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B16539

ALEXANDRIA UNIVERSITY
FACULTY OF ENGINEERING

*HYDRAULIC EFFECT OF WAVES ON THE NORTHERN COAST
AND SUBMARINE SAND BARS CHARACTERISTICS*

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Fulfillment of the Requirements for the
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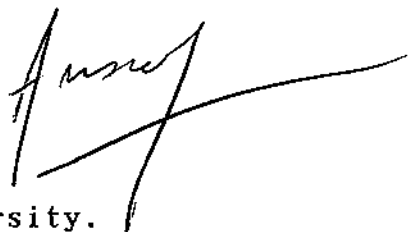
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SYNOPSIS

A long term study of sand bars characteristics along the Nile Delta Coast between 1981 and 1990 was determined using a developed computer program.

The study aimed to obtain the relationship between bars crest height and depths of water over the bar crest, the relationship between bars height and onshore-offshore sediment quantity, and the distribution of equilibrium bars.

The bars migration rate, trend and the relationships between bars movement and the net cross-shore sediment patterns and volume were obtained. Also, the distribution of bars mean position and mean height along the Nile Delta Coast was presented.

The prevailing waves climate and offshore currents as well as, grain size distribution, bed slope changes and volumetric changes were also determined to relate them with the characteristics of bars.

Measured data at different stations along the Delta Coast is used. Also satellite photographs for the coast are obtained to show the position and type of the bars. Useful and definite conclusions are presented in the thesis.

N O M E N C L A T U R E

a_i	Incident wave amplitude near the point of breaking
B_t	Galvin's breaker type index
C_B	Bar crest speed.
D	Water depth from still water level
D_b	Breaking depth from still water level
D_{so}	Mean grain size of beach material
f_p	Central frequency of the frequency band containing maximum energy density
g	Acceleration due to gravity
H	Bar crest height (maximum bar height in each depth zone)
H_b	Breaking wave height
H_c	Bar crest depth from the still water level
H_o	Unrefracted deep water wave height
H_s	Significant wave height
H_t	Bar trough depth from still water level
n^{th}	Number of vortices
h_{vn}	Water depth of the vortex
i	Average beach slope shoreward of the breaker zone
k	Dimensionless constant
L	Wave length
L_b	Breaking wave length
L_c	Crescentic bar wave length

L_e	Alongshore edge wave length
L_{vn}	Average horizontal distance from break point to the location where h^{th} vortex reaches the bottom
L	Width of the surf zone
m^i	The ordinal number (from the break point to the shore $m = 1, 2, \dots$
m	Node number of the edge wave ($n = 0, 1, 2, \dots$)
R_e	Reynolds number of breaking waves
S	Area of water mass in the surf zone.
T	Wave period
T_e	Edge wave period
T_p	Peak wave period
t	Time
X	Constant 3.5 for deposition at node 6.5 for deposition at antinodes
X_B	Bar crest horizontal location according to breaking theory of bars formation
x_o	Distance offshore to the bar crest according to edge wave theory of bars formation
x_o	Distance between the bar crest line and the shoreline (used in the computer program analysis)
x_1	Distance between the bar trough to the baseline
x_2	Distance between the bar beginning point to the baseline
x_{21}	Distance between the beginning and trough points of the bar

Y	Depth water over the bar crest
Y_1	Depth of water over the bar trough point
Y_2	Depth of water over the beginning point of the bar
Y_{21}	Difference in depth of water over the beginning and trough points of the bar
Z_b	Equilibrium bar height
β	Beach face slope, inshore-foreshore slope
α	Decay coefficient
α_o	Deep water wave angle
ω	Sediment fall speed
ω_t	Wave frequency
δ	Sea surface displacement
η	Single similarity parameter
η_b	Single similarity parameter for breaking waves
η_o	Single similarity parameter for deep water waves
ν	Kinematic viscosity of fluid
ϵ	Surf-scaling parameter

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