Post Disaster Management of Mithi River Flood After July -2005 by HAVOC

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Abstract- *The disaster of Mumbai, July 2005 a galvanised the concerned agencies into recognising the importance of the river, which in fact flows through the heart of Mumbai Suburbs. The authorities were willing now to recognise that the Mithi was a "river" and not a "nalla". The Mithi River Development and Protection Authority was established to initiate the study to identify the causes of pollution affecting the river and to suggest remedial measures. The authority conducted and environmental survey of the Mithi River to determine the pollution level of its water. I have tried to analyse the situation and have suggested guidelines for immediate actions as well as for long term measures. I have refrained from working out specific details of any proposals and it will be done as required by the concerned public agencies keeping in view of the guidelines suggested in this paper. Ours has not been a fault finding mission, but a serious exercise to understand as to which deficiencies need to be overcome, so as to be able to face calamitous situations as on 26th and 27th July,2005 in a better prepared way. We hope that our findings will help Mumbaikar's to move in the right direction rapidly and with confidence.*

Keywords- Mumbai Suburbs; Mithi; Calamitous

I. INTRODUCTION

Mumbai a mega metropolis is the financial capital of India. Originally, the city was built around H seven islands and was known as 'Bomb Bahia' a fine bay surrounding the city. Subsequently, the island was city was connected to the northern 'Salsetta' island by rail and roads. The city suburbs were thus develop in course of time.

Seven island of Mumbai were reclaimed and grown into a mega-city were in the reclaimable land areas were use for development of settlements leading to the metamorphosis of hydrological features. Mithi River is denoted as Mahimriver in the published maps of 1923. It is a tidal river (to and fro flow) and the tidal flow reached up to a maximum length of 8.5 km. Embankments of railway line and Agra road are the only surface connectivity and the between the (Sion fort and Kurla hill) southern and northern island. They were the only crossing over Mahim, Mahul and Chembur Creek confluence in 1923. Mithi River originates from the hill around Powai. Vihar and Powai reservoirs were constructed in harnessing the surface run of for Mumbai's drinking water purposes. Over flow stroke release of water from the reservoir are the only fresh water flows to the river during non-monsoon periods. Hence, surface flow (non-monsoonal period) is governed by the discharge/ over flow of storm water drainages and open-sewages draining into the river. The surface fresh water flow seize to exists immediately or 2 or 3 weeks after the monsoon. During the non-monsoon periods, the waste water flow delivered from the residential and industrial units located around the river occupies the river course. The course of Mithi River flowing through adjoining areas of the urban sprawls has been modified at many places. In order to understand the changes and also mapping of Mithi River, the available spatial (maps, drawings) and point information of historical data were studied and compared with the presents observation in deriving a suitable physical environment for the river and developmental projects. Mithi River, in Mumbai originates from the overflow weir of Viharlake and meets Arbaian sea at Mahim causeway. It has total length of 17.83 km passing south wards through Powai, Marol, SakinakaSahar, Santacurz Airport and Kurla area before turning westwards to pass through the Bandra-Kurla complex and reaching Mahim Creek. The VakolaNalla having a length of about 4 km also joins the Mithi River. The river course from its origin to Mahim causeway in shown in fig.1.1. Mithi River passes through the industrial, commercial and residential areas through the heart of the city of Mumbai. These activities release large quantities of wastewater containing chemicals, oil and heavy metals in the river. Beside, truck loads of solid waste containing plastics, metals glasses and debris ate frequently, dumped on the banks of the river leading to illegal reclamation and altering the path of the river.

II. OBJECTIVES

To suggest remedial measures to avoid flooding and loss of human lives and properties as a part of pre and post disaster management of various Indian Rivers which may help

in saving of valuable financial resources for enhancement of socio economic aspects of the affected people.

Objectives are as follows:

1. Identifying the various causes of flooding
2. To find out remedies to avoid flooding in future
3. To enhance socio economic aspects of Project affected people.
4. To find out water and odour control of River.
5. To implement various methods of channelisation and embankment protection.
6. To find various methods of recreation of river.

III. METHODOLOGY

The work of desilting /deepening and widening work was executed with the help of Pontoon Mounted Poclains for dredging inside the river course. The work of deepening of Mithi River was carried out as per the bed gradient (1:4250) for Phase-1 and (1:3500) for Phase-II work as recommended by CWPRS, Pune. The silt removed from the river was dumped along the bank of Mithi River and thereafter it was lifted by poclain standing on the banks and loaded in the dumpers and transported to the temporary dumping ground for drying purpose. The microbial treatment was carried out on the silt for killing hazardous bacteria's. The dried material thereafter transported with the help of dumpers to permanent dumping grounds located outsider the city area. The initial and final levels for measurement of silt were taken eco sounding method by the agency Maharashtra Maritime Board. The volume of silt removed was measured by cross section method. The mode of measurement was on cubic meter basis and 30% shrinkage was deducted from the volume.

