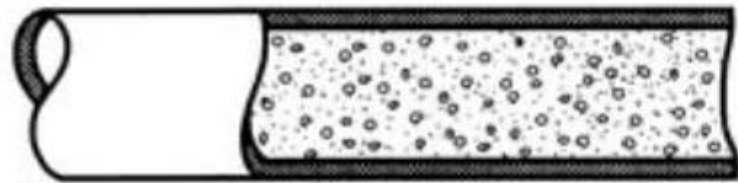
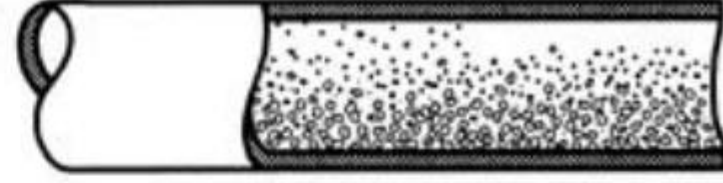


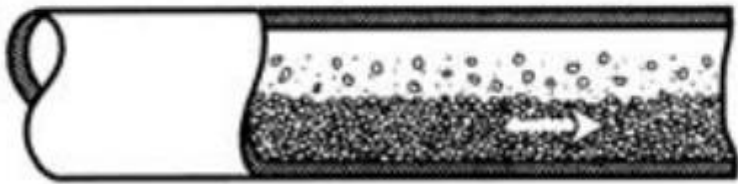
Flow regimes for slurry flow in a horizontal pipeline.



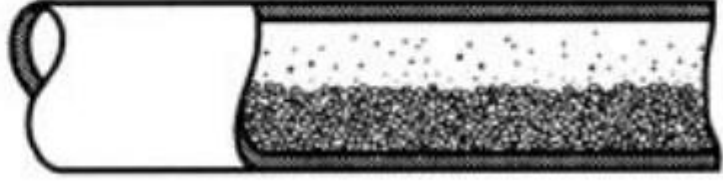
HOMOGENEOUS



HETEROGENEOUS



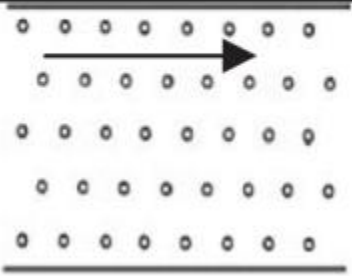
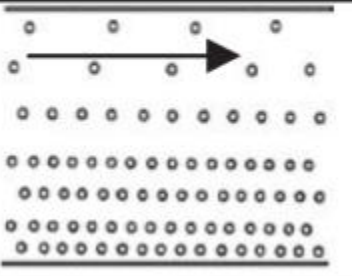
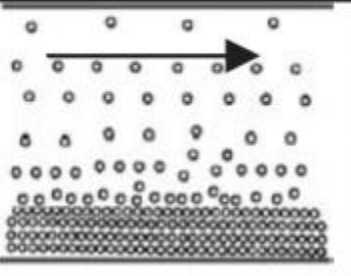
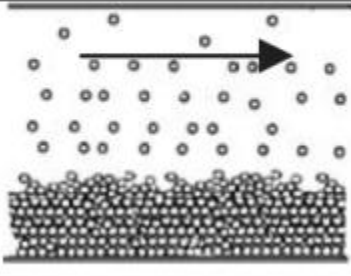
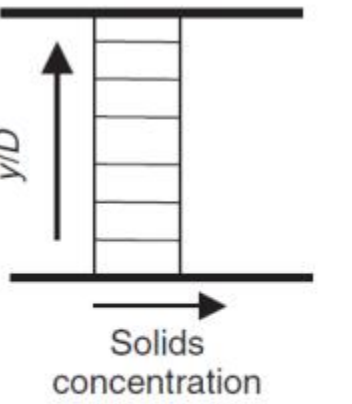
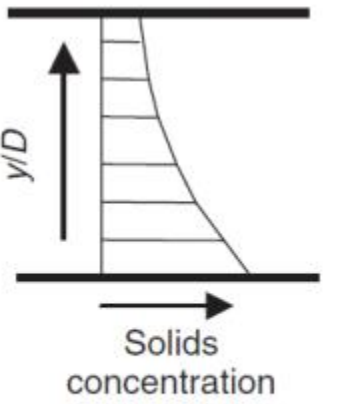
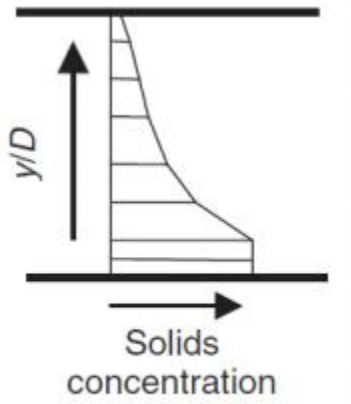
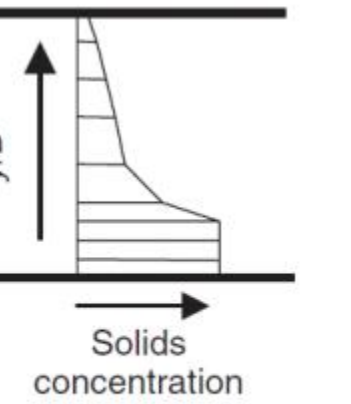
SALTATION : MOVING BED

