

EFFECT OF KAIZEN & 5S IN TOTAL QUALITY MANAGEMENT PRACTICES OF MANUFACTURING INDUSTRY: A CASE STUDY

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Abstract: - This paper provides a detailed analysis of total quality management done by different models including KAIZEN, 5s, etc. where the main focus was given on production planning, inventory control and transportation. TQM or total quality management is a system of management based on the principle that every member of staff must be committed to maintaining high standards of work in every aspect of a company's operations. Translate total quality management to the objective of 5S initiative is to create effective workmen environment through people participation and build foundation for quality for sustenance of continually improved performance. The objective of KAIZEN initiative is to continually improve the processes to achieve customer delight (Internal & External) by exceeding their PQCD/SME performance expectations, through human creativity and participation across organization.

Keywords: *Battery manufacturer, quality control, KAIZEN, 5s, TQM, MIS*

I. INTRODUCTION

The term total quality management may have been first coined in the United States by the Naval Air Systems Command to describe its quality-improvement efforts in 1985. In total quality management; expertise is based on how well flow of products and services are supervised. Quality management ensures that an organization, product or service is consistent. It has four main components: quality planning, quality assurance, quality control and quality improvement. [1] Quality management is focused not only on product and service quality, but also on the means to achieve it. Quality management, therefore, uses quality assurance and control of processes as well as products to achieve more consistent in every section is required in every important area. The primary focus of quality management is to meet customer requirements and to strive to exceed customer expectations. Sustained success is achieved when an organization attracts and retains the confidence of customers and other interested parties on whom it depends. Every aspect of customer interaction provides an opportunity to create more value for the customer. Understanding current and future needs of

customers and other interested parties contributes to sustained success of an organization. Leaders at all levels establish unity of purpose and direction and create conditions in which people are engaged in achieving the organization's quality objectives. Creation of unity of purpose and direction and engagement of people enable an organization to align its strategies, policies, processes and resources to achieve its objectives. Competent, empowered and engaged people at all levels throughout the organization are essential to enhance its capability to create and deliver value. To manage an organization effectively and efficiently, it is important to involve all people at all levels and to respect them as individuals. Recognition, empowerment and enhancement of competence facilitate the engagement of people in achieving the organization's quality objectives. Consistent and predictable results are achieved more effectively and efficiently when activities are understood and managed as interrelated processes that function as a coherent system. The quality management system consists of interrelated processes. Understanding how results are produced by this system enables an organization to optimize the system and its performance. Successful organizations have an ongoing focus on improvement. Improvement is essential for an organization to maintain current levels of performance, to react to changes in its internal and external conditions and to create new opportunities. Decisions based on the analysis and evaluation of data and information are more likely to produce desired results. Decision making can be a complex process, and it always involves some uncertainty. It often involves multiple types and sources of inputs, as well as their interpretation, which can be subjective. Facts, evidence and data analysis lead to greater objectivity and confidence in decision making. For sustained success, an organization manages its relationships with interested parties, such as suppliers. Interested parties influence the performance of an organization. Sustained success is more likely to be achieved when the organization manages relationships with all of its interested parties to optimize their impact on its performance.

II. LITERATURE REVIEW

Numerous literatures have been reviewed to assess the role of Total Quality Management in an organization. The

Details of literature review has been provided in the table below.

AUTHORS	FOCUS
1.Sushanta Tripathy, Asutosh samal, Satyabrata Aich(2014)	Critical success factors of TQM in Indian small and medium sector industries
2.S.D Kalpande, R.C Gupta(2010)	Small and medium sector industries implementing TQM
3.Thomas C. Powell, (1995)	Total Quality Management as competitive advantage
4. Gao Shang,Low Sui Pheng (2013)	Discusses the different types of activities associated with kaizen have been adopted by Chinese construction firms at the project level
5.Anshul Gangele, Mohammad Israr(2014)	Comparative Analysis between manufacturing companies through TQM
6. Amit Kumar Arya, Sanjiv Kumar Jain (2014)	It discusses the impacts and significance of the Kaizen in small-scale industries of India
7. H. James Harrington, Frank Voehl, Hal Wiggan	Applying TQM to construction industries
8. Asiya Gul, Syed Aamir Saeed Jafery	Improving employee performance through Total Quality Management
9. Maria Leticia Santos, Luis I. Alvarez	Total Quality Management and firms' performance
10. Faisal Talib, Zillur Rahman, M.N. Qureshi	Analysis of Total Quality Management in service industries
11. Wayne G. Macpherson, James C Lockhart, Heather Kavan, Anthony L. Iaquinto(2015)	This paper contributes to the development of practitioner understanding of the utility of kaizen in Japan through unhindered cross-cultural research methodology.

