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Adoption of Six Sigma Tools in Construction

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A B S T R A C T

Six sigma tools are prominent and essence problem solving tools they can support the entire process of six sigma and then improve the work as per standards. The concept of six sigma is adopted to achieve an required effectively both substantively and qualitatively.The tools and methods of the six sigma are the prominent tools to improve the work with an error free processing and then lead to increase performance of work reduce and reduce the redundancy then greater the profits and adoption of good quality managerial product services with an good amicability. The main aim of the six sigma concept an this tools is to allocate the where the defects are occurred and determining them and think to reduce those defects and how to improve the work and how to reduce the repeatable defects can be probably taken as concern and then improve the accuracy of the work.It is an one of the systematic managerial technique to find the defects and provides the methods to solve those problems for the particular field of the wok. The objective of the six sigma is eliminating what are causes that are behind the defects in the particular work and arbitrary as well as appropriately reduce the variation of the work.

Keywords:DMAIC, six sigma concept, six sigma tools, wastes in six sigma

1. Introduction

While each and every six sigma tools should have particular standard information they can adopt the based upon the problem that can be encountered so that they can reveals the scope and role of the particular work.The main objective of the six sigma tools are to eliminate unnecessary troubles and meets the goals and taken appropriate warranted action and then prominently control those defects and then estimating with respect to the standard deviation of the set of data.So they can depict the work as per the required standards and then allocating the erroneous and predictable impending problems and evaluate those defects and consistently eliminated those abrupt defects that are encountered.The six sigma tools having the following feature such as verify the scope of the work, and then adoption of control schedules then eminent to masticate the quality control techniques, then execution can be started with performance report and access the control of risks and finally administer the procurement of the culminate works.

Then based on the priority the pro motive concerns can be effectively implemented with respect to the assured tools with respect to the particular encountered or arisen problem. The essentials of the six sigma tools are they can reveals the specifications of work and represents input and output resilience work flow , mention the processed existed and sampling and reporting the executed works and then finally documenting the information and taking the actions as per the particular interference that we obstructed.So six sigma tools are key to the reduces the variations on constructional activities with respect to the blog of defects they faced are arisen. So " DMAIC" is an concurrent methodology in the six sigma concept they can determinedly gave the information regarding how the problem can be solved with respect to the six sigma in the each of the " DMAIC" so that they can be gave an idea about how the problem can be resolved by following such as define the problem and cluster the testament of the problem and masticate the requirements, then measure the problem in an amicable manner and gather the all data. After that analyze the causes and defects where they occurred, then follows the improve the work based on the reliability of the processing, finally adopt the control plan in an appropriate manner to reduce variations and achieve the

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required efficiency and also sustainable to achieve the economy.The DMAIC is attempting to improve the existing process and then eventually reduce the defects in process flow of the following methodology. The main goals and objective of the six sigma and their tools is to deliberate the defects and reduce the expensive variations and adopt an systematic managerial techniques to over come those problems.While DMAIC is an data driven improvement methodology adopted for increasing, reducing, and standardizing the process and executed works o it creates an essential frame work for the entire six sigma concept. It is an general standard procedure to introduce and eliminate those defects.So, finally DMAIC is an conceptual methodology in '6 sigma' the concept is eliminate the variability and improve the locality of the construction work and reduce the complexity of the work and reduce or exhibits with mean variations and extremely lowering the deviations.So the main agenda of the six sigma is it is an statistical methodology and then inclusive with "DMAIC" concept and then initially observe the problem and adopt six sigma tools to reduce the wastage's and improve the performance and efficiency of the work

2. Methodology

2.1 DEFINE [to identify the problem initially]

- In the define phase the problem can be defined with respect to the following such as
- Indicate the problem fore mostly
- Resembles the aim and scope of the project
- Clustering the requirements
- Defining the objectives
- Opportunity of the defects occurred can be probably known
- Identify the working desiccate
- Finally views scope and aim and reveals with the integrated with problem that occurred
- The objective of the define phase clearly says that to define the problem forts then understand the problem and measure the what are the requirements we need can ultimately known.

2.2 MEASURE[to measure the problem with data arrived from define phase]

These can involve the analysis of data and then studies numerical archives these pertain to following for problem measuring.

- Scattering the information
- Validation of the problem
- Identify root causes then quantification of the variance
- After inclusive of the measurements
- Restructuring the data
- Adoption of current or standard process that can be measured
- Accounting the base line problem
- Collect all relevant information regarding the problem
- Finally measured data can be measured in units

2.3 ANALYZE[analyze the problem with data that can be taken from measure phase]

The prime objective of the process as follows in the analyze phase such as

- Identification of the problem in the work flow
- Represents the caused and defect work
- To denting the spots of the problem
- Gathering information can be appropriately analyzed
- Focused on the cause reliably
- It is an deliverers the phrases of gap opportunities of the currently entitled work
- Bring the information from the measure phase
- Analyze the problem with grid charts, flow charts. Or process flow charts
- Finally analyze the problem in appropriate manner.

