

Sand Control – Connection Between Reservoir and Wellbore

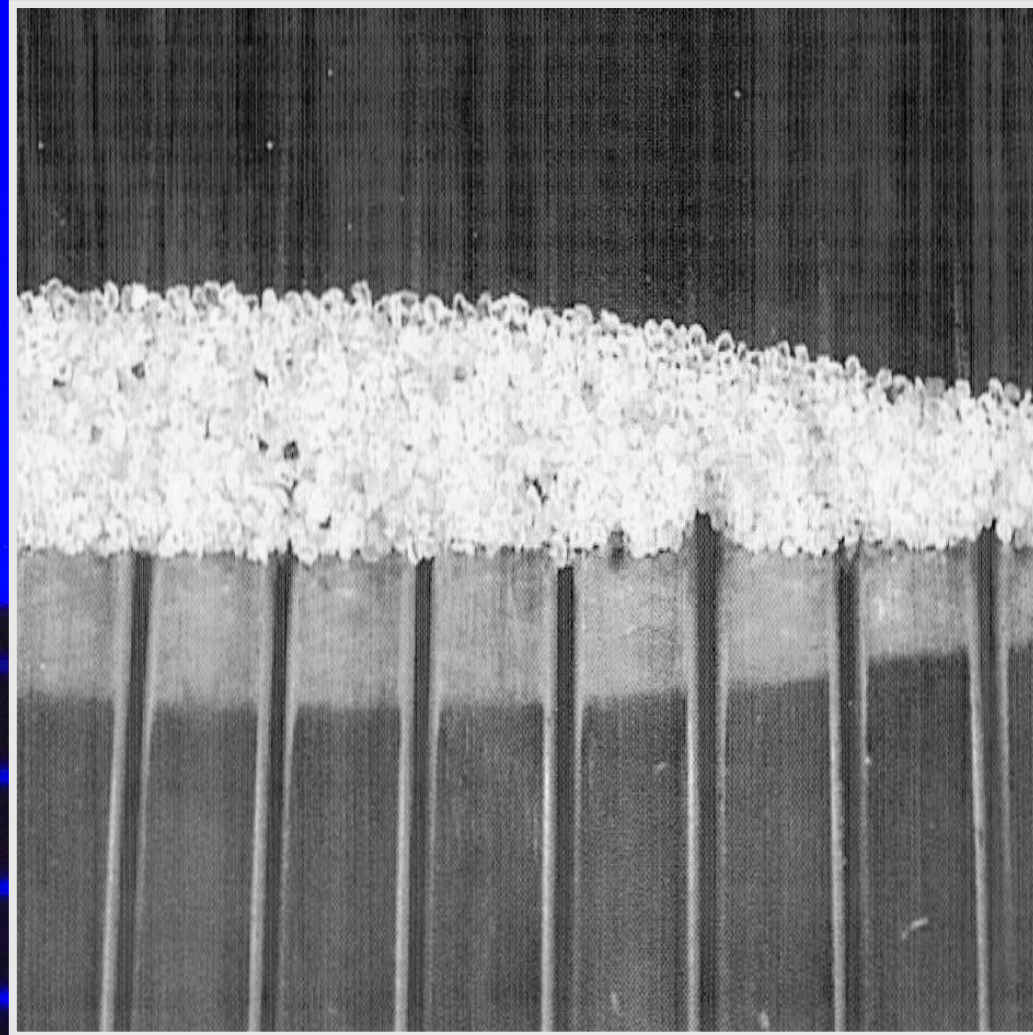
How to create highest productivity connection between reservoir and wellbore?



William K. (Bill) Ott, P.E.

