Universiti Malaysia PAHANG
Engineering • Technology • Creativity

Mechanics of Materials

Lecture 3 - 1

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1.0 INTRODUCTION

- This project use the application of an overhead crane, which also known as bridge crane. The design structure member of the crane undergo axial, shear and bending process when force is applied. The main function of this crane is to transfer a certain amount of load from a place to another. Overhead crane consist of many types and can be choose depending on customer requirement. The overhead crane comprises of parallel runways, with a traveling bridge, spanning the gap and, hoist, lifting component that travels along the bridge.
- Other type is, gantry crane (USA, ASME B30 series) where the bridge is rigidly supported on two or more legs running on a fixed rail at ground level.
- The applications of overhead cranes is commonly used in manufacturing or maintenance, as there are some critical factors such as, efficiency or downtime.
- This project has specify to analyse small scale of gantry crane beam behaviour when load been applied. The amount of load will be 200 kg (1962 N) Catia's Finite Element Analysis has been use to visualize the stress acting on the beam and the amount of stress will be calculated manually.

Figure 1 Goliath Crane

1.1 GANTRY CRANE COMPONENTS

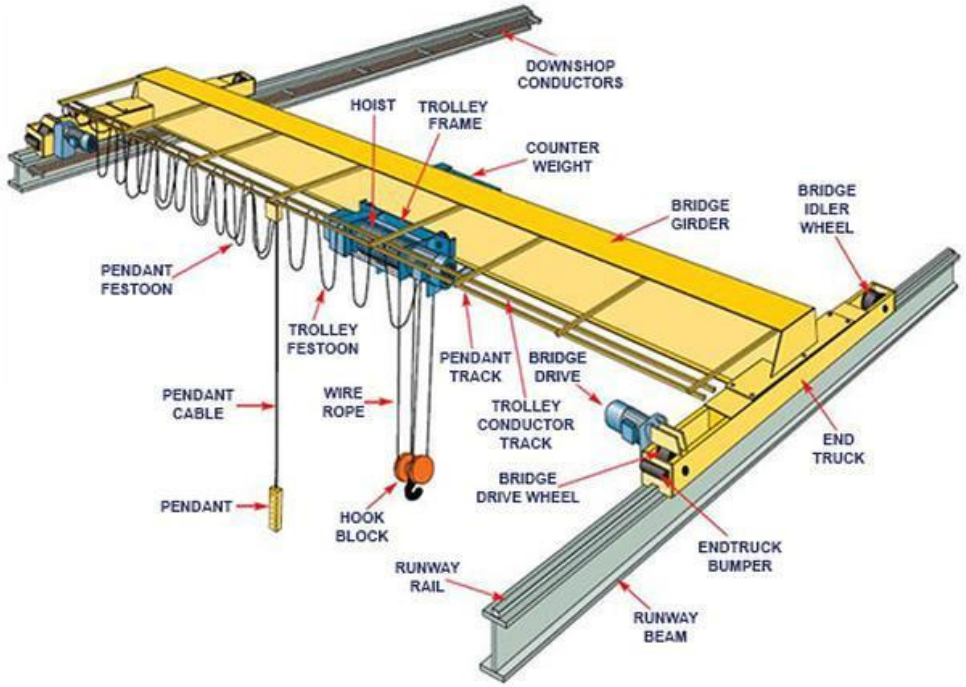

Figure 3 Gantry Crane Components

- **The Bridge** – It is made up of a single or double girder, where it depends on the requirements and configuration, and also a set of end trucks at either end.
- **End Trucks** – The end trucks of bridge crane are situated on both sides of the span. It is the place for the bridge wheel assemblies, where it allows the whole crane to travel along the complete length of the bay. The wheel assemblies, which are mounted to the runway beams in the bridge end trucks can travel along rails.
- **Girder(s)** – It is the structure in which the trolley is supported, and connected to the end trucks. It is a beams and considered to be the principal element of the crane.

- **Trolley Hoist** – It consist of hoist and the frame of the trolley. In dual hoist applications, there are single trolley frame, where two hoists can be mounted or two trolley frames that can be manufactured with each with individual hoist.
- **Hoist** – The main feature is, to lift and lower the desired load. It is fixed to the trolley frame and can use a hook or custom lifting attachment to carry the load. The two types of hoist are, Munck electric wire rope hoist or electric chain hoist. The wire rope hoists are reliable, durable, and had long term usage, while chain hoists are designed for lower capacity operations and light duty requirements or new projects with the factor such as, price in selecting the proper lifting equipment.
- **Trolley** – The trolley rides across the span of the bridge, along the girder and it also carries the hoist.