III. KAIZEN

The objective of KAIZEN initiative is to continually improve the processes to achieve customer delight (Internal & External) by exceeding their PQCDsME performance expectations, through human creativity and participation across organization. The procedure to be followed in KAIZEN are 1. Declare the Champion at unit / function level to deliver responsibilities mentioned below a) Ensure training & awareness on KAIZEN initiative including workmen b) Coordinate for monthly review of KAIZEN, short listing of good and best KAIZEN c) Organize monthly KAIZEN award

ceremony for recognition of best KAIZEN d) Prepare monthly MIS/ Horizontal & vertical communication in all aspect related to KAIZEN initiative e) Coordinate with accounts for savings validation f) Coordinate for participation in external KAIZEN competition g) Coordinate with unit leadership and corporate TQM for effective deployment of KAIZEN initiative h) Conduct the KAIZEN sustenance audit i) Ensure standardization of improvement through KAIZEN j) Horizontal deployment of KAIZEN Ideas at unit level. 2. The KAIZEN Champion should coordinate with unit leadership for setting the KAIZEN target for KAIZEN KPIs

as per guideline below a) No of KAIZEN: 01 / Employee / Month b) Cost Savings: Minimum Rs. 8,000/ KAIZEN(Annualized)

3. Communicate monthly KAIZEN MIS to unit with following mandatory details a) Target vs. actual KAIZEN nos. unit level cum. And for the month b) Target vs. actual cost savings at unit level cum and for the month c) List of employee not met KAIZEN target cum. Till date d) List of employee not met savings target cum. Till date

4. Monthly Recognition for Good & Best KAIZEN shall be done as per steps below a) The dept. head should short list the

Year/Month	Department - Production			
	Target	Actual	Savings (lakhs)	Savings/ Kaizen (Lakhs)
16-Jan	61	10	0.25	0.025
16-Feb	61	10	0.1	0.01
16-Mar	61	13	1	0.076923077
16-Apr	61	17	1.54	0.090588235
16-May	61	14	0	0
16-Jun	61	0	0	0
16-Jul	61	0	0	0
16-Aug	61	0	0	0
16-Sep	61	0	0	0
16-Oct	61	0	0	0
16-Nov	61	0	0	0
16-Dec	61	0	0	0
Total	732	64	2.89	0.202511312

2-good KAIZEN every month b) Unit KAIZEN review committee should review the all good KAIZEN of month and identify the 3 best KAIZENs for the month at unit level c) Prior to review committee meeting, all the good KAIZEN site verification should be done. d) Monthly recognition ceremony shall be organized at unit level to share and recognize the best KAIZEN.

5. The unit level best KAIZEN shall be shared across organization for horizontal deployment.

6. Each KAIZEN shall be registered and identified through unique KAIZEN numbering system. 7. Individual shall submit the KAIZEN in completely filled KAIZEN Format as per the details below. 8. The Evaluation of KAIZEN shall be done as per format below; the good KAIZEN shall be uploaded in portal for horizontal deployment. 9. Participate in external KAIZEN Conferences to promote the learning. The KAIZEN numbering system can be in the form of A 01 PA KK JAN15-001 where, A describes the target customer sector, 01 describes the manufacturing plant code, PA is the function/process, KK is the initiative code, JAN is the month, 15 is the year, 001 is the serial number.

