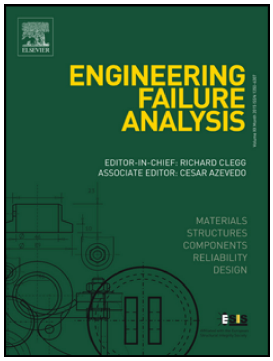

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REHABILITATION OF TIMBER BRIDGES IN GHANA WITH CASE STUDIES OF THE KAASE MODULAR TIMBER BRIDGE

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ABSTRACT

Construction of bridges in Ghana has largely been done in reinforced concrete and steel to a lesser extent. These materials and construction technology employed are very expensive and a severe drain on the foreign exchange resources of the country. However, timber is readily available and could be utilised for bridge construction in Ghana.

In order to demonstrate the viability of local timber for bridge construction, a prototype timber bridge designed to withstand American AASHTO-HS-20-44 and Interstate Highway loads was constructed over river Subin at Kaase, in Kumasi. The Kaase Timber Bridge was built in 1990 and has since been in exploitation.

Inspection of the bridge in 2015 showed extensive deterioration of the timber pile caps, the timber piles, the timber decking, the timber abutment and wing walls due to environmental factors. However, the built-up timber girders were found to be in very good condition except minor deterioration at the ends of the girders in contact with the soil. The extent of deterioration necessitated rehabilitation of the bridge.

This paper describes the processes undertaken to rehabilitate the bridge after years of use. The Kaase Timber Bridge has demonstrated the applicability of local wood species in bridge construction. The initiative can be extended to low traffic volume roads in the rural setting to improve connectivity.

Keywords: Timber Bridge, Pile, Pile cap, Girder, Rehabilitation.

1.0 Introduction

Many developing countries such as Ghana spend a significant portion of her foreign earnings on importing materials and technology for her heavy construction, one of which is bridge. The traditional method of bridge construction in Ghana has emphasized the use of reinforced concrete in particular and steel to a lesser extent. Waagner Biro [1] carried out three projects in Ghana. The projects involved the supply of modular steel bridges and pedestrian bridges to the Ministry of Roads and Highways for the construction of five steel bridges in Ghana. These materials are to a large extent imported, depleting the very scarce foreign exchange resources of the country and limit the number of bridges that can be constructed in a given time.

Exploitation of timber in Ghana is limited to a small number out of about 800 known species. High demand for a handful of the primary species both locally and internationally has led to dangerous exploitation with great waste [2]. Although there are lesser-used and lesser-known species, they are largely ignored by the industry because their technical properties have not yet