

# HICERF DIRECTIONAL WAVE BASIN

The U.S. Army Engineer Research and Development Center (ERDC) Hudson Integrated Coastal Engineering Research Facility (HICERF) directional wave basin is a state-of-the-art resource for simulating nearshore, coastal environments. The HICERF Basin in combination with a multi-element wave generator (MEG) supports transformative research and site-specific studies for government and non-government organizations, including academia and the private sector.

## APPLICATIONS

The HICERF Basin allows for the discovery, development and delivery of fundamental research and operational needs in the coastal environment by reproducing littoral and nearshore hydrodynamics. The HICERF Basin's configurable setup and application addresses both civilian and military needs in physical modeling including coastal infrastructure, coastal processes, sediment transport, wave hydrodynamics and natural and nature-based features.

## RECENT PROJECTS

- Nearshore hydrodynamics and sediment transport research including nearshore placement
  - Surf zone morphodynamics and change including channel infilling
- Testing of coastal structures (e.g., breakwaters, groins, geotextiles, jetties) to include armor stability, wave runoff, reflection, transmission, overtopping, and harbor resonance
- Evaluating flood mitigation and barrier products through the National Flood Barrier Testing and Certification Program
- Testing amphibious craft, beach landing craft, and modular causeway systems for Joint Logistics Over-the-Shore (JLOTS) operations

## WAVE GENERATION SYSTEM

- 56 wave paddles
- Max Stroke: 1.1 m
- Max Paddle Velocity: 0.7 m/s
- Period Range: 1.0 to 10.0 s
- Max Regular Wave Height : 0.49 m between wave periods of 2.0 – 3.0 s
- Max Significant Wave Height: 0.26 m between peak wave periods of 2.0 – 3.0 s at a depth of 1.0 m

## BASIN SPECIFICATIONS

- 29.9 m wide, 79 m long, and 1.45 m deep
- Separate sandy beach and structure testing areas
- Variable water depth between 0.3 m and 1.0 m
- Modifiable bathymetry (existing 1:30 beach slope)
  - 20 vertical turbine pumps with variable speed motors for recirculating longshore current
- Impact and seepage testing in accordance with ANSI/FM 2510 standard

Moveable, multi-element piston-type wave generator with modern wave generation capabilities, including active wave absorption. The MEG can produce regular waves, irregular waves for commonly used (e.g., JONSWAP, TMA, Pierson-Moskowitz) and user-specified spectra, solitary waves, and multidirectional waves.

## SUPPORT

Testing in the HICERF Basin is supported by an onsite sediment supply comprised of fine, well-sorted sand ( $d_{50} = 0.15$  mm) and a cross-shore instrumentation bridge. Instrumentation includes capacitance wave gauges, acoustic Doppler velocimeters (ADV), underwater and surface motion tracking systems, and terrestrial LiDAR. Shop capability includes custom model bathymetry; 5-axis CNC machining for plastics, wood, and metal; 3D printing; acrylic molding; and skilled trades like carpentry, welding, and plumbing.



## CONTACT