

Utkal Alumina International Ltd. Doraguda, Rayagada, Odisha

Precipitation Agitator maintenance work using Electric winch

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Safety of personnel is of utmost importance when work is done at height. Stringent measures must be taken when risk of fall from height is involved. In Precipitation area of Alumina refinery, the tanks are arranged in descending order of levels so that the overflow from each tank can move to the next by the force of gravity itself. The difference in level for two consecutive precipitator tanks has been kept at 0.9 meter. The precipitator tanks are equipped with mechanical agitators which have paddle type impellers.

Applicability

- This is applicable to tank inside maintenance where height job is involved.
- This practice can be applicable for height jobs where base mounting provision is available for supporting the electric winch.

Business Impact/Benefits:

- First in Utkal unit to implement one-of-a-kind practice of carrying out inspection of vertical shafts and blades of agitators by means of electrically operated winch and man basket in order to evade the risks associated with conventional practices.
- Best in class in the industry for agitator maintenance and a Standard accepted Methodology to avoid erection of scaffolding or installing crane.
- Higher safety standard is maintained resulting in safety culture enhancement.
- Elimination of 200T crane for the agitator maintenance jobs resulting in cash saving of 26

Problem Definition

All of us to an extent have an inherent phobia while working at height and height work in fact is a major factor of incident occurrences across industries. The determinants may be physiological or psychological in nature or both. Fall from heights is one of the most common causes of workplace accidents and fatalities. Most of the accident investigations show the reasons for falling accidents involve casual approach of workmen to follow compliance or lack of assessment of the hazards to take precaution.

In PPT, each month 04 nos. of tanks are taken into scheduled outage for cleaning and maintenance activities. Agitator blades maintenance work



is being carried out with the help of man basket. 02 nos. of technicians with requisite tools and tackles do the checking of each fastener of the agitator blades with the help of man basket which is lifted and lowered with the help of 200 T crane. Worn-out portions of blade are filled with hard facing welding rods.

Problems faced.

- For each tank maintenance, 200T crane was required for 2 days. There is only one crane in whole refinery. So, crane availability was a major constraint.
- Hazards associated with crane such as blind spot to the crane operator was a problem.
- Installing crane on a sloping surface poses a stability threat. To tackle this, extra number of wooden packings are provided.

Approach:

- Brainstorming session with cross functional team was carried out and decided to install Electric winch for the agitator maintenance purpose.
- Our requirement was communicated to the external vendors and some vendors offered their best price.
- Our focus was to have no compromise with safety.
- Winch expert from M/s. Durodrive reached our site to discuss our requirement. As the winch carries workmen, so factor of safety had to be considered high. Total load expected to carry was 500 Kg. So, the winch design and selection was made in accordance to the standards applicable for lifting devices for carrying men and resources.
- Maximum travelling speed of wire rope was taken as 1.5m/ min. This lower linear speed reduces shock to the workmen.
- For safety of manpower, 03 nos. of brakes act simultaneously (02 nos. of thruster brakes, 01 nos. DC brake fitted onto motor shaft).
- if any one of the brake fails, other two brakes will be there for the rescue. In case of power failure, man basket can be lowered by operating the DC brake lever manually.
- So, this winch is designed by considering each aspect of safety minutely.

Specifications of Electric Winch:

- Winch model: 5TEW-1.5-65
- Make: Durodrive
- Load carrying capacity: 2.5T
- Variable speed drive: Yaskawa Technologies
- Max. travelling speed of rope: 1.5 M./Min.



- That winch was tested and certified by 3rd party. After that the winch is taken into operation.

Modification photos

BEFORE



AFTER

