RECORD COMPUTATIONS

- 1.) THE USE OF DATUM CORRECTIONS
- 2.) THE USE OF GAGE-HEIGHT CORRECTIONS
- 3.) THE USE OF SHIFTING REGIMES

Definition of a datum correction

- A correction applied to gage-height readings to compensate for the effect of settlement or uplift of the gage is usually measured by levels and is called a “datum correction” (Kennedy, 1983, p. 9).

Two characteristics of datum corrections

- ---magnitude of the correction – usually anything over 0.015 ft.

  ---dates of applicability - in the absence of evidence indicating exactly when the datum change occurred, the change is assumed to have occurred at the last significant hydrologic event (such as spring high water, or ice out) occurring just prior to the time that the need for the datum correction was identified.

How to apply Datum corrections

- Try to find the hydrological reasoning
- Assumptions may need to be made
- Definitely try to avoid having a datum correction take effect on the beginning of the water year – Oct. 1
- Prorations may need to be done
- Explain in detail in the Station Analysis the explanation for the datum corr, how it is applied, and any assumptions that you made.

Definition of gage-height correction

- A correction applied to gage-height readings to compensate for differences between the recording gage and the base gage is called a “gage-height correction” (Rantz and others, 1982, p. 563).

Characteristics and types of gage-height corrections

- Corrections need not be applied unless 0.02 ft or more
- Types of corrections –

  instrument drift

  pen corrections on A-35 charts

  purging corrections

  float sinking

  any time that instr. has been reset or corr.

  others --

How to apply GHT corrections

- Depends upon what type of correction you have
- You need to determine (if possible) when the correction begins and apply accordingly
- Corrections are normally applied by proration of time, but know that they could be event driven – again depends upon the type of correction
- Assumptions may need to be made
- Corrections and assumptions should be explained in the Station Analysis

Definition of a shift

A correction applied to the stage-discharge relation, or rating, to compensate for variations in the rating is called a shift. Shifts reflect the fact that stage-discharge relations are not permanent but vary from time to time, either gradually or abruptly, because of changes in the physical features that form the control at the gaging station (Rantz and others, 1982, p. 344). Shifts can be applied to vary in magnitude with time and with stage (Kennedy, 1983, p. 35).

Caveats and Characteristics

- Shifts are temporary
- Usually used if measurements and rating curves differ by more than 5%
- Shifts are either caused by manmade or natural changes within the gage pool and/or control
- Shifts indicate scour and fill condition – in theory scour occurs on the rise, and deposition occurs on the recession of a hydrologic event
- Shifts need to be explained very well in the station analysis – as to what caused the shift and why is it being distributed the way it is

The don’ts of shifts usage

- Don’t use open-ended shifts
- Shift curves should not cross ratings
- Don’t use time shifts (single point shifts)
- Low-water shifts as indicated by low-flow measurements should not, never ever be applied to high flows

Types of shifts

- Time shifts, used in the past but strongly discouraged – single point shifts
- Stage-shifts (V – diagrams)

  --double-point

  --triple-point
- Stage-Time shifts

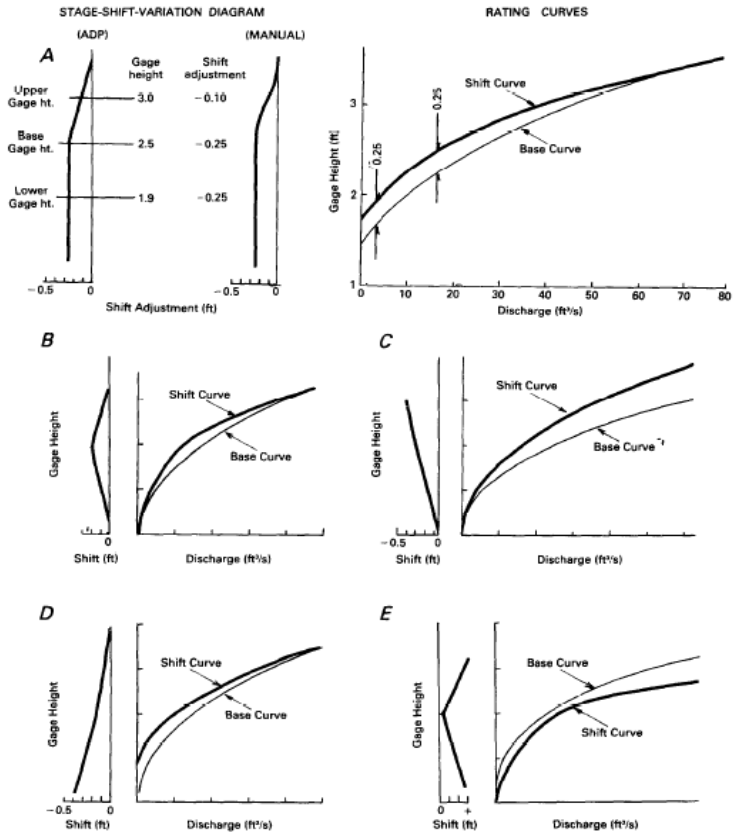

FIGURE 23.—Effect of various stage-shift-variation diagram shapes on shift-curve shape.

Figure 23 illustrates typical stage-shift V diagrams and the relations between their corresponding base curves and shift curves. The V diagrams for manual application are usually curved, but the curve must be approximated by two straight lines for ADP use (in 1982). An ADP version is defined by six descriptors; three gage heights called "upper," "base," and

Reasons for Shifting

- A scour or fill condition brought on by hydrologic events – usually occurs rapidly by the event
- Build up of algae – can occur by time
- Deposition of sand and silt during low-flow conditions – can occur by time
- Debris lodging on the control – ex. logs, leaves, other debris, beaver dams
- Rating transition, if the ratings don't conjoin
- Encroachment of vegetation
- Man-made temporary changes to pool or control
- Change in approach conditions to a weir or sensitive control

When not to shift

- Whenever your measurements are within 5% of the rating, you need not shift – still permissible for various reasons, ie: operational needs
- Loss of stage-discharge relationship – this record should be estimated. Ex. Beaver dams, ice, infrequent measurements during times of channel changes
- Others reasons

- **Remember:**

  Any and all shifting applications need to be explained in thorough detail in the station analysis. Need to explain the justification for the shift (why it is occurring) and the justification how and why it is being applied the way it is.

How to Apply Shifts

- 1.) Shifts are applied by Time
- 2.) Shifts are applied by Stage
- 3.) Shifts are applied by Hydrologic Event
- 4.) Shifts are applied by combination of each

Rules of thumb

- In theory-all shifts should approach “zero” on significant peaks.
- Shifts should be applied based upon hydrologic events rather than from meas. to meas.
- In theory-scour occurs on the rise and (+) and fill occurs on the recession (-).
- Hydrographic comparison can help determine the magnitude of shifts