CCT-UFPb

ESTÁGIO SUPERVISIONADO
LABORATÓRIO DE SOLOS II

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Biblioteca Setorial do CDSA. Outubro de 2021.

Sumé - PB

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A G R A D E C I M E N T O S

Ao Professor Francisco Barbosa de Lucena, pela oportunidade que me concedeu para que eu podesse realizar / este estágio.

Ao professor Francisco de Assis Quintãns, pela orientação sincera,honesta e segura com que o mesmo me orientou.

Ao Centro de Ciências e Tecnologia, nas pessoas de JOSÉ FARIAS e Heber Carlos Ferreira, Coordenador e Chefe do departamento de Engenharia Civil, respectivamente, pelo / apoio na realização deste estágio.

Ao Sr. João de Deus, por ter me dado oportunidade de ajudá-lo durante o estudo feito por ele para defesa de sua tese.

Aos funcionários e laboratoristas do laboratório de / solos II pela colaboração que os mesmos me deram, durante o período em que estive estagiando.

Agradeço a DEUS, por ter me dado saúde e confiança em mim mesmo, como também ter me concedido grandes amizades neste centro.

ILUSTRISSIMO SENHOR CHEFE DO DEPARTAMENTO DE ENGENHARIA CIVIL DO CENTRO DE CIÊNCIAS E TECNOLOGIA DA UFPb - CAMPINA GRANDE - PARAÍBA.

CARLOS HENRIQUE DA SILVA, aluno regularmente matriculado no departamento de Engenharia/ Civil sob o nº de inscrição 7211023 - 5 , com estágio supervisionado no laboratório de Solos II, do Institutó/ Tecnologico da Universidade Federal da Paraíba, com sede/ em Campina Grande, solicita que V.Sa., se digne a apreciar o seu relatório anexo, em duas vias, bem como o parecer do Engenheiro chefe do laboratório sobre o referido estagio. aproveito o ensejo e comunico a V.Sa., que este está gio foi realizado durante o período compreendido entre / o2 de janeiro de 1977 a 14 de março de 1977.

Solicito também que o mesmo seja encaminhado a quem de direito, para a atribuição do devido conceito e que se fôr o caso seja feita a contagem / dos créditos correspondentes.

Nestes Termos
Espera Deferimento

Campina Grande, 20 de abril de 1977

O P I N I Ã O E S U G E S T Ã O

Considero os resultados Obtidos durante o desenrolar do estágio aqui relatado da maior valia para o exercício de minha carreira profissional.

Não sòmente pela orientação segura da qual fui / alvo no período, na pessoa do meu supervisor direto, bem como pelos requisitos de técnica proprocionados pelo acervo do laboratório de solos, componentes sem os quais não poderiamter sido alcançadaos os frutos ao fim do período.

Em termos de sugestão, acho oportuno e válido, seja encetada pela escola uma maior divulgação do programa / entre os alunos, como forma de incentivo e a fim de / que sejam obtidos os objetivos dessa medida, em sua plenitude, qualificando o pessoal com o aliamento da teoria à prática , num dueto inseparável das normas técnicas de / ensino do mundo atual.

PESQUISA BIBLIOGRÁFICA

L : MECÂNICA DOS SOLOS E SUAS APLICAÇÕES
Volumes - 1 e 2
CAPUTO, HOMERO PINTO

2 : MECÂNICA DOS SOLOS NA PRÁTICA DA ENGENHARIA;
YERZAGHI, KARL

3 : MECÂNICA DEL SUELO Y SUS APLICACIONES A LA ENGENIERIA
JIMENES SALAS, JOSÉ A.

4 : APOSTILA DA UNIVERSIDADE DE SÃO CARLOS .

E N S A I O D E A D E N S A M E N T O

Ensaio de Adensamento

1 - Finalidade :

Determinação de propeiedade do Solo: (Coeficiente de Com - pressibilidade e coeficiente de adensamento.) requeridos/ parao cálculo de recalques em camadas compressíveis.

2 - Aparelhagem:

Anel de Adensamento
Prensa de adensamento
Balanças com capacidade de looo g e precisão de o,1 g, capacidade de 2oo g e precisão de o,ool g.
Talhador
Facas , espátulas
Capsulas de aluminio ou semelhante, para determinação da umidade do solo.
estufa
cronômetro

3 - Procedimento do ensaio

3.1 - Medir a altura e o diâmetro do anel de adensamento.
3.2 - talhar o corpo de prova , de maneira a ter as estratificações orientadas na mesma direção, no anel de adensamento e no campo.
3.3 - Retirar uma amostra de solo de aproximadamente / 12,5cm de diâmetro e 4,5 cm de altura, com uma das/ faces rigorosamente plana. Colocar a amostra no talhador com a face plana para baixo, e cortar os / cantos , rodando a amostra depois de cada corte até que uma secçao circular seja obtida.

3.4 -Das pates cortadas da amostra separar pelo menos 4 porções bem representativas(aproximadamente 15,0 g cada) para duas determinações da umidade.

3.5 - Ingerir a amostra, talhada no anel tomando a máxima precaução de garantir um ajuste tão perfeito quanto possível.

3.6 - Cortar as faces inferior e superior da amostra que ficam paa fora do anel com um fio de arame fino.

3.7 - Colocar a pedra porosa inferior na base do conjunto e subir o nível da água até acima desta.

3.8 - Colocar a mostra e o nael sobre a pedra porosa; a pedra porosa deve ser colocada cuidadosamente como tambem o anel de vedação, a pedra porosa superior e a / tampa sôbre a amostra; a seguir; prender o conjunto a / base.

3.9 - Colocar o conjunto na prensa de adensamento , e acertar o extênsômetro numa dada leitura.

3.1o- Aplicar a carga para dar uma pressão de aproximadamente de o,12 Kg/cm^2 na amostra (o,5 Kg no prato), e iniciar as leituras de tempo, e de deformação. Se o corpo de prova evidenciar tendencia de incamento, aumentar ràpidamente a pressão aplicada até eliminar tal tendência ,provocando uma pequena compressão; esta será a presão/ do primeito carregamento.

3.11 Al leituras de compressão devem ser tomadas a intervalos totais de - 0; 0,25; 1,0; 2,25; 4,0; 6,25; 9,0; 12,25 ;/ 16,0; 25?0; 25?o minutos até que alcance 90% de adensamento; Este ponto pode ser determinado, fazendo-se um gráfico de leitura de compressão com $\sqrt{t}$ (raiz quadrada do tempo decorrido) enquanto o ensaio estiver em andamento, até que os pontos plotados se desviem mais do / que 20% da reta inicial. Podem ser então suspensas as leituras em intervalos pré-determinados, mas devem continuar a ser feitas leituras ocasionais até que se tenha um numero suficiente de pontos para o método do logaritmo do tempo.

3.12 Ao fim de 24 horas devem ser feitas as leituras de - tempo e compressão e a pressão aumentada para o dôbro da pressão anterior; as leituras devem ser tomadas como foram para a primeira pressão aplicada.

3.13 Em dias sussessivos devem ser aplicados novos ingrementos de pressão (geralmente cada incremento equivalendo à pressão anterior).

3.14 - Depois que a ultima pressão tiver permanecido atuando por 24 horas , procede-se a descarga, geralmente / em três ou quatro fases e finalizando com a pressão do primeiro carregamento. Deve-se manter um minimo / de 4 horas sob cada pressão de descompressão; normal mente não se tomam leituras de tempo durante a descompressão.

3.15 - Durante o ensaio, o reservatório sobre o anel e a bureta devem ser mantidos cheios de água, de maneira a evitar ressecamento da amostra e a proporcionar água durante a descompressão.

3.16- Depois de feita a leitura final de volta à pressão / inicialde carregamento, desmontar rapidamente o apa - relho , secar a água da superficie da amostra e pesa--la.

3.17 - Colocar a amostra depois de pesada em uma estufa / para secar, isto possibilita a obtenção do teor de umidade final de todo o corpo de prova.

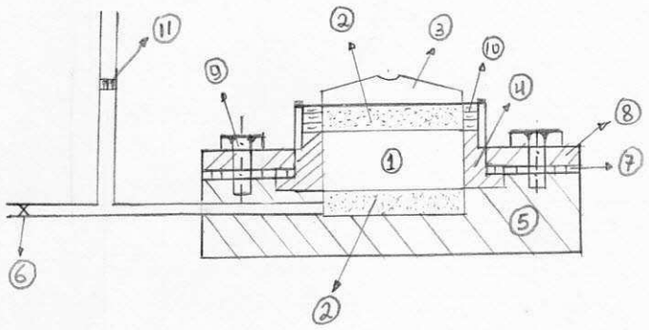

Figura 1 -Corte esquemático de um anel de adensamento.

1 - Corpo de prova
2 - Pedra porosa
3 - Placa de carregamento
4 - Anel de adensamento
5 - Base do Anel
6 - Torneira de saída dàgua
7 - Anel de vedação de Borracha.
8 - Anel metálico para prender o nael de adensamento a base.
9 - parafusos de fixação
lo - Reservatrio de água para não deixar o corpo de prova secar
11 - Bureta.

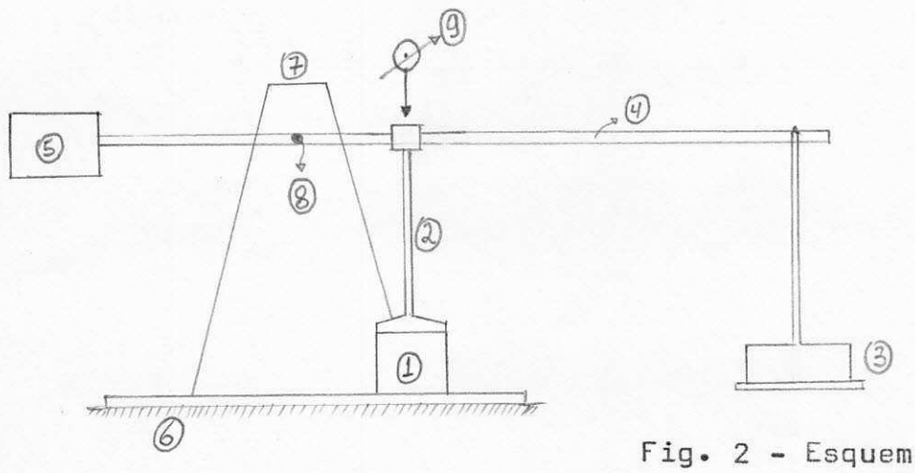

Fig. 2 - Esquema de uma prensa de adensamento.

1 - Anel de adensamento
2 - Pino transmissor da carga vertical aplicada
3 - Carga aplicada no prato da prensa
4 - braço da prensa
5 - Conta peso (equilibrando o peso preprio)
6 -base da prensa
7 - apoio do eixo
8 - eixo ondeestá engastado o braço da prensa
9 - extensômetro para medir a compressão no corpo de prova.

4 - Cálculo do ensaio

4.1 - Da amostra tirada conforme ítem 2.4; determinar a umidade natural do solo.

4.2 - Determinar o pêso umido , e o volume da amostra a ser / ensaiada.

4.3 - Determinar o peso específico natural do solo.

4.4 - Determinar o peso específico aparente seco, o índice de vazios, eo grau de saturação do solo.

4.5 - Em cada estágio de carregamento determinar:

4.5.1 - Compressão do corpo de prova em cm, e que é dado pela diferença entre a leitura inicial do / extensômetro L_o e a leitura final L_f.

$$\Delta H = (L_o - L_f) \times 0,1 \text{ cm.}$$

4.5.2 - Variação do índice de vazios que é dado por:

$$\Delta \varepsilon = H/H .(1+ \varepsilon). \quad \text{onde,}$$

ΔH = Compressão do corpo de prova por estágio.

H = Altura do corpo de prova no inicio do estágio de carregamento.

ε = Índice de vazios do corpo de prova no / inicio do estágio de carregamento.

4.5.3 - Distância de drenagem H_d , que é igual a / $H_d = H/2$ (dua faces drenantes).

4.5.4 - determinação do coeficiente de adensamento-:

a) processo de taylor - Fig -3

a.1 - Colocar em um grafico raiz quadrada dos tempos observados em abcissas e leituras do extensômetro em ordenadas

a.2 - A curva originada apresenta , após um trecho inicial, um trecho reto e um / trecho curvo.

a.3 - prolongar o trecho reto encontrado / até interceptar o eixo das ordenadas obtendo um ponto d_o.

a.4 - Numa ordenada qualwuer do trec ho reto, traçar uma reta paralela ao/ eixo de abcissas, marcar nesta reta , a partir da sua intersecção / com a curva,traçada pelos pontos / de leitura,um segmento de valor / 15% do segmento entre o eixo de / ordenadas e a reta.

a.5 -Unir o ponto d_o ao fim do segmento obtido anteriormente, obtendo-se / na intersecção desta reta com a / curba o ponto correspondente a 90% do adensamento . Em abcissas temos t_{9o} em ordenadas a leitura do extensometro correspondente a 90%, L_{9o}.

a.6-Calculado t_{9o}, calcular o coeficiente de adensamento.

$$C_v = T_{9o} . H_d^2 / t_{9o} = o,848 . H_d^2 / t_{9o}$$

a.7-Calcular agora a ordenada correspondente a 100% de adensamento, / L_{1oo}. Será dada por:

$$L_{1oo} = L_{9o} - 1/9 \; (L_{9o} - d_o)$$

a.8-Calcular agora:
Compressaão inical - $(L_{9o} - d_o)$
Compressão primaria - $(d_o - L_{1oo})$
compressaão secundaria - $(L_{1oo} - L_f)$

-$-$-$-$-$-$-$-$-$-$-$-$-$-$-$- -$-$-$-$-$-$-$- -$-$-$-$-$-$-$-$-

b - Processo de Casagrande - Utilizado por Nós, no estágio.
fig. 4.

b.1 - Colocar em grafico ,um papel semi-logaritmo, os tempos observados em abcissas (escala logaritmica) e leituras do extensômetro, em ordenadas

b.2 - A curva originada apresenta um primeiro trecho parabólico e um segundo trecho curvo não parabólico.

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b.3 - Na interseção entre a assintota e a tangente à curva de recalque temos a ordenada correspondente a 100% de recalque L_{100}.

b.4 - Determinar a ordenada do (0% de recalque teórico) valendo-se da relação parabólica da fase inicial do recalque. acha-se a diferença de ordenadas entre dois / pontos com tempos na relação 4:1. Transfere-se este valor para cima da curva. Obten-se varios pontos, que unidos vão dar no eixo/ das ordenadas oponto d_o.

b.5 - Determinar o tempo correspondente 50% do recalque.

$L_{50} = (L_{100} - d_o)/2$

e a abcissa correspondente a L_{50} será t_{50}.

b.6 - Calculado t_{50}, temos

$$C_v = (T_{50} \cdot H_d^2)/t_{50} = 0.197 \cdot H_d^2 / t_{50}$$

b.7 - Calcular também:

Compressão inicail - $(L_o - d_o)$
compressaõao primária - $(L_{100} - d_o)$
compressão secundária - $(L_f - L_{100})$

4.6 - Lançar em grafico semi-logarítmo, pressão em abcissas (logaritmica e índice de vazios em ordenadas.

4.7 - A curva tem um trecho inicial com uma pequena inclinação e um trecho essencialmente reto.

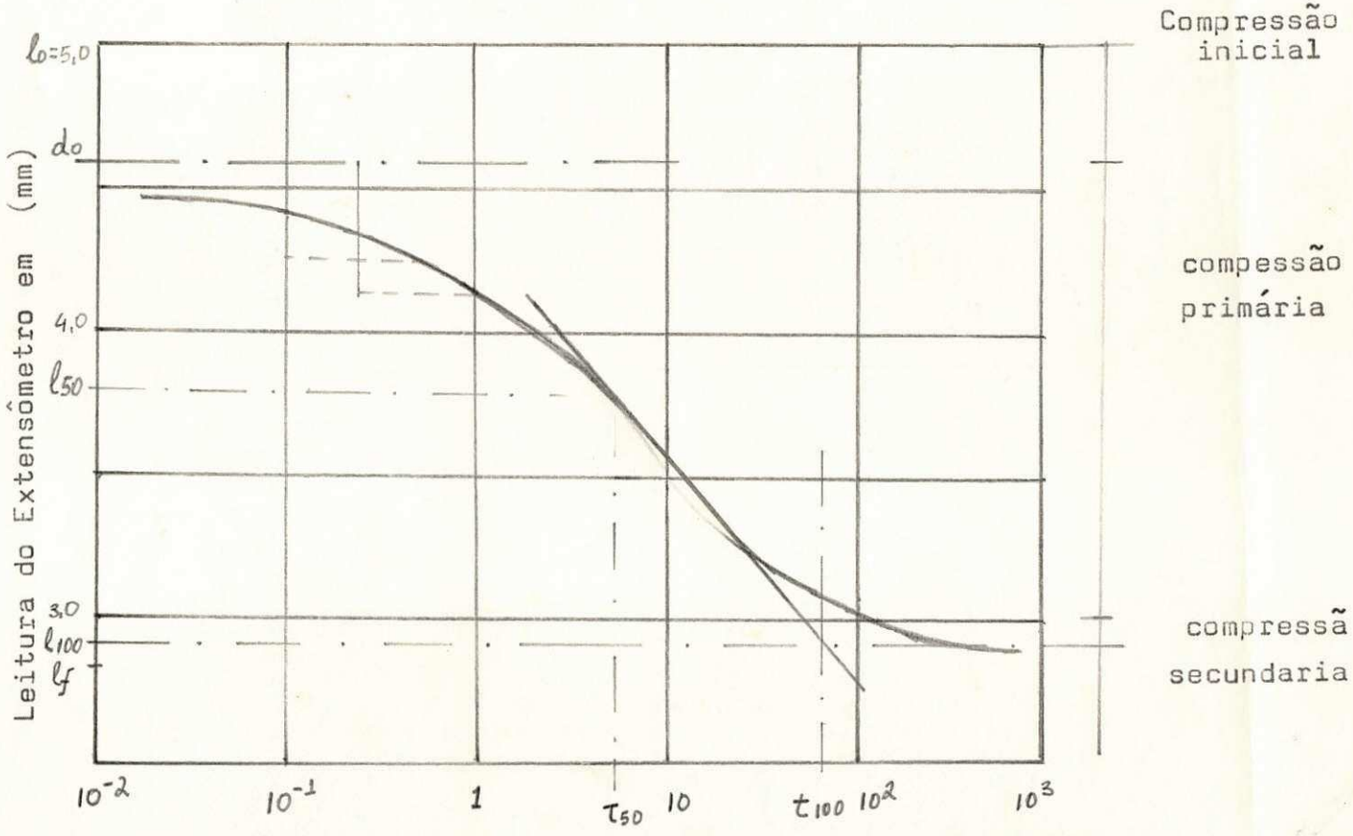
4.8 - Calcular a pressaõ de pré-adensamento do solo, atravéz da construção gráfica de Casagrande: pelo ponto de maior curvatura da curva, traça-se uma tangente e uma horizontal . Determina-se a bissetriz do ângulo formado pelas duas retas. A abcissa do ponto de encontro da bissetriz com a / reta de compressão virgem é o valor da pressão de pré-adensamento.

4.9 - Calcular o valor do índice de compressão K. È o coefieiente angular da reta de compressão virgem.

Sendo. $\Delta \varepsilon = K.\log P_2/P_1$

Este processo foi o utilizado em nossa pesquisa

Processo de Casagrande - fig -4



para Calcular K, se toma P2/P1 = 10, então

log P2/P1 = 1 e $K = \Delta\varepsilon$.

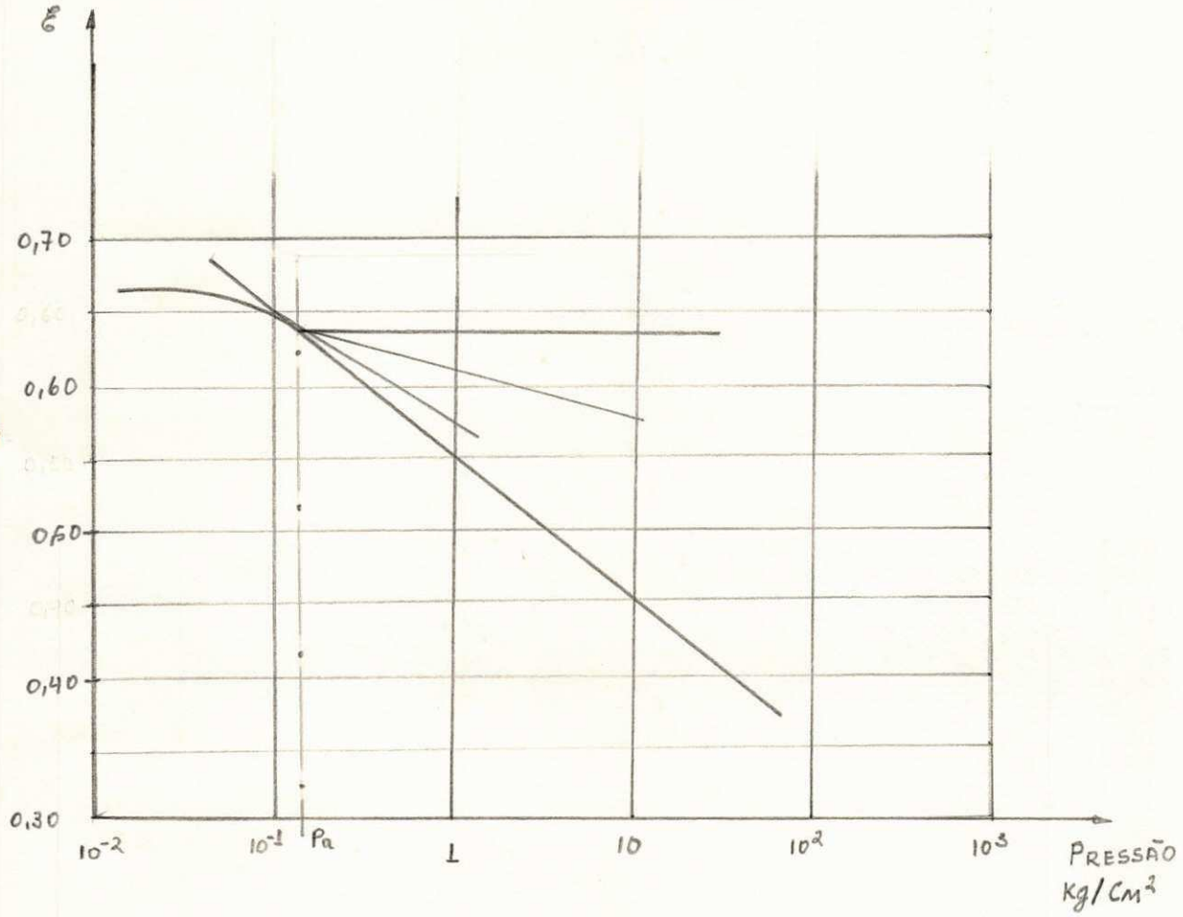
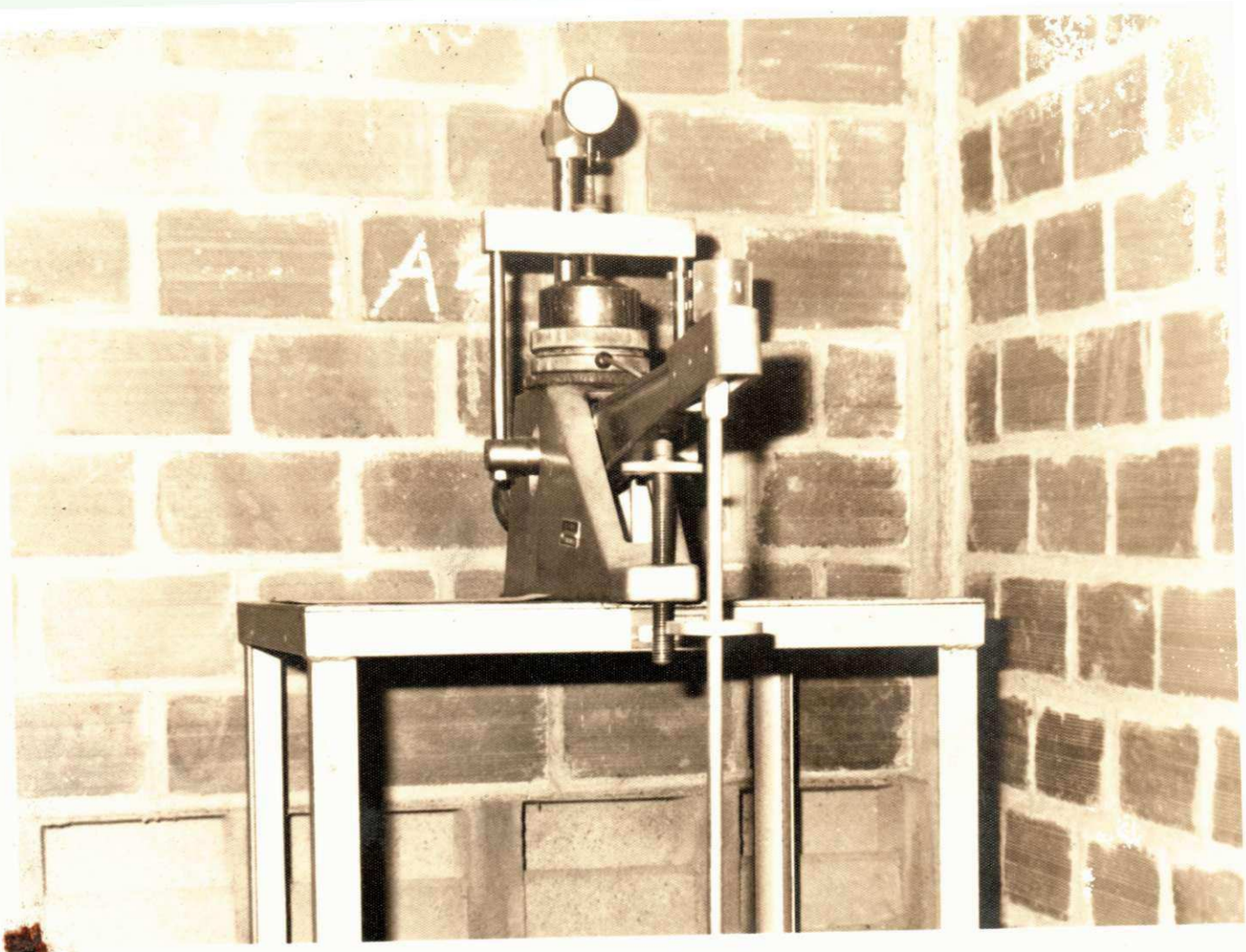


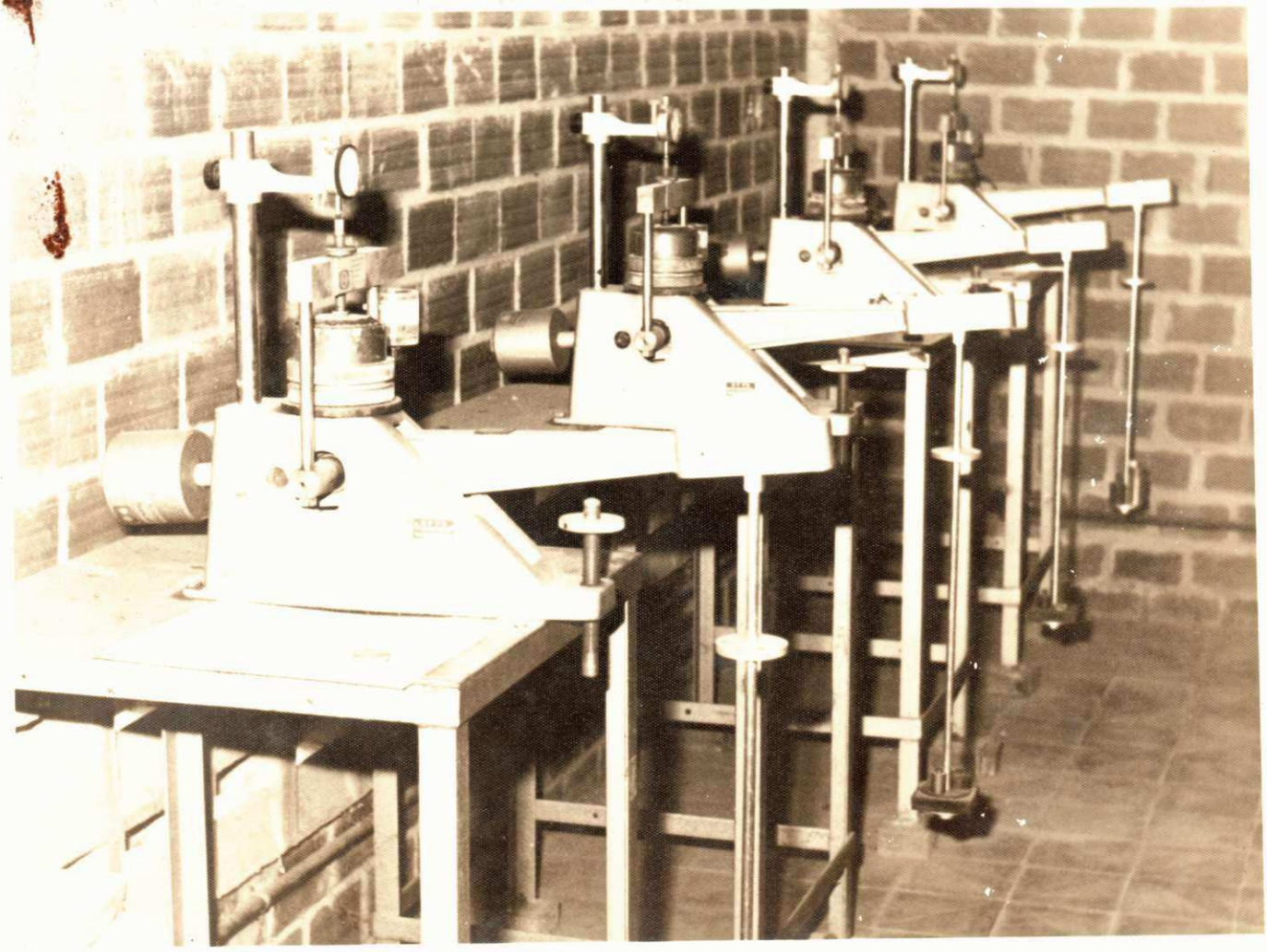
Fig- 16 - Grafico Tensão - Deformação

1) Determinação da pressão de pré-adensamento- P_a = o,14 Kg/cm^2

2) Determinação do índice de compressão - K = o,1 .

VER - ANEXO 1 - 2 - 3.





LIMITE DE LIQUIDEZ E ÍNDICE DE PLASTICIDADE

Limite de liquidez

1 - Finalidade :

Caracterizar o solo quanto a um de seus índices básicos (em - bora empirico) representativos da platicidade. A amostra a ser ensaiada deve estar tanto quanto possível em condições idênticas às do campo.,Tendo sido assim mantida desde a sua extração.

2 - Aparelhagem .

Aparêlho e cinzel de Casagrande
Balança Analítica de 100 g de capacidade e precisão de 0,001g
Diversos: - Estufa - Cápsulas de aluminio ou porcelana - espátula - água destila - etc.

3 - Verificação e calibração da aparelhagem :

3.1 - Calibração do Aparelho de Casagrande:
Usar o calibrador do aparelho, de 1 cm de altura ,para verificar a altura do ponto em que a concha bate na base, quando a altura do ponto em que sua posição mais / elevada(observar que não é mais baixoda concha, mas aquele que na base). Se não tiver exata, ajustar com o parafuso de ajustagem.

3.2 - Verificar ainda-:

3.2.1 Que a marca do ponto da concha que bate na base não esteja gasta.

3.2.2 - que a borracha inferior da base não esteja gasta.

3.2.3 - A resiliencia dinâmica inferior da base: / uma esfera de aço de 8,o mm de diâmetro / 5/16 Pol - , caindo da altura de 25,4 cm / (10 pol) de elevar -se entre 18 a 25 cm . /

4 - Procedimento do ensaio

4.1 - Homogeinizar o solo, em almofariz com a mão de borracha , quebrando os torrões e evitando triturar o material.

4.2 - Verificar se o solo representa particulas de Ø o,42mm (≠40 USBS) por peneiramento de material que será abadonado.

4.3 - No caso do solo apresentar particulas de Ø o,42 mm / umidece -lo com agua destilada até umidades intermediária entre LL e o LP, permitindo sua extrusão pela peneira / Nº 40 do USBS, para retirada das partículas maiores.

4.4 - Utilizando agua destilada ou secamento do ar, ajustar a umidade do solo peneirado, até o teor de umidade apro - ximadamente necessário à determinação (ítem 4,6), tomando cuidado para evitar variações acentuadas desnecessárias / e nocívas.

4.5- Colocar na cápsula de porcelana cerca de 100g do solo obtido no ítem 4.4.

4.6 - Homogeinizar muito bem o solo juntando água destilada se necessário, a fim de formar uma pasta uniforme , / relativamente consistente.

4.7 - Com a concha doaparelho de Casagrande na mãp, tranferir com a espátula parte da massa asim obtida para a concha; alisar sua superficie com a espátula, de forma a obter uma camada com espessura de 12 mm de material na secção mais profunda.

4.8 - Fazer neste solo uma ranhura ao longo do eixo de si - metria da concha, por meio de um cinzel, que deve ser mantido em posição normal a concha no ponto de contacto durante o movimento.

4.9 - Colocar cuidadosamente a concha no aparelho, e logo a / seguir girar a manivela à razaõ de 2 duas revoluções por segundo. Cortar e anotar o numero de golpes necessários para que as bordas inferiores da ranhura se unam ao / longo de um (1) cm de comprimento.

4.10 -Transferir imediatamente cerca de 10 g do mateial juntando às bordas que se unirem, para a cápsula de aluminio, para a determinação de sua umidade.

4.11 - Adicionando um pouco de água para alterar o teor de umidade do solo e repetindo os iten 4.6 ã 4.10, obter quatro pares de valores umidade-número de golpes(estes devem / estar compreendidos entre 10 e 40 golpes, de preferência no mínimo 2 abaixo e 2 acima de 25 golpes).

4.12 - construir um gráfico do logaritmo do número de golpes / em função da umidade. traçar a reta que melhor se ajuste par os pontos plotados: esta reta é empregada para a determinação do limite de Liquidez (umidade correspondente a 25 golpes).

-%-
-$-
-$-

NOTA - VER Anexo 4 (4)

Anexo 2

Anexo 3

L I M I T E D E P L A S T I C I D A D E

LIMITE DE PLASTICIDADE

Aparelhagem :

Placa de vidro esmerilado

Balança analítica de 100g de capacidade e precisão de 0,001 g

Diversos: - estufa - cápsulas de pocelana e de / aluminio - espátula - água destilada - etc.

Procedimento do ensaio.

1.1 - Homogeneizar o solo , em almofariz com mão de borracha, quebrando os torrões, e evitando triturar o material /

1.2 - Verificar se o solo possui partículas de $\varnothing > 0{,}42$ mm , (≠ 40 USPS) por peneiramento de material que será / abadonado.

1.3 - NO caso do solo apresentar partículade $\varnothing > 0{,}42$mm, umidecê -lo com água destilada até umidades intermediárias / entre o LL e o LP, permitindo sua eztrusão pela peneira Nº 40 do USPS, para retirada das particulas maiores.

1.4 - Utilizando agua destilada ou secamento ao ar, ajustar a umidade do solo peneirado, até o teor de umidade aproximadamente necessário à determinação do ìtem 2.6 , / tornando cuidado para evitar variãções acentuadas / desnecessárias e nocivas .

1.5 - Colocar an cápsula de porcelana cerca de 15g de solo umido.

1.6 - Homogeinizar muito bem o solo, juntando água destilada se necessário, a fim de formar uma pasta uniforme, relativamente consistente.

1.7 - Role o Rolo com a mão, sobre a placa de vidro, até conseguir um bastonete , com as dimensões acima, isto é / com 3 mm de diâmetro, da ordem de 1 a 2 cm de comprimento.

1.8 - Repita o ìtem 1.7 até que o bastonete , com as dimensões acima , apresente as primeiras fissuras.

1.9 - Coloque o trecho assim fissurada do bastonete obtido do / item 2.8 numa cápsula de aluminio, para a determinação da umidade.

2.o - Repita os ìtens 1.7 e 1.9 para obter três determinções com dispersão máxima inferior a 5% do valor da média; a média re respectiva dará o valor do Limite de Plasticidade .

-%-%-%-%-%-%-%-%-%-%-%-%-%-%- -%-%-%-%-%-%-%-%-%-

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NOTA Ver anexo 4

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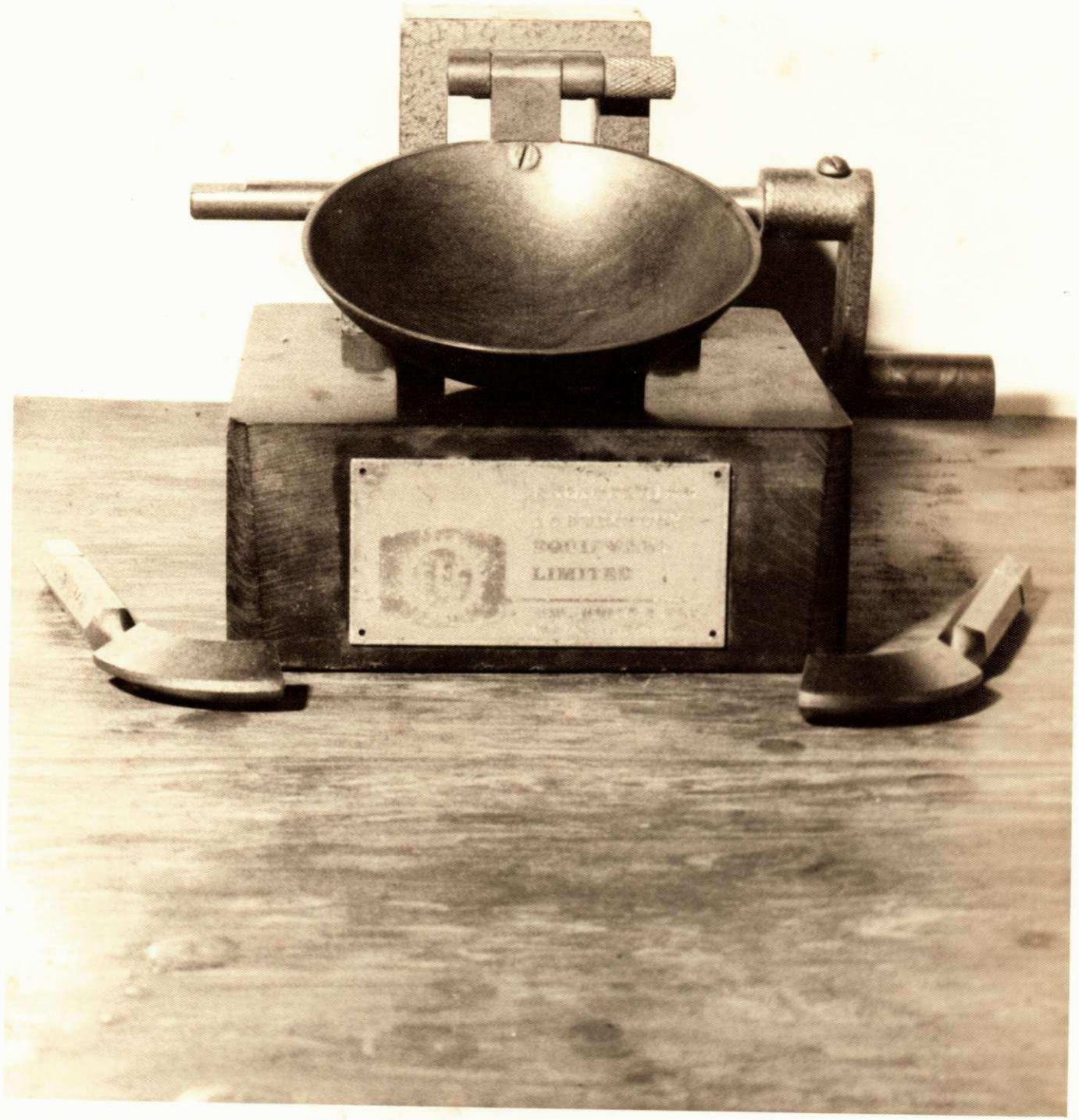


APARELHO DE CASAGRANDE E CINZEIS

A D E N S A M E N T O

A N E X O 1

P R O F U N D I D A D E 8 , 5 0 m

P O N T O " F "

A N E L 3

C R O N O G R A M A D E C A R R E G A M E N T O

Inicio P/8

Carregamento - P/8 - P/ 4 - P/2 - P

Descarregamento - P/2 - P/4

Carregamento - P/2 - P - 2P - 4 P - 8p

CONSOLIDATION TEST

LOC. No. ANEL Nº 3 SAMPLE No. 8,50 metros DATE 02/de 01 de 1977

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD P/8 ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 260,00 g lb.

DRAINAGE PATH CALCULATION

Ho = 2,00 cm. H_1 = 1,9882 cm. $\bar{H} = \frac{Ho + HI}{2}$ = 0,9970 cm $\bar{H}^2$ = 0,9941 cm^2

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 423,80 g.

Weight of Ring 344,70 g.

Weight of Wet Sample 79,00 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) 494,20 g.

Weight of Dry Sample Watch Class ( ) _____ g.

Weight of Watch Glass _____ g.

Weight of Dry Sample 39,60 g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading (10,000")	$\sum d H$
02/01/77		0		0,0	
		10 sec.		12,5	
		15 sec.		13,5	
		30 sec.		15,6	
		1 min.		18,0	
		2 min.		20,0	
		4 min.		23,0	
		8 min.		26,5	
		15 min.		29,0	
		30 min.		32,0	
		1 hr.		34,0	
		2hr.		36,0	
		4hr.		39,0	
		6 hr.		40,5	
		8hr		42,5	
03/01/77		24hr		44,5	
04/01/77		48hr		46,5	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

$\sum i$

FINAL VOIDS RATIO

Final M.C. _____ %

$\sum f$

CONSOLIDATION COEFFICIENT

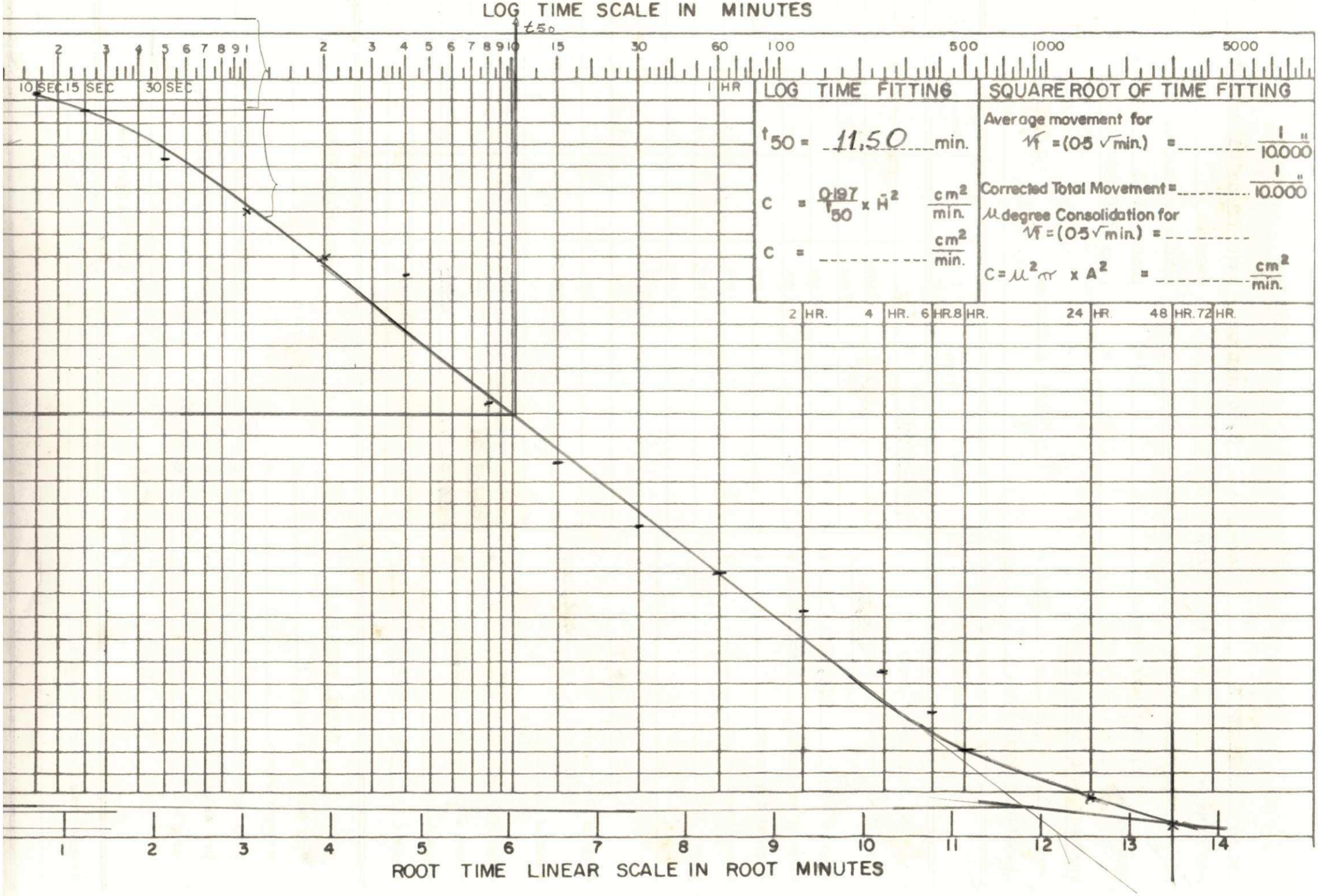
C_v = 0.2838 x 10^{-3} cm^2/min S

(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked _____


LOG TIME SCALE IN MINUTES
t_{50}
2 3 4 5 6 7 8 9 1 2 3 4 5 6 7 8 9 10 15 30 60 100 500 1000 5000
10 SEC. 15 SEC 30 SEC 1 HR
LOG TIME FITTING
t_{50} = 11.50 min.
$C = \frac{0.197}{t_{50}} \times H^2$ $\frac{cm^2}{min.}$
C = _____ $\frac{cm^2}{min.}$
SQUARE ROOT OF TIME FITTING
Average movement for
$\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____ $\frac{1}{10.000}$"
Corrected Total Movement = _____ $\frac{1}{10.000}$"
μ degree Consolidation for
$\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____
$C = \mu^2 \pi \times A^2$ = _____ $\frac{cm^2}{min.}$
2 HR. 4 HR. 6 HR. 8 HR. 24 HR. 48 HR. 72 HR.
1 2 3 4 5 6 7 8 9 10 11 12 13 14
ROOT TIME LINEAR SCALE IN ROOT MINUTES

CONSOLIDATION TEST

LOC. No. ANEL Nº 3 SAMPLE No. 8,50 metros DATE 06 de 01 de 1977

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD P/4 ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 510,00 lb.

DRAINAGE PATH CALCULATION

Ho = 1.9882 cm. H_1 = 1.9707 cm. $\bar{H} = \frac{Ho + HI}{2}$ = 0.9897 cm $\bar{H}^2$ = 0.9795 cm²

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 423,70 g.

Weight of Ring 344,70 g.

Weight of Wet Sample 79,0 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) _____ g.

Weight of Dry Sample Watch Class ( ) _____ g.

Weight of Watch Glass _____ g.

Weight of Dry Sample _____ g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading (10,000")	Σ d H
04/01/77		0		46,50	
		10 sec.		59,00	
		15 sec.		60,00	
		30 sec.		62,50	
		1 min.		65,00	
		2 min.		69,00	
		4 min.		73,50	
		8 min.		78,00	
		15 min.		84,00	
		30 min.		89,00	
		1 hr.		93,00	
		2hr.		97,50	
		4hr.		102,50	
		6 hr.		106,00	
		8hr		108,00	
05/01/77		24hR		112,50	
06/01/77		48hr		115,50	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

Σi

FINAL VOIDS RATIO

Final M.C. _____ %

Σf

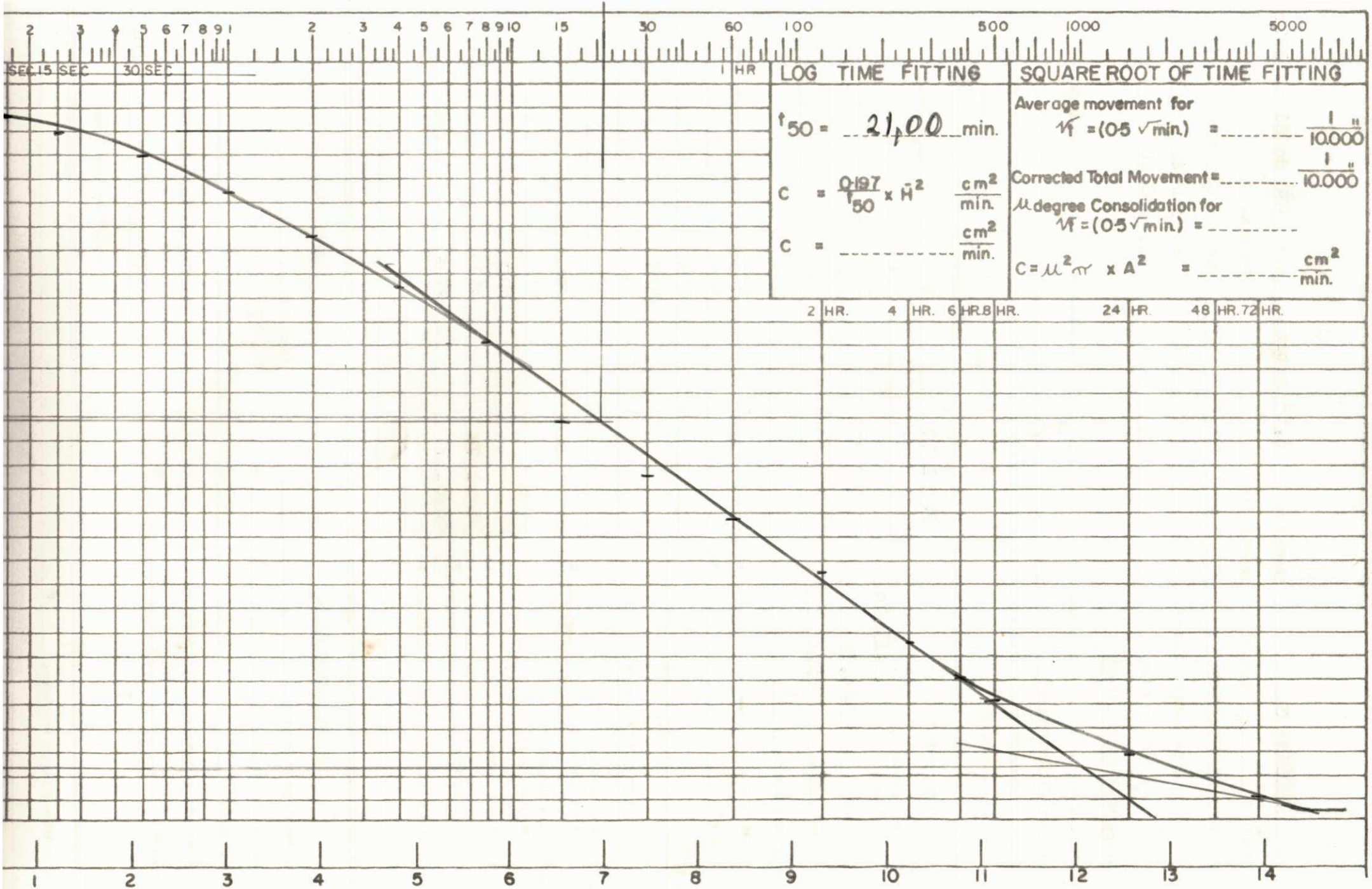
CONSOLIDATION COEFFICIENT

C_v = 0,1787 x 10⁻³ cm²/min. S

(Log Time Root Time)

Deviation from Standard Procedure _____

LOG TIME SCALE IN MINUTES



LOG TIME FITTING

t_{50} = 21,00 min.

$C = \frac{0.197}{t_{50}} \times H^2 \quad \frac{cm^2}{min.}$

$C = \_\_\_\_\_ \frac{cm^2}{min.}$

SQUARE ROOT OF TIME FITTING

Average movement for

$\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____ $\frac{1}{10.000}$ "

Corrected Total Movement = _____ $\frac{1}{10.000}$ "

μ degree Consolidation for

$\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____

$C = \mu^2 \pi \times A^2$ = _____ $\frac{cm^2}{min.}$

ROOT TIME LINEAR SCALE IN ROOT MINUTES

LOC. No. ANEL Nº 3 SAMPLE No. 8,50 metros DATE 06 de 01 de 1977

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD P/2 ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 1.850,00 lb.

DRAINAGE PATH CALCULATION

Ho = 1,9707 cm. H$_1$ = 1,9284 cm. $\bar{H} = \frac{Ho + H1}{2}$ = 0,9748 cm $\bar{H}^2$ = 0,9502 cm^2

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 423,70 g.

Weight of Ring 344,70 g.

Weight of Wet Sample 79,0 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) _____ g.

Weight of Dry Sample Watch Class ( ) _____ g.

Weight of Watch Glass _____ g.

Weight of Dry Sample _____ g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading (10,000")	$\sum$ d H
06/01/77		0		115,50	
		10 sec.		133,80	
		15 sec.		135,50	
		30 sec.		140,00	
		1 min.		146,50	
		2 min.		154,00	
		4 min.		165,00	
		8 min.		179,50	
		15 min.		194,00	
		30 min.		208,50	
		1 hr.		221,50	
		2hr.		234,00	
		4hr.		248,00	
		6 hr.		256,50	
		8hr		262,00	
07/01/77		24hr		271,00	
08/01/77		48hr		282,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

$\sum i$

FINAL VOIDS RATIO

Final M.C. _____ %

$\sum f$

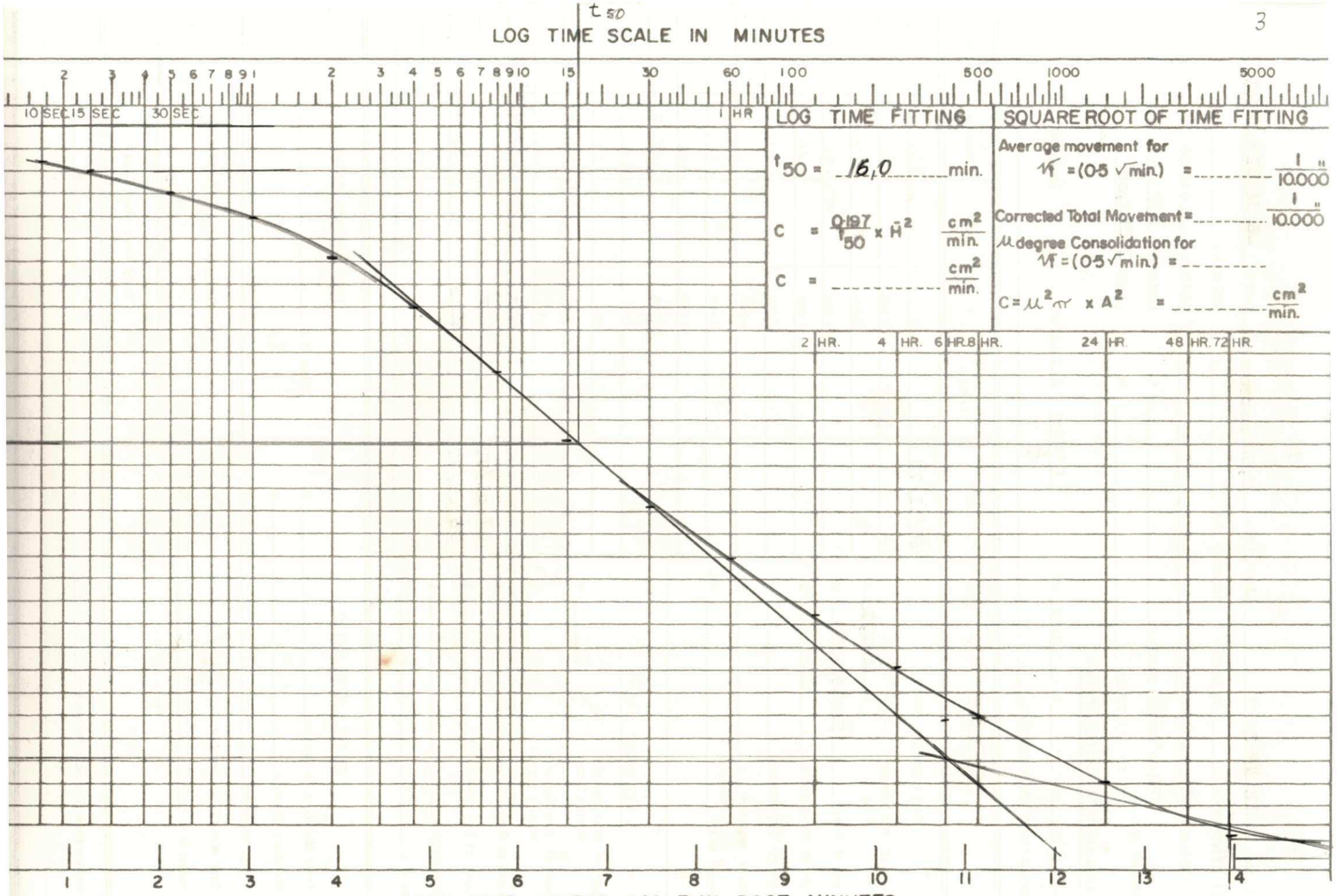
CONSOLIDATION COEFFICIENT

C_v = 0,2013 x 10^{-3} cm^2/~~min~~ S

(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____


t_{50}
LOG TIME SCALE IN MINUTES
2 3 4 5 6 7 8 9 1 2 3 4 5 6 7 8 9 10 15 30 60 100 500 1000 5000
10 SEC. 15 SEC 30 SEC 1 HR
LOG TIME FITTING
t_{50} = 16.0 min.
$C = \frac{0.197}{t_{50}} \times H^2$ $\frac{cm^2}{min.}$
C = _____ $\frac{cm^2}{min.}$
SQUARE ROOT OF TIME FITTING
Average movement for
$\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____ $\frac{1}{10.000}$"
Corrected Total Movement = _____ $\frac{1}{10.000}$"
μ degree Consolidation for
$\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____
$C = \mu^2 \pi \times A^2$ = _____ $\frac{cm^2}{min.}$
2 HR. 4 HR. 6 HR. 8 HR. 24 HR. 48 HR. 72 HR.
1 2 3 4 5 6 7 8 9 10 11 12 13 14
ROOT TIME LINEAR SCALE IN ROOT MINUTES

CONSOLIDATION TEST

LOC. No. ANEL Nº 3 SAMPLE No. 8,50 metros DATE 04 de 01 de 1977

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD P ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 2.020,00 g/lb.

DRAINAGE PATH CALCULATION

Ho = 1.9284 cm. H$_1$ = 1.8073 cm. $\bar{H} = \frac{Ho + HI}{2} = 0.9339$ cm $\bar{H}^2 = 0.8722$ cm^2

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 423,80 g.

Weight of Ring 344,70 g.

Weight of Wet Sample 79,0 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) _____ g.

Weight of Dry Sample Watch Class ( ) _____ g.

Weight of Watch Glass _____ g.

Weight of Dry Sample _____ g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading 1 10,000"	Σ d H
04/01/77		0		282,00	
		10 sec.		305,00	
		15 sec.		308,00	
		30 sec.		316,00	
		1 min.		326,00	
		2 min.		342,00	
		4 min.		363,00	
		8 min.		391,50	
		15 min.		424,00	
		30 min.		469,00	
		1 hr.		518,00	
		2hr.		571,00	
		4hr.		623,50	
		6 hr.		653,50	
		8hr		669,00	
05/01/77		24hrs		715,00	
06/11/77		48hr		759,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

Σi

FINAL VOIDS RATIO

Final M.C. _____ %

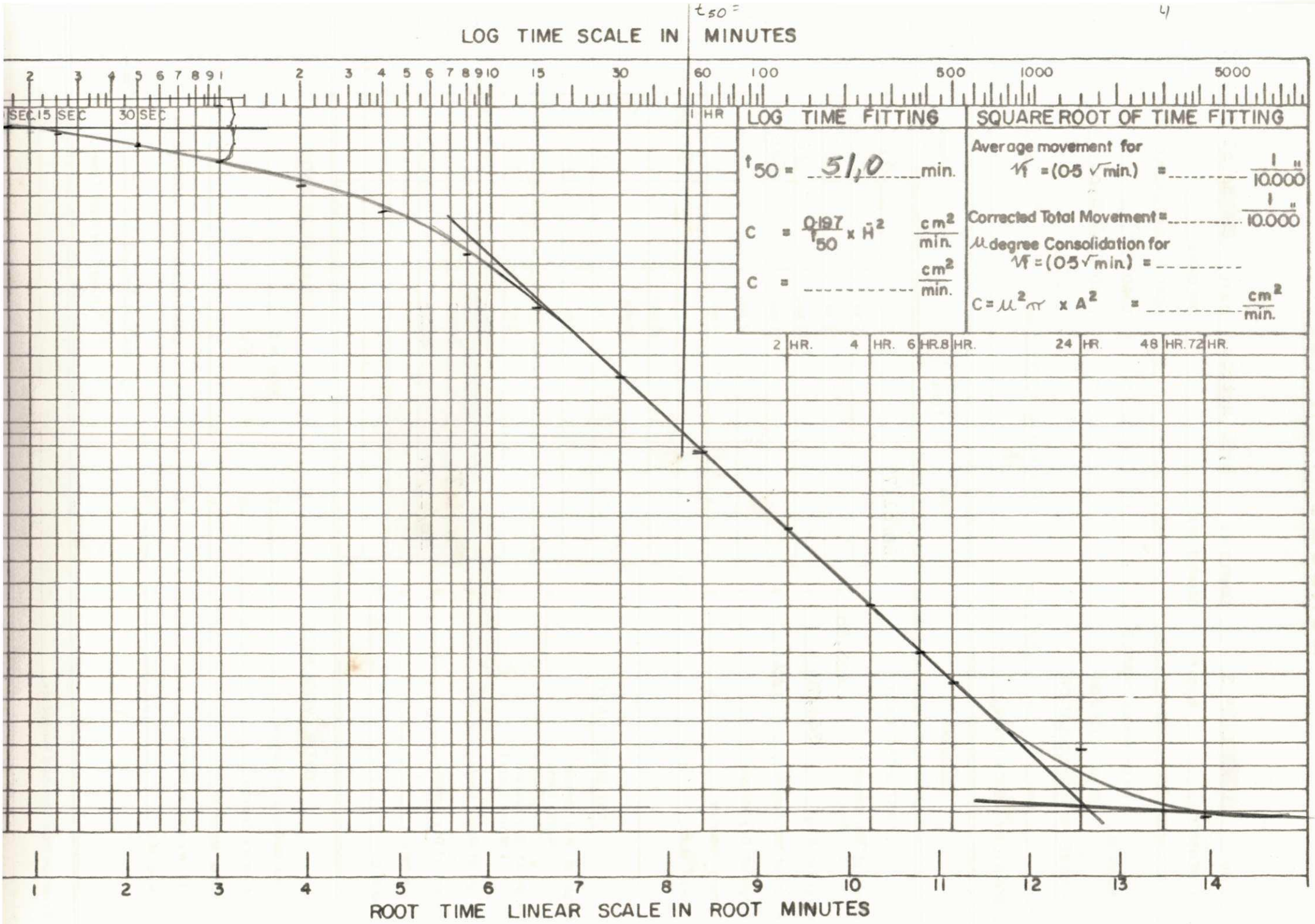
Σf

CONSOLIDATION COEFFICIENT

$C_v = 0.0561 \times 10^{-3}$ Cm^2/min

(Log Time Root Time)

Deviation from Standard Procedure _____


t_{50} =
LOG TIME SCALE IN MINUTES
2 3 4 5 6 7 8 9 1 2 3 4 5 6 7 8 9 10 15 30 60 100 500 1000 5000
SEC. 15 SEC 30 SEC 1 HR
LOG TIME FITTING
t_{50} = 51,0 min.
C = $\frac{0.197}{t_{50}} \times H^2$ $\frac{cm^2}{min.}$
C = ---------- $\frac{cm^2}{min.}$
SQUARE ROOT OF TIME FITTING
Average movement for
$\sqrt{t}$ = (0.5 $\sqrt{min.}$) = ---------- $\frac{1}{10.000}$ "
Corrected Total Movement = ---------- $\frac{1}{10.000}$ "
μ degree Consolidation for
$\sqrt{t}$ = (0.5 $\sqrt{min.}$) = ---------
$C = \mu^2 \pi \times A^2$ = ---------- $\frac{cm^2}{min.}$
2 HR. 4 HR. 6 HR. 8 HR. 24 HR. 48 HR. 72 HR.
1 2 3 4 5 6 7 8 9 10 11 12 13 14
ROOT TIME LINEAR SCALE IN ROOT MINUTES

CONSOLIDATION TEST

LOC. No. ANEL Nº 3 SAMPLE No. 8,50 metros DATE 10/de 01 de 1977

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD P/2 ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 1010,00 lb.

DRAINAGE PATH CALCULATION

Ho = _____ cm. _____ H_1 = _____ cm. $\bar{H} = \frac{Ho + H1}{2}$ = _____ cm $\bar{H}^2$ = _____ cm^2

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 423,80 g.

Weight of Ring 344,70 g.

Weight of Wet Sample 79,0 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) _____ g.

Weight of Dry Sample Watch Class ( ) _____ g.

Weight of Watch Glass _____ g.

Weight of Dry Sample _____ g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading 1 10,000"	$\sum d H$
10/01/77		0		759,00	731
		10 sec.		730,00	
		15 sec.		730,00	
		30 sec.		729,50	
		1 min.		729,00	
		2 min.		727,50	
		4 min.		725,50	
		8 min.		722,00	
		15 min.		719,00	
		30 min.		715,00	
		1 hr.		712,50	
		2hr.		710,00	
		4hr.		707,00	
		6 hr.		706,50	
		8hr		706,00	
13/01/77		24hr		704,00	
14/01/77		48hr		703,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

$\sum i$

FINAL VOIDS RATIO

Final M.C. _____ %

$\sum f$

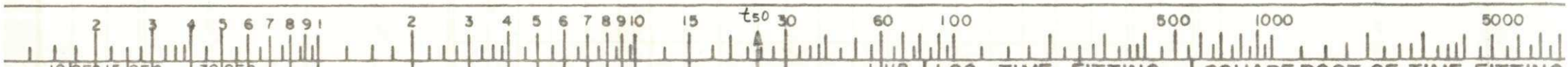
CONSOLIDATION COEFFICIENT

C_v = _____ Cm^2/min

(Log Time Root Time)

Deviation from Standard Procedure _____

LOG TIME SCALE IN MINUTES



LOG TIME FITTING

t_{50} = 26,0 min.

$C = \frac{0.197}{t_{50}} \times H^2 \quad \frac{cm^2}{min.}$

C = _____ $\frac{cm^2}{min.}$

SQUARE ROOT OF TIME FITTING

Average movement for

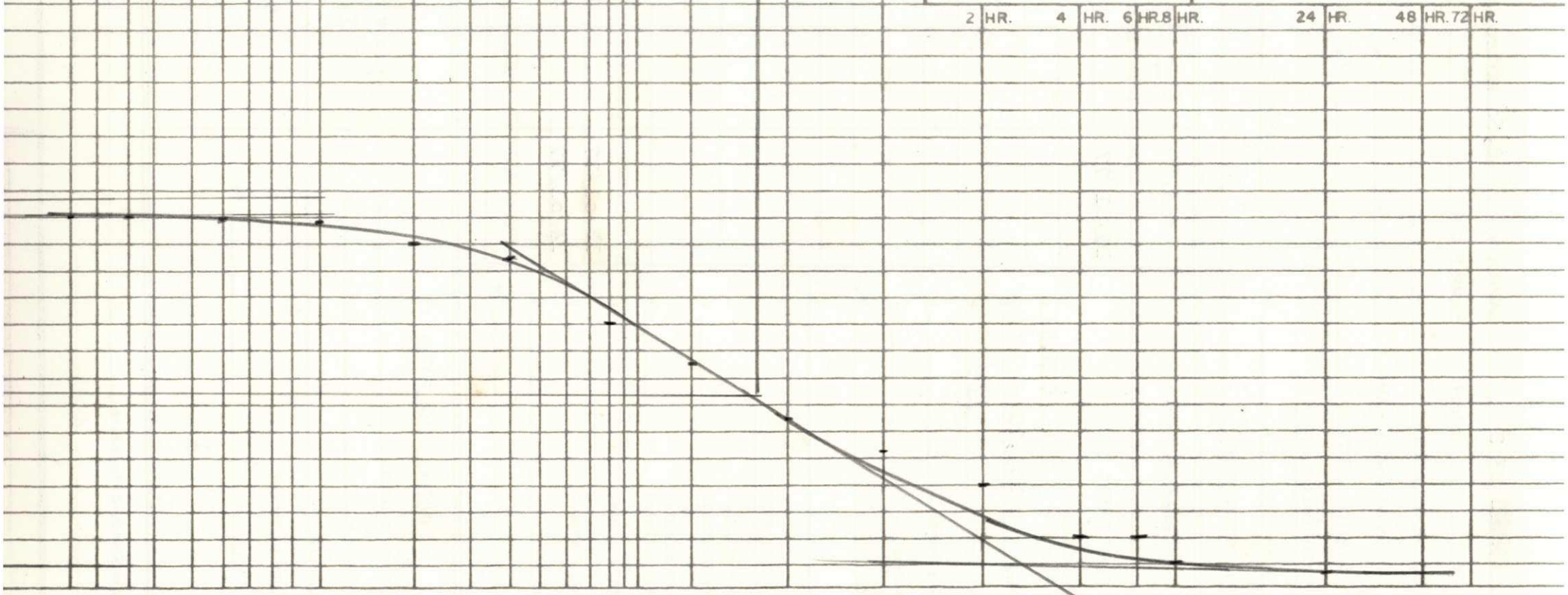
$\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____ $\frac{1}{10.0}$

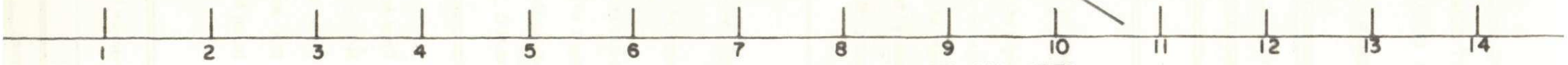
Corrected Total Movement = _____ $\frac{1}{10.0}$

μ degree Consolidation for

$\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____

$C = \mu^2 \pi \times A^2$ = _____ $\frac{cm^2}{min.}$





ROOT TIME LINEAR SCALE IN ROOT MINUTES

CONSOLIDATION TEST

LOC. No ANEL Nº 3 SAMPLE No. 8,50 metros DATE 12 de 01 de 1977

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD P/4 ton sq.ft.

(b) OF CUTTINGS _____ % LOAD 510,00 lb.

DRAINAGE PATH CALCULATION

Ho = _____ cm. _____ H_1 = _____ cm. $\bar{H} = \frac{Ho + HI}{2}$ = _____ cm $\bar{H}^2$ = _____ cm^2

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 423,80 g.

Weight of Ring 344,70 g.

Weight of Wet Sample 79,0 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) _____ g.

Weight of Dry Sample Watch Class ( ) _____ g.

Weight of Watch Glass _____ g.

