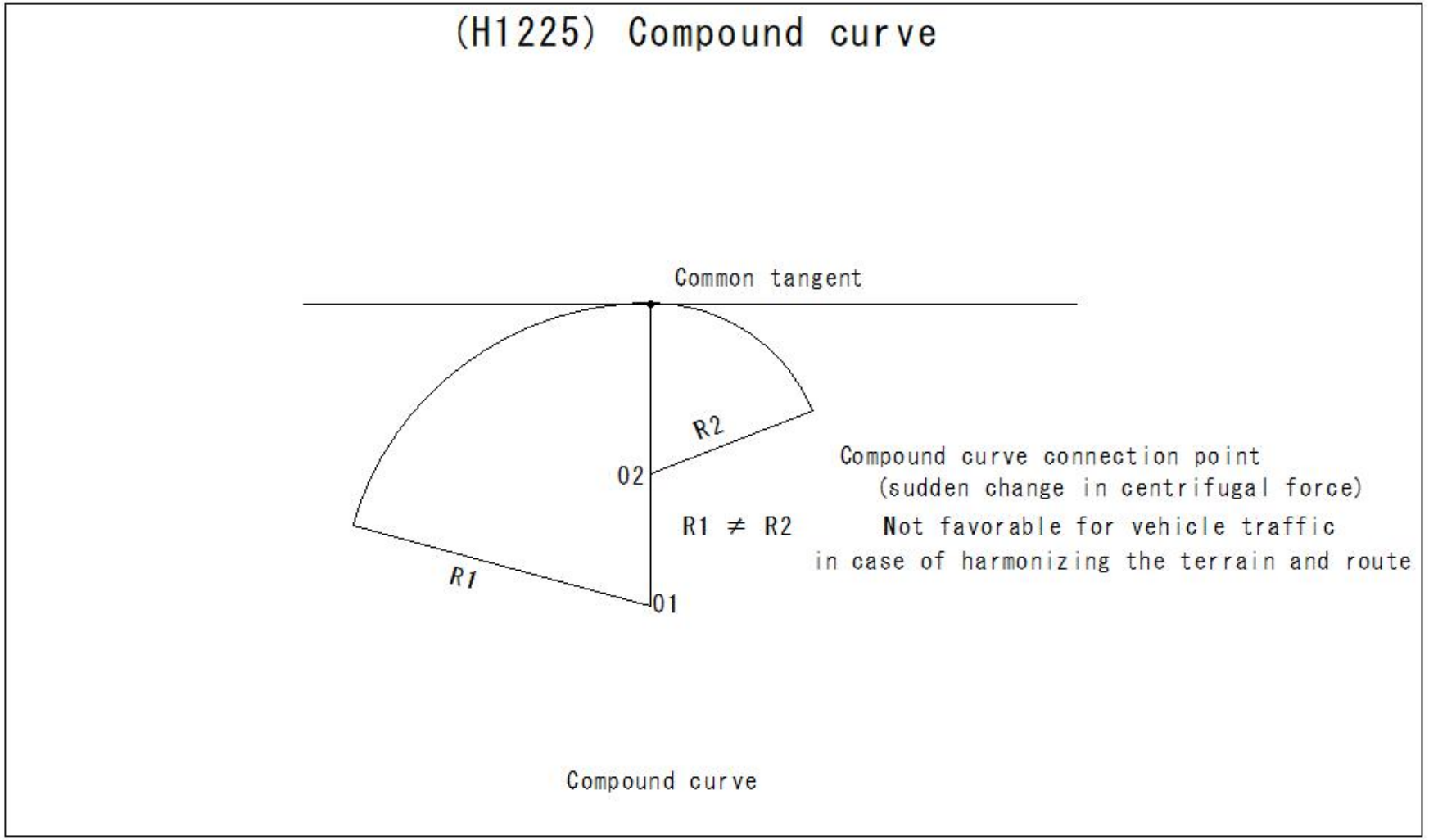
(H1223) alignment of road



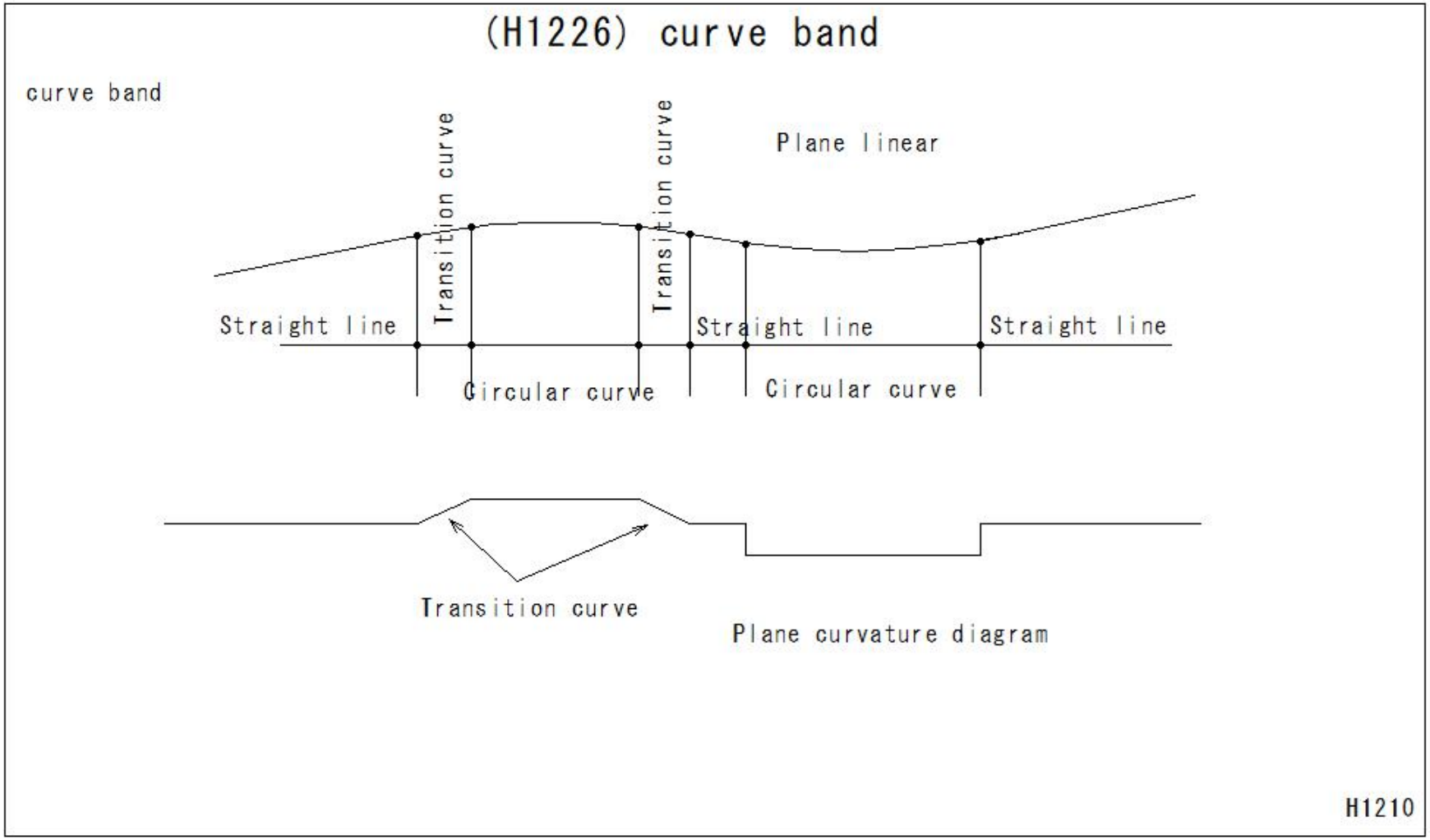
(H1224) Reverse curve



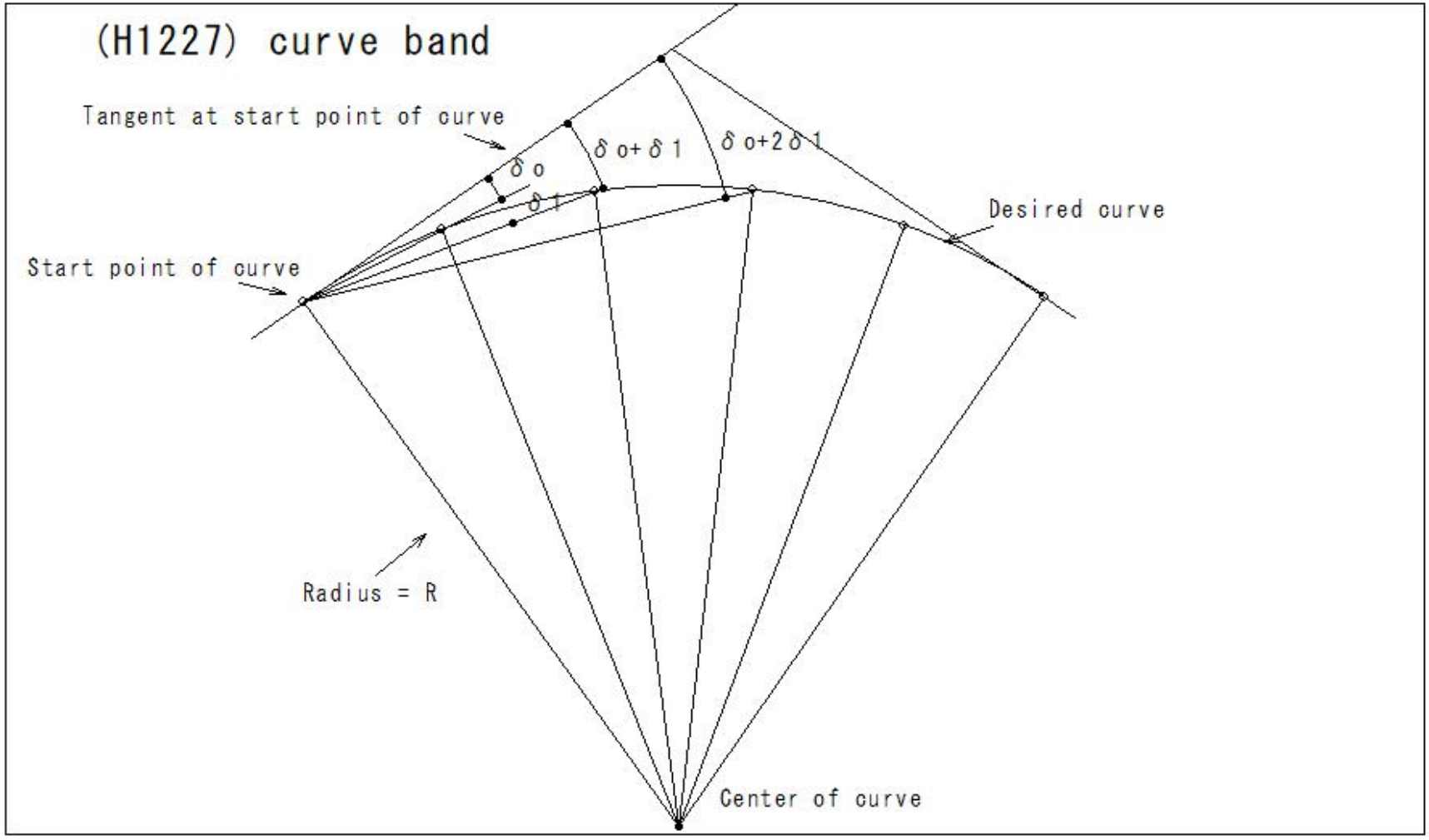
