بسم الله الرحمن الرحيم

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التوثيق الالكتروني والميكروفيلم

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قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها

علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

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بالرسالة صفحات

لم ترد بالأصل

Suez Canal University
Faculty of Engineering
Ship Engineering Department

Analysis Of
Theoretical And Experimental
Results of Residual Stresses
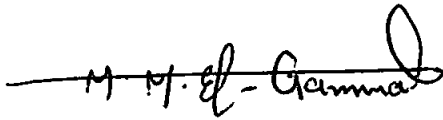# Due To Shipbuilding Processes

A Thesis Submitted to
Faculty of Engineering – Suez Canal University
for the Degree of MASTER OF SCIENCE
in Ship Engineering

By
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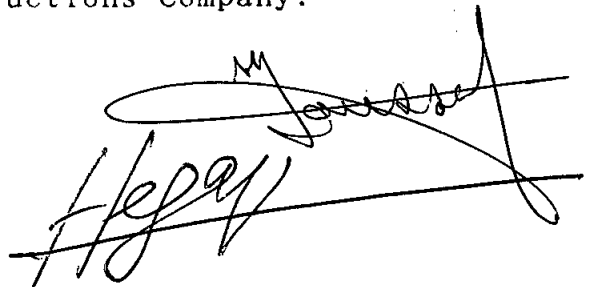
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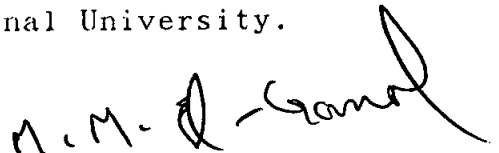
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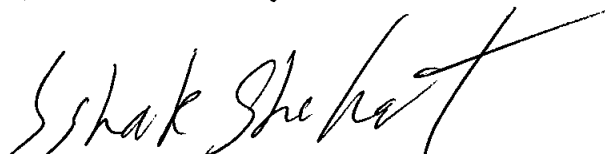
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ABSTRACT

The ship structure is subjected to many types of stresses. The history shows and proves that most of failures and cracks in ship structures are originated at the welded joints containing residual stresses. No one can deny the effect of those stresses specially in regions of tensile components which may cause the catastrophic failure of ships. This was the case of Schenectady which broken into two parts due to the act of the residual stresses. It is rather important to give a tool to take into consideration the assessment of the residual stresses. This has been done within the context of this thesis.

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Nomenculature

The following symbols are used in the present thesis.

A,B	Constants.
C,C_1,C_2	Constants.
D	A proportionality constant called the distribution ratio.
D_e	The distribution ratio of the end fillet weld.
D_s	The distribution ratio of the side fillet weld.
E	Young's Modulus.
E_1	The moment arm of resultant about root $= W_s/3$
F	The external load per unit length of fillet.
F-ratio	The ratio between regression mean squares to error mean squares.
G	The shear modulus.
I	The welding current.
K,u,v	Constants.
L_e	Length of end fillet weld.
L_h	The length of hypotenuse of weld.
L_L	The leg length of fillet weld.
L_{Lo}	The initial leg length of fillet weld.
L_{pi}	The length of a circular pipe which is butt-welded at the end.
L_s	The length of the slot and inserted web.
L_t	The length of throat of weld.
L_w	The length of weld.
N	The number of welds in the cross-section of the joint.
P	The total external load.
P_i	The internal pressure.

Q_x	The shear load per unit length at any point along the length of the side fillet weld.
R	The radial distance to the point under consideration.
R_1	The radius of the hole.
R^2	The coefficient of determination.
R_i	The internal radius of the pipe.
R_s	The radius of the concenterated source of heating.
S	A constant assumed to be 0.05 cm^{-2}
SE	Standered error of element.
S_w	The average welding speed.
T	The temperature at point distant x or r from the origin.
Tc	The crack initiation period in built-in stress free structure.
T_{cr}	The crack initiation period for the same structure but contains residual and built-in stresses.
T_{fsl}	The fail-safe life period for a built-in stress free structure.
T_{fslr}	The fail-safe life period for the same structure including the effect of residual and built-in stresses.
T_{wr}	The working life in the presence of residual and built-in stresses.
U_x	The stress concenteration factor $= Q_x \cdot L_w/P$
V	The welding voltage.
W_s	The width of strip.
W_t	The width of tension zone.
a	The bead angle.
a_p	The cross-section area of plate.
a_s	The cross-section area of strip.
a_t	The total cross-section of weld.