

المنطقة الخامسة - (غرب الدلتا)

السيد المهندس / رئيس قطاع التنفيذ والمناطق

تحية طيبة .. وبعد،،

بالإحالة إلى مشروع القطار الكهربائى فائق السرعة (العين السخنة - العاصمة الادارية -
العلمين - مطروح) قطاع غرب النيل
نتشرف بأن نرفق لسيادتكم طيه المقايمة المعدله للقطاعات الآتية:-

المسلسل	اسم الشركة	من المحطة	إلى المحطة	الإتجاه
1	شركة الماسة للمقاولات العمومية والاستيراد والتصدير ش.م.م	363+000	366+000	إستكمال أعمال الردم وأعمال طبقات الأساس

برجاء من سيادتكم التفضل بالأحاطه والتوجيه بالازم

وتفضلوا بقبول فائق الاحترام والتقدير،،



رئيس الإدارة المركزية

منطقة غرب الدلتا

الاسكندرية - مرسى مطروح

عميد - مهندس /
هاني محمد محمود طه "

"هانی محمد محمود طه"



مشروع : القطار الكهربائي السريع (العين السخنة - العاصمة الادارية - العلمين - مطروح) قطاع غرب النيل فى المسافة
من الكم 363.000 الى الكم 366.000 بطول 3.00 كيلو متر - استكمال اعمال الردم واعمال طبقات الأساس
رقم البند و بيانه : (1-3) اعمال توريد وتشغيل اترية صالحة للردم ومطابقة للمواصفات والتشغيل باستخدام المعدات بسمك لا يزيد عن 50 سم
حتى منسوب 2 متر ويسمك لا يزيد عن 25 سم لاستكمال المنسوب التصميمي
عن شهر فبراير 2023
تنفيذ : شركة الماسة للمقاولات العمومية والاستيراد والتصدير

3٠

0.0

مقدار العمل السابق :

29583.959		كمية الاعمال بالمقاييس					البند
الكمية	المسطح	الطول	الى الكم	من الكم	التاريخ	رقم الريكويست	
1,136.40	18.94	60.00	364+860	364+800	2023/04/08	IR-F150	أعمال تحميل وتوريد ونقل أترية مطابقة للمواصفات وتشغيلها باستخدام الات التسوية بسمك لا يزيد عن 50 سم حتى منسوب 2 متر ويسمك لا يزيد عن 25 سم لاستكمال المنسوب التصميمي لتشكيل الجسر والاكتاف (نسبة تحمل كالفورنيا لا تقل عن 15%) ورشها بالمياة الاصولية للوصول الى نسبة الرطوبة المطلوبة والدمك الجيد بالهوايات للوصول الى اقصى كثافة جافة (95% من الكثافة الجافة القصوى) ويتم التنفيذ طبقا للمناسبي التصميمية والقطاعات العرضية النموذجية والرسومات التفصيلية المعتمدة والبند بجميع مشتملاته طبقا لاصول الصناعة ومواصفات الهيئة العامة للطرق والكبارى وتعليمات المهندس الشرف . - فى حالة طلب جهاز الاشراف زيادة نسبة الدمك عن 95% يحسب زيادة 1 جنيه على زيادة نسبة الدمك لكل 1% . -مسافة النقل حتى 2كم ويتم احتساب علاوة 1.5 جنيه للكم بالزيادة او النقصان. - السعر يشمل عمل تشوينات وتخليط واختبارات ونقل لموقع العمل حتى مسافة 2كم. - السعر يشمل قيمة المادة المحجرة.
599.20	7.49	80.00	365+180	365+100	2023/04/10	IR-F151	
433.40	21.67	20.00	363+120	363+100	2023/04/13	IR-F152	
1,522.80	12.69	120.00	365+300	365+180	2023/04/20	IR-F153	
421.40	21.07	20.00	363+120	363+100	2023/04/20	IR-F154	
438.00	21.90	20.00	363+120	363+100	2023/04/27	IR-F155	
5,682.00	18.94	300.00	365+100	364+800	2023/04/27	IR-F156	
4,368.00	18.20	240.00	365+100	364+860	2023/05/02	IR-F157	
722.40	9.03	80.00	365+180	365+100	2023/05/02	IR-F158	
401.60	20.08	20.00	363+120	363+100	2023/05/04	IR-F160	
1,519.20	12.66	120.00	365+300	365+180	2023/05/06	IR-F161	
919.20	11.49	80.00	365+180	365+100	2023/05/11	IR-F162	
421.60	21.08	20.00	363+120	363+100	2023/05/11	IR-F163	
1,512.00	12.60	120.00	365+300	365+180	2023/05/13	IR-F164	
917.60	11.47	80.00	365+180	365+100	2023/05/23	IR-F165	
1,519.20	12.66	120.00	365+300	365+180	2023/05/29	IR-F166	
1,122.00	18.70	60.00	364+860	364+800	2023/07/11	IR-F167	
397.20	19.86	20.00	363+120	363+100	2023/07/11	IR-F168	
397.20	19.86	20.00	363+280	363+260	2023/07/11	IR-F169	
2,049.60	17.08	120.00	365+900	365+780	2023/07/12	IR-F170	
1,028.35	17.1392	60.00	363+060	363+000	2024/08/08	(S5-B-MS) (IR-F-38-D.P) REV-01	
1,027.20	17.12	60.00	363+060	363+000	2024/08/12	(S5-B-MS) (IR-F-41-D.P) REV-01	
1,028.40	17.14	60.00	363+060	363+000	2024/08/15	(S5-B-MS) (IR-F-43-D.P) REV-01	
29583.95	اجمالي الكميات خلال فترة المستخلص الحالية (3م)						
29583.95	الاجمالي الكلي (3م)						

مدير مشروع الهيئة

م/ مارجريت مجدي زاهر



مهندس الاستشاري مكتب (XYZ)

م/ محمد شهاب خليل



مهندس الشركة

م/ عبدالرحمن محمد عبدالصمد



مشروع : القطار الكهربائي السريع (العين السخنة - العاصمة الادارية - العلمين - مطروح) قطاع غرب النيل في المسافة من الكم 363.000 الى الكم 366.000 بطول 3.00 كيلو متر - استكمال اعمال الردم واعمال طبقات الأساس

رقم البند و بيانه : (1-3) علاوة مسافة النقل للتربة مسافة 120 كم بنسبة 80%

تفصيل : شركة الماسة للمقاولات العمومية والاستيراد والتصدير

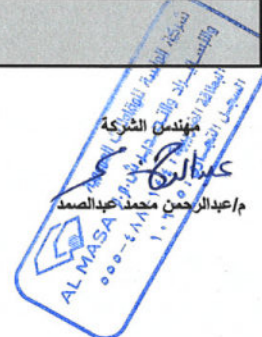
3م

0.0

مقدار العمل السابق :

2467.167				كمية الاعمال بالمقاييس				
البلد	رقم الريكويست	التاريخ	من الكم	الى الكم	الطول	المسطح	نسبة التربة	الكمية
أعمال تحميل وتوريد ونقل أتربة مطابقة للمواصفات وتشغيلها باستخدام آلات التسوية بسمك لا يزيد عن 50 سم حتى منسوب -2 متر وبسمك لا يزيد عن 25 سم لاستكمال المنسوب التصميمي لتشكيل الجسر والاكتاف (نسبة تحمل كاليفورنيا لا تقل عن 15%) ورشها بالمياة الاصولية للوصول الى نسبة الرطوبة المطلوبة والدمك الجيد بالهزات للوصول الى أقصى كثافة جافة (95% من الكثافة الجافة القصوى) ويتم التنفيذ طبقا للمناسبي التصميمية والقطاعات العرضية النموذجية والرسومات التفصيلية المعتمدة والبند بجميع مشتملاته طبقا لاصول الصناعة ومواصفات الهيئة العامة للطرق والكباري وتطبيقات المهندسين الشرف .	(S5-B-MS) (IR-F-38-D.P) REV-01	2024/08/08	363+000	363+060	60	17.1392	80%	822.68
- في حالة طلب جهاز الاشراف زيادة نسبة الدمك عن 95% بحسب زيادة 1 جنيه على زيادة نسبة الدمك لكل 1%.	(S5-B-MS) (IR-F-41-D.P) REV-01	2024/08/12	363+000	363+060	60	17.12	80%	821.76
- مسافة النقل حتى 2كم ويتم احتساب علاوة 1.5 جنيه للكم بالزيادة او النقصان.	(S5-B-MS) (IR-F-43-D.P) REV-01	2024/08/15	363+000	363+060	60	17.14	80%	822.72
- السعر يشمل عمل تشوينات وتخليط واختبارات ونقل لموقع العمل حتى مسافة 2كم.								
- السعر يشمل قيمة المادة المحجيرة.								
اجمالي الكميات خلال فترة المستخلص الحالية (م3)								
2467.16								
اجمالي الكالسي الكالسي (م3)								
2467.16								

مدير مشروع الهيئة
م/ مارجريت مجدي زاهر



مشروع : القطار الكهربائي السريع (العين السخنة - العاصمة الإدارية - العلمين - مطروح) قطاع غرب النيل في المسافة من الكم 363.000 الى الكم 366.000 بطول 3.00 كيلو متر - استكمال اعمال الردم واعمال طبقات الأساس

رقم البند و بيانه : (1-3) علاوة مسافة النقل للرمال مسافة 82 كم بنسبة 20%

تنفذ : شركة الماسة للمقاولات العمومية والاستيراد والتصدير

3م

0.0

مقدار العمل السابق :

616.792				كمية الاعمال بالمقاييس				
الكمية	نسبة الرمال	المسطح	الطول	الى الكم	من الكم	التاريخ	رقم الريكويست	البند
205.67	20%	17.1392	60	363+060	363+000	2024/08/08	(S5-B-MS) (IR-F-38-D.P) REV-01	اعمال تحميل وتوريد ونقل اترية مطابقة للمواصفات وتشغيلها باستخدام الات التسوية بسلك لايزيد عن 50 سم حتى منسوب 2- متر ويسمك لايزيد عن 25 سم لاستكمال المنسوب التصممي لتشكيل الجسر والاكشاف (نسبة تحمل كالفورنيا لا تقل عن 15%) ورشها بالمياة الاصولية للوصول الى نسبة الرطوبة المطلوبة والدمك الجيد بالهزات للوصول الى اقصى كثافة جافة (95% من الكثافة الجافة القصوى) ويتم التنفيذ طبقا للمناسي التصميمية والقطاعات العرضية النموذجية والرسومات التفصيلية المعتمدة والبند بجميع محتوياته طبقاً لاصول الصناعة ومواصفات الهيئة العامة للطرق والكباري وتعليمات المهندسين الشرف . - في حالة طلب جهاز الاشراف زيادة نسبة الدمك عن 95% بحسب زيادة 1 جنيه على زيادة نسبة الدمك لكل 1%.
205.44	20%	17.12	60	363+060	363+000	2024/08/12	(S5-B-MS) (IR-F-41-D.P) REV-01	مسافة النقل حتى 2كم ويتم احتساب علاوة 1.5 جنيه للكم بالزيادة او النقصان . - السعر يشمل عمل تشوينات وتخليط واختبارات ونقل لموقع العمل حتى مسافة 2كم . - السعر يشمل قيمة المادة المحجيرة.
205.68	20%	17.14	60	363+060	363+000	2024/08/15	(S5-B-MS) (IR-F-43-D.P) REV-01	
616.79	اجمالي الكميات خلال فترة المستخلص الحالية (3م)							
616.79	الاجمالي الكلي (3م)							

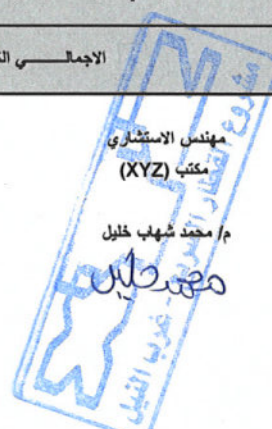
مدير مشروع الهيئة

م/ مارجريت مجدي زاهر



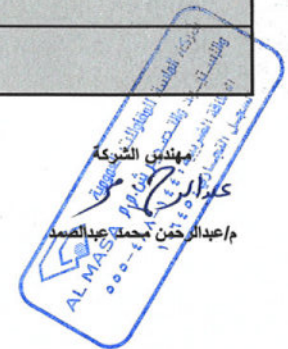
مهندس الاستشاري
مكتب (XYZ)

م/ محمد شهاب خليل



مهندس الشركة

م/ عبد الرحمن محمد عبدالصمد



مشروع : القطار الكهربائي السريع (العين السخنة -العاصمة الادارية -العلمين -مطروح) قطاع غرب النيل في المسافة من الكم 363.000 الى الكم 366.000 بطول 3.00 كيلو متر - استكمال اعمال الردم واعمال طبقات الأساس

رقم البند و بياته : (1-3) علاوة تحصيل رسوم الكارثة والموازن طبقا للاحه الشركة الوطنية

تنفيذ : شركة الماسة للمقاولات العمومية والاستيراد والتصدير

3م

26500.00

مقدار العمل السابق :

29583.959			كمية الاعمال بالمقيسة				
الكمية	المسطح	الطول	الى الكم	من الكم	التاريخ	رقم الريكويست	البند
1,028.35	17.1392	60.00	363+060	363+000	2024/08/08	(S5-B-MS) (IR-F-38-D.P) REV-01	أعمال تحميل وتوريد ونقل أتربة مطابقة للمواصفات وتشغيلها باستخدام الات التسوية بسمك لايزيد عن 50 سم حتى منسوب 2 متر وبسمك لايزيد عن 25 سم لاستكمال المنسوب التصميمي لتشكيل الجسر والاكتاف (نسبة تحمل كاليفورنيا لا تقل عن 15%) ورشها بالمياة الأصولية للوصول الى نسبة الرطوبة المطلوبة والدمك الجيد بالهوايات للوصول الى أقصى كثافة جافة (95% من الكثافة الجافة القصوى) ويتم التنفيذ طبقا للمناسي التصميمية والقطاعات العرضية النموذجية والرسومات التفصيلية المعتمدة والبند بجميع مشتملاته طبقا لاصول الصناعة ومواصفات الهيئة العامة للطرق والكبارى وتعليمات المهندس الشرف . - فى حالة طلب جهاز الاشراف زيادة نسبة الدمك عن 95% بحسب زيادة 1 جنيه على زيادة نسبة الدمك لكل 1% . -مسافة النقل حتى 2كم ويتم احتساب علاوة 1.5 جنيه للكم بالزيادة او النقصان. - السعر يشمل عمل تشوينات وتخليط واختبارات ونقل لموقع العمل حتى مسافة 2كم. - السعر يشمل قيمة المادة المحجرية.
1,027.20	17.12	60.00	363+060	363+000	2024/08/12	(S5-B-MS) (IR-F-41-D.P) REV-01	
1,028.40	17.14	60.00	363+060	363+000	2024/08/15	(S5-B-MS) (IR-F-43-D.P) REV-01	
3083.95	اجمالي الكميات خلال فترة المستخلص الحالية (3م)						
29583.95	الاجمالي الكلي (3م)						

مدير مشروع الهيئة

م/ مارجريت مجدي زاهر



مهندس الاستشاري

مكتب (XYZ)

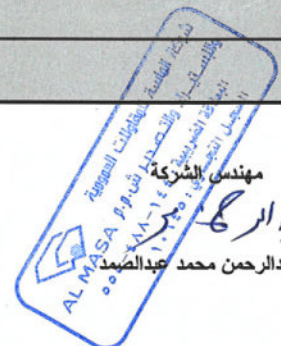
م/ مازن عصامي حبيب

مهندس الاستشاري

مكتب (XYZ)

م/ محمد شهاب خليل

محمد خليل



مهندس الشركة

م/ محمد عبد الرحمن محمد

مشروع : القطار الكهربائي السريع (العين السخنة - العاصمة الإدارية - العلمين - مطروح) قطاع غرب النيل في المسافة من الكم 363.000 الى الكم 366.000 بطول 3.00 كيلو متر - استكمال اعمال الردم واعمال طبقات الأساس
رقم البند و بيانه : (2-4) بالمتر المكعب اعمال توريد وفرش طبقة أساس من الاحجار الصلبة المترجرة ناتج تكسير الكسارات والمطابقة للمواصفات
عن شهر فبراير 2023

توقيع : شركة الماسة للمقاولات الصومية والاستيراد والتصدير

3٠

1947.52

مقار العمل السابق :

27497.04			كمية الاعمال بالمقايمة							
الكمية	المسطح	الطول	ترقيم EET		ترقيم ENR		التاريخ	ITEM	رقم الريكويست	البند
			من الكم	الى الكم	من الكم	الى الكم				
418.74	2.991	140	363+260	363+120	-	-	2023/03/11	Sub-Ballast (1)	(IR-SB-07-EET)	بالمتر المكعب اعمال توريد وفرش طبقة أساس من الاحجار الصلبة المترجرة ناتج تكسير الكسارات والمطابقة للمواصفات واقصي حجم للحبيبات ما بين 31.5م الى 40مم والا يزيد نسبة المار من منخل 200 عن 5% والتدرج الوارد بالاشتراطات الخاصة بالمشروع لا تقل نسبة تحمل كاليفورنيا عن 80% والا يقل معامل المرونة (Ev2) من تجربه لوح التحميل عن 120 ميجاباسكال والا يزيد نسبة الفقد بجهاز لوس انجلوس عن 30% والا يزيد الامتصاص عن 15% ويتم فردها علي طبقتين باستخدام الات التسوية الحديثة علي ان لا يزيد سمك الطبقة بعد تمام الدمك عن 20 سم ورشها بالحبيبات الاصلوية للوصول الي نسبة الرطوبة المطلوبة والدمك الجيد بالهراسات للوصول الي اقصى كثافة جافة (لا تقل عن 100%) من الكثافة المعملية والفئة تشمل اجراء التجارب المعملية والحقلية ويتم التنفيذ طبقا لاصول الصناعة والرسومات التفصيلية المعتمدة والبند يجمع مشتعلاته طبقا للمواصفات الفنية للمشروع وتقرير الاستشاري وتعليمات المهندس المشرف. - مسافه النقل لا تقل 20 كم . - يتم احتساب علاوه 1.3 جنيه لكل 1 كم بالزيادة او النقصان . - السعر لا يشمل قيمة المواد المحجيرة .
837.48	2.991	280	365+580	365+300	-	-	2023/03/13	Sub-Ballast (1)	(IR-SB-08-EET)	
400.96	2.864	140	363+260	363+120	-	-	2023/03/18	Sub-Ballast (2)	(IR-SB-09-EET)	
299.10	2.991	100	363+700	363+600	-	-	2023/03/28	Sub-Ballast (1)	(IR-SB-10-EET)	
801.92	2.864	280	365+580	365+300	-	-	2023/03/30	Sub-Ballast (2)	(IR-SB-11-EET)	
286.40	2.864	100	363+700	363+600	-	-	2023/04/04	Sub-Ballast (2)	(IR-SB-12-EET)	
239.28	2.991	80	365+660	365+680	-	-	2023/04/11	Sub-Ballast (1)	(IR-SB-13-EET)	
598.20	2.991	200	363+900	363+700	-	-	2023/04/16	Sub-Ballast (1)	(IR-SB-14-EET)	
658.02	2.991	220	364+120	363+900	-	-	2023/04/16	Sub-Ballast (1)	(IR-SB-15-EET)	
229.12	2.864	80	365+660	365+680	-	-	2023/04/16	Sub-Ballast (2)	(IR-SB-16-EET)	
572.80	2.864	200	363+900	363+700	-	-	2023/04/22	Sub-Ballast (2)	(IR-SB-17-EET)	
630.08	2.864	220	364+120	363+900	-	-	2023/04/22	Sub-Ballast (2)	(IR-SB-18-EET)	
179.46	2.991	60	364+860	364+800	-	-	2023/05/04	Sub-Ballast (1)	(IR-SB-19-EET)	
538.38	2.991	180	365+840	365+660	-	-	2023/05/07	Sub-Ballast (1)	(IR-SB-20-EET)	
171.84	2.864	60	364+860	364+800	-	-	2023/05/10	Sub-Ballast (2)	(IR-SB-21-EET)	
516.62	2.864	180	365+840	365+660	-	-	2023/05/13	Sub-Ballast (2)	(IR-SB-22-EET)	
69.82	2.991	20	363+120	363+100	-	-	2023/07/22	Sub-Ballast (1)	(IR-SB-23-EET)	
69.82	2.991	20	363+280	363+260	-	-	2023/07/22	Sub-Ballast (1)	(IR-SB-24-EET)	
57.28	2.864	20	363+280	363+260	-	-	2023/07/28	Sub-Ballast (2)	(IR-SB-25-EET)	
57.28	2.864	20	363+120	363+100	-	-	2023/07/29	Sub-Ballast (2)	(IR-SB-26-EET)	
1028.16	2.866	360	364+100	363+740	-	-	2023/11/04	Sub-Ballast (1)	(S5-B-MS) (IR-S.B-01-D.P)	
990.36	2.751	360	364+100	363+740	-	-	2023/11/07	Sub-Ballast (2)	(S5-B-MS) (IR-S.B-02-D.P)	
698.88	2.688	260	363+740	363+480	-	-	2023/11/18	Sub-Ballast (1)	(S5-B-MS) (IR-S.B-03-D.P)	
659.10	2.635	260	363+740	363+480	-	-	2023/11/21	Sub-Ballast (2)	(S5-B-MS) (IR-S.B-04-D.P)	
1076.76	2.991	360	364+460	364+100	-	-	2023/12/16	Sub-Ballast (1)	(S5-B-MS) (IR-S.B-05-D.P)	

مدير مشروع الهيئة

م/ مارجريت مجدي زاخر



مهندس الاستشاري
مكتب (XYZ)

م/ محمد شهاب خليل

مهندس الشركة

م/ عبد الرحمن محمد عبد الصمد

الكمية	المسطح	الطول	EET ترافيم		ENR ترافيم		التاريخ	ITEM	رقم الريكويست	البند
			الى الكم	من الكم	الى الكم	من الكم				
180.00	3.000	60	363+060	363+000	-	-	2023/12/17	Sub-Ballast (1)	(S5-B-MS) (IR-S.B-06-D.P)	بالمتر المكعب أعمال توريد وفرش طبقة أساس من الاحجار الصلبة المتدرجة ناتج تكسير الكسارات والمطابقة للمواصفات واقصى حجم للحبيبات ما بين 31.5مم الى 40مم والا يزيد نسبة المار من منخل 200 عن 5% والتدرج الوارد بالاشتراطات الخاصة بالمشروع لا تقل نسبة تحمل كاليفورنيا عن 80% والا يقل معامل المرونة (Ev2) من تجربه لوح التحميل عن 120 ميجاباسكال والا يزيد نسبة الفقد بجهاز لوس انجلوس عن 30% والا يزيد الامتصاص عن 15% ويتم فردها على طبقتين باستخدام الات التسوية الحديثة على ان لا يزيد سمك الطبقة بعد تمام الدمك عن 20 سم ورشها بالمياة الاصوية للوصول الى نسبة الرطوبة المطلوبة والدمك الجيد بالهراسات للوصول الى اقصى كثافة جافة (لا تقل عن 100%) من الكثافة العملية والفقه تشمل اجراء التجارب المعملية والتفتيش ويتم التنفيذ طبقا لاصول الصناعة والرسومات التفصيلية المعتمدة والبند بجميع مشتملاته طبقا للمواصفات الفنية للمشروع وتقرير الاستشاري وتعليمات المهندس المشرف. - مسافة النقل لا تقل 20 كم . - يتم احتساب علاوة 1.3 جنيه لكل 1 كم بالزياده او النقصان . - السعر لا يشمل قيمة المواد المحجورية .
216.92	5.423	40	363+100	363+060	-	-	2023/12/17	Sub-Ballast (1)	(S5-B-MS) (IR-S.B-07-D.P)	
1039.32	2.887	360	364+460	364+100	-	-	2023/12/19	Sub-Ballast (2)	(S5-B-MS) (IR-S.B-08-D.P)	
180.00	3.000	60	363+060	363+000	-	-	2023/12/20	Sub-Ballast (2)	(S5-B-MS) (IR-S.B-09-D.P)	
211.92	5.298	40	363+100	363+060	-	-	2023/12/20	Sub-Ballast (2)	(S5-B-MS) (IR-S.B-10-D.P)	
123.00	4.100	30	363+310	363+280	-	-	2024/01/18	Sub-Ballast (1)	(S5-B-MS) (IR-S.B-11-D.P)	
651.72	5.431	120	363+480	363+360	-	-	2024/01/18	Sub-Ballast (1)	(S5-B-MS) (IR-S.B-12-D.P)	
120.00	4.000	30	363+310	363+280	-	-	2024/01/22	Sub-Ballast (2)	(S5-B-MS) (IR-S.B-13-D.P)	
636.72	5.306	120	363+480	363+360	-	-	2024/01/22	Sub-Ballast (2)	(S5-B-MS) (IR-S.B-14-D.P)	
183.24	1.018	180	363+280	363+100	-	-	2024/01/28	Sub-Ballast (2)	(S5-B-MS) (IR-S.B-15-D.P)	
956.92	1.018	940	364+540	363+600	-	-	2024/02/04	Sub-Ballast (2)	(S5-B-MS) (IR-S.B-16-D.P)	
1316.04	2.991	440	365+300	364+860	-	-	2024/05/25	Sub-Ballast (1)	(S5-B-MS) (IR-S.B-27-EET)	
1260.16	2.864	440	365+300	364+860	-	-	2024/05/29	Sub-Ballast (2)	(S5-B-MS) (IR-S.B-28-EET)	
478.56	2.991	160	366+000	365+840	-	-	2024/05/25	Sub-Ballast (1)	(S5-B-MS) (IR-S.B-29-EET)	
458.24	2.864	160	366+000	365+840	-	-	2024/05/29	Sub-Ballast (2)	(S5-B-MS) (IR-S.B-30-EET)	
316.00	1.580	200	363+320	363+120	3+860	3+660	2023/07/27	Sub-Ballast (1)	(S5-B-MS) (IR-SB-01-ENR)	
292.00	1.460	200	363+320	363+120	3+860	3+660	2023/08/01	Sub-Ballast (2)	(S5-B-MS) (IR-SB-02-ENR)	
853.20	1.580	540	365+580	365+040	6+120	5+580	2023/08/16	Sub-Ballast (1)	(S5-B-MS) (IR-SB-03-ENR)	
316.00	1.580	200	365+780	365+580	6+320	6+120	2023/08/17	Sub-Ballast (1)	(S5-B-MS) (IR-SB-04-ENR)	
347.60	1.580	220	366+000	365+780	6+540	6+320	2023/08/19	Sub-Ballast (1)	(S5-B-MS) (IR-SB-05-ENR)	
788.40	1.460	540	365+580	365+040	6+120	5+580	2023/08/21	Sub-Ballast (2)	(S5-B-MS) (IR-SB-06-ENR)	
262.80	1.460	180	365+760	365+580	6+300	6+120	2023/08/22	Sub-Ballast (2)	(S5-B-MS) (IR-SB-07-ENR)	
350.40	1.460	240	366+000	365+760	6+540	6+300	2023/08/23	Sub-Ballast (2)	(S5-B-MS) (IR-SB-08-ENR)	
94.80	1.580	60	363+420	363+360	3+960	3+900	2023/09/02	Sub-Ballast (1)	(S5-B-MS) (IR-SB-09-ENR)	
87.60	1.460	60	363+420	363+360	3+960	3+900	2023/09/06	Sub-Ballast (2)	(S5-B-MS) (IR-SB-10-ENR)	
189.60	1.580	120	365+040	364+920	5+580	5+460	2023/10/26	Sub-Ballast (1)	(S5-B-MS) (IR-SB-11-ENR)	
175.20	1.460	120	365+040	364+920	5+580	5+460	2023/10/31	Sub-Ballast (2)	(S5-B-MS) (IR-SB-12-ENR)	
726.80	1.580	460	364+920	364+460	5+460	5+000	2024/01/03	Sub-Ballast (1)	(S5-B-MS) (IR-SB-13-ENR)	
671.60	1.460	460	364+920	364+460	5+460	5+000	2024/01/08	Sub-Ballast (2)	(S5-B-MS) (IR-SB-14-ENR)	
25549.52		اجمالي الكميات خلال فترة المستخلص الحالية (م3)								
27497.04		الاجمالي الكلي (م3)								

