معادلات نظم الري بالرش ٥٢١ هزر (ربيع أول ١٤٢٩هـ)

$Taw = (\theta_{FC} - \theta_{WP}) \times B_d \times D_{rz}$

$Taw = Taw\ mm/m \times D_{rz}$

$Dn = Taw * Mad$

$B_P = \frac{W_P}{E_P} = \frac{Q_s * TDH}{E_P * 102}$

$II = \frac{D_n}{ET_c}$ $\quad D_g = \frac{D_n}{E_a}$ $\quad T_i = \frac{D_g}{R_a}$

$R_a = \frac{Q_{SP}}{S_S \times S_L}$

$Q_S = \frac{D_g \times A_i}{T_i}$

$H_f = 1.22 \times 10^{10} \times L \times \left(\frac{Q_L}{C_{HW}}\right)^{1.852} \times d^{-4.87} \times F$

$N_{set} = n_{set} \times N_d$

$n_{set} = \frac{T_{day}}{T_i}$ $\quad H_{sp} = \frac{P_{sp}}{\gamma}$

$H_L = H_{sp} + 0.75 H_f + H_r \pm 0.5 \Delta H_z$

$h_L = 1.1 H_f \pm \Delta H_z$

$Q_{sp} = cd \times \frac{\pi}{4} d^2 \times \sqrt{2gH_{sp}}$

$H_L = H_e + 1.1 H_f \pm \Delta Hz$

$h_L \le 0.20 H_{sp}$

$E = \frac{D_g - \overline{X}}{D_g} \times 100 = 100 - E_a$

$TDH = H_L + H_{f_m} + H_{f_{min}} + TSH + H_{f_{mis}}$

$L = S_1 + S_s (N_{sp} - 1)$

$E_a = \frac{\overline{X}}{D_g} \times 100$

$H_{f2} = H_{f1} \left(\frac{d_1}{d_2}\right)^n$

$Q = A.V = \frac{\pi}{4} d^2 . V$

$PELQ = \frac{d}{D_g} \times 100$

$Power = \frac{Q_s * TDH}{Ep \bullet 102}$

$D_u = \frac{d}{\overline{X}} \times 100$

$C_u = \left[1 - \frac{\sum |X_i - \overline{X}|}{N \times \overline{X}}\right] \times 100$

$H_{spa} = H_{spe} \left(\frac{Q_{spa}}{Q_{spe}}\right)^2$

$Q_x = Q_L \left(1 - \frac{r^2}{L^2}\right)$

$H_{fx} = H_{fL} \left[1 - \left(1 - \frac{r}{L}\right)^{m+1}\right]$

$r_{ave} = 0.377\ L$

$r_{min} = \frac{S_s}{Q_{sp}} \left[Q_L - CHw \left(\frac{S \cdot d^{4.87}}{1.22 \times 10^{10}}\right)^{1/1.852}\right]$

$H_{fx} = 1.875 H_{fL} \left[X - \frac{2}{3} X^3 + \frac{X^5}{5}\right]$

$Q_L = N_{sp} \times Q_{sp}$ $\quad X = \frac{r}{L}$

$H_{min} = H_x = H_L - (S \cdot r_{min}) - H_{fx}$

$h_p = \frac{3\, Q_{sp} \cdot T_i}{\pi\, {r_a}^3} \left(N_{sp} \cdot r_a - r_{p_1} - r_{p_2} - r_{p_3} - r_{p_{N_{sp}}}\right)$

$TDH = H_L + H_{f_m} + H_{f_{min}} + TSH + H_{f_{mis}}$

$R_{ap} = R_a \left(\frac{r_a - r_p}{r_a}\right)$

$R_{ap} = R_a \left(\frac{{r_a}^2 - {r_p}^2}{{r_a}^2}\right)$

$H_f = h_{f_{o-L}}(\text{for all } d_1) - h_{f_{L_2}}(\text{for } d_1) + h_{f_{L_2}}(\text{for } d_2)$

$V = \frac{2 \pi R_L}{T_{rev}}$ $\quad N_{rev} = \frac{D_g}{d_g} = \frac{T_i}{T_{rev}}$

$\frac{d_{g2}}{d_{g1}} = \frac{X_1}{X_2}$ $\quad \frac{T_{rev\,2}}{T_{rev\,1}} = \frac{X_1}{X_2}$ $\quad \frac{V_2}{V_1} = \frac{X_2}{X_1}$

