

1. Record Nr.	UNINA9910777490903321
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Titolo	Hydrodynamics around cylindrical structures / / B. Mutlu Sumer, Jørgen Fredsøe
Pubbl/distr/stampa	London : , : World Scientific Publishing, , 2006 ©2006
ISBN	1-281-37328-1 9786611373283 1-61583-243-2 981-277-277-4
Edizione	[Revised ed.]
Descrizione fisica	1 online resource (xviii, 530 pages) : illustrations (some color)
Collana	Advanced series on ocean engineering ; ; v. 26
Altri autori (Persone)	FredsøeJørgen
Disciplina	627.98
Soggetti	Offshore structures - Hydrodynamics Underwater pipelines Cylinders - Hydrodynamics Wave resistance (Hydrodynamics) Ocean currents
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Previous ed. (i.e. 1st ed.) : 1997.
Nota di bibliografia	Includes bibliographical references and indexes.
Nota di contenuto	PREFACE; CREDITS; LIST OF SYMBOLS; Contents; 1. Flow around a cylinder in steady current; 1.1 Regimes of flow around a smooth circular cylinder; 1.2 Vortex shedding; References; 2. Forces on a cylinder in steady current; 2.1 Drag and lift; 2.2 Mean drag; 2.3 Oscillating drag and lift; 2.4 Effect of cross-sectional shape on force coefficients; 2.5 Effect of incoming turbulence on force coefficients; 2.6 Effect of angle of attack on force coefficients; 2.7 Forces on a cylinder near a wall; References; 3. Flow around a cylinder in oscillatory flows. 3.1 Flow regimes as a function of Keulegan-Carpenter number3.2 Vortex-shedding regimes; 3.3 Effect of Reynolds number on flow regimes; 3.4 Effect of wall proximity on flow regimes; 3.5 Correlation length; 3.6 Streaming; References; 4. Forces on a cylinder in regular waves; 4.1 In-line force in oscillatory flow; 4.2 Lift force in oscillatory flow; 4.3 Effect of roughness; 4.4 Effect of coexisting current; 4.5 Effect of angle of attack; 4.6 Effect of orbital motion; 4.7 Forces on a cylinder

near a wall; 4.8 Forces resulting from breaking-wave impact; References. 5. Mathematical and numerical treatment of flow around a cylinder 5.1 Direct solutions of Navier-Stokes equations; 5.2 Discrete vortex methods; 5.3 Hydrodynamic stability approach; References; 6. Diffraction effect. Forces on large bodies; 6.1 Vertical circular cylinder; 6.2 Horizontal circular cylinder near or on the seabottom. Pipelines; References; 7. Forces on a cylinder in irregular waves; 7.1 Statistical treatment of irregular waves; 7.2 Forces on cylinders in irregular waves; References; 8. Flow-induced vibrations of a free cylinder in steady currents. 8.1 A summary of solutions to vibration equation 8.2 Damping of structures; 8.3 Cross-flow vortex-induced vibrations of a circular cylinder; 8.4 In-line vibrations of a circular cylinder; 8.5 Flow around and forces on a vibrating cylinder; 8.6 Galloping; 8.7 Suppression of vibrations; References; 9. Flow-induced vibrations of a free cylinder in waves; 9.1 Introduction; 9.2 Cross-flow vibrations; 9.3 In-line vibrations; 9.4 In-line oscillatory motion; 9.5 Flow around and forces on a vibrating cylinder; References; 10. Vibrations of marine pipelines; 10.1 Cross-flow vibrations of pipelines. 10.2 In-line vibrations and in-line motions of pipelines 10.3 Effect of Reynolds number; 10.4 Effect of scoured trench; 10.5 Vibrations of pipelines in irregular waves; 10.6 Effect of angle of attack; 10.7 Forces on a vibrating pipeline; References; 11. Mathematical modelling of flow-induced vibrations; 11.1 The steady-current case; 11.2 The wave case; 11.3 Integrated models; References; APPENDIX I. Force coefficients for various cross-sectional shapes; APPENDIX II. Hydrodynamic-mass coefficients for two- and three-dimensional bodies; APPENDIX III. Small amplitude linear waves

Sommario/riassunto

This book discusses the subject of wave/current flow around a cylinder, the forces induced on the cylinder by the flow, and the vibration pattern of slender structures in a marine environment. The primary aim of the book is to describe the flow pattern and the resulting load which develops when waves or current meet a cylinder. Special attention is paid to circular cylinder. The development in the forces is related to the various flow patterns and is discussed in detail. Regular as well as irregular waves are considered, and special cases like wall proximities (pipelines) are also investigated.