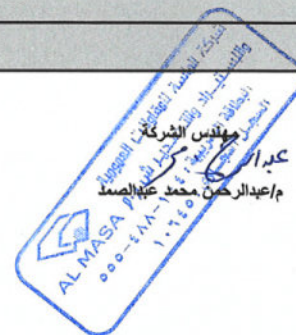
مدير مشروع الهيئة

م/ ملارجيت مجدي زاهر



مهندس الاستشاري
مكتب (XYZ)

م/ محمد شهاب خليل



مهندس الشركة
م/ عبد الرحمن محمد عبد الصمد

MATERIAL APPROVAL REQUEST	AL MASA		الهيئة العامة للطرق والكباري (GARB)	وزارة النقل	الهيئة العامة للطرق والكباري	الهيئة العامة للطرق والكباري	الهيئة العامة للطرق والكباري	الهيئة العامة للطرق والكباري
	AL MASA		الهيئة العامة للطرق والكباري (GARB)	وزارة النقل	الهيئة العامة للطرق والكباري	الهيئة العامة للطرق والكباري	الهيئة العامة للطرق والكباري	الهيئة العامة للطرق والكباري

Contractor Company	Al-Masa General Contracting Company		Designer Company	(SPECTRUM) Engineering Consulting Office						
Issued by Contractor	Name	Sign	Date/Serial Number	Time						
	Eng. Mohamed Elsaied		30/09/2023 (S5-B-MS) (MAR-S.B-05)	1:00 PM						
Received by GARB CONSULTANT	Eng. Mazen Essamy	MAR	C1	C2	C3	DD	MM	YY	HH	MM
			363	EW	CS	1	10	2023		

CODE-1	S1 to S21	D1 to S3	Kp XXX Note
	Station Reference	Depot Reference	For Kilometer point only Start Km is used
CODE-2	Work Activity		
CODE-3	Sub Element of Activity		

Description of Materials	Sub-ballast Total Quantity (25,000 m3)				
Location to be Used	From	363+000	TO	366+000	Rev-29
		363+180		366+180	Rev-35
sample only	yes	Materials Type	S.B		
Supplier Name	Elsiw , Alharamin	Data Sheet Provided	yes attached		
reference in BOQ		Specification	EARTHWORK SPECIFICATIONS & TESTING REPORT (CG21-41.2) VERSION 2 BY CIVECON GROUP		
Prequalification Reference		Test Samples Results			
Reference Photos	NO	Other			
Comments by: Eng. Mazen Essamy (SPECTRUM)		Comments by: Eng. Alaa Abd-Allatif (ER)			
1-quality test result by third party lab (comibassal) is Approved		1-All Tests Were Carried -Out By Third Party Lab			
2-this sample representative (5000 m3) only		2-Results report attached and acceptable with project specifications.			

APPROVAL STATUS				
Organisation	Name	Sign	Date	A-AWC-R
Contractor	Eng. Mohamed Elsaied			A
QA/QC *	Eng. Mazen Essamy			A
GARB**	Eng. Margeret Magdy			
Employers Representative	Eng. Alaa Abd-Allatif			A

* Designer

** Alignment/Bridge: (S5-B-MS) (MAR-S.B-05)

MATERIAL APPROVAL REQUEST	     	
	AL MASA General Contracting Company (SPECTRUM) Engineering Consulting Office	

Contractor Company	Al-Masa General Contracting Company		Designer Company	(SPECTRUM) Engineering Consulting Office						
Issued by Contractor	Name	Sign	Date/Serial Number	Time						
	Eng. Mohamed Elsaied		30/09/2023 (S5-B-MS) (MAR-S.B-05)	1:00 PM						
Received by GARB CONSULTANT	Eng. Mazen Essamy	MAR	C1	C2	C3	DD	MM	YY	HH	MM
			363	EW	CS	1	10	2023		

CODE-1	S1 to S21	D1 to S3	Kp XXX Note
	Station Reference	Depot Reference	For Kilometer point only Start Km is used
CODE-2	Work Activity		
CODE-3	Sub Element of Activity		

Description of Materials	Sub-ballast Total Quantity (25,000 m3)				
Location to be Used	From	363+000	TO	366+000	Rev-29
		363+180		366+180	Rev-35
sample only	yes	Materials Type		S.B	
Supplier Name	Elsiwiy , Alharamin	Data Sheet Provided		yes attached	
reference in BOQ		Specification		EARTHWORK SPECIFICATIONS & TESTING REPORT (CG21-41.2) VERSION 2 BY CIVECON GROUP	
Prequalification Reference		Test Samples Results			
Reference Photos	NO	Other			
Comments by: Eng. Mazen Essamy (SPECTRUM)			Comments by: Eng. Alaa Abd-Allatif (ER)		
1-quality test result by third party lab (comibassal) is Approved			1-All Tests Were Carried -Out By Third Party Lab		
2-this sample representative (5000 m3) only			2-Results report attached and acceptable with project specifications.		
			3-Final approval is subject to above mentioned comments.		

APPROVAL STATUS				
Organisation	Name	Sign	Date	A-AWC-R
Contractor	Eng. Mohamed Elsaied			A
QA/QC *	Eng. Mazen Essamy			A
GARB**	Eng. Margeret Magdy			
Employers Representative	Eng. Alaa Abd-Allatif		5-10-2023	Awc

* Designer

** Alignment/Bridge (S5-B-MS) (MAR-S.B-05)



COMIBASSAL International Controllers

Internal inspection and laboratories sector

Accredited by : Egypt General Authority for Petroleum under No. 34/29-11-2011

SOIL REPORTS FOR ELECTRIC EXPRESS TRAIN PROJECT

Contractor :

شركة الماسة للمقاولات

Date of report :

5/10/2023

QC :

990-4





COMIBASSAL International Controllers

Internal inspection and laboratories sector

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I- Introduction

General Consultant :	SYSTRA
Consultant :	Spectrum
Contractor :	شركة الماسة للمقاولات
Sample :	Sub-Ballast
Station :	St(363+000) to st(366+000)
Date of Test :	1/10/2023
QC :	990-4

II- Sample description:

Crushed stone and sand

III- Required tests and Results:

Required Tests		Results
1- Grain size analysis and classification and Percentage of MATERIALS FINER THAN No. 200 (75 μ m)	Grain size analysis	As showed in appendix
	Classification	A-1-a
	Pass From No.200	3.4%
2- Modified compaction (Proctor test)	MDD	2.210
	OMC	6.5%
3- Liquid limit, plastic limit and plasticity index	LL	Non plastic
	PL	Non plastic
	PI	Non plastic
4- California bearing ratio (CBR)	CBR ratio	97%
5- Specific gravity (SG), absorption and degradation	S S D	2.552
	Absorption	1.4%
	Degradation	0.2%
6- Los Angeles test	Abrasion ratio	22.2%

IV- Notes

- 1- Samples were brought by : contractor
- 2- Samples are responsible from the Person who brought it.
- 3- The results are applying only for the present report.



LAB DIRECTOR
Eng / Eman kandil



Geotechnical consultant
Dr. Mohamed Mostafa Badry





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APPENDIX





COMIBASSAL International Controllers

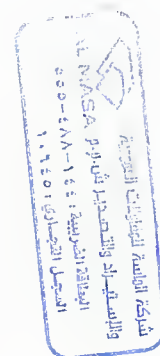
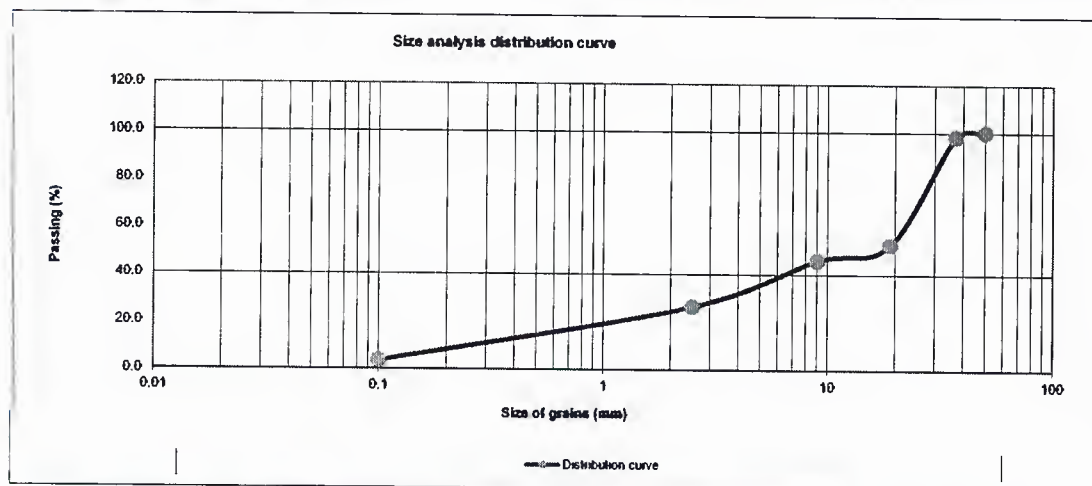
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PARTICLE SIZE DISTRIBUTION ANALYSIS ASTM C-136 / AASHTO T27

	WEIGHT RETAINED (gm)	CUMULATIVE WEIGHT RETAINED (gm)	CUMULATIVE PERCENTAGE RETAINED (%)	CUMULATIVE PERCENTAGE PASSING (%)	STANDURD SPECIFICATION LIMITS
2	0.00	0.00	0.00	100.0	
1 1/2	190.00	190.00	1.90	98.1	
1	2398.00	2588.00	25.88	74.1	
3/4	2165.00	4753.00	47.53	52.5	
1/2	565.00	5318.00	53.18	46.8	
3/8	103.00	5421.00	54.21	45.8	
No.4	293.00	5714.00	57.14	42.9	
No.10	193.00	193.00	38.60	26.3	
No.200	460.00	460.00	92.00	3.4	

Total sample weight = 10000.00 pass No.4= 4286.0 Total fine aggregates weight = 500 gm



Soil classification: A - 1 - a (Sample is Non Plastic)



Kilo 23 Alexandria - Cairo Desert Road - Merghem
Tel: 002 03 4704595 - 002 034701191
Email : civdept@comibassal.com
WebSite : www.comibassal.com



49 El Horria Ave. Alex, Egypt
Tel: 002 033920176 - 002 033931482
Fax :002 033900476
Email : internal-inspection@comibassal.com



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Modified Proctor Test Report ASTM - D 1557

Mould Number :- 1
Volume of mould = 2165 cm³
Weight of mould = 5821 g
G.S = 2.73 g/cm³

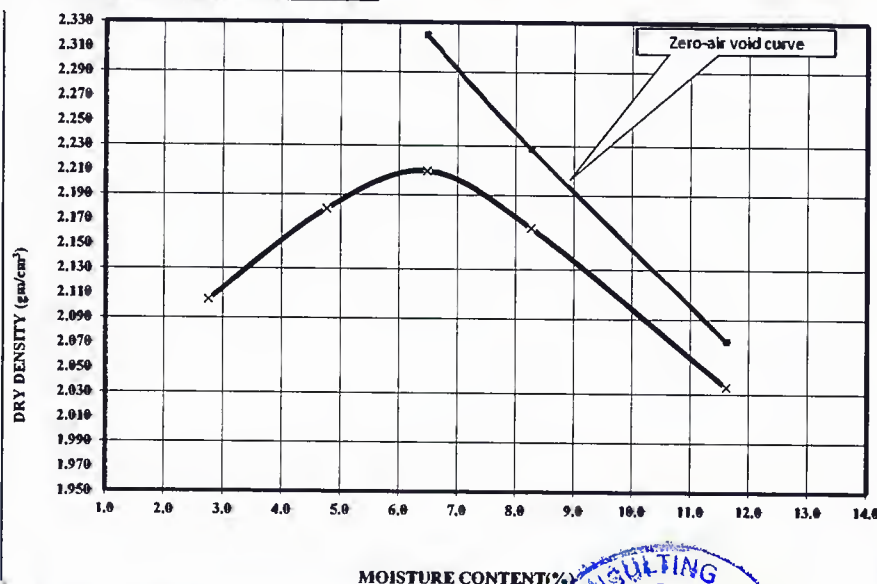
A- Density Calculations :-

	1	2	3	4	5
Weight of wet soil+mould (g)	10503	10762	10914	10892	10740
Weight of mould (g)	5821	5821	5821	5821	5821
Weight of wet soil (g)	4682	4941	5093	5071	4919
Volume of mould (cm ³)	2165	2165	2165	2165	2165
Wet density (g/cm ³)	2.163	2.282	2.352	2.342	2.272
Dry density (g/cm ³)	2.105	2.178	2.209	2.163	2.036
Zero-air Void curve			2.320	2.227	2.073

B- Moisture Calculations :-

Weight of wet soil+container (g)	250.0	250.0	250.0	250.0	250.0
Weight of dry soil+container (g)	245.5	240.0	236.5	233.2	227.0
Weight of container (g)	82.0	30.0	28.0	30.0	29.0
moisture content(%)	2.8	4.8	6.5	8.3	11.6

C - Dry density-Moisture relationship:-



M.D.D= 2.210 gm/cm³
O.M.C= 6.50 %





COMIBASSAL International Controllers

Internal inspection and laboratories sector

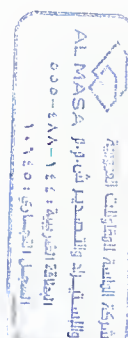
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ABRASION AND IMPACT " LOS ANGELES " TEST

(For coarse aggregate)

ASTM- C 131-96 / AASHTO-T-96

Speed	Rotate at 30 to 33 Rpm For 500 Revolution
Trial Grading	A
Intitial Weight (W1) gms	5000
Weight of tested sample (W2) gms Retained on sieve No.12	3890
% abrasion By Weight Passing from Sieve No.12	22.2%





COMIBASSAL International Controllers

Internal inspection and laboratories sector

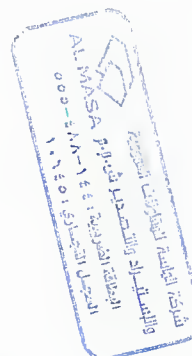
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Absorption & Specific Gravity for Aggregate AASHTO T85 - ASTM C127

Weight of sample	2500
Weight of saturated - dry surface sample (B)	2532
Weight of saturated sample in water (C)	1540
Weight of dry sample aftr heating (A)	2496

Results:-

Saturation surface dry spcific gravity = $B / (B-C)$	2.552
Bulk spcific gravity = $A / (B-C)$	2.516
Apparent spcific gravity = $A / (A-C)$	2.611
Asorbtion of water = $(B-A)/A*100$	1.4
Degradation of aggregate = $(2500-A)/ A*100$	0.2





COMIBASSAL International Controllers

Internal inspection and laboratories sector

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Report	:	394 - 4 - Center
Date	:	04/10/2023

CHEMICAL ANALYSIS

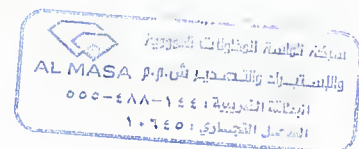
General Consultant	:	SYSTRA
Consultant	:	SPECTRUM
Contractor	:	شركة الماسه للمقاولات العمومية ورصف الطرق
Project	:	Electric express train
Sample	:	Sub Ballast
Station	:	ST (363 + 00.0):(366 + 00.0)
Date of Test	:	1-10-2023
Temperature	:	28 °C
Humidity	:	35%

ANALYSIS	RESULTS	TEST METHOD
CHLORIDE	0.0014%	ASTM D 1411
SULPHATE	0.0036%	ASTM D 1580
ORGANIG MATTER	NEGATIVE	ASTM D 2974

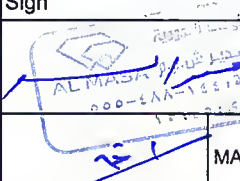


LAB DIRECTOR
CH/ Mostafa Asker

Moustaf

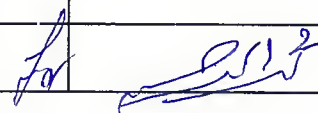


MATERIAL APPROVAL REQUEST	     	
	AL MASA GENERAL CONTRACTING COMPANY GARB SYSTRA SHAKER	

Contractor Company	Al-Masa General Contracting Company		Designer Company	(SPECTRUM) Engineering Consulting Office						
Issued by Contractor	Name	Sign	Date/Serial Number	Time						
	Eng. Mohamed Elsaied		31/10/2023 (S5-B-MS) (MAR-S.B-06)	1:00 PM						
Received by GARB CONSULTANT	Eng. Mazen Essamy	MAR	C1	C2	C3	DD	MM	YY	HH	MM
			363	EW	CS	1	11	2023		

CODE-1	S1 to S21	D1 to S3	Kp XXX Note
	Station Reference	Depot Reference	For Kilometer point only Start Km is used
	Work Activity		
	Sub Element of Activity		

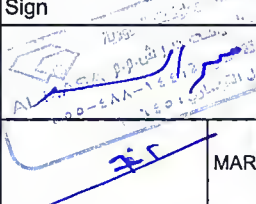
Description of Materials	Sub-ballast Total Quantity (30,000 m3)				
Location to be Used	From	363+000	TO	366+000	Rev-29
		363+180		366+180	Rev-35
sample only	yes	Materials Type		S.B	
Supplier Name	Elsiw , Alharamin	Data Sheet Provided		yes attached	
reference in BOQ		Specification		EARTHWORK SPECIFICATIONS & TESTING REPORT (CG21-41.2) VERSION 2 BY CIVECON GROUP	
Prequalification Reference		Test Samples Results			
Reference Photos	NO	Other			
Comments by: Eng. Mazen Essamy (SPECTRUM)			Comments by: Eng. Alaa Abd-Allatif (ER)		
1-quality test result by third party lab (comibassal) is Approved			1-All Tests Were Carried -Out By Third Party Lab		
2-this sample representative (5000 m3) only			2-Results report attached and acceptable with project specifications.		

APPROVAL STATUS				
Organisation	Name	Sign	Date	A-AWC-R
Contractor	Eng. Mohamed Elsaied			A
QA/QC *	Eng. Mazen Essamy			A
GARB**	Eng. Margeret Magdy			
Employers Representative	Eng. Alaa Abd-Allatif			A

* Designer

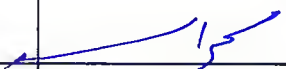
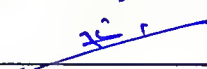
** Alignment/Bridge: (S5-B-MS) (MAR-S.B-06)

MATERIAL APPROVAL REQUEST	    	
	الهيئة العامة للطرق و الكبارى (GARB)	

Contractor Company	Al-Masa General Contracting Company		Designer Company	(SPECTRUM) Engineering Consulting Office						
Issued by Contractor	Name	Sign	Date/Serial Number	Time						
	Eng. Mohamed Elsaied		31/10/2023 (S5-B-MS) (MAR-S.B-06)	1:00 PM						
Received by GARB CONSULTANT	Eng. Mazen Essamy	MAR	C1	C2	C3	DD	MM	YY	HH	MM
			363	EW	CS	1	11	2023		

CODE-1	S1 to S21	D1 to S3	Kp XXX Note
	Station Reference	Depot Reference	For Kilometer point only Start Km is used
CODE-2	Work Activity		
CODE-3	Sub Element of Activity		

Description of Materials	Sub-ballast Total Quantity (30,000 m3)				
Location to be Used	From	363+000	TO	366+000	Rev-29
		363+180		366+180	Rev-35
sample only	yes	Materials Type	S.B		
Supplier Name	Elsiw , Alharamin	Data Sheet Provided	yes attached		
reference in BOQ		Specification	EARTHWORK SPECIFICATIONS & TESTING REPORT (CG21-41.2) VERSION 2 BY CIVECON GROUP		
Prequalification Reference		Test Samples Results			
Reference Photos	NO	Other			
Comments by: Eng. Mazen Essamy (SPECTRUM)		Comments by: Eng. Alaa Abd-Allatif (ER)			
1-quality test result by third party lab (comibassal) is Approved		1-All Tests Were Carried -Out By Third Party Lab			
2-this sample representative (5000 m3) only		2-Results report attached and acceptable with project specifications.			
		3-Final approval is subject to above mentioned comments.			

APPROVAL STATUS				
Organisation	Name	Sign	Date	A-AWC-R
Contractor	Eng. Mohamed Elsaied			A
QA/QC *	Eng. Mazen Essamy			A
GARB**	Eng. Margeret Magdy			
Employers Representative	Eng. Alaa Abd-Allatif		5-11-2023	Awc

* Designer

** Alignment/Bridges (S5-B-MS) (MAR-S.B-06)



COMIBASSAL International Controllers

Internal inspection and laboratories sector

Accredited by : Egypton General Authority for Petroleum under No. 34/29-11-2011

SOIL REPORTS FOR ELECTRIC EXPRESS TRAIN PROJECT

Contractor :

شركة الماسة للمقاولات

Date of report :

5/11/2023

QC :

990-5





COMIBASSAL International Controllers

Internal inspection and laboratories sector

Accredited by : Egyption General Authority for Petroleum under No. 34/29-11-2011

I- Introduction

General Consultant :	SYSTRA
Consultant :	Spectrum
Contractor :	شركة الماسة للمقاولات
Sample :	Sub-Ballast
Station :	St(363+000) to st(366+000)
Date of Test :	1/11/2023
QC :	990-5

II- Sample description:

Crushed stone and sand

III- Required tests and Results:

Required Tests		Results
1- Grain size analysis and classification and Percentage of MATERIALS FINER THAN No. 200 (75 μ m)	Grain size analysis	As showed in appendix
	Classification	A-1-a
	Pass From No.200	2.8%
2- Modified compaction (Proctor test)	MDD	2.219
	OMC	6.0%
3- Liquid limit, plastic lim/t and plasticity index	LL	Non plastic
	PL	Non plastic
	PI	Non plastic
4- California bearing ratio (CBR)	CBR ratio	99%
5- Specific gravity (SG), absorption and degradation	S S D	2.543
	Absorption	1.3%
	Degradation	0.2%
6- Los Angeles test	Abrasion ratio	23.0%



IV- Notes

- 1- Samples were brought by : contractor
- 2- Samples are responsible from the Person who brought it.
- 3- The results are applying only for the present report.

LAB DIRECTOR

Eng / Eman kandil

Eman



Geotechnical consultant

For Dr. H.