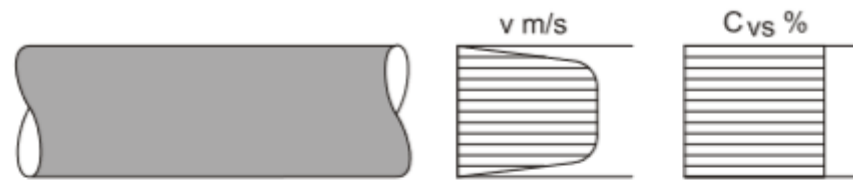


SALTATION : STATIC BED

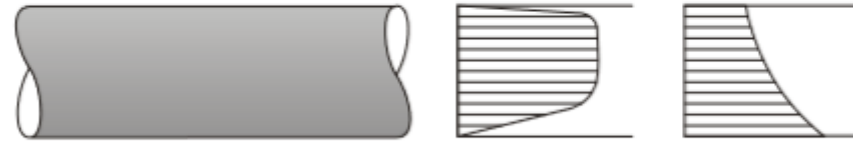
Based on the specific gravity of particles with a magnitude of 2.65, Durand (1953) proposed to divide the flows of non-settling slurries in horizontal pipes into four flow regimes based on average particle size as follows:

1. Homogeneous suspensions for particles smaller than $40\ \mu\text{m}$ (mesh 325)
2. Suspensions maintained by turbulence for particle sizes from $40\ \mu\text{m}$ (mesh 325) to $0.15\ \text{mm}$ (mesh 100)
3. Suspension with saltation for particle sizes between $0.15\ \text{mm}$ (mesh 100) and $1.5\ \text{mm}$ (mesh 11)
4. Saltation for particles greater than $1.5\ \text{mm}$ (mesh 11)

Homogeneous flow	Heterogeneous flow	Flow with a moving bed	Flow with a stationary bed
			
			



