1-1: Introduction:

Kaizen is a Japan's word divided in to kai and Zen means (change &better) it is large scale of continuous improvement. It based on philosophy that everything can be improved, Small improvement steps can yield large results in work place.

Manufacturing field or any organizationneeds daily small steps towards improving. Processes, production, quick delivery, elements cost and waste, improve work environment, safety, satisfy customer and increase profit.

Kaizen It based on:

- Good processes bring good results
- Evaluate your current situation and take improving action.
- Speak with data, manage by facts
- Take action to contain and correct root causes of problems
- Work as a team
- Kaizen is everybody's business
- Continues improvement mean sustain work and lower cost
- Gamba mean go to woke place with insure involve manager and supervisor in process and real follow.

Implement kaizen methodology based on element wastes like (Defects, Overproduction, Waiting, Non value added processing, Transportation, Inventory and Motion.

5S methodology is a key driver for Kaizen, 5S relates to workplace organizing and forms a solid foundation upon which many organizations base their drive for

continuous improvement. It is equally applicable and successful in all sectors helping to achieve high impact results.

It is a systematic approach allowing teams to organize their workplace in the safest and most efficient manner. And stimulate manager to go to Gemba.

Gemba means 'the real place' go to work place to be close to problems and try to solve it and involve your staff, don't stay at office and sending order.

1-2: Research problem:

Kaizen mean continuous improvement and implement 5S means insure comfortable, safety, element waste, time and cost in work place. The problem is that most of our industrial areas did not implement Kaizen and 5S which gives positive impact to work environment, employees, increasing cost.

1.3: Research Question:

In this research, the following questions should be answered:
- What is kaizen?
- What is 5S methodology?
- What is the problem that facing industry work place which did not implement Kaizen and 5s?
- What the benefit of applicationKaizen and 5s?

1-4: Research Objective:

The main objective of this research is try to give complete idea about what are the benefit of implementing Kaizen in manufacturing field specially the positive impact to implement 5S on work environment.

1-5: Specific of the research:

The high benefit the impact to manufacturing when implement kaizen and 5S.

1-6 Hypotheses:

1. There is a direct relation between implementing kaizen and eliminate waste in manufacturing field.
2. There is direct relation between implementing kaizen and continuous improvement in manufacturing field.
3. There is positive relation between implementing sort in work place to keep improvement in work plan
4. There is positive relation between implementing set in order in work place to keep improvement in work plan
5. There is positive relation between implementing shin in work place to keep improvement in work plan
6. There is positive relation between implementing sustain in work place to keep improvement in work plan
7. There is positive relation between implementing standardize in work place to keep improvement in work plan

1-7: Expecting Result:

  If manufacturing organizations application Kaizen and 5S in right way we expect high quality with good work environment for internal and external customer and high profit

1-8 The problem facing researcher:

- Difficult acceptance to Kaizen and 5S in Sudan industrial area , Chance human culture is not easy
- Lack of loyalty to work place.
- Lack of references or previous research in Kaizen and 7S.

1-9: Methodology:

Methodology of this research is analytical method. Questionnaire forms will be prepared by researcher.

1-10: The research period:

Place: Sur civil and military clothing factory

Time: April 2016- May 2017

<u>Chapter One</u>

We first need to define what is quality clearly based on quality gurus definitions, field study and what exactly we need before starting.

QualityDefinitions:

Quality is the degree to which a commodity or service meets the requirements of the customer at the start of its life*(IOS 9001).*

Quality is degree of excellent *(The Concise Oxford Dictionary)*

Fitness of purpose *(Defore and Juran)*

Conformance to requirements *(Cresby)*

Quality is a dynamic state associated with products, services, people, processes and environments that meets or exceeds expectations and helps produce superior value (Goetsch and Davis)*(Quality Management – Graeme Knowles)*

Generally to cover all these definitionsquality must be defined by customersand this will change over time to meet and exceed theirrequirements, adding value, satisfying, competitive in marketing and achieve high revenue.

Quality does not stop in production but it coversall organizational departments andthe commitment to create employees satisfaction, customer satisfaction, after sales service, health and safety environment, organizing workplace, reducing cost and achieve high profit.

Based on continues improvement ideaif top management and employees are committed to sustain improvement steps in work, it insures success and high quality.

To achieve high standard and successful organization quality management focuses on everything.It focuses on processes,employee'ssatisfaction,customersatisfaction, society and any internal and external issues.

The Concept of Quality Management:-

Quality Management System is quite simple.Itseek to recognize the external quality related requirements specified in customer requirements, and the chosen management system standard(s).

- Ensure that all requirements have been documented within the management system in the appropriate location in terms of defined specific system requirements
- Confirm that employees receive applicable training in the quality system requirements
- Outline performance processes, where applicable, to the quality system requirements
- Produce records or evidence that system requirements have been met
- Measure, monitor and report the extent of compliance with these performance procedures
- Continually monitor and analyze changes to the requirements and confirm that all changes are reflected in changes to the specific requirements when necessary
- Execute the audit and analyze the system processes and correct them when necessary
- Include processes that will help continually improve the quality system.*(IOS 9000 – Version 2008- Quality Management Requirement)*

Quality Classification:

QC/QA and TQM groups work hand-in-hand to fulfill the company's vision and mission to provide a competitive edge in offering the best products and services to the company's customers. For the organization to be successful, every staff member should consider himself to be a partner in business with his colleagues, and serve as his own QC inspector, QA auditor and TQM consultant

For a metric of treatment quality:
• QC aims at measuring the variation
• QA aims at reducing the variations
• QM encompasses both

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Figure No (1)

Qualitymanagement (QM)

QM is a set of policies, processes and procedures required for planning and execution (production/development/service) in the core business area of an organization, in the areas which can impact the organization's ability to meet customer requirements.*(ISO 9001:2008)*

Quality Control (QC)

Part of quality management which focuses on fulfilling quality requirements. *(ISO 9001)*

Quality Assurance (QA):

Part of quality management which focuses on providing the confidence that quality requirement will be fulfilling. *(ISO 9001)*

Total Quality Management (TQM)

TQM is people-focused management system that focuses on increasing customer satisfaction while continually reducing costs. Although it uses scientific methods for assessing quality and associated costs and constraints and implementing improvement, it takes a total systems approach in which all functions, processes, and departments across the organization, and all employees at all levels, are integral to ensuring success in the manufacture of products or delivery of services.TQM stresses learning and adaptation to continual change as essential to achieving this success. *(W.Edwards Deming QUALITY CONTROLAND CONTINUOUSIMPROVEMENT)*

Benefit of implementing quality in the manufacturing field:

Manufacturing field, like any workplace area, needs quality to insure production with zero defect, low cost, high profit and competitiveness in market.

Not all organizations need are implement quality bout also sustain on it and improved, for that organizations need documents all work and evident for everything ,to sustain perfect work we must measures our work to determined defect, gaps and clear improvement point.

Key Performance Indicter KPIs:

A Key Performance Indicator (KPIs) is a measurable value that demonstrates how effectively a company is achieving key business objectives. Organizations use KPIs at multiple levels to evaluate their success at reaching targets. *(David Parmenter (2007) - Key performance indicators – developing implementing and using winning KPIs –- chapter 6 – page 101)*

To measureworkfirst need to determine KPIs carefully to any departments to insure perfect measureand useful rustles depend on organization target.

There are many types of KPIs depend on works type and departments:

- Production Quantity
- Efficiency
- RFT (Do it right first time)
- Of worker
- Absenteeism
- Defects Rate

- Customerscomplain

- Profit

- Order speed implementation

- Machin stoppage

- Cost

- Monthly sales

- Number of customers

- Employees satisfaction

Measuring Quality:-

There are many quality tools to measure processes, production area, work environment, revenue, customer satisfaction, safety and all what we need to improve and its use depends on what we need to achieve.

Quality Tools:

Firstset a standard upon which you need to achieve andimprove. There must be a precise standard of measurement for every worker, every machine, every process and even every manager. Lack of measurementwill lead to poor performance.

Checklist:

Checklists are a simple way of gathering data so that decisions can be based on fact, rather than anecdotal evidence.*(RAC- Reliability Analysis Center (2001)-Page NO 4)*

Couse and effect diagram:

Ishikawa diagrams are named after their inventor Kaoru Ishikawa. They are also called fishbone charts, after their appearance, or cause and effect diagrams after their function. Their function is to identify the factors that are causing an undesired effect (E.g. defects) for improvement action, or to identify the factors needed to bring about a desired result (E.g. a winning proposal). The factors are identified by people familiar with the process involved. As a starting point, major factors could be designated using the "four M's" Method, Manpower, Material, and Machinery, or the "four P's" Policies, Procedures, People, and Plant. Factors can be subdivided, if useful and the identification of significant factors is often a prelude to the statistical design of experiments. *(RAC- Reliability Analysis Center (2001))*

How to create a fish diagram:

- Create a head which lists the problem or issue to be studied.
- Create a backbone for the fish (straight line which leads to the head).
- Identify at least four "causes" that contribute to the problem. Connect these four causes with arrows to the spine. These will create the first bones of the fish.
- Brainstorm around each "cause" to document those things that contributed to the cause. Use the **5Whys**question to keep the conversation focused.
- Continue breaking down each cause until the root causes have been identified
- Start brainstorming with participant to solve problems

Pareto Chart:

Alfredo Pareto was an economist who noted that a few people controlled mostof a nation's wealth. Pareto's Law has also been applied to many other areas, including defects, where a few causes are responsible for most of the problems. Separating the "vital few" from the "trivial many" can be done using a diagram known as a Pareto chart.

A Pareto chart or Pareto distribution diagram, is a vertical bar graph in which values are plotted in decreasing order of relative frequency from left to right. Pareto charts are extremely useful for analyzing what problems need attention first because the taller bars on the chart, which represent frequency, clearly illustrate which variables have the greatest cumulative effect on a given system.

Histogram:

Histogram is another form of bar chart in which measurements are grouped into bins, in this case each bin representing a range of values of some parameter.*(RAC-Reliability Analysis Center (2001) page NO 7)*

Histogram isStep-column chart that displays summary of the variation in frequency distribution of quantities called classes that fall within certain lower and upper limitsin a set of data.

Control Chart:

Control charts are the most complicated of the seven basic tools of TQM, but are based on simple principles. The charts are made by plotting in sequence the measured values of samples taken from a process. For example the mean length of a sample of rods from a production line the number of defects in a sample of a product, the miles per gallon of automobiles tested sequentially in a model year etc. These measurements are expected to vary randomly aboutsome mean with a known variance. From the mean and variance, Control limits can be established.

