



المالك:

الهيئة العامة  
للطرق و الكبارى و النقل البرى  
GENERAL AUTHORITY  
FOR ROADS BRIDGES  
AND LAND TRANSPORT (GARBLT)  
إدارة النقل



المقاول:



The Arab Contractors  
Osman Ahmed Osman & Co.  
المقاولون العرب  
عثمان أحمد عثمان وشركاه

مشروع: كوبري أعلى مزلقان الشبانات

إدارة الإنشاءات البحرية

بالطن توريد وتركيب القيسون الثابت (غلاف معدني) بارتفاع من أسفل منسوب قاع المجري  
المائي حتى منسوب أسفل المخدة مع دهان القيسونات بمادة مقاومة للصدأ (زنك ريتش أو  
ما يماثلها)

رقم البند بالمقايسة (١١)

ملاحظات	إجمالي	عدد	طول القيسون	وزن المتر	الوحدة	البيان	م
	طن		م	طن			
	١٠٦,٥٣					ما قبله	
	١٨,٤٣	١٢	٧,٥٠	٠,٢٠٤٧٩	طن	قيسونات قطر ١,٠٣	٣
	١٢٤,٩٦					إجمالي	

عن الهيئة العامة للطرق والكبارى

عن المكتب الاستشاري السهلي الصاوي

عن شركة المقاولون العرب

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إدارة الإنشاءات البحرية

رقم البند بالمقايسة (١٢)

بالعدد عمل تجربته تحميل على خازوق عامل بالبر قطر ١٢٠٠ مم ، بحمل يساوي ١٥٠% من حمل التشغيل ، والبند يشمل توريد الأحمال، والألواح المعدنية و المؤقتة وأجهزة القياس (وغير شامل صلب التسليح) وكل ما يلزم لنهو العمل كاملا مما جميعه طبقا لأصول الصناعة و الشروط والمواصفات و الرسومات و تعليمات المهندس المشرف.

م	البيان	الوحدة	الكمية	إجمالي	ملاحظات
١	تجربة تحميل خازوق R4 ناحية البر	عدد	١,٠٠٠	١,٠٠٠	
	إجمالي			١,٠٠٠	

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إدارة الإنشاءات البحرية

مشروع: كوبري أعلى مزلقان الشبانات

م	رقم المحور	الوحدة	طول (م)	عرض (م)	ارتفاع (م)	عدد	إجمالي (م <sup>3</sup> )	ملاحظات
رقم البند بالمقايسة (٢١)								
بالمتر المكعب اعمال خرسانة مسلحة لزوم الاعمدة مع استخدام اسمنت بورتلاندي عادي ومحتوى اسمنت لا يزيد عن ٤٥٠ كجم/سم <sup>3</sup> واجهاد لا يقل عن ٤٠٠ كجم/سم <sup>3</sup> على ان يتم إضافة المواد اللازمة مثل سيليكيا فيوم او ما يماثلها للوصول للاجهاد المطلوب ومنع الشروخ والسعر لا يشمل حديد التسليح ارتفاع حتى ٦ متر								
مقابله								
١٢	العمود على محور A02	٣م	٢,٠٠	٢,٠٠	٠,٥٠	١	٢,٠٠	
١٣	العمود على محور P11	٣م	٢,٠٠	٢,٠٠	٢,٨٠	١	١١,٢٠	
١٢	العمود على محور R03 مجرى	٣م	١,١٣		٠,٨٠	١	٠,٩٠	
١٣	العمود على محور P12	٣م	٢,٠٠	٢,٠٠	٣,٧٠	١	١٤,٨٠	
١٢	العمود على محور بر L06	٣م	١,١٣		٠,٠٠	١	٠,٠٠	
١٣	العمود على محور P04	٣م	٢,٠٠	٢,٠٠	٣,٩٥	١	١٥,٨٠	
إجمالي							٨٢,٩٥	

عن الهيئة العامة للطرق والكبارى

المكتب الاستشاري السهلى الصاوي

عن شركة المقاولون العرب



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إدارة الإتشاءات البحرية

مشروع: كوبري أعلى مزلقان الشبانات

بالمتر المكعب اعمال خرسانة مسلحة (Face Fair) لزوم البلاطة على الخوازيق وكوبستانها ارتفاع حتى ٧ متر							(٢٩)	رقم البند بمستخلص العمل :	
ملاحظات	إجمالي (م <sup>٣</sup> )	عدد	ارتفاع (م)	عرض (م)	طول (م)	الوحدة	العنصر	رقم المحور	م
								بين محور L02 & L04	١
	١٤٢,٥٤	١,٠٠	٠,٤٠	١١,٨٠	٣٠,٢٠	٣م	البلاطة العلوية		
	١٧,٤٤	١,٠٠	٠,٨٠	٠,٨٠	٢٧,٢٥	٣م	كمره (١,٢*٠,٨) ناحية المجرى		
	١٧,٣٥	١,٠٠	٠,٨٠	٠,٨٠	٢٧,١١	٣م	كمره (١,٢*٠,٨) وسطية		
	١٧,٢٥	١,٠٠	٠,٨٠	٠,٨٠	٢٦,٩٥	٣م	كمره (١,٢*٠,٨) ناحية البر		
	٢٤,٩٠	١,٠٠	٢,١١		١١,٨٠	٣م	كمره عرضية L2		
	١٢,٢٧	١,٠٠	٠,٨٠	١,٣٠	١١,٨٠	٣م	كمره عرضية L3		
	٢٥,٣٧	١,٠٠	٢,١٥		١١,٨٠	٣م	كمره عرضية L4		
	٢٥٧,١٢						إجمالي		

عن الهيئة العامة للطرق والكبارى

المكتب الاستشاري السهلي (الصابوي)

شركة المقاولون العرب



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المقاولون العرب  
عثمان أحمد عثمان وشركاه

مشروع: كوبري أعلى مزلقان الشبانات

إدارة الإنشاءات البحرية

رقم البند بالمقاييس (32-أ)				بالعدد توريد و تركيب ركائز حمولة تشغيلية ٢٥٠ طن بجوايط	
م	البيان	الوحدة	الكمية	إجمالي	ملاحظات
١	ركائز محور L2	عدد	٢,٠٠٠	٢,٠٠٠	لم يتم اجراء
١	ركائز محور L4	عدد	٢,٠٠٠	٢,٠٠٠	لا قنارات اللازم
إجمالي				٤,٠٠٠	

عن الهيئة العامة للطرق والكبارى

عن المكتب الاستشاري السهلي الصاوي

عن شركة المقاولون العرب

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مشروع: كوبري أعلي مزلقان الشبانات

إدارة الإنشاءات البحرية

رقم البند بالمقايسة (32-ج)

بالعدد توريد و تركيب ركائز حمولة تشغيلية ٥٥٠ طن بجوايط

م	البيان	الوحدة	الكمية	إجمالي	ملاحظات
١	ركائز محور A1	عدد	٢,٠٠٠	٢,٠٠٠	لم يتم العمل
١	ركائز محور P2 (LEFT)	عدد	٢,٠٠٠	٢,٠٠٠	لاختيار الدرز
	إجمالي			٤,٠٠٠	

عن شركة المقاولون العرب

عن المكتب الاستشاري السهلي الصاوي

عن الهيئة العامة للطرق والكباري

المالك:



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مشروع: كوبري أعلى مزلقان الشبانات

إدارة الإنشاءات البحرية

بالمتر المربع عمل طبقه عازله من البيتومين والدهان وجهان علي البارد والسعر يشمل كل مايلزم  
لنهو العمل نهوا كاملا وذلك طبقا لاصول الصناعه والرسومات والمواصفات وتعليمات المهندس  
المشرف .

رقم البند بالمقاييس (٣٣)

م	رقم المحور	الوحدة	طول (م)	عرض (م)	ارتفاع (م)	عدد	إجمالي ٢م	ملاحظات	
١	القاعدة على محور P01	٢م	٥,٤٠	٥,٤٠	١,٨٠	١	٦٤,٠٤		
٢	القاعدة على محور P02	٢م	٦,٠٠	٦,٠٠	١,٨٠	١	٧٥,٢٠		
							إجمالي	١٣٩,٢٤	

عن الهيئة العامة للطرق والكباري

عن الاستشاري

عن شركة المقاولون العرب



**The Arab Contractors**  
Osman Ahmed Osman & Co.  
**المقاولون العرب**  
عثمان أحمد عثمان وشركاه

المقاول:

المالك:

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إدارة الإنشاءات البحرية

مشروع: كوبري أعلى مزلقان الشبانات

بالمتر المربع عمل طبقه عازله من البيتومين والدهان وجهان علي البارد والسعر يشمل كل مايلزم  
لنهو العمل نهوا كاملا وذلك طبقا لاصول الصناعه والرسومات والمواصفات وتعليمات المهندس  
المشرف .

رقم البند بالمقاييسه (٣٣)

م	رقم المحور	الوحدة	طول (م)	عرض (م)	ارتفاع (م)	عدد	إجمالي ٢م	ملاحظات	
			ما قبله						
١٣	القاعدة على محور A02	٢م	٦,٠٠٠	٦,٠٠٠	١,٨٠	١	١٠٧٠,٧٥		
	إجمالي						١١٤٦		

عن الهيئة العامة للطرق والكبارى

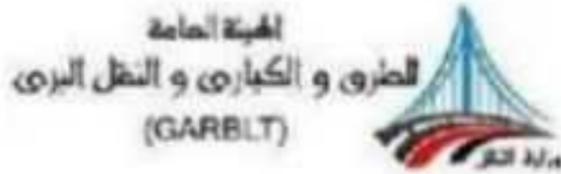
المكتب الاستشاري السهلي الصاوي

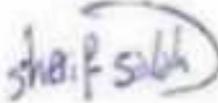
عن شركة المقاولون العرب



CONCERNING: **SIT** REPORT ON (**50**) CONCRETE PILE(S) IN

## AL-SHABANAT RAILWAY CROSSING BRIDGE, ZAGAZIG



Rev	Status	Date	Editor	Checked by
0	FINAL	05-Feb-2024	SHERIF SALAH, BSc 	DR. ENG. A. F. EL - KADI 

NILE ENGINEERING CONSULTING BUREAU (MISR)

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**Subject** : SIT Final Report \_ Al-Shabanat Railway Crossing Bridge, Zagazig.

**To** : Arab Contractors "Marine Management".

**Status** : Formal Final\_Rev 0, Feb 5<sup>th</sup>, 2024.

**Checked by** : **A. F. El-Kadi, PhD**



### Document History

Title	NECB Ref.	Rev.	Status	Date	Remark
SIT Report	SIT085/0249/022	0	Formal/ Final	5-02-2024	-

**Subject** : SIT Final Report \_ Al-Shabanat Railway Crossing Bridge, Zagazig.

**To** : Arab Contractors "Marine Management".

**Status** : Formal Final\_Rev 0, Feb 5<sup>th</sup>, 2024.

**Checked by** : **A. F. El-Kadi, PhD**



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**Checked by** : **A. F. El-Kadi, PhD**



## 1. Introduction

1.1 Upon the request of **Arab Contractors Co. "Marine Management"**



Sonic Integrity Testing (SIT) following the Project specifications executed to verify the integrity of (50) concrete pile(s).

