

《中文核心期刊要目总览》收录
i Compendex(核心版)收录
百种中国杰出学术期刊
CCSE中国权威学术期刊

2017. 5
第 33 卷 VOL. 33



ISSN 1002-6819
CN 11-2047/S
CODEN NGOXEO

农业工程学报

TRANSACTIONS OF THE CHINESE SOCIETY
OF AGRICULTURAL ENGINEERING NONGYE
GONGCHENG XUEBAO



ISSN 1002-6819



9 771002 681177



中国农业工程学会 主办

万方数据

农业工程学报

2017 年 3 月第 5 期 总第 308 期 (第 33 卷)

目次

· 综合研究 · 关键技术 ·

CMJY-1500 型农田残膜捡拾打包联合作业机设计与试验

赵岩, 郑炫, 陈学庚, 牛琪, 纪超, 周敦兴 (1)

水稻精量穴直播机开沟装置的设计与试验 张明华, 王在满, 罗锡文, 杨文武, 戴亿政, 王宝龙 (10)

农业现代化过程中基础设施工程化路径与方法 齐飞, 周新群, 吴政文, 张学军 (16)

· 农业装备工程与机械化 ·

液压驱动下肢助力外骨骼机器人膝关节结构设计及试验 靳兴来, 朱世强, 张学群, 朱笑丛, 潘忠强 (26)

仿旗鱼头部曲线型开沟器设计与性能试验 赵淑红, 刘宏俊, 谭贺文, 曹秀振, 张先民, 杨悦乾 (32)

秸秆深埋还田开沟灭茬机设计与试验 王瑞丽, 杨鹏, Rabiul Falah Jahun, 窦森 (40)

虎杖根系脱土滑梳式辊指的设计与试验 陈学深, 马旭, 武涛, 曾令超, 李康毓, 陈林涛 (48)

天牛仿生大麻收割机切割刀片设计与试验 田昆鹏, 李显旺, 沈成, 张彬, 黄继承, 王锦国, 周杨 (56)

玉米种子仿生脱粒机性能试验与参数优化 李心平, 马磊, 耿令新, 王升升, 庞靖, 姬江涛 (62)

牛鲨牙齿微观结构组成和摩擦磨损特性 委凯琪, 佟金, 张东光, 庄健, 马云海 (70)

果园货运链索风致振动非线性动力学分析 李君, 薛坤鹏, 杨洲, 洪添胜, 张倩倩, 许坚聪 (75)

基于电液悬挂系统的拖拉机主动减振控制 承鉴, 迟瑞娟, 赖青青, 杨悦静, 毛恩荣 (82)

· 农业水利工程 ·

基于变水位静水法的梯形渠道渗漏强度函数构建及验证 柴春岭, 苏艳娜, 杨路华, 刘宏权 (91)

NaCl 及生物降解活性剂对曝气灌溉水氧传输特性的影响

雷宏军, 刘欢, 张振华, Bhattarai Surya, Balsys Ron (96)

西南地区综合干旱监测模型构建与验证 张建平, 刘宗元, 王靖, 何永坤, 罗红霞 (102)

基于地面红外检测系统验证的灌区地表温度遥感反演 蔡甲冰, 白亮亮, 许迪, 李益农, 刘钰 (108)

秸秆排水体埋深对盐渍土水盐分布的影响及排水抑盐效果 陆培榕, 张展羽, 冯根祥, 万长宇, 史棚帆 (115)

旱涝交替下控制灌溉对稻田节水及氮磷减排的影响 高世凯, 俞双恩, 王梅, 曹睿哲, 郭蓉 (122)

覆黑地膜对旱作玉米根区土壤温湿度和光合特性的影响 路海东, 薛吉全, 郭东伟, 郝引川, 陈鹏飞 (129)

柠条锦鸡儿细根表面积密度对土壤水分空间分布的响应

高玉寒, 姚云峰, 郭月峰, 赵文昊, 温健, 杨阳, 祁伟 (136)

新疆艾比湖绿洲潜在蒸散量年代际变化特征 谭娇, 丁建丽, 董煜, 杨爱霞, 张喆 (143)

高分子多肽衍生物防治风蚀的风洞试验 李元元, 王占礼 (149)

