

Measurements for water

A.M.J. Coenders

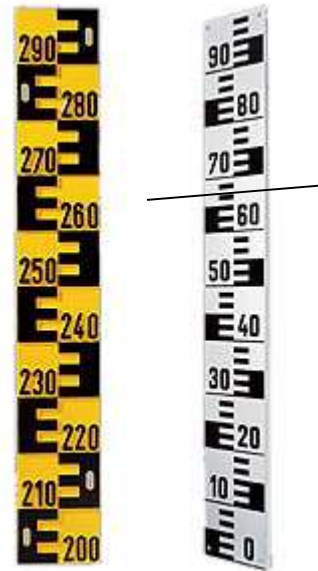
Waterbalans: Stage-discharge relation



Measurement of stage

Direct systems:

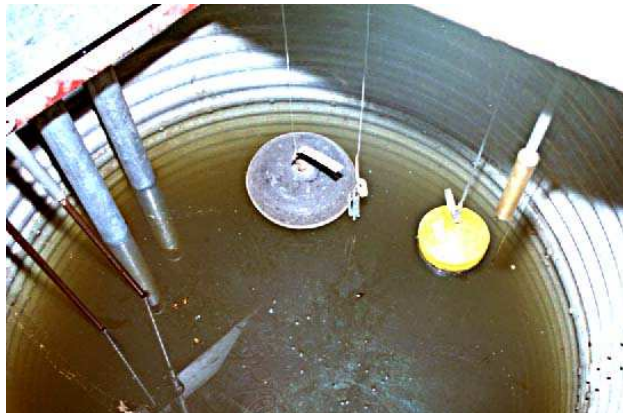
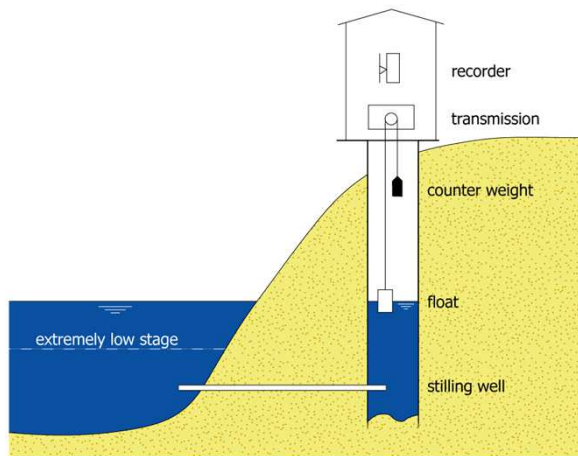
Staff gauge:

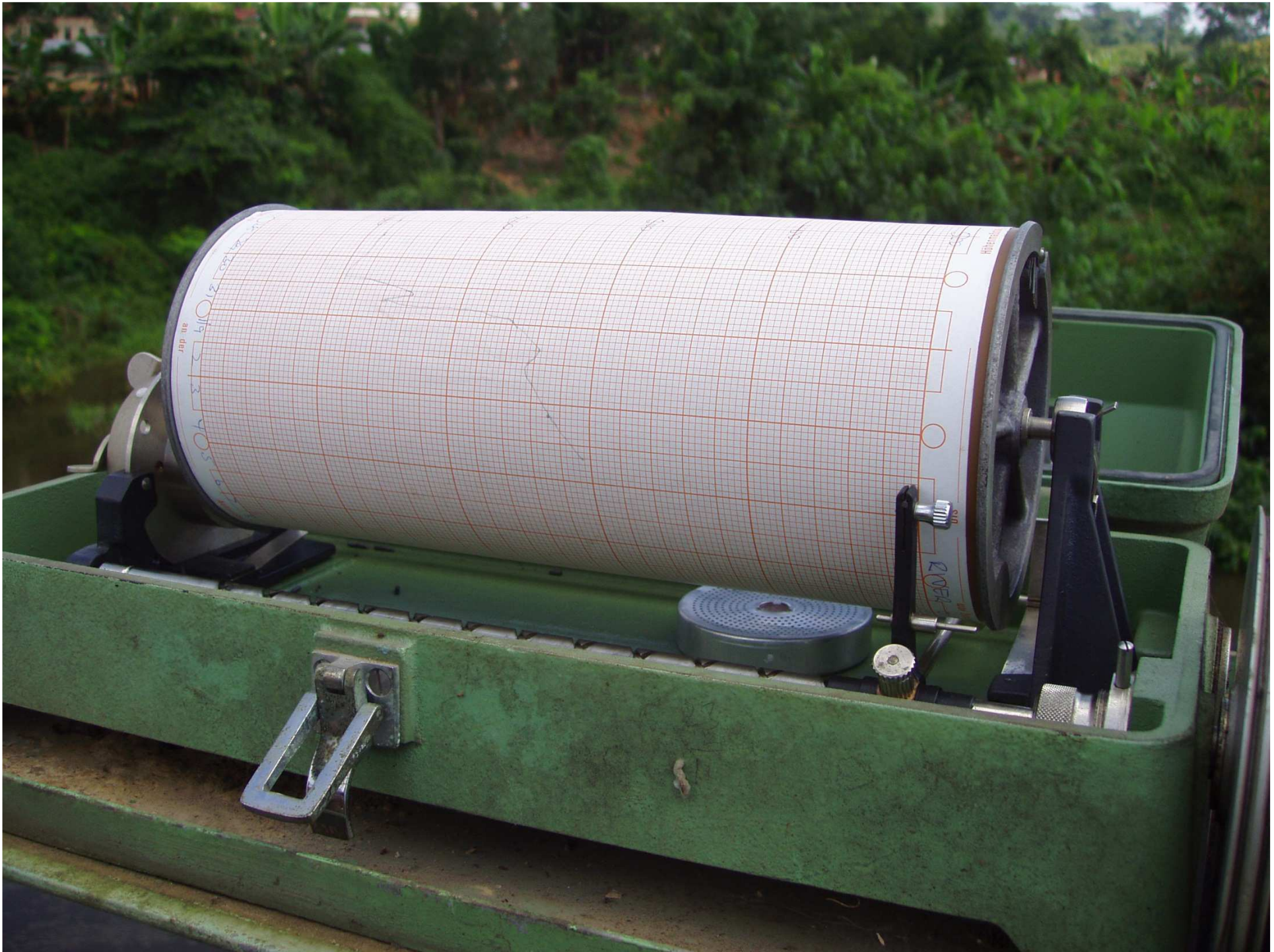


Measurement of stage

Direct systems:

Float gauge:

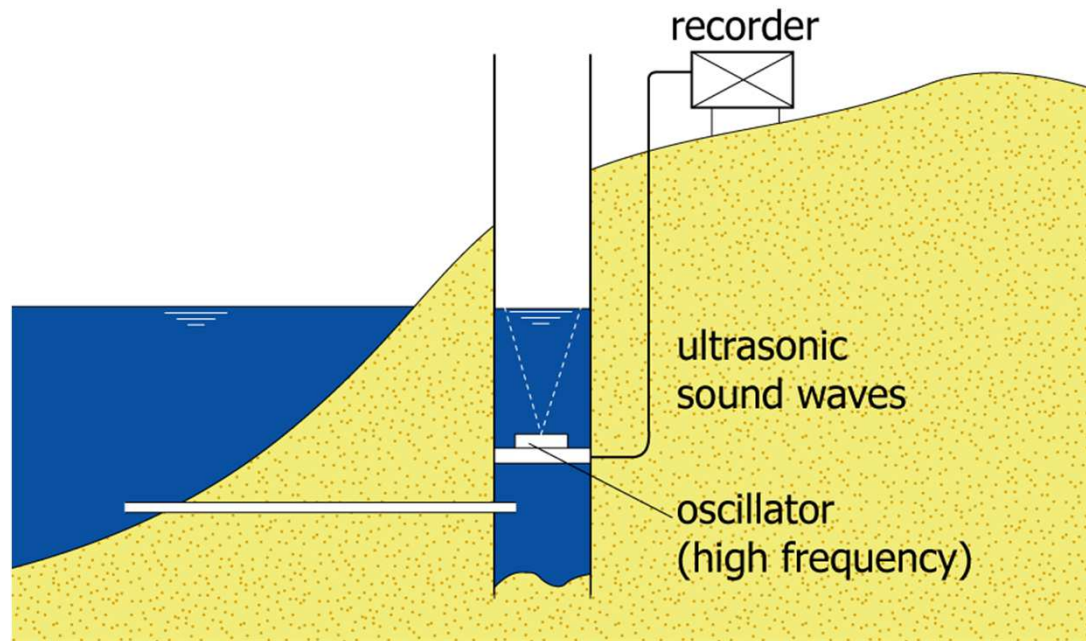






Measurement of stage
indirect system

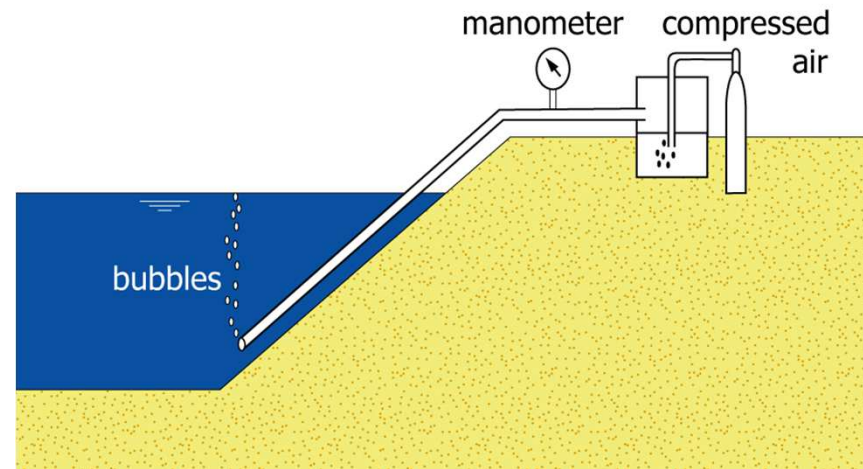
Ultrasonic water level gauge





Measurement of stage
indirect system

Bubble type pneumatic gauge



Measurement of stage
indirect system

Optic water level gauge



Measurement of stage indirect system

Capacitance Rod

The AquaRod is a high precision, low maintenance instrument based on capacitance-measuring technology. It is comprised of a pod, which contains the electronics for data acquisition, and a rod, which is the capacitance gauge. A simple snap-on design