(H1225) Compound curve



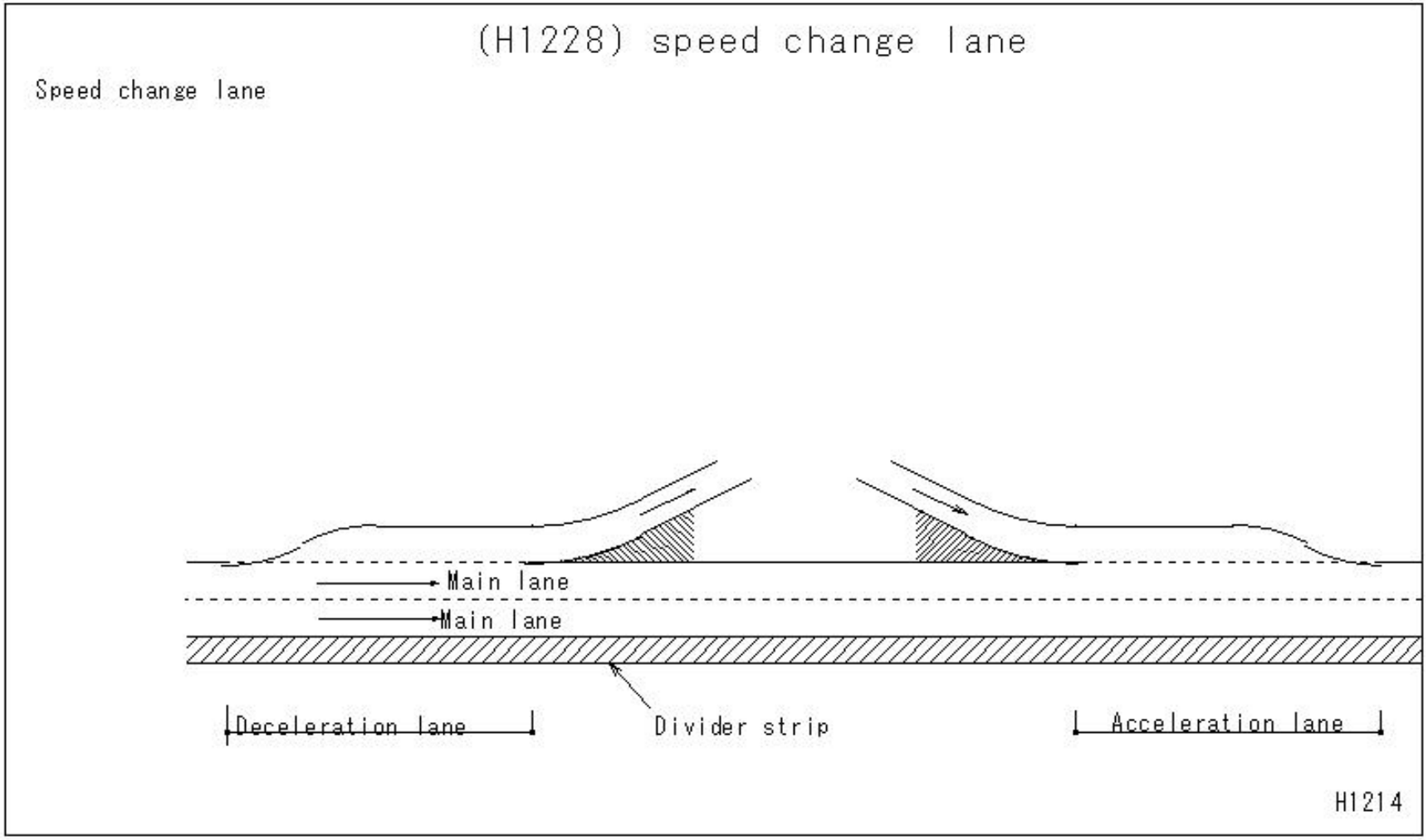
(H1226) curve band



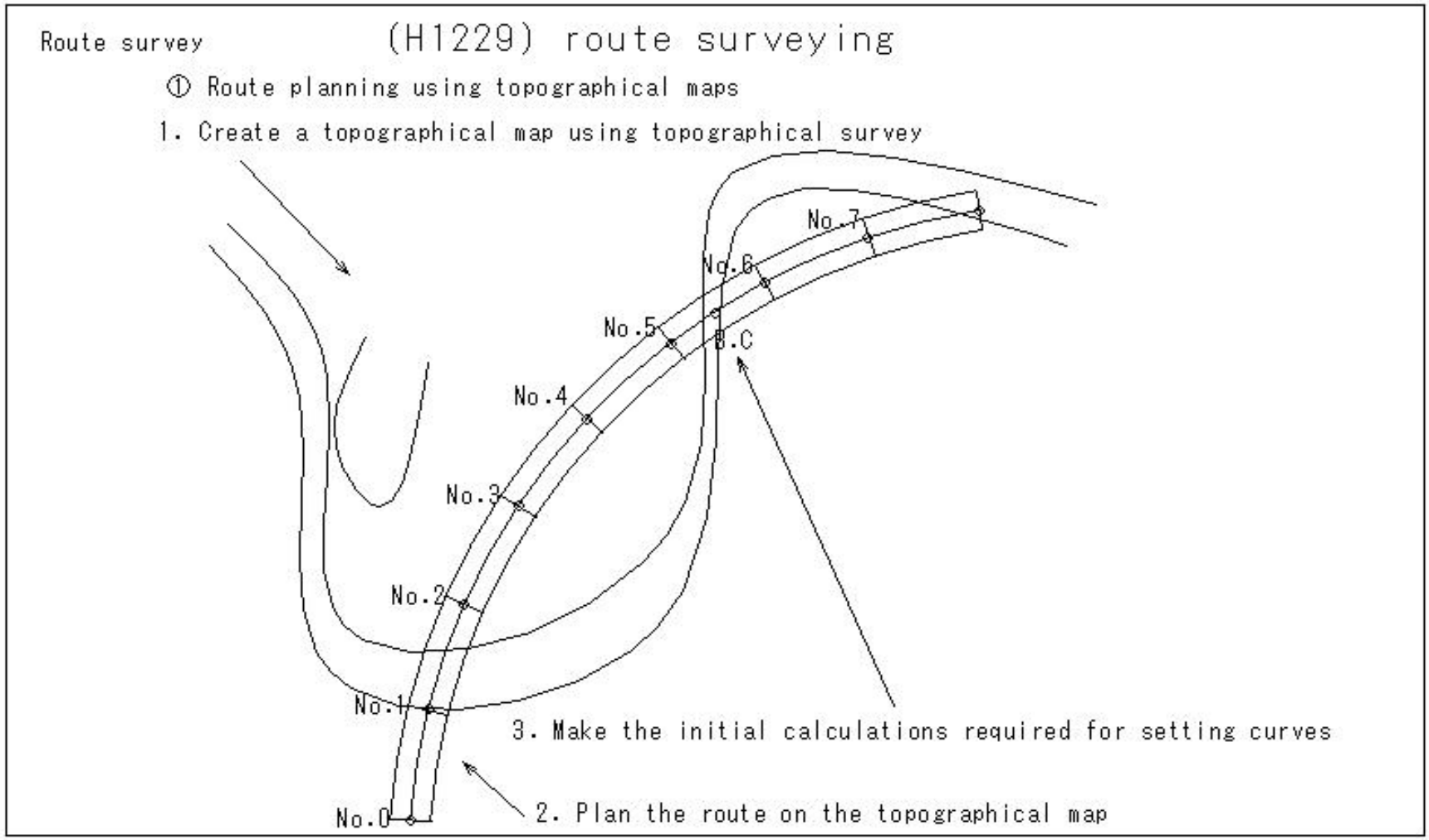
(H1227) method of deflection angle