· 农业信息与电气技术 ·

基于波段比模型的地形调节植被指数组合算法构建与验证 江 洪，何国金，黄海明，曹小杰，汪小钦，张兆明（156）

基于 AdaBoost 模型和 mRMR 算法的小麦白粉病遥感监测 马慧琴，黄文江，景元书，董莹莹，张竞成，聂臣巍，唐翠翠，赵晋陵，黄林生（162）

基于高光谱的春玉米大斑病害遥感监测指数选择 王利民，刘 佳，邵 杰，杨福刚，高建孟（170）

基于高光谱的油麦菜叶片水分 CARS-ABC-SVR 预测模型 孙 俊，丛孙丽，毛罕平，武小红，张晓东，汪 沛（178）

四端子电极提高根系生物量电容法估测的有效性 张 正，刘国彬，李 强（185）

· 农业生物环境与能源工程 ·

温室设计必要通风量估算方法的确定及参数取值分析 王 莉，周长吉（190）

夏热冬暖地区阳台壁挂式平板型太阳能热水器水量配比优化 魏生贤，胡粉娥，杨慧敏（199）

太阳能加温和沼液回用沼气工程的生态效益评价 吴树彪，刘莉莉，刘 武，陈 理，董仁杰（205）

猪粪堆肥挥发性有机物的产生规律与影响因素 沈玉君，孟海波，张明月，赵立欣，周海宾，侯月卿（211）

基于动特性分析法的海上养殖平台多点系泊系统设计 王绍敏，刘海阳，郭根喜，陶启友，黄小华，胡 昱（217）

基于物联网的肉鸡可追溯与监管平台设计与应用 陈长喜，许晓华（224）

基于图像纹理特征的养殖鱼群摄食活动强度评估 陈彩文，杜永贵，周 超，孙传恒（232）

· 土地整理工程 ·

中国东北多煤层老矿区采煤沉陷地损毁特征与复垦规划 胡振琪，龙精华，张瑞娅，肖 武，赵艳玲（238）

产权认知及外部环境对农户土地流转行为影响模型分析 高 佳，宋 戈（248）

基于土壤肥力的江苏省耕作层土壤剥离分区与深度确定 王君櫛，刘 斌，周生路，徐翠兰，隋雪艳，朱 雁，王炳君（257）

· 农产品加工工程 ·

大豆籽粒的化学-力学特性灰色关联度及本构模拟 张 涛，张锋伟，孙 伟，孙步功，王 婷，吴建民（264）

筒仓动态卸料过程侧压力模拟与验证 张大英，许启铿，王树明，梁醒培（272）

胶乳分离机高速转鼓流体动力学特性 薛晓宁，石 凯（279）

基于机器视觉的马铃薯黑心病检测机构设计与试验 田 芳，彭彦昆，魏文松，郑晓春，王文秀（287）

黑穗醋栗果实超声波降解多糖的结构及抗糖基化活性 徐雅琴，刘 菲，郭莹莹，陈宏超，王丽波，杨 昱（295）

金线鱼鱼皮抗冻蛋白酶法制备工艺优化 张 怡，吴 珊，傅维擎，黄灿灿，曾红亮，郑宝东（301）

· 争鸣与讨论 ·

土地整治工作中生态建设问题及发展建议 王 军，钟莉娜（308）

Transactions
of the Chinese Society of Agricultural Engineering
Vol.33 No.5 Mar. 2017
CONTENTS

• Comprehensive Research • Key Technology •

Design and test of CMJY-1500 type plastic film residue collecting and balling machine
.....*Zhao Yan, Zheng Xuan, Chen Xuegeng, Niu Qi, Ji Chao, Zhou Dunxing* (1)

Design and experiment of furrowing device of precision hill-drop drilling machine for rice
.....*Zhang Minghua, Wang Zaiman, Luo Xiwen, Yang Wenwu, Dai Yizheng, Wang Baolong* (10)

Approaches and methods of infrastructure engineering during agricultural modernization
.....*Qi Fei, Zhou Xinqun, Wu Zhengwen, Zhang Xuejun* (16)

• Agricultural Equipment Engineering and Mechanization •

Structure design and experiment of knee joint of hydraulic driven lower-limb power-assistance exoskeleton robot
.....*Jin Xinglai, Zhu Shiqiang, Zhang Xuequn, Zhu Xiaocong, Pan Zhongqiang* (26)

