FACTORS THAT INFLUENCE BOTTOM ROUGHNESS CREATED BY DREDGING PROCESSES

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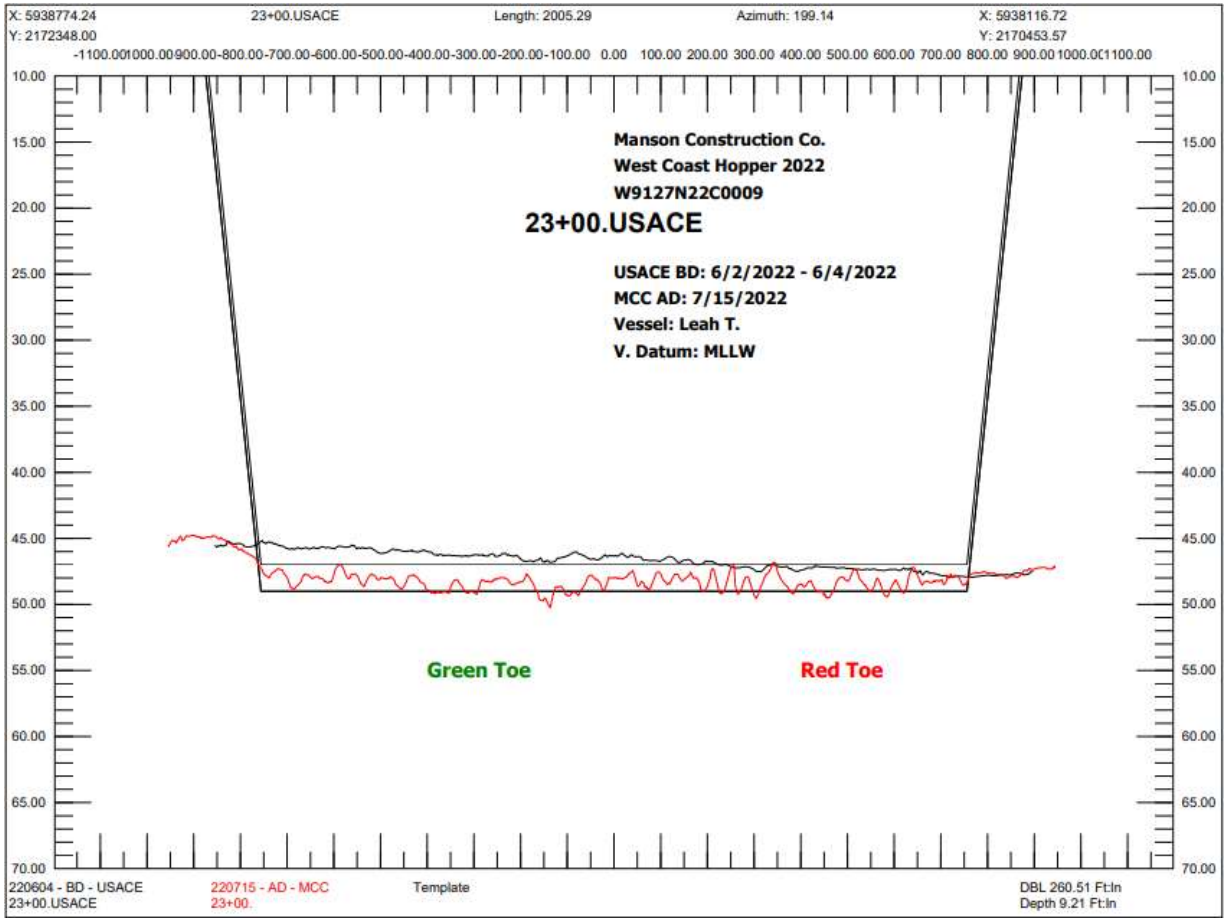
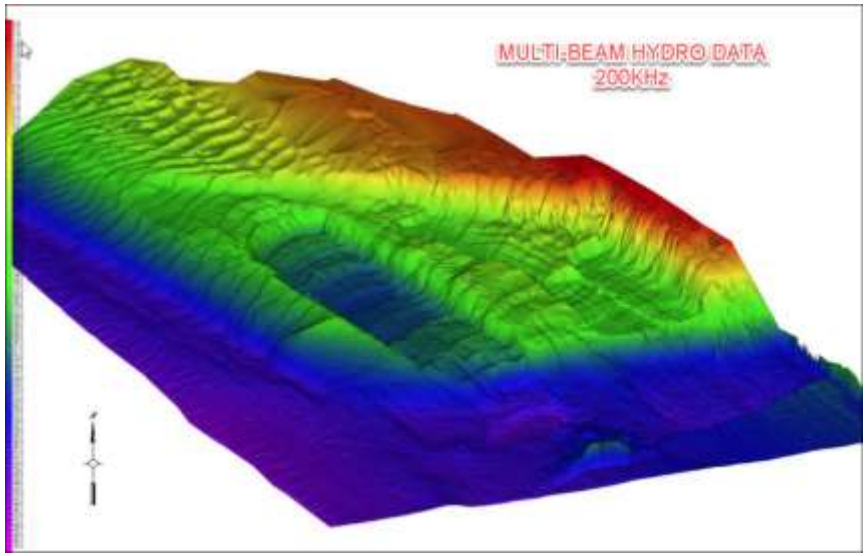
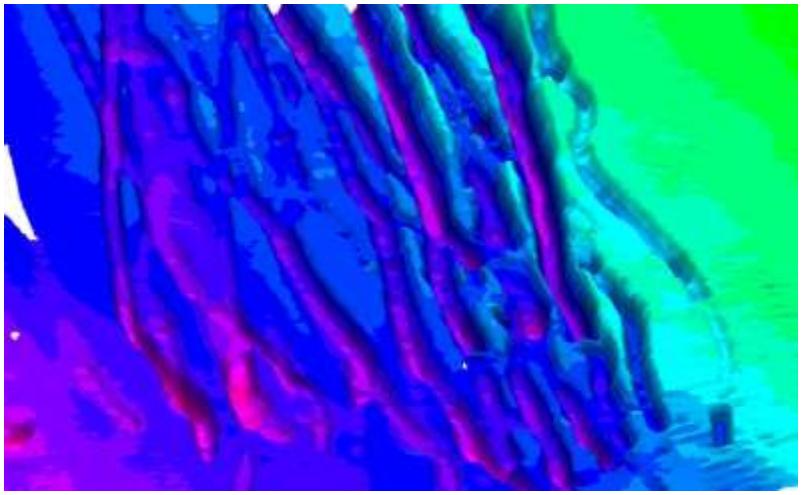
What is Roughness?



