CIVIL ENGINEERING CONSTRUCTION

SBC2253

MASS HAUL DIAGRAMS

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INTRODUCTION

- In order to minimize material waste or borrow, it is necessary to produce what is called a Mass Haul diagram. This is essentially a plot of cumulative volume of soil against distance along the road, often called the chainage. Cut volumes are taken to be positive and fill volumes to be negative.

Mass Haul Diagram

- Most excavated materials are found to increase in volume after excavation ('bulking'), but after being re-compacted by roller or other means, soils in particular might be found to occupy less volume than originally, i.e. a 'shrinkage' has taken place when compacted in the in situ volume.

Mass Haul Diagrams

- diagrammatic representation of earthwork volumes along a linear profile
- horizontal stationing is plotted along the X-axis
- net earthwork values are plotted along the Y-axis

Mass Haul Diagrams

- An *Earthwork Profile* is a plot of the net earthwork along a roadway or airstrip
- Net cut values are plotted above the X-axis (positive Y value)
- Net fill values are plotted below the X-axis (negative Y value)
- Presents a picture of the earthwork requirements

Mass Haul Diagrams

- A *Mass Haul Diagram* is a continuous curve representing the cumulative volume of earthwork along the linear profile of a roadway or airfield
- the vertical coordinate is a plot of the cumulative earthwork from the origin to that point

Mass Haul Diagrams

- upward sloping curves indicate (rising left to right) indicate a cut
- downward sloping (falling left to right) curves occur in a fill section
- peaks indicate a change from cut to fill and valleys occur when the earthwork changes from fill to cut

Mass Haul Diagrams

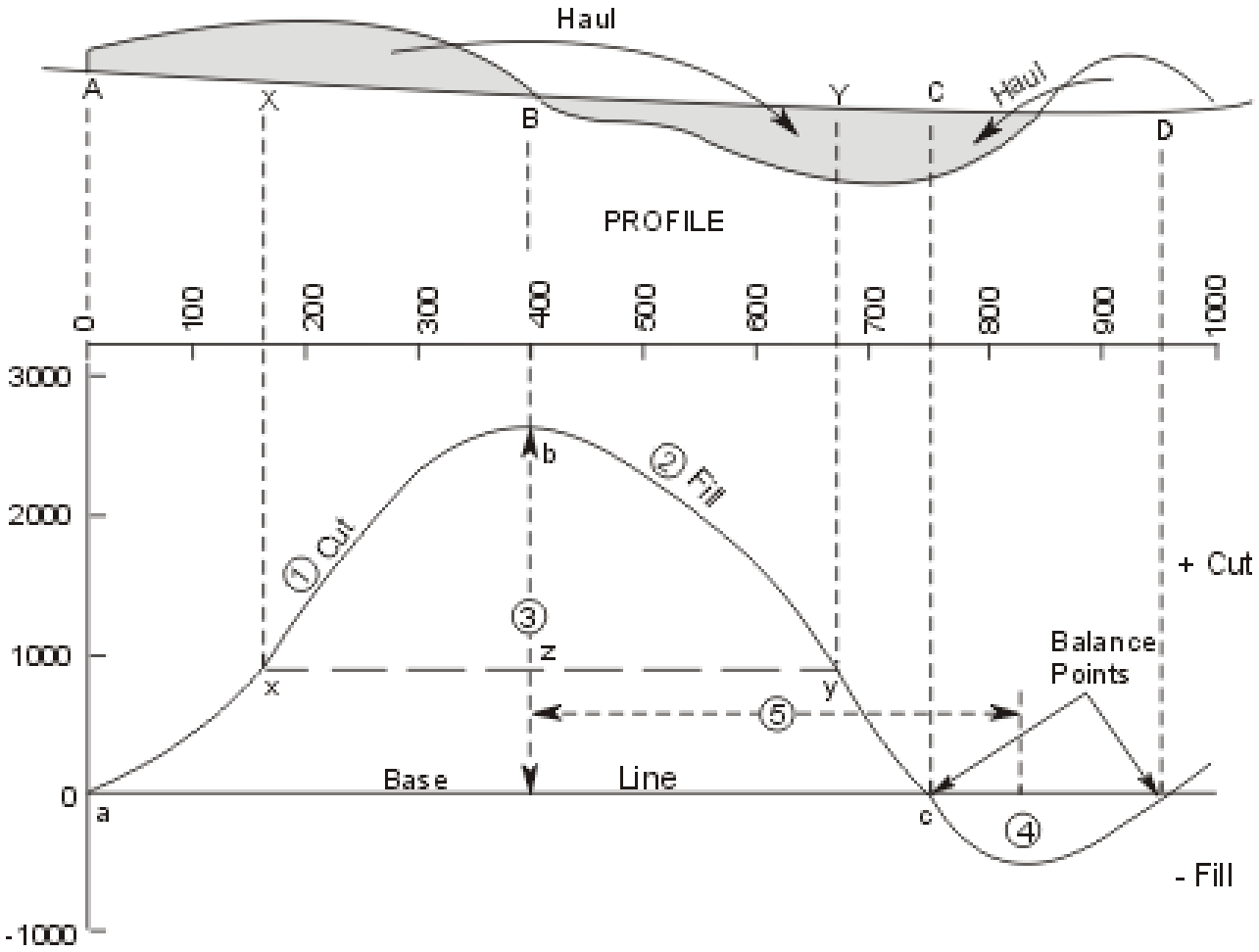
- The accumulated volume of earthwork at the horizontal axis (Y=0) is 0
- When a horizontal line intersects two or more points along the curve, the accumulated volumes at those points are equal
- A negative value at the end of the curve indicates that borrow is required to complete the fill
- A positive value at the end of the curve indicates that a waste operation will be the net result

