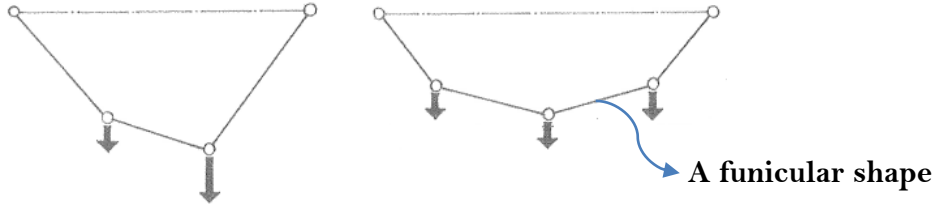


## I.7.4. Cable Structures:

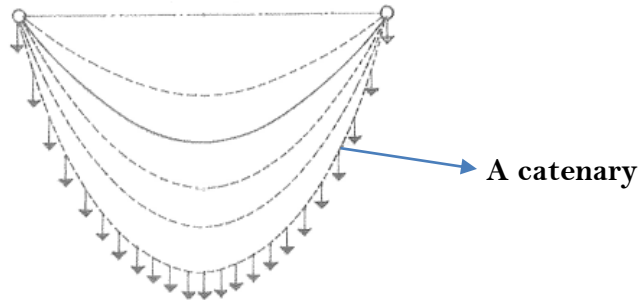
### I.7.4.1. Definition

Cable structures use the cable as the principal means of support. Cables must only be used under tension since they have a high tensile strength but no resistance to compression or bending.

When subject to concentrated loads, the shape of a cable consists of straight-line segments.



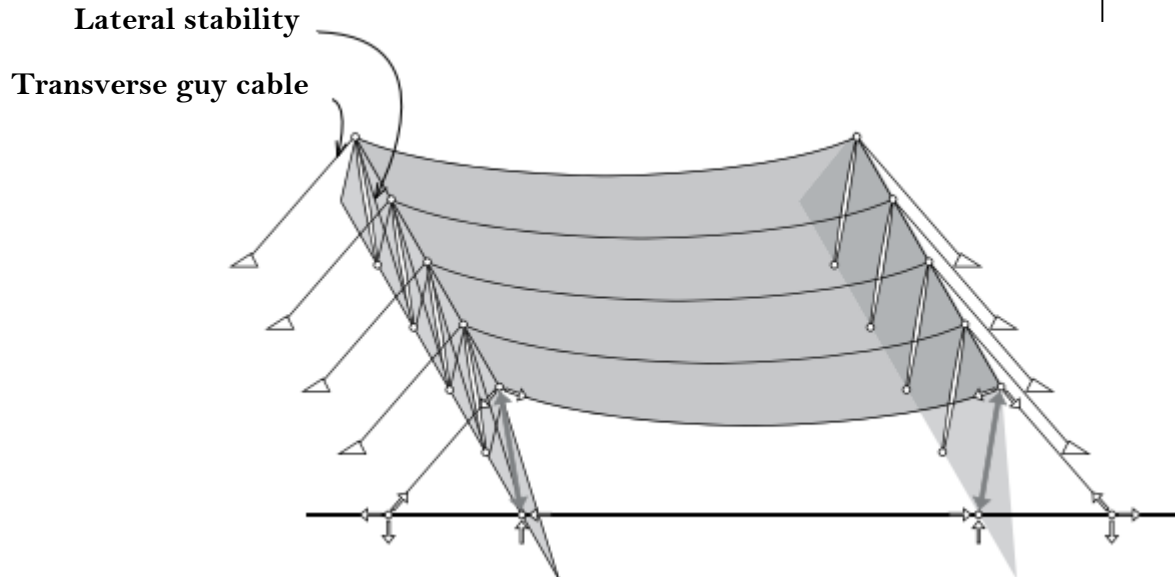
It will take on the shape of an inverted arch when subjected to an evenly distributed load.



