Corps of Engineers Exhumation of the Battleship Maine, 1912

CPT David A. Pounds

References

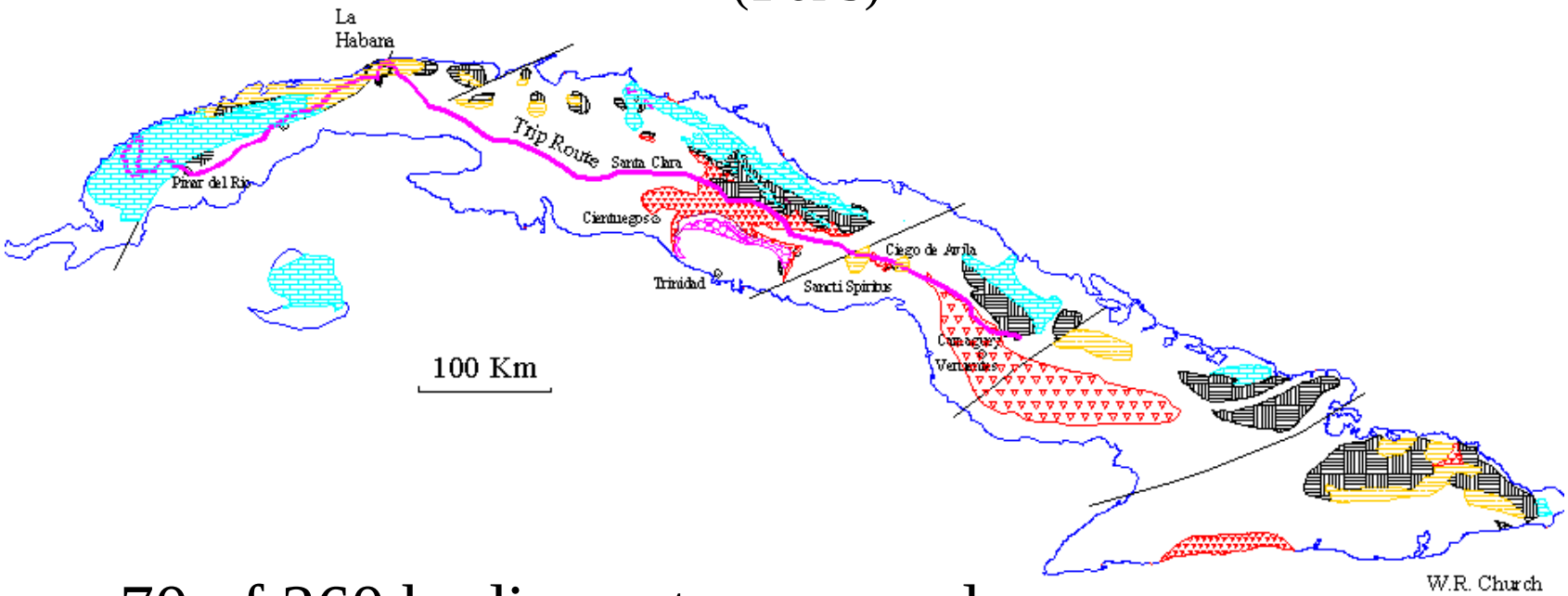
- *The Design and Construction of Dams*, Wegmann, Edward, 1927.
- *How the Battleship Maine Was Destroyed*, Rickover, H.G., 1976.
- http://www.spanamwar.com
- Engineering News, 9 March 1916.
- USS Maine Investigation on History's Mysteries, The Discovery Channel.

Background

- 15 February 1898 - *USS Maine* destroyed in Havana Harbor
- Initial investigation conducted
- Spanish American War
- Public outcry for recovery of missing bodies
- Public/political questions of the mine theory

Problem Introduction

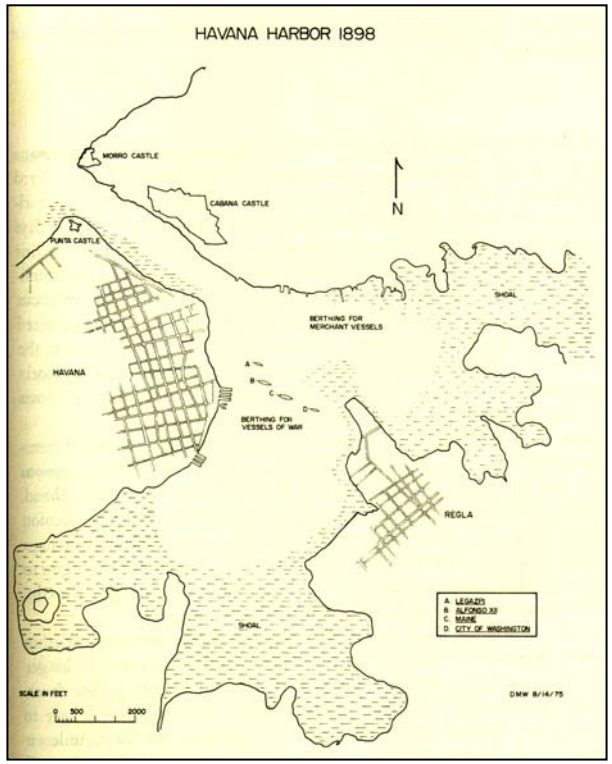
(1 of 3)