Weight of Dry Sample _____ g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading 1:10,000"	Σ d H
12/01/77		0		703,00	
		10 sec.		682,00	
		15 sec.		681,00	
		30 sec.		680,50	
		1 min		677,00	
		2 min.		673,00	
		4 min.		669,00	
		8 min.		666,00	
		15 min.		662,00	
		30 min.		655,00	
		1 hr.		649,00	
		2hr.		643,00	
		4hr.		638,00	
		6 hr.		635,00	
		8hr		634,50	
13/01/77		24hr		629,50	
13/01/77		48hr		626,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

Σi

FINAL VOIDS RATIO

Final M.C. _____ %

Σf

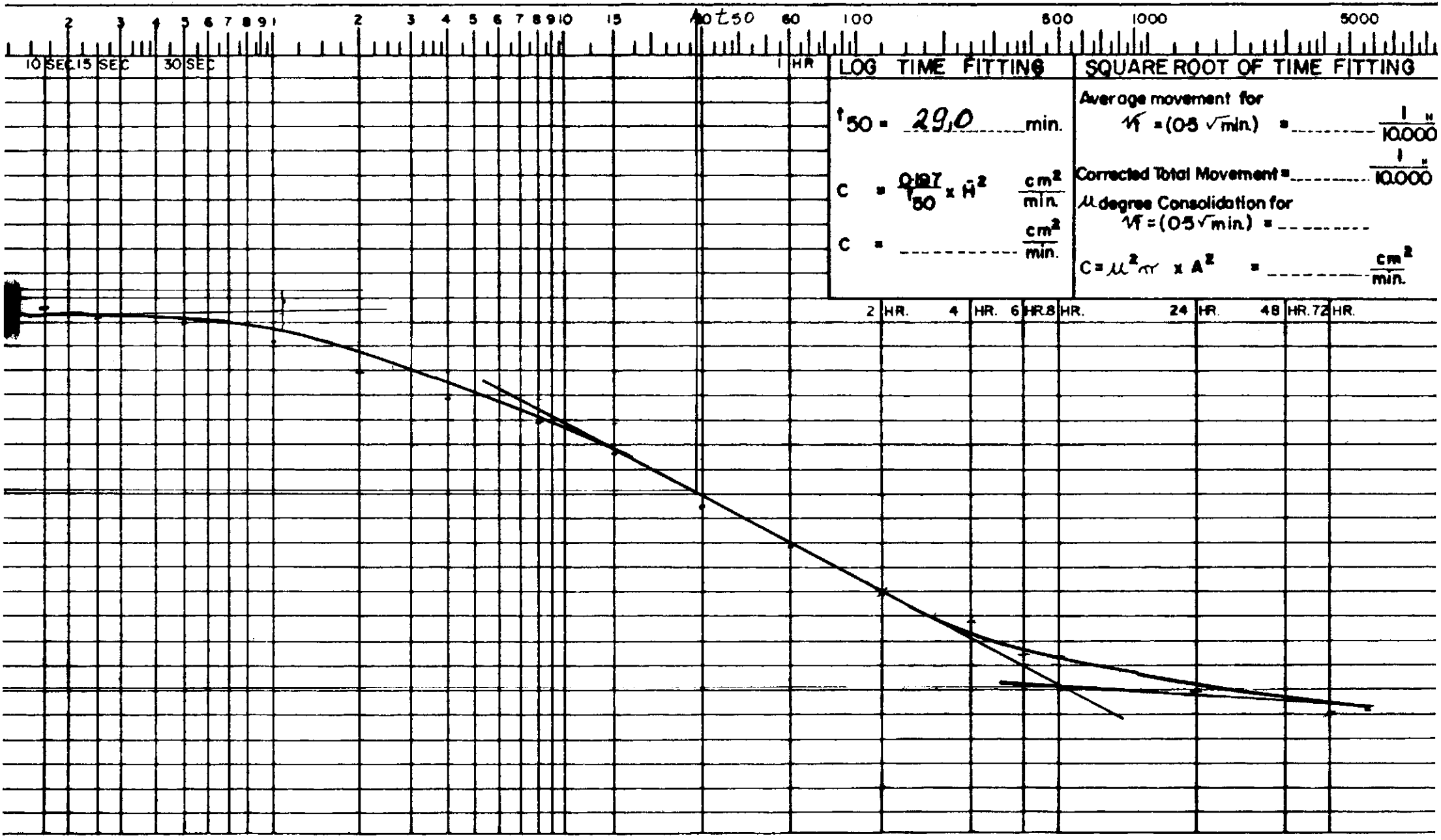
CONSOLIDATION COEFFICIENT

C_v = _____ Cm^2/min

(Log Time Root Time)

Deviation from Standard Procedure _____

LOG TIME SCALE IN MINUTES



ROOT TIME LINEAR SCALE IN ROOT MINUTES

CONSOLIDATION TEST

LOC. No. ANEL Nº 3 SAMPLE No. 8,50 metros DATE 14 de 01 de 1977

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD P/2 ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 1010,00 lb.

DRAINAGE PATH CALCULATION

Ho = _____ cm. _____ H_1 = _____ cm. $\bar{H} = \frac{Ho + H1}{2}$ = _____ cm $\bar{H}^2$ = _____ cm^2

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 423,80 g.

Weight of Ring 344,70 g.

Weight of Wet Sample 79,0 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) _____ g.

Weight of Dry Sample Watch Class ( ) _____ g.

Weight of Watch Glass _____ g.

Weight of Dry Sample _____ g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading (10,000")	$\Sigma d H$
14/01/77		0		626,00	
		10 sec.		632,00	
		15 sec.		633,00	
		30 sec.		635,00	
		1 min		637,50	
		2 min		641,00	
		4 min.		646,00	
		8 min.		652,50	
		15 min.		658,00	
		30 min.		663,00	
		1 hr.		666,00	
		2hr.		669,00	
		4hr.		671,00	
		6 hr.		672,00	
		8hr		672,50	
15/01/77		24hr		674,50	
16/01/77		48hr		677,50	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

Σi

FINAL VOIDS RATIO

Final M.C. _____ %

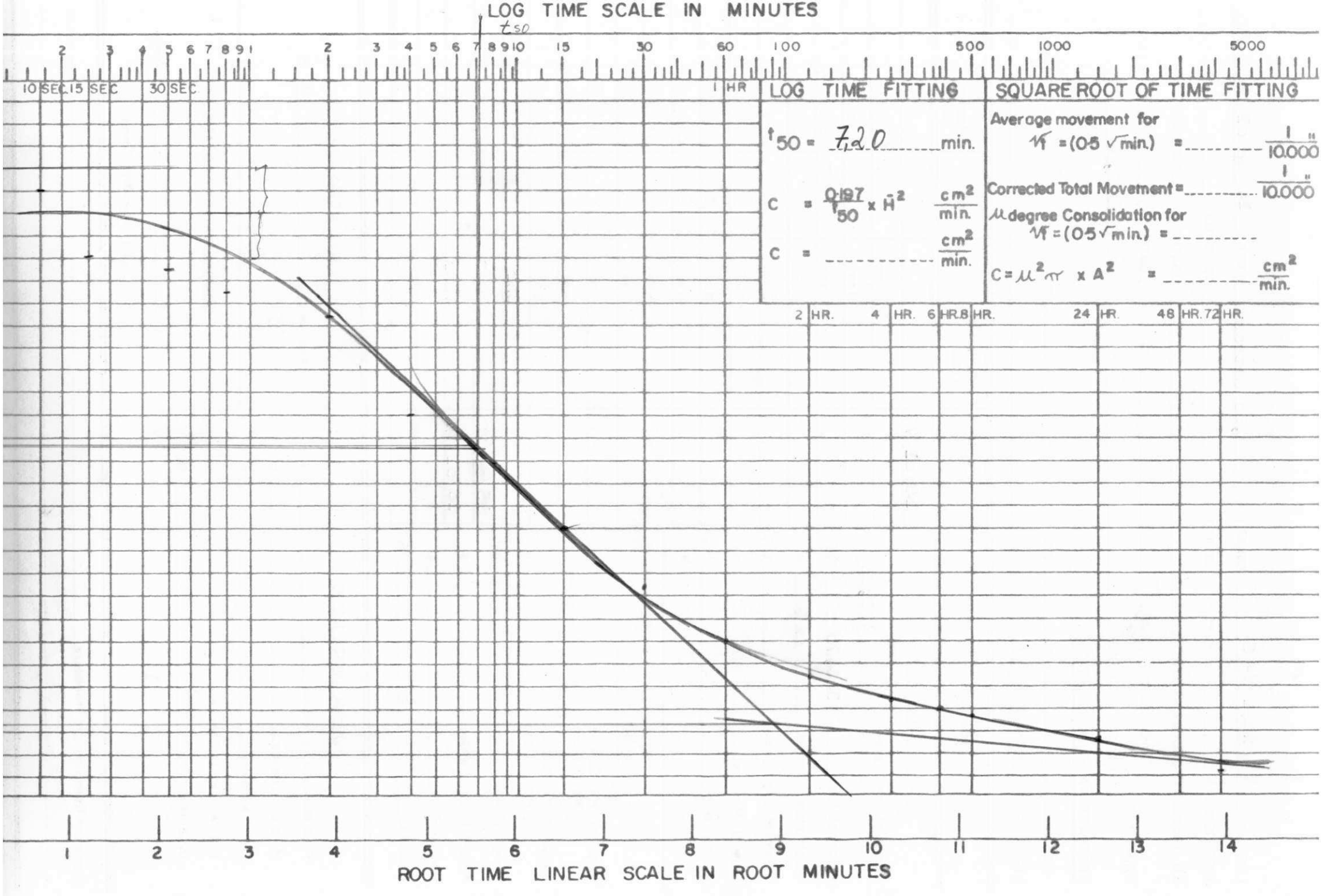
Σf

CONSOLIDATION COEFFICIENT

C_v = _____ Cm^2/min

(Log Time Root Time)

Deviation from Standard Procedure _____


LOG TIME SCALE IN MINUTES
t_{50}
2 3 4 5 6 7 8 9 1 2 3 4 5 6 7 8 9 10 15 30 60 100 500 1000 5000
10 SEC. 15 SEC 30 SEC 1 HR
LOG TIME FITTING
t_{50} = 7.20 min.
$C = \frac{0.197}{t_{50}} \times H^2$ $\frac{cm^2}{min.}$
C = _____ $\frac{cm^2}{min.}$
SQUARE ROOT OF TIME FITTING
Average movement for
$\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____ $\frac{1}{10.000}$"
Corrected Total Movement = _____ $\frac{1}{10.000}$"
μ degree Consolidation for
$\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____
$C = \mu^2 \pi \times A^2$ = _____ $\frac{cm^2}{min.}$
2 HR. 4 HR. 6 HR. 8 HR. 24 HR. 48 HR. 72 HR.
1 2 3 4 5 6 7 8 9 10 11 12 13 14
ROOT TIME LINEAR SCALE IN ROOT MINUTES

CONSOLIDATION TEST

LOC. No. ANEL Nº 3 SAMPLE No. 8,5o metros DATE 26 de o1 de 1977

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD P ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 2020,00 lb.

DRAINAGE PATH CALCULATION

Ho = _____ cm. _____ H_1 = _____ cm. $\bar{H} = \frac{Ho + HI}{2}$ = _____ cm $\bar{H}^2$ = _____ cm^2

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 423,8o g.

Weight of Ring 344,7o g.

Weight of Wet Sample 79,0 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) _____ g.

Weight of Dry Sample Watch Class ( ) _____ g.

Weight of Watch Glass _____ g.

Weight of Dry Sample _____ g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading (10,000")	$\Sigma d H$
26/01/77		0		677,50	
		10 sec.		688,00	
		15 sec.		690,00	
		30 sec.		693,00	
		1 min		699,00	
		2 min.		707,00	
		4 min.		716,50	
		8 min.		730,00	
		15 min.		744,50	
		30 min.		759,00	
		1 hr.		771,00	
		2hr.		781,00	
		4hr.		793,00	
		6 hr.		803,00	
		8hr		809,80	
27/01/77		24hr		824,00	
28/01/77		48hr		838,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

Σi

FINAL VOIDS RATIO

Final M.C. _____ %

Σf

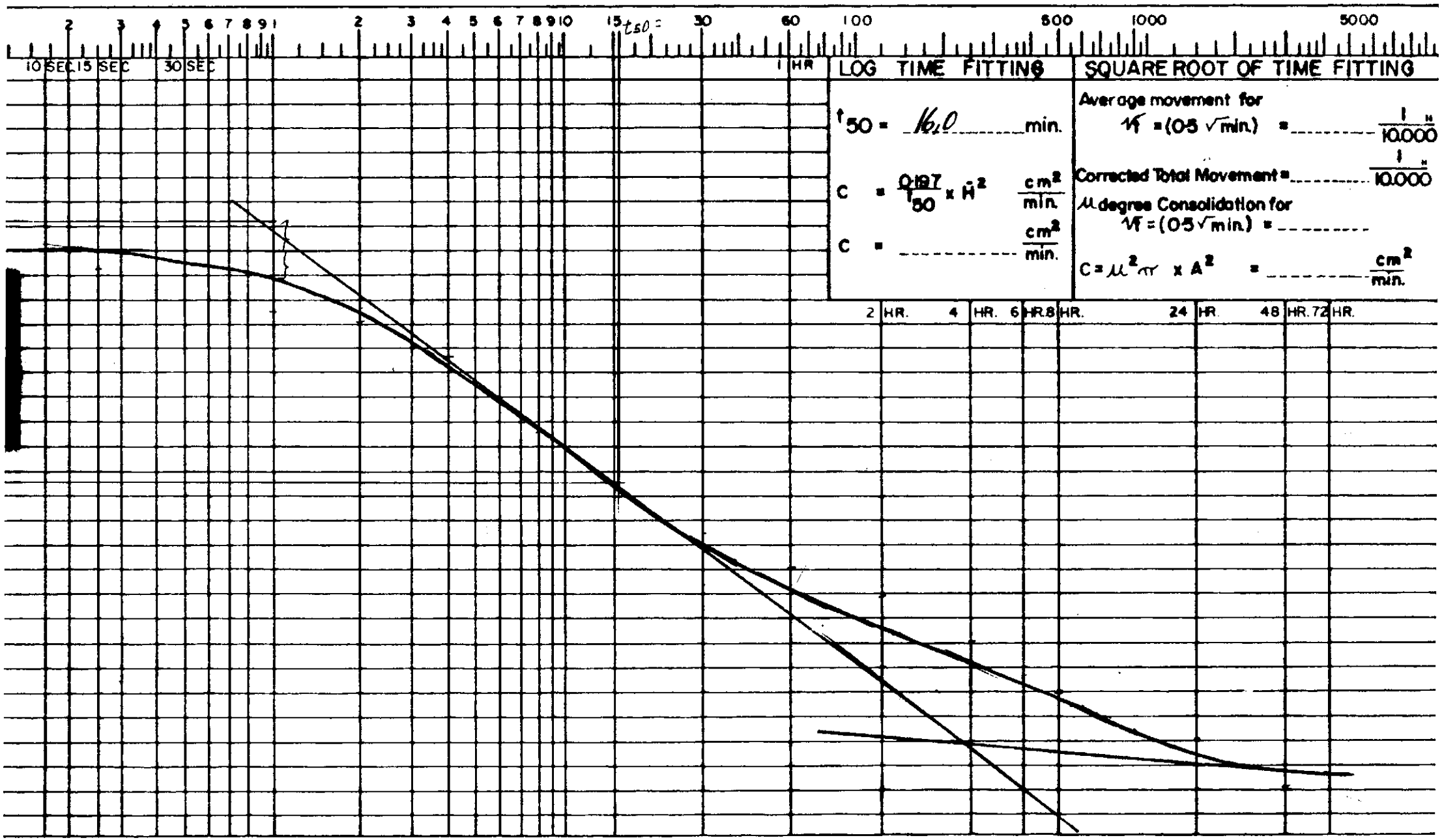
CONSOLIDATION COEFFICIENT

C_v = _____ Cm^2/min

(Log Time Root Time)

Deviation from Standard Procedure _____

LOG TIME SCALE IN MINUTES



ROOT TIME LINEAR SCALE IN ROOT MINUTES

CONSOLIDATION TEST

LOC. No ANEL Nº 3 SAMPLE No. 8,50 metros DATE 18 de 02 de 1977

WET DENSITY _____ lb./cu ft. SAMPLE DIA. _____ PRESS No _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD 2P ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 4.090,00 lb.

DRAINAGE PATH CALCULATION

Ho = 1.8073 cm. H_1 = 1.6206 cm. $\bar{H} = \frac{Ho + HI}{4}$ = 0.8570 cm $\bar{H}^2$ = 0.7344 cm²

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 423,80 g.

Weight of Ring 344,70 g.

Weight of Wet Sample 79,0 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) _____ g.

Weight of Dry Sample Watch Class ( ) _____ g.

Weight of Watch Glass _____ g.

Weight of Dry Sample _____ g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading 1 10,000"	Σ d H
18/01/77		0		838,00	
		10 sec.		858,00	
		15 sec.		862,00	
		30 sec.		871,00	
		1 min.		884,00	
		2 min.		903,00	
		4 min.		930,00	
		8 min.		970,00	
		15 min.		1021,00	
		30 min.		1098,00	
		1 hr.		1194,00	
		2hr.		1203,00	
		4hr.		1405,00	
		6 hr.		1456,00	
		8hr		1489,50	
19/01/77		24hr		1535,00	
20/01/77		48hr		1573,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

Σ_i

FINAL VOIDS RATIO

Final M.C. _____ %

Σ_f

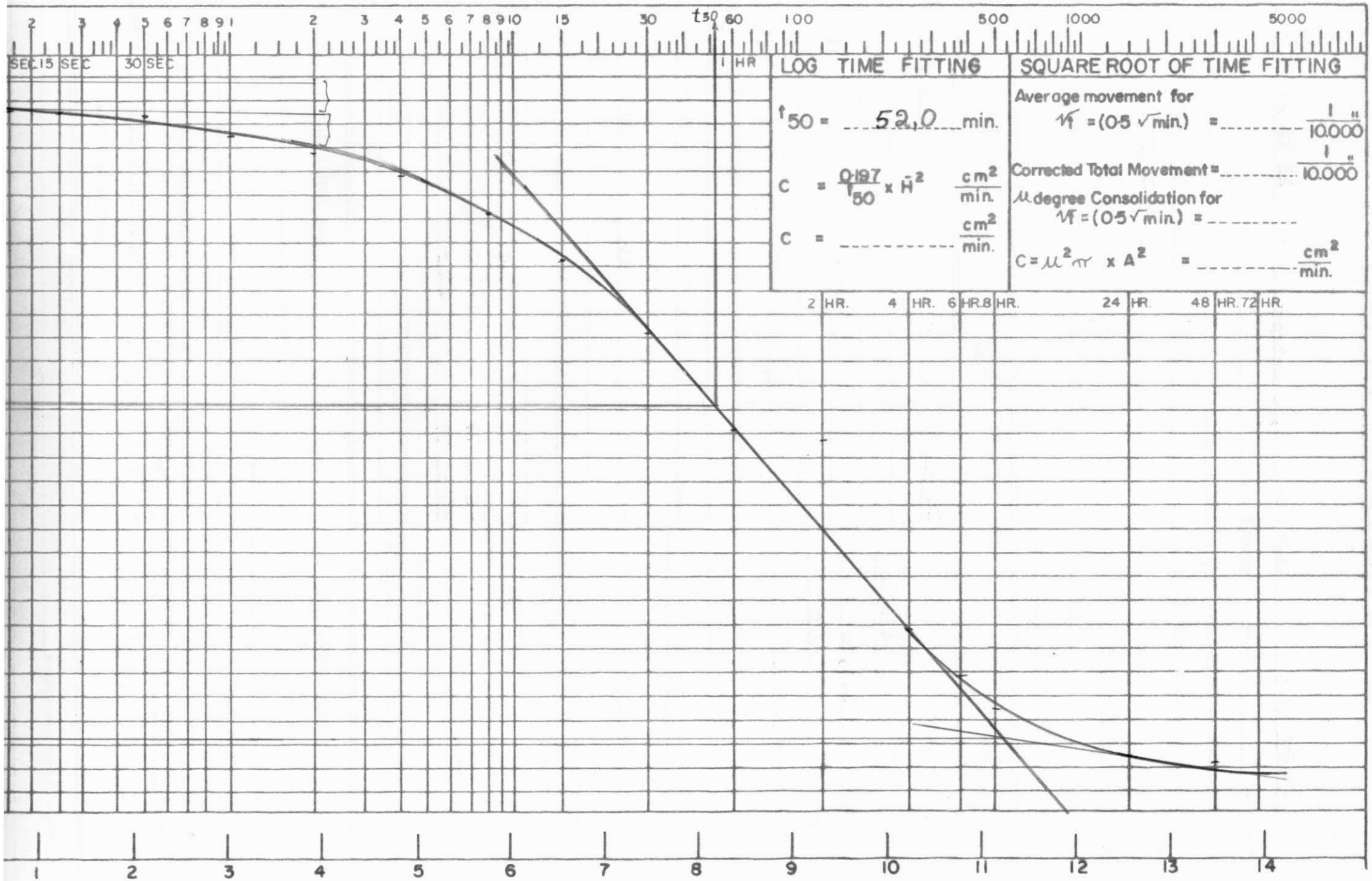
CONSOLIDATION COEFFICIENT

C_v = 0,0464 x 10^{-3} cm^2/min S

(Log Time Root Time)

Deviation from Standard Procedure _____

LOG TIME SCALE IN MINUTES



LOG TIME FITTING

t_{50} = 52.0 min.

$C = \frac{0.197}{t_{50}} \times H^2 \quad \frac{cm^2}{min.}$

$C = $ _____ $\frac{cm^2}{min.}$

SQUARE ROOT OF TIME FITTING

Average movement for

$\sqrt{t} = (0.5\sqrt{min.}) =$ _____ $\frac{1}{10.000}$ "

Corrected Total Movement = _____ $\frac{1}{10.000}$ "

u degree Consolidation for

$\sqrt{t} = (0.5\sqrt{min.}) =$ _____

$C = u^2 \pi \times A^2 =$ _____ $\frac{cm^2}{min.}$

ROOT TIME LINEAR SCALE IN ROOT MINUTES

CONSOLIDATION TEST

LOC. No. ANEL - Nº 3 SAMPLE No. 8,50 metros DATE 20 de 01 de 1977

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD 4P ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 8.050,00 lb.

DRAINAGE PATH CALCULATION

Ho = 1,6206 cm. _____ H_1 = 1,4441 cm. $\bar{H} = \frac{Ho+HI}{2} = 0,7662$ cm $\bar{H}^2 = 0,5870$ cm²

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 423,80 g.

Weight of Ring 344,70 g.

Weight of Wet Sample 79,0 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) _____ g.

Weight of Dry Sample Watch Class ( ) _____ g.

Weight of Watch Glass _____ g.

Weight of Dry Sample _____ g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading 1 10,000"	$\sum d H$
20 4/01/77		0		1573,00	
		10 sec.		1598,00	
		15 sec.		1602,00	
		30 sec.		1613,00	
		1 min.		1627,00	
		2 min.		1649,00	
		4 min.		1680,00	
		8 min.		1723,00	
		15 min.		1779,00	
		30 min.		1862,00	
		1 hr.		1966,00	
		2hr.		2066,00	
		4hr.		2150,00	
		6 hr.		2188,00	
		8hr		2206,00	
21 5/01/77		24hr		2235,00	
22/01/77		48hr		2268,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

$\sum i$

FINAL VOIDS RATIO

Final M.C. _____ %

$\sum f$

CONSOLIDATION COEFFICIENT

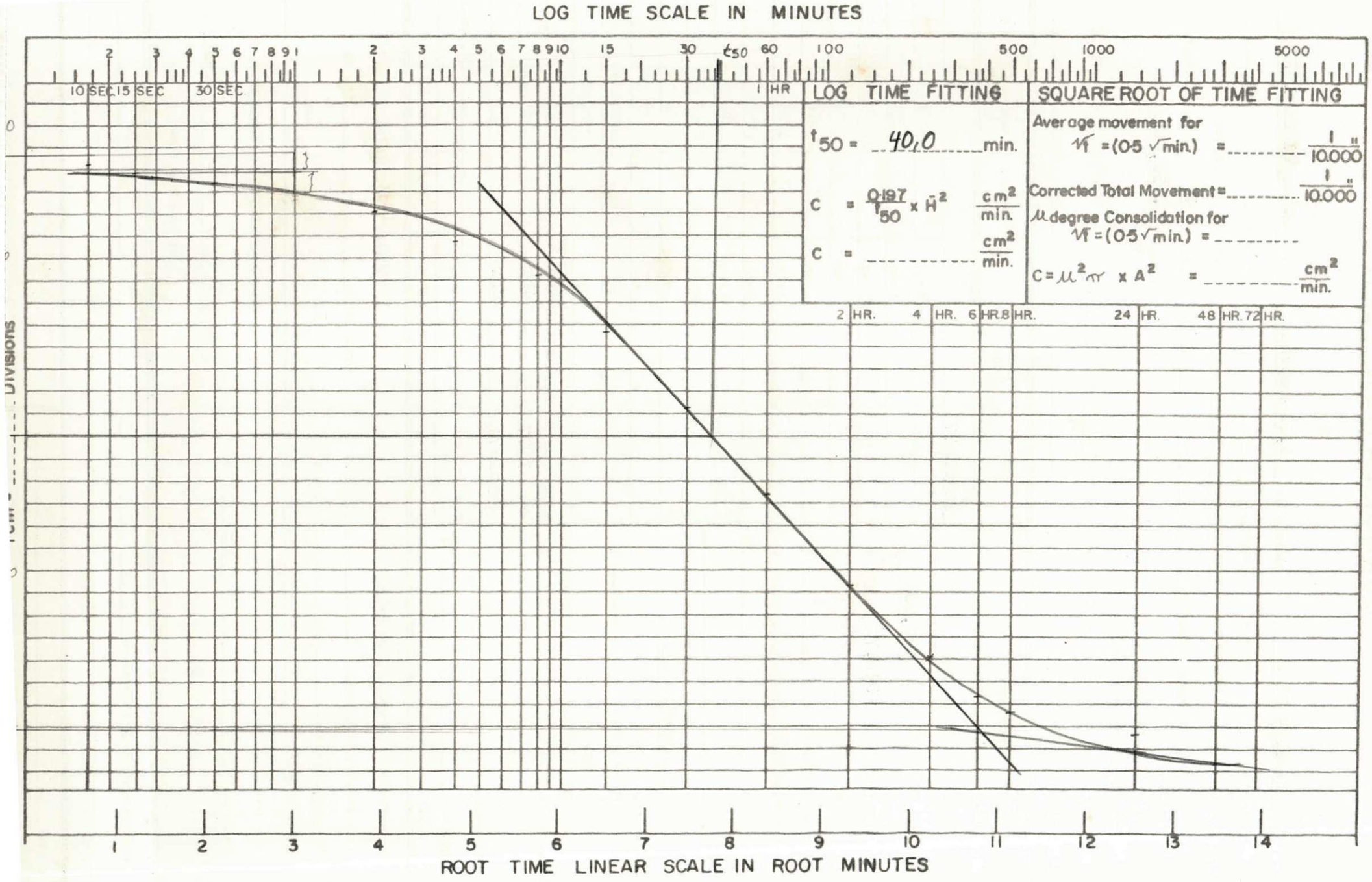
C_v = 0,482 x 10⁻³ Cm²/~~min~~ s

(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked


LOG TIME SCALE IN MINUTES
2 3 4 5 6 7 8 9 1 2 3 4 5 6 7 8 9 10 15 30 t50 60 100 500 1000 5000
10 SEC. 15 SEC 30 SEC 1 HR
LOG TIME FITTING
t50 = 40.0 min.
C = 0.197 / t50 x H² cm²/min.
C = cm²/min.
SQUARE ROOT OF TIME FITTING
Average movement for √t = (0.5 √min.) = 1" / 10.000
Corrected Total Movement = 1" / 10.000
μ degree Consolidation for √t = (0.5 √min.) =
C = μ² π x A² = cm²/min.
2 HR. 4 HR. 6 HR. 8 HR. 24 HR. 48 HR. 72 HR.
1 2 3 4 5 6 7 8 9 10 11 12 13 14
ROOT TIME LINEAR SCALE IN ROOT MINUTES

CONSOLIDATION TEST

LOC. No. ANEL Nº 3 SAMPLE No. 8,5o metros DATE 22 de 01 de 1977

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD 8P ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 16.100,00 lb.

DRAINAGE PATH CALCULATION

Ho = 1.4441 cm. H_1 = 1.2376 cm. $\bar{H} = \frac{Ho + H1}{4}$ = 0.6854 cm $\bar{H}^2$ = 0.4698 cm²

LABORATORY DESCRIPTION _____

Calculations	Date	Clock Time	t	$\sqrt{t}$	Dial Reading 1 10,000"	Σ d H
FIRST SHEET ONLY	22/01/77		0		2268,00	
Weight of Wet Sample Ring ( ) 423,80 g.			10 sec.		2293,00	
Weight of Ring 344,7o g.			15 sec.		2297,00	
Weight of Wet Sample 79,0 g.			30 sec.		2302,00	
Weight of Dry Sample _____ g.			1 min.		2321,00	
Primary Moisture _____ g.			2 min.		2342,00	
Primary M.C. _____ %			4 min.		2372,00	
			8 min.		2410,00	
LAST SHEET ONLY			15 min.		2460,00	
Weight of Wet Sample Watch Glass ( ) 494,20g.			30 min.		2532,00	
Weight of Dry Sample Watch Class ( ) _____ g.			1 hr.		2618,00	
Weight of Watch Glass _____ g.			2hr.		2696,00	
Weight of Dry Sample 39360 g.			4hr.		2752,00	
Final Moisture _____ g.			6 hr.		2781,00	
Final M.C. _____ %			8hr		2799,00	
	23/01/77		24hr		2825,00	
	24/01/77		48hr		2845,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

Σi

FINAL VOIDS RATIO

Final M.C. _____ %

Σf

CONSOLIDATION COEFFICIENT

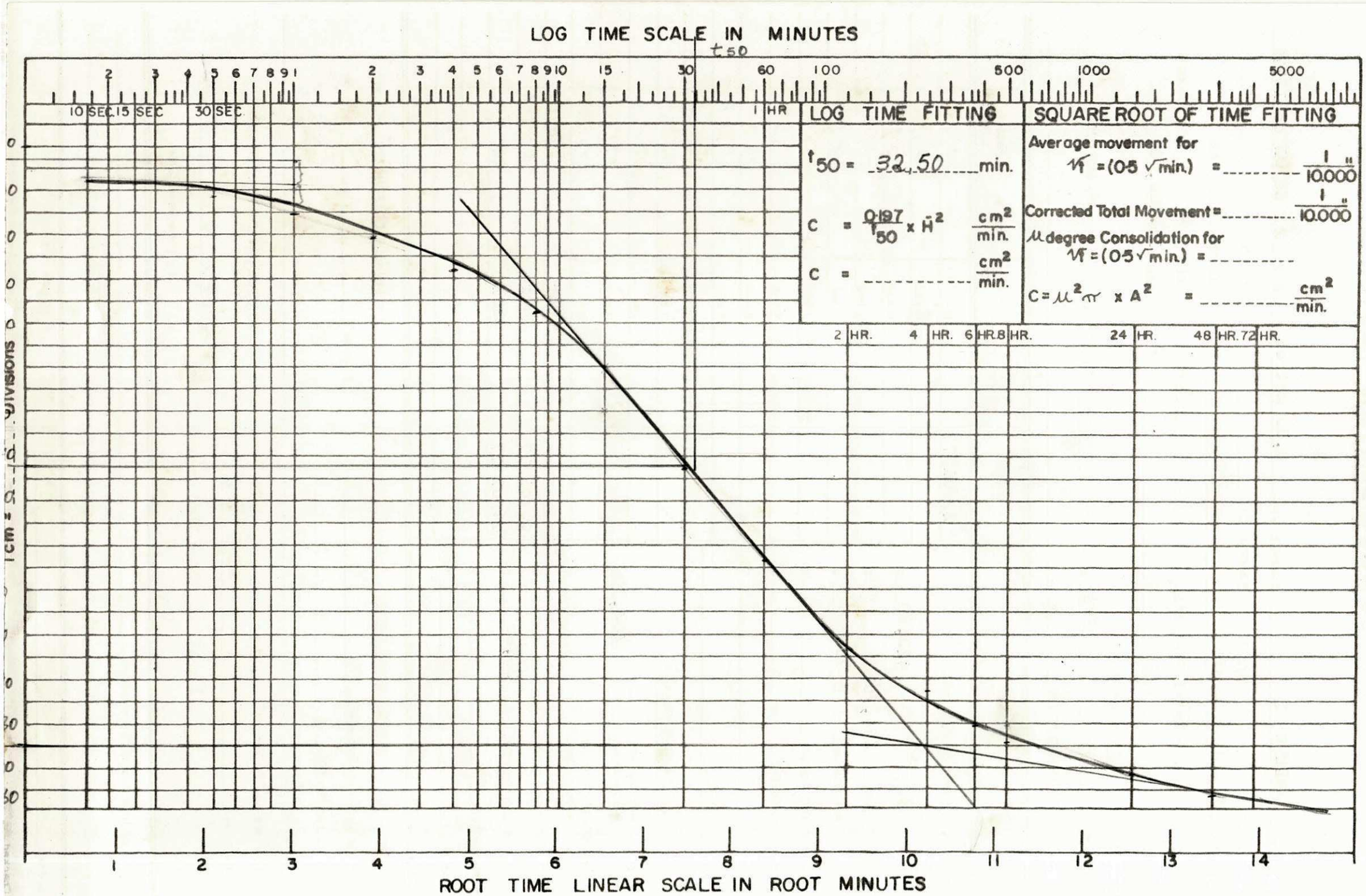
C_v = 0,0475 x 10⁻³ Cm²/min

(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked


LOG TIME SCALE IN MINUTES
t50
10 SEC. 15 SEC 30 SEC 1 HR
LOG TIME FITTING
t50 = 32.50 min.
C = 0.197/t50 x H̄² cm²/min.
C = ---------- cm²/min.
SQUARE ROOT OF TIME FITTING
Average movement for
√t = (0.5 √min.) = ---------- 1/10.000 in.
Corrected Total Movement = ---------- 1/10.000 in.
μ degree Consolidation for
√t = (0.5 √min.) = ---------
C = μ² π x A² = ---------- cm²/min.
2 HR. 4 HR. 6 HR. 8 HR. 24 HR. 48 HR. 72 HR.
1 cm = 0.1 DIVISIONS
ROOT TIME LINEAR SCALE IN ROOT MINUTES

PROFUNDIDADE 9,50 m

PONTO "G"

ANEL 1

C R O N O G R A M A D E C A R R E G A M E N T O

INICIO : - P/8

Carregamento - P/8 - P/4 - P/2 - P.

Descarregamento - P/2 - P/4

Carregamento - P/2 - P - 2P - 4P - 8p

CONSOLIDATION TEST

LOC. No. Anel Nº 1 SAMPLE No. 9,50 metros DATE 02 de 01 de 1977

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD P/8 ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 285,00g lb.

DRAINAGE PATH CALCULATION

Ho = 2,00 cm. H_1 = 1,9892 cm. $\bar{H} = \frac{Ho + HI}{2}$ = 0,9973 cm $\bar{H}^2$ = 0,9946 cm²

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 395,80 g.

Weight of Ring 313,80 g.

Weight of Wet Sample 82,00 g.

Weight of Dry Sample 44,30 g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass (379,40 g.
ring +

Weight of Dry Sample Watch Class (134,50 g.

Weight of Watch Glass 90,00 g.

Weight of Dry Sample 44,30 g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading (10,000"	$\sum d H$
02/01/77		0		0,0	
		10 sec.		11,20	
		15 sec.		12,00	
		30 sec.		13,50	
		1 min.		15,50	
		2 min.		17,50	
		4 min.		20,50	
		8 min.		23,70	
		15 min.		26,50	
		30 min.		29,00	
		1 hr.		30,00	
		2hr.		32,00	
		4hr.		35,00	
		6 hr.		36,50	
		8hr		37,40	
03/01/77		24hr		40,50	
04/01/77		48hr		42,50	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

$\sum i$

FINAL VOIDS RATIO

Final M.C. _____ %

$\sum f$

CONSOLIDATION COEFFICIENT

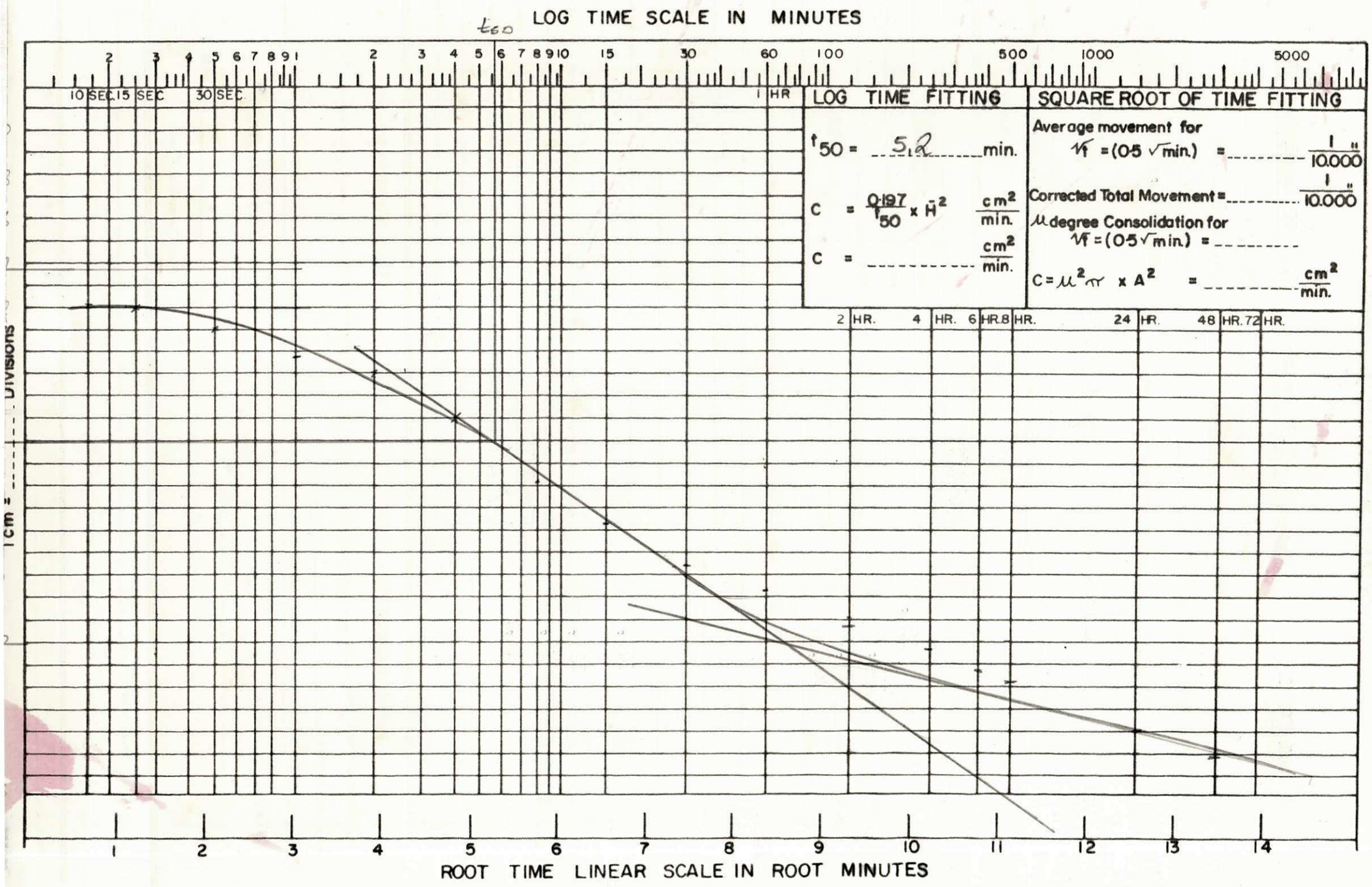
C_v = _____ Cm^2/min

(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked


LOG TIME SCALE IN MINUTES
t50
2 3 4 5 6 7 8 9 1 2 3 4 5 6 7 8 9 10 15 30 60 100 500 1000 5000
10 SEC. 15 SEC 30 SEC 1 HR
LOG TIME FITTING
t50 = 5.2 min.
C = 0.197 / t50 x H̄² cm²/min.
C = ____ cm²/min.
SQUARE ROOT OF TIME FITTING
Average movement for
√t = (05 √min.) = ____ 1" / 10.000
Corrected Total Movement = ____ 1" / 10.000
μ degree Consolidation for
√t = (05 √min.) = ____
C = μ² π x A² = ____ cm²/min.
2 HR. 4 HR. 6 HR. 8 HR. 24 HR. 48 HR. 72 HR.
1 cm = ____ DIVISIONS
1 2 3 4 5 6 7 8 9 10 11 12 13 14
ROOT TIME LINEAR SCALE IN ROOT MINUTES

CONSOLIDATION TEST

2

LOC. No. Anel Nº 1 SAMPLE No. 9,50 metros DATE 04 de 01 de 1977

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD P/4 ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 570,00g lb.

DRAINAGE PATH CALCULATION

Ho = 1,9892 cm. H_1 = 1,9778 cm. $\bar{H} = \frac{Ho + H1}{2}$ = 0,9917 cm $\bar{H}^2$ = 0,9836 cm²

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring (395,80) g.

Weight of Ring 313,80 g.

Weight of Wet Sample 82,00 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) _____ g.

Weight of Dry Sample Watch Class ( ) _____ g.

Weight of Watch Glass _____ g.

Weight of Dry Sample _____ g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading 1 10,000"	$\sum d H$
04/01/77		0		42,50	
		10 sec.		48,50	
		15 sec.		49,00	
		30 sec.		50,00	
		1 min.		52,00	
		2 min.		54,50	
		4 min.		58,20	
		8 min.		62,00	
		15 min.		65,80	
		30 min.		69,50	
		1 hr.		72,00	
		2hr.		75,50	
		4hr.		79,00	
		6 hr.		81,00	
		8hr		82,50	
05/01/77		24hr		85,00	
06/01/77		48hr		87,50	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

$\sum i$

FINAL VOIDS RATIO

Final M.C. _____ %

$\sum f$

CONSOLIDATION COEFFICIENT

C_v = _____ Cm^2/min

(Log Time Root Time)

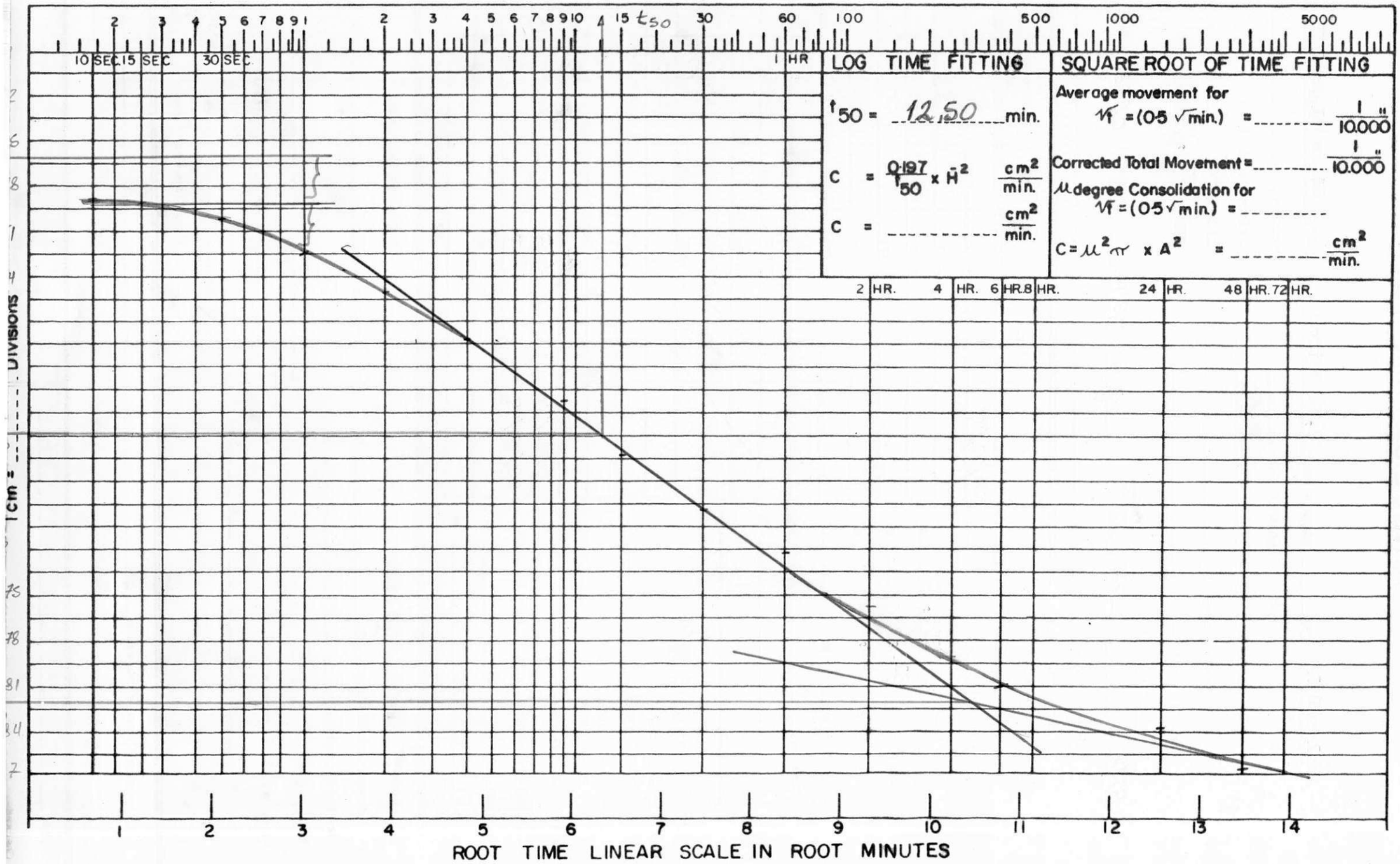
Deviation from Standard Procedure _____

Signed _____

Checked _____

2

LOG TIME SCALE IN MINUTES



CONSOLIDATION TEST

LOC. No. Anel Nº 1 SAMPLE No. 9m50 metred DATE 06/01/77

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD P/2 ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 1.130,00g lb.

DRAINAGE PATH CALCULATION

H_o = 1.9778 cm. H_1 = 1.9510 cm. $\bar{H} = \frac{H_o + H_1}{2}$ = 0,9822 cm $\bar{H}^2$ = 0,9647 cm²

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 395,80 g.

Weight of Ring 313,80 g.

Weight of Wet Sample 82,00 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) _____ g.

Weight of Dry Sample Watch Class ( ) _____ g.

Weight of Watch Glass _____ g.

Weight of Dry Sample _____ g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading 1 10,000"	$\sum d H$
06/01/77		0		87,50	
		10 sec.		98,50	
		15 sec.		99,60	
		30 sec.		102,00	
		1 min.		106,00	
		2 min.		111,50	
		4 min.		116,00	
		8 min.		129,00	
		15 min.		140,00	
		30 min.		151,00	
		1 hr.		159,00	
		2hr.		166,00	
		4hr.		173,50	
		6 hr.		178,00	
07/01/77		8hr		181,00	
" " "		24hr		189,00	
08/01/77		48hr		193,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

$\sum i$

FINAL VOIDS RATIO

Final M.C. _____ %

$\sum f$

CONSOLIDATION COEFFICIENT

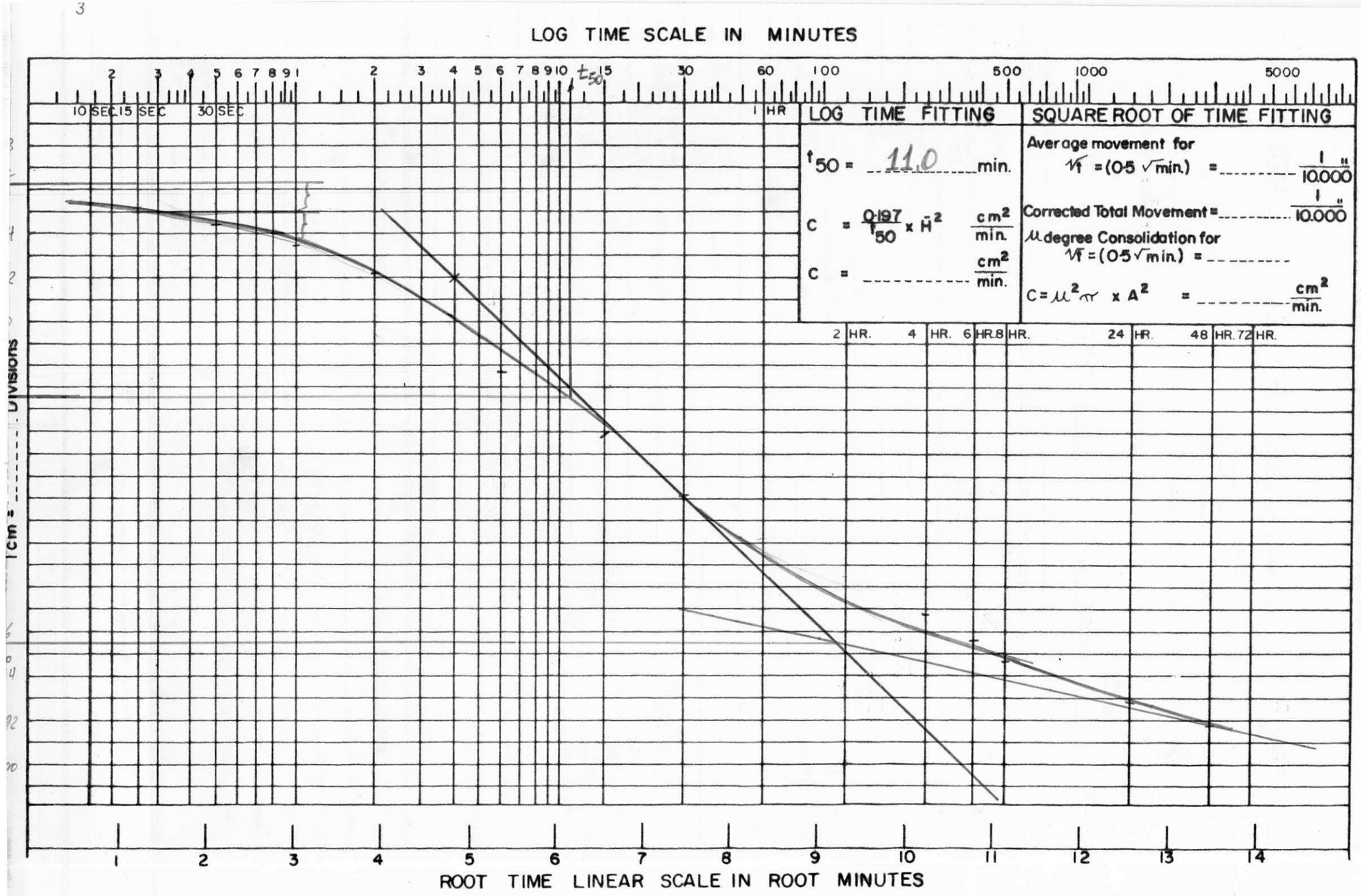
C_v = _____ Cm^2/min

(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked _____


LOG TIME SCALE IN MINUTES
10 SEC. 15 SEC 30 SEC 1 HR
t_{50}
LOG TIME FITTING
t_{50} = 11.0 min.
$C = \frac{0.197}{t_{50}} \times \bar{H}^2 \quad \frac{cm^2}{min.}$
C = _____ $\frac{cm^2}{min.}$
SQUARE ROOT OF TIME FITTING
Average movement for
$\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____ $\frac{1}{10.000}$"
Corrected Total Movement = _____ $\frac{1}{10.000}$"
μ degree Consolidation for
$\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____
$C = \mu^2 \pi \times A^2$ = _____ $\frac{cm^2}{min.}$
2 HR. 4 HR. 6 HR. 8 HR. 24 HR. 48 HR. 72 HR.
1 cm = _____ DIVISIONS
ROOT TIME LINEAR SCALE IN ROOT MINUTES

CONSOLIDATION TEST

LOC. No. Anel Nº 1 SAMPLE No. 9,50 metros DATE 08de 01 de 1977

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD P ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 2.265,00 lb.

DRAINAGE PATH CALCULATION

Ho = 1.9510 cm. H1 = 1.8504 cm. $\bar{H} = \frac{Ho + H1}{2} = 0,9503$ cm $\bar{H}^2 = 0,9032$ cm²

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 395,80 g.

Weight of Ring 313,80 g.

Weight of Wet Sample 82,00 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) _____ g.

Weight of Dry Sample Watch Class ( ) _____ g.

Weight of Watch Glass _____ g.

Weight of Dry Sample _____ g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading (10,000")	$\sum d H$
08/01/77		0		193,00	
		10 sec.		211,00	
		15 sec.		213,50	
		30 sec.		220,0	
		1 min.		228,70	
		2 min.		241,50	
		4 min.		259,20	
		8 min.		283,50	
		15 min.		310,50	
		30 min.		346,50	
		1 hr.		383,00	
		2hr.		422,00	
		4hr.		468,20	
		6 hr.		493,00	
		8hr		508,00	
09/01/77		24hr		548,00	
10/01/77		48Hr		589,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

$\sum i$

FINAL VOIDS RATIO

Final M.C. _____ %

$\sum f$

CONSOLIDATION COEFFICIENT

C_v = _____ Cm^2/min

(Log Time Root Time)

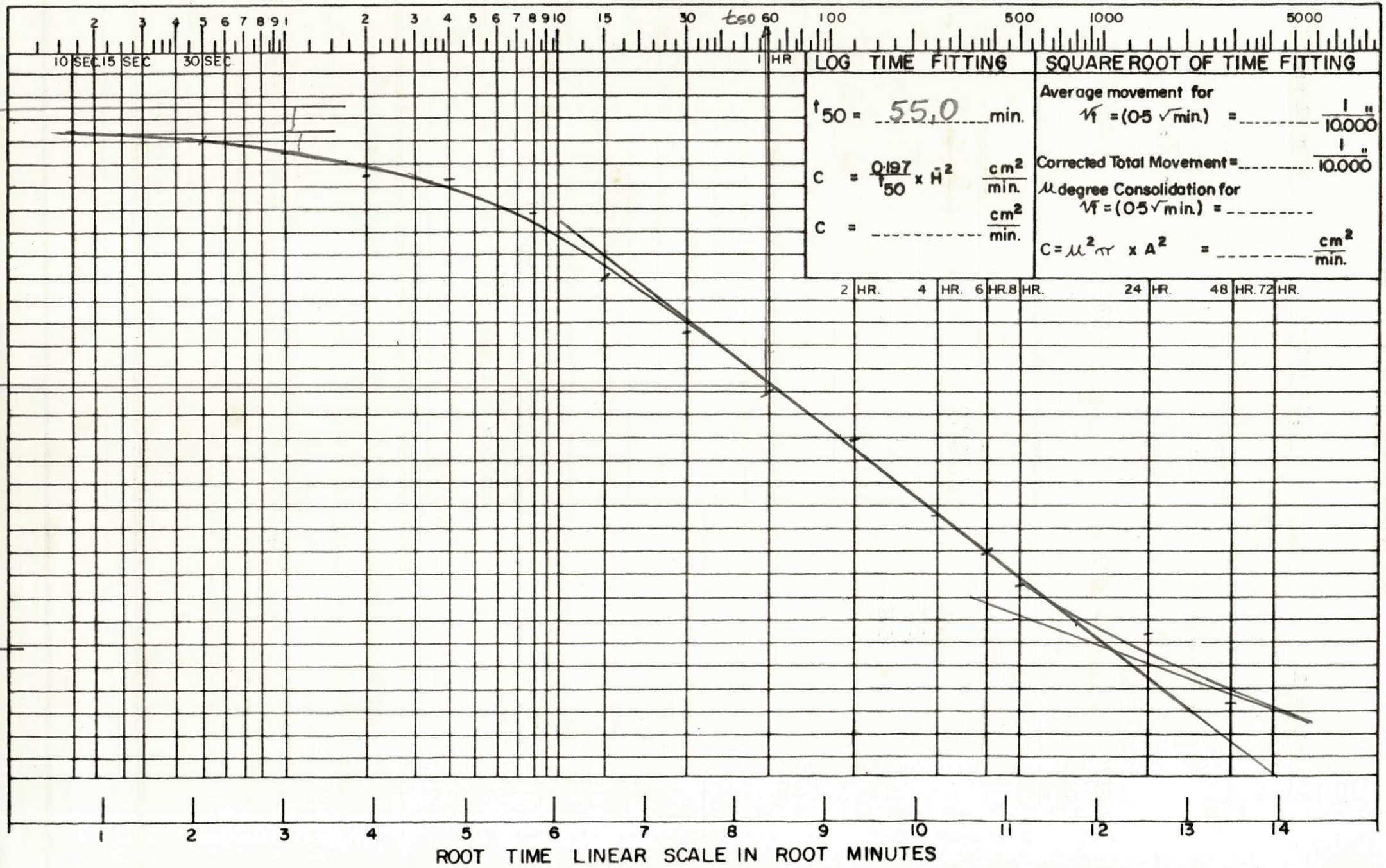
Deviation from Standard Procedure _____

Signed _____

Checked

4

LOG TIME SCALE IN MINUTES



CONSOLIDATION TEST

5

LOC. No. Anel Nº 1 SAMPLE No. 9,50 metros DATE 10 de 01 de 1977

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) " DESCARREGAMENTO" LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD P/2 ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 1.130,00 lb.

DRAINAGE PATH CALCULATION

Ho = _____ cm. _____ H_1 = _____ cm. $\bar{H} = \frac{Ho + H1}{2f}$ = _____ cm $\bar{H}^2$ = _____ cm^2

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 395,80 g.

Weight of Ring 313,80 g.

Weight of Wet Sample 82,00 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) _____ g.

Weight of Dry Sample Watch Class ( ) _____ g.

Weight of Watch Glass _____ g.

Weight of Dry Sample _____ g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading / 10,000"	Σ d H
10/01/77		0		589,00	
		10 sec.		582,50	
		15 sec.		581,50	
		30 sec.		579,20	
		1 min.		576,00	
		2 min.		572,00	
		4 min.		566,00	
		8 min.		559,00	
		15 min.		553,50	
		30 min.		548,20	
		1 hr.		545,00	
		2hr.		543,00	
		4hr.		540,50	
		6 hr.		539,00	
		8Hr		538,50	
11/01/77		24Hr		537,00	
12/01/77		48Hr		536,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

Σi

FINAL VOIDS RATIO

Final M.C. _____ %

Σf

CONSOLIDATION COEFFICIENT

C_v = _____ Cm^2/min

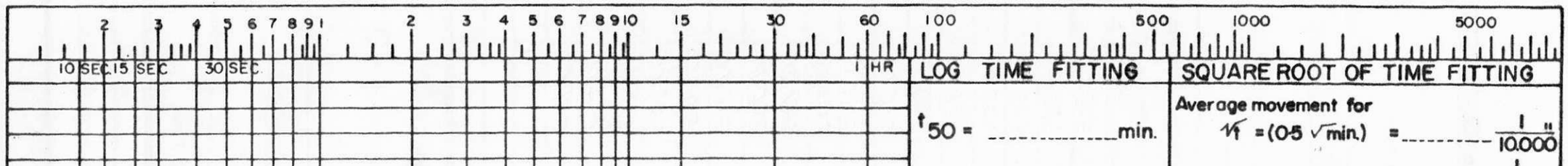
(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked

LOG TIME SCALE IN MINUTES



LOG TIME FITTING

t_{50} = _____ min.

$C = \frac{0.197}{t_{50}} \times H^2 \quad \frac{cm^2}{min.}$

C = _____ $\frac{cm^2}{min.}$

SQUARE ROOT OF TIME FITTING

Average movement for $\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____ $\frac{1}{10.000}$ "

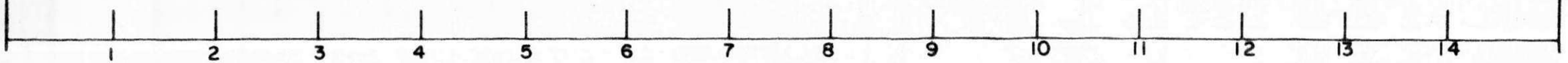
Corrected Total Movement = _____ $\frac{1}{10.000}$ "

μ degree Consolidation for $\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____

$C = \mu^2 \pi \times A^2$ = _____ $\frac{cm^2}{min.}$

2 HR. 4 HR. 6 HR. 8 HR. 24 HR. 48 HR. 72 HR.

1 cm = _____ Divisions



ROOT TIME LINEAR SCALE IN ROOT MINUTES

CONSOLIDATION TEST

LOC. No. Anel Nº 1 SAMPLE No. 9,50 metros DATE 12 de 01 de 1977

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No _____

S.G. (ASSUMED CALCULATED) " Decorrer do tempo" LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD P/4 ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 570,00 lb.

DRAINAGE PATH CALCULATION

Ho = _____ cm. _____ H_1 = _____ cm. $\bar{H} = \frac{Ho + H1}{2}$ = _____ cm $\bar{H}^2$ = _____ cm^2

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 395,80 g.

Weight of Ring 313,80 g.

Weight of Wet Sample 82,00 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) _____ g.

Weight of Dry Sample Watch Class ( ) _____ g.

Weight of Watch Glass _____ g.

Weight of Dry Sample _____ g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading 1/10,000"	Σ d H
12/01/77		0		536,00	
		10 sec.		531,00	
		15 sec.		530,00	
		30 sec.		526,50	
		1 min.		526,00	
		2 min.		522,00	
		4 min.		517,00	
		8 min.		510,00	
		15 min.		502,00	
		30 min.		593,50	
		1 hr.		486,00	
		2hr.		481,00	
		4hr.		473,50	
		6 hr.		471,50	
		8Hr		469,00	
13/01/77		24Hr		463,70	
14/01/77		48Hr		459,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

Σi

FINAL VOIDS RATIO

Final M.C. _____ %

Σf

CONSOLIDATION COEFFICIENT

C_v = _____ Cm^2/min

(Log Time Root Time)

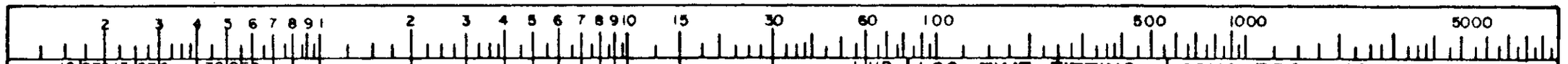
Deviation from Standard Procedure _____

Signed _____

Checked

6

LOG TIME SCALE IN MINUTES



LOG TIME FITTING

t_{50} = _____ min.

$C = \frac{0.197}{t_{50}} \times \bar{H}^2 \quad \frac{cm^2}{min.}$

C = _____ $\frac{cm^2}{min.}$

SQUARE ROOT OF TIME FITTING

Average movement for $\sqrt{t}$ = (.05 $\sqrt{min.}$) = _____ $\frac{1}{10.000}$ "

Corrected Total Movement = _____ $\frac{1}{10.000}$ "

μ degree Consolidation for $\sqrt{t}$ = (.05 $\sqrt{min.}$) = _____

$C = \mu^2 \pi \times A^2$ = _____ $\frac{cm^2}{min.}$

2 HR.	4 HR.	6 HR.	8 HR.	24 HR.	48 HR.	72 HR.

1 cm = ____ DIVISIONS

ROOT TIME LINEAR SCALE IN ROOT MINUTES

CONSOLIDATION TEST

7 ⑧

LOC. No. Anel Nº 1 SAMPLE No. 9,50 metros DATE 14 de 01 de 1977

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No _____

S.G. (ASSUMED CALCULATED) " Recarregamento " LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD P/2 ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 1.130,00g lb.

DRAINAGE PATH CALCULATION

Ho = _____ cm. _____ H_1 = _____ cm. $\bar{H} = \frac{Ho + HI}{2}$ = _____ cm $\bar{H}^2$ = _____ cm^2

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 395,80 g.

Weight of Ring 313,80 g.

Weight of Wet Sample 82,00 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) _____ g.

Weight of Dry Sample Watch Class ( ) _____ g.

Weight of Watch Glass _____ g.

Weight of Dry Sample _____ g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading 1 10,000"	$\sum d H$
14/01/77		0		459,00	
		10 sec.		464,50	
		15 sec.		465,50	
		30 sec.		467,50	
		1 min.		470,00	
		2 min.		474,00	
		4 min.		479,50	
		8 min.		486,50	
		15 min.		491,50	
		30 min.		496,00	
		1 hr.		499,00	
		2hr.		502,00	
		4hr.		504,00	
		6 hr.		505,50	
		8Hr		506,50	
15/01/77		24Hr		508,00	
16/01/77		48Hr		510,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

$\sum i$

FINAL VOIDS RATIO

Final M.C. _____ %

$\sum f$

CONSOLIDATION COEFFICIENT

C_v = _____ Cm^2/min

(Log Time Root Time)

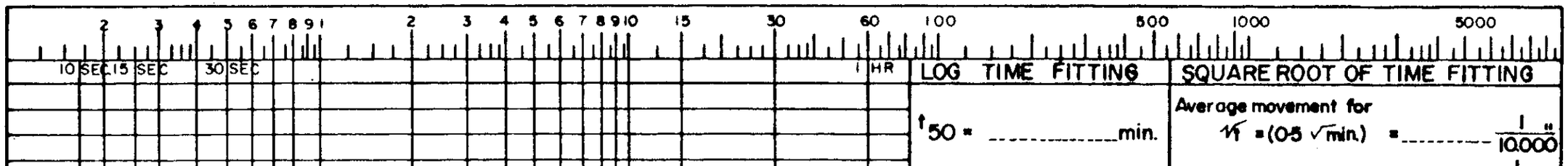
Deviation from Standard Procedure _____

Signed _____

Checked

8

LOG TIME SCALE IN MINUTES



LOG TIME FITTING

t_{50} = _____ min.

$C = \frac{0.197}{t_{50}} \times H^2 \quad \frac{cm^2}{min.}$

C = _____ $\frac{cm^2}{min.}$

SQUARE ROOT OF TIME FITTING

Average movement for $\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____ $\frac{1}{10.000}$ "

Corrected Total Movement = _____ $\frac{1}{10.000}$ "

μ degree Consolidation for $\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____

$C = \mu^2 \pi \times A^2$ = _____ $\frac{cm^2}{min.}$

2 HR. 4 HR. 6 HR. 8 HR. 24 HR. 48 HR. 72 HR.

1 CM = _____ DIVISIONS

1 2 3 4 5 6 7 8 9 10 11 12 13 14

ROOT TIME LINEAR SCALE IN ROOT MINUTES

CONSOLIDATION TEST

8

LOC. No. Anel Nº 1 SAMPLE No. 9,50 metros DATE 16/01/1977

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) " Recarregamento" LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD P ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 2.260,00 g lb.

DRAINAGE PATH CALCULATION

Ho = _____ cm. _____ H_1 = _____ cm. $\bar{H} = \frac{Ho + H1}{2}$ = _____ cm $\bar{H}^2$ = _____ cm^2

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 395,80 g.

Weight of Ring 313,80 g.

Weight of Wet Sample _____ g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) _____ g.

Weight of Dry Sample Watch Class ( ) _____ g.

Weight of Watch Glass _____ g.

Weight of Dry Sample _____ g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading (10,000")	$\sum d H$
16/01/77		0		510,00	
		10 sec.		520,00	
		15 sec.		522,00	
		30 sec.		525,50	
		1 min.		531,00	
		2 min.		538,00	
		4 min.		548,50	
		8 min.		562,00	
		15 min.		576,00	
		30 min.		591,00	
		1 hr.		603,00	
		2hr.		614,00	
		4hr.		630,00	
		6 hr.		640,00	
		8Hr		645,00	
17/01/77		24 Hr		660,00	
18/01/77		48Hr		676,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

$\sum i$

FINAL VOIDS RATIO

Final M.C. _____ %

$\sum f$

CONSOLIDATION COEFFICIENT

C_v = _____ Cm^2/min

(Log Time Root Time)

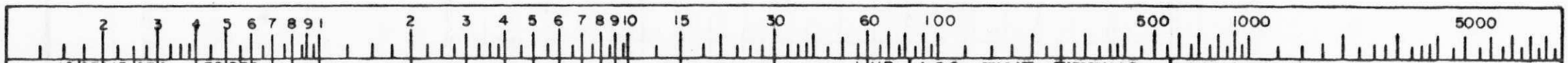
Deviation from Standard Procedure _____

Signed _____

Checked

7

LOG TIME SCALE IN MINUTES



LOG TIME FITTING

t_{50} = _____ min.

$C = \frac{0.197}{t_{50}} \times H^2 \quad \frac{cm^2}{min.}$

C = _____ $\frac{cm^2}{min.}$

SQUARE ROOT OF TIME FITTING

Average movement for

$\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____ $\frac{1}{10.000}$"

Corrected Total Movement = _____ $\frac{1}{10.000}$"

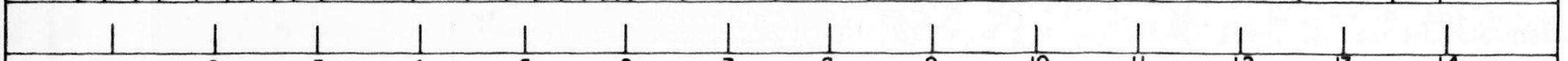
μ degree Consolidation for

$\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____

$C = \mu^2 \pi \times A^2$ = _____ $\frac{cm^2}{min.}$

2 HR. 4 HR. 6 HR. 8 HR. 24 HR. 48 HR. 72 HR.

1 cm = _____ DIVISIONS



ROOT TIME LINEAR SCALE IN ROOT MINUTES

CONSOLIDATION TEST

9

LOC. No. Anel Nº 1 SAMPLE No. 9,50 metros DATE 18/de 01 de 1977

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD 2P ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 4.520,0 g lb.

