



济南二机床集团全面复工，开足马力保生产

ISSN 1673-5587



9 771673 558198

现代制造技术与装备

主管 山东省机械工业协会

主办 山东省机械设计研究院

理事会

理事长：刘卫东

副理事长：林江海

理事：

陈声环	曾庆良	邓德乐	齐晓光	李保民
李胜军	李政军	毛志猛	孟庆堂	尚书旗
孙龙平	孙清洲	孙少军	宋家禄	汤世贤
王新建	魏修亭	徐龙泉	薛兴振	许宪志
许允和	于元波	张万谋	张承瑞	张跃成
张志刚	张世君	晁向博	姜小兴	薛峰
孙振华	郭信学	沙克清	马昭喜	马祖文

杂志社

社长：林江海

副社长：唐炳武 周靖 夏玉海 姚立新

主编：吴小临

副主编：徐民兴

编辑：刘凌 张秀明 许彦红 郭鹏

英译：李莹 王建文

编委：边秀房 丁明 樊炳辉 黄传真

李木森 李军 李玉奎 刘川

刘永飞 石长河 孙宏飞 孙宁

王善坡 徐刚 周以齐 赵玉刚

曹明通

出版：《现代制造技术与装备》杂志社

编辑：《现代制造技术与装备》编辑部

发行：《现代制造技术与装备》广告发行部

刊号：ISSN1673-5587
CN37-1442/TH

广告代理权：现代制造技术与装备编辑部

广告经营许可证：3700004000145

印刷：济南景升印业有限公司

定价：15.00 元

《现代制造技术与装备》杂志社

地址：济南市济洛路129号

邮编：250031

电话：0531-85955168 0531-87116637

[Http://www.sdji.cbpt.cnki.net](http://www.sdji.cbpt.cnki.net)

E-mail:sdjx163@163.com mmte@163.com

zzjsybz@163.com zzjsybz@126.com

万方数据

目次

·设计与研究·

基于凸轮变间距结构的柔性化锯床下料生产系统的研究

..... 谢子锋 陈荣标 张传龙 张宏伟 (1)

一件便携式车辆检测仪器的设计 宋飞 张英杰 张千龙 李智胜 费柏林 潘华伟 (4)

家用植物自动浇水装置 李德治 陈强华 张翠芸 卢夏博 石征锦 (7)

飞机舱门生产线方案设计与优化研究 刘向龙 涂洪铭 边毅 何林 伍剑波 (8)

青藏铁路机车车辆选型及技术特点研究 伍赛特 (13)

一种节能环保型水面垃圾清理船设计 张凯淇 (15)

备品备件结构树在动车平台上的研究 张岩 (18)

基于ADAMS的车辆角度传感器安装机构的研究 赵文雅 包宁 王雅洁 董鑫琪 (20)

载荷变动对船舶运动响应的影响 梁艳霞 (24)

重型卡车驾驶室抖动问题分析方法研究 范志达 王笑 (27)

煤矿救灾机器人研究现状及需要重点解决的技术问题 苏锦智 张继鹏 (28)

大载重货梯轿厢架的设计及强度计算 季宏芳 (30)

逆向设计在工业制造中的创新应用与研究 杨玉昆 (33)

机械传动方案设计与组合实训台的设计 梅雪峰 (35)

钣金工艺优化目标下的钣金件结构设计 孙东冉 (36)

跑步机简易心率测量系统设计 徐林建 (38)

基于汽车安全气囊生产线MES系统的开发与研究 石铁山 王晓东 (39)

水润滑轴承水膜压力研究进展 杨利涛 王楠 袁哲 雷帅 王佳伟 (41)

基于Zigbee的无线传感器网络四驱小车系统设计 李汉玲 (44)

纤维复合板滚压成型设备技术研发 李苏扬 孟凯 (47)

一种高碳纤维盘根弹性变形曲线与摩擦系数测试实验的研究

..... 王继光 刘建平 冯雁 尤立 (49)

化疗药物自动化配药机器的循环净化系统设计 崔明科 (51)

基于MATLAB六轴喷涂机器人运动仿真研究 高方俊 郑磊 徐强 檀晓宏 (53)

基于人工鱼群算法的工厂调度系统优化 杨云鹏 (58)

一种新型机构组件自动装配机的研发与样机研制 谭伟超 梁门长 (60)