- 70 of 260 bodies not recovered
- *USS Maine* investigation (public pressure)
- *USS Maine* location (Cuban pressure)

Problem Introduction

(2 of 3)



USS Maine's location in Havana Harbor (C)

Problem Introduction

(3 of 3)

- 9 May 1910 Legislation passed to authorize Secretary of War and Chief of Engineers to take action.
- Assignment given to Corps of Engineers
  - Remove the *USS Maine*
  - Recover the remaining 70 bodies

Key Players

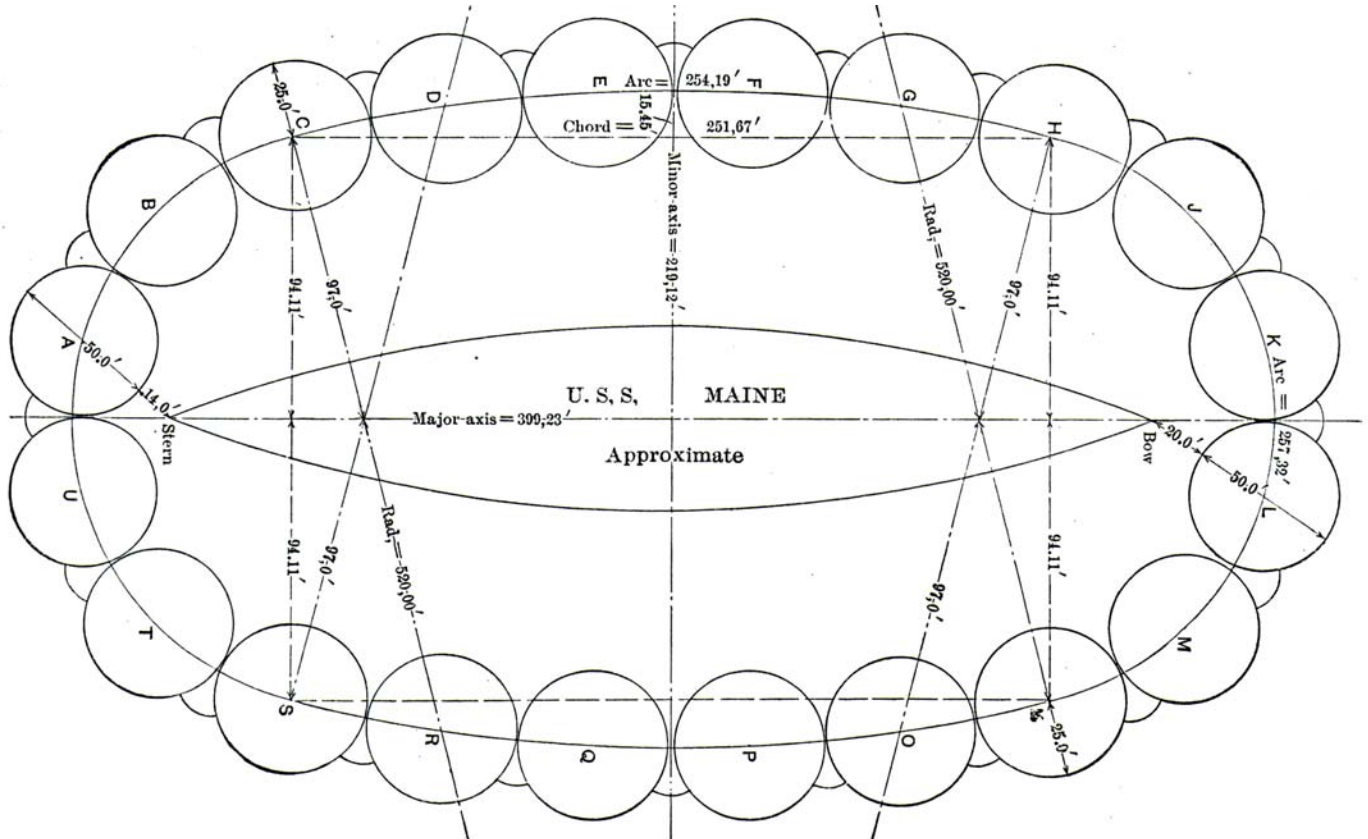
- BG William H. Bixby
  - Chief of Engineers
- MAINE Board
  - COL William Black
  - MAJ Mason M. Patrick
  - CPT Harley B. Ferguson

The Engineer's Problem

- USS MAINE
  - Roughly 350' x 120' of wreckage
- Harbor Conditions
  - 37' Water (+/- 2')
  - 18' Red Loam and Shell
  - 46.5' Blue Clay
  - 3' of stiff Yellow Clay
  - 12' of Yellow Clay and Marl
- Coordination Required
  - Cuba
  - Spain (declined to participate)
  - US Navy (advising/investigation)

