29.103 SURVEYING III

PRACTICAL No. 1

TAPE STANDARDISATION & THEODOLITE ADJUSTMENT

1. Calibration of UNSW Base (behind ME Workshop) using standard tape # APT 3246. This will be carried out as a combined effort of all parties within the group.

The standard tape is used to determine the distances between zero graduation lines on the scales at 0 m, 25 m, 50 m, 75 m and 100 m on the base. The standard tape has been standardised by N.S.L. as follows:-

Distance	between	0 - 25 m	marks	on	Std.	Tape	=	24.999 5 m *
"	"	0 - 50 m	"	"	"	"	=	49.999 7 m *
"	"	0 - 75 m	"	"	"	"	=	74.999 7 m *
"	"	0 -100 m	"	"	"	"	=	99.999 6 m *

* At 15 lbs and 20°C

Estimated accuracy 1 in 10^5

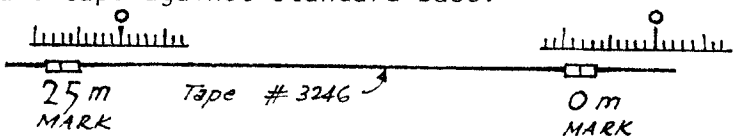
Coefft of Linear Expansion 11.2×10^{-6} per °C

The calibration consists of 10 determinations for each interval employing the whole range of the scales on the Standard Base. The tension applied to the Standard Tape is 15 lbs (i.e. standard tension) and the field temperature is to be measured by 3 thermometers situated along the base. The tape can be considered to be fully supported. The supervisor will explain the detailed procedure.

The observations and reductions are to be entered on the forms provided. (See example below).

*Example of reading standard tape against standard base.

e.g. Observation No. 9 (see below)



*Example of reduction of standard tape readings

Scale Readings

No.	25 m Red.	25 m Obs.	0 m Red.	0 m Obs.
1	R 0.9	R 1.2	0	R 0.3
2	R 1.0	R 9.0		R 8.0
3	R 0.9	R13.9		R13.0
4	R 0.7	R20.4		R19.7
5	R 0.9	R31.0		R30.1
6	R 0.8	L29.2		L30.0
7	R 0.9	L22.1		L23.0
8	R 1.0	L15.9		L16.9
9	R 1.0	L 7.1		L 8.1
10	R 1.0	L 1.0	0	L 2.1
Mean	R 0.9	mm	0	mm

Field Temperature
18° C

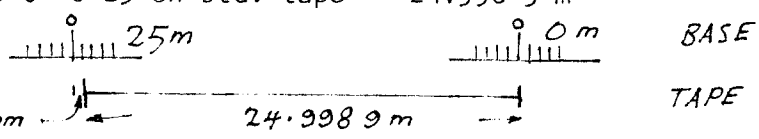
Corrn. for temp: $L\,\alpha(t_F - t_S)$

$= 25 \times 11.2 \times 10^{-6}(18-20)$

$= -0.0006$

@ 20°C 0-25 on std. tape = 24.999 5 m

@ 18°C 0-25 on std. tape = 24.998 9 m



i.e. Distance between zero marks on 0 & 25 m scales = 24.999 8 m.

2. Standardisation of 100 m Band. Each party is to individually standardise an 100 m band which they can then use for all future field work exercises. This is to be done on the UNSW Standard Base for which the values determined in part(1) of this exercise are to be used.

The invervals 0-50 m and 0-100 m on the band are to be measured 3 times each at a tension of 60 N.

The temperatures at which the band correctly measures 50 m and 100 m are to be determined.

3. Theodolite Adjustment. Each party is to carry out the standard tests and if necessary adjustments to a 20" Vernier Theodolite. These adjustments are

(1) adjustment of plate bubble
(2) collimation in azimuth
(3) vertical circle index.

When these adjustments have been carried out the instrument will be inspected by the supervisor. Any group member may be asked by the supervisor about some aspect of the adjustment of a theodolite. (Each member of the party should do at least one of the above adjustments).

No submission is required, but marks will be awarded on the basis of the resulting adjustment, the viva question and the quality of the fieldbook.

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