2.4 IMPROVE [improve work by considering problem with respect to analyze phase]

In this phase while we finally concluded the solutions for the endeavour problems that we are facing and it is an mostly an innovative and creative stage of the DMAIC. Because it should not completely relied on the analysis of the statistics and they adopt an procedure to post the questionnaires the people of the concerned authorities and they finally gave an idea about the problem and with respect to the particular solution.

- These pertains to following process such as
- Initially they identify the problem
- Then adaption of the solution based on their address of the issue
- Execute the work with an potential solutions
- Evaluating the execute solutions and instead of that once e test the solution that we can adopt
- It is also called as deliverable s phase
- Finally they masticate the possible solutions with respect to the particular problem is generated
- So they develop the ideas and to remove the variance in the processing and then standardize the procedures and then substantially shows the strategy they developed and they implement the process changes and then finally confirms the diffidence in measuring also.
- The main prominence gave these phases because entire that cab b thoroughly accurately analyzed with this phase so that we conclude the work with proper idealization.

2.5 CONTROL[adoption of control plan to reduce the defects for further occurrence]

In these stages we completely lower the defects by adopting control plan the way of procedure they follows such as

- To adopt an control plan with respect to actual changes occurred instead of what actually we need plan can be properly accessed
- Then after we can monitor the work at an regular and frequent intervals and adopt the writing action plan
- Then finally they bring the variance with in the limits
- they comparability increase the performance of the work to lower the concentration of the defects
- Then they executing works in an appropriate and specified manner
- Finally control;l phase shows that the solution that we implemented is to adopted, recorded, and then monitored then executed the work as per the needs and then necessitates.
- The corrective action taken in the control plan is
- Monitor the work
- Measure the inflow and outflow of proceeding
- Methodology that involved in the execution
- Adoption of the actions regarding augmentation, recording, and standardizing the final potential solutions
- The control charts are essentially adopted to controlled the defects and clearly executed the work under the standard limits.

Figure :1 Methodology of the Six Sigma Concept

3. Wastes In Six Sigma

3.1 Defects

Defects are nothing but the flaws in the work we proceed this causes the endeavor and creates an danger situations and conditions they can caused many factors regarding human, design, executioner errors. So care should be taken prior to work to be done

3.2 Excess Processing

this is the typical waste reefers us to adoption of more workman for the double handling of the material so that it will lot effect the economy and optimizing the work progress s as far possible we exercising defects, precising can be done in efficient manner so hat they an be probably reduced as much as level you need

3.3 Over Production

Over production is a some what similar term that tells us that to produce the amount of materials in excess quantity it means there is an clear overlap between the production of material. This type of waste occurs due to negligence in the amount to produce effectively, lack of awareness, inability in planning, and faults in execution .so we can maintain the proper standards for these aspect can be well known

3.4 Waiting

The name itself indicates the wait for the actually has to be executed that is to be delay. It can cause the lack of material source, and lack of skills and lack of management, and their set of instructions can be can be probably known waiting will look like a shorter described issue but there is an an lot of inconvenience in the entire frame work completion.

3.5 Inventory

To produce the source of material from the source of the availability of raw material so it can be deliverable tells us that with the proper indication of backup source of an raw material then only wee can produce amount of inferior goods with an acceptable limits. So that we can arrive with the material and goods to complete or work possibly on time

3.6 Transportation

Due to lack of existing transportation system with in the site to transport materials can cause the disruption with an lot on economy. It means they require lot of maintenance such as parking, washing, fueling, servicing. So care should be taken while before adoption of existing transport system we can be aware of that at what location we can place an economical route to haul the material with optimized economy can be well known.

3.7 Motion

Time and motion are keep interrelated based on the time we can complete the particular task of the work on time so that we can concluded that we can carry a specified work under standard conditions is necessary.Ensure that proper time planning is necessary to complete the particular task so we can probably known well before we can executed.

3.7 Non Utilized Talent

Non utilized talent means even though he has skills and he cannot adopted in the execution of work because of its lack of negligence and do not know about roles and scopes and perform the work.So as an coherence an high level superior can take the lead to allocate the people based on their skills and efficiently adopted a an educated guess for us and complete the work effectively.