DRAINAGE PATH CALCULATION

Ho = 1,8504 cm. H_1 = 1,6500 cm. $\bar{H} = \frac{Ho + H1}{2}$ = 0,8751 cm $\bar{H}^2$ = 0,7658 cm²

LABORATORY DESCRIPTION _____

Calculations	Date	Clock Time	t	$\sqrt{t}$	Dial Reading 1 10,000"	$\sum d H$
FIRST SHEET ONLY	18/01/77		0		678,00	
Weight of Wet Sample Ring (395,80 g.			10 sec.		698,00	
Weight of Ring 313,80 g.			15 sec.		701,50	
Weight of Wet Sample 82,00 g.			30 sec.		710,00	
Weight of Dry Sample _____ g.			1 min.		723,50	
Primary Moisture _____ g.			2 min.		743,00	
Primary M.C. _____ %			4 min.		773,00	
			8 min.		817,00	
LAST SHEET ONLY			15 min.		874,00	
Weight of Wet Sample Watch Glass ( ) _____ g.			30 min.		958,00	
Weight of Dry Sample Watch Class ( ) _____ g.			1 hr.		1071,00	
Weight of Watch Glass _____ g.			2hr.		1198,00	
Weight of Dry Sample _____ g.			4hr.		1309,00	
Final Moisture _____ g.			6 hr.		1360,00	
Final M.C. _____ %			8Hr		1385,50	
	19/01/77		24Hr		1430,50	
	20/01/77		48Hr		1467,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

$\sum i$

FINAL VOIDS RATIO

Final M.C. _____ %

$\sum f$

CONSOLIDATION COEFFICIENT

C_v = _____ Cm^2/min

(Log Time Root Time)

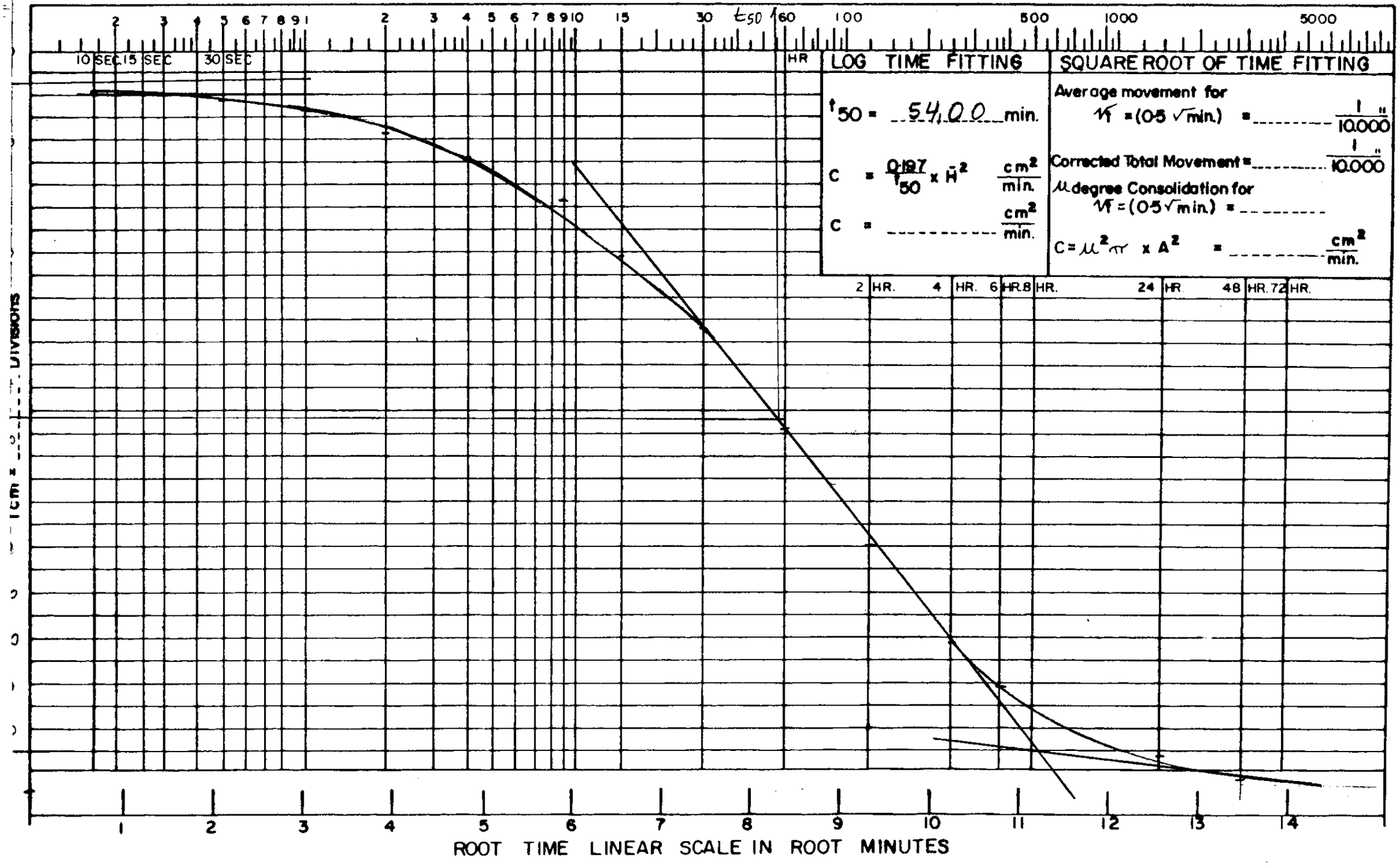
Deviation from Standard Procedure _____

Signed _____

Checked

9

LOG TIME SCALE IN MINUTES



CONSOLIDATION TEST

10

LOC. No. Anel Nº 1 SAMPLE No. 9,50 metros DATE 20 de 01 de 1977

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD 4P ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 9.050,0 g lb.

DRAINAGE PATH CALCULATION

Ho = 1,6500 cm. H_1 = 1,4816 cm. $\bar{H} = \frac{Ho+Hi}{2}$ = 0,7829 cm $\bar{H}^2$ = 0,6129 cm²

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 395,80 g.

Weight of Ring 313,80 g.

Weight of Wet Sample 82,00 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) _____ g.

Weight of Dry Sample Watch Class ( ) _____ g.

Weight of Watch Glass _____ g.

Weight of Dry Sample _____ g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading 1 10,000"	$\sum d H$
20/01/77		0		1467,00	
		10 sec.		1490,00	
		15 sec.		1505,00	
		30 sec.		1510,00	
		1 min.		1518,00	
		2 min.		1538,00	
		4 min.		1568,00	
		8 min.		1610,00	
		15 min.		1660,00	
		30 min.		1755,00	
		1 hr.		1847,00	
		2hr.		1945,00	
		4hr.		2020,00	
		6 hr.		2055,50	
		8Hr		2072,00	
21/01/77		24Hr		2102,00	
22/01/77		48Hr		2130,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

$\sum i$

FINAL VOIDS RATIO

Final M.C. _____ %

$\sum f$

CONSOLIDATION COEFFICIENT

C_v = _____ Cm^2/min

(Log Time Root Time)

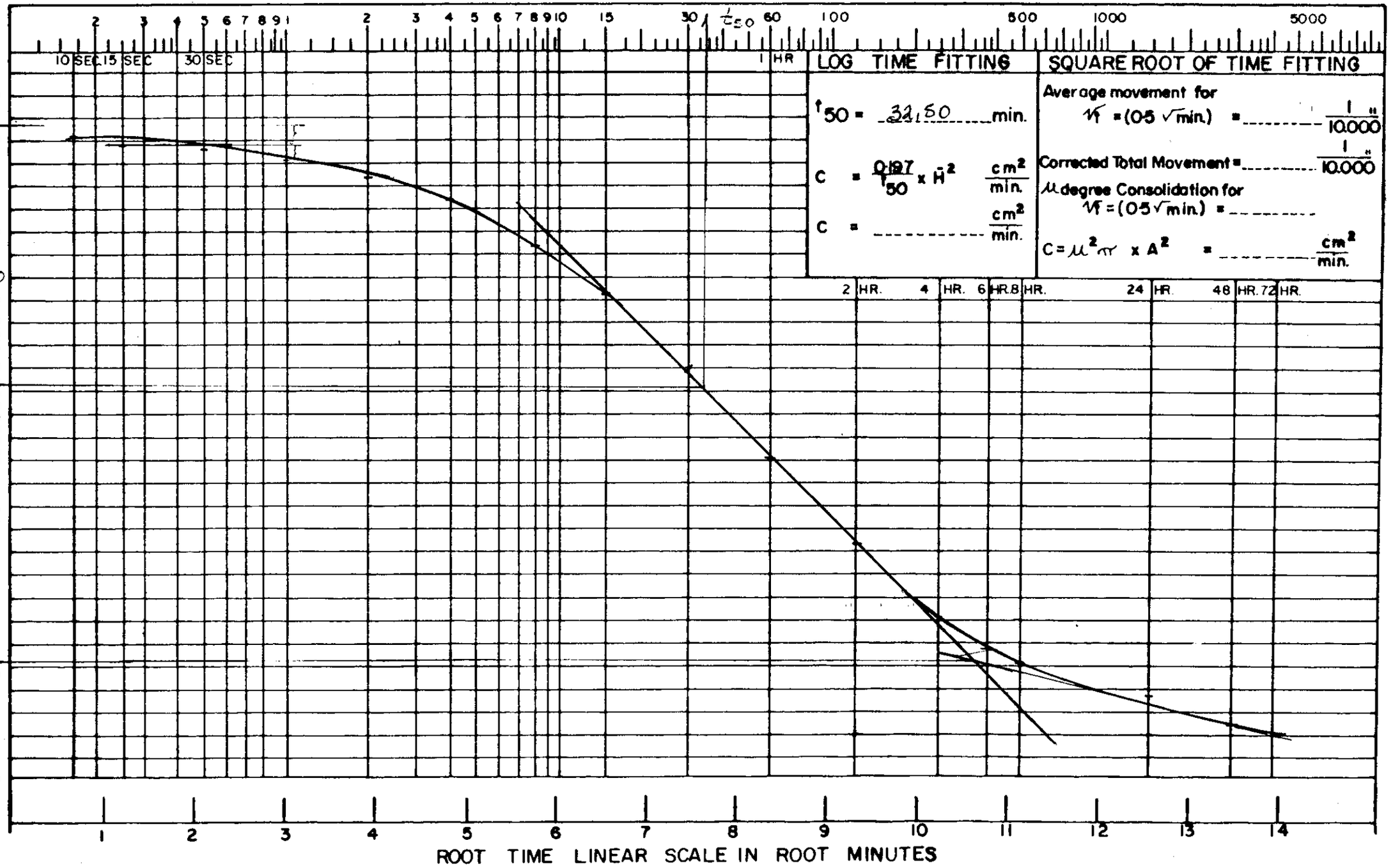
Deviation from Standard Procedure _____

Signed _____

Checked

10

LOG TIME SCALE IN MINUTES



CONSOLIDATION TEST

LOC. No. Anel Nº 1 SAMPLE No. 9,50 Metros DATE 22de 01 de 1977

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD 8P ton. sq.ft.

(b) OF CUTTINGS _____ % LOAD 18.100,0 [illegible] lb.

DRAINAGE PATH CALCULATION

Ho = 1,3406 cm. H1 = 1,3406 cm. $\bar{H} = \frac{Ho + H1}{2} = 0,7055$ cm $\bar{H}^2 = 0,4977$ cm²

LABORATORY DESCRIPTION _____

Calculations	Date	Clock Time	t	$\sqrt{t}$	Dial Reading 1 10,000"	$\sum d H$
FIRST SHEET ONLY	22)01/77		0		2180,00	
Weight of Wet Sample Ring ( ) 395,80 g.			10 sec.		2160,00	
Weight of Ring 313,80 g.			15 sec.		2165,00	
Weight of Wet Sample 82,00 g.			30 sec.		2176,00	
Weight of Dry Sample _____ g.			1 min.		2190,00	
Primary Moisture _____ g.			2 min.		2210,00	
Primary M.C. _____ %			4 min.		2241,00	
			8 min.		2288,00	
			15 min.		2331,50	
			30 min.		2410,50	
LAST SHEET ONLY			1 hr.		2495,50	
Weight of Wet Sample Watch Glass ( ) _____ g.			2hr.		2570,00	
Weight of Dry Sample Watch Class ( ) _____ g.			4hr.		2615,00	
Weight of Watch Glass _____ g.			6 hr.		2630,00	
Weight of Dry Sample _____ g.			8Hr		2650,00	
Final Moisture _____ g.	23/01/77		24hr		2638,00	
Final M.C. _____ %	24/01/77		48Hr		2665,00	
					2685,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

$\sum i$

FINAL VOIDS RATIO

Final M.C. _____ %

$\sum f$

CONSOLIDATION COEFFICIENT

C_v = _____ Cm^2/min

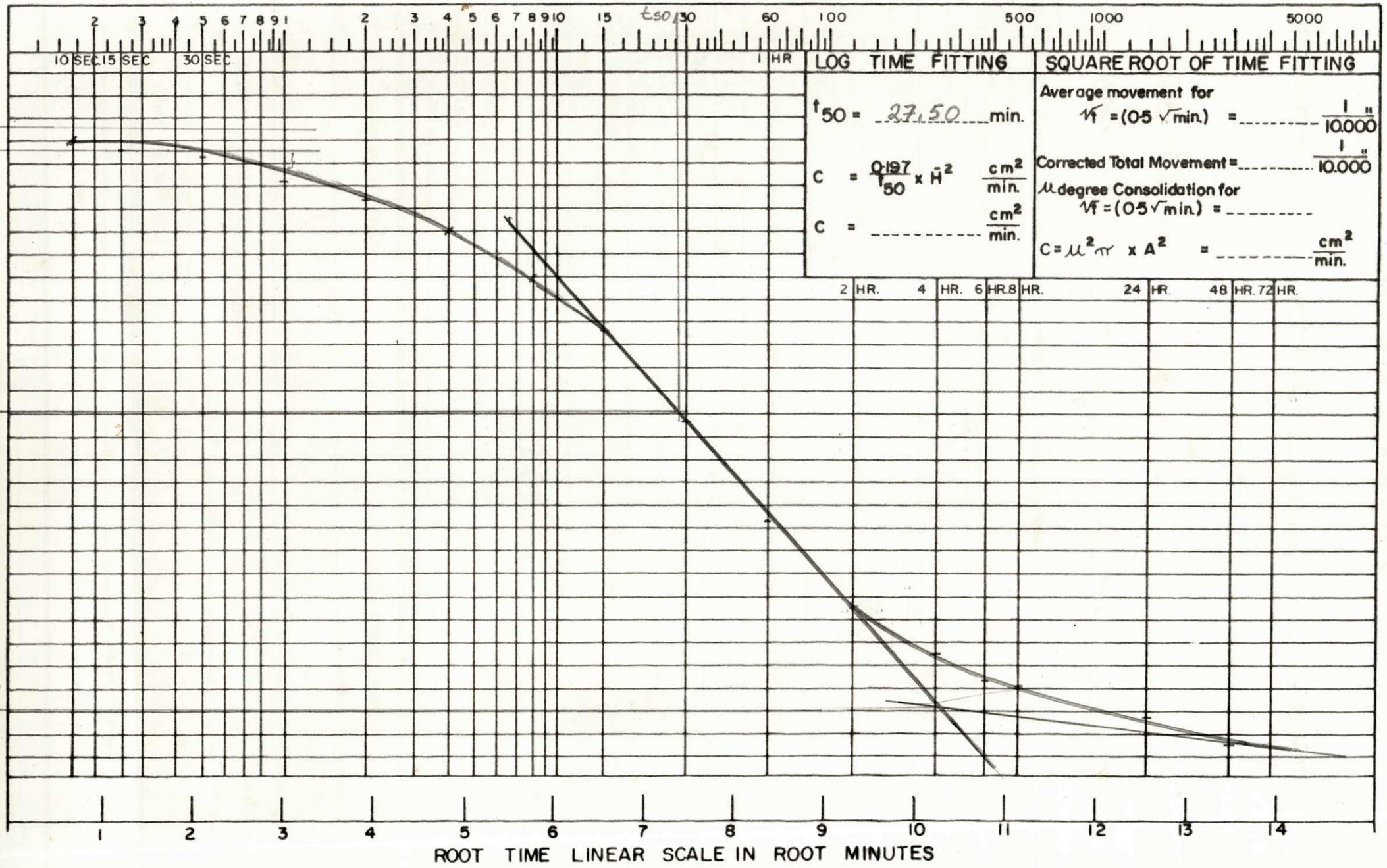
(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked

LOG TIME SCALE IN MINUTES



P R O F U N D I D A D E 10,50 M

P O N T O " H "

A N E L " 2 "

C R O N O G R A M A D E C A R R E G A M E N T O

I N I C I O - P/8

Carregamento - P/8 - P/4 - P/2 - P.

Descarregamento - P/2 - P/4 .

Carregamento - P/2 - P - 2P - 4P - 8P

CONSOLIDATION TEST

LOC. No ANEI NO 2 SAMPLE No. 10,50 METERS DATE 30/01/77

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD P/8 ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 325,00 g

DRAINAGE PATH CALCULATION

Ho = 2,00 cm. H$_1$ = 1,9670 cm. $\bar{H} = \frac{Ho + HI}{2}$ = 0,9917 cm $\bar{H}^2$ = 0,9836 cm^2

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 420,20 g.

Weight of Ring 313,80 g.

Weight of Wet Sample 106,40 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) 402,80 g.

Weight of Dry Sample Watch Class ( ) 359,50 g.

Weight of Watch Glass _____ g.

Weight of Dry Sample 45,70 g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading (10,000"	$\sum d H$
30/01/77		0		0,00	
		10 sec.		15,00	
		15 sec.		17,00	
		30 sec.		20,00	
		1 min.		24,00	
		2 min.		29,00	
		4 min.		38,00	
		8 min.		46,00	
		15 min.		56,00	
		30 min.		68,00	
		1 hr.		78,00	
		2hr.		90,00	
		4hr.		108,00	
		6 hr.		113,50	
		8 hr		115,00	
31/01/77		24hr		125,00	
01/02/77		48hr		130,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

$\sum i$

FINAL VOIDS RATIO

Final M.C. _____ %

$\sum f$

CONSOLIDATION COEFFICIENT

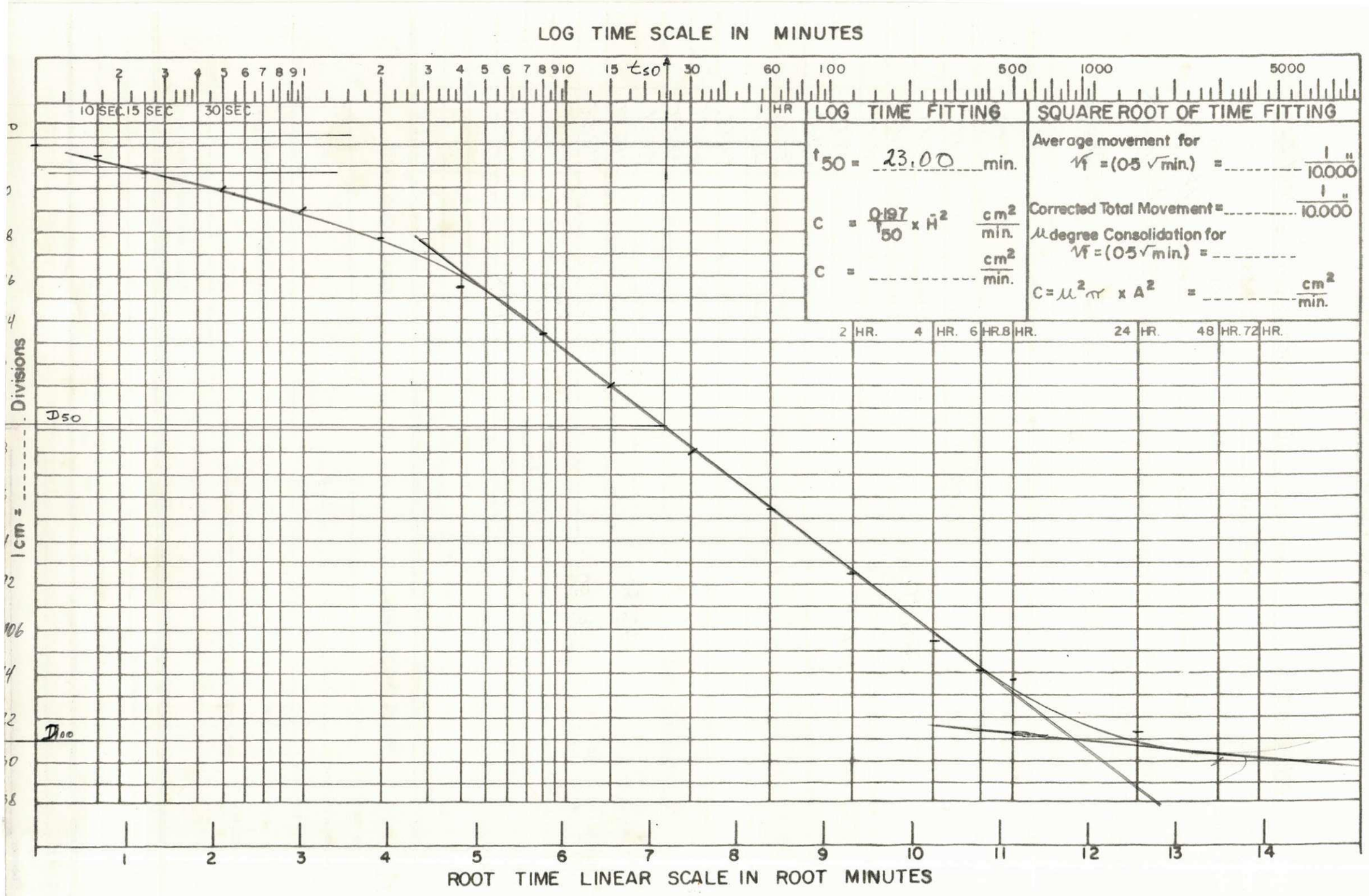
C_v = _____ Cm^2/min

(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked _____


LOG TIME SCALE IN MINUTES
2 3 4 5 6 7 8 9 1 2 3 4 5 6 7 8 9 10 15 t_{50} 30 60 100 500 1000 5000
10 SEC. 15 SEC 30 SEC 1 HR
LOG TIME FITTING
t_{50} = 23.00 min.
$C = \frac{0.197}{t_{50}} \times H^2$ cm²/min.
C = _____ cm²/min.
SQUARE ROOT OF TIME FITTING
Average movement for
$\sqrt{t}$ = (0.5 $\sqrt{\text{min.}}$) = _____ 1/10.000"
Corrected Total Movement = _____ 1/10.000"
μ degree Consolidation for
$\sqrt{t}$ = (0.5 $\sqrt{\text{min.}}$) = _____
$C = \mu^2 \pi \times A^2$ = _____ cm²/min.
2 HR. 4 HR. 6 HR. 8 HR. 24 HR. 48 HR. 72 HR.
Divisions
1 cm = _____
D_{50}
D_{100}
1 2 3 4 5 6 7 8 9 10 11 12 13 14
ROOT TIME LINEAR SCALE IN ROOT MINUTES

CONSOLIDATION TEST

LOC. No. DNEL Nº 2 SAMPLE No. 10,50 METROS DATE 01/02/77

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD P/4 ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 650,00 g lb.

DRAINAGE PATH CALCULATION

Ho = 1,9670 cm. H_1 = 1,9459 cm. $\bar{H} = \frac{Ho + HI}{2}$ = 0,9782 cm $\bar{H}^2$ = 0,9569 cm²

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 420,20 g.

Weight of Ring 313,80 g.

Weight of Wet Sample 106,40 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) 402,80 g.

Weight of Dry Sample Watch Class ( ) 359,60 g.

Weight of Watch Glass _____ g.

Weight of Dry Sample 46,70 g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading (10,000")	$\sum d H$
01/02/77		0		130,00	
		10 sec.		137,00	
		15 sec.		138,00	
		30 sec.		140,00	
		1 min.		143,00	
		2 min.		147,00	
		4 min.		152,00	
		8 min.		159,00	
		15 min.		165,00	
		30 min.		174,00	
		1 hr.		180,50	
		2hr.		187,00	
		4hr.		191,50	
		6 hr.		196,00	
		8hr		199,00	
02/02/77		24hr		206,00	
03/02/77		48hr		213,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

$\sum i$

FINAL VOIDS RATIO

Final M.C. _____ %

$\sum f$

CONSOLIDATION COEFFICIENT

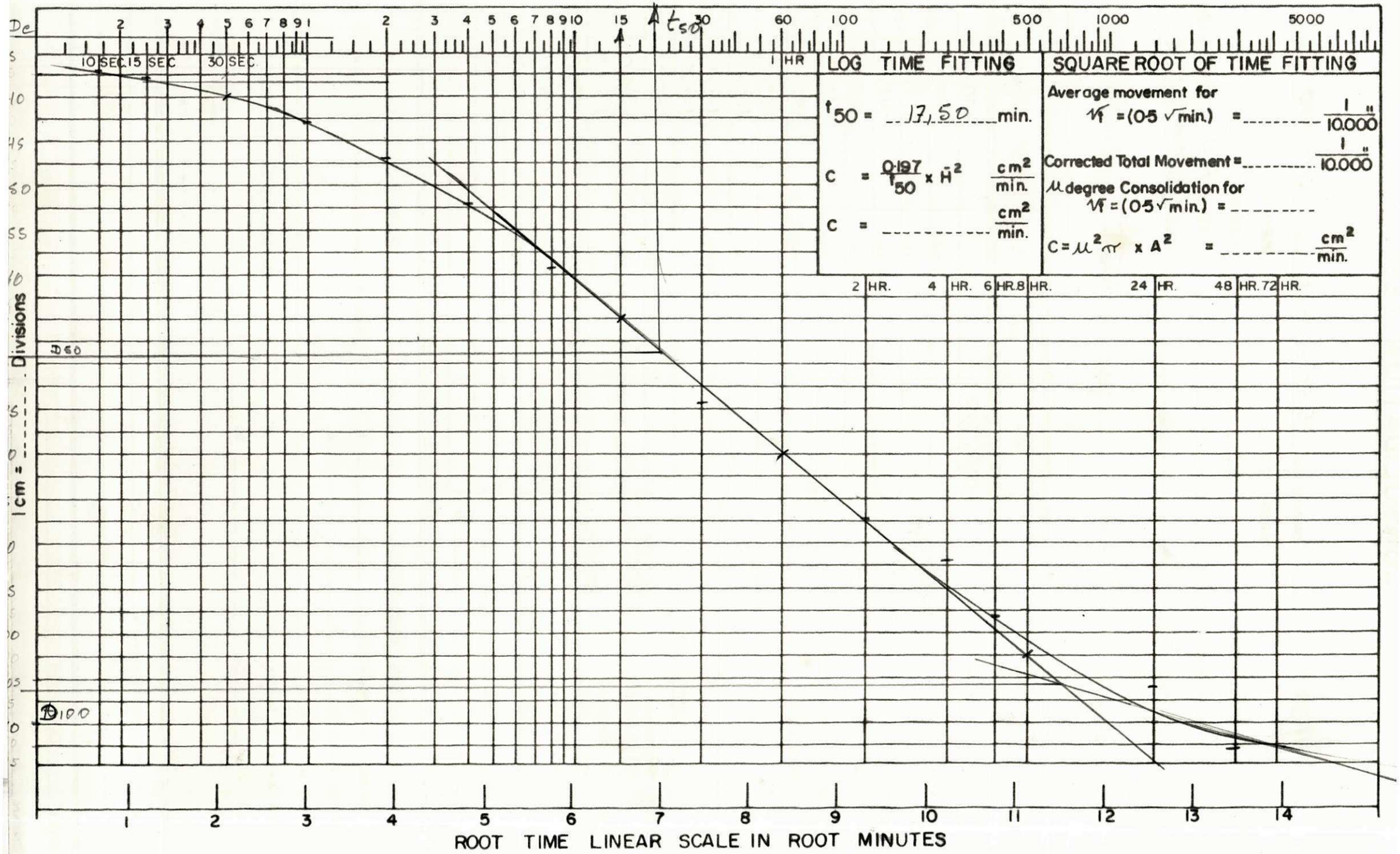
C_v = _____ Cm^2/min

(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked _____


LOG TIME SCALE IN MINUTES
10 SEC
15 SEC
30 SEC
1 HR
t_{50}
LOG TIME FITTING
t_{50} = 17,50 min.
$C = \frac{0.197}{t_{50}} \times H^2$ $\frac{cm^2}{min.}$
C = ---------- $\frac{cm^2}{min.}$
SQUARE ROOT OF TIME FITTING
Average movement for
$\sqrt{t}$ = (0.5 $\sqrt{min.}$) = ---------- $\frac{1}{10.000}$"
Corrected Total Movement = ---------- $\frac{1}{10.000}$"
μ degree Consolidation for
$\sqrt{t}$ = (0.5 $\sqrt{min.}$) = ---------
$C = \mu^2 \pi \times A^2$ = ---------- $\frac{cm^2}{min.}$
2 HR. 4 HR. 6 HR. 8 HR. 24 HR. 48 HR. 72 HR.
D60
D100
1 cm = ---------- Divisions
ROOT TIME LINEAR SCALE IN ROOT MINUTES

CONSOLIDATION TEST

LOC. No. ANEL - N°2 SAMPLE No. 10,50 METROS DATE 03/02/77

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD P/2 ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 1.300,00 g lb.

DRAINAGE PATH CALCULATION

Ho = 1,9459 cm. H$_1$ = 1,8842 cm. $\bar{H} = \frac{Ho+HI}{2}$ = 0,9575 cm $\bar{H}^2$ = 0,9168 cm^2

LABORATORY DESCRIPTION _____

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 420,20 g.

Weight of Ring 313,80 g.

Weight of Wet Sample 106,40 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) 402,80 g.

Weight of Dry Sample Watch Class ( ) 369,50 g.

Weight of Watch Glass _____ g.

Weight of Dry Sample 45,70 g.

Final Moisture _____ g.

Final M.C. _____ %

Calculations	Date	Clock Time	t	$\sqrt{t}$	Dial Reading (10,000")	$\sum d H$
	03/02/77		0		213,00	
			10 sec.		231,00	
			15 sec.		232,00	
			30 sec.		235,00	
			1 min.		239,50	
			2 min.		246,00	
			4 min.		255,00	
			8 min.		268,00	
			15 min.		282,00	
			30 min.		301,00	
			1 hr.		324,00	
			2hr.		348,00	
			4hr.		385,00	
			6 hr.		410,00	
			8hR		425,50	
	04/02/77		24hR		429,00	
	05/02/77		48hR.		456,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

$\sum i$

FINAL VOIDS RATIO

Final M.C. _____ %

$\sum f$

CONSOLIDATION COEFFICIENT

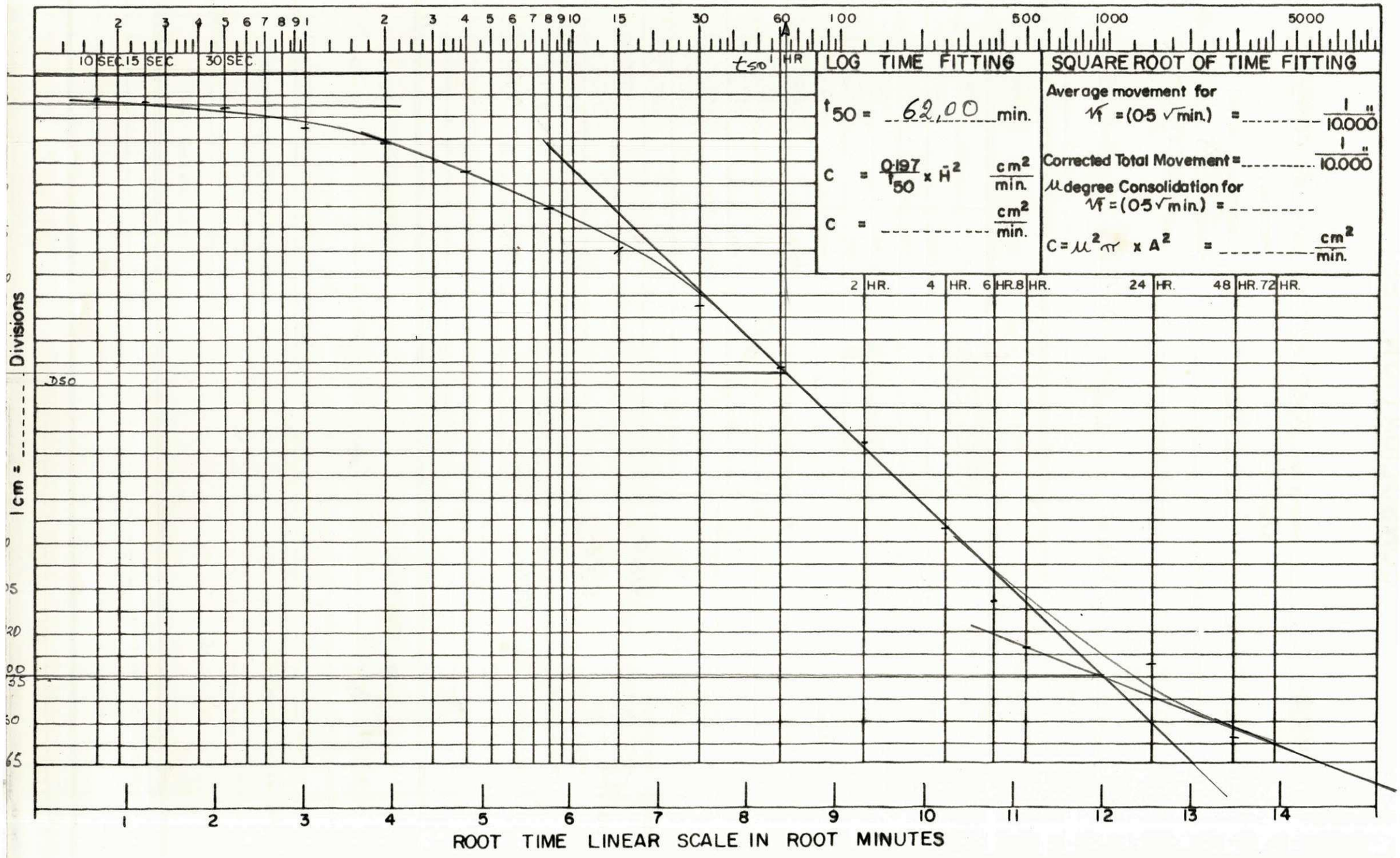
C_v = _____ Cm^2/min

(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked _____


LOG TIME SCALE IN MINUTES
2 3 4 5 6 7 8 9 1 2 3 4 5 6 7 8 9 10 15 30 60 100 500 1000 5000
10 SEC. 15 SEC 30 SEC
t50 1 HR
LOG TIME FITTING
t50 = 62,00 min.
C = 0.197/t50 x H² cm²/min.
C = ---------- cm²/min.
SQUARE ROOT OF TIME FITTING
Average movement for
√t = (0.5 √min.) = ---------- 1/10.000 "
Corrected Total Movement = ---------- 1/10.000 "
μ degree Consolidation for
√t = (0.5 √min.) = ---------
C = μ² π x A² = ---------- cm²/min.
2 HR. 4 HR. 6 HR. 8 HR. 24 HR. 48 HR. 72 HR.
Divisions
1 cm = ----
D50
1 2 3 4 5 6 7 8 9 10 11 12 13 14
ROOT TIME LINEAR SCALE IN ROOT MINUTES

CONSOLIDATION TEST

LOC. No. ANEL - Nº 2 SAMPLE No. 10,50 METROS DATE 07/02/77

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD P ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 2.600,00 g ~~lb.~~

DRAINAGE PATH CALCULATION

Ho = 1.8842 cm. H_1 = 1.7186 cm. $\bar{H} = \frac{Ho + H1}{2}$ = 0,9007 cm $\bar{H}^2$ = 0,8113 cm²

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 420,20 g.

Weight of Ring 313,80 g.

Weight of Wet Sample 106,40 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) 402,80 g.

Weight of Dry Sample Watch Class ( ) 359,50 g.

Weight of Watch Glass _____ g.

Weight of Dry Sample 45,70 g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading 1 10,000"	$\sum d H$
07/02/77		0		456,00	
		10 sec.		482,00	
		15 sec.		486,00	
		30 sec.		495,00	
		1 min.		507,00	
		2 min.		526,00	
		4 min.		540,00	
		8 min.		588,00	
		15 min.		632,00	
		30 min.		701,00	
		1 hr.		780,00	
		2hr.		876,00	
		4hr.		938,00	
		6 hr.		985,00	
		8hr		1005,00	
08/02/77		24hr		1063,00	
09/02/77		48hr		1108,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

$\sum i$

FINAL VOIDS RATIO

Final M.C. _____ %

$\sum f$

CONSOLIDATION COEFFICIENT

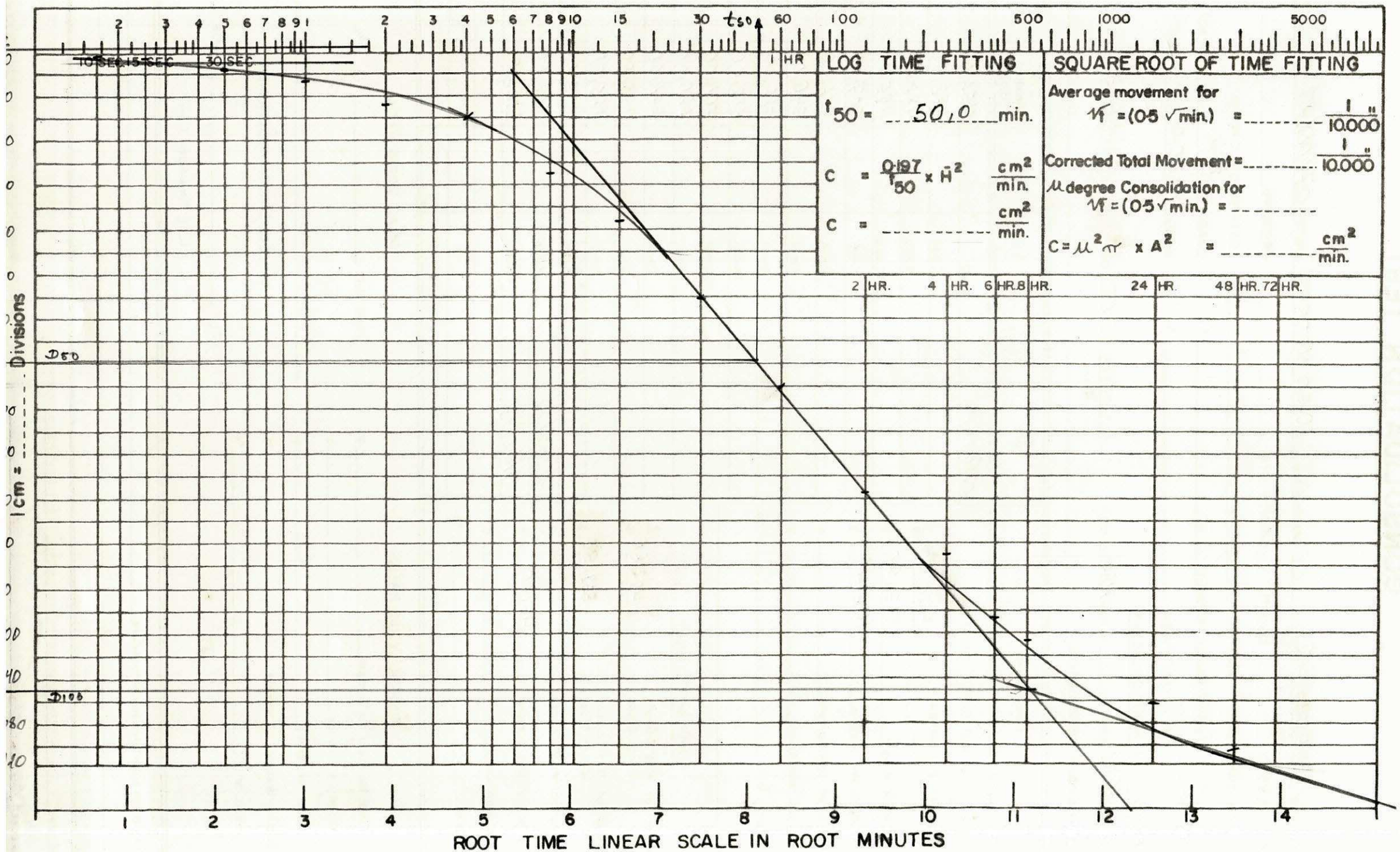
C_v = _____ Cm^2/min

(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked _____


LOG TIME SCALE IN MINUTES
2 3 4 5 6 7 8 9 1 2 3 4 5 6 7 8 9 10 15 30 t_{50} 60 100 500 1000 5000
10 SEC. 15 SEC. 30 SEC. 1 HR
LOG TIME FITTING
t_{50} = 50.0 min.
$C = \frac{0.197}{t_{50}} \times H^2 \quad \frac{cm^2}{min.}$
C = _____ $\frac{cm^2}{min.}$
SQUARE ROOT OF TIME FITTING
Average movement for
$\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____ $\frac{1}{10.000}$"
Corrected Total Movement = _____ $\frac{1}{10.000}$"
μ degree Consolidation for
$\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____
$C = \mu^2 \pi \times A^2$ = _____ $\frac{cm^2}{min.}$
2 HR. 4 HR. 6 HR. 8 HR. 24 HR. 48 HR. 72 HR.
Divisions
1 cm = _____
D50
D100
1 2 3 4 5 6 7 8 9 10 11 12 13 14
ROOT TIME LINEAR SCALE IN ROOT MINUTES

CONSOLIDATION TEST

LOC. No ANEL - MP2 SAMPLE No. 10,50 METROS DATE 09/02/77

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) DESCARREGAMENTO LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD P/2 ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 1.300,00 g lb.

DRAINAGE PATH CALCULATION

Ho = 1.7166 cm. H$_1$ = 1.7303 cm. $\bar{H} = \frac{Ho + HI}{2}$ = _____ cm $\bar{H}^2$ = _____ cm^2

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 420,20 g.

Weight of Ring 313,80 g.

Weight of Wet Sample 106,40 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) 402,80 g.

Weight of Dry Sample Watch Class ( ) 359,60 g.

Weight of Watch Glass _____ g.

Weight of Dry Sample 45,70 g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading 1 10,000"	$\sum$ d H
09/02/77		0		1108,00	
		10 sec.		1098,00	
		15 sec.		1097,00	
		30 sec.		1096,00	
		1 min.		1094,50	
		2 min.		1092,00	
		4 min.		1087,00	
		8 min.		1082,50	
		15 min.		1078,00	
		30 min.		1074,00	
		1 hr.		1071,00	
		2hr.		1069,00	
		4hr.		1067,50	
		6 hr.		1065,50	
		6hr		1064,00	
10/02/77		24hr		1063,00	
11/02/77		48hr		1062,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

Σi

FINAL VOIDS RATIO

Final M.C. _____ %

Σf

CONSOLIDATION COEFFICIENT

C_v = _____ Cm^2/min

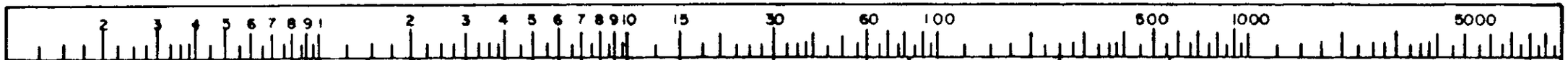
(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked _____

LOG TIME SCALE IN MINUTES



LOG TIME FITTING

t_{50} = _____ min.

$C = \frac{0.197}{t_{50}} \times H^2 \quad \frac{cm^2}{min.}$

C = _____ $\frac{cm^2}{min.}$

SQUARE ROOT OF TIME FITTING

Average movement for

$\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____ $\frac{1}{10.000}$ "

Corrected Total Movement = _____ $\frac{1}{10.000}$ "

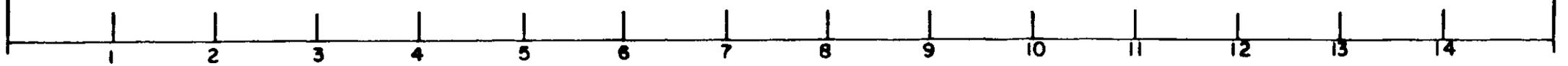
μ degree Consolidation for

$\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____

$C = \mu^2 \pi \times A^2$ = _____ $\frac{cm^2}{min.}$

2 HR.	4 HR.	6 HR.	8 HR.	24 HR.	48 HR.	72 HR.

1 cm = _____ Divisions



ROOT TIME LINEAR SCALE IN ROOT MINUTES

CONSOLIDATION TEST

6

LOC. No. ANEL - Nº 2 SAMPLE No. 10,50 METROS DATE 11/02/77

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) DESCARREGAMENTO. LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD P/4 ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 650,00 g lb.

DRAINAGE PATH CALCULATION

Ho = 1,7303 cm. _____ H_1 = 1,7493 cm. $\bar{H} = \frac{Ho + H1}{2}$ = _____ cm $\bar{H}^2$ = _____ cm²

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 420,20 g.

Weight of Ring 313,80 g.

Weight of Wet Sample 106,40 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) 402,80 g.

Weight of Dry Sample Watch Class ( ) 359,50 g.

Weight of Watch Glass _____ g.

Weight of Dry Sample 45,70 g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading 1 10,000"	$\sum d H$
11/02/77		0		1062,00	
		10 sec.		1045,00	
		15 sec.		1044,50	
		30 sec.		1044,00	
		1 min.		1043,00	
		2 min.		1041,00	
		4 min.		1038,50	
		8 min.		1034,50	
		15 min.		1029,00	
		30 min.		1022,00	
		1 hr.		1015,00	
		2hr.		1008,00	
		4 hr.		1003,00	
		6 hr.		1000,00	
		8hR		998,00	
12/02/77		24hR		993,00	
13/02/77		48hR		987,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

$\sum i$

FINAL VOIDS RATIO

Final M.C. _____ %

$\sum f$

CONSOLIDATION COEFFICIENT

C_v = _____ Cm^2/min

(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked _____

LOG TIME SCALE IN MINUTES

2 3 4 5 6 7 8 9 1 2 3 4 5 6 7 8 9 10 15 30 60 100 500 1000 5000

10 SEC 15 SEC 30 SEC 1 HR

1 cm = ... Divisions

LOG TIME FITTING

t_{50} = ... min.

$C = \frac{0.197}{t_{50}} \times \bar{H}^2$ $\frac{cm^2}{min.}$

C = ... $\frac{cm^2}{min.}$

SQUARE ROOT OF TIME FITTING

Average movement for $\sqrt{t}$ = (0.5 $\sqrt{min.}$) = ... $\frac{1}{10.000}$"

Corrected Total Movement = ... $\frac{1}{10.000}$"

μ degree Consolidation for $\sqrt{t}$ = (0.5 $\sqrt{min.}$) = ...

$C = \mu^2 \pi \times A^2$ = ... $\frac{cm^2}{min.}$

2 HR. 4 HR. 6 HR. 8 HR. 24 HR. 48 HR. 72 HR.

1 2 3 4 5 6 7 8 9 10 11 12 13 14

ROOT TIME LINEAR SCALE IN ROOT MINUTES

CONSOLIDATION TEST

LOC. No. ANEL - Nº 2 SAMPLE No. 10,50 METROS DATE 13/02/77

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD P/2 ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 1.300,00 g ~~lb.~~

DRAINAGE PATH CALCULATION

H_o = 1.7493 cm. H_1 = 1.7379 cm. $\bar{H} = \frac{H_o + H_1}{2}$ = _____ cm $\bar{H}^2$ = _____ cm^2

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 420,20 g.

Weight of Ring 313,80 g.

Weight of Wet Sample 106,40 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) 402,80 g.

Weight of Dry Sample Watch Class ( ) 359,50 g.

Weight of Watch Glass _____ g.

Weight of Dry Sample 45,70 g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading 1 10,000"	$\sum d H$
13/02/77		0		987,00	
		10 sec.		991,00	
		15 sec.		991,50	
		30 sec.		993,00	
		1 min.		996,00	
		2 min.		999,00	
		4 min.		1003,00	
		8 min.		1008,00	
		15 min.		1013,00	
		30 min.		1018,00	
		1 hr.		1020,00	
		2hr.		1023,00	
		4hr.		1026,00	
		6 hr.		1027,00	
		8hr		1030,00	
14/02/77		24hr		1031,00	
15/02/77		48hr		1032,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

$\sum i$

FINAL VOIDS RATIO

Final M.C. _____ %

$\sum f$

CONSOLIDATION COEFFICIENT

C_v = _____ Cm^2/min

(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked _____

LOG TIME SCALE IN MINUTES

2 3 4 5 6 7 8 9 1 2 3 4 5 6 7 8 9 10 15 30 60 100 500 1000 5000

10 SEC. 15 SEC 30 SEC 1 HR

1 cm = _____ Divisions

LOG TIME FITTING

t_{50} = _____ min.

$C = \frac{0.197}{t_{50}} \times \bar{H}^2 \quad \frac{cm^2}{min.}$

C = _____ $\frac{cm^2}{min.}$

SQUARE ROOT OF TIME FITTING

Average movement for

$\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____ $\frac{1}{10.000}$ in.

Corrected Total Movement = _____ $\frac{1}{10.000}$ in.

μ degree Consolidation for

$\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____

$C = \mu^2 \pi \times A^2$ = _____ $\frac{cm^2}{min.}$

2 HR. 4 HR. 6 HR. 8 HR. 24 HR. 48 HR. 72 HR.

1 2 3 4 5 6 7 8 9 10 11 12 13 14

ROOT TIME LINEAR SCALE IN ROOT MINUTES

CONSOLIDATION TEST

LOC. No. PANEL - No 2 SAMPLE No. 10,60 METROS DATE 15/02/--

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD P ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 2,600,00 g ~~lb~~

DRAINAGE PATH CALCULATION

H_o = 1,7372 cm. _____ H_1 = 1,7044 cm. $\bar{H} = \frac{H_o + H_1}{2}$ = _____ cm $\bar{H}^2$ = _____ cm²

LABORATORY DESCRIPTION _____

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 420,20 g.

Weight of Ring 318,80 g.

Weight of Wet Sample 106,40 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) 402,80 g.

Weight of Dry Sample Watch Class ( ) 359,50 g.

Weight of Watch Glass _____ g.

Weight of Dry Sample 45,70 g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading (10,000")	$\sum d H$
15/02/77		0		1032,00	
		10 sec.		1039,00	
		15 sec.		1040,00	
		30 sec.		1043,00	
		1 min.		1047,00	
		2 min.		1054,00	
		4 min.		1058,00	
		8 min.		1072,00	
		15 min.		1083,00	
		30 min.		1095,00	
		1 hr.		1104,00	
		2hr.		1111,00	
		4 hr.			
		6 hr.			
		8hr			
16/02/77		24hr		1147,00	
17/02/77		48hr		1164,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

$\sum i$

FINAL VOIDS RATIO

Final M.C. _____ %

$\sum f$

CONSOLIDATION COEFFICIENT

C_v = _____ Cm²/min

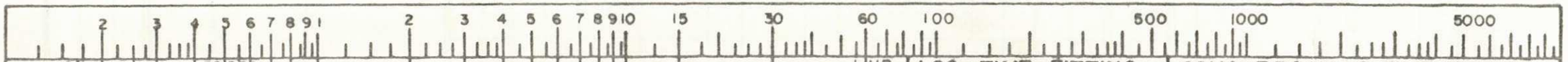
(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked _____

LOG TIME SCALE IN MINUTES



LOG TIME FITTING

t_{50} = _____ min.

$C = \frac{0.197}{t_{50}} \times \bar{H}^2 \quad \frac{cm^2}{min.}$

C = _____ $\frac{cm^2}{min.}$

SQUARE ROOT OF TIME FITTING

Average movement for $\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____ $\frac{1}{10.000}$"

Corrected Total Movement = _____ $\frac{1}{10.000}$"

μ degree Consolidation for $\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____

$C = \mu^2 \pi \times A^2$ = _____ $\frac{cm^2}{min.}$

2 HR.	4 HR.	6 HR.	8 HR.	24 HR.	48 HR.	72 HR.

1 cm = _____ Divisions

ROOT TIME LINEAR SCALE IN ROOT MINUTES

CONSOLIDATION TEST

LOC. No. ANEL-Nº 2 SAMPLE No. 10,50 METROS DATE 17/02/77

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD 2P ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 5.200,00 lb.

DRAINAGE PATH CALCULATION

Ho = 1,7044 cm. H1 = 1,5203 cm. $\bar{H} = \frac{Ho+H1}{2} = 0,8062$ cm $\bar{H}^2 = 0,6499$ cm²

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 420,20 g.

Weight of Ring 313,80 g.

Weight of Wet Sample 106,40 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) 402,80 g.

Weight of Dry Sample Watch Class ( ) 359,50 g.

Weight of Watch Glass _____ g.

Weight of Dry Sample 45,70 g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading 1 10,000"	$\sum d H$
17/02/77		0		1164,00	
		10 sec.		1182,00	
		15 sec.		1185,00	
		30 sec.		1192,00	
		1 min.		1204,06	
		2 min.		1225,00	
		4 min.		1248,00	
		8 min.		1287,00	
		15 min.		1337,00	
		30 min.		1416,00	
		1 hr.		1512,00	
		2hr.		1636,00	
		4hr.		1704,00	
		6 hr.		1794,50	
		8hr		1828,00	
18/02/77		24hr		1869,50	
19/02/77		48hr		1889,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

$\sum i$

FINAL VOIDS RATIO

Final M.C. _____ %

$\sum f$

CONSOLIDATION COEFFICIENT

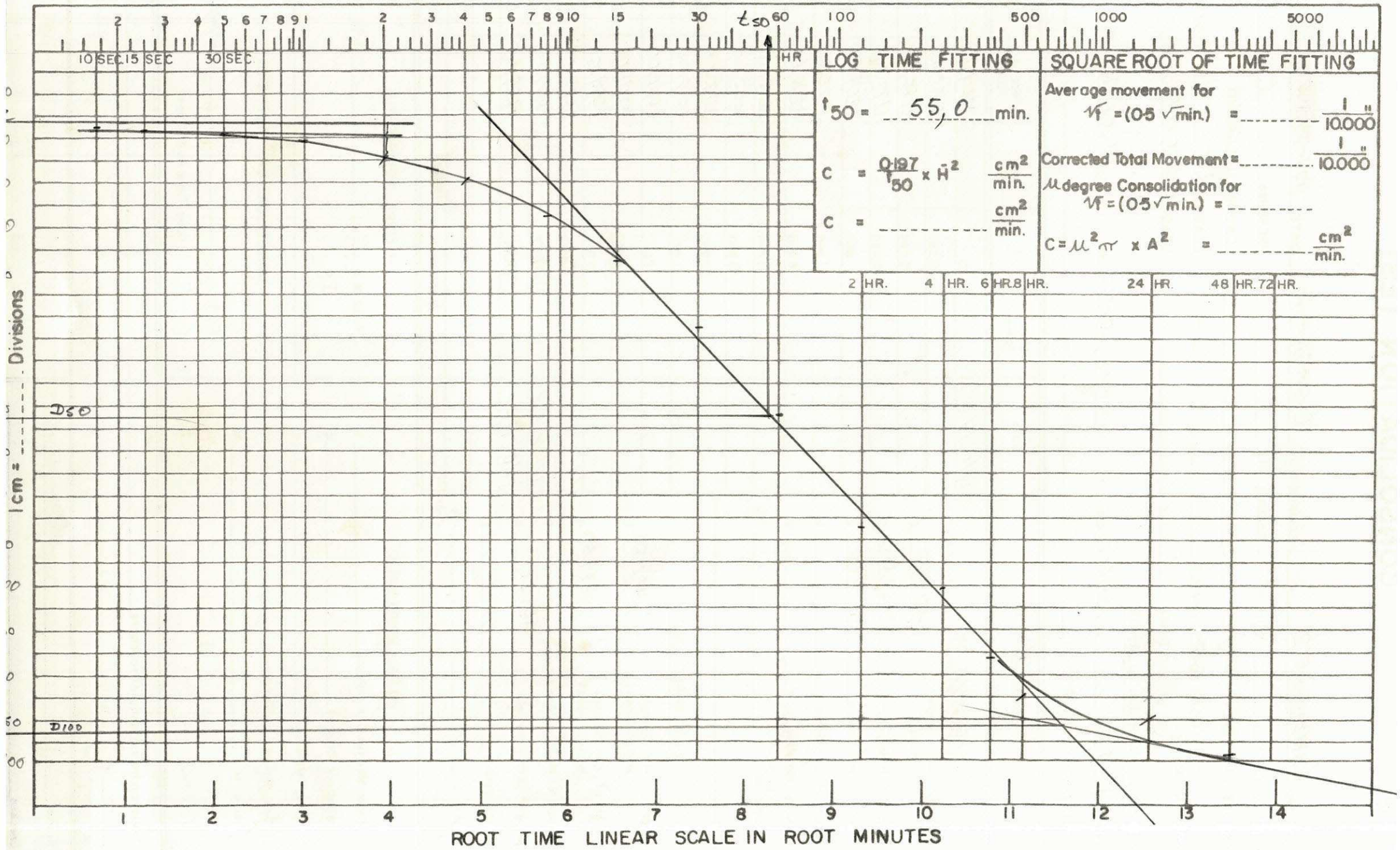
C_v = _____ Cm^2/min

(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked _____


LOG TIME SCALE IN MINUTES
2 3 4 5 6 7 8 9 1 2 3 4 5 6 7 8 9 10 15 30 t_{50} 60 100 500 1000 5000
10 SEC. 15 SEC 30 SEC HR
LOG TIME FITTING
t_{50} = 55,0 min.
$C = \frac{0.197}{t_{50}} \times H^2$ $\frac{cm^2}{min.}$
C = _____ $\frac{cm^2}{min.}$
SQUARE ROOT OF TIME FITTING
Average movement for
$\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____ $\frac{1}{10.000}$"
Corrected Total Movement = _____ $\frac{1}{10.000}$"
μ degree Consolidation for
$\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____
$C = \mu^2 \pi \times A^2$ = _____ $\frac{cm^2}{min.}$
2 HR. 4 HR. 6 HR. 8 HR. 24 HR. 48 HR. 72 HR.
Divisions
1 cm = _____
D50
D100
1 2 3 4 5 6 7 8 9 10 11 12 13 14
ROOT TIME LINEAR SCALE IN ROOT MINUTES

CONSOLIDATION TEST

LOC. No. ANEL - N°2 SAMPLE No. 10,50 [illegible] DATE [illegible]

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD 4F ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 10,400,009 lb

DRAINAGE PATH CALCULATION

H_o = 1,5203 cm. H_1 = 1,3682 cm. $\bar{H} = \frac{H_o + H_1}{2}$ = 0,7221 cm $\bar{H}^2$ = 0,5215 cm²

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 420,20 g.

Weight of Ring 313,80 g.

Weight of Wet Sample 106,40 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) 402,50 g.

Weight of Dry Sample Watch Class ( ) 369,60 g.

Weight of Watch Glass _____ g.

Weight of Dry Sample 115,70 g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading (10,000")	$\sum d H$
24/02/77		0		1869,00	
		10 sec.		1917,00	
		15 sec.		1921,00	
		30 sec.		1930,00	
		1 min.		1942,00	
		2 min.		1960,00	
		4 min.		1986,00	
		8 min.		2025,00	
		15 min.		2074,00	
		30 min.		2147,00	
		1 hr.		2240,00	
		2hr.			
		4hr.			
		6 hr.		2325,00	
		8hr			
		24hr		2421	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

$\sum i$

FINAL VOIDS RATIO

Final M.C. _____ %

$\sum f$

CONSOLIDATION COEFFICIENT

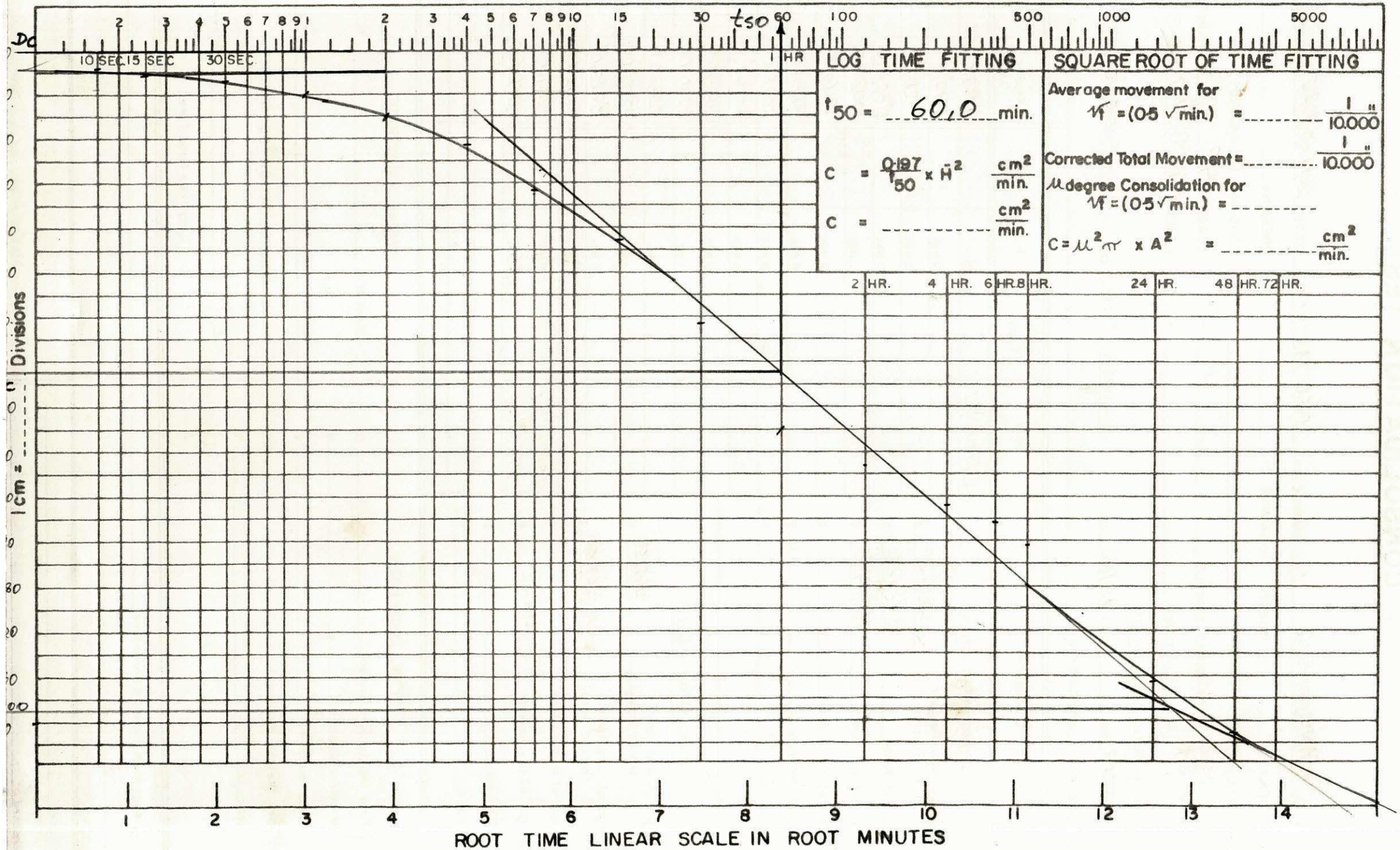
C_v = _____ Cm^2/min

(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked _____


LOG TIME SCALE IN MINUTES
10 SEC. 15 SEC 30 SEC 1 HR
2 3 4 5 6 7 8 9 1 2 3 4 5 6 7 8 9 10 15 30 60 100 500 1000 5000
t_{50}
LOG TIME FITTING
t_{50} = 60,0 min.
$C = \frac{0.197}{t_{50}} \times H^2 \quad \frac{cm^2}{min.}$
$C = \_\_\_\_\_ \frac{cm^2}{min.}$
SQUARE ROOT OF TIME FITTING
Average movement for
$\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____ $\frac{1}{10.000}$"
Corrected Total Movement = _____ $\frac{1}{10.000}$"
μ degree Consolidation for
$\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____
$C = \mu^2 \pi \times A^2$ = _____ $\frac{cm^2}{min.}$
2 HR. 4 HR. 6 HR. 8 HR. 24 HR. 48 HR. 72 HR.
Divisions
1 cm = _____
1 2 3 4 5 6 7 8 9 10 11 12 13 14
ROOT TIME LINEAR SCALE IN ROOT MINUTES

CONSOLIDATION TEST

LOC. No. ANEL - Nº 2 SAMPLE No. 10,50 METROS DATE 26/02/77

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD BP ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 20,800,00 g ~~lb.~~

DRAINAGE PATH CALCULATION

Ho = 1,3682 cm. H1 = 1,2402 cm. $\bar{H} = \frac{Ho + H1}{2} = 0,6521$ cm $\bar{H}^2 = 0,4252$ cm²

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 420,20 g.

Weight of Ring 313,80 g.

Weight of Wet Sample 106,40 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) 402,80 g.

Weight of Dry Sample Watch Glass ( ) 359,50 g.

Weight of Watch Glass _____ g.

Weight of Dry Sample 45170 g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading 1 10,000"	$\sum d H$
26/02/77		0		2488,00	
		10 sec.		2518,00	
		15 sec.		2520,00	
		30 sec.		2530,00	
		1 min.		2542,00	
		2 min.		2560,00	
		4 min.		2585,00	
		8 min.		2620,00	
		15 min.		2663,00	
		30 min.		2728,00	
		1 hr.		2795,00	
		2hr.		2865,00	
		4hr.		2915,00	
		6 hr.		2944,00	
		8hr		2957,00	
27/02/77		24hr		2972,00	
28/02/77		48hr		2992,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

$\sum i$

FINAL VOIDS RATIO

Final M.C. _____ %

$\sum f$

CONSOLIDATION COEFFICIENT

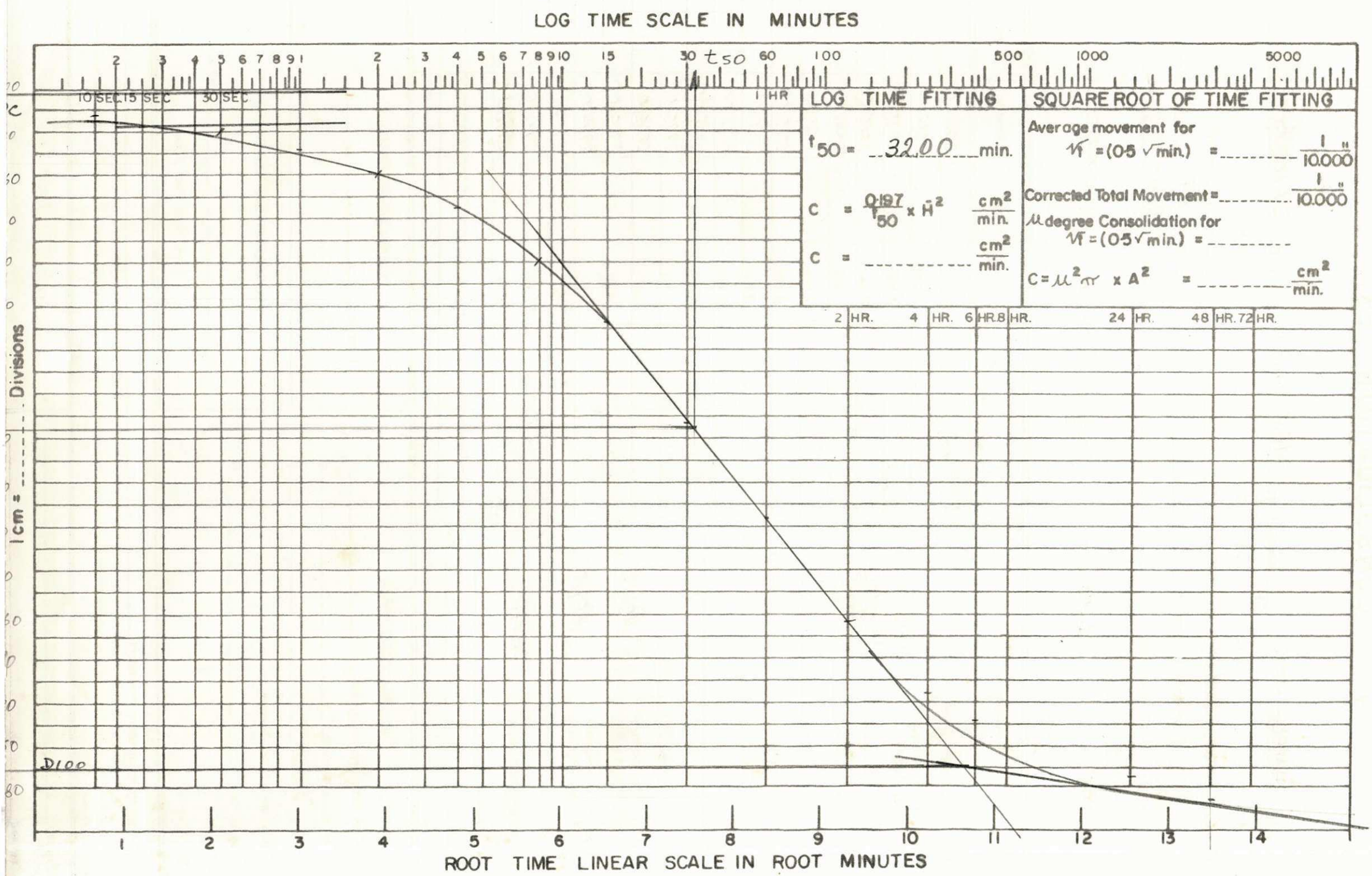
C_v = _____ Cm^2/min

(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked _____


LOG TIME SCALE IN MINUTES
10 SEC. 15 SEC 30 SEC 1 HR
t50
LOG TIME FITTING
t50 = 3200 min.
C = 0.197/t50 x H² cm²/min.
C = ---------- cm²/min.
SQUARE ROOT OF TIME FITTING
Average movement for √t = (0.5 √min.) = ---------- 1" / 10.000
Corrected Total Movement = ---------- 1" / 10.000
μ degree Consolidation for √t = (0.5 √min.) = ---------
C = μ² π/4 x A² = ---------- cm²/min.
2 HR. 4 HR. 6 HR. 8 HR. 24 HR. 48 HR. 72 HR.
1 cm = ---------- Divisions
D100
ROOT TIME LINEAR SCALE IN ROOT MINUTES

P R O F U N D I D A D E = 1 1 , 5 0 M E T R O S

P O N T O " I "

A N E L Nº 01

C R O N O G R A MA D E C A R R E G A M E N T O

INICIO - P/8

Carregamento - P/8 - P/4 - P/2 -:P

Descarregamento - P/2 - P/4

Carregamento - P/2 - P - 2P - 4P - 8P.

CONSOLIDATION TEST

LOC. No. ANEL Nº 1 SAMPLE No. 11,50 METROS DATE 30/01/77

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD P/8 ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 375,00 g lb.

DRAINAGE PATH CALCULATION

Ho = 2,00 cm. H_1 = 1.9871 cm. $\bar{H} = \frac{Ho + H1}{2}$ = 0,9968 cm $\bar{H}^2$ = 0,9936 cm²

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 425,70 g.

Weight of Ring 344,70 g.

Weight of Wet Sample 81,00 g.

Weight of Dry Sample 43,00 g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample RING + Watch Glass ( ) 497,50 g.

Weight of Dry Sample Watch Class ( ) _____ g.

Weight of Watch Glass 88,10 g.

