„Kierunki badań naukowych w technologii robót budowlanych”

Google Scholar

Znaczące publikacje od 2020 roku

Słowa kluczowe:

- construction methods and equipment
- formwork layout
- crane planning
- precast erection
- earth moving optimization
- automation in construction

Automatyzacja

- Xiao B., Chen C. Xianfei Yin X.: Recent Advancements of Robotics in Construction, Automation in Construction, 2022
- Delgado J.M.D.D., Oyedele L.: Robotics in Construction: A Critical Review of the Reinforcement Learning and Imitation Learning Paradigms, Advanced Engineering Informatics, 2022
- Pradhananga P., ElZomor M., Kasabdji G. S.: Identifying the Challenges to Adopting Robotics in the US Construction Industry. Journal of Construction Engineering and Management, 2021
- Masri A.A., da Costa B.B.F., Vasco D., Boer D., Haddad A.N., Najjar M.K.: Roles of Robotics in Architectural and Engineering Construction Industries: Review and Future Trends. Journal Building Design and Environment, 2024
- Xu Z., Song T., Guo S. et al.: Robotics Technologies Aided for 3D Printing in Construction: a Review, International Journal of Advance Manufacturing Technology, 2022


budimex


GreenBuild


建模机器人可以实现全房型高精度空间感知和拼接

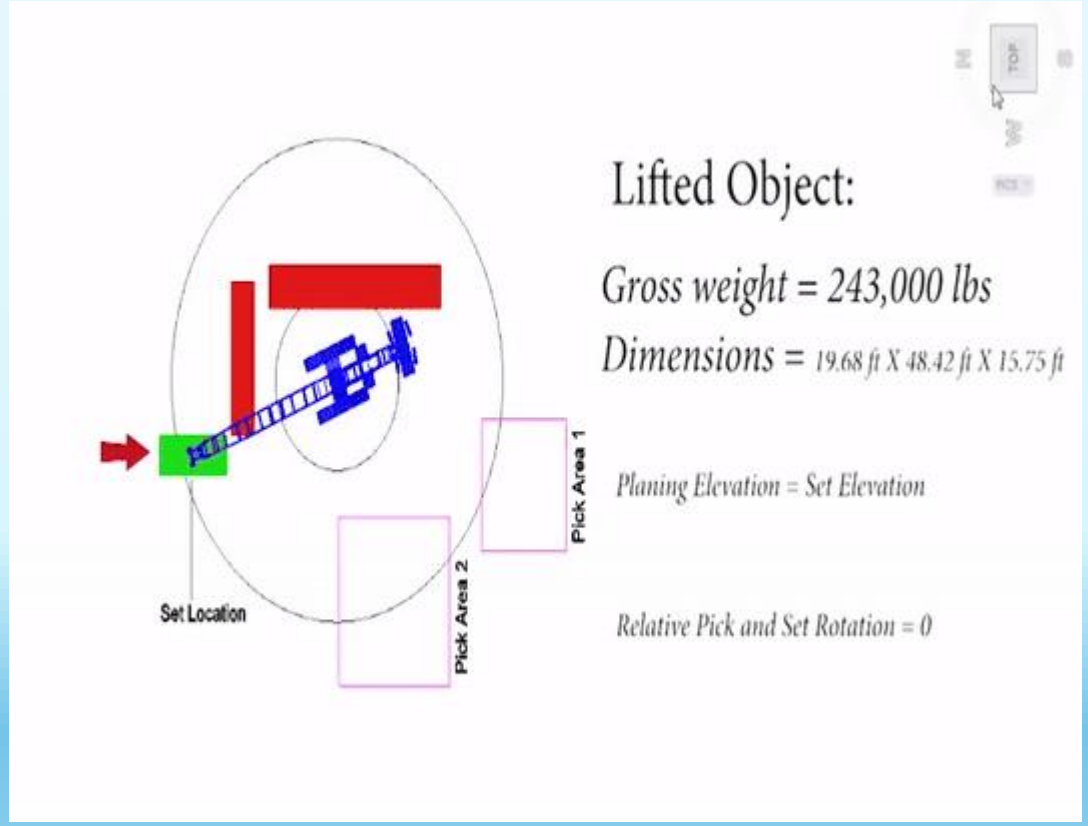
Planowanie deskowań

- Lee B., Choi H, Min B., Lee D.-E.: Applicability of Formwork Automation Design Software for Aluminum Formwork. Applied Sciences, 2020
- Mei Z., Xu M., Wu P., Wang J., Tan Y.: BIM-Based Framework for Formwork Planning Considering Potential Reuse. Journal of Management in Engineering, 2022
- Baskova R., Tazikova A., Strukova Z., Kozlovska M., Cabala J. A Dynamic Model for Effective and Optimal Planning of Formwork in Construction Projects. Buildings. 2023
- Pham V.-H., Chen P.-H., Nguyen Q., Duong D.-T.: BIM-Based Automatic Extraction of Daily Concrete and Formwork Requirements for Site Work Planning, Buildings, 2024
- Allam A., Elbeltagi E., Abouelsaad M. N., El Madawy M. E.: Integrated BIM-GA Approach for Slab formwork Design Optimization. Construction Innovation: Information Process Management, 2024
- Mizushima Y. , Inoue H., Morikawa S., Shojiro Taira S.: Optimization of Formworks Shoring Location as a Continuous Optimization Problem. Structures, 2023
- Vansya M. L. D., Kuncaravita S. A., Bustamin M. O., Sujatmiko B., Zuraidah S., Nugroho W. A.: Cost Optimization of Formwork Using Value Engineering. Techniques in Building Projects. Journal of Advanced Industrial Technology and Application, 2024

Żurawie

- Zhang Z., Pan W., Pan M.: Critical Considerations on Tower Crane Layout Planning for High-rise Modular Integrated Construction. Engineering, Construction and Architectural Management, 2022