Control limits are values that sample measurements are not expected to exceedunless some special cause changes the process. A sample measurement outside the control limits therefore indicates that the process is no longer stable, and is usually reason for corrective action.

Other causes for corrective action are non-random behavior of the measurements within thecontrol limits. Control limits are established by statistical methods depending on whether the measurements are of a parameter, attribute or rate. (*RAC-Reliability Analysis Center (2001)*)

Statistical tool used in quality control to:

1) Analyze and understand processvariables
2) Determineprocess capabilities
3) Monitor effects of the variables on the difference between target and actual performance.

Control charts indicate upper and lower control limits, and often include a central (average) line, to help detect trend of plotted values. If all datapoints are within the control limits, variations in the values may be due to a common cause and process is said to be 'in control'. If data points fall outside the control limits, variations may be due to a special cause and the process is said to be out of control.

Flow Chart:

Flow chart shows the steps in a process, Actions which transform an input to an output for the next step. This is a significant help in analyzing a process but it must reflect the actual process used rather than what the process owner thinks it is or wants it to be. The differences between the actual and the intended process are often surprising and provide many ideas for improvements. Measurements could

be taken at each step to find the most significant causes of problem then it will be flagged for improvement.*(RAC- Reliability Analysis Center (2001))*

A flowchart is a formalized graphic representation of a logic sequence, work or manufacturing process, organization chart, or similar formalized structure. The purpose of a flow chart is to provide people with a common language or reference point when dealing with a project or process.

Scatter diagram:

Scatter diagram are a graphical, rather than statistical, means of examining whether or not two parameters are related to each other. It is simply the plotting of each point of data on a chart with one parameter as the x-axis and the other as the y-axis. If the points form a narrow "cloud" the parameters are closely related and one may be used as a predictor of the other. A wide "cloud" indicates poor correlation. *(RAC- Reliability Analysis Center (2001))*

The scatter diagram graphs pairs of numerical data, with one variable on each axis, to look for a relationship between them. If the variables are correlated, the points will fall along a line or curve. The better the correlation, the tighter the points will hug the line.

Otherseffective tools in measuring data:

SWOTAnalysis:-

SWOT Analysis is a useful technique for understanding your Strengths and Weaknesses, and for identifying both the Opportunities open to you and the Threats you face. What makes SWOT particularly powerful is that, with a little thought, it can help you uncover opportunities that you are well placed to exploit. And by understanding the weaknesses of your business, you can manage and eliminate threats that would otherwise catch you unawares. More than this, by

looking at yourself and your competitors using the SWOT framework, you can start to craft a strategy that helps you distinguish yourself from your competitors, so that you can compete successfully in your market.*(SWOT Analysis strategic skills (2013)*

Questionnaire:

A questionnaire is a data collection instrument consistent of a series of questions and other prompts for the purpose of gathering information from respondents. The questionnaire was invented by Sir Francis Galton.

A questionnaire should allow us to collect the most complete and accurate data in a logical flow.

This is done in order to reach reliable conclusions from what we are planning to observe.

A well-designed questionnaire should meet the research goal and objectives and minimize unanswered questions a common problem bound to many surveys.

(Dr. Karim Abawi, (2013) Data Collection Instruments (Questionnaire & Interview)

Customer Complaint:

A complaint is any expression of dissatisfaction by a customer, potential customer or other business partner related to a service or product provided by ADNIC or on behalf of ADNIC by one of our business partners; this expression of dissatisfaction will require a response from ADNIC.

Customer complaint is communicationwaycustomer uses to explain his opinion about product or service. It is usually used to express thedissatisfaction.*(ABUDABI NATIONAL INSURANCE COMPANY, (2014) CUSTOMER COMPLAINT HANDLING Manual)*

Successful organization focuses on customer by giving clear ways to communicate like direct call, service point, and monthly survey to have a clear view about customers' requirements and improving product or service.

VOC (voice of customer):

The Voice of the Customer (VOC) is a term used in business to describe the process of capturing customers' requirements. The Voice of the Customer is a product development technique that produces a detailed set of customer wants and needs which are organized into a hierarchical structure, and then prioritized in terms of relative importance and satisfaction with current alternatives.

The Voice of the Customer process has important outputs and benefits for product developers.

VOC provides**:**

• A detailed understanding of the customer's requirements

• A common language for the team going forward

• Key input for the setting of appropriate design specifications for the new product or service

• A highly useful springboard for product innovation there are four aspects of the VOC – customer needs, a hierarchical structure, priorities, and customer perceptions of performance.*(Steven P. Gaskin Applied Marketing Science, Inc. Waltham, MA USA Abbie Griffin David Eccles School of Business, University of Utah Salt Lake City, UT USA John R. Hauser MIT Sloan School of Management, Massachusetts Institute of Technology Cambridge, MA USA Gerald M. Katz Applied Marketing Science, Inc. Waltham, MA USA Robert*

2.1.8.5. Balance Scorecard:

The Balanced Scorecard is a management system that maps an organization's strategic objectives into performance metrics in four perspectives: financial, internal processes, customers, and learning and growth. These perspectives provide relevant feedback as to how well the strategic plan is executing so that adjustments can be made as necessary. The Balance Scorecard framework can be depicted as follows:

The Balanced Scorecard (BSC) was published in 1992 by Robert Kaplan and David Norton. In addition to measuring current performance in financial terms, the Balanced Scorecard evaluates the firm's efforts for future improvement using process, customer, and learning and growth metrics. The term "scorecard" signifies quantified performance measures and "balanced" signifies that the system is balanced between:

- Short-term objectives and long-term objectives

- Financial measures and non-financial measures

- Lagging indicators and leading indicators

- Internal performance and external performance perspectives

Benchmarking:

Benchmarking is a tool for improving performance, ECU defines benchmarking as a continuous and systematic process of comparing products, services, processes

and outcomes with other organizations or exemplars, for the purpose of improving outcomes by identifying, adapting and implementing best practice approaches

One of the most important benefits of benchmarking is the discovery of innovative approaches. Benchmarking highlights problem areas and the potential for improvement, providing an incentive to change, and assists in setting targets and formulating plans and strategies (Meade, 1998). Benchmarking provides assessments of quality that identify measures that give a valid and balanced, current picture of the parameters that distinguish courses, universities or sections of a university (McKinnon, et al., 2000).

(Dr Rowena Scott, (2011) Benchmarking - Centre for Learning & Development)

Brainstorming:

Brainstorming is a strategy used to generate a number of ideas to help solve a particular problem. The technique has been around for over 70 years and is still used today to engage students in solving a range of problems. Techniques vary but there is a general structure to follow when developing brainstorming sessions. After the problem or issue is presented, students are organized into groups to brainstorm all possible ideas which could solve the problem. Discussion of these ideas takes place after the brainstorming session ends, usually after a defined period of time. Each idea will be discussed and considered, some ideas will be eliminated, and a final list will be ranked for possible use as a solution toward solving the problem.

(Northern Illinois University, Faculty Development and Instructional Design Center facdev@niu.edu, www.niu.edu/facdev, 815.753.0595)

Survey:

A survey is any activity that collects information in an organized and methodical manner about characteristics of interest from some or all units of a population using well-defined concepts, methods and procedures, and compiles such information into a useful summary form. A survey usually begins with the need for information where no data or insufficient data exist.

 Sometimes this need arises from within the statistical agency itself, and sometimes it results from a request from an external client, which could be another government agency or department or a private organization. Typically the statistical agency or the client wishes to study the characteristics of a population build a database for analytical purposes or test a hypothesis.

- A survey can be thought to consist of several interconnected steps which include
- Defining the objectives
- Selecting a survey frame
- Determining the sample design
- Designing the questionnaire
- Collecting and processing the data
- Analyzing and disseminating the data and documenting the survey.

The life of a survey can be broken down into several phases. The first is the planning phase, which is followed by the design and development phase, and then the implementation phase. Finally the entire survey process is reviewed and evaluated the individual tasks and how they are interconnected and related. The steps of a survey are: - formulation of the Statement of Objectives; - selection of a

survey frame; - determination of the sample design; - questionnaire design; - data collection; - data capture and coding; - editing and imputation; - estimation; - data analysis; - data dissemination; - documentation. *(Survey Methods and Practices- Catalogue no. 12-587-X pdf)*

2.2.KAIZEN

Kaizen Definition:

Kaizen is a Japan's word dived to tow components(Kai) and (Zen) it means continuous improvement in personal life, home life, social life and working life. Accordion to (*Kaizen - wrote by Masaaki Imai – page xx*)

Everyday brought new challenges, and rising of these challenges required daily steps toward improvement to stay on business, that mean kaizen is a way of life.

When we apply Kaizen in workplace that mean everyone involve in continuous improvement concept. Managers, employees, laborers and even customer, we need to open channel with customer to collect their opinion about our product and use it in improving work.

Kaizen principle:

The principles of kaizen. Include a heavy reliance on teamwork, in which everyone's opinion is valued and considered, involving their active participation in the form of suggestions aimed at continuous improvement, even when a system appears to be functioning adequately.

I International Symposium Engineering Management And Competitiveness 2011 (EMC2011)

The Ten Basic Kaizen principles and rules:

1. Throw out all your old fixed ideas on how to do things.

2. No blame - treat others as you want to be treated

3. Think positive – don't say can't

4. Don't wait for perfection. 50% improvement now is fine

5. Correct mistakes as soon as they are found

6. Don't substitute money for thinking - Creativity before cash

7. Keep asking why until you get to the root cause

8. Better the wisdom of 5 people that the expertise of 1

9. Base decisions on data not opinions

10. Improvement is not made from a conference room

Leading Edge Grope (Are a multinational organization operating in two major sectors; buying group management and sales channel management across Australia, New Zealand and the UK start on 1986)

Kaizen philosophy:

It is great that Kaizen philosophy recognizes that there is always room for improvement. The system uses quality circles, groups of workers who meet and work together to solve problems and come up with innovative changes. Kaizen is a system that involves every employee - from upper management to the cleaning crew.

Everyone is encouraged to come up with small improvement suggestions on a regular basis. *(I International Symposium Engineering Management And Competitiveness 2011 (EMC2011)*
June 24-25, 2011, Zrenjanin, Serbia (6/11/2016)

Small steps of improvement insure good processes, production, safe environment, high profit and eliminate waste.

