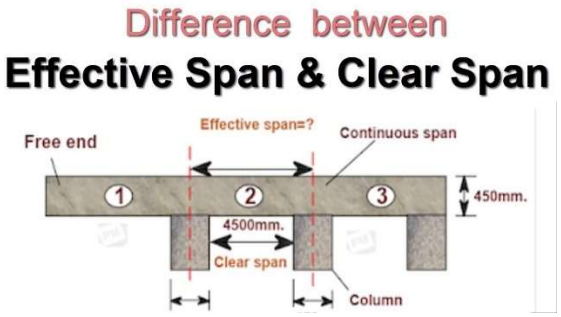
Chapter 2

Design of Slab bridge

2.1 Design of rail post

SQ –

1. Difference between effective and clear span



2. Draw all the working diagrams
3. S20H16 mean?
   The simple difference is an “H” series truck is a two-axle truck, while an “HS” series truck has multiple loaded axles.
4. Effective depth for rail = D-2.5 and Effective depth for post = D-1.5

Problems –

1. Load calculation for railing, W
   Self weight($\frac{6\ x\ 6}{12\ x\ 12}\ x\ 150$) + vertical given load
2. Moment calculation
   $\frac{W.Actual\ Spacing\ of\ railing}{8}$
3. Spacing of rail post 6.5’. Clear span of length of slab bridge 14.5’. Determine actual spacing
   Number of rail post = $\frac{14.5}{6.5} + 1 = 4$
   $S_a = \frac{14.5}{4-1} = 4.83\ '$
4. Effective depth of railing 3.5’ or d=6’ and vertical moment, Mv = 546.77 lb-ft. Calculate required steel and do a shear check
5. Maximum Horizontal load at base at rail post
   Horizontal load x C/C x height of 1st rail + Horizontal load x C/C x height of 2nd rail

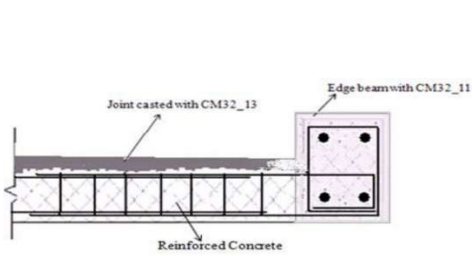
2.2 Design of edge beam

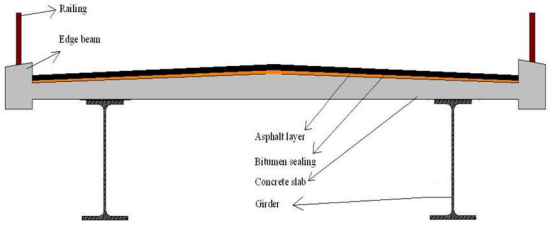
SQ

1. What is edge beam?

- Edge beam is that part of the bridge deck which is situated along the side of the deck slab.

- It is used for the distribution and transmission of the traffic loads close to edges of the bridge deck slab.
- It accommodates the railings and lighting poles and also directs the rain water to flow through the drainage system, protecting the underside of bridge deck

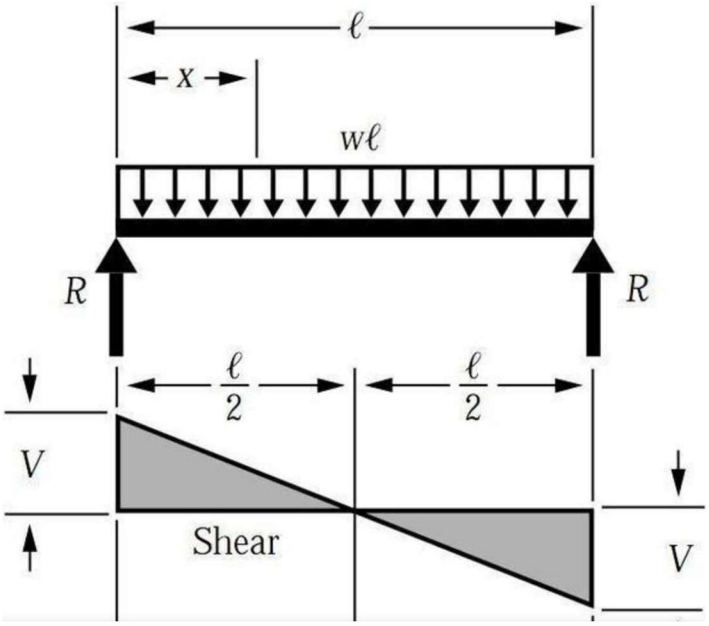




2. What is kerb?
   Kern indicates boundary between pavement and shoulder, sometimes as island, footpath or kerb parking space
3. Deff =Edge beam height – 2.375
4. What are the loads and moment that will carried by edge beam?
   - Self-weight of edge beam + rail post wight
   - D.L. moment + L.L. Moment
5. Other name of that edge beam?
   Kerb

2.3 Design of Slab

1. H-S loading details
2. What do you mean by impact analysis and design shear, moments
3. Concentrated and UDL load for H20-S16, H15-S12, H10-S8
   Shear = 18000 lb
   M=26000
   UDL = 640 plf
4. Deff = D-1
5. LL M and DL M
6. Why we use stirrup?
   <u>to reduce the shear at the support of beams</u>
   At the support the shear demand is more as we compare to that of midpoint in beams (also shown in below figure) so stirrups are provided more closely at the supports to resist shear forces. While at mid-point there are no or less shear forces acting on beam so we provide stirrups at far distance.



2.4 Design of Abutment

1. Forces acting on abutment?
   Lateral earth pressure, surcharge, wheel load