1.2 The testing activities can be summarized as follows:

<b>Project /Location</b>	<b>Al-Shabanat Railway Crossing Bridge, Zagazig</b>
<b>Date /Time</b>	5-Feb-2024
<b>Witnessed</b>	Project Engineer; and Client Engineer
<b>NECB Staff</b>	Kamel Ahmed, BSc.
<b>Tested Element (s) Information</b>	Concrete / Bored /Cast-in situ As stated in annex 1 ( <i>from level of test</i> )
<b>Visual Inspection</b>	As stated in the Reflectogram footer



## **2. The Measuring Technique**

### **2.1 Applicable standards:**

**2.1.1** The measuring technique fully complies with ASTM Standard D5882-17, EA Pfähle 2012, CUR-Aanbeveling 109:2013, AFNOR NF P 94-160-2, and NF P 94-160-4.

**2.1.2** The detailed method statement attached in the attachments.

### **2.2 Additional measurement**

**2.2.1** Not used.

### **2.3 Testing Equipment**

**2.3.1** The used testing equipment manufactured by Profound B.V.

**2.3.2** All testing equipment data are in the attachments.



## **3. Conclusion**

Based on test results interpretation using available nearest borehole logs, the following may be stated:

**3.1** The test results for all tested and report piles shows acceptable length according to the pile's execution data as shown in annex 1;

**3.2** The test results for all tested and reported piles are matching site average wave and soil layers' sequence.

### **Generally, it is be concluded that:**

**1)** No major construction anomalies are evident from the test results;

**2)** All tested and reported piles **Integrity Wisely Accepted.**

- يمكن تلخيص نتائج الاختبار لعدد (50) خازوق خرساني والموضحة بالجدول المرفق أدناه بان

الخوازيق المختبرة ذات تكاملية جيدة ومقبولة (في الطول المقاس من منسوب الاختبار ومتوسط

القطر)، وبدون أي عيوب جوهريّة أو اختناقات مؤثرة على تكامليتها.

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## **General Tips**

- Depending on our instrument accuracy, while the pile length is greater than 25 times the pile diameter. The measurement accuracy is about 90%;
- Pile marked (poor pile head preparation) means surface cracks appear due to pile head demolishing, which does not affect either the wave quality or the integrity of this pile.
- Pile marked (anomaly @ pile head) means the marked pile needs to demolish for about 10 to 20 cm to reach sound concrete.
- The truth of the tested elements ID and input data is the client's responsibility.

**Cairo, 5 Feb 2024**

**NILE ENGINEERING CONSULTING BUREAU  
(NECB- MISR)**

**Dr. ENG. A. F. EL – KADI**

**CEO**

**Subject** : SIT Final Report \_ Al-Shabanat Railway Crossing Bridge, Zagazig.

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**Checked by** : **A. F. El-Kadi, PhD**



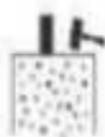
# **ANNEXES**

## **ANNEX 1**

### **Tested Pile(s) on Febraury 5<sup>th</sup>, 2024**



S	Type	Pile ID Cap/ No.	Details	Reflectogram	Pile toe/ Analysis/Conclusion
1	Bored	P30	D:1.00m L:18.73m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted
2	Bored	P31	D:1.00m L:18.79m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted
3	Bored	P32	D:1.00m L:18.56m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted
4	Bored	P33	D:1.00m L:18.62m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted
5	Bored	P34	D:1.00m L:18.70m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted

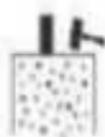


**Anomaly @ pile head** means the marked pile need to be demolished for about 10 to 20 cm to reach sound concrete.  
**Poor pile head preparation** means surface cracks appears due to pile head demolishing, that doesn't the integrity of this pile.  
**Bulging @ Pile head** means the difference between diameter of the first segment of pile compared by the designed diameter affecting the wave shape nor the pile integrity





S	Type	Pile ID Cap/ No.	Details	Reflectogram	Pile toe/ Analysis/Conclusion
6	Bored	P35	D:1.00m L:18.61m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted
7	Bored	P36	D:1.00m L:18.52m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted
8	Bored	P37	D:1.00m L:18.56m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted
9	Bored	P38	D:1.00m L:18.42m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted
10	Bored	P39	D:1.00m L:18.66m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted

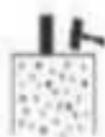


**Anomaly @ pile head** means the marked pile need to be demolished for about 10 to 20 cm to reach sound concrete.  
**Poor pile head preparation** means surface cracks appears due to pile head demolishing, that doesn't the integrity of this pile.  
**Bulging @ Pile head** means the difference between diameter of the first segment of pile compared by the designed diameter affecting the wave shape nor the pile integrity





S	Type	Pile ID Cap/ No.	Details	Reflectogram	Pile toe/ Analysis/Conclusion
11	Bored	P40	D:1.00m L:18.43m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted
12	Bored	P41	D:1.00m L:18.71m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted
13	Bored	P42	D:1.00m L:18.50m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted
14	Bored	P43	D:1.00m L:18.32m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted
15	Bored	P44	D:1.00m L:18.40m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted

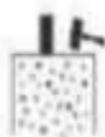


**Anomaly @ pile head** means the marked pile need to be demolished for about 10 to 20 cm to reach sound concrete.  
**Poor pile head preparation** means surface cracks appears due to pile head demolishing, that doesn't the integrity of this pile.  
**Bulging @ Pile head** means the difference between diameter of the first segment of pile compared by the designed diameter affecting the wave shape nor the pile integrity





S	Type	Pile ID Cap/ No.	Details	Reflectogram	Pile toe/ Analysis/Conclusion
16	Bored	P45	D:1.00m L:18.75m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted
17	Bored	P46	D:1.00m L:18.49m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted
18	Bored	P47	D:1.00m L:18.46m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted
19	Bored	P48	D:1.00m L:18.62m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted
20	Bored	P49	D:1.00m L:18.70m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted

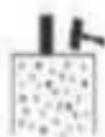


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S	Type	Pile ID Cap/ No.	Details	Reflectogram	Pile toe/ Analysis/Conclusion
21	Bored	P50	D:1.00m L:18.33m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted
22	Bored	P51	D:1.00m L:18.29m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted
23	Bored	P52	D:1.00m L:18.56m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted
24	Bored	P53	D:1.00m L:18.62m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted
25	Bored	P54	D:1.00m L:18.72m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted



**Anomaly @ pile head** means the marked pile need to be demolished for about 10 to 20 cm to reach sound concrete.

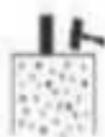
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S	Type	Pile ID Cap/ No.	Details	Reflectogram	Pile toe/ Analysis/Conclusion
26	Bored	P55	D:1.00m L:18.73m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted
27	Bored	P56	D:1.00m L:18.79m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted
28	Bored	P57	D:1.00m L:18.54m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted
29	Bored	P58	D:1.00m L:18.65m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted
30	Bored	P59	D:1.00m L:18.40m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted

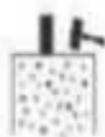


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S	Type	Pile ID Cap/ No.	Details	Reflectogram	Pile toe/ Analysis/Conclusion
31	Bored	P60	D:1.00m L:18.63m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted
32	Bored	P61	D:1.00m L:18.79m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted
33	Bored	P62	D:1.00m L:18.56m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted
34	Bored	P63	D:1.00m L:18.51m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted
35	Bored	P64	D:1.00m L:18.54m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted

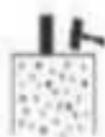


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S	Type	Pile ID Cap/ No.	Details	Reflectogram	Pile toe/ Analysis/Conclusion
36	Bored	P65	D:1.00m L:18.39m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted
37	Bored	P66	D:1.00m L:18.79m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted
38	Bored	P67	D:1.00m L:18.56m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted
39	Bored	P68	D:1.00m L:18.61m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted
40	Bored	P69	D:1.00m L:18.50m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted

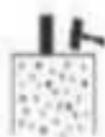


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S	Type	Pile ID Cap/ No.	Details	Reflectogram	Pile toe/ Analysis/Conclusion
41	Bored	P70	D:1.00m L:18.47m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted
42	Bored	P71	D:1.00m L:18.74m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted
43	Bored	P72	D:1.00m L:18.58m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted
44	Bored	P73	D:1.00m L:18.62m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted
45	Bored	P74	D:1.00m L:18.30m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted

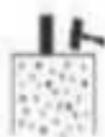


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S	Type	Pile ID Cap/ No.	Details	Reflectogram	Pile toe/ Analysis/Conclusion
46	Bored	P75	D:1.00m L:18.83m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted
47	Bored	P76	D:1.00m L:18.80m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted
48	Bored	P77	D:1.00m L:18.36m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted
49	Bored	P78	D:1.00m L:18.72m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted
50	Bored	P79	D:1.00m L:18.70m F: Auto C:4200m/s		Clear No major anomaly Integrity accepted



**Anomaly @ pile head** means the marked pile need to be demolished for about 10 to 20 cm to reach sound concrete.  
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**Subject** : SIT Final Report \_ Al-Shabanat Railway Crossing Bridge, Zagazig.

**To** : Arab Contractors "Marine Management".

**Status** : Formal Final\_Rev 0, Feb 5<sup>th</sup>, 2024.

**Checked by** : **A. F. El-Kadi, PhD**



## **ATTACHMENTS**

1. SIT Method Statement.
2. SIT Equipment Calibration Certificate.
3. Site Handover Sheet.

## Sonic Integrity Testing(SIT) – Generic Method Statement



<b>Rev</b> <b>0</b>	<b>Status</b> Final	<b>Date</b> May, 2022	<b>Editor</b> SHERIF SALAH, BSc 	<b>Checked by</b> DR. ENG. A. F. EL - KADI 
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## 1) General

- Integrity testing of piles is designed to provide data about the physical dimensions, continuity, and consistency of material used in piles, not to give direct information about the performance of piles under the conditions of loading.
- An acoustic technique, developed by the institute for building material and building construction research of the Netherlands (TNO). The method, called Sonic Integrity Testing, has been in use in Europe since 1965.
- SIT classified as a most quickly and cheapest testing of pile integrity.
- The test itself takes no more than a few minutes, and over 100 piles a day can be easily tested.



Fig. 1 SIT General Scheme

## 2) Applicable Standard

SIT-system fully complies with the following standard : **ASTM Standard D 5882; CUR109, EA PFähle, AFNOR, NF, P94-160-214.**

## 3) SIT Requirement

3.1 In the cast –in- place concrete piles, integrity tests shall not be carried out until at least 5 days from the casting date or reach to 75% of the designed strength.

### 3.2 "Client Obligation"

3.2.1 The pile head must be clean, accessible, sound, and free from standing water so that a small

accelerometer can be pressed against it.

3.2.2 All related data for the tested piles (pile numbers, lengths, diameters, soil data, execution sheets) should be turned over to NECB's technical office as required via any available form "E-mail, Whatsup, or hard copy".

