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Autore	Kyriakides S
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4.3 Nonlinear Formulation 4.3.1 Kinematics; 4.3.2 Constitutive Behavior; 4.3.3 Principle of Virtual Work; 4.3.4 Examples; 4.4 Factors Affecting Pipe Collapse; 4.4.1 Collapse Pressure Experiments; 4.4.2 Prediction of Collapse Pressures; 4.4.3 Effect of Initial Ovality; 4.4.4 Type of Pressure Loading; 4.4.5 Wall Thickness Variations; 4.4.6 Effect of Material Stress-Strain Response; 4.4.7 Residual Stresses; 4.4.8 Anisotropic Yielding; 4.4.9 An Approximate Estimate of Collapse Pressure; 4.5 Representative Seamless Pipe Imperfections; 4.5.1 Imperfection Scanning System; 4.5.2 Data Reduction 4.5.3 Four Examples 4.6 Conclusions and Design Recommendations; Chapter 5 Collapse of UOE Pipe Under External Pressure; 5.1 Collapse Pressure of UOE Pipe; 5.2 Prediction of Collapse Pressure of UOE Pipe; 5.3 Improvement of Compressive Properties by Heat Treatment of the Pipe; 5.4 One-Dimensional Model of UOE Pipe Forming; 5.5 Two-Dimensional Models of UOE/UOC; 5.5.1 UOE/UOC Forming Steps; 5.5.2 Numerical Simulation; 5.5.3 An Example of UOE Forming; 5.5.4 Parametric Study-Optimization of UOE/UOC; 5.6 Conclusions and Recommendations; Chapter 6 Collapse of Dented Pipes Under External Pressure 6.1 Dent Characteristics 6.2 Denting and Collapse Experiments; 6.2.1 Indentation; 6.2.2 Collapse Experiments; 6.3 Modeling of Denting and Collapse; 6.3.1 Prediction of Collapse Pressure of Dented Tubes; 6.4 Universal Collapse Resistance Curves for Dented Pipes; 6.4.1 Localization of Collapse Under External Pressure; 6.4.2 The Universal Collapse Resistance Curve; 6.5 Conclusions and Recommendations; Chapter 7 Buckling and Collapse Under Combined External Pressure and Tension; 7.1 Elastic Buckling; 7.2 Plastic Buckling; 7.3 Nonlinear Formulation; 7.3.1 Examples 7.4 Collapse Under External Pressure and Tension

Sommario/riassunto

Offshore oil and gas production was conducted throughout the entire 20th century, but the industry's modern importance and vibrancy did not start until the early 1970's, when the North Sea became a major producer. Since then, the expansion of the offshore oil industry has been continuous and rapid. Pipelines, and more generally long tubular structures, are major oil and gas industry tools used in exploration, drilling, production, and transmission. Installing and operating tubular structures in deep waters places unique demands on them. Technical challenges within the field have spawned...