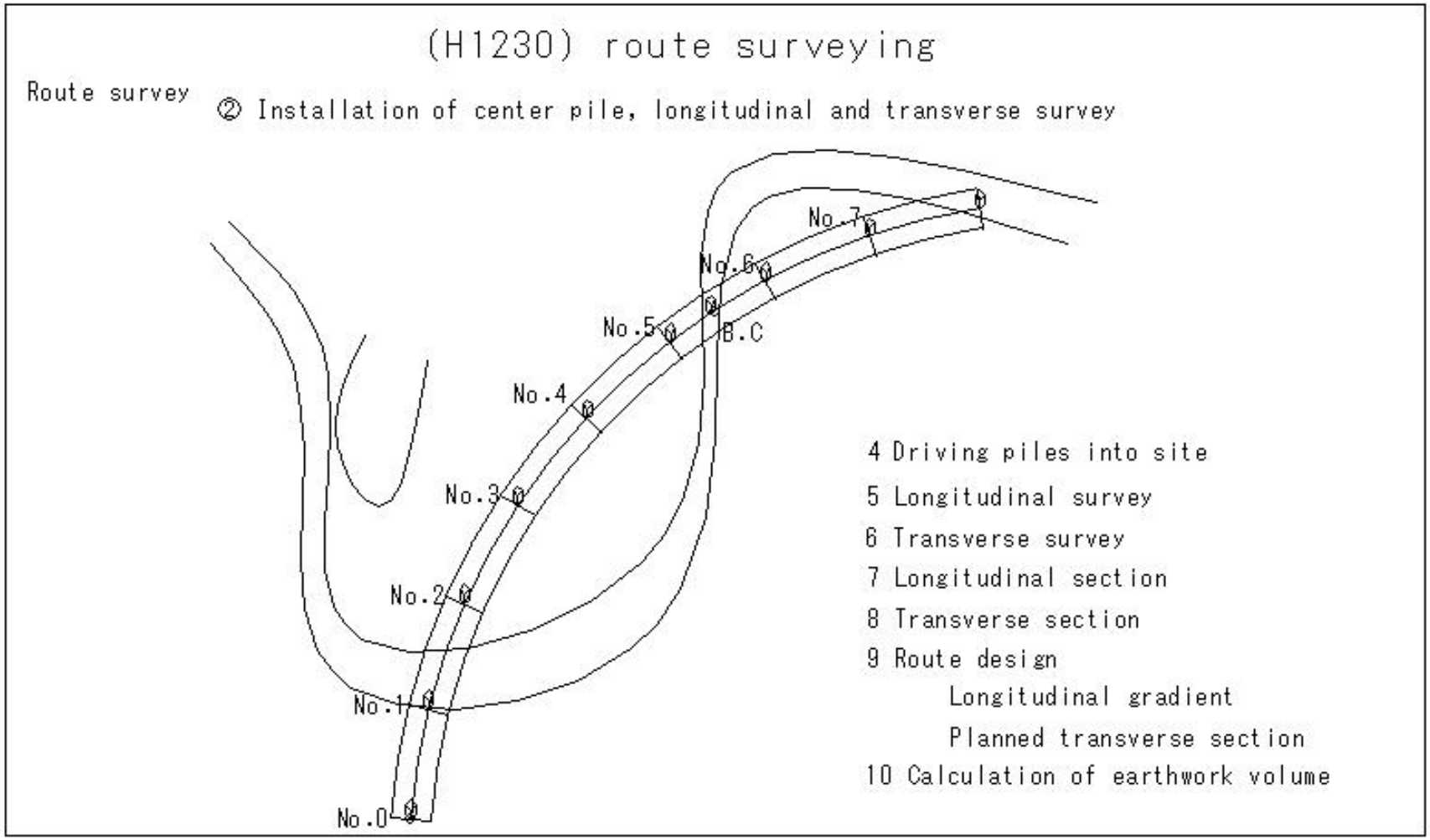
(H1228) Speed change lane



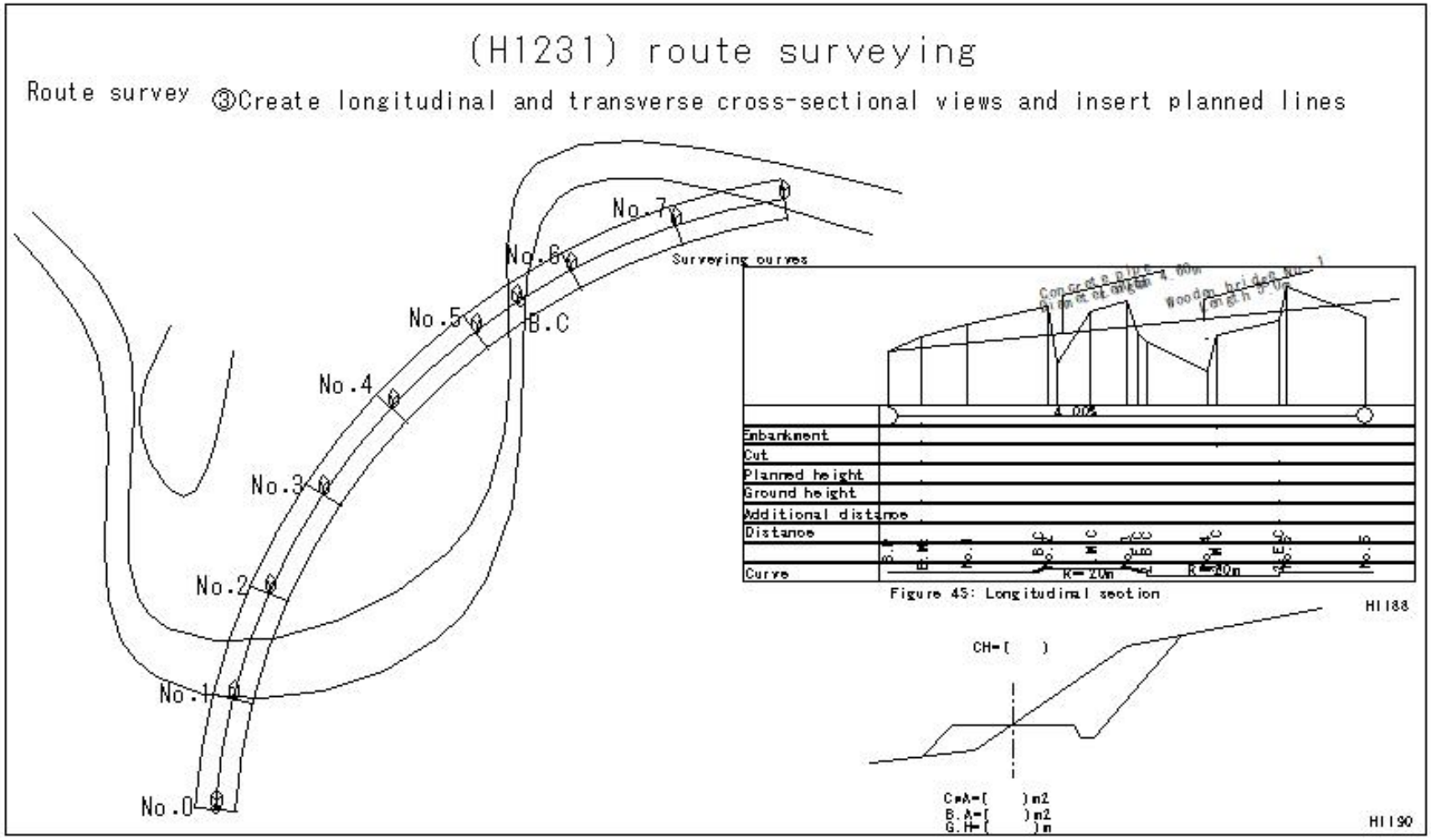
(H1229) route surveying



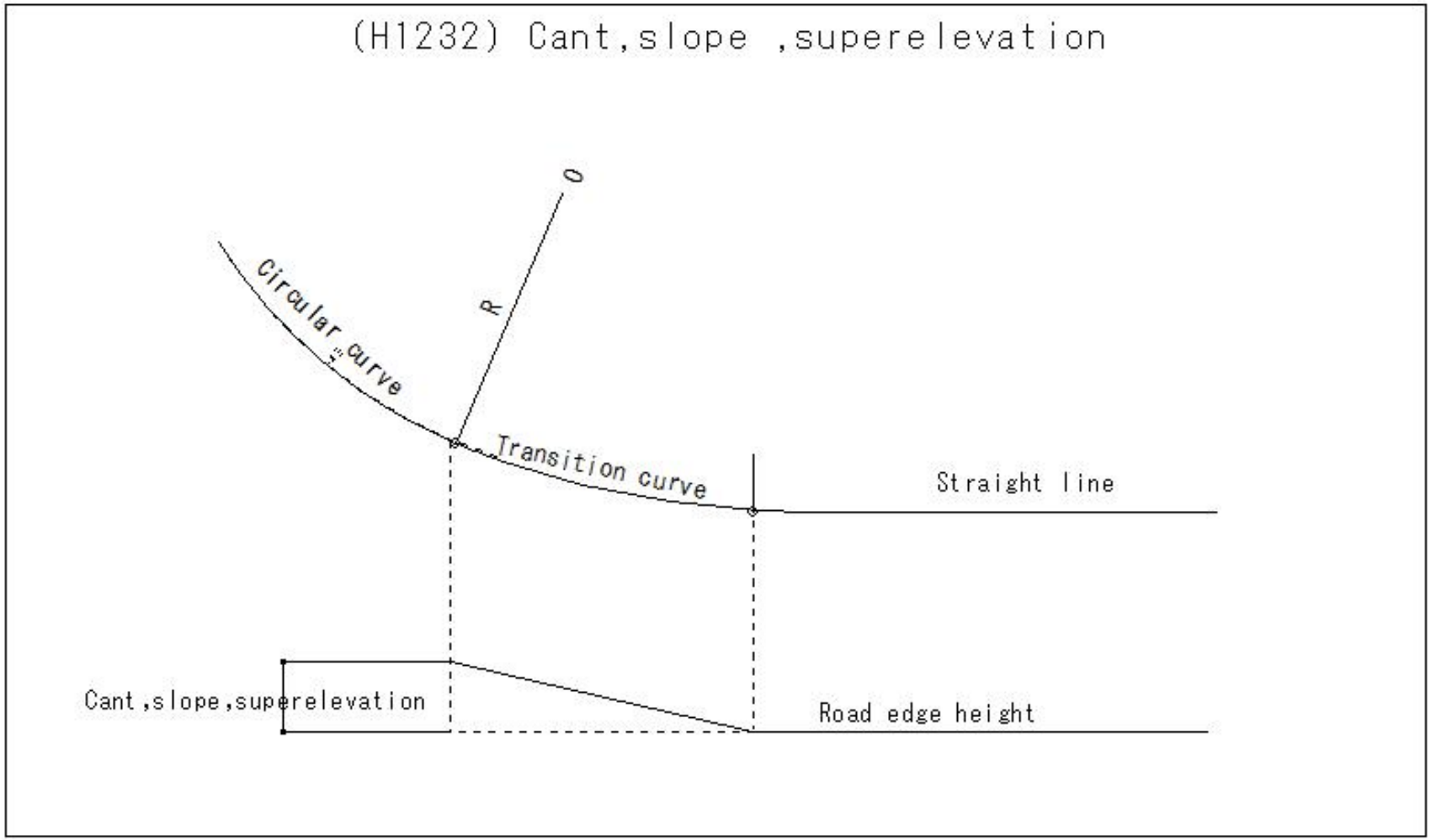
(H1230) route surveying



