

Slum Redevelopment of Multi Storey Buildings by Using Six Sigma Concepts

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Abstract: Construction industry is one of the booming industries in today's times. Besides these Heights of a large section of people are expecting better roof especially in megacities like Mumbai Kolkata, etc. To Overcome these difficulties Government announces redevelopment project like MHADA, SIDCO etc. To provide cheap and suited houses, row houses, multistorey buildings. Rapid Urbanization comes with a vast influx of people population into urban areas. This is a cause for Significant concern given that many of the countries even lack the ability to provide infrastructure. While research on slum redevelopment has been on going with such work which is mainly focused on 3 aspects like Social, economic policy issues, political aspects including proper fund distribution and Certain Environmental clearances. According to the norms, the redevelopment schemes are being Constructed on smart City and RERA laws. Minimization of cost of construction materials using of E-Materials, the spaces, and the location are bounded by these laws. Certain basic services are being Provided considering the location. To analyse the problems structured 6-sigma concept for defects Calculation was used. Certain Political, Social and economic questions were introduced during the Framing. All these defects were calculated and differentiated according to 6-sigmas working levels. These defects and queries were discussed with MHADA unit owners and professionals in Redevelopment schemes. Taking into consideration above views, suitable solution to a better extent Were found out through a ground level survey with all stakeholders.

Keywords: 6 Sigma Concept, Construction Defects, Redevelopment, MHADA Project.

I. INTRODUCTION

With growing urbanization more population is forced to live in urban slums. As per studies, 62% of Mumbai's population lives in slums. In fact, the largest slum in Asia, Dharavi is in Mumbai. To overcome this, the State of Maharashtra enacted The Maharashtra Slum Areas (Improvement Clearance and Redevelopment) Act, 1971 (**the Slum Act**). Under the Slum Act, the 'Slum Rehabilitation Authority (SRA) was formed in the year 1995 which was tasked to complete all the requirements under the Act including survey and review slums, formulate scheme under section 3-B of the Slum Act known as 'Slum Rehabilitation Scheme (SRS) for rehabilitation and redevelopment of slums, implementation of such schemes, declaring any area as slum and fit for rehabilitation etc. This particular paper is executed according to the rules of six sigma method. Lean six sigma is a disciplined systematic and quantitative method with a goal of reducing deviations and eliminating unvalued activity in construction. Lean Six Sigma not only reduces process defects and waste, but also provides a framework for overall organizational change. By introducing Lean Six Sigma, the mindset of employees and managers change to one that focuses on growth and continuous improvement through process optimization. This change in culture and the mindset of an organization maximizes efficiency and increases profitability.

II. APPLICATION OF SIX SIGMA ANALYSIS IN CONSTRUCTION MANAGEMENT

Companies that implement Six Sigma should expect to undertake continuous efforts to achieve stable and predictable process results. For contractors, these efforts could apply to every stage of a construction project — from sales to bidding to on-site operations and in-house financial management. Like so many of today's business-improvement



models, the practice is also heavily focused on statistics. A tenet of Six Sigma is that every company’s processes have characteristics that can be measured, analyzed, improved and controlled. Accomplishing this objective, however, calls for a total organizational commitment — particularly from you, the owner and other top-level managers.

III. CASE STUDY

Name of work: Construction of 20 T/S HIG T/s + 10 Shops on S. No. 8 at Talegaon, Taluka Mawal, Dist. Pune.

Pune Housing Board has under taken work of 20 T/s & 10 Shops for HIG income group. The land about 2 km. away from Talegaon Railway Station and along Talegaon - Chakan Road & well approachable from Pune Mumbai Highway. The colony is developed and all amenities like School, Hospital, Shopping etc. are available near site.

Salient Features:

Name of Scheme : Construction of 20 HIG T/s + 10 Shops.

Location : S.No. 8, Near Manoharnagar Talegaon Chakan Road, Opposite Hotel Sachin.

Types of Schemes : High Income Group Category

Total No.of Tenements : 20 Tenements + 10 Shops

Area Per Tenement : Tenements : 'A' type - Carpet Area - 49.57 Sqm. = 10 Nos.

