Unit II – Influence line diagram and rolling load

- **MOVING LOADS AND INFLUENCE LINES**

- Influence lines for reactions in statically determinate structures – influence lines for member forces in pin-jointed frames – Influence lines for shear force and bending moment in beam sections – Calculation of critical stress resultants due to concentrated and distributed moving loads. Muller Breslau‟s principle – Influence lines for continuous beams and single storey rigid frames – Indirect model analysis for influence lines of indeterminate structures.

- **(DETERMINATE &INDETERMINATE STRUCTURES WITH REDUNDANCY RESTRICTEDTO ONE)**

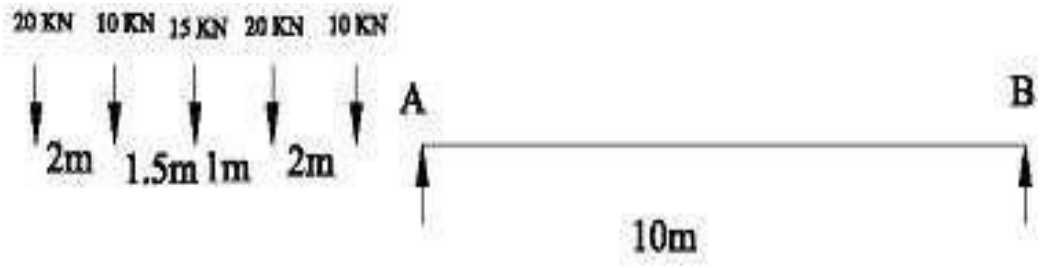
- ***Introduction:***
  - To statically determinate and statically indeterminate structural analysis under non- moving load (dead load or fixed loads).
  - To determination of maximum internal actions at cross-sections of members of statically determinate structured under the effects of moving loads (live loads).
  - Common sense tells us that when a load moves over a structure, the deflected shape of the structural will vary.
  - In the process, we can arrive at simple conclusion that due to moving load position on

- the structure, reactions value at the support also will vary.

From the designer's point of view, it is essential to have safe structure, which doesn't exceed the limits of deformations and also the limits of load carrying capacity of the structure.

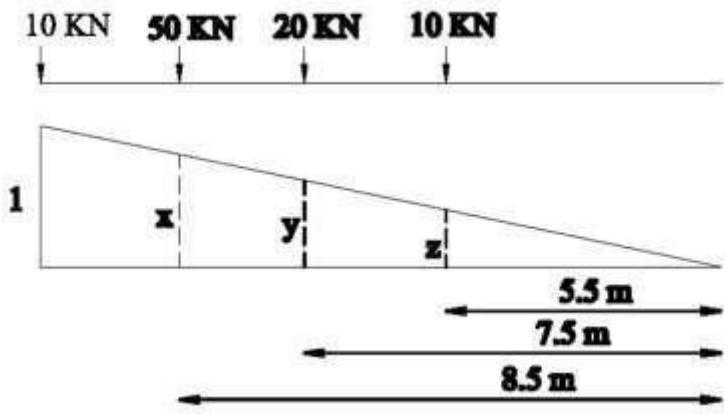
- ***Definitions of influence line***
  - An influence line is a diagram whose ordinates, which are plotted as a function of distance along the span, give the value of an internal force, a reaction, or a
  - displacement at a particular point in a structure as a unit load move across the
  - structure.
  - An influence line is a curve the ordinate to which at any point equals the value of some particular function due to unit load acting at that point.
  - An influence line represents the variation of either the reaction, shear, moment, or
  - deflection at a specific point in a member as a unit concentrated

1) A system of concentrated load, role beam left to right, s.s beam span of 10m and 10 KN load leading



1. Absolute max +ve S.F

2..Absolute max -ve S.F 3..Absolute max BM



- **Solution**
- **1. Absolute max +ve S.F**

Using the similar triangle method and we get the x, y & z values

X = 0.85 m

Y = 0.75 m

Z = 0.55 m

S.F = (10×1)+(15×0.83)+(20×0.75)+

= (10×0.55)

43.25 KN