(H1231) route surveying



(H1232) Cant, slope , superelevation



(H1233) transition curve

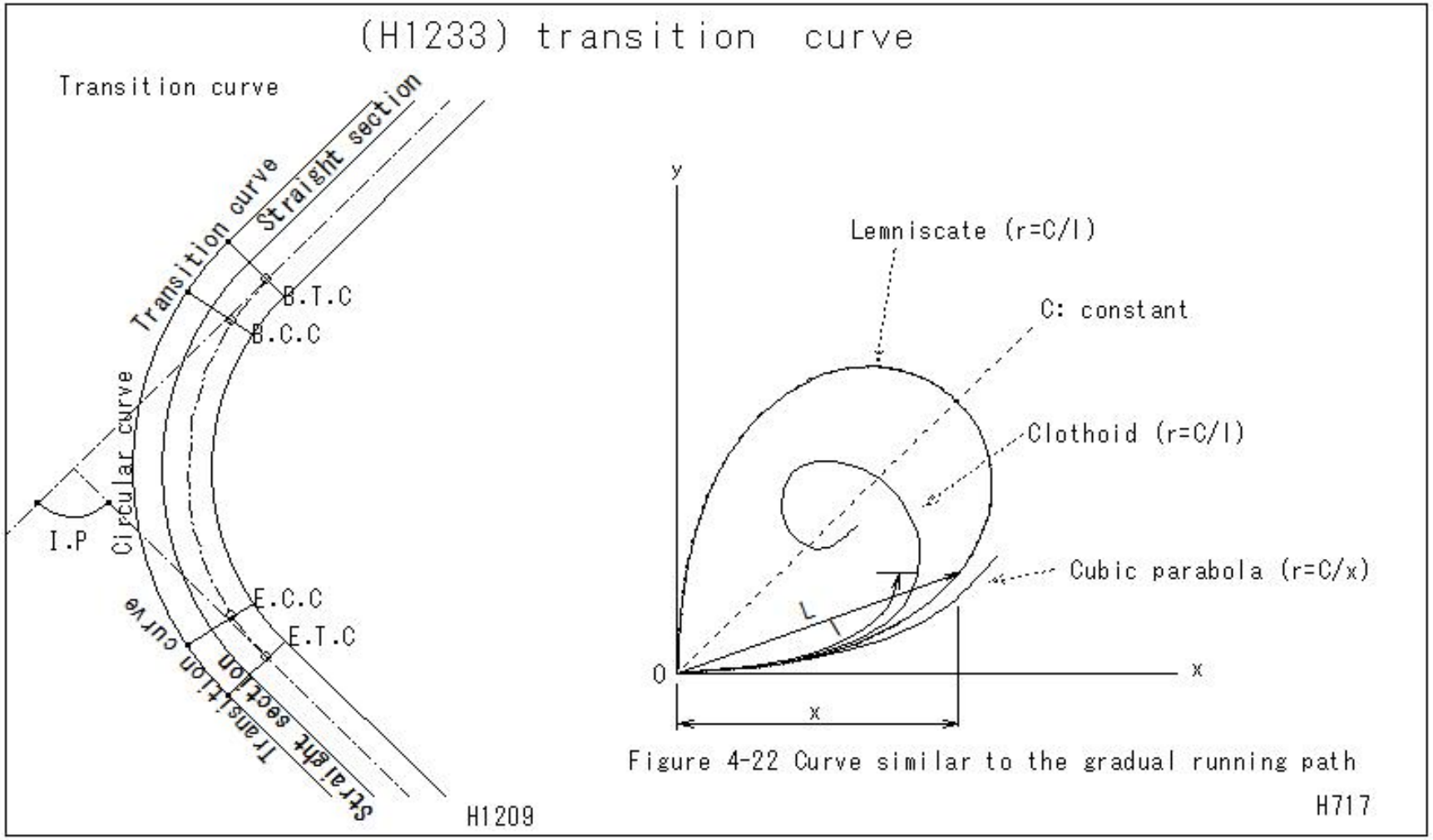
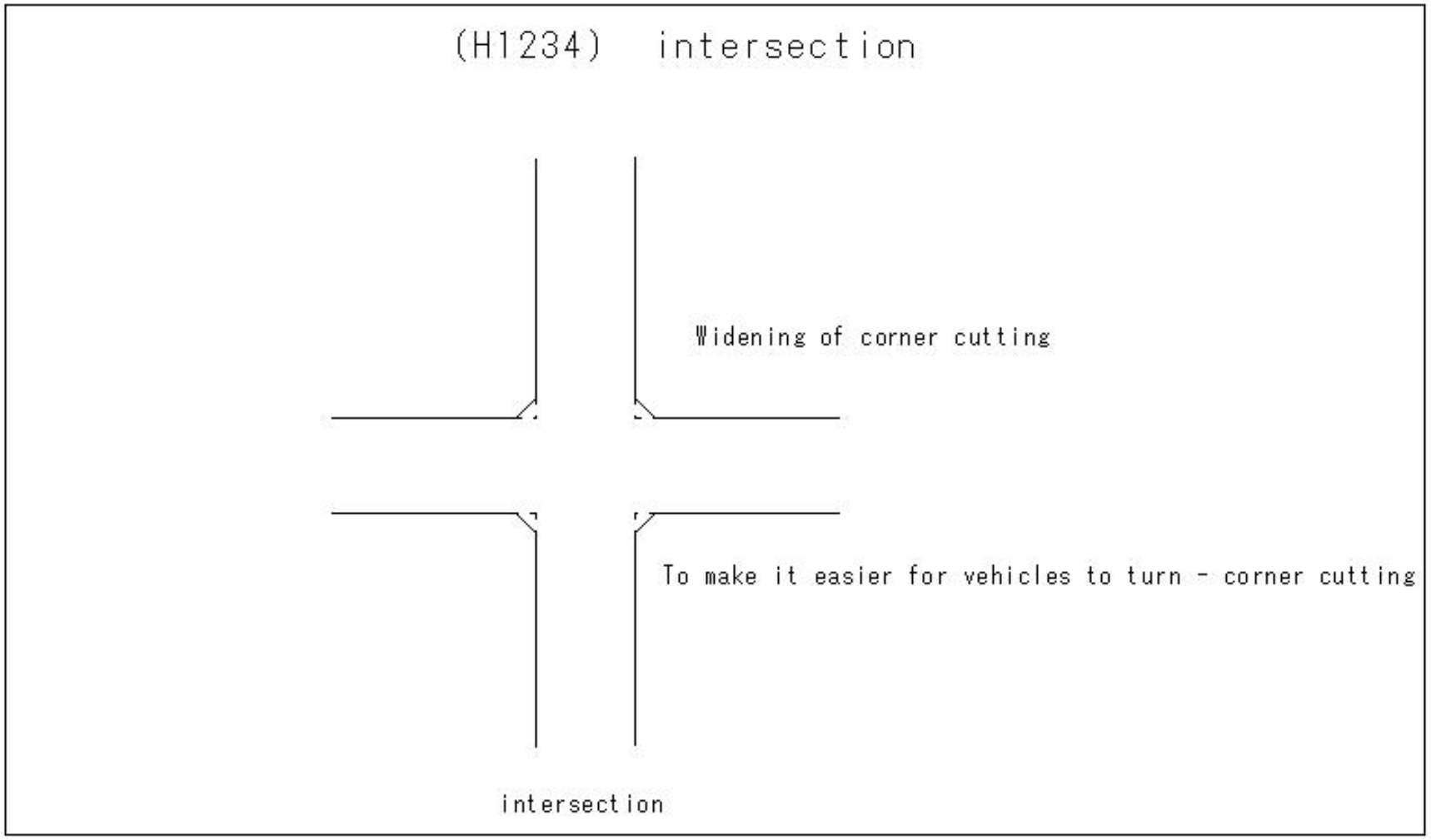