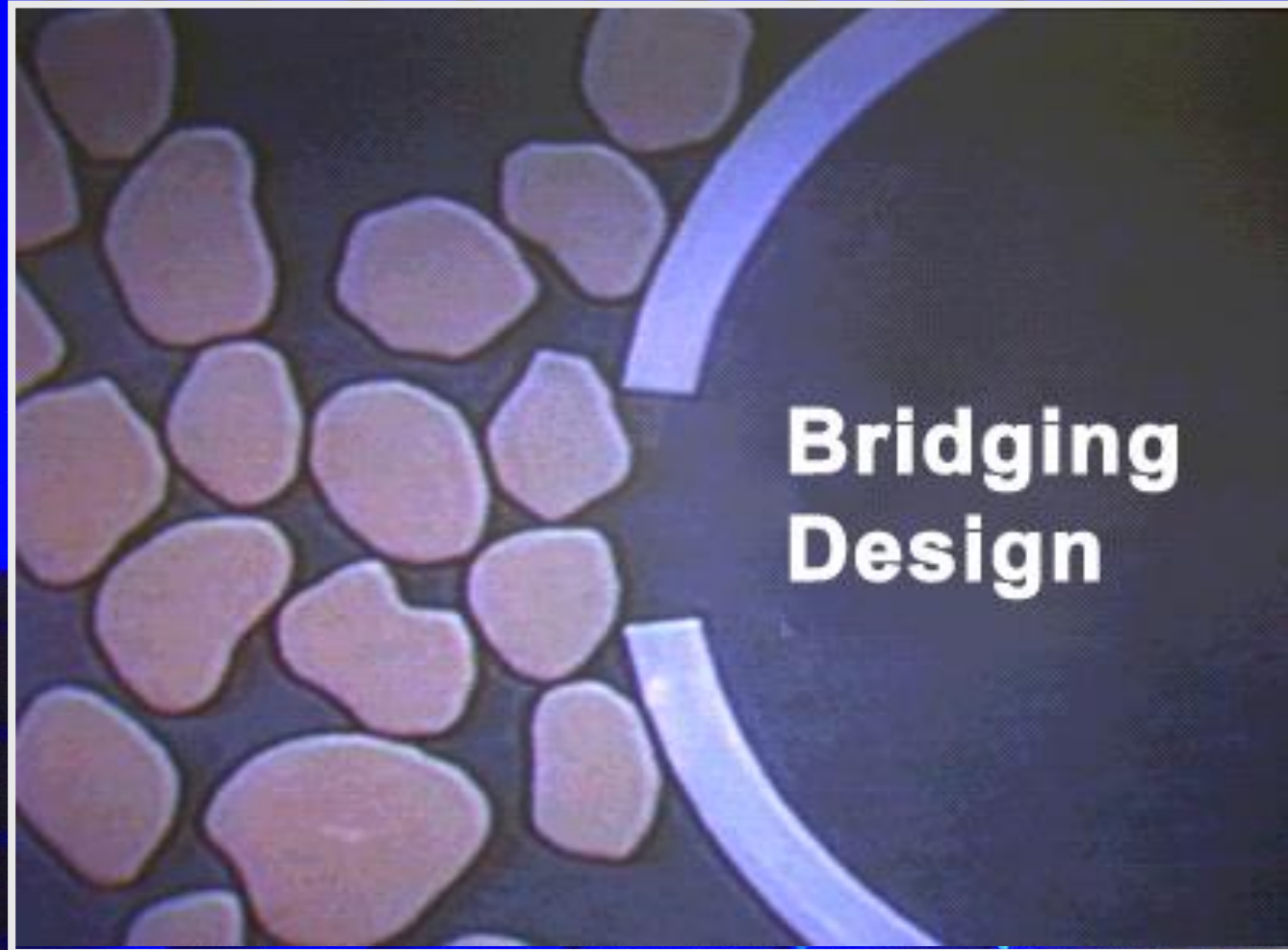
Well Completion Technology - Houston

Effective Bridging



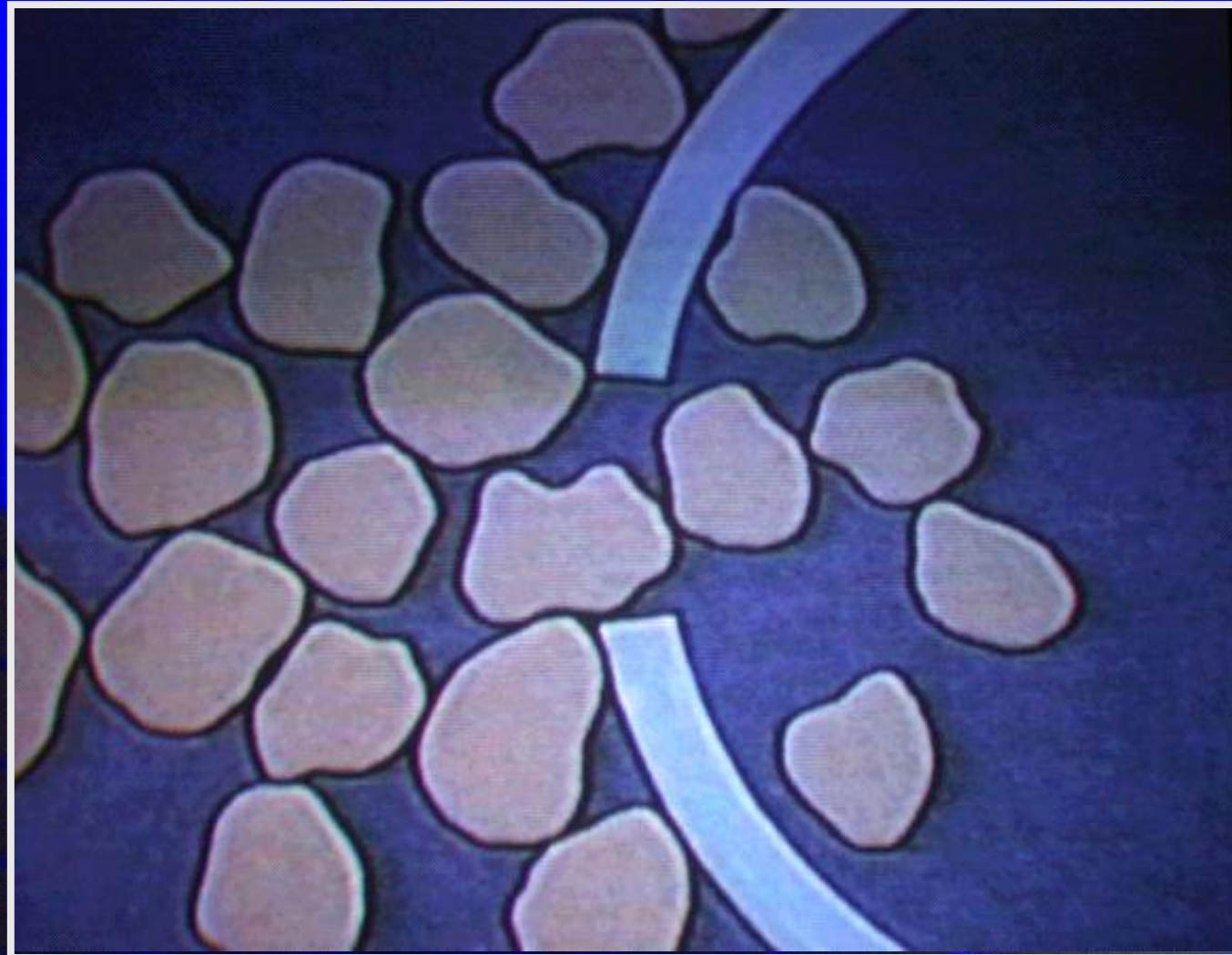
