Chapter - 5

Operational Excellence at Mawana Sugar Works

1) Operational Excellence
2) Overview of SGIA
3) DMAIC Methodology
4) Six-Sigma – An Introduction
5) Six-Sigma Methodology at MSW
6) Concept of Lean Six-Sigma Methodology
7) What is DMAIC Methodology – Phases
8) Kaizen – An Introduction
9) Kaizen (Ankur) activities at MSW
10) Structure and coverage of Ankur at MSW.
11) Organisation with and without Ankur
12) The 3 Mortal Sins of the workplace
13) Darpan (Housekeeping) – The 5S programmes at MSW
14) Steps in the Implementation of 5s at MSW
Chapter 5

Operational Excellence at Mawana Sugar Works

The present research work is based on identifying the role of training and development in achieving operational excellence (with special reference to Mawana Sugar Works, Mawana). In chapter four, the researcher has given the details of training and development activities at MSW.

This chapter discusses about operational excellence activities at Mawana Sugar Works, Mawana. It highlights the concept of operational excellence and its various activities like SGIA, DMAIC Methodology, Kaizen, 5s etc and their implementation at Mawana Sugar Works, Mawana.

Operational Excellence

Operational Excellence (OpEx) may be defined as a company’s commitment to consistently deliver quality products or services to the customers at the right cost in the right quantities and at the right time. Operational Excellence is the pursuit of conducting business in a manner that continuously improves the quality of goods and services, reduces the costs, increases the rate of production and enhances flexibility to achieve competitive advantage.
Wikipedia\(^1\) defines operational excellence as a philosophy of leadership, teamwork and problem solving resulting in continuous improvement throughout the organisation by focusing on the needs of the customers, empowering the employees and optimizing existing activities in the process.

The researcher had several visits to Mawana Sugar Works, Mawana and talked to HR professionals and higher management officials of the company to know about various operational excellence activities at MSW and their significance. Through the discussion with the management officials, it has come to the knowledge of the researcher that at Mawana Sugar Works, the operational excellence activities are conducted with a primary objective to develop the required competencies in the employees, so as to gain competitive advantage in the market.

As per the discussion held with Mr. Karan Singh (Vice President – MSW), “Achieving operational excellence is the first priority for us. He further added that at MSW, operational excellence activities focuses on quality, infrastructure, cost of products, operations cost and lean efforts.

Mr. Pradyuman Pandey (Asst. Vice President, Mawana Sugar Works), he says, “Our approach to reducing the costs and enhancing the products quality through operational excellence initiatives was so successful that investors and analysts kept enquiring about our OpEx programmes. At Mawana Sugar Works, the purpose of operational excellence is the quality of been exceptionally good at creating happy and loyal customers or meeting the stakeholders needs. Operational excellence is not just

concerned with the functions of the operations group at MSW; rather it applies to the operations of all functional areas.”

Mr. Sanjeev Mishra (Senior Manager – HR and OpEx at MSW), told that, “Mawana Sugar Works, being a premier sugar manufacturing company, firmly believes that operational excellence (OpEx) is the strategic philosophy of providing excellent leadership, enhancing employee involvement (EI) and problem-solving resulting in continuous improvement throughout the organisation in all its functional areas.” He further added that training and development play a significant role in achieving operational excellence because training and development programmes help in improving skills and competencies of the employees required to make operational efficiency of the firm better.

Mr. Himanshu Agarwal (Manager – Operations at Mawana Sugar Works) told that, “Mawana Sugar Works pays a great attention to achieving operational excellence through DMAIC methodology, six-sigma, Kaizen (Ankur), and 5s (Darpan) etc., by providing suitable need-based training programmes to the employees. Through training and development programmes, employees are motivated to give their valuable ideas and suggestions through Ankur (Kaizen).

Mr. Pankaj Suri, (Manager – HR and OpEx at Mawana Sugar Works), told the researcher that, At Mawana Sugar Works, operational excellence is an ongoing and never ending journey. It is something which cannot be implemented and achieved overnight. To achieve a true operational excellence, the organisation has to make the continuous efforts in the right direction with an ongoing approach to conducting business.
Through the discussion held with Mr. Vineet Kumar (Senior Executive – HR and OpEx at Mawana Sugar Works), it has come to the notice of the researcher that in order to become operationally excellent, organisations needs to develop a matured capability for accurately identifying stakeholders needs, defining those processes that employees will have to follow to meet those needs, developing employees capability to carry out those well defined processes that meets the needs of stakeholders, conducting the business processes with timely, accurate and relevant information and data, and supporting them with the right information technology, for their effective and efficient performance.

Through the discussion held with Mr. Ashish Kumar (Senior Executive – HR and OpEx at Mawana Sugar Works), it has come to the notice of the researcher that achieving operational excellence is a continuous improvement process and not a onetime event. It fully rests on the foundations of people, process, information and technology (also known as the four business value pillars) to carry out its management and business functions and the activities in order to meet the growing needs of the customers.

With the help of important discussions held with company’s HR department professionals, it is worth notable here that operational excellence is the bedrock of business growth, profitability and competitive advantage. As per the information provided by the higher management officials, it would be worth mentioning here that Mawana Sugar Works is continuously seeking for the best ways to achieve operational excellence (lower operational cost, improved flexibility and speed to market, quality and reliability and customer satisfaction) in order to be more
profitable and competitive. Moreover, training and development programmes play a very essential role in improving the operational performance through DMAIC methodology, Six-sigma, Kaizen (Ankur) and 5s (Darpan) etc. The next part will discuss about the small group improvement activity i.e. SGIA.

**Overview of SGIA**

The word SGIA is an acronym of Small Group Improvement Activity. As per the information obtained by the researcher during the discussion, SGIA is considered to be one of the important methods in successfully implementing and conducting six-sigma methodology.

Since, Mawana Sugar Works (MSW) is a sugar manufacturing company, the basic nature of the company belongs to the machines, tools, devices, instruments, equipment handling and other processes. So, it is utmost important for the company to ensure that its machines, tools and equipments are processed uninterruptedly so that it does not hamper the productivity and efficiency of the organisation.

However, it is quite natural that some problems may occur (like defects, repair or wastes) due to heavy loads, break-downs and repetitive continuous machine processes. Therefore, it is highly required to identify the root cause of those problems and make a proper analysis so that it should not be repeated in the near future. Small Group Improvement Activities (SGIA) is a very effective tool in identifying and analyzing the causes of those problems and finding the ways to solve them.