Mass Haul Diagrams

To construct the Mass Haul Diagram manually:

- Compute the net earthwork values for each station, applying the appropriate shrink factor
- Net cuts have a positive value, net fills have a negative value
- The value at the first station (origin) = 0
- Plot the value of each succeeding station which equals the cumulative value to that point, i.e., the value at i = net cut/fill$_{\mathbf{a+b+c+\ldots i}}$

Mass Haul Diagram

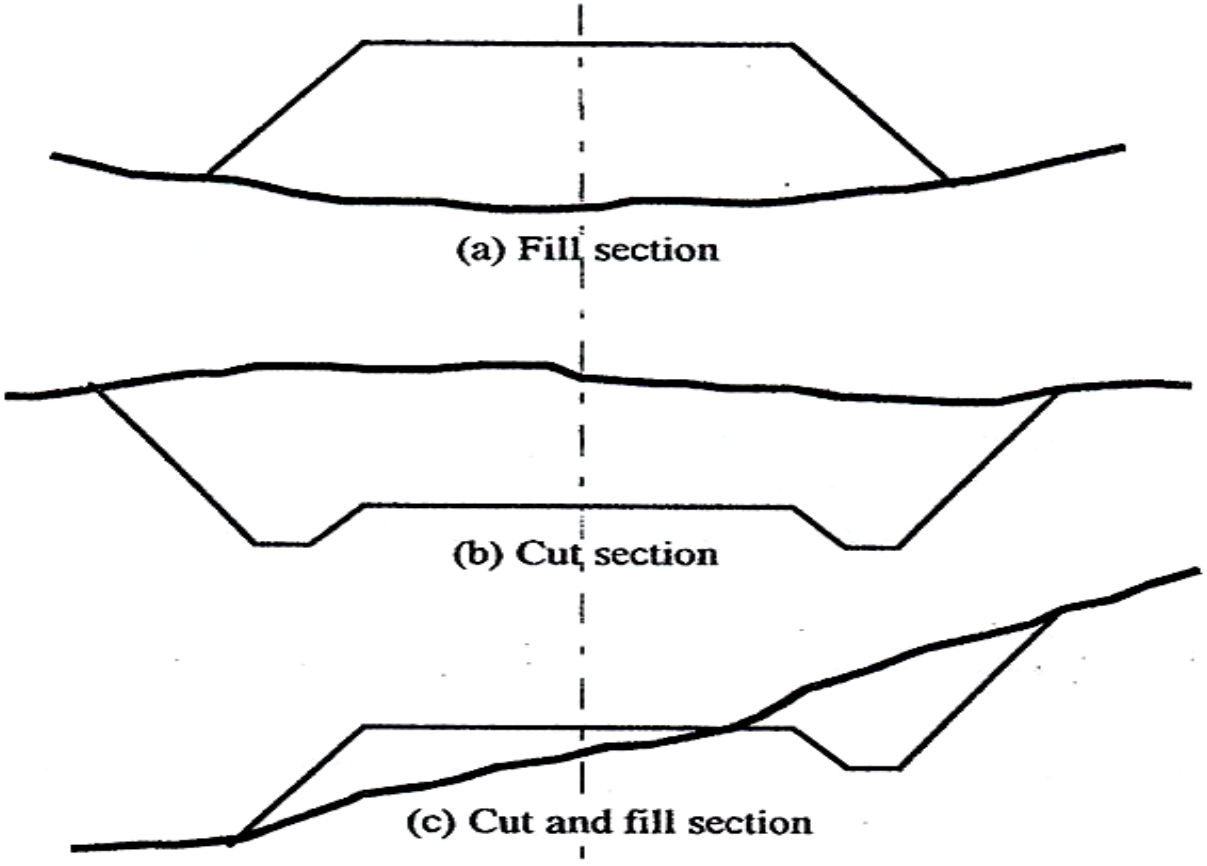


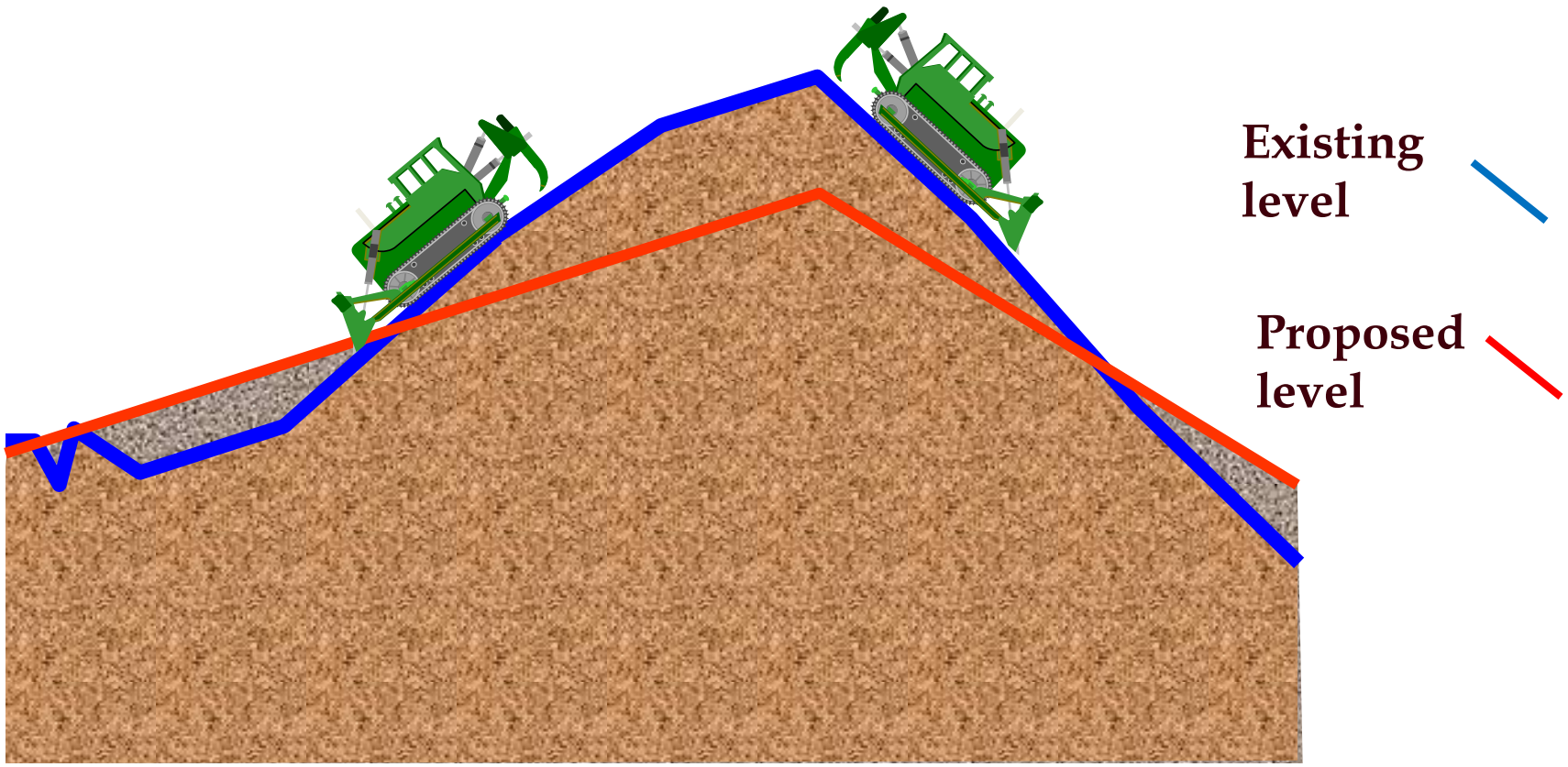
Mass Haul Diagrams

To construct & analyze the Mass Haul Diagrams manually:

- Identify the the resulting balanced sections, which are bounded by points that intersect the X-axis.
- Draw a horizontal line midway between the peak or valley and the X-axis. The scale length of that line is the average length of haul within that balanced section.
- Determine earthwork volumes within each balanced section.
- Determine whether there is an overall balance, waste or if borrow is required.

Cut and Fill





Result: Normally earthworks operation= “Cut for the High and Fill for the Low”

THANK YOU