Design and performance experiment of opener based on bionic sailfish head curve
.....*Zhao Shuhong, Liu Hongjun, Tan Hewen, Cao Xiuzhen, Zhang Xianmin, Yang Yueqian* (32)

Design and experiment of combine machine for deep furrowing, stubble chopping, returning and burying of chopped straw
.....*Wang Ruili, Yang Peng, Rabiou Falalu Jahun, Dou Sen* (40)

Design and experiment of slide-combing roller finger for *Polygonum cuspidatum* root-soil separation
.....*Chen Xueshen, Ma Xu, Wu Tao, Zeng Lingchao, Li Kangyu, Chen Lintao* (48)

Design and test of cutting blade of cannabis harvester based on longicorn bionic principle
.....*Tian Kunpeng, Li Xianwang, Shen Cheng, Zhang Bin, Huang Jicheng, Wang Jinguo, Zhou Yang* (56)

Performance test and parameter optimization of corn seed bionic thresher

.....	<i>Li Xinping, Ma Lei, Geng Lingxin, Wang Shengsheng, Pang Jing, Ji Jiangtao</i>	(62)
Micro-structure composition and behavior of friction and wear for bull shark teeth		
.....	<i>Wei Kaiqi, Tong Jin, Zhang Dongguang, Zhuang Jian, Ma Yunhai</i>	(70)
Nonlinear dynamics analysis for wind-induced vibration of orchard chain ropeway system		
.....	<i>Li Jun, Xue Kunpeng, Yang Zhou, Hong Tiansheng, Zhang Qianqian, Xu Jiancong</i>	(75)
Active vibration control of tractor based on electro-hydraulic hitch system		
.....	<i>Cheng Jian, Chi Ruijuan, Lai Qingqing, Yang Yuejing, Mao Enrong</i>	(82)
• Soil and Water Engineering •		
Seepage rate function establishment and validation for trapezoidal canal based on dropping head ponding test		
.....	<i>Chai Chunling, Su Yanna, Yang Luhua, Liu Hongquan</i>	(91)
Impact of NaCl and biodegradable surfactant on water and oxygen transmission under aerated irrigation		
.....	<i>Lei Hongjun, Liu Huan, Zhang Zhenhua, Bhattarai Surya, Balsys Ron</i>	(96)
Construction and validation of comprehensive drought monitoring model in Southwest China		
.....	<i>Zhang Jianping, Liu Zongyuan, Wang Jing, He Yongkun, Luo Hongxia</i>	(102)
Remote sensing inversion of land surface temperature based on validation by observed infrared temperature in situ		
.....	<i>Cai Jiabing, Bai Liangliang, Xu Di, Li Yinong, Liu Yu</i>	(108)
Effect of straw draining piece depth in soil on water-salt distribution in saline soil and its drainage-salt inhibiting performance ...		
.....	<i>Lu Peirong, Zhang Zhanyu, Feng Genxiang, Wan Changyu, Shi Xufan</i>	(115)
Effect of controlled irrigation and drainage on saving water and reducing nitrogen and phosphorus loss in paddy field under alternate drought and flooding condition		
.....	<i>Gao Shikai, Yu Shuang'en, Wang Mei, Cao Ruizhe, Guo Rong</i>	(122)
Effects of black plastic film mulching on soil temperature and humidity in root zone and photosynthetic characteristics of rainfed maize		
.....	<i>Lu Haidong, Xue Jiquan, Guo Dongwei, Hao Yinchuan, Chen Pengfei</i>	(129)
Response of <i>Caragana microphylla</i> fine root surface area density to spatial distribution of soil moisture		
.....	<i>Gao Yuhan, Yao Yunfeng, Guo Yuefeng, Zhao Wenhao, Wen Jian, Yang Yang, Qi Wei</i>	(136)
Decadal variation of potential evapotranspiration in Ebinur Lake oasis of Xinjiang		
.....	<i>Tan Jiao, Ding Jianli, Dong Yu, Yang Aixia, Zhang Zhe</i>	(143)

Wind tunnel experiment on polypeptide derivatives in controlling wind erosion.....	<i>Li Yuanyuan, Wang Zhanli</i> (149)
--	---------------------------------------