The main purpose of SGIA at MSW is not only to rectify the problem and achieve the desired results but also to focus on the
process which is adopted in order to achieve the desired results in terms of operational excellence.

**Figure 5.1 – SGIA using DMAIC methodology at MSW**

For effective implementation of SGIA at MSW, small groups or cross functional teams of employees are formed and these teams are assigned the task of problem identification and its solution. Hence, these small group activities (SGIA’s) are the independent projects taken up by the cross-functional teams focusing on areas with heavy problems or ‘chronic problems’. Basically DMAIC methodology (which has been explained in next part of this chapter) is used in SGIA to sort out and rectify the problem but the main focus of SGIA is on result as well as the process orientation, which has been explained in the figure 5.1

*Source – Self constructed by the researcher based on the discussion with HR department at MSW.*
DMAIC Methodology

The DMAIC approach of six-sigma is a systematic methodology utilising training, measurement and data analysis tools to identify the root causes of certain problems and also eliminate these causes for improving the current processes and thus achieving better results. Six-Sigma DMAIC methodology allows effective problem definition, allows for use of data rather than trails and conjecture during critical decision making, helps the study teams or the small cross-functional teams to think about the process and provides an approach for managing and achieving continuous improvements.

The original problem–solving process for six-sigma developed from Motorola was MAIC which means Measurement-Analysis-Improvement-Control. Later on ‘D’ was added to it and ‘DMAIC’ was formed. DMAIC is mostly used as a unique problem solving process in manufacturing areas\(^2\) (Park, 2002).

At MSW, the DMAIC process works well as a breakthrough strategy. The six-sigma is considered as a very effective tool in achieving operational excellence (OpEx) because it enables real improvements and real results. The DMAIC methodology works equally well on variation, cycle time, yield, design and others. Its five phases have been broadly classified into two activities, namely, characterization and optimization. Characterisation means the specification of the problems & analysis. Whereas, optimisation means making out the best results. It has also been explained in figure 5.2.

Figure 5.2 – Classification of DMAIC process into two activities

![Diagram of DMAIC process classification]

**Source** – *Self constructed by the researcher as based on the discussion with HR department at MSW.*

The DMAIC methodology at MSW is also based on PDCA cycle i.e., Plan-Do-Check-Act cycle (which is frequently attributed to the Quality Guru Deming). It has also been explained in figure 5.3.

Figure 5.3 – The DMAIC Methodology based on PDCA Cycle

![Diagram of DMAIC methodology]

**Source** – *Operational excellence (OpEx) manual at MSW*
Six-Sigma – An Introduction

Six-Sigma is a process improvement methodology that uses data and statistical analysis to identify and manage process variations to reduce or eliminate ‘defects’ in a company’s operational performance.

The word Six-Sigma (6σ) is a statistical term that measures how far a given process deviates from perfection. Six-Sigma is named after the process that has six hundred deviations on each side of the specification window.

It is a disciplined data-driven approach and methodology for eliminating defects. The central idea behind Six-Sigma is that if one can measure how many ‘defects’ one have in a process, it can systematically figure out how to eliminate them and get as close to ‘zero defects’ as possible.

Six-Sigma starts with the application of statistical methods for translating information from customers into specifications for products or services being developed or produced. It is a measure of quality for near perfection. Six-Sigma is a business strategy and a philosophy of one working smarter not harder.

Six-Sigma refers to a statistically derived performance target of operating with only 3.4 defects for every million activities or ‘opportunities’. This means one needs to be nearly flawless in executing key processes. One Sigma gives a precision of 68.27 percent, two sigma of 95.45 percent and three sigma of 99.73 percent, whereas Six-Sigma gives a precision of 99.9997 percent. Although 99.73 percent (i.e. three sigma) sounds very good, it slowly dawned on the companies that there is a tremendous
difference between 99.73 percent and 99.9997 percent. It has also been shown in the figure 5.4.

**Figure 5.4 – Diagram showing the specification of why 6 Sigma is better than 3 Sigma.**

As shown in the figure 5.4, it is clear that for every million opportunities, the difference is between 66,738 lost items and 3.4 lost items. To achieve Six-sigma Quality, a process must produce no more than 3.4 defects per million opportunities. An opportunity is defined as a chance for nonconformance, or not meeting the required specifications. This means, one needs to be nearly flawless in executing key processes. The process and culture is conditioned for zero defects rather than being one that accepts that it is inevitable, and acceptable, that mistakes will occur. Hence, Six-Sigma delivers substantial cost reductions, enhanced

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3 Dr. Sharma Manish, Dr. Pandla Kapil, Prof. Gupta Prashant; Case Study on Six-sigma at Wipro Technologies; Thrust on Quality, pp.1-16.
efficiencies, sustainable improvements and increased stakeholder value.\textsuperscript{4}

Six-Sigma is a process improvement methodology that uses data and statistical analysis to identify and manage process variations to reduce or eliminate ‘defects’ in a company’s operational performance. It was developed by Bill Smith\textsuperscript{5} at Motorola Corporation in 1986.

Mahanti and Antony\textsuperscript{6} in (2005) have highlighted in their research paper that Six-Sigma is considered as a business strategy that focuses on improving the understanding of customer requirements, business systems, productivity and financial performance. It focuses on improving quality by reducing variation and thus helping an organisation to produce products and services better, faster and cheaper.

Ray. S and Das. P\textsuperscript{7} in (2009) have opined in their research article that six-sigma is a well structured methodology that can help a company achieve its expected goals through a continuous improvement methodology. It is a project-driven scheme that employs a well structured methodology called DMAIC comprising of five phases – Define, Measure, Analyse, Improve and Control. They pointed out that six-sigma methodologies were typically implemented first to improve manufacturing processes; however later on organisations realized the benefits of six-sigma and its use to different functional areas such as marketing, engineering, purchasing, manufacturing etc.

\textsuperscript{4} Mahuya Deb. 2011; Operational Excellence through Lean Six-sigma, Proceedings of 10\textsuperscript{th} International conference on Operations & Quantitative Management, Nasik, pp.918-922.
\textsuperscript{5} Motorola, “The Inventors of Six-sigma” (accessed March 2006), www.motorola.com/content.jsp.
Balachandran and Ramasamy\(^8\) in (2008) have discussed the role of training and development in six-sigma. They opined that training improves the employee's participation and involvement in six-sigma programme. So, people need to be better informed of the latest methods, tools and techniques of six-sigma and to be able to communicate effectively with actual data and meaningful analysis.

