الآيـــــه

قال تعالي:

بسم الله الرحمن الرحيم

(29) أَوَلَمْ يَرَ الَّذِينَ كَفَرُوا أَنَّ السَّمَاوَاتِ وَالْأَرْضَ كَانَتَا رَتْقًا فَفَتَقْنَاهُمَا ۖ وَجَعَلْنَا مِنَ الْمَاءِ كُلَّ شَيْءٍ حَيٍّ ۖ أَفَلَا يُؤْمِنُونَ (30)

صدق الله العظيم

سورة الانبياء

Dedication

This research is dedicated to:

My parents,

Brothers, sisters and friends,

Teacher,

Family of Sudan University of science & technology

collage of civil engineering

& any person helps me to prepare the study

ABSTRACT

Water harvesting is ideal for access to water when other water sources are not available, especially in dry areas where there is no permanent water available this study deals with the construction and design of a water harvesting depot, which consists of constructing a water plant containing several means of storing water.

This study reached the diameter of the outlet from the water sources is 0.45m and 0.35m, which depends on the amount of discharge, as well as the water losses in the pipes due to friction and protection along the pipe path which reached 10.46m. As well as the design of the ground reservoir and the knowledge of the thickness of the appropriate for the walls and ceilings and rules are 0.35 m and 0.22 m and 0.600 m respectively, as well as the security design of the upper cabinets exposed to wind loads.

الخلاصة

يعتبر حصاد المياه من الوسائل المثلي للحصول علي المياه عندما لا تكون مصادر المياه الأخري متوفرة وخاصة في المناطق الجافة التي لا تتوفر فيها المياه الدائمة الجريان.

تناولت هذة الدراسة التصميم الإنشائي والهيدرولكي لمنشأة لحصاد المياه متمثلة في إنشاء محطة مياه تحتوي علي عدة وسائل لتخزين المياه.

تم التوصيل إلي الأقطار المناسبة لمواسير المأخذ من مصادر المياه وهي 0.45م و 0.35م والتي تعتمد علي كمية التصريف وكذلك حساب فواقد المياه في المواسير نتيجة الإحتكاك والضفط علي طول مسار المواسير والتي بلغت 10.46mوذلك بإستعانة بالمواصفة المصرية.وتمت الإستعانة بالمواصفة البريطانية في تصميم الخزان الأرضي ومعرفة سمك المناسب للحوائط والسقوفات والقواعد وهي 0.35m و 0.22m و 0.60m علي التوالي وأيضاً التصميم الأمن للخزانات العلوية التي تتعرض لأحمال الرياح.

خرجت الدراسة بعدة توصيات أهمها حساب أقطار مواسير المأخذ عند السرعة القصوي للمياه في المواسير وتصميم الخزان الأرضي في حالة أن الخزان مغمور بالمياه وأيضا تصميم الخزان العلوي في حالة أن المنطقة تتعرض لأحمال رياح كبيرة

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$\boldsymbol{Q}$= the discharge (m^3/s).

$\boldsymbol{V}$= velocity in pipe (m/s).

$\boldsymbol{D}$= pipe diameter (m).

$\boldsymbol{hf}$= Friction losses (m).

$\boldsymbol{F}$ = friction factor.

$\boldsymbol{L}$ =length of pipe (m).

$\boldsymbol{V}$= velocity in pipe (m/s).

$\boldsymbol{g}$ = acceleration of gravity (9.81 m/s^2)

$\boldsymbol{h_{minor\_loss}}$ = minor head loss (m)

$\boldsymbol{\xi}$ = minor loss coefficient (m)

$\boldsymbol{v}$ = flow velocity (m/s).

$\boldsymbol{P}$ = (watt)

$\boldsymbol{q} = flow\ in\ m^3/sec$

$\boldsymbol{g}$ = density of the liquid in Kg/m3 = 1000 Kg/m3

$\boldsymbol{H}$ = paizomitric height in metal of water assume (m).

$\gamma_{\boldsymbol{SOIL}}$ = Soil unit weight (kN/m^3).

$\gamma_{\boldsymbol{W}}$ =Water unit weight (kN/m^3).

$\boldsymbol{\Phi}$ =Coefficient of friction.

γ_w =Height of water (m).

γ_C = Concrete unit weight (kN/m^3).

L= Where is the smaller length of the tank (m).

H=height of tank (m).

f_{gross}= The stress transferred to the soil without calculating water weight *(kN/m^2).*

$\sum W$= weight of floor slab, walls cover slabs, beams and water (kN/m)

A=area of the base of the tank (m^2)

Fos = total uplift

W= weight of tank (kN/m^2).

γ_{RC}=reinforced concrete unites weight (kN/m^3).

t_f=thickness of foundation (m).

γ_w= unites weight of water (kN/m^3).

H= height of tank (m*).*

W_{tank} = $total$ Weight of tank (kN/m^2).

W_{floor}= Weight of floor (kN/m^2).

W_{wall} = Weight of wall (kN/m^2).

W_{roof}= Weight of roof (kN/m^2).

f_{gross} = stresses on soil (KN/m^2).

Volume=volume of tank (m^3).

R, ß, α = distributions factor .

e= water pressure (KN/m^2).

F, R = element force & reaction (kN)

$\mathbf{M_{working}}$ = working moment (kN.m).

$\boldsymbol{M_{ull}}$= ultimate moment (kN.m).

$\boldsymbol{T_{ull}}$= ultimate shear (kN).

T= thickness of floor (mm).

b= width (mm).

$\gamma_{\textbf{Stainless steel}}$= unites weight of steel *(kN)*.

Weight= weight (kg).

G=weight (kg).

L= length of member (m).

No= number 0f member.

$\mathbf{P_0}$= Total load on heavily loaded column (kN).

$\mathbf{M_{br}}$ =Bracing moment **(**kN.m)

$\mathbf{M_c}$ = moment capacity **(**kN.m)

$\mathbf{P_y}$ =design strength of steel

$\mathbf{M_b}$ = buckling resistance moment **(**kN.m)

sx = plastic modulus about the major axis

S= Shear force on bracing **(**kN**)**

$\mathbf{A_c}$ =area of concrete section (mm^2)

$\mathbf{L_E}$= effective length of column (m)

L= length of column (m)

λ=slenderness

ry = radius of the gyration about the minor axis

$\mathbf{P_c}$= peering capacity (N)

$\mathbf{P_{cs}}$= Compression resistance (N)

W = weight (kg /m)

A = area (cm^2)

S = thickness (mm)