## 4) Testing equipment and tools

Testing equipment consists of:

- 4.1 Portable Computer containing required software;
- 4.2 Accelerometer connected to the computer
- 4.3 Teflon Head Hammer; and
- 4.4 Pile head cleaning tool.

NECB has a four sets of Testing equipment as follows:

- **SIT+** Sys. manufactured by Profound B.V;
- **SIT Pro**. manufactured by Profound B.V; and
- **Two ALLSIT sys.** manufactured Allnamics USA.

The available equipment will do the required tests as available.

The related testing equipment information and calibration certificates shall be included in the test results reports.

## 5) Testing procedure

The testing of the piles shall follow the following steps:

- 5.1 Preparation of pile heads to avoid any loose concrete particles and standing water;
- 5.2 Press a small accelerometer against the pile head, and implement a number of three hits to the pile head using a Teflon Hammer;
- 5.3 Receive the equivalent waves on the portable computer screen;

5.4 Check that at least three waves are as similar as possible;



Fig.2 Pile head preparation

5.5 Check the waves and implement preliminary evaluation;

5.6 In case a defect is obvious it is recommended to implement several tests to assure the defect; and

5.7 Save results on the computer for later thorough interpretation and reporting.

**5.8 SIT duration:**

5.8.1 Test takes about 3 to 5 minute /pile in the normal conditions, poor pile head preparation, wet surface or other reasons may affect this duration.



Fig.4 Test in progress

**6) Interpretation of results**

6.1 It must be emphasized that results of integrity testing need to be interpreted with the requisite experience, and that all methods have limitations.

6.2 It should be appreciated that anomalous results can arise which may be capable of alternative interpretations. Integrity testing may also identify minor defects, which shall not necessarily affect pile performance, and the experienced person(s) shall have to

exercise his judgment as to the acceptability or refusal of such a pile. Full details of the ground conditions, pile dimensions construction method and, logs shall be made available to the specialist in order to facilitate interpretation of the results.

**7) SIT accuracy**

7.1 The accuracy of the pile length depends directly on the accuracy of the stress wave velocity. When the pile length is known, the stress wave velocity can be measured by adjusting this velocity until the pile length corresponds with the known pile length.

7.2 Also to be clarified that the pile length is not one of the major findings of the test and does have an accuracy of 90-95%, while the stress wave velocity range (3000 to 4400m/sec), where:

7.2.1 Length of the pile <25 Diameter, the accuracy is about 95%;

7.2.2 Length of the pile >25 Diameter, the accuracy is about 90%.

7.3 The pile length is for the stored signal data. If the pile length is too short, the measured signal will be too short to determine the pile toe. The pile length should be estimated between 80% and 130% of the real pile length.

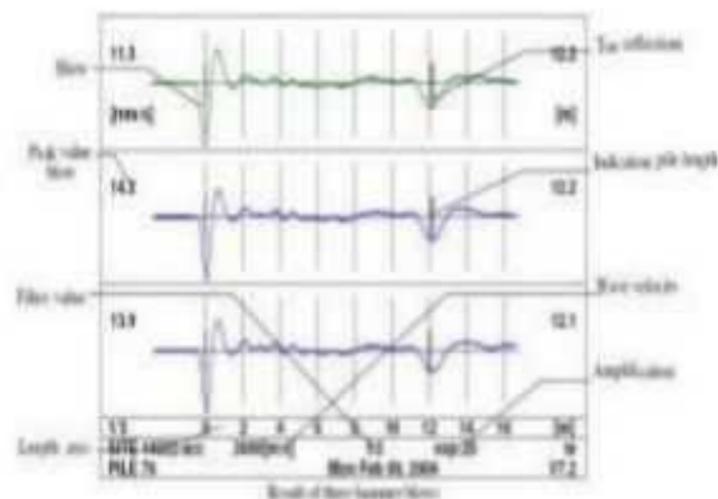


Fig. 5 SIT interface

**8) Advantages of SIT**

8.1 First line quality assurance against major faults;

8.2 Hundreds of piles can be tested in a single day;

8.3 Testing on any accessible pile;

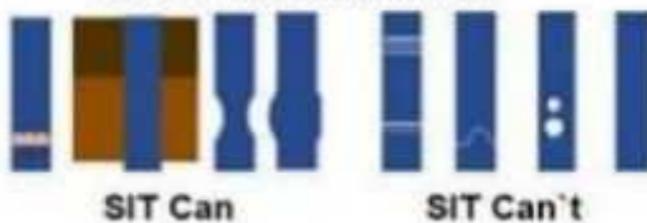
( SIT MS Doc.)



- 8.4 Defects discovered at an early stage;
- 8.5 Quick and economical compared to other methods;
- 8.6 Equipment is portable and easy to operate.

### 9) Limitations of SIT include

- 9.1 Can not estimate bearing capacity;
- 9.2 Minor defects are not easily seen (local loss of cover to steel or small inclusions);
- 9.3 Length is difficult to determine for very long piles with very high shaft friction;
- 9.4 The thickness of a debris layer at the pile toe can not be determined.



### 10) SITWAVE (optional)

- 10.1 Numerical analysis (SITWAVE) is a finite element using the computer program TNOWAVE based on one-dimensional wave propagation theory. This allows the behavior of a pile and the Surrounding ground under an impact load to be simulated. The algorithm for the program in the past was developed by TNO and applied in the program TNOWAVE.
- 10.2 SITWAVE analysis consists of two or three phases. The first step is to create a computer model based on the reliable reference pile with the ground profile. There are the theoretical dimensions of the pile and bring the sounding introduced (cone resistance with a depth of soil).
- 10.3 After entering the data, the measurement results of the reference pile are compared with the output of the theoretical model. By means of (signal processing/ comparison techniques) and signal matching the basic model in the computer is adjusted so that as much as possible consistent with the measurement of the reference pile. The reference piles will not usually be a pile of constant diameter and in the second phase, a match is made on the pile diameters.

10.4 The third phase is to run a match to the suspect signal pile. This is the basic model taken from the previous stage and the pile diameter is adjusted to that corresponding to the measurement of the suspect pile.

- SITWAVE calculates the wave signal of a modeled pile (with or without discontinuities or soil behavior) Experience with simulated SIT signals greatly helps the understanding of real SIT signals. When normal interpretation is not possible or too difficult, TNOWAVE calculations can clarify a discontinuity in a pile.
  - **SITWAVE may use for the following causes:**
    - I. Recording a major problem during the pile execution,
    - II. Recording an abnormal SIT result from the rest of the result, and
    - III. The client requested an analysis of a random sample.
- Therefore, official approval to conduct the analysis is required.

### 11) SITWAVE requirement

- IV. Measurement signals for selected pile ;
- V. Pile record sheet including all casting data (theoretical and actual concrete, casting date, pile diameter, pile toe penetration, and any related information);
- VI. Related or nearest borehole;
- VII. Static and /or dynamic test report (if available);
- **SITWAVE output**
  - I. Graph of velocity as a function of time or length;
  - II. Graph of Radius and velocity as a function of time;
  - III. Graph of equivalent diameter along pile axis;
  - IV. Graph of pile cross-section along pile axis; and Excel sheet of the defected segments reading.

### 12) Reports:

- SIT final report for **each site visit** will be ready to submit at NECB office in Nasr City branch within less than 48Hr. Soft copy will be available as needed.

## Calibration Certificate of the Profound *SIT-series* acceleration sensor

Sensor data	
Serial number	4514-B-57389
Manufacturing year	2010

The *SIT* acceleration sensor with s/n 4514-B-57389  
complies with the specifications of the following  
governing codes:

ASTM D5882-16  
CUR-Aanbeveling 109:2013  
Empfehlungen des Arbeitskreises "Pfähle":  
EA-Pfähle April 2012  
AFNOR NF P94-160-2 (1993)  
AFNOR NF P94-160-4 (1994)

### Typical values

Temperature range : -20 °C to 60 °C  
Sensor weight : 60 g  
Measuring range : ± 50 g peak  
Resonance Frequency : 32 kHz

Report		Approved by
Calibration date	28-3-2022	Signature 

Note: the calibration equipment consists of: a reference accelerometer from PCB (sn. 312323), a calibration amplifier, a multimeter Agilent 34410A (sn. MY45000561), a function generator Agilent 33220A (sn. MY44010188) and a Tira TV S2120 sn. 120/13 vibrator with power amplifier.

The calibration system for the reference accelerometer is accredited to ISO/IEC 17025 by A2LA. Traceable through N.I.S.T. test report #683/287323 to the National Institute of Standards and Technology, U.S.A.

## Calibration Certificate of the Profound *SIT-series*

<b>System data</b>	
Serial number	SIT02004
Manufacturing year	2010
Software version	8.00
System model	SIT+

The *SIT* with s/n SIT02004  
complies with the following governing codes:

ASTM D5882-16  
CUR-Aanbeveling 109:2013  
Empfehlungen des Arbeitskreises Pfähle: EA-Pfähle April 2012  
AFNOR NF P 94-160-2 (1993)  
AFNOR NF P 94-160-4 (1994)<sup>1</sup>

### Typical values

A/D conversion : 24 bit  
Temperature range : - 20 °C to 60 °C  
System weight : 2.3 kg

Note 1: For compliance with the above mentioned code AFNOR NF P 94-160-4 the use of an instrumented hammer and a *SIT*<sup>+</sup> or *SIT*<sup>+</sup> system model is required.

<b>Report</b>		<b>Approved by</b>
Calibration date	28-3-2022	Signature: 

Note: The calibration equipment consists of an electronic generated reference pile by a Waveform Generator Agilent 33220A (sn. MY44010188). The Waveform Generator Agilent 33220A (sn. MY44010188) is verified by an oscilloscope LeCroy Wavesurfer 424 (sn. LCRY0301J11173).





المقاولون العرب  
شركة شبان وشركاه



وزارة النقل  
الهيئة العامة للطرق والجسور  
والنقل النهري

**FINAL REPORT**  
**FOR**  
**STATIC COMPRESSION PILE LOAD TEST**  
**Shabanat Upper Bridge**  
**Zagazig - Sharkia Governorate**  
**Egypt**

Owner	General Authority For Roads and Bridges (GARB)
General Consultant	مكتب الاستشارات الهندسية (المهولي - الصلوي)
Contractor	Arab Contractors - Marine Construction
Design load	300.00 tons
Pile Name	R4-1

Consulting Bureau  
Geotechnical & Structural  
Consultant No. (559)



CEO  
Prof. Adel Kamel Gabr



CONSULTING BUREAU PROF ADEL KAMEL GABR, MANSOURA, EGYPT

December, 2023

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## 1.0 Introduction

This Report is presented at the request of Arab Contractors - Marine Construction to carry out the static compression pile load test for tested pile: R4-1, located in Shabanat Upper Bridge - Zagazig - Sharkia governorate - Egypt. The report is addressing the benchmark of a full-scale static pile load test results to check the approved design pile capacity under the effect of static loads. The main objectives and purposes of this report are:

- Establishing the load-settlement, load-time and settlement-time curves in the tested pile-soil system.
- Evaluating the pile behavior under the anticipated static loads, to ensure the ultimate capacity of the pile in accordance with Egyptian Code of Practice (ECP) for Soil Mechanics and Foundation Design and Construction

### 1.1. References & Codes

The following references and design codes have been used in the study:

- Egyptian Code of Practice (ECP) for Soil Mechanics and Foundation Design and Construction, (2004), 202/10, 1st Edition.

