

Table of Contents

Preface	1
 ADAPTATION AND SUSTAINABILITY	
Future Ecosystems and Biodiversity linked to Marine engineering structures	3
<i>Karen Wiltshire</i>	
Adaptive Structures in Architecture	5
<i>Walter Haase, Christina Eisenbarth, Katrin Chwalek & Lucio Blandini</i>	
Rising on ice – Antarctic Station Neumayer III	13
<i>Andreas Nitschke, Thomas Matz</i>	
 IMPACT AND RESISTANCE	
Rising water levels and probability of extreme weather and waves	33
<i>Vera Fofonova, Norbert Hoffmann, Sergey Danilov, Marco Klein & Karen Helen Wiltshire</i>	
Adaption of steel and concrete structures allowing longer lifecycles	43
<i>Sylvia Keßler, Johannes Gescher & Marcus Rutner</i>	
 MODELING, SIMULATION AND OPTIMIZATION	
Modern computational techniques for modeling, simulation and optimization of large and flexible structures	57
<i>Roland Wüchner & Kai-Uwe Bletzinger</i>	
Multifield and multiscale problems: Challenges in modeling, simulation and optimization of marine structures	59
<i>Alexander Düster & Thomas Rung</i>	

MONITORING AND AUTOMATION

Smart Sensor Systems – Aspects of Low Power Devices, Energy Harvesting, and Artificial Intelligence	71
<i>Khiem Trieu, Johannes Gescher & Kay Smarsly</i>	
Coupling underwater and construction robotics for waterside structures	81
<i>Robert Seifried, Kay Smarsly, Kosmas Dragos, Daniel A Dücker & Marc-André Pick</i>	
Autonomous robotics using microbial energy harvesting	89
<i>Ioannis A. Ieropoulos</i>	

BRIDGES

smartBRIDGE Hamburg the digital twin of the Köhlbrand bridge optimizing infrastructure maintenance	91
<i>Niklas Schwarz & Marc Wenner</i>	
Adaptive bridge design through additively manufactured modular Laminated Metal Composites	101
<i>Marcus Rutner, Jacob Brunow & Niclas Spalek</i>	

QUAY WALLS

Climate change, sustainability, ship size development – Challenges for the Port of Hamburg	121
<i>Christian Heitmann</i>	
Smart quay walls & trends in quay wall engineering	127
<i>Alfred Roubos</i>	

FLOATING STRUCTURES

Floating wind turbines – developments and challenges 133
Kimon Argyriadis

Model tests of a wave energy converter in tailored wave sequences 135
Marco Klein, Leo Dostal, Marc-André Pick & Merten Stender

Numerical and experimental investigations on the dynamic behavior of offshore structures in waves 145
Christian Windt, Stefan Netzband, Christian Schulz, Moustafa Abdel-Maksoud & Nils Goseberg