



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكرو فيلم

بسم الله الرحمن الرحيم



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شبكة المعلومات الجامعية التوثيق الإلكتروني والميكروفيلم



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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

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**SPRINKLER IRRIGATION SYSTEM
MANAGEMENT BASED ON
ENGINEERING DESIGN
FACTORS**

By

ENGY MOSLAME MOHAMED KHAIR

B.Sc .Agricultural Engineering, Faculty of Agriculture, Ain Shams University, 2011

M. Sc. Agric. Eng., Faculty of Agriculture, Ain Shams University, 2015

A Thesis Submitted in Partial Fulfillment

Of

the Requirements for the Degree of

DOCTOR OF PHILOSOPHY

in

Agricultural Sciences

(On Farm Irrigation and Drainage Engineering)

Department of Agricultural Engineering

Faculty of Agriculture

Ain Shams University

2021

Approval Sheet

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ABSTRACT

ENGY MOSLAME MOHAMED KHAIR: SPRINKLER IRRIGATION SYSTEM MANAGEMENT BASED ON ENGINEERING DESIGN FACTORS. Unpublished Ph.D. Thesis, Department of Agricultural Engineering, Faculty of Agriculture, Ain Shams University, 2021.

The engineering factors are necessary to improve sprinkler system efficiency. So, this study had been focused on some engineering factors as: nozzle characteristic, roughness of the sprinkler entrance, overlapping ratio and raiser height on sprinkler performance in terms of precipitation rate, distribution uniformity, and coefficient uniformity. The experiment was carried out during the period of 2017 up to 2020 in two stages: the first stage was conducted at the National Laboratory for Testing the Components of Irrigation Networks and Field Drainage, Agricultural Engineering Research Institute "AEnRI", ARC and the second stage was carried out in open field in Cairo University, Faculty of Agriculture, Giza region. This study focused on studying performance of two kinds of sprinkler size $\frac{3}{4}$ and $\frac{1}{2}$ inch each of them had many local nozzles at different operating pressures. The first stage of this study concentrated on developing for $\frac{3}{4}$ sprinkler size with 5mm circle gradual enlargement plastic nozzle (No 10) using roughness connector RC -9mm-smooth (P2) to increase its performance achieving increased uniformity by 8.5% at operating pressure of 200kPa and for $\frac{1}{2}$ sprinkler size designing new nozzle (No 9) to obtain acceptable uniformity 74% at operating pressure of 150kPa. The second stage of this study, focal point using of ($\frac{3}{4}$ sprinkler size with nozzle No 10 and P2, 70% overlapping and 1 meter raiser) to increase uniformity by 5.91%, saving 10.3% of water applied and decreasing total annual cost by 4.4%.

Key words: Nozzle, pressure, performance, velocity and overlapping.

ACKNOWLEDGMENT

Thanks to **Allah** for his gracious kindness in all the endeavors that the author has taken in her life.

The author wishes to express gratitude and most appreciation to **Prof. Dr. Mahmoud Mohamed Hegazi**, Prof. Emeritus of Agric. Eng., Ain shams Univ. for his valuable advice, encouragement and his great effort to produce this work.

The author also wishes to thank **Prof. Dr. Khalid Faran El-Bagoury**, Prof. of Agric. Eng., Ain shams Univ. for supervising, his great advices, patience and his perception to carry out this work

With sincere appreciation due to **Prof. Dr. Wael Sultan**, Chief Researches and director of the National Laboratory for Testing the Components of Irrigation Networks and Field Drainage, AEnRI for his constant help, advices and his support during carrying out this work.

Thanks, are expressed to staff members of Agric. Eng. Department at Faculty of Agric., Ain Shams Univ. for encouraging me during carried out this work.

Seriously thanks to **Prof. Dr. Hazem Mehawad**, Chief Researches and Deputy Director of Agricultural Engineering Research Institute for his valuable advice, support and helping me throughout this work.

Special thanks to all staff members of The National Laboratory for Testing the Components of Irrigation Networks and Field Drainage and AEnRI for their great effort throughout this work.

Thanks, a lot to all staff members of Agric. Eng. Depart. at Faculty of Agric., Cairo Univ., for their helping me during field experiments of this work.

Thanks a lot to **Eng. Mahmoud Abd El-Razik**, Abd El-Eazikturnery workshop, for helping me turning the new designed nozzle at this work.

Finally, the author wishes to express her deepest appreciation to **her family** for their understanding, patient, loving encouragement and co-operation during carried out this work.

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