Dr. Mohamed Mostafa Badry

Kilo 23 Alexandria - Cairo Desert Road - Merghem

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APPENDIX





COMIBASSAL International Controllers

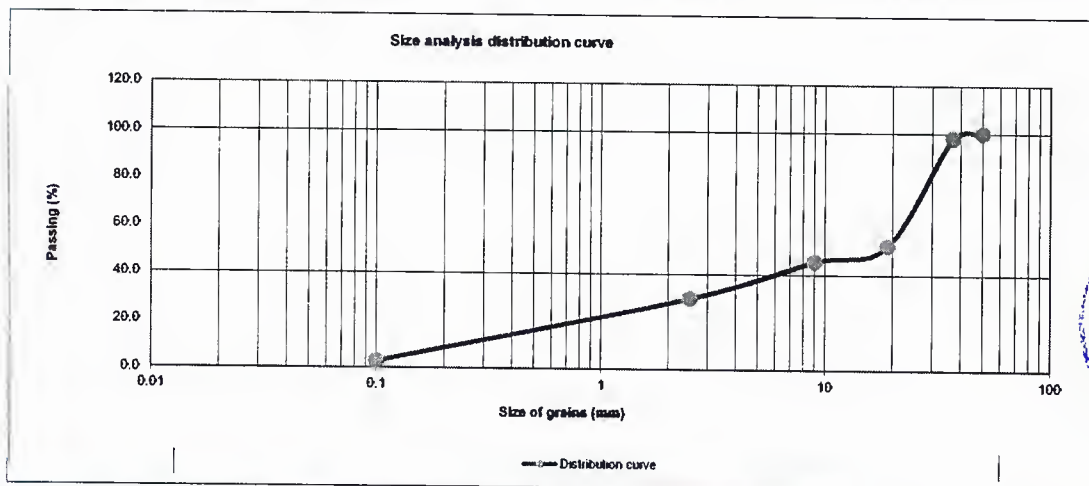
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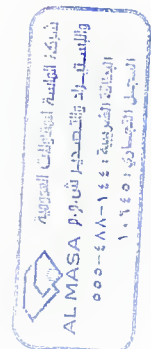
PARTICLE SIZE DISTRIBUTION ANALYSIS ASTM C-136 / AASHTO T27

	WEIGHT RETAINED	CUMULATIVE WEIGHT RETAINED (gm)	CUMULATIVE PERCENTAGE RETAINED (%)	CUMULATIVE PERCENTAGE PASSING (%)	STANDURD SPECIFICATION LIMITS
2	0.00	0.00	0.00	100.0	
1 1/2	210.00	210.00	2.10	97.9	
1	2430.00	2640.00	26.40	73.6	
3/4	2130.00	4770.00	47.70	52.3	
1/2	573.00	5343.00	53.43	46.6	
3/8	116.00	5459.00	54.59	45.4	
No.4	352.00	5811.00	58.11	41.9	
No.10	145.00	145.00	29.00	29.7	
No.200	467.00	467.00	93.40	2.8	

Total sample weight = 10000.00 pass No.4= 4189.0 Total fine aggregates weight = 500 gm



Soil classification: A - 1 - a (Sample is Non Plastic)





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Modified Proctor Test Report ASTM - D 1557

Mould Number :- 3
Volume of mould = 2231 cm³
Weight of mould = 4960 g
G.S = 2.65 g/cm³

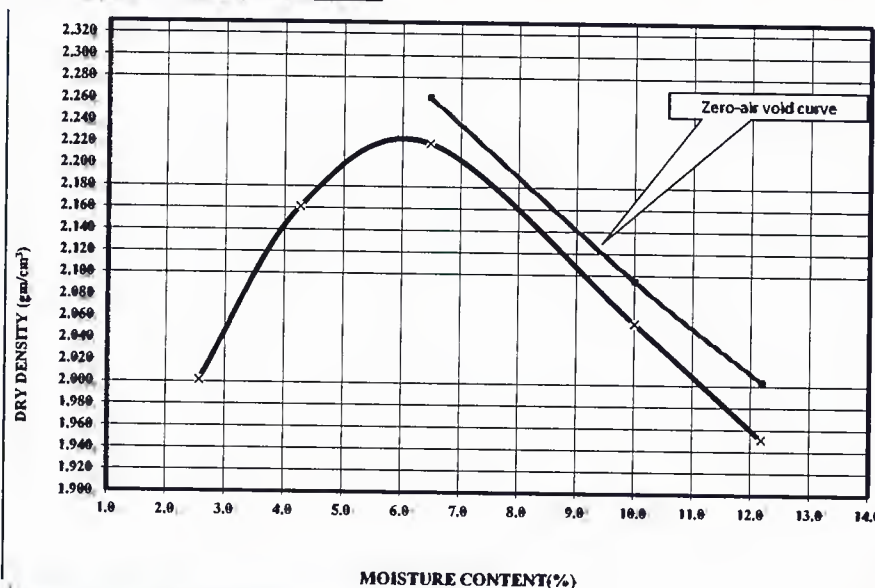
A- Density Calculations :-

	1	2	3	4	5
Weight of wet soil+mould (g)	9540	9987	10232	10005	9843
Weight of mould (g)	4960	4960	4960	4960	4960
Weight of wet soil (g)	4580	5027	5272	5045	4883
Volume of mould (cm ³)	2231	2231	2231	2231	2231
Wet density (g/cm ³)	2.053	2.253	2.363	2.261	2.189
Dry density (g/cm ³)	2.002	2.161	2.219	2.056	1.951
Zero-air Void curve			2.262	2.095	2.003

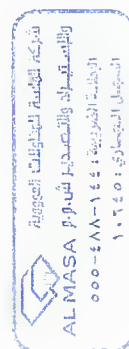
B- Moisture Calculations :-

Weight of wet soil+container (g)	250.0	250.0	250.0	250.0	250.0
Weight of dry soil+container (g)	245.8	241.0	236.5	230.0	226.0
Weight of container (g)	82.0	30.0	28.0	30.0	29.0
moisture content (%)	2.6	4.3	6.5	10.0	12.2

C - Dry density-Moisture relationship:-



M.D.D = 2.219 gm/cm³
O.M.C = 6.00 %





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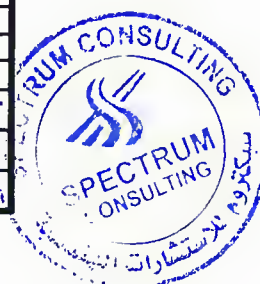
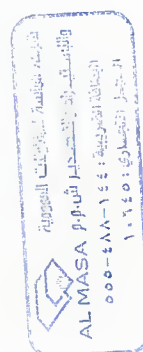
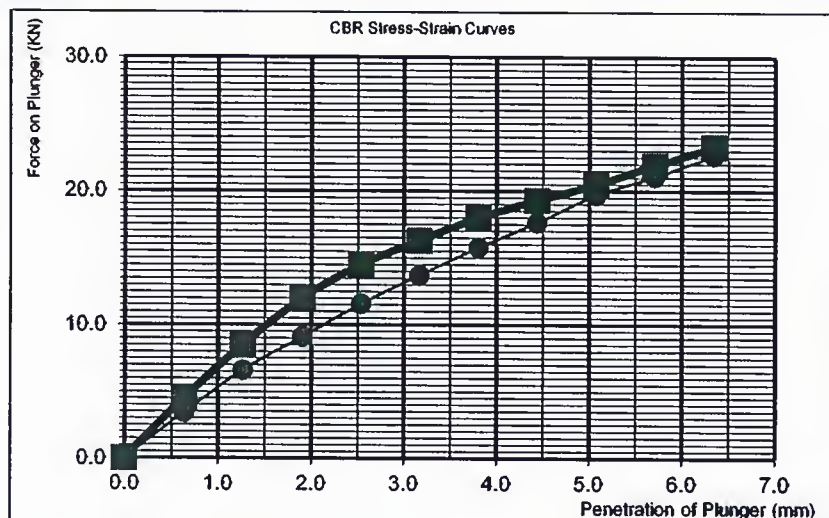
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Report Of CBR Test - ASTM - D 1883

NO OF BLOWS	56					
MOULD NO	1					
WT OF MOULD+SOIL	10183					
WT OF MOULD	5172					
WT OF SOIL	5011					
VOLUME OF MOULD	2120					
WET DENSITY	2.364					
	MC before soaking			Weight of Rammer	4.54Kg	
TIN NO	1			MDD	Kg/m3	2.219
WT OF WET SOIL+TIN	250.00			OMC	%	6.0
WT OF DRY SOIL+TIN	243					
WT OF WATER	7.00					
WT OF TIN	30					
WT OF DRY SOIL	99					
MOISTURE CONTENT	7.1					
DRY DENSITY	2.208					

Pen	Reading (Div)	Bearing (KN)	standard	CBR
mm	56	56	56	56
0.00	0	0.0	0.0	
0.64	348	3.4	4.5	
1.27	674	6.6	8.5	
1.91	930	9.1	12.0	
2.54	1180	11.6	14.5	88
3.17	1400	13.7	16.3	
3.81	1610	15.8	18.0	
4.45	1800	17.6	19.3	
5.08	2011	19.7	20.5	99
5.71	2150	21.1	21.9	
6.35	2310	22.6	23.3	





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ABRASION AND IMPACT " LOS ANGELES " TEST

(For coarse aggregate)

ASTM- C 131-96 / AASHTO-T-96

Speed	Rotate at 30 to 33 Rpm For 500 Revolution
Trial Grading	A
Intital Weight (W1) gms	5000
Weight of tested sample (W2) gms Retained on sieve No.12	3850
% abrasion By Weight Passing from Sieve No.12	23.0%



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Internal inspection and laboratories sector

Accredited by : Egypton General Authority for Petroleum under No. 34/29-11-2011

Absorption & Specific Gravity for Aggregate AASHTO T85 - ASTM C127

Weight of sample	2500
Weight of saturated - dry surface sample (B)	2528
Weight of saturated sample in water (C)	1534
Weight of dry sample aftr heating (A)	2495

Results:-

Saturation surface dry spicific gravity = $B / (B-C)$	2.543
Bulk spicific gravity = $A / (B-C)$	2.510
Apparent spicific gravity = $A / (A-C)$	2.596
Asorbtion of water = $(B-A)/A*100$	1.3
Degradation of aggregate = $(2500-A)/ A*100$	0.2





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Internal inspection and laboratories sector

Accredited by : Egypton General Authority for Petroleum under No. 34/29-11-2011

Report	:	394 - 5 - Center
Date	:	04/11/2023

CHEMICAL ANALYSIS

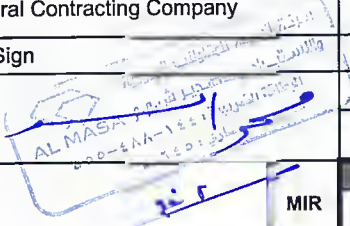
General Consultant	:	SYSTRA
Consultant	:	SPECTRUM
Contractor	:	شركة الماسه للمقاولات العمومية ورصف الطرق
Project	:	Electric express train
Sample	:	Sub Ballast
Station	:	ST (363 + 00.0):(366 + 00.0)
Date of Test	:	1-11-2023
Temperature	:	28 °C
Humidity	:	35%

ANALYSIS	RESULTS	TEST METHOD
CHLORIDE	0.0011%	ASTM D 1411
SULPHATE	0.0040%	ASTM D 1580
ORGANIG MATTER	NEGATIVE	ASTM D 2974

LAB DIRECTOR
CH/ Mostafa Asker

Mostafa Asker

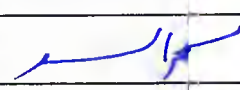
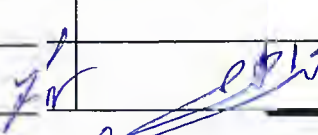


Contractor Company	Al-Masa General Contracting Company			Designer Company	(SPECTRUM) Engineering Consulting Office					
Issued by Contractor	Name	Sign	Date/Serial Number	Time						
	Eng. Mohamed Elsaied	 AL MASA 000-444-1111 000-444-1111	07/11/2023	10:00 AM						
			(S5-B-MS) (PLT S.B-01-D.P)							
Received by GARB CONSULTANT	Eng. Mazen Essamy	MIR	C1	C2	C3	DD	MM	YY	HH	MM
			363	EW	CS	8	11	2023	10	0

CODE-1	S1 to S21	D1 to D3	Kp XXX Note
	Station Reference	Depot Reference	For Kilometer point only Start Km is used
	Work Activity		
	Sub Element of Activity		

Description of Materials	Sub-Ballast (2) AT (+0.90)				
Location to be Used	From	363+740	TO	364+100	Rev-29
		363+920		364+280	Rev-35
MAR & UIR Approval No	(S5-B-MS) (IR-S.B-02-D.P)		Date	07/11/2023	
	(S5-B-MS) (MAR-S.B-05)			01/10/2023	
Supplier Name	Elsiw , Alharamin				
Test Requirement	P.L.T (DIN 18134)		Specification	EARTHWORK SPECIFICATIONS & TESTING REPORT (CG21-41.2) VERSION 2 BY CIVECON GROUP	
Reference Photos	No/Yes		Other		
Item	Description	Unit	Quantity	Arrival Date	Note
1	PLATE LOAD POINT	NUMBER	8		

Comments by: Eng. Mazen Essamy (SPECTRUM)	Comments by: Eng. Alaa Abd-Allatif (ER)
 1-THE PLATE LOAD TEST RESULT P.L.T (DIN 18134) IS APPROVED	1-PLATE LOAD TEST WAS CARRIED - OUT BY THIRD PART LAB 2-Results report attached and acceptable with project specifications.

APPROVAL STATUS				
Organisation	Name	Sign	Date	A-AWC-R
Contractor	Eng. Mohamed Elsaied			A
QA/QC *	Eng. Mazen Essamy			A
GARB**	Eng. Margeret Magdy			
Employers Representative	Eng. Alaa Abd-Allatif			A

* Designer

** Alignment/Bridge: (S5-B-MS) (PLT-S.B-01-D.P)

MATERIAL INSPECTION REQUEST



الهيئة العامة
للطرق والكباري
(GARB)



Contractor Company	Al-Masa General Contracting Company			Designer Company		(SPECTRUM) Engineering Consulting Office				
Issued by Contractor	Name	Sign	Date/Serial Number	Time						
	Eng. Mohamed Elsaied		07/11/2023 (S5-B-MS) (PLT S.B-01-D.P)	10:00 AM						
Received by GARB CONSULTANT	Eng. Mazen Essamy	MIR	C1 363	C2 EW	C3 CS	DD 8	MM 11	YY 2023	HH 10	MM 0

CODE-1	S1 to S21	D1 to S3	Kp XXX Note
	Station Reference	Depot Reference	For Kilometer point only Start Km is used
CODE-2	Work Activity		
CODE-3	Sub Element of Activity		

Description of Materials	Sub-Ballast (2) AT (+0.90)				
Location to be Used	From	363+740	TO	364+100	Rev-29
		363+920		364+280	Rev-35
MAR & UIR Approval No	(S5-B-MS) (IR-S.B-02-D.P)	Date	07/11/2023		
	(S5-B-MS) (MAR-S.B-05)		01/10/2023		
Supplier Name	Elsiwly , Alharamin				
Test Requirement	P.L.T (DIN 18134)		Specification	EARTHWORK SPECIFICATIONS & TESTING REPORT (CG21-41.2) VERSION 2 BY CIVECON GROUP	
Reference Photos	No/Yes	Other			
Item	Description	Unit	Quantity	Arrival Date	Note
1	PLATE LOAD POINT	NUMBER	8		

Comments by: Eng. Mazen Essamy (SPECTRUM)

Comments by: Eng. Alaa Abd-Allatif (ER)

1-THE PLATE LOAD TEST RESULT P.L.T (DIN 18134) IS APPROVED



- 1-PLATE LOAD TEST WAS CARRIED - OUT BY THIRD PART LAB
- 2-Results report attached and acceptable with project specifications.
- 3-Final approval is subject to above mentioned comments.

APPROVAL STATUS

Organisation	Name	Sign	Date	A-AWC-R
Contractor	Eng. Mohamed Elsaied			A
QA/QC *	Eng. Mazen Essamy			A
GARB**	Eng. Margeret Magdy			
Employers Representative	Eng. Alaa Abd-Allatif		9-11-2023	Awc

* Designer

** Alignment/Bridget (S5-B-MS) (PLT-S.B-01-D.P)



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Internal inspection and laboratories sector

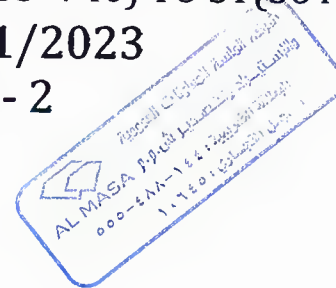
Accredited by : Egypton General Authority for Petroleum under No. 34/29-11-2011

Technical report

of Plate Loading Test (DIN 18134)



General	:	SYSTRA
Consultant	:	SPECTRUM
Contractor	:	شركة الماسة للمقاولات
Project	:	ELECTRIC EXPRESS TRAIN
Sample	:	Sub-Ballast (2)
Station	:	ST(363+740) TO ST(364+100)
Date of Test	:	9/11/2023
QC	:	964 - 2





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Introduction:

The Plate Load test is designed to determine the vertical deformation and strength characteristics of soil by assessing the force and amount of penetration with time when a rigid plate is made to penetrate the soil.

The test to be carried out on the native soil according to German specifications DIN 18134.

Test methods :

- 1- The German standard DIN 18134 was applied to define the apparatus used, the loading system, test conditions, and procedure for plate load test.
- 2- Loading plates with a diameter of 600 mm have a thickness of 25mm and are provided with equally spaced stiffeners with even upper faces parallel to the plate bottom face to allow 300 mm plate to be placed on top of it.
- 3- The loading system consisted of a hydraulic pump connected to a hydraulic jack of 700 bar capacity, which is capable of applying and releasing the load stages.
- 4- The dial gauge used to measure the plate settlement has a resolution of 0.01mm and the lever ratio was equal to 1.
- 5- The temperature at the time of the test was 25°.
- 6- The plate was carried out on a native soil (sand-gravel). The test surface area was levelled and the plate was bedded on this surface.
- 7- The hydraulic jack was placed on the middle of, and at normal to, the loading plate beneath the reaction loading system and secured against tilting.
- 8- The reaction loading system was a heavy multi-purpose excavator (more than 20 ton).

Description of experiment:

- 1- Loading, unloading and reloading regims were applied according to DIN 18134 for the plate load test to estimate the resilient modulus
- 2- Prior to the test, the force transducer and dial gauge were set to zero, after which a load was applied corresponding to a stress of 0.01 MN/m².
- 3- In the first loading cycle, the load was increased until a normal stress of 0.25 MN/m² was reached, and the loading increment was 0.025 MN/m². The load was released in four stages.
- 4- Following unloading, a further second loading cycle was carried out, in which, the load was increased only to the penultimate stage of the first cycle.



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St (363+740)

600

Table 1: Measured values for first loading cycle and unloading cycle

Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
0	1.414	0.005	0.00
1	7.07	0.025	0.10
2	14.14	0.050	0.16
3	21.21	0.075	0.22
4	28.28	0.100	0.27
5	35.35	0.125	0.31
6	42.42	0.150	0.36
7	49.49	0.175	0.38
8	56.56	0.200	0.43
9	63.63	0.225	0.47
10	70.7	0.250	0.52
11	56.56	0.200	0.51
12	49.49	0.175	0.50
13	35.35	0.125	0.49
14	21.21	0.075	0.41
15	1.414	0.005	0.10

Table 2: Measured values for second loading cycle

Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
15	1.414	0.005	0.10
16	7.07	0.025	0.20
17	14.14	0.050	0.29
18	21.21	0.075	0.35
19	28.28	0.100	0.38
20	35.35	0.125	0.42
21	42.42	0.150	0.44
22	49.49	0.175	0.48
23	56.56	0.200	0.51
24	63.63	0.225	0.54

Table 3: Compilation of results

Parameters	1st loading cycle	2nd loading cycle
$(\sigma_{0, \max})$ MN/m ²	0.250	0.250
a_0 (mm)	0.049	0.112
a_1 (mm/(MN/m ²))	3.921	4.012
a_2 (mm/(MN ² /m ⁴))	-1.960	-7.072
$E_v = 1.5 \text{ r} / (a_1 + a_2 \cdot \sigma_{0, \max})$	131.15	200.50
E_{v2}/E_{v1}	1.53	



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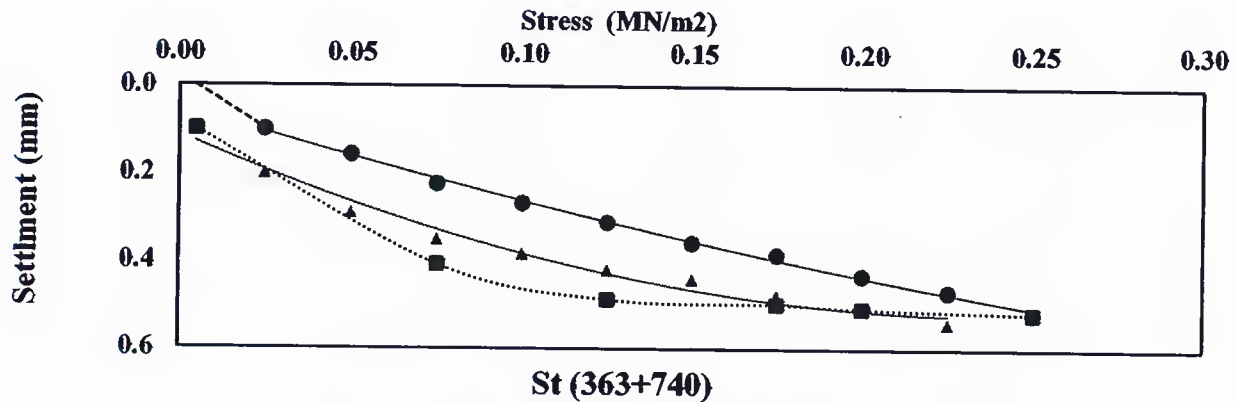


Fig. 1: Load-settlement curve, fitting curves according to Table 1 and Table 2 for the first and second loading cycles

- Measurement points from the first loading cycle
- Measurement points from the unloading cycle
- ▲ Measurement points from the second loading cycle
- S Settlement in mm
- σ_0 Normal stress MN/m²





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St (363+790)

600

Table 4: Measured values for first loading cycle and unloading cycle

Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
0	1.414	0.005	0.00
1	7.07	0.025	0.19
2	14.14	0.050	0.32
3	21.21	0.075	0.39
4	28.28	0.100	0.51
5	35.35	0.125	0.59
6	42.42	0.150	0.66
7	49.49	0.175	0.73
8	56.56	0.200	0.77
9	63.63	0.225	0.81
10	70.7	0.250	0.87
11	56.56	0.200	0.86
12	49.49	0.175	0.85
13	35.35	0.125	0.84
14	21.21	0.075	0.81
15	1.414	0.005	0.55

Table 5: Measured values for second loading cycle

Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
15	1.414	0.005	0.55
16	7.07	0.025	0.61
17	14.14	0.050	0.67
18	21.21	0.075	0.72
19	28.28	0.100	0.77
20	35.35	0.125	0.80
21	42.42	0.150	0.83
22	49.49	0.175	0.86
23	56.56	0.200	0.89
24	63.63	0.225	0.92

Table 6: Compilation of results

Parameters	1st loading cycle	2nd loading cycle
($\sigma_{0, \max}$) MN/m ²	0.250	0.250
a_0 (mm)	0.121	0.544
a_1 (mm/(MN/m ²))	1.495	2.909
a_2 (mm/(MN ² /m ⁴))	6.083	-4.375
$E_v = 1.5 r / (a_1 + a_2 \cdot \sigma_{0, \max})$	149.23	247.89
E_v2/E_v1	1.66	



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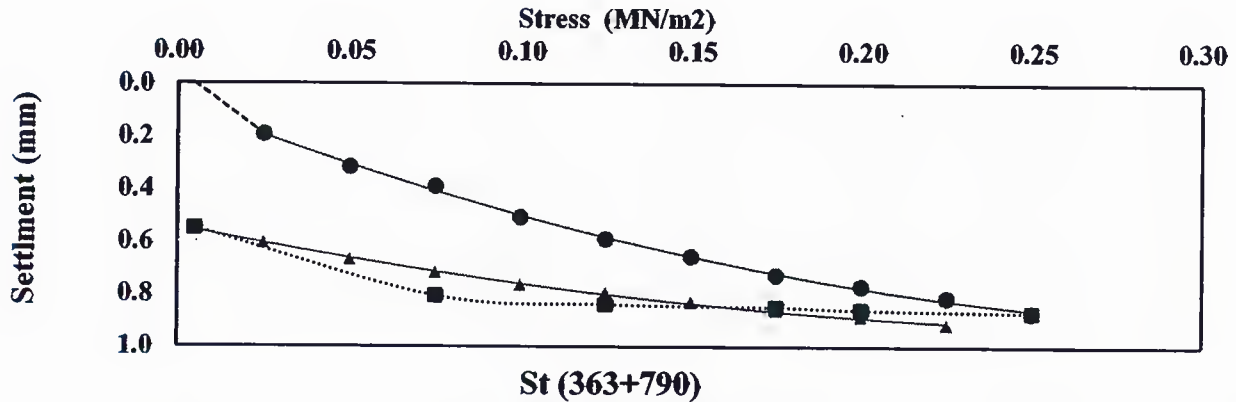


Fig. 2: Load-settlement curve, fitting curves according to Table 4 and Table 5 for the first and second loading cycles

- Measurement points from the first loading cycle
- Measurement points from the unloading cycle
- ▲ Measurement points from the second loading cycle
- S Settlement in mm
- σ_0 Normal stress MN/m²





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St (363+840)

600

Table 7: Measured values for first loading cycle and unloading cycle

Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
0	1.414	0.005	0.00
1	7.07	0.025	0.13
2	14.14	0.050	0.29
3	21.21	0.075	0.36
4	28.28	0.100	0.49
5	35.35	0.125	0.61
6	42.42	0.150	0.74
7	49.49	0.175	0.83
8	56.56	0.200	0.90
9	63.63	0.225	0.98
10	70.7	0.250	1.06
11	56.56	0.200	1.05
12	49.49	0.175	1.04
13	35.35	0.125	1.03
14	21.21	0.075	0.99
15	1.414	0.005	0.75

Table 8: Measured values for second loading cycle

Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
15	1.414	0.005	0.75
16	7.07	0.025	0.82
17	14.14	0.050	0.88
18	21.21	0.075	0.93
19	28.28	0.100	0.97
20	35.35	0.125	1.00
21	42.42	0.150	1.03
22	49.49	0.175	1.06
23	56.56	0.200	1.09
24	63.63	0.225	1.13

Table 9: Compilation of results

Parameters	1st loading cycle	2nd loading cycle
($\sigma_{0,MAX}$) MN/m ²	0.250	0.250
a_0 (mm)	-0.005	0.758
a_1 (mm/(MN/m ²))	5.695	2.905
a_2 (mm/(MN ² /m ⁴))	-5.720	-3.537
$Ev = 1.5 r / (a_1 + a_2 \cdot \sigma_{0,MAX})$	105.49	222.67
$Ev2/Ev1$	2.11	



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Internal inspection and laboratories sector

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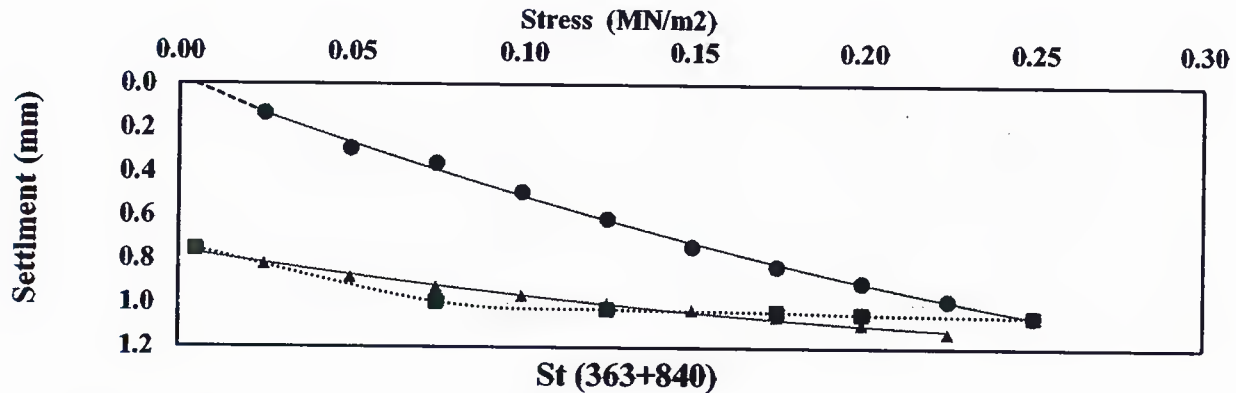


