

## Theodolite Survey of a Bench

- The key to the theodolite metal box is in the AES lock box
- The key to the magnet shed is in the MCC lock box
- Survey data recorded should be placed in the black survey notebook found in the magnet shed
- To perform the survey, the theodolite box and encoder are required, they can be found in the metal box in the entrance hall to Hall A
- Once the theodolite has been brought to the sight of the surveying bench, it needs to be left in the area for about an hour so that it can reach the same temperature as surroundings
- After the theodolite has reached thermo-equilibrium, it can be placed on the bench. To do this, the removable base should be taken off of the theodolite and the theodolite should be placed and secured into the similar base on bench
- The theodolite can then be leveled by using the knobs on the base, while using the “bubble” scale as a reference. The device should be leveled twice, the second being approximately 90 degrees from the first
- Mount a charged battery pack to the theodolite (two battery packs and chargers can be found in the shed)
- Push “ON/ENTER” button, the bottom display should read “V zero 1”
- Initialize the V (vertical angle) by slowly turning the lens vertically until a beep is heard, and “V zero 2” is displayed. Then turn in the opposite direction until another beep is heard and an “A zero” is displayed
- Initialize the A (horizontal angle) by slowly turning the lens horizontally until a beep is heard and “Theo” is displayed
- Press “ON/ENTER” button to accept the theodolite menu
- V and A should now display angles from 0.0000 to 359.9999, if the decimal part is not displayed, correct the leveling
- Measure the autocollimation angle:
  - Open the light tube
  - Plug in the autocollimation light cable
  - Turn ON the autocol. power switch
  - Adjust the autocol. power potentiometer (knob under the autocol. power switch) to half range
  - Adjust the small knob on optics to your vision (cross hairs in focus)
  - Adjust main focusing (large knob on the optics) to infinity (turn in counter clockwise direction to the limit and then come back about  $\frac{1}{4}$  of a turn)
  - Adjust the V angle to 90.0000 degrees, first move the optics directly to  $\sim 90$ , then put on break (small knob on top pair of knobs) and adjust exactly to 90.0000 using the large knob of the top pair
  - Adjust the A angle to point in direction of the light tube: first move theodolite directly, then break it and use the small knob on bottom pair of knobs
  - Using the A knob search for a light signal (if the autocollimation is being performed downstream, the green cross might be hard to see. A flash light can be

used by shining it into the tunnel and using the sight on the theodolite to line it up)

- Focus (main focus) and adjust the theodolite until a green cross comes into focus (there is two wrong autocollimation patterns): when you change by a small amount the A/V angle, then the A/V coincidence between both crosses must be destroyed. If it is not the case, you are focusing on one of the two wrong patterns. Then change the main focusing towards infinity (CC) to get another pattern.
  - Fine adjust A and V angles, record their values in the Shed Logbook. *> Zero (A) angle before focusing*
  - Change both angles by 180.0000 degrees, WITHOUT CHANGING THE MAIN FOCUSING, and redo previous steps for finding the green cross.
  - Close the light tube.
  - Turn OFF the autocollimation power switch on the battery.
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- Measure the scanners
    - Remove the scanner cover
    - Unplug the connector of the encoder
    - Plug in the connector for the encoder box and plug in the lamp wire into the side of the encoder.
    - Record the encoder reading into the logbook. It should be 118407 +/-2.
    - Adjust the main focusing on the fiducial wire
    - Adjust the V and A angle to the center of the brass aperture which is found coming out of the scanner (For Scanner #1 and #2 the focal point is right below the autocollimation measurement with a vertical angle of ~109 or ~251 degrees. For scanner #3 and #4, the focal point is off by ~6 degrees in the horizontal direction from the autocollimation measurement).
    - Fine adjust the V and A and record measurements in logbook
    - Change both angles by 180 degrees, WITHOUT CHANGING THE MAIN FOCUSING, and repeat the previous steps.
    - Unplug the control box, plug in the connector of the encoder and cover scanner.
    - These steps should be repeated for each scanner.

*Mode +  
till you see  
set A  
then hit  
ENTER till  
back to  
orig read  
out*

*Add the  
step to  
focus on  
the top  
half of front  
circle and  
bottom of  
rear circle*

## Theodolite Software Procedure

- Login to jlabs1
- jlabs1> xhost jlabs1
- jlabs1> setenv DISPLAY [display monitor]:0.0
- jlabs1> telnet jlabs1
- login to gougnaud (see Arun Saha for password)
- jlabs> cd ~gougnaud/arc2/ARC/angles
- jlabs1> ls -al (a listing of files in the “angles” directory will appear)
- jlabs1> emacs&
- emacs will now open. In emacs, click on Files, and then open files.
- Go back to jlabs1 and highlight the desired file with the form of upstream\_ddmmy
- Return to emacs and middle click on the directory/file window which should have “~gougnaud/arc2/ARC/angles” already present.
- The file name should appear beside the directory
- Press Enter to open the file
- Once file is open, it can be edited as needed.
- If new data is to be added to make a new file, save the edited file under a new name (example: downstream\_250699)
- It would be prudent to try and open the new file by repeating the steps above to affirm the fact that it exists and is operational

stty, erase, ←

IP (r) -d [printer]

## HAC/MEDM LOGON PROCEDURE

Log on to jlabh1

Jlabh1> xhost +

Jlabh1> telnet hac → login to hac

hac> stty erase (then hit backspace)

hac> setenv DISPLAY [display monitor]:0.0

hac> pwd (optional)

hac> cd ~gougnaud/arc2/adl

hac> medm -cleanup (-cleanup is optional)

\*\*Loads alias fonts.....\*\*

open arc6

open expert