

‘Vendor TPM’ Implementation at Indian Automobile Electrical and Electronics Components Manufacturing Organization

Rohit R. Parab¹, Ajaykumar A. Ambike²

Assistant Manager¹, HOD –QMS², Flash Electronics India Pvt .Ltd , Pune, India

Abstract: In this era of intense competition supplier management Holds key importance as it is not only important from cost management i.e. inventory management, reliability ,faster delivery to customers. Flash Electronics India Pvt. Ltd. is leading Tier 1 supplier of Automobile electrical and electrical components for Bajaj Auto Ltd, Volkswagen India Ltd, Genaral Motors India Ltd., Dellarto India. It adopted TPM as strategic Initiative for achieving manufacturing excellence. It has was awarded with “BAL TPM EXCELLENCE’ Award.

As a part of Journey towards excellence FEIPL adopted a new initiative of Implementing TPM at vendors end. In this Paper we will discuss Framework of vendor TPM and results obtained for pilot lot.

Keywords: TPM, Supplier Development, Manufacturing Excellence.

1. INTRODUCTION

Suppliers (vendors) are at the heart of any organization’s processes and activities. Hence, supplier management is very critical from organization success in market and making profits. Role of procurement function is now changing to ‘Strategic sourcing’ .Supplier management is crucial from following perspectives.

1. To mitigate risks
2. To optimize performance
3. To reduce costs
4. Create loyal relationships
5. To inceased admisnistrative efficiencies
6. To increase onboarding speed
7. To protect and enhance brand value

M/s Flash Electronics (India) Pvt. Ltd. is one of the established unit in Indian market and a trusted supplier to major Indian two and three wheeler manufacturers. Major customers include Bajaj Auto, General Motors, and Volkswagen to name a few.

As FEIPL is into manufacturing of Electrical and Electronic component for automobile sectors, It manufactures Magnetos, alternators, spark plug caps, sensors required for two wheelers as well as three wheelers.

TPM stands for total productive maintenance, it is Japanese philosophy which is used to reduce ‘waste’ or losses occurring in an organization. TPM works to maximize equipment effectiveness of the equipment. It strives to maintain the equipment in optimum condition in order to prevent unexpected breakdown, speed losses and quality defects occurring from process activities.

2. FRAMEWORK OF VENDOR TPM

FEIPL has supplier base of nearly 460 suppliers in various category like Press parts ,Machined components ,Casting and forging componenets,Electrical components such as PCB,wiring harness ,Insulating sleeves .In order reduce cost of entire supply chain strategic decision to implement vendor TPM was initiated.

As a part of this initiative, rationalization study of suppliers was carried out .From database of existing suppliers, they were divided into LTS (Long Term Suppliers) and Non –LTS suppliers .Criteria for deciding LTS is as Follows.

1. High business volume
2. Product /process criticality
3. Bottleneck to quality and delivery
4. Quality certifications such as ISO 9001 ,TS 16949

Table 1: Rationalization data of suppliers

Material Category	BAL Approved	FEIPL Approved	Grand Total	After Rationalization
Press Parts	3	17	20	10
Rubber	1	10	11	4
Plastic parts	1	7	8	3
Electrical Assly.	1	2	3	3
Machining	3	23	26	15
Bearing & Roller	4	1	5	3
El. Insulation Powder	0	1	1	1
Copper	0	4	4	1
Fastners	0	6	6	3
Heat Treatment	0	1	1	1
Magnets	0	3	3	3
Paintings/Coatings	4	1	5	1
PCB	0	1	1	1
Sintered Parts	0	2	2	2
Wire Terminals and springs	1	4	5	2
Wiring Harness and sleeves	1	5	6	5
Grand Total	19	88	107	58

Expectations which were set from rationalized suppliers are as mentioned below:

- Effective organization structure
- Vision towards component to sub-assembly
- Should takes ownership of product
- Loyalty and transparency
- System oriented approach
- Geographical presence with FEIPL
- Continual improvement through technological up gradation

After rationalisation of vendors, they were further categorised region wise i.e. as per the location. It helped to track the distances of FEIPL to supplier in order to overcome logistics issues, also to plan inventory at warehouse at walunj Aurangabad and at plant located at Chakan, Pune.