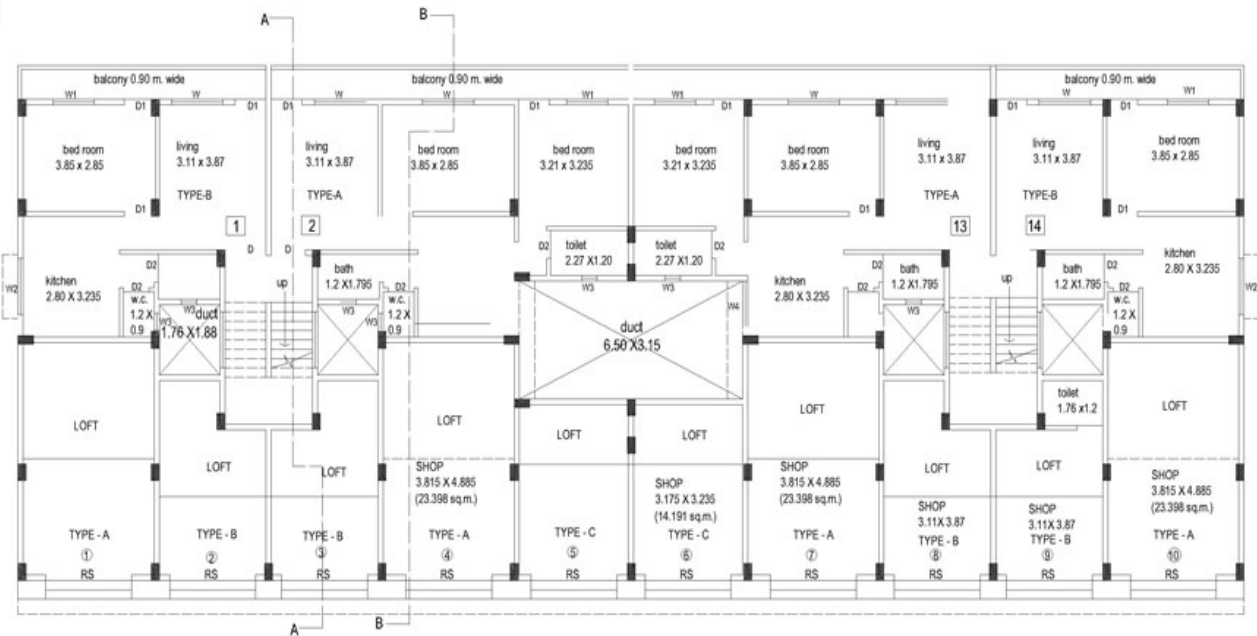
'B' type - Carpet Area - 37.22 sqm Sq.ft.= 10 Nos. Shops 'A' type - Carpet Area - 23.39 sqm = 04 Nos.

'B' type - Carpet Area - 13.21 sqm = 04 Nos.

'C' type - Carpet Area - 14.19 sqm = 02 Nos.

Year Of Construction : 2009

Floor plan



GROUND & STILT FLOOR PLAN

Amenities of be provided in the Tenements.

Parking + Three storied & shops + two storied structure .

R C C open foundation and R C C framed structure in M 20

External walls in 150mm thick Thokla bricks.

Internal walls 115 mm thick B.B.M



External doors: solid core flush door with pressed metal frame

Toilet doors: solid core flush door with pressed metal frame.

Windows: Aluminium Window.

Flooring:

For Rooms :ceramic tile + Skirting

For Toilet : ceramic flooring & glazed tiles dado

For WC : colored glazed tiles

Table 1: Expert review table

SR NO	QUESTIONS	YES (in %)	NO (in %)
1	Did you get loan facilities for MHADA property?	29%	71%
2	Do Economically Weaker Section (EWS) get proper representation in the lottery system?	45%	55%
3	During Redevelopment of old site does government provide tenants, required financial assistance?	58%	42%
4	Are Slum redevelopment authorities like MHADA politically influenced?	53%	47%
5	Is proper funding provided for redevelopment projects?	69%	31%
6	Do you want MHADA to charge minimum stamp duty on redevelopment agreements?	71%	29%
7	Is it necessary to form committees for performing checks on functioning of these authorities like mhada?	58%	42%
8	Is the poverty criteria correct to avail these schemes?	55%	45%
9	Is privatisation necessary for redevelopment projects?	83%	17%
10	Is proper waste management necessary in these projects?	76%	24%
11	Can more use of E- Materials for Construction be the solution to reduce pollution?	65%	35%
12	Are basic amenities like water and electricity provided regularly in slums?	50%	50%
13	Is the number of houses provided under these schemes sufficient?	60%	40%
14	Is the area of these houses sufficient to live for a family?	46%	54%
15	Is Public Private Partnership (PPP) a required solution for smart functioning of these authorities?	81%	19%
16	Is the structural Audit is done on regular interval of time?	72%	28%
17	Are the tenants living in MHADA schemes satisfied by the houses?	59%	41%
18	Do you get your possession on time said by redevelopment authority?	65%	35%
19	Do You Find any difference between the amenities said by MHADA (REDEVELOPMENT AUTHORITY) before and after Construction?	28%	72%
20	Was MHADA (REDEVELOPMENT AUTHORITY) customer service provided you in an accessible manner?	56%	44%
21	Is Covid 19 related protocol followed in redevelopment projects?	69%	31%

IV. CONCLUSION

One of the biggest hurdles with in-situ slum redevelopment is the acquisition of land. Currently most developers are shying away from in-situ slum redevelopment as the land acquisition is cumbersome and not their main expertise. If the government could analyze, determine (which slums), acquire the land from the slum dwellers, and provide them with

temporary government housing it would pique interest within the real-estate developers to come in and develop the project. This would also allow the government to reduce the current subsidy and incentives given to developers as projects would naturally meet the required hurdle rate. Currently, projects are assigned to developers in an open auction—that is, the first developer to gain the 70% consensus is allowed to develop the project. If the government acquires the land by gaining the consensus it could award these projects based on the merit of the development proposal similar to how Low-Income Housing Tax Credits are awarded in the United States. There are no set development guidelines/requirements for the proposed redevelopment except for the minimum required area of the unit to be provided. Providing guidelines would help the development to be of higher quality. Each proposal could be reviewed by a board and selected based on the one that provides quality construction that matches market rate projects, provides maximum social benefit, provides jobs, and is proposed by a reputed builder. This process should be transparent; the slum dwellers association to be rehoused should participate in this process, making sure there is no political patronage. The real-estate industry lacks an industry status due to the high risk associated with it, which has resulted in extremely high lending rates that are unsustainable when the project time period is taken into account. Banks in the United States award subsidized rates for projects that help the local economy, as a way to give back to the community. A similar approach could be used for in-situ slum redevelopment projects allowing subsidized borrowing rates for subsidized housing.

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