Figure 4-22 Curve similar to the gradual running path

(H1234) intersection



(H1235) horizontal visibility

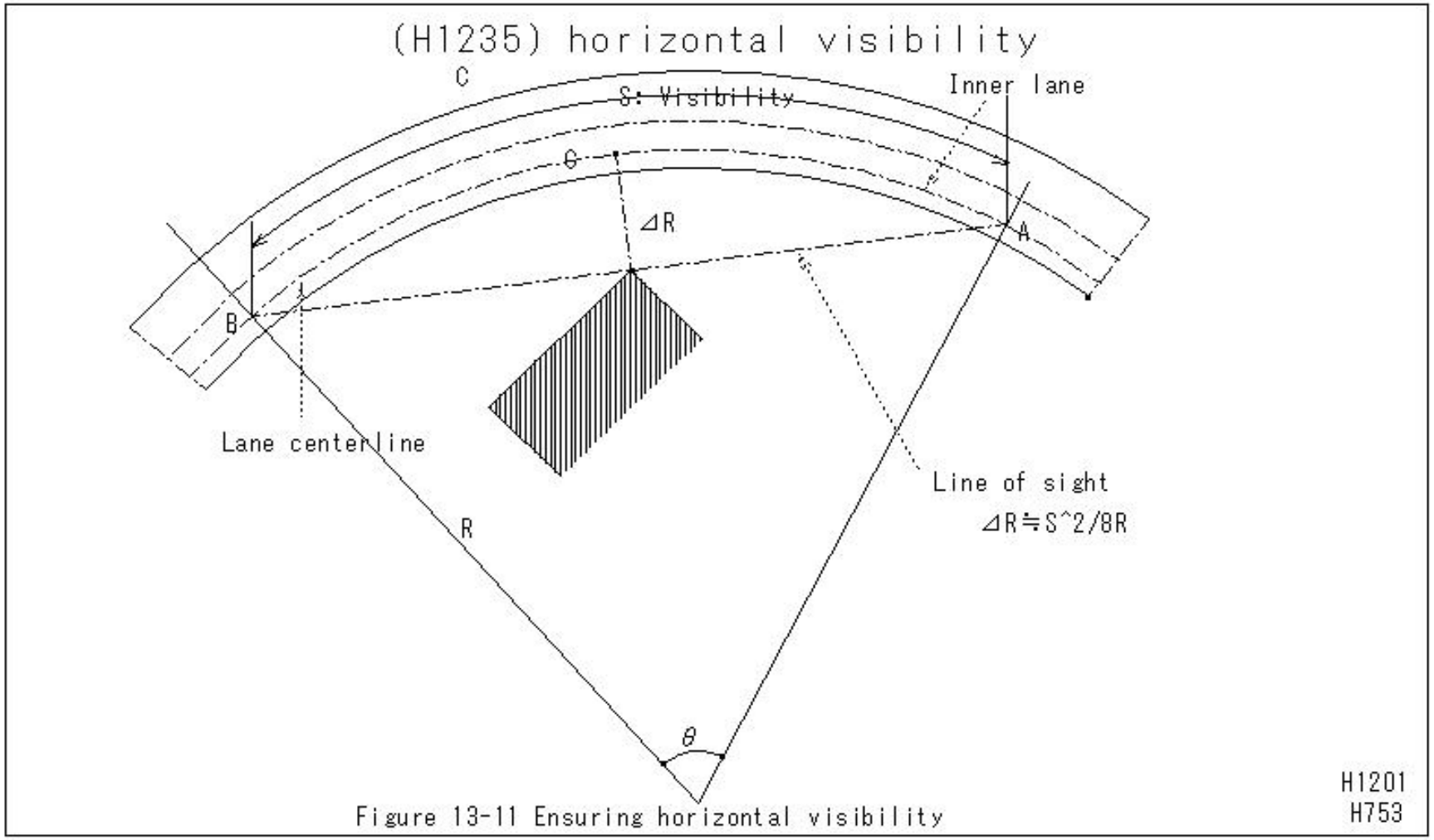


Figure 13-11 Ensuring horizontal visibility

(H1236) longitudinal sight distance

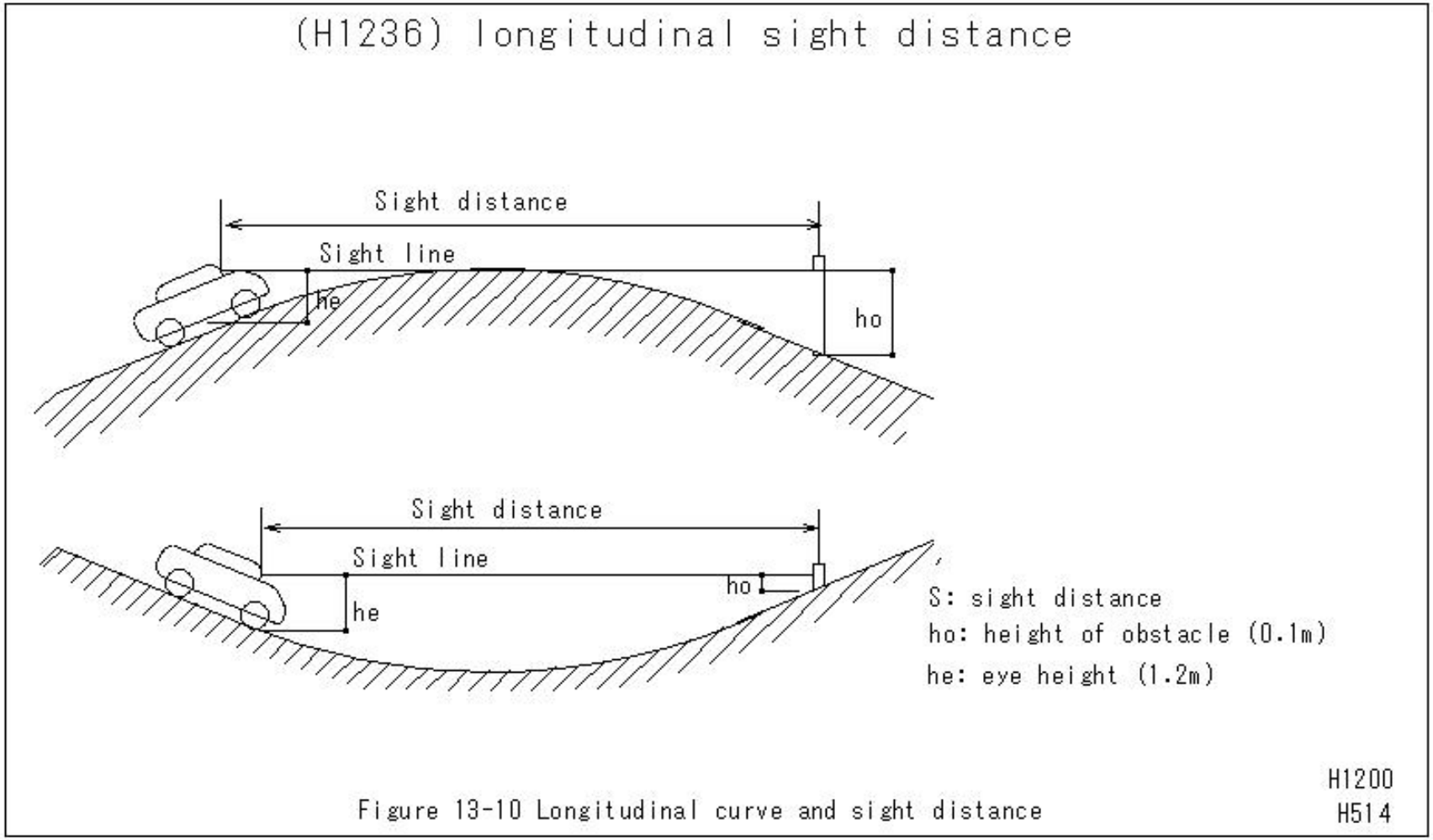


Figure 13-10 Longitudinal curve and sight distance

(H1237) Overtaking sight distance

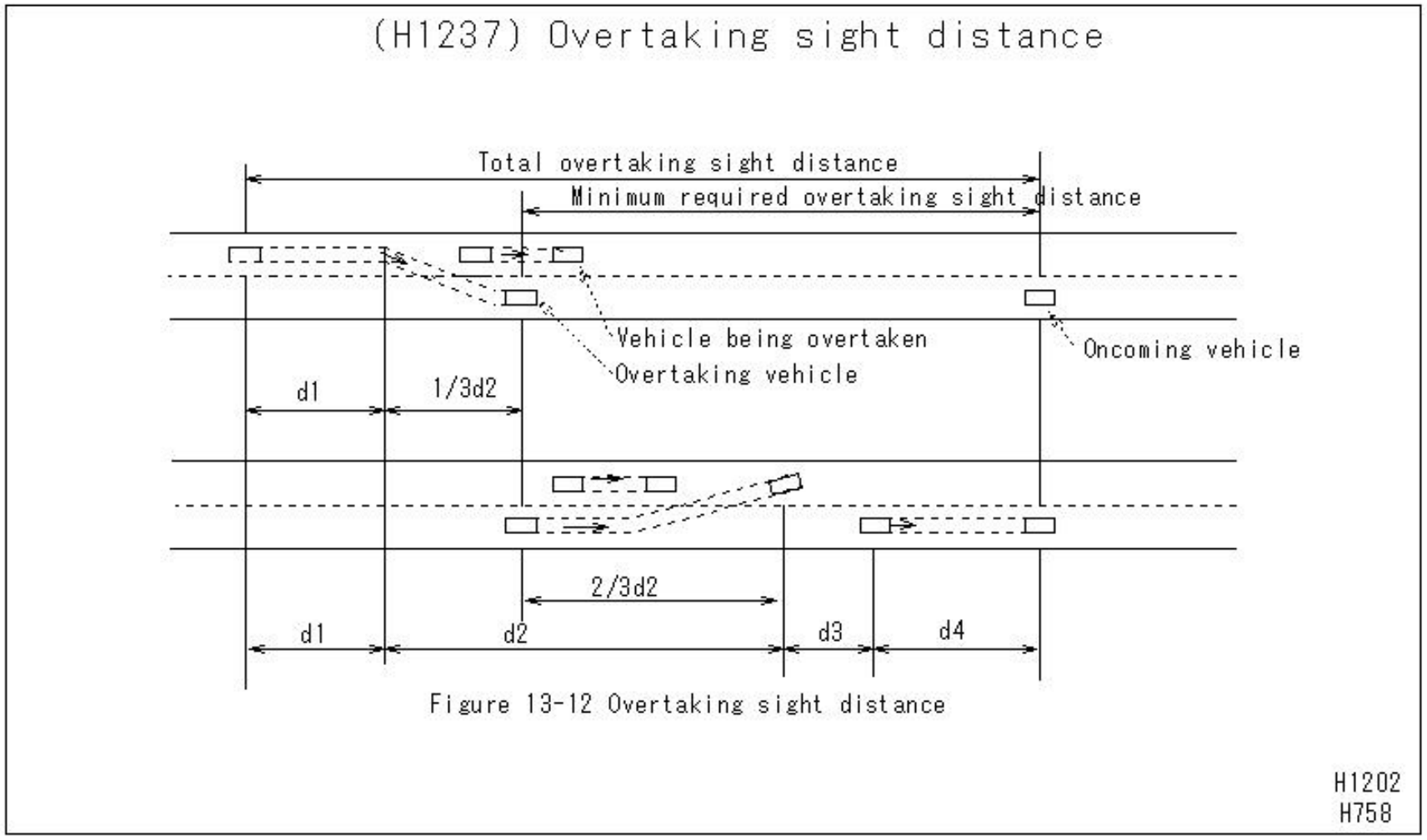


Figure 13-12 Overtaking sight distance

(H1238) Braking and stopping sight distance

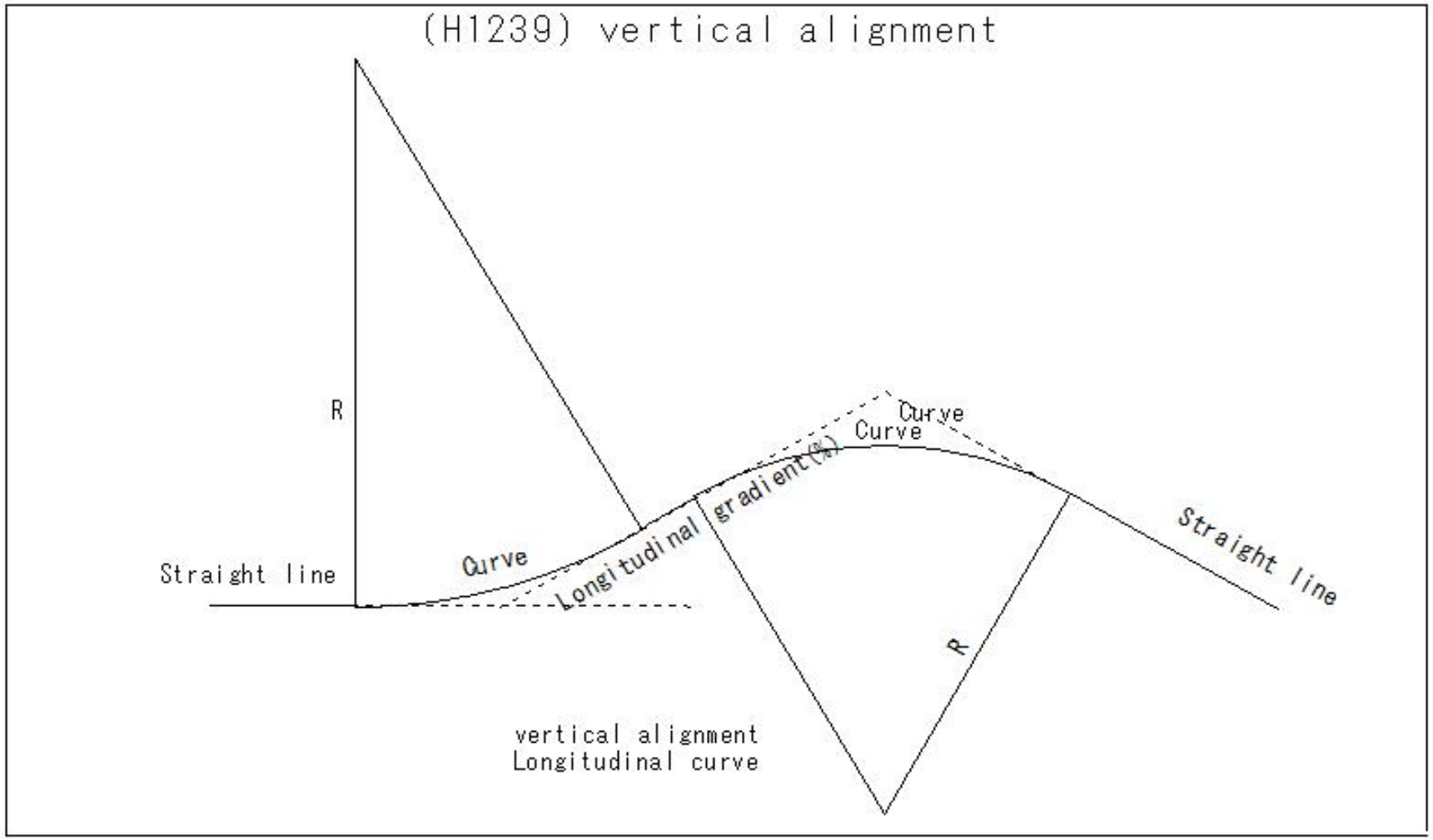
(H1238) Braking and stopping sight distance