Das and Bhattacharya\(^9\) in (2011) have highlighted the use of DMAIC methodology. They pointed out that the DMAIC approach of six-sigma is a systematic methodology utilising proper training programmes, measurement and data analysis tools to identify the root causes of high cycle-time and also eliminate these causes for improving the current process and thus achieving better results in terms of operational performance.

**Six-Sigma Methodology at MSW**

In order to become the market leader, MSW is continuously focusing on eliminating process variation of its scarce resources and to reduce cycle-time to increase the productivity. The researcher has come to know through the discussions that the company is facing rapidly changing customer expectations, escalating costs and emerging new markets which are all impacting process efficiency. From past several years, the six-sigma methodology is been used at MSW for reducing defects and producing a measurable operational and financial results. But in recent years, six-sigma has sometimes been combined with lean

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manufacturing to yield a methodology named as Lean six-sigma which has been discussed in next part.

At MSW, the six-sigma process is implemented through a series of steps which are mentioned in the figure 5.5. Six-sigma methodology is implemented through both ways i.e. at individual employee level or at group level. But mostly it is conducted at group level which is known as Small Group Improvement Activities (SGIA).

**Concept of Lean Six-Sigma Methodology**

Lean is a systematic approach to identifying and eliminating waste and non-value added activities through continuous improvement in pursuit of perfection. The philosophy behind lean is to maximise the value delivered to the customer by eliminating waste. Lean and six-sigma both are model for continuous improvement and pursuit of perfection. Lean and six-sigma are both closely connected with Total Quality Management (TQM) and their implementations are very similar to PDCA cycle, which provides a basis for their integration to form into Lean Six-sigma.

Lean methodology was originated in Toyota Motor Corporation in Japan and is an approach that eliminates wastes by reducing cost in overall production process, in operations within that process and in the utilisation of production labour. Lean principles basically had been developed on the work of two industrial engineers of Toyota, Frederick Taylor and W. Edwards Deming in the 1950’s. It was further enhanced and developed by Toyota to create Toyota Production System (TPS).
Figure 5.5 – Steps in Implementation of Six-Sigma at MSW

Source – Self constructed by the researcher as based on the discussion with HR department at MSW.
According to C.R. Kothari\textsuperscript{10} (2004), the ultimate goal of implementing lean production in an organisation is to have the customer in focus when improving productivity, enhancing quality, shortening lead times, reducing costs etc. While lean has been considered as a philosophy and as a long term journey (Lewis\textsuperscript{11}, 2000; Shah and Ward\textsuperscript{12} 2003).

At MSW, Lean Six-sigma methodology is implemented through DMAIC process. When the DMAIC steps are aggregated, the end result is substantial and sustainable process improvement leading to overall operational excellence at Mawana Sugar Works (MSW), Mawana.

The next part will discuss about the phases of DMAIC methodology at MSW.

**What is DMAIC Methodology – Phases**

The DMAIC Methodology consists of five phases namely – Define, Measure, Analyse, Improve and Control, explained as below:

**Phase 1 – Define (D)**

At MSW, this phase is concerned with the identification of the process that needs improvement. Define is the first phase of SGIA and is one of the most critical phases of the whole technique. It defines the problem with specification and time-period. As told to the researcher by the HR department of MSW, this phase consists of many steps, where the leaders are expected to select projects,

set initial goals or targets and develop a project charter or Statement of Work (SOW). Leaders then select the appropriate team members. The team then determines more precisely the criteria that are critical to the customer. Run charts, interviews etc. are utilised to obtain suitable data. A high level process map of the existing process is developed with start and end-point clearly illustrated. The various steps in the Define phase are explained in figure 5.6.

**Figure 5.6 – Various Steps in the Define Phase at MSW**

- Leadership
- Creating a Project Charter or Statement of work (SOW)
- Define Customers and their requirements
- Identifying the Processes to be improved
- Create a Process Map Ex- Flow-Chart
- Identify Project Support People or Team Members (Operators, Engineers, Supervisors etc.)

**Source** – *Self constructed by the researcher as based on the discussion with HR department at MSW.*

**Phase 2 – Measure - (M)**

The purpose of the Measurement stage is to factually understand the nature and extent of the problem. Additionally, this
phase provides the ground work for the ‘Analysis’ stage of the project by narrowing the problem to its major factors.

Measure is the second step of the six-sigma methodology and its goal is to activate the data management, which includes both collection and organisation of the data for the purpose of observation. This phase entails selecting product characteristics i.e. dependent variables, mapping the respective processes, making the necessary measurement, recording the results and estimating the short and long term process capabilities.

**Figure 5.7 – Various Steps in the Measure Phase at MSW**

- Observe the Process
- Create Process Maps (Flow Charts)
- Collect data and assess "Current State of the Process"
- Develop Data Collection Plan (Identify Key variables)
- Assess measurement system or data collection ability
- Identify quality targets or desired level of improvement

**Source** – *Self constructed by the researcher as based on the discussion with HR department at MSW.*
Quality Function Deployment (QFD) plays a major role in selecting critical product characteristics. Failure Modes and Effects Analysis (FMEA) and Measurement System Analysis (MSA) are the tools used in problem identification and data management stages. These are described as below:

- A Failure Modes and Effects Analysis\(^{13}\) (FMEA) is a procedure in product development and operations management for analysis of potential failure modes within a system.
- A Measurement System Analysis\(^{14}\) (MSA) is a specially designed experiment that seeks to identify the components of variation in the measurement.
- Quality Function Deployment\(^{15}\) (QFD) is a method to transform user demands into design quality, to deploy the functions forming quality and ultimately to the specific elements of the manufacturing process.

**Phase 3 – Analyse (A)**

The Analyse phase is the third step of the Six-sigma methodology. This phase is concerned with analyzing and benchmarking the key product or process performance metrics. Following this, a gap analysis is often undertaken to identify the common factors of successful performance i.e. what factors explain best-in-class performance. Various steps followed during the Analyse phase at MSW, are explained in figure 5.8.

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\(^{13}\) FMEA, Wikipedia, http://en.wikipedia.org/wiki/failure_mode_and_effects_analysis


Figure 5.8 – Various Steps in the Analyse Phase at MSW

1. Identify gaps between current performance level and targets (goals)

2. Identify sources of Variation or causes of defects or non-conformities

3. Identify the 'vital few' key process input variables that affect the key outputs

4. Use simple analysis tools first and apply complex tools as necessary (Be careful of too much data)

Source – Self constructed by the researcher as based on the discussion with the HR department at MSW.

