Putting Re =500 in eq.(4)
Fr = $15.95\times10^{-2}\,\mu$
Putting Re =1000 in eq.(4)
Fr = $3.192\times10^{-1}\,\mu$
Putting Re =2000 in eq.(4)
Fr = $6.381\times10^{-1}\,\mu$
Putting Re =3000 in eq.(4)
Fr = $9.57\times10^{-1}\,\mu$
Putting Re =5000 in eq.(4)
Fr = $15.95\times10^{-1}\,\mu$
Putting Re =7000 in eq.(4)
Fr = $22.33\times10^{-1}\,\mu$

$$\Rightarrow Ak = \frac{Fr}{Re} = 3.192 \times 10^{-4}\mu_R$$

5. Results and Discussion

1. The theoretical derivation performed in this work indicates the definite relationship between two important dimensionless quantities viz. Reynolds Number (Re) and Froude Number (Fr).

2. Hence, there must exist a third dimensionless number, mentioned so far in this work as Akydual Number(Ak), which should be able to express the relationship between the gravitational energy and the kinetic energy of the fluid as a function of relative dynamic viscosity, μ_R

3. μ_R is defined as the ratio of localized dynamic viscosity at any point of flow and the dynamic viscosity of pure water. Mathematically,

$$\mu_R = \frac{\mu_L}{\mu_{purewater}}$$

4. The velocity of flow at any particular time will be a direct function of relative viscosity.

5. The shear stress exerted by the flowing water will be a direct function of the flow velocity.

6. Hence, the rate of erosion shall be a direct function of the shear stress exerted by the fluid and the soil strength.

7.Where, Mk shall be positive, there shall be erosion. Where Mk shall be negative, there shall be sedimentation and for Mk of the order of zero or so, there must exist the point or region of dynamic erosion.

6. Scope of Future Work

By this theory we concluded that prediction of sediment transportation will become much simpler by studying local viscosity of the desired point. In future this theory should be experimentally carried out to check out the extent of agreement of experimental results with respect to this theory.

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