Braking and stopping sight distance and minimum overtaking sight distance

Design speed (km/h)	Sight distance for braking and stopping (m)		Minimum overtaking sight distance (m)
	For one lane	For two lanes	
50	-	55	200
40	80	40	150
30	60	30	100
20	40	20	70

Length of vertical curve (unit: meters)	
Design speed (km/h)	Length of vertical curve (m)
50	40
40	35
30	25
20	20

(H1239) vertical alignment



(H1240) Horizontal alignment

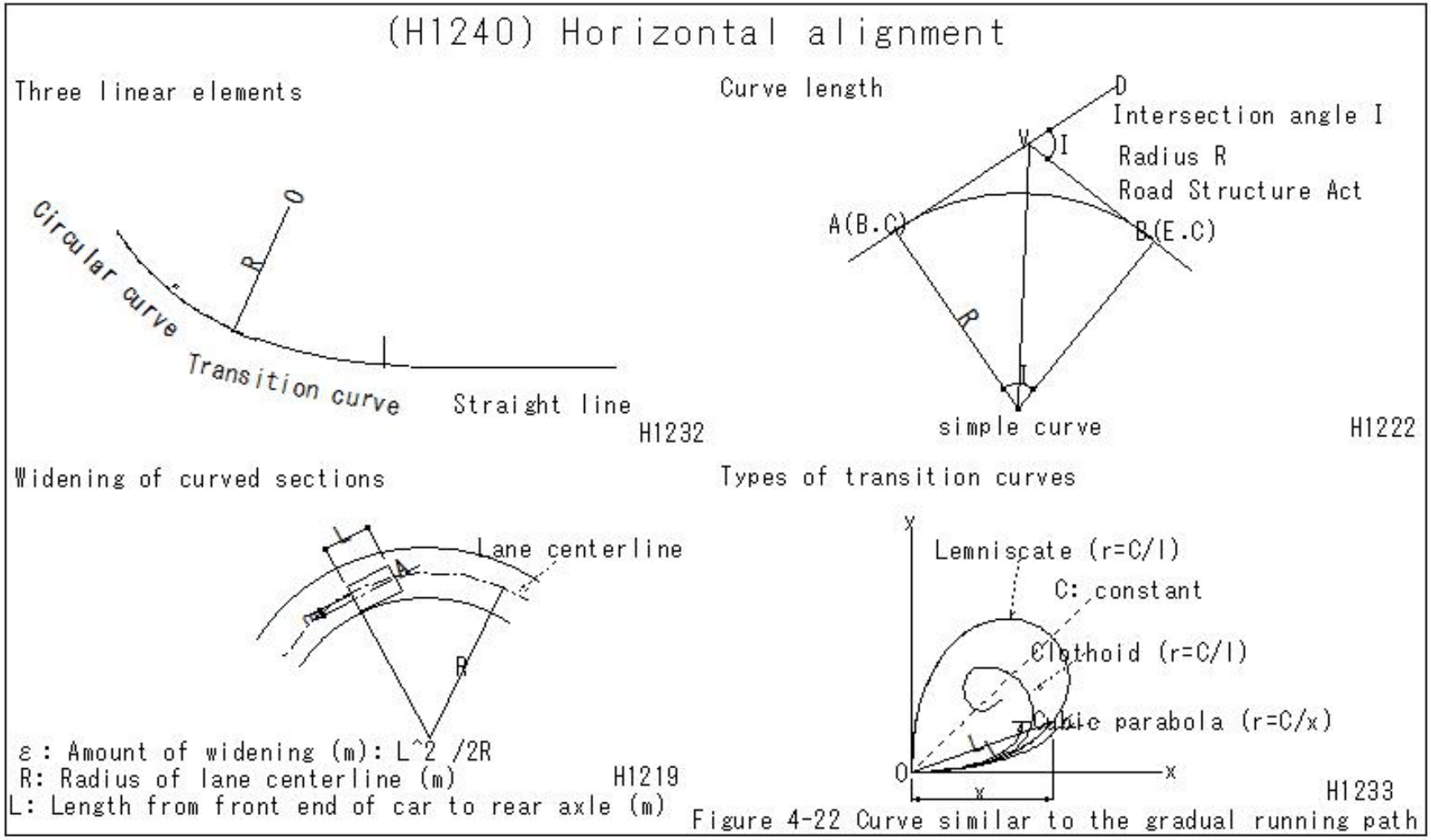
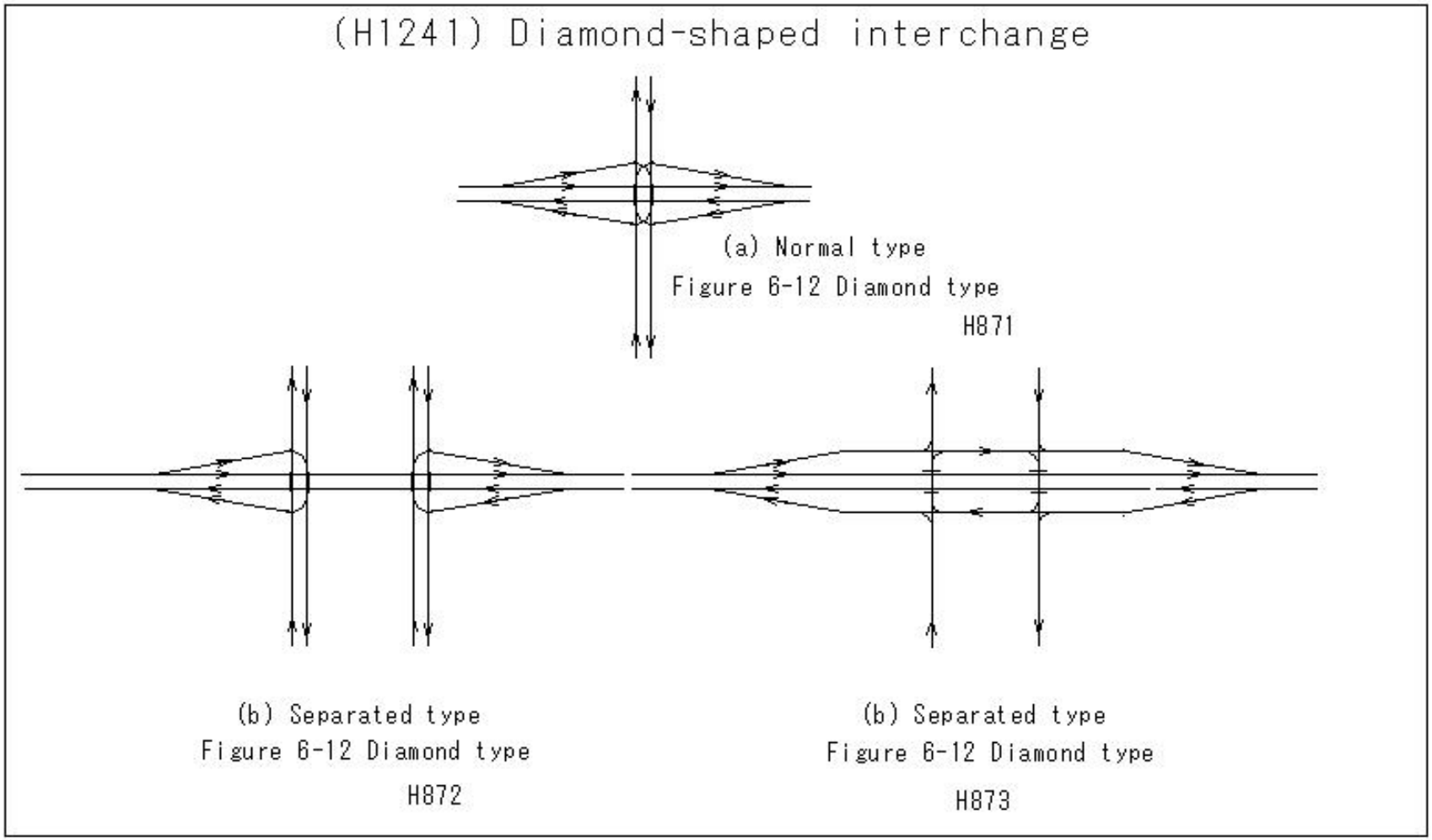
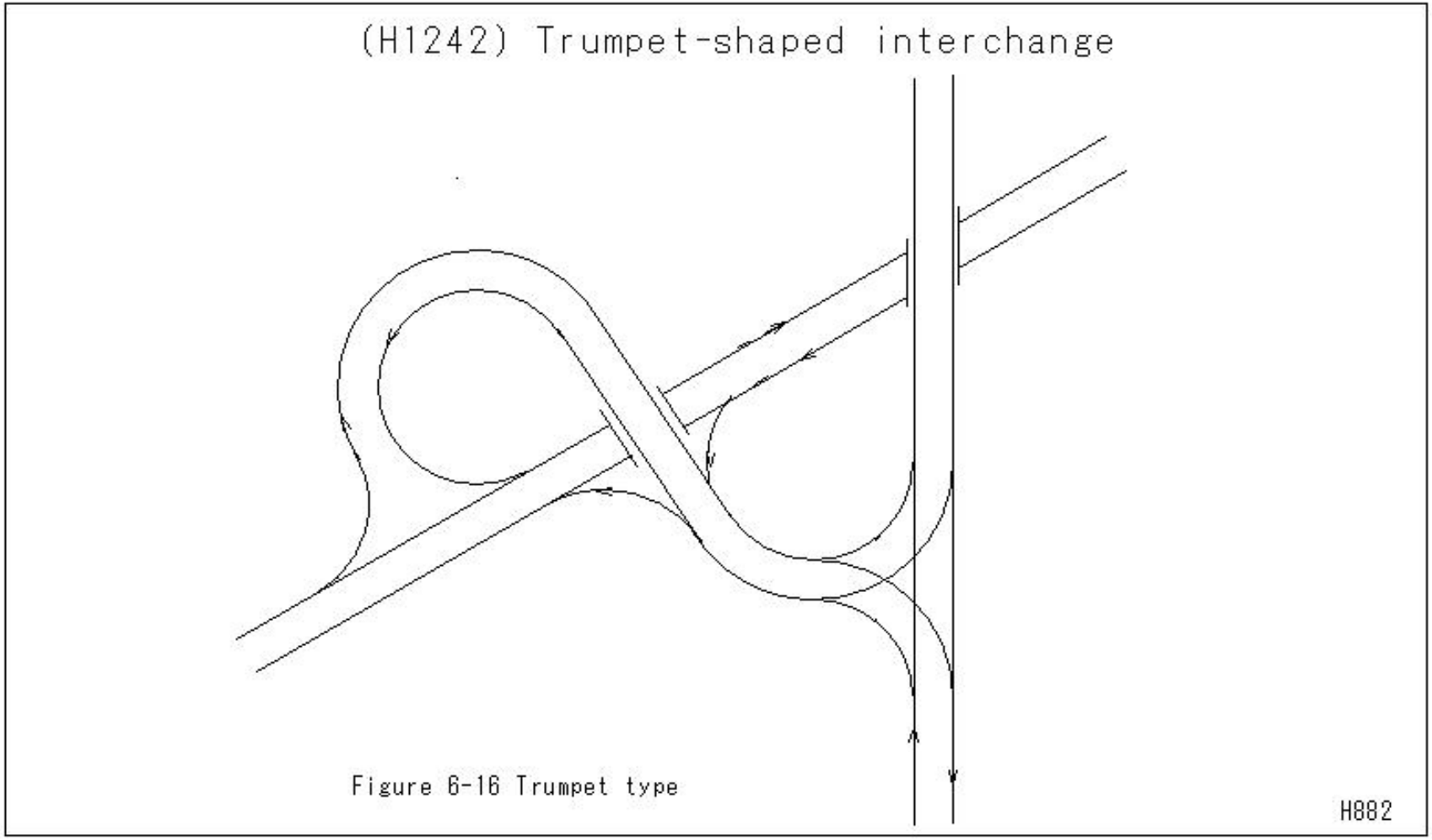