Various tools like cause and effect diagram, Pareto chart etc. are used in this phase.

The basic purpose of this phase is to identify and verify the root cause of the problem. In this phase, various teams are assigned the task to collect and analyse the relevant data to identify the causes and confirm their impact.

Phase 4 – Improvement (I)

Improvement Phase (I) is the fourth phase of six-sigma methodology. This phase is related to selecting those product performance characteristics which must be improved to achieve the goal. This phase involves application of scientific tools and techniques for making tangible improvements in profitability and customer satisfaction.
This phase (shown in figure – 5.9) is intended to show the counter measures (proposed solution) selected by the team that will correct the identified root cause of the problem. Once the management approves this solution, it is being implemented and the results of this implementation are used to prove that the problem and its root causes have been eliminated and the mission statement has been achieved. Various tools used in this phase, as noticed by the researcher, at MSW are as follows –

**Analytical Tools** – Counter measure Matrix, Histogram Pareto Chart, Graphs

**Administrative Tools** – Force Field analysis and cost benefit analysis

**Phase 5 – Control (C)**
Control is the last step of Six-sigma methodology. This phase is initiated by ensuring that the new process conditions are documented and monitored via Statistical Process Control (SPC) methods. This phase has the objective of preventing the problem and its root cause from recurring.

Certain things have been noticed by the researcher during this phase at MSW. Once the data in the improvement phase indicates that the corrective measures have been successful, the team begins to standardize its system of improvement. Before the project is winded, the team gets a chance to compile their learning from the project in a learning diary, which can be used by subsequent project teams working in the same or related areas. The basic tools used in this phase include – control charts and graphs etc.
Figure 5.9 – Various Steps in the Improve Phase at MSW

Develop & evaluate potential counter measures

Develop an Action Plan that answers the Who, What, When, Where and How and also reflects the barriers

Obtain cooperation and approvals

Implement the counter measures

Confirm the effects of counter measures to see if the root causes have been reduced

Compare the problem before & after

Compare results obtained to the target

Result Satisfactory?

Yes → OK

No → Implement additional countermeasures

Source – Self constructed by the researcher as based on the discussion with the HR department at MSW.
Various steps conducted during the control phase at MSW, as noticed by the researcher are explained in figure 5.10.

**Figure 5.10 – Various Steps in Control Phase at MSW**

<table>
<thead>
<tr>
<th>Step Description</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assure that counter measures become the part of daily work</td>
<td></td>
</tr>
<tr>
<td>Provide training inputs to the employees on revised process or standards</td>
<td></td>
</tr>
<tr>
<td>Consider areas of replication and or expansion</td>
<td></td>
</tr>
<tr>
<td>Analyse and evaluate any remaining aspects of problem</td>
<td></td>
</tr>
<tr>
<td>Prepare Action Plans for further activities</td>
<td></td>
</tr>
<tr>
<td>Preparing a learning diary capturing the team experiences and lessons learnt</td>
<td>Source</td>
</tr>
</tbody>
</table>

**Source** – *Self constructed by the researcher as based on the discussion with the HR department at MSW.*

In this way this part highlights the five phases of DMAIC methodology which starts with the leadership role taken up by the top management. It is the art of leadership only to define the things and motivate its workforce and make operational system the method required to make the individuals, groups & the organisations perform. Again this supports the present research study in defining a strong relation between employee training and development and the operational performance of the organisation.
The next part will discuss about ‘Kaizen’ which at MSW is locally named as ‘Ankur’.

**Kaizen – An Introduction**

The word Kaizen has come from Japanese management system which means “continuous improvement” where Kai means “to change or modify” and Zen means “to improve or make better”. Kaizen means improvement i.e. continuous improvement involving everyone in the organisation from top management, to managers then to supervisors, and to workers. Kaizen was first introduced in the Toyota manufacturing plant in Japan in the early 1950’s.

Imai\(^{16}\) (1986) has broadly defined Kaizen in his book as, “Kaizen is a strategy to include concepts, systems and tools within the bigger picture of leadership involving and people culture, all driven by the customer.

Imai\(^{17}\) (1997) has discussed in his book the difference between Kaizen and Innovation. He says that, “the improvement can be divided into kaizen and innovation. Kaizen signifies small improvements as a result of ongoing efforts while Innovation implies a drastic improvement as a result of large investment of resources in new technology or equipment. It has also been explained in the figure 5.11.


Janani Gopalakrishnan\textsuperscript{18} (2006) has highlighted the difference between kaizen and innovation by saying that, “while large scale innovation would involve huge investments, kaizen aims at taking small steps towards improvement. Unlike innovation, kaizen is not dramatic. It is simple and inexpensive and aims to use brain, rather than financial brawn to make gradual improvements. Thus the sum and substance of kaizen is to keep improving in all aspects of product, services, processes, systems procedures etc; so that wastes of all types and nature are eliminated, costs of all types are minimized, inconsistencies everywhere and anywhere are done away with, safety standards are maximised, productivity is enhanced, employees are highly engaged and the customers and investors get maximum value for money.

\textsuperscript{18} Gopalakrishnan, Janani (2006). Manage the Kaizen way | Intercom (society for Technical Communication), June
Seth and Rastogi\textsuperscript{19} (2004) have pointed out in their book that, “Kaizen, the core concept of total quality management (TQM), is a short term, cost effective and result oriented technique which helps to identify root causes of inefficient working and offer systematic approach to change the attitude of people, to eliminate causes of problem in the process, leading to improvement in quality of output and to miraculous organisational changes. Kaizen signifies step by step, gradual large number of continuous improvements at the workplace. It focuses on small, gradual and frequent improvements over the long run.

\textbf{Significance of Kaizen}

Kaizen refers to the continuous improvement in the performance, cost and quality. Kaizen strives to certain aspects like empowering the workers, increasing worker’s satisfaction, facilitating a sense of accomplishment and thereby creating a pride of work. Kaizen, a philosophy, a strategy; a programme and an inherent part of the total quality management (TQM) process, helps to improve quality of goods and services of an organisation. Kaizen is the philosophy of continually seeking ways to improve operations. It transforms the drive towards quality into a never-ending journey. Kaizen means ongoing, continuous and never ending improvement involving everyone in work life. It is based on the concept that the knowledge of how to improve the workplace should come from the workplace itself and not to be imposed from outside.

