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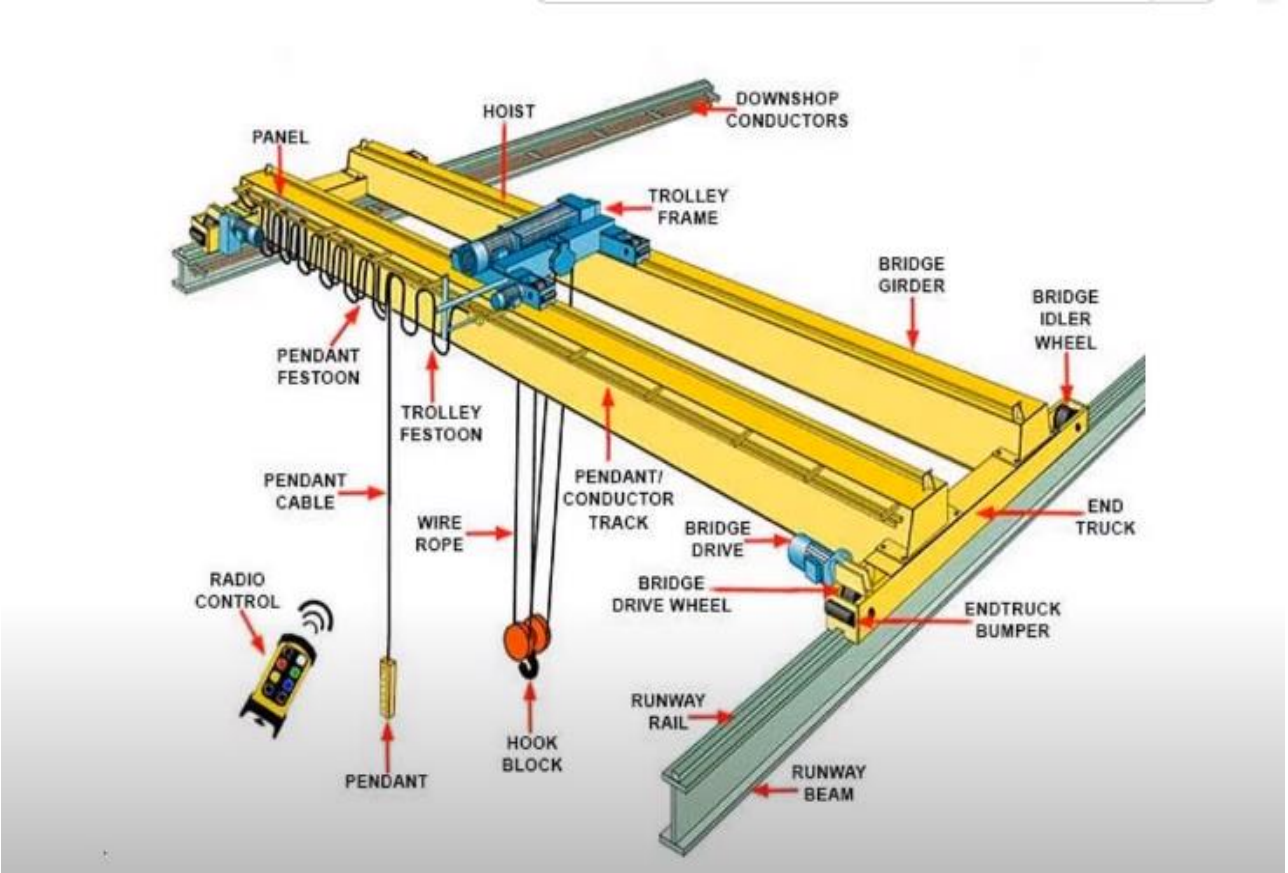
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COIMBATORE**

DEPARTMENT OF CIVIL ENGINEERING

19CET304-DESIGN OF STEEL STRUCTURES

III YEAR / VI SEMESTER

Unit 5 :Gantry girder





Gantry girders, also known as crane girders, are used in industrial buildings like processing plants, workshops, steel production, and other similar establishments to carry overhead cranes that are either manually or electrically operated.

These cranes are used to lift and transport heavy materials, equipment, and other such items from one location within the building to another.





Types of Gantry Girder

Semi-Gantry crane systems



Portable gantry crane systems





Adjustable gantry cranes





Gantry girder: Various loading conditions

The gantry girder, which lacks lateral support throughout its length, is required to withstand the following loads:

Crane-Hauled vertical loads

The crane's own weight, the weight of any crabs, and the crane's own lifting capacity all add up to a vertical load that acts over the gantry girder. The maximum load on a roller is used to figure out the response. The evaluation should be proportional to the combined response of a gantry girder and the rail's own weight.



Crane-induced impact load

The stresses that are generated in gantry girders as a result of overhead loads are much higher than the stresses that are caused by minimally provided loads. This is because of the forces that are generated as a result of the unanticipated usage of brakes in order to carry packed cranes in a smooth manner. These forces include acceleration, deceleration, vibration, and the potential slippage of slings.

For these cranes to be able to move as quickly as they do, the steelwork supporting them must be stronger. The bending strains in the gantry girders are created gradually from zero up to their peak values by slow-moving hand-operated cranes, whereas they are produced almost instantly by fast-operating Electric Overhead Travelling cranes.

Drag force

This takes place when the crane girder begins and breaks off its longitudinal transit across the crane rails. A drag force, for instance, acts in the path of the gantry girder. For either electrically or manually operated cranes, this force is equivalent to 5 percent of the stationary wheel loads.



Surge load

The following factors could persuade the existence of lateral stresses on crane girders:

Abrupt crab movement across the crane girder

The transverse gantry girders experience point loads via the main wheels transmitted from the upper or pressure flanges of the girders based on the frictional reluctance of the rail. When the gantry girder is stressed to its ultimate lateral and shear bending, the position of the massive wheels will be the same as when the moment of shear and bending are at their maximum in the vertical direction.

If the crane is moving heavy objects across the floor

When moving heavy objects over the floor, the crane is the tool of choice. If the weight is too heavy to lift, rollers are used to move it down a wooden plank track. It is thus a question of conjecture how much lateral force and drag the gantry girders will experience on their compressive flanges. The biggest impeding factor is the friction created by the many wheels rolling along the gantry rails.



Gantry girder: Uses of gantry girder cranes

Shipbuilding

The shipbuilding industry relies on gantry girder cranes for the enormous lifting required to construct ships. While [construction](#) is underway, the crane facilitates the ship's mobility.

Warehouses

It is usually necessary to have a variety of heavy lifting equipment available for usage in warehouses. As a consequence of this, gantry cranes may be found in almost every kind of warehouse.

Automobile industry

In the field of automotive manufacturing, engines may take on a variety of forms depending on the size of the vehicles they power. The gantry girder will be of assistance throughout the whole of the lifting procedure in the automotive sector.

Manufacturing units

The manufacturing industry often uses gantry girder cranes of a smaller size for transporting elements of the product from one location to another. In manufacturing, a gantry crane with a 4-ton capacity is a standard tool in which many pallets of items may be moved simultaneously.



THANK YOU