Fig. 3: Load-settlement curve, fitting curves according to Table 7 and Table 8 for the first and second loading cycles

- Measurement points from the first loading cycle
- Measurement points from the unloading cycle
- ▲ Measurement points from the second loading cycle
- S Settlement in mm
- σ_0 Normal stress MN/m²





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Internal inspection and laboratories sector

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St (363+890)

600

Table 10: Measured values for first loading cycle and unloading cycle

Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
0	1.414	0.005	0.00
1	7.07	0.025	0.09
2	14.14	0.050	0.16
3	21.21	0.075	0.20
4	28.28	0.100	0.25
5	35.35	0.125	0.28
6	42.42	0.150	0.31
7	49.49	0.175	0.36
8	56.56	0.200	0.43
9	63.63	0.225	0.55
10	70.7	0.250	0.83
11	56.56	0.200	0.82
12	49.49	0.175	0.81
13	35.35	0.125	0.80
14	21.21	0.075	0.75
15	1.414	0.005	0.47

Table 11: Measured values for second loading cycle

Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
15	1.414	0.005	0.47
16	7.07	0.025	0.55
17	14.14	0.050	0.62
18	21.21	0.075	0.66
19	28.28	0.100	0.71
20	35.35	0.125	0.74
21	42.42	0.150	0.77
22	49.49	0.175	0.80
23	56.56	0.200	0.83
24	63.63	0.225	0.87

Table 12: Compilation of results

Parameters	1st loading cycle	2nd loading cycle
$(\sigma_{0, \max})$ MN/m ²	0.250	0.250
a_0 (mm)	0.160	0.480
a_1 (mm/(MN/m ²))	1.005	3.277
a_2 (mm/(MN ² /m ²))	12.955	-4.480
$E_v = 1.5 r / (a_1 + a_2 \cdot \sigma_{0, \max})$	2106.05	208.66
E_{v2}/E_{v1}	1.97	



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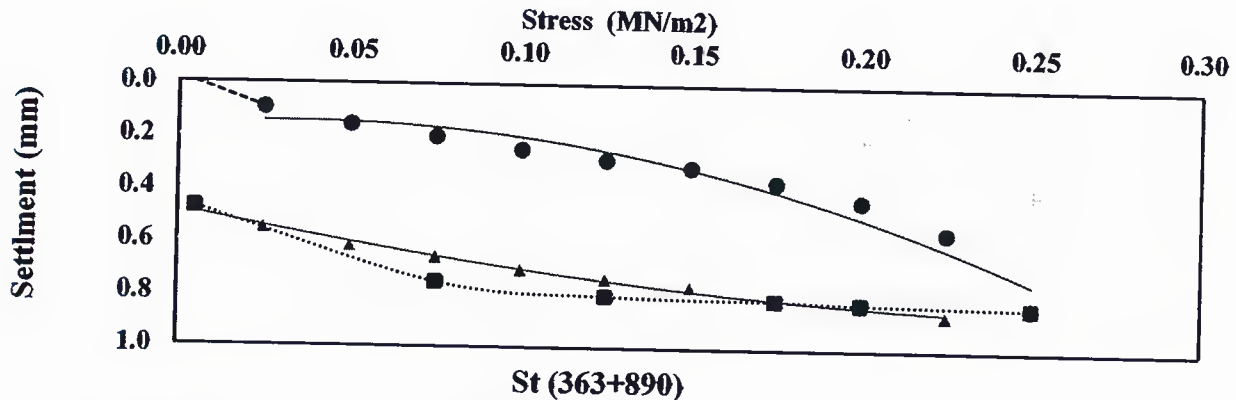


Fig. 4: Load-settlement curve, fitting curves according to Table 10 and Table 11 for the first and second loading cycles

- Measurement points from the first loading cycle
- Measurement points from the unloading cycle
- ▲ Measurement points from the second loading cycle
- S Settlement in mm
- σ_0 Normal stress MN/m²





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St (363+940)

600

Table 13: Measured values for first loading cycle and unloading cycle

Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
0	1.414	0.005	0.00
1	7.07	0.025	0.11
2	14.14	0.050	0.20
3	21.21	0.075	0.27
4	28.28	0.100	0.36
5	35.35	0.125	0.42
6	42.42	0.150	0.47
7	49.49	0.175	0.53
8	56.56	0.200	0.56
9	63.63	0.225	0.62
10	70.7	0.250	0.68
11	56.56	0.200	0.67
12	49.49	0.175	0.66
13	35.35	0.125	0.65
14	21.21	0.075	0.59
15	1.414	0.005	0.44

Table 14: Measured values for second loading cycle

Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
15	1.414	0.005	0.44
16	7.07	0.025	0.50
17	14.14	0.050	0.56
18	21.21	0.075	0.57
19	28.28	0.100	0.59
20	35.35	0.125	0.63
21	42.42	0.150	0.65
22	49.49	0.175	0.70
23	56.56	0.200	0.74
24	63.63	0.225	0.78

Table 15: Compilation of results

Parameters	1st loading cycle	2nd loading cycle
($\sigma_{0,max}$) MN/m ²	0.250	0.250
a_0 (mm)	0.028	0.460
a_1 (mm/(MN/m ²))	4.077	2.102
a_2 (mm/(MN ² /m ⁴))	-4.083	-0.030
$E_v = 1.5 r / (a_1 + a_2 \sigma_{0,MAX})$	147.22	214.86
E_{v2}/E_{v1}	1.46	



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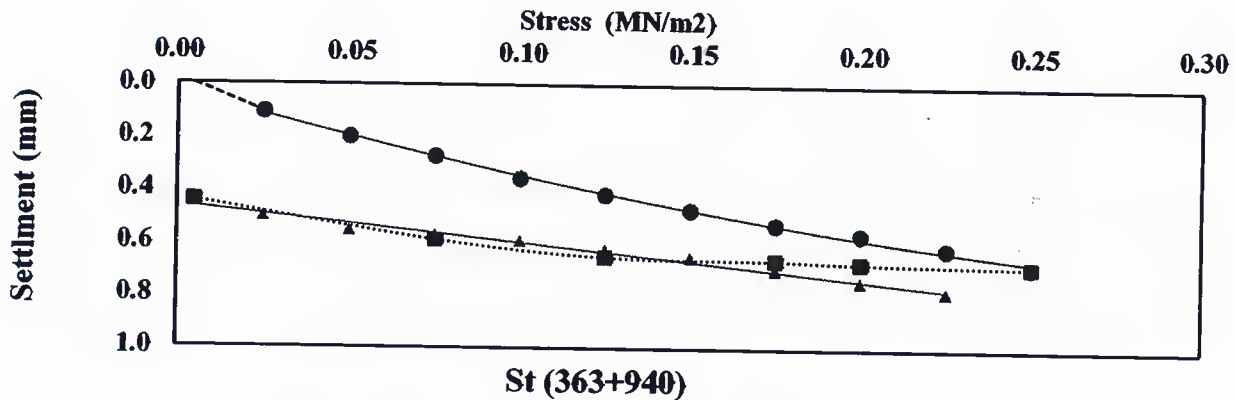


Fig. 5: Load-settlement curve, fitting curves according to Table 13 and Table 14 for the first and second loading cycles

- Measurement points from the first loading cycle
- Measurement points from the unloading cycle
- ▲ Measurement points from the second loading cycle
- S Settlement in mm
- σ_0 Normal stress MN/m²



St (363+990)

600

Table 16: Measured values for first loading cycle and unloading cycle

Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
0	1.414	0.005	0.00
1	7.07	0.025	0.23
2	14.14	0.050	0.40
3	21.21	0.075	0.52
4	28.28	0.100	0.65
5	35.35	0.125	0.78
6	42.42	0.150	0.91
7	49.49	0.175	1.00
8	56.56	0.200	1.13
9	63.63	0.225	1.20
10	70.7	0.250	1.25
11	56.56	0.200	1.24
12	49.49	0.175	1.23
13	35.35	0.125	1.22
14	21.21	0.075	1.21
15	1.414	0.005	0.89

Table 17: Measured values for second loading cycle

Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
15	1.414	0.005	0.89
16	7.07	0.025	0.97
17	14.14	0.050	1.07
18	21.21	0.075	1.13
19	28.28	0.100	1.18
20	35.35	0.125	1.21
21	42.42	0.150	1.26
22	49.49	0.175	1.31
23	56.56	0.200	1.38
24	63.63	0.225	1.45

Table 18: Compilation of results

Parameters	1st loading cycle	2nd loading cycle
($q_{0,max}$) MN/m ²	0.250	0.250
s_0 (mm)	0.066	0.905
s_1 (mm/(MN/m ²))	6.354	2.821
s_2 (mm/(MN/m ²))	-7.842	-2.174
$E_{v1} = \frac{1.25}{s_1} \times (q_{0,max} - q_{0,min})$	102.41	197.60
E_{v2}/E_{v1}	1.93	



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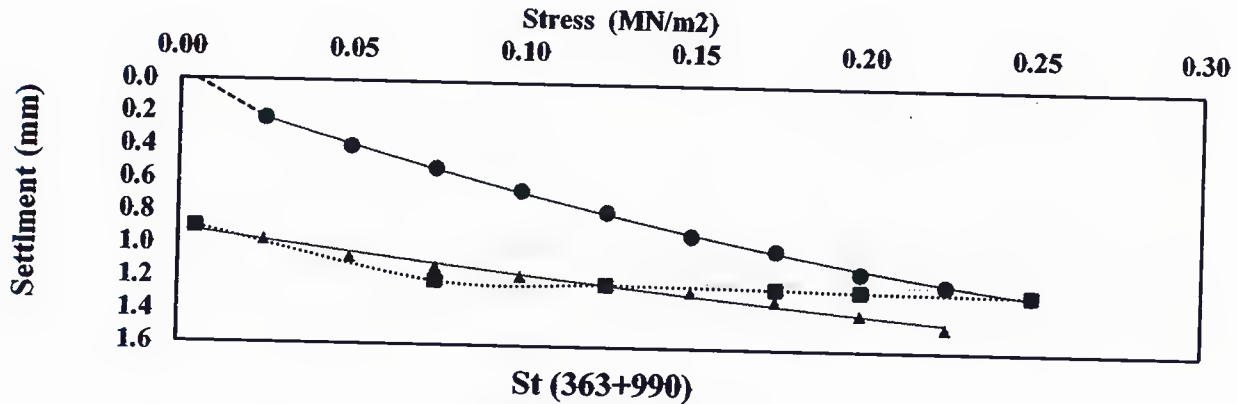


Fig. 6: Load-settlement curve, fitting curves according to Table 16 and Table 17 for the first and second loading cycles

- Measurement points from the first loading cycle
- Measurement points from the unloading cycle
- ▲ Measurement points from the second loading cycle
- S Settlement in mm
- σ_0 Normal stress MN/m²



St (364+040)

600

Table 19: Measured values for first loading cycle and unloading cycle

Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
0	1.414	0.005	0.00
1	7.07	0.025	0.10
2	14.14	0.050	0.17
3	21.21	0.075	0.25
4	28.28	0.100	0.30
5	35.35	0.125	0.36
6	42.42	0.150	0.43
7	49.49	0.175	0.54
8	56.56	0.200	0.67
9	63.63	0.225	0.74
10	70.7	0.250	0.85
11	56.56	0.200	0.84
12	49.49	0.175	0.83
13	35.35	0.125	0.75
14	21.21	0.075	0.65
15	1.414	0.005	0.31

Table 20: Measured values for second loading cycle

Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
15	1.414	0.005	0.31
16	7.07	0.025	0.43
17	14.14	0.050	0.50
18	21.21	0.075	0.58
19	28.28	0.100	0.64
20	35.35	0.125	0.70
21	42.42	0.150	0.74
22	49.49	0.175	0.77
23	56.56	0.200	0.81
24	63.63	0.225	0.86

Table 21: Compilation of results

Parameters	1st loading cycle	2nd loading cycle
($\sigma_{0,max}$) MN/m ²	0.250	0.250
a_0 (mm)	0.068	0.319
a_1 (mm/(MN/m ²))	1.703	3.855
a_2 (mm/(MN ² /m ⁴))	5.740	-6.786
$E_v = 1.5 r / (a_1 + a_2 \sigma_{0,max})$	143.40	208.47
$E_v / E_v I$	1.45	



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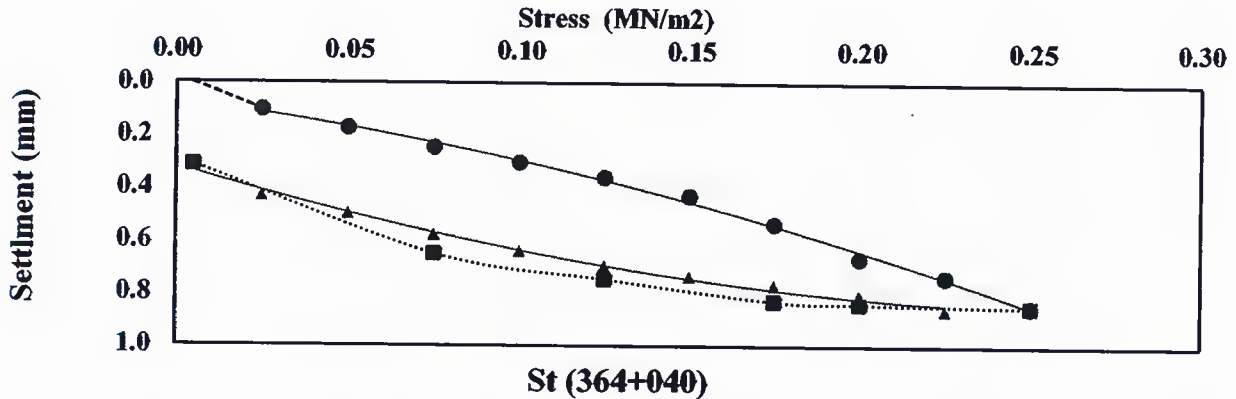


Fig. 7: Load-settlement curve, fitting curves according to Table 19 and Table 20 for the first and second loading cycles

- Measurement points from the first loading cycle
 - Measurement points from the unloading cycle
 - ▲ Measurement points from the second loading cycle
- S Settlement in mm
 σ_0 Normal stress MN/m²





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St (364+090)

600

Table 22: Measured values for first loading cycle and unloading cycle

Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
0	1.414	0.005	0.00
1	7.07	0.025	0.09
2	14.14	0.050	0.19
3	21.21	0.075	0.32
4	28.28	0.100	0.41
5	35.35	0.125	0.50
6	42.42	0.150	0.56
7	49.49	0.175	0.64
8	56.56	0.200	0.72
9	63.63	0.225	0.79
10	70.7	0.250	0.86
11	56.56	0.200	0.85
12	49.49	0.175	0.84
13	35.35	0.125	0.83
14	21.21	0.075	0.77
15	1.414	0.005	0.35

Table 23: Measured values for second loading cycle

Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
15	1.414	0.005	0.35
16	7.07	0.025	0.46
17	14.14	0.050	0.54
18	21.21	0.075	0.62
19	28.28	0.100	0.72
20	35.35	0.125	0.79
21	42.42	0.150	0.84
22	49.49	0.175	0.89
23	56.56	0.200	0.94
24	63.63	0.225	1.00

Table 24: Compilation of results

Parameters	1st loading cycle	2nd loading cycle
$(\sigma_{0, MAX})$ MN/m ²	0.250	0.250
s_0 (mm)	-0.013	0.338
a_1 (mm/(MN/m ²))	4.596	3.654
a_2 (mm/(MN/m ²))	-4.547	-6.520
$E_v = 1.5 \times (\sigma_1 + \sigma_2 + \sigma_3) / (E_1 + E_2 + E_3)$	130.07	222.25
E_{v2}/E_{v1}	1.71	



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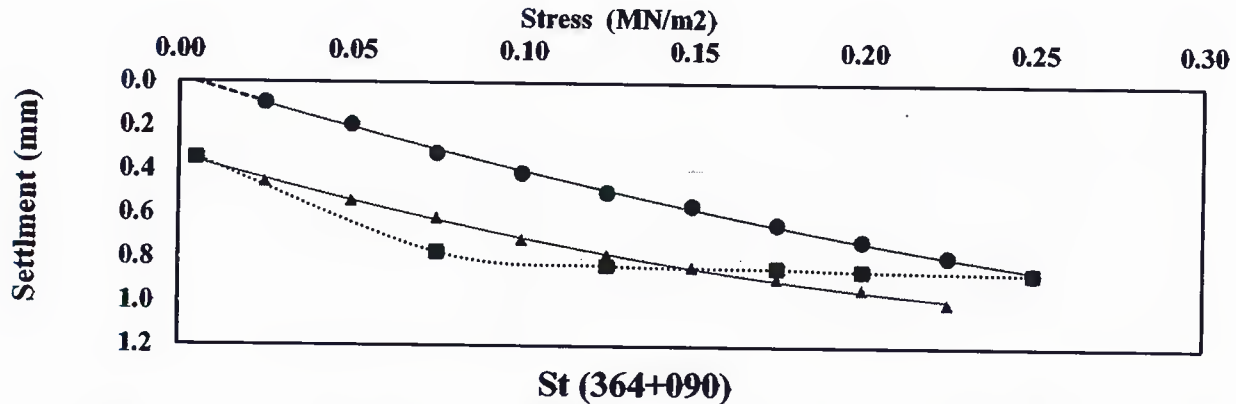


Fig. 8: Load-settlement curve, fitting curves according to Table 22 and Table 23 for the first and second loading cycles

- Measurement points from the first loading cycle
- Measurement points from the unloading cycle
- ▲ Measurement points from the second loading cycle
- S Settlement in mm
- σ_0 Normal stress MN/m²





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Conclusions:

The present test results which were obtained via the plate loading tests of the native soil on sub-ballast layer of the electric express train project at location from St(363+740) to St(364+100) in accordance to the German standard , DIN 18134 are illustrated in table 25 .

Table 25 :Test results

Location	Ev1(MN/m ²)	Ev2(MN/m ²)	Ev2/Ev1 ratio
St (363+740)	131.15	200.50	1.53
St (363+790)	149.23	247.89	1.66
St (363+840)	105.49	222.67	2.11
St (363+890)	106.05	208.66	1.97
St (363+940)	147.22	214.86	1.46
St (363+990)	102.41	197.60	1.93
St (364+040)	143.40	208.47	1.45
St (364+090)	130.07	222.25	1.71

Lab Director

Eng / Eman Kandil

Eman.

Geotechnical Consultant

Dr. Dr. M.
Dr / Mohamed Mostafa Badry



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MATERIAL INSPECTION REQUEST



الهيئة العامة
للطرق والكباري
(GARB)



Contractor Company	Al-Masa General Contracting Company		Designer Company	(SPECTRUM) Engineering Consulting Office							
Issued by Contractor	Name	Sign	Date/Serial Number	Time							
	Eng. Mohamed Elsaied		21/11/2023 (S5-B-MS) (PLT-S.B-02-D.P)	10:00 AM							
Received by GARB CONSULTANT	Eng. Mazen Essamy		MIR	C1	C2	C3	DD	MM	YY	HH	MM
				363	EW	CS	22	11	2023	10	0

CODE-1	S1 to S21	D1 to S3	Kp XXX Note
	Station Reference	Depot Reference	For Kilometer point only Start Km is used
CODE-2	Work Activity		
10	Sub Element of Activity		

Description of Materials	Sub-Ballast (2) AT (+0.90)					
Location to be Used	From	363+480	TO	363+740	Rev-29	
		363+660		363+920	Rev-35	
MAR & UIR Approval No	(S5-B-MS) (IR-S.B-04-D.P)		Date	21/11/2023		
	(S5-B-MS) (MAR-S.B-05)			01/10/2023		
Supplier Name	Elsiwly , Alharamin					
Test Requirement	P.L.T (DIN 18134)		Specification	EARTHWORK SPECIFICATIONS & TESTING REPORT (CG21-41.2) VERSION 2 BY CIVECON GROUP		
Reference Photos	No/Yes		Other			
Item	Description	Unit	Quantity	Arrival Date	Note	
1	PLATE LOAD POINT	NUMBER	6			

Comments by: Eng. Mazen Essamy (SPECTRUM)	Comments by: Eng. Alaa Abd-Allatif (ER)
 1-THE PLATE LOAD TEST RESULT P.L.T (DIN 18134) IS APPROVED	1-PLATE LOAD TEST WAS CARRIED - OUT BY THIRD PART LAB 2-Results report attached and acceptable with project specifications.

APPROVAL STATUS				
Organisation	Name	Sign	Date	A-AWC-R
Contractor	Eng. Mohamed Elsaied			A
QA/QC *	Eng. Mazen Essamy			A
GARB**	Eng. Margeret Magdy			
Employers Representative	Eng. Alaa Abd-Allatif			A

* Designer

** Alignment/Bridget (S5-B-MS) (PLT-S.B-02-D.P)

MATERIAL INSPECTION REQUEST



الهيئة العامة
للطرق والكباري
(GARB)



Contractor Company	Al-Masa General Contracting Company			Designer Company	(SPECTRUM) Engineering Consulting Office					
Issued by Contractor	Name	Sign	Date/Serial Number	Time						
	Eng. Mohamed Elsaied		21/11/2023 (S5-B-MS) (PLT-S.B-02-D.P)	10:00 AM						
Received by GARB CONSULTANT	Eng. Mazen Essamy	MIR	C1	C2	C3	DD	MM	YY	HH	MM
			363	EW	CS	22	11	2023	10	0

CODE=1	S1 to S21	D1 to S3	Kp XXX Note
	Station Reference	Depot Reference	For Kilometer point only Start Km is used
	Work Activity		
	Sub Element of Activity		

Description of Materials	Sub-Ballast (2) AT (+0.90)				
Location to be Used	From	363+480	TO	363+740	Rev-29
		363+660		363+920	Rev-35
MAR & UIR Approval No	(S5-B-MS) (IR-S.B-04-D.P)	Date	21/11/2023		
	(S5-B-MS) (MAR-S.B-05)		01/10/2023		
Supplier Name	Elsiwly , Alharamin				
Test Requirement	P.L.T (DIN 18134)	Specification	EARTHWORK SPECIFICATIONS & TESTING REPORT (CG21-41.2) VERSION 2 BY CIVECON GROUP		
Reference Photos	No/Yes	Other			
Item	Description	Unit	Quantity	Arrival Date	Note
1	PLATE LOAD POINT	NUMBER	6		

Comments by: Eng. Mazen Essamy (SPECTRUM)	Comments by: Eng. Alaa Abd-Allatif (ER)
 1-THE PLATE LOAD TEST RESULT P.L.T (DIN 18134) IS APPROVED	1-PLATE LOAD TEST WAS CARRIED - OUT BY THIRD PART LAB 2-Results report attached and acceptable with project specifications. 3-Final approval is subject to above mentioned comments.

APPROVAL STATUS				
Organisation	Name	Sign	Date	A-AWC-R
Contractor	Eng. Mohamed Elsaied			A
QA/QC *	Eng. Mazen Essamy			A
GARB**	Eng. Margeret Magd			
Employers Representative	Eng. Alaa Abd-Allatif		23-11-2023	AWC

* Designer

** Alignment/Bridge: (S5-B-MS) (PLT-S.B-02-D.P)



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Internal inspection and laboratories sector

Accredited by : Egypton General Authority for Petroleum under No. 34/29-11-2011

Technical report

of Plate Loading Test (DIN 18134)

General	:	SYSTRA
Consultant	:	SPECTRUM
Contractor	:	شركة الماسة للمقاولات
Project	:	ELECTRIC EXPRESS TRAIN
Sample	:	Sub-Ballast (2)
Station	:	ST(363+480) TO ST(363+740)
Date of Test	:	23/11/2023
QC	:	964 -1





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Introduction:

The Plate Load test is designed to determine the vertical deformation and strength characteristics of soil by assessing the force and amount of penetration with time when a rigid plate is made to penetrate the soil.

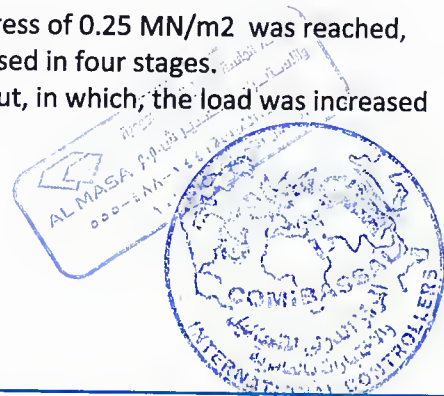
The test to be carried out on the native soil according to German specifications DIN 18134.

Test methods :

- 1- The German standard DIN 18134 was applied to define the apparatus used, the loading system, test conditions, and procedure for plate load test.
- 2- Loading plates with a diameter of 600 mm have a thickness of 25mm and are provided with equally spaced stiffeners with even upper faces parallel to the plate bottom face to allow 300 mm plate to be placed on top of it.
- 3- The loading system consisted of a hydraulic pump connected to a hydraulic jack of 700 bar capacity, which is capable of applying and releasing the load stages.
- 4- The dial gauge used to measure the plate settlement has a resolution of 0.01mm and the lever ratio was equal to 1.
- 5- The temperature at the time of the test was 25°.
- 6- The plate was carried out on a native soil (sand-gravel). The test surface area was levelled and the plate was bedded on this surface.
- 7- The hydraulic jack was placed on the middle of, and at normal to, the loading plate beneath the reaction loading system and secured against tilting.
- 8- The reaction loading system was a heavy multi-purpose excavator (more than 20 ton).

Description of experiment:

- 1- Loading, unloading and reloading regims were applied according to DIN 18134 for the plate load test to estimate the resilient modulus
- 2- Prior to the test, the force transducer and dial gauge were set to zero, after which a load was applied corresponding to a stress of 0.01 MN/m².
- 3- In the first loading cycle, the load was increased until a normal stress of 0.25 MN/m² was reached, and the loading increment was 0.025 MN/m². The load was released in four stages.
- 4- Following unloading, a further second loading cycle was carried out, in which, the load was increased only to the penultimate stage of the first cycle.