Kaizen Numbering System		
Example: C02 QA KK JUN15-002		
CODE	EXAMPLE	DESCRIPTION
SBU	C	A-AUTOMOBILE B-INDUSTIAL C-COMMON
Plant (or Unit)	2	1-KOLKATA, 2-DURGAPUR, 3-KOLAGHAT 4-HALDIA
Function/Process	QA	AL-Alloy Blending; LO-Lead Oxide Mill; GC-Grid casting; PA-Pasting, Curing & Drying; EP-Expander Plate Processing; FR-Formation & Parter; AY-Assembly; JF-Jar Formation & Charging; DS-Packing & Despatch; MT-Material & Stores; QA-Tech & QA; ES-Engg. Services-Maintenance & Utility Services;
Initiative	KK	KK-KK Pillar, JH-JH Pillar, QM-QM Pillar, PM-PM Pillar, SH-SHE Pillar, OT-OTPM Pillar DM-DM Pillar, ET-ET Pillar, QC-Quality Circle, KS-Kaizen & 5S Initiatives, VE-Value Engg. IMS-ISO/TS/9001/14001/OHSAS, OH- Others
Month	JUN	Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec
Year	15	15 (2015- Calendar year)
Serial Number	002	Three Digit Serial Number

IV. MATHEMATICAL EXAMPLE

Following data were accumulated from industries and are shown below:

Table I: KAIZEN in Production Department

Year/Month	Department - Production			
	Target	Actual	Savings (lakhs)	Savings/ Kaizen (Lakhs)
16-Jan	61	10	0.25	0.025
16-Feb	61	10	0.1	0.01
16-Mar	61	13	1	0.076923077
16-Apr	61	17	1.54	0.090588235
16-May	61	14	0	0
16-Jun	61	0	0	0
16-Jul	61	0	0	0
16-Aug	61	0	0	0
16-Sep	61	0	0	0
16-Oct	61	0	0	0
16-Nov	61	0	0	0
16-Dec	61	0	0	0
Total	732	64	2.89	0.202511312

Table II: KAIZEN in Technical Department

Year/Month	Department - Technical			
	Target	Actual	Savings (lakhs)	Savings/ Kaizen (Lakhs)
16-Jan	22	2	0.1	0.05
16-Feb	22	0	0	0
16-Mar	22	2	0	0
16-Apr	22	1	0	0
16-May	22	0	0	0
16-Jun	22	0	0	0
16-Jul	22	0	0	0
16-Aug	22	0	0	0
16-Sep	22	0	0	0
16-Oct	22	0	0	0
16-Nov	22	0	0	0
16-Dec	22	0	0	0
Total	264	5	0.1	0.05

Table III: KAIZEN in Maintenance Department

Year/Month	Department - Maintenance			
	Target	Actual	Savings(lakhs)	Savings/ Kaizen (Lakhs)
16-Jan	15	10	1	0.1
16-Feb	15	25	0	0
16-Mar	15	76	20.91	0.275131579
16-Apr	15	39	11.85	0.303846154
16-May	15	0	0	0
16-Jun	15	0	0	0
16-Jul	15	0	0	0
16-Aug	15	0	0	0
16-Sep	15	0	0	0
16-Oct	15	0	0	0
16-Nov	15	0	0	0
16-Dec	15	0	0	0
Total	180	150	33.76	0.678977733

Table IV: KAIZEN in Utility Department

Year/Month	Department - Utility			
	Target	Actual	Savings(lakhs)	Savings/ Kaizen (Lakhs)
16-Jan	4	4	0.2	0.05
16-Feb	4	0	0	0
16-Mar	3	0	0	0
16-Apr	3	0	0	0
16-May	3	6	4.66	0.77666667
16-Jun	3	0	0	0
16-Jul	3	0	0	0
16-Aug	3	0	0	0
16-Sep	3	0	0	0
16-Oct	3	0	0	0
16-Nov	3	0	0	0
16-Dec	3	0	0	0
Total	38	10	4.86	0.82666667

Table VIII: KAIZEN in Plastic cell Department

Year/Month	Department - Stores			
	Target	Actual	Savings(lakhs)	Savings/ Kaizen (Lakhs)
16-Jan	2	0	0	0
16-Feb	2	0	0	0
16-Mar	2	2	0	0
16-Apr	2	5	0.03	0.006
16-May	2	0	0	0
16-Jun	2	0	0	0
16-Jul	2	0	0	0
16-Aug	2	0	0	0
16-Sep	2	0	0	0
16-Oct	2	0	0	0
16-Nov	2	0	0	0
16-Dec	2	0	0	0
Total	24	7	0.03	0.006