- Zhang Z., Pan W.: Multi-criteria Decision Analysis for Tower Crane Layout Planning in High-rise Modular Integrated construction, Automation in Construction, 2021
- Kayhani N., Taghaddos H., Mousaei A., Behzadipour S., Hermann U.: Heavy Mobile Crane Lift Path Planning in congested modular industrial plants using a robotics approach, Automation in Construction, 2021,
- Khodabandelu A., Park J.W., Arteaga C.: Improving Multitower Crane Layout Planning by Leveraging Operational Flexibility Related to Motion Paths. Journal of Management in Engineering, 2023
- Wang R.D., Zayed T., Eltoukhy A.E.E., Wu H.: Integrated Planning Approach for Optimizing Tower Crane and Truck Locations in Modular Integrated Construction. Journal of Construction Engineering and Management, 2024.
- El-Tourkey M., Alshibani A., Mohammed A., Shash A., Firas Tuffaha F.: An Integrated Decision Support System for Mobile Crane Selection. Expert Systems with Applications, 2022,

Heavy Mobile Crane Lift Path Planning in congested modular industrial plants using a robotics approach



Montaż elementów prefabrykowanych

- Yan Xu, Yi Luo, Jian Zhang, Laser-scan based Pose Monitoring for Guiding Erection of Precast Concrete Bridge Piers. Automation in Construction, 2022
- Reichenbach S., Kromoser B.: State of Practice of Automation in Precast Concrete Production. Journal of Building Engineering, 2021
- Chang R., Zhang N., Gu Q.: A Review on Mechanical and Structural Performances of Precast Concrete Buildings. Buildings, 2023
- Ma Z., Liu Y., Li J.: Review on Automated Quality Inspection of Precast Concrete Components. Automation in Construction, 2023,
- Syed A., Sonparote R.: A Review of Precast Concrete Pavement Technology. The Baltic Journal of Road and Bridge Engineering, 2020

MOD21

GOLDBECK

Maszyny budowlane

- Zhang F., Ju Y., Ernesto D.R. Santibanez Gonzale E., Aihua Wang A.: SNA-based Multi-criteria Evaluation of Multiple Construction Equipment: A Case Study of Loaders Selection. Advanced Engineering Informatics, 2020
- Asadi S.S., Kowshik K., Asadi S.Pasadi S.S., Alla S.: Strategical Construction Equipment Management using Henry Garret Method, Materials Today: Proceedings, 2021
- Alshboul O., Shehadeh A., Tatari O., Almasabha G., Saleh E.: Multiobjective and Multivariable Optimization for Earthmoving Equipment. Journal of Facilities Management, 2024
- Patcharachavalit N., Limsawasd C., Athigakunagorn N.: Multiobjective Optimization for Improving Sustainable Equipment Options in Road Construction Projects. Journal of Construction Engineering and Management, 2020
- Boyko N., Lukash O.: Methodology for Estimating the Cost of Construction Equipment Based on the Analysis of Important Characteristics Using Machine Learning Methods. Journal of Engineering, 2023,