Fundamental Elements of Kaizen:-

The foundation elements of Kaizen consist of:-

1. Teamwork.
2. Self-discipline
3. Improved morale
4. Quality circles
5. Suggestions for improvement
6. Elimination of waste (Muda) and inefficiency
7. The Kaizen 5S (Store –Shine –Sustain- - Set in order -Standardization) framework for good housekeeping.
8. Standardization of the processes

An Analysis of Relationship between Total Quality Management and Kaizen Muhammad Saleem1, Nawar Khan2, Shafqat Hameed3, M Abbas Ch4 National University of Sciences and Technology (NUST), Islamabad, Pakistan (14/6/2016)

Kaizen umbrella:-

Figure (1)
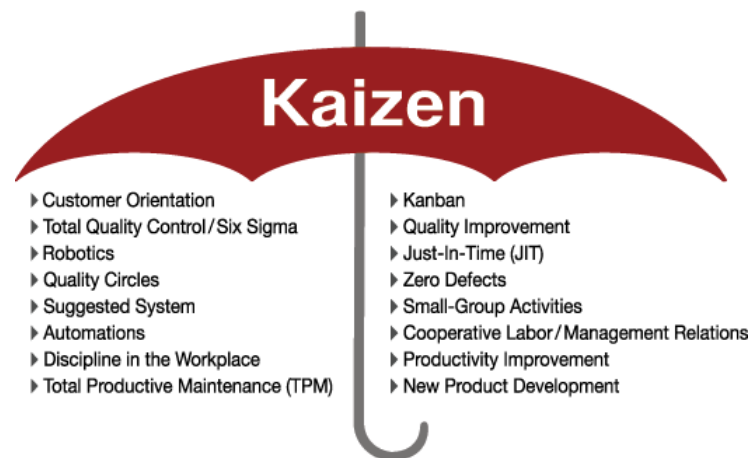
The Kaizen Umbrella

(*Kaizen - wrote by Masaaki Imai - Page 4*)

1-Customer orientation:-

Thus TQM is said to be customer oriented , this is also why TQM activates have shifted their emphasis from maintaining quality throughout the production process to building quality into product by developing and designing products that meet customer requirements .

After company shift it is focus from satisfy company need to satisfy customer need to increase products,this suggest that customer oriented is top management priority, since this definition determines the quality characteristics that the product needs to satisfy the customer *(Kaizen - wrote by Masaaki Imai- Page 52 & 53)*

Developing a qualityproduct appreciate by consumers. Responding promptly and respectfully to consumer complaints and queries and dealing sensitively with communityissues.

2-Total Quality Management& Six Sigma:

 TQC is Japan movement centered on improvement of managerial performance at all levels. Such as:

1- Quality assurance
2- Cost reduction
3- Meeting production quotas
4- Meeting delivery schedule
5- Safety

6- New product development

7- Productivity improvement

8- Supplier management

And recently TQC has come include marketing, sale, and service as well, TQC has dealt with such crucial management concerns as deployment. TQC undergoes perpetual change and improvement, and it is never quite the same from one day to the next.*(Kaizen - wrote by Masaaki Imai–page 13&14)*

Six sigmais a highly disciplined process that enables organizations deliver nearly perfect products and services, the figure of six arrived statistically from current average maturity of most business enterprises

Six sigma philosophy and a goal is perfect as practically possible. It is a methodology and a symbol of quality.

It is consider as a statistical concept that measures a process in terms of defects – at the six sigma level, there 3.4 defects per million opportunities.*(Kaizen Foundation Presentation – Dr.Mamon Osman Ahmaed)*.

Robotics:

  Kaizen Robotics Program is a certificate program to provide students with a steep learning curve in the field of robotics. The program comprises of Intensive Training program conducted in the college and additional support which will be provided to students through office at IIT Madras. Till now, more than 1800 students have been trained under the Kaizen Robotics Program. The clients include few of the best technical institutes in Chennai.

Lema Labs team, with the guidance of faculty members at IIT Madras, has developed a 2 year long program or course which aims at teaching students emerging technologies

Quality Circle:

This is a small group that voluntarily performs quality activities within the workplace, carrying out its work continuously as part of company – wide program of quality control self-development, mutual education flow control and improvement within the workplace.*(Kaizen - wrote by Masaaki Imai– Page 61-62)*

A group of employees who volunteer to meet regularly to discuss and propose solutions to problems (as of quality or productivity) in the workplace.To arrive at better quality that satisfy customer, Deming wheel (PDCA) the four stage should be rotate constantly, with quality as the top criterion.

Figure (2)

Initial PDCA circle
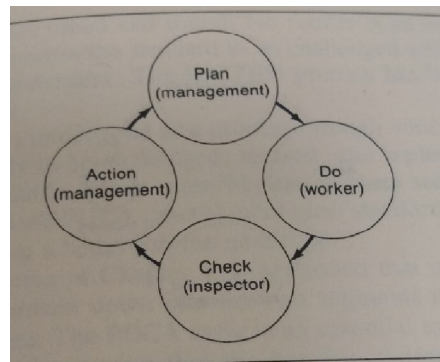
(KAIZENDEFINITION & PRINCIPLES - THESSALONIKI 2006)

PDCA cycle is a series of successful activities pursued.

Plan: Define and Analysis problem and identity the root cause.

Do: Devise solution develop detailed action plan and implement it systematically.

Check: Confirm out comes against plan identify derivation and issue

Act: Standerztion solution review and define next issues

Suggestion System:

Management makes aconcerted effort to involve employees in Kaizen though suggestion, Thus the suggestion system is an integral part of establish management system and the number of workers suggestions is regard as an important criterion in reviewing the performance of the workers, supervisor the manager of the supervisors is in turn expected to assist them so thatthey can help workers generate more suggestion. *(Kaizen - wrote by Masaaki Imai – Page 14-15)*

It is amethod by which the ideas and suggestions of the employees are communicated upward through the managementhierarchy.

6-Automation:

Accordion to ISA (International Society of Automation) definition automation is the creation and application of technology to monitor and control the production and delivery of products and services.

Automation encompasses many vital elements, systems, and job functions.

Automation provides benefits to virtually all of industry. Here are some examples:

- **Manufacturing** : Including food and pharmaceutical, chemical and petroleum, pulp and paper
- **Transportation** :Including automotive, aerospace, and rail
- **Utilities** : Including water and wastewater, oil and gas, electric power, and telecommunications

- **Defense**

- **Facility operations** : Including security, environmental control, energy management, safety, and other building automation

- **And many others**

Automation crosses all functions within industry from installation, integration, and maintenance to design, procurement, and management. Automation even reaches into the marketing and sales functions of these industries. Automation involves a very broad range of technologies including robotics and expert systems, telemetry and communications, electro-optics. Cybersecurity, process measurement and control, sensors, wireless applications, systems integration, test measurement, and many, many more.*ISA (International Society of Automation) 67 T.W. Alexander Drive - Research Triangle Park, NC 27709 - E-Mail: info@isa.org*

Discipline in the workplace:

Accordion to UBC discipline in the workplace is the means by which supervisory personnel correct behavioral deficiencies and ensure adherence to established company rules. The purpose of discipline is to correct behavior. It is not designed to punish or embarrass an employee. *(University of Britch Colombia –Human Resources Department)*

Total productive maintenance (TPM):

Total Productive Maintenance(TPM) defined as productive maintenance carried out by employees through small group activities. Thus to say TPM succeeds not because of its engineering techniques but because of its reliance on training and team empowerment. It addresses the maintainability of the machine that ultimately leads to improved productivity. It also captures the need to produce the technical and skill training needed to meet the sophistication of operation and maintenance

arising from equipment automation, and to foster worker proficiency in the plant. The goals of TPM include the maximizing of overall equipment efficiency (OEE) in a multiple model, small lot production system that eliminates equipment failures, defects and accidents. General improvements in quality andProductivity and the creation of a more positive atmosphere in the workplace are also central to TPM philosophy.*(Implementing Successful Total Productive Maintenance (TPM) in a Manufacturing PlantIgnatio Madanhire, and Charles Mbohwa Proceedings of the World Congress on Engineering 2015 Vol IIWCE 2015, July 1 - 3, 2015, London, U.K.)*

Total productive maintenance (TPM) is a maintenance philosophy that requires the total participation of the workforce. TPM incorporates the skills of all employees and focuses on improving the overall effectiveness of the facility by eliminating the waste of time and resources. Typically, total productive maintenance is a concept that is most easily applied to a manufacturing facility.

TPM emphasizes all aspects of production, as it seeks to incorporate maintenance into the everyday performance of a facility. To do this the maintenance performance is one factor that is considered when evaluating the performance of the facility. One of the most important measurements of total productive maintenance is overall equipment effectiveness (OEE). It is a measure of availability, performance efficiency and quality rate. As such, equipment stopping, equipment working at less than peak capacity, and equipment producing poor quality products are all penalized when the OEE is determined.

KAMBAN:

You might not be familiar with the word Kanban but you are probably familiar with the process. Many businesses and homes already use an organization system that is loosely based on Kanban without even knowing it. Simply put Kanban is an

organizational system. The point of this and really any organizing system is to keep products running in an even manner. Kanban is a way of providing signals so that the process of maintaining inventory is simplified.

The word Kanban comes from the Japanese and means billboard or signboard. This word is used because Kanban relies heavily on cards that are used as markers for moving and replacing inventory.

The whole system centers around these visual cues that help you maintain inventory at the proper levels so that you never keep too much or too little of your products or materials in stock. In order to use Kanban effectively it is important to understand a few other concepts related to it.

Figure (3)

(Sur factory production line)

Kamban is communication tool in the (just in time) production and Kamban inventory control system developed by Taiichi Ohno at Toyota.

A kamben or signboard is attached to specific part in the production line signifying the delivery of a given quantity .When the parts have all been used the same sign is returned to its origin where it become an order for more.

Figure (4)

(Sur factory warehouse)

Quality improvement:

Improvement as a part of successful Kaizen strategy goes beyond the dictionary of the word. Improvement is mind set inextricably linked to maintaining and improvement standers. In a still broader sense, improvement can be defined as Kaizen and innovation, where a Kaizen strategy maintains and improve the working standardthrough small, gradual improvement and innovation calls forth radical improvement as a result of large investment in technology or equipment.(*Kaizen - wrote by Masaaki Imai)*

Quality improvement is a systematic approach to reduction or elimination of waste, rework, and losses in production process.

Just in time (JIT):

Just in time is a production and inventory control technique that is part of the Toyota production system it was designed and perfected at Toyota by Taiichi Ohno specifically to cut waste in production.*(Kaizen - wrote by Masaaki Imai-88)*

The basis of Just-In-Time (JIT) is the concept of ideal production. It centers on the elimination of waste in the whole manufacturing environment, from raw materials through shipping. Just-In-Time is defined as "the production of the minimum number of different units, in the smallest possible quantities, at the latest possible time, thereby eliminating the need for inventory. Remember, JIT does not mean to produce on time, but to produce just in time

Just-in-time manufacturing (PDF) 15/6/2016

Also in service field JIT in time service satisfy customer, eliminate west and minimize cost.