## I.7.4.2. Types

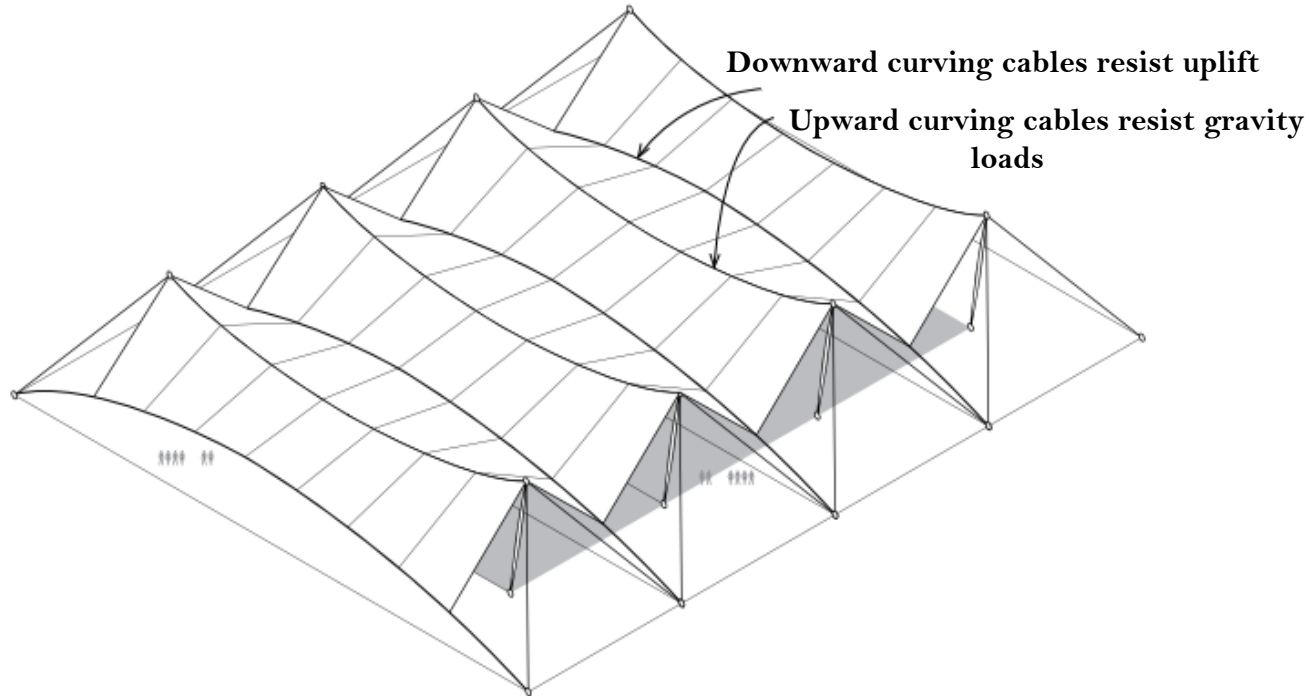
### A- Singly-Curved Structures

Single-curvature structures use a parallel series of cables to support surface-forming beams or plates. They are vulnerable to flutter brought on the wind's aerodynamic effects. this liability can be minimized by increasing to the structure's dead weight and using transverse guy cables to attach the primary cables to the ground.



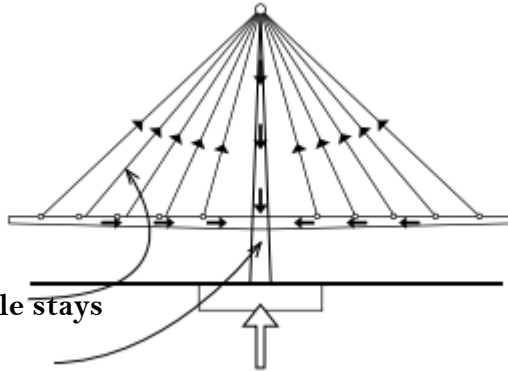
## B- Double-Curvature Structures

Double-curvature structures consist of a field of crossed cables of different and often reverse curvatures. Each set of cables has a different natural period of vibration, thus forming a self-dampening system that is more resistant to flutter.



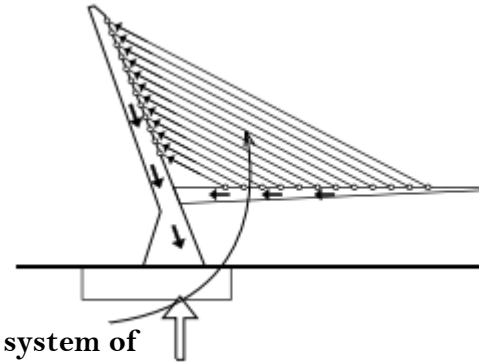
## C- Cable-Stayed Structures

Cable-stayed structures have vertical or inclined masts from which cables extend to support horizontally spanning arranged in a parallel or radial pattern.



Radial or fan cable stays

The tower may be constructed of RC or steel ( $h = 1/6$  to  $1/5$  of  $L_{span}$ )



Harp system of parallel cable stays

# References

1. Francis, D K C. Onouye, B. Zuberbuhle, D. 2014. Building Structures Illustrated. Second Edition, John Wiley & Sons, New Jersey.
2. Francis, D K C. 2008. Building Structures Illustrated. Forth Edition, John Wiley & Sons, New Jersey.
3. Hibbeler, R C. 2012. Structural Analysis. Eighth Edition, Pearson Prentice Hall, New Jersey.