**Kaizen (Ankur) activities at MSW**

The local name of Kaizen at Mawana Sugar Works (MSW) is known as ‘Ankur’. Ankur is defined as any implemented suggestion. These suggestions may be given by any employee at any level from any department. The researcher had many visits to Mawana Sugar Works and talked to HR department of the company to know about the Ankur activities and their implementation at MSW.

It has been noticed by the researcher that at MSW, Ankur is not just a onetime change. That’s why crisis management activities and one time improvements are not considered as Ankur at MSW.

At MSW, Ankur is basically the small improvements of permanent nature, done by any employee in his own work-area and department so as to –

a) Reduce the strains and extra efforts
b) Improving the quality and thus reducing the inconsistencies;
c) Reducing any wasteful activity done at MSW.

Therefore, Ankur is a positive step forward to achieve operational excellence at MSW.

HR department of Mawana Sugar Works (MSW) says that they motivate their employees time to time to generate new ideas, which could enhance the quality, efficiency and overall work performance.

At MSW, Ankur is to be done by all employees of Mawana Sugars family where every employee is encouraged to bring small improvements in anything related to their own routine work, or anything that could help his own department or any other ideas
that could be helpful in the functioning of other related departments.

**Figure 5.12 – Steps in the Implementation of Ankur at MSW**

<table>
<thead>
<tr>
<th>Step</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Commonly agreed vision &amp; objectives of the programme</td>
</tr>
<tr>
<td>2</td>
<td>Design the scheme and promote communication</td>
</tr>
<tr>
<td>3</td>
<td>Formally launching the programme</td>
</tr>
<tr>
<td>4</td>
<td>Providing Ankur awareness throughout the organisation</td>
</tr>
<tr>
<td>5</td>
<td>Barriers and Aids analysis and Planning corrective action</td>
</tr>
<tr>
<td>6</td>
<td>Carrying out reward and recognition activities</td>
</tr>
<tr>
<td>7</td>
<td>Driving and steering through apex forum promote, communicate, monitor and review at steering committee</td>
</tr>
</tbody>
</table>

**Source** – *Kaizen manual at MSW.*

It has come to the notice of the researcher through the discussion with HR department of MSW that they focus more on individual Ankur rather than group Ankur. Any employee who is the originator of an idea and gets it implemented shall be entitled to
that Ankur. If the same idea is applied in multiple numbers, then it would be considered as one Ankur only.

Based on the information collected by the researcher through the discussion with HR department at MSW, various steps in the implementation of Ankur at MSW, have been described in the figure 5.12.

**Structure and Coverage of Ankur at MSW**

At Mawana Sugar Works (MSW), Ankur covers the whole organisation including every employee from management to the workers. It includes those contract workers who are involved in the regular permanent work but non-plant contract workers are out of this scope. It is worth noting here that proper rewards and titles are given to the employees contributing their Ankurs per year, as shown in table 5.1.

<table>
<thead>
<tr>
<th>S.No.</th>
<th>No. of Ankurs Per Year</th>
<th>Title Awarded</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>25</td>
<td>Star</td>
</tr>
<tr>
<td>2</td>
<td>50</td>
<td>Performer</td>
</tr>
<tr>
<td>3</td>
<td>75</td>
<td>King</td>
</tr>
<tr>
<td>4</td>
<td>100</td>
<td>Champion</td>
</tr>
<tr>
<td>5</td>
<td>above 100</td>
<td>Champion of Champions</td>
</tr>
</tbody>
</table>

**Source** – Self constructed by the researcher as based on the discussion with the HR department at MSW.
At MSW, the structure of the Ankur follows a proper and systematic hierarchy from top to bottom where every individual member (who contributes any Ankur) approaches to the departmental coordinator who further reports to the HOD (Head of the Department). HOD reports to the Unit Coordinator who is a member of Unit Steering Committee. This Committee further reports to the central resource coordinator who is a member of corporate central committee. This has also been explained in the figure 5.13 which shows the structure of Ankur at MSW. (Ankur-worksheet and proposal sheets are enclosed in Annexure 6 and 7 respectively)

**Figure 5.13 – Structure of Ankur at MSW**

Source – *Self developed by the researcher as based on the discussion with the HR department at MSW.*
**Organisation with and without Ankur**

At MSW, Ankur describes the process of orderly continuous improvement. Ankur is defined as a short burst of intense activity driven towards resolving a specific problem or achieving a specific company goal in a short period of time.

**Figure 5.14 – Ideal Pattern from Innovation**

![Ideal Pattern from Innovation Diagram](image1)

*Source* – *Kaizen manual at MSW.*

**Figure 5.15 – Actual pattern from Innovation i.e. organisation without Ankur**

![Actual Pattern from Innovation Diagram](image2)

*Source* – *Kaizen manual at MSW.*
The figures 5.14 show the ideal pattern from innovation and the figure 5.15 shows the actual pattern from innovation i.e. the performance of the organisation without Ankur.

The HR department officials of the MSW say that there is a greater improvement in terms of quality and performance when Ankur activities are implemented in the organisation. Ankur activities when added to the basic innovation process of the organisation give a tremendous growth to the organisation.

Basically innovation means, “introducing something new”. At MSW, innovation covers wide areas like introduction of new processes, practices, new technology, equipments and new materials etc. In addition to productivity and quality gains, innovation also results in improved responsiveness to customer demands, lower turnaround times, higher product quality, better designed products, capacity for a wider product range, streamlined relationships with suppliers and customers.

But at MSW, the HR department says that they strictly believe in adding Ankur to innovation programmes at Mawana Sugar Works. There occurs a strong relationship between Ankur and innovation at MSW. Ankur practices improve the status-quo by bringing added value to it. Ankur does not replace or preclude innovation; rather the two are complementary (Figure 5.16). Innovation is basically bringing growth in terms of productivity, with the use of advanced technology and decision making at the top level but when Ankur practices are added to the innovation, then it provides further growth to the organisation in terms of not only production and new methods but also the improvement in the existing methods and work practices and also enhances the product quality, employee involvement (EI) and customer
satisfaction. Therefore, in simple words, it can be said that Ankur practices when combined with innovation bring an overall continuous improvement in the organisation.

**Figure 5.16 – Organisation with Ankur**

![Diagram of Organisation with Ankur]

*Source* – *Kaizen manual at MSW.*

The figure 5.17 describes the total manufacturing chain of the organisation using innovation and Ankur so as to bring continuous improvement in the organisation.

