

# “APPLICATION OF SIX-SIGMA TOOL IN RESIDENTIAL BUILDING ATANAND AVENUE, SURAT.”

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**Abstract** - Six sigma is a quality improvement technique that has been implemented in manufacturing and other industries whereas it is new to construction industry. The six sigma takes attention to the quality that customers are concerned with and also contribute to achieve efficiency and reduce costs. The works carried out using the six sigma tool are mostly for the manufacturing processes as started by Motorola Company. Here an attempt has been made that the theories regarding the six sigma tool are practically implemented in the construction industry. Hence the objective of this study is to develop strategy for applying six sigma in construction project, and to investigate the existing sigma level of project undertaken, there after proposing the corrective measure to enhance the sigma level of the project. Here DMADV tool of six sigma is applied to the residential construction project. In this research work, the numbers of defects at the site were identified for selected activities viz. concreting, flooring, ceiling, using the checklist to get the current sigma level, which came out to be 2.743n, which was later improved by using the DMADV methodology of six sigma. After finding the current sigma value, causes and recommendations were given along with the repair measures. Some of the recommendations were implemented at the site as per the feasibility. Again after that, the new sigma level was calculated after collecting the data which showed that sigma level increased to 3.415n. This result shows that the six sigma tool is quite helpful in achieving the quality not only in the manufacturing industry but also in the construction industry.

**Key Words:** Six-Sigma, Quality Control, Defects, Questionnaire Survey, Construction industry

## 1. INTRODUCTION

The importance of quality improvement and excellent performance in the highly competitive world market, lead many organizations, their top managers, project managers, and engineers to implement the new philosophies such as Lean principle, Six sigma, etc. at their organizations.

Six sigma is a highly disciplined process that helps us focus on developing and delivering near perfect product and services.

### 1.1 Six Sigma

“SIGMA” is a statistical term that measures how far a given process deviates from perfection

A set of management techniques intended to improve business processes by greatly reducing the probability that an error or defect will occur.

It also defines as Quality Improvement, Problem solving tool or simply an improvement methodology for Manufacturing Process as well as administrative and service applications that help us focus on developing and delivering near perfect products and services.

### 1.2 AIM:

Six Sigma's aim is to eliminate waste and inefficiency, thereby increasing customer satisfaction by delivering what the customer is expecting.

### 1.3 OBJECTIVE OF STUDY

To develop strategy for applying six sigma in construction project.

To investigate the existing sigma level of project undertaken.

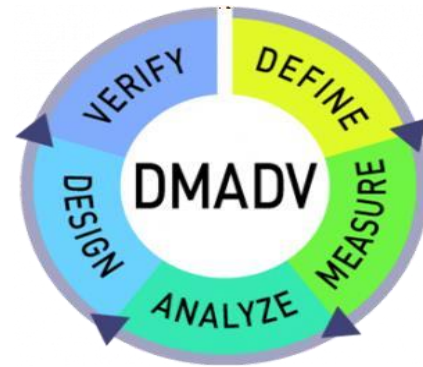
To propose the corrective measure for enhance the sigma level of the project.

## 2. What exactly does “Six Sigma ” mean?

Six Sigma is named after a statistical concept where a process only produces 3.4 defects per million opportunities (DPMO).

Sigma can therefore be also thought of as a goal, where processes not only encounter less defects, but do so consistently (Low variability).

Sigma Level	Defects per Million	Yield
6	3.4	99.99966%
5	230	99.977%
4	6,210	99.38%
3	66,800	93.32%
2	308,000	69.15%
1	690,000	30.85%



### 3 Method

DMAIC : It refers to a data – driven quality strategy for improving processes. This methodology is used to improve an existing business process.



DMDAV : It refers to a data-driven quality strategy for designing products and processes. This methodology is used to create new product design or process designs in such a way that it results in a more predictable, mature and defect free performance.

### 4 Benefits of six sigma

- Customer Satisfaction
- Sustained gains and improvements
- Systematic problem solving
- Sets a performance goal for everyone
- Accelerates the rate of improvement
- Executes strategic change

### 5 ANALYSIS:

#### Calculation of 6σ

Yield	DPMO	Sigma Level
30.9	690000	1
69.2	308000	2
93.3	66800	3
99.4	6210	4
99.98	320	5
99.9997	3.41	6

Table: Rate of DPMO in Different Sigma Level

### 6 Equation

$$YIELD = \left( \frac{\text{Total no of perfects}}{\text{Total no of checks}} \right) \times 100\%$$

$$DPMO = \left( \frac{\text{No x data collection sheet}}{\text{No of opportunities of defects x NO of unit}} \right) \times 1000000$$

## 7. CONCLUSIONS

The research has been done the three phase to achieve the objectives of the study Within the scope of research. In the first phase a survey was carried out to get an Overview of the trend about quality control at the construction site, following by Second phase to evaluate the existing sigma level at the project undertaken, and In the last phase the recommendations/implementations of corrective measure on The site were done and the updated sigma level was evaluated.

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