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August 6, 2015

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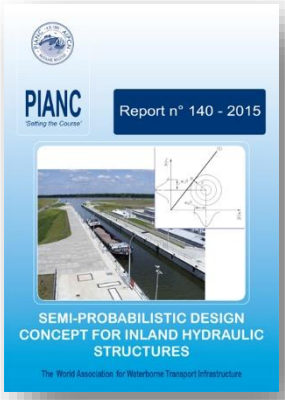

Title: **"Semi-Probabilistic Design Concept for Inland Hydraulic Structures"**

Author's: InCom Working Group 140

Price: € 200,00 (172 pages)

Available at: www.pianc.org -> publications (http://www.pianc.org/technicalreportsbrowseall.php)

Introduction:

PIANC Working Group 140 investigated the state-of-the-art of the semi-probabilistic design concepts for hydraulic structures in Europe, USA and China. By a questionnaire typical elements of the semi-probabilistic design procedures were investigated for ultimate and serviceability limit states. These are, e.g., the determination of characteristic load or resistance values, typically used actions for hydraulic structures, partial safety factors for actions and resistances, model factors, combination factors, configurations of limit state functions, existence and number of consequence classes, target reliability indices and robustness criteria.

By literature the different methods were worked out and described. Differences by methods and figures are shown and analysed. Only a few countries have special additional regulations for hydraulic structures, although the basic codes are preferentially developed for buildings. Some of the investigated issues identifying differences are:

- in loads (hydraulic, seismic, geotechnical, wind, uplift, etc.) and their distributions
- in load combinations
- in strengths (steel, concrete, etc.) and their distributions
- in limit states for navigation and flood control structures

Another concern was the investigation of statistical distributions for relevant actions and resistances. With these findings the understanding of the partial safety concept, as well as probabilistic analyses are enabled. Especially the action of water, a key action for hydraulic structures, has been dealt with more intensely, with some examples.

To identify the differences, the WG reported practical examples for several navigation and control structures. To facilitate acceptance by the design community and to aid in education, the report included examples using the semi-probabilistic procedures. These examples are:

- a steel gate from navigation lock
- U-frame lock wall (reinforced concrete)
- a gravity flood wall (plain concrete)

Differences in the design outcome, a measure for the safety, was often moderate between the different design concepts. As much as possible the findings have been compared and evaluated.

The report finishes with a conclusion and recommendations for best practice.

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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