Small group activity:

is also known as focused or continuous improvement in English SGA finds its origin in Japanes industry where it is called "Kobetsu Kaizen" or Quality SGA circle SGA is method for problem solving in teams by structurally searching for the root cause and eliminating them after standardization of solution the reoccurrence of the problem in prevented. The feeling of ownership is intensified because those who are directly involved solve the problem in multifunctional team.*(Diana ŁYJAK, Krzysztof EJSMONT)(PTZP - Page 341)*

Zero defects:

Six sigma based on 3.4 defect per million opportunities, but zero defect considers the design of processes and all, with the aim that defect are out of the process or product. It based on the fact that every defect has a hidden cost associated with it. It can be due to inspection, waste/scrap, rework, lost customers etc. Hence if we

can reduce the defects or if we can get rid of the defects completely, we can save a lot of money due to the above facts.

So Crosby proposed the concept of free quality. ZD make it sure that all waste existing in the process is eliminate in the very first go itself which makes the way for cost reduction. So ZD directs towards reduction in waste as well as cost cutting. So this entire process improves the services and hence, improves quality which leads to satisfied customers.

Defect prevention level where all output is within specification limits. Zero defects is a laudable objective only where the process' ability to predictably generate output within the specification limits is improved instead of widening the specification limits (*International Research Journal of Engineering and Technology (IRJET) Issue: 05 /Aug-2015)*

Depend on this we can say it based on (RFT) concept that mean do it right first time in all process steps to element waste. Zero defects is the quality performance standard creating by Philip Crosby

The ZD concept demands that no wastage is there in a project. Here the term "waste" is used to address all the unproductive work process, machineries, etc. So anything that is unproductive and does not add value to product should be eliminated. (*International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395 -0056 Volume: 02 Issue: 05 / Aug-2015 www.irjet.net p-ISSN: 2395-0072 © 16/6/2016)*

Cooperative:

An autonomous association of persons united voluntarily to meet their common economic, social and cultural needs and aspirations through a jointly-owned and democratically controlled enterprise.

The values on which co-operatives are based are self-help, self-responsibility, democracy, equality, equity and solidarity. At first sight, these principles and values seem to focus upon internal and organizational aspects of co-operative enterprises. Still, co-operatives will stress upon their market behavior as well, stating they distinguish themselves by honest measurement, high quality and fair prices.*(February 2005 Co-operatives and Fair-Trade (page 10)*

Productively:

Productivity is commonly defined as a ratio between the output volume and the volume of inputs. In other words, it measures how efficiently production inputs, such as labor and capital, are being used in an economy to produce a given level of output. Productivity is considered a key source of economic growth and competitiveness and, as such, is basic statistical information for many international comparisons and country performance assessments. For example, productivity data are used to investigate the impact of product and labor market regulations on economic performance. Productivity growth constitutes an important element for modelling the productive capacity of economies. It also allows analysts to determine capacity utilization, which in turn allows one to gauge the position of economies in the business cycle and to forecast economic growth. In addition, production capacity is used to assess demand and inflationary pressures.*(Paul Krugman, The Age of Diminishing Expectations (1994))*

New product development:

Successful new product development (NPD) is a critical cornerstone of firm success, significant incentives exist for firms to continuously introduce viable new products to the markets they serve. The financial payoff from successful new product introductions can help many firms overcome the slowing growth and

profitability of existing products and services that are approaching the maturity stages of their life cycles.

At a 1990 study sponsored by the Marketing Science Institute found that 25% of successful firms' current sales were derived, on average, from new products introduced in the last three years, new product development can also be a potential source of significant economies of scale for the firm.

Furthermore, new product development can be an important source of leverage for the firm to use in its relationships with its distribution channel partners.

New products may be able to use many of the same raw material inputs as the firm's existing products, and may be able to be sold by the firm's existing sales force – resulting in substantially lower unit costs (and in turn higher margins) for the firm.

Furthermore, the image and reputation of the firm and its brands is heavily influenced by the number and caliber of successful products in its portfolio.

(Dahan, Ely and John R. Hauser (2003), "Product Management: New Product Development and Launching," Handbook of Marketing, Barton Weitz and Robin Wensley, Eds, Sage Press, (June), 179-222.Chapter 8)

Kaizen And Management:

 Ask any management in Japanese company what top management is press for, he going to say Kaizen.

   Management first must establish policies, rules, directive and procedures and follow (SOP) Stander Operator Procedures, if people cannot implement this SOP management can provide training until his staff start to go on.

Management has two major components maintenance and improvement, maintenance refer to activities directed tower maintenance current technology, managerial and operating stander Improvement refers to those directed toward improving current stander.

Improvement broken down between Kaizen and innovation. Kaizen signifies small improvement made in the status quo as a result of ongoing effort. Innovation involve a drastic improvement in the status quo as result of a large investment in new technology and equipment.*(Kaizen wrote by Masaaki Imai– 5&6)*

Poor management which did not implement Kaizen fall drop in maintenance management, lack of staff involvement and don't know where there company go. Always it solve problem without clear processes to steps toward improvement.

Kaizen and TQM:

Total Quality Management (TQM) and Kaizen- a continuous change toward betterment are two
Fundamental concepts directly dealing with continuous improvement of quality of processes and performance of an organization to achieve positive transformation in mindset and action of employees and management. For clear understanding and to get maximum benefit from both of these concepts, as such it becomes mandatory to precisely differentiate between TQM and Kaizen. TQM features primarily focus on customer's satisfaction through improvement of quality. It is both a top down and bottom up approach whereas kaizen is processes focused and a bottom up

approach of small incremental changes. Implementation of TQM is more costly as compared to Kaizen.

Through kaizen, improvements are made using organization's available resources. For the effective implementation of kaizen, the culture of the organization must be supportive and the result of continuous improvement should be communicated to the whole organization for motivation of all employees and for the success of continuous improvement program in the organization. *(Muhammad Saleem, Nawar Khan, Shafqat Hameed, M Abbas Ch. An Analysis of Relationship between Total Quality Management and Kaizen. Life Science Journal. 2012;9(3):31-40] (ISSN:1097-8135). http://www.lifesciencesite.com. 5(14/6/2016)*

TQM and Kaizen are interdependent concept in the literature, Kaizen is one of TQM Damage 14 point (continuous improvement), The Differences between TQM & Kaizen TQM is a philosophy of what makes up a quality organization, and Kaizen is a methodology that one can apply to encourage improvements to existing processes .successful organizations implementing both to encourage improvements to existing processes.*(KAIZN (WROTE BY Masaaki Imai - 13)*

Paradigm and change:

A paradigm is a way of thinking (based on values and beliefs, and reinforced by standards, habits and results) which influences our way of interpreting a given situation or problem. When we react to a situation in a stereotyped or usual way this is called a paradigm. Each person reacts according to the paradigms adopted. Paradigms usually stands a long period of time until something occurs to bring into question the validity of the model.

Change means "to cause to be different". Change begins with acceptance

We resist change because we fear:

- Fear of failure
- Creating new habit
- No obvious need
- Loss of control
- Concern about support system
- Coming out of comfort zone
- Closed mind
- Unwilling to learn
- Fear of personal impact
- Fear about new way
- Fear of unknown

October 10, 2014 by Kaizen Institute – India, Kaizen | Six Sigma | Lean Management | Training & Consulting | Operational ExcellenceGlobal Leader & Pioneer in Kaizen/Lean/Operational Excellence domain

Adding value and waste:

A key focus of the Lean approach is to eliminate / reduce waste from processes. This starts with determining which steps in the process add value from the consumer's perspective. The question to ask is whether the step transforms the product or service in a way that is valuable for the consumer (ie they would be prepared to pay for it). If the answer is no, then the step is waste. Time spent actually adding value typically represents less than 20% of the total time a product or service spends going through the processes (lead time). Identifying the 80% of waste enables us to challenge our current process and find ways to improve.

Eight types of wastes to look for in a work environment are:

- Overproduction
- Waiting
- Unnecessary transportation
- Over processing

- Excess inventory
- Unnecessary motion
- Defects
- Human talent

Advantages of Kaizen:

1. Kaizen can be useful in industry or other fields.

2. It concentrates attention on the processes and activity is centered on getting the process right.

3. It rewards effort as well as achievement.

4. It is a method for active problem solving.

5. It delegates responsibility to all participants.

6. It gives employees a sense of purpose.

7. It acts as a motivator for building quality in to product.

8. It eliminates the need for inspection.

9. It harbors group-centered activity and therefore encourage teamwork.

10. It helps to breakdown departmental barriers.

11. The focus for improvement is returned to the needs for the customer.

12. It aims to reduce waste and superfluous activity which are not-visible to management.

13. It helps to establish long-term goals for the company so that it can keep abreast of change.

The above are only some of the more obvious reasons for starting down the path to continuous improvement. The list is limited only by the imagination of the observer. In any activity, there are endless opportunities to do things better, then again. By adopting the philosophy wholeheartedly.

People can be inspired to achieve levels of quality and artisanship hitherto thought impossible. The human mind is limitless in its ability to achieve. All that is required is a believing heart, and a strong will. The desire to improve, once caught, will be self-perpetuating when the benefits of that improvement become visible. People must believe in themselves and their ability to do better. Of course, it is frightening to change, to break out of a humdrum state of affairs. However, if one does not try, changes are that the rut merely grows deeper and more difficult to get out of.*(Posted by Satish Raj Pathak at 9:29 AMLabels: Kaizen)*

Speake of data:

 TQM emphasize the use of data writs we should take with facts, data and measurement, Even if accurate data are a valuable they will be meaningless if they are no use correctly.

The skill with which company collects and uses data can make the difference between success and failure. The problem is that even if the valuable information is available few people take the trouble to make good use of it.

Information sharing among executive is just as important as information collection and processing. Where information probably collected processed of improvement.

