Practical No: 12 **Perform Fly Levelling to check levelling work.**

I. Practical Significance:

Dumpy level/Auto level is used to find reduced levels of unknown points from known datum. Durin survey work always it is not possible to complete the work from single datum. Hence in medium t large project works establishment of temporary bench marks becomes necessary to continue the wor on next day. Fly levelling is a type of levelling which is used simply to establish such temporary benc marks. After completion of any work either minor, medium of major project work verification c calculated reduced levels must be verified. Hence by check levelling survey work is done in revers direction & reduced level of first datum is verified

II. Industry/Employer Expected Outcome(s):

- Establishment of temporary bench marks by using dumpy level/ Auto level and levelling staff.

III. Course Level Learning Outcome (COs):

- CO4 - Determine Reduced Level to prepare Contour maps for the given type of terrain.

IV. Laboratory Learning Outcome (LLO):

- LLO 12.1 Undertake fly leveling with double check using dumpy level/ Auto level and levelir staff.

V. Relevant Affective Domain related Outcome(s):

- Using Safe behaviors effectively.
- Maintain high standards of hygiene.
- Efficient application of tools, equipment's and machinery.
- Professional and ethical standards.

VI. Relevant Theoretical Background:

When survey work is large then temporary bench marks are set up by using fly levelling and wh days' work or project work is finished it is to be checked by check levelling. In fly & check levelli only back sights & fore sights are taken. It involves no of change points. Temporary adjustments a necessary at each & every setup of instrument.

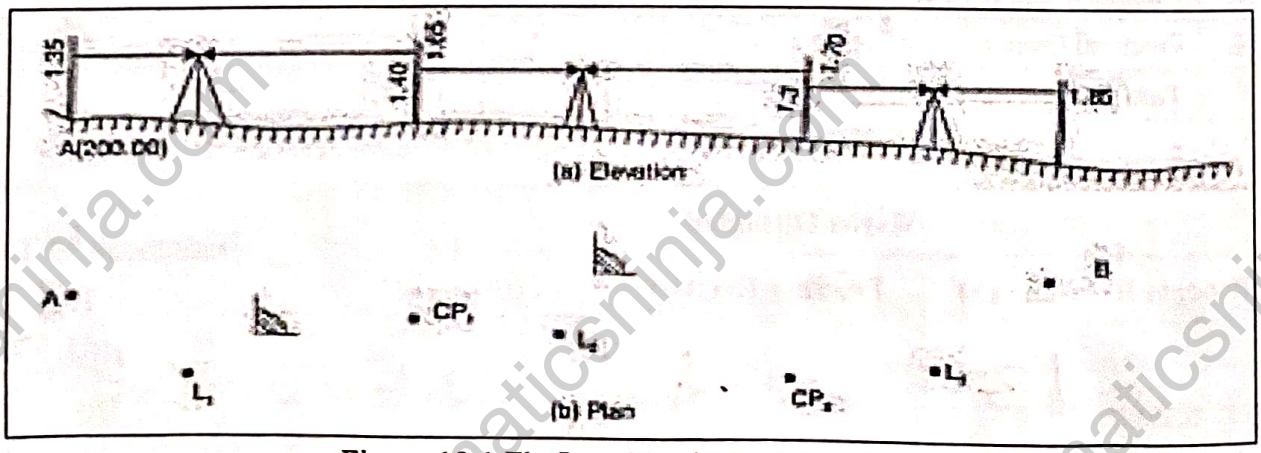

Figure 12.1 Fly Levelling/ Check levelling

VII. Required Resources:

Sr. No.	Resource required	Particulars	Quantity
01	Dumpy/Auto level with tripod stand	As per standard Specification	1 nos.
02	Levelling staff	4m	2 nos
03	Field book for recording readings	As per standard norms of field book page	1 nos

VIII. Precautions to be followed:

1. Perform temporary adjustments precisely.
2. Hold the staff truly vertical.
3. Read staff reading accurately.
4. Enter the staff readings correctly in the level book.

IX. Procedure:

1. First collect the all instruments as per mentioned in point no VII from the survey lab.
2. Mark the staff stations on the ground whose elevations are to be found.
3. Position of the level should be approximately midway between the BS and FS stations
4. Rotate the telescope towards the levelling staff on BM, observe and record the staff readings in the BS columns of the level book.
5. Take a FS on the point towards working site. This point, would be change point (CP).
6. Shift the instrument to new position. First reading from the new instrument position is the BS on change point.
7. Continue the procedure till the readings on the suitable station at working site is recorded.
8. Find the elevations of the points by HI or rise and fall method.
9. Return back the instrument to survey store.

X. Observation Table:

Inst. Station	Staff Reading		Rise	Fall	Reduced Level	Remark
	BS	FS				
1	1·500				100·000	BM
		2·200		0·70	99·300	
	1·850			1·25	99·300	
		3·100	1·55		98·050	
	2·500			1·5	98·050	
		0·950	1·3		99·600	
	1·250		1·3		99·600	
		2·750		1·3	98·100	
	3·000		1·7		98·100	
		1·700	1·7		99·400	
	2·150			2·1	99·400	
		0·850	1·3		100·700	
	1·600			1·75	100·700	

Σ BS - FS = 2·850 Σ Rise - Fall = 2·85 last RL - First RL = 2·85

Inst. Station	Staff Reading		Rise	Fall	Reduced Level	Remark
	BS	FS				
SUM=						

Arithmetic Check:

XI. Result:

- RL of TBM 1= 99.600 m
- RL of TBM 2 = 99.400 m
- RL of TBM 3 = 100.700 m
- RL of TBM 4 = 1001.100 m
- RL of TBM 5 = 102.850 m
- RL of TBM n (last) = 100.700 m
- RL of Starting BM = 100.00 m

XII. Interpretation of Results:

The fly levelling practical successfully temporary benchmarks along a survey line.

XIII. Conclusions:

the reduced level of the established temporary bench marks were successfully determined using fly levelling

XIV. Practical Related Questions:

1. State the purpose of fly levelling.
2. State the situation where fly levelling is done

Space for Answer

Q. 1 ⟶ ?

Ans:- The purpose of fly levelling is to established a series of temporary bench marks along a survey line, providing a network of refrence points for future levelling work.

Q. 2 ⟶ ?

Ans:- The survey area is large:- covering a significants distance requires establishing TBMs at intervals to ensure accurate.