

# SOLAR BASED MOBILE CRANE WITH 360°

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## ABSTRACT

A crane is a lifting machine equipped with a winder, wire ropes or chains and sheaves that can be used both to lift and lower materials and to move them horizontally. It uses one or more simple machines to create mechanical advantage and thus move loads beyond the normal capability of a human. Cranes are commonly employed in the transport industry for the loading and unloading of freight; in the construction industry for the movement of materials; and in the manufacturing industry for the assembling of heavy equipment.

The generally-accepted definition of a crane is a machine for lifting and moving heavy objects by means of ropes or cables suspended from a movable arm. As such, a lifting machine that does not use cables, or else provides only vertical and not horizontal movement, cannot strictly be called a 'crane'.

**Keyword:** - Chains, Cranes, and Lifting etc....

## 1. INTRODUCTION

A crane that is using its own wheels and power to move from job site to job site and around a job site is a mobile crane. The mobile crane is especially designed to cost-efficiently transport heavy loads quickly and easily to a site. A basic mobile crane consists a control panel, a wire rope system and chains. The main advantage of mobile crane is the incredible flexibility to access job sites that are otherwise inaccessible. To perform most efficiently, there are few different mobile crane types, including truck-mounted, all terrain, rough terrain, crawler, railroad and side lift type. Different in specifications, but they all must be operated by highly-trained operators for optimal results. The most popular type of mobile crane is truck-mounted type, where the crane-apparatus is mounted at the rear of a truck (for greater flexibility). The truck-mounted crane is able and legal to travel on highways and main roads, increasing the flexibility by allowing the operators to transport large loads to all locations.

Mobile crane is suitable to a wide range of applications. Its road movements are called transit movements, while its job site movements are called travel movements. All types of mobile cranes are able to travel on road, except the crawler crane, because it is wider than all other types and exceeds the road limits. As most mobile crane types are compact, they can easily maneuver around a job site and operate in very narrow spaces. When compared to the tower cranes, mobile cranes take up a small space only. In addition to being versatile and flexible, the mobile crane is also practical. It does not require a set up (except mobile cranes with stabilizing legs), because it has its own wheels to get itself directly on a job site and is ready to operate. Once a process is carried out, the mobile crane does not require a lot of dismantling. This makes the mobile crane suitable to many more applications. With the numerous of highly-advanced technologies and features that have increased the capacities of the mobile cranes, they have become a much better option than fixed cranes. With the increasing of the mobile cranes market, the fixed crane market is slowly starting to decrease. There are some ultra-big projects that require huge, tower cranes with incredible lifting capacities, but with the constant mobile crane upgrades, it is only a matter of time when will they be able to lift exactly as much as fixed (tower) cranes.

### 1.1 Mobile wheeled cranes

Mobile wheeled **cranes** are mounted on a wheeled chassis with stabilisers that can be used when lifting to prevent movement. Generally, crane is controlled and driven by an operator inside the cab. The slewing ring beneath the cab allows for a 360-degree turning circle, and the boom extends upwards supported by suspension ropes.

Lifting capacity: Tends to vary from 3 - 50 tonnes, but is generally around 10 tonnes.

Average speed: Usually does not exceed 30 km/h.

Mobile wheeled **cranes** are commonly used for moving moderately heavy loads, **equipment** and other plant in goods yards or storage areas.

### 1.2 Truck-mounted cranes

Truck-mounted **cranes** are mounted on a truck or lorry specially adapted to carry an increased load. The lorry can be driven from a front cab as a conventional vehicle, as well as having additional controls for a lattice mast or telescopic boom which extends in sections. Fly jib attachments can be used for lattice **cranes** to increase lifting capacity.

Lifting capacity: Tends to vary from 5 – 20 tonnes, and can be increased by using outrigger stabilising jacks. Lattice masts can lift in excess of 100 tonnes.

Average speed: Can usually travel at around 30 mph (65 km/h).

As this type of crane is very transportable and has a short site preparation time they are commonly used for short hire periods.

### 1.3 Track-mounted cranes

Track-mounted cranes are mounted on a diesel powered crawler unit together with a lattice mast that can accommodate a fly jib attachment with additional lifting ropes to allow for better site coverage. They can move at low speed around sites but need to be transported to and rigged on the site.

Lifting capacity: Tends to vary from 5 – 30 tonnes.

Average speed: Usually does not exceed 2 km/h.

The flexibility of this crane is its main advantage, as it can be adapted to act as a dragline with the addition of a winch drum at the front. The tracks allow for it to be operational on poor ground conditions.

### 1.4 Static cranes

Despite having a similar appearance to the traditional tower cranes, static cranes differ in that the lattice mast is mounted on the slewing ring meaning that the whole tower rotates from one fixed position. They are fitted with a luffing jib which can be raised through 90-degrees from horizontal, with a trolley and hoist block that can move along the length of the jib.