基于ANSYS的回转轴零件均匀切向面力静力学分析

..... 熊勇刚 刘亚春 成威 龚琦 陈邦国 (63)

智能网联技术在试验场车辆试验安全中的研究 谷渤海 张春颖 张洪程 (66)

机采棉加工企业智能化生产系统构建与实施方法研究 李辉 李玉林 (67)

光纤传感产业发展现状及展望 王树春 毛健 (70)

手帕纸包装机虚切装置的改进设计 蔡敏 (72)

NS4.0生活垃圾分类磁化热解处理站的研制 叶永博 蔡小华 (74)

航空发动机燃油与控制系统余度设计要求 陈杰 周丽萍 夏商周 (77)

大型步履式架桥机主梁结构损伤研究 盛林 (79)

一种重卡驾驶室翻转机构疲劳试验系统建设及试验方法的研究 杨毅 (81)

智能高效多功能晾衣架的设计 李昕鸣 郑淑馨 李侃 倪海鹏 李永琪 (83)

一种E型密封圈疲劳试验装置的设计与研究 刘永兴 王强 阳彦雄 (87)

工业伺服系统振动抑制方法研究 苏加泉 (89)

嵌入式PLC在电气自动化中的实践应用研究 李盛福 (93)

基于系留气球的RFID定位系统研究 缪敏昌 (94)

超重力旋转床设计 王强 (96)

湿式离合器电磁阀颤振电流参数自动化标定 郭明林 汤浩 (97)

·工艺与装备·

内燃机车螺杆空压机油乳化问题分析 李军 靳春雷 刘刚 (100)

高温重载差曲率钢厂专用调心滚子轴承 李波 (102)

激光切割在钣金加工行业的应用与展望 姜秀丽 韩增颂 (104)

动车组转向架融冰除雪方法的探讨 高菲 于增源 (105)

内环凸轮滚柱接触面磨削高度超差原因分析及优化

..... 黄云前 李书法 李建 许春东 (107)

海洋平台节点处焊缝过近的常规处理方法 田建锋 (109)

数控平旋盘在大口径数控管螺纹机床上的应用与研究 王帅 温华栋 金明刚 (112)

游览车平台化浅析 袁文 朱乐军 徐志刚 (114)

对转炉煤气柜内钢结构的腐蚀原因探讨 邹晓超 (117)

激光加工技术在汽轮机叶片制造中的应用 敦祥 (118)

机械齿轮故障机理以及特性分析 陈金平 (120)

航天机电产品装配及调试技术要点分析 褚慧航 丁美丽 陶涛 朱秋萍 伏宜永 (121)