Bridging and arching

Bridging Design

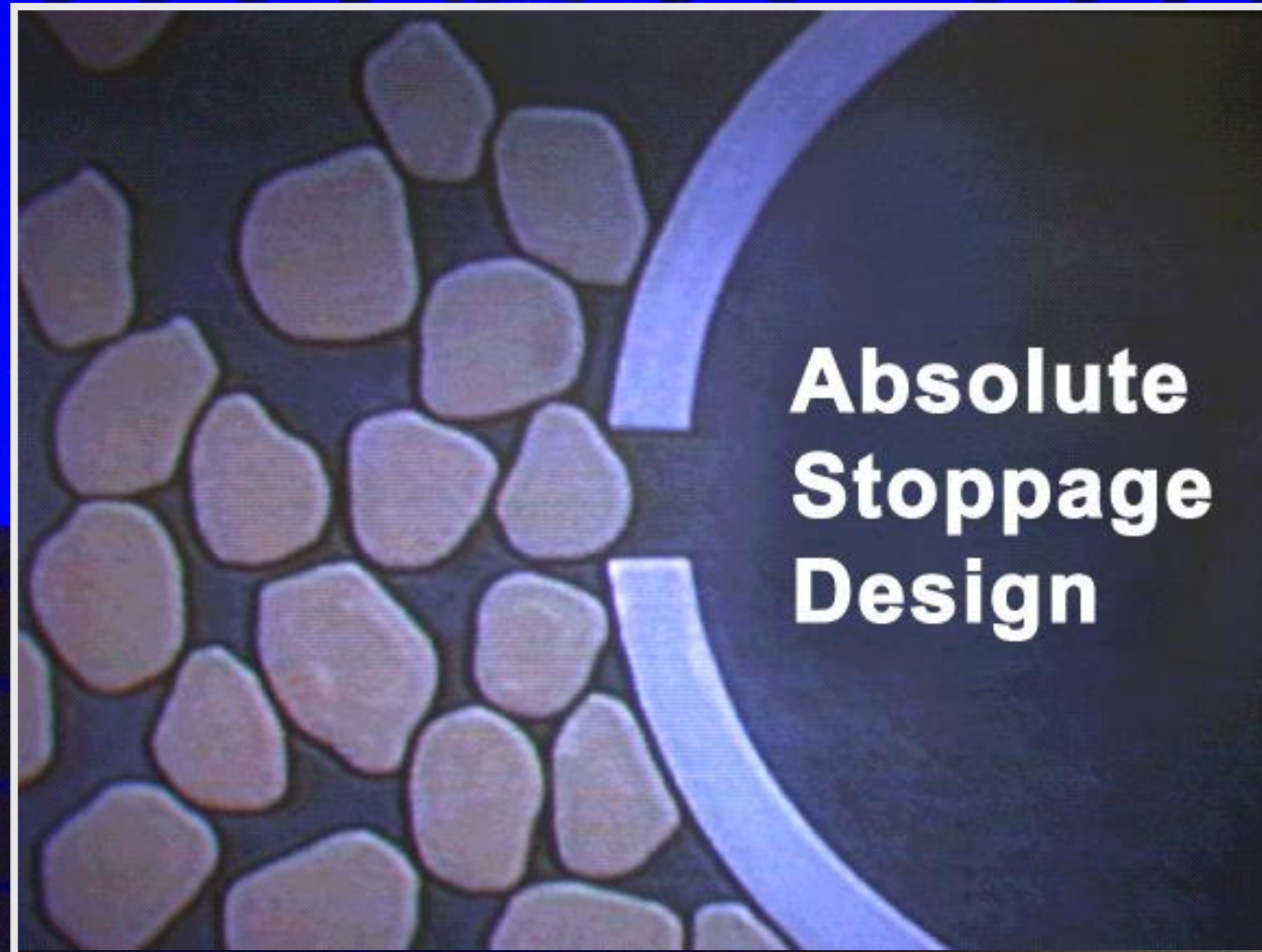


$$\text{Bridging Particle Diameter} = \frac{\text{Slot width}}{2 - 2.5}$$