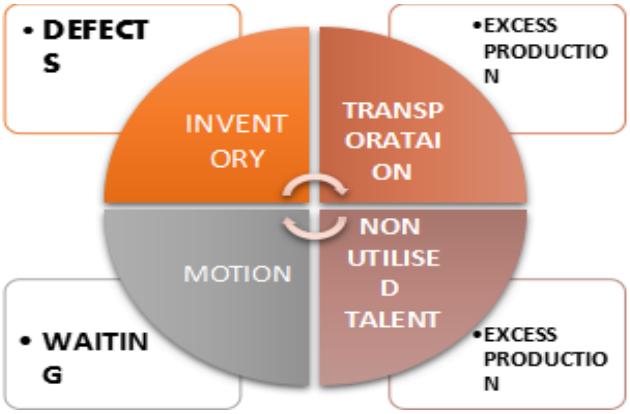

Figure : 2 Wastes Condired in Six Sigma Concept

4. Adoption of Six Sigma Tools

4.1 Define

4.1.1 High Level Process Map

It is a simple impediment process to illustrate or enumerate the task which can be done to represent it' s importance based on their primary needs.

Used In

The main use of the this tool is to picturesque the importance of the concerned works tat are involved.

Adoption

In the construction field the high level process map helps the to know the importance of the work based on their behind ed background

4.1.2 Project Plan

The definitive means of the project plan is to be indicate the project scope, establishment, works involved, objective of work criteria to be executed and requirement of their needs can be compensated.
So that to complete the project with in the elapsed tome.

Used In

The entire or whole some work of the project can be documented priory with some technical meetings based on that we will done the assumptions and decisions.

This augmentation document the tells us that where the work started how to complete it successfully.

Adoption

In the construction it plays very much key role because construction industry is an diversified industry compared to the other industries.

So it can be used as an on boarding process and decision can be taken based on the importance and objective of the work and scintillated the services what you done prior to execution

4.1.3 Communication Plan

It is an one of the superior formula behind it to complete the project on time successively so it is an policy driven approach with proper communication we will get and obtain good results with proper flow of information

Used In

The main advantage of the communication plan is to indicate what are the roles performed each worker is efficient or not can be properly enumerated then aware of the essentials of the project work and takes as an motivational lead to bring the work with an quality standards.

Adoption

In the construction they are so many workers are involved so each and every task can be performed various workmen at various allocated divisions so through proper communication from the bottom line of worker to the top of the supervisor can take lead and proper flow of information and he known the how the work is performed and how to improve the work can illustrated with this.

4.1.4 Validate

Validate means the it will shows that it is the particular work or task or opinion is true or fact and acceptable or not can be appropriately known validate can be hear by say as an distinct tool for particular decision.

Used In

Validate to check the work with the suitable data or with the experienced foreman opinion is the decision is valid or correct can be properly accessed, so it is used as an verification tool for the particular work.

Adoption

In the construction for the particular work so many decisions can be illustrated for the particular work or same but one decision and opinion valid with their experience that set of instructions can be accessed and then meet those in to ranking criteria and then analyze the results finally concluded the right decision and then execute successively without prior interpretation

4.1.5 Finance

It is not represents any tool but for any task and work we executed they can have behind its good back up resource. So that's why finance plays an vital role to complete the project successfully.

Used In

To complete the work smoothly with out prior interruption , then o immediate reach of the elapsed work and ensure that work completed on time.

Adoption

In the constructional activities finance plays an key role, with out the inflow and outflow of the cash cannot complete the work successfully .so it can be specified for the effective management of the construction

4.1.6 Character

In the construction a complex workers are involved based on their physical and mental conditions so we can prior to distinguish with each other and then create an environment to workers to complete the particular proceeded work without an ambiguity efficiency.

Used In

The character can be influence the mode of the work that can be carried out, the main six six objectives of the character of the worker indicates the truth, worth, responsible, fairness in execution, care about the work, good good faith fullness

Adoption

In construction the workers have different attitude so member the each worker and then grouped according to their skills and gave prior motivation and maintain proper interrelationship with respect ti executed work and complete the work successfully.

4.1.7 Final Project Solution

The problem that we faced in the execution can be properly understood first and identify what are the root causes and pin point where the defects occurred then address the outline of the project solution of the current situation and with an effective manner.

Used In

The main uses and in the initial part will be understood the problem that we faced and clear about what is the root cause to transform the plan in effective manner to overcame those inferior problems and gave prior solution for the particular work and once we instead check the solution is it effective or not.

Adoption

In the construction the manager of the particular project is responsible for if any project that is failed with the works negligible or execution difficulties what ever it is in those circumstances the implement the final project solution as an tools and interact the workers to know thew masticate mistakes have done carried out and gave an clear inferior report then do the work with an effective manner.