I Homogeneous



II Heterogeneous
with full suspension



III Heterogeneous
with rolling, saltation



IV Sliding bed



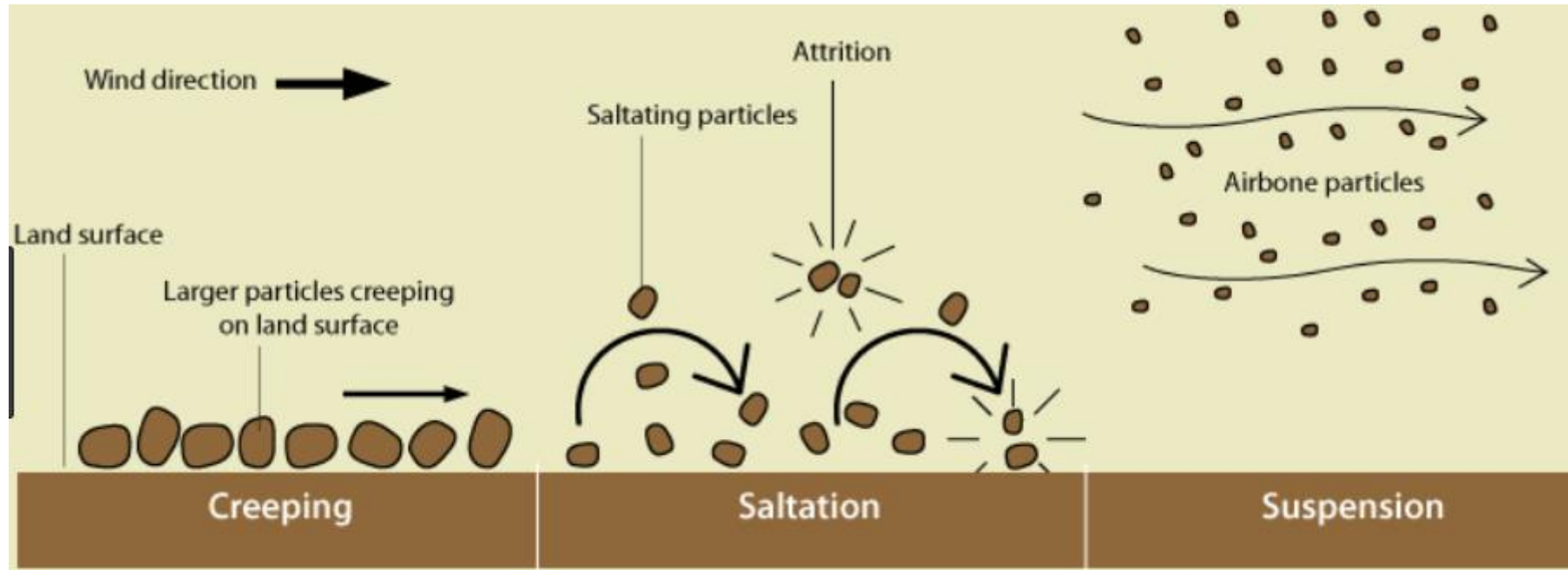
V Fixed bed

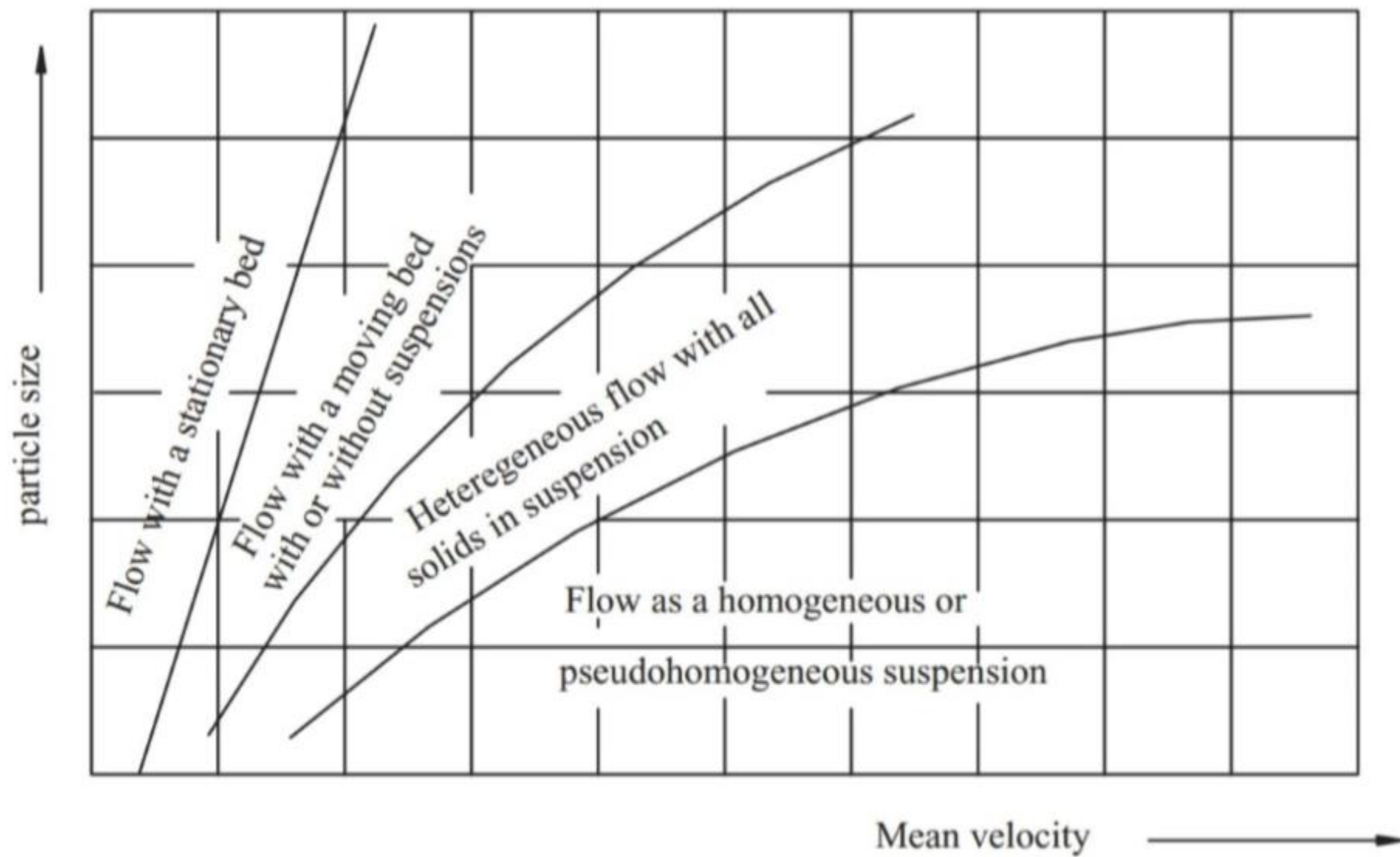
v m/s