## 2.0 Tested Pile Data

The following table indicates the tested pile data:

**Table 2.1: Tested Pile Data**

<b>Tested Pile</b>	<b>R4-1</b>
<b>Pile Diameter</b>	<b>120.00 cm</b>
<b>Pile Length</b>	<b>27.65 m</b>
<b>Pile Design Load</b>	<b>300.00 tons</b>
<b>Test Load</b>	<b>(150%) 450.00 tons</b>
<b>Test Date</b>	<b>20 – 21 December 2023</b>

### 3.0 Loading Technique

The pile was loaded at 150 % of the design load, in accordance with the American Society for Testing and Material (ASTM) for Soil Mechanics and Foundation Design and Construction. The following table indicates the loading-reloading cycle:

**Table 3.1: Loading Cycle**

Time	Loading Technique	Load (%)	Applied Load
1 Hour	Loading	25%	75.00
1 Hour		50%	150.00
1 Hour		75%	225.00
1 Hours		100%	300.00
1 Hour		125%	375.00
12 Hours		150%	450.00
1 Hour	Unloading	100%	300.00
1 Hour		50%	150.00
1 Hour		0%	0.00

## 4.0 Test Results

According to settlement records shown in Appendix (A), the following table indicates the settlement values of the tested pile:

**Table 4.1: Settlement Records**

Remarks	Settlement (mm)
Maximum Settlement	4.53 mm
Settlement at Design Load	2.69 mm
Final Settlement	1.31 mm

After reviewing the results, the maximum settlement is 4.53 mm, the settlement at design load is 2.69 mm and the final settlement is 1.31 mm.

## 5.0 Results Analysis

### 5.1. According to Davisson's Criteria

The design load shall be half of the ultimate test load defined at a deformation equal to the gross elastic compression of the pile plus 0.15 inch plus  $D/120$  of the pile.

Indicating the previous statement to the following equation:

$$\Delta_{all} = \left( \frac{N \times L}{E \times Area} \right) + (0.15 \times inch) + \left( \frac{D}{120} \right)$$

Where:

$N$	Test Load (ton)	= 300.00 tons
$L$	Length of Pile (cm)	= 2765.00 cm
$A$	Cross Section Area of Pile (cm <sup>2</sup> )	= 11309.73 cm <sup>2</sup>
$E$	Modulus of Elasticity, Young's Modulus (tons/cm <sup>2</sup> )	

$$\Delta_{all} = \left( \frac{300 \times 2765}{232.83 \times 11309.73} \times 10 \right) + (0.15 \times 2.54 \times 10) + \left( \frac{120.00}{120} \times 10 \right)$$

So, the MAXIMUM acceptable settlement of a pile = 4.73 + 3.81 + 10.00  
= 18.54 mm

## 5.2. According to The Egyptian Code of Soil Mechanics and Foundation Design and Construction (ECP Deep Foundation)

The maximum acceptable settlement of a pile should not exceed 2.00% of the pile diameter in addition to the half of the elastic compression, hence the elastic compression could be estimated by the following formula:

$$S = \frac{0.50 N L}{E A}$$

Where:

$S$	The Elastic Compression of Pile (cm)	
$N$	Test Load (ton)	= 300.00 tons
$L$	Length of Pile (cm)	= 2765.00 cm
$A$	Cross Section Area of Pile (cm <sup>2</sup> )	= 11309.73 cm <sup>2</sup>
$E$	Modulus of Elasticity, Young's Modulus (tons/cm <sup>2</sup> )	

So, the MAXIMUM acceptable settlement of a pile = 24.00 + 2.36  
= 26.36 mm

It is noticed that the maximum settlement 4.53 mm is less than the least allowable settlement 18.54 mm.

## 5.3. Maximum Allowable Load According to Chin Method and Brinch Hansen Method

The following table indicates the maximum allowable pile load capacity in accordance with CHIN & BRINCH HANSEN methods:

Table 5.1: Maximum Allowable Pile Load

Test Pile	Analysis Method	Maximum Load (tons)	Factor of Safety	Allowable Load (tons)
R4-1	Modified Chin Method	1163.80	3.88	300.00
	Brinch Hansen Method	1241.39	4.14	
	Average Pile Load	1202.60	4.01	

## 6.0 Conclusions and Recommendations

Based on the proposed test results of the tested pile: R4-1 located in Shahanat Upper Bridge - Zagazig - Sharkia governorate – Egypt, is as the followings summary can be concluded:

- 1- The settlement of the tested pile at the Design load is 2.69 mm.
- 2- The final settlement of The Tested Pile is 1.31 mm.
- 3- The maximum settlement of the tested pile is 4.53 mm at the test load which is less than the maximum acceptable settlement at this stage of loading (According to ECP, and project specifications).
- 4- The factor of safety of the pile allowable load is greater than 2.00.

From the summary above; the tested pile:

- 1- Can carry more than the design load of 300.00 ton according to The Egyptian Code of Practice (ECP).
- 2- Is structurally safe for carrying the working load of 300.00 ton

Consulting Bureau  
Geotechnical & Structural  
Consultant No. (559)



CEO  
Prof. Adel Kamel Gabr



## **Appendix A: Settlement Records**

 Consulting Bureau Prof. Adel Gabr 8 El-Dokki Street, Mansara, Dokki, Egypt 12511 Phone No. +972010102000 Email: info@agb.com.eg		STATIC PILE LOAD TEST TEST LOAD 150% OF WORKING LOAD AMERICAN SOCIETY FOR TESTING AND MATERIAL (ASTM)										
Project Data		Pile Data		Test Data								
Project	Shahhat Upper Bridge	Number	RU-1	Test Date	Wednesday, December 28, 2022							
Location	Zagazig	Diameter (m)	1.20	Working Load (ton)	300.00							
	Sheikha gawmicheh - Egypt	Length (m)	27.85	Test Load 150% (ton)	450.00							
		Concrete Grade (kg/cm <sup>2</sup> )	300									
Appendix (A) - Settlement Records												
Total Time (min)	Time Increment (min)	Load Technique	Load (%)	Total Load (ton)	Dial Gauge Reading				Settlement (mm)	Average Settlement (mm)	Movement / Applied Load (mm/ton <sup>2</sup> )	Rate of Settlement (mm/min)
					1"	2"	3"	4"				
0:00	0:00	0:20	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	-	-
0:00	0:00			75.00	0:00	0:00	0:00	0:00	0:00	0:00	0.000	-
1:00	1:00			75.00	0:03	0:03	0:03	0:03	0:03	0:03	7.708	-
0:00	0:00			75.00	0:04	0:05	0:04	0:04	0:05	0:04	7.900	0.00187
10:00	10:00	Loading	20%	75.00	0:05	0:04	0:04	0:05	0:04	0:04	7.900	0.00150
20:00	20:00			75.00	0:07	0:06	0:04	0:05	0:06	0:06	8.267	0.00125
40:00	40:00			75.00	0:08	0:06	0:05	0:07	0:08	0:08	8.300	0.00088
00:00	00:00			75.00	0:11	0:09	0:09	0:08	0:10	0:09	8.300	0.00079
01:00	1:00			150.00	1:20	1:09	1:20	1:21	1:20	1:20	1.18	7.800
05:00	5:00			150.00	1:22	1:11	1:22	1:23	1:22	1:21	1.20	7.800
70:00	10:00			150.00	1:24	1:14	1:25	1:26	1:24	1:24	1.20	7.800
01:00	20:00	Loading	80%	150.00	1:28	1:19	1:27	1:27	1:28	1:27	1.26	8.267
100:00	40:00			150.00	1:29	1:19	1:26	1:26	1:28	1:28	1.25	8.400
120:00	00:00			150.00	1:29	1:19	1:21	1:20	1:28	1:27	1.27	8.467

 Consulting Bureau Prof. Adel Gabr 4 El-Dokki Street, Helwan, Giza, Egypt, 10011 Phone No. +972101000000 Fax No. +972101000000 Email: info@ead.com.eg		STATIC PILE LOAD TEST TEST LOAD 100% OF WORKING LOAD AMERICAN SOCIETY FOR TESTING AND MATERIAL (ASTM)															
<b>Project Data</b> Sheshaat Upper Bridge		<b>Pile Data</b> No. 64-1															
Location Sheshaat government - Egypt		<b>Test Data</b> Wednesday, December 20, 2023 Thursday, December 21, 2023															
Diameter (m) Length (m) Concrete Grade (kg/cm <sup>2</sup> )		Test Date Working Load (kn) Test Load 100% (kn)															
		1.30	27.65	350	300.00 450.00												
<b>Appendix (A) - Settlement Records</b>																	
Total Time (min)	Time Increment (min)	Load Technique	Load (%)	Total Load (kn)	Dial Gauge Reading				Settlement (mm)	Average Settlement (mm)	Movement / Applied Load (mm/kn <sup>2</sup> × 10 <sup>2</sup> )	Rate of Settlement (mm/min)					
					1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>									
121.00	1.00			225.00	1.86	1.87	1.77	1.74	1.68	1.67	1.77	1.74	1.68	1.67	1.71	7.478	-
126.00	5.00			225.00	1.67	1.65	1.65	1.77	1.67	1.60	1.60	1.77	1.60	1.60	1.71	7.366	0.00081
130.00	10.00		75%	225.00	1.75	1.65	1.64	1.80	1.73	1.65	1.64	1.80	1.65	1.64	1.75	7.278	0.00036
140.00	20.00	Loading		225.00	1.76	1.65	1.66	1.82	1.76	1.66	1.66	1.82	1.66	1.66	1.76	7.489	0.00060
160.00	40.00			225.00	1.76	1.65	1.67	1.84	1.78	1.68	1.67	1.84	1.68	1.67	1.76	7.567	0.00687
160.00	05.00			225.00	1.86	1.78	1.85	1.88	1.66	1.76	1.85	1.88	1.66	1.76	1.81	8.044	0.00068
161.00	1.00			300.00	2.48	2.40	2.61	2.62	2.48	2.40	2.56	2.62	2.40	2.56	2.62	8.383	-
168.00	8.00			300.00	2.52	2.44	2.61	2.66	2.52	2.44	2.56	2.66	2.44	2.56	2.66	8.563	0.01000
180.00	10.00	Loading	100%	300.00	2.66	2.67	2.71	2.75	2.66	2.67	2.71	2.75	2.66	2.67	2.71	8.700	0.00700
200.00	20.00			300.00	2.68	2.61	2.75	2.75	2.68	2.60	2.73	2.75	2.68	2.60	2.73	8.763	0.00080
220.00	40.00			300.00	2.81	2.63	2.76	2.76	2.81	2.63	2.76	2.76	2.81	2.63	2.76	8.863	0.00180
240.00	60.00			300.00	2.64	2.65	2.76	2.76	2.64	2.65	2.76	2.76	2.64	2.65	2.76	8.878	0.00137
241.00	1.00			375.00	3.23	3.20	3.45	3.47	3.23	3.20	3.45	3.47	3.23	3.20	3.45	8.820	-
246.00	6.00			375.00	3.26	3.24	3.52	3.60	3.26	3.24	3.52	3.60	3.26	3.24	3.52	8.073	0.00678
260.00	10.00	Loading	100%	375.00	3.30	3.27	3.56	3.64	3.30	3.27	3.56	3.64	3.30	3.27	3.56	8.107	0.00700
280.00	20.00			375.00	3.34	3.30	3.68	3.67	3.34	3.30	3.68	3.67	3.34	3.30	3.68	8.200	0.00060
280.00	40.00			375.00	3.37	3.34	3.65	3.60	3.37	3.34	3.65	3.60	3.37	3.34	3.65	8.263	0.00178
280.00	60.00			375.00	3.40	3.38	3.60	3.65	3.40	3.38	3.60	3.65	3.40	3.38	3.60	8.307	0.00198

