CE200 SURVEYING

FIELDWORKS

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Practises

Fieldwork 1 (1a-1b): Horizontal distance measurement by the method of taping.

Fieldwork 2: Surveys of small areas and buildings by the method of intersecting arcs.

Fieldwork 3: Making contour map of a small area by intersecting arcs and differential leveling

- ✓ **Phase 1:** Horizontal position fixing of contour points by intersecting arcs.
- ✓ **Phase 1a:** Two-peg test
- ✓ **Phase 2:** Vertical position fixing of contour points by intersecting arcs.

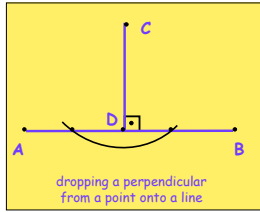**Fieldwork 4:** Making contour map by tacheometric method.

- ✓ **Phase 1:** Finding the coordinates of reference points by traversing.
- ✓ **Phase 2:** Contour by tacheometer.

Fieldwork 5: Indirect measurement of a vertical line segment.
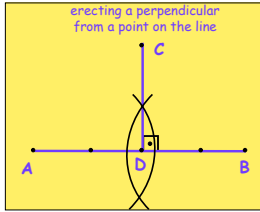

FIELDWORK 1

- Set up a rod at a point in vertical position (to make the road plumb)
- Ranging a line (to locate a rod at an intermediate point on a line)
- Hand signals in ranging
- Measuring the horizontal distance between two points

dropping a perpendicular from a point onto a line

erecting a perpendicular from a point on the line

AB > 20m.

Warning:
Write a report what you have done and difficulties you encountered while you are working. Each member of subgroup should measure individually and check the measurements.

FIELDWORK 1a & 1b

Fieldwork 1a: In a flat area...
- dropping two perpendiculars   AB > 40 m.
- erecting two perpendiculars

Fieldwork 1b: In a sloped area...
- dropping one perpendicular   AB > 20 m.
- erecting one perpendicular

FIELDWORK 2

- ❖ **Find your site**
- ❖ **Draw a sketch for the site**
- ❖ **Show the measurements on the sketch**
- ❖ **Take your equipment**
- ❖ **Then you will start to measure the building that you had chosen.**
- ❖ **Bring your sketch before starting to draw plan for checking**

Each subgroup has to bring sketch, plan, and report

FIELDWORK 3
PHASE 1

✓ Divide the Ataturk Koru into places (small areas with minimum dimensions 40x40m.

✓ Each piece is the working area for one subgroup. Subgroups of a main group should be in neighborhood.

✓ Each subgroup should establish at least 4 reference points as a frame. These points must be protected in their locations on the ground till the end of the course.

✓ Neighboring subgroups must have at least two common reference points.

✓ Neighbor pieces must have an overlapped area approximately 10 m. width.

✓ Each subgroup should mark contour points max. 8 m apart from each other. These points should be protected in their locations on the ground until finishing fieldwork 3. (you need iron stakes for points in the field!!) – totally 40 points.

✓ Draw a **sketch** of your are showing reference and contour points and neighboring subgroups and other features.

✓ Give names to the reference and contour points by numbering. Use three digits for reference points starting with your subgroups number and indicate other numbers for common points given by neighbor subgroups, e.g. 111,112(211)

✓ Use two digits for detail points starting 01 …

✓ Make horizontal measurements write on your sketch and draw a **plan** for your reference and contour points. (every possible horizontal measurements should be made!!)

✓ Write a **report** what you have done.

FIELDWORK 3
PHASE 1-a

❑ Each subgroup will be required to perform a peg test to check the instrument.

❑ Each person in the subgroup should record the results of the peg test in their own fieldbook.

❑ Place two pegs about L = 40m apart.

❑ Set up instrument midway between the two pegs.

❑ Read staff on each peg, and calculate height difference.

❑ Move instrument about L / 10 = 4m beyond one of the pegs.

❑ Read staff on each peg again, and calculate height difference.

Collimation Error → e = difference in the differences
Acceptable error: 1mm per 20m

FIELDWORK 3
PHASE 2

✓ We will show you a point in the field, and give its elevation.
✓ We do not have enough leveling instruments so you will work in turn.
✓ You may arrange the turns of subgroups by yourself.
✓ It is your responsibility to keep your instruments.
✓ You as a subgroup must show us your reference and contour points in the field before you begin leveling operation.
✓ 0.5 m. < Working range at leveling < 20 m.
✓ Acceptable errors:
   For Check Points → max. 3 cm.
   For Field Loop → max. 1 cm.
✓ **You must bring us raw data at every step !!!**
✓ **Take measurements, calculate the height of points by level book, draw a plan with contour lines, bring us report and plan of phase II.**

Fieldwork 4, Phase 1: Finding the coordinates of reference points by traversing.

▪ Each subgroup will take the reference points as traverse points and form a closed traverse.

▪ Make necessary measurements and calculate the X,Y coordinates. (horizontal distances and horizontal angles in two ways as three sets).

▪ Take 1100.00, 1100.00 m (for subgroup 1.1) for the coordinates of one of your reference point.

▪ Estimate the azimuth of the leg of your traverse, starting from the point with the given coordinates.

▪ Make your calculations and balance your misclosures.

Warning!

Phase I: Angular Measurements
   Rod & Tripods / Theodolite & Tripod
   } instrument height is not important for phase 1

Phase II: Tacheometry
   Tape & Staff / Theodolite & Tripod
   } instrument height must be measured for phase 2

* Your reference points form a traverse. The instrument is set at a reference point and aimed to another reference point.

* Angular measurements (vertical and horizontal angles) are read at face I and face II, for 3 sets.

* For 3 sets and 2 target points: 400ᵍ / 3*2 = 66ᵍ
So Set I:0ᵍ, Set II:66ᵍ, Set III:132ᵍ

* It is difficult to set the theodolite! Circular bubble must be in the center. To do this you can use legs of the tripod by changing the heights. Tubular bubble is brought to the middle using the foot screws. The instrument must exactly be over the reference (traverse=station) point.

Fieldwork 4, Phase 2: Contours by tacheometer

Draw another plan of your own field with contour lines by applying tacheometric method.

- Bring us:
✓ Measurements of your traverse.
✓ Calculation of your traverse.
✓ A **sketch** showing traverse points and legs, approximate locations of points and their numbers.
✓ Tacheometric **fieldbook**.
(Use the coordinates of traverse calculation.)
✓ Plan with the same scale of previous plan.
✓ Report

Fieldwork 5

- Choose a vertical line segment with an approximate length of 7-10m.

- Mark three points around forming 2 triangles with a common side.

- The length of sides should be 40m approximately.

- Make necessary measurements. (3 sets of vertical angle, 3 sets of horizontal angle, distance measurement in two ways)

- Calculate the length of vertical line segment.

You will give us:
- ✓ Definition of the problem (one copy for each subgroup)
- ✓ Proof for the formula given
- ✓ Results of measurements made (one copy for each subgroup) and average of your measurements
- ✓ Sketch (showing surrounding buildings)
- ✓ Report