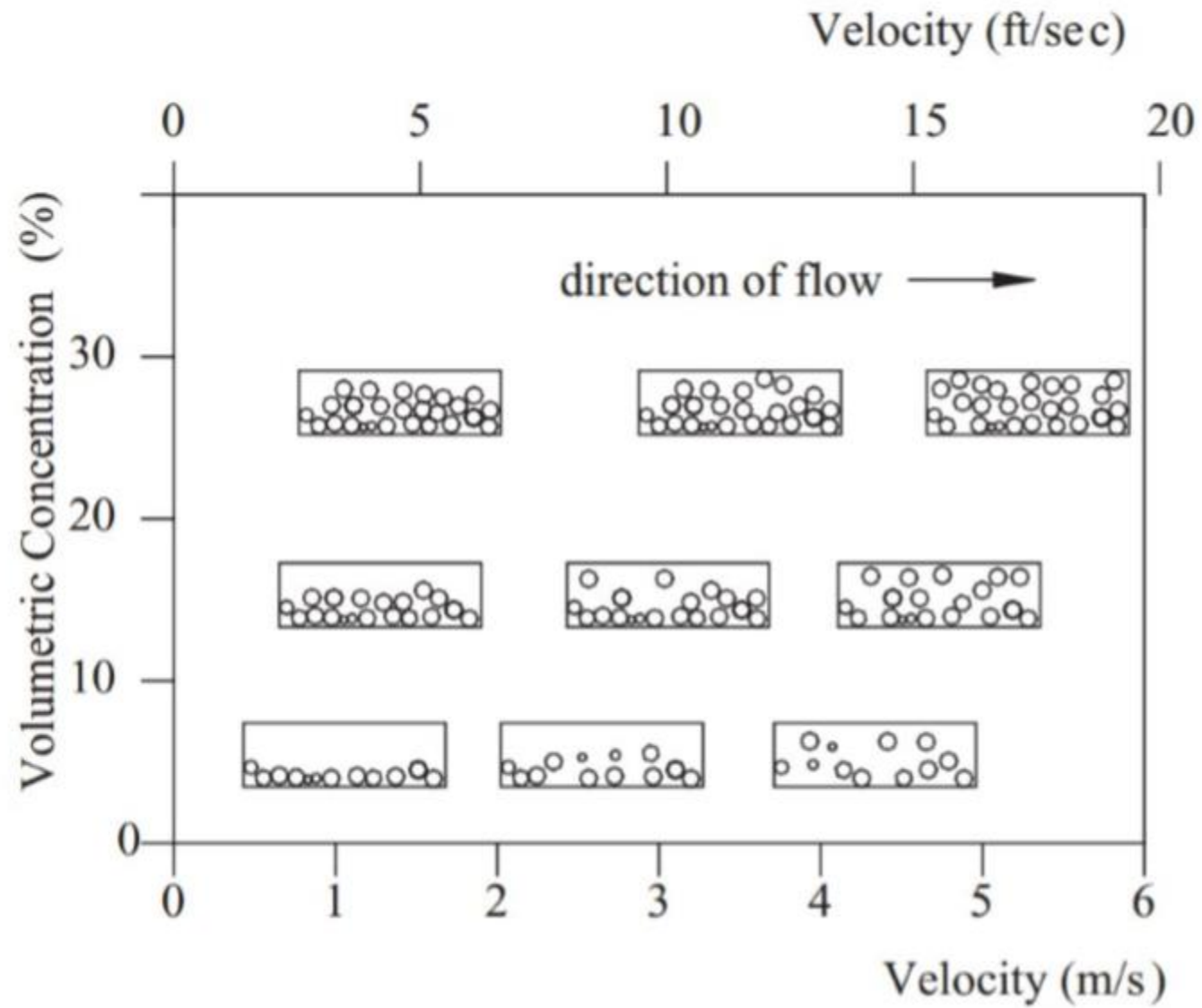
C vs %

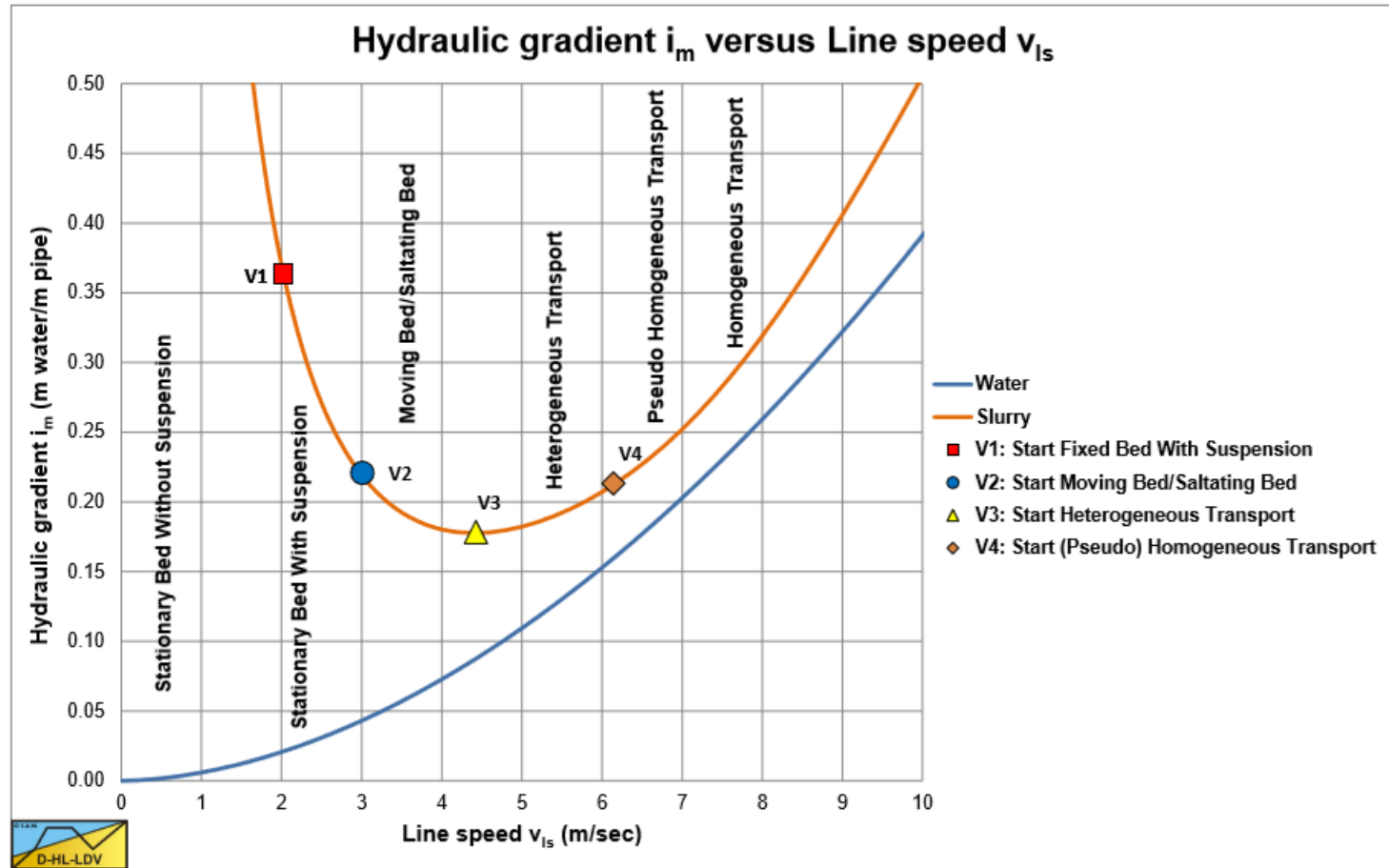
mixture
velocity

volume
concentration



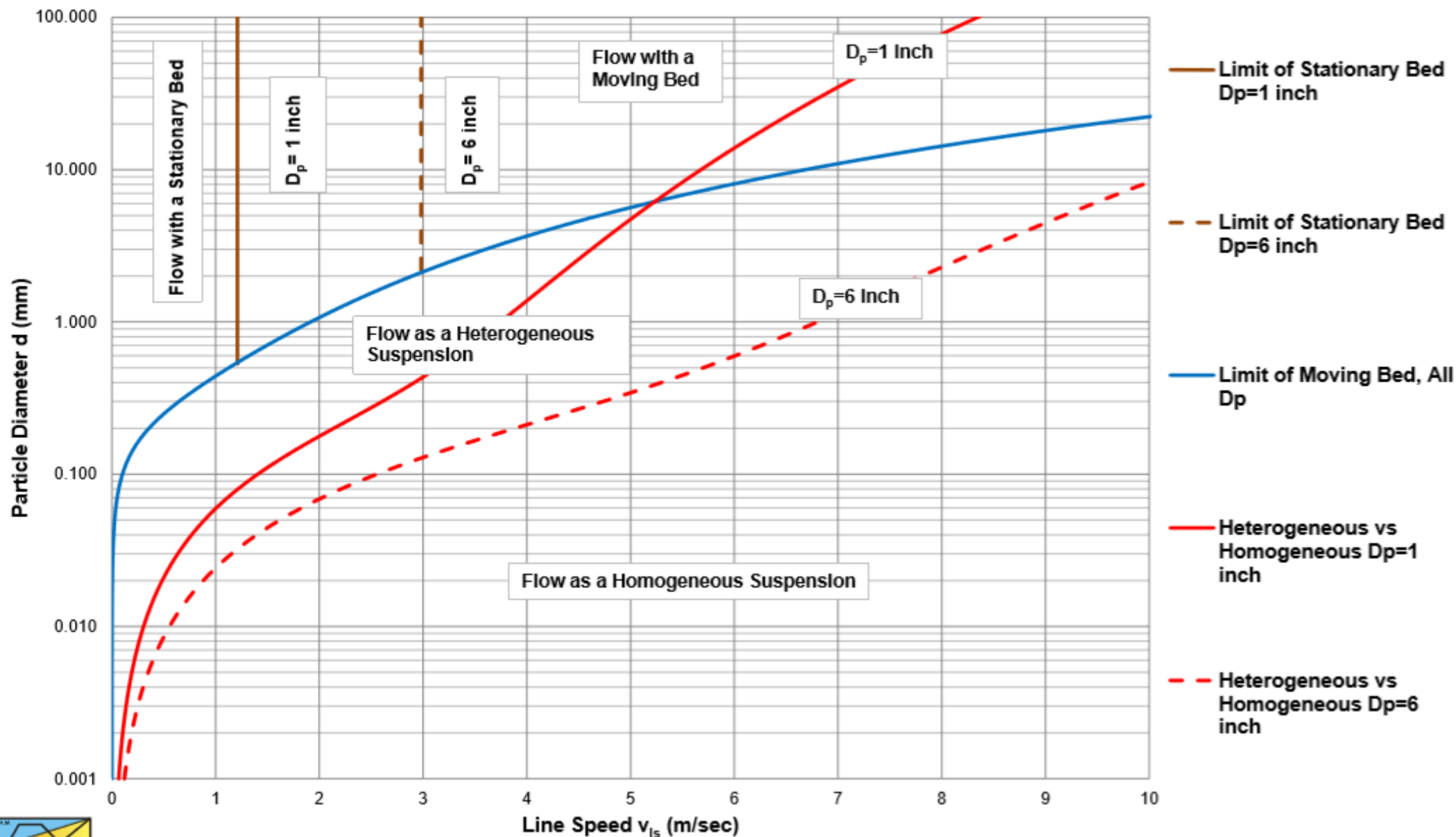






- **V₁**: velocity at or above which the bed in the lower half of