A system of data collection and evaluation is vital part of TQM/Kaizen program.
(KAIZN - Wrote By Masaaki Imai 48-49)

Kaizen and measurement:

When manager is looking for specific result such as quarterly profit, productivity indices or quality level, his only yard-stick is to see whether the goal has been achieved or not .On other hand when he uses process oriented measure to look in to the effort for improvement his criteria will be more supportive and he may be less critical of the result since improvement is slow and come in small steps.*(KAIZN - Wrote By Masaaki Imai 39)*

Kaizen and leadership:

Kaizen also is requires a different kind of leadership based on experience and conviction on authority,rank, or age.Anybody who has gone through the experience himself can become leader .For proof. One only has to note how enthusiastically QC circle leaders, young and old, make their presentation at meetings. This is because improvement brings many truly satisfying experience. in life identify problem thinking and learningtogether, tackling and solving difficult tasks and thus being elevated to new heights of achievement .*(KAIZN - Wrote By Masaaki Imai 41)*

Six steps of Kaizen:

1- Discover improvement potential

2- Analysis the current method

3- Generate the original idea

4- Develop an implementing plan

5- Implement the plan

6- Evaluate the new method

(Toyota Kaizen Method – Wrote by Isao Kato and Art Smalley – Page 60)

Figure (5)
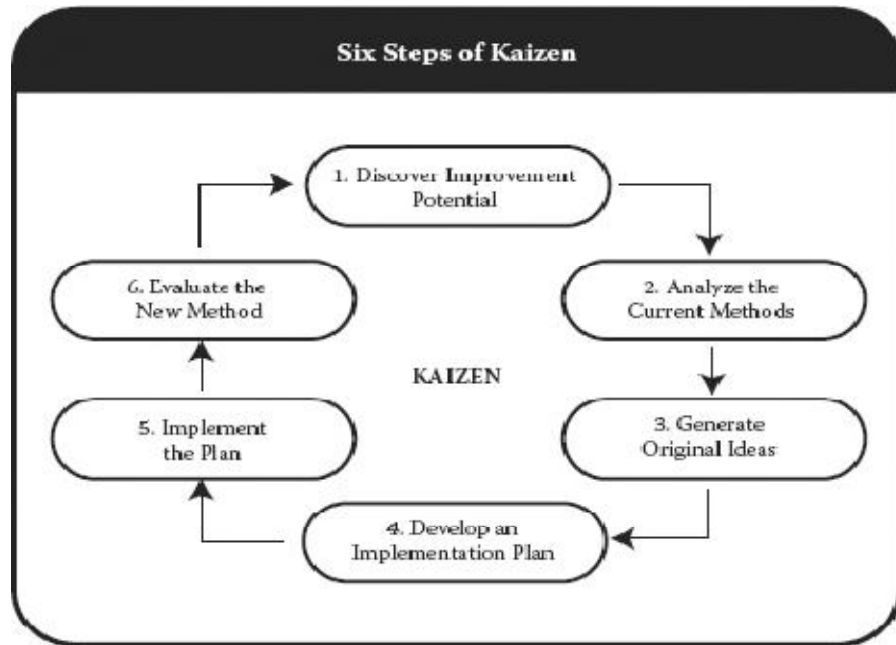
Six step of Kaizen

Toyota Kaizen Method- Wrote by Isao Kato and Art Smalley – Page (60)

5S Arrangement and important for work please:

5S is one of the most widely adopted techniques from the lean manufacturing toolbox. Along with Standard Workplace and Total Productive Maintenance, 5S is

considered a "foundational" lean concept, as it establishes the operational stability required for making and sustaining continuous improvements.

The primary objective of 5S is to create a clean, orderly environment- an environment where there is a place for everything and everything is in its place. Beyond this, many companies begin their lean transformation with 5S because it exposes some of the most visible examples of waste it also helps establish the framework and discipline required to successfully pursue other continuous improvement initiatives.*(5S / Visual Workplace Handbook - www.BradyID.com/visualworkplace)*

Figure (6)
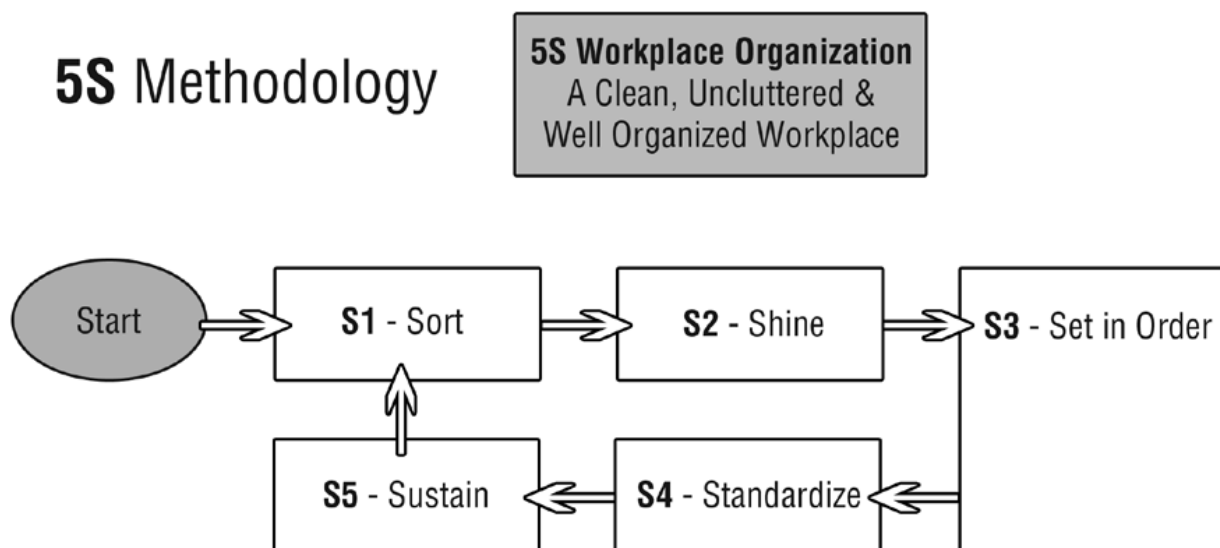
5S is a methodical way to organize your workplace and your working practices as well as being an overall philosophy and way of working. It is split into 5 phases, each named after a different Japanese term beginning with the letter (S) (seiri,

seiton, seiso, seiketsu, and shitsuke) mean in order (Store-Set in order- Shine –
Standardize – Sustain). It is possible to translate the terms into English equivalents,
but something is usually lost in the process. Shows the five words in Japanese and
an interpretation of what each one truly.*(Toyota Kaizen Method – Wrote by Isao Kato and Art*
Smalley – Page 84)

Figure (7)
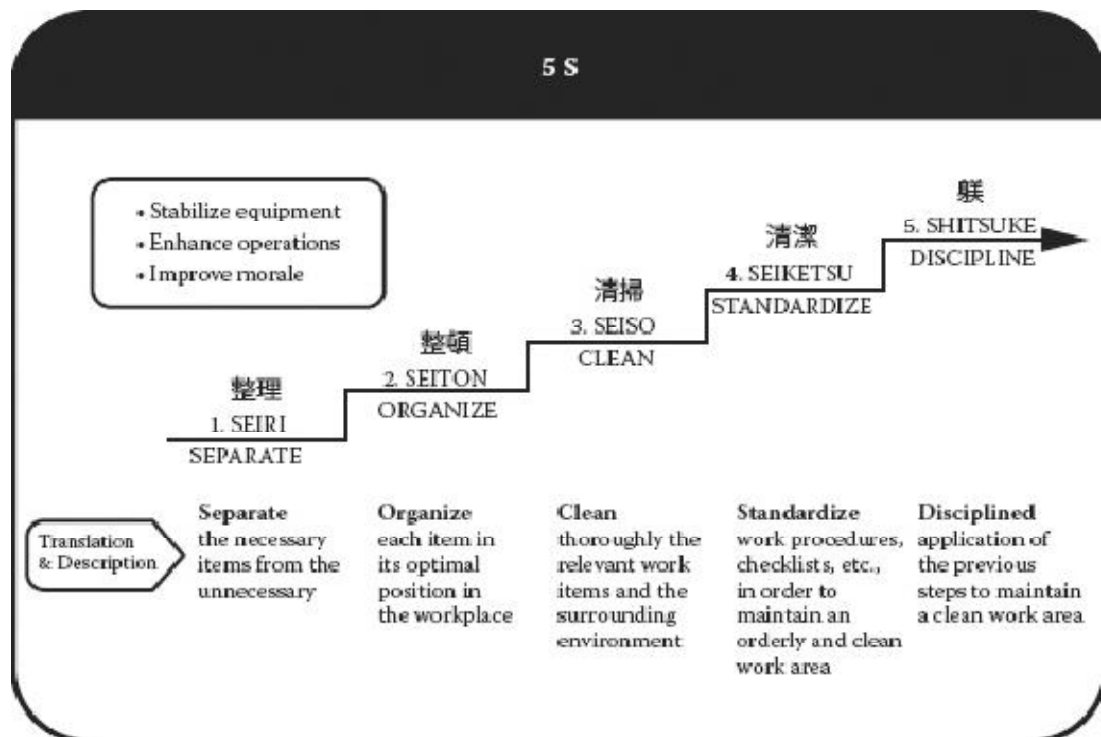
Depend on **5S store**5S core is about removing non-value added processes by
developing standard methods for doing the necessary work. An effective 5S
program will therefore improve efficiency, quality and employee safety. *(5S Store)*
5S is system that is designed to ensure work place safety, efficiency, cleanliness
and increasing quality.

Visual Workplace:

A visual workplace is a work environment that is self-ordering, self-explaining, self-regulating and self-improving – where what is supposed to happen does happen, on time, every time, because of visual solutions.*(Visual Workplace, Visual Thinking" by Dr. Gwendolyn Galsworth, www visualworkplace.com)*

Visual Workplace in a Lean Manufacturing Process Overview:

In additional to the previous concept, Visual workplace is a lean concept that's all about putting important information right where employees need to see it. This concept plays a critical role in some of the most popular lean tools, including 5S. That's because it creates a sustaining base for lean improvements to remain clearly visible, readily understood and consistently adhered to.*(Create a Visual Workplace 5S Plus Guide - BEST PRACTICES FOR A LEANER AND SAFER WORKPLACE - chapter 1- page 4)*

How visual workplace helps you:

1. Reduce Waste (Reduce waste types support to increase productivity and decrease cost)
2. Enhance Knowledge (Knowledge and training help worker and employees to implement duties right and fast , if there is lack of knowledge means wasting time, materials and safety)
3. Improve Productivity (Visual work place and true implement of Quality , Kaizen and 7S support high productivity , high quality without waste)

(Create a Visual Workplace 5S Plus Guide - BEST PRACTICES FOR A LEANER AND SAFER WORKPLACE- Chapter 1- page6-8-10)

5S and Safety:

While 5S is one of the most widely adopted techniques from the lean manufacturing toolbox, "5S Plus" goes a step further to emphasize a critical aspect of any workplace.Safety that way you benefit from a workplace that is both efficient and safe. *(Create a Visual Workplace 5S Plus Guide - BEST PRACTICES FOR A LEANER AND SAFER WORKPLACE- Chapter 2- page 13)*

Depend on Sur factory policies we add safety and smile to 5S to be 7S (sort-set in order- shin – standardization-sustain-safety and smile).

5S Plus Safety:

Sort: Eliminate non-essential items by going throughall of the tools and materials in your facility and discarding unused items.