$R = R_L + L_o + r_a = L + r_a$

$R_g = R_L + L_o + r_{ag} = L + r_{ag}$

$Q_s = \frac{D_g \cdot \pi R^2}{T_i}$

$d_{sp} = 30.46 \sqrt{\frac{Q_{sp}}{\sqrt{P_{sp}}}}$

$R_g = R \left(\frac{Q_t}{Q_s}\right)^{0.5} = R \left(\frac{Q_s + Q_g}{Q_s}\right)^{0.5}$

$Q_t = \frac{D_g \cdot \pi {R_g}^2}{T_i}$

$V1 = \frac{2 \times 3.14 \times R_L}{T_{rev}}$

$d_g(rev) = \frac{D_g}{N_{rev}}$ $\quad Q_r = Q_s \left(1 - \frac{r^2}{R^2}\right)$

$(R_a)_{sp} = \frac{Q_s \cdot r_{sp}}{R^2 \cdot r_w}$

$V2 = \frac{2 \times r_a}{T_w} = \frac{D_w}{T_w}$

$Q_r = Q_t \left(1 - \frac{r^2}{{Rg}^2}\right)$ $\quad Q_g = Q_t \left(1 - \frac{L^2}{{R_g}^2}\right)$

$D_w = 2.59 + 0.56 d_{noz} + 0.023 P_{sp}$

$H_f = H_v - \left(H_e + \Delta H_z + H_r + H_{rg}\right)$

$Q_{sp} = \frac{Q_s}{R^2}\left[2r \times S_m - \left({S_1}^2 - {S_2}^2\right)\right]$

$R_a = \frac{7200\ r\ Q_s}{R^2 \cdot D_w}$ $\quad R_{am} = \frac{4}{\pi} R_a$

$R_{am} = \frac{4\ Q_s}{\pi \cdot R \cdot r_a}$

$Q_{sp} = \frac{Q_s}{R^2}[2r \times S_s]$

$A_t = \pi R^2 \left(\frac{4\theta}{360}\right) + \pi {R_g}^2 \left(\frac{4\alpha}{360}\right)$

$\cos \alpha = \frac{R}{R_g} = \frac{R}{R + r_{ag}}$ $\quad \theta = 90 - 2\alpha$ $\quad R_g = R + r_{ag}$

$A_g = \frac{\theta}{90} \times \frac{\pi}{4} \times \left({R_g}^2 - R^2\right)$

$A_t = A_i + 4 A_g$

$\Delta A\% = \frac{4 A_g}{A_i} \times 100$

$$H_i = H_f\left[1 - 1.875\left(X - \frac{2X^3}{3} + \frac{X^5}{5}\right)\right] + H_e \qquad H_f = 1.22\times10^{10}\times0.548\times L\times\left(\frac{Q_S}{C_{HW}}\right)^{1.852}\times d^{-4.87} \qquad Q_t = Q_s + Q_g$$

$$H_f = 1.22\times10^{10}\times0.548\times R_g\times\left(\frac{Q_t}{C_{HW}}\right)^{1.852}\times d^{-4.87} - 1.22\times10^{10}\times(R_g - L)\times\left(\frac{Q_g}{C_{HW}}\right)^{1.852}\times d^{-4.87} \qquad H_i = H_v - H_f\left(X - \frac{2X^3}{3} + \frac{X^5}{5}\right) \pm \Delta H_z$$

$$P_v = P_e + 1.1P_f \pm \Delta P_z + P_{rg} + P_r \qquad TDH = P_v + P_{fm} + P_d + P_s \qquad H_a = H_v - H_f \pm 0.5\,\Delta H_z$$

$$H_i = H_v - h_{fi} = H_e + (H_f - h_{fi}) \qquad \Delta H = H_f \pm \Delta H_z$$

$$PELQ = \frac{d_w}{D_g}\times100 \qquad D_u = \frac{d_w}{D_w}\times100 \qquad E_a = \frac{D_w}{D_g}\times100 \qquad E = \frac{D_g - D_w}{D_g}\times100$$

$$V = \frac{Q_{gun}}{W\times D_g} \qquad Q_{qun} = K\sqrt{P} \qquad D_g = \frac{Q_{gun}}{W\times V} \qquad R_{ag} = \frac{Q_g}{r_{ag}^{\,2}\cdot\theta}$$

$$T_i = \frac{L}{V_i} \qquad R_a = \frac{Q_{gun}}{3.14\times(0.9r_a)^2}\left(\frac{360}{\theta}\right) \qquad W = Dw * \%dia$$