Failed Bridge

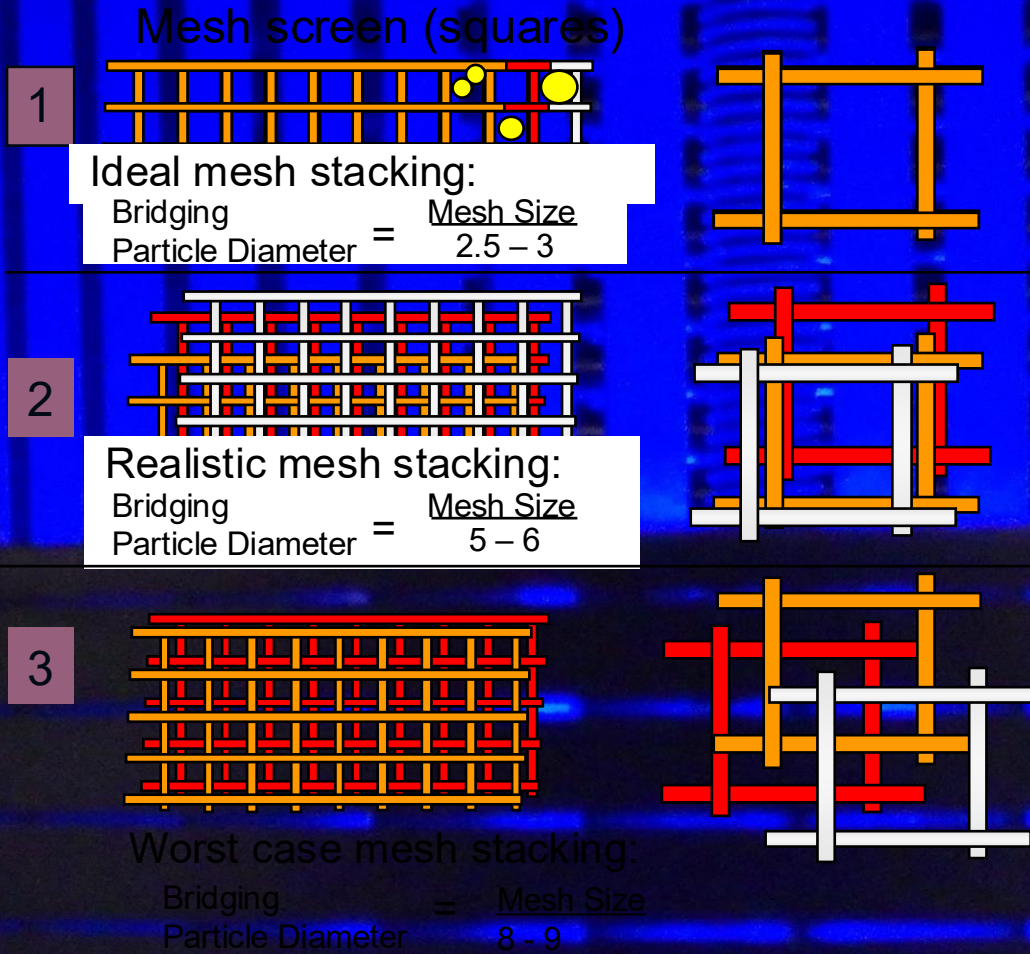


Absolute Stoppage Design

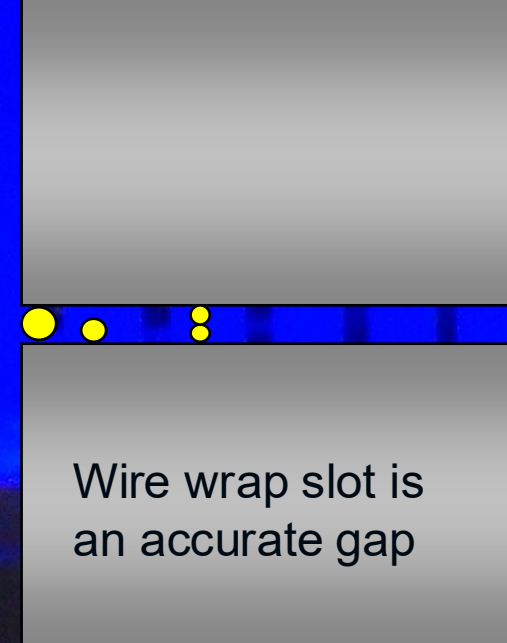