Weight of Dry Sample 43,00 g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading 1 10,000"	$\sum d H$
30/01/77		0		0,0	
		10 sec.		8,5	
		15 sec.		9,5	
		30 sec.		10,50	
		1 min.		14,00	
		2 min.		18,00	
		4 min.		21,00	
		8 min.		24,00	
		15 min.		28,00	
		30 min.		31,00	
		1 hr.		34,50	
		2hr.		37,00	
		4hr.		40,00	
		6 hr.		42,50	
		8 hr		44,00	
31/01/77		24hr		49,00	
01/02/77		48hr		51,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

$\sum i$

FINAL VOIDS RATIO

Final M.C. _____ %

$\sum f$

CONSOLIDATION COEFFICIENT

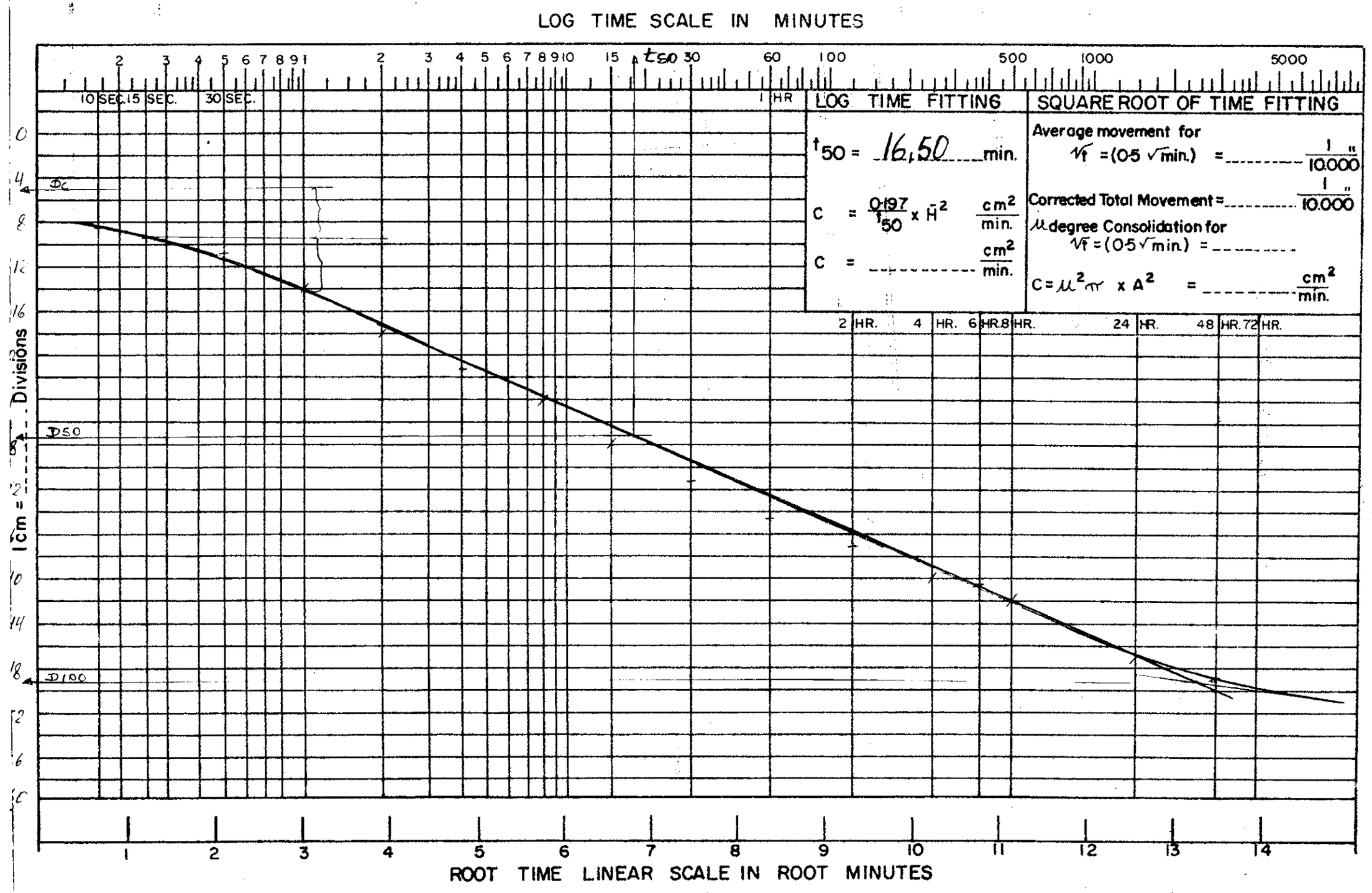
C_v = _____ Cm^2/min

(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked _____


LOG TIME SCALE IN MINUTES
2 3 4 5 6 7 8 9 1 2 3 4 5 6 7 8 9 10 15 t50 30 60 100 500 1000 5000
10 SEC. 15 SEC. 30 SEC. 1 HR
LOG TIME FITTING
t50 = 16.50 min.
C = 0.197 / t50 x H̄² cm²/min.
C = ---------- cm²/min.
SQUARE ROOT OF TIME FITTING
Average movement for √t = (0.5 √min.) = ---------- 1/10.000 in
Corrected Total Movement = ---------- 1/10.000 in
μ degree Consolidation for √t = (0.5 √min.) = ---------
C = μ² π x A² = ---------- cm²/min.
2 HR. 4 HR. 6 HR. 8 HR. 24 HR. 48 HR. 72 HR.
Dc
D50
D100
0 4 8 12 16 20 24 28 32 36 40
1cm = ---- Divisions
1 2 3 4 5 6 7 8 9 10 11 12 13 14
ROOT TIME LINEAR SCALE IN ROOT MINUTES

CONSOLIDATION TEST

2

LOC. No. ANEL Nº 1 SAMPLE No. 11,50 METROS DATE 01/02/77

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD P/4 ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 750,00 g lb.

DRAINAGE PATH CALCULATION

Ho = 1,9871 cm. H_1 = 1,9757 cm. $\bar{H} = \frac{Ho + H1}{2}$ = 0,9979 cm $\bar{H}^2$ = 0,9816 cm²

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 425,70 g.

Weight of Ring 344,70 g.

Weight of Wet Sample 81,00 g.

Weight of Dry Sample 43,00 g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) 497,10 g.

Weight of Dry Sample Watch Class ( ) _____ g.

Weight of Watch Glass 88,10 g.

Weight of Dry Sample 43,00 g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading 1 10,000"	Σ d H
01/02/77		0		51,00	
		10 sec.		58,00	
		15 sec.		59,00	
		30 sec.		60,50	
		1 min.		62,00	
		2 min.		66,00	
		4 min.		68,00	
		8 min.		72,00	
		15 min.		74,50	
		30 min.		79,00	
		1 hr.		82,00	
		2hr.		86,00	
		4hr.		89,00	
		6 hr.		90,50	
		8hr		91,50	
02/02/77		24hr		94,00	
03/02/72		48hr		97,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

Σi

FINAL VOIDS RATIO

Final M.C. _____ %

Σf

CONSOLIDATION COEFFICIENT

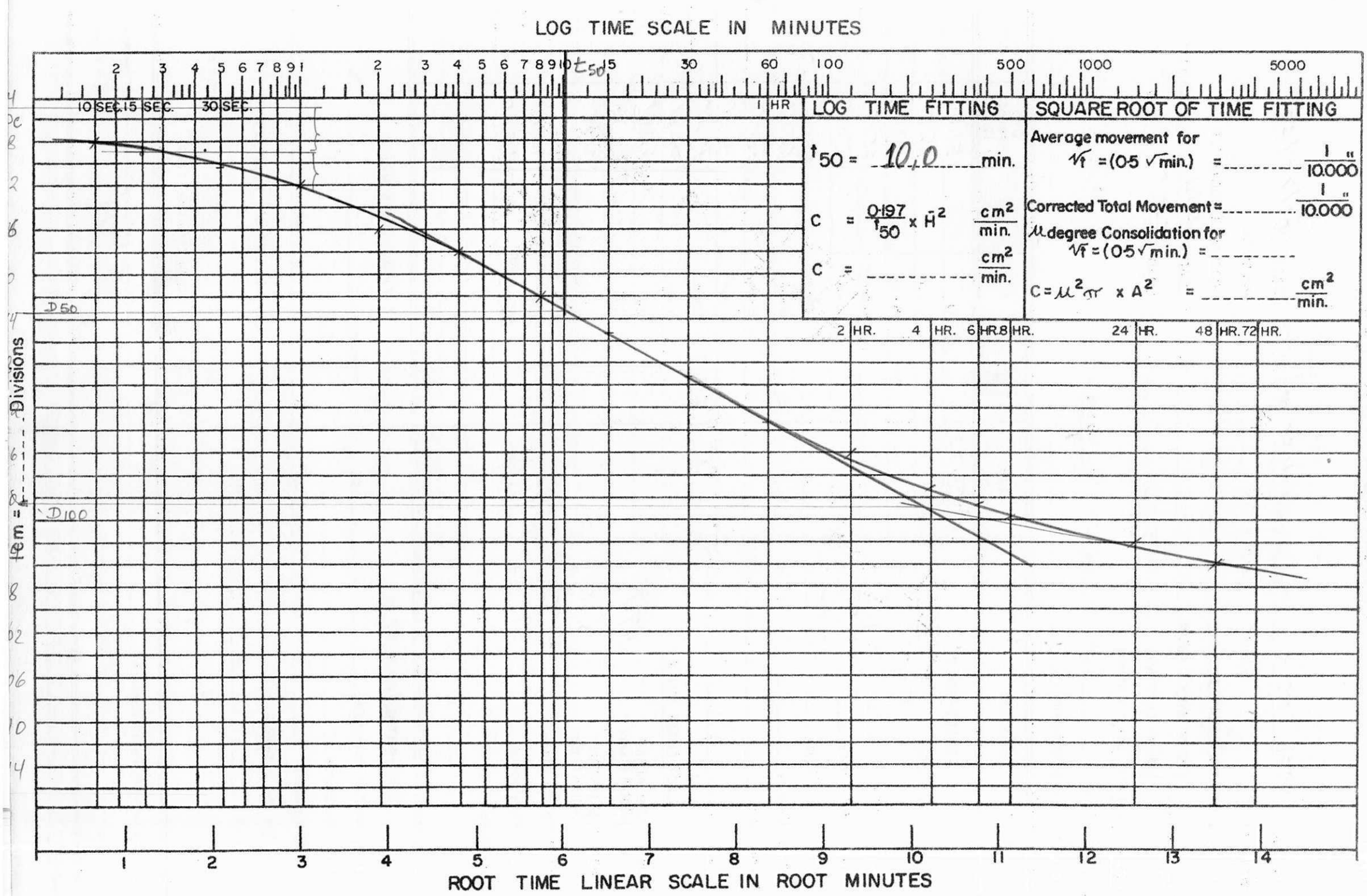
C_v = _____ Cm^2/min

(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked _____


LOG TIME SCALE IN MINUTES
10 SEC. 15 SEC. 30 SEC.
1 HR
t_{50}
LOG TIME FITTING
t_{50} = 10.0 min.
C = $\frac{0.197}{t_{50}} \times H^2$ $\frac{cm^2}{min.}$
C = _____ $\frac{cm^2}{min.}$
SQUARE ROOT OF TIME FITTING
Average movement for
$\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____ $\frac{1}{10.000}$"
Corrected Total Movement = _____ $\frac{1}{10.000}$"
μ degree Consolidation for
$\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____
C = $\mu^2_{\pi r} \times A^2$ = _____ $\frac{cm^2}{min.}$
D50
D100
2 HR. 4 HR. 6 HR. 8 HR. 24 HR. 48 HR. 72 HR.
Dial Divisions
ROOT TIME LINEAR SCALE IN ROOT MINUTES

CONSOLIDATION TEST

LOC. No. ANEL - 01 SAMPLE No. 11,50 METROS DATE 03/02/77

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD P/2 ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 1500,00 g lb.

DRAINAGE PATH CALCULATION

Ho = 1,9757 cm. H_1 = 1,9438 cm. $\bar{H} = \frac{Ho + H1}{4}$ = 0,9796 cm $\bar{H}^2$ = 0,9597 cm²

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 426,70 g.

Weight of Ring 244,70 g.

Weight of Wet Sample 81,00 g.

Weight of Dry Sample 42,00 g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) 497,50 g.

Weight of Dry Sample Watch Class ( ) 88,10 g.

Weight of Watch Glass 42,00 g.

Weight of Dry Sample _____ g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading 1 10,000"	$\sum d H$
03/02/77		0		[illegible]	
		10 sec.		[illegible]	
		15 sec.		[illegible]	
		30 sec.		126,00	
		1 min.		129,00	
		2 min.		129,00	
		4 min.		135,50	
		8 min.		145,00	
		15 min.		156,00	
		30 min.		168,50	
		1 hr.		181,00	
		2hr.		193,00	
		4hr.		204,00	
		6 hr.		209,00	
		8hr		211,00	
04/02/77		24hr		217,00	
05/02/77		48hr		226,50	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

$\sum i$

FINAL VOIDS RATIO

Final M.C. _____ %

$\sum f$

CONSOLIDATION COEFFICIENT

C_v = _____ Cm²/min

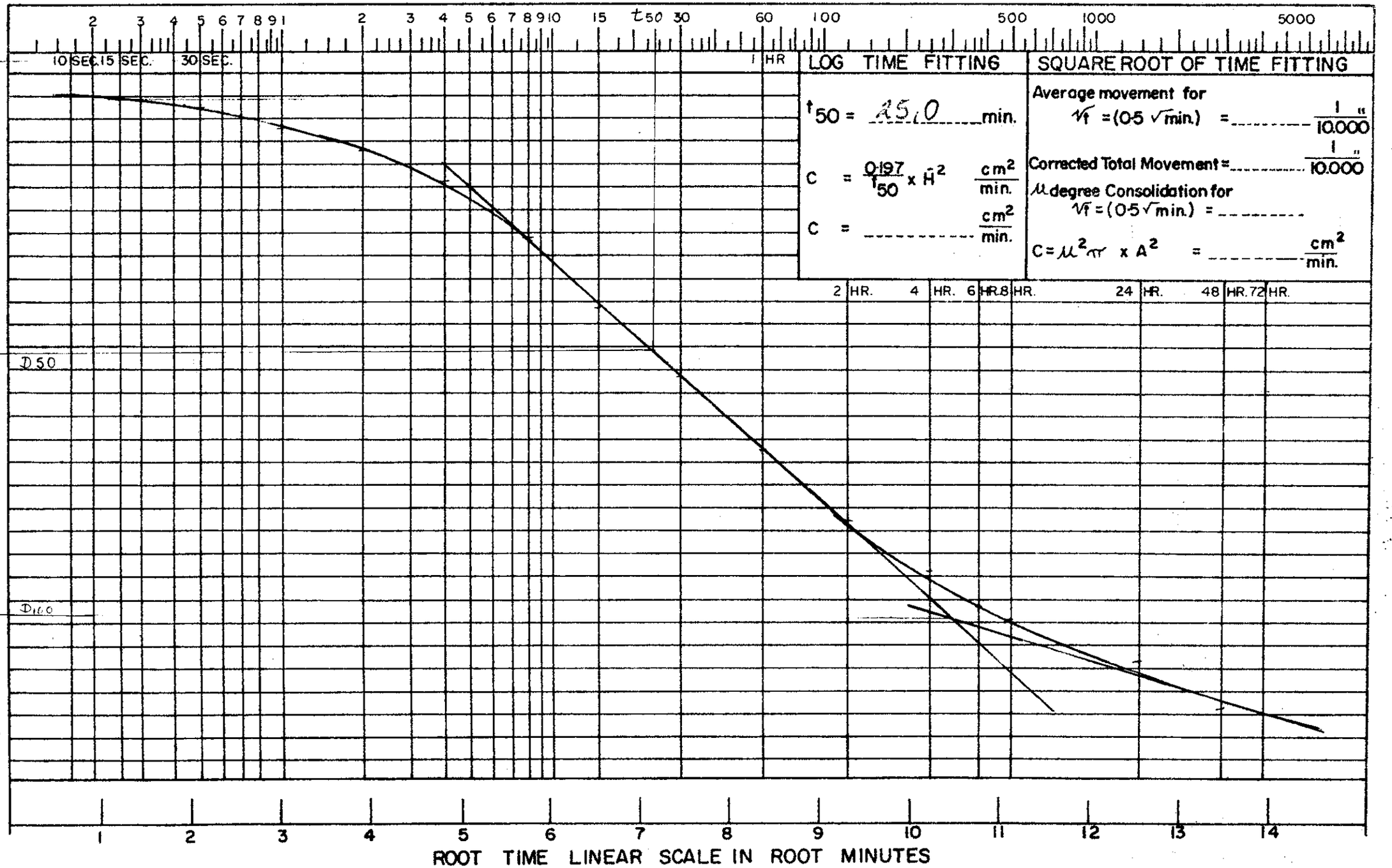
(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked _____

LOG TIME SCALE IN MINUTES



CONSOLIDATION TEST

LOC. No. ANEL Nº 1 SAMPLE No. 11,50 METROS DATE 07/02/77

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD P ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 3.000,00 g lb.

DRAINAGE PATH CALCULATION

Ho = 1.9428 cm. H_1 = 1.8139 cm. $\bar{H} = \frac{Ho + Hl}{2}$ = 0.9392 cm $\bar{H}^2$ = 0.8820 cm²

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 425,70 g.

Weight of Ring 344,70 g.

Weight of Wet Sample 81,00 g.

Weight of Dry Sample 43,00 g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) 497,60 g.

Weight of Dry Sample Watch Class ( ) 88,10 g.

Weight of Watch Glass 43,00 g.

Weight of Dry Sample _____ g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading / 10,000"	$\sum d H$
07/02/77		0		226,50	
		10 sec.		242,00	
		15 sec.		245,00	
		30 sec.		251,50	
		1 min.		261,00	
		2 min.		274,00	
		4 min.		295,00	
		8 min.		321,00	
		15 min.		356,00	
		30 min.		397,50	
		1 hr.		460,00	
		2hr.		490,00	
		4hr.		575,00	
		6 hr.		618,00	
		8hr		[illegible]	
08/02/77		24hr		[illegible]	
09/02/77		48hr		[illegible]	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

$\sum i$

FINAL VOIDS RATIO

Final M.C. _____ %

$\sum f$

CONSOLIDATION COEFFICIENT

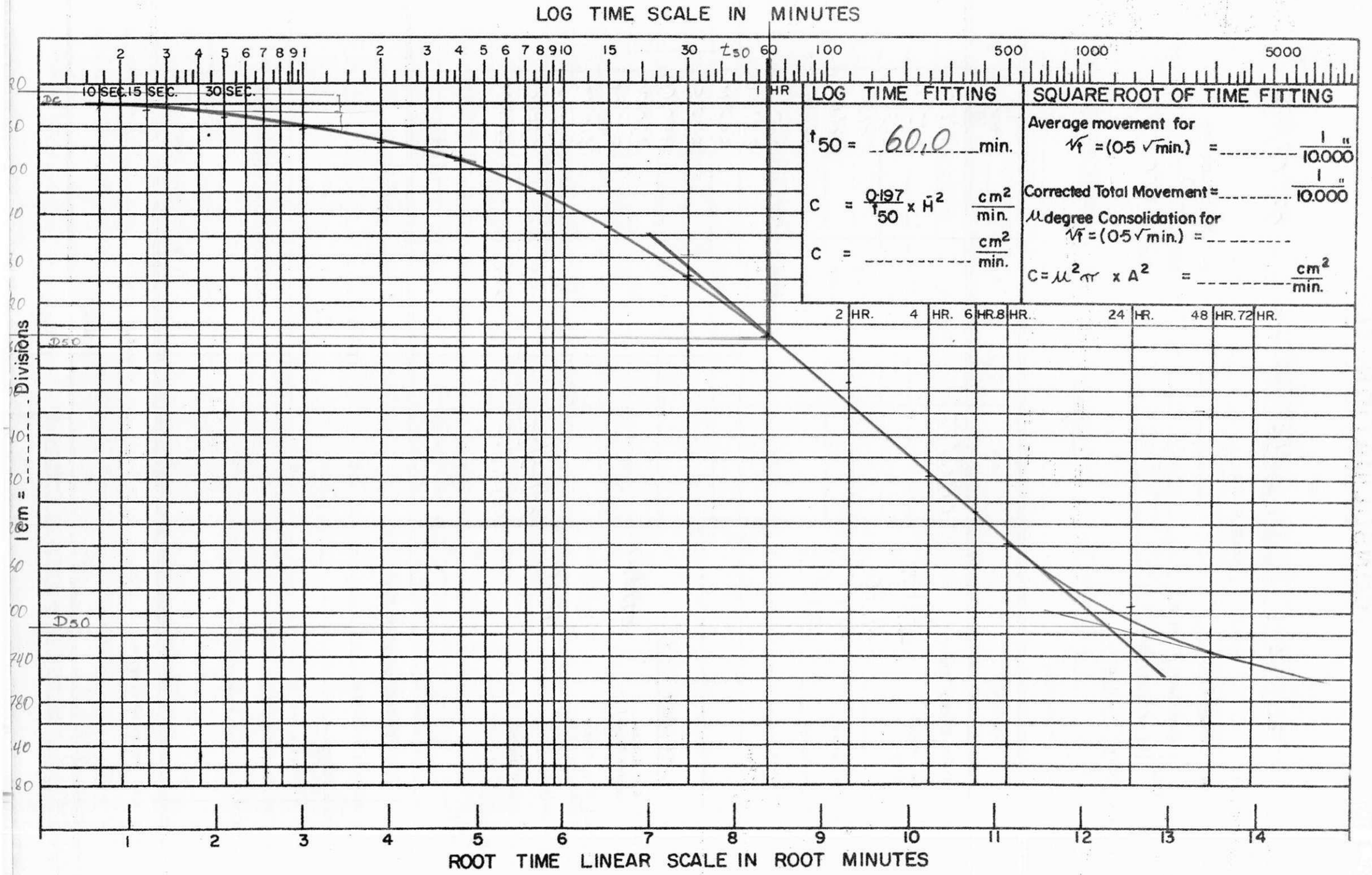
C_v = _____ Cm^2/min

(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked _____


LOG TIME SCALE IN MINUTES
2 3 4 5 6 7 8 9 1 2 3 4 5 6 7 8 9 10 15 30 t50 60 100 500 1000 5000
10 SEC. 15 SEC. 30 SEC. 1 HR
Dc
D50
D50
LOG TIME FITTING
t50 = 60.0 min.
C = 0.197 / t50 x H̄² cm²/min.
C = _____ cm²/min.
SQUARE ROOT OF TIME FITTING
Average movement for
√t = (0.5 √min.) = _____ 1" / 10.000
Corrected Total Movement = _____ 1" / 10.000
μ degree Consolidation for
√t = (0.5 √min.) = _____
C = μ² π x A² = _____ cm²/min.
2 HR. 4 HR. 6 HR. 8 HR. 24 HR. 48 HR. 72 HR.
1 cm = _____ Divisions
1 2 3 4 5 6 7 8 9 10 11 12 13 14
ROOT TIME LINEAR SCALE IN ROOT MINUTES

CONSOLIDATION TEST

S

LOC. No. ANEL Nº 1 SAMPLE No. 11,50 METROS DATE 09/02/77

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) DESPARREGAMENTO LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD P/2 ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 1.500.00 lb.

DRAINAGE PATH CALCULATION

Ho = _____ cm. _____ H_1 = _____ cm. $\bar{H} = \frac{Ho+H1}{2}$ = _____ cm $\bar{H}^2$ = _____ cm^2

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 425,70 g.

Weight of Ring 344,70 g.

Weight of Wet Sample 81,00 g.

Weight of Dry Sample 43,00 g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) 477,50 g.

Weight of Dry Sample Watch Class ( ) _____ g.

Weight of Watch Glass 88,10 g.

Weight of Dry Sample 43,00 g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading (10,000")	Σ d H
[illegible]		0		[illegible]	
		10 sec.		728,50	
		15 sec.		727,50	
		30 sec.		725,50	
		1 min.		722,50	
		2 min.		718,00	
		4 min.		712,50	
		8 min.		705,50	
		15 min.		698,00	
		30 min.		692,00	
		1 hr.		687,00	
		2hr.		684,00	
		4hr.		681,00	
		6 hr.		680,00	
		8hr		679,00	
10/02/77		24hr		677,50	
11/02/77		48hr		676,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

Σ_i

FINAL VOIDS RATIO

Final M.C. _____ %

Σ_f

CONSOLIDATION COEFFICIENT

C_v = _____ Cm^2/min

(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked _____

LOG TIME SCALE IN MINUTES

2 3 4 5 6 7 8 9 1 2 3 4 5 6 7 8 9 10 15 30 60 100 500 1000 5000

10 SEC. 15 SEC. 30 SEC. 1 HR

1 cm = _____ Divisions

LOG TIME FITTING	SQUARE ROOT OF TIME FITTING
t_{50} = _____ min.	Average movement for $\sqrt{t}$ = (0.5 $\sqrt{\text{min.}}$) = _____ $\frac{1}{10.000}$ "
$C = \frac{0.197}{t_{50}} \times H^2$ $\frac{cm^2}{min.}$	Corrected Total Movement = _____ $\frac{1}{10.000}$ "
C = _____ $\frac{cm^2}{min.}$	μ degree Consolidation for $\sqrt{t}$ = (0.5 $\sqrt{\text{min.}}$) = _____
	$C = \mu^2 \pi \times A^2$ = _____ $\frac{cm^2}{min.}$

2 HR. 4 HR. 6 HR. 8 HR. 24 HR. 48 HR. 72 HR.

1 2 3 4 5 6 7 8 9 10 11 12 13 14

ROOT TIME LINEAR SCALE IN ROOT MINUTES

CONSOLIDATION TEST

6

LOC. No. ANEL Nº 1 SAMPLE No. 11,50 METROS DATE 11/02/77

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) DESCARREGANDO LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD P/4 ~~ton.sq.ft.~~

(b) OF CUTTINGS _____ % LOAD 750,00 g lb.

DRAINAGE PATH CALCULATION

Ho = _____ cm. _____ H_1 = _____ cm. $\bar{H} = \frac{Ho + Hi}{2}$ = _____ cm $\bar{H}^2$ = _____ cm^2

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 426,70 g.

Weight of Ring 344,70 g.

Weight of Wet Sample 81,00 g.

Weight of Dry Sample 43,00 g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) 497,50 g.

Weight of Dry Sample Watch Class ( ) _____ g.

Weight of Watch Glass 88,10 g.

Weight of Dry Sample 43,00 g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading 1 10,000"	$\sum d H$
11/02/77		0		668,00	
		10 sec.		[illegible]	
		15 sec.		[illegible]	
		30 sec.		66[illegible]	
		1 min.		667,00	
		2 min.		663,50	
		4 min.		658,50	
		8 min.		651,50	
		15 min.		643,50	
		30 min.		633,00	
		1 hr.		623,00	
		2hr.		614,00	
		4hr.		607,00	
		6 hr.		603,00	
		8hr		599,00	
12/02/77		24hr		596,00	
13/02/77		48hr		594,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

Σi

FINAL VOIDS RATIO

Final M.C. _____ %

Σf

CONSOLIDATION COEFFICIENT

C_v = _____ Cm^2/min

(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked _____

LOG TIME SCALE IN MINUTES

2 3 4 5 6 7 8 9 1 2 3 4 5 6 7 8 9 10 15 30 60 100 500 1000 5000

10 SEC. 15 SEC. 30 SEC. 1 HR

LOG TIME FITTING	SQUARE ROOT OF TIME FITTING
t_{50} = _____ min.	Average movement for $\sqrt{t}$ = (0.5 $\sqrt{\text{min.}}$) = _____ $\frac{1}{10.000}$ "
$C = \frac{0.197}{t_{50}} \times \bar{H}^2$ $\frac{cm^2}{min.}$	Corrected Total Movement = _____ $\frac{1}{10.000}$ "
C = _____ $\frac{cm^2}{min.}$	μ degree Consolidation for $\sqrt{t}$ = (0.5 $\sqrt{\text{min.}}$) = _____
	$C = \mu^2_{rr} \times A^2$ = _____ $\frac{cm^2}{min.}$

2 HR. 4 HR. 6 HR. 8 HR. 24 HR. 48 HR. 72 HR.

1 cm = _____ Divisions

1 2 3 4 5 6 7 8 9 10 11 12 13 14

ROOT TIME LINEAR SCALE IN ROOT MINUTES

CONSOLIDATION TEST

LOC. No. ANEL Nº 1 SAMPLE No. 11,50 METROS DATE 13/02/77

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) RECALCEGAMENTO LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD P/2 ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 1500,00 g lb.

DRAINAGE PATH CALCULATION

Ho = _____ cm. _____ H_1 = _____ cm. $\bar{H} = \frac{Ho+H1}{2}$ = _____ cm $\bar{H}^2$ = _____ cm^2

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 425,70 g.

Weight of Ring 344,70 g.

Weight of Wet Sample 81,00 g.

Weight of Dry Sample 43,00 g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) 497,50 g.

Weight of Dry Sample Watch Class ( ) _____ g.

Weight of Watch Glass 88,10 g.

Weight of Dry Sample 43,02 g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading 1 10,000"	$\sum d H$
13/02/77		0		[illegible]	
		10 sec.		[illegible]	
		15 sec.			
		30 sec.		604,00	
		1 min.		614,00	
		2 min.		607,00	
		4 min.		612,00	
		8 min.		618,00	
		15 min.		625,00	
		30 min.		630,00	
		1 hr.		634,00	
		2hr.		636,00	
		4hr.		640,00	
		6 hr.		641,50	
		8hR		643,00	
14/02/77		24hR		644,50	
15/02/77		48hR		646,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

$\sum i$

FINAL VOIDS RATIO

Final M.C. _____ %

$\sum f$

CONSOLIDATION COEFFICIENT

C_v = _____ Cm^2/min

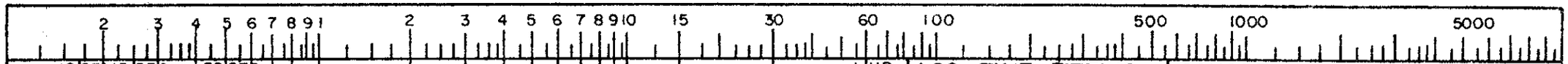
(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked _____

LOG TIME SCALE IN MINUTES



LOG TIME FITTING

t_{50} = _____ min.

$C = \frac{0.197}{t_{50}} \times H^2 \quad \frac{cm^2}{min.}$

C = _____ $\frac{cm^2}{min.}$

SQUARE ROOT OF TIME FITTING

Average movement for $\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____ $\frac{1}{10.000}$ "

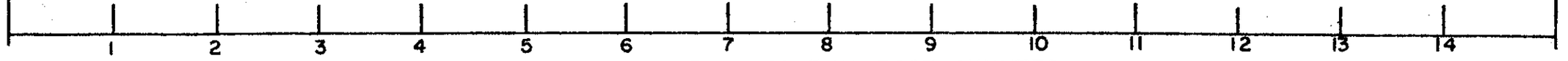
Corrected Total Movement = _____ $\frac{1}{10.000}$ "

μ degree Consolidation for $\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____

$C = \mu^2_{\pi r} \times A^2$ = _____ $\frac{cm^2}{min.}$

2 HR. 4 HR. 6 HR. 8 HR. 24 HR. 48 HR. 72 HR.

1 cm = _____ Divisions



ROOT TIME LINEAR SCALE IN ROOT MINUTES

CONSOLIDATION TEST

LOC. No. ANEL Nº 1 SAMPLE No. 1150 METROS DATE 15/02/77

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) ACCORDEAMENTO LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD P ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 3.000,00 g

DRAINAGE PATH CALCULATION

Ho = _____ cm. _____ H_1 = _____ cm. $\bar{H} = \frac{Ho+Hl}{2}$ = _____ cm $\bar{H}^2$ = _____ cm^2

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 425,70 g.

Weight of Ring 344,70 g.

Weight of Wet Sample 81,00 g.

Weight of Dry Sample 43,00 g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Ring + Watch Glass ( ) 477,60 g.

Weight of Dry Sample Watch Class ( ) _____ g.

Weight of Watch Glass 22,10 g.

Weight of Dry Sample 43,00 g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading 1 10,000"	Σ d H
15/02/77		0		646,00	
		10 sec.		655,00	
		15 sec.		[illegible]	
		30 sec.		660,00	
		1 min.		664,50	
		2 min.		671,50	
		4 min.		681,00	
		8 min.		695,00	
		15 min.		710,00	
		30 min.		727,00	
		1 hr.		741,00	
		2hr.		767,00	
		4hr.		[illegible]	
		6 hr.		776,50	
		8hr		[illegible]	
16/02/77		24hr		797,00	
17/02/77		48hr		816,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

Σi

FINAL VOIDS RATIO

Final M.C. _____ %

Σf

CONSOLIDATION COEFFICIENT

C_v = _____ Cm^2/min

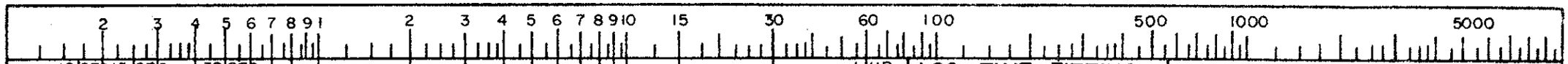
(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked _____

LOG TIME SCALE IN MINUTES



1 cm = _____ Divisions

LOG TIME FITTING

t_{50} = _____ min.

$C = \frac{0.197}{t_{50}} \times H^2 \quad \frac{cm^2}{min.}$

C = _____ $\frac{cm^2}{min.}$

SQUARE ROOT OF TIME FITTING

Average movement for $\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____ $\frac{1}{10.000}$ "

Corrected Total Movement = _____ $\frac{1}{10.000}$ "

μ degree Consolidation for $\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____

$C = \mu^2_{\pi/4} \times A^2$ = _____ $\frac{cm^2}{min.}$

2 HR.	4 HR.	6 HR.	8 HR.	24 HR.	48 HR.	72 HR.

ROOT TIME LINEAR SCALE IN ROOT MINUTES

CONSOLIDATION TEST

LOC. No. ANEL Nº 1 SAMPLE No. 11,50 METROS DATE 24/02/77

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD 4P ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 12.000,00 g kg.

DRAINAGE PATH CALCULATION

Ho = 1,61158 cm. H1 = 1,44461 cm. $\bar{H} = \frac{Ho+Hi}{2}$ = 2,76655 cm $\bar{H}^2$ = 2,58659 cm²

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 425,70 g.

Weight of Ring 344,70 g.

Weight of Wet Sample 81,00 g.

Weight of Dry Sample 43,00 g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) 497,50 g.

Weight of Dry Sample Watch Class ( ) _____ g.

Weight of Watch Glass 82,10 g.

Weight of Dry Sample 42,00 g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading 1 10,000"	$\sum d H$
24/02/77		0		1516,00	
		10 sec.		1620,00	
		15 sec.		1624,00	
		30 sec.		1638,00	
		1 min.		1647,00	
		2 min.		1662,00	
		4 min.		1695,00	
		8 min.		1736,00	
		15 min.		1786,00	
		30 min.		1866,00	
		1 hr.		1961,50	
		2hr.		2041,50	
		4hr.		2140,00	
		6 hr.		2195,00	
		8 hr.		2217,00	
25/02/77		24 hr.		2234,00	
26/02/77		48 hr.		2264,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

$\sum i$

FINAL VOIDS RATIO

Final M.C. _____ %

$\sum f$

CONSOLIDATION COEFFICIENT

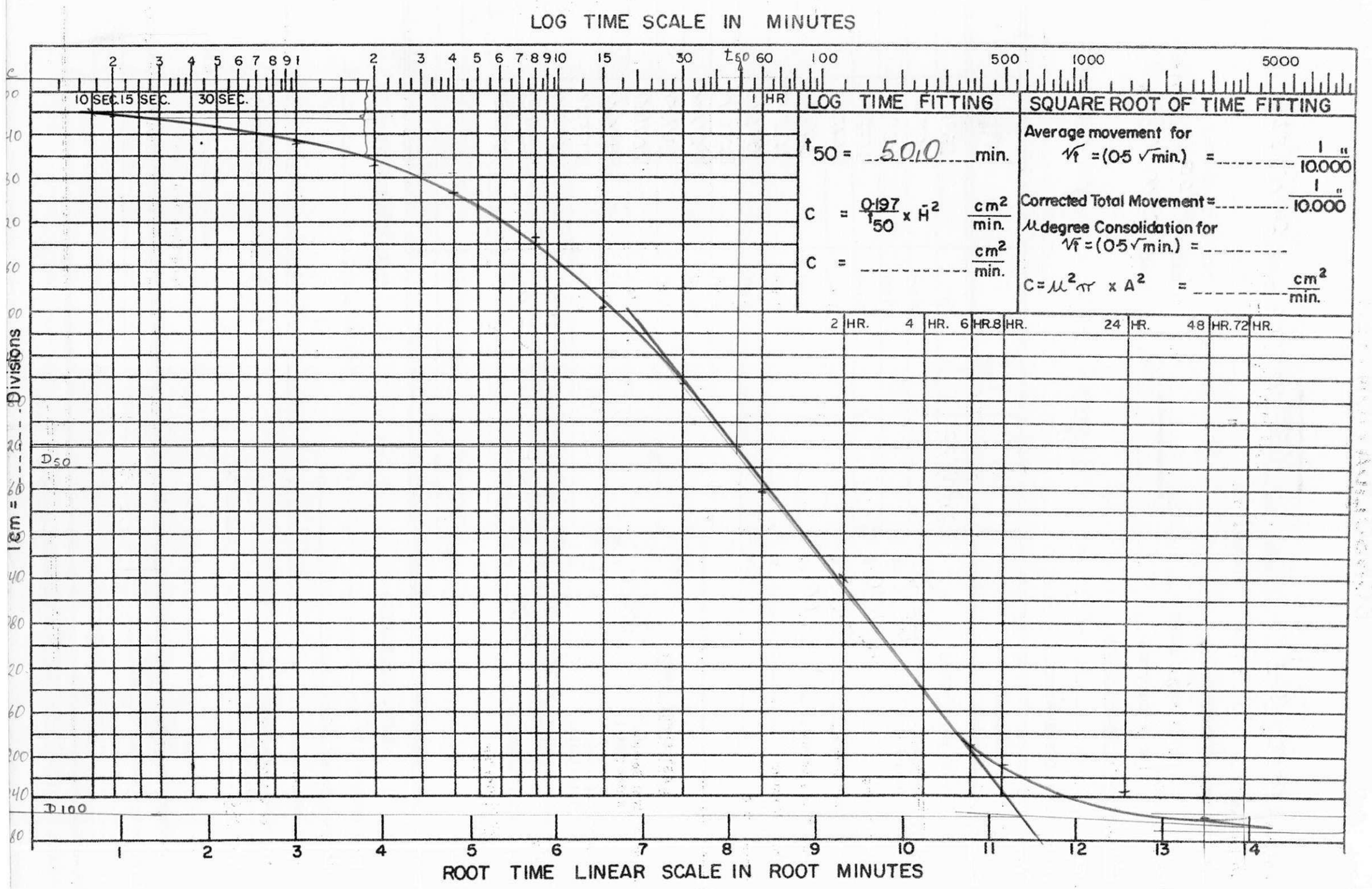
C_v = _____ Cm^2/min

(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked _____


LOG TIME SCALE IN MINUTES
2 3 4 5 6 7 8 9 1 2 3 4 5 6 7 8 9 10 15 30 t50 60 100 500 1000 5000
10 SEC. 15 SEC. 30 SEC. 1 HR
LOG TIME FITTING
t50 = 50.0 min.
C = 0.197 / t50 x H̄² cm²/min.
C = ---------- cm²/min.
SQUARE ROOT OF TIME FITTING
Average movement for √t = (0.5 √min.) = ---------- 1" / 10.000
Corrected Total Movement = ---------- 1" / 10.000
μ degree Consolidation for √t = (0.5 √min.) = ----------
C = μ² π x A² = ---------- cm²/min.
2 HR. 4 HR. 6 HR. 8 HR. 24 HR. 48 HR. 72 HR.
1 cm = ---- Divisions
D50
D100
1 2 3 4 5 6 7 8 9 10 11 12 13 14
ROOT TIME LINEAR SCALE IN ROOT MINUTES

CONSOLIDATION TEST

LOC. No. ANEL Nº 1 SAMPLE No. 11,50 METROS DATE 17/02/77

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD 2P ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 6.000,00 g lb.

DRAINAGE PATH CALCULATION

Ho = 1.813 cm. H1 = 1.6158 cm. $\bar{H} = \frac{Ho + H1}{2}$ = 0.8574 cm $\bar{H}^2$ = 2,7352 cm²

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 425,70 g.

Weight of Ring 344,70 g.

Weight of Wet Sample 81,00 g.

Weight of Dry Sample 43,00 g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) 497,50 g.

Weight of Dry Sample Watch Glass ( ) _____ g.

Weight of Watch Glass 88,10 g.

Weight of Dry Sample 43,00 g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading 1 10,000"	$\sum d H$
17/02/77		0		816,00	
		10 sec.		835,00	
		15 sec.		840,00	
		30 sec.		848,00	
		1 min.		860,00	
		2 min.		878,50	
		4 min.		906,00	
		8 min.		947,00	
		15 min.		997,00	
		30 min.		1081,50	
		1 hr.		1200,00	
		2hr.		1316,00	
		4hr.		1445,00	
		6 hr.		1490,00	
		8 hr		1522,00	
18/02/77		24hr		1563,00	
19/02/77		48hr		1596,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

$\sum i$

FINAL VOIDS RATIO

Final M.C. _____ %

$\sum f$

CONSOLIDATION COEFFICIENT

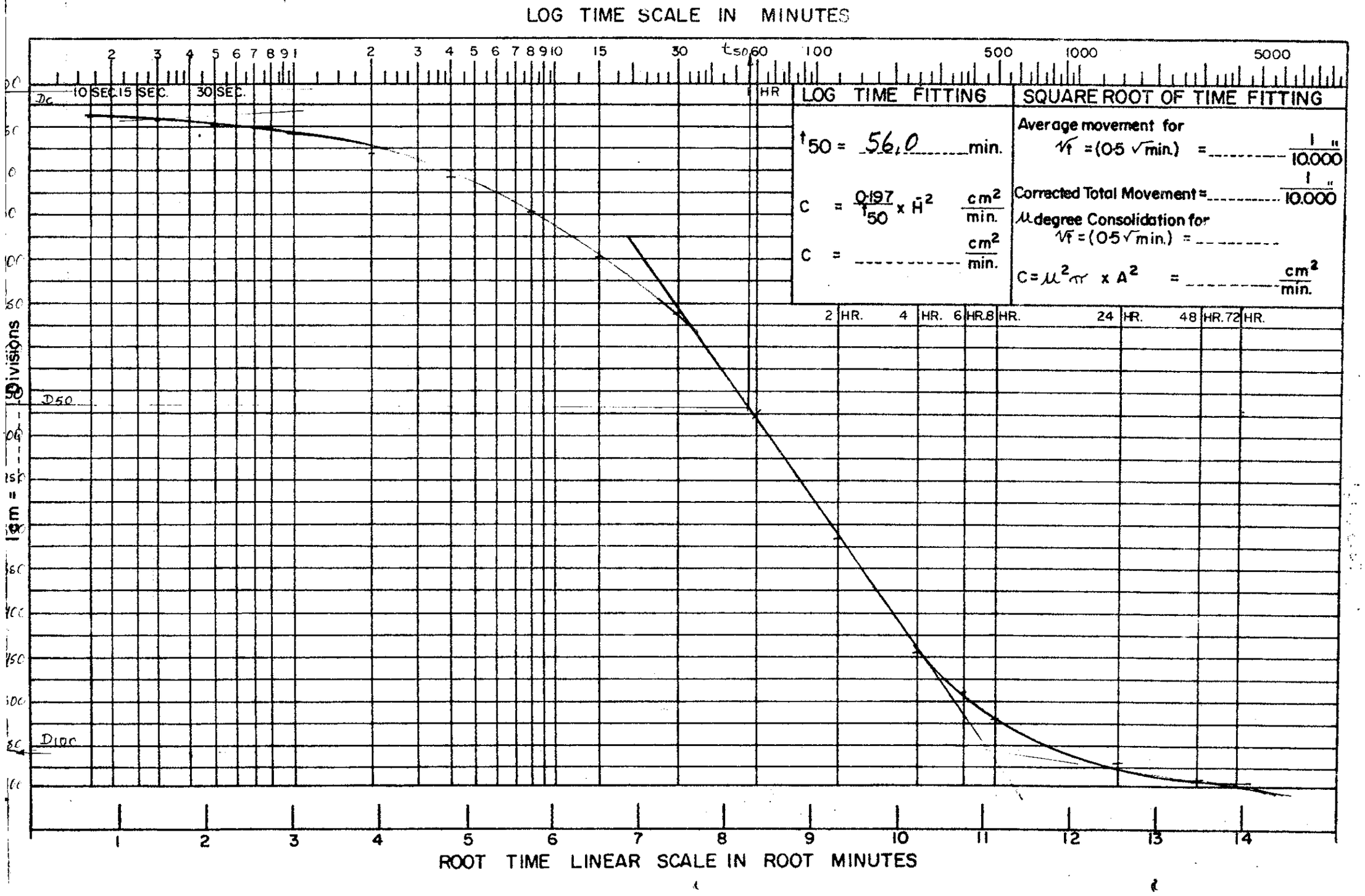
C_v = _____ Cm²/min

(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked _____


LOG TIME SCALE IN MINUTES
2 3 4 5 6 7 8 9 1 2 3 4 5 6 7 8 9 10 15 30 t50 60 100 500 1000 5000
Dc
10 SEC. 15 SEC. 30 SEC. 1 HR
LOG TIME FITTING
t50 = 56.0 min.
C = 0.197 / t50 x H̄² cm²/min.
C = ---------- cm²/min.
SQUARE ROOT OF TIME FITTING
Average movement for √t = (0.5 √min.) = ---------- 1" / 10.000
Corrected Total Movement = ---------- 1" / 10.000
μ degree Consolidation for √t = (0.5 √min.) = ---------
C = μ² π x A² = ---------- cm²/min.
2 HR. 4 HR. 6 HR. 8 HR. 24 HR. 48 HR. 72 HR.
D50
D100
Divisions
1 cm =
1 2 3 4 5 6 7 8 9 10 11 12 13 14
ROOT TIME LINEAR SCALE IN ROOT MINUTES

CONSOLIDATION TEST

LOC. No. PANEL Nº 1 SAMPLE No. 11,50 METROS DATE 26/02/77

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD 8P ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 24.000,00g lb.

DRAINAGE PATH CALCULATION

H_o = 1.4461 cm. H_1 = 1.3078 cm. $\bar{H} = \frac{H_o + H_1}{2}$ = 0.6885 cm $\bar{H}^2$ = 0.4740 cm²

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 425,70 g.

Weight of Ring 344,70 g.

Weight of Wet Sample 81,00 g.

Weight of Dry Sample 43,00 g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) 497,50 g.

Weight of Dry Sample Watch Class ( ) _____ g.

Weight of Watch Glass 88,10 g.

Weight of Dry Sample 43,00 g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading 1 10,000"	$\sum d H$
26/02/77		0		2344,00	
		10 sec.		2306,00	
		15 sec.		2306,00	
		30 sec.		2319,00	
		1 min.		2333,00	
		2 min.		2366,00	
		4 min.		2404,00	
		8 min.		2452,00	
		15 min.		2500,00	
		30 min.		2602,50	
		1 hr.		2675,50	
		2hr.		2733,00	
		4hr.		2757,00	
		6 hr.		2767,00	
		8hr		2779,00	
27/02/77		24hr		2792,00	
28/02/77		48hr		2808,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

$\sum i$

FINAL VOIDS RATIO

Final M.C. _____ %

$\sum f$

CONSOLIDATION COEFFICIENT

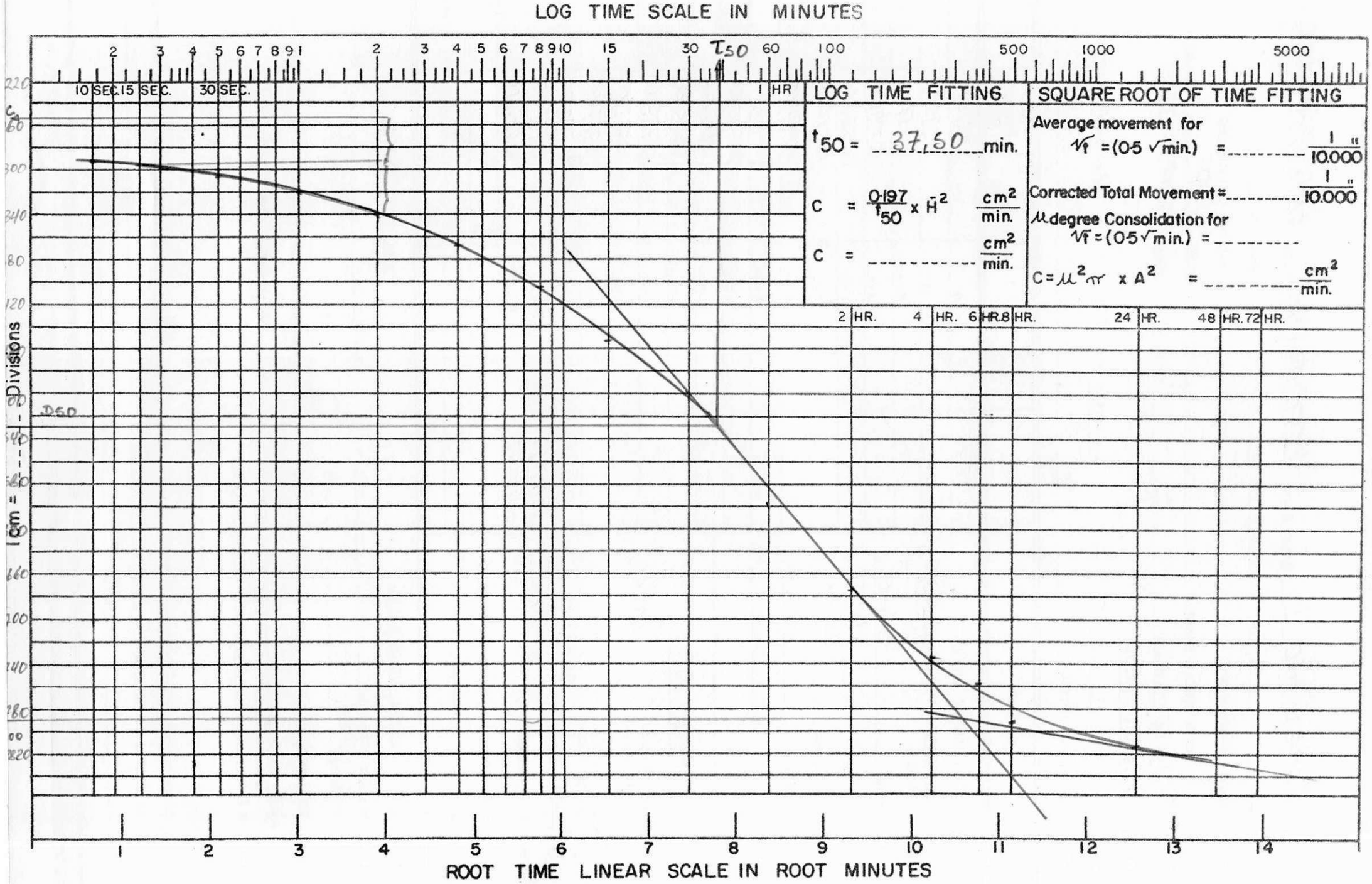
C_v = _____ Cm²/min

(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked _____


LOG TIME SCALE IN MINUTES
2 3 4 5 6 7 8 9 1 2 3 4 5 6 7 8 9 10 15 30 t_{50} 60 100 500 1000 5000
10 SEC. 15 SEC. 30 SEC. 1 HR
LOG TIME FITTING
t_{50} = 37.50 min.
$C = \frac{0.197}{t_{50}} \times H^2 \quad \frac{cm^2}{min.}$
$C = \_\_\_\_\_ \frac{cm^2}{min.}$
SQUARE ROOT OF TIME FITTING
Average movement for $\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____ $\frac{1}{10.000}$ "
Corrected Total Movement = _____ $\frac{1}{10.000}$ "
μ degree Consolidation for $\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____
$C = \mu^2 \pi \times A^2$ = _____ $\frac{cm^2}{min.}$
2 HR. 4 HR. 6 HR. 8 HR. 24 HR. 48 HR. 72 HR.
D50
1 cm = ---- Divisions
1 2 3 4 5 6 7 8 9 10 11 12 13 14
ROOT TIME LINEAR SCALE IN ROOT MINUTES

P R O F U N D I D A D E - 1 2 , 5 0 M E T R O S

P O N T O - " J "

A N E L 3

C R O N O G R A M A DE CA R R E G A ME N T O

INICIO - P/8

Carregamento - P/8 - P/4 - P/2 - P.

Cescarregamento - P/2 - P/4.

Carregamento - P/2 - P - 2P - 4P - 8P.

CONSOLIDATION TEST

LOC. No. ANEL - 3 SAMPLE No. 12,50 M DATE 01/03/77

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD P/8 ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 430,009 lb.

DRAINAGE PATH CALCULATION

Ho = 2,000 cm. H1 = 1,9673 cm. $\bar{H} = \frac{Ho + H1}{2} = 0,3909$ cm $\bar{H}^2 = 0,9819$ cm²

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 423,30 g.

Weight of Ring 344,70 g.

Weight of Wet Sample 78,60 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) 404,20 g.

Weight of Dry Sample Watch Class ( ) 385,70 g.

Weight of Watch Glass _____ g.

Weight of Dry Sample 41,00 g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading I 10,000"	$\sum d H$
01/03/77		0		0,00	
		10 sec.		57,00	
		15 sec.		60,00	
		30 sec.		65,00	
		1 min.		71,00	
		2 min.		77,50	
		4 min.		86,50	
		8 min.		96,00	
		15 min.		109,00	
		30 min.		113,00	
		1 hr.		119,00	
		2hr.		125,00	
		4hr.		129,00	
		6 hr.		132,00	
		8hr		135,00	
02/03/77		24hr		140,00	
03/03/77		48hr		143,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

$\sum i$

FINAL VOIDS RATIO

Final M.C. _____ %

$\sum f$

CONSOLIDATION COEFFICIENT

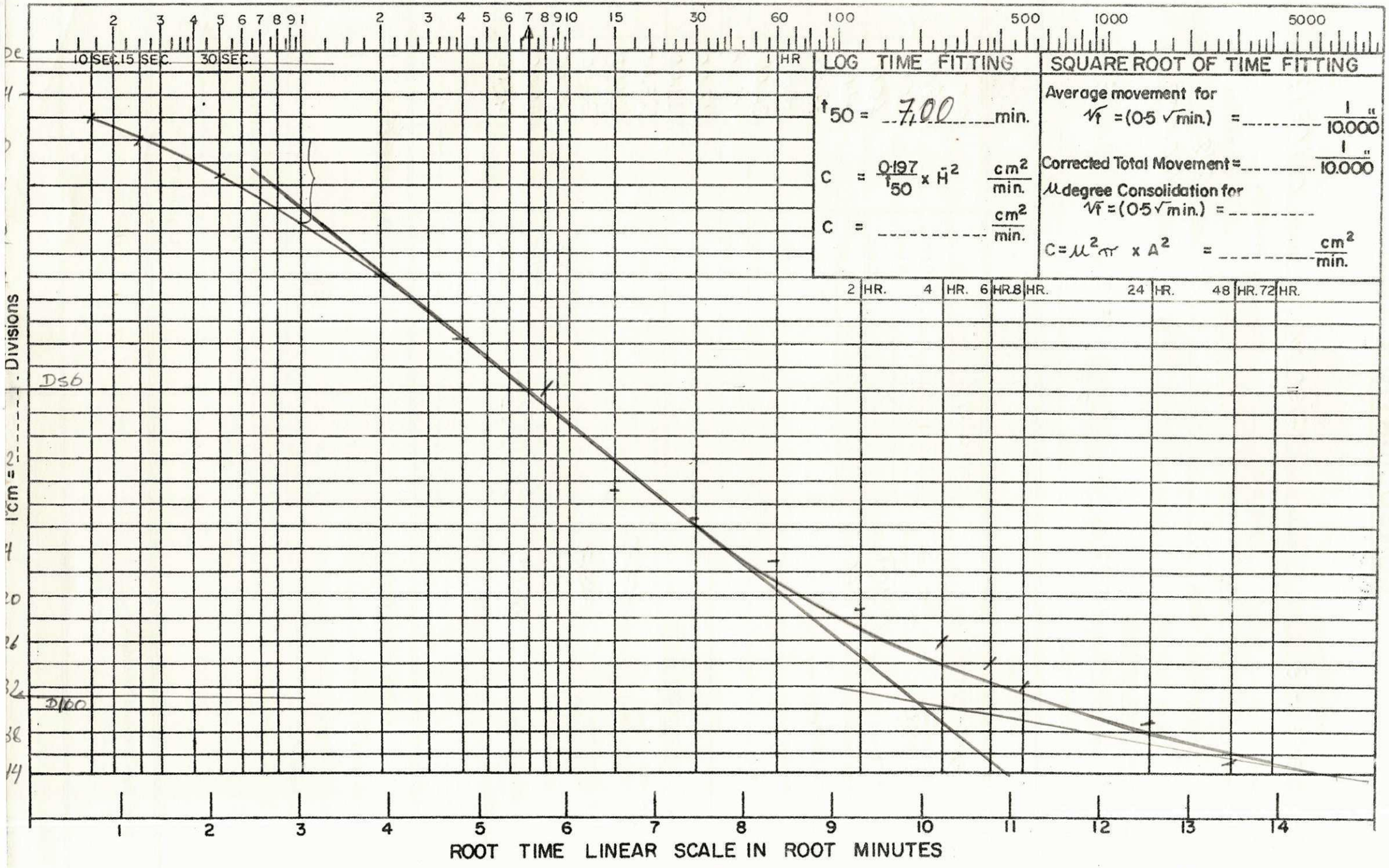
C_v = _____ Cm^2/min

(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked


LOG TIME SCALE IN MINUTES
2 3 4 5 6 7 8 9 1 2 3 4 5 6 7 8 9 10 15 30 60 100 500 1000 5000
10 SEC. 15 SEC. 30 SEC. 1 HR
LOG TIME FITTING
t_{50} = 700 min.
C = $\frac{0.197}{t_{50}} \times H^2$ $\frac{cm^2}{min.}$
C = _____ $\frac{cm^2}{min.}$
SQUARE ROOT OF TIME FITTING
Average movement for
$\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____ $\frac{1}{10.000}$ "
Corrected Total Movement = _____ $\frac{1}{10.000}$ "
μ degree Consolidation for
$\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____
C = $\mu^2 \pi \times A^2$ = _____ $\frac{cm^2}{min.}$
2 HR. 4 HR. 6 HR. 8 HR. 24 HR. 48 HR. 72 HR.
D50
D100
1cm = _____ Divisions
1 2 3 4 5 6 7 8 9 10 11 12 13 14
ROOT TIME LINEAR SCALE IN ROOT MINUTES

CONSOLIDATION TEST

LOC. No. ANEL 3 SAMPLE No. 12,50 m DATE 11/03/77

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) DESCARBONAMIENTO LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD [illegible] ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD [illegible] lb.

DRAINAGE PATH CALCULATION

Ho= [illegible] cm. H_1 = 1,2638 cm. $\bar{H} = \frac{Ho+H1}{2}$ = 0,9508 cm $\bar{H}^2$ = 0,9041 cm²

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 423,30 g.

Weight of Ring 344,70 g.

Weight of Wet Sample 78,60 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) 404,20 g.

Weight of Dry Sample Watch Glass ( ) 388,70 g.

Weight of Watch Glass _____ g.

Weight of Dry Sample 41,00 g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading 1 10,000"	Σ d H
[illegible]		0		[illegible]	
		10 sec.		[illegible]	
		15 sec.		1143,00	
		30 sec.		[illegible]	
		1 min.		[illegible]	
		2 min.		1114,00	
		4 min.		[illegible]	
		8 min.		[illegible]	
		15 min.		1134,00	
		30 min.		[illegible]	
		1 hr.		1118,00	
		2hr.		1110,00	
		4hr.		1103,00	
		6 hr.		1101,00	
		24hr		1099,00	
12/03/77		[illegible]		1091,00	
13/03/77		[illegible]		1085,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

Σi

FINAL VOIDS RATIO

Final M.C. _____ %

Σf

CONSOLIDATION COEFFICIENT

C_v = _____ Cm²/min

(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked _____

LOG TIME SCALE IN MINUTES

2 3 4 5 6 7 8 9 1 2 3 4 5 6 7 8 9 10 15 30 60 100 500 1000 5000

10 SEC. 15 SEC. 30 SEC. 1 HR

1 cm = _____ DIVISIONS

LOG TIME FITTING

t_{50} = _____ min.

$C = \frac{0.197}{t_{50}} \times H^2$ $\frac{cm^2}{min.}$

C = _____ $\frac{cm^2}{min.}$

SQUARE ROOT OF TIME FITTING

Average movement for $\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____ $\frac{1}{10.000}$ "

Corrected Total Movement = _____ $\frac{1}{10.000}$ "

μ degree Consolidation for $\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____

$C = \mu^2 \pi \times A^2$ = _____ $\frac{cm^2}{min.}$

2 HR. 4 HR. 6 HR. 8 HR. 24 HR. 48 HR. 72 HR.

1 2 3 4 5 6 7 8 9 10 11 12 13 14

ROOT TIME LINEAR SCALE IN ROOT MINUTES

CONSOLIDATION TEST

LOC. No. ANEL Nº 3 SAMPLE No. 12,50 m DATE 13/03/77

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD _____ ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 1.670,00 lb.

DRAINAGE PATH CALCULATION

Ho= illegible cm. H1= illegible cm. $\bar{H} = \frac{Ho+H1}{2 \times 4}$ = 0,9743 cm $\bar{H}^2$ = 0,9493 cm²

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 423,30 g.

Weight of Ring 344,70 g.

Weight of Wet Sample 76,60 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) 464,30 g.

Weight of Dry Sample Watch Glass ( ) 388,70 g.

Weight of Watch Glass _____ g.

Weight of Dry Sample 41,60 g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading 1 10,000"	$\sum d H$
13/03/77		0		1085,00	
		10 sec.		illegible	
		15 sec.		illegible	
		30 sec.		illegible	
		1 min.		illegible	
		2 min.		1097,00	
		4 min.		1102,00	
		8 min.		illegible	
		15 min.		1111,00	
		30 min.		illegible	
		1 hr.		1120,00	
		2hr.		illegible	
		4hr.		1132,00	
		6 hr.		1133,00	
		illegible		1136,00	
illegible		24hr		1137,00	
15/03/77		48hr		1138,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

$\sum i$

FINAL VOIDS RATIO

Final M.C. _____ %

$\sum f$

CONSOLIDATION COEFFICIENT

C_v = _____ Cm^2/min

(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked

LOG TIME SCALE IN MINUTES

2 3 4 5 6 7 8 9 1 2 3 4 5 6 7 8 9 10 15 30 60 100 500 1000 5000

10 SEC. 15 SEC. 30 SEC. 1 HR

1 cm = _____ Divisions

LOG TIME FITTING	SQUARE ROOT OF TIME FITTING
t_{50} = _____ min.	Average movement for $\sqrt{t}$ = (0.5 $\sqrt{\text{min.}}$) = _____ $\frac{1}{10.000}$ "
$C = \frac{0.197}{t_{50}} \times \bar{H}^2$ $\frac{cm^2}{min.}$	Corrected Total Movement = _____ $\frac{1}{10.000}$ "
C = _____ $\frac{cm^2}{min.}$	μ degree Consolidation for $\sqrt{t}$ = (0.5 $\sqrt{\text{min.}}$) = _____
	$C = \mu^2 \pi \times A^2$ = _____ $\frac{cm^2}{min.}$

2 HR. 4 HR. 6 HR. 8 HR. 24 HR. 48 HR. 72 HR.

1 2 3 4 5 6 7 8 9 10 11 12 13 14

ROOT TIME LINEAR SCALE IN ROOT MINUTES

CONSOLIDATION TEST

LOC. No. ANEL Nº 3 SAMPLE No. 12,50 M DATE 07/03/77

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD P ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 3.340,0 g lb.

DRAINAGE PATH CALCULATION

H_o = 1,8696 cm. H_1 = 1,6852 cm. $\bar{H} = \frac{H_o + H_1}{2\ 4}$ = 0,8887 cm $\bar{H}^2$ = 0,7893 cm²

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 423,20 g.

Weight of Ring 344,10 g.

Weight of Wet Sample 78,60 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) 403,80 g.

Weight of Dry Sample Watch Class ( ) 385,70 g.

Weight of Watch Glass _____ g.

Weight of Dry Sample 41,00 g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading 1 10,000"	$\sum d H$
07/03/77		0		513,00	
		10 sec.		539,00	
		15 sec.		543,00	
		30 sec.		551,00	
		1 min.		564,00	
		2 min.		583,00	
		4 min.		620,00	
		8 min.		648,00	
		15 min.		697,00	
		30 min.		769,00	
		1 hr.		865,00	
		2hr.		884,00	
		4hr.		963,50	
		6 hr.		1022,00	
		8hR		1135,00	
08/03/77		24hR		1196,00	
09/03/77		48hR		1240,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

$\sum i$

FINAL VOIDS RATIO

Final M.C. _____ %

$\sum f$

CONSOLIDATION COEFFICIENT

C_v = _____ Cm^2/min

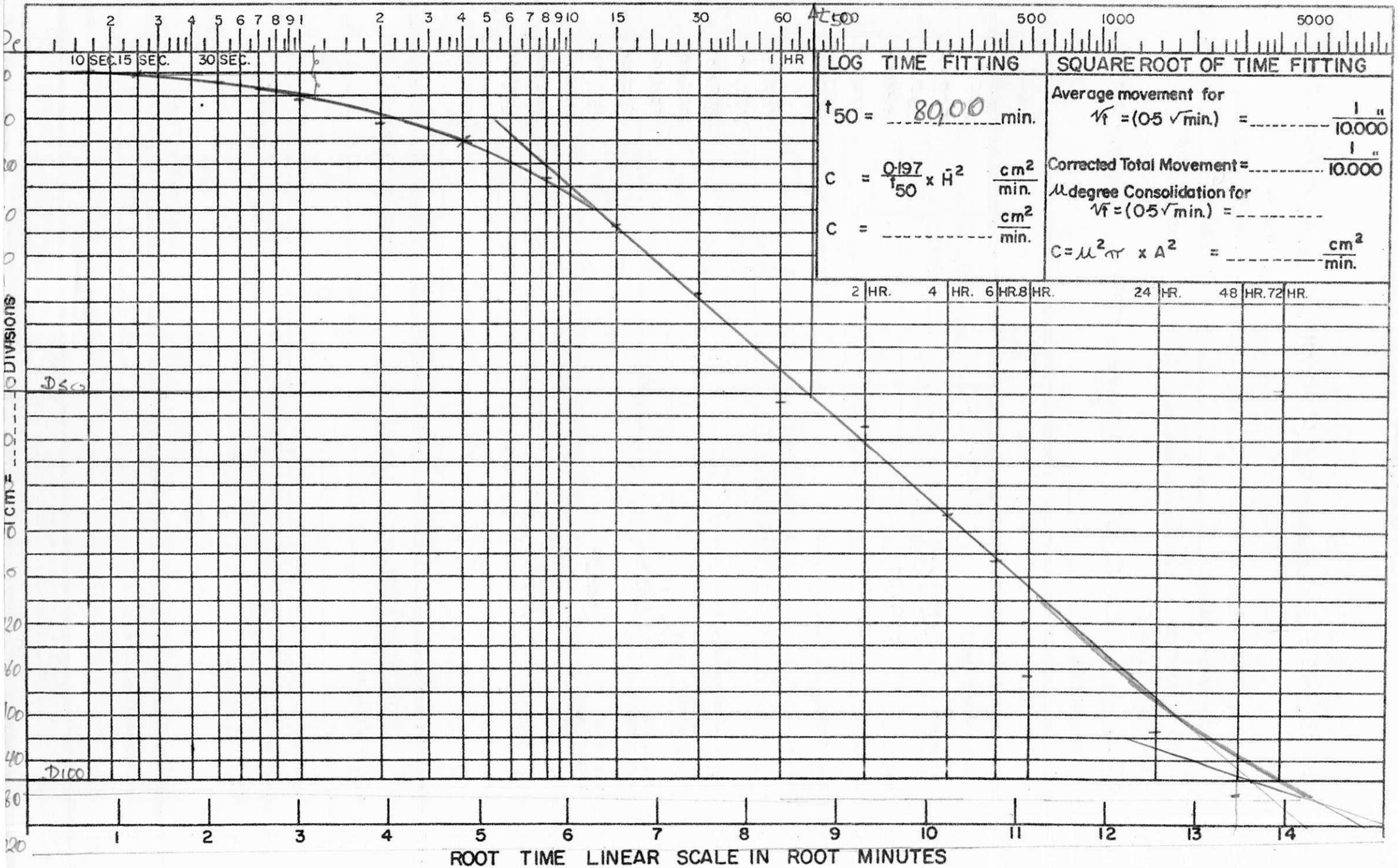
(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked _____

LOG TIME SCALE IN MINUTES



LOG TIME FITTING

t_{50} = 80.00 min.

$C = \frac{0.197}{t_{50}} \times H^2$ $\frac{cm^2}{min.}$

$C =$ _____ $\frac{cm^2}{min.}$

SQUARE ROOT OF TIME FITTING

Average movement for $\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____ $\frac{1}{10.000}$ "

Corrected Total Movement = _____ $\frac{1}{10.000}$ "

μ degree Consolidation for $\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____

$C = \mu^2 \pi \times A^2$ = _____ $\frac{cm^2}{min.}$

CONSOLIDATION TEST

LOC. No. ANEL Nº 3 SAMPLE No. 12,50 M DATE 05/03/77

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD P/2 ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 1.670,00 lb.

DRAINAGE PATH CALCULATION

Ho = _____ cm. _____ H_1 = _____ cm. $\bar{H} = \frac{Ho + H1}{2}$ = _____ cm $\bar{H}^2$ = _____ cm^2

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 423,80 g.

Weight of Ring 344,10 g.

Weight of Wet Sample 78,60 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) 404,30 g.

Weight of Dry Sample Watch Class ( ) 386,70 g.

Weight of Watch Glass _____ g.

Weight of Dry Sample 41,00 g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading I 10,000"	$\sum d H$
05/03/77		0		262,00	
		10 sec.		280,00	
		15 sec.		288,00	
		30 sec.		289,00	
		1 min.		295,00	
		2 min.		305,00	
		4 min.		316,50	
		8 min.		343,00	
		15 min.		360,00	
		30 min.		387,00	
		1 hr.		412,00	
		2hr.		438,00	
		4hr.		461,00	
		6 hr.		471,50	
		8Hr		485,00	
06/03/77		24Hr		496,00	
07/03/77		48Hr		513,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

$\sum i$

FINAL VOIDS RATIO

Final M.C. _____ %

$\sum f$

CONSOLIDATION COEFFICIENT

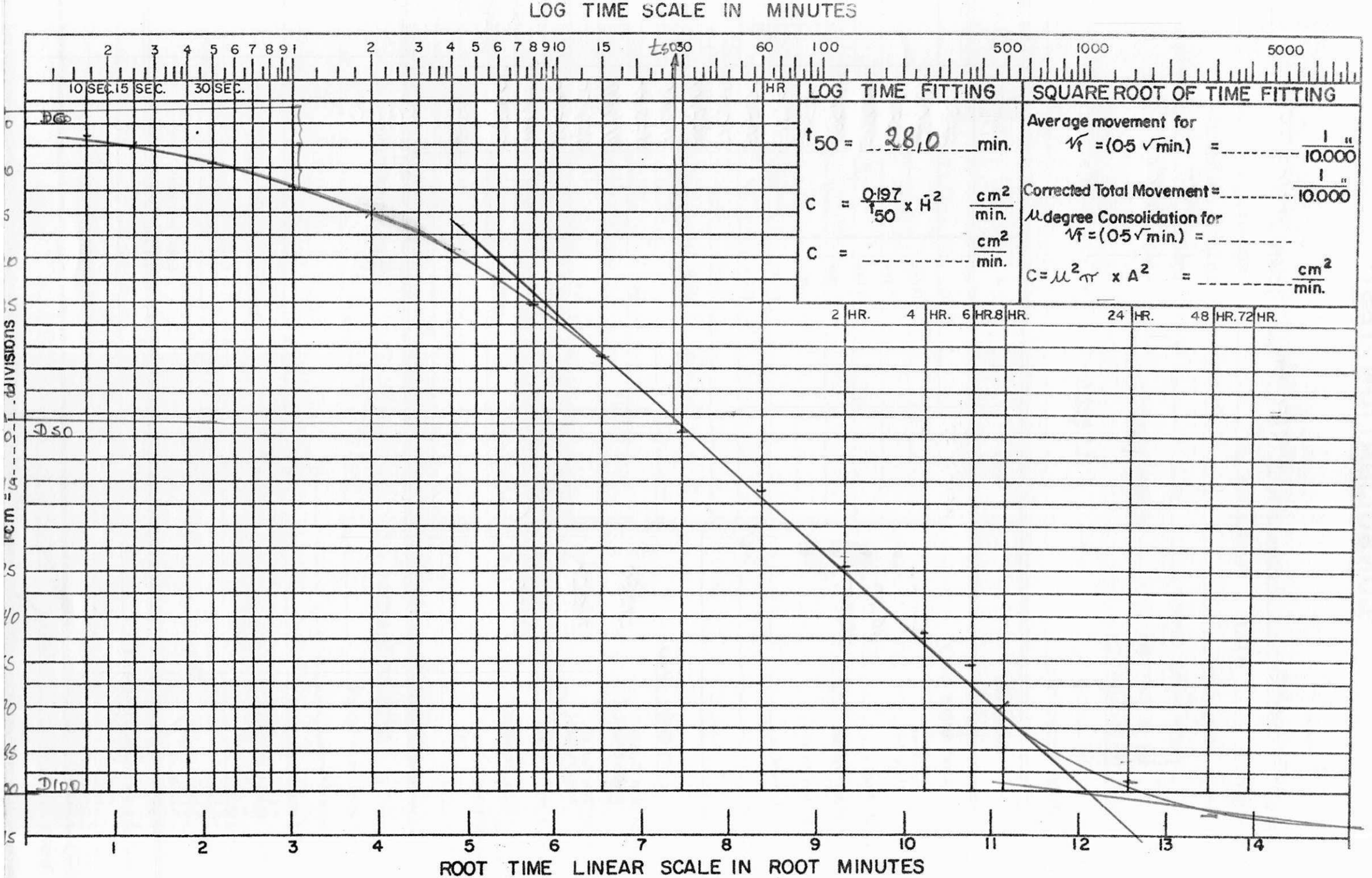
C_v = _____ Cm^2/min

(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked _____


LOG TIME SCALE IN MINUTES
2 3 4 5 6 7 8 9 1 2 3 4 5 6 7 8 9 10 15 t50 30 60 100 500 1000 5000
10 SEC. 15 SEC. 30 SEC. 1 HR
LOG TIME FITTING
t50 = 28,0 min.
C = 0.197 / t50 x H̄² cm²/min.
C = ____ cm²/min.
SQUARE ROOT OF TIME FITTING
Average movement for √t = (0.5 √min.) = ____ 1/10.000"
Corrected Total Movement = ____ 1/10.000"
μ degree Consolidation for √t = (0.5 √min.) = ____
C = μ² π x A² = ____ cm²/min.
2 HR. 4 HR. 6 HR. 8 HR. 24 HR. 48 HR. 72 HR.
D0
D50
D100
DIAL DIVISIONS = .01"
1 2 3 4 5 6 7 8 9 10 11 12 13 14
ROOT TIME LINEAR SCALE IN ROOT MINUTES

CONSOLIDATION TEST

LOC. No. ANEL Nº 3 SAMPLE No. 12150 MM DATE 03/03/77

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD P/4 ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 840,00 g lb.

