

## Laboratory Experimental Study for the Hydraulics and Structural Performance of Flap Gates

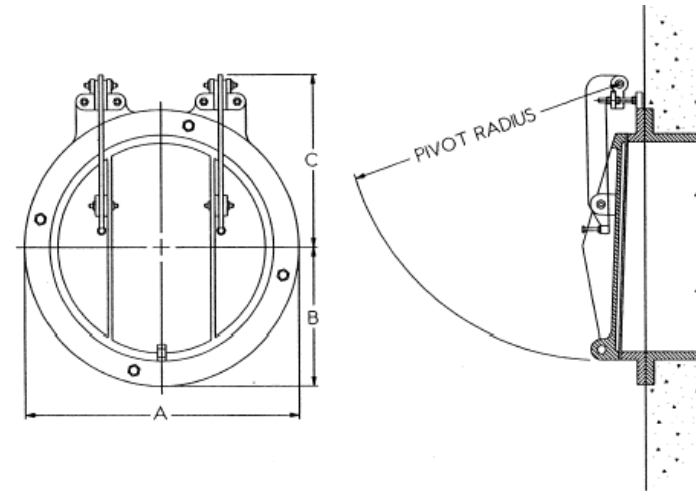
**Sponsor:** Louisiana Department of Natural Resources

### **Brief Description:**

The objective of this laboratory experiment is to test the hydraulic and structural performance of flap gates, which is a widely used structure in coastal Louisiana. It is mainly used to control the progression of salinity within Louisiana's coastal wetlands. A quantitative measure of energy losses through flap gates is not precisely known. Published literature discussing such losses is quite scarce and fairly outdated.



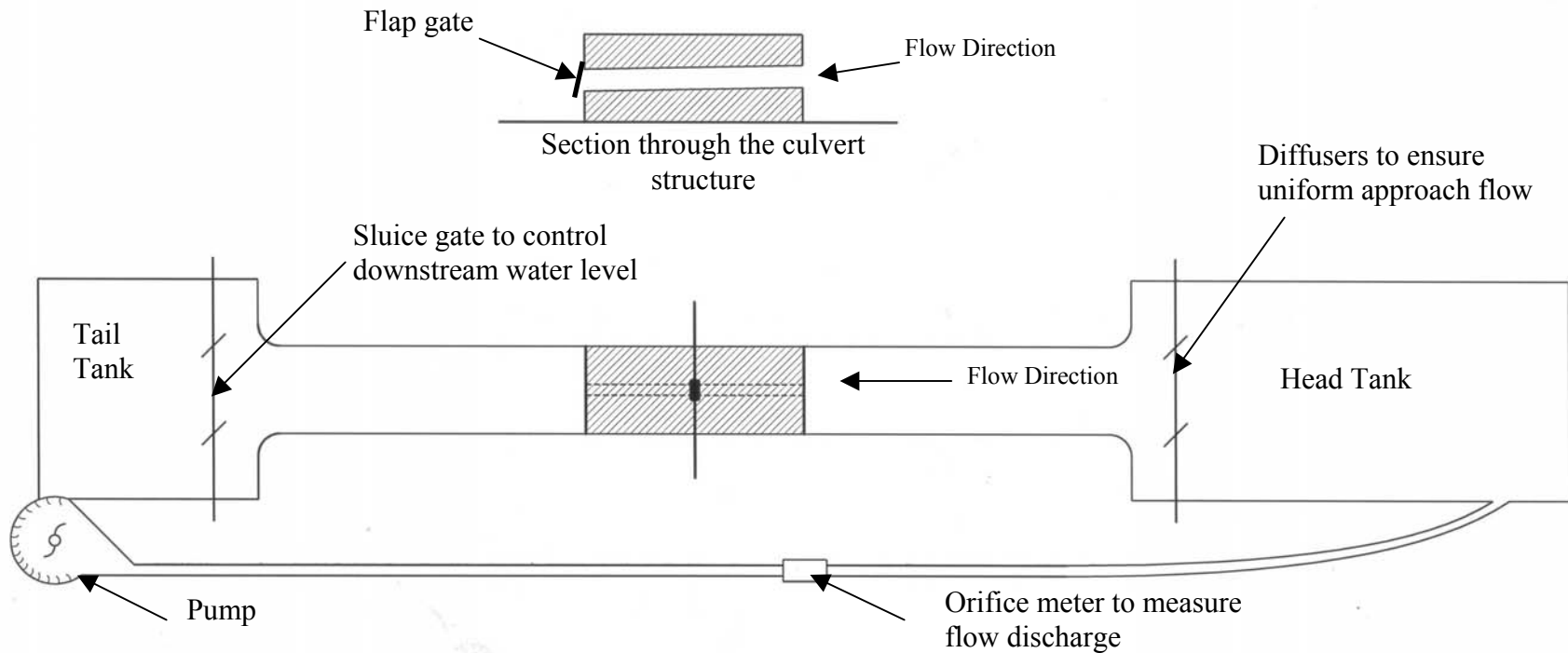
The two figures shown in this page are typical examples of flap gates used in coastal Louisiana. The proposed study herein will investigate and quantify the head losses due to the gate's own weight, the friction of the gate's bearing, and the flow turbulence downstream of the gate. Chart, tables, and possibly equations describing and quantifying such losses will be documented and provided to Louisiana Department of Natural Resources (LDNR). This document will be valuable for performing detailed data analysis of field observations, and for calibrating numerical models.



## APPROACH

This research effort will begin by conducting a thorough literature review of previous work that has been done on flap gates. This review will be part of the final report submitted to LDNR.

It is proposed herein to construct a laboratory flume to perform detailed testing of the hydraulics and structural performance of flap gates. A preliminary design of the flume is shown below.



The water level upstream and downstream of the culvert structure will be measured using either an acoustic water level sensors or a conventional point gage. A wide range of flow rate and differential head across the structure will be tested. These tests will be repeated for a variety of culvert barrel slope, and different bearing material (rotational joint).

The experimental tests described above will be performed with and without the flap gate in place. This way, the head losses due to the culvert inlet, culvert outlet, and friction losses through the culvert barrel will be separated from the head losses of the flap gate itself.

One of the intended goals of this research effort is to provide suggestions on how to improve the installation setting or the structural design of some of the components of flap gates. Typical installation currently used in Coastal Louisiana is shown in the picture above.



Additional pictures of the experimental flume showing the structural design and the assembly are shown in the next page:

