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Use of Cranes for Various Industry Sectors

In any process industry, material handling is the most obvious and key feature of the operation. Material handling can consume up to 70 per cent of the processing time in a plant. The one constant in any industry is the movement of material. All industry segments, large or small, require material handling equipment and systems. Regardless of the nature of the material, eventually it will have to be moved. Efficient material handling can result in improved productivity and contribute significantly to the bottom line.

The material is transported by a crane which is a permanent fixture of the factory. Depending on the industry, the type of crane selected will need to comply with certain requirements to be effective in optimising the process. Typically, such equipment will need to be installed in a factory, workshop, building or open shed.

While there are endless varieties of industry sectors today, they can broadly be classified into those that move light weight or heavy weight material. Moreover, the path traversed by the material can be either fixed and constant, or vary according to day to day situations. Material may need to be stored indoors or outdoors. All these factors will influence the choice of crane the client chooses. There is a large range of cranes that are appropriate for almost all types of industry segments.

Overhead cranes are most suitable inside closed factories. They can be Single Girder, Double Girder or underslung cranes. These cranes can

traverse the length and breadth of the space without any obstruction. The assembly is mounted on a gantry a short distance away from the ceiling, above the reach of individuals. The crane travels horizontally along a hoist and a hook suspended below it travels up and down to pick up the load. It approaches the load in three quick, efficient motions, picks it up and transports it to its destination.

Single Girder cranes provide for handling of materials when production units and warehouses are relatively small and low. Being light weight, these cranes are suspended on one girder and can lift a maximum of 10 tonnes of load. Their horizontal span of movement ranges from 0.5 m to 25 m. They can move material through a height of up to 12 m. Normally, no maximum safety distance to the ceiling of the building is prescribed for such cranes; as a result, they can save space in buildings with unfavourable dimensions. The travelling crane can be designed to fit the available space using a comprehensive range of fixing arrangements.

Single Girder cranes can be used by the refrigeration, automobile, aerospace, electronics and windmill industries, to name a few.

Double Girder cranes are based on the same principle as single girder cranes, but they have a wider span of up to 40 m. Being heavier, they have a larger carrying capacity, well over 10 tonnes. These cranes consist of two torsion-free box girders that makes them especially suitable for lifting and transporting heavy loads. A range of fixing arrangements integrates them into new and existing buildings. They are used in the cement, steel, construction, plastic, chemical and pharmaceutical industries.

What happens if you have a structure where a Single or Double Girder crane cannot be installed, or if you had not planned for a crane in your initial design? Underslung Cranes are the answer. In this case, the crane track is not fastened to pillars, but instead to the beams of the building. These cranes can be installed with very small trolley approach dimensions, and as a result



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make operations easy regardless of the building width. They come in compact dimensions, have low weight and are easy to operate and maintain. Their typical load capacity is from 0.5 to 10 tonnes; their spans can go up to 25 m. The cantilever can be fitted such that optimal area is covered. Underslung Cranes have the same applications as single or double girder cranes.

When material has to be stored and transported from an open area, an Overhead Crane cannot be used. The material still needs to be lifted and moved. In such a situation, a gantry crane is the best option. The rails can be fixed in the ground, and the main girder mounted on two 'A' shaped columns that rest on wheel mounted end carriages. The design of the girder will depend on the class, frequency and duty cycle of the operation. For heavy duty applications, a double girder can be used, with a suitable track on top of the girders for travel of crab wheels.

Gantry Cranes can be used by any industry dealing in light or heavy material; however, the most common application is in the stone quarrying and construction industries, where material is typically stored in the open.

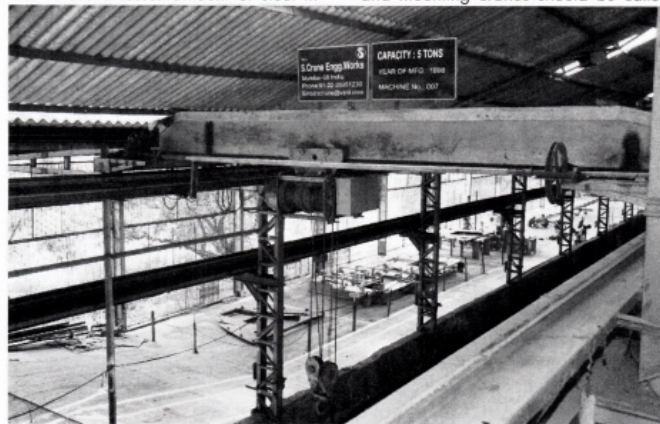
Wire rope hoists find applications in all industry sectors, but are suitable when material has to be moved along a fixed path. They cover a wide operating range of up to 18 m, have fuseless circuitry and are easy to install and maintain.

The chemical, drug and pharmaceutical industries very often need goods lifts to convey material vertically to a higher storey. This is necessary when material has to be fed into the mouth of a large reactor from the top. Usually, these industries operate many such reactors simultaneously. The material is loaded onto a trolley, wheeled into the goods lift and transported to the upper floor where the trolley is wheeled out. The material is then physically carted to the desired location on that floor.

Jib cranes are what one usually sees on the tops of buildings under construction. A jib crane has a horizontal beam that is connected to a vertical pillar mounted on the floor. The beam is fixed to the pillar through supports having bearings on the top and bottom. The column can rotate around its axis

through a 360° angle, and the beam will move along with it in a circle. The diameter of the circle will be the maximum extent through which the hoist can travel horizontally along the beam. Jib cranes have a limited reach and are operated by technical personnel. They are used in light and heavy duty industrial applications.

When a user wishes to install a crane with larger cross section and cost-efficiency, the best option is to go in for a double truss Single Bridge crane. These cranes use a lesser amount of steel in



their design; hence they are lightweight, and reduce the load stress on the building supports. Their increased cross section ensures lesser vibrations in the girder. A motor driven trolley travels with the hoist and greatly increases the speed and efficiency of load handling. They have low headroom, ensuring maximum lift. The biggest advantage that these cranes bring is that they are cost-effective, easy to maintain and can be used by virtually any industry sector.

Most often, users will order a crane tailored to their specific requirement. The dimensions of the work areas or sheds will depend on the machines that are to be installed on the floor. If the width of the shed is up to 20 m, it becomes easy to install any of the conventional cranes in that shed. For extraordinarily wide sheds, say of 40 m or 50 m width, such as aeroplane hangars, conventional cranes cannot be used. Cranes having long span girders, using completely different engineering, have to be made

specifically for each wide shed. Such cranes require specialized expertise and are not very easy to find in India. The more ergonomical the design of the factory along with the crane and other equipment, the more smooth the process and greater the efficiency of operation.

When a crane has to be fitted on a gantry, it must be done with precision and care to allow for ease of operation and safety of people and machines. Only manufacturers with adequate experience and a good track record in producing and mounting cranes should be called

in to install such cranes.

Another very important aspect in the operation of cranes is their maintenance. A small malfunction in a crane can disproportionately hamper the productivity of the entire operation. Therefore, cranes need to be checked and maintained regularly. It is necessary for plant operators to enlist the support of a service organisation with a technically trained and qualified maintenance crew. The crew must have access to the latest tools and equipment, and be trained to deal with all kinds of replacement, servicing and maintenance issues. Regular checks will minimise breakdowns, and consequently, ensure continuous operation of the process.

Last, but not the least, a user must verify the credibility of the crane manufacturer before finalising on the purchase. An ISO certified manufacturer with a good track record and reputation can make a difference in the value you derive from your investment. □