

## 3.7 HIGHWAY ALIGNMENT

Highway alignment is the position of the centre line of the highway on the ground.

The alignment of a new road should be done very carefully and accurately. Because once the road is aligned and constructed it is very difficult to change the alignment due to increase in cost of adjoining land and cost of shifting the costly structures along the road sides.

### 3.7.1 Basic Requirements of an Ideal Alignment

*The basic requirements of an ideal alignment of a road between two terminal stations are that it should be :*

- (a) **Short** : The alignment should be as short as possible between two terminal stations. For this the alignment should be as straight as possible.
- (b) **Easy** : The alignment should be such that it is easy to construct and maintain. For this alignment should be with easy gradient and curves.
- (c) **Safe** : The alignment should be safe for the traffic operations. For this alignment should have safe geometric features, stable natural hill slopes, embankment and cut slopes.



(d) **Economical** : The alignment is said to be economical if the total cost including initial cost, maintenance cost and operation cost is lowest.

(f) **Useful** : The alignment should be such that it would be useful for maximum population and products.

### 3.7.2 Factors Controlling Alignment

The various factors which control the highway alignment are :

- (i) Obligatory points
- (ii) Economy
- (iii) Geometric design
- (iv) Traffic
- (v) Other Considerations

(i) **Obligatory Points** : There are obligatory points through which road-alignment has to pass and for this alignment has to deviate from the shortest or easiest path. These points are intermediate town, bridge, a mountain pass, a quarry etc. There are also obligatory points through which road alignment should not pass and should be avoided while aligning a road. These points are like temples, church, mosques, marshy and water logged areas etc.

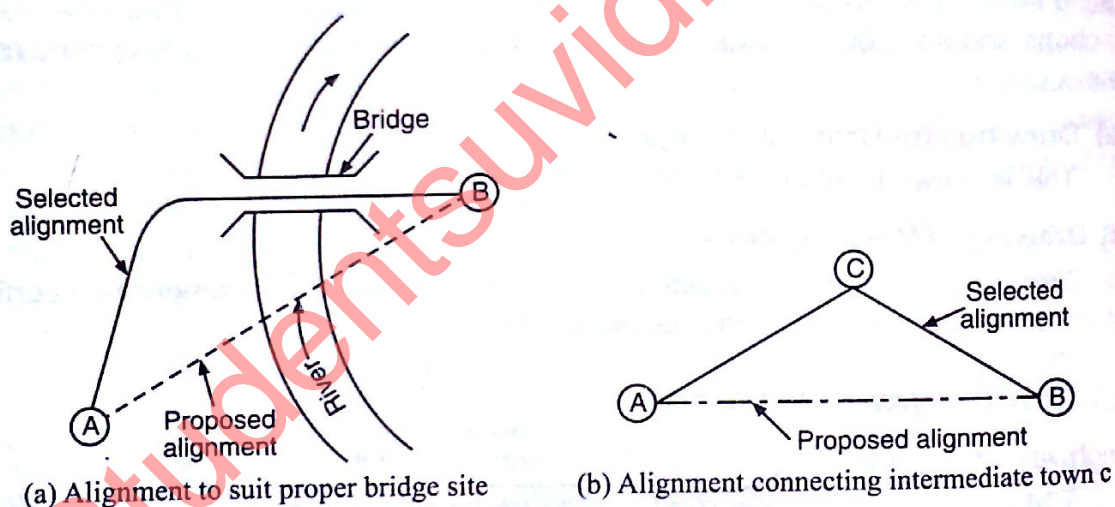


Fig. 3.1. Obligatory points controlling alignment of roads

(ii) **Economy** : While finalizing the alignment this factor is also considered. In working out the economics, the initial cost, cost of maintenance and vehicle operation should be taken into account. The initial cost of construction can be decreased by choosing alignment in such a manner that cutting and filling are balanced.

(iii) **Geometric Design** : Geometric design factors like sight distance, gradient, radius of curve etc. also govern the final alignment of the highway. The alignment should be such that it provides enough visible distance for safe overtaking operation and for safe stopping of the vehicle. Alignment to be finalized should fulfil the sight distance requirements. While aligning a new road as far as possible the gradient should be flat and less than the ruling gradient. For this requirement the alignment is to be changed. Sometimes it may be necessary to make adjustment in the alignment of roads to obtain the minimum radius of curve.

(iv) **Traffic** : The alignment should suit the need of traffic. Before fixing any alignment traffic studies should be carried out which give an idea about goods and



passengers traffic expected on the proposed road. If the traffic is mainly of slow moving type, the alignment may be of winding nature joining all the villages. Sharp curves may be allowed in such roads. But if the traffic is fast moving, proposed alignment should as far as possible be straight with easy curves.

**(v) Other Considerations :** Other factors which may govern the alignment of roads are hydrological factors, political considerations, monotony and drainage considerations. The alignment should not cross a foreign territory. It may tend to change the alignment so as to keep the road away from the foreign land. To avoid monotony caused due to lengthy straight routes, a slight bend should be provided to break the monotony. The vertical alignment is often guided by drainage considerations.