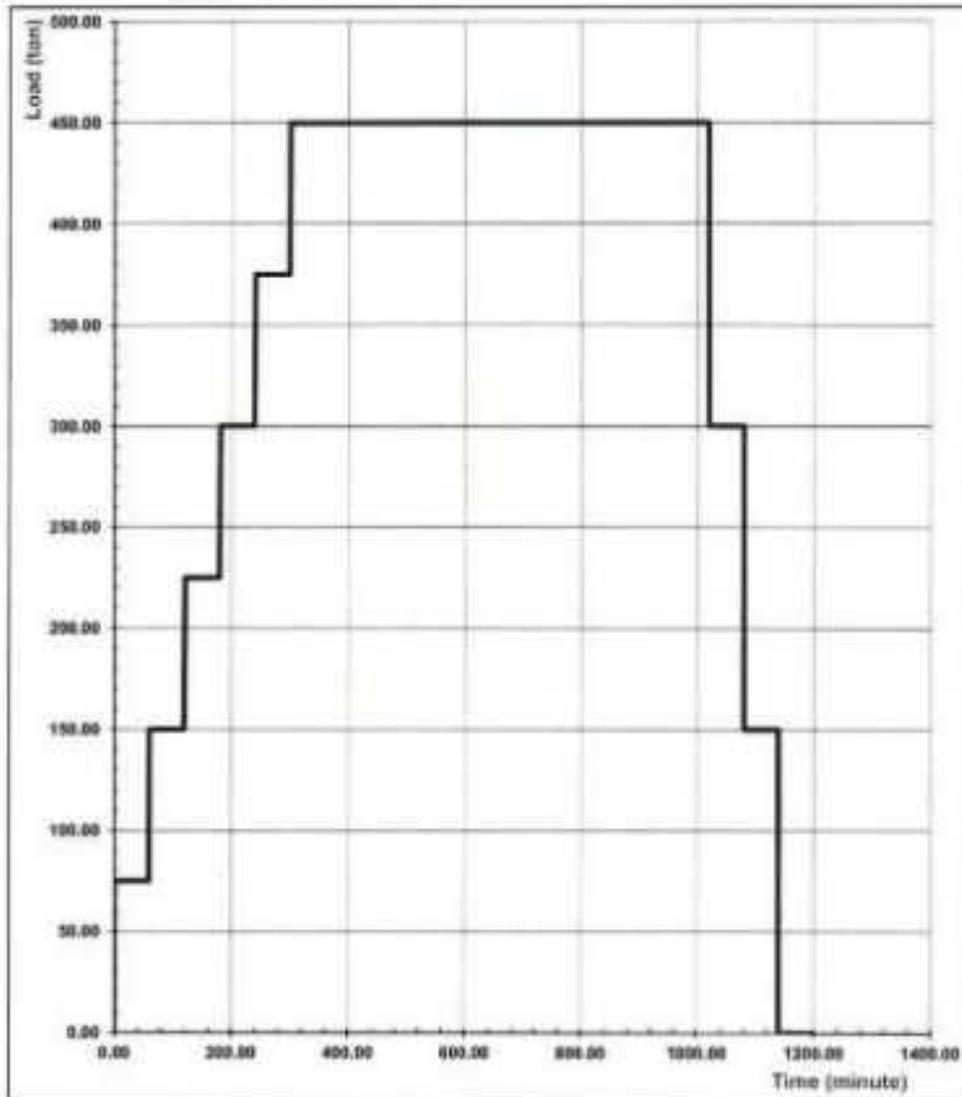
		Consulting Bureau Prof. Adel Gabr 1 El-Dokki Ave, Heliopolis, Cairo, Egypt 11511 Phone No. - 02100 100008 Email: info@abgm.com Website: www.abgm.com		<b>STATIC PILE LOAD TEST</b> <b>TEST LOAD 150% OF WORKING LOAD</b> <b>AMERICAN SOCIETY FOR TESTING AND MATERIAL (ASTM)</b>										
<b>Project Data</b>		<b>File Data</b>		<b>Test Data</b>										
Project	Shubrahat Upper Bridge	Number (Diameter [m])	R4-1	Test Date	Wednesday, December 20, 2022									
Location	Zagazig Shubrahat governmentals - Egypt	Length [m] Concrete Grade [kg/cm <sup>2</sup> ]	1.25 27.65	Working Load [ton]	Thursday, December 21, 2022									
			3.65	Test Load 150% [ton]	2055.00			4533.00						
Appendix (A) - Settlement Records														
Total Time [sec]	Time Increment [sec]	Load Technique	Total Load [ton]	Dial Gauge Reading				Settlement [mm]	Average Settlement [mm]	Movement / Applied Load [mm/ton*10 <sup>3</sup> ]	Rate of Settlement [mm/sec]			
				1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>							
305.00	1.00	Loading	460.00	4.15	4.10	4.28	4.30	4.10	4.28	4.20	4.21	8.390	-	
328.00	8.00		460.00	4.17	4.15	4.21	4.25	4.17	4.15	4.21	4.20	4.24	8.411	0.000878
315.00	10.00		460.00	4.20	4.15	4.24	4.28	4.20	4.15	4.24	4.26	4.28	8.472	0.000500
333.00	20.00		460.00	4.25	4.18	4.37	4.38	4.25	4.18	4.37	4.38	4.39	8.533	0.000780
340.00	40.00		460.00	4.28	4.22	4.40	4.42	4.28	4.22	4.40	4.42	4.43	8.611	0.001780
380.00	80.00		460.00	4.28	4.24	4.42	4.44	4.28	4.24	4.42	4.44	4.46	8.668	0.001000
385.00	90.00		460.00	4.30	4.27	4.48	4.48	4.30	4.27	4.48	4.48	4.57	8.711	0.000650
420.00	120.00		460.00	4.32	4.30	4.48	4.50	4.32	4.30	4.48	4.50	4.40	8.778	0.001000
480.00	180.00		460.00	4.38	4.33	4.52	4.54	4.38	4.33	4.52	4.54	4.44	8.888	0.000680
540.00	240.00		460.00	4.37	4.34	4.36	4.36	4.37	4.34	4.36	4.36	4.46	8.894	0.000380
600.00	300.00		460.00	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.47	8.922	0.000218
600.00	300.00		460.00	4.40	4.37	4.38	4.30	4.40	4.37	4.38	4.30	4.48	8.941	0.000280
720.00	420.00		460.00	4.42	4.38	4.38	4.31	4.42	4.38	4.38	4.31	4.50	8.944	0.000280
780.00	480.00		460.00	4.43	4.39	4.38	4.35	4.43	4.39	4.39	4.35	4.51	9.017	0.000187
840.00	540.00		460.00	4.44	4.40	4.30	4.35	4.44	4.40	4.30	4.30	4.52	9.038	0.000167
900.00	600.00	460.00	4.45	4.40	4.31	4.34	4.45	4.40	4.31	4.34	4.53	9.068	0.000138	
960.00	660.00	460.00	4.45	4.40	4.31	4.34	4.45	4.40	4.31	4.34	4.53	9.068	0.000000	
1000.00	720.00	460.00	4.45	4.40	4.31	4.34	4.45	4.40	4.31	4.34	4.53	9.068	0.000000	

 Consulting Bureau Prof. Adel Gaber 8 El-Dokki Street, Helwan, Cairo, Egypt, 11511 Phone No. +9662 53338888    Fax No. +9662 53338888    Email: info@agb-egy.com		STATIC PILE LOAD TEST TEST LOAD 150% OF WORKING LOAD AMERICAN SOCIETY FOR TESTING AND MATERIAL (ASTM)														
<b>Project Data</b> Project: Shubra El-Khayma Upper Bridge Location: Shubra El-Khayma - Egypt		<b>Pile Data</b> Number: R4-4 Diameter (m): 1.20 Length (m): 27.45 Concrete Grade (kg/cm <sup>2</sup> ): 300		<b>Test Data</b> Test Date: Wednesday, December 20, 2023 Thursday, December 21, 2023 Working Load (kn): 300.00 Test Load 150% (kn): 450.00												
Total Time (min)	Time Increment (min)	Load Technique	Load (%)	Total Load (ton)	Dial Gauge Reading				Settlement (mm)	Average Settlement (mm)	Movement / Applied Load (mm/ton)	Rate of Settlement (mm/min)				
					1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>								
1021.00	1.00	Unloading	100%	300.00	3.04	3.08	4.18	4.10	3.34	3.30	4.16	4.10	-	-		
1028.00	8.00			300.00	3.83	3.87	4.14	4.26	3.83	3.87	4.14	4.06			4.00	
1035.00	10.00			300.00	3.23	3.28	4.12	4.07	3.55	3.26	4.12	4.07			4.02	
1040.00	20.00			300.00	3.05	3.04	4.11	4.06	3.33	3.34	4.11	4.06			4.01	
1060.00	40.00	Unloading	80%	300.00	3.87	3.82	4.11	4.28	3.87	3.82	4.11	4.08	3.88	-	-	
1080.00	40.00			200.00	3.86	3.82	4.06	4.03	3.88	3.82	4.06	4.05	3.88			
1091.00	1.00			150.00	3.86	3.07	3.01	3.82	3.38	3.07	3.01	3.82	3.30			3.00
1098.00	8.00			150.00	3.85	3.04	3.06	3.30	3.40	3.04	3.06	3.30	3.30			3.27
1099.00	10.00	Unloading	60%	150.00	3.85	3.02	3.07	3.84	3.38	3.02	3.07	3.84	3.34	3.26	-	-
1100.00	20.00			100.00	3.81	3.00	3.06	3.87	3.31	3.00	3.06	3.87	3.27	3.24		
1120.00	40.00			100.00	3.88	3.00	3.05	3.89	3.38	3.00	3.05	3.89	3.26	3.25		
1140.00	60.00			100.00	3.88	3.05	3.04	3.86	3.38	3.05	3.04	3.86	3.24	3.21		
1141.00	1.00	Unloading	2%	0.00	1.80	1.86	1.48	1.30	1.80	1.86	1.48	1.30	1.48	-	-	
1148.00	8.00			0.00	1.45	1.40	1.45	1.38	1.45	1.40	1.45	1.38	1.45			1.46
1160.00	10.00			0.00	1.40	1.37	1.41	1.22	1.40	1.37	1.41	1.22	1.41			1.40
1160.00	30.00			0.00	1.37	1.34	1.37	1.18	1.37	1.34	1.37	1.18	1.37			1.37
1180.00	40.00	Unloading	-	0.00	1.33	1.35	1.33	1.18	1.33	1.35	1.33	1.18	1.33	-	-	
1200.00	60.00			0.00	1.30	1.47	1.32	1.15	1.30	1.47	1.32	1.15	1.32			1.31

