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HAZARD IDENTIFICATION AND RISK ASSESMENTFOR EQUIPMENT ERECTION & DISMANTLING IN CONSTRUCTION SITE

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Abstract: It is a common fact that we find a wide variety of construction machines on every construction sites, which make the construction jobs easy, safe and quicker. Good project management in construction must vigorously pursue the efficient utilization of labor, material and equipment. These act as a backbone in the case of huge construction projects. Project use of the appropriate equipment contributes to economy, quality, safety, speed and timely completion of a project. Equipments are used for highway projects, buildings, power projects etc. Almost 15-30% of total project cost has been accounted towards equipment and machinery. So every project needs multiple cranes to progress the site. Erection of tower crane is so easier said than done, it's too risky than we think because one mistake equals to life of many people's, its needs an expertise to do that specified work and technical knowledge of the equipment and most is experience on how erection of tower crane done. You have to familiarize all the details components of tower crane before start erection, and check all the components if it's in good quality and makes it sure that it is certified pass undergo the standard procedure requirements, just testing of material, 3rd party certification and among of the above is safety first.

Keywords: Hazard Identification, Equipment and Machinery, Erection Of Tower Crane.

1.INTRODUCTION

High Rise Buildings

As the high rise building are constructed rapidly and the demand of high rise building is also very high for the growing population due to the scarcity of land. For the construction of high rise building there are some requirements that should be fulfilled. Safety and health facility is the most requirements of the high rise building. The construction technique and the requirements for the high rise building is most important for the proper management and for the strength of building.

Role Of Tower Crane In High Rise Building

Equipment selection is a major factor in the execution of many construction projects. This is to be much more critical in heavy construction projects where the equipment fleet plays a vital role in performing the different types of work. Out of all equipment, Tower Crane plays an important role in the field of construction; the positioning of cranes and facilities within construction site is a very important phase for construction companies as major cost is involved.

Tower cranes are considered as the centerpiece of construction equipment in building projects. They play a key role in transporting a variety of materials vertically and horizontally. The efficiency of tower cranes largely depends on theirtype, number, location, operator skill and many more. As the number of work tasksand the demand for tower cranes increase, planners may experience difficulties in making an appropriate decision about the optimum layout of tower cranes.

2. LITERATURE SURVEY

Literature consistently indicates that employees who are obese take more sick time and have more injuries and higher healthcare costs than their nonobese counterparts. This difference has been shown across countries and across types of companies. As employers are recognizing the importance of disease management and wellness programs (e.g., smoking cessation) for overall employee well-being and healthcare costs, they may also consider implementing programs to help employees achieve and maintain a healthy weight. The current study provides evidence that an employer directed and

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supported MC program focused on weight management could have a positive and significant impact on the economic costs and productivity related to an obese working population. In summary, the current study provides compelling evidence that MC for weight management may be a practical and effective program in addressing obesity and related health disparities in the workplace

Construction Industry is highly prone to hazards related to site activities and construction projects engage large number of contract workers. Contract workers come from varied trades especially from rural areas and agricultural background and do not have proper training in construction safety. During execution at site, these workers are exposed to various risks involved in construction works and other occupational diseases and health hazards which cause injuries and illnesses. As a result, the construction projects get delayed due to loss of working hours and other legal hassles. Therefore, it is essential for any construction project to have certain safety guidelines for site activities and to create awareness among the workers, site supervisor and engineers. The aim of the Construction Safety Manual is to enable to maintain safe working condition at all construction sites under Architecture and Civil Engineering Division, Bhabha Atomic Research Centre. This manual covers safety policy, principles and objectives of Architecture and Civil Engineering Division, Bhabha Atomic Research Centre, general guidelines on safe working procedures for various construction activities, Site Level Safety Committee responsible for implementation of these procedures, monitoring and reporting procedures and training and awareness building programmes. This manual also includes annexures containing various formats to be followed for implementation of safe working procedure and legal compliance.

3.PROBLEM IDENTIFICATION

Challenges Faced

As far as dismantlement of tower crane is concerned, it can be carried out completely by means of mobile crane whereas one of the construction projects, tower crane was surrounded by high rise building, there is no way to use the mobile crane to dismantle the tower crane so it has to be removed by self-dismantling & Rope reeving method and winch operation where need lot of planning and skill for dismantling the tower crane.

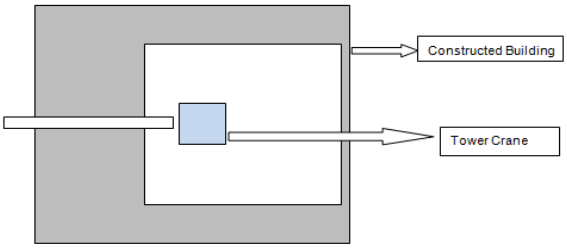

Figure.3. Dismantling Tower Crane

Details Of Tower Crane Location

- The Tower Crane is on its free standing height of 45 metres.
- It stands in between north & south blocks of building.
- The crane erected at the beginning of project, using a 40T Crane with 100 feetboom.
- Under normal circumstances, we should dismantle too with the same Crane.
- But now, the Tower Crane is surrounded all around by buildings andconnecting corridors.