They include the following such the way of process involves as initially identify the problem, access the possible solutions to sustain suitably alternatives , then list out the possible solutions that are validate very much, after that eventuate the solution that we approach,then select the one best solution that we proceed, finally select the argumentation option and concluded the work in an effective manner.

4.2 Measure

4.2.1 Sipoc

It is an one of the tool to describe the whole process of inputs and outputs in the tabular performa. The Sipoc stands for supplies input and process output and customers.

Used In

The main objective and use of the tool is to indicate and represent or identify the what are the need and requirements for imprudence of the work or project prior the work has been started, then they can enumerate scope of the project and use as an effective tool in the complex process.

Adoption

In the construction it is used as processing map, they can adopted as an modular sheet by means to check the what are the needs and requirements can be well known, and also identified the progress of the work, and it is also used for warning tool for execution works.

4.2.2 Time plot

Time series plot has used as an measure the time to complete the particular progressed work then illustrate of the graph on the x-axis that we consider the and y- axis as ordinate as variable that we taken are measured this graph we can analyze the trends of the work is executed on time or any delay if any can be accessed.

Used in

the main and primary concern of the time plot is to picture the work progress in the form of graphical template. Because the data that we taken is discreet and continuous .so they can simply influence and describe how the work is carried out on daily or weekly basis with respect to the time period have to be done.

Adoption

In the construction it can be used as an measured device to enumerate the tasks we complete and how the patter en of working is done is the work done as per the time standards are not can be accessed.

4.2.3 Frequency plots

Frequency plot can be adopted as an summarizing tool for the particular distribution of variance. In this the entire computations are done by following such as the response of variable that we get can be divided into equal intervals and distributed uniformly and then with respect to this we can calculate the variance of particular work.

Used in

It can be used as an how the frequency of the activities can be carried out on daily basis or with respect weekly/ monthly can be properly accessed and then if any inferiority occurred on the execution of tasks are works can be enumerated as you many and then concluded the work effectively.

Adoption

In the construction the frequency plot can b used as an efficiency plots by means to know the flow of work and the effectiveness of progress of the work can be properly illustrated .so it is one of the effective tools to describe the way of the work can you plotted.

4.2.4 Box plot

Box plot represent the it should consists of the group data and that should be depict the group of the data the we numerically obtained through the questionnaires.

The feature of box plot is they indicate the variation if any defects that are arisen during execution they consistency extending lines and they can ultimately indicate what amount of variance occurred with respect to the booth upper quartile and lower quartile. So simply depict how the variation occurred.

Used in

It can simply summarizing of group of data intervals that we measured on the frequent sale intervals. Then we easily understood the defect percentage , if is an self explanatory tool the distribution can be simply shows the distribution that can indicates the variation in the processing techniques can properly Ma canted and understand.

Adoption

Similar to the all graphical plots but it has an own way to represent the defect the percentage with respect to variety of feature own construction where ever the delays in the transportation and delays in the materials transport from the source to the site can be represented by variation of efficiency of the work . soits can be used as an effective tool in constructional aspects.

4.2.5 Dot plot

Dot plot has an simple performa of the picture that data that we obtain in the site or any processing area. It is also called ad strip and dot plot, they follows an that should be represents in two dots in linearly upward extending individuates the what time and what level the effectiveness of the work is reached or carried can appropriately known so each dot represents the one activity based on their consideration and assumption they can vary.

Used in

Usually the dot plot are used in continuous data processing, qualitative estimates, unavailability of the data that can get properly place don the abssica of the graph . Fortunately they are simple statistical plots high level variations and clearly depict the effect behind defect accessed in subcutaneous way.

Adopted in

In construction it can be adopted in small and middle organization structured because higher the data in the defects can statically different in the plots about their advantages is they concerns the numerical information distinctly.

In construction they can also adopted s the activity measurement means it division can Cary different activities simultaneous they can vary with skills and execution methodologies .so they can be properly and simply analyze with respect to this tool to known the progress of the work.

4.2.6 Histogram

Histogram is an one of the graphical template and tool in six sigma it is very much use full for the analyze the group of data into points and into the specific range's it means the data should be indicates in bars and the level of variation shows the depicts of work variance they can condense the series of data and then interpreted with an simple and computational manner the entire graphical plot is some what logical manner.

Used in

It can be used as early we seen easy tools adopted as an to a summarize and discrete tool the entire plot visualize the whole some of numeric points in an specified range, and these re also called as bins they possess the similar characteristic of vertical graph. The main objective is used as an surface smoething that is what are needs that can be priory we can accessed.

