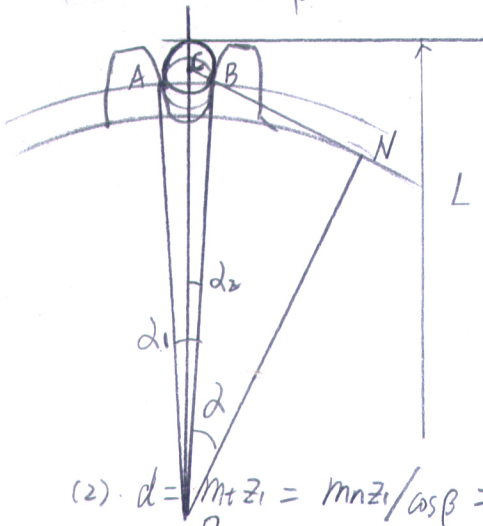


(四) 齿轮相关计算



解: 分度圆半径 $r = \frac{mz}{2} = 78\text{mm}$, $AB = r \cdot \alpha_1 = \frac{\pi m}{2}$, $\therefore \alpha_1 = 6.9^\circ$

$$\alpha_2 = \frac{1}{2} \alpha_1 = 3.5^\circ,$$

$$r_b = ON = r \cdot \cos \alpha = 73.3\text{mm},$$

$$\begin{aligned} r_p = BC &= CN - BN = ON [\tan(\alpha + \alpha_2) - \tan \alpha] \\ &= 73.3 (\tan 23.5^\circ - \tan 23^\circ) \\ &= 5.2\text{mm} \end{aligned}$$

$$OC = ON / \cos(\alpha + \alpha_2) = 80\text{mm},$$

$$\therefore L = 2[OC + r_p] = 2(80 + 5.2) = 170.3\text{mm}.$$

$$(2) \cdot d = m z_1 = m n z_1 / \cos \beta = 5 \times 14 / \cos 15^\circ = 72.5\text{mm}$$

$$h_a = m h_{at}^* = m h_{an}^* = 5 \times 1 = 5\text{mm}, \quad h_f = m(h_{at}^* + c_t^*) = m n(h_{an}^* + c_n^*) = 6.25\text{mm}$$

$$d_a = d + 2h_a = 82.5\text{mm}, \quad d_f = d - 2h_f = 60\text{mm}$$

$$d_b = d \cos \alpha_t, \quad \because \tan \alpha_n = \tan \alpha_t \cdot \cos \beta, \quad \text{算得 } \alpha_t = 20.65^\circ$$

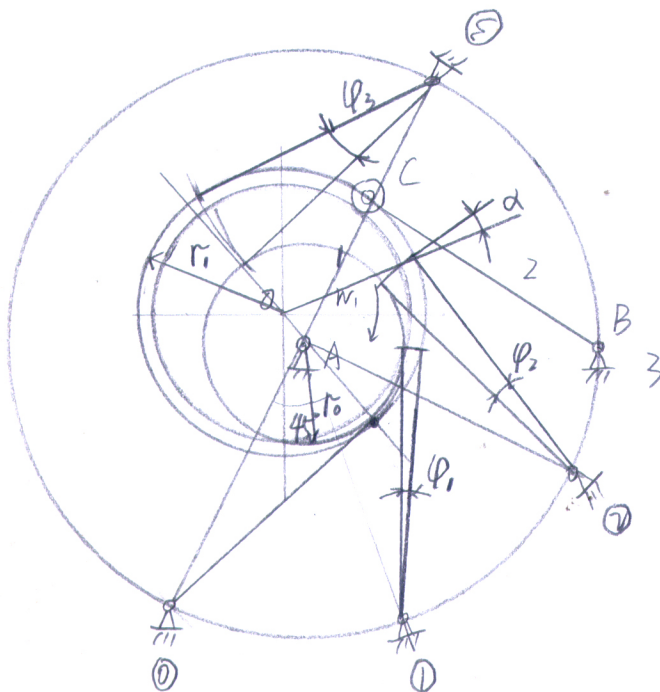
$$\therefore d_b = d \cos \alpha_t = 72.5 \times \cos 20.65^\circ = 67.8\text{mm}$$

对于斜齿轮, 不发生根切的最小齿数为

$$z_{\min} = \frac{2h_{at}^*}{\sin^2 \alpha_t} = \frac{2h_{an}^* \cos \beta}{\sin^2 \alpha_t} = \frac{2 \times 1 \times \cos 15^\circ}{\sin^2 20.65^\circ} = 15.5$$

而 $z < z_{\min}$ \therefore 会发生根切.

五: 凸轮的画圆



(1). 理论轮廓曲线如图所示, 半径为 r_1

(2). 基圆如图所示, 半径为 r_0

(3). 角位移如图所示, $\varphi_1, \varphi_2, \varphi_3$

(4). 压力角如图所示, α

(2)