DRAINAGE PATH CALCULATION

Ho = _____ cm. _____ H_1 = _____ cm. $\bar{H} = \frac{Ho + H1}{2}$ = _____ cm $\bar{H}^2$ = _____ cm^2

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 423,30 g.

Weight of Ring 344,70 g.

Weight of Wet Sample 78,60 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) 404,30 g.

Weight of Dry Sample Watch Class ( ) 365,70 g.

Weight of Watch Glass _____ g.

Weight of Dry Sample 41,00 g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading 1 10,000"	$\sum d H$
03/03/77		0		143,00	
		10 sec.		160,00	
		15 sec.		162,00	
		30 sec.		165,00	
		1 min.		170,00	
		2 min.		174,00	
		4 min.		180,00	
		8 min.		187,50	
		15 min.		196,00	
		30 min.		205,50	
		1 hr.		215,00	
		2hr.		223,50	
		4hr.		230,00	
		6 hr.		237,00	
		8hr		241,00	
04/03/77		24hr		252,00	
06/03/77		48hr		262,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

$\sum i$

FINAL VOIDS RATIO

Final M.C. _____ %

$\sum f$

CONSOLIDATION COEFFICIENT

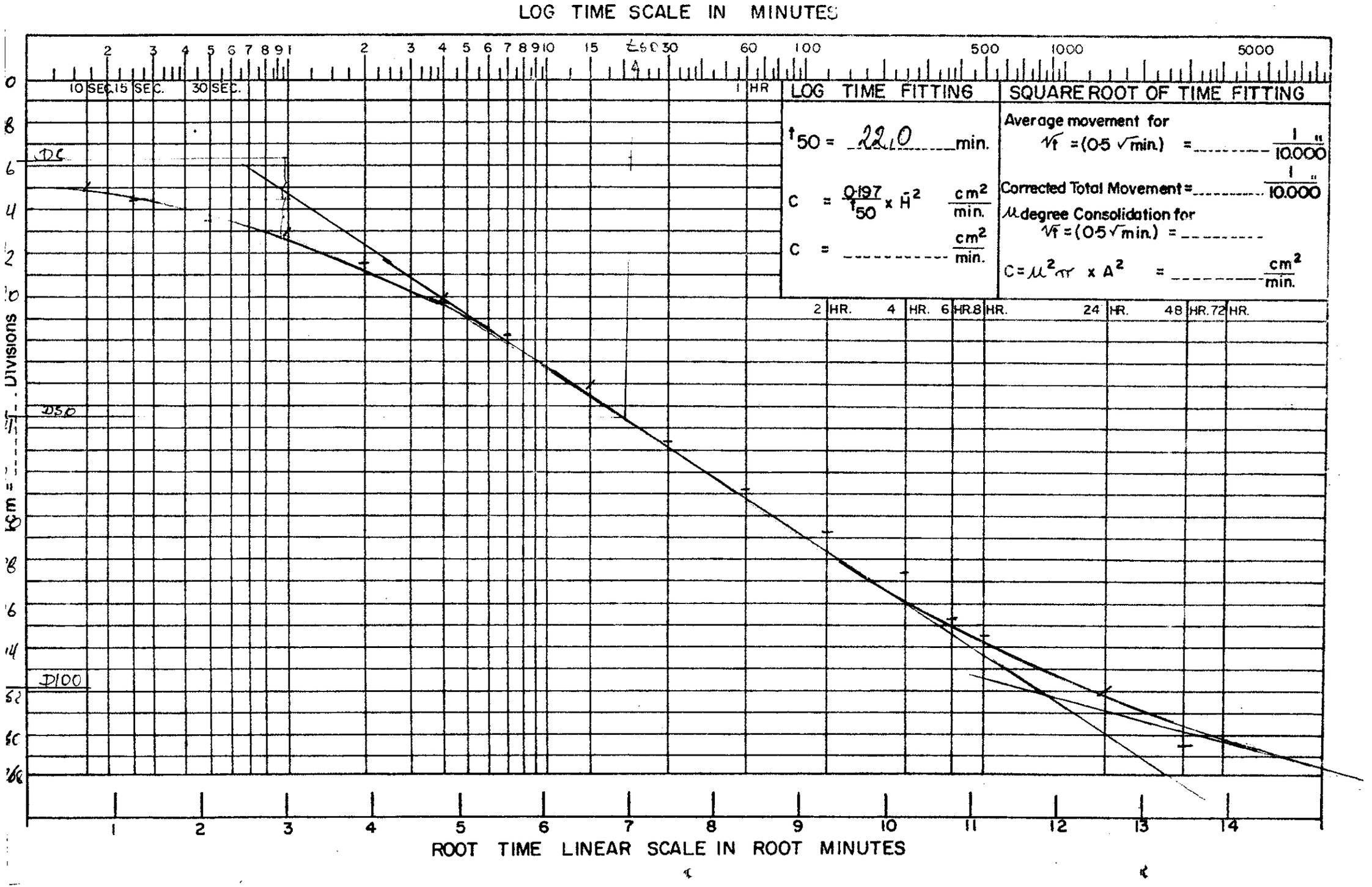
C_v = _____ Cm^2/min

(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked


LOG TIME SCALE IN MINUTES
10 SEC. 15 SEC. 30 SEC. 1 HR
2 HR. 4 HR. 6 HR. 8 HR. 24 HR. 48 HR. 72 HR.
LOG TIME FITTING
t_{50} = 22.0 min.
$C = \frac{0.197}{t_{50}} \times H^2$ cm²/min.
C = _____ cm²/min.
SQUARE ROOT OF TIME FITTING
Average movement for
$\sqrt{t}$ = (0.5 √min.) = _____ 1" / 10.000
Corrected Total Movement = _____ 1" / 10.000
μ degree Consolidation for
$\sqrt{t}$ = (0.5 √min.) = _____
$C = \mu^2_{rr} \times A^2$ = _____ cm²/min.
D0
D50
D100
Dial Divisions = _____
ROOT TIME LINEAR SCALE IN ROOT MINUTES

CONSOLIDATION TEST

LOC. No. ANEL - NO 3 SAMPLE No. 12,50 MM DATE 09/03/77

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) DESCHARGAMENTO LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD F/C ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 1.670,00 g lb.

DRAINAGE PATH CALCULATION

Ho = _____ cm. _____ H_1 = _____ cm. $\bar{H} = \frac{Ho + H1}{2}$ = _____ cm $\bar{H}^2$ = _____ cm^2

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 423,20 g.

Weight of Ring 244,10 g.

Weight of Wet Sample 178,10 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) 403,30 g.

Weight of Dry Sample Watch Class ( ) 385,70 g.

Weight of Watch Glass _____ g.

Weight of Dry Sample 141,00 g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading 1 10,000"	Σ d H
[illegible]		0		1240,00	
		10 sec.		1229,00	
		15 sec.		1228,00	
		30 sec.		1226,00	
		1 min.		1226,00	
		2 min.		1219,00	
		4 min.		1212,00	
		8 min.		1206,00	
		15 min.		1198,00	
		30 min.		1192,00	
		1 hr.		1187,00	
		2hr.		1184,00	
		4hr.		1181,50	
		6 hr.		1179,00	
		[illegible]		1178,00	
10/03/77				1176,00	
11/03/77				1173,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

Σ_i

FINAL VOIDS RATIO

Final M.C. _____ %

Σ_f

CONSOLIDATION COEFFICIENT

C_v = _____ Cm^2/min

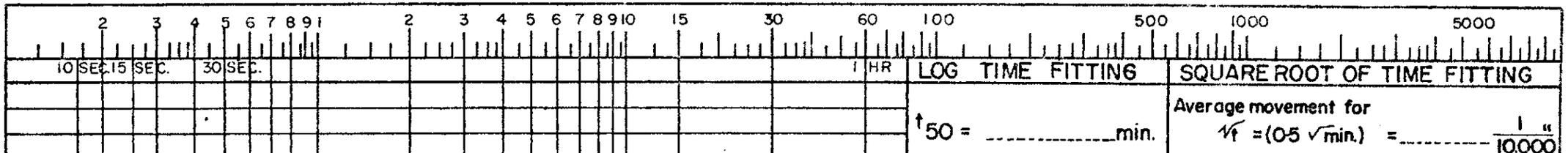
(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked

LOG TIME SCALE IN MINUTES



LOG TIME FITTING

t_{50} = _____ min.

$C = \frac{0.197}{t_{50}} \times H^2$ $\frac{cm^2}{min.}$

C = _____ $\frac{cm^2}{min.}$

SQUARE ROOT OF TIME FITTING

Average movement for $\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____ $\frac{1}{10.000}$ "

Corrected Total Movement = _____ $\frac{1}{10.000}$ "

μ degree Consolidation for $\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____

$C = \mu^2 \pi \times A^2$ = _____ $\frac{cm^2}{min.}$

2 HR. 4 HR. 6 HR. 8 HR. 24 HR. 48 HR. 72 HR.

1 cm = _____ Divisions

1 2 3 4 5 6 7 8 9 10 11 12 13 14

ROOT TIME LINEAR SCALE IN ROOT MINUTES

CONSOLIDATION TEST

LOC. No. ANEL - Nº 3 SAMPLE No. 12,50 M1 DATE 15/03/77

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD 1 ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 3.340,00 lb.

DRAINAGE PATH CALCULATION

Ho = 1,8698 cm. H1 = 1,6852 cm. $\bar{H} = \frac{Ho + H1}{2} = 0,8887$ cm $\bar{H}^2 = 0,7899$ cm²

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 428,20 g.

Weight of Ring 344,70 g.

Weight of Wet Sample 76,00 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) 404,80 g.

Weight of Dry Sample Watch Glass ( ) 386,70 g.

Weight of Watch Glass _____ g.

Weight of Dry Sample 41,00 g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading 1 10,000"	Σ d H
15/03/77		0		1136,00	
		10 sec.		1147,00	
		15 sec.		1149,00	
		30 sec.		1157,00	
		1 min.		1164,00	
		2 min.		1173,00	
		4 min.		1186,00	
		8 min.		1197,00	
		15 min.		1200,00	
		30 min.		1214,00	
		1 hr.		1[illegible]	
		2hr.		1233,00	
		4hr.		1245,00	
		6 hr.		1253,00	
		8hr		1266,60	
[illegible]		[illegible]		1279,00	
[illegible]		[illegible]		1295,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

Σi

FINAL VOIDS RATIO

Final M.C. _____ %

Σf

CONSOLIDATION COEFFICIENT

C_v = _____ Cm^2/min

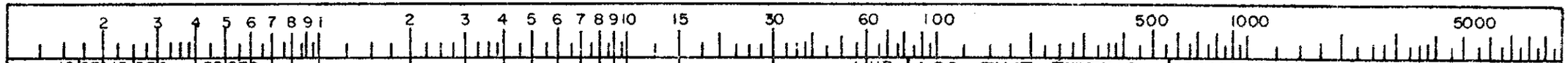
(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked _____

LOG TIME SCALE IN MINUTES



LOG TIME FITTING

t_{50} = _____ min.

$C = \frac{0.197}{t_{50}} \times H^2$ $\frac{cm^2}{min.}$

C = _____ $\frac{cm^2}{min.}$

SQUARE ROOT OF TIME FITTING

Average movement for $\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____ $\frac{1}{10.000}$"

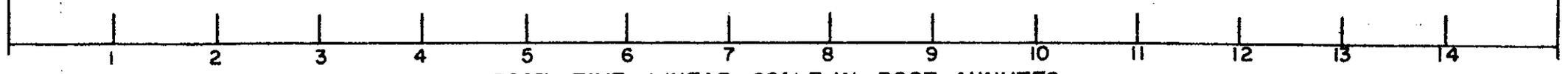
Corrected Total Movement = _____ $\frac{1}{10.000}$"

μ degree Consolidation for $\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____

$C = \mu^2_{\pi/4} \times A^2$ = _____ $\frac{cm^2}{min.}$

2 HR. 4 HR. 6 HR. 8 HR. 24 HR. 48 HR. 72 HR.

1 cm = _____ Divisions



ROOT TIME LINEAR SCALE IN ROOT MINUTES

CONSOLIDATION TEST

LOC. No. ANEL Nº 3 SAMPLE No. 12150 M1 DATE 17/03/77

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD 2P ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 6.680,000 lb.

DRAINAGE PATH CALCULATION

Ho = 1.6711 cm. H_1 = 1.4867 cm. $\bar{H} = \frac{Ho + H1}{2} = \frac{}{4}$ = 0.7894 cm $\bar{H}^2$ = 0.6232 cm²

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 423,30 g.

Weight of Ring 344,70 g.

Weight of Wet Sample 78,60 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) 404,30 g.

Weight of Dry Sample Watch Class ( ) 386,70 g.

Weight of Watch Glass 41,00 g.

Weight of Dry Sample 41,00 g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading 1 10,000"	$\sum d H$
17/03/77		0		1295,00	
		10 sec.		1314,00	
		15 sec.		1317,00	
		30 sec.		1327,00	
		1 min.		1339,00	
		2 min.		1358,00	
		4 min.		1387,00	
		8 min.		1428,00	
		15 min.		1480,00	
		30 min.		1581,00	
		1 hr.		1678,00	
		2hr.		1785,00	
		4hr.		1853,00	
		6 hr.		1935,00	
		8hr		1965,00	
18/03/77		24hr		1996,00	
19/03/77		48hr		2021,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

$\sum i$

FINAL VOIDS RATIO

Final M.C. _____ %

$\sum f$

CONSOLIDATION COEFFICIENT

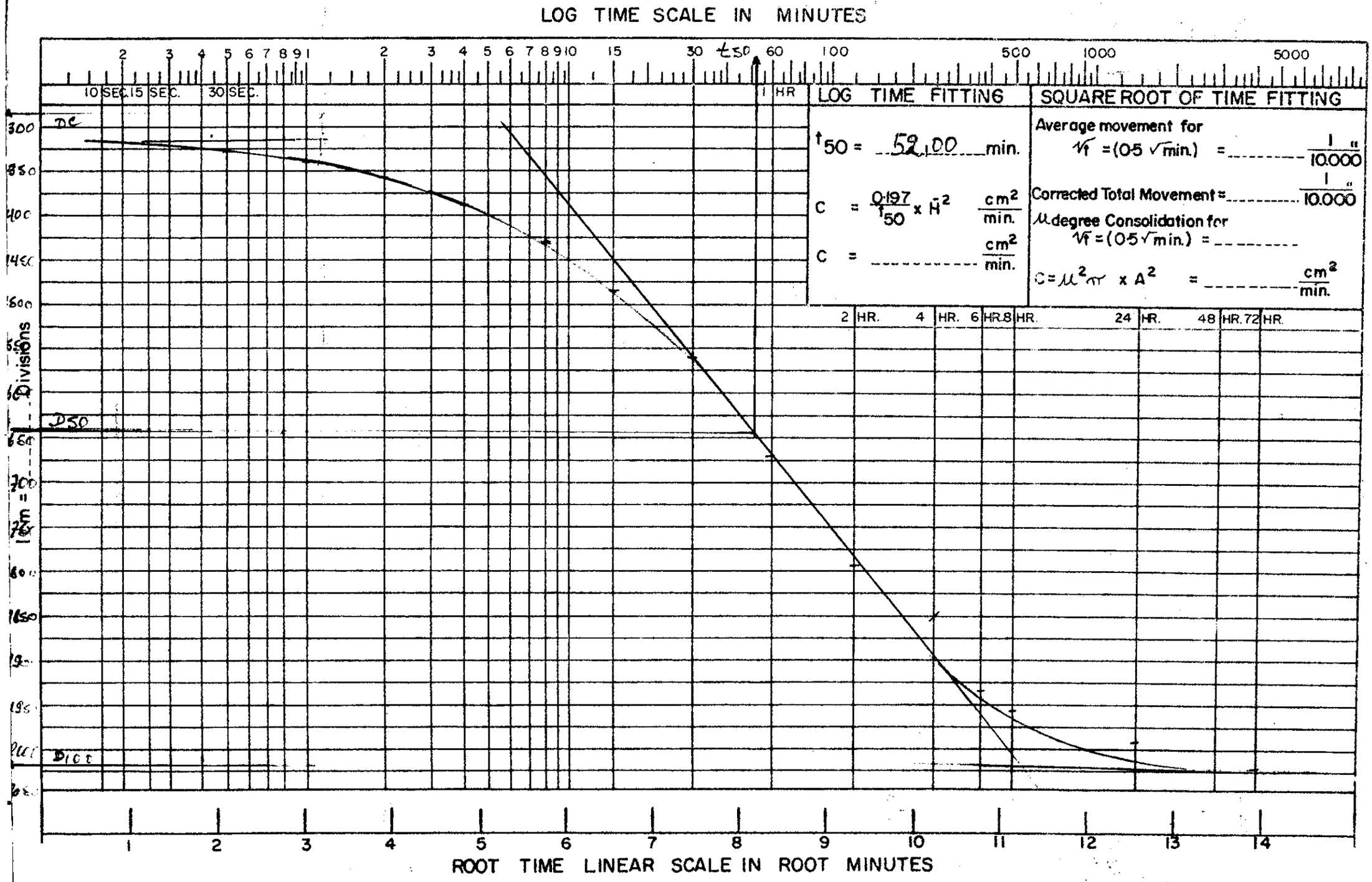
C_v = _____ Cm²/min

(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked _____


LOG TIME SCALE IN MINUTES
2 3 4 5 6 7 8 9 1 2 3 4 5 6 7 8 9 10 15 30 t50 60 100 500 1000 5000
10 SEC. 15 SEC. 30 SEC. 1 HR
LOG TIME FITTING
t50 = 52.00 min.
C = 0.197/t50 x H̄² cm²/min.
C = cm²/min.
SQUARE ROOT OF TIME FITTING
Average movement for √t = (0.5 √min.) = 1/10.000 "
Corrected Total Movement = 1/10.000 "
μ degree Consolidation for √t = (0.5 √min.) =
C = μ² π x A² = cm²/min.
2 HR. 4 HR. 6 HR. 8 HR. 24 HR. 48 HR. 72 HR.
D0
D50
D100
Divisions
1 2 3 4 5 6 7 8 9 10 11 12 13 14
ROOT TIME LINEAR SCALE IN ROOT MINUTES

CONSOLIDATION TEST

LOC. No. ANEL Nº 3 SAMPLE No. 2180 AU DATE 19/03/77

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD 4P ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 13.380,00 lb.

DRAINAGE PATH CALCULATION

Ho = 1.4667 cm. H_1 = 1.3208 cm. $\bar{H} = \frac{Ho+H1}{2}$ = 0,7044 cm $\bar{H}^2$ = 0,4961 cm²

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 423,30 g.

Weight of Ring 344,70 g.

Weight of Wet Sample 78,60 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) 404,30 g.

Weight of Dry Sample Watch Class ( ) 365,70 g.

Weight of Watch Glass _____ g.

Weight of Dry Sample 41,60 g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading 1 10,000"	Σ d H
19/03/77		0		[illegible]	
		10 sec.		2042,00	
		15 sec.		[illegible]51,00	
		30 sec.		2061,00	
		1 min.		2074,00	
		2 min.		2093,00	
		4 min.		2121,00	
		8 min.		2161,00	
		15 min.		2212,00	
		30 min.		2283,00	
		1 hr.		2385,00	
		2hr.		2478,00	
		4hr.		2555,00	
		6 hr.		2671,50	
		[illegible]		2597,00	
20/03/77		[illegible]		2620,00	
21/03/77		[illegible]		2635,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

Σi

FINAL VOIDS RATIO

Final M.C. _____ %

Σf

CONSOLIDATION COEFFICIENT

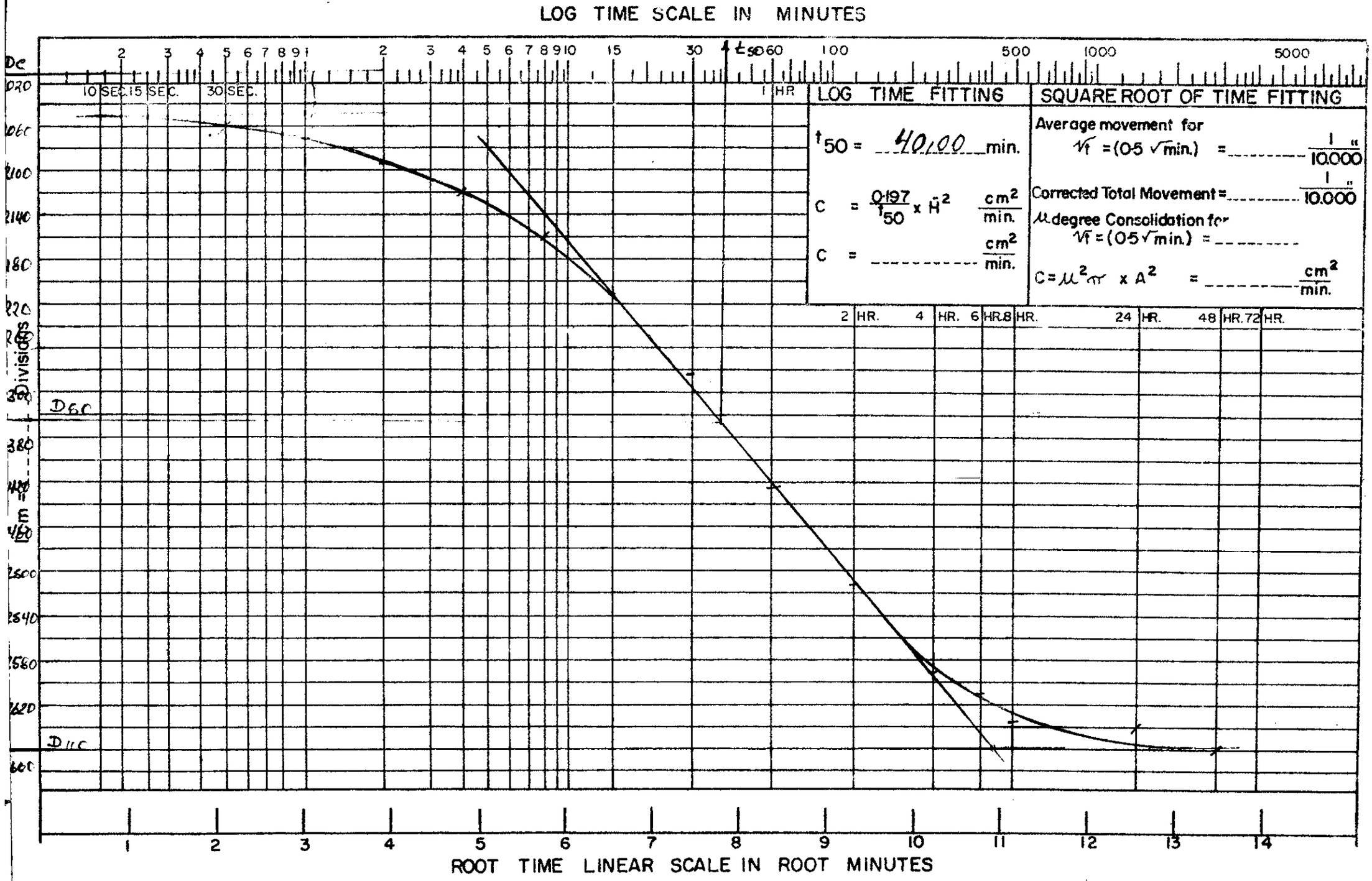
C_v = _____ Cm²/min

(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked _____


LOG TIME SCALE IN MINUTES
10 SEC.
15 SEC.
30 SEC.
1 HR
LOG TIME FITTING
t_{50} = 40.00 min.
C = $\frac{0.197}{t_{50}} \times H^2$ $\frac{cm^2}{min.}$
C = _____ $\frac{cm^2}{min.}$
SQUARE ROOT OF TIME FITTING
Average movement for
$\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____ $\frac{1}{10.000}$"
Corrected Total Movement = _____ $\frac{1}{10.000}$"
μ degree Consolidation for
$\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____
C = $\mu^2_{\sigma r} \times A^2$ = _____ $\frac{cm^2}{min.}$
2 HR.
4 HR.
6 HR.
8 HR.
24 HR.
48 HR.
72 HR.
Dial Divisions
D 50 C
D 90 C
D 100 C
ROOT TIME LINEAR SCALE IN ROOT MINUTES

CONSOLIDATION TEST

LOC. No. RAFEL N° 3 SAMPLE No. 12,50 M1 DATE 21/03/77

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD 8T ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 26,700 lb.

DRAINAGE PATH CALCULATION

Ho= 1,3621 cm. H$_1$= 1,2962 cm. $\bar{H} = \frac{Ho+Hi}{2} = 0,6567$ cm $\bar{H}^2 = 0,4313$ cm^2

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 423,30 g.

Weight of Ring 344,70 g.

Weight of Wet Sample 78,60 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) 464,30 g.

Weight of Dry Sample Watch Class ( ) 365,70 g.

Weight of Watch Glass _____ g.

Weight of Dry Sample 11,00 g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading 1 10,000"	Σ d H
21/03/77		0		2435,00	
		10 sec.		[illegible]	
		15 sec.		2464,00	
		30 sec.		2521,00	
		1 min.		2568,00	
		2 min.		2705,00	
		4 min.		2738,00	
		8 min.		2770,00	
		15 min.		2816,00	
		30 min.		[illegible]	
		1 hr.		2952,00	
		2hr.		3025,00	
		4hr.		3078,00	
		6 hr.		3102,00	
		24 hr.		3125,00	
22/03/77		24 hr.		3145,00	
23/03/77		48 hr.		3165,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

Σi

FINAL VOIDS RATIO

Final M.C. _____ %

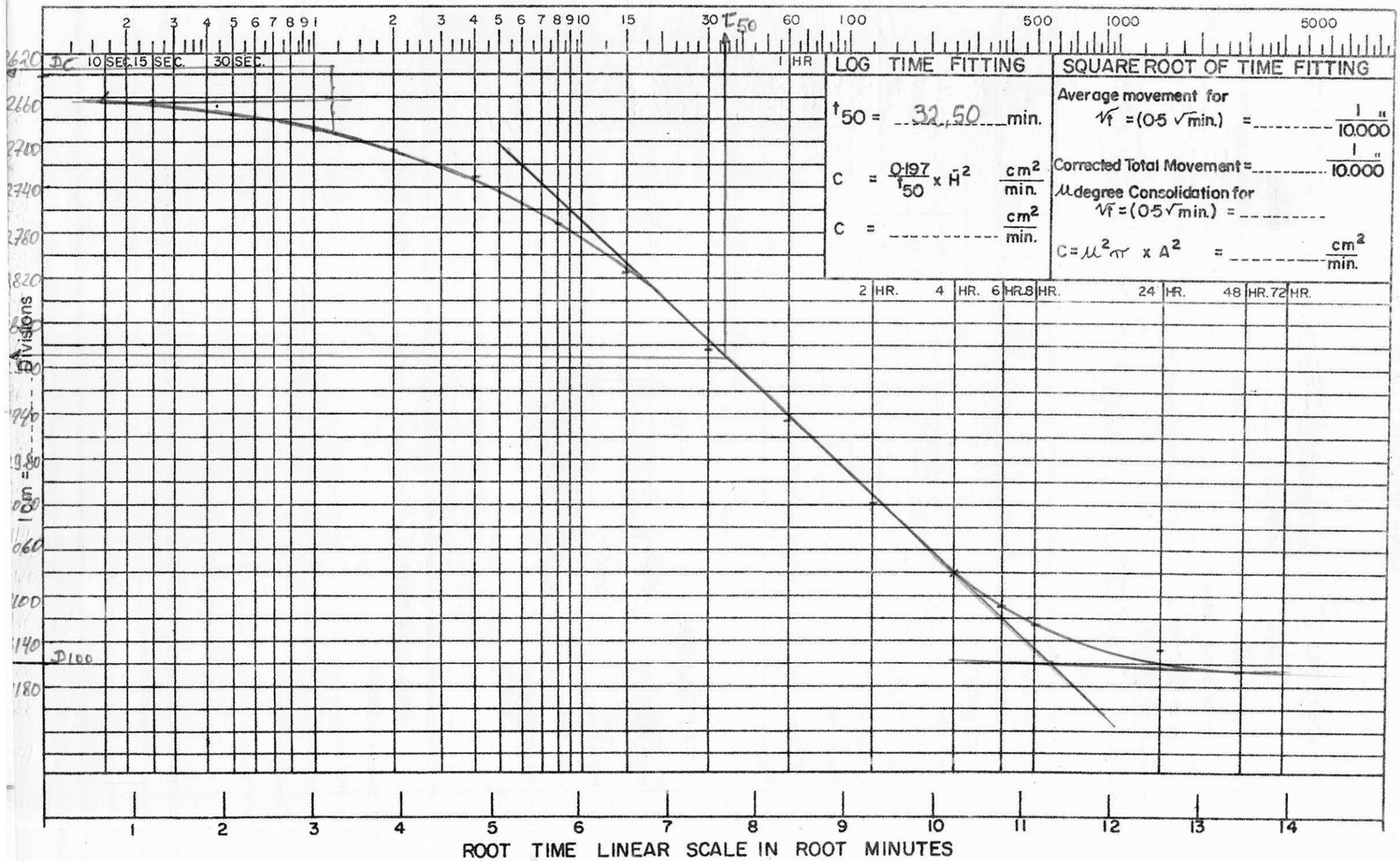
Σf

CONSOLIDATION COEFFICIENT

C_v = _____ Cm^2/min

(Log Time Root Time)

Deviation from Standard Procedure _____


LOG TIME SCALE IN MINUTES
2 3 4 5 6 7 8 9 1 2 3 4 5 6 7 8 9 10 15 30 60 100 500 1000 5000
t_{50}
DC 10 SEC. 15 SEC. 30 SEC. 1 HR
LOG TIME FITTING
t_{50} = 32.50 min.
$C = \frac{0.197}{t_{50}} \times H^2$ $\frac{cm^2}{min.}$
C = _____ $\frac{cm^2}{min.}$
SQUARE ROOT OF TIME FITTING
Average movement for
$\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____ $\frac{1}{10.000}$"
Corrected Total Movement = _____ $\frac{1}{10.000}$"
μ degree Consolidation for
$\sqrt{t}$ = (0.5 $\sqrt{min.}$) = _____
$C = \mu^2 \pi \times A^2$ = _____ $\frac{cm^2}{min.}$
2 HR. 4 HR. 6 HR. 8 HR. 24 HR. 48 HR. 72 HR.
Divisions
1 cm =
D100
ROOT TIME LINEAR SCALE IN ROOT MINUTES
1 2 3 4 5 6 7 8 9 10 11 12 13 14

P R O F U N D I D A D E 1 3 , 5 0 M

P O N T O " L "

A N E L 1

C R O N O G R A M A DE C A R R E G A M E N T O

INICIO - P/8

Carregamento - P/8 - P/4 - P/2 - P.

Descarregamento - P/2 - P/4

Carregamento - P/2 - P - 2P - 4P - 8P.

CONSOLIDATION TEST

LOC. No. ANEL - 01 SAMPLE No. 13,50 METROS DATE 01/03/77

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD P/8 ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 467,00 g ~~lb~~

DRAINAGE PATH CALCULATION

Ho = 2,00 cm. H1 = 1,9726 cm. $\bar{H} = \frac{Ho+H1}{2} = 0,9931$ cm $\bar{H}^2 = 0,9863$ cm²

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 534,20 g.

Weight of Ring 213,80 g.

Weight of Wet Sample 70,40 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) 468,20 g.

Weight of Dry Sample Watch Class ( ) _____ g.

Weight of Watch Glass 90,20 g.

Weight of Dry Sample _____ g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading (10,000")	Σ d H
01/03/77		0		0,00	
		10 sec.		20,50	
		15 sec.		21,00	
		30 sec.		35,00	
		1 min.		39,00	
		2 min.		44,00	
		4 min.		50,00	
		8 min.		57,50	
		15 min.		66,00	
		30 min.		75,50	
		1 hr.		82,50	
		2hr.		90,00	
		4hr.		95,00	
		6 hr.		97,50	
		8hr		99,00	
02/03/77		24hr		103,00	
03/03/77		48hr		108,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

Σi

FINAL VOIDS RATIO

Final M.C. _____ %

Σf

CONSOLIDATION COEFFICIENT

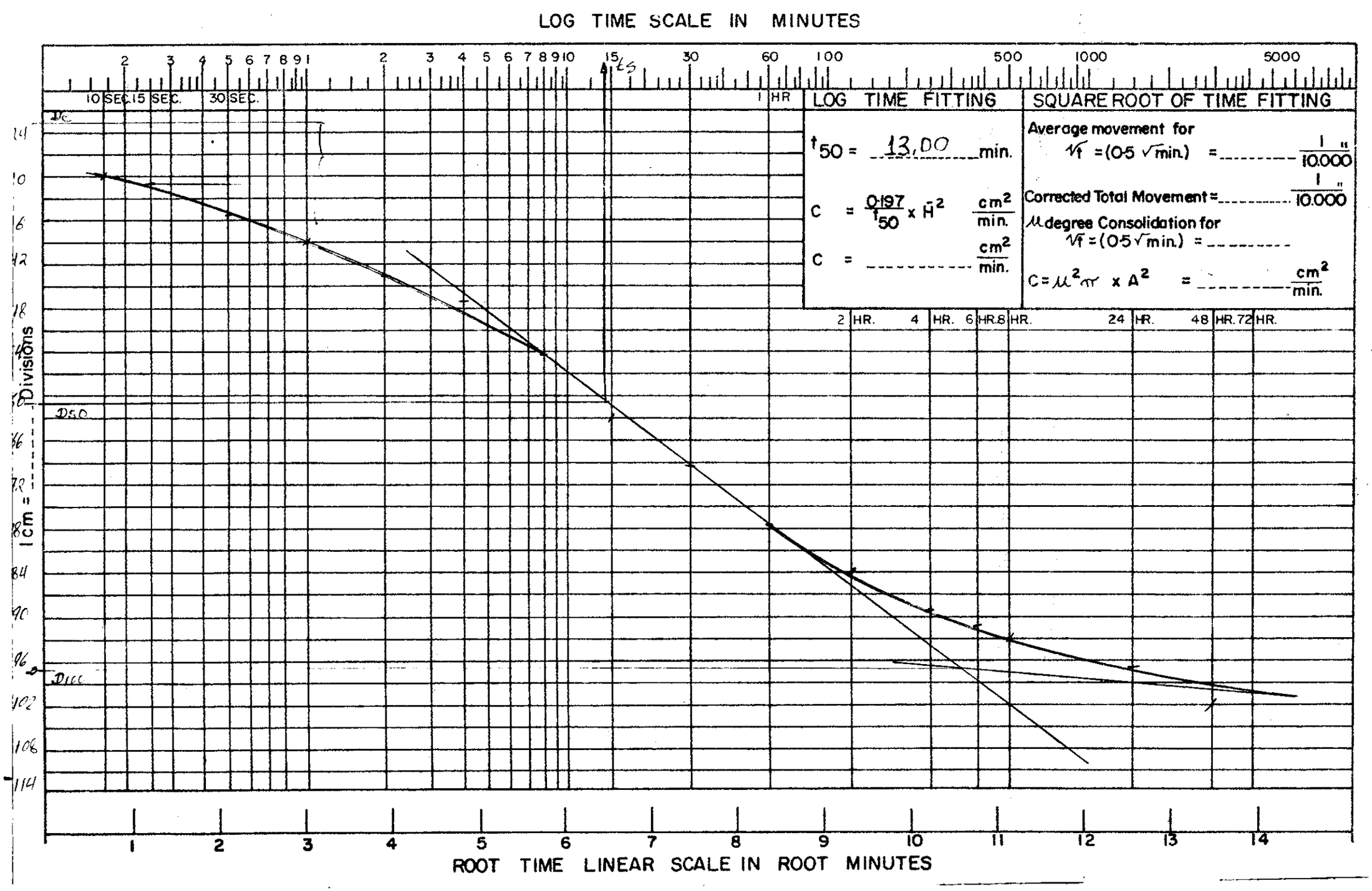
C_v = _____ Cm^2/min

(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked _____


LOG TIME SCALE IN MINUTES
2 3 4 5 6 7 8 9 1 2 3 4 5 6 7 8 9 10 15 30 60 100 500 1000 5000
10 SEC. 15 SEC. 30 SEC. 1 HR
LOG TIME FITTING
t_{50} = 13.00 min.
$C = \frac{0.197}{t_{50}} \times H^2$ cm²/min.
C = _____ cm²/min.
SQUARE ROOT OF TIME FITTING
Average movement for
$\sqrt{t}$ = (0.5 √min.) = _____ 1" / 10.000
Corrected Total Movement = _____ 1" / 10.000
μ degree Consolidation for
$\sqrt{t}$ = (0.5 √min.) = _____
$C = \mu^2 \pi \times A^2$ = _____ cm²/min.
2 HR. 4 HR. 6 HR. 8 HR. 24 HR. 48 HR. 72 HR.
D0
D50
D100
1 cm = Divisions
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38
1 2 3 4 5 6 7 8 9 10 11 12 13 14
ROOT TIME LINEAR SCALE IN ROOT MINUTES

CONSOLIDATION TEST

LOC. No. ANEL - 01 SAMPLE No. 13,50 METROS DATE 03/03/77

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD P/4 ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 934,00 lb.

DRAINAGE PATH CALCULATION

Ho = 1,9726 cm. H_1 = 1,9454 cm. $\bar{H} = \frac{Ho + Hi}{2}$ = 0,9795 cm $\bar{H}^2$ = 0,9594 cm²

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 383,60 g.

Weight of Ring 313,80 g.

Weight of Wet Sample 70,40 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) 468,20 g.

Weight of Dry Sample Watch Class ( ) _____ g.

Weight of Watch Glass 90,20 g.

Weight of Dry Sample _____ g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading 1 10,000"	Σ d H
03/03/77		0		108,00	
		10 sec.		112,50	
		15 sec.		116,50	
		30 sec.		121,00	
		1 min.		124,00	
		2 min.		128,00	
		4 min.		133,50	
		8 min.		141,00	
		15 min.		150,50	
		30 min.		162,50	
		1 hr.		174,50	
		2hr.		185,00	
		4hr.		195,00	
		6 hr.		199,00	
		8hr		203,50	
04/03/77		24hr		210,00	
06/03/77		48hr.		215,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

Σi

FINAL VOIDS RATIO

Final M.C. _____ %

Σf

CONSOLIDATION COEFFICIENT

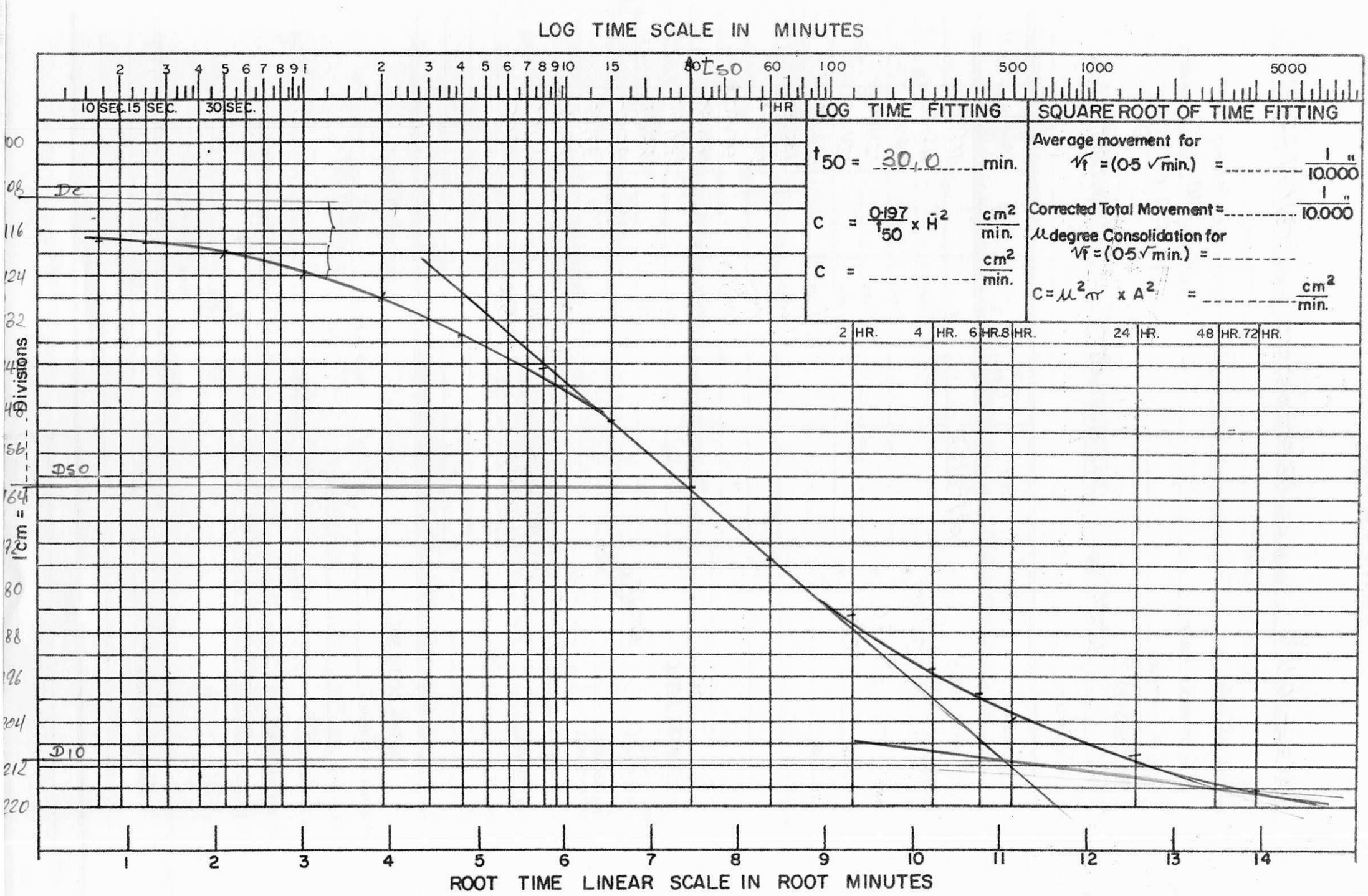
C_v = _____ Cm^2/min

(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked _____


LOG TIME SCALE IN MINUTES
2 3 4 5 6 7 8 9 1 2 3 4 5 6 7 8 9 10 15 30 60 100 500 1000 5000
t50
10 SEC. 15 SEC. 30 SEC. 1 HR
LOG TIME FITTING
t50 = 30.0 min.
C = 0.197 / t50 x H̄² cm²/min.
C = ____ cm²/min.
SQUARE ROOT OF TIME FITTING
Average movement for √t = (0.5 √min.) = ____ 1/10.000 "
Corrected Total Movement = ____ 1/10.000 "
μ degree Consolidation for √t = (0.5 √min.) = ____
C = μ² π x A² = ____ cm²/min.
2 HR. 4 HR. 6 HR. 8 HR. 24 HR. 48 HR. 72 HR.
Dc
D50
D10
100 108 116 124 132 140 148 156 164 172 180 188 196 204 212 220
1 cm = ____ Divisions
1 2 3 4 5 6 7 8 9 10 11 12 13 14
ROOT TIME LINEAR SCALE IN ROOT MINUTES

CONSOLIDATION TEST

LOC. No. ANEL - 01 SAMPLE No. 13,50 M DATE 05/03/77

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD P/2 ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 1870,00 g lb.

DRAINAGE PATH CALCULATION

H_o = 1,9454 cm. H_1 = 1,8897 cm. $\bar{H} = \frac{H_o + H_1}{2}$ = 0,9586 cm $\bar{H}^2$ = 0,9192 cm²

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 294,20 g.

Weight of Ring 213,80 g.

Weight of Wet Sample 70,40 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) 468,20 g.

Weight of Dry Sample Watch Class ( ) _____ g.

Weight of Watch Glass 90,20 g.

Weight of Dry Sample _____ g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading I 10,000"	$\sum d H$
05/03/77		0		215,00	
		10 sec.		221,00	
		15 sec.		225,00	
		30 sec.		236,00	
		1 min.		244,00	
		2 min.		253,00	
		4 min.		264,60	
		8 min.		281,00	
		15 min.		300,20	
		30 min.		325,00	
		1 hr.		352,00	
		2hr.		375,00	
		4 hr.		395,00	
		6 hr.		405,00	
		8hr		410,00	
06/03/77		24hr		421,00	
07/03/77		48hr		434,50	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

$\sum i$

FINAL VOIDS RATIO

Final M.C. _____ %

$\sum f$

CONSOLIDATION COEFFICIENT

C_v = _____ Cm^2/min

(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked _____

CONSOLIDATION TEST

LOC. No. ANEL - 01 SAMPLE No. 13,50 METROS DATE 07/03/77

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD P ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 3.740,00 g lb.

DRAINAGE PATH CALCULATION

H_o = 1,8892 cm. H_1 = 1,7606 cm. $\bar{H} = \frac{H_o + H_1}{2}$ = 0,9101 cm $\bar{H}^2$ = 0,8282 cm²

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 394,20 g.

Weight of Ring 313,80 g.

Weight of Wet Sample 70,40 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) 468,20 g.

Weight of Dry Sample Watch Class ( ) _____ g.

Weight of Watch Glass 90,20 g.

Weight of Dry Sample _____ g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading 1 10,000"	$\sum d H$
07/03/77		0		[illegible]	
		10 sec.		454,00	
		15 sec.		457,00	
		30 sec.		464,00	
		1 min.		474,00	
		2 min.		488,60	
		4 min.		509,00	
		8 min.		537,50	
		15 min.		574,00	
		30 min.		625,00	
		1 hr.		690,00	
		2hr.		762,00	
		4hr.		841,00	
		6 hr.		871,00	
		8hr		901,00	
08/03/77		24hr		945,00	
09/03/77		48hr		982,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

Σi

FINAL VOIDS RATIO

Final M.C. _____ %

Σf

CONSOLIDATION COEFFICIENT

C_v = _____ Cm^2/min

(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked _____

CONSOLIDATION TEST

LOC. No. ANEL-01 SAMPLE No. 13,50 METROS DATE 09/03/77

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) "DESCARREGAMENTO" LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD P/2 ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 1.860,00g lb.

DRAINAGE PATH CALCULATION

H_o = _____ cm _____ H_1 = _____ cm. $\bar{H} = \frac{H_o + H_1}{2}$ = _____ cm $\bar{H}^2$ = _____ cm^2

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 394,20 g.

Weight of Ring 313,80 g.

Weight of Wet Sample 70,40 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) 46,20 g.

Weight of Dry Sample Watch Class ( ) _____ g.

Weight of Watch Glass 90,20 g.

Weight of Dry Sample _____ g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading 1 10,000"	$\Sigma d H$
03/03/77		0			
		10 sec.		977,1	
		15 sec.		975,00	
		30 sec.		973,00	
		1 min.		966,00	
		2 min.		960,50	
		4 min.		953,00	
		8 min.		945,00	
		15 min.		937,00	
		30 min.		931,00	
		1 hr.		927,00	
		2hr.		924,00	
		4 hr.		923,00	
		6 hr.		922,00	
		8hr		920,00	
10/03/77		24hr		919,00	
11/03/77		48hr		919,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

Σi

FINAL VOIDS RATIO

Final M.C. _____ %

Σf

CONSOLIDATION COEFFICIENT

C_v = _____ Cm^2/min

(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked _____

CONSOLIDATION TEST

LOC. No. ANEL-01 SAMPLE No. 13,50 METROS DATE 11/03/77

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) "DESCARREGAMENTO" LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD P/4 ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 980,00 g lb.

DRAINAGE PATH CALCULATION

Ho = _____ cm. H_1 = _____ cm. $\bar{H} = \frac{Ho + Hl}{2}$ = _____ cm $\bar{H}^2$ = _____ cm^2

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 394,20 g.

Weight of Ring 313,80 g.

Weight of Wet Sample 70,40 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) 468,20 g.

Weight of Dry Sample Watch Class ( ) _____ g.

Weight of Watch Glass 90,20 g.

Weight of Dry Sample _____ g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading 1 10,000"	$\sum d H$
11/03/77		0		919,00	
		10 sec.		918,00	
		15 sec.		912,00	
		30 sec.		910,00	
		1 min.		906,00	
		2 min.		904,00	
		4 min.		899,00	
		8 min.		891,00	
		15 min.		882,00	
		30 min.		868,00	
		1 hr.		855,00	
		2hr.		847,00	
		4hr.		832,50	
		6 hr.		829,00	
		8hr		822,50	
12/03/77		24hr		818,00	
13/03/77		48hr		814,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

$\sum i$

FINAL VOIDS RATIO

Final M.C. _____ %

$\sum f$

CONSOLIDATION COEFFICIENT

C_v = _____ Cm^2/min

(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked _____

CONSOLIDATION TEST

LOC. No. ANEL - 01 SAMPLE No. 13,50 METROS DATE 13/03/77

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) "RECARREGAMENTO" LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD P/2 ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 1.860,00 lb.

DRAINAGE PATH CALCULATION

Ho = _____ cm. H1 = _____ cm. $\bar{H} = \frac{Ho + H1}{2}$ = _____ cm $\bar{H}^2$ = _____ cm²

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 394,20 g.

Weight of Ring 313,80 g.

Weight of Wet Sample 70,40 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) 468,20 g.

Weight of Dry Sample Watch Class ( ) _____ g.

Weight of Watch Glass 90,20 g.

Weight of Dry Sample _____ g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading 1 10,000"	Σ d H
13/03/77		0		820,00	
		10 sec.		820,50	
		15 sec.		821,00	
		30 sec.		823,50	
		1 min.		826,00	
		2 min.		830,00	
		4 min.		843,50	
		8 min.		851,00	
		15 min.		860,00	
		30 min.		866,00	
		1 hr.		871,00	
		2hr.		874,50	
		4hr.		876,50	
		6 hr.		877,00	
		8hr		878,00	
14/03/77		24hr		880,00	
15/03/77		48hr		883,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

Σi

FINAL VOIDS RATIO

Final M.C. _____ %

Σf

CONSOLIDATION COEFFICIENT

C_v = _____ Cm²/min

(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked _____

CONSOLIDATION TEST

LOC. No. ANEL-01 SAMPLE No. 13,50 METROS DATE 15/03/77

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD P ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 3.720,00 g lb

DRAINAGE PATH CALCULATION

Ho = _____ cm. _____ H_1 = _____ cm. $\bar{H} = \frac{Ho + HI}{2}$ = _____ cm $\bar{H}^2$ = _____ cm^2

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 394,20 g.

Weight of Ring 313,80 g.

Weight of Wet Sample 70,40 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) 468,20 g.

Weight of Dry Sample Watch Class ( ) _____ g.

Weight of Watch Glass 90,20 g.

Weight of Dry Sample _____ g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading 1 10,000"	$\sum d H$
15/03/77		0		883,00	
		10 sec.		893,00	
		15 sec.		894,50	
		30 sec.		900,00	
		1 min.		905,00	
		2 min.		912,50	
		4 min.		923,00	
		8 min.		938,00	
		15 min.		953,00	
		30 min.		972,00	
		1 hr.		989,50	
		2hr.		1004,00	
		4hr.		1016,00	
		6 hr.		1025,00	
		8hr		1034,00	
16/03/77		24hr		1042,00	
17/03/77		48 hr		1057,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

$\sum i$

FINAL VOIDS RATIO

Final M.C. _____ %

$\sum f$

CONSOLIDATION COEFFICIENT

C_v = _____ Cm^2/min

(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked _____

CONSOLIDATION TEST

LOC. No. ANEL-01 SAMPLE No. 13,60 METROS DATE 17/03/77

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD 2P ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 7.440,00 g lb.

DRAINAGE PATH CALCULATION

Ho = 1,7506 cm. H_1 = 1,5804 cm. $\bar{H} = \frac{Ho + Hi}{2}$ = 0,8327 cm $\bar{H}^2$ = 0,6935 cm²

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 394,20 g.

Weight of Ring 313,80 g.

Weight of Wet Sample 70,40 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) 468,20 g.

Weight of Dry Sample Watch Class ( ) _____ g.

Weight of Watch Glass 90,20 g.

Weight of Dry Sample _____ g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading 1 10,000"	Σ d H
17/03/77		0		1057,00	
		10 sec.		1076,00	
		15 sec.		1080,00	
		30 sec.		1088,00	
		1 min.		1100,00	
		2 min.		1117,00	
		4 min.		1141,00	
		8 min.		1177,00	
		15 min.		1222,00	
		30 min.		1292,00	
		1 hr.		1385,00	
		2hr.		1484,00	
		4hr.		1590,00	
		6 hr.		1625,00	
		8hr		1662,00	
18/03/77		24hr		1703,00	
19/03/77		48hr		1727,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

Σi

FINAL VOIDS RATIO

Final M.C. _____ %

Σf

CONSOLIDATION COEFFICIENT

C_v = _____ Cm^2/min

(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked _____

CONSOLIDATION TEST

LOC. No. ANEL-01 SAMPLE No. 13,60M DATE 19/03/77

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD 4 P ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 14.880,00g lb.

DRAINAGE PATH CALCULATION

Ho = 1.5804 cm. H_1 = 1.4176 cm. $\bar{H} = \frac{Ho+HI}{2}$ = 0,7495 cm $\bar{H}^2$ = 0,5617 cm²

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 394,20 g.

Weight of Ring 313,80 g.

Weight of Wet Sample 70,40 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) 468,20 g.

Weight of Dry Sample Watch Class ( ) _____ g.

Weight of Watch Glass 90,20 g.

Weight of Dry Sample _____ g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading 1 10,000"	$\sum d H$
19/03/77		0		1727,00	
		10 sec.		1753,00	
		15 sec.		1757,00	
		30 sec.		1766,50	
		1 min.		1780,00	
		2 min.		1799,00	
		4 min.		1826,00	
		8 min.		1864,50	
		15 min.		1912,00	
		30 min.		1982,00	
		1 hr.		2074,50	
		2hr.		2170,00	
		4hr.		2245,00	
		6 hr.		2280,00	
		8hr		2316,00	
20/03/77		24hr		2338,00	
21/03/77		48hr		2368,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

$\sum i$

FINAL VOIDS RATIO

Final M.C. _____ %

$\sum f$

CONSOLIDATION COEFFICIENT

C_v = _____ Cm^2/min

(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked _____

CONSOLIDATION TEST

LOC. No. ANEL-01 SAMPLE No. 13,50 METROS DATE 21/03/77

WET DENSITY _____ lb./cu.ft. SAMPLE DIA. _____ PRESS No. _____

S.G. (ASSUMED CALCULATED) _____ LOADING UNLOADING

PRIMARY M.C. (a) OF WHOLE SAMPLE _____ % LOAD 8P ton.sq.ft.

(b) OF CUTTINGS _____ % LOAD 29.760,00 g lb

DRAINAGE PATH CALCULATION

Ho= 1,1176 cm. H_1= 1,2826 cm. $\bar{H} = \frac{Ho+Hl}{2}$ = 0,6750 cm $\bar{H}^2$=0,4556 cm²

LABORATORY DESCRIPTION _____

Calculations

FIRST SHEET ONLY

Weight of Wet Sample Ring ( ) 394,20 g.

Weight of Ring 313,80 g.

Weight of Wet Sample 70,40 g.

Weight of Dry Sample _____ g.

Primary Moisture _____ g.

Primary M.C. _____ %

LAST SHEET ONLY

Weight of Wet Sample Watch Glass ( ) 468,20 g.

Weight of Dry Sample Watch Class ( ) _____ g.

Weight of Watch Glass 90,20 g.

Weight of Dry Sample _____ g.

Final Moisture _____ g.

Final M.C. _____ %

Date	Clock Time	t	$\sqrt{t}$	Dial Reading 1 10,000"	$\sum d H$
21/03/77		0		2368,00	
		10 sec.		2395,00	
		15 sec.		2399,00	
		30 sec.		2407,00	
		1 min.		2420,00	
		2 min.		2438,00	
		4 min.		2464,50	
		8 min.		2500,00	
		15 min.		2546,00	
		30 min.		2613,00	
		1 hr.		2692,00	
		2hr.		2766,00	
		4hr.		2824,00	
		6 hr.		2849,00	
		8hR		2859,00	
22/03/77		24hR		2882,00	
23/03/77		48hR		2900,00	

INITIAL VOIDS RATIO

Final Moisture in Sample _____ g.

Moisture Change _____ g.

Initial Moisture _____ g.

Dry Weight of Sample _____ g.

Initial M.C. _____ %

$\sum i$

FINAL VOIDS RATIO

Final M.C. _____ %

$\sum f$

CONSOLIDATION COEFFICIENT

C_v = _____ Cm^2/min

(Log Time Root Time)

Deviation from Standard Procedure _____

Signed _____

Checked _____

A D E N S A M E N T O

C Á L C U L O S

A D E N S A M E N T O

PROFUNDIDADE 8,50 m.

ponto " F "

- CÁLCULO DAS TENSÕES EFETIVAS -

Ponto - f Profundidade = 8,50 m

$$\bar{\sigma}'_{v_6} = \bar{\sigma}'_{v_5} + \gamma_{sub(5)} \times 50 + \gamma_{sub(6)} \times 50$$

$$\bar{\sigma}'_{v(6)} = 694,40 + 0,698 \times 50 + \gamma_{sub(6)} \times 50$$

$$\bar{\sigma}'_{v(6)} = 694,40 + 0,698 \times 50 + 0,652 \times 50$$

$$\bar{\sigma}'_{v(6)} = 694,40 + 34,90 + 32,60$$

$$\bar{\sigma}'_{v(6)} = 761,90 \ g/cm^2$$

- Cálculo do volume e Peso especifico Submerso

$$V_s = (77,1855 - 23,3300) - 6,4650/0,906$$

$$V_s = 53,8555 - 7,1357$$

$$V_s = 46,7199$$

$$\gamma = 77,1855/46,7198 = 1,625$$

$$\gamma_{Sub} = 0,625$$

- Calculo do peso correspondente -

$$P = \frac{\bar{\sigma} \cdot A}{10} = \frac{761,90 \times 24,41}{10} =$$

$$P = 1.834,00 \ g = 1,834 \ Kg$$

Coeficiente de Compressibilidade: a_v

$\frac{P}{4}$ $av = \frac{\Delta C}{\Delta T} = \frac{0.0193}{0.0952} \longrightarrow av = 0.2027 \ cm^2/Kg$

$\frac{P}{2}$ $av = \frac{\Delta C}{\Delta T} = \frac{0.0466}{0.1905} \longrightarrow av = 0.2446$ "

$P\ av = \frac{\Delta C}{\Delta T} = \frac{0.1334}{0.3809} \longrightarrow av = 0.3502$ "

$2P\ av = \frac{\Delta C}{\Delta T} = \frac{0.2057}{0.7619} \longrightarrow av = 0.2700$ "

$4P\ av = \frac{\Delta C}{\Delta T} = \frac{0.1945}{1.5238} \longrightarrow av = 0.1276$ "

$8P\ av = \frac{\Delta C}{\Delta T} = \frac{0.1614}{3.0476} \longrightarrow av = 0.0529$ "

Coeficiente de Permeabilidade : "K"

$K = \frac{Cv \times av \times fa}{1 \times C} = \frac{0.1231 \times 10^{-3} \times 0.2080 \times 10^{-3}}{1 + 0.8975} \therefore \underline{K = 1,349 \times 10^{-8} \ cm/s}$

Índice de Compressão "C_c"

$Cc = \frac{C_1 - C_2}{\log \frac{P_2}{P_1}} = \frac{0.780 - 0.410}{\log \frac{6.0}{1.6}} = \frac{0.37}{\log 3.75} = \frac{0.37}{0.574031}$

$\underline{Cc = 0.6446.}$

Índice de Expansão : " Ce"

$C_E = \frac{C_1 - C_2}{\log \frac{P_2}{P_1}} = \frac{1.024 - 0.993}{\log \frac{0.6}{0.22}} = \frac{0.031}{\log 2.7272}$

$CE = \frac{0.031}{0.435728} \therefore \underline{C_E = 0.0711}$

- Cálculo dos parametros -

Profundidade - 8,50 m .. ponto "F" ... Anel = Nº 03

Indice de Vazios :::::: No Descarregamento :::::::

P/2 NA LEITURA → 56 div → 1 div = 10^{-4} POLEGADAS

$\Delta H = 56 \times 2{,}54 \times 10^{-4}$ ∴ $\boxed{\Delta H = 0.0142\ cm}$ → $\boxed{H_0 = 1.8073 cm}$

$H_1 = H_0 + \Delta H$ → $H_1 = 1.8073 + 0{,}0142$ ∴ $\boxed{H_1 = 1.8215\ cm}$

$e = \frac{H_1 - H_S}{H_S} = \frac{1.82073 - 0.9077}{0{,}9077}$ ∴ $\boxed{e = 1.0067}$

P/4 NA LEITURA → 77 div → 1 div = 10^{-4} POLEGADAS

$\Delta H = 77 \times 2{,}54 \times 10^{-4}$ ∴ $\boxed{\Delta H = 0.0195\ cm}$ → $\boxed{H_0 = 1.8215 cm}$

$H_1 = H_0 + \Delta H = 1.8215 + 0{,}0195$ → $\boxed{H_1 = 1.8410\ cm}$

$e = \frac{1.8410 - 0{,}9077}{0{,}9077}$ ∴ $\boxed{e = 1.0282}$

:::::: No Recarregamento ::::::

P/2 NA LEITURA → 51 DIVISÕES → 1 div = 10^{-4} POLEGADAS

$\Delta H = 77 \times 2{,}54 \times 10^{-4}$ ∴ $\boxed{\Delta H = 0.0129 cm}$ $\boxed{H_0 = 1.8410 cm}$

$H_1 = H_0 - \Delta H = 1.8215 + 0{,}0195$ ∴ $\boxed{H_1 = 1.8281\ cm}$

$e = \frac{H_1 - H_S}{H_S} = \frac{1.8281 - 0{,}9077}{0{,}9077}$ ∴ $\boxed{e = 1.0140}$

P NA LEITURA → 161 div → 1 div = 10^{-4} Pol

$\Delta H = 161 \times 2{,}54 \times 10^{-4}$ ∴ $\boxed{\Delta H = 0{,}0409\ cm}$ $\boxed{H_0 = 1.8281 cm}$

$H_1 = H_0 - \Delta H$ → $H_1 = 1.8281 - 0{,}0409$ ∴ $\boxed{H_1 = 1.7872 cm}$

$e = \frac{H_1 - H_S}{H_S} = \frac{1.7872 - 0.9077}{0{,}9077}$ ∴ $\boxed{e = 0{,}9689}$

PROFUNDIDADE = 8,50 M - PONTO "F" - ANEL - 3

a) Carga → $\frac{P}{8} = 0.2515$ kg

b) Tensão → $\bar{\sigma}v = 0.0952$ kg/cm²

c) $\Delta H_2 H_1$ → Na leitura → 46,5 div → 1 div = 10^{-4} pol.

$\Delta H = 46,5 \times 254 \times 10^{-4} \therefore \boxed{\Delta H = 0.0118 \text{ cm}}$ $\boxed{H0 = 2.00 \text{ cm}}$

$H_1 = H0 - \Delta H = 2.00 - 0.0118 \therefore H_1 = 2.00 - 0.0118 \therefore \boxed{H_1 = 1.9882 \text{ cm}}$

d) $Mv = \frac{\Delta H}{H_1 \times \Delta P}$ $\begin{cases} \Delta P = \bar{\sigma}'(F) - \bar{\sigma}'(E) = 0.0952 - 0.0868 \\ \Delta P = 0.0084 \text{ kg/cm}^2 \end{cases}$

$Mv = \frac{0.0118}{1.9882 \times 0.0084} \therefore \boxed{Mv = 0.7065 \text{ cm}^2/\text{kg}}$.

e) $\bar{H} = \frac{H0 + H_1}{4} = \frac{2. + 1.9882}{4} = 0.9970 \therefore \boxed{\bar{H}^2 = 0.9941 \text{ cm}^2}$

f) $Cv = \frac{0.197 \times \bar{H}^2}{t_{50}} = \frac{0.197 \times 0.9941}{11.5 \times 60} \therefore \boxed{Cv = 0.2838 \times 10^{-3} \text{ cm}^2}$

g) $e = \frac{H_1 - Hs}{Hs} = \frac{1.9882 - 0.9077}{0.9077} \therefore \boxed{e = 1.1904}$

$Hs = \frac{Ps}{A \times \rho}$ $\begin{cases} Ps = 39,60 \text{ g} \\ A = 26,4074 \rightarrow \text{para } d = 58 \text{ mm} \\ \rho = 1,652 \text{ g/cm}^3 \end{cases}$

$Hs = \frac{39,60}{26,4074 \times 1,652} \therefore \boxed{Hs = 0.9077 \text{ cm}}$

h) $r = \frac{dc - d100}{di - d7} = \frac{-35.3}{-46.5} \therefore \boxed{r = 0.7591}$

PROFUNDIDADE = 8,60M - PONTO "F" - ANEL-3

a) carga → $\frac{P}{4} = 0.5030$ kg

b) Tensão → $\sigma'_v = 0.1905$ Kg/cm²

c) ΔH e H_1 → Na leitura → 69.0 div → 1 div = 10^{-4} pol.

$\Delta H = 69 \times 254 \times 10^{-4}$ ∴ $\boxed{\Delta H = 0.0175 \text{ cm}}$ $\boxed{H_0 = 1,9882 \text{ cm}}$

$H_1 = H_0 - \Delta H \rightarrow 1.9882 - 0.0175$ ∴ $\boxed{H_1 = 1.9707 \text{ cm}}$

d) $M_v = \frac{\Delta H}{H_1 \times \Delta P}$ $\begin{cases} \Delta P = \sigma'(F) - \sigma'(E) = 0.1905 - 0.1736 \\ \Delta P = 0.0169 \text{ Kg/cm}^2 \end{cases}$

$M_v = \frac{0.0175}{1.9707 \times 0.0169}$ ∴ $\boxed{M_v = 0.5254 \text{ cm}^2/\text{kg}}$

e) $\bar{H} = \frac{H_0 + H_1}{4} = \frac{1.9882 + 1.9707}{4} = 0.9897$ ∴ $\boxed{\bar{H}^2 = 0.9795 \text{ cm}^2}$

f) $C_v = \frac{0.197 \times \bar{H}^2}{t_{50}} = \frac{0.197 \times 0.9795}{18. \times 60.}$ ∴ $\boxed{C_v = 0.1787 \times 10^{-3} \text{ cm}^2/\text{s}}$

g) $e = \frac{H_1 - H_S}{H_S} = \frac{1.9707 - 0.9077}{0.9077}$ ∴ $\boxed{e = 1.1711}$

h) $r = \frac{de - d100}{di - df} = \frac{-58.5}{-69}$ ∴ $\boxed{r = 0.8478}$

PROFUNDIDADE = 8,50 m - PONTO "F" - ANEL-3

a) carga $\rightarrow \frac{P}{2} = 1.0061\ kg$

b) Tensão $\rightarrow \bar{\sigma v} = 0.3809\ kg/cm^2$

c) ΔH e $H_1 \rightarrow$ Na Leitura $\rightarrow$ 166.5 div $\rightarrow$ 1 div $= 10^{-4}$ pol

$\Delta H = 166.5 \times 2.54 \times 10^{-4} \therefore \boxed{\Delta H = 0.0423\ cm}$ $\boxed{H0 = 1.9707\ cm}$

$H_1 = H0 - \Delta H \rightarrow H_1 = 1.9707 - 0.0423 \therefore \boxed{H_1 = 1.9284\ cm}$

d) $Mv = \frac{\Delta H}{H_1 \times \Delta P}$ $\begin{cases} \Delta P = \bar{\sigma}(F) - \bar{\sigma}(E) = 0.3809 - 0.3472 \\ \Delta P = 0.0337\ kg/cm^2 \end{cases}$

$Mv = \frac{0.0423}{1.9284 \times 0.0337} \therefore Mv = 0.6509\ cm^2/kg$

e) $\bar{H} = \frac{H0 + H1}{4} = \frac{1.9707 + 1.9284}{4} = 0.9748 \therefore \boxed{\bar{H}^2 = 0.9502\ cm^2}$

f) $Cv = \frac{0.197 \times \bar{H}^2}{t50} = \frac{0.197 \times 0.9502}{15.50 \times 60} \therefore \boxed{Cv = 0.2013 \times 10^{-3}\ cm^2/s}$

g) $e = \frac{H_1 - Hs}{Hs} = \frac{1.9284 - 0.9077}{0.9077} \therefore \boxed{e = 1.1245}$

h) $r = \frac{dc - d100}{di - d7} \therefore r = \frac{-138}{-166.5} \therefore \boxed{r = 0.8288}$

PROFUNDIDADE - 8,50MM - PONTO "F" — ANEL-3

a) carga → $P = 2.0122\ kg$

b) Tensão → $T'v = 0.7619\ kg/cm^2$

c) ΔH e H_1 → Na Leitura → 477 div → 1 div = 10^{-4} pol

$\Delta H = 477 \times 2.54 \times 10^{-4}$ ∴ $\boxed{\Delta H = 0.1211\ cm}$ $\boxed{H_0 = 1.9284\ cm}$

$H_1 = H_0 - \Delta H = 1.9284 - 0.1211$ ∴ $\boxed{H_1 = 1.8073\ cm}$

d) $Mv = \dfrac{\Delta H}{H_1 \times \Delta P}$ $\begin{cases} \Delta P = T'(F) - T'(E) = 0.7619 - 0.6844 \\ \Delta P = 0.0675\ kg/cm^2 \end{cases}$

$Mv = \dfrac{0.1211}{1.8073 \times 0.0675}$ ∴ $\boxed{Mv = 0.9927\ cm^2/kg}$

e) $\bar{H} = \dfrac{H_0 + H_1}{4} = \dfrac{1.9284 + 1.8073}{4} = 0.9339$ ∴ $\boxed{\bar{H}^2 = 0.8722\ cm^2}$

f) $Cv = \dfrac{0.197 \times \bar{H}^2}{t_{50}} = \dfrac{0.197 \times 0.8722}{51 \times 60}$ ∴ $\boxed{Cv = 0.0561 \times 10^{-3}\ cm^2/s}$

g) $e = \dfrac{H_1 - H_s}{H_s} = \dfrac{1.8073 - 0.9077}{0.9077}$ ∴ $\boxed{e = 0.9911}$

h) $r = \dfrac{d_c - d_{100}}{d_i - d_f} = \dfrac{-415}{-477}$ ∴ $\boxed{r = 0.8700}$

PROFUNDIDADE = 8,50 m - PONTO "F" - ANEL-3

a) carga → $2P = 4.0244$ kg

b) Tensão → $\sigma'v = 1.5238$ kg/cm²

c) ΔH e H_1 → Na leitura → 735 div → 1 div = 10^{-4} pol.