• **Agricultural Information and Electrical Technologies** •

Construction and validation of combination model of topography-adjusted vegetation index based on band-ratio model	<i>Jiang Hong, He Guojin, Huang Haiming, Cao Xiaojie, Wang Xiaoqin, Zhang Zhaoming</i> (156)
Remote sensing monitoring of wheat powdery mildew based on AdaBoost model combining mRMR algorithm	<i>Ma Huiqin, Huang Wenjiang, Jing Yuanshu, Dong Yingying, Zhang Jingcheng, Nie Chenwei, Tang Cuicui, Zhao Jinling, Huang Linsheng</i> (162)
Remote sensing index selection of leaf blight disease in spring maize based on hyperspectral data	<i>Wang Limin, Liu Jia, Shao Jie, Yang Fugang, Gao Jianmeng</i> (170)
CARS-ABC-SVR model for predicting leaf moisture of leaf-used lettuce based on hyperspectral	<i>Sun Jun, Cong Sunli, Mao Hanping, Wu Xiaohong, Zhang Xiaodong, Wang Pei</i> (178)
Four-terminal configuration enhancing estimation efficiency of root biomass by electrical capacitance method	<i>Zhang Zheng, Liu Guobin, Li Qiang</i> (185)

• **Agricultural Bioenvironmental and Energy Engineering** •

Determination of calculated method for necessary ventilation rate and its determination analysis of parameter value	<i>Wang Li, Zhou Changji</i> (190)
Optimization of tank-volume-to-collector-area ratio for balcony wall-mounted flat-plate solar water heater in hot summer and warm winter region of China	<i>Wei Shengxian, Hu Fene, Yang Huimin</i> (199)
Ecological effect evaluation of biogas project integrated with solar-ground source heat pump system and slurry recirculation	<i>Wu Shubiao, Liu Lili, Liu Wu, Chen Li, Dong Renjie</i> (205)
Generation law and influencing factors of volatile organic compounds during pig manure composting	<i>Shen Yujun, Meng Haibo, Zhang Pengyue, Zhao Lixin, Zhou Haibin, Hou Yueqing</i> (211)
Design of multi-point mooring system for offshore aquaculture platform based on dynamic analysis	<i>Wang Shaomin, Liu Haiyang, Guo Genxi, Tao Qiyou, Huang Xiaohua, Hu Yu</i> (217)

Design and application of traceability and supervision platform for broiler based on Internet of Things
.....Chen Changxi, Xu Xiaohua (224)

Evaluation of feeding activity of shoal based on image texture
.....Chen Caiwen, Du Yonggui, Zhou Chao, Sun Chuanheng (232)

• Land Consolidation and Rehabilitation Engineering •

Damage characteristics and reclamation planning for coal-mining subsidence in old multiple seam mining area in northeast China
.....Hu Zhenqi, Long Jinghua, Zhang Ruiya, Xiao Wu, Zhao Yanling (238)

Modeling analysis on influence of property cognition and external environment on land transfer behavior of farmer
.....Gao Jia, Song Ge (248)

Determination of peel depth and partition in cultivated soil of Jiangsu Province
.....Wang Junxiao, Liu Bin, Zhou Shenglu, Xu Cuilan, Sui Xueyan, Zhu Yan, Wang Bingjun (257)

• Agricultural Produce Processing Engineering •

Gray relation degree and constitutive modeling of chemo-mechanical properties for soybean seed
.....Zhang Tao, Zhang Fengwei, Sun Wei, Sun Bugong, Wang Ting, Wu Jianmin (264)

Simulation and experimental validation of silo wall pressure during discharging
.....Zhang Daying, Xu Qikeng, Wang Shuming, Liang Xingpei (272)

Fluid dynamics characteristic of high-speed drum for latex separatorXue Xiaoning, Shi Kai (279)

Design and experiment of detection mechanism for potato blackheart based on machine vision
.....Tian Fang, Peng Yankun, Wei Wensong, Zheng Xiaochun, Wang Wenxiu (287)

Structure and antiglycation activity of polysaccharides after ultrasonic degradation from blackcurrant fruit
.....Xu Yaqin, Liu Fei, Guo Yingying, Chen Hongchao, Wang Libo, Yang Yu (295)

Optimization of preparation of antifreeze proteins of fish skin from *Nemipterus virgatus* by using protease
.....Zhang Yi, Wu Shan, Fu Weiqing, Huang Cancan, Zeng Hongliang, Zheng Baodong (301)