Shine: Get the workplace clean, maintain its appearance and use preventative measures

to keep it clean. Set in Order Focus on organizing equipment, establishing

Safety:measures, and creating procedures, product quality standards, and effective inventory and material handling.

Standardize: Create best practices to make the improved workplace a standard.

Sustain: Maintain momentum, ensure employees know the importance of workplace organization and strive to continuous improvement.

Plus Safety: Make the workplace safer by looking for any potential hazards and resolving them. *(Create a Visual Workplace 5S Plus Guide - BEST PRACTICES FOR A LEANER AND SAFER WORKPLACE- Chapter 2- page 14)*

Key benefits to having a "5S Plus" workplace

Figure (8)

Key benefits to having a "5S Plus" workplace

IMPROVE
- Floor space utilization
- Employee safety and morale
- Product quality
- Equipment reliability through frequent cleaning and inspections

Non-value-added activities
- Mistakes made by employees or suppliers
- Time for employee training
- Time searching for tools, parts and supplies
- Unnecessary transportation of goods and navigation around the facility

REDUCE

(Create a Visual Workplace 5S Plus Guide - BEST PRACTICES FOR A LEANER AND SAFER WORKPLACE- Chapter 2- page 15)

5S AND LABELS:

On of 5S benefit establish labels in workplace to:

- Helped you sort through all of your equipment and supplies to determine what you need and what you don't – right at a glance?

- Reduced waste by showing employees the stock levels
- Prevented your employee from losing member of body

Figure (9)

Labels sample
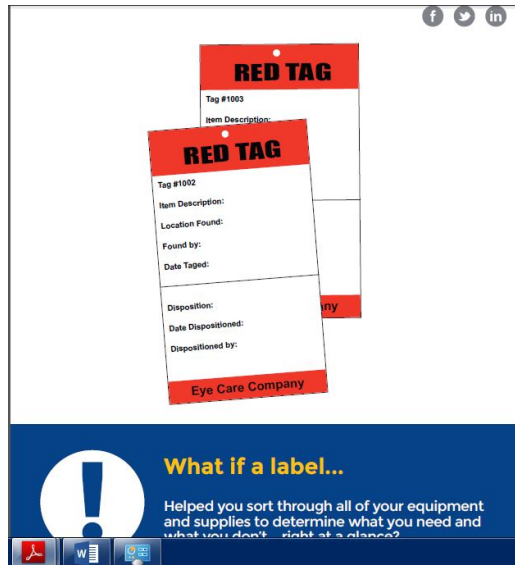
(Create a Visual Workplace 5S Plus Guide - BEST PRACTICES FOR A LEANER AND SAFER WORKPLACE- Chapter 3 - page 17)

Benefit of implement 5S:

In order to participate in the global economy and compete against companies that are advantaged by overseas production, businesses are looking to find ways to reduce cost, improve quality and increase productivity. For this reason, businesses are implementing lean manufacturing, which allows for improvements in productivity while increasing the quality of the output. Lean manufacturing systems use minimal amounts of resources to produce high volume of high-quality goods with some variety, allowing companies to make better use of available resources.

The 5S process is one of the most fundamental and widely applied components of lean manufacturing. Its application is simple, involving basic common sense; however, the advantages cannot be underestimated due to its simplicity. Once

implemented a 5s system can be the stabilizing force underlying a lean manufacturing strategy.

The benefit of implement 5S in workplace

- Increases in productivity:
- Increases in quality:
- Reduction in cost

One of the great aspects of implementing a 5s system is that it can be done today and everyone can participate. Furthermore, all businesses and all departments can benefit from the 5s system. Manufacturing and industrial plants have the greatest applications; however, its use is not limited to production areas. Office and administration areas, information or data flow hubs, retail space and service delivery systems can also achieve productivity gains from its implementation. The bottom line advantage to any company is an increase in profits and a maximization of shareholder wealth.

(LW and Associates)   *(www.lwandassoc.com •
lori@lwandassoc.com – Page 1-2)*

Type of waste:
 Accordion to Kaizen classification to waste types there are three types (Muda – Mura – Muri).

Muda: Any activity in your process that does not add value to work or customers.

Mura: Any variation leading to unbalanced situations, Mura exists when workflow is out of balance and workload is inconsistent and not in compliance with the standard.

Muri:Any activity asking unreasonable stress or effort from personnel, material or equipment. In short: overburden, For people Muri means a too heavy mental or

physical burden. For machinery Muri means expecting a machine to do more than it is capable of or has been designed to do.

Figure (10)
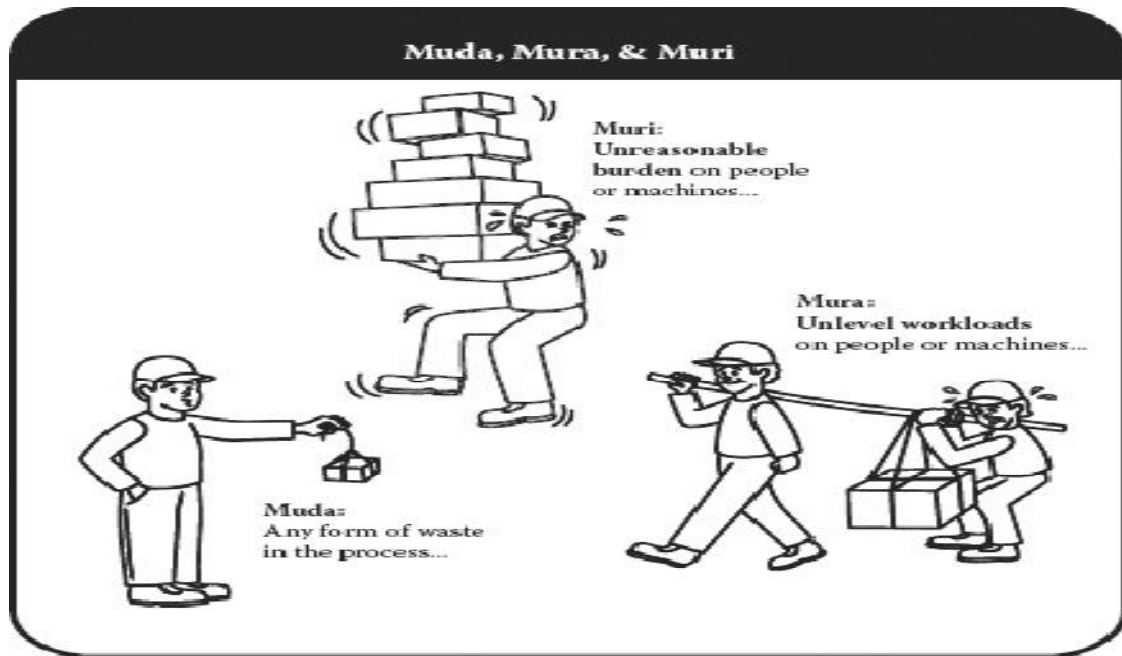
Type of waste

For more specifically there is seven typical types of waste.

1. Over production
2. Excess inventory
3. Scrap and rework
4. Wait time
5. Excess conveyance
6. Excess motion
7. Over processing

(Toyota Kaizen Method – Wrote by Isao Kato and Art Smalley – Page 54-55)

Depend on Dr. Omer Goraffi classification waste types can gather in (DOWNTIME)

D For Defects

O For Over production

W For Waiting time

N For Non use of people creativity

T For Transportation

I For Inventory

M For Motion

E For Extra process

Dr. Omer Goraffe – Althota Center For Training And Human Development

Previous studies:

Maizora Abdalhateb mention in her scientific paperwhich present in Azher University (The entrance to continuous development) to some point agree with research and there are some points research does not mention it

Main points which agree with research:

1- Kaizen definition

2- Explain waste points

3- Kaizen effective to reduce waste

4- Kaizen concept

5- The concept of Kaizen concludes that the path of the tendency begins with a step

6- Gemba and its effectiveness in business

7- Team effectiveness in work and solving problems

Main points which research doesn't mention it with research:

1- The starting of Kaizen method

2- Different between Kaizen and Handara method

3- Statistic results for implement Kaizen

- Reduce run time 50-70%

- Increase efficiency 20-40%

- Reduce cost 20-40 %

- Reduce defects 40-60%

- Reduce using space 50%

- Motivate worker

- Enable human resources

- Discover new Talents

Also Rezan Salahaldeen mention in her research (Kaizen method and its relation with reduce cost in manufacturing field to increase marketing Competitiveness)

Main points which agree with research:

- Rise of Kaizen
- Kaizen important in reducing waste

Main points which research did not explain:

- Compare between American method (innovation) and Japanese method (Kaizen)

	Characteristic	Kaizen (Japan)	Innovation (America)
1	Effectiveness	Long term	Short term
2	Steps	Small and scaling steps	Large and quick steps
3	Time term	Continues and increase	not continuous and decrease
4	Chang	Continues –sustain and constant	Sudden and unsteady
5	Amide	All Pearson	Talents one
6	Method	Team work	Individual work
7	Developing type	Maintenance and improvement	Destruction and rebuilding
8	Scope	Technical practice	New method and innovation

9	Direction	Person	Technology
10	Evaluation	Efforts for good result	Efforts for good revenue
11	Environment	Slowly economic	Quick economic

3. Dr. Ali Abdel Karim Al Safar said in his scientific paper which published in www.uobaghdad.edu.iq/uploads/pics13/q1684/pptx

Continues improvement or change in Japanese concept divide to two concepts:

- Small change (Kaizen).
- Large change (Kikako)

The different between two strategic in the size of change.

Compare between traditional management and Kaizen:

	Traditional management	Kaizen management
1	Do routine work	Have right to change
2	Innovation is right just for high level of managers	All employees have right to innovation
3	Take employees innovation to implement it	Take employees innovation to motivate them
4	Receive ideas from any area to developing	Received ideas just from your department to be more focus

- There are three types of waste :
  1- Muda (waste in time and money)
  2- Mura (Waste due to conflicting powers or business)
  3- Muri (Wasting due to increased physical stress)

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3. INTRODUCTION:

Researcher chose Sur civil and military clothing factory as case study for this research. Sur factory located in Bahri industrial area, it is a partner between Sudan ministry of defense, Qatar ministry of defense and Oktay Arjan Turkish businessman.

Aim of this factory to cover all military clothing need and other accessories also it is cove high scale for civil and special orders, and it is provide good opportunity jobs.

After literature review chapter which gives idea about three important issue in this research. Researcher prepared questionnaire to determine if Sur factory implement quality, Kaizen and 5S in right way.

3.1. Study Approach:

Researcher useSPSS program (Statistical Package for the Social Sciences), it descriptive analysis which give fact and evident by numbers and with scientific methodand view results in tables and charts.