Engineer's Solution

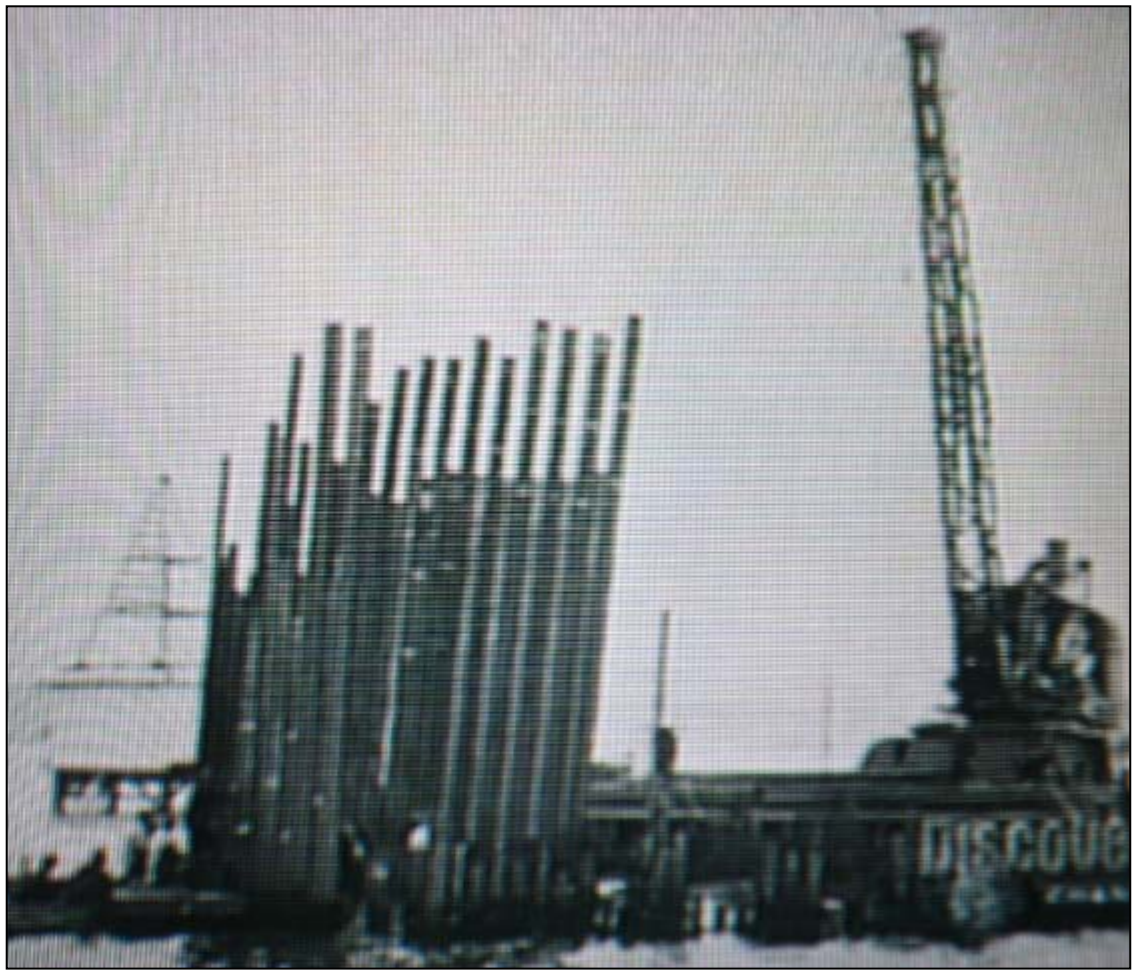
- Sheet pile Cofferdam Construction
- Concrete and Wood Bulkhead



Execution

(1 of 2)

- 29 AUG 10 - Maine Board Meeting
- 13 OCT 10 - Project Approved
- DEC 10 - Cofferdam Construction Started



Execution

(2 of 2)

- 7 JUN 11 - Cofferdam Completed
- OCT 11 - Pumping completed
- DEC 11 - Navy Completed Investigation
- 13 FEB 12 - Dam Flooded/ Maine floated
- 16 MAR 12 - Maine removed
- 02 DEC 12 - All work completed

Other Problems/Solutions

- **High water saturation of clay fill within cylinders**
  - Multi-staged dewatering of cofferdam
  - Well emplacement in cylinders
  - Drain holes inside cofferdam
- **Cofferdam sliding and/or tilting inward**
  - 14,900 cy stone toe and counterbalance/ monitoring
  - Timber and concrete bracing
- **Wreckage stuck in mud**
  - Dredge and excavate 13’
  - 6” Holes cut and water tight flanges installed

The Outcome

- Recovered remains of about 75 bodies
- Removed *USS Maine* wreckage
- Graded Havana harbor to 37.5’
- Facilitated US Navy’s investigation