CASE STUDY REF: 007

MITRE GATES AT STORM WATER PUMPING STATION, BRITANNIA OUTFALL AT MUMBAI FOR FLOOD PREVENTION

Actual site photograph of Mitre (Tidal Control) gate

Project Details	
Project	3110 MLD storm water PS at Britannia outfall
Customer	Municipal Corporation of Greater Mumbai
EPC Contractor	Unity-M&P-WPK Consortium
Consultant	Montgomery Watson Harza

Product Details	
Nos. of Gate Leaves	2 nos.
Channel Size	3750 (w) mm and 5700 (h) mm
Gate leaf size	3991 (w) mm and 5200 (h) mm
Design water head	4.70 meters
Material of construction	Mild Steel ASTM A 36
Operation through	Electric actuator
Corrosion protection	Provided by FRP coatings and Cathodic Protection Anodes

Location:

Britannia storm water pumping station is located at Reti Bunder Bey, near Reay Road Railway station in south Mumbai, India.

About the project:

Britannia storm water pumping station is a part of Brihanmumbai Storm Water Drain (BRIMSTOWAD) project which is launched by Municipal Corporation of Greater Mumbai after one of the worst floods in Mumbai on 26th July 2005 which took life of hundreds of people.

The construction work of project started in June 2014 after the delay of eight years for want of NOCs from Mumbai Port Trust and Maharashtra Coastal Zone Management Authority, at an estimated cost of 116 Crores (17.8 Million USD). The pumping station became operative in 2016.

The pumping station is housed with 6 VT pumps having pumping capacity of 518 MLD (137 MGD) each. During storm and heavy rains, the pumps can totally discharge 3110 Million liters (821 Million gallon) of storm water every day.

Role of storm water pumping station at Britannia outfall:

In the monsoon, Mumbai gets an average rainfall of 2420 mm (96”). However sometimes rains per day can be as high as 400 mm (15”) and if this is accompanied with high tide then gravity flow from the drains to the sea does not take place. This results in to severe flooding which can reach few feet in low lying areas inundating businesses, homes, vehicles and railways stations and costing millions in losses with related loss of life due to drowning.

Role of Electrically actuated Mitre gates in storm water pumping station:

These Mitre gates are installed to prevent entry of sea water into pumping station during high tides.

During floods period, when sea side water level rises to high tide level then these gates facilitate complete isolation of pumping station by closing the entire channels and at the same time flood water from city of Mumbai is pumped out in to the sea through pumps. During normal operation, these gates are kept open to allow automatic discharge of city water into the sea side.

Actual site photograph of Mitre (Tidal Control) gates

Operating arrangement of Mitre (Tidal Control) Gate

Description of Mitre (Tidal Control) Gates:

Carbon steel FRP coated single leaf type Mitre (Tidal control) gates of size 3.99 m width & 5.2 m height suitable for channel opening of size 3.75 m width & 5.2 m height with electric actuator operating mechanism and cathodic protection anodes for corrosion protection.

Design standard:

Mitre gates are generally constructed in accordance with United Facilities Guide Specification as issued by the US Corp of Engineers, Division 35 –Waterway and Marine Construction, Section 35 20 16.33 - Mitre Gates.

Salient features:

i). Sealing Arrangement: To prevent the leakage, PRESS ON resilient EPDM rubber seals provided at the bottom and at side edges of gate structure that seat on steel plates affixed to civil structure to achieve the maximum permissible leakage of 2 liters per second per gate as stipulated in tender specification of this project.

These gates automatically open and close against a differential head of 200 mm during normal operation.

ii). Corrosion protection System: As these gates are exposed to the combination of sea water and sewage water, they are provided with special types of two stage corrosion protection system as mentioned hereunder:

a). FRP coating (min. 3 mm thick) is applied to the gate structure. FRP coating is applied in stages and finally checked using spark test (holiday test).

b). Cathodic protection system for which high silicon anode (min 11 kg) are used, on both sides i.e. sea side & city side.

These Mitre gates were installed in 2016 and in operation since then.

In addition to these Mitre gates Jash has also supplied most of the other electro-mechanical equipment required in this pumping station such as 6 nos. 3500 x 6000 (WxH) mm & 2 nos. 3750 x 5250 (WxH) mm Aluminum Stoplogs, 6 nos. 3500 x 2000 (WxH) mm Cast Iron Sluice Gates and 6 nos. 3500 mm wide Jash Mahr "MM2MM" multi raking screens for this project.

Jash is a major supplier of electro-mechanical equipment to various storm water pumping stations of MCGM and has supplied CI gates / Stoplogs / Suspended trash screens / Multi raking screens / Mitre gates to various projects such as Love Grove, Haji Ali, Irla, Cleveland and Gazdarbandh of MCGM through various EPC contractors.

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