3.2. Study Samples:

Sur factory has one thousand and two hundred employees and workers, most of them are worker.

Researcher took four hundred random sample in this questionnaire 80% from worker and 20% from employers.

Questionnairecontent three questions groups to discuss Quality, Kaizen and 5S.

4. RESEARCH ANALYSIS:

Sur civil and military clothing factory contents one thousand and two hundred employees and workers, most of them are workers in production lines.

Researcher took four hundred samples divide as 80% from worker and 20% from employers.

There are ninety three missing questionnaires result for that the real samples is three hundred and seven.

4.1. Analysis Result:

Total analysis by questions:

Implement Quality

Table (1) – Implementing Quality Question No 1

Question	Analysis	Frequency	Percentage
Did you think that quality implement in your factory in right way	Strongly Disagree	15	4.9%
	Disagree	57	18.6%
	I don't know	46	15%
	Agree	125	40.7%
	Strong agree	61	19.9%
	Missing	3	1%
	Sum	**307**	**100%**

Table (2) – Implementing Quality Question No 2

Question	Analysis	Frequency	Percentage
Did you think that quality implement guide to improve performance in factory	Strongly Disagree	11	3.6%
	Disagree	24	7.8%
	I don't know	55	17.9%
	Agree	116	37.8%

	Strong agree	86	28.0%
	Missing	15	4.9%
	Sum	307	100**%**

Table (3) – Implementing Quality Question No 3

Question	Analysis	Frequency	Percentage
Management commitment to implement quality	Strongly Disagree	8	2.6%
	Disagree	34	11.1%
	I don't know	63	20.5%
	Agree	123	40.1%
	Strong agree	52	16.9%
	Missing	27	8.8%
	Sum	307	100**%**

Table (4) – Implementing Quality Question No 4

Question	Analysis	Frequency	Percentage
Worker commitment to quality management instructionsin factory	Strongly Disagree	6	2.0%
	Disagree	28	9.1%
	I don't know	42	13.7%
	Agree	146	47.6%
	Strong agree	80	26.1%
	Missing	5	1.6%
	Sum	307	100**%**

Table (5) – Implementing Quality Question No 5

Question	Analysis	Frequency	Percentage
Do you think your participation in quality in your factory is good	Strongly Disagree	6	2.0%
	Disagree	30	9.8%
	I don't know	44	14.3%
	Agree	130	42.3%
	Strong agree	89	29.0%

	Missing	8	2.6%
	Sum	307	100%

Table (6) – Implementing Quality Question No 6

Question	Analysis	Frequency	Percentage
Do you think that quality change is big	Strongly Disagree	9	2.9%
	Disagree	29	9.4%
	I don't know	76	24.8%
	Agree	115	37.5%
	Strong agree	65	21.2%
	Missing	13	4.2%
	Sum	**307**	**100%**

Table (7) – Implementing Quality Question No 7

Question	Analysis	Frequency	Percentage
Your product competitive international	Strongly Disagree	11	6%
	Disagree	20	6.5%
	I don't know	78	25.4%
	Agree	99	32.25%
	Strong agree	91	29.6%
	Missing	8	2.6%
	Sum	**307**	**100%**

Table (8) – Implementing Quality Question No 8

Question	Analysis	Frequency	Percentage
Your product competitive in local factories	Strongly Disagree	11	3.6%
	Disagree	19	6.2%
	I don't know	70	22.8%
	Agree	112	36.5%
	Strong agree	85	27.7%
	Missing	10	3.3%
	Sum	**307**	**100%**

Above tables give result for implementing quality, by separate questions and its frequency's and percentages

Implement Kaizen Methodology:

Table (1) – Implementing Kaizen Question No 1

Question	Analysis	Frequency	Percentage
Do you like change to better in your work	Strongly Disagree	7	2.3%
	Disagree	0	0%
	I don't know	10	3.26%
	Agree	100	32.57%
	Strong agree	180	58.63%
	Missing	10	3.3%
	Sum	**307**	**100%**

Table (2) – Implementing Kaizen Question No 2

Question	Analysis	Frequency	Percentage
Kaizen training was enough for you	Strongly Disagree	6	2.0%
	Disagree	36	11.7%
	I don't know	58	18.9%
	Agree	129	42.0%
	Strong agree	65	21.2%
	Missing	13	4.2%
	Sum	**307**	**100%**

Table (3) – Implementing Kaizen Question No 3

Question	Analysis	Frequency	Percentage
Starting implement Kaizen methodology in your factory	Strongly Disagree	7	2.3%
	Disagree	27	8.8%
	I don't know	96	31.3%

	Agree	110	35.8%
	Strong agree	47	15.3%
	Missing	20	6.5%
	Sum	**307**	**100%**

Table (4) – Implementing Kaizen Question No 4

Question	Analysis	Frequency	Percentage
Your manager go to problem location to solve it (Go to gamba)	Strongly Disagree	22	7.2%
	Disagree	37	12.1%
	I don't know	46	15.0%
	Agree	124	40.4%
	Strong agree	61	19.9%
	Missing	17	5.5%
	Sum	**307**	**100%**

Table (5) – Implementing Kaizen Question No 5

Question	Analysis	Frequency	Percentage
Manager gives worker chance to solving problem	Strongly Disagree	73	23.8%
	Disagree	72	23.5%
	I don't know	49	16.0%
	Agree	60	19.5%
	Strong agree	33	10.7%
	Missing	20	6.5%
	Sum	**307**	**100%**

Table (6) – Implementing Kaizen Question No 6

Question	Analysis	Frequency	Percentage
There is waste in your factory	Strongly Disagree	21	6.8%
	Disagree	43	14.0%
	I don't know	107	34.9%
	Agree	67	21.8%
	Strong agree	37	12.1%
	Missing	32	10.4%
	Sum	**307**	**100%**

Table (7) – Implementing Kaizen Question No 7

Question	Analysis	Frequency	Percentage
Have quality tools to measure and analysis work result and improvement in your factory	Strongly Disagree	11	3.6%
	Disagree	43	14.0%
	I don't know	82	26.75
	Agree	112	36.5%
	Strong agree	42	13.7%
	Missing	17	5.5%
	Sum	**307**	**100%**

Table (8) – Implementing Kaizen Question No 8

Question	Analysis	Frequency	Percentage
If all your reply is disagree did you think implement Kaizen is	Strongly Disagree	4	1.3%
	Disagree	20	6.5%
	I don't know	81	26.4%

	Agree	106	34.5%
possible in future	Strong agree	45	14.7%
	Missing	51	16.6%
	Sum	**307**	**100%**

Above tables give result for implementing Kaizen, by separate questions and its frequency's and percentages.

Implement 5S Methodology:

Table (1) – Implementing 5S Question No 1

Question	**Analysis**	**Frequency**	**Percentage**
	Strongly Disagree	5	1.6%
	Disagree	36	11.7%
5S training was enough for you	I don't know	69	22.5%
	Agree	131	42.7%
	Strong agree	42	13.7%
	Missing	24	7.8%
	Sum	**307**	**100%**

Table(2) – Implementing 5S Question No 2

Question	**Analysis**	**Frequency**	**Percentage**
	Strongly Disagree	13	4.2%
	Disagree	31	10.1%
Managers and worker commitment to implement 5S	I don't know	80	26.1%
	Agree	113	36.8%
	Strong agree	45	14.7%
	Missing	25	8.1%
	Sum	**307**	**100%**

Table(3) – Implementing 5S Question No 3

Question	Analysis	Frequency	Percentage
Do you think 5S Methodology implementing in a right way	Strongly Disagree	9	2.93%
	Disagree	47	15.3%
	I don't know	86	28.01%
	Agree	105	34.20%
	Strong agree	34	11.07%
	Missing	26	8.46%
	Sum	**307**	**100%**

Table(4) – Implementing 5S Question No 4

Question	Analysis	Frequency	Percentage
Do you think that your work place is sort	Strongly Disagree	9	2.9%
	Disagree	47	15.3%
	I don't know	86	28.0%
	Agree	105	34.2%
	Strong agree	34	11.1%
	Missing	26	8.5%
	Sum	**307**	**100%**

Table(5) – Implementing 5S Question No 5

Question	Analysis	Frequency	Percentage
Do you think that in your work place everything set in order	Strongly Disagree	12	3.9%
	Disagree	29	9.4%
	I don't know	29	9.4%
	Agree	141	45.9%
	Strong agree	80	26.1%
	Missing	16	5.2%
	Sum	**307**	**100%**

Table(6) – Implementing 5S Question No 6

Question	Analysis	Frequency	Percentage
Do you think that your work place is clean and worker care of this	Strongly Disagree	14	4.6%
	Disagree	34	11.1%
	I don't know	22	7.2%
	Agree	143	46.6%
	Strong agree	79	25.7%
	Missing	15	4.9%
	Sum	**307**	**100%**

Table(7) – Implementing 5S Question No 7

Question	Analysis	Frequency	Percentage
Do you think that everything in your work depend on	Strongly Disagree	8	2.6%

stander	Disagree	34	11.1%
	I don't know	60	19.5%
	Agree	128	41.7%
	Strong agree	54	17.6%
	Missing	23	7.55
	Sum	**307**	**100%**

Table(8) – Implementing 5S Question No 8

Question	Analysis	Frequency	Percentage
Do you think that your factory can sustain in good implementing and improvement	Strongly Disagree	11	3.6%
	Disagree	30	9.8%
	I don't know	76	24.8%
	Agree	128	41.7%
	Strong agree	50	16.3%
	Missing	12	3.9%
	Sum	**307**	**100%**

Table(9) – Implementing 5S Question No 9

Question	Analysis	Frequency	Percentage
If 5S methodology did not implement in your factory, do you think it is possible in near future	Strongly Disagree	6	2.0%
	Disagree	21	6.8%
	I don't know	74	24.1%
	Agree	128	41.7%
	Strong agree	57	18.6%
	Missing	21	6.8%
	Sum	**307**	**100%**

Above tables give result for implementing 5S, by separate questions and its frequency's and percentages

Standard and Result

Standard table

Level	Average mean
Strong disagree	1-1.79
Disagree	1.80-2.59
I don't know	2.60-3.39
Agree	3.40-4.19
Strong agree	4.20-5

4.3. Hypothesis Analysis

First hypothesis:

Question	Mean	Result
Did you think that quality implement in your factory in right way	3.58	Agree
Did you think that quality implement guide to improve performance in factory	4.08	Agree
Management commitment to implement quality	4.10	Agree
Worker commitment to quality management instructions in factory	3.96	Agree
Do you think your participation in quality in your factory is good	4.02	Agree
Do you think that quality change is big	3.90	Agree
Your product competitive international	3.93	Agree
Your product competitive in local factories	3.98	Agree

