



## Panama Canal expansion project – design and fabrication of lock gates

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### Summary

For the construction of the third set of lock complexes of the Panama Canal, a total number of 16 rolling gates were required in order to regulate water levels between chambers. Given that actions on gates differ between Atlantic and Pacific site, three different gate types were designed for each complex, resulting gate weights between 2060t and 3770t of structural steel.

Lock gates are constituted by an external skin plates at upstream and downstream, horizontal skin plate stiffeners, vertical column beams, horizontal and diagonal bracings, a buoyancy chamber in their lower part, which move during operation on an upper and lower wagon.

Governing analyses for structural lock gate design are fatigue, dry outage and seismic analysis.

**Keywords:** Panama Canal, lock gates, structural steel, fatigue, dry outage, seismic analysis, welding

### 1. Introduction

Two new sets of lock complexes are built within the Panama Canal expansion program: one between the Atlantic Ocean and Gatun Lake and another one between Gatun Lake and the Pacific Ocean (see also “Panama Canal expansion project - design and construction third set of locks project”). In order to pass hydraulic levels between oceans and Gatun Lake, three chambers (lower, middle and upper) are foreseen for each complex being separated by lock heads.

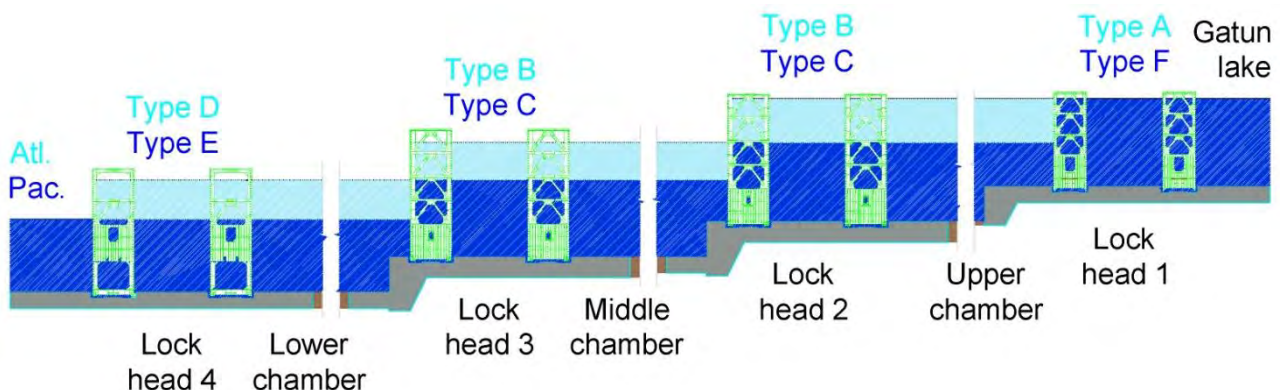


Fig. 1: Scheme location lock gates

The Authority of the Panama Canal (ACP) required for the third set of locks an availability of 99.6% each month. For that reason 2 interchangeable rolling gates were designed for each lock head permitting maintenance operations at one gate inside the recess while the other one can be used habitually. Given that 4 lock heads at each complex are required, a total number of 16 gates are