

Methodologies to Reduce Defects in Ceramic Products industries: Application of Continuous Improvement Processes

¹Prof. Sagar Patel ²Dr. Mohammad Israr

¹Research:Scholar, Rai University & Assistant Professor, L.E. College Morbi

²Department of Mechanical Engineering, Sur University, College, Sur, Sultanate of Oman.

Abstract

Theoretical Continuous Improvement is a key component in any business methodology, In any case, because of the qualities of the ceramic area, it is particularly intricate to try it. This paper depicts the work in progress to endeavour to diminish deserts in development artistic coatings apply-ing ceaseless change devices. When information have been gathered, needs were set up for the execution of the enhanced venture, in light of measurable instruments for continuous change. The procedure of examination is clarified in this paper, and additionally the motivations to develop the investigation concentrating on the inadequacies of this working section, in order to build up systems to diminish disappointments in it.

Keywords: Continuous improvement • Quality • Management • Infrastructure and housing failures • Infrastructure and housing defects

INTRODUCTION AND AIMS

This paper presents a research Project carried out on the Continuous Improvement process within the Quality Management Systems applied to Infrastructure and new Housing infrastructure and housing projects. .

Practically all Management models (ISO 9001, Six Sigma, Total Quality -Management TQM, Análisis de Modos de Fallo y Efectos) [1] defend Continuous Improvement as one of the most important processes in quality assurance. Industrial sectors in general, as can be seen in the existing literature, started to integrate improvement projects some years after Deming claimed the statistical techniques applied to quality, in Japan, in 1948. Today, the “Deming-Steward circle” is widely known: Plan-Do-Check-Act.

Be that as it may, because of the singularities of the framework and lodging part, and the persistent utilization of models propagation, executing change procedures and estimating the outcomes isn't simple, as it would have been in a sequential construction system.

By and by, in spite of challenges, the best way to enhance is to know our mis-takes before actualizing activities to anticipate redundancy. To this end, we are chipping away at the examination of foundation and lodging disappointments and planning a procedure to actualize change designs and surveying their execution.

The points of this paper, which accumulates the advance of the on-going exploration work, are the accompanying:

- Briefly clarify the measurable quality apparatuses connected in the examination.
- Present the characterization work of rates distinguished in seven framework and lodging works.
- Establish needs to empower setting methodologies of the potential change projects-.

RESEARCH METHODOLOGY

History of Continuous Improvement

Today we have accepted "nonstop change and development as basic to contend temporarily and to make due in the long haul in a globalized economy condition" (our interpretation) [2]. Each creator, administration model or brilliance demonstrate in administration safeguards this start. In spite of the fact that far has been fol-lowed—since the bosses started to spread these thoughts - despite everything we have far to go in the framework and lodging area. Our nation, Spain, is especially postponed when contrasted with United States or England, for instance.

Juran [3] and Ishikawa [4, 5] have completed an awesome activity upholding and spreading the advantages coming about because of the usage of the Continuous Improvement as a fundamental procedure to develop from the "quality affirmation" to the "Aggregate quality" and "Quality Control" [2, 4].

In 1962, Ishikawa started to present Total Quality in Japan through the Quality Circles, insisting that, "utilizing all out quality control with the cooperation of the considerable number of representatives, including the President, any organization can make better items (or administrations) at bring down cost, and additionally expanding deals, enhancing the utilities and transform ing the organization into a best association" [4]. The idea of "add up to quality control" was contrived by Armand V. Feigenbaum in the 1950s [4], however he contended that the TQC ought to be in the hands of masters, rather than Ishikawa's approach, whose thought has achieved our days.

In Spain however, within the infrastructure and housing companies, the quality assurance -systems did not begin to be implemented until the 1990s, based on the ISO 9001 standard and today, Total Quality has not yet been integrated.