Absolute Stoppage = $\frac{2}{3}$ x Slot Width

Bridging Theory (Coberly and Penberthy)



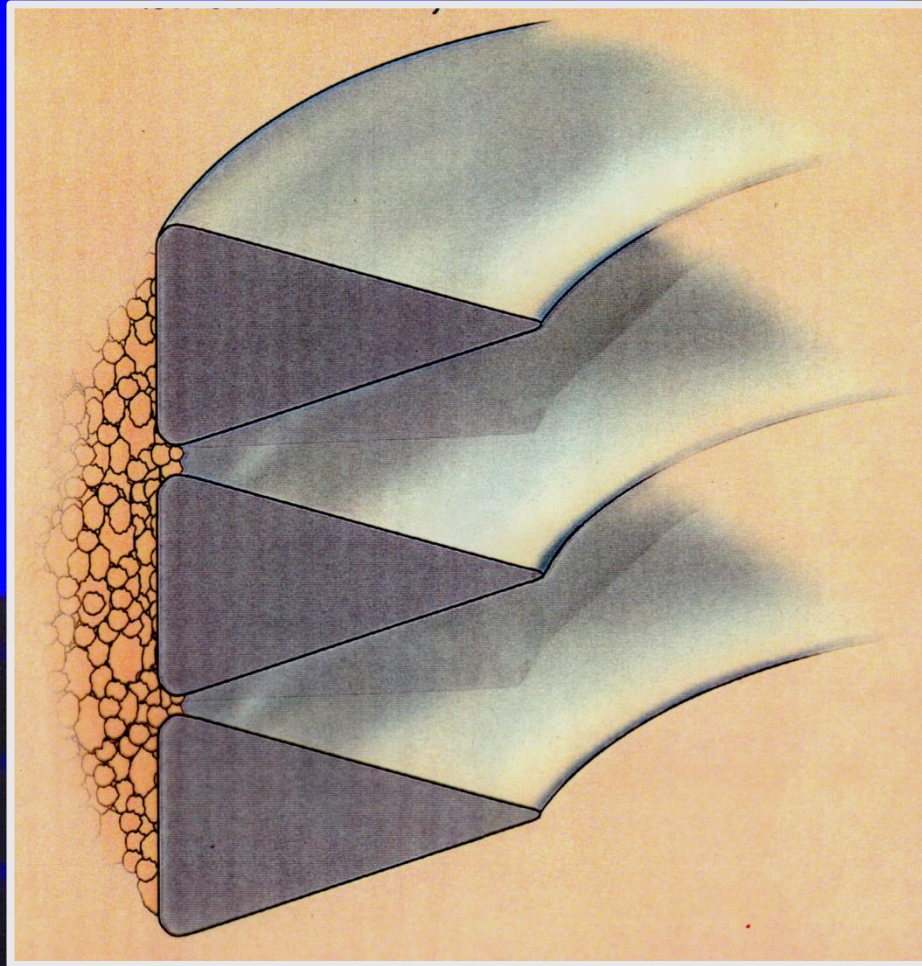
Wire wrap screen (Slot)



