**Example of calculating the coordinates of a closed polygon :**

 The lengths and angles of a closed polygon were measured and the results were as follows: If side AB is located in the first quadrant, halfway between north and east (Az. Of AB = 45° 0' 0'') and the coordinates of point A are equal to (YA = 1000 1000 XA =). Calculate the corrected coordinates of the polygon using Baudage's correction method.

|  |
| --- |
| **C****84° 57' 12''** **106° 40' 21''** **170.88 m****146.65 m** **B****A****244.61 m** **66° 53' 21''** **217.09 m** **D****101° 29' 14''**  |

المجموع النظري للزوايا = ( 360° 0' 0'' )

مجموع الزوايا المقاسة حقلياً = 106°40'21'' + 101°29'14'' + 66°53'21'' + 84°57'12''

 = 360° 0' 8''

الخطأ = المجموع الهندسي للزوايا – مجموع الزوايا المقاسة حقلياً

الخطأ = ( 360°0'0'' ) – ( 360°0'8'' )

الخطأ = - 8''

التصحيح = ( الخطأ / عدد الزوايا ) = ( -8 / 4 ) = -2'' لكل زاوية

**الان نحسب الزوايا المصححة :**

الزاوية المصححة = الزاوية المقاسة حقلياً ± مقدار التصحيح

Corrected Angles :

A= 106° 40' 19'' C = 66° 53' 19''

B= 101° 29' 12'' D = 84° 57' 10''

AZ. of AB = 45° 0' 0''

AZ. of BC = AZ. of AB + Corr. Angle at B ±180°

 = (45° 0' 0'' ) + (101° 29' 12'' ) ± 180°

 = (146° 29' 12'' ) ± 180° = 326° 29' 12''

AZ. of BC = 326° 29' 12''

AZ. of CD = AZ. of BC + Corr. Angle at C ± 180°

 = 326° 29' 12'' + 66° 53' 19'' ± 180°

 = 393° 22' 31'' ± 180°

 = 213° 22' 31''

AZ. of DA = AZ. of CD + Corr. Angle at D ± 180°

 = 213° 22' 31'' + 84° 57' 10'' ± 180°

 = 298° 19' 41'' ± 180°

 = 118° 19' 41''

AZ. of AB = AZ. of DA + Corr. Angle at A ± 180°

 = 118° 19' 41'' + 106° 40' 19'' ± 180°

 = (225° 0' 0'' ) ± 180°

 = 45° 0' 0''

الان نحسب المركبات :

For line AB :

∆x AB = LAB \* SinAZ of AB = 146.65 \* Sin (45°0'0'' ) = 146.65 \* 0.707 = 103.7m

∆y AB = LAB \* CosAZ of AB = 146.65 \* Cos(45°0'0'' ) = 146.65 \* 0.707 = 103.7m

For line BC :

∆x BC = LBC \* SinAZ of BC = 217.09 \* Sin (326°29'12'' ) = -119.86 m

∆y BC = LBC \* CosAZ of BC = 217.09 \* Cos(326°29'12'') = 181 m

For line CD :

∆x CD = LCD \* SinAZ of CD = 244.61 \* Sin (213°22'31'' ) = -134.564 m

∆y CD = LCD \* CosAZ of CD = 244.61 \* Cos(213°22'31'') = -204.27 m

For line DA :

∆x DA = LDA \* SinAZ of DA = 170.88 \* Sin (118°19'41'' ) = 150.42 m

∆y DA = LDA \* CosAZ of DA = 170.88 \* Cos(118°19'41'') = -81.09m

الان نحسب مقدار الخطأ الافقي والعمودي

Ex = ∆x AB + ∆x BC + ∆x CD + ∆x DA

Ex =(103.7) + (-119.86) + ( -134.564) + (150.42)

Ex = -0.3m

Ey = ∆y AB + ∆y BC + ∆y CD + ∆y DA

Ey = -0.66 m

ايجاد مقدار التصحيح لكل مركبة افقية وعمودية :

تصحيح الضلع AB :

∆x AB ) correct to AB = $\frac{ LAB}{\sum\_{}^{} L}\*Ex$)

