شبكة المعلومات الجامعية

بسم الله الرحمن الرحيم

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأفلام قد أعدت دون أية تغيرات

يجب أن

تحفظ هذه الأفلام بعيدا عن الغبار

في درجة حرارة من ١٥-٢٥ مئوية ورطوبة نسبية من ٢٠-٤٠%

To be Kept away from Dust in Dry Cool place of 15-25- c and relative humidity 20-40%

بعض الوثائق الاصلية تالفة

بالرسالة صفحات لم ترد بالاصل

AIN SHAMS UNIVERISITY
FACULTY OF ENGINEERING
IRRIGATION AND HYDROLIC DEPARTMENT

EVALUATION OF RECENT TECHNOLOGY FOR INSTALLATION OF SUBSURFACE DRAINAGE IN EGYPT

Thesis

Submitted in partial fulfillment of the degree
of master of science in civil engineering

BY
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STATEMENT

This dissertation is submitted to Ain Shams University for the degree of Master of Science in Civil Engineering.

The work included in this thesis was carried out by the author in the Department of Irrigation and Hydraulics, Ain Shams University, from September 1994 to June 1997.

No part of this thesis has been submitted for a degree or a qualification at any other University or Institute.

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ABSTRACT

IN Egypt approximately 1.75 million hectares has been provided with subsurface drainage. When the construction of drainage systems reached the fringes of the Nile Delta, unstable soils and heavy sticky clay soils were encountered. The commonly used trenching technique faced substantial construction problems when such soils were encountered. The trenchless drainage system technique executed with the V-plow type of trenchless machine provides a good alternative. A V-plow trenchless drainage machine was imported and used under Egyptian irrigated field conditions and was thoroughly tested.

A total of 141 km of lateral drains were constructed during a 13 weeks period, in semi-unstable, medium textured and fine textured soils. During the experiment, extensive data were collected on the performance of the machine. Speed and production of the V-plow are tested against depth, soil type, soil moisture status, soil resistance, land surface condition (wetness, type of crop), number of irrigation canals to be crossed, days after irrigation, and experience of the operator.

It was found that the production per hour of the trenchless machine was 1.6 times higher than the trencher machine. The installation costs per kilometer length of drains with the trenchless machine proved to be 25% lower than the trencher machine. No difficulties were encountered in any of the soil types and virtually no machine maintenance was needed. However, also some disadvantages of the trenchless technique were observed: (i) an excavator is required full time, (ii) not all wet (irrigated) fields could be crossed (approx. 1% of all drains), and (iii) visual inspection of the installed drains was not possible. The trencherless experiment was considered successful to be applied in similar soils in Egypt.