شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم

بسم الله الرحمن الرحيم

HANAA ALY

شبكة المعلومات الجامعية

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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

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HANAA ALY

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

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(On Farm Irrigation and Drainage Engineering)

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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 Unpublished Ph.D. Thesis, Department of Agricultural Engineering, Faculty of Agriculture, Ain Shams University, 2021.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 focusedon some engineering factors as:nozzle characteristic, roughness of the sprinkler entrance, overlappingratioand raiser heighton sprinkler performance in terms ofprecipitation rate, distribution uniformity, and coefficient uniformity. The experimentwas 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 outin open field in Cairo University, Faculty of Agriculture, Giza region.This study focused on studying performance of two kinds of sprinklersize ¾ and½ inch each of them had many local nozzles at different operating pressures. The first stage of this study concentrated on developing for ¾ sprinkler size with 5mm circle gradual enlargement plastic nozzle (No10)usingroughness connector RC -9mm-smooth (P2)to increase its performance achievingincreased uniformity by 8.5%at operating pressure of 200kPa and for ½ sprinkler size designing newnozzle (No 9) toobtain acceptable uniformity 74% at operating pressure of 150kPa. The second stage of this study,focal point using of(¾ sprinkler size with nozzle No 10and P2, 70% overlapping and 1meter raiser)to increase uniformity by 5.91%, saving 10.3% of water applied and decreasing total annual cost by4.4%.

Key words: Nozzle, pressure,performance, velocity andoverlapping.

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