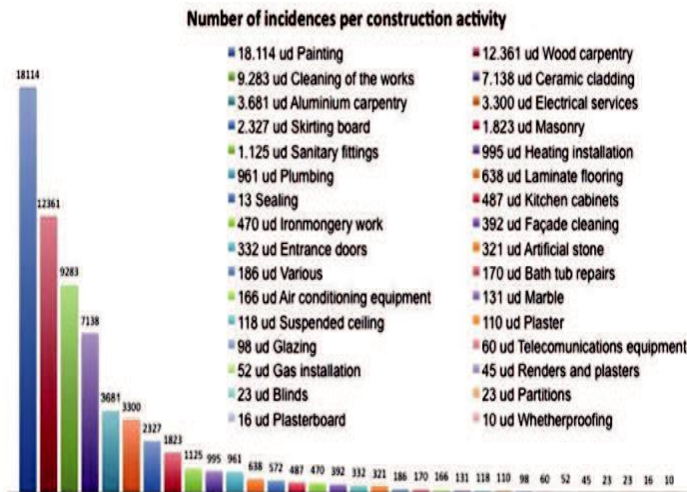


Figure 1. Stratification historiogram of the number of defects per infrastructure and housing activity

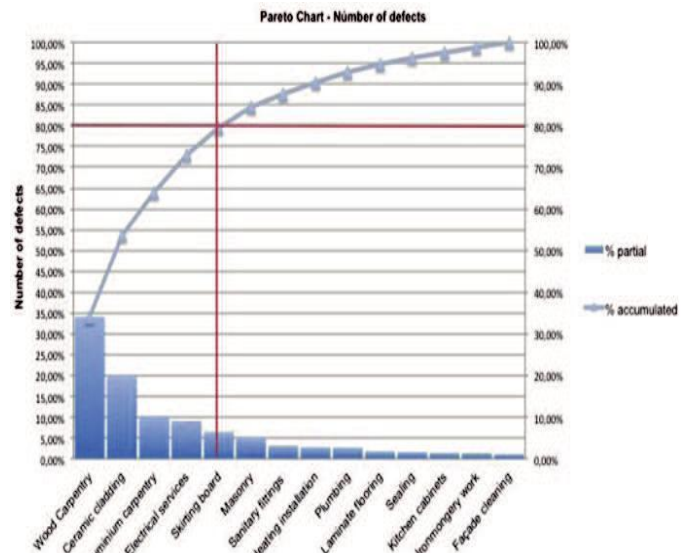


Figure 2. Pareto Chart—Improvement prioritizing

The latest version of the ISO 9001: 2008 standard stresses the importance of the continuous improvement process and defends the principles of Total Quality: i. e. fo-cus on the customer, address responsibility, company involvement at all levels, etc.

Our research project aims to establish a methodology, which will enable the implementation of improvement projects in a simple way in Infrastructure and new Housing infrastructure and housing companies.

Improvement Applied to Reducing Defects

As Ishikawa states: “The seven tools of quality control, when used skilfully, allow to solve 95 % of the problems of the different jobs. Intermediate and advanced statisti-cal tools are only needed in 5 % of cases.” [5]. These seven tools are:

- Pareto chart
- Cause and effect diagram (or Ishikawa diagram or herringbone).
- Stratification
- Verification or check sheet
- Histogram
- Scatter diagram
- Control graphs and charts.

In the first phase of our study, we have worked with the “Check sheet”, taking data from five housing infrastructure and housing works, and collecting a total of 65. incidences. These incidences have been classified in different categories regarding the “Stratification” tool. [6]. All these data was obtained thanks to the collaboration of SME companies around MORBI, whom we want to express our gratitude (Fig. 1).

Because of the low effect on repair cost of the foundation and lodging exercises with more rates: painting and cleaning works, we chose to isolate information and spotlight on exchanges with the best effect and speaking to over 1 % of the aggregate. With this information a "Pareto outline" is spoken to giving data to "decide the recurrence or the relative significance of different issues or causes" and focuses "on fundamental issues arranging them as far as significance" (our interpretation) [7; Fig 2].

As can be seen, 80 % of the imperfections are amassed in 5 foundation and lodging exercises:

- Wooden carpentry
- Ceramic tile cladding
- Aluminium section work
- Electrical installation
- Decorative board

Prioritizing to Establish Strategies

At this point we have to decide in which trade we are going to focus our efforts to try to implement action and control protocols in order to achieve a significant reduction in the defects produced. “Often the first two or three types of defects comprise at least seventy or eighty per cent of the total.” “Is clear that if we eliminate these specific defects, we will have eliminated most of the defects and the fraction of faulty units will decrease dramatically,” (our translation) [5].

