Air Raising Feat! Roof Fixing on LNG Storage Tank

An inside view of LNG Tank Roof before being raised.

Initial aerial view of tank roof before air raising.

Final position of tank roof after raising at a height of 40 mtrs.

Lateral view of LNG Storage tank.

It's an incredible feat!!Finally it is nothing but Air!

Pressurised air lifted an almost 600 tonne steel dome roof to a height of 40 meters in about 170 minutes, and fixed it on the roof of Tank Number One at Ennore LNG Project site.

Team Ennore LNG Project, Kamarajar Port complex, Chennai, led by Mr. K. Ramu, CEO, IndianOil LNG Pvt Ltd exchanged celebratory notes and congratulatory messages on this extraordinary feat, a first of its kind for IndianOil!!

The two LNG Storage tanks under construction at the Rs. 5151 Crore LNG Import Terminal Project site, has a gross capacity of 180000 cubic meter each with a diameter of 84 meters and a height of 55 meters.

"It is a milestone achievement for IndianOil and marks an important step forward for the LNG Project team. The steel dome roof tank structure with aluminium suspended deck weighing about 600 tonnes was raised using nothing but air; about 130 mm of water column pressure was applied to lift the roof. We commenced operations early morning and completed in about three hours' time. The weight of dome roof is almost comparable to three Boeing 747 aircrafts" said Mr. Ramu.

IndianOil officials Mr. T. Sampath GM (PJ) and Mr. S.Chandra babu, GM (LNGT-PJ) and officials of PMC- Amec Foster Wheeler, along with their team members were present during the air raising activity.

Tank Roof Fixing harnessed the power of aero dynamics, two fans and a web of steel wires. The crew actually used simple science to lift the roof. Site workers had assembled the dome on supports inside the base of the circular tank, for it to be floated up and welded to the top of the tank walls. They assembled the roof close to the ground inside the tank during the early stages of the tank's construction. Construction of the tank wall continued after the roof was assembled, with a series of concrete pours allowing the tank wall to reach close to 40m in height.

They raised the roof by increasing air pressure underneath the roof – inside the tank – while air pressure on top of the roof remained constant. If air pressure is the same on both sides of an object, then the "push" factor from one side cancels out the "push" factor on the other side. But increasing the air pressure on one side makes the "push" factor stronger on that side of the object and weaker on the other. Therefore, the object will move with the "push" from the side with greater air pressure.

The roof was fitted with metal sheeting around the rim, providing an airtight seal. Once the seal was fitted, and roof was ready to be raised, the tank entrance was sealed and two large fans began to pump air into the tank, underneath the roof. This increase in air pressure enabled the roof to slowly rise to the top of the tank.

A team of engineers continually monitored the progress of the roof as it rose, to ensure it ascended evenly and maintained its alignment throughout the process. The roof was lifted at a speed of approximately 20 cm/minute using two air blowers with capacity 1380 M3/Hr. Team of employees of MHI & Punj Lloyd were directly involved in the roof raising and the whole process was handled very professionally, enforcing all safety requirements. Once the roof reached the top of the tank, it was welded into position.

The LNG Storage Tank No.1 now has got its roof in its place. Tank No.2 roof would also be raised in a similar fashion in a few days.

'The sky is the limit if you have a roof over your head' it is said. Once the roof for Tank Nos. 1 and 2 are fixed, the sky is the limit for the Ennore LNG Team as its progress would catapult availability of LNG product in the southern belt!!