Highway Alignment

Competency 2 – L-1;  Ref: T2: 3
Highway Alignment

- The position or **layout** of the centre line of the highway on the ground is called the alignment.
Factors Controlling Alignment

- Obligatory points
- Traffic
- Geometric design
- Economics
- Other considerations

Hill Roads – Special Considerations:

- Stability
- Drainage
- Geometric Design of hill roads &
- Resisting Length
(a) Alignment along a hill side pass
(b) Alignment to suit proper location of bridge

(c) Alignment to connect intermediate town
(d) Alignment avoiding an intermediate area

Fig. 3.1 Obligatory Points Controlling Alignment of Roads
Factors Controlling Alignment

- **Traffic:** desired lines, future trends
- **Geometric Design:** Gradient, Radius of the curve, and sight distance etc
- **Economy:**
  - Initial cost, maintenance cost and vehicle operation cost
  - High embankments and deep cuttings – avoidance – decrease initial cost
  - Balance cutting and filling
- **Other Considerations:** Drainage Considerations, hydrological factors, political considerations etc
Hill Roads – Special Considerations

- **Stability:** problem – land slides, cutting & filling increase the existing slopes
- **Drainage:** Numerous Cross Drainage structures are necessary but to the extent possible minimize as it is costly
- **Geometric standards of hill roads:** ruling gradient for most of the length, minimize steep gradient, hairpin bends etc
- **Resisting length:** sum of excessive rise and fall over the floating gradient
Engineering surveys

T2 : 3.2 & 3.3
Stages of Engineering Survey

- **Map study:**
  - From Topographic map, Rivers, hills, valleys etc, Several possible alternate routes

- **Reconnaissance:**
  - A field survey party will inspect, simple instrument like abney level, tangent, clinometer, barometer etc are used.
Stages of Engineering Survey

- **Preliminary Surveys:**
  - To survey various alternative alignments
  - To compare the different proposals
  - To estimate quantity of earth work materials
  - To finalize the best alignment from all considerations

- **Final Location and Detailed Surveys:**
  - Centre line finalized
Preliminary Surveys

- Primary Traverse
- Topographical Features
- Leveling Work
- Drainage and Hydrological Data
- Soil Survey
- Material Survey
- Traffic Survey
- Determination of Final Centre line
Drawings and Report

- **Drawings**
  - Key map: Proposed & existing roads and important places to be connected
  - Index map: General topography of the area
  - Preliminary survey plans: Various alternative alignments
  - Detailed plans: Ground plan with alignment & boundaries
  - Longitudinal sections: As per the detailed plan
**Drawings and Report**

- **Drawings**
  - Detailed cross sections: The cross sections up to proposed right of way
  - Land acquisition plans and schedules
  - Drawings of cross drainage and other retaining structures
  - Drawings of road intersections
  - Land plans showing quarries etc
Drawings and Report

Reports:
- General details of the project and its importance
- Materials, labour and equipment
- Rates
- Construction programming etc