$$\text{Bridging Particle Diameter} = \frac{\text{Slot Width}}{2 - 2.5}$$

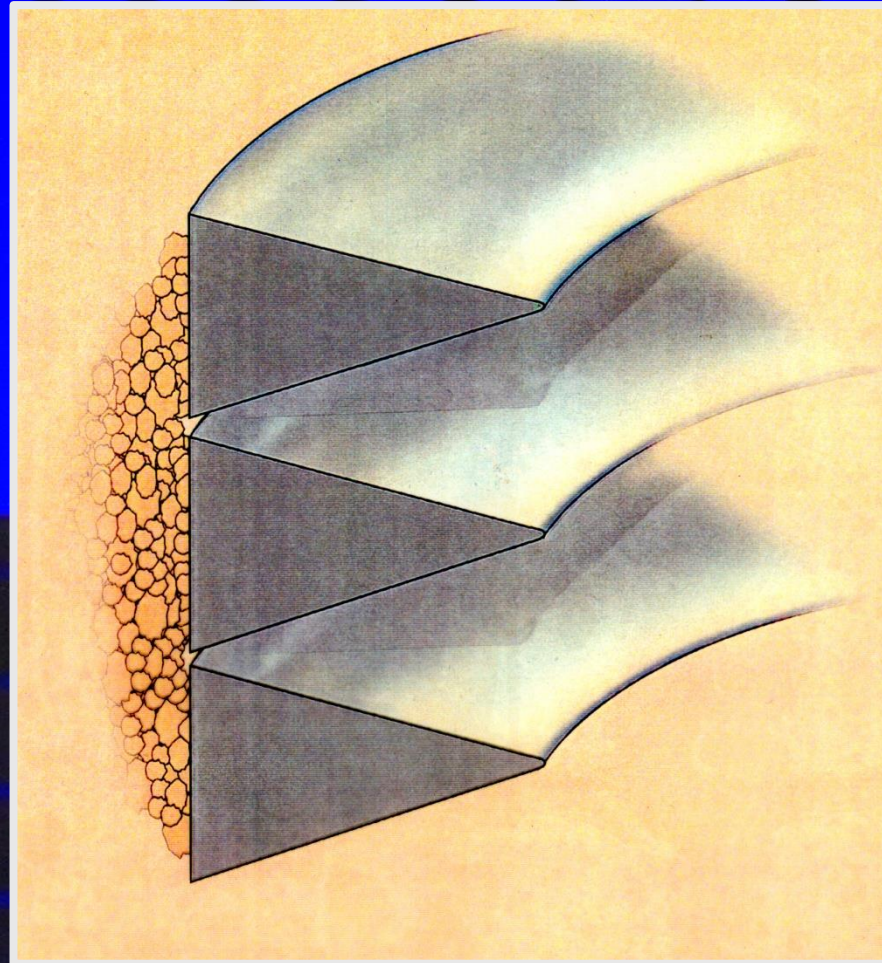
- Experiments performed on well sorted, river bed sand with optimum sphericity
- Layered mesh screen will have effective opening significantly reduced
- Mesh screens will trap fines that would be produced through a wire wrap screen