Table V: KAIZEN in Personnel & Admin Department

Year/Month	Department - Personnel & Admn			
	Target	Actual	Savings(lakhs)	Savings/ Kaizen (Lakhs)
16-Jan	10	0	0	0
16-Feb	10	2	0	0
16-Mar	10	3	0	0
16-Apr	10	4	0	0
16-May	10	2	0	0
16-Jun	10	0	0	0
16-Jul	10	0	0	0
16-Aug	10	0	0	0
16-Sep	10	0	0	0
16-Oct	10	0	0	0
16-Nov	10	0	0	0
16-Dec	10	0	0	0
Total	120	11	0	0

Table IX: KAIZEN in Accounts Department

Year/Month	Department - Accounts			
	Target	Actual	Savings(lakhs)	Savings/ Kaizen (Lakhs)
16-Jan	8	0	0	0
16-Feb	8	0	0	0
16-Mar	8	0	0	0
16-Apr	8	0	0	0
16-May	8	0	0	0
16-Jun	8	0	0	0
16-Jul	8	0	0	0
16-Aug	8	0	0	0
16-Sep	8	0	0	0
16-Oct	8	0	0	0
16-Nov	8	0	0	0
16-Dec	8	0	0	0
Total	96	0	0	0

Table VI: KAIZEN in Purchase Department

Year/Month	Department - Purchase			
	Target	Actual	Savings(lakhs)	Savings/ Kaizen (Lakhs)
16-Jan	5	2	0.2	0.1
16-Feb	5	0	0	0
16-Mar	5	0	0	0
16-Apr	5	0	0	0
16-May	5	3	3.35862	1.11954
16-Jun	5	0	0	0
16-Jul	5	0	0	0
16-Aug	5	0	0	0
16-Sep	5	0	0	0
16-Oct	5	0	0	0
16-Nov	5	0	0	0
16-Dec	5	0	0	0
Total	60	5	3.55862	1.21954

Table X: KAIZEN in IT Department

Year/Month	Department - IT			
	Target	Actual	Savings(lakhs)	Savings/ Kaizen (Lakhs)
16-Jan	1	0	0	0
16-Feb	1	0	0	0
16-Mar	1	0	0	0
16-Apr	1	0	0	0
16-May	1	0	0	0
16-Jun	1	0	0	0
16-Jul	1	0	0	0
16-Aug	1	0	0	0
16-Sep	1	0	0	0
16-Oct	1	0	0	0
16-Nov	1	0	0	0
16-Dec	1	0	0	0
Total	12	0	0	0

Table VII: KAIZEN in Stores Department

Year/Month	Department - Stores			
	Target	Actual	Savings(lakhs)	Savings/ Kaizen (Lakhs)
16-Jan	7	2	0.2	0.1
16-Feb	7	0	0	0
16-Mar	7	1	0	0
16-Apr	7	1	0	0
16-May	7	0	0	0
16-Jun	7	0	0	0
16-Jul	7	0	0	0
16-Aug	7	0	0	0
16-Sep	7	0	0	0
16-Oct	7	0	0	0
16-Nov	7	0	0	0
16-Dec	7	0	0	0
Total	84	4	0.2	0.1

Table XI: KAIZEN in Dispatch Department

Year/Month	Department - Dispatch			
	Target	Actual	Savings(lakhs)	Savings/ Kaizen (Lakhs)
16-Jan	5	2	0.1	0.05
16-Feb	5	0	0	0
16-Mar	5	0	0	0
16-Apr	5	6	8.655	1.4425
16-May	5	0	0	0
16-Jun	5	0	0	0
16-Jul	5	0	0	0
16-Aug	5	0	0	0
16-Sep	5	0	0	0
16-Oct	5	0	0	0
16-Nov	5	0	0	0
16-Dec	5	0	0	0
Total	60	8	8.755	1.4925

