

# Levelling for hydrology

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# Levelling for hydrology



- Theory is in the handout
- Unfortunately, in hydrology we don't get a lot of practice

# Uses – for us

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- Setting up staff gauges, EPBs, PTs, etc
- Periodic checking of these
- Measuring water-level, flood levels
- Measuring cross-sections
  - Similar technique to gauging
- Recording levels of well inverts, recorder floor, intake pipes, etc
- DIY – making sure your patio is level, your drains go downhill, etc.

# Levelling

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- Basic principles
- Instruments & how to use them
- Booking
- Reducing
- General technique
- Checking instruments

# Basic principles

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- termed “differential levelling”
- series of connected pairs of readings
- can have intermediate readings
- checking is by closing - effectively repeating the measurement



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- O'head

# Instruments

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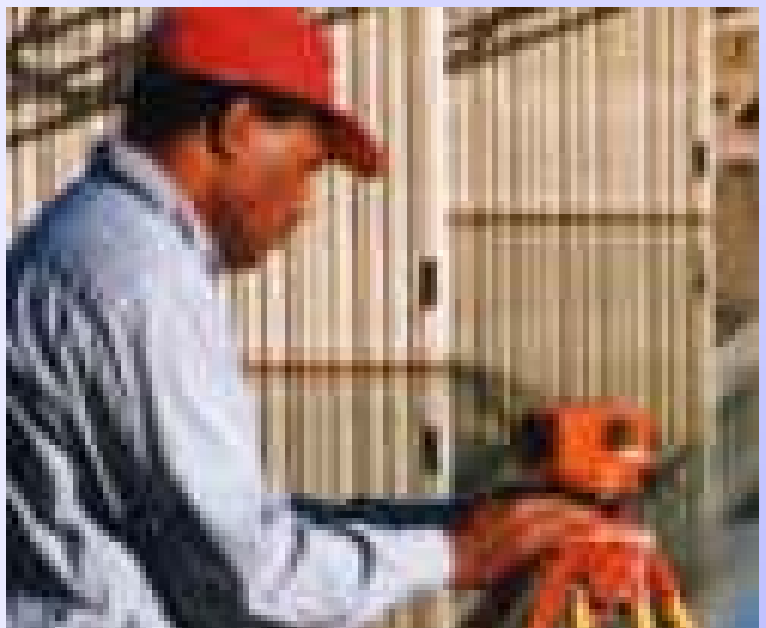
- older types
- dumpy is quick but coarse
- tilting takes extra time to read
- modern automatic levels



# Using levels

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- care in handling
- carry tilted, over arm or shoulder
- staves
- staff bubbles
- set up using “rule of left thumb”



# Laser levels



- Suitable for one-person operation
- instrument set up, readings taken at staff
- booked in same way as conventional



# Booking & reducing

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- done on level pages or in books
- uses a standard format
- laid out to facilitate checking
- calculate rises and falls
- add BS, FS, Rises and Falls to check arithmetic
- corrections if required
- Reduced levels (RL)

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- Booking o'h

# General technique

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- BS and FS distances approx the same
- set-ups located to see shots
- focus to eliminate parallax
- book all details
- inverted shots possible
- can shoot directly onto SG - book as SG zero
- staff held vertical - read lowest value
- always close the levels

# Checking instruments

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- use the “2 peg” technique
- set it up in your yard
- carry out test every 6 months or before a significant amount of work

# Exercise: Aims

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- Initial practical experience
- Understanding of technique
- Terminology
- The rules
- Understand booking and reducing (i.e. calculations)

# The “Rules”

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- Take absolute care of the instrument
- Book the results using the standard format
- Reduce the levels
  - As you go – when possible
  - Definitely before finishing
- Backsights equal distance as foresights
  
- *Note:* technique needs to be disciplined, habitual, standard practice