

Implementation of Six Sigma Methodology in Management of Small Size Construction Organization

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Abstract: This paper will give an overview of the challenges associated with management of small sized construction organizations. Those challenges are discussed in the paper, & then the six-sigma methodology concept is implemented on one of the most observed challenge in management of organization. The six sigma is a set of management tool and techniques to improve business by reducing the likelihood of errors. In this study an interview-based approach is used to identify and understand the current management difficulties faced in small sized organizations. The findings suggest that common challenges in management of a small size construction organization are an incompetence team leader, improper cashflow management, improper communication between contractor & site team, improper coordination of different agencies involved in project & skilled labour shortage. Out of these challenges, one of the most observed challenge an incompetence team leader is evaluated using the DMAIC methodology of six sigma for successful improvement of management of organization.

Keywords: Construction Industry, Six Sigma, Small Sized Construction Organization, Management Level.

1. Introduction

The construction industry relies heavily on small & medium sized organizations, any improvement in these construction organization will lead to improvement in the construction industry as whole. The success of any construction organization depends almost entirely upon the quality of its management. Management is a purpose-oriented activity. A good management is the backbone of successful organizations and managing an organization means getting things done to achieve its objectives. But any negligence in management gives an adverse impact to the organization as well as to the other stakeholders involved in it and this can lead to deterioration of organizations productivity. This deterioration of an organization's productivity can be overcome by implementing six sigma methodology concept for the improvement of management. The section title also can be copied and paste it, when you need new section and type the section heading as per your requirement.

Six sigma is a set of management tool & techniques to improve business by reducing likelihood of errors. Six sigma is

the most effective methodology available for improving the performance of any organization by minimizing the defects in its products or services. It was first endorsed at Motorola in the mid-1980s. The company was trying to devise a methodology that could measure defects at a granular level than previous methods. This resulted in an astounding increase in the quality level of several Motorola products. After that Motorola shared the six sigma secretly and soon various companies started reaping rewards. Basically, this technique was firstly being implemented in manufacturing & other industry, now it has been implemented in construction industry as well. This approach has given better benefits to large construction organizations in improving their management. So, this paper aims to implement a DMAIC concept of six-sigma methodology in small size construction organization for the better improvement of their management.

DMAIC is a data driven technique used to improve processes. It is a key tool of the six-sigma methodology. The technique is simple, yet powerful. It brings structure to the improvement process and help teams explore potential solutions, decides a course of action and implement process control. DMAIC is an acronym for Define, Measure, Analyze, Improve and Control. In brief, these 5 steps are as follows.

- Define (D): Identify the problem and issues causing decreased customer satisfaction.
- Measure (M): Collect data from the process
- Analyze (A): Evaluate the current process identify the root causes of the problem
- Improve (I): Act on the data to change the process for improvement.
- Control (C): Monitor the process to sustain the gain.

2. Objectives of Study

- To find out what are the challenges at management of construction organization.
- To study the basic concept of DMAIC methodology.
- To apply DMAIC methodology to one of the challenge for better improvement of management of construction organization.

3. Scope of Study

- The area of study is confined to small sized (20-30 employees) construction organization.
- This study will implement the six-sigma methodology at the management level of construction organization.

4. Literature Review

An article by Gerald J. Hahn & Necip Doganaksoy & Roger Hoerl – The Evolution of Six sigma [1] explains the evolution of six sigma, its basic concepts & its initial implementation. It also explains what the requirements of training program for people are involved into six sigma projects. It also explains the basic principles of Design for Six Sigma (DFSS). This paper concludes that the key elements of success are the combination of a highly disciplined approach with one that is intensely data driven, the ready accessibility of appropriate technical tools to leverage the concepts and continuing uncompromising commitment of top management. It also concludes that six sigma is highly dynamic approach & the significant element is the broadening of the general approach & this has resulted in greater emphasis on customer satisfaction and reducing variability in performance. It has led to extending the use of six sigma tools from mainly short-term manufacturing situations to longer – range product design and commercial application.

A research paper by Young Hoon Kwak, Frank T. Anbari - Benefits, Obstacles & Future of six sigma Approach [2] examines the evolution, benefits & challenge of six sigma practices & identifies the key factors for influencing successful six sigma project implementation. This paper concludes that effective six sigma principles and practice will be succeeded by refining the organizational culture continuously. Cultural changes require time and commitment before they are strongly implanted into organization. It also explains the concept of six sigma & its benefits of implementation to different sectors.