Table XII: KAIZEN in Projects Department

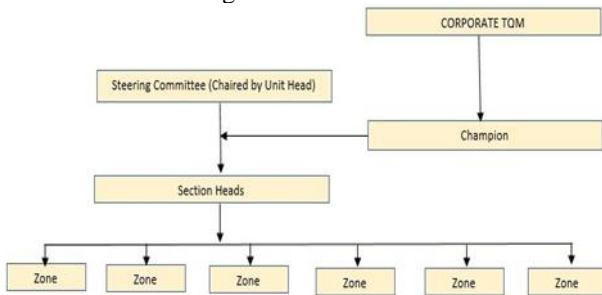
Year/Month	Department - Projects			
	Target	Actual	Savings(lakhs)	Savings/ Kaizen (Lakhs)
16-Jan	2	0	0	0
16-Feb	2	0	0	0
16-Mar	2	0	0	0
16-Apr	2	0	0	0
16-May	2	0	0	0
16-Jun	2	0	0	0
16-Jul	2	0	0	0
16-Aug	2	0	0	0
16-Sep	2	0	0	0
16-Oct	2	0	0	0
16-Nov	2	0	0	0
16-Dec	2	0	0	0
Total	24	0	0	0

Table XIII: KAIZEN in Total - Automotive

Year/Month	Total-Automotive			
	Target	Actual	Savings(lakhs)	Savings/ Kaizen (Lakhs)
16-Jan	142	32	2.05	0.0640625
16-Feb	142	37	0.1	0.002702703
16-Mar	141	84	20.91	0.248928571
16-Apr	141	73	22.075	0.30239726
16-May	141	25	8.01862	0.3207448
16-Jun	141	0	0	0
16-Jul	141	0	0	0
16-Aug	141	0	0	0
16-Sep	141	0	0	0
16-Oct	141	0	0	0
16-Nov	141	0	0	0
16-Dec	141	0	0	0
Total	1694	251	53.15362	0.21176741

IV. 5S

The objective of 5S initiative is to create effective workmen environment through people participation and build foundation for quality for sustenance of continually improved performance. The scope includes All Functions / Units / Partners (Vendors, Dealers & Distributors). The structure of 5S is discussed in the figure below.



ROLES & RESPONSIBILITIES:-

Steering Committee 1 Conduct 5S review along with monthly meeting. 2 Facilitate and support in closing pending gaps (if any). 3 Identify top & bottom performing Zones, Areas & communicate.

Champion 1 Co-ordinate 5S review along with monthly meeting. 2 Facilitate and support in closing pending gaps. 3 Identify top & bottom performing Zones, Areas & communicate. Section Heads 1 Conduct 5S review along

with monthly performance meeting. 2 Facilitate and support in closing pending gaps, filter agenda for Section level. 3 Identify top & bottom performing zones.

Zone Owners 1 Monthly Mutual 5S Audit. 2 Closing audit observation gaps in zone. 3 Act as a change agent, train and pursue with people working in zone for 5S standards.

Procedures followed are 1. Form the steering committee for the Function/ Unit as per the 5S framework. Meeting record of steering committee meeting to be kept. 2. Declare the Champion at unit / function level to deliver responsibilities mentioned below:

- a) Ensure formation of 5S zones & zone owners in consultation with management and all employees concerned as per the 5S framework
- b) Coordinate for 5S promotion & review activities.
- c) Ensure 5S training & awareness to every individual zone owners, sectional/ steering committee, management and operators (including contract/third party personnel).
- d) Make the list of 5S auditors for zone audits, establish the mutual monthly zone audit system.
- e) Make the audit plan and do the audits as per the decided frequency.
- f) Conduct the audit with photographs for 1S, 2S & 3S as per the audit sheets given in the 5S framework. 1S Audit Sheet: Audit to be done as per the below sheet.
- g) Monitor and track the actions on gap identified through 5S audit, coordinate for review at sectional/unit level.
- i) Coordinate the monthly steering committee meeting to review of 5S Score, pending actions, support areas. Steering Committee review shall be done on monthly basis. Inputs for the review will be: i) 5S score Overall. ii) Pending gaps more than 21 days. iii) Others points can also be included based on the needs. Section Heads review will be done on fortnightly basis. Inputs for the review will be: iv) 5S score Sections. v) Pending gaps more than 7 days. vi) Others points can also be included based on the needs.

j) Ensure standardization of improvement & horizontal deployment.

