

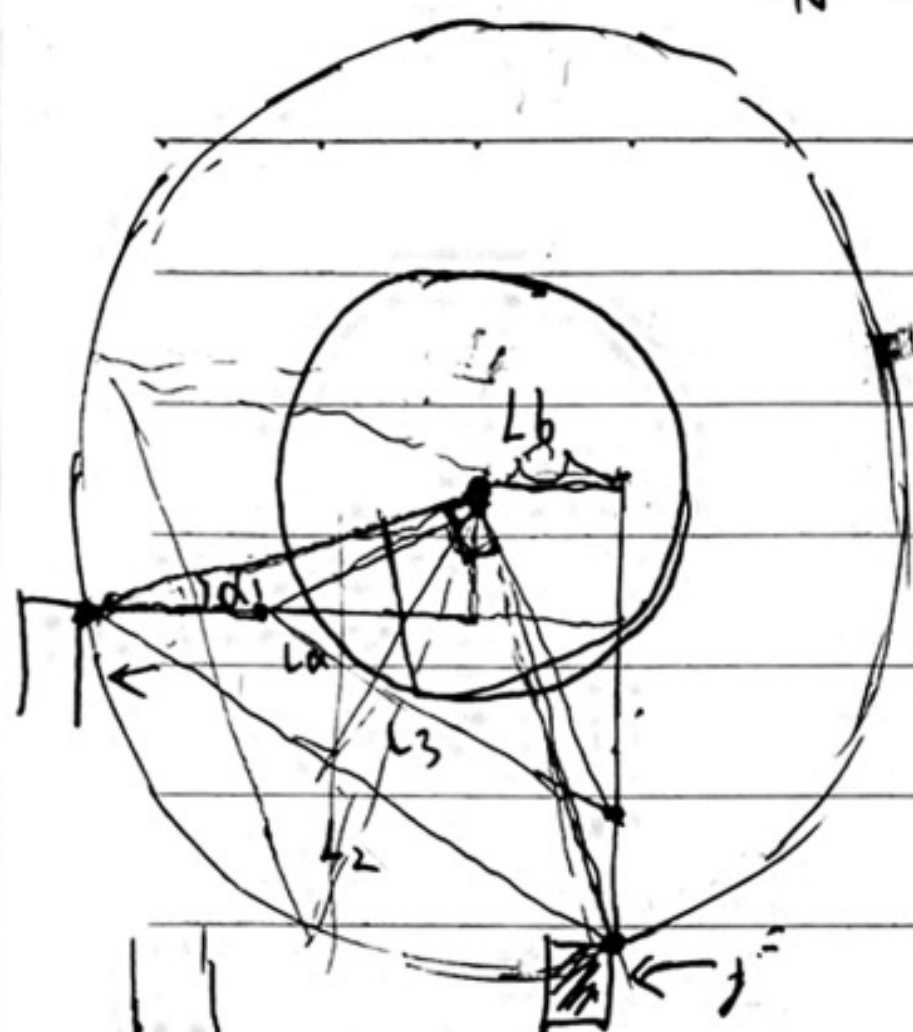
No.

Date



(用此处校准)

$$\theta_{A1} = 0$$



直径: $D_1 = 10$
 磨杆长度: $L_0 = 100$

(向左) ~~$L_1 = 50$~~ $D_2 = 20$

接触水平点: $Z_1 = 0$, $Z_3 = 50$
 接触垂直点: $Y_1 = 0$, $Y_3 = 10$

$$\theta_{A2} = 90$$

向左接触

(向左) \rightarrow 接触水平点: $Z_2 = -100$, $Z_4 = -90$
 接触垂直点: $Y_2 = 100$, $Y_4 = 10$

基径长度(磨杆为0): L_0 , 相对圆半径 R_1, R_2

中心偏距: L_6

相对夹角: α_1, α_2

磨杆中心坐标: $\theta_{A1} = 0$ 时 $\begin{cases} Z_1' = 0 \\ Y_1' = Y_1 - \frac{D_1}{2} = 0 - \frac{10}{2} = -5 \end{cases}$
 $\theta_{A2} = 90$ 时 $\begin{cases} Z_2' = Z_2 - \frac{D_1}{2} = -100 - \frac{10}{2} = -105 \\ Y_2' = Y_2 = 100 \end{cases}$

两个距离: $L_2 = \sqrt{(Z_1' - Z_2')^2 + (Y_1' - Y_2')^2}$, 夹角 $\theta_A' = \theta_{A2} - \theta_{A1} = 90^\circ$

