

PETROLEUM TUBULAR GOODS & INSTRUMENTS

ISSN 2096-0077

CN 61-1500/TE

# 石油管材与仪器

SHIYOU GUANCAI YU YIQI

中国石油学会石油管材专业委员会会刊

- 《中国石油文献数据库》收录期刊
- 《中国期刊全文数据库》全文收录期刊
- 《中文科技期刊数据库》原文收录期刊
- 《中国核心期刊(遴选)数据库》收录期刊
- 《中国学术期刊影响因子年报》统计源期刊
- 《中国学术期刊综合评价数据库》统计源期刊

双月刊

2022 Vol. 8

5



主管:中国石油天然气集团有限公司    主办:中国石油集团工程材料研究院有限公司

双月刊 2015年创刊

2022年10月1日出版  
第8卷  
第5期(总第47期)



本刊微信公众号

# 石油管材与仪器

## 目次

**主管单位:**中国石油天然气集团有限公司  
**主办单位:**中国石油集团工程材料研究院有限公司  
**主 编:**冯耀荣  
**副 主 编:**马小芳 姜 婷  
**本期责编:**屈忆欣  
**英文编辑:**屈忆欣  
**技术编辑:**王 骏

**编辑出版:**《石油管材与仪器》编辑部  
**本刊地址:**西安市锦业二路89号  
**邮政编码:**710077  
**编 辑:**029-81887825 81887589  
**广告发行:**029-81887585  
**网址(投稿):**www.gcyq.net  
**电子邮箱:**sygcyqq@126.com  
**发 行:**《石油管材与仪器》编辑部  
**印 刷:**陕西省委机关第二印刷厂  
**中国标准连续出版物号:** ISSN 2096—0077  
CN 61—1500/TE  
**邮发代号:** 52—286  
**广告经营许可证号:** 6101004003048  
**单册定价:** 20.00元  
**全年定价:** 120.00元

### ■ 综 述

- 1 国内油田地面系统防腐研究与应用进展 ..... 王 帅,张金星,李纪朋,朱明杰,宋成立,林冠发

### ■ 开发设计

- 8 基于测试异常信息套损三级预警设计及应用 ..... 郭立敏  
12 基于相态调控的油水两相流含率在线测量方法 ..... 韩连福,郑朝亮,付长凤,刘兴斌  
16 宽频调速液压动力模块的设计及在超低渗地层测试器中的应用 ..... 郝桂青,周明高,兰 萌,马俊全,褚晓冬,周艳敏

### ■ 试验研究

- 21 合金元素 Mo、Ni 对 X70 管线钢管性能和焊接性影响研究 ..... 张银根,齐丽华,宋朋利,王迎新,陈越峰,周 扬  
26 新疆油田玛湖地区套管损坏机理及主控因素研究 ..... 张丽萍,李一强,舒振辉,赵 田,王 航,韩礼红  
32 环焊缝缺陷漏磁内检测图像识别技术研究 ..... 雷铮强,颜 元  
37 管道应力影响因素分析 ..... 孙明楠,陈 涵,帅 健,王 宇,朱丽霞

### ■ 失效分析与预防

- 43 某超深井 Φ450 稳定器内螺纹刺漏开裂原因分析 ..... 谭雷川,李洪兴,高德利,胡殊睿,周效民  
48 输气管线水域穿越段管道滑移失效分析 ..... 石来民  
51 储气库套管柱环空压力影响因素动态评价 ..... 刘毅璠,闫怡飞,宋运存,闫相祯  
57 高原冻土区含缺陷天然气管道现场应力检测和分析 ..... 张 良,惠文颖,徐 琳,方卫林,李玉坤  
60 L360N 热煨弯管开裂原因分析 ..... 李小龙,刘养勤,刘 红,刘 刚,于开祥,蔡 克,全 河,宋恩鹏

### ■ 仪器设备与应用

- 66 地震仪器在复杂区高密度地震勘探中的应用 ..... 甘志强,杨 睿,尹弋赞,郭俊超,高丰婉  
71 放射性和磁性方法在工程测井中的应用 ..... 陈 辉,林作华,薛素丽,朱爱民,刘博达,徐蜀文,李 剑  
76 可控冲击波增产技术在大庆油田的应用 ..... 赵树彬,张命俊,路远涛,汤俊萍,汪 锋,朱立江,郑永学  
81 超声多普勒测井产气量定量解释研究及其在涩北气田的应用 ..... 雷 刚,魏顺科,何 伟,周 峰,刘 伟,鲁焕强,周 涛

### ■ 经验交流

- 85 美国天然气分输管道失效事故深度分析 ..... 李为卫 编译  
90 哈德油田试井解释方法改进与应用 ..... 朱礼萍  
95 国外生产测井传感技术应用及研究动向 ..... 邢建民

### 7 《石油管材与仪器》广告征求函

### 42 本刊加入“万方数据”——数字化期刊群的声明

### 75 《石油管材与仪器》征稿要求

### 25 广告索引

BIMONTHLY. Started in 2015

Oct. 1st, 2022

Vol.8

No.5 (Serial No.47)