3. Monthly Recognition for Best Zones & Most Improved Zones shall be done as per steps below: a) Unit Level review of 5S score and based on score the zone to be decided as best zone or most improved zones (comparing previous month score). Maximum 3 in each category is reasonable, however in case of units with small number of zones like Regional office etc. it shall be limited to 1 in each category. b) Monthly recognition ceremony shall be organized to recognize the best and most improved zones, and result shall be communicated to all at unit levels.

4. Prepare, maintain and Communicate monthly 5S MIS with following to TQM: a) Target vs. actual of 1S, 2S & 3S score of zones. b) Target vs. actual of 1S, 2S & 3S score of all functions & unit level. c) Photographs of best & most improved zone owners to sent to TQM on monthly basis. 5. The function/unit level best zone practices shall be shared

across unit for horizontal deployment. If the results of 1S,2S,3S are found to be satisfactory then 4S and 5S is standardized and sustained.

Table XIV: Zone formation in 5S

Zone Formation					
Zone No.	Z001	Z002	Z003	Z004	Z005
Zone	Area Name	Area Name	Area Name	Area Name	Area Name
Owner	Mr. ABC	Mr. DEF	Mr. GHI	Mr. JKL	Mr. MNO

Table XV: Zone Owners Table

Zone Owners Training					
Sl.No	Zone Number	Zone	Zone Owner	Training Date	Status
1	Z001	Area Name	Mr. ABC		
2	Z002	Area Name	Mr. DEF		
3	Z003	Area Name	Mr. GHI		
4	Z004	Area Name	Mr. JKL		
5	Z005	Area Name	Mr. MNO		

Table XVI: Audit Plan

Audit Plan					
Zone No.:-	Z001	Z002	Z003	Z004	Z005
Zone Name:-	Area Name	Area Name	Area Name	Area Name	Area Name
Auditors:	Mr. ABC	Mr. DEF	Mr. GHI	Mr. JKL	Mr. MNO
Mr. PQ	✓				
Mr. RS		✓			
Mr. TU			✓		
Mr. VW				✓	
Mr. XY					✓
Audit of all Zones	Week 2			✓	
Confirmation of actions on NG points	Week 4				

Table XVII: 1S Audit Sheet

1S Audit Sheet			
Auditor:	Zone:	Owner:	
Check Point	Max. Marks	Marks Obtained	Remarks
List of essential items along with quantity needed to carryout the operations is available			
5 - Everything is as per list. 3 - Material / documents sorted out but List not available. 0 - Neither Material / Documents is sorted out, nor List is prepared.			
There is system for particular disposal / control of unwanted / surplus Material / Documents			
5 - System is in place & followed. 3 - System made but not followed. 0 - System non-existent.			
Discarded items on walls / boards / Tables / Work Surface / Drawers / Cupboards / tools etc. etc.			
5 - Everything is as per list. 3 - Material / documents sorted out but List not available. 0 - Neither Material / Documents is sorted out, nor List is prepared.			
Aisles, stairways, corridors etc. are free of items			
5 - System is in place & followed. 3 - System made but not followed. 0 - System non-existent.			
TOTAL MAXIMUM MARKS	0	0	0
MARKS OBTAINED	0	0	0
%AGE MARKS	#DIV/0!	#DIV/0!	#DIV/0!
Auditor Sign:		Auditee Sign:	