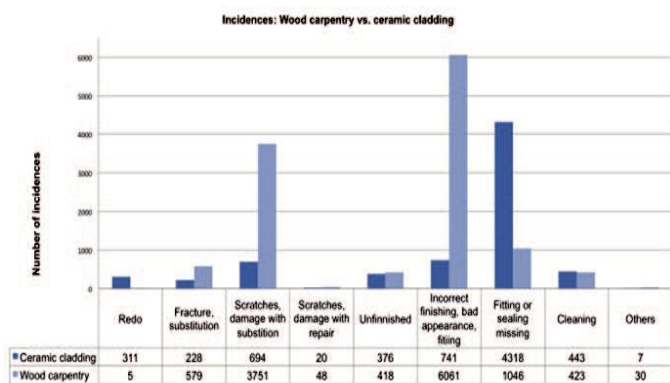


Figure 3. Incidences in ceramic tile cladding

For this situation, before concentrating on particular deformities, specific framework and lodging dynamic ties will be the focal point of intrigue. Our Pareto graph demonstrates that the two framework and lodging exercises with the best convergence of occurrences are wooden carpentry and artistic tile cladding.

Deformities in these two gatherings were dissected by the other arrangement classes: activity compose for repair; repair cost reality; affect earnestness in the corporate picture; and cause creating the frequency.

The accompanying table looks at the impacts of these two exchanges as indicated by the sort of activity (Fig. 3):

In this figure, a significant distinction can be found in three gatherings:

- Scratches or harm requiring substitution or repair.
- Poor completing, terrible appearance or absence of fitting. The component, or piece is finis-hed however in a wrong way or it looks terrible.
- Sealing of a component is flawed or wretched. It requires this activity for working effectively.

Investigating the different gatherings, the accompanying conclusions can be drawn:

- In the main gathering, in spite of the fact that the quantity of occurrences is far more prominent in wood carpentry-attempt exchange, supplanting a stage or cupboard entryway is normally a quick and clean task, however substituting a divider or a story, completely or halfway, substantially affects the work and, it can by and large impact different exchanges or foundation and lodging exercises. This implies the need ought to be to take a shot at absconds in fired tiling.
- Something comparable occurs in the second gathering. Essentially, a tasteful defect does not in fact require substitution or reprocessing as it falls inside the allow ted resilience's. It is in any case, a potential claim the property clients may do, and every so often, it may bring about the need to re-try the flawed region. For this situation, and also in the past case, the effect of cost and time in the clay tiling

movement is more prominent than in that of wood carpentry

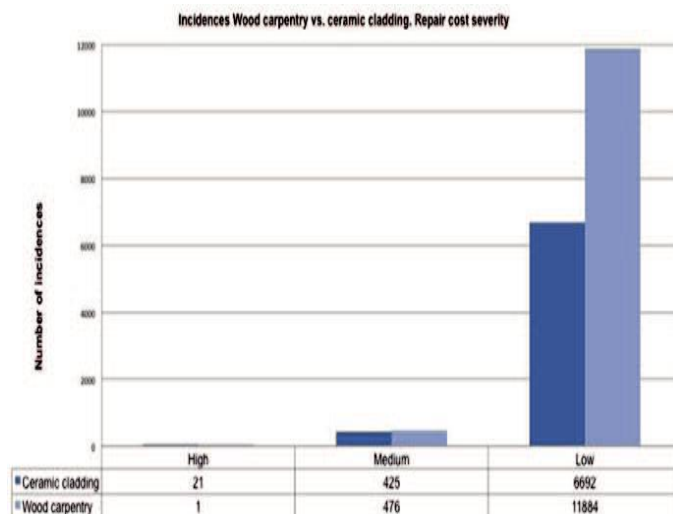


Figure 4. Incidences in wood and ceramic coatings classified by repair cost

The third group includes minor repairs, which can easily be fixed in both cases. Occurrences are more frequent in ceramic tiling.

In addition, the incidence between both infrastructure and housing activities classified in the other three categories are compared: seriousness due to cost of repair; impact seriousness on corporate image; and cause that produces the incidence.

The most important conclusion in these cases indicates that 96. % of the incidents of the woodwork belong to the group of low-cost repairs, confirming the conclusions drawn in the comparison previously commented (Fig. 4).

FUTURE RESEARCH LINES

As per the examination up until now—summed up in the past areas—the re-inquiry will be taken after taking a shot at the change task of the deformities found in the fired claddings. The means to be satisfied are:

- Study of the rates in the clay cladding gathering.
- Defects stratification by types.
- Histogram and Pareto outline to build up activity needs inside the deformities of this action.
- Proposal of Protocols and Verification/registering sheets to consider in the framework and lodging stage by the labourers and the subcontractors playing out these occupations.
- Collect information in new framework and lodging attempts to decide the level of change got.

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