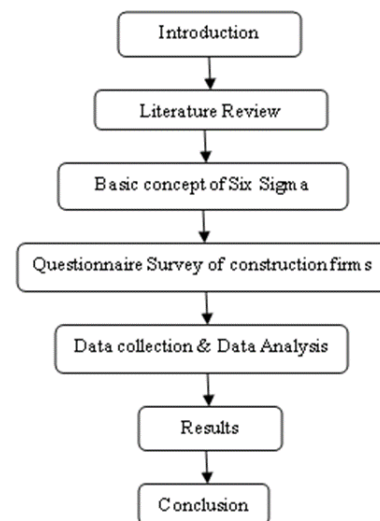
A research paper by Jiju Antony & Ricardo banuelas - Key ingredients for the effective implementation of six sigma.[3] This paper presents the key ingredients which are essentials for Six Sigma implementation. Those ingredients are generated from pilot survey conducted in UK manufacturing and service organizations. From the analysis it is concluded that management commitment & involvement is the most important ingredient and linking Six Sigma to employee (human resources) is the least important ingredient for the six-sigma program.

A research paper by Mehmet Tolga Taner – Critical Success Factor for Six sigma Implementation in Large Scale Turkish Construction Companies [4] investigate the critical success factor (CSF) for successful introduction of six sigma in large scale Turkish construction companies. A survey-based approach is used to identify the continues improvement (CI) initiatives commonly practiced in large scale Turkish construction companies as well as understanding the approach of these companies to six sigma. Involvement and commitment of top management, linking quality initiatives to customer and

linking quality initiatives to supplier are found to be the most important CSFs to the construction companies. Leadership and commitment of top management, cross-functional teamwork and commitment of middle managers are found to be the most CSFs for successful introduction of Six Sigma, whereas lack of knowledge of the system to initiate and complacency are found to be hindering its implementation. High costs and high amount of waste are found to lower the performance of Turkish construction companies.

5. Methodology

In this study an interview-based (Survey) approach is used to identify and understand the current management difficulties faced in small sized (20-30employees) organizations. The survey is carried out in the 6 (n=6) small sized construction organizations among their top – level managers and owners of the organizations. They were selected for the interview due to their knowledge about the organizational structure, culture and strategies. This study was structured as follows:



6. Results and Tables

The respondents of interview-based survey were asked about what challenges in management of their organizations are. Then they were asked about which is the factors that hinder the improvement of management initiative in their organization. Following this they were asked about which factor is important for the successful improvement of management initiative in their organization. After conducting the interview-based survey in 6 small size organizations findings observed are as follows:

- The top 5 challenges commonly answered by the respondents involved in the management of organization.



Fig. 1. Challenges faced by management of organization

- The factors that is hindering the improvement of management initiative in their organization.

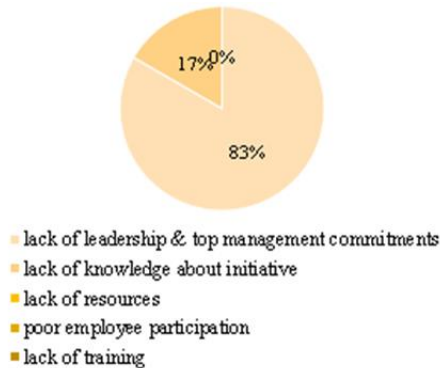


Fig. 2. Factor that is hindering the improvement.

- The factor which is important for successful improvement of management in their organization.



Fig. 3. Factor that is imp. for improvement of management.

After analyzing the findings of the survey, it is observed that the most answered challenge is skilled labour shortage, but this activity is related to on site management and since this study is about the management of organization, so I am considering the second most answered challenge incompetent team leader for implementing the DMAIC methodology for better improvement of organizations management. DMAIC methodology is as follows:

Define: In this study, the second most answered challenge in management of organization is incompetent team leader. And the factors which is hindering the improvement of management initiatives in organization is lack of leadership and top management commitments. The organization is facing this management challenge because of incompetent team leader and team leader is incompetent because of lack of practical knowledge, poor communication skills, lack of team building skills, poor decision-making quality. Also, team leader lacks in leadership because of lack of proper appreciation is given to him. Leadership is one of the most important factor determining the success of a company. Poor leadership can cause the organization's bottom line to plunge.