## PETROLEUM TUBULAR GOODS & INSTRUMENTS

# CONTENTS

### OVERVIEW

- 1 Research and Application Progress of Oilfield Surface System Anti -corrosion in China  
..... WANG Shuai, ZHANG Jinxing, LI Jipeng, ZHU Mingjie, SONG Chengli, LIN Guanfa

### DEVELOPMENT AND DESIGN

- 8 Design and Application of Three-level Early Warning of Casing Damage Based on Abnormal Logging and Testing Information ..... GUO Limin  
12 Online Measurement Method of Oil-water Two-phase Flow Holdup Based on Phase State Regulation ..... HAN Lianfu, ZHENG Chaoliang, FU Changfeng, LIU Xingbin  
16 Application of Wide-band Speed Regulation Hydraulic Power Technology in Formation Tester ..... HAO Guiqing, ZHOU Minggao, LAN Meng, MA Junquan, CHU Xiaodong, ZHOU Yanmin

### EXPERIMENTS AND INVESTIGATION

- 21 Effect of Mo and Ni on Properties and Weldability of X 70 Line Pipe ..... ZHANG Yingen, QI Lihua, SONG Pengli, WANG Yingxin, CHEN Yuefeng, ZHOU Yang  
26 Investigation of Mechanism and Dominant Factors of Casing Damage in Mahu Area in Xinjiang Oilfield ..... ZHANG Liping, LI Yiqiang, SHU Zhenhui, ZHAO Tian, WANG Hang, HAN Lihong  
32 Image Recognition of Magnetic-flux-leakage Inspection for Girth Weld ..... LEI Zhengqiang, YAN Yuan  
37 Analysis of Influence Factors of Pipeline Stress ..... SUN Mingnan, CHEN Han, SHUAI Jian, WANG Yu, ZHU Lixia

### FAILURE ANALYSIS AND PREVENTION

- 43 Failure Analysis of Stab Leakage and Cracking at the Internal Thread of Φ450 Centralizer in an Ultra-deep Well ..... TAN Leichuan, LI Hongxing, GAO Deli, HU Shurui, ZHOU Xiaomin  
48 Failure Mode Analysis of a Gas Pipeline Crossing Section under Slipping Accident ..... SHI Laimin  
51 Risk Assessment of Annular Pressure Buildup in Natural Gas Storage ..... LIU Yifan, YAN Yifei, SONG Yuncun, YAN Xiangzhen  
57 Stress Detection and Analysis of Defective Natural Gas Pipelines in Plateau Frozen Soil Area ..... ZHANG Liang, HUI Wenying, XU Lin, FANG Weilin, LI Yukun  
60 The Cracking Cause of L360N Heat Bend ..... LI Xiaolong, LIU Yangqin, LIU Hong, LIU Zhao, YU Kaixiang, CAI Ke, TONG Ke, SONG Empeng

### INSTRUMENT AND EQUIPMENT

- 66 Application of Seismic Instruments in Large-scale Seismic Exploration ..... GAN Zhiqiang, YANG Han, YIN Yizan, GUO Junchao, GAO Fengwan  
71 Application of Radioactivity and Magnetism in Engineering Logging ..... CHEN Hui, LIN Zuohua, XUE Suli, ZHU Aimin, LIU Boda, XU Shuwen, LI Jian  
76 Application of Controllable Shock Wave Stimulation Technology in Daqing Oilfield ..... ZHAO Shubin, ZHANG Mingjun, LU Yuantao, TANG Junping, WANG Feng, ZHU Lijiang, ZHENG Yongxue

- 81 Gas Production Quantitative Interpretation of Ultrasonic Doppler Logging and Its Application in Sebei Gas Field ..... LEI Gang, WEI Shunke, HE Wei, ZHOU Feng, LIU Wei, LU Huanqiang, ZHOU Tao

### EXPERIENCE EXCHANGE

- 85 An In-depth Analysis of Distribution System Incidents in the US Natural Gas Pipeline Industry ..... LI Weiwei Compiled  
90 Improvement and Application of Well Test Interpretation in Kazgermunai Oilfield ..... ZHU Liping  
95 Application and Research Trend of Foreign Production Logging Sensor Technology ..... XING Jianmin

Responsible Authority : China National Petroleum Corporation  
Sponsor : CNPC Tubular Goods Research Institute

Editor in Chief : Feng Yaorong

Vice chief-editor: Ma Xiaofang Jiang Ting

Editor in Charge:Qu Yixin

English Editor: Qu Yixin

Technical Editor: Wang Jun

Editor and Publisher:

Editorial Department of

PETROLEUM TUBULAR GOODS & INSTRUMENTS

Address: No.89 Jinye 2nd Road, Xi'an,China

Post Code: 710077

Editor Tel : (029) 81887825 81887589

Advertisement Tel: (029)81887585

Website: <http://www.gcyq.net>

E-mail: sygcyq@126.com

Distributor: Editorial Department of

PETROLEUM TUBULAR GOODS & INSTRUMENTS

Printer: The Second Printing Factory of  
Shaanxi Shengwei Jiguan

Periodical Registration: ISSN 2096-0077  
CN 61-1500/TE

Postal Code:52-286

Advertisement License: 6101004003048

Subscription Rates: RMB 20.00 per copy

RMB 120.00 per year