Adoption

In the construction it can be used as an resource leveling and some thing technique by means is that are the needs and requirements for the next stage of executed work can be properly accessed and then interpret specified ranges based on importance and availability if resources.

4.2.7 Cell intervals

Cell intervals data is indicates the measured scale it means the data that we measured is uniformly distributed row of cells and they scaled in to proportion as we required.that intervals that we taken are in cells are in numerical because they can simply interpret percentage of defects in an standardize scale

Used in

They can be used as time devices it indicates what ever the work that we carried can be placed as an set of instructions and then placed in an frequent with the time constraints of the particular activity.

Adoption

In the construction they have lot of activities are involved so each having the different character so they can plotted in the cells of rows in columns and placed uniformly in the standard performa and then analyze with statistical tool at what level we improve the work can be accessed exactly.

4.2.7 Spaghetti diagram

The spaghetti diagram reveals and relatively shows that it should consists of an continuous drag in the with an tracing path with these we can access the activity that we can lowering extremes by means loss its efficiency in the execution they can visualize entire work that can we execute and enable and identify redundancy to remove those reductions and complete work successfully

Used in

the spaghetti has own feature of data interpretation because the construction line that start it indicates the activity and origin point traces the activity progress, so we simply gave an idea about the is the work carried under standards as we actually we planned or not.

Adoption

In construction the spaghetti can be used as an minimizing tool it reassembles what ever the work carried in the so we can continually monitored and then augmented with emergent documentation and then if any work is not under satisfactory level can be properly cross checked with simpler represent ion diagram.

4.2.8 Pareto chart

it is an essential tools used as an interpretation of data revelation . this consists of the both bars to fix the specified ranges and lines for the efficiency measurement the both cumulative of the bars and lines can resultant is called Pareto chart.

Used in

They can used as an indicate the frequency of defects occurred with both advantage of lines and bars so they can advantageously overcame the obstacle then imprudence of the work that we can carried out so it is used as an developing tool indicate what remedies taken with respect to defect we observed

Adoption

in construction these graphical plot can used as the to identify and indicate problem or obstruction faced by the particular firm. So they can effectively address the problem and immediate remedy can be adopted with respect to the level or importance of the work.

4.2.9 Data stratification

The name it self is explained the to sort out the group of data that we collected then analyze these data into layers with their parent source of gathering information. It should inclusive of group of data is combine together and analyze in chronological order.

Used in

It is used as an random sampling tool many of the workers re used these because of special feature as such separation of data based on their levels of importance .so they have properly to divide the data homogeneously with random sampling process and entire process is some what exclusive . so it can be indicates what are the basic need to complete the optimum activities with in the time line schedule.

Adoption

In the construction the works that are executed they are inter connected so we can take care about these issue. Because, if any failure within the context leads to an major distribution so there is an time monitoring id necessary, so with respect to tools we can collect all data stratification will enable the good results because the activities that are carried is under standards are not can be properly accessed.

4.3 ANALYZE

4.3.1 Cause and effect diagram

These are the diagrams to identify the root causes of the problem and then adopt an potential solution for that in an specified range. So it is an specified tools to org anise it logically and obtain a possible solution for a particular problem graphically or diagrammatically so that why we can aware of the work and the scope essentially.

Used in

It is a specific tool adopted for the to identify the to sort out meagre data that present and shows the data in the systematic manner and for a specific problem and properly access the factors that are influence can be known well before by using these.

The main objective behind these is what ever the probe-lm that we encounter can be accessed in an schematic manner and then it can be properly or thoroughly analyzed and gave idea about what the solution we adopt potentially.

Adoption

In the construction aspect they can be adopted as an analyzing tool . so we illustrate the activities that can under the defect zone can be accessed initially then place an relevant solution for that and then execute the work as our standards such as based on the back up source of an economy.

4.3.2 Fish bone diagram

Fish bone diagram is the name it indicates and resembles the schematic sketch is similar to the fish bone and it is also known ishiwikam diagram they can be adopted mainly for the purpose of to known the reasons behind the imperfection in the carried out tasks or works.
They can be properly enumerated the variations of work and location of defect occurred and reason for failure can be properly illustrate s we said the name give based on the shape of he fish skeleton and starting from the origin of the spine.

Used in

Used as an amazing tool to access the solutions in various ways in to sorting the problems with respect to ideal in systematic manner and the displayed it in the fish bone .it is amazing tool to represent the way to resolve the problem for the particular field of the work.

Adoption

In the construction they can be used an referring tools because, what ever actually we executed activity can be placed at one end and the probable solution and problem can can be placed at the other end then concurrently go with each other will gave an idea about the problem or defect starts and how is to be mitigate can be known in accurate and distinct manner.