4.METHODOLOGY

Self Dismantling & Rope Reeving Method

4.1 Rope Reeving Method

The purpose of a wire rope reeving system is to provide mechanical advantage so the system can hoist heavy loads by applying relatively little force to the rope. Themechanical advantage equals the number of sections of wire rope actually supporting the load.

A typical wire rope reeving system consists of a grooved cable drum, two pulleys mounted on a hoist and three more on a main beam, so the rope can be reeved into a six-part form supported at a hoist. Each hoist is driven by an electric motor and operated by a ratchet and pawl lever system.

4.2 Self Dismantling

There are three main ways of erecting them: freestanding, internally climbing and externally climbing. On all of them, the crane can normally partially dismantle itself. It may also have small hoists on the upper structure/machinery deck that

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can lower some components to the ground. Partial dismantling means de-telescoping the tower crane by removing the mast from the tower crane.

4.3 Planning

4.3.1Appointment Of Competent Specialist Contractor

A Specialized erection and dismantling team is engaged for dismantling of thetower crane and methodology is briefed to them.

4.3.2 Dismantling Methodology

Unloading of counterweight using Main host winch:

Counterweight is lowered using main host winch on terrace and counter jib is removed.Ballasts are kept at terrace and the same will be followed for all the three ballast.

4.4 Main Jib Dismantling

- The Main Jib is 42 meter long and weighs about 5 tons.
- Using Main Hoist Winch, the far end of Main Jib is lowered on terrace
- The 12 fall rope reeving method, adopted for this work, to lower the main jibon terrace
- After detaching from Tower Crane, the Main Jib is split into 4 equal (more orless) parts
- Using Main Hoist Winch, the 4 parts are lowered to ground one by one.

4.5 Removal Of Mast Inserts

- There are 15 Nos. 2.3 metre Mast Inserts, for free standing height.
- They are removed one by one using the regular de-telescoping method.
- Using main hoist winch, the Mast Inserts are brought to ground
- On the ground, the Mast Inserts are split into mast panels for transportation purpose.

4.5.1 Tower Crane Materials From Terrace to Ground

- Using 5T Erection Winch and Diversion pulleys, following parts of TowerCrane are dismantled brought down to the ground;
- Cat-Head,
- Tower Head,
- Telescopic Cage,
- Mast Inserts-2 Nos
- Bottom Ballasts-18 Nos
- Oblique Legs-4 Nos
- Basic Mast-1 No
- Stud-4 Nos
- Cross Member-2 Nos
- Travel Bogie-2 Nos
- Rail-2 Nos.

4.6 Hazard Identification & Risk Assessment

The overall purpose of the hazard identification & risk assessment process is to recognize and understand the hazards that might arise in the course of the organization's activities and ensure that the risks to people arising from these hazards are assessed, prioritized and controlled to a level that is acceptable.

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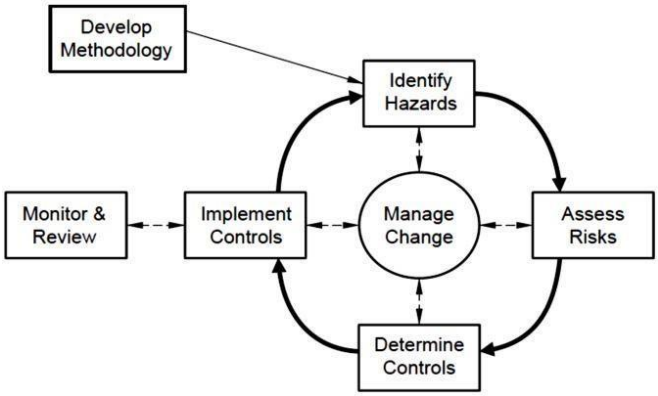

Figure.4 This shall be achieved by the following steps,

- Developing a methodology for hazard identification and riskassessment,
- Identifying hazards,
- Checking the adequacy of any existing controls,
- Determining whether these risks are acceptable, and
- Determining the appropriate additional risk controls, where these arefound to be necessary

CONCLUSION

Accidents do not happen they are caused. A very well planning and proactive measuresaves the life and property. Before start of any works following needs to be taken carried and complete study shall be done to execute the work safely.

- Site surveys – for feasibility
- Identifying the hazards associated with the task- Group HIRA
- Carrying out a risk assessment
- Identifying control measures
- Developing the method to be used
- Communicating the plan to all persons involved
- Reviewing the plan before the job starts
- Roles & Responsibility of OEM Team
- Competence team- Team work

Probability of accidents can be reduced 50% during planning stage. A good planningis arranging of resources in time to avoid any shortcuts or make shift arrangements.

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