Chart (1)

ch

Quality Mean Result

4.081433225 4.104234528 4.022801303 3.980456026
3.964169381 3.899022801 3.93485342
3.578431373

question1 question2 question3 question4 question5 question6 question7 question8
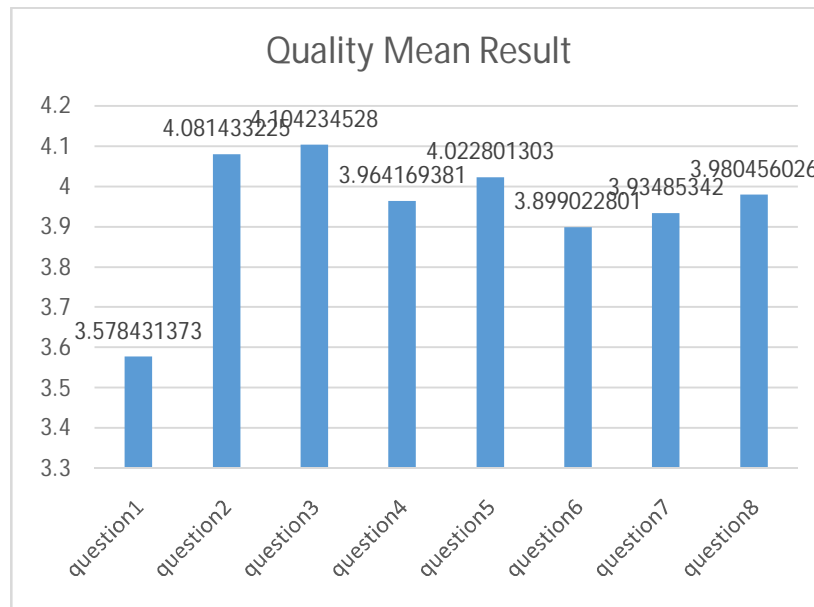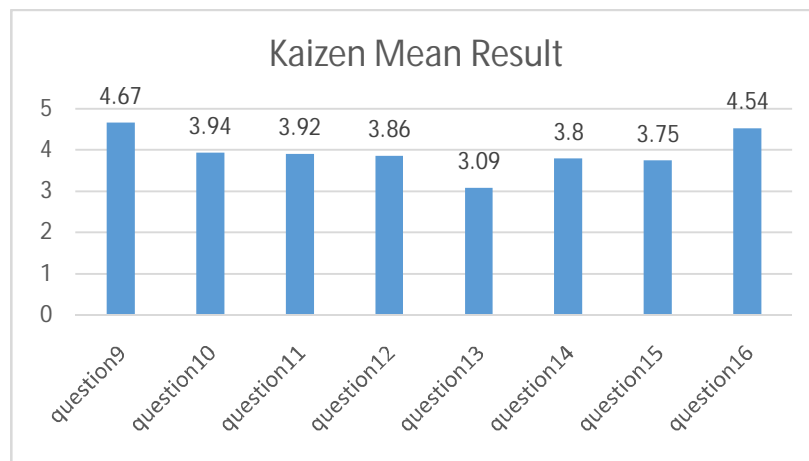
Quality Question Result

Above table and chart give details result about quality implementation in Sur factory, and depend on previous results about quality implementation frequency and percentage appear that all our results in agree rate. Which achieve the first hypothesis that is a direct relation between implementing quality policy and developing work in manufacturing field.

Second and third hypothesis:

Question	Mean	Result
Do you like change to patter in your work	4.67	Strong Agree
Kaizen training was enough for you	3.94	Agree
Starting implement Kaizen methodology in your factory	3.92	Agree
Your manager go to problem location to solve it (Go	3.87	Agree

|		
to gamba)		
Manager gives worker chance to solving problem	3.09	Agree
There is waste in your factory	3.81	Agree
Have quality tools to measure and analysis work result and improvement	3.76	Agree
Have quality tools to measure and analysis work result and improvement	4.54	Strong Agree
If all your reply is disagree did you think implement Kaizen is possible in future	4.67	Strong Agree

Chart (2)

Kaizen Questions chart

Above table and chart give details results about Kaizen implementation in Sur factory, and depend on previous results about Kaizen implementation and eliminate waste frequency and percentage appear that all our results in strong agree and agree rate. Which achieve the second hypothesis that there is a direct relation between implementing kaizen and eliminate waste in manufacturing field. And third hypnosis about direct relation between implementing kaizen and continues improvement in manufacturing field

Fourth hypothesis:

| Question	Mean	Result
5S training was enough for you	4.02	Agree
Management and worker commitment to implement 5S	3.96	Agree
Do you think that 5S in implementing in a right way	3.86	Agree
Do you think that your work place is sort	4.12	Agree
Do you think that in your work place everything set in order	4.07	Agree
Do you think that your work place is clean and worker care of this	4.02	Agree
Do you think that everything in your work depend on stander	4.06	Agree
Do you think that your factory can sustain in good implementing and improvement	3.81	Agree
If 5S methodology did not implement in your factory, do you think it is possible in near future	4.09	Agree

Chart (3)
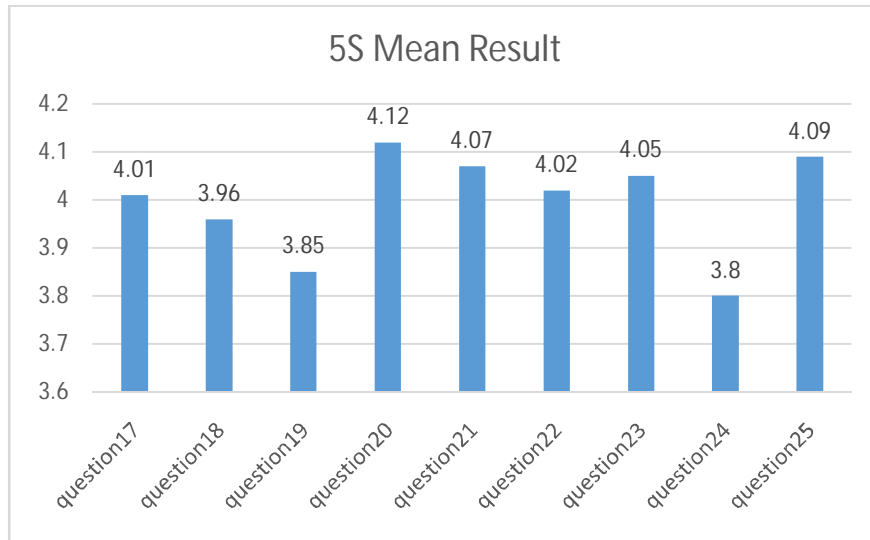
5S Questions chart

Above table and chart give details results about 5S implementation in Sur factory, and depend on previous result about 5S implementation frequency and percentage appear that all our results in agree rate. Which archives hypnosis that is positive relation between implementing 5S methodology and keep improvement in work place.

Final chart
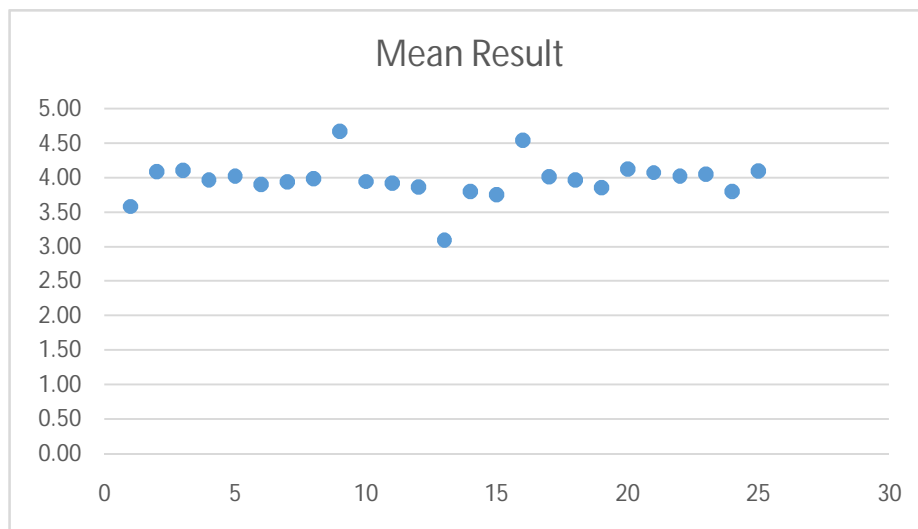
Summary Result

5.1 RESULTS:

During this research we try to see how implementing quality, Kaizen and 5S in manufacturing is effect especially Kaizen and 5S , Sur military clothing factory our case study which researcher did training before for production section in Kaizen and 5S has result as follow :

1. They implement quality correct and in perfect way in a large extent, all documents are existent and complete, there have daily, weekly and monthly reports for productions and defects rate and work follow.

2. Managers and supervisors use this data to follow production lines solving problems and making decision in quality meeting which done every month or twice a month if there is an urgent issues.

3. Accordion to questionnaire results Kaizen training was very effect and they started implement it in production lines.

4. Accordion to questionnaire researcher observe that employees did have complete idea about Kaizen and 5S.

5. Manager and supervisors always in production lines and implement Gemba Kaizen philosophy.

6. There is weak points like involve worker in decisions making and solving problems

7. Accordion to questionnaire results 5S training was effective for production sections and they start implement it.

8. Employees have no any idea about 5S because they did not have training.

9. There is a direct relation between implementing quality policy and developing work in manufacturing field.

10. There is a direct relation between implementing kaizen and eliminate waste in manufacturing field.

11. There is a direct relation between implementing kaizen and continues improvement in manufacturing field.

12. There is positive relation between implementing 5S (sort- set in order -shin- sustain-standardize) in work place to keep improvement in work plan.

We can say that analyses result compatible with research hypotheses, small data is incompatible put it can be points for planning improvement.

5.2. RECOMMENDATIONS:

Depend on what researcher reached in previous chapters, questionnaire results, and her observation she recommend that:

- Continues implement quality policy in factory and search for improvement points, and put clear plan to implement it
- Quality must be culture for all worker, employees and manager not just as a factory policy or order and it be possible by more quality training and give all work relative chance to be aware to factory policy and solving problems.
- System development department coordinate with quality department to continue training in quality to all factory sections to insure more understanding and implement for quality in factory.
- Employees need training in Kaizen and 5S and how they can keep work environment clean and comfortable.
- Use Kaizen methodology to eliminate wastes in work
- 5S methodology give good impact for work environment we need sustain and improvement
- Give worker in production lines chance in suggestion and solving problems.

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