4.3.3 '5' whys

The '5' whys represents the asking the questioning n '5' times .that is why the reason failure occurred why the reason defect raised, why the reason the failure occurred, why the reason failure behind its effects, why the reason the early occurred, why the reasons wastage can be idealize ourselves to know the root cause of the particular problem.

Used in

It is an effusive and simple strategy tool to access the countering of root causes and trouble shoot problems and initiate the quality standards they ask why can be it used and where the risk involved can be as an check tool for the asking right information.

Adoption

In construction these type of tool is used as an effective manner because many risks are involved in the execution of works in construction but there will be chance to minimize them priory and mitigate them effectively by adopting these questionnaire like tool as '5 ' whys. So it is adopted to increase the efficiency of the work and to reduce the defects that are enumerated priory.

4.3.4 Process mapping

It is shows that the enumeration of flow chart the each and every details easily identified and observed by using the process mapping because it has indication of the task and how the work flow reaches and how to mitigate can be simply show by it.

Used in

The main use of process mapping is to improve the efficiency of the work and think about the out of the box and brainstorming can be done and improve menace in the execution methodologies and proper flow of information takes place. So process mapping can deliberately indicates the how the work is carried as actual planned are not can be known.

Adoption

In the construction they can use as an checking tool as early we said that is indicates each and every activity and their root causes and defects they faced can be illustrated improper way then they finalize the best solutions with respect the activity that is failed

So the definitive process as follows such as identify the scope of problem , then analyze the problem, after that observe the activities with their potential solutions , then design the proper work sheet for that, prior we can executrices the proper solution for that, finally we can concluded the whole work where the defective work id occurred and how it mitigate.

4.3.5 Regression analysis

Regression analysis an one of the statistical method and gave an relation between the independent and dependent variables with an distinct variation and with impact assessment .so it can be used as prediction woks and forecasting works and it is use as effective tool for the indication of variation and effects of thew works.

Used in

Used as an distinguished of the estimating and forecasting of the statistic data an also adopted in model regression analysis also

Adopted in

In construction there is an interdependent in the activities so each activity and task has own priority . so while taking assessment we can be ware of the how the work is done , what elements and parameters involved can be properly and then the defects an be laid in dependency variables and task we have carried an be placed in the independent variables , so we can understand that for the particular work how the defect variation can vary so that we can ideal about that situation and adopt an superior remedies and mitigate it initially based on the economic back up source.

4.4 Improve

4.4.1 Brain storming

It is an effective methodology to gave ideas to defected the problems clearly .it should possess the conditional circumstances and free thing environmental conditions and the approach should be creative and innovative for the problem. The method involved in these tool is initiate the internal relationship bet wen the ideas and accommodate the possible potential solutions for the.

Used in

It is an creative technique to their efforts those can be find the specified potential solutions fir the particular problem .it includes gathering the set of instructions and questionnaire and they groped and find the best solution. He min id regarding o think the in a possible creative way.

Adoption

In construction it involves lateral thinking so authorities involved in the work execution enable their innovative thoughts and determine the innovate solutions for that and sparkled the grater ideas so instantaneously they contributes the free of to enable ideas. So we can express our thoughts in validate manner. I the construction the brainstorming includes attain the proper interrelation between workers and then gave an encouragement for these concern and advantageously we obtain as many possible solutions.

4.4.2 Affinity diagram

Affinity diagram is an superior for to gather the huge amount of data that is ideas, opinion, methodology they adopted and work flow can be taken into consideration. The affinity diagram has ansome what inclusiveness with brainstorming tool. So they can take the all considerations and adopted in an systematic manner based on their priority and consolidate the source of information and productive obtain a best solution t complete the faced problem.

Used in

The use is what ever the output that are arrived from the brainstorming can be analyzed in proper way so they can generate the new idealization for the problem that we encountered can resolved with an minimum economic effort so we concluded the spontaneously between the works.

Adoption

In the construction aspect the process involved for the particular tool is initially we can gather all information from the particular defect and then analyzed with the substantial open ions and idealistic than after select best modem solution , ten finally we can solve the problem in an regular basis so it is involves an lot creative thinking.

4.4.3 "5 s"

"5 s" it stands for or it acrimonious is sort in order, shine, standardize, sustain, these each and every will illustrate that what are the needs and requirements and procedure to be adopt to met the demanded by means the efforts of the works can be properly prioritized.

The principle involved in these is just in time by mean to complete the project with in the time, with in the standards, within the specifications, within the reliable economy to complete the project with in the elapsed time based on the importance.