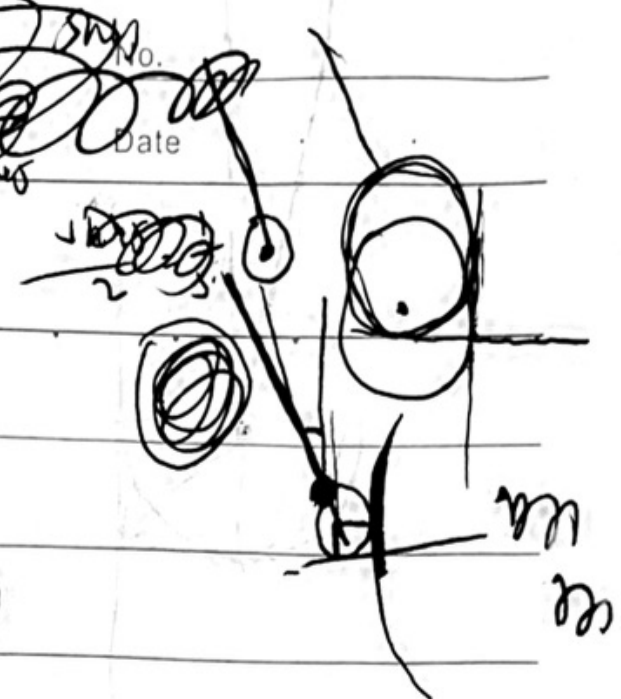
$$R_1 = L_2 \cdot \sin(\theta_A'/2) = L_2 \cdot \sin(45^\circ)$$

同理求得 $L_3 = \sqrt{(Z_3' - Z_4')^2 + (Y_3' - Y_4')^2}$

$$R_2 = L_3 \cdot \sin(\theta_A'/2) = L_3 \cdot \sin(45^\circ)$$



SN No. _____
Date _____

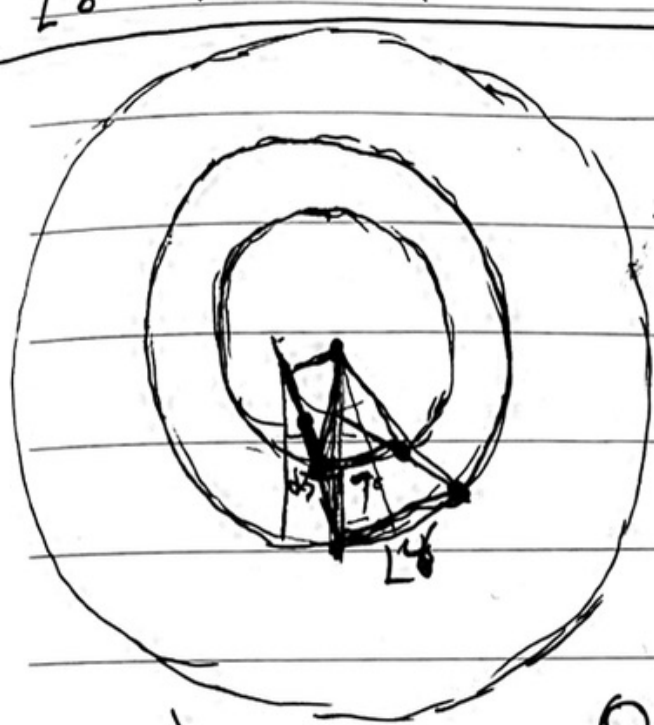


~~$\alpha_1 = \arccos(\dots)$~~

$$\alpha_1 = \arccos\left(\frac{R_1^2 + (L_0 - L_1)^2 - R_2^2}{2 R_1 \cdot (L_0 - L_1)}\right)$$

$$L_a = R_1 \cdot \cos \alpha_1 - L_0$$

$$L_b = R_1 \cdot \sin \alpha_1$$



$$\theta_{A3} = 10$$

测头长度 $L_4 = 20$ 球 $D_3 = 2$

点 $L_5 = 10$ 球 $D_4 = 1$

向右测量:

接触点	$\begin{cases} Z_5 = 0 \\ Y_5 = 0 \end{cases}$	$\begin{cases} Z_7 = 10 \\ Y_7 = -10 \end{cases}$
-----	--	---



$$\theta_{A4} = 30$$

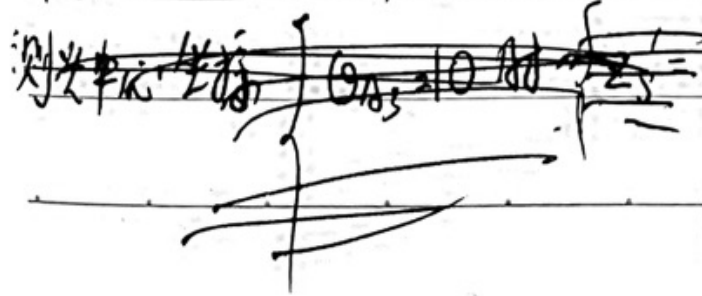
向右测量、水平:	$\begin{cases} Z_6 = -20 \\ Y_6 = -5 \end{cases}$	$\begin{cases} Z_8 = -5 \\ Y_8 = -15 \end{cases}$
----------	---	---

测头长度 L_c ，相对半径 R_3, R_4

中心偏角 L_d ，(测头) 测头垂直偏角 α_3

~~用 L4 测头测量完 Z5 Y5 后，抬高测头，再次测量出 Z9 Y9~~

~~$\alpha_3 = \arctan(\dots)$~~



用 L4 测头测量完 Z5 Y5 后，测头手动收回

上面一点点，再次测量出 Z9 Y9

$$\alpha_3 = \arctan\left(\frac{Z_9 - Z_5}{Y_5 - Y_9}\right) - \theta_{A3}$$

测头中心点在测量位置时
~~排除测头球后，其半径长度~~ 测量半径的修正：

$$\begin{cases} Z_5' = Z_5 + \frac{D_3}{2} \\ Y_5' = Y_5 - \frac{D_3}{2} \end{cases} \begin{cases} Z_7' = Z_7 + \frac{D_4}{2} \\ Y_7' = Y_7 - \frac{D_4}{2} \end{cases} \begin{cases} Z_6' = Z_6 + \frac{D_3}{2} \\ Y_6' = Y_6 - \frac{D_3}{2} \end{cases} \begin{cases} Z_8' = Z_8 + \frac{D_4}{2} \\ Y_8' = Y_8 - \frac{D_4}{2} \end{cases}$$

① 两个角度上的相对距离：

$$(L_6) = \sqrt{(Z_5' - Z_6')^2 + (Y_5' - Y_6')^2} \quad (L_7) = \sqrt{(Z_7' - Z_6')^2 + (Y_7' - Y_6')^2}$$

$$\text{② 转角 } \theta_A'' = \theta_{A4} - \theta_{A3} = 30 - 10 = 20$$

$$(R_3) = \frac{L_6}{2} / \sin\left(\frac{\theta_A''}{2}\right)$$

$$(R_4) = \frac{L_7}{2} / \sin\left(\frac{\theta_A''}{2}\right) \quad \text{两测头中心长度差 } L_8$$

$$L_8 = (L_4 - \frac{D_3}{2}) - (L_5 - \frac{D_4}{2})$$

~~第一组测量时~~ 第一组测量时，测头相对回转中心夹角 α_4

$$\alpha_4 = \arccos\left(\frac{R_3^2 + L_8^2 - R_4^2}{2 \cdot R_3 \cdot L_8}\right)$$

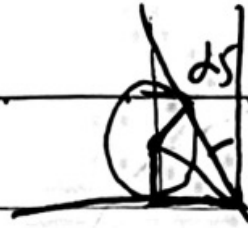
$$L_c = R_3 \cdot \cos \alpha_4 - (L_4 - \frac{D_3}{2})$$

$$L_d = R_3 \cdot \sin \alpha_4$$

Date . . .

No.

Date

前角角度: $\alpha_5 = 15^\circ$

测头长 $L_{10} = 30$ $D_5 = 3$ $\theta_{A5} = 35^\circ$ $\begin{cases} Z_{10} = 0 \\ Y_{10} = 0 \end{cases}$

测头中心坐标: $\begin{cases} Z_{10}' = Z_{10} + \left(\frac{D_5}{2}\right) / \tan\left(\frac{90 - \alpha_5}{2}\right) \\ Y_{10}' = Y_{10} - \frac{D_5}{2} \end{cases}$