**Figure 5.17 – The Total Manufacturing Chain of the Organisation**

![Diagram of Total Manufacturing Chain]

*Source* – *Kaizen manual at MSW.*
The 3 Mortal Sins of the workplace

In the work environment of MSW, Ankur is understood as gradual, orderly and continuous improvement method involving minimal investment. The main purpose of Ankur activities at MSW is to reduce the wastes, as maximum as possible. Ankur is restless state of constant questioning, re-appraisal and incremental improvements, however tiny. It works on the principle of “one percent improvement” – the idea of looking for the acting on tiny improvement possibilities – everyday, that’s why, MSW also follows the principle\(^{20}\), “An Ankur a day keeps the problems away”!

As per the information given by HR department to the researcher, Ankur programme at MSW also carries out “the 3m practice” i.e. the three Japanese mantra of Muri, Mura and Muda popularly known as ‘The Big 3”, which was originally started by the Japanese manufacturing system. The ‘3m’ practice at MSW is helpful in bringing down the cost of production without affecting the quality and creating more user friendliness for the customers. This concept involves the identification and elimination of unreasonableness, unevenness or wastages from the workplace in its all areas of operations including processes, products, services or people. The 3m’s are explained below –

1) **Muri** – The work Muri fundamentally means 'unreasonable' or irrational approach to any field of operation whatsoever. The Ankur Time observation checklist (attached in Annexure-4) tries to look into improvement by identifying and eliminating the “unreasonableness” or excessive strain in all eleven areas of manpower, technique, method, time, facilities, tools, materials, materials,

\(^{20}\) “An Ankur a day keeps the problems away!” – The motto of Ankur programme at MSW.
inventory, place, production quantity, quality and way of thinking.

2) **Mura** – The Japanese word ‘Mura’ means irregular, uneven or inconsistent. So, ‘Mura’ means inconsistency in the system which has to be addressed for effective working at the shop floor. Ankur programme at MSW uses ‘Mura’ as a powerful improvement tool. However, instead of terming it as inconsistency, it is preferred to term it as ‘discrepancy’. It calls for identifying the discrepancy in the eleven defined areas of men, technique, method, time, facilities, tools and manufacturing aids, materials, production, volume, inventory, place and way of thinking.

![Figure 5.18 – 3 Broad Types of Wastes](image)

*Source – Self developed by the researcher as based on the discussion with HR department at MSW.*
3) **Muda** – ‘Muda’ means waste, waste is any activity that does not add value. Ankur programme at MSW also works on identifying the seven Mudas or the seven Wastes which have been elaborated by the Taichi Ohno of Toyota Motor Company.

The objective of identifying the seven wastes is the same i.e. to identify and analyse the ‘Mudas’ and then take suitable corrective and preventive actions to eliminate the same. This will obviously reduce the cost of production, enhance the productivity, reduce the cycle time and lead to better customer satisfaction. A waste Analysis form has also been attached in the Annexure 5.

These seven wastes (seven mudas) are explained as below—

a) **Waste from over production** – It occurs when the products are produced at a faster rate than what is required. It may lead to piling up of excess inventory, occupying more storage space, excessive material handling cost, interest cost on unsold stock etc.

b) **Waste from excess inventories** – It is that inventory that is more than what the customer ordered. Inventory that sits in storage areas waiting for an order is a waste of material, money tied up, and the use of valuable factory space. Excess inventory leads to increase in ‘ICC’ or inventory carrying cost.

c) **Waste due to waiting time** – Any time wasted in waiting for the parts to arrive due to improper line balancing or waiting for job instructions due to improper planning or non-aligned objectives is a drain in the organisational resources. All such waiting time has to be identified and eliminated from the system.

d) **Wastes due to unwarranted transportation** – This happens due to unplanned and improper plant lay-out leading to things or
parts being moved multiple times. If parts are not properly placed they are difficult to find leading to further wastages.

e) **Processing waste or useless operation in processing waste**

These are the wastes that occur during the process manufacturing stage. They can be human error; machine caused defects or the quality problems. This can be improved by proper method study, incorporating proper technology, proper training to the operations, work study etc.

![Figure 5.19 – The 7 wastes or the 7 Mudas](image)

**Source** – *Self developed by the researcher as based on the discussion with the HR department at MSW.*

f) **Waste from product defects or defective parts** – This is a major Muda which not only affects the cost of production, but
also leads to loss of sales due to customer dissatisfaction. This involves the major cost of rejection, rework and replacement. To eliminate this waste, there is more emphasis on the implementation of the Six-sigma practice which makes it almost impossible to produce a defective part.

g) Waste of motion or due to unnecessary human movements

This includes any unnecessary human bending, reaching, walking or movement during the manufacturing process. This can be eliminated by the study of human motions, ergonomics and applying the principles of motion study. This includes the incorporation of simple human motion, proper arrangement of work place, location of operating switches, reduction of fatigue as well as the pre-arrangement of tools and accessories leading to reduction of “Motion Muda”.

**Darpan (Housekeeping) – The 5S programmes at MSW**

The 5S programmes are one of the very important operational excellence activities at MSW. The local name of 5s at Mawana Sugar works is ‘Darpan’ or the ‘Housekeeping’.

‘5S’ is a tool with Japanese roots, focused on fostering and sustaining high quality housekeeping. ‘5S’ is the beginning of a productive life for everyone and is fundamental to productivity improvement.21

‘5S’ is the methodology of creating and maintaining well organised, clean, high effective and high quality workplace. Its result is the effective organisation of the workplace, reduction or

elimination of losses connected with failures and breaks, improvement of the quality and safety of work.\textsuperscript{22}

The researcher had many discussions with higher management officials as well as HR department managers to know the significance of ‘5S’ for MSW and its implementation at MSW.

As per the discussion with Mr. Karan Singh, (Vice-president, MSW), “5S is a system to reduce waste and optimize productivity through maintaining an orderly workplace and using visual cues to achieve more consistent operational performance. The term 5S refers to five steps – Sort, Set in order, Shine, Standardize and Sustain, that are also known as the five pillars of a visual workplace. Mawana Sugar Works successfully implements 5S programmes by making various small teams working together to get materials closer to operations, right at worker’s fingertips and organised and labelled to facilitate operations with the smallest amount of wasted time and materials.

As per the discussion with Mr. Pradyuman Pandey (SGM-HR at MSW), “The 5S method begins with each programme of improvement. It is the tool for helping the analysis of processes running at MSW.