$\Delta H = 735 \times 2,54 \times 10^{-4}$ ∴ $\boxed{\Delta H = 0.1867 \text{ cm}}$ $\boxed{H_0 = 1.8073 \text{ cm}}$

$H_1 = H_0 - \Delta H = 1.8073 - 0.1867$ ∴ $\boxed{H_1 = 1.6206 \text{ cm}}$

d) $Mv = \dfrac{\Delta H}{H_1 \times \Delta P}$ $\begin{cases} \Delta P = \sigma'(F) - \sigma'(E) = 1.5238 - 1.3888 \\ \Delta P = 0.1350 \text{ kg/cm}^2 \end{cases}$

$Mv = \dfrac{0.1867}{1.6206 \times 0.1350}$ ∴ $\boxed{Mv = 0.8534 \text{ cm}^2/\text{kg}}$

e) $\bar{H} = \dfrac{H_0 + H_1}{4} = \dfrac{1.8073 + 1.6206}{4} = 0.8570$ ∴ $\boxed{\bar{H}^2 = 0.7344 \text{ cm}^2}$

f) $Cv = \dfrac{0.197 \times \bar{H}^2}{t_{50}} = \dfrac{0.197 \times 0.7344}{52 \times 60}$ ∴ $\boxed{Cv = 0.0464 \times 10^{-3} \text{ cm}^2/\text{s}}$

g) $e = \dfrac{H_1 - H_s}{H_s} = \dfrac{1.6206 - 0.9077}{0.9077}$ ∴ $\boxed{e = 0,7854}$

h) $r = \dfrac{d_c - d_{100}}{d_i - d_f} = \dfrac{-679}{-735}$ ∴ $\boxed{r = 0.9238 \text{ cm}}$

PROFUNDIDADE = 8,50MM - PONTO "F" - ANEL - 3

a) carga → $4P = 8.0488\ kg$

b) Tensão → $T'v = 3.0476\ kg/cm^2$

c) ΔH e H_1 → Na Leitura → 695 div → 1 div $\times 10^{-4}$ pol.

$\Delta H = 695 \times 2.54 \times 10^{-4}$ ∴ $\boxed{\Delta H = 0.1765\ cm}$ $\boxed{H_0 = 1.6206\ cm}$

$H_1 = H_0 - \Delta H = 1.6206 - 0.1765$ ∴ $\boxed{H_1 = 1.4441\ cm}$

d) $Mv = \dfrac{\Delta H}{H_1 \times \Delta P}$ $\begin{cases} \Delta P = T'(F) - T'(E) = 3.0476 - 2.7776 \\ \Delta P = 0.2700\ kg/cm^2 \end{cases}$

$Mv = \dfrac{0.1765}{1.4441 \times 0.270}$ ∴ $\boxed{Mv = 0.4527\ cm^2/kg}$

e) $\bar{H} = \dfrac{H_0 + H_1}{4} = \dfrac{1.6206 + 1.4441}{4} = 0.7662$ ∴ $\boxed{\bar{H}^2 = 0.5870\ cm^2}$

f) $Cv = \dfrac{0.197 \times \bar{H}^2}{t50} = \dfrac{0.197 \times 0.5870}{40 \times 60}$ ∴ $\boxed{Cv = 0.0432 \times 10^{-3}\ cm^2/s}$

g) $e = \dfrac{H_1 - Hs}{Hs} = \dfrac{1.4441 - 0.9077}{0.9077}$ ∴ $\boxed{e = 0.5909}$

h) $r = \dfrac{dc - d100}{di - df} = \dfrac{-652}{-695}$ ∴ $\boxed{r = 0.9381}$

PROFUNDIDADE = 8,50m - Ponto "F" - ANEL - 03

a) carga → $\delta P = 16.0976$ kg

b) Tensão → $\bar{\sigma}'v = 6.0952$ kg/cm²

c) ΔH e H_1 → Na Leitura → 577 div → 1 div = 10^{-4} pol.

$\Delta H = 577 \times 2,54 \times 10^{-4}$ ∴ $\boxed{\Delta H = 0.1465 \text{ cm}}$ $\boxed{H_0 = 1.4441 \text{ cm}}$

$H_1 = H_0 - \Delta H = 1.4441 - 0.1465$ ∴ $\boxed{H_1 = 1.2976 \text{ cm}}$

d) $M_v = \dfrac{\Delta H}{H_1 \times \Delta P}$ $\begin{cases} \Delta P = \bar{\sigma}'(F) - \bar{\sigma}'(E) = 6.0952 - 5.5552 \\ \Delta P = 0.5400 \text{ kg/cm}^2 \end{cases}$

$M_v = \dfrac{0.1465}{1.2976 \times 0.54}$ ∴ $\boxed{M_v = 0.2091 \text{ cm}^2/\text{kg}}$

e) $\bar{H} = \dfrac{H_0 + H_1}{4} = \dfrac{1.4441 + 1.2976}{4} = 0.6854$ ∴ $\boxed{\bar{H}^2 = 0.4698 \text{ cm}^2}$

f) $C_v = \dfrac{0.197 \times \bar{H}^2}{t_{50}} = \dfrac{0.197 \times 0.4698}{32.5 \times 60.0}$ ∴ $\boxed{C_v = 0.0475 \text{ cm}^2/\text{s}}$

g) $e = \dfrac{H_1 - H_s}{H_s} = \dfrac{1.2976 - 0.9077}{0.9077}$ ∴ $\boxed{e = 0.4295}$

h) $r = \dfrac{dc - d100}{di - df} = \dfrac{-544}{-577}$ ∴ $\boxed{r = 0.9428}$

A D E N S A M E N T O

PROFUNDIDADE 9,50 m

Ponto " G "

Cálculo das tensões Efetivas nas profundidades

a) Profundidade = 9,50 metros- Ponto G -

$\sigma'_7 = \sigma'_6 + \gamma_{sub(6)} \times 50 + \gamma_{sub(7)} \times 50$

$\sigma'_7 = 761,90 + 50 \times 0,652 + 50 \times 1,236$

$\sigma'_7 = 761,90 + 32,60 + 61,80$

$\sigma'_7 = 856,30 \ g/cm^2 \quad | \quad = 0,8563 \ kg/cm^2$

Calculo do Peso correspondente

$\sigma = 10P/A \quad \therefore \quad A = \pi d^2/4 \rightarrow d = 58 \ mm$

$A = 24,41 cm^2$

$\sigma'_G = 0,8564 \ kg/cm^2$

$P_G = \frac{\sigma_G . A}{10}$

$P_G = (856,4 \times 26,41)/10 \quad = P_G = 2.261,48 \ g \rightarrow P_G = 2,2614 \ kg$

Cálculo do Peso Específico

Profundidade = 9,50 m : : Ponto G : :

$V_S = (W_6 - W_g) - \frac{W}{\gamma_p} \quad -=- \quad (89,07 - 29,25) - (18,11/0,906)$

$V_S = 59,82 - 19,99 \quad \therefore \quad V_S = 39,83$

$\gamma_{sat} = \frac{W_S}{V_S}$ e $\gamma_{sub} = \gamma_{sat} - \gamma_a$

$\gamma_{sat} = \frac{89,07}{39,83} \quad \therefore \quad \gamma_{sat} = 2,236 \ g/cm^3$

$\gamma_{sub} = 2,236 - 1,0 = 1,236 \ g/cm^3$

Coeficiente de Compressibilidade

P/4 $a_v = \Delta e/\Delta\sigma = 0,0151/0,1070 \therefore a_v = 0,1411\ cm^2/kg$

P/2 $a_v = \Delta e/\Delta\sigma = 0,0858/0,2141 \therefore a_v = 0,1672\ cm^2/kg$

P $a_v = \Delta e/\Delta\sigma = 0,1341/0,4282 \therefore a_v = 0,3132\ cm^2/kg$

2P $a_v = \Delta e/\Delta\sigma = 0,2671/0,8564 \therefore a_v = 0,3119\ cm^2/kg$

4P $a_v = \Delta e/\Delta\sigma = 0,2245/1.7128 \therefore a_v = 0,1311\ cm^2/kg$

8P $a_v = \Delta e/\Delta\sigma = 0,1873/3,4256 \therefore a_v = 0,0548\ cm^2/kg$

Coeficiente de Permeabilidade

$$K = \frac{C_v \times a_v \times \gamma_a}{1+e} = \frac{0,1994\times10^{-3}\times0,1865\times10^{-3}}{1+1,3309} \therefore \boxed{K = 1.595\times10^{-8}\ cm/s}$$

Indice de Compressão

$e_1 = 1.30$
$e_2 = 0,87$
$P_1 = 1,40\ kg/cm^2$
$P_2 = 5,00\ kg/cm^2$

$$C_c = \frac{e - C_2}{\log P_2/P_1}$$

$$C_c = \frac{1,30 - 0,87}{\log(5,00/1,40)} = \frac{0,43}{\log 3,571498} \therefore \boxed{C_c = 0,7778}$$

Indice de Expansão

$e_1 = 1,500$
$e_2 = 1,466$
$P_1 = 0,24\ kg/cm^2$
$P_2 = 0,70\ "\ "$

$$C_e = \frac{e_1 - e_2}{\log P_1/P_2} \therefore C_e = \frac{1,500 - 1.466}{\log(0,70/0,24)} \therefore C_e = \frac{0,034}{\log 2,91667}$$

$$C_e = \frac{0,034}{0,464886} \therefore \boxed{C_e = 0,0731}$$

CÁLCULO DOS PARÂMETROS

Profundidade = 9,50 metros -- Ponto "G" -- Anel Nº 01

Índice de Vazios - (No Descarregamento)

P/2 ΔH e H_1 → NA LEITURA → -53 div → 1 div = 10^{-4} pol.

a) $\Delta H = -53 \times 2{,}54 \times 10^{-4}$ ∴ $\Delta H = -0{,}0135$ cm $H_0 = 1.8504$ cm

$H_1 = H_0 + \Delta H$ ∴ $H_1 = 1{,}8504 + 0{,}0135$ ∴ $H_1 = 1.8639$ cm

b) $H_s = 0{,}7502$ cm

c) $e = \frac{H_1 - H_s}{H_s} = (1.8639 - 0{,}7502)/0{,}7502$ ∴ $e = 1.4845$

P/4

a) ΔH e H_1 → NA LEITURA → -77 div → 1 div = 10^{-4} Pol

$\Delta H = -77 \times 2{,}54 \times 10^{-4}$ ∴ $\Delta H = -0{,}0195$ cm $H_0 = 1.8639$ cm

$H_1 = H_0 + \Delta H = 1.8639 + 0{,}0195$ ∴ $H_1 = 1{,}8834$ cm

b) $H_s = 0{,}7502$ cm

c) $e = \frac{H_1 - H_s}{H_s} = \frac{1{,}8834 - 0{,}7502}{0{,}7502}$ ∴ $e = 1.5105$

P/2 "RECARREGAMENTO"

ΔH e H_1 → NA LEITURA → 51 div → 1 div = 10^{-4} pol

$\Delta H = 51 \times 2{,}54 \times 10^{-4}$ ∴ $\Delta H = 0{,}0129$ cm $H_0 = 1{,}8834$ cm

$H_1 = H_0 - \Delta H = 1.883 - 0{,}0427$ ∴ $H_1 = 1{,}8278$ cm

$H_s = 0{,}7502$ cm

$e = \frac{H_1 - H_s}{H_s}$ ∴ $e = \frac{1{,}8278 - 0{,}7502}{0{,}7502} = 1.4364$

P

ΔH e H_1 → NA LEITURA → 168 div → 1 div = 10^{-4} Pol

$\Delta H = 168 \times 2{,}54 \times 10^{-4}$ ∴ $\Delta H = 0{,}0427$ cm $H_0 = 1{,}8705$ cm

$H_1 = H_0 - \Delta H = 1.8705 - 0{,}0427$ ∴ $H_1 = 1.8278$ cm

$H_s = 0{,}7502$ cm

$e = \frac{H_1 - H_s}{H_s} = \frac{1{,}8278 - 0{,}7502}{0{,}7502}$ ∴ $e = 1{,}4364$

PROFUNDIDADE = 9,50m – PONTO "G" – ANEL – 1

a) carga → $\frac{P}{8} = 0.2827$ kg

b) Tensão → $\bar{\sigma}v = 0.1070$ kg/cm²

c) ΔH e H1: Na Leitura → 425 div → 1 div = 10^{-4} pol.

$\Delta H = 42,5 \times 2,54 \times 10^{-4}$ ∴ $\boxed{\Delta H = 0.0108 \text{ cm}}$ $\boxed{H0 = 2.00 \text{ cm}}$

$H1 = H0 - \Delta H$ ∴ $H1 = 2,00 - 0.0108$ ∴ $\boxed{H1 = 1,9892 \text{ cm}}$

d) $Mv = \frac{\Delta H}{H1 \times \Delta P}$ $\begin{cases} \Delta P = \bar{\sigma}'(F) - \bar{\sigma}'(E) = \Delta P \\ \Delta P = 0.1070 - 0.0952 \\ \boxed{\Delta P = 0.0118 \text{ kg/cm}^2} \end{cases}$

$Mv = \frac{0,0108}{1.9892 \times 0.0118} = \frac{0.0108}{0.0235} = \boxed{0.9946 \text{ cm}^2/\text{kg}}$

e) $\bar{H} = \frac{H0 + H1}{4} = \frac{2,00 + 1.9892}{4} = 0,9973$ ∴ $\boxed{\bar{H}^2 = 0.9946 \text{ cm}^2}$

f) $Cv = \frac{0,197 \times \bar{H}^2}{t50}$ ∴ $Cv = \frac{0.197 \times 0.9946}{5,2 \times 60} = \frac{0,1959}{312,0} = \boxed{0.6280 \times 10^{-3} \text{ cm}^2/}$

g) $e = \frac{H1 - HS}{HS}$ $\begin{cases} HS = \frac{PS}{A \times \delta} \\ HS = \frac{44.30}{26,4074 \times 2,636} \text{ ∴ } \boxed{HS = 0.6502 \text{ cm}} \end{cases}$ $\begin{cases} d = 58 \text{ mm} \\ A = 26,4074 \text{ cm}^2 \\ Ps = 44.32 \text{ cm} \end{cases}$

$e = \frac{1.9892 - 0,7502}{0,6502}$ ∴ $\boxed{e = 1.9016}$

h) $r = \frac{dc - d100}{di - d7} = \frac{8,5 - 33,10}{0,0 - 42,50} = \frac{-24,6}{-42,5} = \boxed{0,5788}$

PROFUNDIDADE = 9,60 M - PONTO "G" - ANEL - 1

a) Carga → $\frac{P}{4} = 0.5653$ kg

b) Tensão → $\sigma' v = 0,2141$ Kg/cm²

c) ΔH e H_1 → Na leitura → 45 div → 1 div = 10^{-4} pol.

$\Delta H = 45 \times 2,54 \times 10^{-4}$ ∴ $\boxed{\Delta H = 0.0114 \text{ cm}}$ $\boxed{H_0 = 1,9892 \text{ cm}}$

$H_1 = H_0 - \Delta H \rightarrow H_1 = 1.9892 - 0.0114$ ∴ $\boxed{H_1 = 1.9778 \text{ cm}}$

d) $Mv = \frac{\Delta H}{H_1 \times \Delta P}$ $\begin{cases} \Delta P = \sigma'(F) - \sigma'(E) = 0.2141 - 0.1905 \\ \boxed{\Delta P = 0.0236 \text{ kg/cm}^2} \end{cases}$

$Mv = \frac{0.0114}{1.9778 \times 0.0236} = \frac{0.0114}{0.0467}$ ∴ $\boxed{Mv = 0.2441 \text{ cm}^2/\text{kg}}$

e) $\bar{H} = \frac{H_0 + H_1}{4} = \frac{1.9892 + 1.9778}{4} = 0.9917$ ∴ $\boxed{\bar{H}^2 = 0.9836 \text{ cm}^2}$

f) $Cv = \frac{0.197 \times \bar{H}^2}{t\,50} = \frac{0.197 \times 0.9836}{12,5 \times 60} = \frac{0.1938}{750} = \boxed{0.2584 \times 10^{-3} \text{ cm}^2/\text{s}}$

g) $e = \frac{H_1 - H_S}{H_S}$ $\begin{cases} H_S = 0.7502 \text{ cm} \\ H_1 = 1.9778 \text{ cm} \end{cases}$

$e = \frac{1.9778 - 0.7502}{0.7502} = \boxed{1.6364}$

h) $r = \frac{dc - d100}{di - d7} = \frac{45,4 - 83,0}{42,5 - 87,5} = r = \frac{-37,6}{-45,0}$ ∴ $\boxed{r = 0.8355}$

PROFUNDIDADE = 9,50 M – PONTO "G" – ANEL-1

a) carga → $\frac{P}{2} = 1.1307$ kg

b) Tensão → $\bar{\sigma}v = 0.4282$ kg/cm²

c) ΔH e H_1 → Na Leitura → 105,5 div → 1 div = 10^{-4} pol.

$\Delta H = 105,5 \times 2,54 \times 10^{-4} = \boxed{0.0268}$ ∴ $\boxed{H_0 = 1.9778 \text{ cm}}$

$H_1 = H_0 - \Delta H = 1.9778 - 0.0268$ ∴ $\boxed{H_1 = 1.9510 \text{ cm}}$

d) $M_v = \frac{\Delta H}{H_1 \times \Delta P}$ $\begin{cases} \Delta P = \bar{\sigma}(F) - \bar{\sigma}(E) = 0.4282 - 0.3809 \\ \boxed{\Delta P = 0.0473 \text{ kg/cm}^2} \end{cases}$

$M_v = \frac{0.0268}{1.9510 \times 0.0473} = \frac{0.0268}{0.0923} = \boxed{0.2903 \text{ cm}^2/\text{kg}}$

e) $\bar{H} = \frac{H_0 + H_1}{4} = \frac{1.9778 + 1.9510}{4} = 0,9822$ ∴ $\boxed{\bar{H}^2 = 0.9647 \text{ cm}^2}$

f) $C_v = \frac{0.197 \times \bar{H}^2}{t_{50}} = \frac{0.197 \times 0.9647}{11 \times 60} = \frac{0.1900}{660} = \boxed{0.2879 \times 10^{-3} \text{ cm}^2/\text{s}}$

g) $e = \frac{H_1 - H_s}{H_s}$ $\begin{cases} H_s = 0.7502 \text{ cm} \\ H_1 = 1.9510 \text{ cm} \end{cases}$

$e = \frac{1.9510 - 0.7502}{0.7502} = \boxed{1.6006}$

h) $r = \frac{dc - d100}{di - df} = \frac{92,5 - 173,0}{87,5 - 193,0} = \frac{-80,5}{-105,5}$ ∴ $\boxed{r = 0.7630}$

PROFUNDIDADE = 9,50M - PONTO "G" - ANEL - 1

a) carga → $P = 2.2614$ kg

b) Tensão → $\bar{\sigma}v = 0.8564$ kg/cm²

c) ΔH e H_1 → Na Leitura → 396 div → 1 div = 10^{-4} pol

$\Delta H = 396 \times 2,54 \times 10^{-4}$ ∴ $\boxed{\Delta H = 0.1006 \text{ cm}}$ $\boxed{H_0 = 1.9510 \text{ cm}}$

$H_1 = H_0 - \Delta H$ ∴ $H_1 = 1.9510 - 0.1006$ ∴ $\boxed{H_1 = 1.8504 \text{ cm}}$

d) $M_v = \dfrac{\Delta H}{H_1 \times \Delta P}$ $\begin{cases} \Delta P = \bar{\sigma}'_{(G)} - \bar{\sigma}'_{(F)} \\ \Delta P = 0.8564 - 0,7619 \end{cases}$ ∴ $\boxed{\Delta P = 0,0945 \text{ kg/cm}^2}$

$M_v = \dfrac{0,1006}{1.8504 \times 0,0945} = \dfrac{0,1006}{0,1749}$ ∴ $\boxed{M_v = 0,5752 \text{ cm}^2/\text{kg}}$

e) $\bar{H} = \dfrac{H_0 + H_1}{4} = \dfrac{1.9510 + 1.8504}{4} = 0.9503$ ∴ $\boxed{\bar{H}^2 = 0,9032 \text{ cm}^2}$

f) $C_v = \dfrac{0,197 \times \bar{H}^2}{t_{50}} = \dfrac{0,197 + 0,9032}{55 \times 60} = \dfrac{0,1779}{3300}$ ∴ $\boxed{C_v = 0,0539 \times 10^{-3} \text{ cm}^2/\text{S}}$

g) $e = \dfrac{H_1 - H_s}{H_s}$ → $\begin{cases} H_s = 0,7702 \text{ cm} \\ H_1 = 1.8504 \end{cases}$

$e = \dfrac{1.8504 - 0,7502}{0,7502} = \boxed{1.4665}$

h) $r = \dfrac{d_{200} - d_{100}}{d_i - d_f} = \dfrac{205 - 553}{193 - 589} = \dfrac{348}{396}$

$\boxed{r = 0,8788}$

PROFUNDIDADE = 9,50 M - PONTO "G" - ANEL - 1

a) carga → $2P = 4.5228\ kg$

b) tensão → $\bar{\sigma v} = 1.7128\ kg/cm^2$

c) ΔH e H_1 → na leitura → 789 div → 1 div = 10^{-4} pol

$\Delta H = 789 \times 2,54 \times 10^{-4}$ ∴ $\boxed{\Delta H = 0,2004\ cm}$ $\boxed{H_o = 1.8504 cm}$

$H_1 = H_o - \Delta H$ ∴ $H_1 = 1.8504 - 0.2004$ ∴ $\boxed{H_1 = 1.6500 cm}$

d) $M\sigma = \dfrac{\Delta H}{H_1 \times \Delta P}$ $\left[\Delta P = \bar{\sigma}'(G) - \bar{\sigma}'(F) = 1.7128 - 1.5238 = \boxed{0,1890\ kg/cm^2}\right.$

$M\sigma = \dfrac{0,2004}{1.6500 \times 0,1890} = \dfrac{0.2004}{0.3118} = \boxed{M\sigma = 0,6427}$

e) $\bar{H} = \dfrac{H_o - H_1}{4} = \dfrac{1.8504 + 1.6500}{4} = 0,8751$ ∴ $\boxed{\bar{H}^2 = 0,7658\ cm^2}$

f) $C_v = \dfrac{0,197 \times \bar{H}^2}{t_{50}} = \dfrac{0,197 \times 0,7658}{54 \times 60}$ ∴ $\boxed{C_v = 0,0466 \times 10^{-3}\ cm^2/s}$

g) $e = \dfrac{H_1 - H_s}{H_s}$ $\left[\begin{array}{l} H_1 = 1.6500\ cm \\ H_s = 0,7502 cm \end{array}\right.$

$e = \dfrac{1.6500 - 0,7502}{0,7502}$ ∴ $\boxed{e = 1.1994}$

h) $r = \dfrac{dc - d_{100}}{di - df}$ ∴ $r = \dfrac{685 - 1427}{678 - 1467} = \dfrac{742}{782}$ ∴

$\boxed{r = 0,9404}$

PROFUNDIDADE = 9,50M - PONTO "G" - ANEL-1

a) Carga → $\Delta P = 9.0456\ kg$

b) Tensão → $\bar{\sigma v} = 3.4256\ kg/cm^2$

c) ΔH e H_1 → Na Leitura → 663 div → 1 div = 10^{-4} Pol.

$\Delta H = 663 \times 2,50 \times 10^{-4} \therefore$ **$\Delta H = 0,1684$ cm** $\therefore$ **$H_0 = 1.6500$ cm**

$H_1 = H_0 - \Delta H \therefore H_1 = 1.6500 - 0,1684 \therefore$ **$H_1 = 1.4816$ cm**

d) $M_v = \dfrac{\Delta H}{H_1 + \Delta P}$ [$\Delta P = \bar{\sigma}'(G) - \bar{\sigma}'(F) = 3.4256 - 3.0476 =$ **0,3780 cm**

$M_v = \dfrac{0.1684}{1.4816 \times 0,3780} \therefore$ **$M_v = 0,3007\ cm^2/kg$**

e) $\bar{H} = \dfrac{H_0 + H_1}{4} \therefore \bar{H} = \dfrac{1.6500 + 1.4816}{4} \therefore \bar{H} = 0,7829$

$\bar{H}^2 = 0,6129\ cm^2$

f) $C_v = \dfrac{0,197 \bar{H}^2}{t_{50}} \therefore C_v = \dfrac{0,197 \times 0,6129}{32,5 \times 60,0} \therefore$ **$G_v = 0,0619 \times 10^{-3}\ cm^2/s$**

g) $e = \dfrac{H_1 - H_s}{H_s} = \dfrac{1.4816 - 0,7502}{0,7502} \therefore$ **$e = 0,9749$**

H) $R = \dfrac{d_e - d_{100}}{d_i - d_f} = \dfrac{1470 - 2065}{1467 - 2130} = \dfrac{595}{663}$

$R = 0,8974$

PROFUNDIDADE = 9,50mm - PONTO "G" - ANEL - 1

a) CARGA = δP → 18.0912 kg

b) TENSÃO = $\bar{\sigma}v'$ → 6.8512 kg/cm²

c) ΔH e H_1 → NA LEITURA → 555 div → 1 div = 10^{-4} Pol.

$\Delta H = 10^{-4} \times 2,54 \times 555 \therefore$ **$\Delta H = 0,1410$ cm** | **$H_0 = 1.4816$**

$H_1 = H_0 - \Delta H = 1.4816 - 0,1410 \therefore$ **$H_1 = 1.3406$ cm**

d) $Mv = \frac{\Delta H}{H_1 * \Delta P}$

$\Delta P = \bar{\sigma}'(G) - \bar{\sigma}'(F) = 6,8512 - 6.0952$

$\Delta P = 0,7560$ kg/cm²

$Mv = \frac{0,1410}{1.3406 \times 0,7560} \therefore$ **$Mv = 0,1391$ cm²/kg**

e) $\bar{H} = \frac{H_0 + H_1}{4} = \frac{1.4816 + 1.3406}{4} =$ **$0,7055$ cm**

$\bar{H}^2 = 0,497738$ cm²

f) $Cv = \frac{0,197 \times \bar{H}^2}{t_{50}} = \frac{0,187 \times 0,497738}{17,5 \times 60} \therefore$ **$Cv = 0,0594$ cm²/s**

g) $e = \frac{H_1 - H_s}{H_s}$

$e = \frac{1.3406 - 07502}{0,7502} \therefore$ **$e = 0,7870$**

h) $\gamma = \frac{dc - d_{100}}{di - df} = \frac{2142 - 2660}{2130 - 2685} \therefore$ **$\gamma = 0,9333$**

A D E N S A M E N T O

Profundidade 10,5o m

Ponto " H "

TENSÕES EFETIVAS

PROFUNDIDADE 10,60 M - PONTO H

a) $\sigma'_{(8)} = \sigma'_{(7)} + \gamma_{sub(7)} \times 50 + \gamma_{sub(8)} \times 50$

$\sigma'_{(8)} = 856,80 + 50 \times 1,236 + 1,328 \times 50$

$\sigma'_{(8)} = 856,80 + 61,80 + 66,40$

$\sigma'_{(8)} = 984,50\ g/cm^2 \rightarrow \sigma'_{(8)} = 0,9845\ kg/cm^2$

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b) PÊSO CORRESPONDENTE

$\sigma = \frac{10P}{A} \therefore P = \frac{\sigma . A}{10}$

$P = \frac{984,5 \times 26,41}{10} = 2.600,00\ g$

$P_{(H)} = 2,600\ kg$

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c) VOLUME E PÊSO ESPECÍFICO SUBMERSO

$V_s = (65,37 - 20,80) - \frac{14,94}{0,906}$

$V_s = 44,57 - 16,49 \therefore V_s = 28,08\ cm^3$

$\gamma_{sat} = \frac{65,37}{28,08} = 2,328\ g/cm^3$

$\gamma_{sub} = 2,328 - 1 = 1,328\ g/cm^3$

PROFUNDIDADE 10,60 METROS PONTO H

a) carga → $\frac{P}{8} = 0.3250$ kg.

b) Tensão → $\sigma' v = 0.1231$ kg/cm²

c) ΔH e H1 → Na Leitura 130 div → 1 div = 10^{-4} pol.

$\Delta H = 130 \times 2,54 \times 10^{-4}$ ∴ $\boxed{\Delta H = 0.0330 \text{ cm}}$ $\boxed{H0 = 2.00 \text{ cm}}$

$H1 = H0 - \Delta H = 2.00 - 0.0330$ ∴ $\boxed{H1 = 1.9670 \text{ cm}}$

d) $Mv = \frac{\Delta H}{H1 \times \Delta \sigma}$ $\begin{cases} \Delta \sigma = \sigma'(H) - \sigma'(G) = 0.1231 - 0.1070. \\ \Delta \sigma = 0.0161 \text{ kg/cm}^2 \end{cases}$

$Mv = \frac{0.0330}{1.9670 \times 0.0161}$ ∴ $\boxed{Mv = 1.0420 \text{ cm}^2/\text{kg}}$

e) $\bar{H} = \frac{H0 + H1}{4} = \frac{2.0 + 1.9670}{4} = 0.9917$ ∴ $\boxed{\bar{H}^2 = 0.9836 \text{ cm}^2}$

f) $Cv = \frac{0.197 \times \bar{H}^2}{t\,50} = \frac{0.197 \times 0.9836}{23 \times 60}$ ∴ $\boxed{Cv = 0.1404 \times 10^{-3} \text{ cm}^2/\text{s}}$

g) $e = \frac{H1 - HS}{HS} \Longrightarrow \begin{cases} H1 = 1.9670 \text{ cm} \\ HS = \frac{PS}{A \times \sigma} \end{cases} \quad \begin{cases} PS = 45,70 \text{ g} \\ A = 26,4074 \text{ cm}^2 \\ P/d = 58 \text{ mm} \\ \sigma = 2.328 \text{ g/cm}^3 \end{cases}$

$HS = \frac{45,70}{26,4074 \times 2,328}$ ∴ $\boxed{HS = 0.7434 \text{ cm}}$

$e = \frac{1.9670 - 0.7434}{0.7434}$ ∴ $\boxed{e = 1.6459}$

h) $r = \frac{dc - d100}{d_i - d_f} = \frac{11 - 120}{0 - 130} = \frac{-109}{-130}$

$\boxed{r = 0.8385}$

PROFUNDIDADE 10,150 m PONTO H (2)

a) Carga → $\frac{P}{4} = 0.6500\ kg$

b) Tensão → $\sigma'v = 0.2461\ kg/cm^2$

c) ΔH e $H1$ → Na Leitura → 83 div → 1 div = 10^{-4} pol.

$\Delta H = 83 \times 2,54 \times 10^{-4}$ ∴ $\boxed{\Delta H = 0.0211\ cm}$ $\boxed{H0 = 1.9670\ cm}$

$H1 = H0 - \Delta H = 1.9670 - 0.0211$ ∴ $\boxed{H1 = 1.9459\ cm}$

d) $Mv = \frac{\Delta H}{H1 \times \Delta\sigma}$ $\begin{cases} \Delta\sigma = \sigma'(H) - \sigma'(G) = 0.2461 - 0.2141 \\ \Delta\sigma = 0.0320\ kg/cm^2 \end{cases}$

$Mv = \frac{0.0211}{1.9459 \times 0.032}$ ∴ $\boxed{Mv = 0.3388\ cm^2/kg}$

e) $\bar{H} = \frac{H0 + H1}{4} = \frac{1.9670 + 1.9459}{4} = 0.9782$ ∴ $\boxed{\bar{H}^2 = 0.9569\ cm^2}$

f) $Cv = \frac{0.197 \times \bar{H}^2}{t50} = \frac{0.197 \times 0.9569}{17.5 \times 60}$ ∴ $\boxed{Cv = 0.1795 \times 10^{-3}\ cm^2/s}$

g) $e = \frac{H1 - HS}{HS} = \frac{1.9459 - 0.7434}{0.7434}$ ∴ $\boxed{e = 1.6176}$

h) $r = \frac{dc - d100}{d1 - d7} = \frac{133 - 199}{130 - 213} = \frac{-66}{-83}$ ∴

$\boxed{r = 0.7952}$

PROFUNDIDADE 10,50M PONTO H

a) carga → $\frac{P}{2} = 1.3000$ Kg

b) Tensão → $\sigma' v = 0.4922$ Kg/cm²

c) ΔH e $H1$ → Na Leitura → 243 div → 1 div = 10^{-4} pol.

$\Delta H = 243 \times 2,54 \times 10^{-4}$ ∴ $\boxed{\Delta H = 0.0617 \text{ cm}}$ $\boxed{H0 = 1.9459 \text{ cm}}$

$H1 = H0 - \Delta H = 1.9459 - 0.0617$ ∴ $\boxed{H1 = 1.8842 \text{ cm}}$

d) $Mv = \frac{\Delta H}{H1 \times \Delta \sigma}$ $\begin{cases} \Delta \sigma = \sigma'(H) - \sigma'(G) = 0.4922 - 0.4282 \\ \Delta \sigma = 0.0640 \text{ Kg/cm}^2 \end{cases}$

$Mv = \frac{0.0617}{0.8842 \times 0.0640}$ ∴ $\boxed{Mv = 1.0903 \text{ cm}^2/\text{Kg}}$

e) $\bar{H} = \frac{H0 + H1}{4} = \frac{1.9459 + 1.8842}{4} = 0.9575$ ∴ $\boxed{\bar{H}^2 = 0.9168 \text{ cm}^2}$

f) $Cv = \frac{0.197 \times \bar{H}^2}{t\,50} = \frac{0.197 \times 0.9168}{62 \times 60}$ ∴ $\boxed{Cv = 0.0485 \times 10^{-3} \text{ cm}^2/\text{s}}$

g) $e = \frac{H1 - HS}{HS} = \frac{1.8842 - 07434}{0.7434}$ ∴ $\boxed{e = 1.5346}$

h) $r = \frac{dc - d100}{di - d7} = \frac{223 - 430}{213 - 456} = \frac{-207}{-243}$ ∴ $\boxed{r = 0.8518}$

PROFUNDIDADE 10,50 M PONTO H

a) carga → $P = 2.6000$ kg

b) tensão → $\sigma'v = 0.9845$ kg/cm²

c) ΔH e $H1$ → Na Leitura → 652 div → 1 div = 10^{-4} pol.

$\Delta H = 652 \times 2,54 \times 10^{-4}$ ∴ $\boxed{\Delta H = 0.1656 \text{ cm}}$ $\boxed{H0 = 1.8842 \text{ cm}}$

$H1 = H0 - \Delta H \rightarrow H1 = 1.8842 - 0.1656$ ∴ $\boxed{H1 = 1.7186 \text{ cm}}$

d) $Mv = \dfrac{\Delta H}{H1 \times \Delta\sigma}$ $\begin{cases} \Delta\sigma = \sigma'(H) - \sigma'(G) = 0.9845 - 0.8564 \\ \Delta\sigma = 0.1281 \text{ kg/cm}^2 \end{cases}$

$Mv = \dfrac{0.1656}{1.7186 \times 0,1281}$ ∴ $\boxed{Mv = 0.7522 \text{ cm}^2/\text{kg}}$

e) $\overline{H} = \dfrac{H0 + H1}{4} = \dfrac{1.8842 + 1.7186}{4} = 0.9007$ ∴ $\boxed{\overline{H}^2 = 0.8113 \text{ cm}^2}$

f) $Cv = \dfrac{0.197 \times \overline{H}^2}{t\,50} = \dfrac{0.197 \times 0.8113}{50 \times 60}$ ∴ $\boxed{Cv = 0.0533 \text{ cm}^2/\text{s}}$

g) $e = \dfrac{H1 - HS}{HS} = \dfrac{1.7186 - 0.7434}{0.7434}$ ∴ $\boxed{e = 1.3118}$

h) $r = \dfrac{dc - d100}{d1 - d7} = \dfrac{460 - 1040}{456 - 1108} = \dfrac{-580}{-652}$ ∴ $\boxed{r = 0.8896}$

PROFUNDIDADE 10,80 M PONTO H (5)

Índice de Vazios

A) No Descarregamento:

$\frac{P}{2}$ → Na Leitura → −46 div → 1 div = 10^{-4} pol.

$\Delta H = 46 \times 2{,}54 \times 10^{-4}$ ∴ $\boxed{\Delta H = 0.0117 \text{ cm}}$ $\boxed{H0 = 1.7186 \text{ cm}}$

$H1 = H0 + \Delta H \rightarrow H1 = 1.7186 + 0.0117$ ∴ $\boxed{H1 = 1.7303 \text{ cm}}$

$e = \frac{H1 - Hs}{Hs} = \frac{1.7303 - 07434}{0.7434}$ ∴ $\boxed{e = 1.3275}$

$\frac{P}{4}$ → Na Leitura → −75 div → 1 div = 10^{-4} pol.

$\Delta H = 75 \times 2{,}54 \times 10^{-4}$ ∴ $\boxed{\Delta H = 0.0190 \text{ cm}}$ $\boxed{H0 = 1.7303 \text{ cm}}$

$H1 = H0 + \Delta H = 1.7303 + 0.0190$ ∴ $\boxed{H1 = 1.7493 \text{ cm}}$

$e = \frac{H1 - Hs}{Hs} = \frac{1.7493 - 07434}{0.7434}$ ∴ $\boxed{e = 1.3531}$

B) No Recarregamento:

$\frac{P}{2}$ → Na Leitura → 45 div → 1 div = 10^{-4} pol.

$\Delta H = 45 \times 2{,}54 \times 10^{-4}$ ∴ $\boxed{\Delta H = 0.0114 \text{ cm}}$ $\boxed{H0 = 1.7493 \text{ cm}}$

$H1 = H0 - \Delta H \rightarrow H1 = 1.7493 - 0.0114$ ∴ $\boxed{H1 = 1.7379 \text{ cm}}$

$e = \frac{H1 - Hs}{Hs} = \frac{1.7379 - 0.7434}{0.7434}$ ∴ $\boxed{e = 1.3378}$

P → Na Leitura → 132 div → 1 div = 10^{-4} pol.

$\Delta H = 132 \times 2{,}54 \times 10^{-4}$ ∴ $\boxed{\Delta H = 0.0335 \text{ cm}}$ $\boxed{H0 = 1.7379 \text{ cm}}$

$H1 = H0 - \Delta H = 1.7379 - 0.0335$ ∴ $\boxed{H1 = 1.7044 \text{ cm}}$

$e = \frac{H1 - Hs}{Hs} = \frac{1.7044 - 0.7434}{0.7434}$ ∴ $\boxed{e = 1.2927}$

PROFUNDIDADE 10,50 M PONTO H

a) carga → $2P = 5.2000\ kg$

b) Tensão → $\sigma b = 1.9690\ kg/cm^2$

c) ΔH e $H1$ → Na Leitura → 725 div → 1 div = 10^{-4} pol.

$\Delta H = 725 \times 2,54 \times 10^{-4} \therefore$ $\boxed{\Delta H = 0.1841\ cm}$ $\boxed{H0 = 1.7044\ cm}$

$H1 = H0 - \Delta H = 1.7044 - 0.1841 \therefore$ $\boxed{H1 = 1.5203\ cm}$

d) $\frac{\Delta H}{H1 \times \Delta\sigma}$ $\begin{cases} \Delta\sigma = \sigma'(H) - \sigma'(G) = 1.9690 - 1.7128 \\ \Delta\sigma = 0.2562\ kg/cm^2 \end{cases}$

$Mv = \frac{0.1841}{1.5203 \times 0.2562} \therefore$ $\boxed{Mv = 0.4726\ cm^2/kg}$

e) $\bar{H} = \frac{H0 + H1}{4} = \frac{1.7044 + 1.5203}{4} = 0.8062 \therefore$ $\boxed{\bar{H}^2 = 0.6499\ cm^2}$

f) $Cv = \frac{0.197 \times \bar{H}^2}{t50} = \frac{0.197 \times 0.6499}{55 \times 60} =$ $\boxed{0.0388 \times 10^{-3}\ cm^2/s}$

g) $e = \frac{H1 - HS}{HS} = \frac{1.5203 - 0.7434}{0.7434} \therefore$ $\boxed{e = 1.0451}$

h) $r = \frac{dc - d100}{d1 - d7} = \frac{-695}{-725} \therefore$ $\boxed{r = 0.9586}$

PROFUNDIDADE 10,80M PONTO H

a) carga → $\Delta P = 10.4000\ Kg$

b) Tensão → $\sigma v = 3.9380\ Kg/cm^2$

c) ΔH e $H1$ → Na Leitura → 599 div → $1 div = 10^{-4}$ pol

$\Delta H = 599 \times 2,54 \times 10^{-4} \therefore \boxed{\Delta H = 0.1521\ cm}$ $\boxed{HO = 1.5203\ cm}$

$H1 = HO - \Delta H = 1.5203 - 0.1521 \therefore \boxed{H1 = 1.3682\ cm}$

d) $Mv = \dfrac{\Delta H}{H1 \times \Delta \sigma}$ $\begin{cases} \Delta \sigma = \sigma'(H) - \sigma'(G) = 3.9380 - 3.4256 \\ \Delta \sigma = 0.5124\ Kg/cm^2 \end{cases}$

$Mv = \dfrac{0.1521}{1.3682 \times 0.5124} \therefore \boxed{Mv = 0.2169\ cm^2/kg}$

e) $\bar{H} = \dfrac{HO + H1}{4} = \dfrac{1.5203 + 1.3682}{4} = 0.7221 \therefore \boxed{\bar{H} = 0.5215\ cm^2}$

f) $Cv = \dfrac{0.197 \times \bar{H}^2}{t50} = \dfrac{0.197 \times 0.5215^2}{60 \times 60} \therefore \boxed{Cv = 0.0285 \times 10^{-4}\ cm^2/s}$

g) $e = \dfrac{H1 - HS}{HS} = \dfrac{1.3682 - 0.7434}{0.7434} \therefore \boxed{e = 0.8405}$

h) $r = \dfrac{dc - d100}{dc - d7} = \dfrac{-590}{-599} \therefore \boxed{r = 0.9850}$

PROFUNDIDADE 10,50 m PONTO H

a) Carga → $\Delta P = 20.800$ kg

b) Tensão → $\sigma'_v = 7.8760$ kg/cm²

c) ΔH e H_1 → Na Leitura → 504 div → 1 div = 10^{-4} pol

$\Delta H = 504 \times 2,54 \times 10^{-4}$ ∴ $\boxed{\Delta H = 0.1280 \text{ cm}}$ $\boxed{H_0 = 1.3682 \text{ cm}}$

$H_1 = H_0 - \Delta H = 1.3682 - 0.1280$ ∴ $\boxed{H_1 = 1.2402 \text{ cm}}$

d) $M_v = \dfrac{\Delta H}{H_1 \times \Delta \sigma}$ $\begin{cases} \Delta\sigma = \sigma'(H) - \sigma'(G) = 7.8760 - 6.8512 \\ \Delta\sigma = 1.0248 \text{ kg/cm}^2 \end{cases}$

$M_v = \dfrac{0.1280}{1.2402 \times 1.0248}$ ∴ $\boxed{M_v = 0.1007 \text{ cm}^2/\text{kg}}$

e) $\bar{H} = \dfrac{H_0 + H_1}{4} = \dfrac{1.3682 + 1.2402}{4} = 0.6521$ ∴ $\boxed{\bar{H}^2 = 0.4252 \text{ cm}^2}$

f) $C_v = \dfrac{0.197 \times \bar{H}^2}{t_{50}} = \dfrac{0.197 \times 0.4252}{32 \times 60}$ ∴ $\boxed{C_v = 0.0436 \text{ cm}^2/\text{s}}$

g) $e = \dfrac{H_1 - H_S}{H_S} = \dfrac{1.2402 - 0.7434}{0.7434}$ ∴ $\boxed{e = 0.6683}$

h) $r = \dfrac{d_c - d_{100}}{d_i - d_f} = \dfrac{-476}{-504}$ ∴ $\boxed{r = 0.9444}$

PROFUNDIDADE 10,50 m

PONTO H

Coeficiente de compressibilidade: (a_v)

$\frac{P}{4} \rightarrow a_v = \frac{\Delta e}{\Delta \sigma} = \frac{0.0283}{0.1231} = 0.2299 \text{ cm}^2/\text{kg}$

$\frac{P}{2} \rightarrow a_v = \frac{\Delta e}{\Delta \sigma} = \frac{0.0830}{0.2461} = 0.3373 \text{ cm}^2/\text{kg}$

$P \rightarrow a_v = \frac{\Delta e}{\Delta \sigma} = \frac{0.2228}{0.4922} = 0.4527 \text{ cm}^2/\text{kg}$

$2P \rightarrow a_v = \frac{\Delta e}{\Delta \sigma} = \frac{0.2667}{0.9845} = 0.2709 \text{ cm}^2/\text{kg}$

$4P \rightarrow a_v = \frac{\Delta e}{\Delta \sigma} = \frac{0.2046}{1.9690} = 0.1039 \text{ cm}^2/\text{kg}$

$8P \rightarrow a_v = \frac{\Delta e}{\Delta \sigma} = \frac{0.1722}{3.9380} = 0.0437 \text{ cm}^2/\text{kg}$

Coeficiente de Permeabilidade

$K = \frac{C_v \times a_v \times \gamma_a}{1 \times e} \rightarrow K = \frac{0.0761 \times 10^{-3} \times 0.2397 \times 1.0 \times 10^{-3}}{1 + 1.237}$

$\boxed{K = 0.77 \times 10^{-8} \text{ cm/s}}$

Índice de Compressão (C_c)

$C_c = \frac{e_1 - e_2}{\log \frac{P_2}{P_1}}$ $\begin{cases} e_1 = 1.19 \\ e_2 = 0.85 \\ P_1 = 1.4 \\ P_2 = 4,0 \end{cases}$

$C_c = \frac{1.19 - 0.85}{\log \frac{4.0}{1.4}}$

$C_c = \frac{0.34}{0.455932}$

$\boxed{C_c = 0.7457}$

Índice de Expansão (C_E)

$C_E = \frac{e_1 - e_2}{\log \frac{P_2}{P_1}}$ $\begin{cases} e_1 = 1.35 \\ e_2 = 1.32 \\ P_1 = 0.26 \\ P_2 = 0.70 \end{cases}$

$C_E = \frac{1.35 - 1.32}{\log \frac{0.70}{0.26}}$

$C_E = \frac{0.03}{0.4301246}$

$\boxed{C_E = 0.0697}$

A D E N S A M E N T O

Profundidade 11,50 m

Ponto " I "

CALCULO DOS PARÂMETROS

Profundidade = 11,50 metros - Ponto " I " Anel Nº 01

a) $V_s = (W_s^o - W_g^o) - \frac{W^o}{\gamma_p}$

$V_s = (76,03 - 22,18) - \frac{22,85}{0,796}$

$V_s = 53,91 - 25,22 \therefore \boxed{V_s = 28,69}$

$\gamma_{sat} = \frac{W_s^o}{V_s}$ e $\gamma_{sub} = \gamma_{sat} - \gamma_a$

$\gamma_{sat} = \frac{76,03}{28,69} = \boxed{2,650\ g/cm^3}$

$\gamma_{sub} = 2,650 - 1,00 = \boxed{1,65\ g/cm^3}$

/// ///

b) Tensões Efetivas

$\bar{\sigma}'_{(9)} = \bar{\sigma}'_{(8)} + \gamma_{sub(8)} \times 50 + \gamma_{sub(9)} \times 50$

$\bar{\sigma}'_{(9)} = 984,50 + 1,328 \times 50 + 1,650 \times 50$

$\bar{\sigma}'_{(9)} = 984,50 + 66,40 + 82,50$

$\boxed{\bar{\sigma}'_{(9)} = 1.133,40\ g/cm^2} \therefore \boxed{\bar{\sigma}'_{(9)} = 1,1334\ kg/cm^2}$

/// ///

c) Peso Correspondente

$\bar{\sigma} = \frac{10P}{A} \therefore P = \frac{\bar{\sigma} \cdot A}{10} = \frac{1133,40 \times 26,41}{10}$

$P = 2993,31\ g \therefore \boxed{P = 2,9933\ g}$

PROFUNDIDADE = 11,50 m - PONTO "I" ANEL - 01

(1)

a) carga → $\frac{P}{8} = 0.3742$ kg

b) Tensão → $\bar{\sigma}v = 0.1417$ kg/cm²

c) ΔH e H_1 → Na Leitura → 51 div → 1 div = 10^{-4} pol

$\Delta H = 51 \times 2,54 \times 10^{-4}$ ∴ $\boxed{\Delta H = 0.0129 \text{ cm}}$ $\boxed{H_0 = 2.00 \text{ cm}}$

$H_1 = H_0 - \Delta H$ ∴ $H_1 = 2,0 - 0.0129$ ∴ $\boxed{H_1 = 1.9871 \text{ cm}}$

d) $Mv = \frac{\Delta H}{H_1 \times \Delta P}$ ∴ $\begin{cases} \Delta P = \bar{\sigma}(I) - \bar{\sigma}(H) = 0.1417 - 0.1031 \\ \Delta P = 0.0186 \text{ kg/cm}^2 \end{cases}$

$Mv = \frac{0.0129}{1.9871 \times 0.0186} = \boxed{0.3490 \text{ cm}^2/\text{kg}}$

e) $\bar{H} = \frac{H_0 + H_1}{4} = \frac{2 + 1.9871}{4} = 0.9968$ ∴ $\boxed{\bar{H}^2 = 0.9936 \text{ cm}^2}$

f) $Cv = \frac{0.197 \times \bar{H}^2}{t_{50}} = \frac{0.197 \times 0.9936}{16,5 \times 60} \rightarrow \boxed{Cv = 0.1977 \times 10^{-3} \text{ cm}^2/\text{s}}$

g) $e = \frac{H_1 - H_S}{H_S} = \begin{cases} H_1 = 1.9871 \text{ cm} \\ H_S = \frac{P_S}{A \times \delta} \rightarrow \begin{cases} d = 58 \text{ mm} \\ A = 26,4074 \text{ cm}^2 \\ P_S = 43,00 \text{ g} \end{cases} \end{cases}$ $\delta = 2,650$ g/cm

$\begin{cases} H_S = \frac{43}{26,4074 \times 2,650} \\ \boxed{H_S = 0.6145 \text{ cm}} \end{cases}$

$e = \frac{1.9871 - 0.6145}{0.6145}$ ∴ $\boxed{e = 2.2337}$

h) $r = \frac{dc - d100}{di - d7} = \frac{5,0 - 49,0}{0,0 - 51,0} = \frac{-44}{-51}$ ∴ $\boxed{r = 0.8627}$

PROFUNDIDADE = 11,50M - PONTO "I" - ANEL-01

a) carga → $\frac{P}{4} = 0.7483$ kg

b) Tensão → $\bar{\sigma v} = 0.2833$ kg/cm²

c) ΔH e H1 → Na Leitura → 45 div → 1 div = 10^{-4} pol

$\Delta H = 45 \times 2,54 \times 10^{-4}$ → $\boxed{\Delta H = 0.0114 \text{ cm}}$ $\boxed{H0 = 1.9871 \text{ cm}}$

$H1 = H0 - \Delta H$ ∴ $H1 = 1.9871 - 0.0114$ ∴ $\boxed{H1 = 1.9757 \text{ cm}}$

d) $mv = \frac{\Delta H}{H1 \times \Delta P}$ $\begin{cases} \Delta P = \bar{\sigma}(I) - \bar{\sigma}(H) = 0.2833 - 0.2461 \\ \boxed{\Delta P = 0.0372 \text{ kg/cm}^2} \end{cases}$

$mv = \frac{0.0114}{1.9737 \times 0.0372}$ ∴ $\boxed{mv = 0.1551 \text{ cm}^2/\text{kg}}$

e) $\bar{H} = \frac{H0 + H1}{4} = \frac{1.9871 + 1.9757}{4} = 0.9907$ ∴ $\boxed{\bar{H}^2 = 0.9815 \text{ cm}^2}$

f) $Cv = \frac{0.197 \times \bar{H}^2}{t50} = \frac{0.197 \times 0.9815}{10 \times 60} = \boxed{0.3222 \times 10^{-3} \text{ cm}^2/\text{s}}$

g) $e = \frac{H1 - HS}{HS}$ $\begin{cases} H1 = 1.9757 \text{ cm} \\ HS = 0.6145 \text{ cm} \end{cases}$

$e = \frac{1.9757 - 0.6145}{0.6145}$ ∴ $\boxed{e = 2.2151}$

h) $r = \frac{dc - d100}{di - d7} = \frac{56,5 - 88,6}{52 - 97} = \frac{-32.1}{-45.0}$ ∴ $\boxed{r = 0.7133}$

PROFUNDIDADE = 11,50 MI - PONTO "I" - ANEL - 01

a) Carga → $\frac{P}{2} = 1.4366$ kg

b) Tensão → $\sigma v = 0.5667$ kg/cm²

c) ΔH e $H1$ → Na Leitura → 129,5 div → 1 div = 10^{-4} pol

$\Delta H = 129,5 \times 2,54 \times 10^{-4}$ ∴ $\boxed{\Delta H = 0.0329 \text{ cm}}$ $\boxed{H0 = 1.9757 \text{ cm}}$

$H1 = H0 - \Delta H$ ∴ $H1 = 1.9757 - 0.0329$ ∴ $\boxed{H1 = 1.9428 \text{ cm}}$

d) $Mv = \frac{\Delta H}{H1 \times \Delta P}$ $\begin{cases} \Delta P = \sigma(I) - \sigma(H) = 0.5667 - 0.4922 \\ \Delta P = 0.0745 \text{ kg/cm}^2 \end{cases}$

$Mv = \frac{0.0329}{1.9428 \times 0.0745}$ ∴ $\boxed{Mv = 0.2273 \text{ cm}^2/\text{kg}}$

e) $\bar{H} = \frac{H0 + H1}{4} = \frac{1.9757 + 1.9428}{4} = 0.9796$ ∴ $\boxed{\bar{H}^2 = 0.9597 \text{ cm}^2}$

f) $Cv = \frac{0.197 \times \bar{H}^2}{t50}$ ∴ $Cv = \frac{0.197 \times 0.9597}{.25 \times 60}$ ∴ $\boxed{Cv = 0.1260 \times 10^{-3} \text{ cm}^2/\text{s}}$

g) $e = \frac{H1 - HS}{HS}$ $\begin{cases} H1 = 0.9428 \\ HS = 0.6145 \end{cases}$

$e = \frac{1.9428 - 0.6145}{0.6145}$ ∴ $\boxed{e = 2.1616}$

h) $r = \frac{dc - d100}{di - df} = \frac{117,5 - 211}{97 - 226,5} = \frac{-93,5}{-129,5}$ ∴ $\boxed{r = 0.7220}$

PROFUNDIDADE = 11,50M - PONTO "I" - ANEL - 01

a) Carga → $P = 2.9933$ Kg

b) Tensão → $\sigma v = 1.1334$ Kg/cm²

c) ΔH e $H1$ → Na Leitura → 507.5 div → 1 div = 10^{-4} pol

$\Delta H = 507,5 \times 2,54 \times 10^{-4} \rightarrow \boxed{\Delta H = 0.1289}$ $\boxed{H0 = 1.9428 \text{ cm}}$

$H1 = H0 - \Delta H \therefore H1 = 1.9428 - 0.1283 \therefore \boxed{H1 = 1.8139 \text{ cm}}$

d) $Mv = \dfrac{\Delta H}{H1 \times \Delta P}$ $\begin{cases} \Delta P = \sigma(I) - \sigma(H) = 1.1334 - 0.9845 \\ \Delta P = 0.1489 \text{ Kg/cm}^2 \end{cases}$

$Mv = \dfrac{0.1289}{1.8139 \times 0.1489} \rightarrow \boxed{Mv = 0.4772 \text{ cm}^2/\text{kg}}$

e) $\bar{H} = \dfrac{H0 + H1}{4} = \dfrac{1.9428 + 1.8139}{4} = 0.9392 \therefore \boxed{\bar{H}^2 = 0.8820 \text{ cm}^2}$

f) $Cv = \dfrac{0.197 \times \bar{H}^2}{t50} = \dfrac{0.197 \times 0.8820}{60 \times 60} \therefore \boxed{Cv = 0.0483 \times 10^{-3} \text{ cm}^2/\text{s}}$

g) $e = \dfrac{H1 - HS}{HS}$ $\begin{cases} H1 = 1.8139 \text{ cm} \\ HS = 0.6145 \text{ cm} \end{cases}$

$e = \dfrac{1.8139 - 0.6145}{0.6145} \therefore \boxed{e = 1.9518}$

h) $r = \dfrac{dc - d100}{di - d_t} = \dfrac{230 - 670}{226,5 - 734,0} = \dfrac{-440}{-507,5} \therefore \boxed{r = 0.8670}$

PROFUNDIDADE = 11,50M - PONTO "I" - ANEL = 01

a) carga → ΔP → 5.9866 Kg

b) Tensão → $\sigma'v$ → 2.2668 Kg/cm²

c) ΔH e H1 → na Leitura → 780 div → 1 div → 10^{-4} ref

$\Delta H = 780 \times 2,54 \times 10^{-4}$ ∴ $\boxed{\Delta H = 0.1981\ cm}$ $\boxed{H0 = 1.813\ cm}$

$H1 = H0 - \Delta H \rightarrow H1 = 1.8139 - 0.1981$ ∴ $\boxed{H1 = 1.6158.\ cm}$

d) $Mv = \dfrac{\Delta H}{H1 \times \Delta P}$ $\begin{cases} \Delta P = \sigma'(I) - \sigma'(H) = 2.2668 - 1.9690. \\ \Delta P = 0.2978\ Kg/cm^2 \end{cases}$

$Mv = \dfrac{0.1981}{1.6158 \times 0.2978}$ ∴ $\boxed{Mv = 0.4117\ cm^2/kg}$

e) $\bar{H} = \dfrac{H0 + H1}{4} = \dfrac{1.8139 + 1.6158}{4} = 0.8574$ ∴ $\boxed{\bar{H}^2 = 0.7352\ cm^2}$

f) $Cv = \dfrac{0.197 \times \bar{H}^2}{t50} = \dfrac{0.197 \times 0.7352}{56 \times 60}$ ∴ $\boxed{Cv = 0.0431 \times 10^{-3}\ cm^2/s}$

g) $e = \dfrac{H1 - HS}{HS}$ $\begin{cases} H1 = 1.6158\ cm \\ HS = 0.6145\ cm \end{cases}$

$e = \dfrac{1.6158 - 0.6145}{0.6145}$ ∴ $\boxed{e = 1.6294}$

h) $r = \dfrac{dc - d100}{di - df} = \dfrac{820.0 - 1560.0}{816.0 - 1596.0} = \dfrac{-740}{-780}$ ∴ $\boxed{r = 0.9487}$

PROFUNDIDADE = 11,50M "PONTO "I" - ANEL = 01

a) carga → $\Delta P = 11.9732$ kg

b) Tensão → $\sigma'v = 4.5336$ kg/cm²

c) ΔH e H_1 → Na Leitura → 668 div → 1 div = 10^{-4} pol.

$\Delta H = 668 \times 2{,}54 \times 10^{-4}$ ∴ $\boxed{\Delta H = 1.1697 \text{ cm}}$ $\boxed{H_0 = 1.6158 \text{ cm}}$

$H_1 = H_0 - H_1 \rightarrow H_1 = 1.6158 - 0.1697$ ∴ $\boxed{H_1 = 1.4461 \text{ cm}}$

d) $Mv = \dfrac{\Delta H}{H_1 \times \Delta P}$ $\begin{cases} \Delta P = \sigma'(I) - \sigma'(H) = 4.5336 - 3.9380 \\ \Delta P = 0.5956 \text{ kg/cm}^2 \end{cases}$

$Mv = \dfrac{0.1697}{1.4461 \times 0.5956}$ ∴ $\boxed{Mv = 0.1970 \text{ cm}^2/\text{kg}}$

e) $\bar{H} = \dfrac{H_0 + H_1}{4} = \dfrac{1.6158 + 1.4461}{4} = 0.7655$ ∴ $\boxed{\bar{H}^2 = 0.5859 \text{ cm}^2}$

f) $Cv = \dfrac{0.197 \times \bar{H}^2}{t_{50}} = \dfrac{0.197 \times 0.5859}{50 \times 60}$ ∴ $\boxed{Cv = 0.0385 \times 10^{-3} \text{ cm}^2/\text{kg}}$

(6)

g) $e = \dfrac{H_1 - H_S}{H_S}$ $\begin{cases} H_1 = 1.4461 \text{ cm} \\ H_S = 0.6145 \text{ cm} \end{cases}$

$e = \dfrac{1.4461 - 0.6145}{0.6145}$ ∴ $\boxed{e = 1.3533}$

h) $r = \dfrac{dc - d100}{di - dt} = \dfrac{1592 - 2250}{1596 - 2264} = \dfrac{-658}{-668}$ ∴ $\boxed{r = 0.9850}$

PROFUNDIDADE = 11,50M - PONTO "I" - ANEL = 01

a) carga → $\delta P = 23.9464$ kg

b) Tensão → $\sigma'v = 9.0672$ Kg/cm²

c) ΔH e $H1$ → Na Leitura → 544,5 div → 1 div = 10^{-4} pol.

$\Delta H = 544,5 \times 2,54 \times 10^{-4}$ ∴ $\boxed{\Delta H = 0.1383 \text{ cm}}$ $\boxed{H0 = 1.4461 \text{ cm}}$

$H1 = H0 - \Delta H$ → $H1 = 1.4461 - 0.1383$ ∴ $\boxed{H1 = 1.3078 \text{ cm}}$

d) $Mv = \dfrac{\Delta H}{H1 \times \Delta P}$ $\begin{cases} \Delta P = \sigma'(I) - \sigma'(H) = 9.0672 - 7.8760 \\ \Delta P = 1.1912 \text{ Kg/cm}^2 \end{cases}$

$Mv = \dfrac{0.1383}{1.3078 \times 1.1912}$ ∴ $\boxed{Mv = 0.0888 \text{ cm}^2/\text{Kg}}$

e) $\bar{H} = \dfrac{H0 + H1}{4} = \dfrac{1.4461 + 1.3078}{4} = 0.6885$ ∴ $\boxed{\bar{H}^2 = 0.4740 \text{ cm}^2}$

f) $Cv = \dfrac{0.197 \times \bar{H}^2}{t_{50}} = \dfrac{0.197 \times 0.4740}{37,5 \times 60}$ ∴ $\boxed{Cv = 0.0421 \times 10^{-3} \text{ cm}^2/\text{s}}$

g) $e = \dfrac{H1 - HS}{HS}$ $\begin{cases} H1 = 1.3078 \\ HS = 0.6145 \end{cases}$

$e = \dfrac{1.3078 - 0.6145}{0.6145}$ ∴ $\boxed{e = 1.1282}$

(7) h) $r = \dfrac{dc - d100}{di - df} = \dfrac{2253 - 2797}{2.264 - 2808,5} = \dfrac{544,0}{544.5}$ ∴ $\boxed{r = 0.9991}$

PROFUNDIDADE = 11,50M - PONTO "I" ANEL - 01

Índice de Vazios → (e) → No descarregamento:

$$\frac{P}{2}$$

a) ΔH e H1 → Na Leitura → 58 div → 1 div = 10^{-4} pol.

$\Delta H = 58 \times 2,54 \times 10^{-4}$ ∴ $\boxed{\Delta H = 0.0147 \text{ cm}}$ $\boxed{H0 = 1.8139 \text{ cm}}$

$H1 = H0 - \Delta H$ ∴ $H1 = 1.8139 + 0.0147$ ∴ $\boxed{H1 = 1.8286 \text{ cm}}$

b) $\boxed{HS = 0.6145 \text{ cm}}$

c) $e = \frac{H1 - HS}{HS} = \frac{1.8286 - 0.6145}{0.6145}$ ∴ $\boxed{e = 1.9757}$

$$\frac{P}{4}$$

a) ΔH e H1 → Na Leitura → -82 div → 1 div = 10^{-4} pol.

$\Delta H = -82 \times 2,54 \times 10^{-4}$ ∴ $\boxed{\Delta H = 0.0208 \text{ cm}}$ $\boxed{H0 = 1.8286}$

$H1 = H0 + \Delta H \longrightarrow H1 = 1.8286 + 0.0208$ ∴ $\boxed{H1 = 1.8494 \text{ cm}}$

b) $\boxed{HS = 0.6145 \text{ cm}}$

c) $e = \frac{H1 - HS}{HS} = \frac{1.8494 - 0.6145}{0.6145}$ ∴ $\boxed{e = 2.0096}$

PROFUNDIDADE = 11,50 M - PONTO "I" - ANEL = 01

Índice dos Vazios → (e) → No carregamento

a) ΔH e H_I → Na Leitura → 52 div → 1 div — 10^{-4} pol.

$\Delta H = 52 \times 2,54 \times 10^{-4}$ ∴ $\boxed{\Delta H = 0.0132 \text{ cm}}$ $\boxed{H_O = 1.8494 \text{ cm}}$

$H_I = H_O - \Delta H = 1.8494 - 0.0132$ ∴ $\boxed{H_I = 1.8362 \text{ cm}}$

b) $\boxed{H_S = 0.6145 \text{ cm}}$

c) $e = \frac{H_I - H_S}{H_S} = \frac{1.8362 - 0.6145}{0.6145}$ ∴ $\boxed{e = 1.9881}$

P

a) ΔH e H_I → Na Leitura → 170 div → 1 div = 10^{-4} pol.

$\Delta H = 170 \times 2,54 \times 10^{-4}$ ∴ $\boxed{\Delta H = 0.0431 \text{ cm}}$ $\boxed{H_O = 1.8362 \text{ cm}}$

$H_I = H_O - \Delta H \rightarrow H_I = 1.8362 - 0.0432$ ∴ $\boxed{H_I = 1.7930 \text{ cm}}$

b) $\boxed{H_S = 0.6145 \text{ cm}}$

c) $e = \frac{H_I - H_S}{H_S} = \frac{1.7930 - 0.6145}{0.6145}$ ∴ $\boxed{e = 1.9178}$

PROFUNDIDADE = 11,50m - PONTO "I" ANEL = 01

Índice de Compressão

$$C_c = \frac{e_1 - e_2}{\log \frac{P_2}{P_1}} \quad \begin{cases} e_1 = 1.835 \\ e_2 = 1.125 \\ P_1 = 1.4 \text{ kg/cm}^2 \\ P_2 = 8.0 \text{ kg/cm}^2 \end{cases}$$

$$C_c = \frac{1.835 - 1.125}{\log \frac{8.0}{1.4}} = \frac{0.710}{\log 5.714285} = \frac{0.71}{0.756962} \therefore \boxed{C_c = 0.9379}$$

Índice de Expressão

$$C_E = \frac{e_1 - e_2}{\log \frac{P_2}{P_1}} \quad \begin{cases} e_1 = 2.005 \\ e_2 = 1.835 \\ P_1 = 0.34 \text{ kg/cm}^2 \\ P_2 = 0.80 \text{ kg/cm}^2 \end{cases}$$

$$C_E = \frac{2.005 - 1.835}{\log \frac{0,80}{0,34}} = \frac{0.170}{\log 2.352941} = \frac{0.170}{0.371611} \therefore \boxed{C_E = 0.4575}$$

Coeficiente de permeabilidade:

$$K = \frac{C_v \times a_v \times \gamma_a}{1 + e} = \frac{0.1168 \times 10^{-3} \times 0.1910 \times 10^{-3}}{1 + 1.8104} \therefore \boxed{K = 0.793 \times 10^{-8} \text{ cm/s}}$$

Coeficiente de compressibilidade

$\frac{P}{4} \rightarrow a_v = \frac{\Delta e}{\Delta \sigma} = \frac{0.0186}{0.1417} = 0.1313 \ cm^2/kg$

$\frac{P}{2} \rightarrow a_v = \frac{\Delta e}{\Delta \sigma} = \frac{0.0535}{0.2833} = 0.1888 \ cm^2/kg$

$P \rightarrow a_v = \frac{\Delta e}{\Delta \sigma} = \frac{0.2098}{0.5667} = 0.3702 \ cm^2/kg$

$2P \rightarrow a_v = \frac{\Delta e}{\Delta \sigma} = \frac{0.3224}{1.1334} = 0.2844 \ cm^2/kg$

$4P \rightarrow a_v = \frac{\Delta e}{\Delta \sigma} = \frac{0.2761}{2.2668} = 0.1218 \ cm^2/kg$

$8P \rightarrow a_v = \frac{\Delta e}{\Delta \sigma} = \frac{0.2251}{4.5336} = 0.0496 \ cm^2/kg$

A D E N S A M E N T O

Prufundidade: 12,50 m

Ponto " J "

TENSÕES EFETIVAS

PROFUNDIDADE 12,60 M - PONTO J -

$\sigma'_{(10)} = \sigma'_{(9)} + \gamma_{sub(9)} \times 50 + \gamma_{sub(10)} \times 50$

$\sigma'_{(10)} = 1115,70 + 1,650 \times 50 + 1,296 \times 60$

$\boxed{\sigma'_{(10)} = 1263,00\ g/cm^2}$

PESO CORRESPONDENTE

$\sigma = \frac{10P}{10} \therefore P = \frac{\sigma \cdot A}{10} = \frac{1263,0 \times 26,41}{10}$

$P = 3335,58\ g \rightarrow \boxed{P = 3,335\ kg}$

PÊSO ESPECÍFICO SUBMERSO

$Vs = (76,91 - 23,10) - \frac{18,40}{0,906}$

$Vs = 53,81 - 20,31$

$Vs = 33,50$

$\gamma_{sat} = \frac{76,91}{33,50} \rightarrow \gamma_{sat} = 2.296$

$\boxed{\gamma_{sub} = 1.296\ g/cm^3}$

PROFUNDIDADE 12,50M - PONTO 'J'

Índice de Vazios

A) No Descarregamento:

$\frac{P}{2}$ → Na Leitura → 67 div → 1 div = 10^{-4} pol

$\Delta H = 67 \times 2,54 \times 10^{-4} \therefore \boxed{\Delta H = 0.0170 \text{ cm}}$ $\boxed{H0 = 1.6852 \text{ cm}}$

$H1 = H0 + \Delta H = 1.6852 + 0.0170 \therefore \boxed{H1 = 1.7022 \text{ cm}}$

$e = \frac{H1 - HS}{HS} = \frac{1.7022 - 0.6762}{0.6762} \therefore \boxed{e = 1.5173}$

$\frac{P}{4}$ → Na Leitura 88 div → 1 div = 10^{-4} pol

$\Delta H = 88 \times 2,54 \times 10^{-4} \therefore \boxed{\Delta H = 0.0223 \text{ cm}}$ $\boxed{H0 = 1.7022 \text{ cm}}$

$H1 = H0 + \Delta H \rightarrow H1 = 1.7022 + 0.0223 \therefore \boxed{H1 = 1.7245 \text{ cm}}$

$e = \frac{H1 - HS}{HS} = \frac{1.7245 - 0.6762}{0.6762} \therefore \boxed{e = 1.5503}$

B) No Recarregamento:

$\frac{P}{}$ → Na Leitura → 53 div → 1 div = 10^{-4} pol.