Appendix (A) - Settlement Records

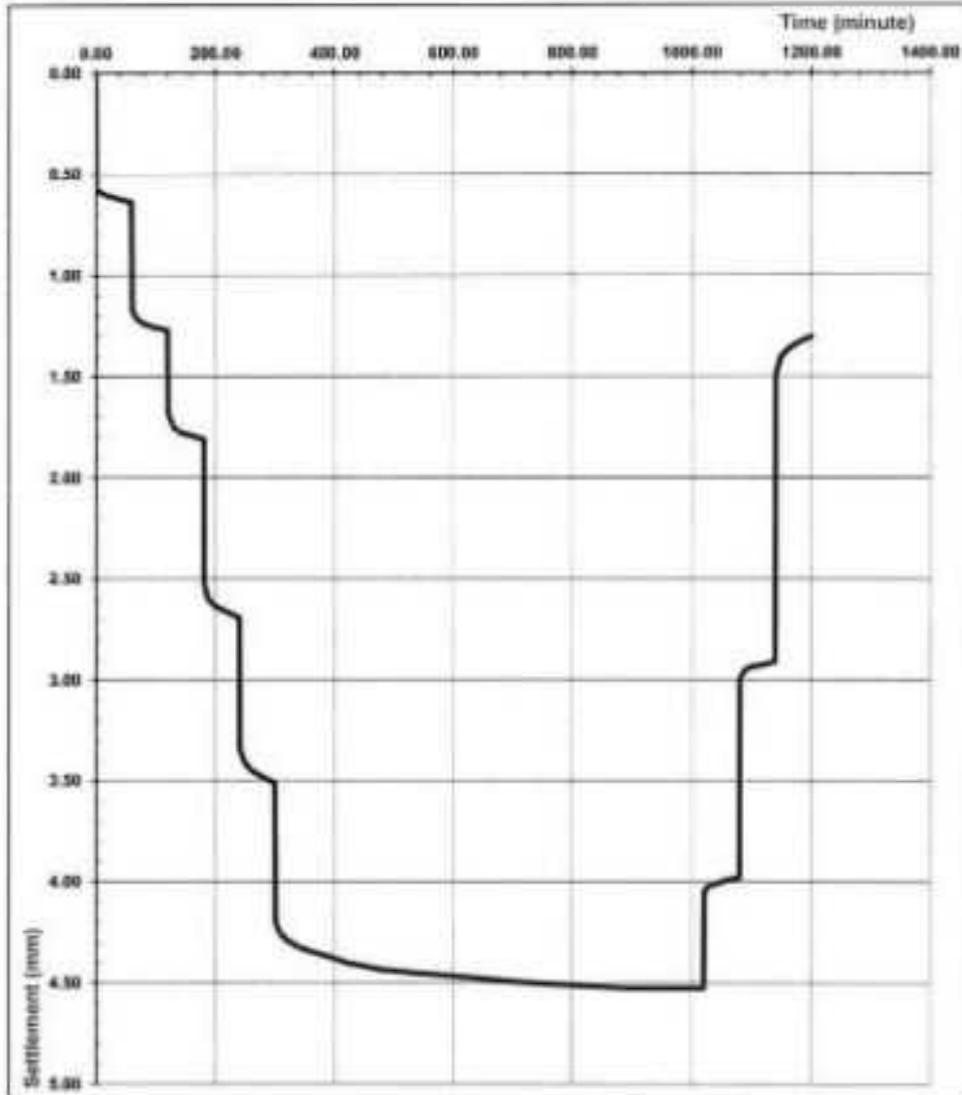
## Appendix B: Result Analysis

		<b>Consulting Bureau Prof. Adel Gohar</b> 414 El-Dokki, Helwan, Cairo, Egypt 11511 www.helwan.com Phone: +9720100000000000 E-mail: adelgohar@helwan.com		<b>STATIC PILE LOAD TEST</b> <b>TEST LOAD 150% OF WORKING LOAD</b> <b>AMERICAN SOCIETY FOR TESTING AND MATERIAL (ASTM)</b>	
<b>Project Data</b>		<b>Pile Data</b>		<b>Test Data</b>	
<b>Project</b>	Shahmed Upper Bridge	<b>Number</b>	04-1	<b>Test Date</b>	Wednesday, December 20, 2012
<b>Location</b>	Egypt	<b>Diameter (m)</b>	1.20	<b>Working Load (ton)</b>	300.00
	Marble concrete - Egypt	<b>Length (m)</b>	27.00	<b>Test Load 150% (ton)</b>	450.00
		<b>Concrete Grade (kg/cm<sup>2</sup>)</b>	250		



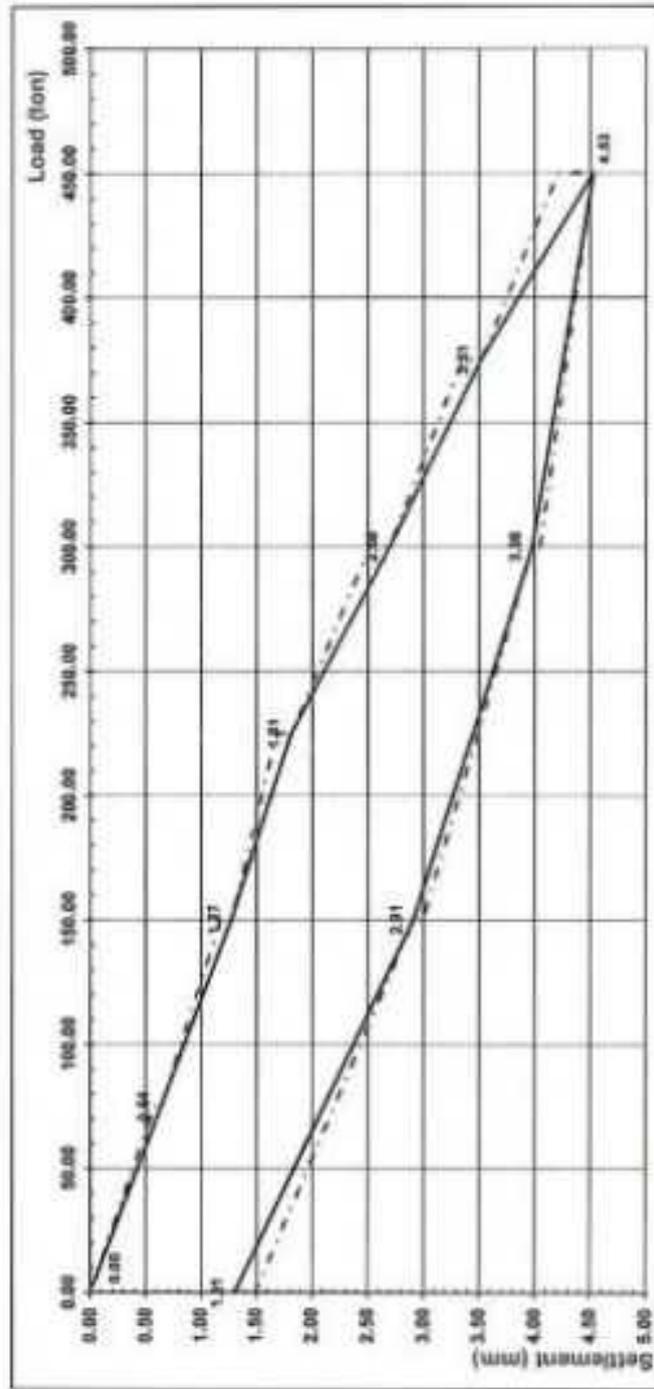
Appendix (B)  
 Figure 01: Time - Load Curve

		<b>Consulting Bureau Prof. Adel Gabr</b> 4 El Ghobaria, Helwan, Fakhria, Egypt, 11511 Phone: +91 9130303030    Fax: +91 9130303030		<b>STATIC PILE LOAD TEST</b> <b>TEST LOAD 100% OF WORKING LOAD</b> <b>AMERICAN SOCIETY FOR TESTING AND MATERIAL (ASTM)</b>	
<b>Project Data</b>		<b>Pile Data</b>		<b>Test Data</b>	
<b>Project</b>	Shabara Upper Bridge	<b>Number</b>	64-1	<b>Test Date</b>	Wednesday, December 20, 2023
<b>Location</b>	Zigra	<b>Diameter (m)</b>	1.20		Thursday, December 21, 2023
	Marka Governorate - Egypt	<b>Length (m)</b>	27.65	<b>Working Load (kN)</b>	300.00
		<b>Concrete Grade (kg/cm<sup>3</sup>)</b>	250	<b>Test Load 100% (kN)</b>	400.00



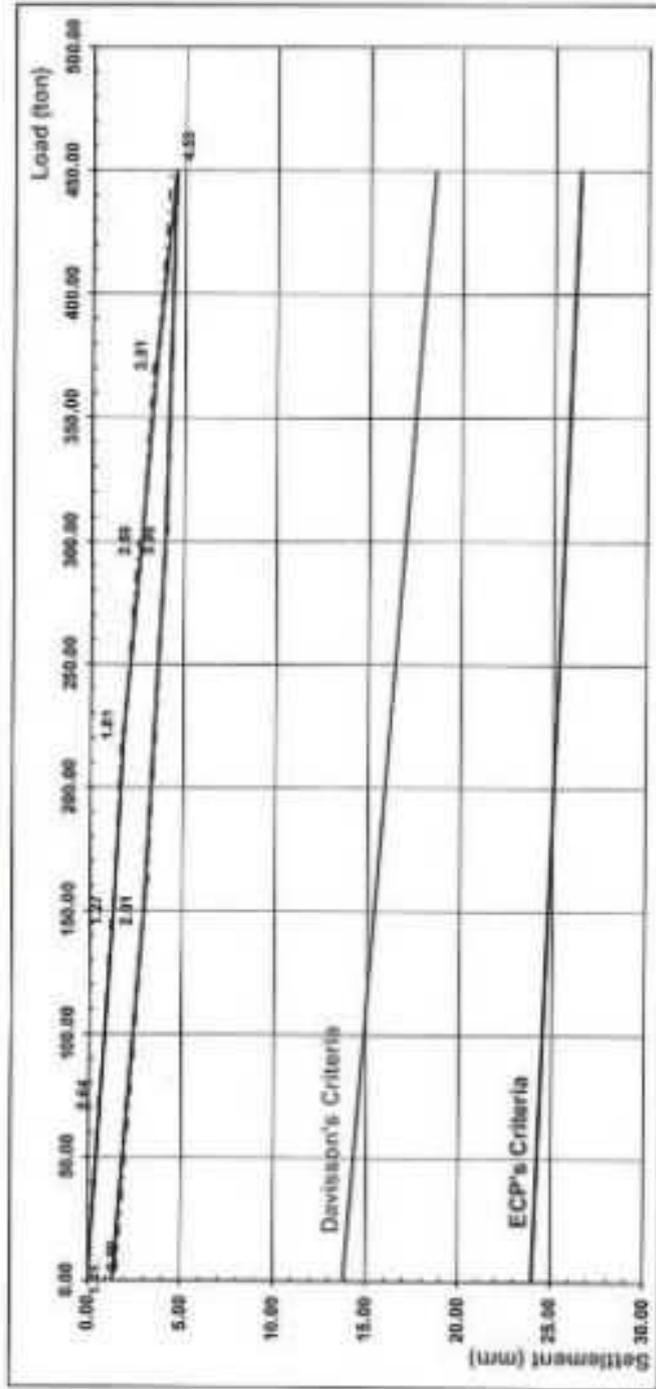
Appendix (B)  
Figure G2: Time - Settlement Curve