IV. THEORETICAL CONTENTS

Construction of Retaining wall along the bank of Mithi River and VakolaNalla The construction of Retaining wall was executed by three methods viz.

1) Counterfort RCC Retaining wall.
2) RCC Meter Panel wall
3) RCC Touch Piles with Rotary Piling method.
4) Gabion wall.

A. Counterfort RCC Retaining wall:

Construction of retaining wall by this type of method was preferred where the good strata with hard surface at 4-5m depth was available. The RCC wall was constructed with the counterforts at 3.5m intervals and crash barrier of 1.0m height at the top with M-35 grade concrete.

B. RCC Meter Panel wall :

Construction of retaining wall by this type of method was preferred where good soil strata was not available at minimum depth especially along the bank of VakolaNalla in slushy area. The meter panel of size 500mmx1000mm and 600mmx1000mm were driven with the help of piling rig. The temporary MS liners of above size were used for meter panels and were driven upto hard strata. After lowering of reinforcement cage concreting was carried out with M-30 grade concrete. The top of meter panels were connected by RCC beam and thereafter crash barrier of 1.0m height of M-35 grade concrete was constructed.

C. RCC Touch Piles with Rotary Piling method :

Construction of retaining wall by this type of method was preferred over meter panel method which was time consuming by drilling 1.0m dia piles with Rotary Drilling Machine (Piling Rig). The permanent MS liners were driven upto hard strata. After lowering of reinforcement cage concreting was carried out with M-35 grade concrete. The top of meter panels were connected by RCC beam and thereafter crash barrier of 1.0m height of M-35 grade concrete was constructed.

D. Gabion wall :

Construction of retaining wall by this type of method was preferred as eco-friendly construction work in the vicinity dense mangroves area where construction of RCC walls were not permitted. In this method the cage of galvanized wire mesh was filled with rubbles and stacked and lowered with the help of crane and were stacked in such a manner that width at base varies from 6.0m to 1.0m from bottom to top.

V. CONCLUSION

- Studies were carried out with prevalent cross sections within the banks of Mithi River corresponding to post 26th July 2005 rainfall event collected by MMRDA in August 2005 in the reach upstream of Mithi confluence of Mithi River and with earlier recommended cross sections based on CWPRS technical report of January 1978 in the reach

downstream of Mini Confluence of Mithi River and VakolaNalla.

- Under existing conditions, flood plain widths of 350m, 200m and 100m on either side of the river bank in the reach from Mahim Causeway to CST Bridge, from CST Bridge to MV Road and Upstream of MV Road were considered respectively.
- The maximum daily and hourly rainfall data observed at Santacruz for the priod 1950-2003 were analysed using Gumbel (Extreme Value Type-1) distribution which gave
- Maximum daily estimation of 382.5mm and 418.3mm of 50 year and 100 year return period respectively.
- Maximum hourly estimation of 101.4mm and 110.8mm for 50 year and 100 year return period.
- Flood water levels were determined with spring tide having high water level of (+) 5.20m and low water level of (+) 0.14m in sea and flood discharges for durations of 1hr, 2hrs, 6 hrs and 24 hrs with quasi steady state flood discharges of 50 year and 100 year return period rainfall events.
- Flood water levels for the event of 26th July 2005 were determined with the prevailing tide having maximum water level of (+) 4.48m and low water level (+) 0.90m on the day and corresponding flood discharges of 3 hourly rainfall intensities observed at Powai lake on 26th and 27th July 2005.
- Studies indicated that maximum flood level would attain (+) 6.0m and (+) 6.35m at Mahim Causeway for hourly maximum rainfall event coinciding with High Water stage of the spring tide with flood discharge of 50 year and 100 year return period respectively.
- Under the existing conditions, in the reach upstream of CST bridge, the flood water levels would rise to (+) 6.55m and (+) 6.75m at Air India colony for flood discharges of50 year and 100 year return periods respectively.
- Desk studies indicated that in the reach upstream of MV Road, under existing conditions, a maximum of 50.0 cumecs flood discharge would be accommodated within the bank levels and high flood level would rise by 3.0m above the existing ground levels with flood plain width of 457m on either side of bank of Mithi River for the hourly peak discharges of 26th July 2005 which appears to match with the Tell-tale marks observed in the region by MMRDA.

V. CONCLUSION

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