航空机体轴承技术特点浅析	刘烨欣 (124)
简易升降机电气控制系统安全隐患分析与改进	张 垒 (125)
环卫车薄板焊接变形分析与控制	陈 欢 (127)
电力系统中高压配电柜调试规程分析	杨宏弢 (129)
风冷式中央空调冷水机组故障处理分析	戴 非 (130)
陶瓷过滤机排液装置的结构分析	龚 静 (132)
三例起重机械检验案例分析与研究	李 伟 (134)
激光焊接设备进行焊接测试的平台机构	顾祖斌 (135)
浅谈半硬橡胶衬里在设备上的应用	邵凯峰 (137)
海上风车安装船桩靴建造工艺优化	朱 畔 (139)
脱氢反应器的制造	王 薇 (142)
数字化制造技术在模具设计与制造中的应用	黄仕银 (144)
材料成型及控制工程模具制造技术探究	张 驰 陈继兵 (146)
高线厂精轧机组常见事故原因及解决方案	张京磊 严 涛 胡跃强 (148)
冷轧产品表面质量攻关实践	商存亮 (149)
铁道车辆电气设备的预防性维修	卢弘博 (151)
机械设备装配精度的影响因素和控制措施分析	李文彬 (152)
家用空调器冷媒噪声成因及改善方法	刘 帅 (154)
餐厨加厨余垃圾预处理设备流水线设计	刘文洲 (155)
垃圾焚烧炉的发展趋势	屠振岳 (157)
铜冶炼烟气中单质硫对制酸系统的危害以及应对措施	李世东 (158)
数控机床电气故障的诊断方法探讨	杨 南 (160)
智能家居门锁技术综述	陶 娟 (162)
数控编程与加工工艺的关系	姜东全 郝双双 (165)
海上油田天然气压缩机选型设计及应用	焦国语 (166)
先进制造技术及其在电力设备制造工业中的应用	刘 威 (168)
镜面定位仪在折转光路光学系统中的应用研究	屈 亮 (170)
六西格玛在隔离锁质量改进中的应用	赵 静 (171)
基于ANSYS的推焦杆系统共振分析及改进措施	石荣翔 (176)
1030MW超超临界二次再热燃煤机组给水控制策略	杨伟山 (178)
· 自动化与控制 ·	
机械电气控制装置中PLC技术的实践研究	苏 超 容 烨 (181)
基于CAD/CAM的机械数控集成系统研究与应用	郭小燕 (182)
电气设备自动化控制中PLC技术的应用	王朝霞 (184)
一种基于PLC的高速智能分选控制系统的设计	沈炜杰 (185)
机电一体化系统中智能控制的应用探讨	陈名升 (187)
基于模糊控制的港口矿石混配控制优化与应用	李 峰 张 哲 (188)
探究自动化技术在煤矿机电设备中的应用	田 贺 (191)
六自由度工业机器人的机械手机电一体化设计	李俊雨 (193)
基于区块链技术的机器人路径规划应用研究	刘学文 (195)
· 行业交流 ·	
企业工艺规划内涵初探	王志萍 (197)
中职机制图教学的创新应用	王晓英 (198)
表面贴装技术的实践教学研究	李 嫚 (200)
基于线上学习平台的“1+X”混合式课堂教学模式研究 ——以《机械CAD-SolidWorks》课程为例	冯 婷 刘庆伦 李玉兰 刘 婷 (202)
浅谈海洋工程一体化建造的成本优势	丛日盛 (204)
一体化建造在海工项目中的应用	李丰亭 (206)
特殊条件下城市轨道车辆维修质量管理分析	李富盈 (209)
智能制造一体化加工单元实训基地模式研究	孙国勋 (210)
装备制造业精益化管理研究	陈 波 (213)
《机械制造基础》中关于刀具的几何参数的教改探索	倪国林 杨 莲 (215)
基于汽车服务商顾客满意度提升策略的研究	胡四莲 (217)
军事信息化对现代军事发展的影响研究	任亚忠 (218)
环保机械的发展现状及发展趋势展望	严 鑫 (220)
绿色崛起理念下江西特色新能源汽车产业链发展研究	李 鑫 翁世杰 姜元昊 (222)
高校创新创业导师队伍建设与提升研究	汪玉琪 (223)

