After creating the program for control of moves on all axis, the operator need just to introduce the distance on the three axis and the PLC will convert these on movements of steppe motors.

Conclusions

The paper highlights the utility and importance of PLCs in the control of the industrial processes, command the function over three axis through simple dates of distance between coordinators, in order not using CNC commands. This is done by programming the PLC ladder diagram language that makes movement on the three axes of the arm by means of stepper motors.

PLC programming has the advantage of creating artificial intelligence by implementing control algorithms in the software and the ability to perform movements based on data provided by the sensors imposed by the developed.

References:

1. T. R. Kurfess, 2005 Robotics and automation handbook, CRC Press, Washington D.C.

2. Barz C., Oprea C., Erdei Z., Pop V. A., Petrovan F., The control of an industrial process with PLC, International Conference on Applied and Theoretical Electricity, pp. 1-4, Craiova, ICATE, DOI 10.1109/ICATE.2014.6972663, 2014.

3. Barz C., Latinovic, T., Deaconu, S., Preradovic, DM., Pop P.P., Pop-Vadean A., Using Moeller PLC in automation of an artesian fountains, International Conference on Applied Sciences (ICAS2016) 25–27 May 2016, Hunedoara, Romania, IOP Conf. Series: Materials Science and Engineering 163 (2017) 012052, pp 1-12 doi:10.1088/1757-899X/163/1/012052.

4. Barz, C., Chiver, O., Zoltan, E., Horgos, M., Preradovic, D, Automation with MFD Titan for Lighting Control, Proceedings of the 2016 International Conference and Exposition on Electrical and Power Engineering (EPE), Iasi, ROMANIA OCT 20-22, 2016, Pages: 466-471, ISBN:978-1-5090-6128-0. 5.www.siemens.com

GREEN LIVING ROOF SIMULATION MODEL REVIEW

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Integration of nature, live, organic materials, in the design of built areas and building structure is an architectural response to environmental problems of dense urban areas. At the site where green space is limited, greening the building envelope is the solution for the issues such as heat waves, flooding, and noise and air pollution. The benefits could be predicted only using accurate simulation model of this

technology. The energy balance of green living roof was researched through models developed over the years by various authors. Most models have been developed and validated with data from extensive roofs and more than 50% of the models were validated using data from warm temperate climatic zones. Ability to determine the impact of green living roofs at different stages of their architectural design process is of most importance if the incorporation this technology is planned due to the impact on building and urban level.

References:

1. Chaoqiang J., Xuelian B., Te L., Min Z., Effects of green roofs' variations on the regional thermal environment using measurements and simulations in Chongqing, China, Urban Forestry & Urban Greening 29, 2018, pp. 223–237

2. Berardi, U., Ghaffarian, H. A., A Comprehensive Analysis of the Environmental Benefits of Green Roofs, Applied Energy, 115 (2014), Feb., pp. 411-428

3. Castleton, H.F., et al., Green Roofs; Building Energy Savings and the Potential for Retrofit, Energy Building, 42 (2010), pp. 1582–1591

4. Takebayashi H, Moriyama M. Surface heat budget on the green roof and high reflection roof for mitigation of urban heat island. Build Environ 2007;42(8):2971–9

5. Tabares-Velasco PC, Griffith B. Diagnostic test cases for verifying surface heat transfer algorithms and boundary conditions in building energy simulation programs. J Build Perform Simul 2012;5(5):329–46

6. Tabares-Velasco PC, Srebric J. Experimental quantification of heat and mass transfer process through vegetated roof samples in a new laboratory setup. Int J Heat Mass Transf 2011;54(25):5149–62

7. Moody SS, Sailor DJ. Development and application of a building energy performance metric for green roof systems. Energy Build 2013;60(Supplement C):262–9

8. Sailor DJ, Elley TB, Gibson M. Exploring the building energy impacts of green roof design decisions – a modelling study of buildings in four distinct climates. J Build Phys 2011;35(4):372–91

9. Herrera J, et al. A model for simulating the performance and irrigation of green stormwater facilities at residential scales in semiarid and Mediterranean regions. Environ Modell Software 2017;95:246–57

10. Djedjig R, et al. Development and validation of a coupled heat and mass transfer model for green roofs. Int Commun Heat Mass Transfer 2012;39(6):752–61

11. Sandoval V, et al. Porous media characterization to simulate water and heat transport through green roof substrates. Vadose Zone J 2017:16(4)

12. Alexandri E, Jones P. Developing a one-dimensional heat and mass transfer algorithm for describing the effect of green roofs on the built environment: comparison with experimental results. Build Environ 2007;42(8):2835–49

13. He H, Jim CY. Simulation of thermodynamic transmission in green roof ecosystem. Ecol Model 2010;221(24):2949–58

14. Sailor DJ. A green roof model for building energy simulation programs. Energy Build 2008;40(8):1466–78

15. Ouldboukhitine SE, et al. Assessment of green roof thermal behavior: a coupled heat and mass transfer model. Build Environ 2011;46(12):2624–31

16. Heidarinejad G, Esmaili A. Numerical simulation of the dual effect of green roof thermal performance. Energy Convers Manage 2015;106(Supplement C):1418–25

17. Decruz A. Development and integration of a green roof model within whole building energy simulation. Ph.D. Thesis. Nottingham, UK: University of Nottingham; 2016

18. Rakotondramiarana H, Ranaivoarisoa T, Morau D. Dynamic simulation of the green roofs impact on building energy performance, case study of Antananarivo, Madagascar. Buildings 2015;5(2):497

19. Munck CS, et al. The GREENROOF module (v7.3) for modelling green roof hydrological and energetic performances within TEB. Geosci Model Dev 2013;6(6):1941–60

20. Tang X, Qu M. Phase change and thermal performance analysis for green roofs in cold climates. Energy Build 2016;121:165–75

21. Arkar C, Domjan S, Medved S. Heat transfer in a lightweight extensive green roof under water-freezing conditions. Energy Build 2018;167:187–99

22. Heusinger J, Sailor DJ, Weber S. Modeling the reduction of urban excess heat by green roofs with respect to different irrigation scenarios. Build Environ 2018;131:174–83

23. Chan ALS, Chow TT. Evaluation of overall thermal transfer value (OTTV) for commercial building
s constructed with green roof. Appl Energy 2013;107:10–24

24. Sailor DJ, Hagos M. An updated and expanded set of thermal property data for green roof growing media. Energy Build 2011;43(9):2298–303

25. Tabares Velasco PC. Predictive heat and mass transfer model of plant-based roofing materials for assessment of energy savings Ph.D. Thesis Department of Architectural Engineering, The Pennsylvania State University; 2009

MOBILE APPLICATION ON ANDROID FOR CALCULATION OF ROUND ROLLS CUTTING USING JAVA TECHNOLOGIES

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Within Industry 4.0, a special role belongs to the development and creation of mobile applications for solving practical production problems. The modern