测头相对半径 R_5 , 相对半径垂直向下夹角 α_6

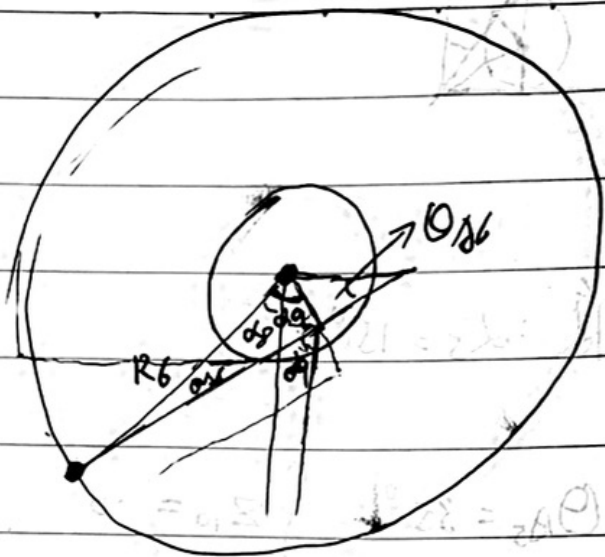
$$R_5 = \sqrt{\left(L_c + L_{10} - \frac{D_5}{2}\right)^2 + L_d^2}$$

相对半径和偏轴长度的夹角 α_7 :

$$\alpha_7 = \arctan\left(\frac{\left(L_c + L_{10} - \frac{D_5}{2}\right)}{L_d}\right)$$

$$\alpha_6 = \alpha_7 - \left(180 - 90 - (\theta_{A5} + \alpha_3)\right)$$

$$\theta_{A0} - p_b = ((\theta_{A0} - \theta_P) + \theta_P) - \theta_{B1} - p_b = 86$$



算上砂粒宽的 齿尖圆弧半径 $R_7 = 2 \text{ mm}$

工件磨杆长度 $L_{11} = 100$, 砂粒半径 $D_6 = 100$, 夹角 $\theta_{A6} = 20^\circ$

相对半径: R_6 , 垂直夹角 α_8

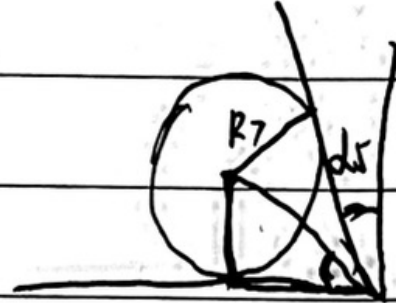
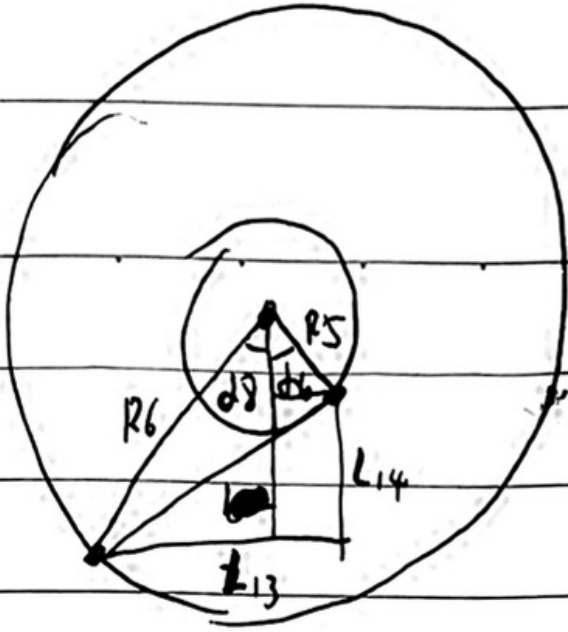
$$R_6 = \sqrt{(L_a + L_{11})^2 + \left(L_b + \frac{D_6 - 2R_7}{2}\right)^2}$$

相对半径和偏斜长度的夹角 α_9

$$\alpha_9 = \arctan\left(\frac{L_a + L_{11}}{L_b + \frac{D_6 - 2R_7}{2}}\right)$$

~~$$\alpha_8 = \alpha_9 - (180 - (90 + (90 - \theta_{A6})))$$~~

$$\alpha_8 = \alpha_9 - (180 - (90 + (90 - \theta_{A6}))) = \alpha_9 - \theta_{A6}$$



$$L_{13} = R_6 \cdot \sin \alpha_8 + R_5 \cdot \sin \alpha_6$$

$$L_{14} = R_6 \cdot \cos \alpha_8 - R_5 \cdot \cos \alpha_6$$

右の点R中心の接線座標 Z_{11} と Y_{11}

$$\begin{cases} Z_{11}' = Z_{10}' + L_{13} \end{cases}$$

$$\begin{cases} Y_{11}' = Y_{10}' + L_{14} \end{cases}$$

$$\begin{cases} Z_{11} = Z_{10}' - \frac{R_7}{\tan\left(\frac{90 - \alpha_5}{2}\right)} \end{cases}$$

$$\begin{cases} Y_{11} = Y_{11}' + R_7 \end{cases}$$