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EVALUATION OF THE IMPACT FORCES OF FERRIES OR BARGES IN STRUTURES OF PROTECTION OF THE BRIDGES ON NAVIGABLE IN RIVERS OF PARÁ

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ABSTRACT

Protection systems against impacts of vessels on bridge supports are essential to guarantee the structural integrity of bridges and the safety of users, avoiding the ruin of supports or the collapse of parts or the entire structure of the bridge, thus guaranteeing its functionality and prolonging its service life. These structures have their specificities and the definition of the type of protection to be adopted and its sizing must consider the environment conditions of the region. In the Brazilian standardizations, there are design criteria and specifications that contemplate the navigable spans considering the width of the vessels only, which has been insufficient for navigation in the region of bridges crossing navigable channels/rivers in Pará, North Region of Brazil. In evaluating the accidents that have been taking place in Pará, it appears that these criteria are insufficient to protect bridge structures from the severe accidents that have occurred in the last 10 years.

Keywords: Protection bridge, impact forces on bridge, floating protections of bridge.

1 INTRODUCTION

Bridges are device of infrastructures that require large investments for their construction, and recently their design service life has been extended to at least 100 years, as referenced in ISO 2394 standards. Functionality and durability in this useful service life with low-cost investments. Among the risks involved in bridges crossing navigable rivers, the impacts of boats or barges on supports or deck's structural are the most critical actions. The mitigation of these risk actions goes through the design of the structural system of the bridge when specifying the navigation spans, which reduces the probability of impact and the design of adequate fenders type or floating protections, with resilience and robustness to guarantee the minimization of kinetic energies during impact on the structures the bridge's structural. Therefore, in this investigation, protection systems against impacts of vessels on bridge support was essential to guarantee the structural safety and safety of users will be evaluated, avoiding the ruin of the supports or the partial collapse of parts or the entire bridge structure. In this way, this work approach the protection structures of the bridges and relevant aspects of the accidents that occurred in the last 10 years in the region of Pará were investigated. In addition, the AASHTO

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