Roughness Examples

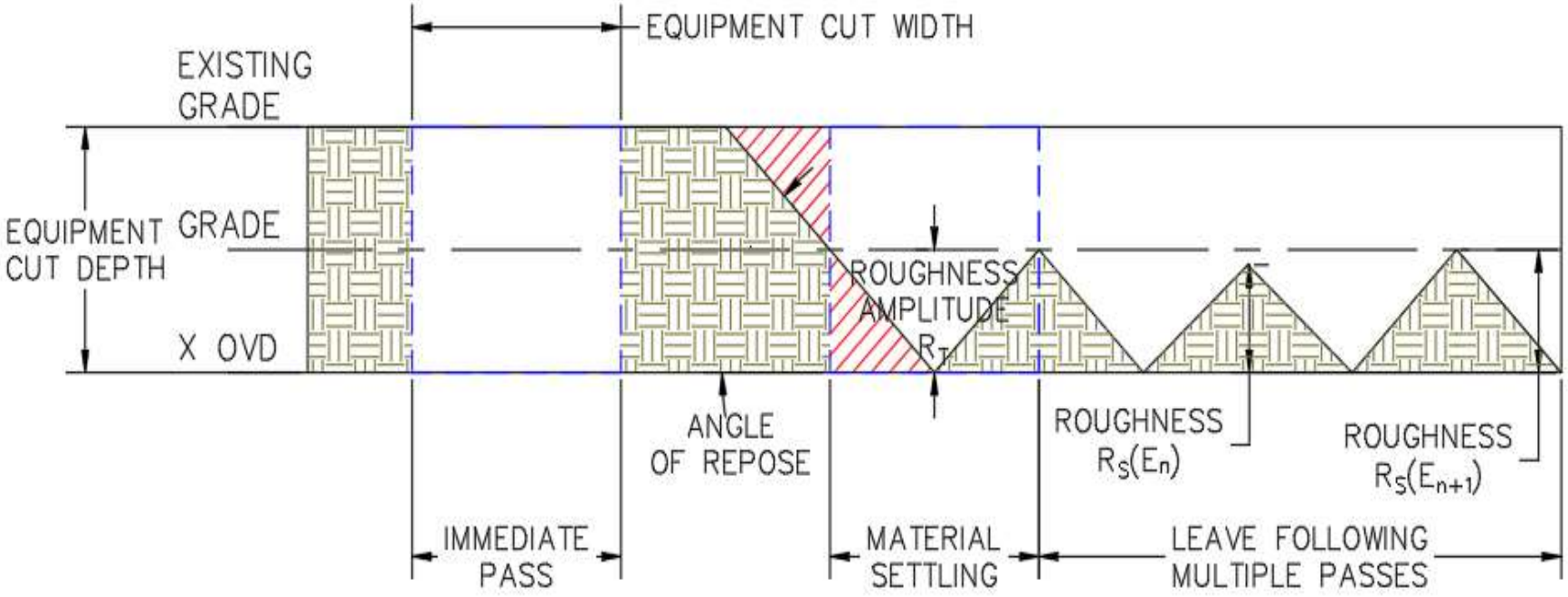


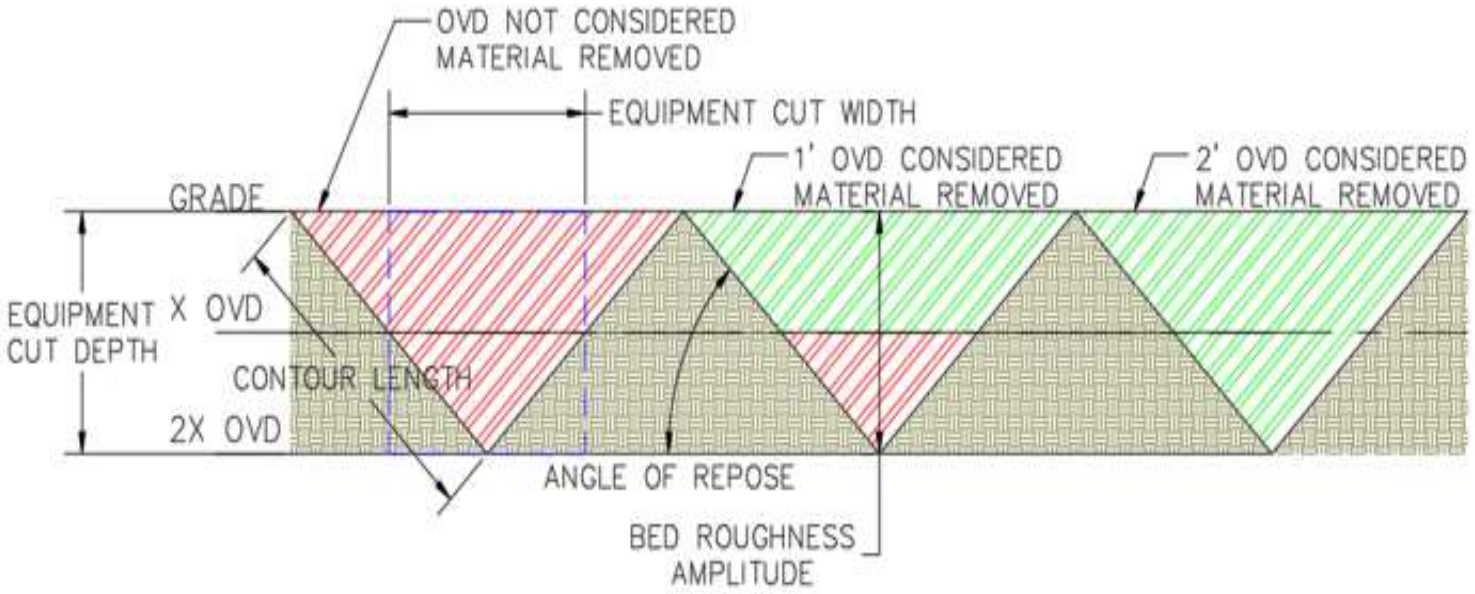
Roughness Examples



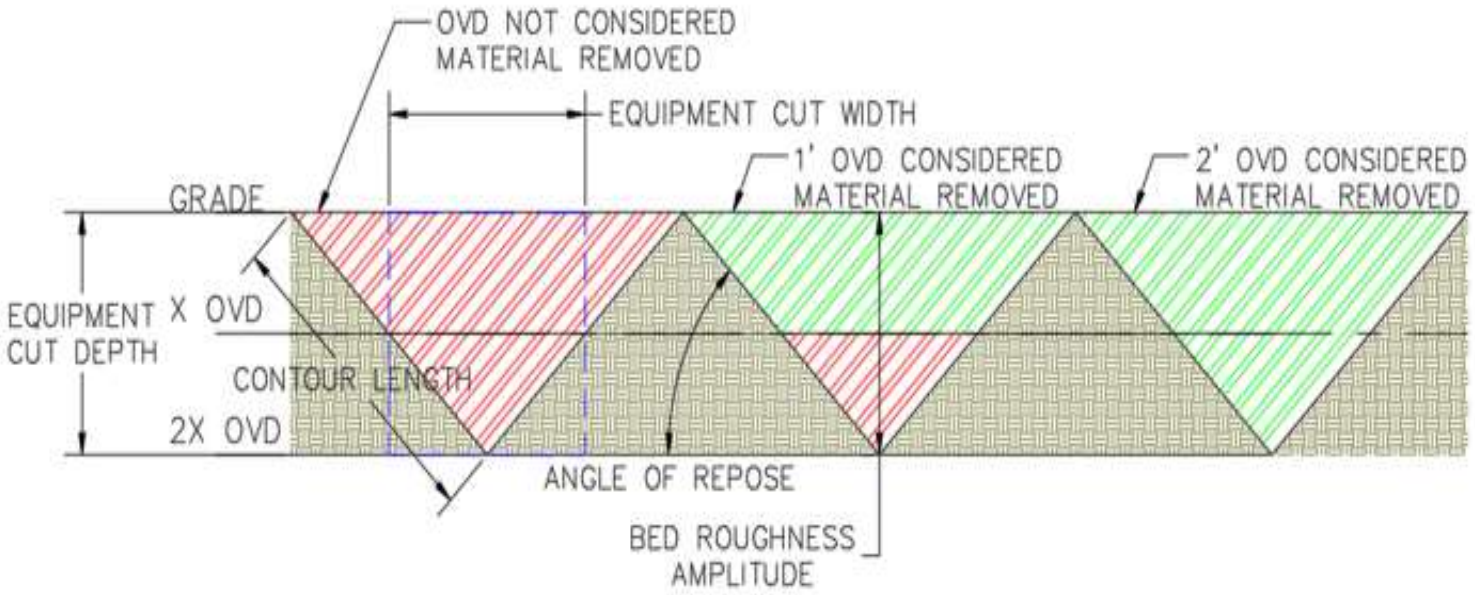
Simplified Example

Applied to Grade and Over Depth Tolerance





$$Pile\ tip\ to\ pile\ tip\ distance = 2 \cdot \frac{bed\ roughness\ amplitude}{tan(angle\ of\ repose)}$$



$$Average\ non-pay\ height = \frac{\left(\frac{(bed\ roughness\ amplitude - over\ depth)^2}{\tan(angle\ of\ repose)}\right)}{pile\ tip\ to\ pile\ tip\ distance}$$

$$\sum Roughness$$

$$= Dredge\ Size\ \&\ Type + Soil\ Type + Sea\ State + Measurement\ Accuracy$$

Selected Results

Location	Equipment	Material	Wave Height (ft)	Wave Period (s)	Frequency (Hz)	R_s (ft)	R_t (ft)
Jacksonville, FL	Clamshell	Silt	0.5	10	200	0.19	0.8
Jacksonville, FL	Clamshell	Sand	0.5	11	24	0.63	1.86
Southpass, LA	Cutter	Silt	1	Nan	200	0.22	0.94
Southpass, LA	Cutter	Sand	1	Nan	24	0.47	1.57
Kings Bay, GA	Hopper	Silt	3.15	8.11	200	0.88	2.21
Kings Bay, GA	Hopper	Sand	3.15	8.11	24	0.69	0.82

Conclusions

- Dredge type & size in combination with soil type will have the largest influence on bottom roughness
- Sea state will have an increasing effect on roughness as wave size increases
- Dredge positioning accuracy and survey measurement accuracy have the least effect on bottom roughness – Unless you aren't using it!

Questions?