The 5S concept is especially used in making operational performance more efficient. The 5S method (Darpan) is based on the mantra of “A place for everything and everything in its place”. 5S is a concept for organising, standardizing and improving the

\textsuperscript{22} Karkoszka T., Szewieczek. D; (2007); Risk of the process in the aspect of quality, natural environment and occupational safety; Journal of achievements in Materials and Manufacturing Engineering; Vol. 20; pp. 539-542.
work, workplace and the work culture for better productivity and efficiency and hence to improve profitability.\textsuperscript{23}

It has come to the notice of the researcher through important discussions with the people at MSW as well as through the published material provided at MSW that 5S is a systematic approach to good housekeeping. The 5S system is a good starting point for all improvement efforts aiming to drive out waste from the sugar manufacturing process and ultimately improves the company's bottom line by improving products and services and lowering costs.

**Table 5.2 – The 5S (Darpan) principles at MSW**

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Japanese '5S'</th>
<th>American '5S'</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Seiri</td>
<td>Sort</td>
<td>Segregate and Eliminate unnecessary items.</td>
</tr>
<tr>
<td>2</td>
<td>Seiton</td>
<td>Set in Order</td>
<td>Orderliness - label a place for everything</td>
</tr>
<tr>
<td>3</td>
<td>Seiso</td>
<td>Shine</td>
<td>Clean Matriculously and Spotless</td>
</tr>
<tr>
<td>4</td>
<td>Seiketsu</td>
<td>Standardize</td>
<td>Develop systems and procedures to maintain and monitor first 3S.</td>
</tr>
<tr>
<td>5</td>
<td>Shitsuke</td>
<td>Sustain</td>
<td>Management and Audit to stay disciplined</td>
</tr>
</tbody>
</table>

**Source** – ‘5S’ (Darpan) manual at MSW

At MSW, the Darpan (5S) programmes provide essential support to various other processes like just-in-time (JIT) production, total quality management (TQM), Six-sigma initiatives and is also a great contributor to making the MSW a better place to

\textsuperscript{23} Improving the productivity and profit through 5S; 2011; Mawana Sugar Works Magazine; pp- 6-8.
spend time. Various benefits to the company from using the five ‘S’ programmes include improving quality, lowering costs, promoting safety, building customer confidence, increasing factory-up-time and lowering repair costs etc.

Basically the five ‘S’ of the Housekeeping (Darpan) at Mawana Sugar Works, Mawana are explained as below\(^{24}\).

a) **Seiri (Sorting)** – It refers to the practice of sorting through all the tools, materials etc. in the work area and keeping only essential items. Everything else is stored and discarded. This leads to fewer hazards and less clutter to interfere with productive work.

b) **Seiton (Set in order)** – This focuses on the need for an orderly workplace. Tools, equipments and materials must be systematically arranged for the easiest and most efficient access. There must be a place for everything and everything must be in its place.

c) **Seiso (Shine)** – It indicates the need to keep the workplace clean as well as neat. At the end of each shift, the work area is cleaned up and everything is restored to its place.

d) **Seiketsu – (Standardize)** – It allows for control and consistency. Basic housekeeping standards apply everywhere in the facility. Everyone knows exactly what his or her responsibilities are. Housekeeping duties are part of regular work routines.

e) **Shitsuke (Sustain)** – It refers to maintaining standards and keeping the facility in safe and efficient order day after day, year after year.

\(^{24}\) Mukherjee P.N. (2010); Total Quality Management; PHI learning Pvt. Ltd., New Delhi; p-46.
**Steps in the Implementation of 5S at MSW**

MSW is well known for successful implementation of housekeeping – 5S (Darpan) principles. Implementing 5S at MSW requires the following pre-conditions –

- Commitment of the top management team and the plant management team.
- Setting aside time and resources for a time bound active 5S programme.
- Setting aside time & resources for monitoring and motivating the 5S programme.

Figure 5.20 shows the steps being taken by Mawana Sugar Works in implementing 5S programmes:

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**Figure 5.20 – Implementing 5S at MSW**

<table>
<thead>
<tr>
<th>Segregating</th>
<th>Organising</th>
<th>Cleaning</th>
<th>Standardizing</th>
<th>Training &amp; Discipline</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Fixed Point Photography</td>
<td>- Cleaning</td>
<td>- Cleaning target</td>
<td>- Standards for • Segregation • Organising • Cleaning</td>
<td>- Visual control campaign</td>
</tr>
<tr>
<td>- Red Tag Campaign</td>
<td>- Address Grid</td>
<td>- Cleaning responsibility</td>
<td>- Red tag campaign schedule</td>
<td>- 5S Slogans</td>
</tr>
<tr>
<td></td>
<td>- Dividing Lines</td>
<td>- Cleaning Schedule</td>
<td>- Internal audit and checking system</td>
<td>- 5S training and awareness campaign</td>
</tr>
<tr>
<td></td>
<td>- Signboard and labeling through 3 keys</td>
<td>- Cleaning Method</td>
<td>- 5S fixed point photo standards</td>
<td>- 5S fixed point photo standards</td>
</tr>
<tr>
<td></td>
<td>- Open storage and functional organisation</td>
<td>- Cleaning Activity</td>
<td>- Monitoring and Recognition</td>
<td></td>
</tr>
</tbody>
</table>

**Source** – ‘5S’ (Darpan) manual at MSW

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**Step 1 – Segregation – Eliminate Unnecessary Items**

This step distinguishes necessary and unnecessary items and eliminates unnecessary items. It involves activities like –
a) Sort through and then sort out
b) Sort through what you have, identify what you need and discard what is unnecessary.

Figure 5.21 – Implementing Step 1 – Segregation

- Where will the tags be put?
- Stocks
- Facilities
- Locations
- Machines
- Fittings
- Documents
- Stationery
- Others

- What kind of material will be tagged?
- Not used since…….? 
- Not expected to be used in ….? 

- What material for the tags?
- Red Tape 
- Red A4 Paper 
- Red Seal 
- What will be written?
- Classification 
- Item ID 
- Quantity 
- Reason 
- Section 
- Date 

- Not more than half a day for a work area 
- Tag after talking to people 
- Audit party from another department section 
- Do not tag people 

- Eliminate defective and dead stock 
- Move sleeping stock or slow moving stock to tagged storage 
- Move necessary but left over and written off material to stock 
- Eliminate unnecessary leftover 

Source – ‘5S’ Darpan manual at MSW.

Step 2 – Organising – Standardize the Storage Spaces

This step enables determination of the type of storage system and layout that will guarantee that required amounts of necessary items will be easily accessible.