∆x AB ) correct to AB = $\frac{ 146.65}{779.13}\*0.3$)

(∆xAB) correct to AB = 0.056m

∆y AB ) correct to AB = $\frac{ LAB}{\sum\_{}^{} L}\*Ey$)

∆y AB ) correct to AB = $\frac{ 146.65}{779.13}\*0.66=0.124 m$)

تصحيح الضلع BC :

∆x BC ) correct to BC = $\frac{ LBC}{\sum\_{}^{} L}\*Ex$)

∆x BC ) correct to BC = $\frac{217.09}{779.13}\*0.3=0.084$)

∆y BC ) correct to BC = $\frac{ LBC}{\sum\_{}^{} L}\*Ey$)

∆y BC ) correct to CD = $\frac{217.09}{779.13}\*0.66=0.184m$)

تصحيح الضلع CD :

(∆xCD) correct to CD = 0.094m

(∆yCD) correct to CD = 0.207m

تصحيح الضلع DA :

(∆xDA) correct to DA = 0.066 m

(∆yDA) correct to DA = 0.145 m

الان نحسب القيم المصححة للمركبات

الضلع AB

(∆xAB) corrected = 103.7 + 0.056 = 103.756 m

(∆yAB) corrected = 103.7 + 0.124 = 103.824 m

الضلع BC

(∆xBC) corrected = (-119.86) + 0.084 = -119.776 m

(∆yBC) corrected = 181 + 0.184= 181.184 m

الضلع CD

(∆xCD) corrected = ( -134.56 ) + 0.094 = -134.466 m

(∆yCD) corrected = (-204.27) + 0.207= -204.063 m

الضلع DA

(∆xDA) corrected = (150.42 ) + 0.066 = 150.50 m

(∆yDA) corrected = (-81.09 ) + 0.145= -80.945 m

بعد انت انتهينا من حساب تصحيح المركبات سوف ننتقل الى حساب الاحداثيات

**For Line AB**

XB = XA + (∆xAB) corrected

XB = 1000 + 103.756 = 1103.756 m

YB = YA + (∆YAB) corrected

YB = 1000 + 103.824 = 1103.824 m

**For Line BC**

XC = XB + (∆xBC) corrected

XC = 1103.756 + ( -119.776 ) = 983.98 m

YC = YB + (∆YBC) corrected

YC = 1103.824 + 181.184 = 1285.008 m

**For Line CD**

XD = XC + (∆xCD) corrected = 983.98 + ( - 134.466 ) = 849.51m

YD = YC + (∆YCD) corrected = 1285.008 + ( - 204.063 ) = 1080.945m

**For Line DA**

XA = XD + (∆xDA) corrected = 849.51 + 150.49 = 1000 m

YA = YD + (∆YDA) corrected = 1080.945 + ( - 80.945) = 1000 m

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Line** | **Length** | **Corrected****Angle** | **Az.** | **∆x =** **L \* Sin (AZ.)** | **∆y =** **L \* Cos(AZ.)** | **Cor. to****∆x** | **Cor. to ∆y** | **Corrected****∆x** | **Corrected****∆y** | **Coordinates****( X , Y )** |
| **AB** | **146.55** | **101° 29' 12''** | **45° 0' 0''** | **103.7** | **103.7** | **0.056** | **0.124** | 103.75 | 103.824 | A ( 1000 , 1000 ) |
| **BC** | **217.09** | **66° 53' 19''** | **326° 29' 12''** | **-119.86** | **181** | **0.084** | **0.184** | -119.776 | 181.184 | B ( 1103.75, 1103.824) |
| **CD** | **244.61** | **84° 57' 10''** | **213° 22' 31''** | **-134.56** | **-204.27** | **0.094** | **0.207** | -134.466 | -204.063 | C (983.98 , 1285.008) |
| **DA** | **170.88** | **106° 40' 19''** | **118° 19' 41''** | **150.42** | **-81.09** | **0.066** | **0.145** | 150.49 | -80.945 | D (849.51, 1080.945) |
| **المجموع** | **779.13** |  |  | **- 0.3 m** | **- 0.66** | **+0.3** | **+066** |  |  | A (1000 , 1000 )  |