Figure 4-22 Curve similar to the gradual running path

(H1241) Diamond-shaped interchange



(H1242) Trumpet-shaped interchange



(H1243) Incomplete cloverleaf-shaped interchange

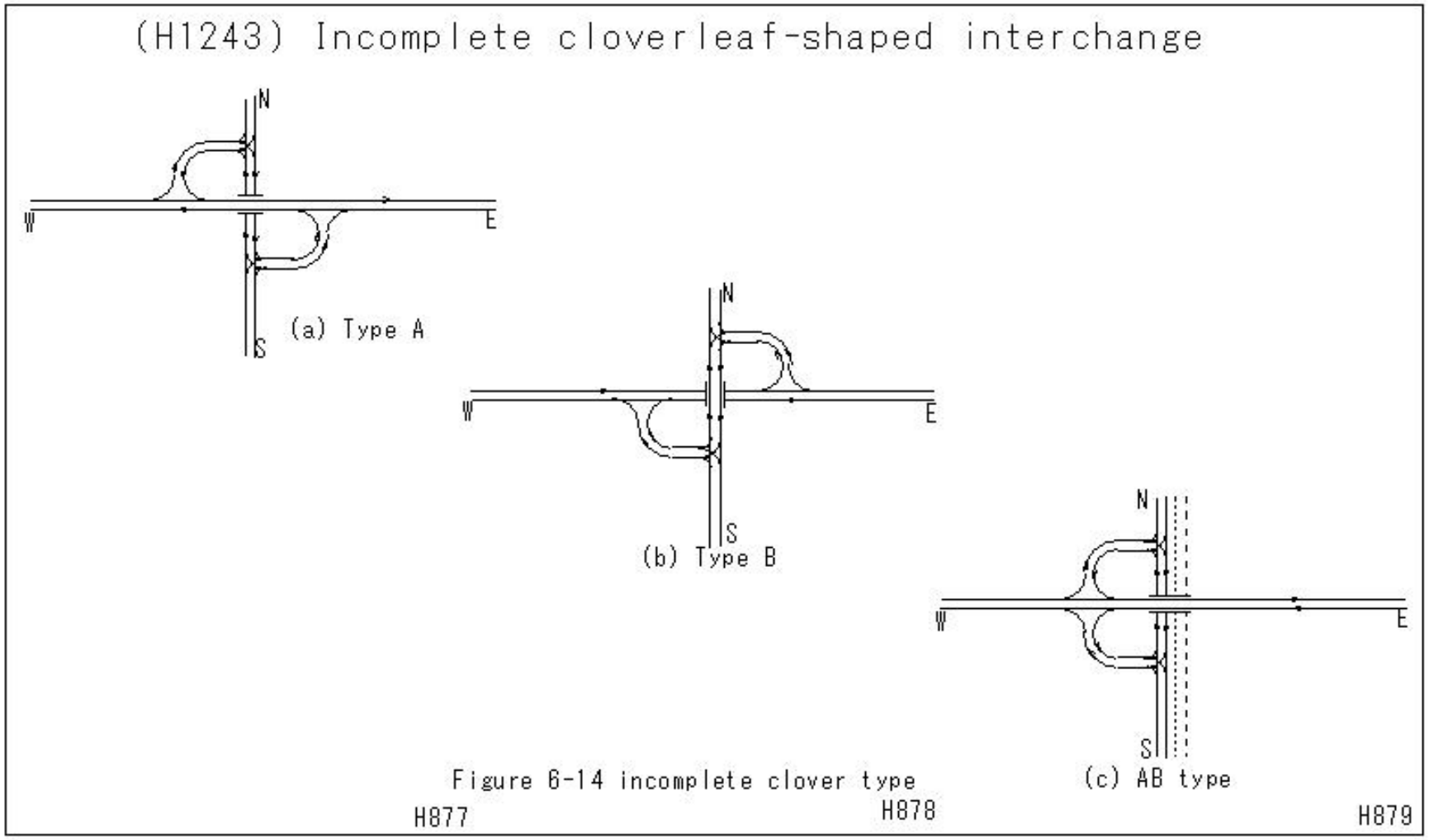
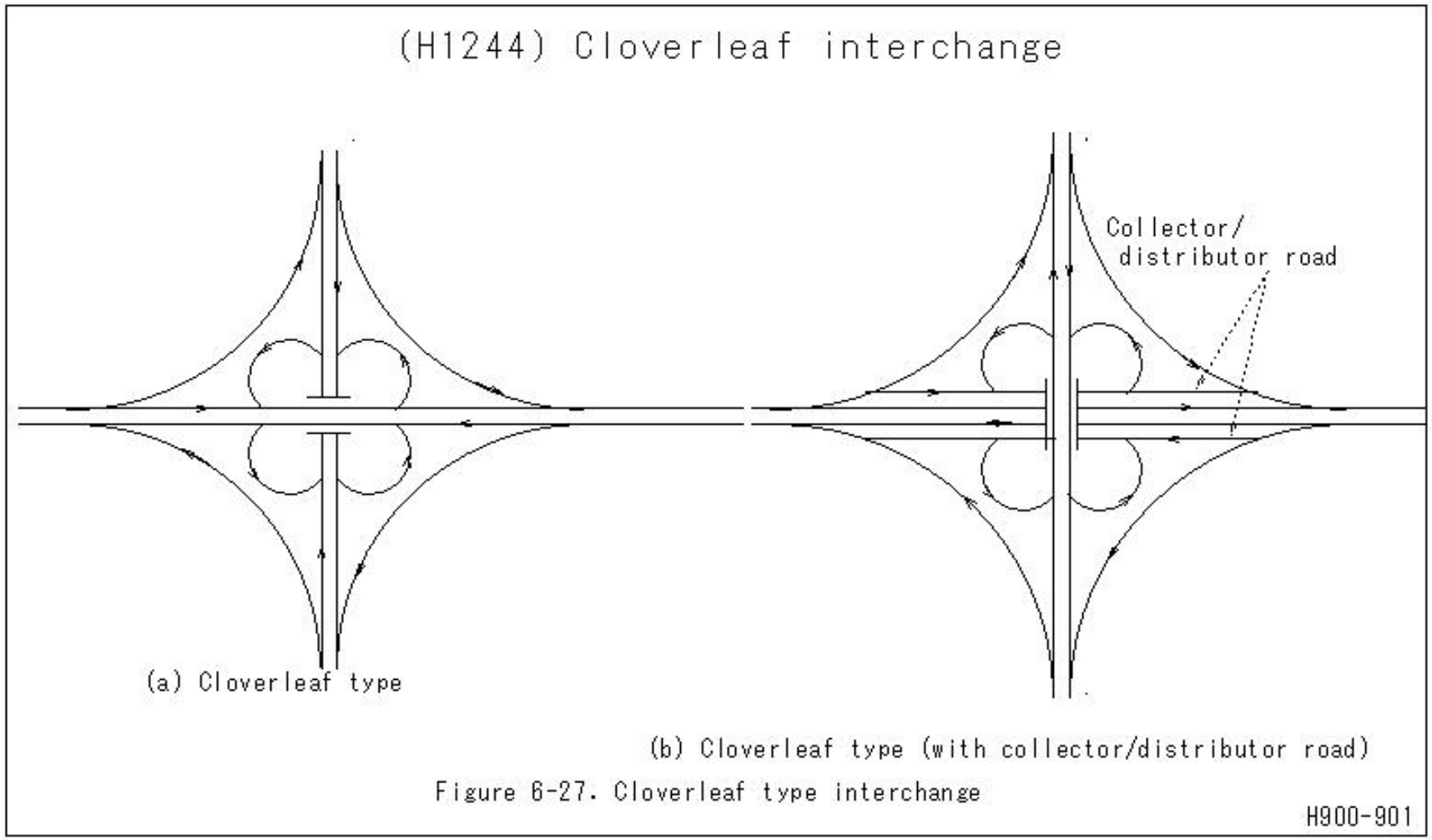


