

VESSEL WAKE PREDICTION TOOL INLET ENGINEERING TOOLS WU

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IET - Vessel wake prediction tool



"Develop software tools to investigate the effects of vessel wake on shoreline change"

Motivation: Recent concern over the impact of navigation to the environment (marsh edge erosion, sacrificial berms, shoreline change) has led to increased need to improve existing approaches to predict vessel wake effects.



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FY19 Research

- Complete executable using MATLAB
- Beta test model
- Apply model to ICW to investigate lifespan of shore protection measures
- Documentation (TN User guide)











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FY19 Research

- Extract vessel characteristics from AISAP tool and cross reference with AVIS
- Compute wave power as a function of vessel type
- Develop energy threshold requirements for wake energy comparison to wind waves
- JP "Effect of tidal stage on sediment concentrations and turbulence by vessel wake" J. Mar. Sci. Eng.
- American Association of Port Authorities Harbor and Navigation **Committee Meeting**
- HH&C Webinar



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FY20 Research

ssues:



1. Standard approach is to equate erosion to wave power (issue: significant scatter, poorly constrained physics)

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2. Vessel wake algorithm (issue: limited validation)

Improve detection algorithm (represent wave height for different vessel types) Model to transfer wave to shore (Leveraged with DOER to obtain field data)



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Summary – Technical Achievements

FY19

Software:

- a. Extract vessel information from AISAP, e.g., MMSI, speed, heading, name, draft, beam, etc.
- b. Improve estimates of vessel draft (entrance and clearance reports)
- c. Develop estimates of wake energy as a function of vessel type

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Model validation/improvements:

- a. Validate shoreline change approaches
- b. Develop methodologies to address the cumulative effect of different vessel types





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