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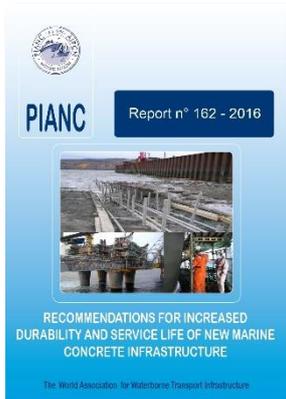


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NEW PIANC PUBLICATION AVAILABLE

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The World Association for Waterborne  
Transport Infrastructure



**Title:** "Recommendations for Increased Durability and Service Life of New Marine Concrete Infrastructure"

**Author's:** MarCom Working Group 162

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### Introduction:

The durability of concrete structures in the marine environment is not only related to design and materials but also to construction. Thus, much of the observed durability problems on marine concrete structures can be ascribed to lack of proper quality assurance during concrete construction and poorly achieved construction quality. Upon completion of new concrete structures, the achieved construction quality typically shows a high scatter and variability, and during the operation of the structures, any weaknesses and deficiencies will soon be revealed whatever durability specifications and materials have been applied. To a certain extent, a probability approach to the durability design can accommodate the high scatter and variability of quality. However, a numerical approach alone is insufficient for ensuring the durability; greater control and improvements in durability also require the specification of performance-based durability requirements which can be verified and controlled during concrete construction in order to practically achieve quality assurance.

As a basis for the durability design and production of new major concrete infrastructure, all minimum requirements in existing concrete codes and standards, as well as all established recommendations and guidelines for good construction practice must be strictly followed. In recent years, however, a rapid increase of international research and development has taken place and new experience gained on how to obtain a more controlled and increased durability beyond what is possible when based only on existing concrete codes and practice. Much of this research has been based on a probability approach to the durability design, which makes it easier to accommodate the high scatter and variability of quality. Also, much of the research has been based on the development of new performance-based durability requirements, which provide a better basis both for durability specification and quality assurance during concrete construction. As a result, a better durability design and quality assurance for new concrete infrastructure can be achieved, and documentation of as-built construction quality and compliance with the durability specification can be obtained.

For new major concrete infrastructure where probability-based durability design and performance-based durability requirements have been applied in recent years, it has been very important for the owners to receive documentation of achieved construction quality and compliance with the durability specification. Moreover, it has been very important to receive this documentation before the structures were formally handed over from the contractors, since this may have implications both for the obtained durability and future operation of the structures.

In recent years, many owners of existing concrete infrastructure have experienced a significant and rapidly increasing proportion of their limited construction budgets being spent on repairs and maintenance of the structures. This development is not only unfortunate from a cost point of view; it directly affects the sustainability of our society. Therefore, many owners are showing an increasing interest to invest somewhat more at the outset of their new projects in order to obtain a better controlled and enhanced durability of the structures beyond what is possible when based only on existing concrete codes and practice; even relatively small additional costs have proved to be an extremely good investment.

In the current document, some additional recommendations and guidelines to existing concrete standards for durability and service life are provided, the objective of which has been to obtain a better controlled and enhanced durability of new marine concrete infrastructure beyond what is possible when based only on existing concrete standards. This guidance is given with emphasis upon durability design and quality assurance as well as condition assessment and preventive maintenance during the operational life of the structures.

**NOTE:** The objective of this report is to provide information and recommendations on good practice. Conformity is not obligatory and engineering judgement should be used in its application, especially in special circumstances. This report should be seen as an expert guidance and state of the art on this particular subject. PIANC disclaims all responsibility in case this report should be presented as an official standard.

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