Modern Manufacturing Technology And Equipment

Contents

· Design and research ·

Research on the Cutting Production System of Flexible Sawing Machine Based on the Structure of Variable Distance of Cam	(1)
The Design of a Portable Vehicle Testing Instrument	(4)
Automatic Watering Device for Household Plants	(7)
Research on Design and Optimization of Aircraft Passenger Door Production Line.....	(8)
Research on Selection and Technical Characteristics of Locomotive and Rolling Stock of Qinghai Tibet Railway	(13)
Design of a New Energy-saving and Environment-friendly Ship for Cleaning Water Surface Garbage	(15)
Study on the Structure Tree of Spare Parts on the Platform of Bullet Train	(18)
Research on Vehicle Angle Sensor Installation Mechanism Based on ADAMS	(20)
Effect of Load Variation on Ship Motion Response	(24)
Research on the Analysis Method of Cab Shaking of Heavy Truck	(27)
Research Status and Key Technical Problems of Mine Rescue Robot	(28)
Design and Strength Calculation of Car Frame for Heavy Load Freight Elevator	(30)
Innovative Application and Research of Reverse Design in Industrial Manufacturing.....	(33)
Scheme Design of Mechanical Transmission and Design of Combined Training Platform	(35)
Research on the Structural Design of Sheet Metal Parts under the Objective of Sheet Metal Process Optimization	(36)
On the Design of a Simple Heart Rate Measurement System for Treadmill	(38)
Development and Research of MES System Based on Automotive Airbag Production Line.....	(39)
Research Progress on Film Pressure of Water-Lubricated Bearings	(41)
System Desgin Four-Wheel-Drive Car Based on Zigbee Wireless Sensor Network	(44)
Research and Development of Rolling Forming Equipment for Fiberboard	(47)
An Experimental Study on Elastic Deformation Curve and Friction Coefficient of High carbon fiber Packing	(49)
Design of Air Flow System for Chemotherapy Drugs Automatic Compounding Machine	(51)
Based on MATLAB Six Axis Spraying Robot Motion Simulation Research	(53)
Optimization of Plant Scheduling System Based on Artificial Fish Swarm Algorithm	(58)
Research and Development of a New Type of Automatic Assembly Machine for Mechanism Components	(60)
Static Analysis of Uniform Tangential Force of Rotating Shaft Parts Based on ANSYS	(63)
Research on Intelligent Network Technology in Vehicle Test Safety of Test Field	(66)
Study on the Structure and Implementation Method of Intelligent Production System in Machine-picking Cotton Processing	(67)
Development Status and Prospect of Optical Fiber Sensing Industry	(70)
Improvement Design of Virtual Cutting Device of Handkerchief Paper Packaging Machine	(72)
A Magnetization Pyrolysis Treatment Station for Domestic Garbage	(74)
Requirements for Redundancy Design of Aeroengine Fuel and Control System	(77)
Study on Damage of Girder in Bridge Erection Machine	(79)
Research on Construction and Test Method of Fatigue Test System for Heavy Truck Cab Overturning Mechanism	(81)
Design of Intelligent and Efficient Multifunctional Clothes Drying Rack	(83)
Design and Research of an E-ring Fatigue Test Device	(87)
The Research on Vibration Suppression Method of Industrial Servo System	(89)
Research on the Application of Embedded PLC in Electrical Automation	(93)
Research on RFID Positioning System Based on Aerostat	(94)
Design of High Gravity Rotating Bed	(96)
Automatic Calibration of Dither Current Parameters for Wet Clutch Solenoid Valve	(97)
· Technology and Equipment ·	
Analysis on Oil Emulsification of Diesel Locomotive Screw Air Compressor	(100)
Special Self-aligning Roller Bearing for High Temperature and Heavy Load Differential Curvature Steel Works	(102)
Application and Prospect of Laser Cutting in Sheet Metal Processing Industry	(104)
Discussion on Ice Melting and Snow Removal Method of EMU Bogies	(105)
Cause Analysis and Optimization of Grinding Height Out of Tolerance of Inner Ring Cam Roller Contact Surface	(107)



Bimonthly

No.3,2020

Total Issue No.280

Published on March 2020

Sponsor: Shandong Machinery Design
And Research Institute
Shandong Mechanical Engineering Society

Publisher: The Periodical Office Of
Modern Manufacturing Technology
And Equipment

Editor: The Editorial Office Of
Modern Manufacturing Technology
And Equipment

Distributor: The advertising Office Of
Modern Manufacturing Technology
And Equipment

International Code: ISSN1673-5587

Domestic Code: CN37-1442/TH

Advertising Agent: Editorial Department of
Modern Manufacturing Technology and Equipment