Maszyny budowlane

- Wu B., Wang W., Yao Z., Xuan K., Wu Z., Shen X., Li X., Zhang H., Xue Y., Cao X., Hao X., Zhou Q.: Multi-Pollutant Emission Characteristics of Non-Road Construction Equipment Based on Real-World Measurement. Science of The Total Environment, 2022
- Masoud Masih-Tehrani, Salman Ebrahimi-Nejad, Masoud Dahmardeh, Combined Fuel Consumption and Emission Optimization Model for Heavy Construction Equipment. Automation in Construction, 2020
- Xie Y., Fan H., Huang Z.: Comparative Analysis of Subsidy and Fee Policies for Construction Equipment Emissions Reduction. Journal of Cleaner Production, 2023
- Kantová R.: Evaluation of Construction Site Noise to Allow the Optimisation of Construction Processes and Construction Machinery Selection. Appl. Sci., 2021

Monitorowanie

- Zhang H., Yang Q., Liu Q., Zhou W., Jin Y., Wang H., Pang X.: Multi-Sensor Integrated Monitoring Equipment and its Application to Dynamic Compaction Quality in Construction. Automation in Construction, 2023
- Nakanishi Y., Kaneta T., Nishino S.: A Review of Monitoring Construction Equipment in Support of Construction Project Management. Frontiers in Built Environment, 2022
- Zhang H., Yang Q., Liu Q., Zhou W., Jin Y., Wang H., Pang X.: Multi-Sensor Integrated Monitoring Equipment and its Application to Dynamic Compaction Quality in Construction. Automation in Construction, 2023
- Rashid K. M., Louis J.: Automated Activity Identification for Construction Equipment Using Motion Data From Articulated Members. Frontiers in Built Environment, 2022
- Kim J., Chi S.: Multi-Camera Vision-based Productivity Monitoring of Earthmoving Operations. Automation in Construction, 2020
- Wu Y., Wang M., Liu, X., Wang Z., Ma T., Lu, Z., Liu, D., Xie, Y., Li, X., Wang,X.: Monitoring the Work Cycles of Earthmoving Excavators in Earthmoving Projects Using UAV Remote Sensing. Remote Sens. 2021
- Wang L., Li H., Wu H., Yao Y., Yu C.. Umer W., Han D., Ma J.: Monitoring Mental Fatigue of Construction Equipment Operators: A Smart Cushion–Based Method with Deep Learning Algorithms. Journal of Management in Engineering, 2024
- Kavaliauskas P., Fernandez J.B., McGuinness K., Jurelionis A.: Automation of Construction Progress Monitoring by Integrating 3D Point Cloud Data with an IFC-Based BIM Model. Buildings, 2022

Praktyczne, ważne, wymagające ...

1. Bezpieczeństwo wykonywania obiektów monolitycznych (termin rozformowania, właściwości świeżego betonu, wielopoziomowe podparcia stropów, rotacja deskowań)

2. Efekt uczenia się (Wright's Learning Model 1936)

Planowanie robót betonowych (przykład)

Dodatkowe zyski

Robocizna	WARIANT 1	WARIANT 2
Nakład jednoskowy	0,35 rg/m2	0,35 rg/m2
Kondygnacja 1	171 r-g	150 r-g
Kondygnacja 2	150 r-g	82 r-g
Kondygnacja 3	113 r-g	63 r-g
Kondygnacja 4	96 r-g	63 r-g
Kondygnacja 5	85 r-g	63 r-g
Kondygnacja 6	79 r-g	63 r-g
Kondygnacja 7	72 r-g	63 r-g
Kondygnacja 8	65 r-g	63 r-g
RAZEM	**830 r-g**	**610 r-g**
Nakład jednoskowy	30,00 zł/r-g	30,00 rg/m2
RAZEM	24 913 zł	18 313 zł
ROBOCIZNA MNIEJSZA O		**6 600 zł**

Wnioski

1. Problematyka TRB nie dominuje w żadnym z periodyków

2. Zróżnicowana tematyka: czynniki wpływające na efektywność procesów budowlanych,

   monitorowanie w czasie rzeczywistym maszyn i pracowników, redukcja CO_2,

   optymalizacja robót ziemnych, planowanie deskowań, ...

3. Bardzo zaawansowane metody i narzędzia

4. Duże zespoły badawcze

5. Wymagane kosztochłonne i długotrwałe badania terenowe

6. Często stare zagadnienia, nowe narzędzia. Istotny sposób rozwiązania a nie problem.

   Mniejsza rola inżyniera budowlanego

7. Duża liczba artykułów przeglądowych


DZIĘKUJĘ ZA
UWAGĘ