 Consulting Bureau Prof. Adel Gabr 9 El-Madinet, Mansour, Shoubra, Egypt, 58511 Phone No. +20101132228 Fax No. +2010132228		STATIC PILE LOAD TEST TEST LOAD 150% OF WORKING LOAD AMERICAN SOCIETY FOR TESTING AND MATERIAL (ASTM)	
Project	Shabanat Upper Bridge	Number	RL-1
Location	Zagazig Sharhia governorate - Egypt	Diameter (m)	1.30
		Length (m)	27.65
		Concrete Grade (kg/cm <sup>2</sup> )	350
		Test Date	
		Test Date	Wednesday, December 20, 2023
		Working Load (ton)	300.00
		Test Load 150% (ton)	450.00



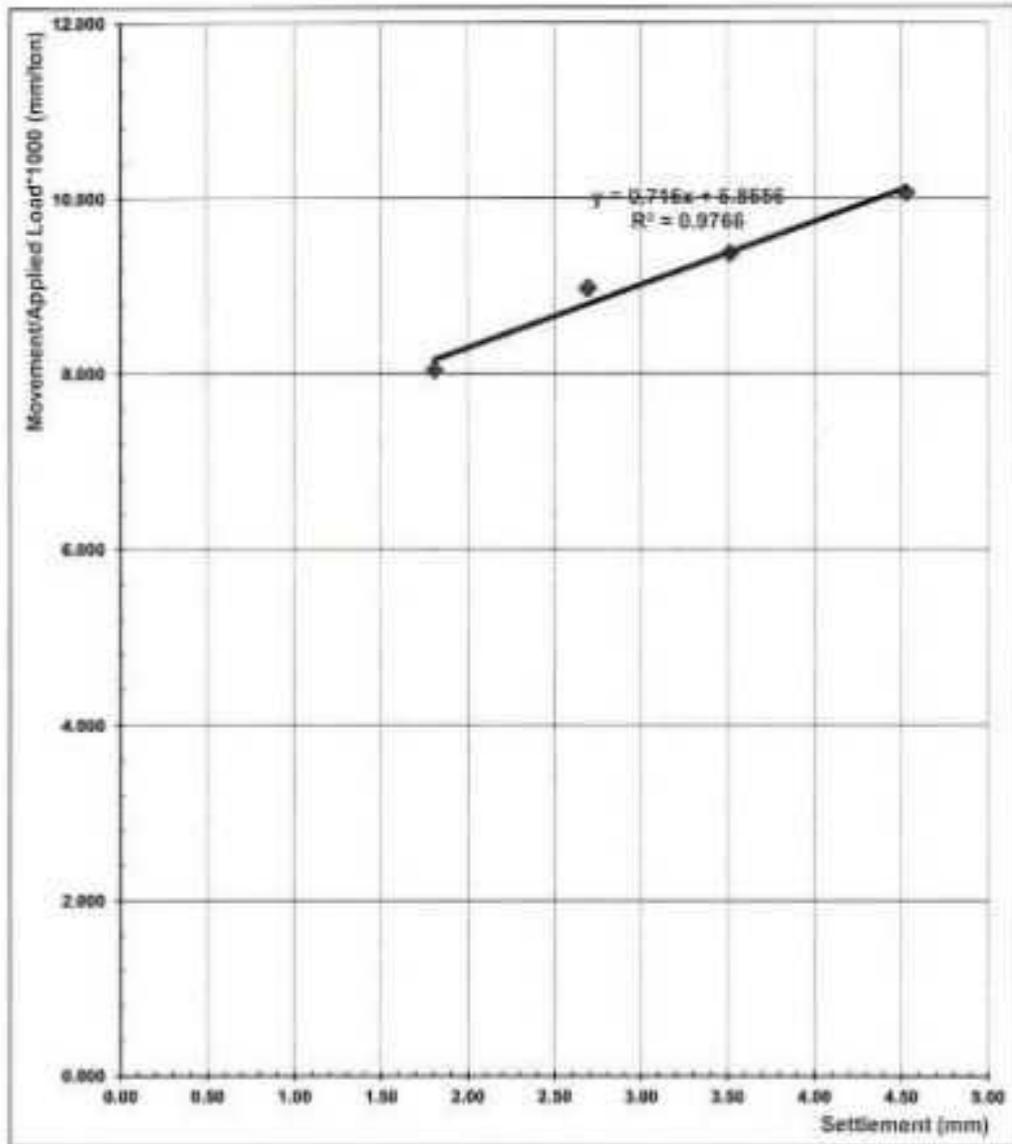
Appendix (B)  
Figure 03A: Load - Settlement Curve

		Consulting Bureau Prof. Adel Gabr 6 El-Dokki Ave., Nassr, Dokki, Egypt 11811 www.fhg-eg.com      E-mail: a.gabr@fhg-eg.com		<b>STATIC PILE LOAD TEST</b> <b>TEST LOAD 150% OF WORKING LOAD</b> <b>AMERICAN SOCIETY FOR TESTING AND MATERIAL (ASTM)</b>	
		Phone No.: +972010100008			
<b>Project Data</b>		<b>File Data</b>		<b>Test Data</b>	
Project	Shubnat Upper Bridge	Number	Rel-1	Test Date	Wednesday, December 20, 2023
Location	Zagazig Sharkia governorate - Egypt	Diameter (m)	1.20	Working Load (ton)	300.00
		Length (m)	27.85	Test Load 150% (ton)	450.00
		Concrete Grade (kg/cm <sup>2</sup> )	350		



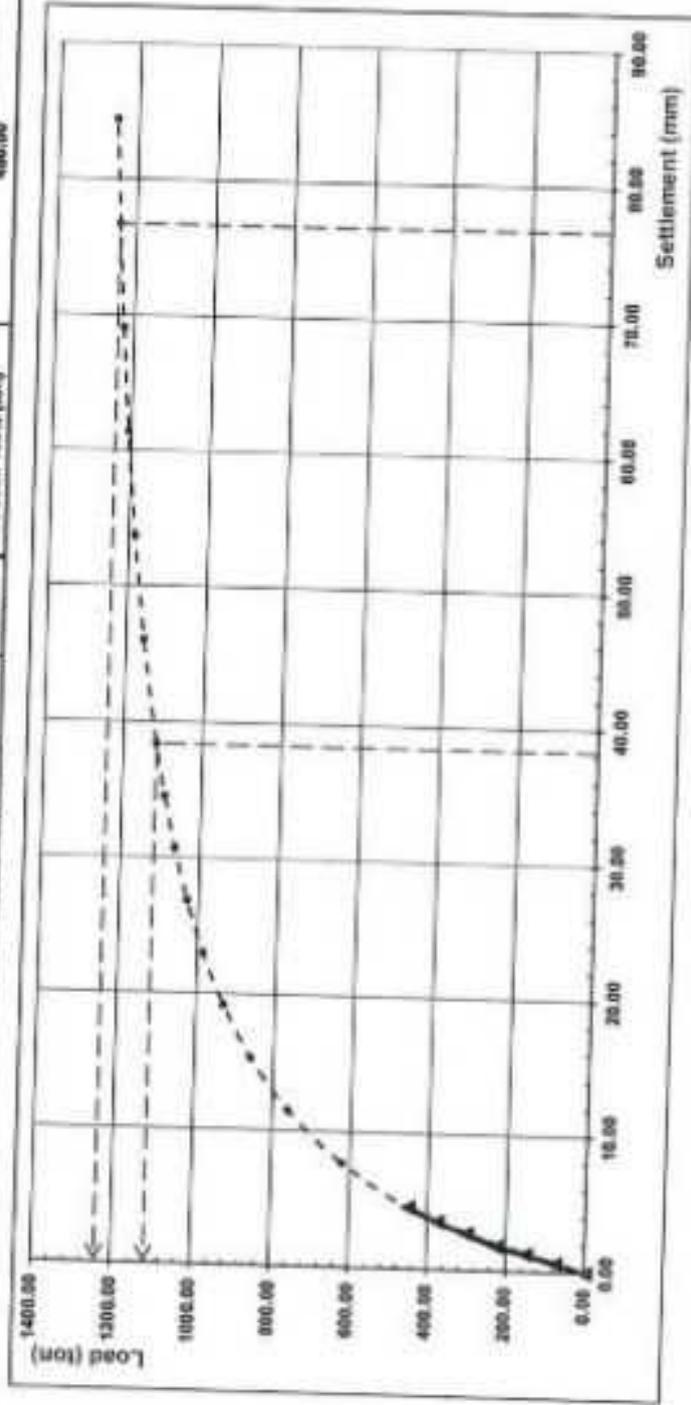
Appendix (B)  
Figure 03B: Load - Settlement Curve

		<b>Consulting Bureau Prof. Adel Gohr</b> 4 El-Dokki Ave., Dokki, Giza, Egypt, 12311 0111 2736 40278 Email: info@adg.com.eg		<b>STATIC PILE LOAD TEST</b> <b>TEST LOAD 150% OF WORKING LOAD</b> <b>AMERICAN SOCIETY FOR TESTING AND MATERIAL (ASTM)</b>	
<b>Project Data</b>		<b>Pile Data</b>		<b>Test Data</b>	
<b>Project</b>	Shubra el-Khaya Upper Bridge	<b>Number</b>	04-1	<b>Test Date</b>	Wednesday, December 20, 2023
<b>Location</b>	Shubra el-Khaya - Egypt	<b>Diameter (m)</b>	1.20	<b>Working Load (ton)</b>	300.00
		<b>Length (m)</b>	27.85	<b>Test Load 150% (ton)</b>	450.00
		<b>Concrete Grade (kg/cm<sup>2</sup>)</b>	300		



Appendix (B)  
 Figure 84: Modified Chin Method

 Consulting Bureau Prof. Adel Gabr 8 El-Nahat Street, Helwan, Suburbia, Egypt 10211 Phone No.: +973101108838 E-mail: info@adg-egy.com		<b>STATIC PILE LOAD TEST</b> <b>TEST LOAD 150% OF WORKING LOAD</b> <b>AMERICAN SOCIETY FOR TESTING AND MATERIAL (ASTM)</b>			
		<b>Project Data</b> Project: Shabanat Upper Bridge Location: Zagazig Shabha governorate - Egypt		<b>File Data</b> Number: RL-1 Diameter (m): 1.20 Length (m): 27.65 Concrete Grade (kg/cm <sup>2</sup> ): 250	



Appendix (B)  
 Figure 05: Brinch Hansen Method, 1963

رقم الاصدار: ( ١ )  
 تاريخ الاصدار: ٢٠١٦/٥/٢٨  
 رقم التعديل: ( )  
 تاريخ التعديل: / /

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 CONCRETE & MATERIALS  
 TESTING LABORATORY

Results of Concrete Testing Cubes

Project : شركة كويين للمباني Test Location : خ.م. حازم روم رقم ٩٧  
 Area Represented : ادارة مشاريع الجدة Test No. : 12  
 Class of Concrete : 350 MPa Specification No. : E.S. 203-2016  
 W/C ratio by wt : 0.42 Specimen : 152/1515  
 Slump mm. : 200

1. Mix Contents KG/M3

Cement : 430 KG/M3 Sand : 670 KG/M3  
 Water : 195 KG/M3 Course Aggregate : 590 - 440 KG/M3  
 Admixtures : 2-0 KG/M3 51 52 ..