Used in

It can be adopted as ongoing or on boarding process we can aware about what are basically we need and their economy involve,met can be statically known. The main idea behind we meet all set of standards then only we meet your required activity with success full backing.

Adoption

In the construction the ideology is used as the thee execution activities that are involved can be meet those '5' steps can ultimately we can obtain good results and sustainable complete the project with an optimum economy and with an maximizing output.

4.4.4 Poke- yoke

The term that is obtained from japanned word it means the mistake proofing or in advertisement error prevention.

It is one of the essential tool used as avoid the misleading and voids within the processing technology and executive methodology and carried out work. The process involved in the poke yoke is to represent he defects by allocating to correct the defects by adopting potential remedy for that and reduce errors in lower concentrations as our requirement.

Used in

The poke yoke mechanism of abruptly adopted equipment operation and in the constructional aspect it is different the concern the term yoke represents the avoid and poky means the to eliminate mistakes and maintain proper attention for the human errors concern so it is also used as an manufacturing tool to reduce errors and mistakes and it is also called ad mistake proofing and error proofing.

Adoption

The prior translation for that avoid (yoke) and mistakes(poke) so hat they elucidate ourselves as capture the defects and correct it mistakes and eliminate those defects abruptly and remove the source of the mistakes are occurred are risen can be known at ideally. The main idea regarding the poke yoke is the to eliminate and reduce defects and wast ages.

4.4.5 Simulation

Simulation means the limit of operation and or process system involved so that can be represent the operator over particular time it can be adopted as an scientific modelling and fermenting methodology so they control's the defects by prior analyzing with the modelling and predict the possible solutions for that and forecast the behaviors of the prototype can be illustrated. After that we can influence the what are the defects occurred and how the defects can be evolved for the particular modeling can be accessed.

Used in

The main use and context of the simulation involvement is increasing the safety engineering aspect, testing involved , training adoption, safety education, etc can be properly known. The primary ideology behind this is to take the decision based on the experience and competence among the particular field can be known so that we can mitigate it initially then achieve proper and ensured economy.

Adoption

In the construction aspect simulation involves in major projects in those lot of investment involved and huge amount are invested for those projects so that's why we need take care of the we can conduct the prototype testing and analyze the modeling and then gave an brief idea about the execution methodologies and then concluded these finally adopt an best solution , then after we advantageous improve the performance of the work.

4.4.6 Bench marking

It is the essence process to compare the details by means what ever the work has been carried out can be comparatively illustrated properly and then improve the work performance alternatively. The bench marking can be properly requisitioned and then improve the performance o the work then fill up the gaps are commit ed to the mistakes an be negotiated carefully.

Used in

Bench marking can be used as an comparing the process with in the executed methodology. So that performing the strategies in an depicted manner, so we can gave an idea about the situation and make the process that can be executed can be known with negligible effects.

Adoption

In the construction aspect bench marking can helps us to to compare the process based on their procedures, methodologies, we can executed can be known and then adopt an potential solution so that they concluded the work and advantageously adopt the work with minor defects.

4.4.7 Pugh matrix

The main objective of the Pugh matrix to identify the best possible solution then determine the more realistic economic solution. The concept involved in the Pugh matrix conception of matrix based on the selection of competence. The primary essence of this concept is determine the potential solution and capture the scope of the problem and assigned the relative score first and then they face idea about the importance of the objective work.

Used in

Pugh matrix can be based on the matrix score so that we can gave an idea about the situation and understand the problem identification Pugh matrix score can gave an idea objective to concern work for complex activities it means to adopt it advantageously in vexatious alternation activities that are carried out abruptly.

Adoption

In construction the Pugh matrix used as an activity corridor it means they can group the similar activities in an one set and then we analyze with the essence of their importance and do the remedies systematically based on their primitive objective so that we can aware about which set of activities can undergoes defect percentage.

4.4.8 Cost benefit analysis

It is also called as thew benefit to the analysis the costs it means the how the finance inflow and outflow can be properly analyzed s that to overcame the commercial issue for the activity that we carried. It allows and follows an systematic approach so that we can clear about the at what stage at amount to be required can be probably knownBy this analysis we can measure the benefits and take the proper decision for the particular action of activity and then perusing the project in an economical way.

Used in

The name it self suggests the analyze the defects firs based on their importance then take appropriate course of action properly and we can ma canted about the situation ten allow the optimum finance for the particular work and gain an maximize output.

Adoption

In the construction aspect cost benefit analysis is very much use full because the construction activities completely depends upon the finance so that it requires proper planning for that with the limited amount of resources we can complete the work effectively we need to adopt an essential analysis that is cost benefit analysis.