Table XVIII: 2S Audit Sheet

Zone Owner:		2S Audit Sheet		Auditor:	
Zone:	Zone:	Max. Marks	Marks Obtained	Zone:	Zone:
Descripti on	Check Point			Remarks	
All	All Machines / work tables & Inspection tables, storage cabinets / racks are arranged as per approved Layout Plan.				
	5 - Plan available & everything as per plan. 3 - Plan made but not followed. 0 - Everything disorganized.				
	Personal drawers, cabinets, desktops, and storage areas are clearly marked and/or well organized				
	5 - Zero non-compliance. 3 - One case of non-compliance. 0 - More than One case of non-compliance.				
	All items have a specific location and All items are placed in the defined location.				
	5 - Zero non-compliance. 3 - One case of non-compliance. 0 - More than One case of non-compliance.				
	Areas / departments / equipments / products / tools are identified				
	3 - Zero non-compliance. 1 - One case of non-compliance. 0 - More than One case of non-compliance.				
	Waste disposal bins (Cotton waste, turnings, Sludge etc) are labeled & designated place.				
	5 - Zero non-compliance. 3 - One case of non-compliance. 0 - More than One case of non-compliance.				
Labels/boards/ Prohibitions	Proper arrangement to be done keeping in view aspects such as - Easy retrievability (Search Free), visual control & Safety (Human & Material)				
	5 - Zero non-compliance. 3 - One case of non-compliance. 0 - More than One case of non-compliance.				
	All notices/ work instructions are displayed in neatly arranged manner. All data is updated. All Notices / work instructions hang / paste within the board. All notices / work instructions displayed are clearly readable. No torn or soiled notices are etc.				
	5 - Zero non-compliance. 3 - Two cases of non-compliance. 0 - More than Two cases of non-compliance.				
	Documents				
	Documents and binders are stored in a orderly fashion with proper identification & Master list is in place with a view to have ease of retrieval.				
	5 - Everything is identified & placed as per master list. 3 - One non-compliance observed. 0 - More than one non-compliance observed.				
	Equipment				
	There are no open / loose / broken wiring, panels, switches etc. Bus bar trunking, air and water lines & all cable connections are at right angle.				
	5 - Zero non-compliance. 3 - Two cases of non-compliance. 0 - More than Two cases of non-compliance.				
Heavy/Gangways	There is adequate space for the operator and maintenance staff to service/ clean the equipments.				
	5 - Zero non-compliance. 3 - Two cases of non-compliance. 0 - More than Two cases of non-compliance.				
	Gangways are clearly marked and there is no storage in Gangways / Zone or on the markings. Objects are always placed at designated places. No raw materials, work-in-process, finished goods, tools or gauges, documents/files are stored directly on floor.				
	3 - Gangways clearly marked with No obstructions & Nothing kept directly on Floor. 3 - One case of non-compliance. 0 - More than One case of non-compliance.				
	Inspection tables are having proper lighting arrangements, identified place for keeping instruments, gauges & display of work instructions.				
	3 - Zero non-compliance. 1 - One case of non-compliance. 0 - More than One case of non-compliance.				
	Storage / Shelves				
	Right quantity of right items must be placed at right place & nothing to be stored on top of equipments or racks.				
	5 - Zero non-compliance. 3 - One case of non-compliance. 0 - More than One case of non-compliance.				
	TOTAL MAXIMUM MARKS	0	0	0	
MARKS OBTAINED	0	0	0		
%AGE MARKS	#DIV/0!	#DIV/0!	#DIV/0!		
Auditor Sign:		Auditee Sign:			

Table XIX: 3S Audit Sheet

3S Audit Sheet					
Zone Owner:	Zone:	Auditor:			
Descripti on	Check Point	Max. Marks	Marks Obtained	Remarks	
All	Responsibility & periodicity of cleaning are clearly defined & Understandable & known to all.				
	5 - System in place. 3 - System partly in place 0 - No system				
	Garbage and recyclables are collected and disposed correctly				
	5 - System in place. 3 - System partly in place 0 - No system				
	All equipment, tools, fixtures, gauges partitions, table tops, furniture, Trolleys, Bins, windows and cabinets are kept clean. Work surfaces and glass are kept clean, rust free, polished & in Shining condition.				
	5 - Everything is Shining, Dust & Rust free. 3 - Dust & Rust free but not Shining. 0 - Dust or rust is observed.				
	Floors are clean and free of scrap / chips / dirt & Oil. There are no cobwebs & dirty spots. No broken glasses. Opening in walls & Shed.				
	5 - Excellent. 3 - Good. 0 - Poor				
	Leakages				
	These should be no oil / air / water leakages & no coolant splashes. Environment to be free from odour & fumes.				
5 - Everything is Leakage free. 3 - Leakage free but some splashes are there. 0 - Leakage or Odour is observed.					
TOTAL MAXIMUM MARKS	0	0	0		
MARKS OBTAINED	0	0	0		
%AGE MARKS	#DIV/0!	#DIV/0!	#DIV/0!		
Auditor Sign:		Auditee Sign:			

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