Lifting capacity: These will vary depending on the length of the jib, the position to which the jib is raised, and the position of the hoist block along the length.

Static cranes tend to be used for low capacity lifting and are beneficial in that they tend to allow for a closer approach to the face of a building.

## 2. MECHANICAL PRINCIPLE

There are two major considerations that are taken into account in the design of cranes. The first is that the crane must be able to lift a load of a specified weight and the second is that the crane must remain stable and not topple over when the load is lifted and moved to another location.

A worm gear is type of mechanical gear. Worm gears are used when large gear reductions are needed. It is common for worm gears to have reductions of 20:1, and even up to 300:1 or greater. Many worm gears have an interesting property that no other gear set has: the worm can easily turn the gear, but the gear cannot turn the worm. This is because the angle on the worm is so shallow that when the gear tries to spin it, the friction between the gear and the worm holds the worm in place. Very interesting usage of worm gears is in the Torsion differential, which is used on some high-performance cars and trucks.

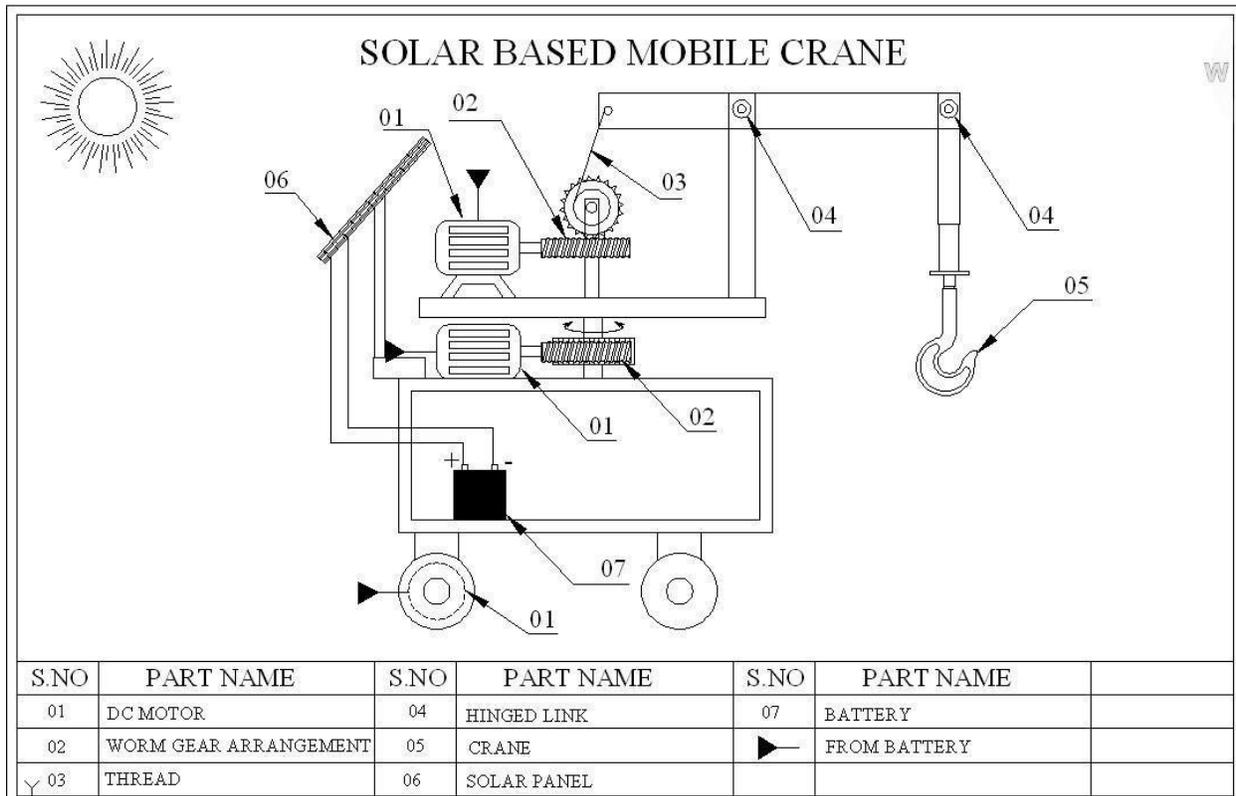


Fig 1 Assembly of Solar Based Mobile Crane

## 3. CONCLUSIONS

The project carried out by us made an impressive task in the field of small scale industries and automobile maintenance shops. It is very useful for the workers to lift the material from one place to another. This project will reduce the cost involved in the concern. Project has been designed to perform the entire requirement task at the shortest time available.

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