4.5 Control

4.5.1 Control charts

Control charts are one of the graphical endeavor so they depicts they can be pot the data that we can statically obtained by the six units these are also known as shew art chart or process behaviour chart or statistical process control charts.

Used in

They can primarily used for the purpose of how the process is changed with in the work flow or an organization and task where we carried out .so the data that we plotted is as time order. The data should be comparatively is histrionically and follows the profile of central line of upper limit of he particular normal distribution. So they can be adopted to control the defects up to what extent we require.

Adoption

In construction aspect they can be used as an equitation tool by means what ever the work that can be executed that can be properly accessed if any inferiority with in the work flow they simply visualize in the control chart and simply interpret the defects by this graphical formats.

4.5.2 Operating rhythm chart

The main circumstance of operating rhythm is to perform the critical activities into an consistent manner so that we can achieve an excellent and effective and efficient results for the activity that we performed.

Used in

They can gave an idea about set of critical activities that re to be present and than properly analyse in an systematic manner by means rhythmical manner by using flow chart then after that we can conclude that is the endeavor to which activity is defective is known abruptly.

Adoption

The main objective of operating rhythm in the construction aspect is used very much a lot in the construction they are so many critical activities are involved so that we can combine with each other and then compared with suitability based on the consideration and importance after that we can done, so the work is done efficiently and effectively with an idealized methodology of the work.

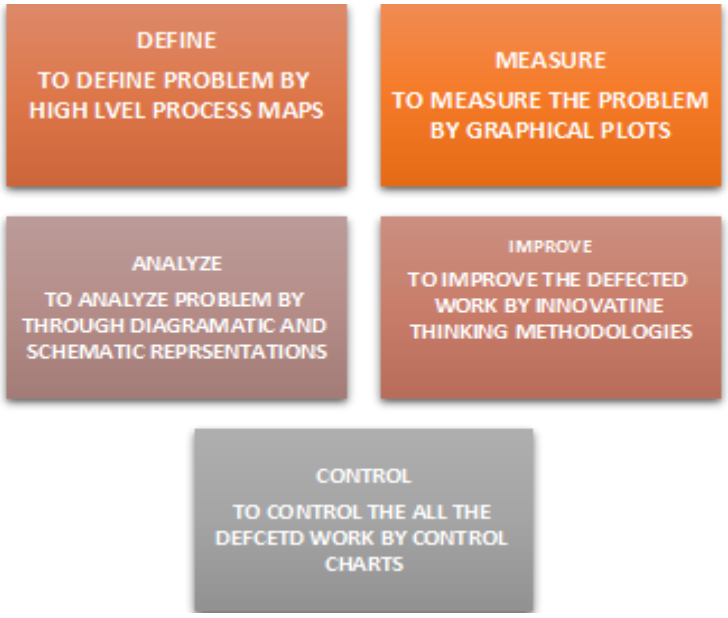

Figure:3 Analysis Though Six Sigma Tools

5. Advantages and Disadvantages of Six Sigma

Advantages of Six Sigma Tools

1. To improve the processing technology
2. To eliminate the defects to an acceptable limits
3. To lowered the variability of the pressings
4. To achieve and enable required economy
5. To allow the satisfactory working level's
6. To obtain the grater profits

Disadvantages of Six Sigma Tools

7. They requires an lot skill full analyzers along the analyzer must competent in the particular field of the work.
8. For the analysis we must need huge amount of data
9. Each and every defected work can accessed in an logical manner so that it can lag's the time to analyze the root cause of the problem
10. The data that we collect it should requires an lot of care if any mistake is done in any particular it will alternatively change the trend of analyzing results.
11. Requires an skill full monitor workers.

Figure: 4 Advantages of the Six Sigma Tools

6. Conclusion

While initially we seen the wastage's that are occurred in the processing and activities that we performed and the same those can compared with the construction aspect.Then after that we will concluded these defects with respect to the six sigma tools in the each phase of the "DMAIC" methodology clearly their use and adoption and its necessity.As in construction a lot of activities are involved so it is difficult to monitor each and every work sometime in those six sigma tools can gave an idea about what you done previously can be taken ad consideration and then thoroughly analyzed with present defect that we faced. So that we can idealize about the particular defected work and get an good potential solution for that and complete the work on time with actually planned budget.The present scenario says us that six sigma concept helps a lot to eliminate the defected work and the main responsible methodology involved in those is" DMAIC" so each phase there is an own advantage to meet an responsible validate characters of the "DMAIC" such as define- measure- analyze- improve- control.So we can overcame those particular problem and then complete the extended work with negligible minor mistakes.

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