$\Delta H = 53 \times 2,54 \times 10^{-4} \therefore \boxed{\Delta H = 0.0135 \text{ cm}}$ $\boxed{H0 = 1.7245 \text{ cm}}$

$H1 = H0 - \Delta H \rightarrow H1 = 1.7245 - 0.0135 \therefore \boxed{H1 = 1.7110 \text{ cm}}$

$e = \frac{H1 - HS}{HS} = \frac{1.7110 - 0.6762}{0.6762} \therefore \boxed{e = 1.5303}$

P → Na Leitura → 157 div → 1 div = 10^{-4} pol.

$\Delta H = 157 \times 2,54 \times 10^{-4} \therefore \boxed{\Delta H = 0.0399 \text{ cm}}$ $\boxed{H0 = 17110 \text{ cm}}$

$H1 = H0 - \Delta H \rightarrow H1 = 1.7110 - 0.0399 \therefore \boxed{H1 = 1.6711 \text{ cm}}$

$e = \frac{H1 - HS}{HS} = \frac{1.6711 - 0.6762}{0.6762} \therefore \boxed{e = 1.4713}$

PROFUNDIDADE 12,50 M PONTO "J"

a) carga → $\frac{P}{2} = 1.6678$ kg

b) Tensão → $\sigma' v = 0.6315$ kg/cm²

c) ΔH e $H1$ → Na Leitura → 251 div → 1 div = 10^{-4} pol.

$\Delta H = 251 \times 2,54 \times 10^{-4}$ ∴ $\boxed{\Delta H = 0.0637 \text{ cm}}$ $\boxed{Ho = 1.9335 \text{ cm}}$

$H1 = Ho - \Delta H = 1.9335 - 0.0637$ ∴ $\boxed{H1 = 1.8698 \text{ cm}}$

d) $Mv = \frac{\Delta H}{H1 \times \Delta \sigma}$ $\begin{cases} \Delta \sigma = \sigma'(J) - \sigma'(I) = 0.6315 - 0.5667 \\ \Delta \sigma = 0.0648 \text{ kg/cm}^2 \end{cases}$

$Mv = \frac{0.0637}{1.8698 \times 0.0648}$ ∴ $\boxed{Mv = 0.5257 \text{ cm}^2/\text{kg}}$

e) $\bar{H} = \frac{Ho - H1}{4} = \frac{1.9335 - 1.8698}{4} = 0.9508$ ∴ $\boxed{\bar{H}^2 = 0.9041 \text{ cm}^2}$

f) $Cv = \frac{0.197 \times \bar{H}^2}{t_{50}} = \frac{0.197 \times 0.9041}{28 \times 60}$ ∴ $\boxed{Cv = 0.1060 \times 10^{-3} \text{ cm}^2/\text{s}}$

g) $e = \frac{H1 - HS}{HS} = \frac{1.8698 - 0.6762}{0.6762}$ ∴ $\boxed{e = 1.7651}$

h) $r = \frac{dc - d100}{di - dJ} = \frac{-230}{-251}$ ∴ $\boxed{r = 0.9163}$

PROFUNDIDADE 12,50M PONTO "J"

a) carga → $\frac{P}{8} = 0.4169$ kg

b) Tensão → $\sigma'_v = 0.1579$ kg/cm²

c) ΔH e H_1 → Na Leitura → 143 div → 1 div = 10^{-4} pol

$\Delta H = 143 \times 2{,}54 \times 10^{-4}$ ∴ $\boxed{\Delta H = 0.0363 \text{ cm}}$ $\boxed{H_0 = 2.00 \text{ cm}}$

$H_1 = H_0 - \Delta H \rightarrow H_1 = 2.00 - 0.0363$ ∴ $\boxed{H_1 = 1.9637 \text{ cm}}$

d) $M_v = \frac{\Delta H}{H_1 \times \Delta\sigma}$ $\begin{cases} \Delta\sigma = \sigma'(J) - \sigma'(I) = 0.1579 - 0.1417 \\ \Delta\sigma = 0.0162 \text{ kg/cm}^2 \end{cases}$

$M_v = \frac{0.0363}{1.9637 \times 0.0162}$ ∴ $\boxed{M_v = 1.1410 \text{ cm}^2/\text{kg}}$

e) $\bar{H} = \frac{H_0 - H_1}{4} = \frac{2.0 + 1.9637}{4} = 0.3909$ ∴ $\boxed{\bar{H}^2 = 0.9819 \text{ cm}^2}$

f) $C_v = \frac{0.197 \times \bar{H}^2}{t_{50}} = \frac{0.197 \times 0.9819}{7 \times 60}$ ∴ $\boxed{C_v = 0.4605 \times 10^{-3} \text{ cm}^2/\text{s}}$

g) $e = \frac{H_1 - H_S}{H_S}$ $\left\{ H_S = \frac{P_S}{A \times \rho} \right.$ $\begin{cases} P_S = 41.00 \text{ g} \\ A = 26.4074 \text{ cm}^2 \\ \rho = 2.296 \text{ g/cm}^3 \end{cases}$

$H_S = \frac{41{,}0}{26{,}4074 \times 2.296}$ ∴ $\boxed{H_S = 0.6762}$

$e = \frac{1.9637 - 0.6762}{0.6762}$ ∴ $\boxed{e = 1.9040}$

h) $r = \frac{dc - d100}{di - d7} = \frac{-86}{-143}$ ∴ $\boxed{r = 0.6014}$

PROFUNDIDADE 12,50M PONTO "J"

a) Carga → $\frac{P}{4} = 0,8339$ kg

b) Tensão → $\sigma'v = 0.3157$ kg/cm²

c) ΔH e $H1$ → Na Leitura → 119 div → 1 div = 10^{-4} pol

$\Delta H = 119 \times 2,54 \times 10^{-4}$ ∴ $\boxed{\Delta H = 0.0302 \text{ cm}}$ $\boxed{H0 = 1.9637 \text{ cm}}$

$H1 = H0 - \Delta H$ ∴ $H1 = 1.9637 - 0.0302$ ∴ $\boxed{H1 = 1.9335 \text{ cm}}$

d) $Mv = \frac{\Delta H}{H1 \times \Delta\sigma}$ $\begin{cases} \Delta\sigma = \sigma'(J) - \sigma'(I) = 0.3157 - 0.2833 \\ \Delta\sigma = 0.0324 \text{ kg/cm}^2 \end{cases}$

$Mv = \frac{0.0302}{1.9335 \times 0.0324}$ ∴ $\boxed{Mv = 0.4821 \text{ cm}^2/\text{kg}}$

e) $\bar{H} = \frac{H0 - H1}{4} = \frac{1.9637 - 1.9335}{4} = 0.9743$ ∴ $\boxed{\bar{H}^2 = 0.9493 \text{ cm}^2}$

f) $Cv = \frac{0.197 \times \bar{H}^2}{t_{50}} = \frac{0.197 \times 0.9493}{22 \times 60}$ ∴ $\boxed{Cv = 0.1417 \times 10^{-3} \text{ cm}^2/\text{s}}$

g) $e = \frac{H1 - HS}{HS} = \frac{1.9335 - 0.6762}{0.6762}$ ∴ $\boxed{e = 1.8594}$

h) $r = \frac{dc - d100}{di - df} = \frac{-94}{-119}$ ∴ $\boxed{r = 0.7899}$

PROFUNDIDADE 12,50 M PONTO "J"

a) carga → $P = 3.3356$ kg

b) Tensão → $\sigma'v = 1.2630$ kg/cm²

c) ΔH e $H1$ → Na Leitura → 727 div → 1 div = 10^{-4} pol

$\Delta H = 727 \times 2{,}54 \times 10^{-4}$ ∴ $\boxed{\Delta H = 0.1846 \text{ cm}}$ $\boxed{H0 = 1.8698 \text{ cm}}$

$H1 = H0 - \Delta H$ ∴ $H1 = 1.8698 - 0.1846$ ∴ $\boxed{H1 = 1.6852 \text{ cm}}$

d) $Mv = \dfrac{\Delta H}{H1 \times \Delta\sigma}$ $\begin{cases} \Delta\sigma = \sigma'(J) - \sigma'(I) = 1.2630 - 1.1334 \\ \Delta\sigma = 0.1296 \text{ Kg/cm}^2 \end{cases}$

$Mv = \dfrac{0.1846}{1.6852 \times 0.1296}$ ∴ $\boxed{Mv = 0.8452 \text{ cm}^2/\text{Kg}}$

e) $\bar{H} = \dfrac{H0 + H1}{4} = \dfrac{1.8698 + 1.6852}{4} = 0.8887$ ∴ $\boxed{\bar{H}^2 = 0.7893 \text{ cm}^2}$

f) $Cv = \dfrac{0.197 \times \bar{H}^2}{t5} = \dfrac{0.197 \times 0.7899}{80 \times 60}$ ∴ $\boxed{Cv = 0.0324 \times 10^{-3} \text{ cm}^2/\text{s}}$

g) $e = \dfrac{H1 - HS}{HS} = \dfrac{1.6852 - 0.6762}{0.6762}$ ∴ $\boxed{e = 1.4922}$

h) $r = \dfrac{dc - d100}{di - d7} = \dfrac{-705}{-727}$ ∴ $\boxed{r = 0.9697}$

PROFUNDIDADE 12,50 M PONTO "J"

a) Carga → $2P = 6.6712$ kg

b) Tensão → $\sigma'v = 2.5260$ kg/cm²

c) ΔH e $H1$ → Na Leitura → 726 div → 1 div = 10^{-4} pol

$\Delta H = 726 \times 2,54 \times 10^{-4}$ ∴ $\boxed{\Delta H = 0.1844 \text{ cm}}$ $\boxed{H0 = 1.6711 \text{ cm}}$

$H1 = H0 - \Delta H = 1.6711 - 0.1844$ ∴ $\boxed{H1 = 1.4867 \text{ cm}}$

d) $Mv = \dfrac{\Delta H}{H1 \times \Delta\sigma} = \begin{cases} \Delta\sigma = \sigma'(J) - \sigma'(I) = 2.5260 - 2.2668 \\ \Delta\sigma = 0.2592 \text{ kg/cm}^2 \end{cases}$

$Mv = \dfrac{0.1844}{1.4867 \times 0.2592}$ ∴ $\boxed{Mv = 0.4785^{-} \text{ cm}^2/\text{kg}}$

e) $\overline{H} = \dfrac{H0 - H1}{4} = \dfrac{1.6711 - 1.4867}{4} = 0.7894$ ∴ $\boxed{\overline{H}^2 = 0.6232 \text{ cm}^2}$

f) $Cv = \dfrac{0.197 \times \overline{H}^2}{t50} = \dfrac{0.197 \times 0.6232}{52 \times 60}$ ∴ $\boxed{Cv = 0.0427 \times 10^{-3} \text{ cm}^2/\text{s}}$

g) $e = \dfrac{H1 - Hs}{Hs} = \dfrac{1.4867 - 0.6762}{0.6762}$ ∴ $\boxed{e = 1.1986}$

h) $r = \dfrac{dc - d100}{di - d7} = \dfrac{-714}{-726}$ ∴ $\boxed{r = 0.9835^{-}}$

PROFUNDIDADE 12,50 M PONTO "J"

a) Carga → $4P = 13.3424$ kg

b) Tensão → $\sigma v = 5.05\text{-}20$ kg/cm²

c) ΔH e $H1$ → Na Leitura → 614 div → 1 div = 10^{-4} pol

$\Delta H = 614 \times 2{,}54 \times 10^{-4} =$ **$\Delta H = 0.15\text{-}59$ cm** | **$HO = 1.4867$ cm**

$H1 = HO - \Delta H = 1.4867 - 0.15\text{-}59 \therefore$ **$H1 = 1.3308$ cm**

d) $Mv = \dfrac{\Delta H}{H1 \times \Delta\sigma}$ $\begin{cases} \Delta\sigma = \sigma'(J) - \sigma'(I) = 5.05\,20 - 4.\,5336 \\ \Delta\sigma = 0.5184 \text{ kg/cm}^2 \end{cases}$

$Mv = \dfrac{0.15\,59}{1.3308 \times 0.5184} \therefore$ **$Mv = 0.2260$ cm²/kg**

e) $\overline{H} = \dfrac{HO + H1}{4} = \dfrac{1.4867 + 1.3308}{4} = 0.7044 \therefore$ **$\overline{H}^2 = 0.4961$ cm²**

f) $Cv = \dfrac{0.197 \times \overline{H}^2}{t\,50} = \dfrac{0.197 \times 0.4961}{40 \times 60} \therefore$ **$Cv = 0.0407 \times 10^{-3}$ cm²/s**

g) $e = \dfrac{H1 - HS}{HS} = \dfrac{1.3308 - 0.6232}{0.6232} \therefore$ **$e = 1.1354$**

h) $r = \dfrac{dc - d100}{di - df} = \dfrac{-590}{-614} \therefore$ **$r = 0.9609$**

PROFUNDIDADE 12,50 M PONTO "J"

a) carga → $\Delta P = 26.6848$ kg

b) Tensão → $\sigma v = 10.1040$ kg/cm²

c) ΔH e $H1$ → Na Leitura → 530 div → 1 div = 10^{-4} pol.

$\Delta H = 530 \times 2,54 \times 10^{-4}$ ∴ $\boxed{\Delta H = 0.1346 \text{ cm}}$ $\boxed{H0 = 1.3308 \text{ cm}}$

$H1 = H0 - \Delta H = 1.3308 - 0.1346$ ∴ $\boxed{H1 = 1.2962 \text{ cm}}$

d) $Mv = \dfrac{\Delta H}{H1 \times \Delta \sigma}$ $\begin{cases} \Delta \sigma = \sigma'(J) - \sigma'(I) = 10.1040 - 9.0672 \\ \Delta \sigma = 1.0368 \text{ kg/cm}^2 \end{cases}$

$Mv = \dfrac{0.1346}{1.2962 \times 1.0368}$ ∴ $\boxed{Mv = 0.1002 \text{ cm}^2/\text{kg}}$

e) $\overline{H} = \dfrac{H0 + H1}{4} = \dfrac{1.3308 + 1.2962}{4} = 0.6567$ ∴ $\boxed{\overline{H}^2 = 0.4313 \text{ cm}^2}$

f) $Cv = \dfrac{0.197 \times \overline{H}^2}{t50} = \dfrac{0.197 \times 0.4313}{32,5 \times 60}$ ∴ $\boxed{Cv = 0.0436 \times 10^{-3} \text{ cm}^2/\text{s}}$

g) $e = \dfrac{H1 - HS}{HS} = \dfrac{1.2962 - 0.6232}{0.6232}$ ∴ $\boxed{e = 1.0799}$

h) $r = \dfrac{dc - d100}{di - df} = \dfrac{-438}{-530}$ ∴ $\boxed{r = 0.9396}$

Coeficiente de compressibilidade: (a_v)

$\frac{P}{4} \rightarrow a_v = \frac{\Delta e}{\Delta \sigma} = \frac{0.0446}{0.1579} = \boxed{0.2571}\ cm^2/kg$

$\frac{P}{2} \rightarrow a_v = \frac{\Delta e}{\Delta \sigma} = \frac{0.0943}{0.3175} = \boxed{0.2987}\ cm^2/kg$

$P \rightarrow a_v = \frac{\Delta e}{\Delta \sigma} = \frac{0.2729}{0.6315} = \boxed{0.4321}\ cm^2/kg$

$2P \rightarrow a_v = \frac{\Delta e}{\Delta \sigma} = \frac{0.2936}{1.2630} = \boxed{0.2325}\ cm^2/kg$

$4P \rightarrow a_v = \frac{\Delta e}{\Delta \sigma} = \frac{0.0632}{2.2560} = \boxed{0.0250}\ cm^2/kg$

$8P \rightarrow a_v = \frac{\Delta e}{\Delta \sigma} = \frac{0.05535}{5.0520} = \boxed{0.0110}\ cm^2/kg$

Coeficiente de Permeabilidade

$$K = \frac{C_v \times a_v \times \gamma_a}{1 + e_0} = \frac{0.1239 \times 10^{-3} \times 0.2094 \times 10^{-3}}{1 + 1.48} \therefore$$

$$\boxed{K = 1{,}045 \times 10^{-8}\ cm/s}$$

Índice de compressão:

$$C_c = \frac{e_1 - e_2}{\log \frac{P_2}{P_1}} \quad \begin{cases} e_1 = 1.39 \\ e_2 = 1.13 \\ P_1 = 1.6 \\ P_2 = 3.0 \end{cases}$$

$$C_c = \frac{1.39 - 1.13}{\log \frac{3.0}{1.6}} = \frac{0.26}{\log .1875}$$

$$C_c = \frac{0.26}{0.2730012} \therefore$$

$$\boxed{C_c = 0.9524}$$

Índice de Expansão:

$$C_e = \frac{e_1 - e_2}{\log \frac{P_2}{P_1}} \quad \begin{cases} e_1 = 1.543 \\ e_2 = 1.496 \\ P_1 = 0.36 \\ P_2 = 0.90 \end{cases}$$

$$C_e = \frac{1.543 - 1.496}{\log \frac{0.90}{0.36}} = \frac{0.047}{\log 2.5}$$

$$C_e = \frac{0.047}{0.39794} \therefore$$

$$\boxed{C_e = 0.1181}$$

A D E N S A M E N T O

Profundidade 13,50 m

Ponto " L "

CALCULO DOS PARAMETROS

PROFUNDIDADE = 13,50 metros Ponto " L" Anel 01

Tensões Efetivas

a) $\sigma'_{(11)} = \sigma'_{(10)} + \gamma_{sub(10)} \times 50 + \gamma_{sub(11)} \times 50$

$\sigma'_{(11)} = 1263,0 + 1,296 \times 50 + 1,682 \times 50$

$\sigma'_{(11)} = 1263,0 + 64,80 + 84,10$

$\sigma'_{(11)} = 1411,90\ g/cm^2 \therefore \boxed{\sigma'_{(11)} = 1,4119\ kg/cm^2}$

Peso Correspondente

$P = \sigma \cdot A/10 = \dfrac{1411,9 \times 26,41}{10}$

$P = 3728,83\ g \therefore \boxed{P = 3,728\ kg}$

Peso Específico

$V_s = (84,12 - 24,80) - (25,33/0,906)$

$V_s = 59,32 - 27,96$

$\boxed{V_s = 31,36}$

$\gamma_{sat} = \dfrac{\sum P_s}{V_s} = 84,12/31,36 = \boxed{2,682\ g/cm^3}$

$\gamma_{sub} = \gamma_{sat} - \gamma_a \therefore \gamma_{sub} = 2,682 - 1,00$

$\boxed{\gamma_{sub} = 1,682\ g/cm^3}$

PROFUNDIDADE 13,50 METROS - PONTO "L" ANEL-01

a) CARGA → $P/8 = 0,4661\ kg$

b) TENSÃO → $\sigma_R = 0.1765\ kg/cm^2$

c) ΔH e H_1 → NA LEITURA → 108 div → 1 DIV = 10^{-4} POL

$\Delta H = 108 \times 2,54 \times 10^{-4}$ ∴ $\boxed{\Delta H = 0,0274\ cm}$ $\boxed{H_0 = 2,0\ cm}$

$H_1 = H_0 - \Delta H = 2,0 - 0,274$ ∴ $\boxed{H_1 = 1.9726\ cm}$

---

d) $M_V = \frac{\Delta H}{H_1 \times \Delta P}$ | $\Delta P = \sigma'(L) - \sigma'(J) = 0,0186\ kg/cm^2$

$M_V = \frac{0,0274}{1.9726 \times 0,0186} = \boxed{0,7408\ cm^2/kg}$

---

e) $\bar{H} = \frac{H_0 + H_1}{4}$ ∴ $\frac{2,0 + 1.9726}{4} = 0,9931\ cm$

$\boxed{\bar{H}^2 = 0,9863\ cm^2}$

---

g) $e = \frac{H_1 - H_S}{H_S}$ | $H_S = \frac{P_S}{A \times \delta}$

$P_S = 43,50\ g$
$A = 26,4074$ $P/d = 58\ mm$
$\delta = 2,650\ g/cm^3$

$H_S = \frac{43,50}{26,4074 \times 2,650}$ ∴ $\boxed{H_S = 0,6216\ cm}$

$e = \frac{1.9726 - 0,6216}{0,6216}$ ∴ $\boxed{e = 2.1734}$

---

h) $n = \frac{d_c - d_{100}}{d_i - d_f}$ ∴ $n = \frac{23,5 - 98}{108}$ ∴ $\boxed{n = 0,6898}$

---

f) $C_v = \frac{0,197 \times 0,9863}{11 \times 60}$ ∴ $\boxed{C_v = 0,2944 \times 10^{-3}\ cm^2/s}$

PROFUNDIDADE : 13,50 METROS - PONTO "L" ANEL Nº 1

a) CARGA ⇒ P/4 = 0,9822 kg

b) TENSÃO → $\bar{\sigma}_v$ = 0,3530 kg/cm²

c) ΔH e H_1 → Na leitura → 107 div → 1 div = 10^{-4} pol

$\Delta H = 107 \times 2,54 \times 10^{-4}$ ∴ $\boxed{\Delta H = 0,0272 \text{ cm}}$ $\boxed{H_0 = 1,9726}$

$H_1 = H_0 - \Delta H$ ∴ $H_1 = 1,9726 - 0,0272$ ∴ $\boxed{H_1 = 1,9454 \text{ cm}}$

////

d) $M_V = \Delta H / H_1 \times \Delta P$ $\Delta P = \bar{\sigma}'_{(1)} - \bar{\sigma}'_{(2)} = 0,3530 - 0,3157$

$\Delta P = 0,0373 \text{ kg/cm}^2$

$M_V = \dfrac{0,0272}{1,9454 \times 0,0373} = \boxed{M_V = 0,3748 \text{ cm}^2/\text{kg}}$

////////

e) $\bar{H} = \dfrac{H_0 + H_1}{4} = \dfrac{1,9726 + 1,9456}{4}$ ∴ $\boxed{\bar{H} = 0,9594 \text{ cm}^2}$

$\boxed{\bar{H}^2 = 0,9594 \text{ cm}^2}$

////

f) $C_V = \dfrac{0,197 \times 0,9594}{30 \times 60}$ ∴ $\boxed{C_V = 0,1050 \times 10^{-3} \text{ cm}^2/\text{s}}$

//////

g) $H_1 = 1,9454$ cm

$H_S = 0,6216$ cm

$e = \dfrac{1,9454 - 0,6216}{0,6216}$ ∴ $\boxed{e = 2,1297}$

/////

H) $R = \dfrac{112 - 210}{108 - 215}$ ∴ $\boxed{R = 0,9159}$

PROFUNDIDADE = 13,50 m - Ponto "L" - ANEL - 01

a) CARGA ⇒ P/2 = 1,8644 kg

b) Tensão → $\bar{\sigma}_v$ = 0,7060 kg/cm²

c) ΔH e H_1 → Leitura → 213,5 div → 1 div = 10^{-4} pol.

ΔH = 213,5 × 2,54 × 10^{-4} ∴ **ΔH = 0,0557 cm** ∴ **H_0 = 1,9454 cm**

$H_1 = H_0 - \Delta H$ ∴ **H_1 = 1,8897 cm**

---

d) $\Delta P = \bar{\sigma}'_{(2)} - \bar{\sigma}'_{(1)} = 0,7060 - 0,6315$ ∴ **ΔP = 0,0745 kg/cm²**

$$M_v = \frac{0,0557}{1,8897 \times 0,0745} \therefore \boxed{M_v = 0,3956 \text{ cm}^2/\text{kg}}$$

---

e) $\bar{H} = \frac{H_0 + H_1}{4}$ ∴ $\bar{H} = \frac{1,9454 + 1,8874}{4}$ ∴ $\bar{H} = 0,9582$

$\bar{H}^2$ = 0,9192 cm²

---

f) $C_v = \frac{0,197 \times 0,9182}{26 \times 60}$ ∴ **$C_v = 0,1078 \times 10^{-3}$ cm²/s**

---

g) H_1 = 1,8897 cm
H_s = 0,6212 cm

$e = \frac{1,8897 - 0,6216}{0,6216}$ ∴ **e = 2,0400**

---

h) $n = \frac{210 - 424}{215 - 430,5}$ ∴ **n = 0,9934**

PROFUNDIDADE : 13,50 M – PONTO "L" - PAINEL - 01

a) Carga → P = 3,7288 kg

b) Tensão → $\bar{\sigma}_v$ = 1,4119 kg/cm²

c) ΔH e H_1 → NA leitura → 547,5 div → 1 div = 10^{-4} gal

$\Delta H = 547,5 \times 2,54 \times 10^{-4} = \boxed{0,1391\ cm}$ ∴ $\boxed{H_0 = 1,8897\ cm}$

$H_1 = H_0 - \Delta H = 1,8897 - 0,1391$ ∴ $\boxed{H_1 = 1,7506\ cm}$

d) $M_v = \frac{0,1391}{1,7506 \times 0,1483}$ ∴ $\boxed{M_v = 0,5336\ cm^2/kg}$

$\left\{ \begin{array}{l} \Delta P = \bar{\sigma}'(v) - \bar{\sigma}'(o) \\ \Delta P = 0,1483\ kg/cm^2 \end{array} \right.$

e) $\bar{H} = \frac{H_0 + H_1}{4} = \frac{1,8897 + 1,7506}{4}$ ∴ $\bar{H} = 0,9101$

$\boxed{\bar{H}^2 = 0,8282\ cm^2}$

f) $C_v = \frac{0,197 \times 0,8282}{57 \times 60}$ ∴ $\boxed{C_v = 0,0477 \times 10^{-3}\ cm^2/s}$

g) $\left\{ \begin{array}{l} H_1 = 1,7506\ cm \\ H_s = 0,6216\ cm \end{array} \right.$ $e = \frac{H_1 - H_s}{H_s}$

$e = \frac{1,7506 - 0,6216}{0,6216}$ ∴ $\boxed{e = 1,8163}$

h) $r = \frac{d_c - d_{100}}{d_1 - d_4}$ ∴ $r = \frac{475,0}{547,50}$ ∴

$\boxed{r = 0,8676}$

PROFUNDIDADE = 13,50 M - PONTO "L" ANEL-1

a) Carga → 2P = 7.4576 kg

b) Tensão → $\bar{\sigma}_v$ = 2.8238 kg/cm²

c) ΔH e H_1 → Na Leitura → 670 div → 1 div = 10^{-4} m/el

$\Delta H = 670 \times 2,54 \times 10^{-4}$ ∴ $\boxed{\Delta H = 0,1702 \text{ cm}}$ ∴ $\boxed{H_0 = 1,7506 \text{ cm}}$

$H_1 = H_0 - \Delta H$ ∴ $\boxed{H_1 = 1,5804 \text{ cm}}$

////

d) $\Delta P = \bar{\sigma}'_{(i)} - \bar{\sigma}'_{(i)} = 2,8238 - 2,5260 = 0,2978$ kg/cm²

$$M_v = \frac{0,1702}{1,5804 \times 0,2978} \therefore \boxed{M_v = 0,3616 \text{ cm}^2/\text{kg}}$$

////

e) $\bar{H} = \frac{H_0 + H_1}{4}$ ∴ $\bar{H} = \frac{1,7506 + 1,5804}{4}$ ∴ $\bar{H} = 0,8327$ cm

$\boxed{\bar{H}^2 = 0,6935 \text{ cm}^2}$

////

f) $C_v = \frac{0,197 \times 0,6935}{47 \times 60} \therefore \boxed{C_v = 0,0480 \times 10^{-3} \text{ cm}^2/\text{s}}$

////

g) $e = \frac{1,5804 - 0,6216}{0,6216} \therefore \boxed{e = 1,5425}$

////

h) $r = \frac{d_e \cdot d_{100}}{d_i - d_f} = \frac{632}{670} \therefore \boxed{r = 0,9433}$

PROFUNDIDADE 13,50 M - Ponto "L" - PVEL - Nº 1

a) CARGA → ΔP = 14,9152 kg

b) tensão → $\bar{\sigma}v$ = 5,6476 kg/cm²

c) ΔH e H_1 → Na leitura → 641 - div → 1 div = 10^{-4} Pol

$\Delta H = 641 \times 2,54 \times 10^{-3}$ ∴ $\boxed{\Delta H = 0,1628}$ ∴ $\boxed{H_0 = 1,5804 \text{ cm}}$

$H_1 = H_0 - \Delta H = 1,5804 - 0,1628$ ∴ $\boxed{H_1 = 1,4176 \text{ cm}}$

////

d) $\Delta P = \bar{\sigma}(v) - \bar{\sigma}(i)$

$\Delta P = 5,6476 - 5,0520 = 0,5956$ kg/cm²

$Mv = \frac{0,1628}{1,4176 \times 0,5956}$ ∴ $\boxed{Mv = 0,1928 \text{ cm}^2/\text{kg}}$

//////

e) $\bar{H} = \frac{H_0 + H_1}{4}$ ∴ $\boxed{\bar{H} = 0,7495}$ ∴ $\boxed{\bar{H}^2 = 0,5617 \text{ cm}^2}$

////

f) $Cv = \frac{0,197 \times 0,5617}{46 \times 60}$ ∴ $Cv = 0,0401 \times 10^{-3} \text{ cm}^2/\text{s}$

///

g) $H_1 = 1,4176$ cm
$H_s = 0,6216$ cm

$e = \frac{1,4176 - 0,6216}{0,6216}$ ∴ $\boxed{e = 1,2806}$

//////

h) $R = \frac{de - dino}{di - df}$ ∴ $R = \frac{610}{641}$ ∴ $\boxed{R = 0,951\%}$

PROFUNDIDADE = 13,50 M - PONTO "C" - ANEL 01

a) CARGA → $\delta P = 29,8304 kg$

b) Tensão → $\bar{\sigma}_v = 11,2952 kg/cm^2$

c) ΔH e H_1 → LEITURA → 532 div → 1 div = 10^{-4} pol

$\Delta H = 532 \times 2,54 \times 10^{-4} = 0,1351$ ∴ $\boxed{H_0 = 1,4176 cm}$

$H_1 = H_0 - \Delta H = 1,4176 - 0,1351$ ∴ $\boxed{H_1 = 1,2826 cm}$

---

d) $\Delta P = \bar{\sigma}(2) - \bar{\sigma}(1) = 11,2962 - 10,1040$

$\Delta P = 1,1912 kg/cm^2$

$M_v = \frac{0,1351}{1,2825 \times 1,1912}$ ∴ $\boxed{M_v = 0,0884 cm^2/kg}$

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e) $\bar{H} = \frac{H_0 + H_1}{4}$ ∴ $\boxed{\bar{H} = 0,6750 cm}$

$\boxed{\bar{H}^2 = 0,4556 cm^2}$

---

f) $C_v = \frac{0,197 \times 0,4556}{31 \times 60}$ ∴ $\boxed{C_v = 0,0482 \times 10^{-3} cm^2/s}$

---

g) $\begin{cases} H_1 = 1,2825 cm \\ H_s = 0,6266 \end{cases}$

$e = \frac{1,2826 - 0,6266}{0,6266}$ ∴ $\boxed{e = 1,0432}$

H) $\pi = \frac{d_e - d_{100}}{d_i - d_f} = \frac{500}{532}$ ∴ $\boxed{\pi = 0,9398}$

PROFUNDIDADE = 13,50 m - Ponto "1" ANEL - 1

ÍNDICE DE VAZIOS NO DESCARREGAMENTO

P/2

ΔH e H_1 → NA LEITURA → 63 div - 1 div = 10^{-4} pol

$\Delta H = -63 \times 2,54 \times 10^{-4}$ ∴ $\Delta H = 0,0160$ cm $\quad H_0 = 1,7506$ cm

$H_1 = H_0 - \Delta H = 1,7506 + 0,0160$ ∴ $H_1 = 1,7666$ cm

b) $H_S = 0,6216$ cm

c) $e = \frac{H_1 - H_S}{H_S}$ ∴ $e = \frac{1,7666 - 0,6216}{0,6216}$ ∴ $e = 1,8420$

P/4

a) ΔH e H_1 → NA LEITURA → 105 div → 1 div = 10^{-4} pol

$\Delta H = 105 \times 2,54 \times 10^{-4}$ ∴ $\Delta H = -0,0267$ cm $\quad H_0 = 1,7666$ cm

$H_1 = H_0 - \Delta H$ ∴ $H_1 = 1,7933$ cm

b) $H_S = 0,6216$ cm

c) $e = \frac{H_1 - H_S}{H_S}$ ∴ $e = \frac{1,7933 - 0,6216}{0,6216}$

$e = 1,8850$

PROFUNDIDADE = 13,60M - PONTO "L" - ANEL-1

ÍNDICE DE VAZIOS NO RECARREGAMENTO

P/2

a) ΔH e H_1 → NA Leitura → 69 div → 1 div = 10^{-4} pol

$\Delta H = 69 \times 10^{-4} \times 2,54 \therefore$ $\Delta H = 0,0175$ cm e $H_0 = 1,7933$ cm

$H_1 = H_0 - \Delta H \therefore$ $H_1 = 1,7758$ cm

b) $H_s = 0,6216$ cm

c) $e = \frac{H_1 - H_s}{H_s} \therefore$ $e = 1,8568$

P

a) ΔH e H_1 → NA Leitura → 174 div - 1 div = 10^{-4} pol

$\Delta H = 174 \times 2,54 \times 10^{-4} \therefore \Delta H = 0,0442$ cm e $H_0 = 1,7758$ cm

$H_1 = H_0 - \Delta H \therefore$ $H_1 = 1,7316$ cm

b) $H_s = 0,6216$ cm

c) $e = \frac{H_1 - H_s}{H_s} \therefore$ $e = 1,7857$

PROFUNDIDADE 13,80 m - PONTO "L" ANEL - I

ÍNDICE DE COMPRESSÃO

$$C_c = \frac{e_1 - e_2}{\log P_1/P_2}$$

$e_1 = 1,670$
$e_2 = 1,080$
$P_1 = 2,0\ kg/cm^2$
$P_2 = 10,0\ kg/cm^2$

$$C_c = \frac{1,670 - 1,080}{\log 10/2} = \frac{0,53}{0,69897} \therefore \boxed{C_c = 0,8441}$$

ÍNDICE DE EXPANSÃO

$e_1 = 1,955$
$e_2 = 1,835$
$P_1 = 0,40\ kg/cm^2$
$P_2 = 1,00\ kg/cm^2$

$$C_E = \frac{1,955 - 1,835}{\log \frac{1,0}{0,4}} = \frac{0,12}{0,39794}$$

$$\boxed{C_E = 0,3015}$$

PROFUNDIDADE = 13,50 Metros - Ponto "L" - ANEL - 1

COEFICIENTE DE PERMEABILIDADE

$$K = \frac{Cv \times av \times \gamma a}{1 + e} = \frac{0,0988 \times 10^{-3} \times 0,1909 \times 10^{-3}}{1 + 1,7208}$$

$$\boxed{K = 0,693 \times 10^{-8} \text{ cm/s}}$$

COEFICIENTE DE COMPRESSIBILIDADE

P/4 → $av = \frac{\Delta e}{\Delta \sigma} = \frac{0,0437}{0,1765} = 0,2476 \text{ cm}^2/\text{kg}$

P/2 → $av = \frac{\Delta e}{\Delta \sigma} = \frac{0,0897}{0,3550} = 0,2541 \text{ cm}^2/\text{kg}$

P → $av = \frac{\Delta e}{\Delta \sigma} = \frac{0,2270}{0,7060} = 0,3168 \text{ cm}^2/\text{kg}$

2P → $av = \frac{\Delta e}{\Delta \sigma} = \frac{0,2738}{1,4119} = 0,1939 \text{ cm}^2/\text{kg}$

4P → $av = \frac{\Delta e}{\Delta \sigma} = \frac{0,2613}{2,8238} = 0,0927 \text{ cm}^2/\text{kg}$

8P → $av = \frac{\Delta e}{\Delta \sigma} = \frac{0,2274}{5,6496} = 0,0403 \text{ cm}^2/\text{kg}$

A D E N S A M E N T O

A N E X O 2

UFPb. — ESCOLA POLITÉCNICA
INSTITUTO TECNOLÓGICO

ENSAIO DE COMPRESSIBILIDADE

PROFUNDIDADE = 8,50 metros ... Ponto "F" da camada de argila Orgânica ... Anel nº 03

ENSAIO N.º

	P/8	P/4	P/2	P	2P	4P	8P		MEDIA
carga kg	0.2515	0.5030	1.0061	2.0122	4.0244	8.0488	16.0976		
tensão kg/cm^2	0.0952	0.1905	0.3809	0.7619	1.5238	3.0476	6.0352		
recalque cm	0.0118	0.0175	0.0423	0.1211	0.1867	0.1765	0.1465		
altura final cm	1.9882	1.9707	1.9284	1.8073	1.6206	1.4441	1.2976		
Mv cm^2/kg	0.7065	0.5254	0.6509	0.9927	0.8534	0.4527	0.2091		0.6272
Cv cm^2/s	$0.2838.10^{-3}$	$0.1787.10^{-3}$	$0.2013.10^{-3}$	$0.056.10^{-3}$	$0.0464.10^{-3}$	$0.0482.10^{-3}$	$0.475.10^{-3}$		$0.1231.10^{-3}$
e	1.1904	1.1711	1.1245	0.9911	0.7854	0.5909	0.4295		0.8975
r	0.7591	0.8478	0.8288	0.8700	0.9238	0.9381	0.9428		0.8729
a_v cm^2/Kg		0.2027	0.2446	0.3502	0.2700	0.1276	0.0529		0.2080

PRESSÃO DE CONSOLIDAÇÃO ~~Pc~~ : Pa = 0,45 Kg/cm^2

PRESSÃO EFETIVA "IN SITU" ~~Po~~ : Pc = 0,76 Kg/cm^2

ÍNDICE DE COMPRESSÃO Cc = 0,64

Índice de Expansão - Ce = 0,07

Coeficiente de Permeabilidade = K

K = 1.35×10^{-8} cm/s

VISTO _____

DATA _____

UFPb. — ESCOLA POLITÉCNICA
INSTITUTO TECNOLÓGICO

ENSAIO DE COMPRESSIBILIDADE

PROFUNDIDADE = 9,50 metros :: Ponto G da camada de argila Orgânica ::: Amel Nº 01.

ENSAIO N.º

	P/8	P/4	P/2	P	2P	4P	8P		Médio
carga kg	0,2828	0,2827	1.1307	2.2614	4.5228	9.0456	18,0912		
tensão kg/cm^2	0,1070	0,2141	0,4282	0,8564	1.7127	3.4256	6.8512		
recalque cm	0,0108	0,0114	0,0268	0,1006	0,2004	0,1684	0,1410		
altura final cm	1,9892	1.9778	1.9510	1.8504	1.6500	1.4816	1,3406		
Mv cm^2/kg	0,4596	0,2441	0,2908	0,5762	0,6427	0,3007	$0,1391 \times 10^{-3}$		0,3789
Cv cm^2/s	$0,6280 \times 10^{-3}$	0.2584×10^{-3}	$0,2879 \times 10^{-3}$	$0,0539 \times 10^{-3}$	$0,0466 \times 10^{-3}$	$0,0612 \times 10^{-3}$	0,0594		$0,1994 \times 10^{-3}$
e	1.9015	1.6364	1.6006	1.4665	1.1994	0,9743	0,7870		1.3309
r	0,5788	0,8355	0,7630	0,8786	0,9404	0,8974	0,9333		0.8324
a_v cm^2/Kg		0,1411	0.1672	0.3132	0.1311	0.1311	0,0648		0.1865

PRESSÃO DE CONSOLIDAÇÃO T'c Pa = 0,60 kg/cm^2 — Índice de Expansão Ce= 0,07

PRESSÃO EFETIVA "IN SITU" ~~T'o~~ Po = 0,86 kg/cm^2 — Coef. de Permeabilidade K= 1.59×10^{-8} cm/s

ÍNDICE DE COMPRESSÃO Cc = 0,80

VISTO _____

DATA _____

UFPb. — ESCOLA POLITÉCNICA
INSTITUTO TECNOLÓGICO

ENSAIO DE COMPRESSIBILIDADE

PROFUNDIDADE = 10,50 METROS - PONTO H - ANEL - 2

ENSAIO N.º

	P/8	P/4	P/2	P	2P	4P	8P		MÉDIO
carga kg	0,3250	0,650	1.300	2.600	5.200	10.400	20.800		
tensão kg/cm^2	0,1231	0,2461	0,4922	0,9845	1.9690	3.9380	7.8760		
recalque cm	0,0330	0,0211	0.06170	0,1656	0,1841	0,1521	0,1280		
altura final cm	1.9670	1.9466	1.8842	1.7186	1.5203	1.3682	1.2404		
Mv cm^2/kg	1.0420	0,3388	1.0903	0,7522	0,4726	0,2169	0,1007		0,573
Cv cm^2/s	0.1404×10^{-3}	$0,1795 \times 10^{-3}$	0.0485×10^{-3}	$0,0533 \times 10^{-3}$	$0,0388 \times 10^{-3}$	$0,0285 \times 10^{-3}$	$0,0436 \times 10^{-3}$		0,0761
e	1.6459	1.6176	1.5344	1.3118	1.0451	0,8405	0,6683		1.237
r	0,8385	0,7952	0,8518	0,8896	0,9586	0,9850	0,9444		0,895
a_v cm^2/kg		0,2289	0,3372	0,4527	0,2709	0,1039	0,0437		0,2397

PRESSÃO DE CONSOLIDAÇÃO T'c $P_a = 0,46\ kg/cm^2$

PRESSÃO EFETIVA "IN SITU" T'o $P_e =$

ÍNDICE DE COMPRESSÃO Cc = 0,75

INDICE DE EXPANSÃO = $C_E = 0,0697$

COEF. DE PERMEABILIDADE = $K = 0.77 \times 10^{-8}$ cm/s

VISTO _____

DATA _____

UFPb. – ESCOLA POLITÉCNICA
INSTITUTO TECNOLÓGICO

ENSAIO DE COMPRESSIBILIDADE

PROFUNDIDADE 11,50 metros Anel Nº 01

ENSAIO N.º Ponto " I " da Camada

	P/8	P/4	P/2	P	2P	4P	8P		Médio
carga kg	0.3742	0.7483	1.4966	2.9933	5.9866	11.9732	23.9464		
tensão kg/cm^2	0.1417	0.2833	0.5667	1.1334	2.2668	4.5336	9.0672		
recalque cm	0.0129	0.0114	0.0329	0.1289	0.1981	0.1697	0.1383		
altura final cm	1.9871	1.9757	1.9428	1.8139	1.6158	1.4461	1.3078		
Mv cm^2/kg	0.3490	0.1551	0.2273	0.4772	0.4117	0.1970	0.0888		0.2723
Cv cm^2/s	0.1977×10^{-3}	0.3222×10^{-3}	0.1260×10^{-3}	0.0483×10^{-3}	0.0431	0.0385×10^{-3}	0.0421×10^{-3}		0.1168×10^{-3}
e	2.2337	2.2151	2.1616	1.9518	1.6294	1.3533	1.1282		1.8104
r	0.8627	0.7133	0.7220	0.8670	0.9487	0.9850	0.9991		0.8711
a_r cm^2/kg	—	0.1313	0.1888	0.3702	0.2844	0.1218	0.0496		0.1910

PRESSÃO DE CONSOLIDAÇÃO Tex p_a = o,63 Kg/cm^2 Indice de Expansão C_e = o,46

PRESSÃO EFETIVA "IN SITU" Tex p_e = 1,13 Kg/cm^2 indice de permeabilidade K = o,79 x 10^{-8} cm/s

ÍNDICE DE COMPRESSÃO Cc = o,94

VISTO _____

DATA _____

UFPb. — ESCOLA POLITÉCNICA
INSTITUTO TECNOLÓGICO

ENSAIO DE COMPRESSIBILIDADE

PROFUNDIDADE 12,50 METROS PONTO "J" ANEL Nº 3

ENSAIO N.º

	P/8	P/4	P/2	P	2P	4P	8P		MÉDIA
carga kg	0,4169	0,8339	1.6678	3.3356	6.5260	13.3424	26.6848		
tensão kg/cm^2	0,1579	0,3157	0,6315	1.2680	2.5260	5.0520	10,1004		
recalque cm	0,0363	0,0302	0,0637	0,1846	0,1844	0,1559	0,1346		
altura final cm	1.9637	1.9335	1.8698	1.6852	1,4867	1.3308	1.2962		
Mv cm^2/kg	1.1410	0,4821	0,5257	0,8452	0,4788	0,2260	0,1002		0,5426
Cv cm^2/s	$0,4605\times10^{-3}$	$0,1417\times10^{-3}$	$0,1060\times10^{-3}$	$0,0324\times10^{-3}$	$0,0427\times10^{-3}$	$0,0407\times10^{-3}$	$0,0436\times10^{-3}$		$0,1236\times10^{-3}$
e	1.9040	1.8594	1.7651	1.4922	1.1986	1.1354	1.0799		1.4906
r	0,6014	0,7899	0,9163	0,9697	0,9835	0,9609	0,9396		0,8801
a_v cm^2/Kg		0,2571	0,2987	0,4321	0,2325	0,0250	0,0110		0,1706

PRESSÃO DE CONSOLIDAÇÃO T'c_____

PRESSÃO EFETIVA "IN SITU" T'o_____

ÍNDICE DE COMPRESSÃO Cc = 0,1524

INDICE DE EXPANSÃO = Ce = 0,1181

COEFICIENTE DE PERMEABILIDADE = K

$K = 1,065\times10^{-8}$ cm/s

VISTO_____

DATA_____

UFPb. — ESCOLA POLITÉCNICA
INSTITUTO TECNOLÓGICO

ENSAIO DE COMPRESSIBILIDADE

PROFUNDIDADE 13,50 METROS - PONTO L - ANEL - 1

ENSAIO N.º

	P/8	P/4	P/2	P	2P	4P	8P		MÉDIO
carga kg	0,4661	0,9322	1.8644	3.7288	7.4576	14.3152	29.8304		
tensão kg/cm^2	0,1765	0,3030	0,7060	1.4119	2.8238	5,6476	11,3952		
recalque cm	0,0274	0,0272	0,0557	0,1391	0,1702	0,1628	0,1351		
altura final cm	1.9726	1,9454	1.8897	1.7506	1.5804	1.4176	1.2825		
Mv cm^2/kg	0,7468	0,3748	0,3956	0,5336	0,3616	0,1928	0,0884		0,3848
Cv cm^2/s	$0,2944 \times 10^{-3}$	$0,1050 \times 10^{-3}$	$0,1078 \times 10^{-3}$	$0,0477 \times 10^{-3}$	$0,0484 \times 10^{-3}$	$0,0401 \times 10^{-3}$	$0,0482 \times 10^{-3}$		$0,0988 \times 10^{-3}$
e	2,1734	2,1297	2,0400	1,8163	1,5425	1,2806	1,0632		1,7208
r	0,6898	0,9159	0,9294	0,8676	0,9433	0,9516	0,9398		0,8910
ar cm^2/kg		0,2476	0,2541	0,3168	0,1939	0,0927	0,0403		0,1909

PRESSÃO DE CONSOLIDAÇÃO T'c P_a = 0,78 kg/cm^2

PRESSÃO EFETIVA "IN SITU" T'o P_e = 1.41 kg/cm^2

ÍNDICE DE COMPRESSÃO Cc = 0,84

INDICE DE EXPANSÃO CE = 0,30

COEF. PERMEABILIDADE $K = 0,68 \times 10^{-8}$ m/s

VISTO _____

DATA _____

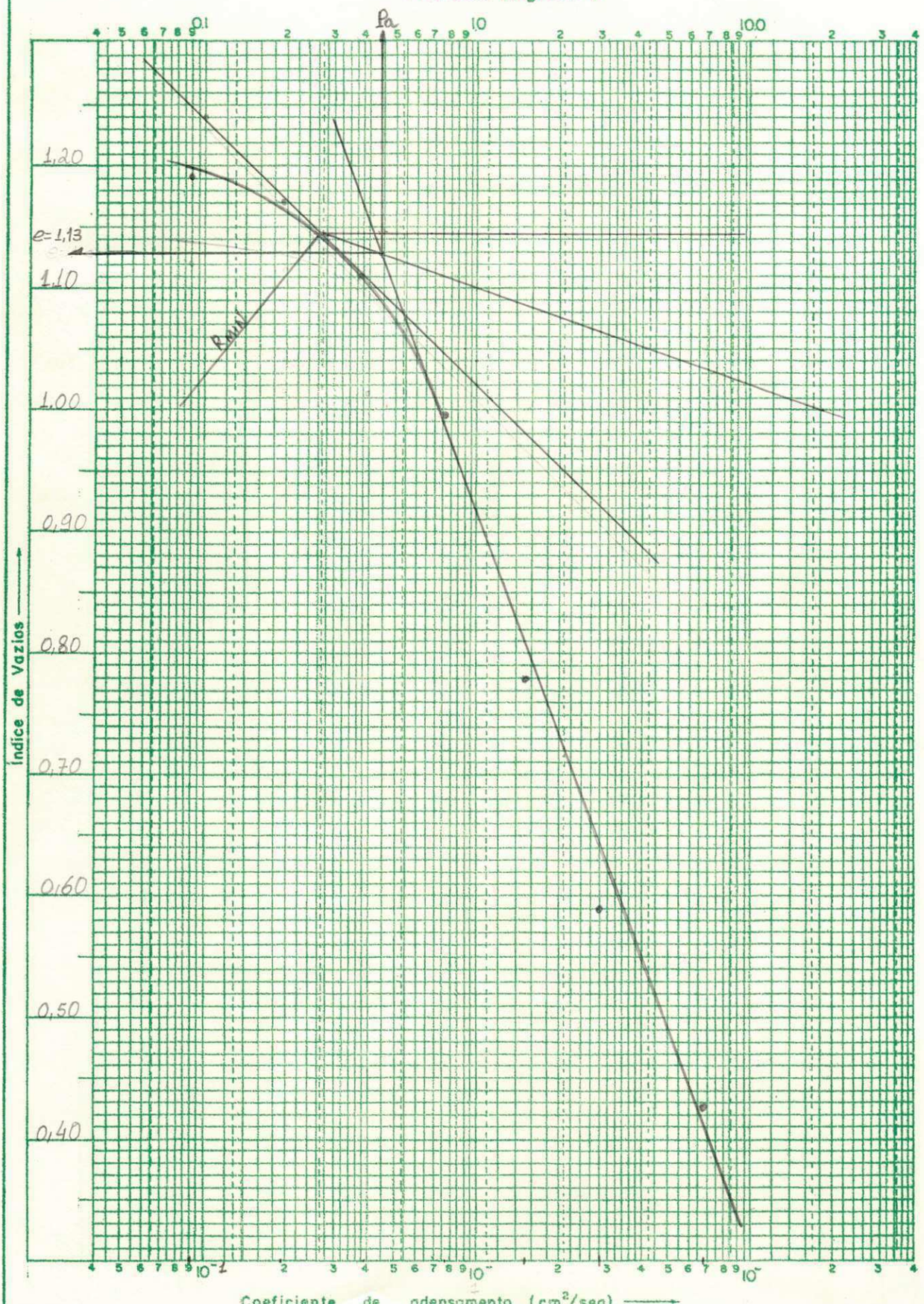
A D E N S A M E N T O

A N E X O 3

PONTO "F" PROFUNDIDADE = 8,50M ANEL Nº 3

CURVA PRESSAO - INDICE DE VAZIOS - COEF. DE ADENSAMENTO

Pressoes (kg/cm^2)

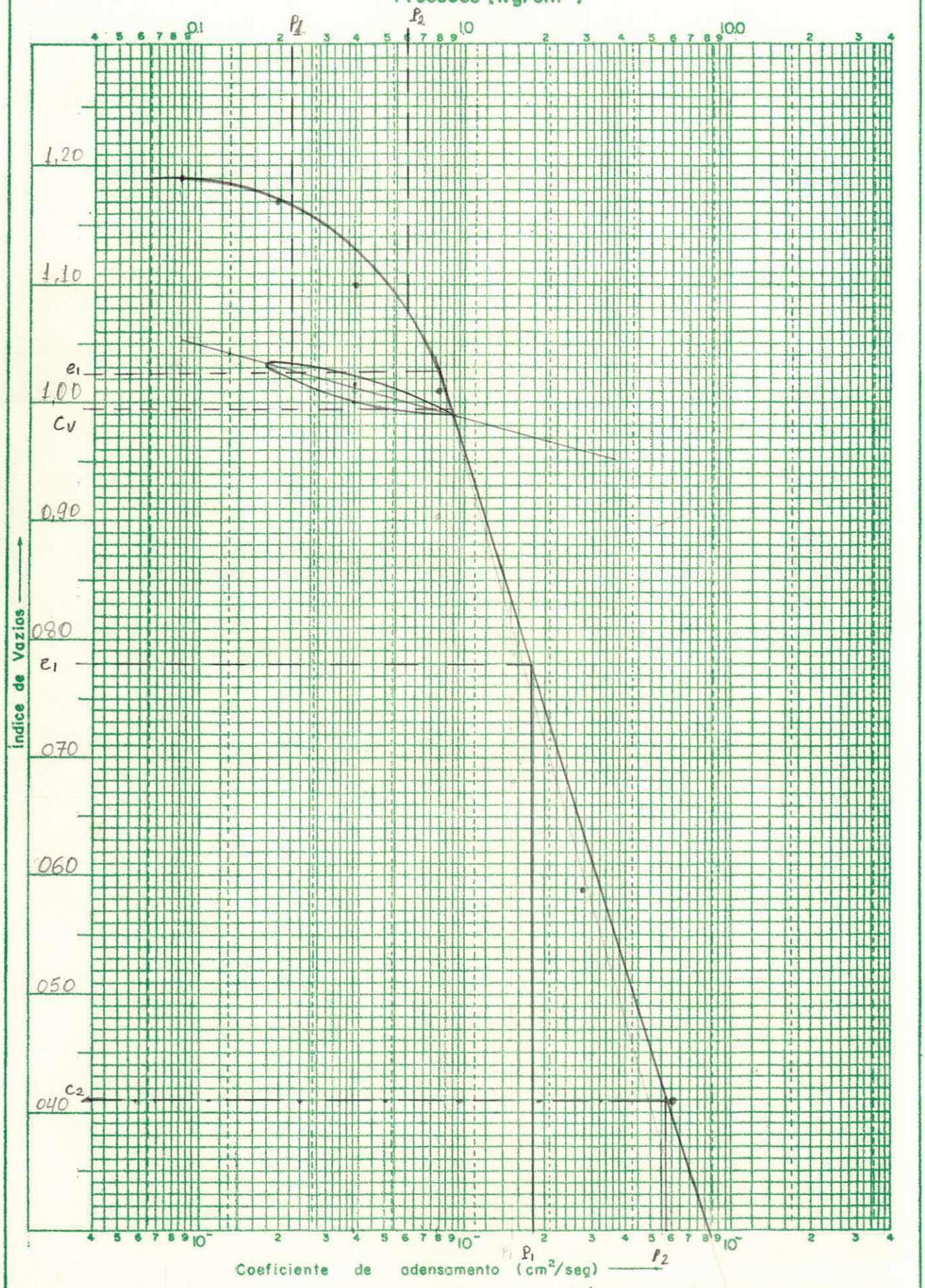


Pré-adensamento { Pressão 0,45 kg/cm² Índice de compressão .....
Índice de Vazios 1.13 Índice de Expanção .....
Indice de Vazios inicial (e_0) _____

Data:	Engº.	ATECEL
Desenho:	Engº. Chefe:	SECÇÃO DE SOLOS

PONTO "F" PROFUNDIDADE = 8,50mm — ANEL=03

CURVA PRESSAO - INDICE DE VAZIOS - COEF. DE ADENSAMENTO



Pré-adensamento { Pressão _____ kg/cm² Índice de compressão 0,64.
Índice deVazios _____ Índice de Expanção 0,07.

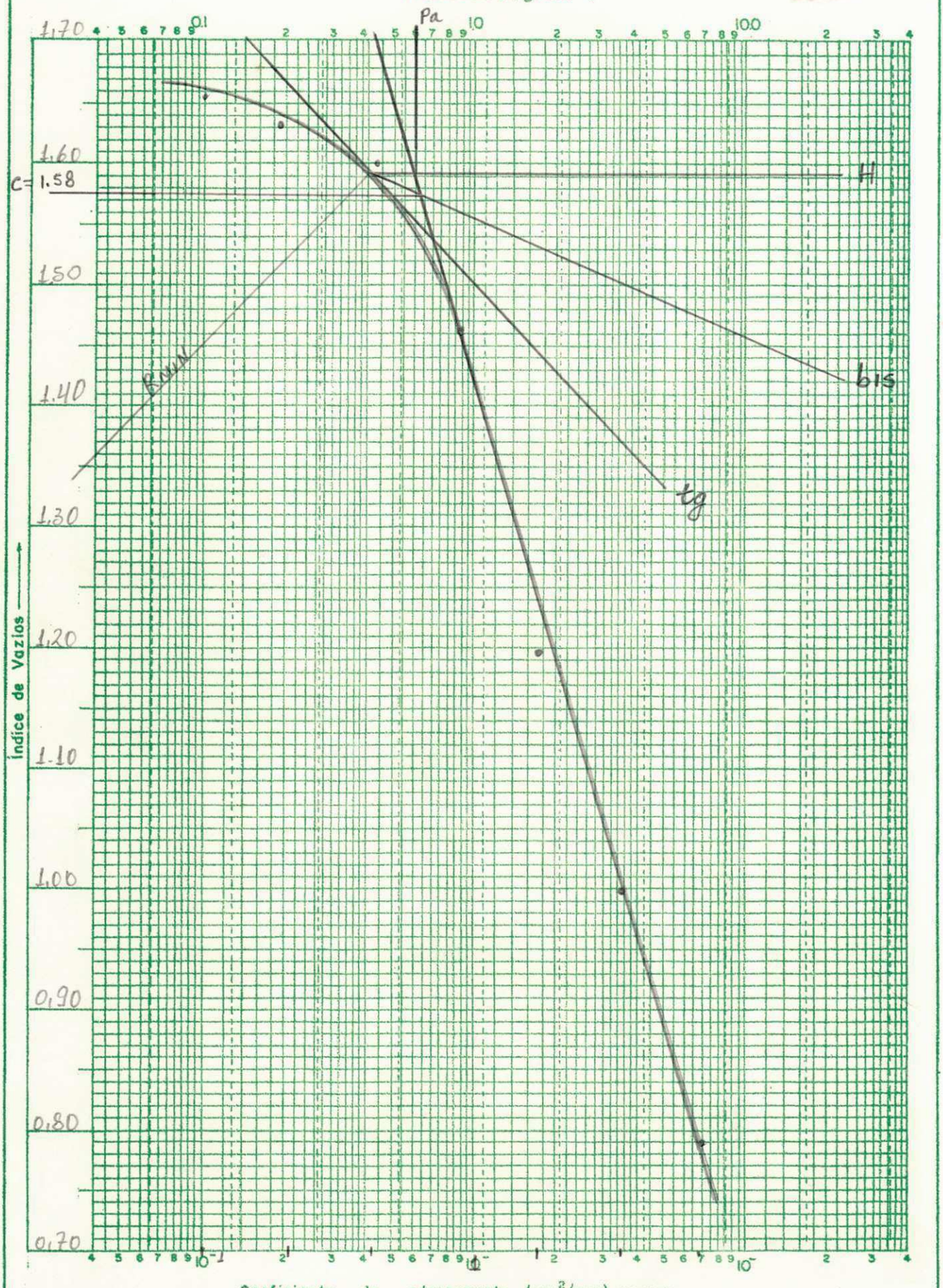
Indice de Vazios inicial (e_0) _____

Data:	Engº.	ATECEL
Desenho:	Engº Chefe:	SECÇÃO DE SOLOS

PROFUNDIDADE = 9,50M - PONTO - "G" - ANEL - 1

CURVA PRESSAO - INDICE DE VAZIOS - COEF. DE ADENSAMENTO

Pressoes (kg/cm^2)



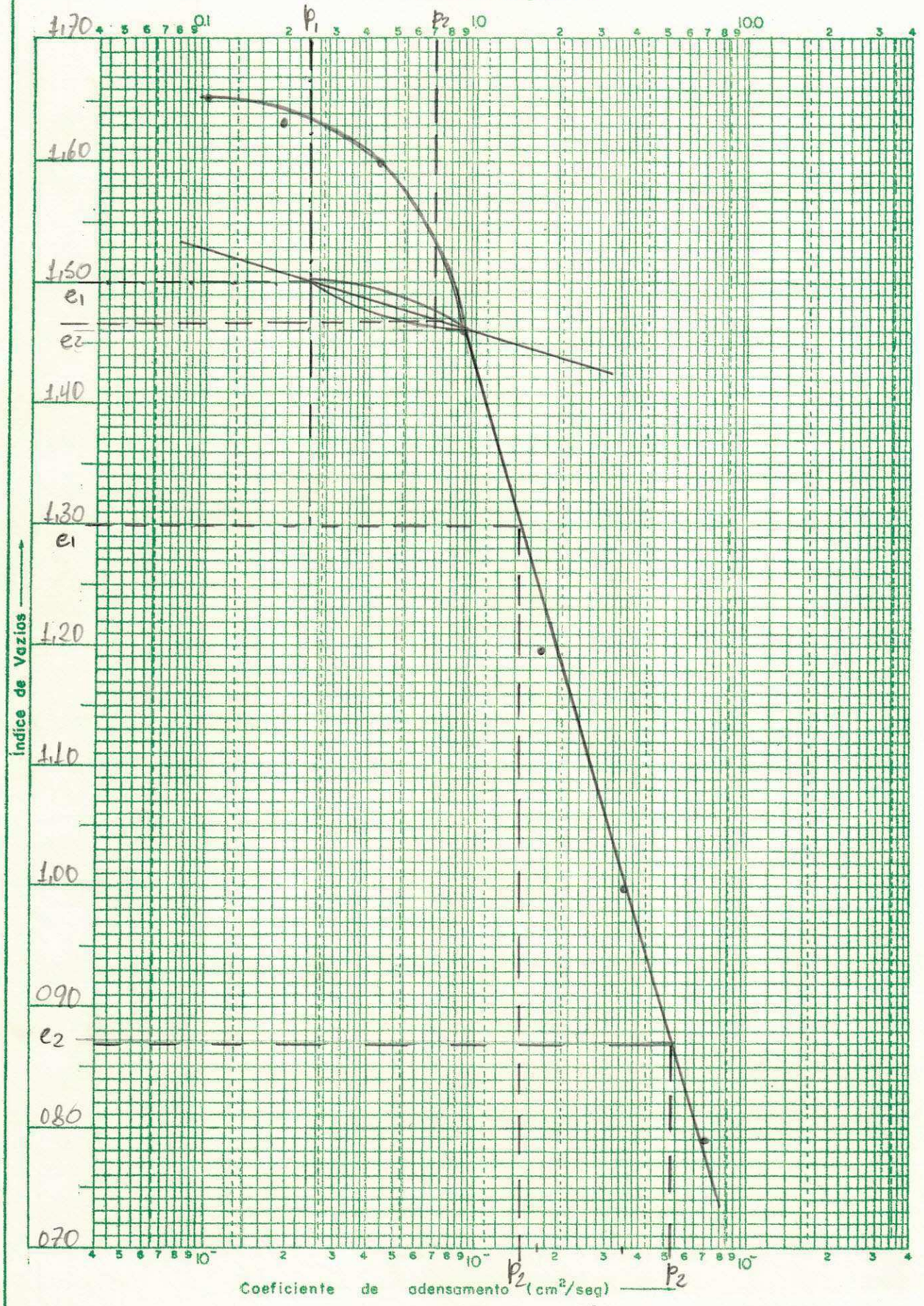
Pré-adensamento { Pressão 0,60 kg/cm² Índice de compressão .....
Índice de Vazios 1.580 Índice de Expanção .....
Indice de Vazios inicial (e_0) .....

Data:	Engº.	ATECEL
Desenho:	Engº. Chefe:	SECÇÃO DE SOLOS

PROFUNDIDADE = 9,50MM - PONTO - "G" - ANEL - 1

CURVA PRESSAO - INDICE DE VAZIOS - COEF. DE ADENSAMENTO

Pressoes (kg/cm^2)



Pré-adensamento { Pressão _____ kg/cm² Índice de compressão 0,178

Índice de Vazios _____ Índice de Expanção 0,07

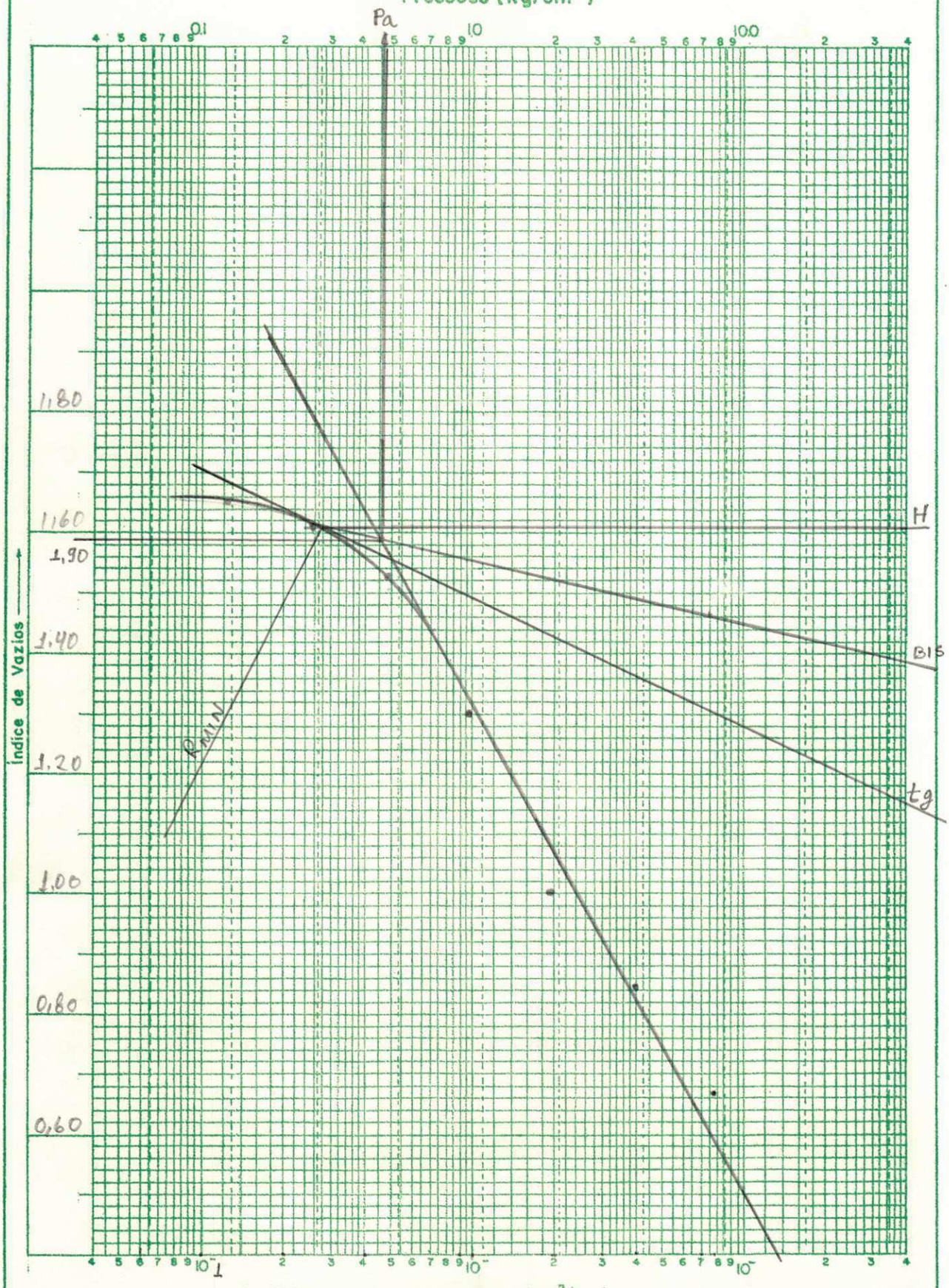
Indice de Vazios inicial (e_0) _____

Data:	Engº.	ATECEL
Desenho:	Engº Chefe:	SECÇÃO DE SOLOS

PROFUNDIDADE 10,50 M - PONTO H - ANEL-2

CURVA PRESSAO - INDICE DE VAZIOS - COEF. DE ADENSAMENTO

Pressoes (kg/cm^2)



Pré-adensamento { Pressão 0,46 kg/cm² Índice de compressão .....
Índice de Vazios 1,90 Índice de Expanção .....