Measure: 23% respondents answered that one of the significant challenge that is affecting the management of organization is incompetent team leader, 83% of respondents answered that factor which is hindering the improvement of management initiative is lack of leadership and top management commitment. And 80% respondent answered that one factor which is important for successful improvement of management is leadership & top management commitments. The challenges faced by incompetent team leader are as follows. It is observed that 40% answered that lack of practical knowledge is one of the reason. 20% said poor communication, 27% said lack of team building skill & 13% poor decision-making quality is one of the reason for lack of leadership and incompetent team leader in the management of small size construction organization.

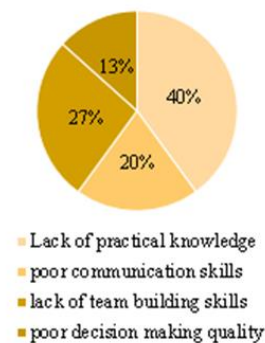


Fig. 4. Reasons of incompetent team leader

Analyze: For analyzing a cause and effect diagram tool is used. cause and effect diagram examine why something happened or might happen by organizing potential causes into smaller categories. The major reasons for incompetent team leader are lack of practical knowledge, poor communication, lack of team building skills, poor decision-making quality, and the one of the significant reason for lack of leaderships are lack of appreciation and lack of team building skills. The lack of practical knowledge challenge is observed because there are no formal trainings that will give them practical knowledge. Poor communication is observed because one of significant reason that is lack of confidence. Lack of confidence is indirectly because of lack of expertise in subject or matter. The poor

decision quality is observed because of lack of clarity of objective of work, mismanages resources, because of lack of confidence they don't themselves as they can lead.

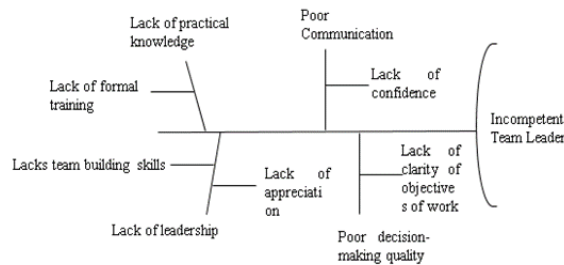


Fig. 5. Cause and effect diagram of incompetent team leader

Improve: Though Academics and practical knowledge are correlated yet differ invariably. Practical knowledge is the actual implementation of the theory. To improve practical knowledge, one must gain hands on experience through different projects. We should provide them proper formal training. Also, one can attend various workshops to get feel of the experience. To address the challenge of communication there should be sessions on written and verbal communication and, we should conduct some confidence development workshops for them. One must practice communication as it is the only key. To improve lack of team building skills, team activities play vital role. Activities also help strengthen the team bonding. Decisions are the important steppingstones of any project. It requires lot of analysis blended with knowledge. Thorough study of trends and resources will help analyze better. Also, any decision taken can be converted to goal with confidence and proper management. To improve lack of appreciation we should reward them with some incentives and appreciate them often. By doing this the lack of leadership can be overcome.

Control: Control plan will help us to check on the various preventive measures which will help to achieve the desired result. Control plan is a description of the procedures, checks or assigned activities with respect to specifications, marking and performance. For lack of practical knowledge, conferences to keep updated with latest trends and workshops will help as control plan. For poor communication, Frequent session on soft skill will help as control plan. For lack of team building skills, Outings, Team building fun activities every month will help as control plan and for poor decision-making group discussions with team members will help have different opinions or views can be considered before taking any final decisions. In lack of appreciation, by giving them rewards and incentives after every successful completion of project can be used as control plan.

7. Conclusion and Recommendations

This paper analyses the challenges faced by management of small-scale construction organization and tries to mitigate those challenges by implement DMAIC concept of six sigma methodology on them. Finding concluded that one of the most important factor for better improvement of management is leadership and commitment of top management and 23% of respondents answered incompetent team leader is one of the most faced challenged in small scale organizations. So, after evaluating this challenge by implementing DMAIC, the root causes of team leader incompetency are lack of practical knowledge, poor communication, lack of leadership. All these challenges are faced because of no formal training is given to them, lack of confidence, lack of team building skills & lack of appreciation. We can improvise this challenge by arranging formal training, conferences & workshops to keep them updated with latest trends, by providing frequent sessions on soft skills and by arranging outings, team building activities every month, by appreciating them frequently by giving them rewards and incentive to keep them motivated will help in overcoming the challenges of incompetent team leader. So, after implementing the detailed methodology based on six sigma principles an organization can get a systematic approach to identify and overcome challenges faced in management of organization and can improvised the current process of their management.

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