Description	1	2	3	4	5	6
Day of Pouring	29-1	2-2	4			
Day of Testing	5-2	2-2	4			
Weight of Cube Kg.	8.550	8.460	8.500			
Density T / M3	2.53	2.51	2.52			
<b>Crushing Strength</b> K <sub>c</sub>	937	837	957			
C7 : Kg / Cm2	424	402	433			
C28 Kg / Cm2						

Average

$C7 = 420 \text{ Kg/Cm}^2$   
 $C28$

Average

Remarks :

تم ايقاد المتعارين وطابق

Tested by

Name :

Sign :

Date :

محمد  
29/5



Checked by

Name :

Sign :

Date :

محمد  
29/5

نموذج (FP18/13)

رقم الاصدار، ( ١ )  
 تاريخ الاصدار، ٢٠١٦/٥/٢٨  
 رقم التعديل، ( )  
 تاريخ التعديل، / /

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 TESTING LABORATORY

**Results of Concrete Testing Cubes**

Project : مشروع كورس السيار Test Location : Al-Tap  
 Area Represented : تأهيل محطات التبريد Test No. : 1  
 Class of Concrete : 530 MPa Specification No. : 530-2018  
 W/C ratio by wt : 0.4 Specimen : 78727  
 Slump mm. : 1

**I. Mix Contents KG/M3**

Cement : 11 KG/M3 Sand : 6 KG/M3  
 Water : 11 KG/M3 Coarse Aggregate : 6 KG/M3  
 Admixtures : 11 KG/M3

Description	1	2	3	4	5	6
Day of Pouring	4-1	20	24			
Day of Testing	1-2	20	24			
Weight of Cube Kg.						
Density T / M3	262	241	235			
<b>Crushing Strength</b> KN	270	281	318			
C7 Kg / Cm2						
C28 Kg / Cm2	562	591	661			

Average  $\frac{C7}{C28} = 605 \text{ Kg/cm}^2$

Remarks :

Tested by

Name :

Sign :

Date :



Checked by

Signature of the checker

نموذج (FP18/13)

رقم الاصدار: ( ١ )  
 تاريخ الاصدار: ٢٨/٥/٢٠١٦  
 رقم التعديل: ( )  
 تاريخ التعديل: / /

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Results of Concrete Testing Cubes

Project : مدرسة كوكبير السليمانية Test Location ٢-١-٤٤-٤٤  
 Area Represented : المنطقة الشمالية Test No. : 2  
 Class of Concrete : ٥٥٠ Specification No. : ٢٠١٥-٢٠١٥  
 W/C ratio by wt : ١ Specimen : ٣ ٣ ٣  
 Slump mm. : ١١

1. Mix Contents KG/M3

Cement : ٤ KG/M3 Sand : ١٢ KG/M3  
 Water : ١١ KG/M3 Course Aggregate : ٤ KG/M3  
 Admixtures : ٤ KG/M3

Description	1	2	3	4	5	6
Day of Pouring	17	1	2	2		
Day of Testing	14	2	2	2		
Weight of Cube Kg.	865	870	891	826		
Density T / M3						
<b>Crushing Strength <math>f_{cu}</math></b>	<b>344</b>	<b>244</b>	<b>333</b>	<b>329</b>		
C7 Kg / Cm2						
C28 Kg / Cm2	726	611	693	684		

Average

Average

Remarks :

$f_{cu}$   
 C28 = 673 Kg/cm<sup>2</sup>

المسوحه ضوئيا

Tested by

Name

Sign

Date



Checked by

Signature and date of the checker.

نموذج (FP18/13)

رقم الاصدار: ( ١ )  
 تاريخ الاصدار: ٢٠١١/٥/٢٨  
 رقم التعديل: ( )  
 تاريخ التعديل: / /

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**Results of Concrete Testing Cubes**

Project : منطقة الميناء Test Location : مبنى ١٧  
 Area Represented : المنطقة Test No. : 3  
 Class of Concrete : س٢٥ Specification No. : ٤٥:٢٠١٠  
 W/C ratio by wt : ٠.٤ Specimen : ٤٢٧  
 Slump mm. : ٤٠

**I. Mix Contents KG/M3**

Cement : 340 KG/M3 Sand : 1100 KG/M3  
 Water : 136 KG/M3 Coarse Aggregate : 640 KG/M3  
 Admixtures : 6 KG/M3

Description	1	2	3	4	5	6
Day of Pouring	31	1	2021			
Day of Testing	7	1	2021			
Weight of Cube Kg.	271	264	265	275		
Density T / M3						
<b>Crushing Strength</b> Kc	228	227	208	218		
C7 Kg / Cm2	1374	132	1333	453		
C28 Kg / Cm2						

Average  
 Average  
 Remarks :

C7 = 458 Kc  
~~C28~~

Tested by  
 Name :  
 Sign :  
 Date :



Checked by  
 Name :  
 Sign :  
 Date :

نموذج (FP18/13)

رقم الاصدار: ( ١ )  
 تاريخ الاصدار: ٢٠١٦/٥/٢٨  
 رقم التعديل: ( )  
 تاريخ التعديل: ١ / ١

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Results of Concrete Testing Cubes

Project : مبنى كورنيش Test Location : ١٤-٤-١٤-٢ عرب  
 Area Represented : ادارة المصانع Test No. : 2  
 Class of Concrete : ٥٥٠/٤٠ Specification No. : EN 12603-1018  
 W/C ratio by wt : ١ Specimen : ٢٢٢٢٢  
 Slump mm. : \_\_\_\_\_

1. Mix Contents KG/M3

Cement : 340 KG/M3 Sand : 1100 KG/M3  
 Water : 180 KG/M3 Coarse Aggregate : 1100 KG/M3  
 Admixtures : 4 KG/M3

Description	1	2	3	4	5	6
Day of Pouring	17	1	20	2		
Day of Testing	24	1	20			
Weight of Cube Kg.	24	1	20			
Density T / M3	852	891	881			
Crushing Strength $\times 10^3$	222	264	295			
C7 Kg / Cm2	12.61	54.9	61.4			
C28 Kg / Cm2	_____	_____	_____	2		

Average C7 = 54.1 MPa  
 Average C28  
 Remarks :

Tested by : [Signature]  
 Name : [Name]  
 Sign : [Signature]  
 Date : [Date]



Checked by : [Signature]

نموذج (FP18/13)

رقم الاصدار: ( ١ )  
 تاريخ الاصدار: ٢٠١٦/٥/٢٨  
 رقم التعديل: ( )  
 تاريخ التعديل: / /

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**Results of Concrete Testing Cubes**

Project : مشروع كوبري الكمامات  
 Area Represented : ادارة الدراسات والبحوث  
 Class of Concrete : 400 kg/cm<sup>2</sup>  
 W/C ratio by wt : 0.42  
 Slump mm. : 275  
 Test Location : P 14 عمود 3  
 Test No. : 20  
 Specification No. : ESI 203-2013  
 Specimen : 15 x 15 x 15

**I. Mix Contents KG/M3**

Cement : 460 KG/M3  
 Water : 195 KG/M3  
 Admixtures : 9.5 KG/M3  
 Sand : 725 KG/M3  
 Coarse Aggregate : 950 KG/M3

Description	1	2	3	4	5	6
Day of Pouring	6	2	2	Z		
Day of Testing	13	2	2			
Weight of Cube Kg.	8.360	8.400	8.390			
Density T / M3	2.47	2.49	2.48			
<b>Crushing Strength</b> kN	1106	1005	1095			
C7 Kg / Cm2	501	455	446			
C28 Kg / Cm2	---	---	---	Z		

Average  
 Average  
 Remarks :

$C7 = 478 \text{ kg/cm}^2$   
 $C28$

النتائج المذكورة صحيحة

Tested by

Name :

Sign :

Date :



Checked by

Signature and date of the checker.

نموذج (FP18/13)

رقم الاصدار: ( ١ )  
 تاريخ الاصدار: ٢٠١٦/٥/٢٨  
 رقم التعديل: ( )  
 تاريخ التعديل: / /

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 TESTING LABORATORY

**Results of Concrete Testing Cubes**

Project : مشروع كوبري الشبراخية Test Location : ١٠٠٠ عمود بار ٤٦  
 Area Represented : ادارة مشاريع الجسر Test No. : 21  
 Class of Concrete : ٤٠٠ kg/m<sup>3</sup> Specification No. : EC2-3-2018  
 W/C ratio by wt : ٠.٤٢ Specimen : 15x15x15  
 Slump mm. : 220

**1. Mix Contents KG/M3**

Cement : 460 KG/M3 Sand : 725 KG/M3  
 Water : 195 KG/M3 Course Aggregate : 950 KG/M3  
 Admixtures : 3.5 KG/M3

Description	1	2	3	4	5	6
Day of Pouring	6	2	2	2	4	
Day of Testing	13	2	2	2	4	
Weight of Cube Kg.	2.290	2.370	2.320			
Density T / M3	2.46	2.46	2.48			
<b>Crushing Strength</b> <sub>kg/cm<sup>2</sup></sub>	935	1112	934			
C7 <sub>kg/cm<sup>2</sup></sub>	423	504	425			
C28 <sub>kg/cm<sup>2</sup></sub>						

Average  
 Average  
 Remarks :

C7 = 451 kg/cm<sup>2</sup>  
 C28

١٠٠٠ عمود بار الجسر

Tested by  
 Name :  
 Sign :  
 Date :



Checked by  
 Name :  
 Sign :  
 Date :

نموذج (FP18/13)