Figure 6-14 incomplete clover type

(H1244) Cloverleaf interchange



(H1245) rotary type interchange

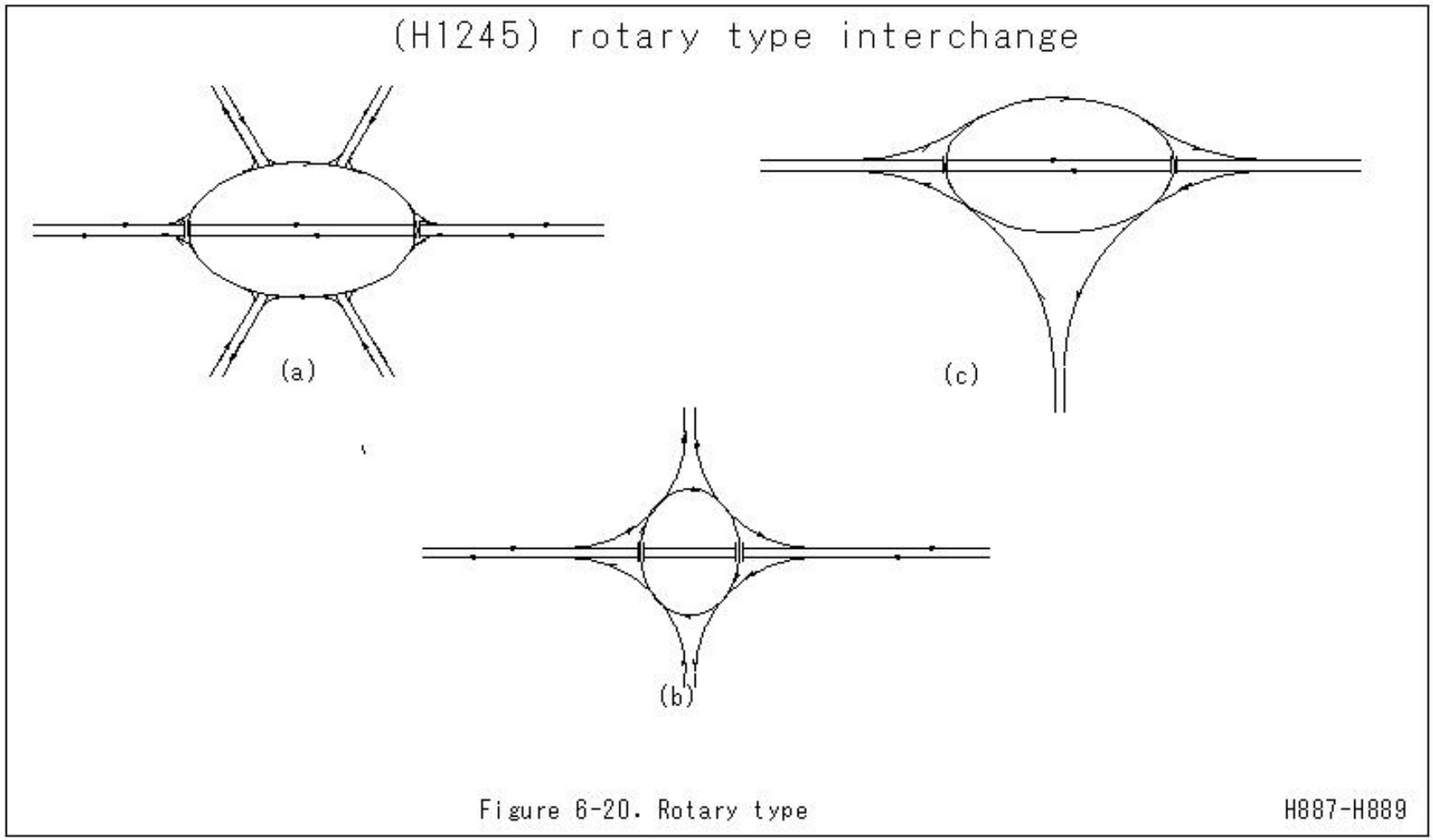
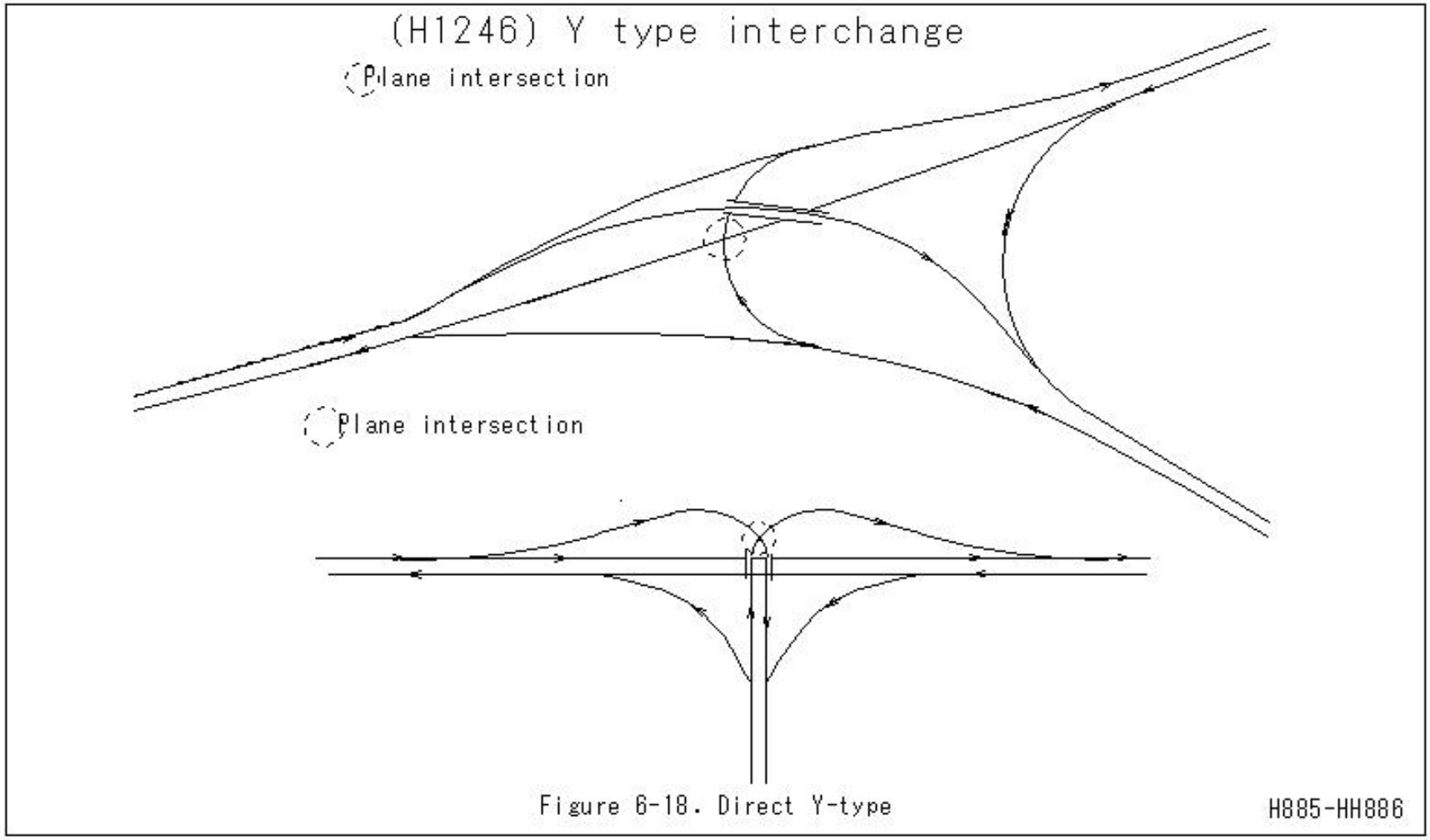


Figure 6-20. Rotary type

H887-H889

(H1246) Y type interchange



(H1247) mixing work on the way