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St (363+480)

600

Table 1: Measured values for first loading cycle and unloading cycle

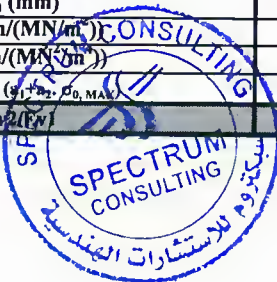
Loading stage no.	Load (F) kN	Normal stress (σ_0) MN/m ²	Settlement of loading plate S (mm)
0	1.414	0.005	0.00
1	7.07	0.025	0.07
2	14.14	0.050	0.15
3	21.21	0.075	0.23
4	28.28	0.100	0.36
5	35.35	0.125	0.51
6	42.42	0.150	0.61
7	49.49	0.175	0.71
8	56.56	0.200	0.79
9	63.63	0.225	0.87
10	70.7	0.250	0.92
11	56.56	0.200	0.91
12	49.49	0.175	0.90
13	35.35	0.125	0.83
14	21.21	0.075	0.76
15	1.414	0.005	0.47

Table 2: Measured values for second loading cycle

Loading stage no.	Load (F) kN	Normal stress (σ_0) MN/m ²	Settlement of loading plate S (mm)
15	1.414	0.005	0.47
16	7.07	0.025	0.57
17	14.14	0.050	0.66
18	21.21	0.075	0.72
19	28.28	0.100	0.77
20	35.35	0.125	0.81
21	42.42	0.150	0.84
22	49.49	0.175	0.88
23	56.56	0.200	0.91
24	63.63	0.225	0.94

Table 3: Compilation of results

Parameters	1st loading cycle	2nd loading cycle
$(\sigma_{0,max})$ MN/m ²	0.250	0.250
a_0 (mm)	-0.095	0.471
a_1 (mm/(MN/m ²))	4.274	3.711
a_2 (mm/(MN ² /m ⁴))	-4.487	-7.459
$Ev = 1.5 r / (a_1 + a_2 \cdot \sigma_{0,max})$	142.74	243.74
$Ev/(Fv)$	1.71	





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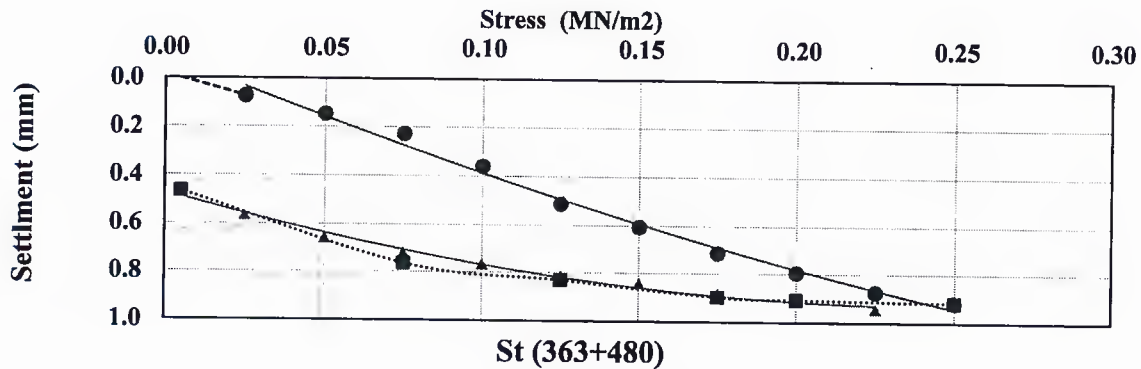


Fig. 1: Load-settlement curve, fitting curves according to Table 1 and Table 2 for the first and second loading cycles

- Measurement points from the first loading cycle
- Measurement points from the unloading cycle
- ▲ Measurement points from the second loading cycle
- S Settlement in mm
- σ_0 Normal stress MN/m²





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St (363+530)

600

Table 4: Measured values for first loading cycle and unloading cycle

Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
0	1.414	0.005	0.00
1	7.07	0.025	0.15
2	14.14	0.050	0.20
3	21.21	0.075	0.26
4	28.28	0.100	0.31
5	35.35	0.125	0.34
6	42.42	0.150	0.38
7	49.49	0.175	0.41
8	56.56	0.200	0.43
9	63.63	0.225	0.45
10	70.7	0.250	0.49
11	56.56	0.200	0.48
12	49.49	0.175	0.47
13	35.35	0.125	0.46
14	21.21	0.075	0.38
15	1.414	0.005	0.17

Table 5: Measured values for second loading cycle

Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
15	1.414	0.005	0.17
16	7.07	0.025	0.22
17	14.14	0.050	0.29
18	21.21	0.075	0.32
19	28.28	0.100	0.37
20	35.35	0.125	0.40
21	42.42	0.150	0.44
22	49.49	0.175	0.47
23	56.56	0.200	0.49
24	63.63	0.225	0.52

Table 6: Compilation of results

Parameters	1st loading cycle	2nd loading cycle
($\sigma_{0,max}$) MN/m ²	0.250	0.250
a_0 (mm)	0.093	0.163
a_1 (mm/(MN/m ²))	4.414	3.166
a_2 (mm/(MN ² /m ²))	-3.436	-4.055
$E_v = 1.5 \frac{a_1}{a_0} + a_2 \cdot \sigma_{0,max}$	126.57	209.07
E_2/E_1	1.65	



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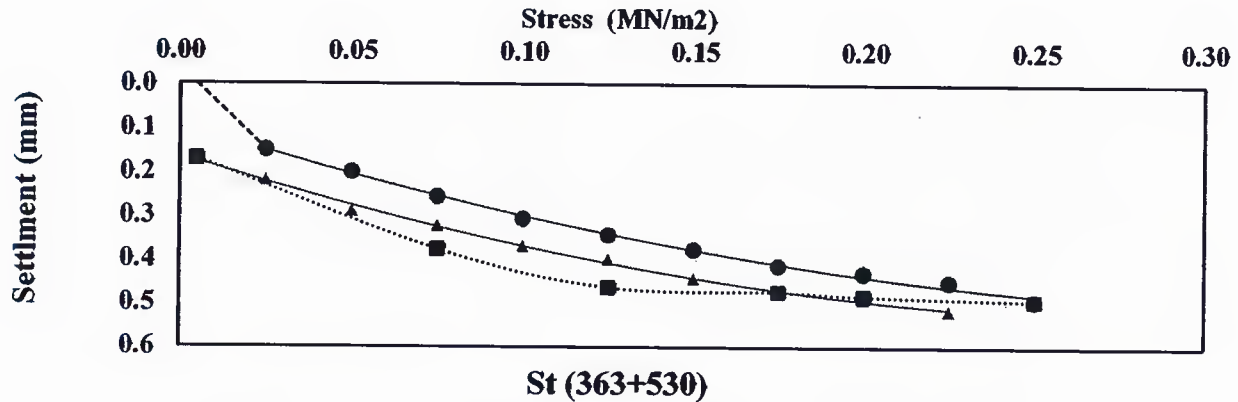


Fig. 2: Load-settlement curve, fitting curves according to Table 4 and Table 5 for the first and second loading cycles

- Measurement points from the first loading cycle
- Measurement points from the unloading cycle
- ▲ Measurement points from the second loading cycle
- S Settlement in mm
- σ_0 Normal stress MN/m²



St (363+580)

600

Table 7: Measured values for first loading cycle and unloading cycle

Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
0	1.414	0.005	0.00
1	7.07	0.025	0.06
2	14.14	0.050	0.23
3	21.21	0.075	0.38
4	28.28	0.100	0.46
5	35.35	0.125	0.63
6	42.42	0.150	0.70
7	49.49	0.175	0.82
8	56.56	0.200	0.96
9	63.63	0.225	1.04
10	70.7	0.250	1.09
11	56.56	0.200	1.08
12	49.49	0.175	1.07
13	35.35	0.125	1.06
14	21.21	0.075	1.00
15	1.414	0.005	0.61

Table 8: Measured values for second loading cycle

Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
15	1.414	0.005	0.61
16	7.07	0.025	0.77
17	14.14	0.050	0.86
18	21.21	0.075	0.94
19	28.28	0.100	0.98
20	35.35	0.125	1.04
21	42.42	0.150	1.07
22	49.49	0.175	1.11
23	56.56	0.200	1.14
24	63.63	0.225	1.17

Table 9: Compilation of results

Parameters	1st loading cycle	2nd loading cycle
$(\sigma_{0, \max})$ MN/m ²	0.250	0.250
a_0 (mm)	-0.081	0.631
a_1 (mm/(MN/m ²))	5.552	4.600
a_2 (mm/(MN ² /m ⁴))	-6.386	-10.173
$E_v = 1.5 / (a_1 + a_2 \cdot \sigma_{0, \max})$	113.75	218.69
E_v2/E_v1	1.92	



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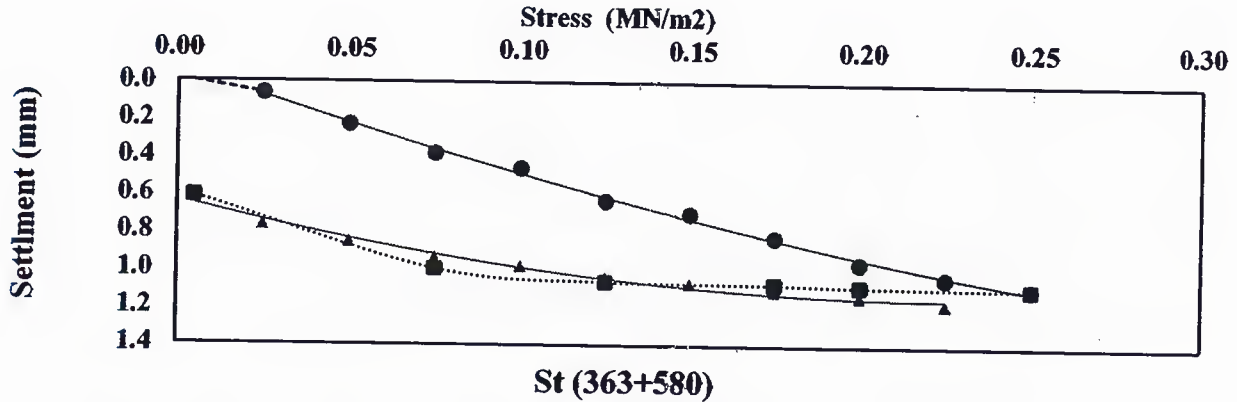


Fig. 3: Load-settlement curve, fitting curves according to Table 7 and Table 8 for the first and second loading cycles

- Measurement points from the first loading cycle
- Measurement points from the unloading cycle
- ▲ Measurement points from the second loading cycle
- S Settlement in mm
- σ_0 Normal stress MN/m²



St (363+630)

600

Table 10: Measured values for first loading cycle and unloading cycle

Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
0	1.414	0.005	0.00
1	7.07	0.025	0.12
2	14.14	0.050	0.23
3	21.21	0.075	0.30
4	28.28	0.100	0.38
5	35.35	0.125	0.43
6	42.42	0.150	0.51
7	49.49	0.175	0.51
8	56.56	0.200	0.52
9	63.63	0.225	0.56
10	70.7	0.250	0.61
11	56.56	0.200	0.60
12	49.49	0.175	0.59
13	35.35	0.125	0.58
14	21.21	0.075	0.46
15	1.414	0.005	0.15

Table 11: Measured values for second loading cycle

Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
15	1.414	0.005	0.15
16	7.07	0.025	0.23
17	14.14	0.050	0.32
18	21.21	0.075	0.39
19	28.28	0.100	0.43
20	35.35	0.125	0.51
21	42.42	0.150	0.52
22	49.49	0.175	0.55
23	56.56	0.200	0.58
24	63.63	0.225	0.60

Table 12: Compilation of results

Parameters	1st loading cycle	2nd loading cycle
$(\sigma_{0, \max})$ MN/m ²	0.250	0.250
a_0 (mm)	0.033	0.139
a_1 (mm/(MN/m ²))	5.131	3.811
a_2 (mm/(MN ² /m ⁴))	-7.700	-7.943
$Ev = 1.3 \times 10^4 (a_1 + a_2 \cdot \sigma_{0, \max})$	140.34	246.42
$Ev2/Ev1$	1.76	



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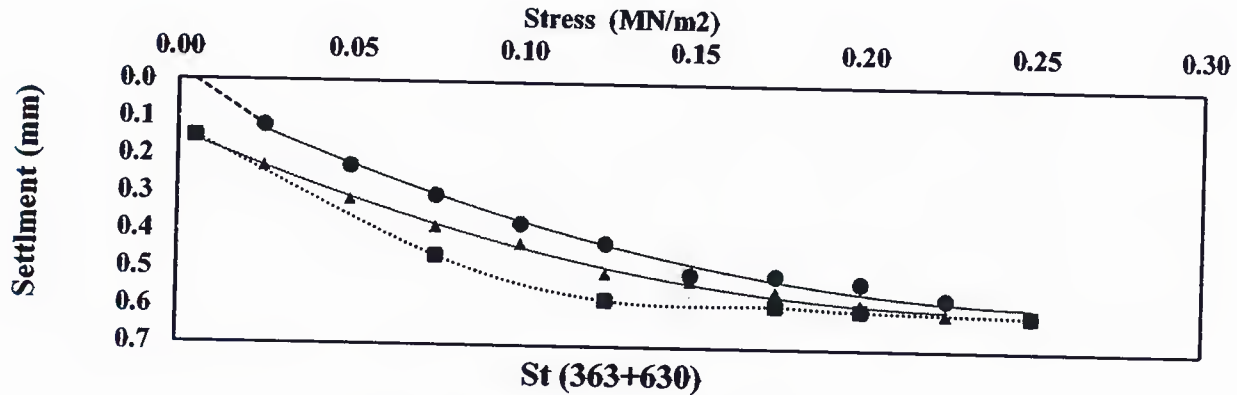


Fig. 4: Load-settlement curve, fitting curves according to Table 10 and Table 11 for the first and second loading cycles

- Measurement points from the first loading cycle
- Measurement points from the unloading cycle
- ▲ Measurement points from the second loading cycle
- S Settlement in mm
- σ_0 Normal stress MN/m²





COMIBASSAL International Controllers

Internal inspection and laboratories secto

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St (363+680)

600

Table 13: Measured values for first loading cycle and unloading cycle

Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
0	1.414	0.005	0.00
1	7.07	0.025	0.18
2	14.14	0.050	0.28
3	21.21	0.075	0.35
4	28.28	0.100	0.43
5	35.35	0.125	0.48
6	42.42	0.150	0.52
7	49.49	0.175	0.56
8	56.56	0.200	0.59
9	63.63	0.225	0.62
10	70.7	0.250	0.64
11	56.56	0.200	0.63
12	49.49	0.175	0.62
13	35.35	0.125	0.56
14	21.21	0.075	0.48
15	1.414	0.005	0.07

Table 14: Measured values for second loading cycle

Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
15	1.414	0.005	0.07
16	7.07	0.025	0.23
17	14.14	0.050	0.52
18	21.21	0.075	0.40
19	28.28	0.100	0.45
20	35.35	0.125	0.50
21	42.42	0.150	0.54
22	49.49	0.175	0.58
23	56.56	0.200	0.62
24	63.63	0.225	0.65

Table 15: Compilation of results

Parameters	1st loading cycle	2nd loading cycle
$(\sigma_{0,max})$ MN/m ²	0.250	0.250
a_0 (mm)	0.095	0.132
a_1 (mm/(MN/m ²))	4.959	4.532
a_2 (mm/(MN/m ²))	-7.195	-10.510
$E \cdot \frac{1}{1.5} \cdot \frac{1}{(3 \cdot \sigma_{0,max})}$	142.37	236.24
E_{V2}/E_{V1}	1.66	

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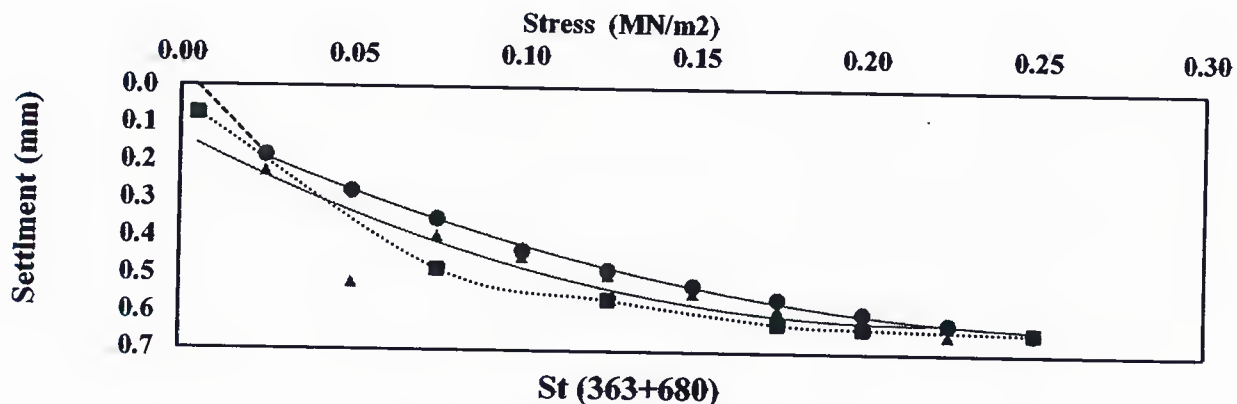


Fig. 5: Load-settlement curve, fitting curves according to Table 13 and Table 14 for the first and second loading cycles

- Measurement points from the first loading cycle
- Measurement points from the unloading cycle
- ▲ Measurement points from the second loading cycle
- S Settlement in mm
- σ_0 Normal stress MN/m²



St (363+730)

600

Table 16: Measured values for first loading cycle and unloading cycle

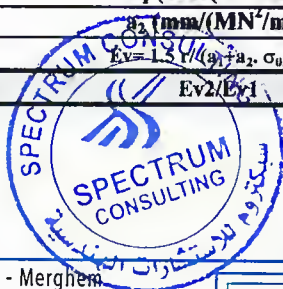
Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
0	1.414	0.005	0.00
1	7.07	0.025	0.09
2	14.14	0.050	0.17
3	21.21	0.075	0.36
4	28.28	0.100	0.54
5	35.35	0.125	0.67
6	42.42	0.150	0.76
7	49.49	0.175	0.82
8	56.56	0.200	0.94
9	63.63	0.225	1.03
10	70.7	0.250	1.08
11	56.56	0.200	1.07
12	49.49	0.175	1.06
13	35.35	0.125	1.05
14	21.21	0.075	0.73
15	1.414	0.005	0.84

Table 17: Measured values for second loading cycle

Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
15	1.414	0.005	0.84
16	7.07	0.025	0.89
17	14.14	0.050	0.93
18	21.21	0.075	0.98
19	28.28	0.100	1.01
20	35.35	0.125	1.05
21	42.42	0.150	1.07
22	49.49	0.175	1.11
23	56.56	0.200	1.16
24	63.63	0.225	1.23

Table 18: Compilation of results

Parameters	1st loading cycle	2nd loading cycle
($\sigma_{0,max}$) MN/m ²	0.250	0.250
a_0 (mm)	-0.124	0.847
a_1 (mm/(MN/m ²))	6.385	1.951
a_2 (mm/(MN ² /m ⁴))	-10.247	0.319
$E_v = 1.5 \cdot 1 / ((a_1 + a_2 \cdot \sigma_{0,MAX})$	117.70	221.65
E_v2/E_v1	1.88	





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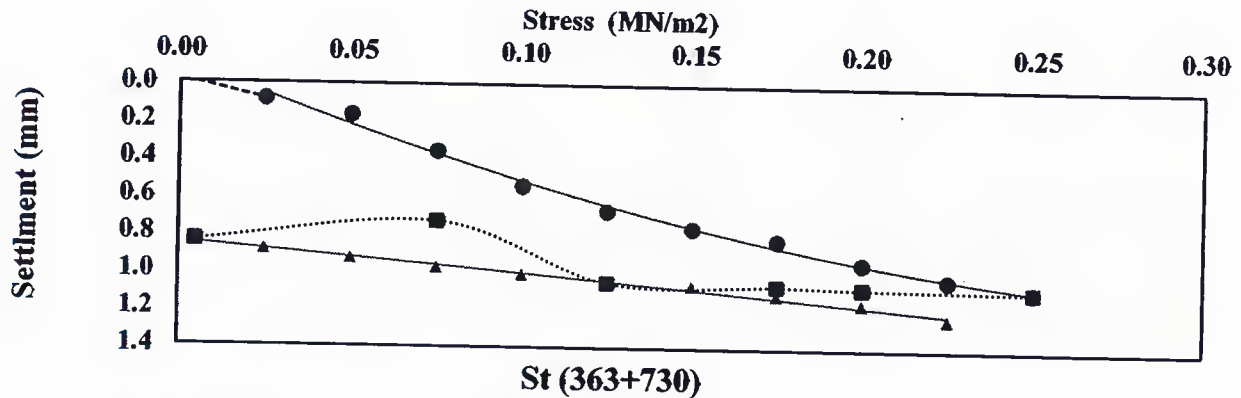
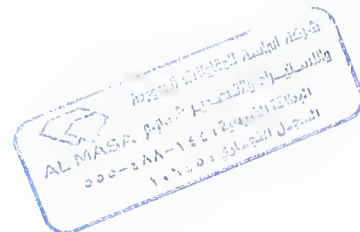


Fig. 6: Load-settlement curve, fitting curves according to Table 16 and Table 17 for the first and second loading cycles

- Measurement points from the first loading cycle
- Measurement points from the unloading cycle
- ▲ Measurement points from the second loading cycle
- S Settlement in mm
- σ_0 Normal stress MN/m²





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Conclusions:

The present test results which were obtained via the plate loading tests of the native soil on sub-ballast layer of the electric express train project at location from St(363+480) to St(363+740) in accordance to the German standard , DIN 18134 are illustrated in table 19 .

Table 19 :Test results

Location	Ev1(MN/m ²)	Ev2(MN/m ²)	Ev2/Ev1 ratio
St (363+480)	142.74	243.74	1.71
St (363+530)	126.57	209.07	1.65
St (363+580)	113.75	218.69	1.92
St (363+630)	140.34	246.42	1.76
St (363+680)	142.37	236.24	1.66
St (363+730)	117.70	221.65	1.88

Lab Director

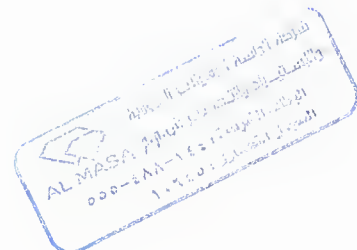
Eng / Eman Kandil

Eman.

Geotechnical Consultant

Dr. Dr. H.

Dr / Mohamed Mostafa Badry



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MATERIAL INSPECTION REQUEST



الهيئة العامة
للطرق والكباري
(GARB)



الهيئة العامة
للتخطيط والتنمية
الاقتصادية



Contractor Company	Al-Masa General Contracting Company		Designer Company	(SPECTRUM) Engineering Consulting Office						
Issued by Contractor	Name	Sign	Date/Serial Number	Time						
	Eng. Mohamed Elsaied		19/12/2023 (S5-B-MS) (PLT S.B-03-D.P)	10:00 AM						
Received by GARB CONSULTANT	Eng. Mazen Essamy	MIR	C1	C2	C3	DD	MM	YY	HH	MM
			364	EW	CS	20	12	2023	10	0

CODE-1	S1 to S21	D1 to S3	Kp XXX Note
	Station Reference	Depot Reference	For Kilometer point only Start Km is used
CODE-2	Work Activity		
CODE-3	Sub Element of Activity		

Description of Materials	Sub-Ballast (2) AT (+0.90)				
Location to be Used	From	364+100	TO	364+460	Rev-29
		364+280		364+640	Rev-35
MAR & UIR Approval No	(S5-B-MS) (IR-S.B-08-D.P)	Date	19/12/2023		
	(S5-B-MS) (MAR-S.B-06)		01/11/2023		
Supplier Name	Elsiwly , Alharamin				
Test Requirement	P.L.T (DIN 18134)	Specification	EARTHWORK SPECIFICATIONS & TESTING REPORT (CG21-41.2) VERSION 2 BY CIVECON GROUP		
Reference Photos	No/Yes	Other			
Item	Description	Unit	Quantity	Arrival Date	Note
1	PLATE LOAD POINT	NUMBER	8		

Comments by: Eng. Mazen Essamy (SPECTRUM)	Comments by: Eng. Alaa Abd-Allatif (ER)
1-THE PLATE LOAD TEST RESULT P.L.T (DIN 18134) IS APPROVED 	1-PLATE LOAD TEST WAS CARRIED - OUT BY THIRD PART LAB 2-Results report attached and acceptable with project specifications.

APPROVAL STATUS					
Organisation	Name	Sign	Date	A-AWC-R	
Contractor	Eng. Mohamed Elsaied			A	
QA/QC *	Eng. Mazen Essamy			A	
GARB**	Eng. Margeret Magdy				
Employers Representative	Eng. Alaa Abd-Allatif			A	

* Designer

** Alignment/Bridge: (S5-B-MS) (PLT-S.B-03-D.P)

MATERIAL INSPECTION REQUEST



الهيئة العامة
للطرق والكباري
(GARB)



Contractor Company	Al-Masa General Contracting Company			Designer Company		(SPECTRUM) Engineering Consulting Office				
Issued by Contractor	Name	Sign	Date/Serial Number		Time					
	Eng. Mohamed Elsaied		19/12/2023 (S5-B-MS) (PLT-S.B-03-D.P)		10:00 AM					
Received by GARB CONSULTANT	Eng. Mazen Essamy	MIR	C1	C2	C3	DD	MM	YY	HH	MM
			364	EW	CS	20	12	2023	10	0

CODE-1	S1 to S21	D1 to S3	Kp XXX Note
	Station Reference	Depot Reference	For Kilometer point only Start Km is used
CODE-2	Work Activity		
CODE-3	Sub Element of Activity		

Description of Materials	Sub-Ballast (2) AT (+0.90)					
Location to be Used	From	364+100	TO	364+460	Rev-29	
		364+280		364+640	Rev-35	
MAR & UIR Approval No	(S5-B-MS) (IR-S.B-08-D.P)		Date	19/12/2023		
	(S5-B-MS) (MAR-S.B-06)			01/11/2023		
Supplier Name	Elsiw , Alharamin					
Test Requirement	P.L.T (DIN 18134)		Specification	EARTHWORK SPECIFICATIONS & TESTING REPORT (CG21-41.2) VERSION 2 BY CIVECON GROUP		
Reference Photos	No/Yes		Other			
Item	Description	Unit	Quantity	Arrival Date	Note	
1	PLATE LOAD POINT	NUMBER	8			

Comments by: Eng. Mazen Essamy (SPECTRUM)	Comments by: Eng. Alaa Abd-Allatif (ER)
 1-THE PLATE LOAD TEST RESULT P.L.T (DIN 18134) IS APPROVED	1-PLATE LOAD TEST WAS CARRIED - OUT BY THIRD PART LAB 2-Results report attached and acceptable with project specifications. 3-Final approval is subject to above mentioned comments.