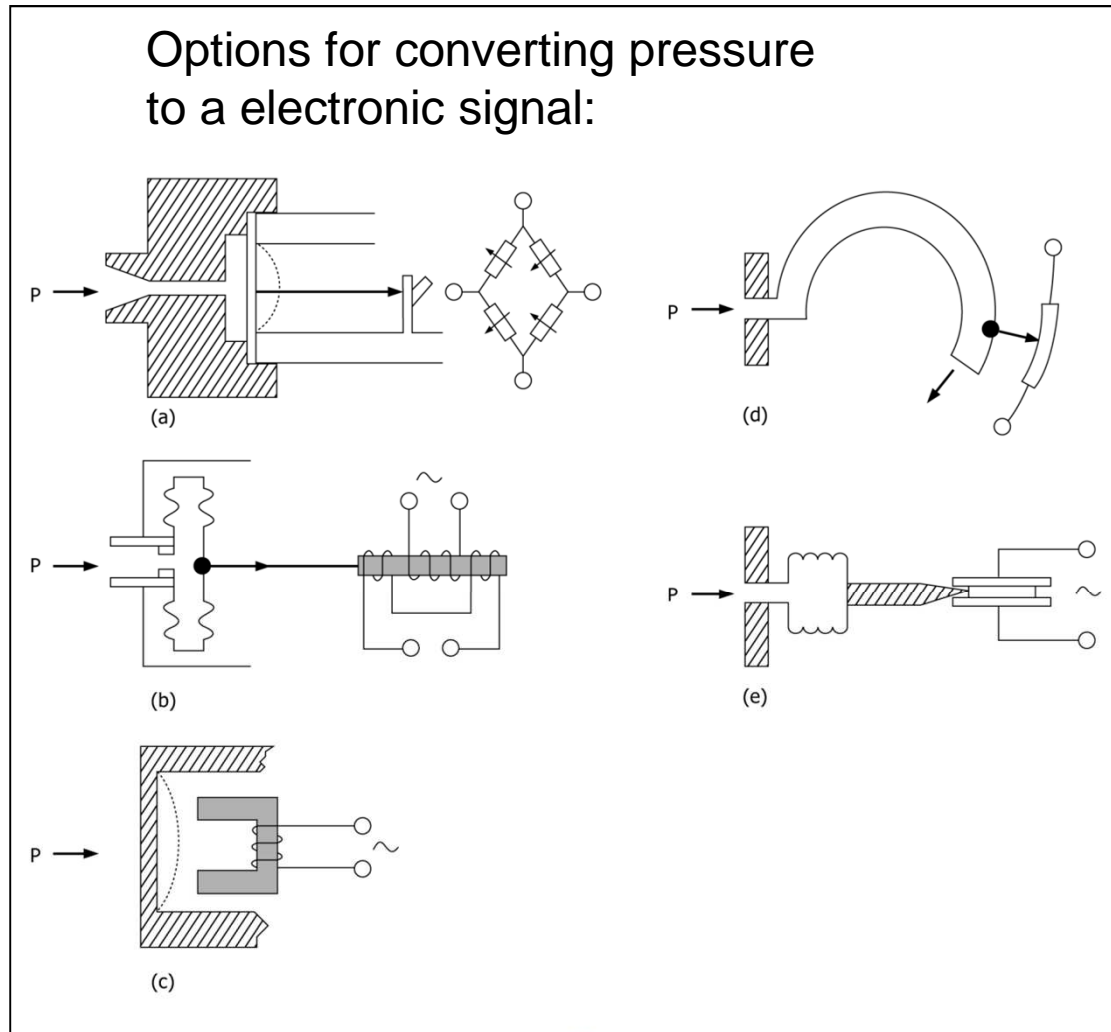
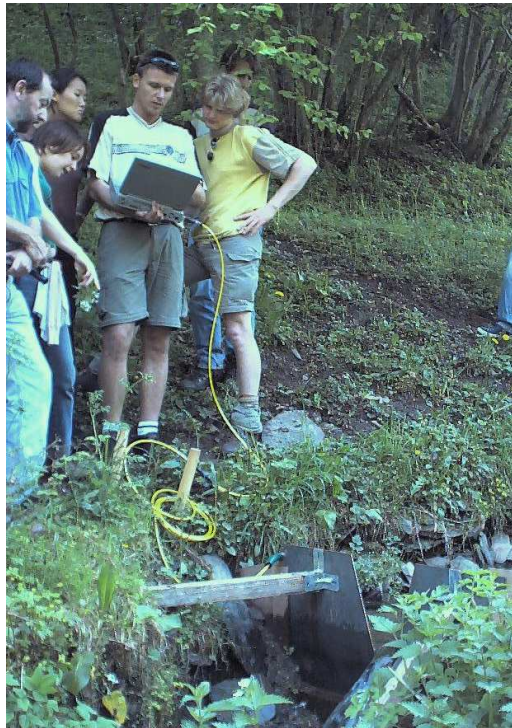
permits easy deployment in cold, damp conditions... More details at [AquaRod Recorder](#)

Measurement of stage indirect system

Pressure transducers

Air pressure compensated

- 1) Vented
- 2) Not vented



InSitu Minitrol
Vented



Van Essen Diver
Not vented

Stage-discharge relation

in natural control sections

Ideally:

-) unique rating curve (Q-H)

Chezy:

$$Q = C * B * (h - h_0)^{1.5} * i_b^{0.5} \quad \Rightarrow$$

Ratinge curve

$$Q = a * (h - h_0)^b$$

a,b are site specific

b relates to shape of the channel.



Stage-discharge relation

for structures

-) unique rating curve (Q-H)

Principles free (critical) flow:

⇒

Rating curve

$$Q = \left(\frac{2}{3}\right)^{3/2} \cdot b \cdot \sqrt{g} \cdot H^{3/2}$$

