KEYWORDS

Pipeline engineering, ferritic-pearlitic and bainitic steels (pipeline-steels), duplex-steels, pipeline failures, natural gas pipelines, crack-arrestors, pipeline corrosion, corrosion protection of pipelines, pipelines in Austria, in Europe, world wide, pipeline welding, heat treatment of pipelines, fracture mechanical investigations, CTOD tests, crack-arrest tests, tensile tests, impact tests, hardness tests, heat-input, alloying elements of thermomechanically treated steels and duplex-steels, metallography, fractography, pipeline design, operation of pipelines, radiographic testing, ultrasonic testing, visual testing, quality management in pipeline engineering, pigging, analysis of failures in pipeline engineering.

SCHLAGWOERTER

ABSTRACT
Pipelines offer an economically and ecologically reliable, good solution for the transport of liquids and gases worldwide. Even in a small country like Austria they are an almost indispensable means of transport, especially for natural gas.

THEORETICAL PART:
This work addresses the most important questions industrial engineers and scientists are confronted with, when working in the fields of project planning, construction, and operation of pipelines. Starting from a description of the situation in Austria and a comparison with worldwide solutions, the following fields are examined: Damage caused by cracks and corrosion, as well as countermeasures; materials used in pipeline construction (ferritic-pearlitic, bainitic, and duplex-steels) and their processing properties (especially concerning welding technology); aspects of materials testing and quality management.

EXPERIMENTAL PART:
Based on numerous welding-technological and fracture-mechanical examinations, the influencing parameters and limits, essential for a problem-free construction and reliable operation of pipelines, are discussed and limits established.

MATHEMATICAL PART:
This part offers mathematical approaches for the predetermination of welding-technological and fracture-mechanical parameters, to be considered during the construction and the subsequent testing of pipelines.
KURZREFERAT
Rohrleitungen stellen weltweit eine oekonomisch und oekologisch zuverlässige und gute Lösung zum Transport flüssiger und gasförmiger Stoffe dar. Auch in einem kleinen Land wie Österreich sind sie kaum zu ersetzende Transportmittel, vor allem für Erdgas.

THEORETISCHER TEIL:

EXPERIMENTELLER TEIL:
Anhand von zahlreichen schweißtechnischen und bruchmechanischen Untersuchungen werden die Einflussgrössen für eine problemlose Fertigung und einen zuverlässigen Betrieb von Pipelines bestimmt und ihre Grenzen festgelegt.

RECHNERISCHER TEIL:
Weiters werden rechnerische Ansätze für die Vorherbestimmung der schweißtechnischen und bruchmechanischen Parameter, die sich bei der Fertigung und einer anschliessenden Prüfung ergeben, geliefert.
PREFACE

The first German edition of this book has been written as a habilitation at Vienna University of Technology. The author is thankful for suggestions to this book. The individual introductions to the various subjects are intended also to open this book to interested experts with different knowledge and background, and not just only to scientifically qualified readers.

Hopefully the variety of information by the dissemination of this book will be supplied to an interested and attentive circle of readers, to lead to a better understanding of the problems possibly occurring with ferritic-pearlitic steels, bainitic steels, or duplex-steels, especially with regard to the properties of the used materials, their processing (especially welding technology), the following testing (e.g. destructive and non-destructive testing, fracture mechanical, metallographical, and fractographical methods), the quality management, the ecology, and the economy.

Ao.Univ.Prof. Dipl.-Ing. Dr.techn. Sonja Felber
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