**The Periodical Office Of
Modern Manufacturing Technology
And Equipment**

Add: 129 JiLuo Road, Jinan

Post Code: 250031

Tel: (0531) 85955168

(0531) 87116637

Http://www.sjji.cbpt.cnki.net

E-mail: sjx168@163.com

mmte@163.com

zzjsybz@163.com

zzjsybz@126.com

Conventional Processing Method for too Close Welds at Offshore Platform Nodes	(109)
Application and Research of NC Flat Rotating Disk in Large Diameter NC Pipe Thread Machine	(112)
On the Platform of Sightseeing Bus	(114)
Discussion on Corrosion of Steel Structure in Converter Gas Holder	(117)
Application of Laser Processing Technology in Turbine Blade Manufacturing	(118)
Analysis of the Fault Mechanism and Characteristic of Mechanical Gear	(120)
Analysis of Key Points of Assembly and Debugging Technology of Aerospace Mechanical and Electrical Products	(121)
Analysis of the Technical Characteristics of the Bearing of the Aircraft Body	(124)
Analysis and Improvement of the Hidden Danger of the Electric Control System of the Simple Elevator	(125)
Welding Deformation Analysis and Control of Thin Plate of Sanitation Vehicle	(127)
Analysis of Regulation of High Voltage Distribution Cabinet in Power System	(129)
Trouble Shooting Analysis of Air-cooled Central Air Conditioning Chiller	(130)
Structure Analysis of the Drainage Device of Ceramic Filter	(132)
Analysis and Research on Three Cases of Crane Inspection	(134)
Platform Mechanism of Laser Welding Equipment for Welding Test	(135)
Application of Semi-rigid Rubber Lining in Equipment	(137)
Optimization of Pile Shoe Construction Technology for Offshore Windmill Installation Vessel	(139)
Manufacture of Dehydrogenation Reactor	(142)
The Application of Digital Manufacturing Technology in Mold Design and Manufacturing	(144)
Research on Manufacturing Technology of Mould for Material Forming and Control Engineering	(146)
Malfunction Analysis and Precaution for High Speed Wire Rod Mill	(148)
Pazetice of Tackling Key Problems on Surface Quality of Cold Rolled Products	(149)
Preventive Maintenance of Electric Equipment of Railway Vehicles	(151)
Analysis of the Influence Factors and Control Measures of the Assembly Accuracy of Mechanical Equipment	(152)
Analysis on Improvement Methods of Refrigerant Noise in Domestic Air Conditioners	(154)
Design of Food and Kitchen Waste Pretreatment Equipment Assembly Line	(155)
Development Trend of MSW Incinerator	(157)
Study on Harm of Elemental Sulfur in Copper Smelting Flue Gas to Acid Making System and Countermeasures	(158)
The Discussion on the Diagnosis Method of Electrical Fault of CNC Machine Tools	(160)
Overview of the Intelligent Home Door Lock Technology	(162)
The Relationship Between NC Programming and Machining Technology	(165)
Selection Design and Application of Natural Gas Compressor in Offshore Oil Field	(166)
Advanced Manufacturing Technology and Its Application in Power Equipment Manufacturing Industry	(168)
Research on the Application of Mirror Interval Non-Contact Measurement in the Optical System of Reflective Light Path	(170)
The Application of Six Sigma in the Quality Improvement of Isolation Lock	(171)
Resonance Analysis and Improvement Measures of Pusher Bar System Based on ANSYS	(176)
Analysis of Feedwater Control Strategy for 1030MW Ultra Supercritical Reheat Unit	(178)
· Automation and Control ·	
Practical Research on PLC Technology in Mechanical and Electrical Control Device	(181)
Research and Application of Mechanical Numerical Control Integrated System Based on CAD/CAM	(182)
The Application of PLC Technology in the Automation Control of Electrical Equipment	(184)
Design of a High-speed Intelligent Separation Control System Based on PLC	(185)
Application of Intelligent Control in Mechatronics System	(187)
Optimization and Application of Ore Mixing Control in Port Based on Fuzzy Control	(188)
Explore the Application of Automation Technology in Mechanical and Electrical Equipment of Coal Mine	(191)
Mechanical, Mobile and Electrical Integration Design of Six Degree of Freedom Industrial Robot	(193)
Research on Robot Path Planning Based on Blockchain Technology	(195)
· Industry exchange ·	
Research on Conception of Enterprise Manufacturing Technology Planning	(197)
Innovative Application of Mechanical Drawing Teaching in Secondary Vocational School	(198)
Practical Teaching Research at Surface-mount Technology	(200)
Research on "1+X" Hybrid Classroom Teaching Mode Based on Online Learning Platform	(202)
Modular Construction Design of Offshore Engineering Based on Cost Analysis	(204)
Application of Integrated Construction in Offshore Projects	(206)
Analysis on Repair Quality Management for Urban Rail Transit Vehicle Base on Special Situation	(209)
Research on Training Base Model of Intelligent Manufacturing Integrated Processing Unit	(210)
Research on Lean Management of Equipment Manufacturing Industry	(213)
Exploration in the Teaching Reform of Cutting Tools' Geometric Parameters in Foundation of Mechanical Manufacturing Course	(215)
Research on the Strategy of Improving Customer Satisfaction of Automobile Service Providers	(217)
Research on the Influence of Military Informatization on Modern Military Development	(218)
Development Status and Trend of Environmental Protection Machinery	(220)
Research on Development of New Energy Vehicle Industry Chain with Jiangxi Characteristics under the Concept of Green Rise	(222)
Research on the Construction and Promotion of Innovation and Entrepreneurship Tutor Team in Colleges and Universities	(223)