It involves activities like –

a) Set things in order by creating place for everything.

b) Put everything in its place.

c) Keep accessibility as easy as possible.

d) Principle of wide range and shallow dept for storage.
Figure 5.22 – Implementing Step 2 – Organising

Source – ‘5S’ Darpan manual at MSW.

**Step 3 – Cleaning – Eliminate dust and dirt and make workplace spotless and beautiful**

This step eliminates dirt, dust and other foreign matter to make workplace clean.

It involves activities like –

a) Clean equipments, furniture, notice boards, records etc.

b) Keep the workplace spotless

c) Sweeping, wiping, polishing, painting etc.
Figure 5.23 – Implementing Step 3 – Cleaning

<table>
<thead>
<tr>
<th>What to clean</th>
<th>Who will clean?</th>
<th>How to clean?</th>
<th>Clean UP!!</th>
</tr>
</thead>
</table>
| - Storage Areas  
  • Warehouses  
  • In-plant Storage  
  • WIP  
  • Parts  
  • Line Storage  
  • Jigs Tools Storage  
- Equipment  
  • Tools  
  • Molds  
  • Cabinet/Chairs  
  • Wheels/Work Tables  
- Surroundings  
  • Floor  
  • Work area  
  • Aisles  
  • Pillars  
  • Ceiling/Window | - Cleaning Responsibility | - 5 Minute cleaning technique  
  • Always 5 minutes of cleaning before starting work and after ending work  
  • No more no less  
  • Efficient and brisk cleaning  
  • Everybody to be involved  
- List and arrange cleaning tool in each area – closest to the cleaning target assigned  
- Apply “organising” for cleaning tools as well | - All should be involved in cleaning up.  
- People should be in charge of cleaning up their own work area  
- Meticulous cleaning  
  • All corners  
  • Visible and not easily visible areas  
  • Spotless  
  • Shining and Beautiful |

Source – ‘5S’ (Darpan) manual at MSW.

**Step 4 – Standardizing – Maintaining the Tidiness**

This step ensures rules, visual controls and procedures to be in place that helps in maintain the desired standards. It involves activities like –

**a)** Establishing checklist for all areas.

**b)** Assigning responsibilities

**c)** Ensuring visual controls to initiate corrective action.

**d)** Creating standards for various zones in terms of time or visual photographs

This step also ensures that all standards should be-
- Easily available
- Easily visible
- Easy to understand – By pictures or vernacular language

**Standards and Audit Points**

1) **Standards – Rules to maintain 5S**

- Weekly/fortnightly/Monthly inspection – internal (other departments)
- Issue register and stock register of material – Record of items.
- Inventory control/maintenance of levels – excess items to move to tag storage or scrap depending upon maximum level and nature of material.
- Cleaning schedule
- Space/Corners for red tag item identification and storage.
- Rule Booklet/Chart
- Divide areas and assign responsibility – Captain/Vice Captain
- Fixed point – photographs
- Audit point checklist (in Annexure-3)

2) **Audit Points**

- Condition / level of cleanliness
  - Windows and panes
  - Storage Area
  - Walls – seepage
  - Plant greenery
  - Toilet
  - Drinking water point
  - Calendar / Watches
  - Electric Panel
- Tagging and item identification
- Items as per location / placement with marking and labels
- Maintenance of right ‘level’ of material
- X-Y orientation of stocked material
- System of maintenance of the area
- Checking of red tag items – how long they have been red tagged.
- Adherence to cleaning schedule
- Safety aspects on machine / fire fighting apparatus
- Grading System
- 2/3 interdepartmental team – including spouses of employees
- Reward after qualifying marks for betterment of workplace.

**Step 5 – Training and Discipline – Making 5S a Personal and organisational habit**

This step is to ensure that everyone sticks to the rules scrupulously and makes it a habit.

It includes the following phases –

a) **Fixed point photography of 5S Standards**

Fixed point photographs from the same locations are taken before the beginning of the campaign.

b) **5S Slogans**

Slogans from employees are selected and then these slogans are changed frequently.

c) **Training and Awareness**

It includes 100% coverage of all employees and it is mandatory for all new joinees in organisation.
d) **Monitoring and Recognition**

It includes a regular system of 5S Audit and there is a strong competition between various areas for 5S audit results. Various performance areas are monitored through a Radar Chart.

A 5S Audit sheet at Mawana Sugar Works, Mawana has been given in the Annexure – 3

**Figure 5.24 – 5S Implementation through PDCA Cycle at MSW**

![PDCA Cycle Diagram](PDCA.jpg)

**Source** – ‘5S’ (Darpan) manual at MSW.
Based on the discussions with employees working at Mawana Sugar Works, the researcher has come to know about certain advantages from implementing 5S (Darpan) at MSW.

The advantages from implementing the 5S Rules at MSW

Some advantages which have been observed by the researcher from implementation of 5S at MSW are as follows –

1S
- Process improvement by cost’s reduction
- Stock decreasing
- Better usage of the working area
- Prevention of losing tools

2S
- Process improvement (increasing of effectiveness and efficiency)
- Shortening of the time of seeking necessary things
- Safety improvement

3S
- Increasing of machines’ efficiency
- Maintenance of the cleanliness of devices
- Maintenance & improvement of the machines’ efficiency
- Maintenance of the clean workplace
- Quick informing about damages
- Improvement of the work environment
- Elimination of the accident’s reasons.
### 4S

- Safety increasing & reduction of the industry pollution
- Working out the procedures defining the course of processes

### 5S

- Increasing of the awareness & morale
- Decreasing of mistakes quantity resulting from the inattention
- Proceedings according to decisions
- Improvement of the internal communication processes
- Improvement of inter-personal relations.

This chapter concludes with highlighting the concept of operational excellence and theoretical background of various operational excellence activities like SGIA, Kaizen, ‘5S’, DMAIC methodology etc. Here, the researcher has also discussed the steps in implementation process of these programmes at Mawana Sugar Works, Mawana. The researcher has collected these details from various company records like operational excellence manuals, SGIA manuals, Darpan (5S) manuals, Ankur (Kaizen) manuals, and other information leaflets based on these activities at Mawana Sugar Works, Mawana.

The next chapter discusses the empirical and analytical part of the present research study where the researcher has presented the question wise analysis of the study. The primary data has been collected by researcher by conducting a survey on the employees of Mawana Sugar Works, Mawana, through a questionnaire, based on five-points Likert Scale. The data has been analysed by using SPSS (version 16.0), in the next chapter.