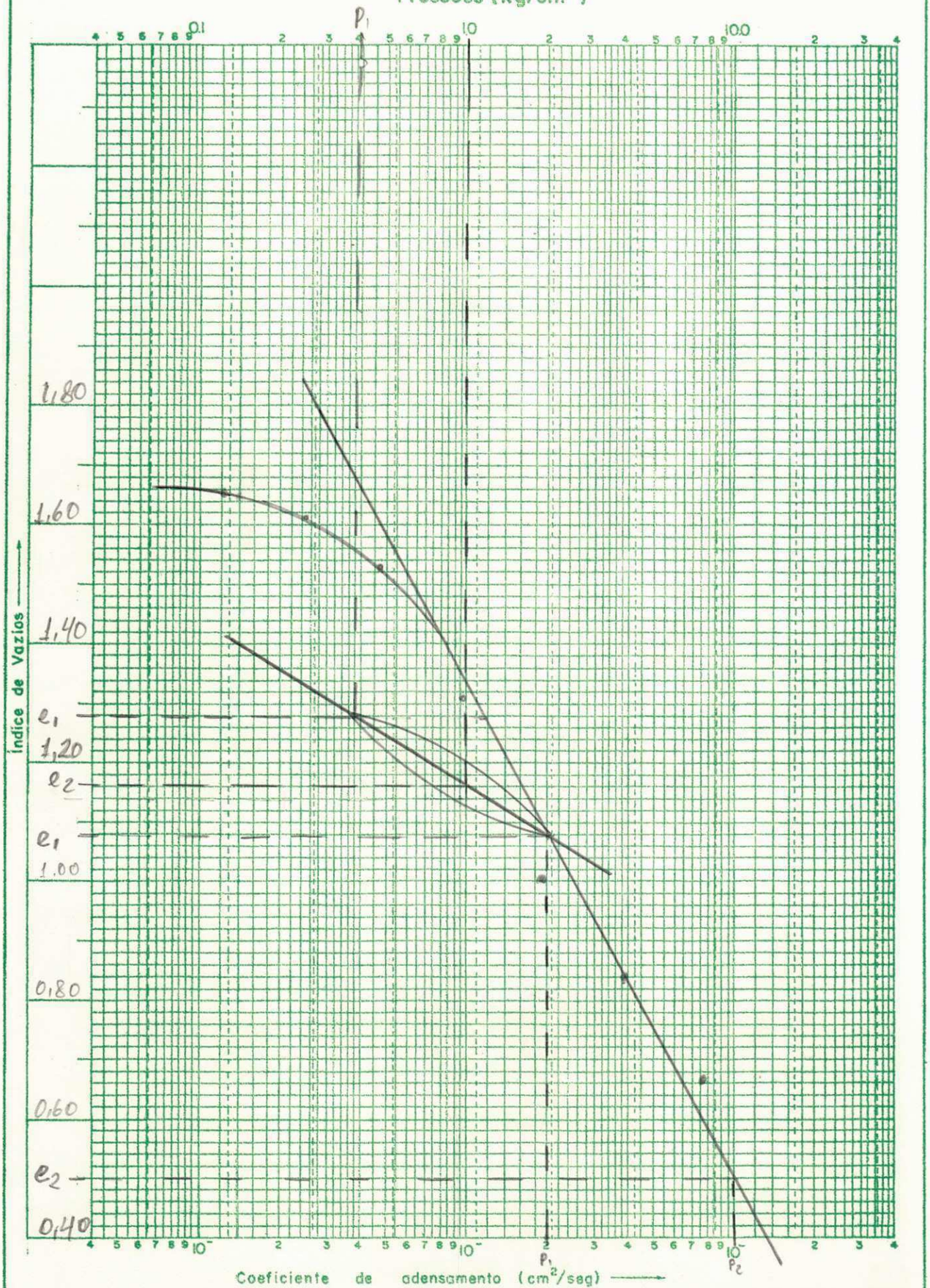
Indice de Vazios inicial (e_0) _____

Data:	Engº.	ATECEL
Desenho:	Engº Chefe:	SECÇÃO DE SOLOS

PROFUNDIDADE 10,50 M - PONTO "H" ANEL-2

CURVA PRESSAO - INDICE DE VAZIOS - COEF. DE ADENSAMENTO

Pressoes (kg/cm^2)

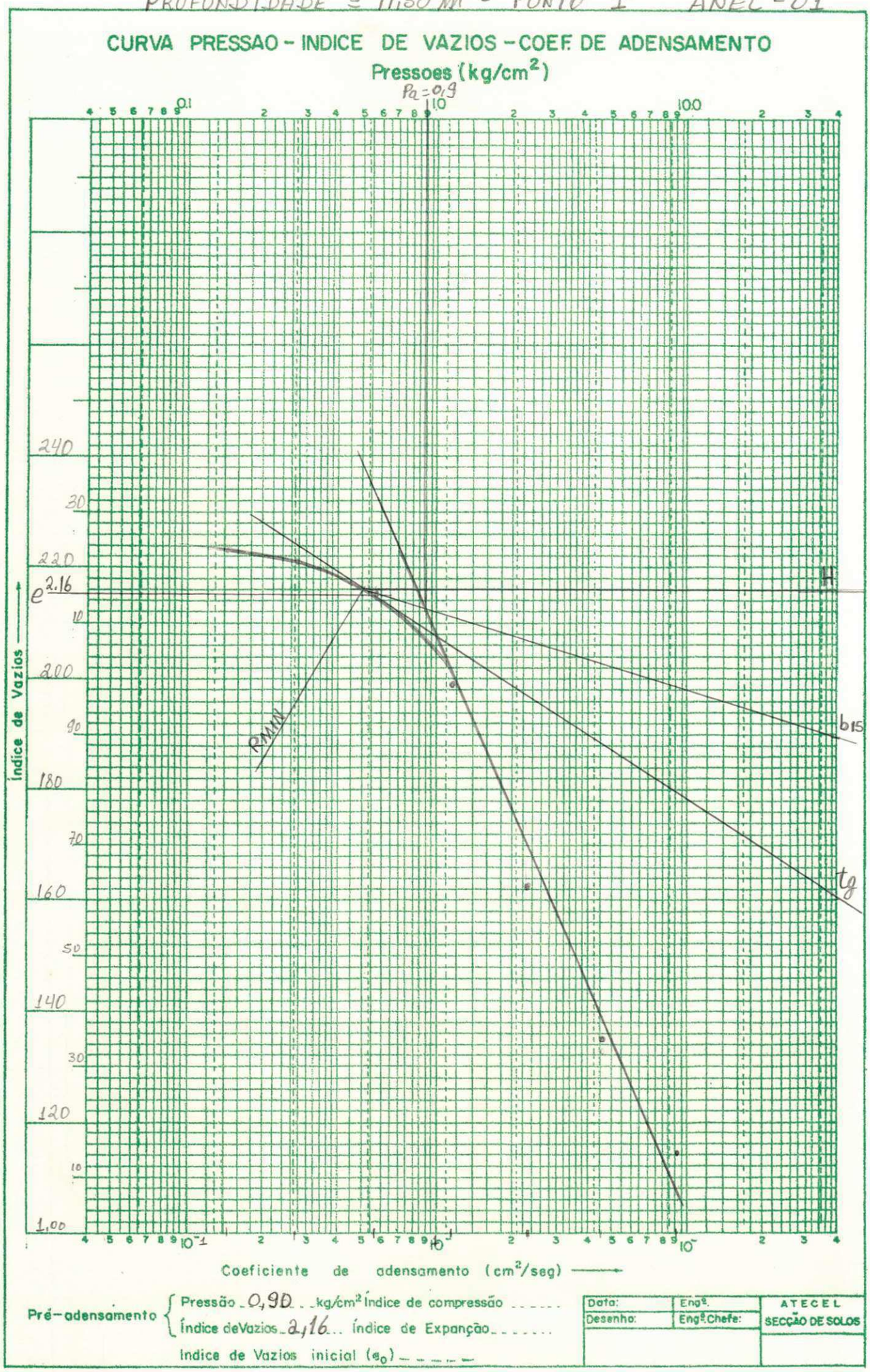


Pré-adensamento { Pressão _____ kg/cm² Índice de compressão 0,175
Índice deVazios _____ Índice de Expanção 0,070

Indice de Vazios inicial (e_0) _____

Data:	Engº.	ATECEL
Desenho:	Engº. Chefe:	SECÇÃO DE SOLOS

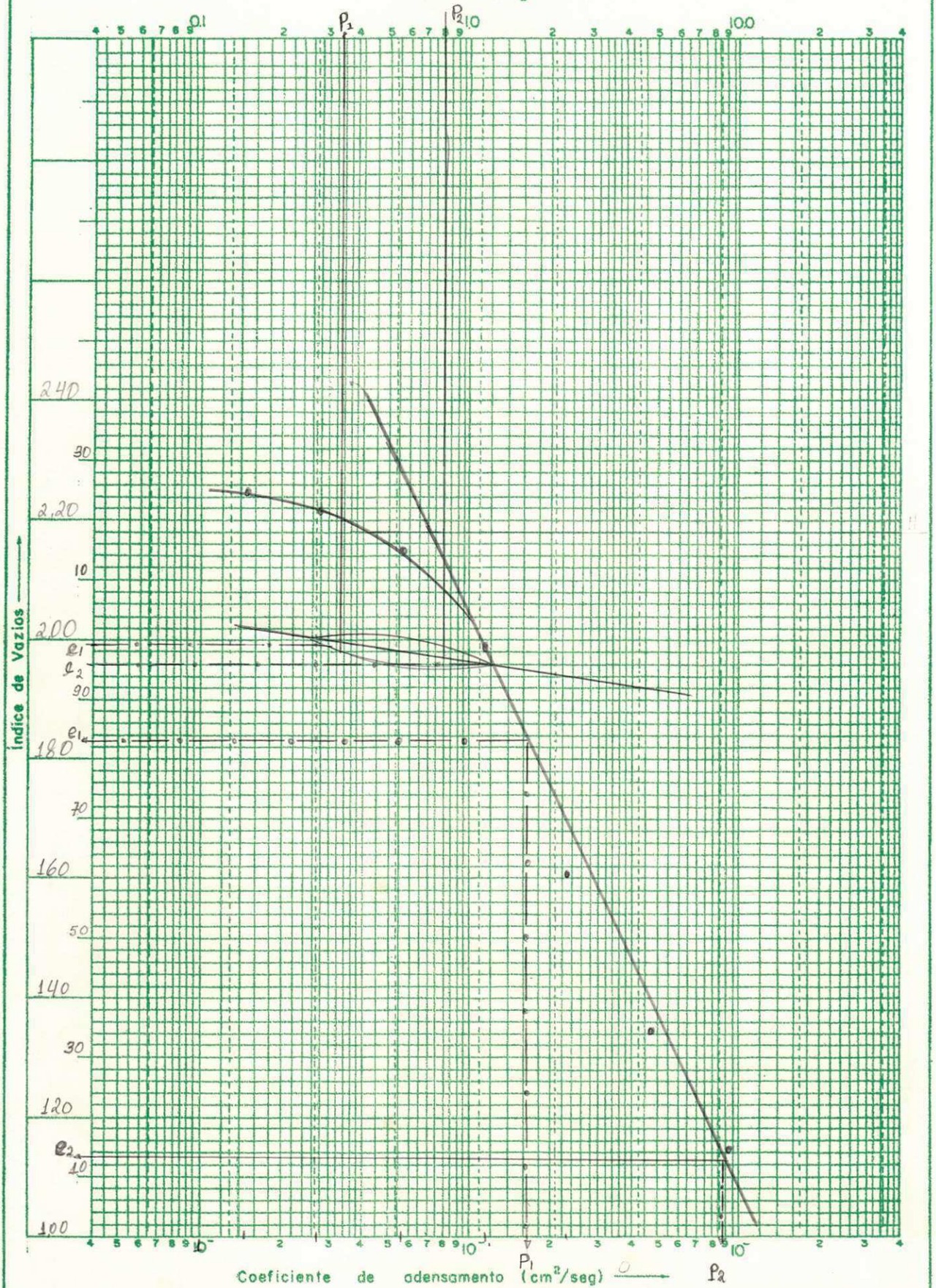
PROFUNDIDADE = 11,50 M - PONTO "I" ANEL - 01



PROFUNDIDADE = 11,50 m - PONTO "I" - ANEL - 01

CURVA PRESSAO - INDICE DE VAZIOS - COEF. DE ADENSAMENTO

Pressoes (kg/cm^2)



Pré-adensamento { Pressão _____ kg/cm² Índice de compressão 0,94

Índice de Vazios _____ Índice de Expanção 0,46

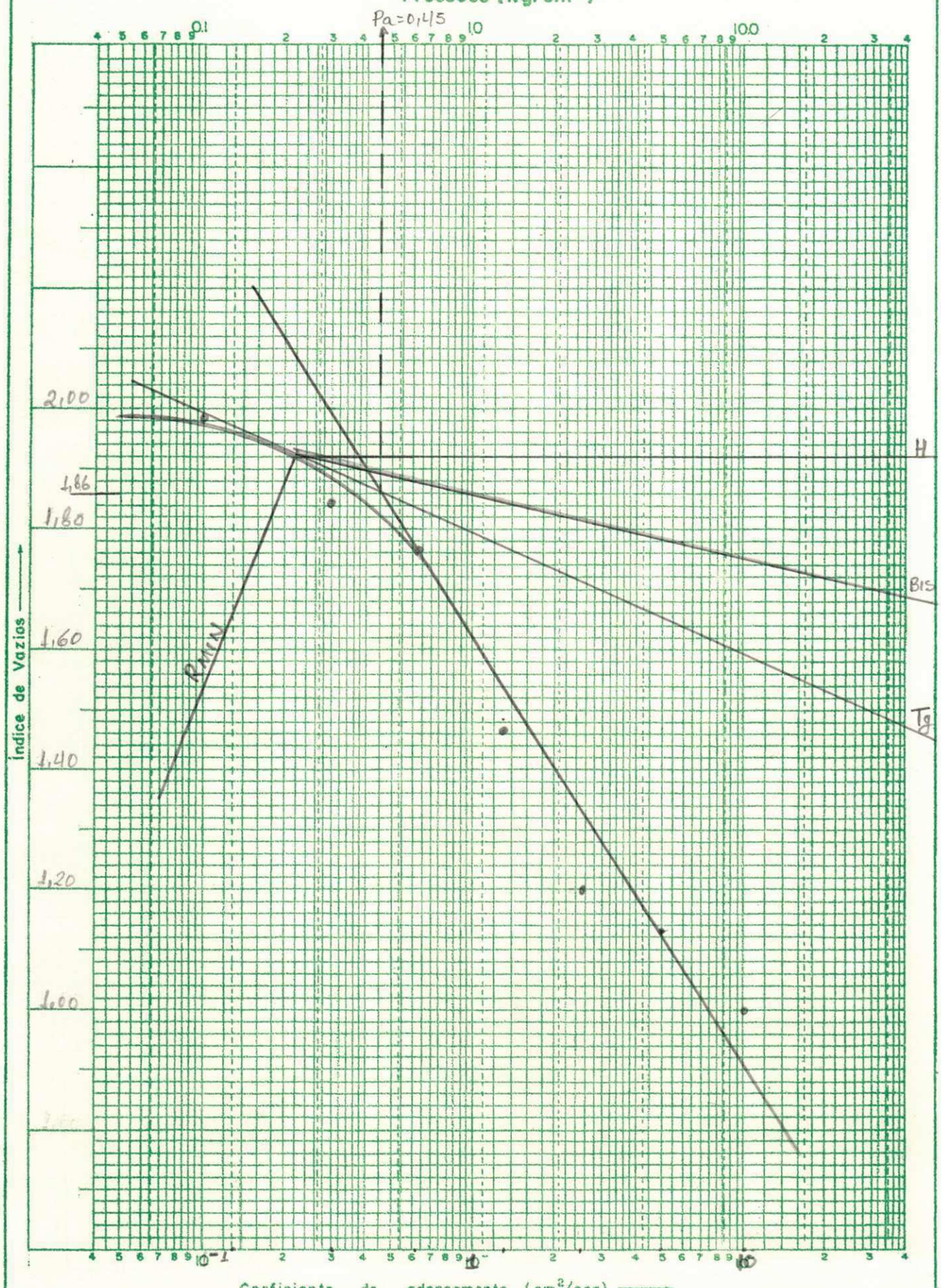
Indice de Vazios inicial (e_0) _____

Data:	Engº.	ATECEL
Desenho:	Engº Chefe:	SECÇÃO DE SOLOS

PROFUNDIDADE 12,50M PONTO "J" ANEL - 3

CURVA PRESSAO - INDICE DE VAZIOS - COEF. DE ADENSAMENTO

Pressoes (kg/cm^2)



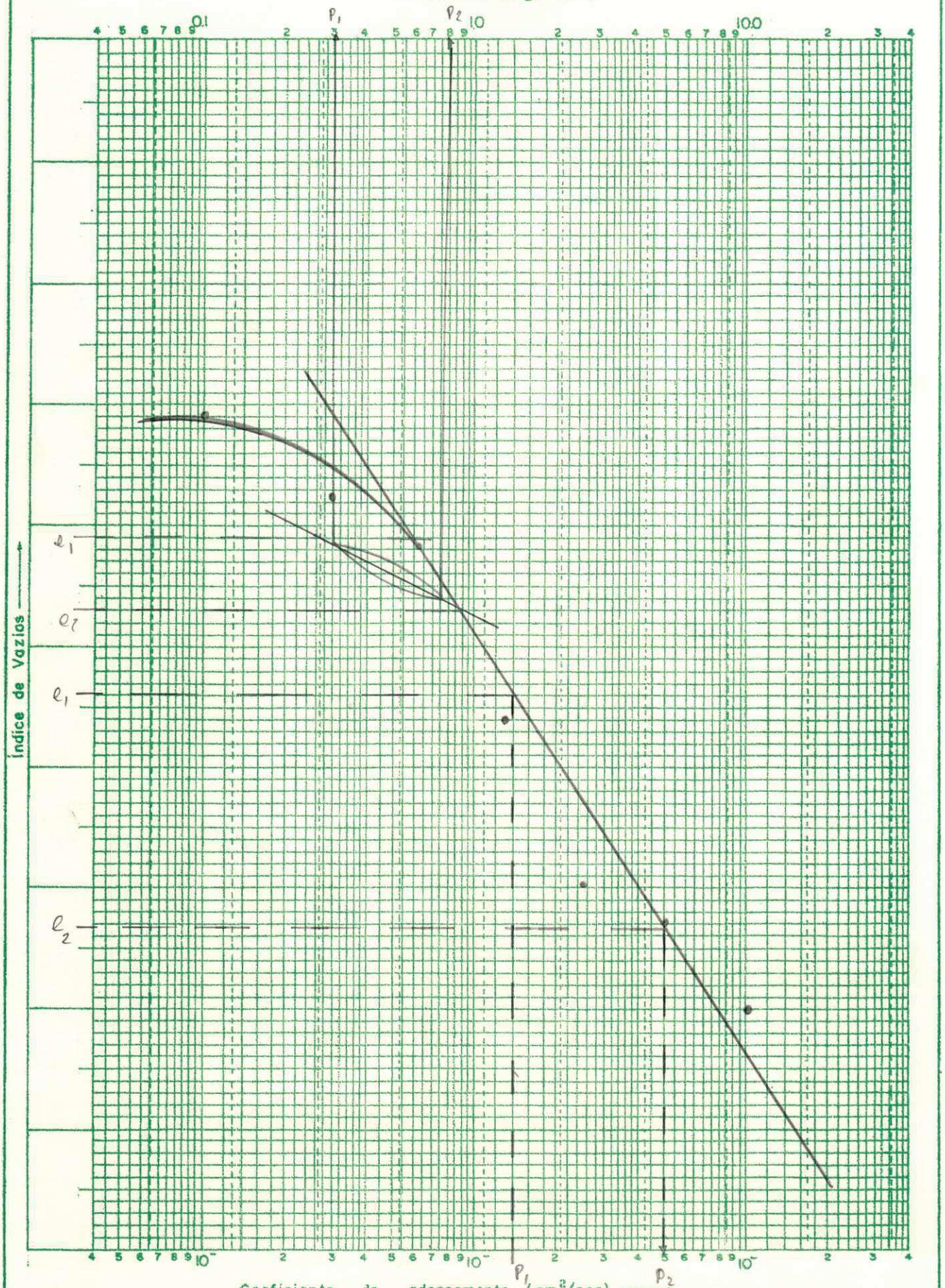
Pré-adensamento { Pressão 0,45 kg/cm² Índice de compressão .....
Índice de Vazios 1,86 ... Índice de Expanção .....
Indice de Vazios inicial (e_o) ---

Data:	Engº.	ATECEL
Desenho:	Engº Chefe:	SECÇÃO DE SOLOS

PROFUNDIDADE 12,50 M PONTO "J" ANEL - 3

CURVA PRESSAO - INDICE DE VAZIOS - COEF. DE ADENSAMENTO

Pressoes (kg/cm^2)



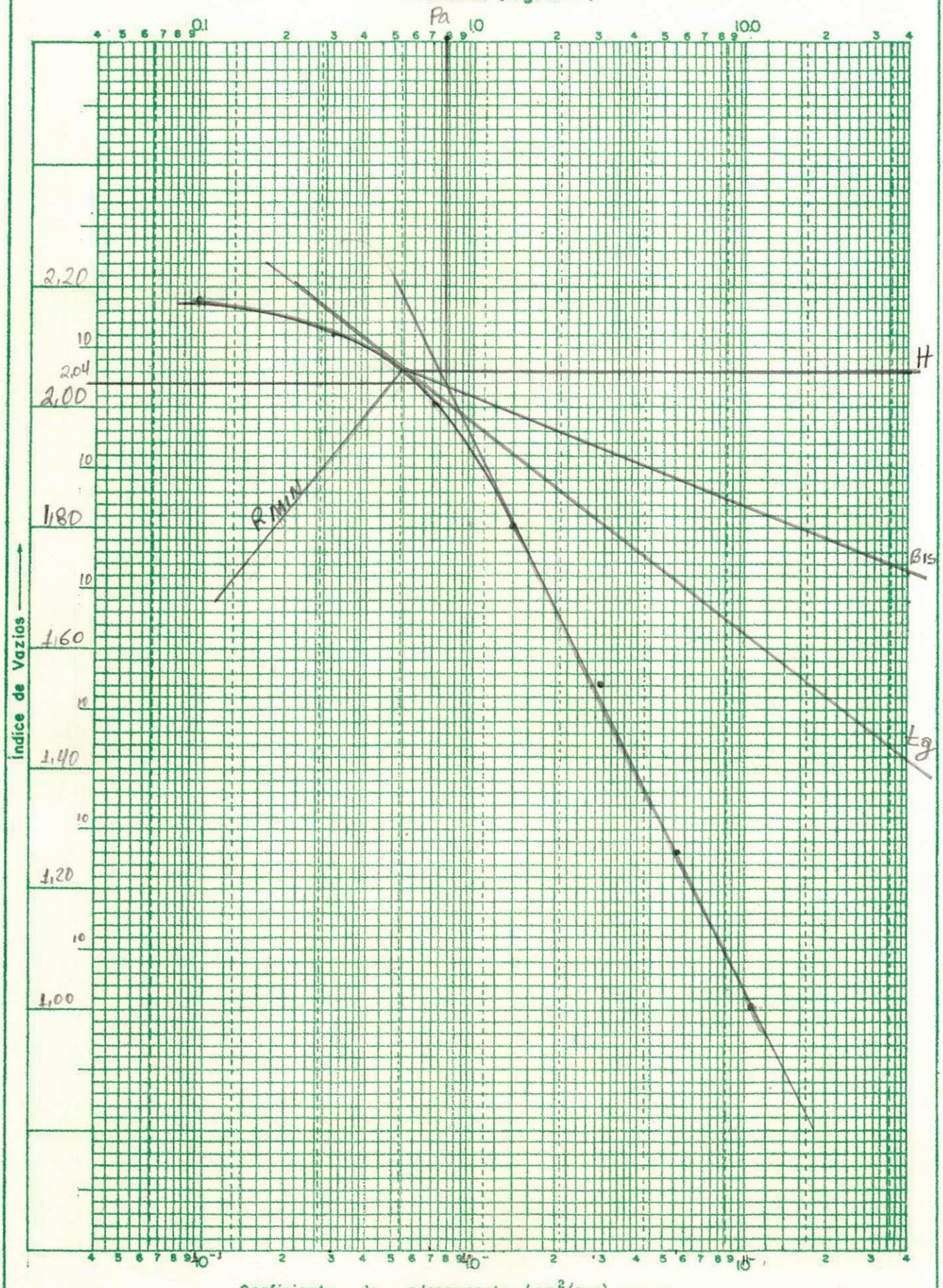
Pré-adensamento { Pressão _____ kg/cm^2 Índice de compressão _____
Índice deVazios _____ Índice de Expanção _____

Indice de Vazios inicial (e_0) _ _ _ _

Data:	Engº.	ATECEL
Desenho:	Engº Chefe:	SECÇÃO DE SOLOS

PROFUNDIDADE = 13,60 M - PONTO L - ANEL - 1

CURVA PRESSAO - INDICE DE VAZIOS - COEF. DE ADENSAMENTO



Pré-adensamento { Pressão 0,78 kg/cm² Índice de compressão .....
Índice de Vazios 2,04 Índice de Expanção .....

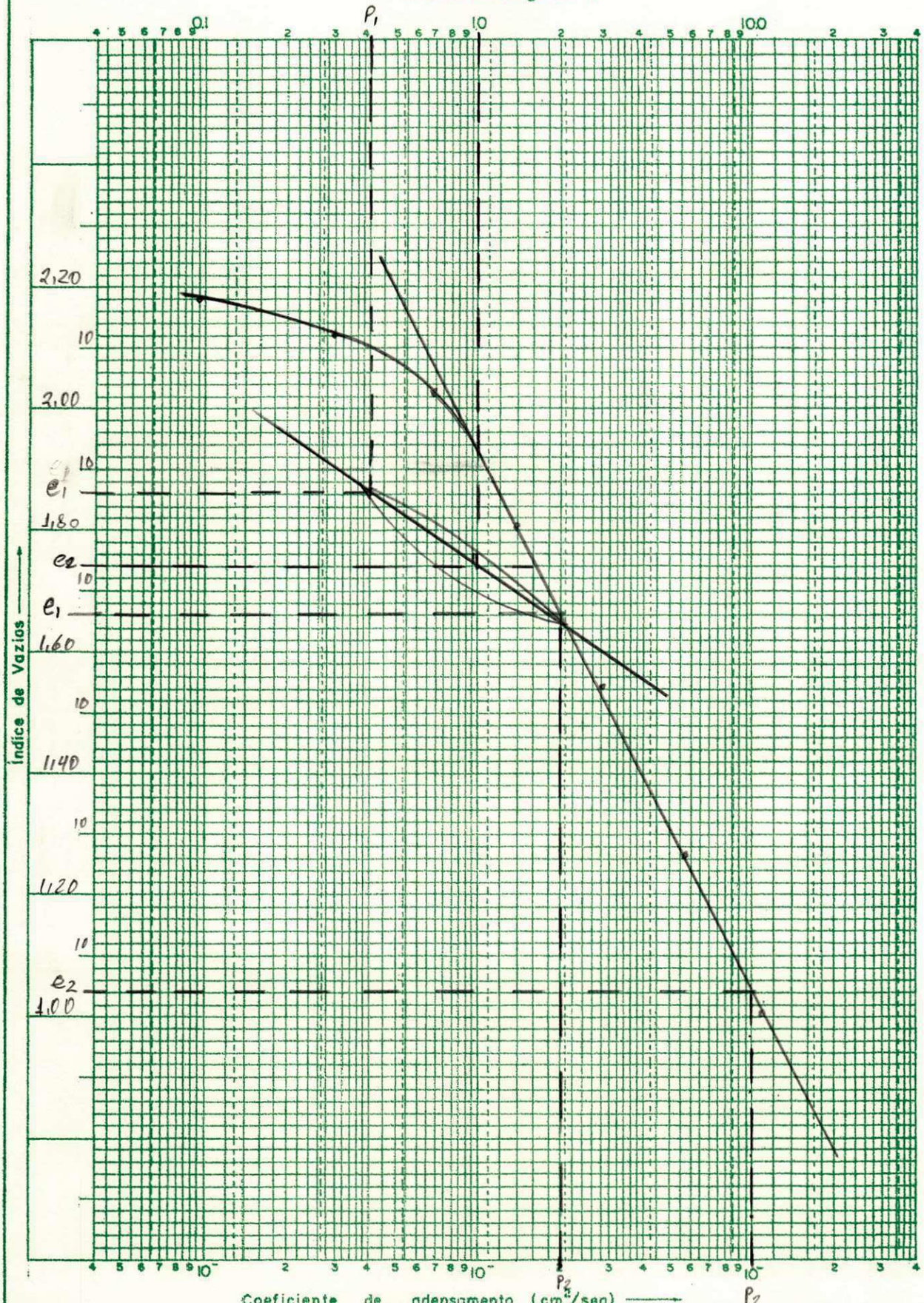
Indice de Vazios inicial (e_0) _ _ _ _

Data:	Engº.	ATECEL
Desenho:	Engº Chefe:	SECÇÃO DE SOLOS

PROFUNDIDADE = 13,60 M - PONTO "L" ANEL - 1

CURVA PRESSAO - INDICE DE VAZIOS - COEF. DE ADENSAMENTO

Pressoes (kg/cm^2)



Pré-adensamento { Pressão _____ kg/cm² Índice de compressão 0,84

Índice de Vazios _____ Índice de Expanção 0,30

Indice de Vazios inicial (e_0) _____

Data:	Engº:	ATECEL
Desenho:	Engº Chefe:	SECÇÃO DE SOLOS

LIMITE DE LIQUIDEZ E INDICE DE PLASTICIDADE

A N E X O 4

INSTITUTO TECNOLÓGICO — ESCOLA POLITÉCNICA

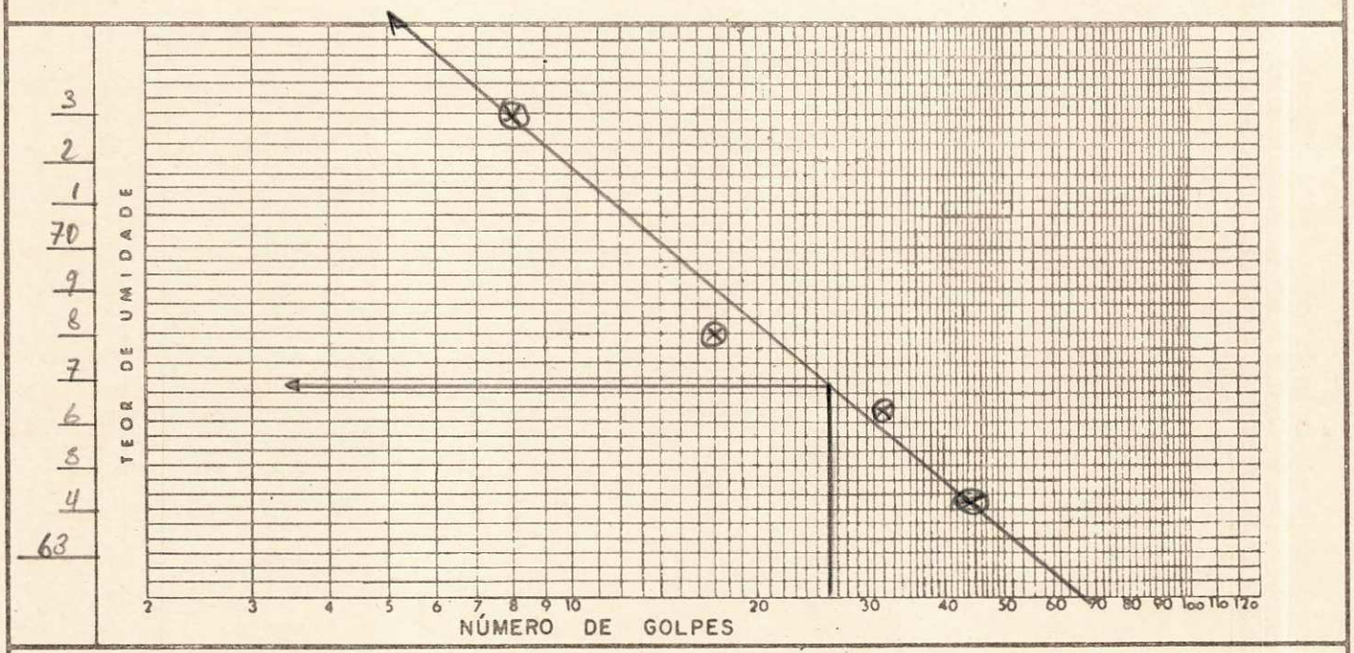
LABORATÓRIO DE SOLOS E ESTRUTURAS

DETERMINAÇÃO DOS LIMITES DE: "LIQUIDEZ E PLASTICIDADE"

RODOVIA	TRECHO		REGISTRO Nº
PROCED-SL-JAZ-AT-etc	LOCALIZ. - FURO-EST-LADO	PROFUND. - m 0,0 a 3,60	LABORATÓRIO: II U. F. Pb - C G
NATUREZA PESQUISA DE TESE DO SR JOÃO DE DEUS			RESULTADO: LL = 66,80 . IP = 20,80

LIMITE DE LIQUIDEZ

1	CÁPSULA Nº	D-8	C-14	C-8	23				
2	Nº DE GOLPES	8	17	32	43				
3	PÊSO BRUTO ÚMIDO	21,07	18,21	16,03	15,16				
4	PÊSO BRUTO SÊCO	16,84	14,33	12,38	11,76				
5	TARA DA CÁPSULA	11,05	8,66	6,88	6,49				
6	PÊSO DA ÁGUA	4,23	3,88	3,65	3,38				
7	PÊSO DO SOLO SÊCO	5,79	5,67	5,50	5,29				
8	UMIDADE	73,0	68,4	66,4	63,9				



INÍCIO. 09/03/77 ... OPERAÇÃO: CARLOS ... VISTO

TÉRMINO: 10/03/77 ... CÁLCULO: CARLOS ...

LL = 66,80 %

LIMITE DE PLASTICIDADE

1	CÁPSULA Nº	33	31	36	4				
2	PÊSO BRUTO ÚMIDO	6,73	6,08	5,86	5,45				
3	PÊSO BRUTO SÊCO	5,76	5,67	5,38	4,86				
4	TARA DA CÁPSULA	4,72	4,76	4,42	3,64				
5	PÊSO DA ÁGUA	0,47	0,41	0,48	0,54				
6	PÊSO DO SOLO SÊCO	1,04	0,91	0,96	1,22				
7	UMIDADE	45,2	45,0	50,0	48,4				

INÍCIO: 09/03/77 ... OPERAÇÃO: CARLOS ... VISTO:

TÉRMINO: 10/03/77 ... CÁLCULO: CARLOS ...

LP = 46,20 %

IP = 20,80 %

INSTITUTO TECNOLÓGICO — ESCOLA POLITÉCNICA

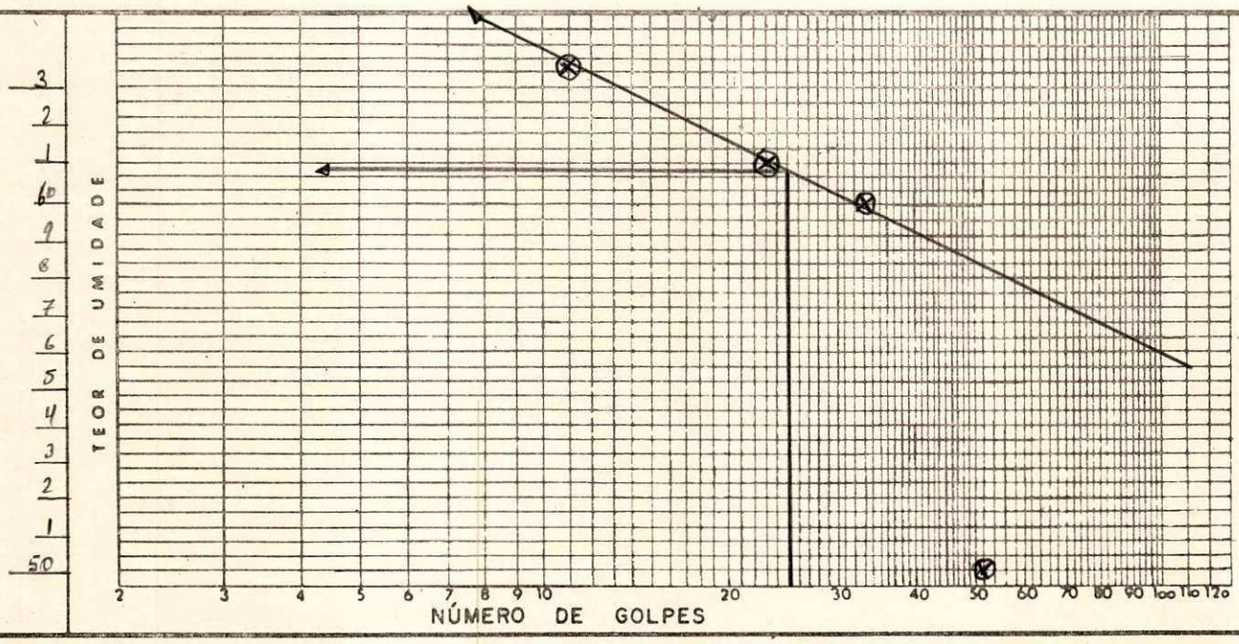
LABORATÓRIO DE SOLOS E ESTRUTURAS

DETERMINAÇÃO DOS LIMITES DE: "LIQUIDEZ E PLASTICIDADE"

RODOVIA	TRECHO		REGISTRO Nº
PROCED-SL-JAZ-AT-etc	LOCALIZ. - FURO-EST-LADO	PROFUND. - cm	LABORATÓRIO: II
		0,0 a 4,60	U.F.Pb - C.G
NATUREZA Pesquisa de Tese do SR: João de Deus			RESULTADO: LL=.60,70. . IP=.15,12. . .

LIMITE DE LIQUIDEZ

1	CÁPSULA Nº	D-9	504	197	170				
2	Nº DE GOLPES	11	23	33	43				
3	PÊSO BRUTO ÚMIDO	15,67	14,62	14,22	12,03				
4	PÊSO BRUTO SÊCO	12,60	11,64	11,39	9,13				
5	TARA DA CÁPSULA	7,79	6,80	6,68	3,33				
6	PÊSO DA ÁGUA	3,07	2,98	2,83	2,90				
7	PÊSO DO SOLO SÊCO	4,81	4,84	4,71	5,80				
8	UMIDADE	63,8	61,6	60,1	50,0				



INÍCIO. 08/03/77 ... OPERAÇÃO: ... Carlos ... VISTO

TÉRMINO: 09/03/77 ... CÁLCULO: ... Carlos ... ...

LL=.60,70...%

LIMITE DE PLASTICIDADE

1	CÁPSULA Nº	4	36	27	33				
2	PÊSO BRUTO ÚMIDO	5,41	6,15	6,71	6,67				
3	PÊSO BRUTO SÊCO	4,85	5,60	6,20	6,04				
4	TARA DA CÁPSULA	3,64	4,42	5,08	4,72				
5	PÊSO DA ÁGUA	0,56	0,55	0,51	0,63				
6	PÊSO DO SOLO SÊCO	1,21	1,18	1,12	1,32				
7	UMIDADE	42,1	46,6	46,5	47,7				

INÍCIO: 08/03/77 ... OPERAÇÃO: Carlos ... VISTO:

TÉRMINO: 09/03/77 ... CÁLCULO: Carlos ... ...

LP=.45,5...%

IP=.15,2...%

INSTITUTO TECNOLÓGICO — ESCOLA POLITÉCNICA

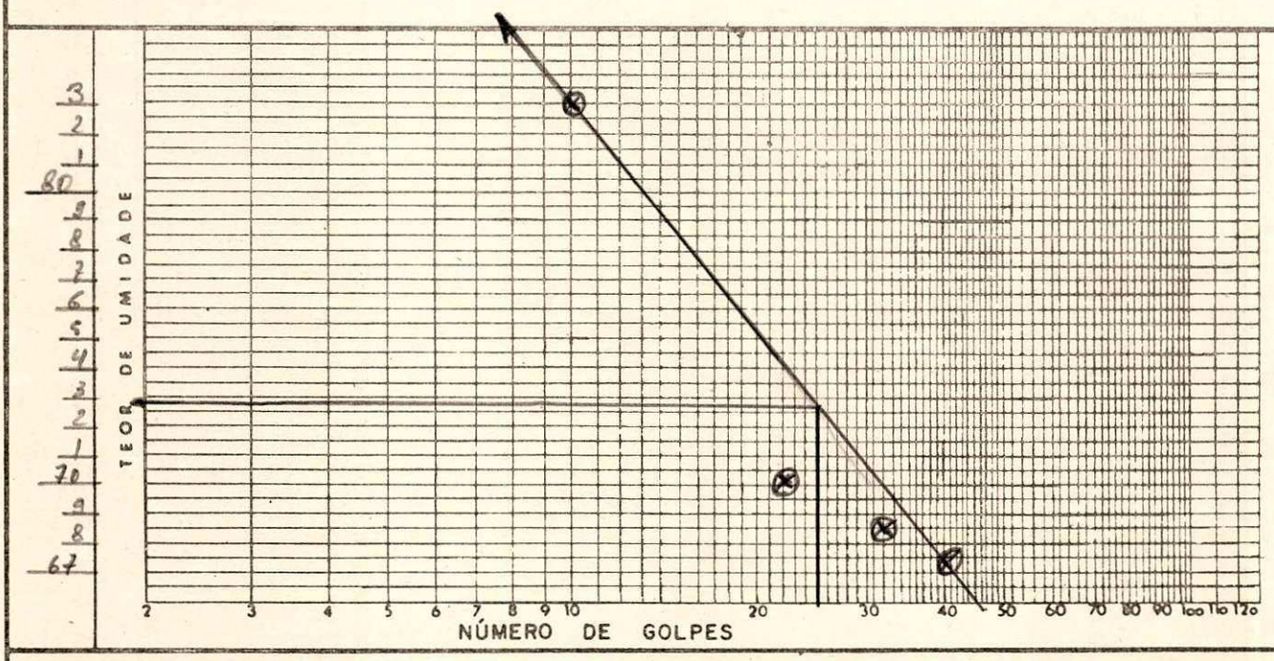
LABORATÓRIO DE SOLOS E ESTRUTURAS

DETERMINAÇÃO DOS LIMITES DE: "LIQUIDEZ E PLASTICIDADE"

RODOVIA	TRECHO		REGISTRO Nº
PROCED-SL-JAZ-AT-etc	LOCALIZ. - FURO-EST-LADO	PROFUND. - cm	LABORATÓRIO: II U.F.Pb - C.G
NATUREZA PESQUISA DE TESE DO GR: João de Deus			RESULTADO: LL = 72,6 ... IP = 36,10 ...

LIMITE DE LIQUIDEZ

1	CÁPSULA Nº	224	48	15	C-14				
2	Nº DE GOLPES	10	22	32	40				
3	PÊSO BRUTO ÚMIDO	21,10	23,22	19,70	19,98				
4	PÊSO BRUTO SÊCO	16,21	18,02	14,61	15,27				
5	TARA DA CÁPSULA	10,32	10,67	6,93	8,32				
6	PÊSO DA ÁGUA	4,89	5,20	5,19	4,71				
7	PÊSO DO SOLO SÊCO	5,89	7,35	7,68	6,95				
8	UMIDADE	83,0	70,7	68,5	67,8				



INÍCIO: 08/03/77 ... OPERAÇÃO: CARLOS ... VISTO

TÉRMINO: 09/03/77 ... CÁLCULO: CARLOS ... .

LL = 72,60 %

LIMITE DE PLASTICIDADE

1	CÁPSULA Nº	166	30	41	43				
2	PÊSO BRUTO ÚMIDO	5,71	6,44	6,84	6,78				
3	PÊSO BRUTO SÊCO	5,12	5,93	6,23	6,21				
4	TARA DA CÁPSULA	3,64	4,62	4,74	4,62				
5	PÊSO DA ÁGUA	0,59	0,51	0,61	0,57				
6	PÊSO DO SOLO SÊCO	1,48	1,41	1,49	1,59				
7	UMIDADE	40,0	36,2	40,0	35,8				

INÍCIO: 08/03/77 ... OPERAÇÃO: CARLOS ... VISTO:

TÉRMINO: 09/03/77 ... CÁLCULO: CARLOS ... .

LP = 38,70 %

IP = 36,10 %

INSTITUTO TECNOLÓGICO — ESCOLA POLITÉCNICA

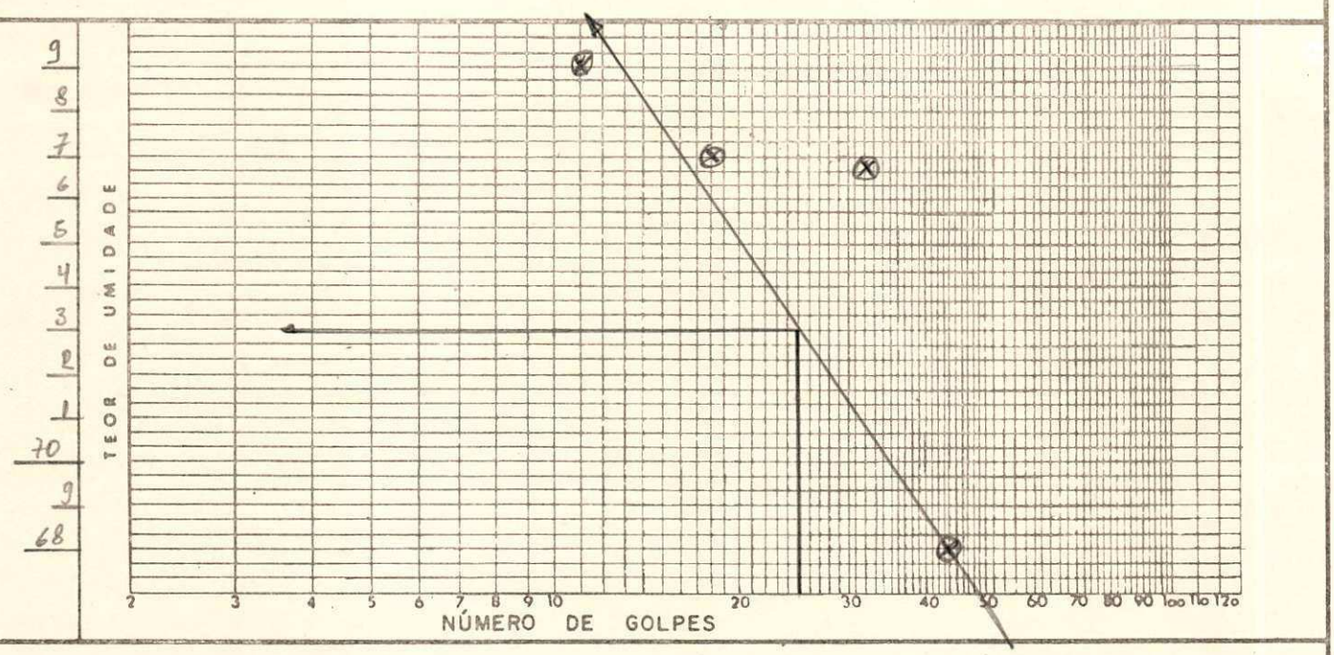
LABORATÓRIO DE SOLOS E ESTRUTURAS

DETERMINAÇÃO DOS LIMITES DE: "LIQUIDEZ E PLASTICIDADE"

RODOVIA	TRECHO		REGISTRO Nº
PROCED-SL-JAZ-AT-etc	LOCALIZ. - FURO-EST-LADO	PROFUND. - ~~cm~~ 0,00 a 6,60	LABORATÓRIO: II U.F.Pb - C.G
NATUREZA PESQUISA DE TESE DO SENHOR: JOÃO DE DEUS			RESULTADO: LL = 73,0 IP = 25,9

LIMITE DE LIQUIDEZ

1	CÁPSULA Nº	36	48	79	96				
2	Nº DE GOLPES	11	18	32	43				
3	PÊSO BRUTO ÚMIDO	22,98	21,92	17,11	17,94				
4	PÊSO BRUTO SÊCO	17,81	17,01	12,81	13,74				
5	TARA DA CÁPSULA	11,41	10,65	7,21	7,56				
6	PÊSO DA ÁGUA	5,08	4,91	4,30	4,20				
7	PÊSO DO SOLO SÊCO	6,40	6,36	5,60	6,18				
8	UMIDADE	79,4	77,2	76,8	68,0				



INÍCIO: 03/03/77 ... OPERAÇÃO: CARLOS ... VISTO

TÉRMINO: 03/03/77 ... CÁLCULO: CARLOS ... ...

LL = 73,0 %

LIMITE DE PLASTICIDADE

1	CÁPSULA Nº	1	27	15	37				
2	PÊSO BRUTO ÚMIDO	6,62	6,70	8,49	6,16				
3	PÊSO BRUTO SÊCO	6,27	6,16	7,98	5,74				
4	TARA DA CÁPSULA	5,46	5,08	6,93	4,87				
5	PÊSO DA ÁGUA	0,36	0,54	0,51	0,42				
6	PÊSO DO SOLO SÊCO	0,81	1,08	1,05	0,87				
7	UMIDADE	44,4	50,0	48,6	48,3				

INÍCIO: 03/03/77 ... OPERAÇÃO: CARLOS ... VISTO:

TÉRMINO: 04/03/77 ... CÁLCULO: CARLOS ... ...

LP = 47,10 %

IP = 25,90 %

INSTITUTO TECNOLÓGICO ESCOLA POLITÉCNICA

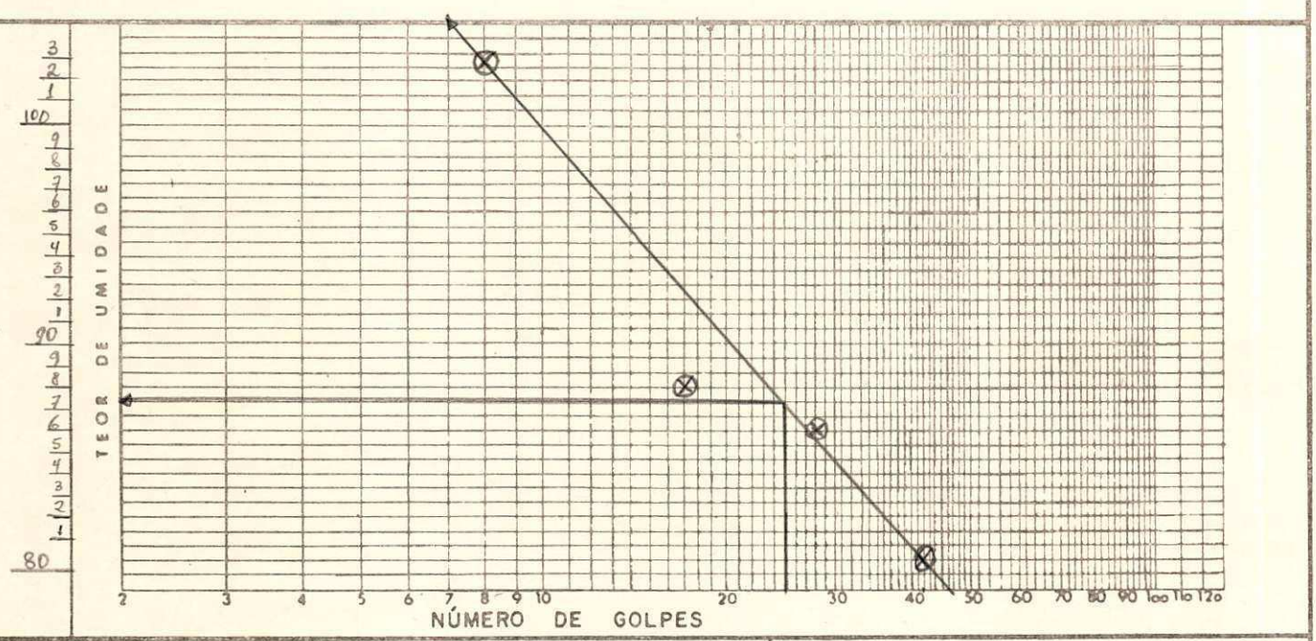
LABORATÓRIO DE SOLOS E ESTRUTURAS

DETERMINAÇÃO DOS LIMITES DE: "LIQUIDEZ E PLASTICIDADE"

RODOVIA	TRECHO		REGISTRO Nº
PROCED-SL-JAZ-AT-etc	LOCALIZ. - FURO-EST-LADO	PROFUND. - m 0,0 a 7,60	LABORATÓRIO: II U. F. Pb - CG.
NATUREZA PESQUISA DE TESE DO SR: JOÃO DE DEUS.			RESULTADO: LL=. 87,5 . IP=. 48,80.

LIMITE DE LIQUIDEZ

1	CÁPSULA Nº	128	134	108	132				
2	Nº DE GOLPES	8	17	28	42				
3	PÊSO BRUTO ÚMIDO	21,33	22,17	22,21	19,99				
4	PÊSO BRUTO SÊCO	15,57	16,60	17,21	15,61				
5	TARA DA CÁPSULA	10,02	10,32	11,40	9,97				
6	PÊSO DA ÁGUA	5,78	5,57	5,00	4,48				
7	PÊSO DO SOLO SÊCO	5,55	6,28	5,81	5,54				
8	UMIDADE	103,8	88,7	86,0	80,9				



INÍCIO. 03/03/77 ... OPERAÇÃO: CARLOS ... VISTO

TÉRMINO: 04/03/77 ... CÁLCULO: CARLOS ...

LL=. 87,50 %

LIMITE DE PLASTICIDADE

1	CÁPSULA Nº	A-32	39	40	38				
2	PÊSO BRUTO ÚMIDO	6,43	7,44	6,85	6,41				
3	PÊSO BRUTO SÊCO	5,93	6,83	6,28	5,89				
4	TARA DA CÁPSULA	4,66	5,20	4,85	4,58				
5	PÊSO DA ÁGUA	0,50	0,61	0,57	0,52				
6	PÊSO DO SOLO SÊCO	1,27	1,63	1,43	1,31				
7	UMIDADE	39,4	37,4	40,0	39,7				

INÍCIO: 03/03/77 ... OPERAÇÃO: CARLOS ... VISTO:

TÉRMINO: 04/03/77 ... CÁLCULO: CARLOS ...

LP= 39,10 %

IP= 48,80 %

INSTITUTO TECNOLÓGICO — ESCOLA POLITÉCNICA

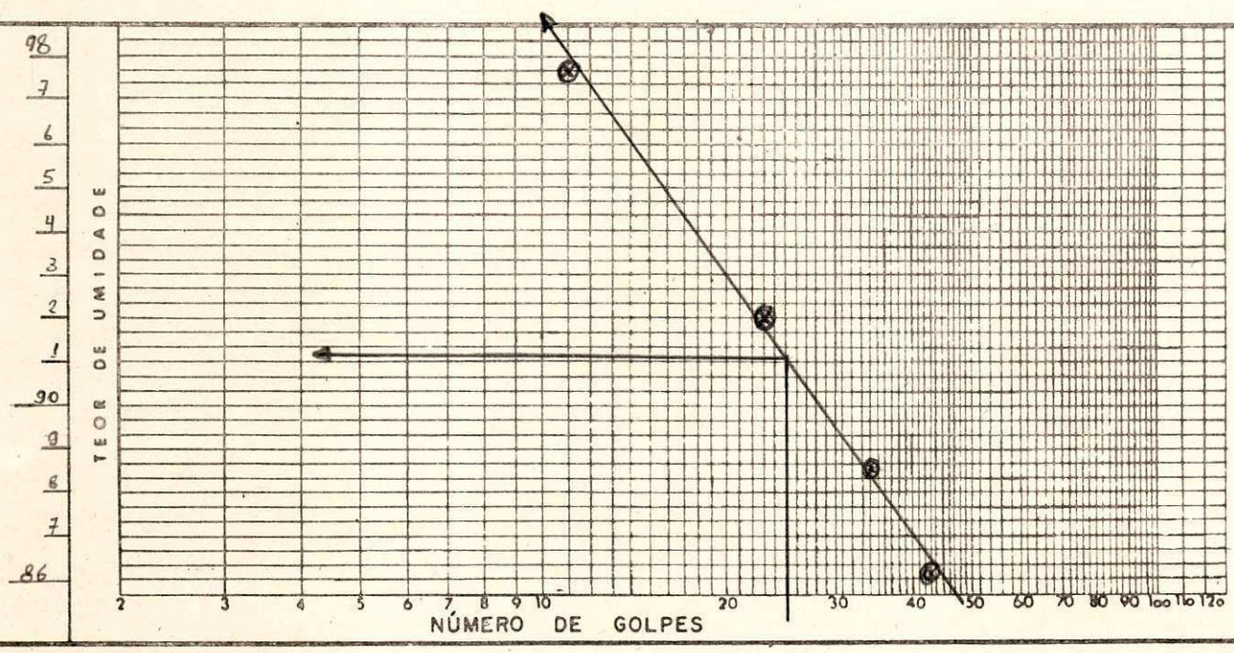
LABORATÓRIO DE SOLOS E ESTRUTURAS

DETERMINAÇÃO DOS LIMITES DE: "LIQUIDEZ E PLASTICIDADE"

RODOVIA	TRECHO		REGISTRO Nº
PROCED-SL-JAZ-AT-etc	LOCALIZ. - FURO-EST-LADO	PROFUND. - cm	LABORATÓRIO: II
		0,0 a 8,60	U.F.Pb. - C.G.
NATUREZA PESQUISA DE TERRENO DO SR: JOÃO DE DEUS.			RESULTADO: LL = 91,40 IP = 52,00

LIMITE DE LIQUIDEZ

1	CÁPSULA Nº	23	79	D-8	C-8				
2	Nº DE GOLPES	11	23	33	43				
3	PÊSO BRUTO ÚMIDO	16,05	18,04	22,56	17,76				
4	PÊSO BRUTO SÊCO	11,33	12,84	17,14	12,72				
5	TARA DA CÁPSULA	6,49	7,21	11,05	6,88				
6	PÊSO DA ÁGUA	4,72	5,20	5,42	5,04				
7	PÊSO DO SOLO SÊCO	4,84	5,63	6,09	5,84				
8	UMIDADE	97,5	92,4	88,9	86,3				



INÍCIO: 04/03/77 ... OPERAÇÃO: CARLOS ... VISTO

TÉRMINO: 05/03/77 ... CÁLCULO: CARLOS ...

LL = 91,40 ... %

LIMITE DE PLASTICIDADE

1	CÁPSULA Nº	36	33	27	4				
2	PÊSO BRUTO ÚMIDO	6,15	6,29	6,82	5,66				
3	PÊSO BRUTO SÊCO	5,68	5,87	6,31	5,06				
4	TARA DA CÁPSULA	4,42	4,72	5,08	3,64				
5	PÊSO DA ÁGUA	0,47	0,42	0,51	0,60				
6	PÊSO DO SOLO SÊCO	1,26	1,15	1,23	1,42				
7	UMIDADE	37,3	36,5	41,5	42,2				

INÍCIO: 04/03/77 ... OPERAÇÃO: CARLOS ... VISTO:

TÉRMINO: 05/03/77 ... CÁLCULO: CARLOS ...

LP = 39,4 ... %

IP = 52,0 ... %

INSTITUTO TECNOLÓGICO — ESCOLA POLITÉCNICA

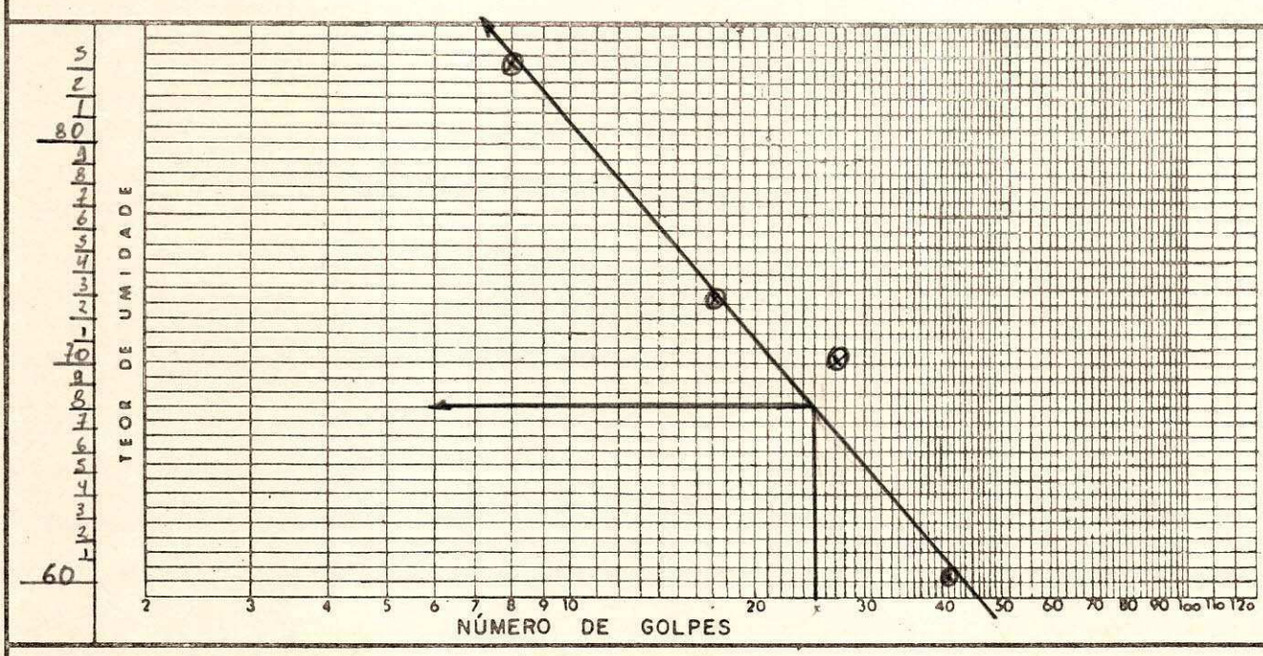
LABORATÓRIO DE SOLOS E ESTRUTURAS

DETERMINAÇÃO DOS LIMITES DE: "LIQUIDEZ E PLASTICIDADE"

RODOVIA	TRECHO		REGISTRO Nº
PROCED-SL-JAZ-AT-etc	LOCALIZ. - FURO-EST-LADO	PROFUND. - cm 0,0 a 10,60	LABORATÓRIO: ~~II~~ U.F.Pb - C.G
NATUREZA PESQUISA DE TESE DO SR: JOÃO DE DEUS			RESULTADO: LL= 68,50 IP= 27,7

LIMITE DE LIQUIDEZ

1	CÁPSULA Nº	200	127	40	1				
2	Nº DE GOLPES	8	17	27	41				
3	PÊSO BRUTO ÚMIDO	23,27	25,61	17,39	20,61				
4	PÊSO BRUTO SÊCO	17,84	19,14	12,75	16,02				
5	TARA DA CÁPSULA	11,36	10,24	6,17	8,42				
6	PÊSO DA ÁGUA	5,43	6,47	4,64	4,69				
7	PÊSO DO SOLO SÊCO	6,48	8,81	6,68	7,60				
8	UMIDADE	83,8	73,4	70,5	60,4				



INÍCIO: 04/03/77 ... OPERAÇÃO: CARLOS ... VISTO

TÉRMINO: 05/03/77 ... CÁLCULO: CARLOS ...

LL = 68,50 %

LIMITE DE PLASTICIDADE

1	CÁPSULA Nº	3	11	35	16				
2	PÊSO BRUTO ÚMIDO	5,63	6,08	7,84	7,44				
3	PÊSO BRUTO SÊCO	4,98	5,41	7,18	6,90				
4	TARA DA CÁPSULA	3,43	3,78	5,50	5,43				
5	PÊSO DA ÁGUA	0,65	0,67	0,66	0,54				
6	PÊSO DO SOLO SÊCO	1,55	1,63	1,68	1,47				
7	UMIDADE	41,9	41,1	39,3	8,67				

INÍCIO: 04/03/77 ... OPERAÇÃO: CARLOS ... VISTO:

TÉRMINO: 05/03/77 ... CÁLCULO: CARLOS ...

LP = 40,80 %

IP = 27,70 %

INSTITUTO TECNOLÓGICO ESCOLA POLITÉCNICA

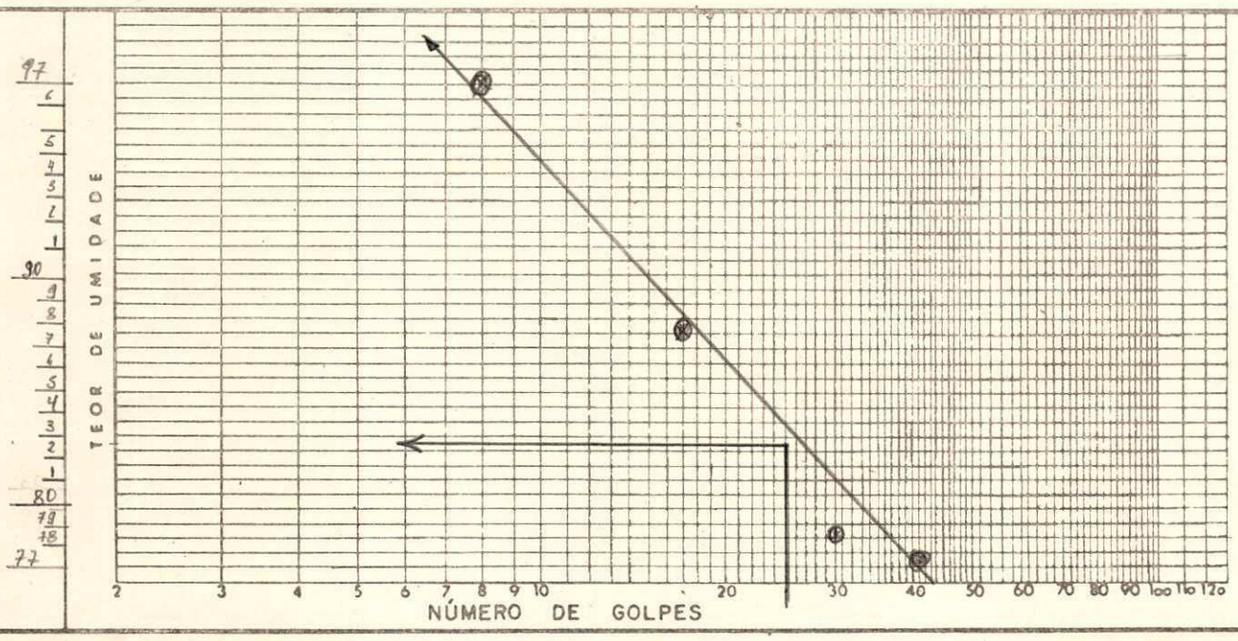
LABORATÓRIO DE SOLOS E ESTRUTURAS

DETERMINAÇÃO DOS LIMITES DE: "LIQUIDEZ E PLASTICIDADE"

RODOVIA	TRECHO		REGISTRO Nº
PROCED-SL-JAZ-AT-etc	LOCALIZ. - FURO-EST-LADO	PROFUND. - m 0,0 a 11,60	LABORATÓRIO: II U.F.Pb. - C. G
NATUREZA PESQUISA DE TESE DO SR: JOÃO DE DEUS			RESULTADO: LL= 83,10 . IP= 40,10 .

LIMITE DE LIQUIDEZ

1	CÁPSULA Nº	C-8	23	79	D-8				
2	Nº DE GOLPES	8	17	30	42				
3	PÊSO BRUTO ÚMIDO	17,00	17,31	18,92	19,12				
4	PÊSO BRUTO SÊCO	12,03	12,27	13,80	15,57				
5	TARA DA CÁPSULA	6,91	6,51	7,22	10,97				
6	PÊSO DA ÁGUA	4,97	5,04	5,12	3,55				
7	PÊSO DO SOLO SÊCO	5,12	5,76	6,58	4,60				
8	UMIDADE	97,1	87,6	77,8	77,1				



INÍCIO. 05/03/77 ... OPERAÇÃO: CARLOS ..... VISTO

TÉRMINO: 07/03/77 ... CÁLCULO: CARLOS .....

LL = 83,10 ... %

LIMITE DE PLASTICIDADE

1	CÁPSULA Nº	40	38	30	166				
2	PÊSO BRUTO ÚMIDO	6,81	6,62	6,57	5,59				
3	PÊSO BRUTO SÊCO	6,20	6,01	5,95	5,00				
4	TARA DA CÁPSULA	4,86	4,69	4,62	3,62				
5	PÊSO DA ÁGUA	0,61	0,61	0,62	0,59				
6	PÊSO DO SOLO SÊCO	1,34	1,42	1,43	1,38				
7	UMIDADE	45,5	42,9	43,3	42,7				

INÍCIO: 06/03/77 ... OPERAÇÃO: CARLOS ..... VISTO:

TÉRMINO: 07/03/77 ... CÁLCULO: CARLOS .....

LP = 43,00 ... %

IP = 40,10 ... %

INSTITUTO TECNOLÓGICO ESCOLA POLITÉCNICA

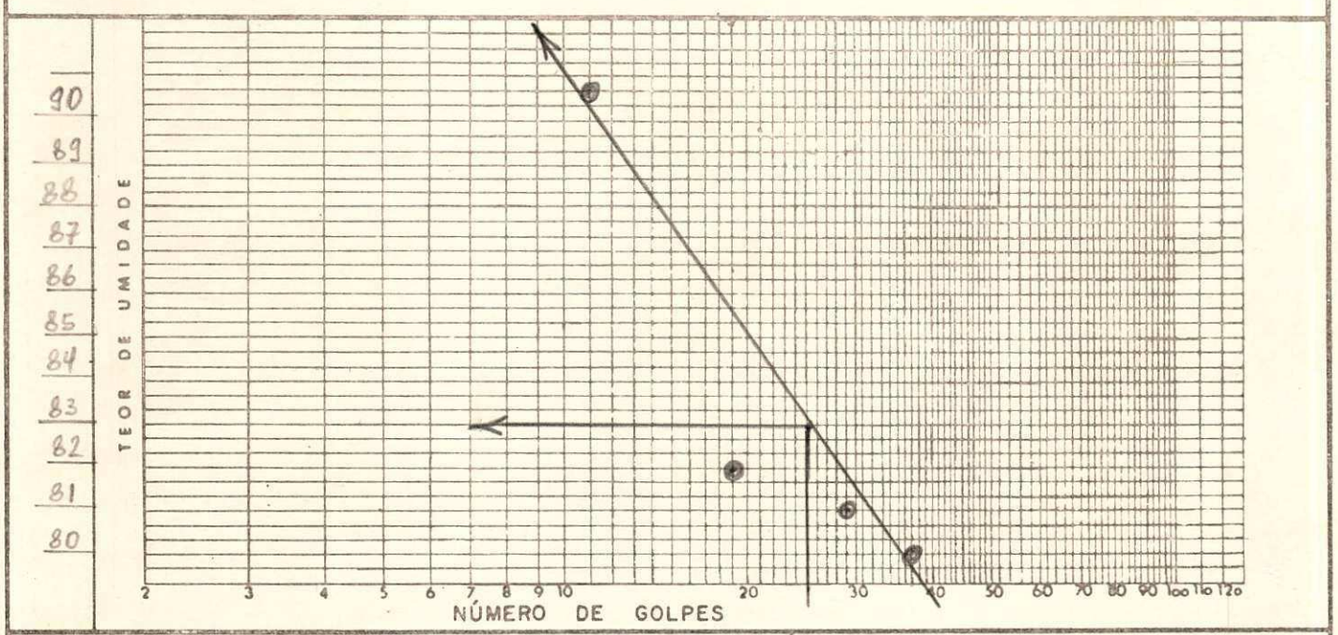
LABORATÓRIO DE SOLOS E ESTRUTURAS

DETERMINAÇÃO DOS LIMITES DE: "LIQUIDEZ E PLASTICIDADE"

RODOVIA	TRECHO		REGISTRO Nº
PROCED-SL-JAZ-AT-etc	LOCALIZ. - FURO-EST-LADO	PROFUND. - m	LABORATÓRIO: II
		0,0 a 13,60	U.F.Pb - CG
NATUREZA: PESQUISA DE TESE DO SR: JOÃO DE DEUS.			RESULTADO: LL=.83,00. IP=.41,40.

LIMITE DE LIQUIDEZ

1	CÁPSULA Nº	114	179	206	130				
2	Nº DE GOLPES	11	19	28	38				
3	PÊSO BRUTO ÚMIDO	20,35	20,90	21,94	20,84				
4	PÊSO BRUTO SÊCO	15,60	16,20	16,99	16,47				
5	TARA DA CÁPSULA	10,37	10,22	10,96	11,01				
6	PÊSO DA ÁGUA	4,75	4,90	4,95	4,37				
7	PÊSO DO SOLO SÊCO	5,23	5,98	6,09	5,46				
8	UMIDADE	90,8	82,0	81,2	80,0				



INÍCIO.05/03/77...OPERAÇÃO:...CARLOS..... VISTO

TÉRMINO:07/03/77...CÁLCULO:...CARLOS..... .....

LL=.83,0.....%

LIMITE DE PLASTICIDADE

1	CÁPSULA Nº	43	41	A-32	39				
2	PÊSO BRUTO ÚMIDO	6,21	6,36	6,65	6,99				
3	PÊSO BRUTO SÊCO	5,72	5,89	6,09	6,47				
4	TARA DA CÁPSULA	4,62	4,74	4,68	5,21				
5	PÊSO DA ÁGUA	0,49	0,47	0,56	0,52				
6	PÊSO DO SOLO SÊCO	1,10	1,15	1,41	1,26				
7	UMIDADE	44,5	40,9	39,7	41,3				

INÍCIO:.05/03/77....OPERAÇÃO:...Carlos..... VISTO:

TÉRMINO:07/03/77.....CÁLCULO:...Carlos..... .....

LP=.41,6...%

IP=.44,4...%