• Contention and Discussion •

Problems and suggestion for developing ecological construction in land management work..... Wang Jun, Zhong Lina (308)

张大英, 等. 筒仓动态卸料过程侧压力模拟与验证 (图5)
Zhang Daying, et al. Simulation and experimental validation of silo wall pressure during discharging (Figure 5)

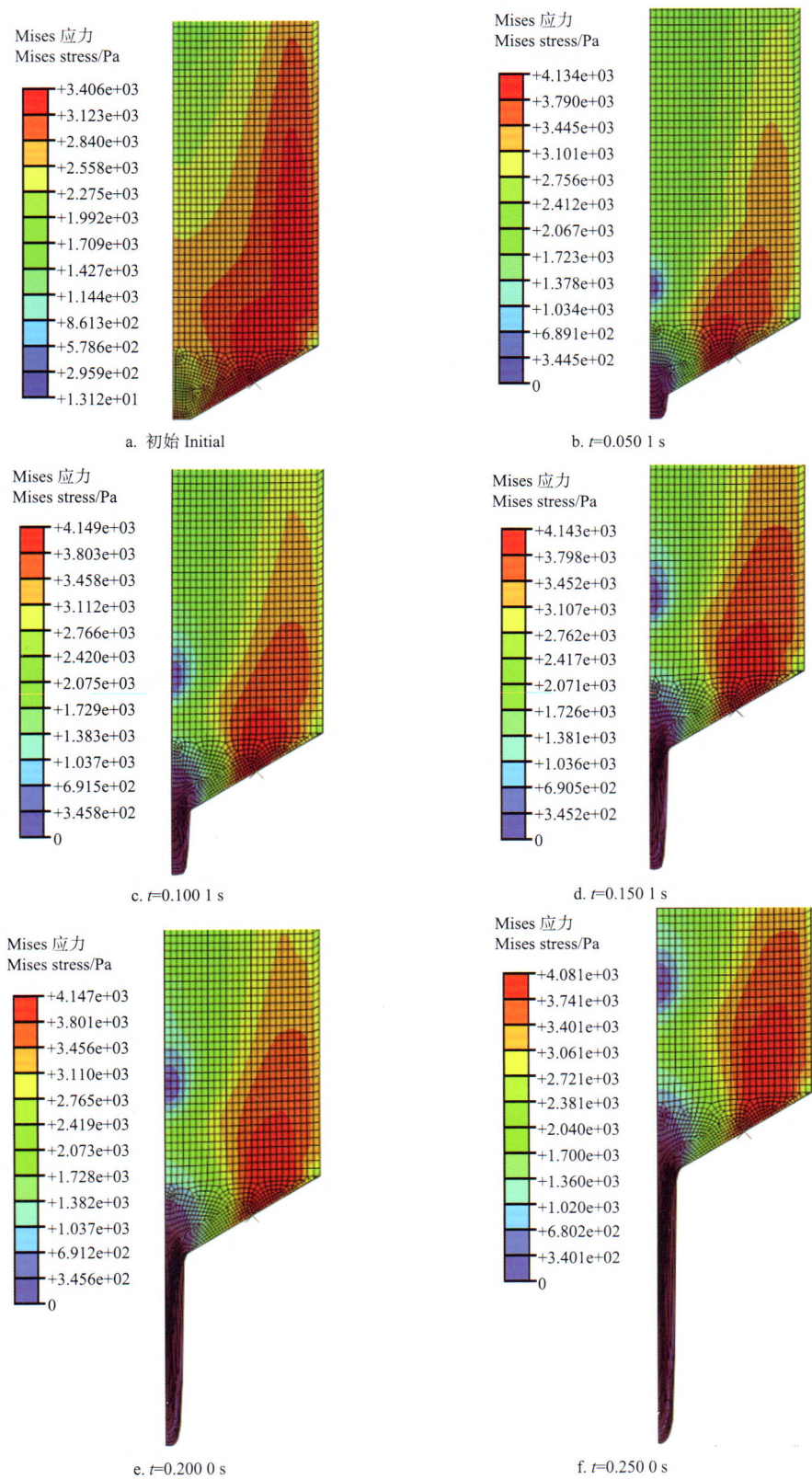


图5 筒仓卸料不同时刻物料单元的网格变形及应力分布
Fig.5 Mesh deformation and stress distribution during discharging of silo