APPROVAL STATUS				
Organisation	Name	Sign	Date	A-AWC-R
Contractor	Eng. Mohamed Elsaied			A
QA/QC *	Eng. Mazen Essamy			A
GARB**	Eng. Margeret Magdy			
Employers Representative	Eng. Alaa Abd-Allatif		21-12-2023	Awc

* Designer

** Alignment/Bridges (S5-B-MS) (PLT-S.B-03-D.P)



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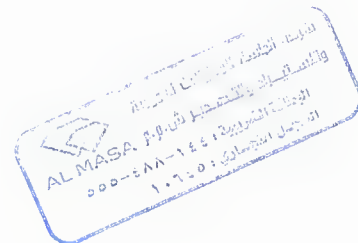
Internal inspection and laboratories sector

Accredited by : Egypton General Authority for Petroleum under No. 34/29-11-2011

Technical report

of Plate Loading Test (DIN 18134)

General	:	SYSTRA
Consultant	:	SPECTRUM
Contractor	:	شركة الماسة للمقاولات
Project	:	ELECTRIC EXPRESS TRAIN
Sample	:	Sub-Ballast (2)
Station	:	ST(364+100) TO ST(364+460)
Date of Test	:	21/12/2023
QC	:	964 - 3





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Introduction:

The Plate Load test is designed to determine the vertical deformation and strength characteristics of soil by assessing the force and amount of penetration with time when a rigid plate is made to penetrate the soil.

The test to be carried out on the native soil according to German specifications DIN 18134.

Test methods :

- 1- The German standard DIN 18134 was applied to define the apparatus used, the loading system, test conditions, and procedure for plate load test.
- 2- Loading plates with a diameter of 600 mm have a thickness of 25mm and are provided with equally spaced stiffeners with even upper faces parallel to the plate bottom face to allow 300 mm plate to be placed on top of it.
- 3- The loading system consisted of a hydraulic pump connected to a hydraulic jack of 700 bar capacity, which is capable of applying and releasing the load stages.
- 4- The dial gauge used to measure the plate settlement has a resolution of 0.01mm and the lever ratio was equal to 1.
- 5- The temperature at the time of the test was 25°.
- 6- The plate was carried out on a native soil (sand-gravel). The test surface area was levelled and the plate was bedded on this surface.
- 7- The hydraulic jack was placed on the middle of, and at normal to, the loading plate beneath the reaction loading system and secured against tilting.
- 8- The reaction loading system was a heavy multi-purpose excavator (more than 20 ton).

Description of experiment:

- 1- Loading, unloading and reloading regims were applied according to DIN 18134 for the plate load test to estimate the resilient modulus
- 2- Prior to the test, the force transducer and dial gauge were set to zero, after which a load was applied corresponding to a stress of 0.01 MN/m².
- 3- In the first loading cycle, the load was increased until a normal stress of 0.25 MN/m² was reached, and the loading increment was 0.025 MN/m². The load was released in four stages.
- 4- Following unloading, a further second loading cycle was carried out, in which, the load was increased only to the penultimate stage of the first cycle.





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St (364+100)

600

Table 1: Measured values for first loading cycle and unloading cycle

Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
0	1.414	0.005	0.00
1	7.07	0.025	0.16
2	14.14	0.050	0.36
3	21.21	0.075	0.54
4	28.28	0.100	0.68
5	35.35	0.125	0.78
6	42.42	0.150	0.87
7	49.49	0.175	0.98
8	56.56	0.200	1.04
9	63.63	0.225	1.11
10	70.7	0.250	1.18
11	56.56	0.200	1.17
12	49.49	0.175	1.16
13	35.35	0.125	1.15
14	21.21	0.075	1.04
15	1.414	0.005	0.64

Table 2: Measured values for second loading cycle

Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
15	1.414	0.005	0.64
16	7.07	0.025	0.75
17	14.14	0.050	0.82
18	21.21	0.075	0.89
19	28.28	0.100	0.95
20	35.35	0.125	1.03
21	42.42	0.150	1.09
22	49.49	0.175	1.15
23	56.56	0.200	1.21
24	63.63	0.225	1.27

Table 3: Compilation of results

Parameters	1st loading cycle	2nd loading cycle
($\sigma_{0, \max}$) MN/m ²	0.250	0.250
a_0 (mm)	-0.012	0.641
a_1 (mm/(MN/m ²))	7.994	3.541
a_2 (mm/(MN ² /m ⁴))	-13.238	-3.475
$E_v = 1.5 r / (a_1 + a_2 \cdot \sigma_{0, \max})$	96.06	168.38
E_{v2}/E_{v1}	1.75	



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St (364+150)

600

Table 4: Measured values for first loading cycle and unloading cycle

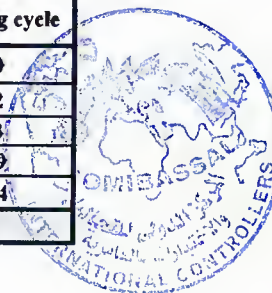
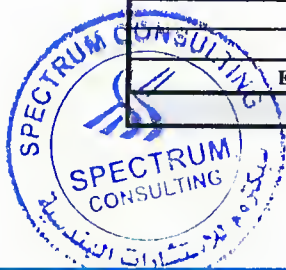
Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
0	1.414	0.005	0.00
1	7.07	0.025	0.08
2	14.14	0.050	0.15
3	21.21	0.075	0.20
4	28.28	0.100	0.25
5	35.35	0.125	0.28
6	42.42	0.150	0.33
7	49.49	0.175	0.36
8	56.56	0.200	0.41
9	63.63	0.225	0.44
10	70.7	0.250	0.53
11	56.56	0.200	0.53
12	49.49	0.175	0.51
13	35.35	0.125	0.50
14	21.21	0.075	0.40
15	1.414	0.005	0.21

Table 5: Measured values for second loading cycle

Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
15	1.414	0.005	0.21
16	7.07	0.025	0.26
17	14.14	0.050	0.31
18	21.21	0.075	0.35
19	28.28	0.100	0.39
20	35.35	0.125	0.42
21	42.42	0.150	0.46
22	49.49	0.175	0.49
23	56.56	0.200	0.51
24	63.63	0.225	0.54

Table 6: Compilation of results

Parameters	1st loading cycle	2nd loading cycle
($\sigma_{0, \max}$) MN/m ²	0.250	0.250
a_0 (mm)	0.050	0.202
a_1 (mm/(MN/m ²))	2.888	2.783
a_2 (mm/(MN ² /m ⁴))	-0.263	-3.069
$E_v = 1.5 r / (a_1 + a_2 \cdot \sigma_{0, \max})$	159.46	223.24
E_v2/E_v1	1.40	





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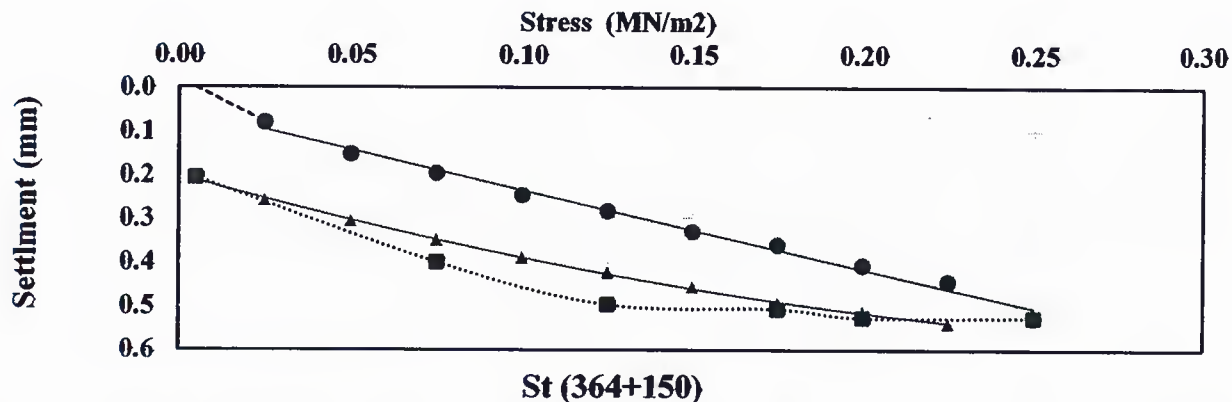


Fig. 2: Load-settlement curve, fitting curves according to Table 4 and Table 5 for the first and second loading cycles

- Measurement points from the first loading cycle
- Measurement points from the unloading cycle
- ▲ Measurement points from the second loading cycle
- S Settlement in mm
- σ_0 Normal stress MN/m²





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St (364+200)

600

Table 7: Measured values for first loading cycle and unloading cycle

Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
0	1.414	0.005	0.00
1	7.07	0.025	0.06
2	14.14	0.050	0.17
3	21.21	0.075	0.44
4	28.28	0.100	0.65
5	35.35	0.125	0.87
6	42.42	0.150	0.96
7	49.49	0.175	1.09
8	56.56	0.200	1.21
9	63.63	0.225	1.33
10	70.7	0.250	1.40
11	56.56	0.200	1.06
12	49.49	0.175	1.04
13	35.35	0.125	1.02
14	21.21	0.075	0.99
15	1.414	0.005	0.64

Table 8: Measured values for second loading cycle

Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
15	1.414	0.005	0.64
16	7.07	0.025	0.71
17	14.14	0.050	0.77
18	21.21	0.075	0.80
19	28.28	0.100	0.84
20	35.35	0.125	0.87
21	42.42	0.150	0.92
22	49.49	0.175	0.99
23	56.56	0.200	1.05
24	63.63	0.225	1.12

Table 9: Compilation of results

Parameters	1st loading cycle	2nd loading cycle
($\sigma_{0, \max}$) MN/m ²	0.250	0.250
a_0 (mm)	-0.237	0.663
a_1 (mm/(MN/m ²))	7.248	1.522
a_2 (mm/(MN ² /m ⁴))	-14.794	2.109
$E_v = 1.5 \text{ r} / (a_1 + a_2 \cdot \sigma_{0, \max})$	126.75	219.57
E_v2/E_v1	1.73	



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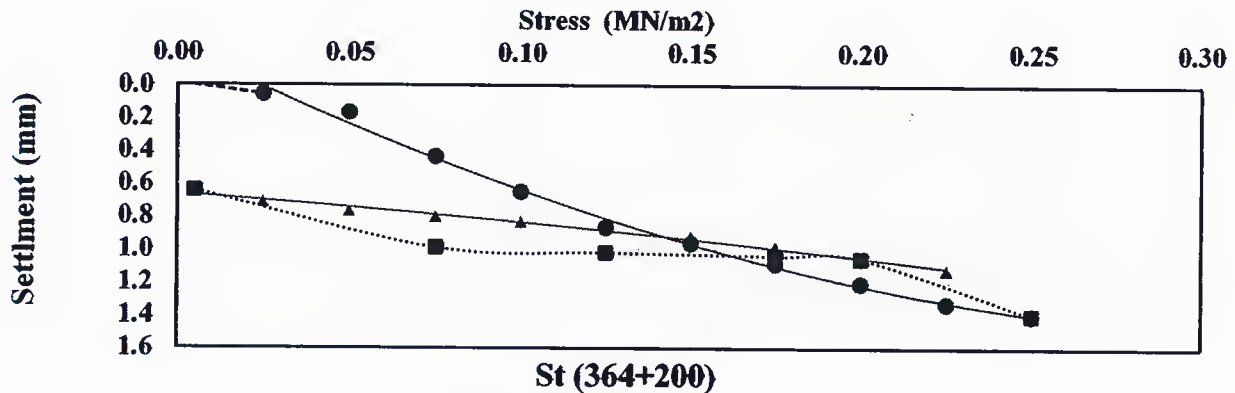
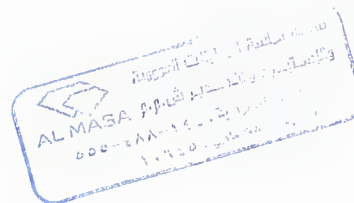


Fig. 3: Load-settlement curve, fitting curves according to Table 7 and Table 8 for the first and second loading cycles

- Measurement points from the first loading cycle
- Measurement points from the unloading cycle
- ▲ Measurement points from the second loading cycle
- S Settlement in mm
- σ_0 Normal stress MN/m²





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St (364+250)

600

Table 10: Measured values for first loading cycle and unloading cycle

Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
0	1.414	0.005	0.00
1	7.07	0.025	0.07
2	14.14	0.050	0.10
3	21.21	0.075	0.14
4	28.28	0.100	0.20
5	35.35	0.125	0.24
6	42.42	0.150	0.27
7	49.49	0.175	0.30
8	56.56	0.200	0.35
9	63.63	0.225	0.42
10	70.7	0.250	0.47
11	56.56	0.200	0.46
12	49.49	0.175	0.45
13	35.35	0.125	0.44
14	21.21	0.075	0.38
15	1.414	0.005	0.22

Table 11: Measured values for second loading cycle

Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
15	1.414	0.005	0.22
16	7.07	0.025	0.27
17	14.14	0.050	0.31
18	21.21	0.075	0.34
19	28.28	0.100	0.37
20	35.35	0.125	0.40
21	42.42	0.150	0.43
22	49.49	0.175	0.45
23	56.56	0.200	0.48
24	63.63	0.225	0.52

Table 12: Compilation of results

Parameters	1st loading cycle	2nd loading cycle
($\sigma_{0, \max}$) MN/m ²	0.250	0.250
a_0 (mm)	0.034	0.219
a_1 (mm/(MN/m ²))	2.955	2.714
a_2 (mm/(MN ² /m ⁴))	1.475	-1.910
$E_v = 1.5 \pi / (a_1 + a_2 \cdot \sigma_{0, \max})$	135.40	201.15
E_{v2}/E_{v1}	1.49	



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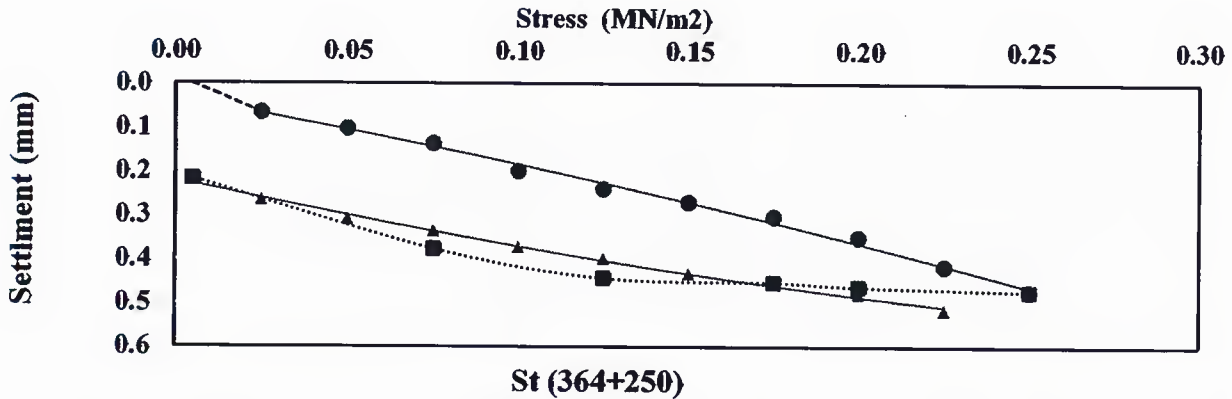


Fig. 4: Load-settlement curve, fitting curves according to Table 10 and Table 11 for the first and second loading cycles

- Measurement points from the first loading cycle
- Measurement points from the unloading cycle
- ▲ Measurement points from the second loading cycle
- S Settlement in mm
- σ_0 Normal stress MN/m²





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St (364+300)

600

Table 13: Measured values for first loading cycle and unloading cycle

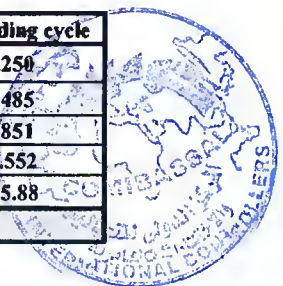
Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
0	1.414	0.005	0.00
1	7.07	0.025	0.10
2	14.14	0.050	0.22
3	21.21	0.075	0.34
4	28.28	0.100	0.47
5	35.35	0.125	0.60
6	42.42	0.150	0.72
7	49.49	0.175	0.85
8	56.56	0.200	0.96
9	63.63	0.225	1.04
10	70.7	0.250	1.12
11	56.56	0.200	1.11
12	49.49	0.175	1.10
13	35.35	0.125	1.09
14	21.21	0.075	0.96
15	1.414	0.005	0.50

Table 14: Measured values for second loading cycle

Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
15	1.414	0.005	0.50
16	7.07	0.025	0.59
17	14.14	0.050	0.66
18	21.21	0.075	0.75
19	28.28	0.100	0.83
20	35.35	0.125	0.90
21	42.42	0.150	0.96
22	49.49	0.175	1.01
23	56.56	0.200	1.07
24	63.63	0.225	1.12

Table 15: Compilation of results

Parameters	1st loading cycle	2nd loading cycle
($\sigma_{0,max}$) MN/m ²	0.250	0.250
a_0 (mm)	-0.063	0.485
a_1 (mm/(MN/m ²))	5.878	3.851
a_2 (mm/(MN ² /m ⁴))	-4.264	-4.552
$Ev = 1.5 \tau / (a_1 + a_2 \cdot \sigma_{0,max})$	93.51	165.88
$Ev2/Ev1$	1.77	





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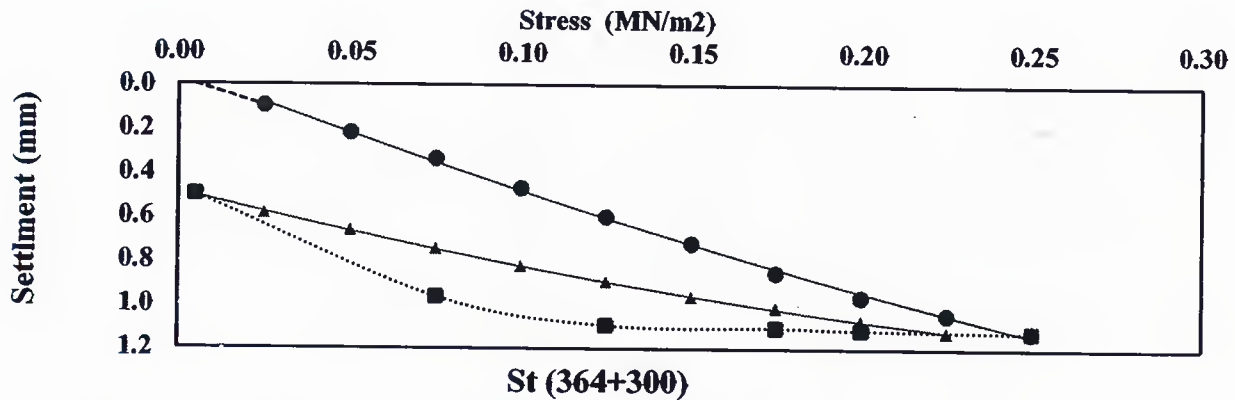
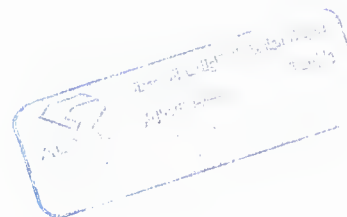


Fig. 5: Load-settlement curve, fitting curves according to Table 13 and Table 14 for the first and second loading cycles

- Measurement points from the first loading cycle
- Measurement points from the unloading cycle
- ▲ Measurement points from the second loading cycle
- S Settlement in mm
- σ_0 Normal stress MN/m²





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St (364+350)

600

Table 16: Measured values for first loading cycle and unloading cycle

Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
0	1.414	0.005	0.00
1	7.07	0.025	0.09
2	14.14	0.050	0.22
3	21.21	0.075	0.32
4	28.28	0.100	0.45
5	35.35	0.125	0.56
6	42.42	0.150	0.65
7	49.49	0.175	0.72
8	56.56	0.200	0.79
9	63.63	0.225	0.88
10	70.7	0.250	0.96
11	56.56	0.200	0.95
12	49.49	0.175	0.94
13	35.35	0.125	0.93
14	21.21	0.075	0.85
15	1.414	0.005	0.40

Table 17: Measured values for second loading cycle

Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
15	1.414	0.005	0.40
16	7.07	0.025	0.52
17	14.14	0.050	0.60
18	21.21	0.075	0.65
19	28.28	0.100	0.73
20	35.35	0.125	0.80
21	42.42	0.150	0.85
22	49.49	0.175	0.90
23	56.56	0.200	0.94
24	63.63	0.225	1.00

Table 18: Compilation of results

Parameters	1st loading cycle	2nd loading cycle
($\sigma_{0, \max}$) MN/m ²	0.250	0.250
a_0 (mm)	-0.035	0.403
a_1 (mm/(MN/m ²))	5.349	3.847
a_2 (mm/(MN ² /m ⁴))	-5.679	-5.551
$Ev = 1.5 / (a_1 + a_2 \cdot \sigma_{0, \max})$	114.52	182.97
$Ev2/Ev1$	1.60	



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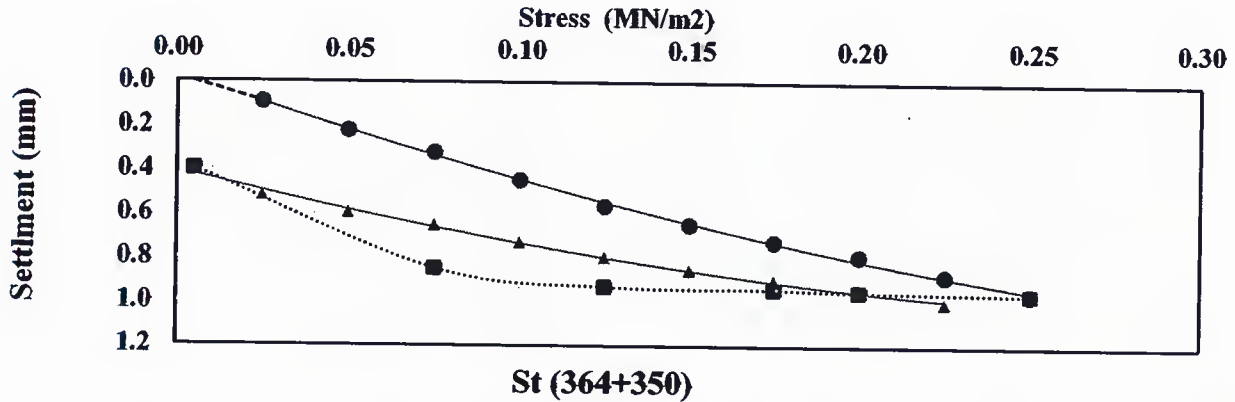


Fig. 6: Load-settlement curve, fitting curves according to Table 16 and Table 17 for the first and second loading cycles

- Measurement points from the first loading cycle
- Measurement points from the unloading cycle
- ▲ Measurement points from the second loading cycle
- S Settlement in mm
- σ_0 Normal stress MN/m²



St (364+400)

600

Table 19: Measured values for first loading cycle and unloading cycle

Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
0	1.414	0.005	0.00
1	7.07	0.025	0.11
2	14.14	0.050	0.22
3	21.21	0.075	0.32
4	28.28	0.100	0.40
5	35.35	0.125	0.49
6	42.42	0.150	0.60
7	49.49	0.175	0.66
8	56.56	0.200	0.72
9	63.63	0.225	0.77
10	70.7	0.250	0.82
11	56.56	0.200	0.81
12	49.49	0.175	0.80
13	35.35	0.125	0.79
14	21.21	0.075	0.72
15	1.414	0.005	0.31

Table 20: Measured values for second loading cycle

Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
15	1.414	0.005	0.31
16	7.07	0.025	0.40
17	14.14	0.050	0.47
18	21.21	0.075	0.53
19	28.28	0.100	0.60
20	35.35	0.125	0.64
21	42.42	0.150	0.70
22	49.49	0.175	0.74
23	56.56	0.200	0.80
24	63.63	0.225	0.86

Table 21: Compilation of results

Parameters	1st loading cycle	2nd loading cycle
($\sigma_{0, \max}$) MN/m ²	0.250	0.250
a_0 (mm)	-0.010	0.311
a_1 (mm/(MN/m ²))	4.852	3.136
a_2 (mm/(MN ² /m ⁴))	-6.063	-3.389
$E_v = 1.5 r / (a_1 + a_2 \cdot \sigma_{0, \max})$	134.86	196.58
E_{v2}/E_{v1}	1.46	



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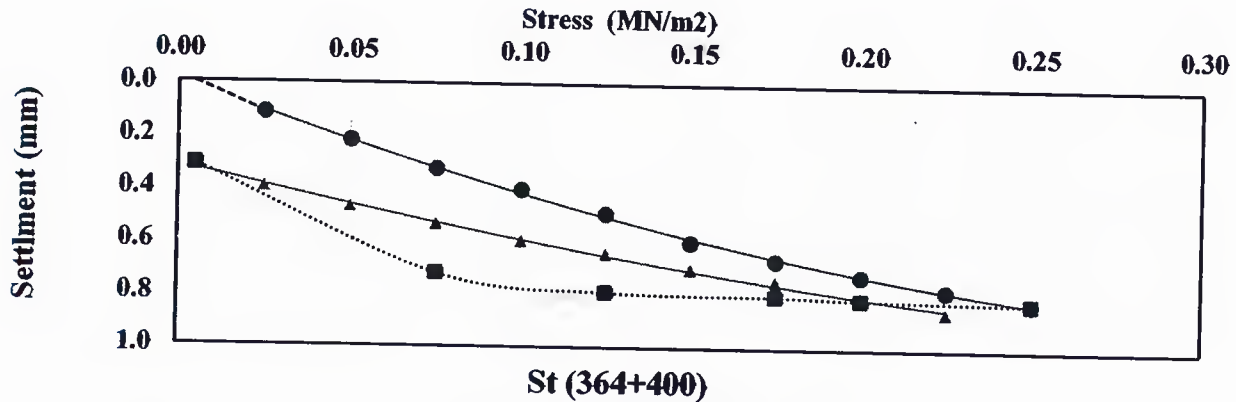


Fig. 7: Load-settlement curve, fitting curves according to Table 19 and Table 20 for the first and second loading cycles

