

Engineering With Nature Project Fact Sheet



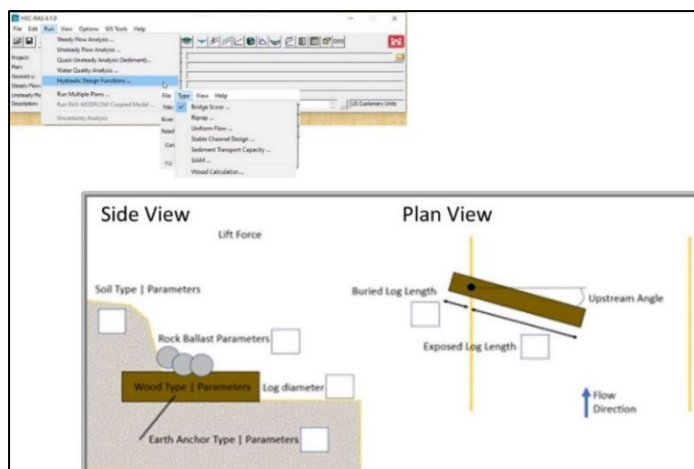
Wood Revetment Design Calculator for HEC-RAS

Background

Woody structures made from locally available material are increasingly common to help reduce bank erosion in Natural and Nature-Based Features (NNBF) stream restoration designs, but river engineers are unfamiliar with using the different materials encountered in the field. There is no USACE training for using wood in bank stabilization, few USACE design tools, and little institutional knowledge relative to hard engineering designs. USACE has a need to modernize the environmental engineering components of its design portfolio using EWN® practices. This need could be addressed via a tool that lives within standard USACE river analysis software and plugs into existing workflows for bank stabilization design. This type of tool could help develop NNBF stream restoration projects more efficiently and with better expectations for success. It could also facilitate the adoption of EWN® practices by more river engineers both within USACE and in the broader engineering community.

Objectives

This project will create an integrated tool for computing forces and factors of safety for stream restoration projects that use natural wood (i.e., root wads, wood revetments, etc.). This tool will be integrated in HEC-RAS, the standard tool of choice used by USACE engineers to model and analyze flow, sediment transport, water temperature, quality, and other key stream factors. The tool will provide engineers a consistent and reliable process for including wood in river engineering designs, which will make the review and approval process for NNBF stream restoration projects more efficient. Design tools that support natural design practices are important to the EWN® program and will enhance stream restoration bank stabilization practices nationwide.



Approach

This project will rely on a natural stream design contractor to help ERDC design and implement analytical software to use HEC-RAS output to compute engineering design criteria. The contract technical specifications will be supported by an HEC model design document. The contractor will coordinate an interagency meeting in Seattle District to review the model design and engineering formulas with future users to get critical input early and to engage them in review and training at the end. The contractor will use agency input to develop code for defined tasks. HEC software developers will be involved at all steps including review and developing user support tools.

Outcomes

Providing sustainable and resilient designs is one of the main Civil Works Strategic Focus Areas and is a major need in supporting USACE Districts. This project will address these needs by creating a wood revetment design tool that will be integrated into HEC-RAS, which can then be used by river engineers who wish to incorporate Natural and Nature Based Features (NNBF) in their river designs. This software tool is intended to efficiently design and build resilient stream restoration projects that will reduce property loss by reducing stream erosion and flooding, and also improve aquatic habitat in streams.



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