

FRP composite bridges provide optimal solutions in urban areas

William Schutte, Mozafar Said, Kees Blom

City of Rotterdam Engineering Office, Rotterdam, The Netherlands

Kees Blom

Delft University of Technology, Delft, The Netherlands

Contact: wd.schutte@rotterdam.nl

Abstract

The city of Rotterdam has fully embraced Fibre Reinforced Polymers (FRP), otherwise known as composites, as building material and uses it extensively for city wide bridge replacements. Over ninety bridge have been realised. FRP has reduced the costs of ownership for asset managers and significantly improved on building nuisance. As a front runner with the application of composites Rotterdam has gained valuable experience on how to deal with a new upcoming market and a material which has not yet earned its place among conventional building materials.

Keywords: composites; fibre reinforced polymers; bridges; new materials; lightweight structures

1 Introduction

The year 2009 has seen the introduction of Fibre Reinforced Polymer (FRP) bridge construction in Rotterdam (Netherlands). After a successful start with two glass fibre polyester load bearing decks and several steel-FRP hybrid bridges the application of FRP has taken flight. To date over 90 FRP bridges have been constructed in Rotterdam. In addition some dozen hybrid bridges bring the grand total up to 150 bridges. Nearly all bridges have been built as part of a replacement program for hardwood pedestrian bridges. Over 200 bridges have had to be replaced having reached the end-of-life phase. FRP has been chosen as prime material in order to reduce the costs of ownership for the coming decades as FRP bridges have an expected life span of at least 50 years. Initial costs are high compared to hardwood bridges. However, maintenance can be significantly reduced giving FRP a clear advantage over hardwood. The

same goes for steel and concrete (except for high performance concrete), with the additional benefit that initial costs are comparable.

When new materials are to be applied in construction works there are some aspects of great importance:

- Knowledge development
- Quality management
- Procurement
- Competition development
- Experiences

This article will elaborate on the above mentioned topics. Furthermore the state of the art and near future visions are shared.