- Measurement points from the first loading cycle
- Measurement points from the unloading cycle
- ▲ Measurement points from the second loading cycle
- S Settlement in mm
- σ_0 Normal stress MN/m²





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St (364+450)

600

Table 22: Measured values for first loading cycle and unloading cycle

Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
0	1.414	0.005	0.00
1	7.07	0.025	0.12
2	14.14	0.050	0.27
3	21.21	0.075	0.40
4	28.28	0.100	0.50
5	35.35	0.125	0.63
6	42.42	0.150	0.72
7	49.49	0.175	0.80
8	56.56	0.200	0.87
9	63.63	0.225	0.96
10	70.7	0.250	1.04
11	56.56	0.200	1.03
12	49.49	0.175	1.02
13	35.35	0.125	1.01
14	21.21	0.075	0.89
15	1.414	0.005	0.53

Table 23: Measured values for second loading cycle

Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
15	1.414	0.005	0.53
16	7.07	0.025	0.61
17	14.14	0.050	0.67
18	21.21	0.075	0.74
19	28.28	0.100	0.82
20	35.35	0.125	0.89
21	42.42	0.150	0.96
22	49.49	0.175	1.02
23	56.56	0.200	1.07
24	63.63	0.225	1.13

Table 24: Compilation of results

Parameters	1st loading cycle	2nd loading cycle
($\sigma_{0, \max}$) MN/m ²	0.250	0.250
a_0 (mm)	-0.015	0.518
a_1 (mm/(MN/m ²))	5.987	3.255
a_2 (mm/(MN ² /m ⁴))	-7.316	-2.448
$E_v = 1.5 \tau / (a_1 + a_2 \cdot \sigma_{0, \max})$	108.21	170.26
E_{v2}/E_{v1}	1.57	





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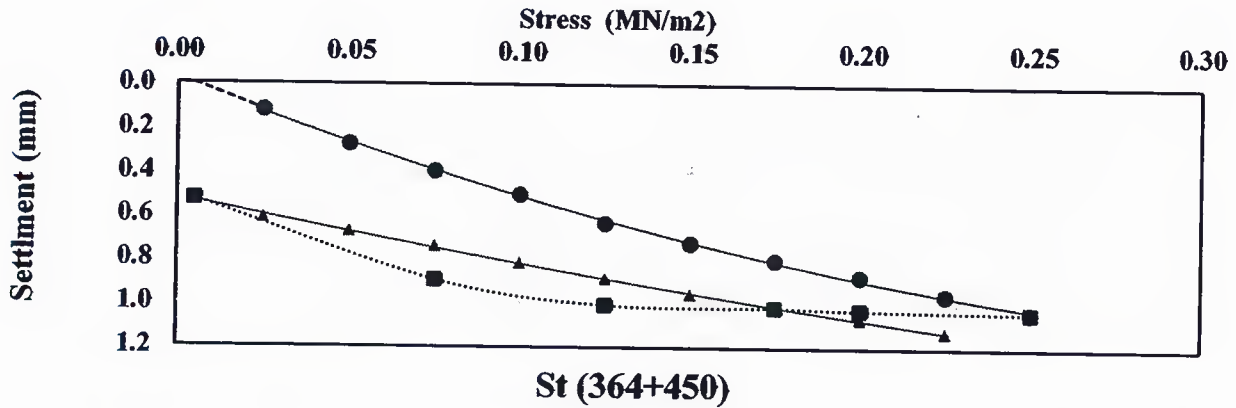


Fig. 8: Load-settlement curve, fitting curves according to Table 22 and Table 23 for the first and second loading cycles

- Measurement points from the first loading cycle
- Measurement points from the unloading cycle
- ▲ Measurement points from the second loading cycle
- S Settlement in mm
- σ_0 Normal stress MN/m²





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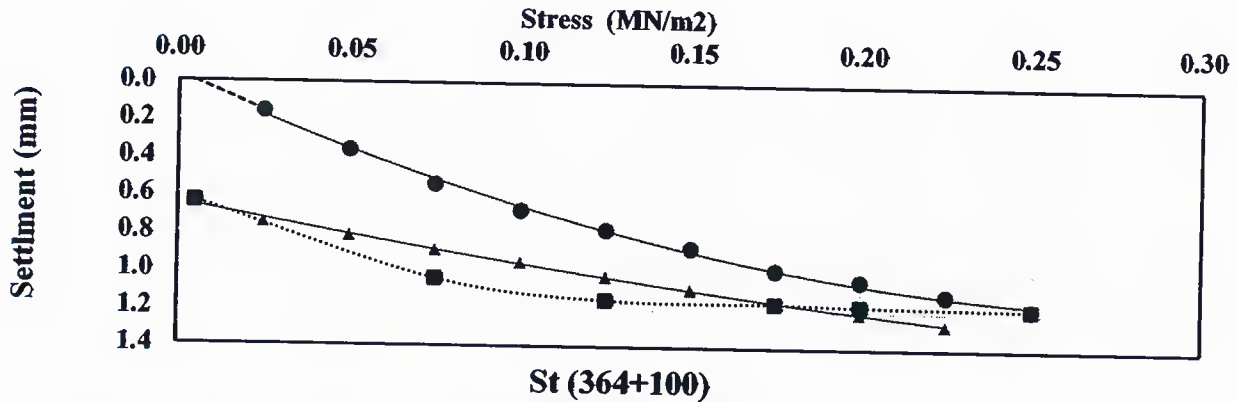


Fig. 1: Load-settlement curve, fitting curves according to Table 1 and Table 2 for the first and second loading cycles

- Measurement points from the first loading cycle
- Measurement points from the unloading cycle
- ▲ Measurement points from the second loading cycle
- S Settlement in mm
- σ_0 Normal stress MN/m²





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Conclusions:

The present test results which were obtained via the plate loading tests of the native soil on sub-ballast layer of the electric express train project at location from St(364+100) to St(364+460) in accordance to the German standard , DIN 18134 are illustrated in table 25 .

Table 25 :Test results

Location	Ev1(MN/m ²)	Ev2(MN/m ²)	Ev2/Ev1 ratio
St (364+100)	96.06	168.38	1.75
St (364+150)	159.46	223.24	1.40
St (364+200)	126.75	219.57	1.73
St (364+250)	135.40	201.15	1.49
St (364+300)	93.51	165.88	1.77
St (364+350)	114.52	182.97	1.60
St (364+400)	134.86	196.58	1.46
St (364+450)	108.21	170.26	1.57

Lab Director

Eng / Eman Kandil

Eman

Geotechnical Consultant

Dr / Mohamed Mostafa Badry

Dr. M. H.



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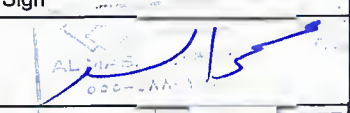


49 El Horria Ave. Alex, Egypt

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Fax :002 033900476

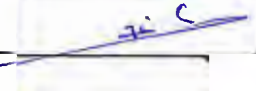
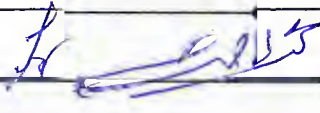
Email : internal-inspection@comibassal.com

Contractor Company	Al-Masa General Contracting Company			Designer Company	(SPECTRUM) Engineering Consulting Office						
Issued by Contractor	Name	Sign	Date/Serial Number	Time							
	Eng. Mohamed Elsaied		22/12/2023 (S5-B-MS) (PLT-S.B-04-D.P)	10:00 AM							
Received by GARB CONSULTANT	Eng. Mazen Essamy	MIR		C1 363	C2 EW	C3 CS	DD 23	MM 12	YY 2023	HH 10	MM 0

CODE-1	S1 to S21 Station Reference	D1 to S3 Depot Reference	Kp XXX Note For Kilometer point only Start Km is used
CODE-2	Work Activity		
CODE-3	Sub Element of Activity		

Description of Materials	Sub-Ballast (2) AT (+0.90)				
Location to be Used	From	363+000	TO	363+060	Rev-29
		363+180		363+240	Rev-35
MAR & UIR Approval No	(S5-B-MS) (IR-S.B-09-D.P)		Date	22/12/2023	
	(S5-B-MS) (MAR-S.B-06)			01/11/2023	
Supplier Name	Elsiw , Alharamin				
Test Requirement	P.L.T (DIN 18134)		Specification	EARTHWORK SPECIFICATIONS & TESTING REPORT (CG21-41.2) VERSION 2 BY CIVECON GROUP	
Reference Photos	No/Yes		Other		
Item	Description	Unit	Quantity	Arrival Date	Note
1	PLATE LOAD POINT	NUMBER	2		

Comments by: Eng. Mazen Essamy (SPECTRUM)	Comments by: Eng. Alaa Abd-Allatif (ER)
 1-THE PLATE LOAD TEST RESULT P.L.T (DIN 18134) IS APPROVED	1-PLATE LOAD TEST WAS CARRIED - OUT BY THIRD PART LAB 2-Results report attached and acceptable with project specifications.

APPROVAL STATUS				
Organisation	Name	Sign	Date	A-AWC-R
Contractor	Eng. Mohamed Elsaied			A
QA/QC *	Eng. Mazen Essamy			A
GARB**	Eng. Margeret Magd			
Employers Representative	Eng. Alaa Abd-Allatif			A

* Designer

** Alignment/Bridge: (S5-B-MS) (PLT-S.B-04-D.P)

MATERIAL INSPECTION REQUEST



الهيئة العامة
للطرق والكباري
(GARB)



Contractor Company	Al-Masa General Contracting Company		Designer Company	(SPECTRUM) Engineering Consulting Office						
Issued by Contractor	Name	Sign	Date/Serial Number	Time						
	Eng. Mohamed Elsaied		22/12/2023 (S5-B-MS) (PLT-S.B-04-D.P)	10:00 AM						
Received by GARB CONSULTANT	Eng. Mazen Essamy	MIR	C1	C2	C3	DD	MM	YY	HH	MM
			363	EW	CS	23	12	2023	10	0

CODE-1	S1 to S21	D1 to S3	Kp XXX Note
	Station Reference	Depot Reference	For Kilometer point only Start Km is used
CODE-2	Work Activity		
CODE-3	Sub Element of Activity		

Description of Materials	Sub-Ballast (2) AT (+0.90)				
Location to be Used	From	363+000	TO	363+060	Rev-29
		363+180		363+240	Rev-35
MAR & UIR Approval No	(S5-B-MS) (IR-S.B-09-D.P)	Date	22/12/2023		
	(S5-B-MS) (MAR-S.B-06)		01/11/2023		
Supplier Name	Elsawy , Alharamin				
Test Requirement	P.L.T (DIN 18134)	Specification	EARTHWORK SPECIFICATIONS & TESTING REPORT (CG21-41.2) VERSION 2 BY CIVECON GROUP		
Reference Photos	No/Yes	Other			

Item	Description	Unit	Quantity	Arrival Date	Note
1	PLATE LOAD POINT	NUMBER	2		

Comments by: Eng. Mazen Essamy (SPECTRUM)	Comments by: Eng. Alaa Abd-Allatif (ER)
 1-THE PLATE LOAD TEST RESULT P.L.T. (DIN 18134) IS APPROVED	1-PLATE LOAD TEST WAS CARRIED - OUT BY THIRD PART LAB 2-Results report attached and acceptable with project specifications. 3-Final approval is subject to above mentioned comments.

APPROVAL STATUS

Organisation	Name	Sign	Date	A-AWC-R
Contractor	Eng. Mohamed Elsaied			A
QA/QC *	Eng. Mazen Essamy			A
GARB**	Eng. Margeret Magdy			
Employers Representative	Eng. Alaa Abd-Allatif			Awe

* Designer

** Alignment/Bridges (S5-B-MS) (PLT-S.B-04-D.P)



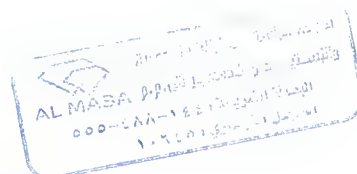
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Technical report

of Plate Loading Test (DIN 18134)



General	:	SYSTRA
Consultant	:	SPECTRUM
Contractor	:	شركة الماسة للمقاولات
Project	:	ELECTRIC EXPRESS TRAIN
Sample	:	Sub-Ballast (Z)
Station	:	S(363+025) TO ST(363+100)
Date of Test	:	23/12/2023
QC	:	2573





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Introduction:

The Plate Load test is designed to determine the vertical deformation and strength characteristics of soil by assessing the force and amount of penetration with time when a rigid plate is made to penetrate the soil.

The test to be carried out on the native soil according to German specifications DIN 18134.

Test methods :

- 1- The German standard DIN 18134 was applied to define the apparatus used, the loading system, test conditions, and procedure for plate load test.
- 2- Loading plates with a diameter of 600 mm have a thickness of 25mm and are provided with equally spaced stiffeners with even upper faces parallel to the plate bottom face to allow 300 mm plate to be placed on top of it.
- 3- The loading system consisted of a hydraulic pump connected to a hydraulic jack of 700 bar capacity, which is capable of applying and releasing the load stages.
- 4- The dial gauge used to measure the plate settlement has a resolution of 0.01mm and the lever ratio was equal to 1.
- 5- The temperature at the time of the test was 25°.
- 6- The plate was carried out on a native soil (sand-gravel). The test surface area was levelled and the plate was bedded on this surface.
- 7- The hydraulic jack was placed on the middle of, and at normal to, the loading plate beneath the reaction loading system and secured against tilting.
- 8- The reaction loading system was a heavy multi-purpose excavator (more than 20 ton).

Description of experiment:

- 1- Loading, unloading and reloading regims were applied according to DIN 18134 for the plate load test to estimate the resilient modulus
- 2- Prior to the test, the force transducer and dial gauge were set to zero, after which a load was applied corresponding to a stress of 0.01 MN/m².
- 3- In the first loading cycle, the load was increased until a normal stress of 0.25 MN/m² was reached, and the loading increment was 0.025 MN/m². The load was released in four stages.
- 4- Following unloading, a further second loading cycle was carried out, in which, the load was increased only to the penultimate stage of the first cycle.



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St (363+025)

600

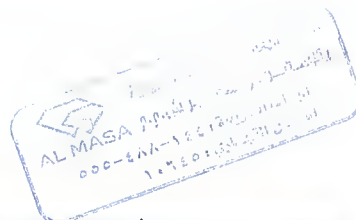


Table 1: Measured values for first loading cycle and unloading cycle

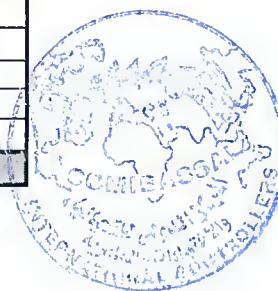
Loading stage no.	Load (F) kN	Normal stress (σ_0) MN/m ²	Settlement of loading plate S (mm)
0	1.414	0.005	0.00
1	7.07	0.025	0.10
2	14.14	0.050	0.28
3	21.21	0.075	0.28
4	28.28	0.100	0.36
5	35.35	0.125	0.45
6	42.42	0.150	0.52
7	49.49	0.175	0.59
8	56.56	0.200	0.68
9	63.63	0.225	0.76
10	70.7	0.250	0.84
11	56.56	0.200	0.83
12	49.49	0.175	0.82
13	35.35	0.125	0.76
14	21.21	0.075	0.69
15	1.414	0.005	0.32

Table 2: Measured values for second loading cycle

Loading stage no.	Load (F) kN	Normal stress (σ_0) MN/m ²	Settlement of loading plate S (mm)
15	1.414	0.005	0.32
16	7.07	0.025	0.40
17	14.14	0.050	0.48
18	21.21	0.075	0.59
19	28.28	0.100	0.66
20	35.35	0.125	0.72
21	42.42	0.150	0.78
22	49.49	0.175	0.82
23	56.56	0.200	0.85
24	63.63	0.225	0.88

Table 3: Compilation of results

Parameters	1st loading cycle	2nd loading cycle
$(\sigma_{0, \max})$ MN/m ²	0.250	0.250
a_0 (mm)	0.061	0.292
a_1 (mm/(MN/m ²))	3.078	4.488
a_2 (mm/(MN ² /m ⁴))	0.101	-8.363
$E_v = 1.5 r / (a_1 + a_2 \cdot \sigma_{0, \max})$	145.03	187.66
E_{v2}/E_{v1}	1.29	





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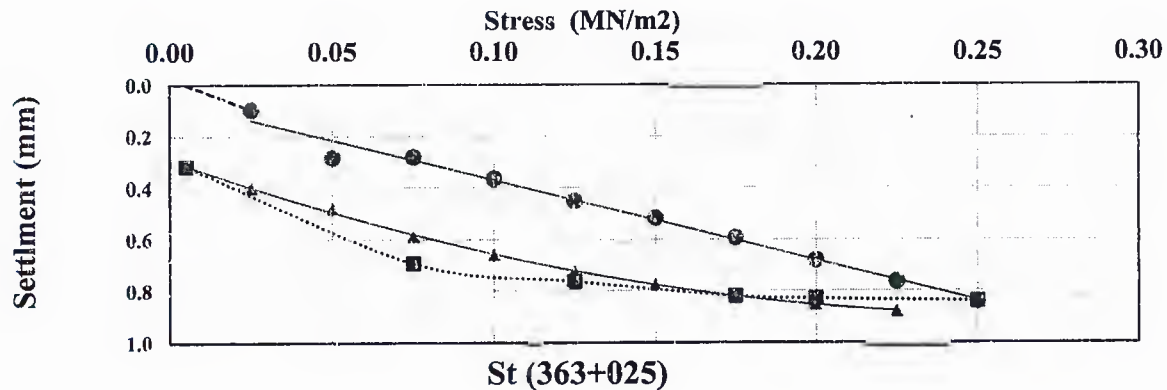


Fig. 1: Load-settlement curve, fitting curves according to Table 1 and Table 2 for the first and second loading cycles

- Measurement points from the first loading cycle
- Measurement points from the unloading cycle
- ▲ Measurement points from the second loading cycle
- S Settlement in mm
- σ_0 Normal stress MN/m²





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St (363+050)

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Table 4: Measured values for first loading cycle and unloading cycle

Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
0	1.414	0.005	0.00
1	7.07	0.025	0.11
2	14.14	0.050	0.21
3	21.21	0.075	0.38
4	28.28	0.100	0.51
5	35.35	0.125	0.64
6	42.42	0.150	0.75
7	49.49	0.175	0.86
8	56.56	0.200	0.99
9	63.63	0.225	1.10
10	70.7	0.250	1.17
11	56.56	0.200	1.16
12	49.49	0.175	1.15
13	35.35	0.125	1.08
14	21.21	0.075	0.96
15	1.414	0.005	0.59

Table 5: Measured values for second loading cycle

Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
15	1.414	0.005	0.59
16	7.07	0.025	0.67
17	14.14	0.050	0.75
18	21.21	0.075	0.84
19	28.28	0.100	0.94
20	35.35	0.125	1.01
21	42.42	0.150	1.08
22	49.49	0.175	1.13
23	56.56	0.200	1.17
24	63.63	0.225	1.21

Table 6: Compilation of results

Parameters	1st loading cycle	2nd loading cycle
($\sigma_{0,max}$) MN/m ²	0.250	0.250
a_0 (mm)	-0.058	0.558
a_1 (mm/(MN/m ²))	6.102	4.422
a_2 (mm/(MN ² /m ⁴))	-4.568	-6.654
$Ev = 1.5 r / (a_1 + a_2 \cdot \sigma_{0,max})$	90.72	163.14
$Ev2/Ev1$	1.80	



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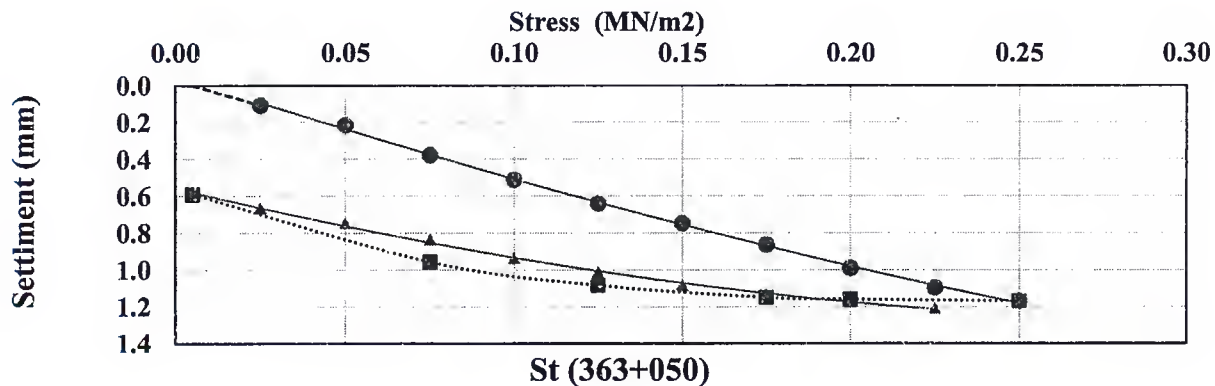
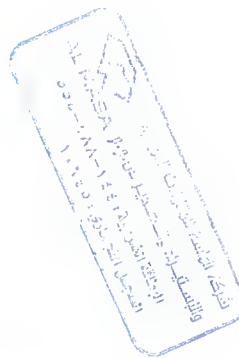


Fig. 2: Load-settlement curve, fitting curves according to Table 4 and Table 5 for the first and second loading cycles

- Measurement points from the first loading cycle
- Measurement points from the unloading cycle
- △ Measurement points from the second loading cycle
- S Settlement in mm
- σ_0 Normal stress MN/m²





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St (363+075)

600

Table 7: Measured values for first loading cycle and unloading cycle

Loading stage no.	Load (F) kN	Normal stress (σ_0) MN/m ²	Settlement of loading plate S (mm)
0	1.414	0.005	0.00
1	7.07	0.025	0.09
2	14.14	0.050	0.18
3	21.21	0.075	0.29
4	28.28	0.100	0.39
5	35.35	0.125	0.50
6	42.42	0.150	0.61
7	49.49	0.175	0.71
8	56.56	0.200	0.83
9	63.63	0.225	0.90
10	70.7	0.250	0.97
11	56.56	0.200	0.96
12	49.49	0.175	0.95
13	35.35	0.125	0.89
14	21.21	0.075	0.79
15	1.414	0.005	0.39

Table 8: Measured values for second loading cycle

Loading stage no.	Load (F) kN	Normal stress (σ_0) MN/m ²	Settlement of loading plate S (mm)
15	1.414	0.005	0.39
16	7.07	0.025	0.47
17	14.14	0.050	0.56
18	21.21	0.075	0.67
19	28.28	0.100	0.73
20	35.35	0.125	0.83
21	42.42	0.150	0.88
22	49.49	0.175	0.92
23	56.56	0.200	0.96
24	63.63	0.225	1.02

Table 9: Compilation of results

Parameters	1st loading cycle	2nd loading cycle
$(\sigma_{0, \max})$ MN/m ²	0.250	0.250
a_0 (mm)	-0.038	0.360
a_1 (mm/(MN/m ²))	4.648	4.617
a_2 (mm/(MN ² /m ⁴))	-2.183	-7.783
$Ev = 1.5 r / (a_1 + a_2 \cdot \sigma_{0, \max})$	109.70	168.43
$Ev2/Ev1$	1.54	



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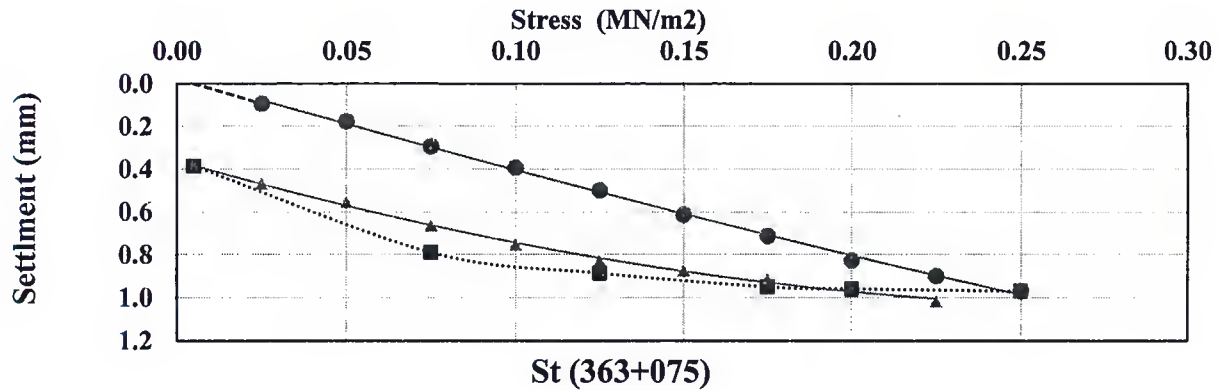


Fig. 3: Load-settlement curve, fitting curves according to Table 7 and Table 8 for the first and second loading cycles

- Measurement points from the first loading cycle
- Measurement points from the unloading cycle
- △ Measurement points from the second loading cycle
- S Settlement in mm
- σ_0 Normal stress MN/m²





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St (363+100)

600

Table 10: Measured values for first loading cycle and unloading cycle

Loading stage no.	Load (F) kN	Normal stress (σ_0) MN/m ²	Settlement of loading plate S (mm)
0	1.414	0.005	0.00
1	7.07	0.025	0.07
2	14.14	0.050	0.14
3	21.21	0.075	0.25
4	28.28	0.100	0.38
5	35.35	0.125	0.47
6	42.42	0.150	0.57
7	49.49	0.175	0.67
8	56.56	0.200	0.78
9	63.63	0.225	0.86
10	70.7	0.250	0.93
11	56.56	0.200	0.92
12	49.49	0.175	0.91
13	35.35	0.125	0.87
14	21.21	0.075	0.76
15	1.414	0.005	0.29

Table 11: Measured values for second loading cycle

Loading stage no.	Load (F) kN	Normal stress (σ_0) MN/m ²	Settlement of loading plate S (mm)
15	1.414	0.005	0.29
16	7.07	0.025	0.36
17	14.14	0.050	0.44
18	21.21	0.075	0.51
19	28.28	0.100	0.60
20	35.35	0.125	0.67
21	42.42	0.150	0.75
22	49.49	0.175	0.82
23	56.56	0.200	0.89
24	63.63	0.225	0.96

Table 12: Compilation of results

Parameters	1st loading cycle	2nd loading cycle
($\sigma_{0, \max}$) MN/m ²	0.250	0.250
a_0 (mm)	-0.061	0.276
a_1 (mm/(MN/m ²))	4.571	3.347
a_2 (mm/(MN ² /m ⁴))	-2.264	-1.358
$E_v = 1.5 r / (a_1 + a_2 \cdot \sigma_{0, \max})$	112.34	149.62
E_v2/E_v1	1.33	



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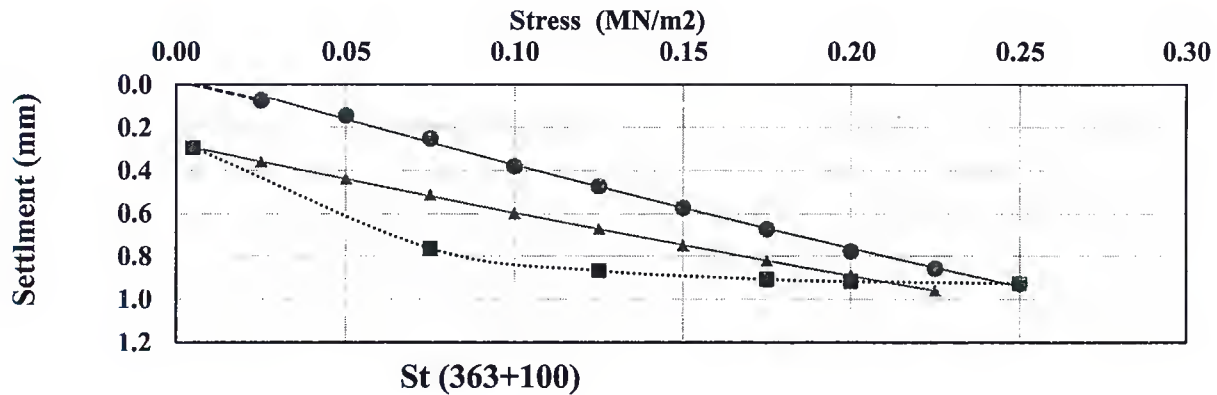
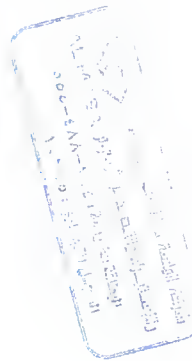


Fig. 4: Load-settlement curve, fitting curves according to Table 10 and Table 11 for the first and second loading cycles

- Measurement points from the first loading cycle
- Measurement points from the unloading cycle
- △ Measurement points from the second loading cycle
- S Settlement in mm
- σ_0 Normal stress MN/m²





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Conclusions:

The present test results which were obtained via the plate loading tests of the native soil on sub-ballast (2) layer of the electric express train project at location from St(363+025) to St (363+100) in accordance to the German standard , DIN 18134 are illustrated in table 13 .

