



# DEHN protects.

Storage tanks at Bharat Petroleum Corporation Ltd. –  
Mumbai, India



## Customer



Bharat Petroleum  
Corporation Ltd.  
(BPCL), Mumbai,  
India

## Project overview

### Industry

Oil industry

### Application

Planning and installation of an  
external lightning protection  
concept for storage tanks

### Hardware

Lightning protection masts  
Overhead line cables (Catenary)  
Lightning counter  
Earthing system (Type A & B)

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## Bharat Petroleum Corporation Ltd.

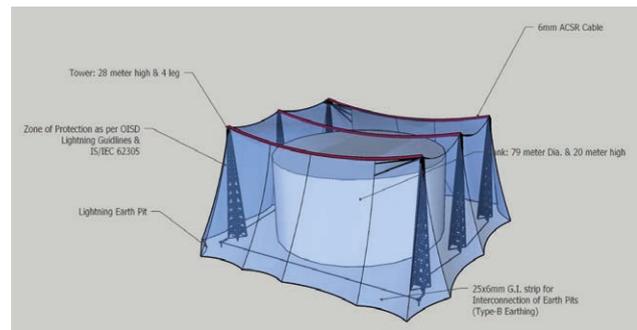
Bharat Petroleum Corporation Ltd. (BPCL), based in Mumbai, is India's second largest oil company. It operates two large refineries in Kochi and Mumbai. These refineries include extensive storage tanks which are located on the Indian west coast.

## Challenges

Safe operation, employee protection and maximum system availability are extremely important for plants in the oil industry. To ensure that these criteria are met, BPCL was the first petroleum company in India to opt for a plant-specific external lightning protection system for storage tanks. Due to the high lightning density in coastal regions, the risk of a direct lightning strike to the tanks is particularly high. Extreme climatic conditions such as strong monsoons and the corrosive environment (coast) pose additional challenges.

## Solution

The storage tanks used by BPCL have diameters of up to 79 m. A lightning protection system with air-termination rods installed directly on the tanks is not possible for reasons of size. As a result, a protection concept with lightning protection masts and an overhead line system was designed for the BPCL storage tanks in accordance with the Indian lightning protection standard OISD 180 (2018). Wind load calculations and soil bearing capacity tests were carried out when planning the foundation. The location of the lightning protection masts was determined using geo-surveying equipment. Whereby the number of masts required depends on the diameter of the tank to be protected. In addition, 3D lightning protection design software was used to help plan the position of the lightning protection masts. This made it possible to ensure that the storage tanks are located entirely within the protected volume of the lightning protection system. The ACSR cables (aluminium conductor, steel-reinforced) for the overhead line were also selected according to the wind load. All installation work had to be carried out manually – due to the special conditions (work in sensitive, potentially explosive areas) no cranes were allowed when installing the masts. The foresighted and professional project management and local expertise of DEHN INDIA enabled the successful implementation of this pioneering project despite all its challenges.



3D lightning protection design



Protection of the storage tanks by means of lightning protection masts and overhead line systems

## Benefits of the DEHN solution

- Optimal protection against direct lightning strikes
- Safe operation, employee protection and maximum system availability thanks to an effective, robust and durable protection solution
- Extensive know-how – in spite of new and complex requirements in plants
- Design, implementation, technical support and project management from one source by DEHN INDIA