$$D_g = \frac{D_n}{E_{ad}} \qquad (R_a)_{soil} = \frac{\pi}{4}\times(R_{am})_{soil} \qquad R_a = \frac{(R_a)_{soil}}{R_e}$$

$$Q_{sp} = \frac{Q_s\cdot S_s}{L} \qquad \frac{T_a}{T_i} = \frac{D_w}{L_f} \qquad T_a = \frac{D_g}{R_a}$$

$$R_a = \frac{L_f}{D_w}\cdot\frac{D_g\cdot R_e}{T_i} \qquad R_a = \frac{L_f}{D_w}\cdot\frac{Q_s\cdot R_e}{L\cdot L_f} \qquad T_a = \frac{D_w}{V}$$

$$R_{am} = \frac{4\,Q_s\cdot R_e}{\pi\,D_w\cdot L} \qquad R_{am} = \frac{4\,Q_{sp}\cdot R_e}{\pi\,D_w\cdot S_s} \qquad L_f = \frac{N_d\cdot T_d - 2T_r}{\left(\frac{1}{V_i} + \frac{1}{V_r} + \frac{T_h}{100}\right)}$$

$$T_{in} = \frac{L_f}{V_r} \qquad T_i = \frac{L_f}{V_i} \qquad Q_s = \frac{A\cdot D_g}{T_i} = \frac{L\cdot L_f\cdot D_g}{T_i} \qquad L_f = \frac{N_d\cdot T_d - 2T_r}{2\left(\frac{1}{V_i} + \frac{T_h}{100}\right)}$$

$$T = \frac{24\,(L_f/V_i)}{(L_f/V_i) + (L_f/V_r) + T_r + T_c} = \frac{24\,(L_f/V_i)}{II} \qquad T_i + T_{in} + \frac{T_h}{100}\times L_f + 2T_r + 2T_c = N_d\times T_d$$

$$T = \frac{24\left[(L_f/V_i) + (L_f/V_r)\right]}{(L_f/V_i) + (L_f/V_r) + T_r + T_c} \qquad N_d = II - \text{day off}$$

$$PWF_{(r)} = \left(\frac{1+r}{1+i}\right)^{uL} \qquad PWF_{(r=0)} = \frac{1}{(1+i)^{uL}} \qquad N = \frac{n}{UL} - 1$$

$$PW_{(r)} = S\times PWF_{(r)} \qquad EAC_{(r)} = S\times EAF_{(r)} \qquad Z = Ic - (Ic - Sv)\cdot\left(\frac{n - N\cdot uL}{uL}\right) \qquad AIC = \frac{(PW - Sv)\times i}{2}$$

$$EAF\ (r) = \left[\frac{(1+r)^n - (1+i)^n}{(r-i)}\right]\times\left[\frac{i}{(1+i)^n - 1}\right] \qquad PW = Ic + (Ic - Sv)\left(\frac{1+r}{1+i}\right)^{ul} - Z\left(\frac{1+r}{1+i}\right)^{n} \qquad XDC = \frac{PW - Sv}{uL}$$

$$CRF = \frac{i\,(1+i)^n}{(1+i)^n - 1} \qquad BP = \frac{Q_s\cdot TDH}{102\times E_P} \qquad PW = Ic - Sv\cdot\left(\frac{1+r}{1+i}\right)^{ul} \qquad AE = \frac{A_{ha}\times D_n(mm)\times TDH(m)}{EP\times Em\times860}$$

$$FC = PW\ \cdot\ CRF \qquad CRF = \frac{FC}{PW} \qquad PW = Ic - Sv_f\cdot\left(\frac{1+r}{1+i}\right)^{n} \qquad AE = \frac{BP\times OT}{EP\times Em}$$

$$SDR = \frac{d}{t} \qquad PR = \frac{2S}{DR-1} \qquad PR = \frac{2S}{DR+1} \qquad Sv_f = Ic - (Ic - Sv)\cdot\left(\frac{n}{uL}\right) \qquad EEC = \frac{BP\times OT}{EP\times Em}\times UEC$$

$$PR = \frac{2S}{\frac{d_o}{t} - 1} \qquad PR = \frac{2S}{\frac{d_i}{t} + 1} \qquad MAC_{pump} = \frac{PW\times CRF}{OT\times BP} \qquad OWC = \frac{Whd}{8}\times Nday\times WhC$$

Cost/hr of Operation = BHP × [Fuel Consumeal in L/hr] × [Cost of fuel per liter]