Table 13 :Test results

Location	Ev1(MN/m ²)	Ev2(MN/m ²)	Ev2/Ev1 ratio
St (363+025)	145.03	187.66	1.29
St (363+050)	90.72	163.14	1.80
St (363+075)	109.70	168.43	1.54
St (363+100)	112.34	149.62	1.33

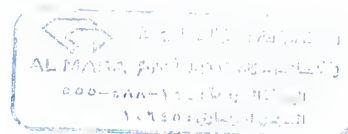
Lab Director

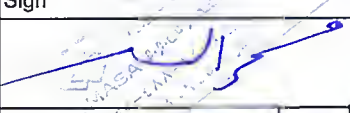
Eng / Eman Kandil



Geotechnical Consultant

Dr / Mohamed Mostafa Badry

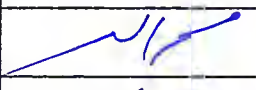
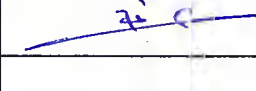


Contractor Company	Al-Masa General Contracting Company			Designer Company	(SPECTRUM) Engineering Consulting Office					
Issued by Contractor	Name	Sign	Date/Serial Number	Time						
	Eng. Mohamed Elsaied		22/12/2023	10:00 AM						
	(S5-B-MS) (PLT-S.B-05-D.P)									
Received by GARB CONSULTANT	Eng. Mazen Essamy	MIR	C1	C2	C3	DD	MM	YY	HH	MM
			363	EW	CS	23	12	2023	10	0

CODE-1	S1 to S21	D1 to 33	Kp XXX Note
	Station Reference	Depot Reference	For Kilometer point only Start Km is used
CODE-2	Work Activity		
CODE-3	Sub Element of Activity		

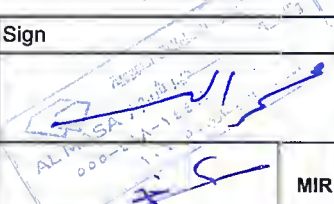
Description of Materials	Sub-Ballast (2) AT (+0.90)				
Location to be Used	From	363+060	TO	363+100	Rev-29
		363+240		363+280	Rev-35
MAR & UIR Approval No	(S5-B-MS) (IR-S.B-10-D.P)		Date	22/12/2023	
	(S5-B-MS) (MAR-S.B-06)			01/11/2023	
Supplier Name	Elsiw , Alharamin				
Test Requirement	P.L.T (DIN 18134)		Specification	EARTHWORK SPECIFICATIONS & TESTING REPORT (CG21-41.2) VERSION 2 BY CIVECON GROUP	
Reference Photos	No/Yes		Other		
Item	Description	Unit	Quantity	Arrival Date	Note
1	PLATE LOAD POINT	NUMBER	2		

Comments by: Eng. Mazen Essamy (SPECTRUM)	Comments by: Eng. Alaa Abd-Allatif (ER)
1-THE PLATE LOAD TEST RESULT P.L.T (DIN 18134) IS APPROVED 	1-PLATE LOAD TEST WAS CARRIED - OUT BY THIRD PART LAB 2-Results report attached and acceptable with project specifications.

APPROVAL STATUS				
Organisation	Name	Sign	Date	A-AWC-R
Contractor	Eng. Mohamed Elsaied			A
QA/QC *	Eng. Mazen Essamy			A
GARB**	Eng. Margeret Magdy			
Employers Representative	Eng. Alaa Abd-Allatif			A

* Designer

** Alignment/Bridge: (S5-B-MS) (PLT-S.B-05-D.P)

Contractor Company	Al-Masa General Contracting Company			Designer Company	(SPECTRUM) Engineering Consulting Office						
Issued by Contractor	Name	Sign	Date/Serial Number	Time							
	Eng. Mohamed Elsaied		22/12/2023 (S5-B-MS) (PLT-S.B-05-D.P)	10:00 AM							
Received by GARB CONSULTANT	Eng. Mazen Essamy	MIR		C1 363	C2 EW	C3 CS	DD 23	MM 12	YY 2023	HH 10	MM 0

CODE-1	S1 to S21	D1 to D33	Kp XXX Note
	Station Reference	Depot Reference	For Kilometer point only Start Km is used
CODE-2	Work Activity		
CODE-3	Sub Element of Activity		

Description of Materials	Sub-Ballast (2) AT (+0.90)				
Location to be Used	From	363+060	TO	363+100	Rev-29
		363+240		363+280	Rev-35
MAR & UIR Approval No	(S5-B-MS) (IR-S.B-10-D.P)		Date	22/12/2023	
	(S5-B-MS) (MAR-S.B-06)			01/11/2023	
Supplier Name	Elsiwy , Alharamin				
Test Requirement	P.L.T (DIN 18134)		Specification	EARTHWORK SPECIFICATIONS & TESTING REPORT (CG21-41.2) VERSION 2 BY CIVECON GROUP	
Reference Photos	No/Yes		Other		
Item	Description	Unit	Quantity	Arrival Date	Note
1	PLATE LOAD POINT	NUMBER	2		

Comments by: Eng. Mazen Essamy (SPECTRUM)  1-THE PLATE LOAD TEST RESULT P.L.T (DIN 18134) IS APPROVED	Comments by: Eng. Alaa Abd-Allatif (ER) 1-PLATE LOAD TEST WAS CARRIED - OUT BY THIRD PART LAB 2-Results report attached and acceptable with project specifications. 3-Final approval is subject to above mentioned comments
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APPROVAL STATUS				
Organisation	Name	Sign	Date	A-AWC-R
Contractor	Eng. Mohamed Elsaied			A
QA/QC *	Eng. Mazen Essamy			A
GARB**	Eng. Margeret Magdy			
Employers Representative	Eng. Alaa Abd-Allatif		23-12-2023	AWC

* Designer

** Alignment/Bridges (S5-B-MS) (PLT-S.B-05-D.P)



COMIBASSAL International Controllers

Internal inspection and laboratories sector

Accredited by : Egypton General Authority for Petroleum under No. 34/29-11-2011

Technical report

of Plate Loading Test (DIN 18134)



General	:	SYSTRA
Consultant	:	SPECTRUM
Contractor	:	شركة الماسة للمقاولات
Project	:	ELECTRIC EXPRESS TRAIN
Sample	:	Sub-Ballast (2)
Station	:	S(363+025) TO ST(363+100)
Date of Test	:	23/12/2023
QC	:	2573





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Introduction:

The Plate Load test is designed to determine the vertical deformation and strength characteristics of soil by assessing the force and amount of penetration with time when a rigid plate is made to penetrate the soil.

The test to be carried out on the native soil according to German specifications DIN 18134.

Test methods :

- 1- The German standard DIN 18134 was applied to define the apparatus used, the loading system, test conditions, and procedure for plate load test.
- 2- Loading plates with a diameter of 600 mm have a thickness of 25mm and are provided with equally spaced stiffeners with even upper faces parallel to the plate bottom face to allow 300 mm plate to be placed on top of it.
- 3- The loading system consisted of a hydraulic pump connected to a hydraulic jack of 700 bar capacity, which is capable of applying and releasing the load stages.
- 4- The dial gauge used to measure the plate settlement has a resolution of 0.01mm and the lever ratio was equal to 1.
- 5- The temperature at the time of the test was 25°.
- 6- The plate was carried out on a native soil (sand-gravel). The test surface area was levelled and the plate was bedded on this surface.
- 7- The hydraulic jack was placed on the middle of, and at normal to, the loading plate beneath the reaction loading system and secured against tilting.
- 8- The reaction loading system was a heavy multi-purpose excavator (more than 20 ton).

Description of experiment:

- 1- Loading, unloading and reloading regims were applied according to DIN 18134 for the plate load test to estimate the resilient modulus
- 2- Prior to the test, the force transducer and dial gauge were set to zero, after which a load was applied corresponding to a stress of 0.01 MN/m².
- 3- In the first loading cycle, the load was increased until a normal stress of 0.25 MN/m² was reached, and the loading increment was 0.025 MN/m². The load was released in four stages.
- 4- Following unloading, a further second loading cycle was carried out, in which, the load was increased only to the penultimate stage of the first cycle.



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St (363+025)

600

Table 1: Measured values for first loading cycle and unloading cycle

Loading stage no.	Load (F) kN	Normal stress (σ_0) MN/m ²	Settlement of loading plate S (mm)
0	1.414	0.005	0.00
1	7.07	0.025	0.10
2	14.14	0.050	0.28
3	21.21	0.075	0.28
4	28.28	0.100	0.36
5	35.35	0.125	0.45
6	42.42	0.150	0.52
7	49.49	0.175	0.59
8	56.56	0.200	0.68
9	63.63	0.225	0.76
10	70.7	0.250	0.84
11	56.56	0.200	0.83
12	49.49	0.175	0.82
13	35.35	0.125	0.76
14	21.21	0.075	0.69
15	1.414	0.005	0.32

Table 2: Measured values for second loading cycle

Loading stage no.	Load (F) kN	Normal stress (σ_0) MN/m ²	Settlement of loading plate S (mm)
15	1.414	0.005	0.32
16	7.07	0.025	0.40
17	14.14	0.050	0.48
18	21.21	0.075	0.59
19	28.28	0.100	0.66
20	35.35	0.125	0.72
21	42.42	0.150	0.78
22	49.49	0.175	0.82
23	56.56	0.200	0.85
24	63.63	0.225	0.88

Table 3: Compilation of results

Parameters	1st loading cycle	2nd loading cycle
$(\sigma_{0, \max})$ MN/m ²	0.250	0.250
a_0 (mm)	0.061	0.292
a_1 (mm/(MN/m ²))	3.078	4.488
a_2 (mm/(MN ² /m ⁴))	0.101	-8.363
$E_v = 1.5 r / (a_1 + a_2 \cdot \sigma_{0, \max})$	145.03	187.66
E_{v2}/E_{v1}	1.29	



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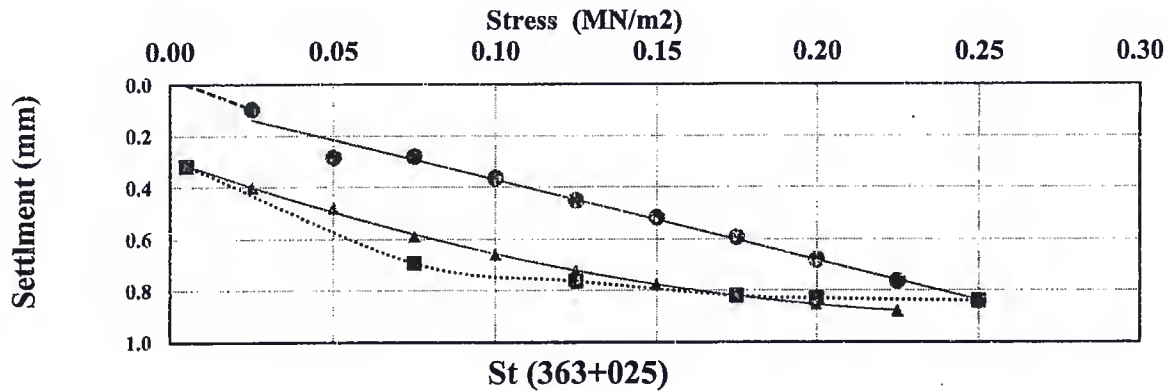
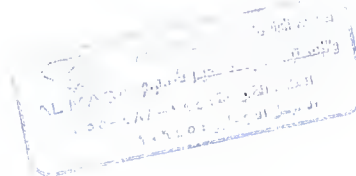
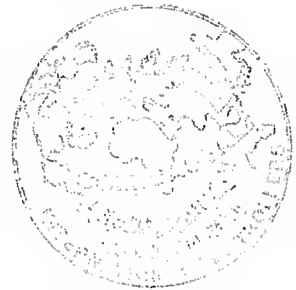


Fig. 1: Load-settlement curve, fitting curves according to Table 1 and Table 2 for the first and second loading cycles

- Measurement points from the first loading cycle
- Measurement points from the unloading cycle
- ▲ Measurement points from the second loading cycle
- S Settlement in mm
- σ_0 Normal stress MN/m²





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St (363+050)

600

Table 4: Measured values for first loading cycle and unloading cycle

Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
0	1.414	0.005	0.00
1	7.07	0.025	0.11
2	14.14	0.050	0.21
3	21.21	0.075	0.38
4	28.28	0.100	0.51
5	35.35	0.125	0.64
6	42.42	0.150	0.75
7	49.49	0.175	0.86
8	56.56	0.200	0.99
9	63.63	0.225	1.10
10	70.7	0.250	1.17
11	56.56	0.200	1.16
12	49.49	0.175	1.15
13	35.35	0.125	1.08
14	21.21	0.075	0.96
15	1.414	0.005	0.59

Table 5: Measured values for second loading cycle

Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
15	1.414	0.005	0.59
16	7.07	0.025	0.67
17	14.14	0.050	0.75
18	21.21	0.075	0.84
19	28.28	0.100	0.94
20	35.35	0.125	1.01
21	42.42	0.150	1.08
22	49.49	0.175	1.13
23	56.56	0.200	1.17
24	63.63	0.225	1.21

Table 6: Compilation of results

Parameters	1st loading cycle	2nd loading cycle
$(\sigma_{0, \max})$ MN/m ²	0.250	0.250
a_0 (mm)	-0.058	0.558
a_1 (mm/(MN/m ²))	6.102	4.422
a_2 (mm/(MN ² /m ⁴))	-4.568	-6.654
$E_v = 1.5 r / (a_1 + a_2 \cdot \sigma_{0, \max})$	90.72	163.14
E_v2/E_v1	1.80	



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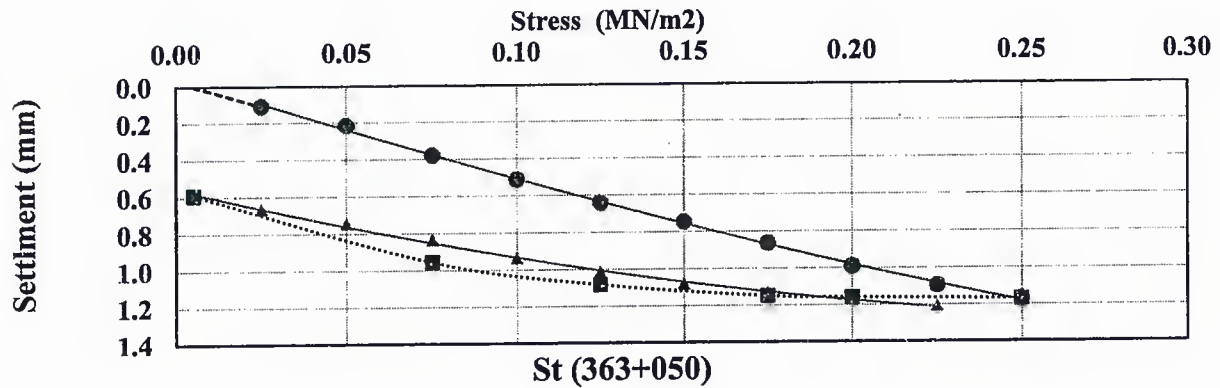
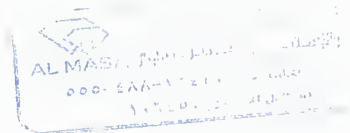
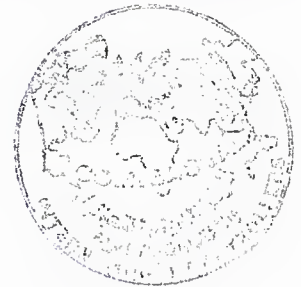


Fig. 2: Load-settlement curve, fitting curves according to Table 4 and Table 5 for the first and second loading cycles

- Measurement points from the first loading cycle
 - Measurement points from the unloading cycle
 - ▲ Measurement points from the second loading cycle
- S Settlement in mm
- σ_0 Normal stress MN/m²





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St (363+075)

600

Table 7: Measured values for first loading cycle and unloading cycle

Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
0	1.414	0.005	0.00
1	7.07	0.025	0.09
2	14.14	0.050	0.18
3	21.21	0.075	0.29
4	28.28	0.100	0.39
5	35.35	0.125	0.50
6	42.42	0.150	0.61
7	49.49	0.175	0.71
8	56.56	0.200	0.83
9	63.63	0.225	0.90
10	70.7	0.250	0.97
11	56.56	0.200	0.96
12	49.49	0.175	0.95
13	35.35	0.125	0.89
14	21.21	0.075	0.79
15	1.414	0.005	0.39

Table 8: Measured values for second loading cycle

Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
15	1.414	0.005	0.39
16	7.07	0.025	0.47
17	14.14	0.050	0.56
18	21.21	0.075	0.67
19	28.28	0.100	0.75
20	35.35	0.125	0.83
21	42.42	0.150	0.88
22	49.49	0.175	0.92
23	56.56	0.200	0.96
24	63.63	0.225	1.02

Table 9: Compilation of results

Parameters	1st loading cycle	2nd loading cycle
$(\sigma_{0, \max})$ MN/m ²	0.250	0.250
a_0 (mm)	-0.038	0.360
a_1 (mm/(MN/m ²))	4.648	4.617
a_2 (mm/(MN ² /m ⁴))	-2.183	-7.783
$E_v = 1.5 r / (a_1 + a_2 \cdot \sigma_{0, \max})$	109.70	168.43
E_{v2}/E_{v1}	1.54	



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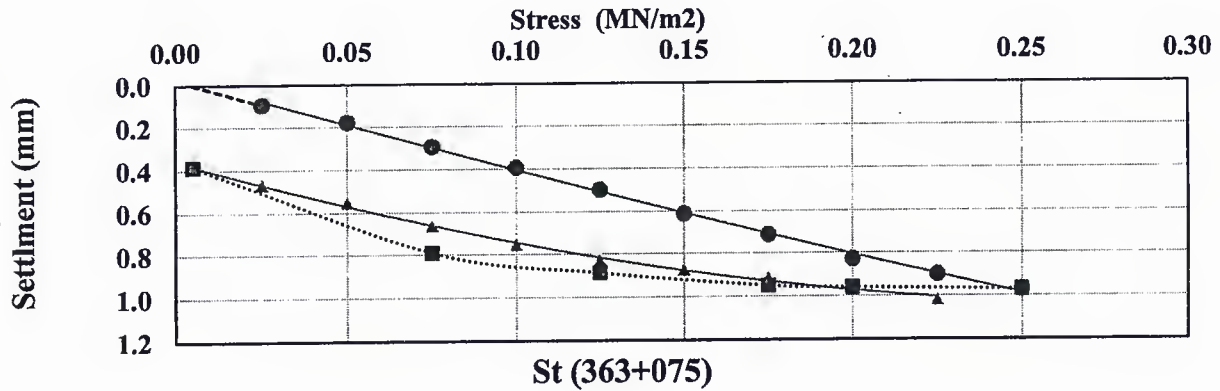
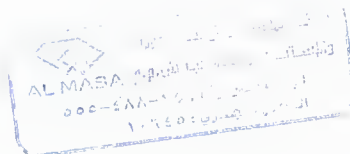


Fig. 3: Load-settlement curve, fitting curves according to Table 7 and Table 8 for the first and second loading cycles

- Measurement points from the first loading cycle
- Measurement points from the unloading cycle
- ▲ Measurement points from the second loading cycle
- S Settlement in mm
- σ_0 Normal stress MN/m²





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St (363+100)

600

Table 10: Measured values for first loading cycle and unloading cycle

Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
0	1.414	0.005	0.00
1	7.07	0.025	0.07
2	14.14	0.050	0.14
3	21.21	0.075	0.25
4	28.28	0.100	0.38
5	35.35	0.125	0.47
6	42.42	0.150	0.57
7	49.49	0.175	0.67
8	56.56	0.200	0.78
9	63.63	0.225	0.86
10	70.7	0.250	0.93
11	56.56	0.200	0.92
12	49.49	0.175	0.91
13	35.35	0.125	0.87
14	21.21	0.075	0.76
15	1.414	0.005	0.29

Table 11: Measured values for second loading cycle

Loading stage no.	Load (F) kN	Normal stress (s_0) MN/m ²	Settlement of loading plate S (mm)
15	1.414	0.005	0.29
16	7.07	0.025	0.36
17	14.14	0.050	0.44
18	21.21	0.075	0.51
19	28.28	0.100	0.60
20	35.35	0.125	0.67
21	42.42	0.150	0.75
22	49.49	0.175	0.82
23	56.56	0.200	0.89
24	63.63	0.225	0.96

Table 12: Compilation of results

Parameters	1st loading cycle	2nd loading cycle
$(\sigma_{0, \max})$ MN/m ²	0.250	0.250
a_0 (mm)	-0.061	0.276
a_1 (mm/(MN/m ²))	4.571	3.347
a_2 (mm/(MN ² /m ⁴))	-2.264	-1.358
$Ev = 1.5 r / (a_1 + a_2, \sigma_{0, \max})$	112.34	149.62
$Ev2/Ev1$	1.33	



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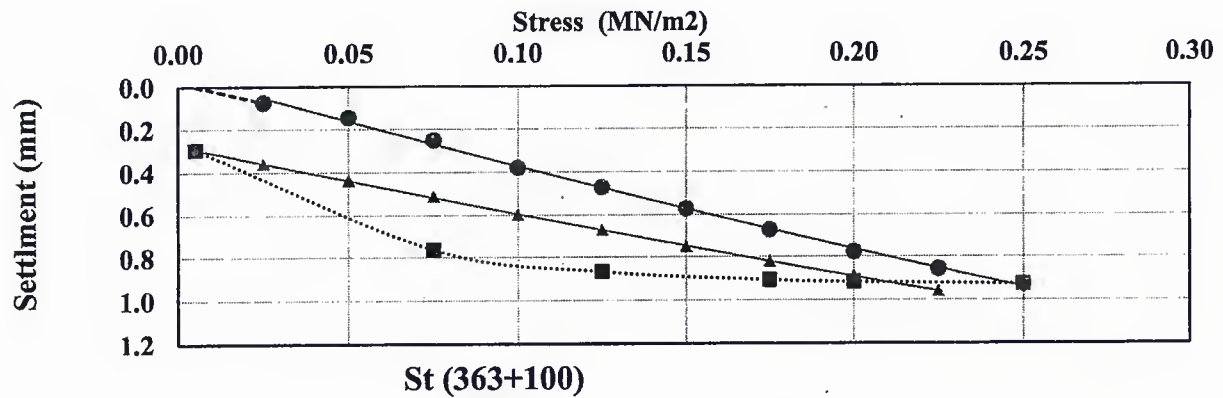
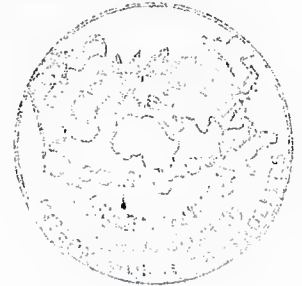


Fig. 4: Load-settlement curve, fitting curves according to Table 10 and Table 11 for the first and second loading cycles

- Measurement points from the first loading cycle
- Measurement points from the unloading cycle
- ▲ Measurement points from the second loading cycle
- S Settlement in mm
- σ_0 Normal stress MN/m²





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Internal inspection and laboratories sector

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Conclusions:

The present test results which were obtained via the plate loading tests of the native soil on sub-ballast (2) layer of the electric express train project at location from St(363+025) to St (363+100) in accordance to the German standard , DIN 18134 are illustrated in table 13 .

Table 13 :Test results

Location	Ev1(MN/m ²)	Ev2(MN/m ²)	Ev2/Ev1 ratio
St (363+025)	145.03	187.66	1.29
St (363+050)	90.72	163.14	1.80
St (363+075)	109.70	168.43	1.54
St (363+100)	112.34	149.62	1.33

Lab Director

Eng / Eman Kandil



Geotechnical Consultant

Dr / Mohamed Mostafa Badry