Early Wire Profile Design



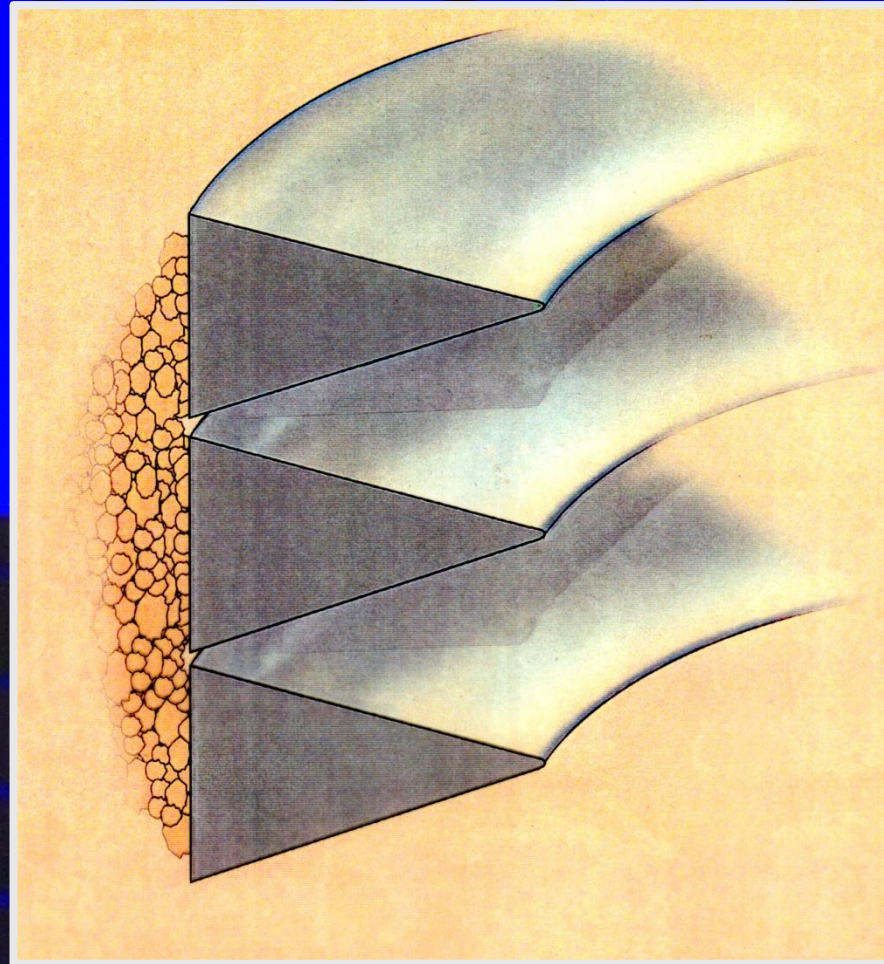
- Round cornered profiles provide low permeability with high skin
- Corner radius equals 0.45 mm
- Round cornered profiles have tendency to plug

Improved Wire Profile Design



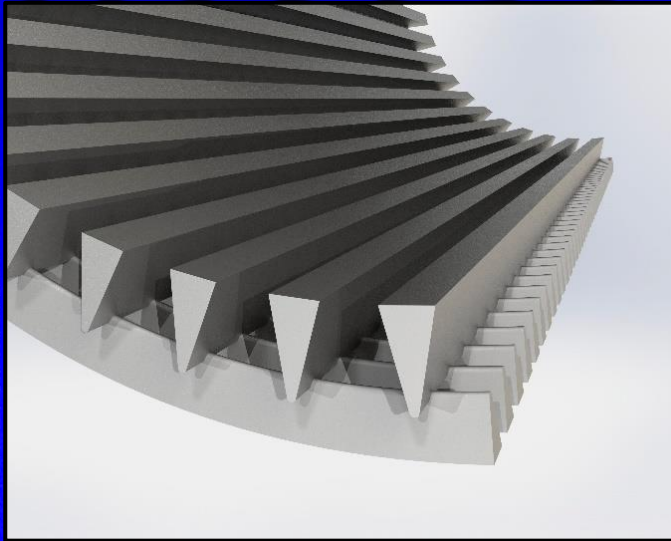
- Sharp cornered profiles provide high permeability with very low skin
- Corner radius equals 0.10 - 0.15 mm
- Sharp cornered profiles allow grains to bridge across the slot opening

Improved Wire Profile Design



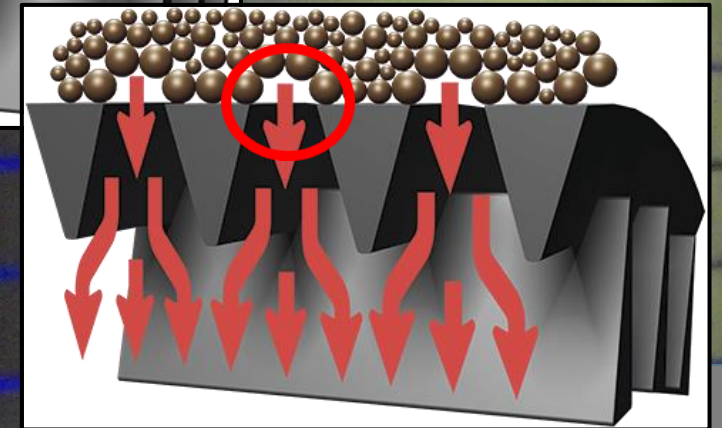
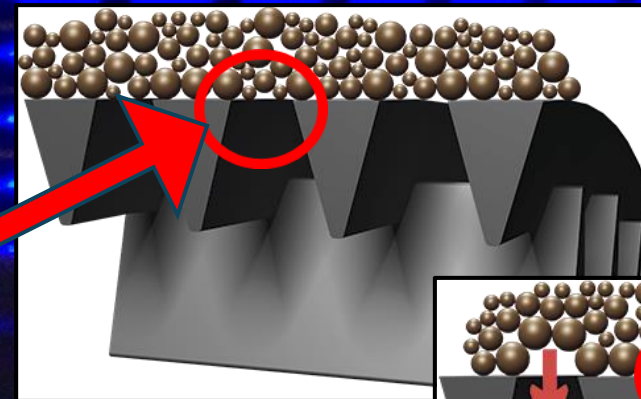
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Wire Wrapped Screen without BasePipe – Stainless Steel



Advantages / Disadvantages

- Design (++)
- **Sharp edges for bridge building during production (++)**
- Material against Erosion (-)



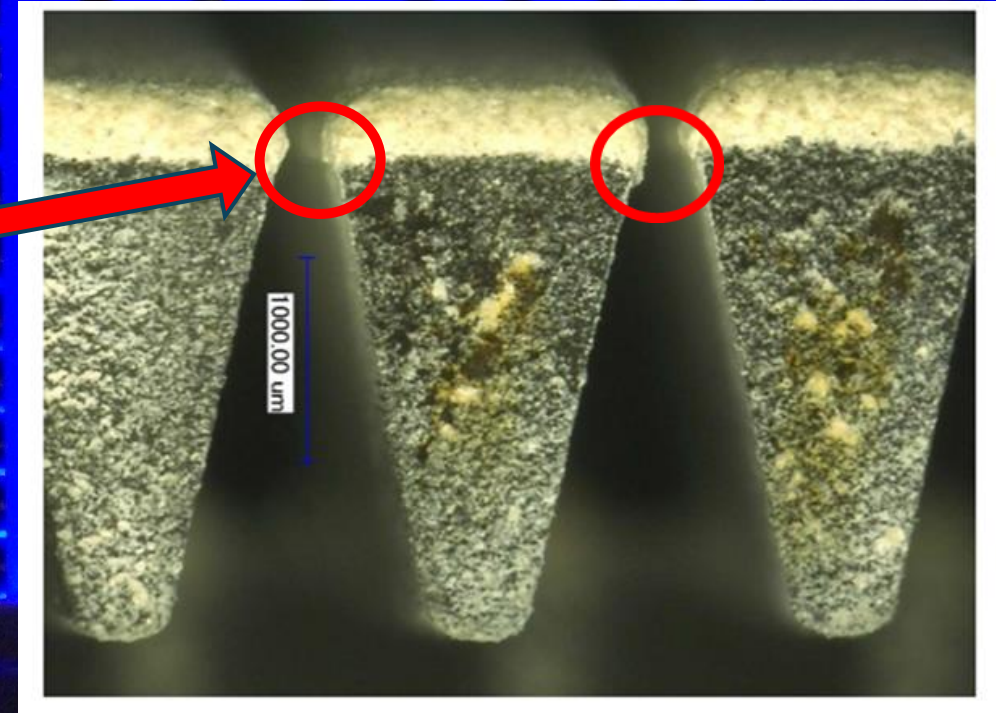
Exceptional resistance to wear:

The higher the hardness, the lower the erosion

Coated Wire Wrapped Screen

Disadvantages

- Coating can get loose (-)
- No coverage inside screen (-)
- **No sharp edges of the wires for outer bridge building (-)**



Source: Fraunhofer IKTS

Exceptional resistance to wear:

The higher the hardness, the lower the erosion