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Section - 3

Q1 Jet Ratio-

(i) It is defined as ratio of the pitch diameter (D) of the pelton ~~wheel~~ wheel to diameter of the Jet (D)

(ii) It is denoted by m

(iii) It is given by the formula:

$$m = \frac{D}{d}$$

(iv) Generally the value of m is 12 for most cases to maintain the balance.

Hydralic Jump ⇒ The hydraulic jump is defined as the sudden & turbulent passager of water from a supercritical stak to subcritical state It has been classified; as rapidly varied flow since the changer in depth of flow from rapid to tranquil state in a abrupt manner over a relatively short distance

(ii) The flow in a hydraulic ~~jop~~ jump is accompained by the formation of extremly turbulent rollers and there is a considerable dissipation of energy.

(iii) A hydraulic jump will form when

water moving at a super critical velocity in a relatively shallow strem strikes water having a relatively large depth & subcritical velocity

Integral moment is used to analyze hydraulic jump.

Use of momentum Equation

1) Due to high turbulence and shear action of the rollar there is considerable loss of energy in the jump between section 1 & 2

2) In view of the high energy loss the nature of which is difficult to estimate the energy equation cannot be applied to section 1 and 2

3) In such situations we use momentum equation in analysis of hydraulic jump.

Expression —

i Considered a horizontal frictionless and rectangular channel considering unit width of the channel, the moment eq— can be written as

$$\frac{1}{2}\gamma y_1^2 - \frac{1}{2}\gamma y_2^2 = \beta_2 \rho q V_2 - \beta_1 \rho q V_1$$

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$B_2 = B_1 = 1$ & by continuity Eq

q = Discharge per unit width =

$$v_1 y_2 = v_2 y_2$$

$$(y_2^2 - y_1^2) = \left(\frac{2q^2}{g}\right)\left(\frac{1}{y_1} - \frac{1}{y_2}\right)$$

$$y_1 y_2 = (y_2 + y_1) = \frac{2q^2}{2g} \quad 2y_c^3$$