the pipe is stationary. In the upper half of the pipe, some solids may move by saltation or suspension. Below **V₁** there are no particles above the bed.
- **V₂**: velocity at or above which the mixture flows as an asymmetric mixture with the coarser particles forming a moving/saltating bed.
- **V₃**: velocity at or above which all particles move as an asymmetric suspension and below which the solids start to settle and form a moving bed.
- **V₄**: velocity at or above which all solids move as an almost symmetric suspension.

Flow Regimes according to Newitt et al. (1955) & Durand & Condolios (1952)



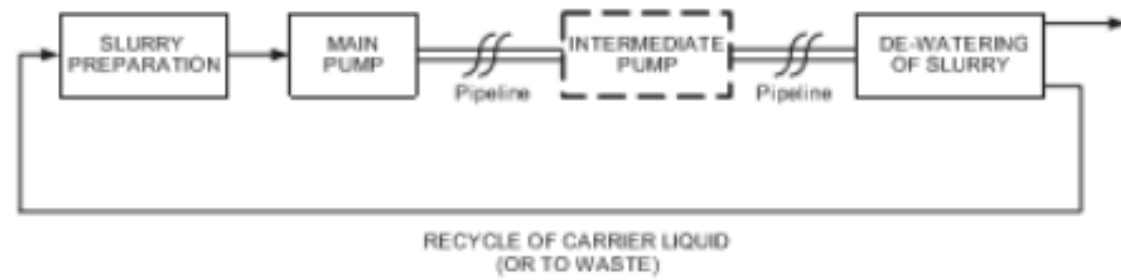


Figure 4.8 Components of a slurry conveying system