Table 2: Region wise supplier data

Material category	Sub material category	Region A Pune	Region B A'bad- Satara – Nasik - Mumbai	Region C Rest part of India	Grand Total
Press Parts	Press parts	3	0	0	3
Plastic & Rubber parts	Plastic parts	2	1	0	3
	Rubber parts	1	1	0	1
Casting & Forging	Casting	4	2	0	0
	Forging	5	0	0	0
	Electrical assembly	1	0	0	0
Electrical Assly.	Wiring terminals and assembly	2	1	0	
	Wiring harness	4	1	0	1
	Insulating and sleeves	2	1	0	3
Machining	Machining	12	2	1	15

TPM IMPLEMENTATION MASTER PLAN:

Table 3: TPM implementation master plan

Year wise vendor TPM Plan																				
Sr. No.	Vendor Code	Name of Vendor	Category	2013-2014				2014-2015				2015-2016								
				Q1-13	Q2-13	Q3-13	Q4-13	Q1-14	Q2-14	Q3-14	Q4-14	Q1-15	Q2-15	Q3-15	Q4-15					
1	100391	Stamping Aids	Press Part	○	●															
2	100425	Trimurti Stampings	Press Part		●															
3	100098	D.P. Auto Parts Pvt Ltd	Forging & Machining	●																
4	100375	Shriram Rubber Products Pvt Ltd	Rubber Parts	●																
5	100320	Renuka Auto Components	Aluminium Casting		●															
6	100160	Impression Systems Industries	Machining		●															
7	100898	Siddheshwar Industries Pvt Ltd	Forging & Machining						○											
8	100132	Essem Srinisons Systems Pvt Ltd	Wiring Harness						○											
9	100111	Dhoot Transmission Pvt Ltd Aurangab	Copper						○											
10	100107	Delta Magnets Limited	Magnets						○											
11	100040	Arun Auto Components	Aluminium Casting						○											
12	100016	Ajinkya Plastics Pvt Ltd	Plastic Parts						○											
13	100199	Kirti Pressings Pvt Ltd	Press Part						○											
14	100307	R.D. Associates	Electrical Assly																○	
15	100355	Shogini Technoarts Pvt Ltd	Pcb																○	
16	100695	Helvoet Rubber & Plastic	Plastic Parts																○	
17	100162	Inaylak Tooling Co.	Press Part																○	
18	100028	Amtek Ring Gears Ltd.	Forging & Machining																○	
19	100161	Ina Bearings India Pvt Ltd	Bearing																○	
20	100390	Srujan Electricals	Electrical Assly																○	

Number of key vendors in various categories vendor decided based on LTS.

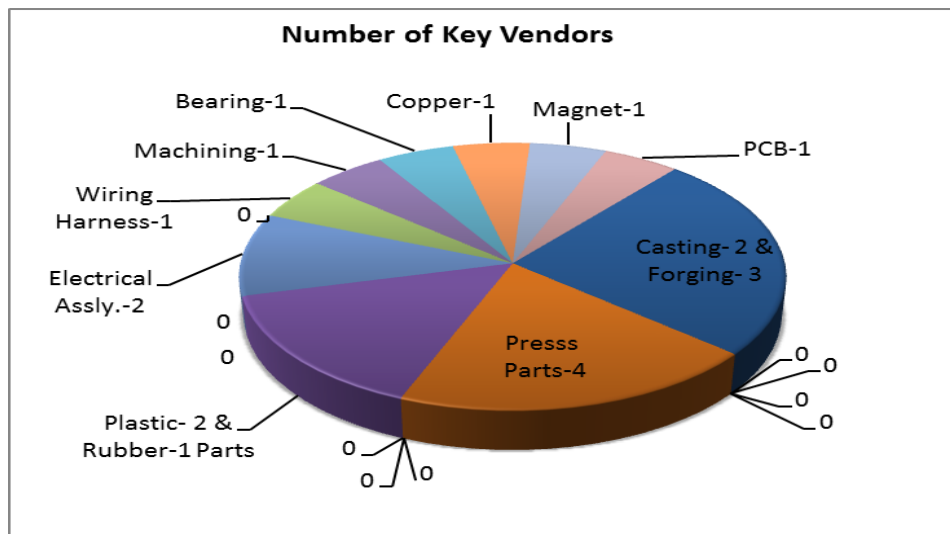


Fig 1: Category wise supplier data

3. OBJECTIVE OF TPM IMPLEMENTATION

- P Productivity Improvement
- Q To Improve Quality
 - Zero customer complaints (EFR/Warranty/Line rejection)
- C Cost Reduction
- D 100% delivery compliance
 - Zero line loss at FEIPI
 - On time delivery
 - reduction in inventory
- S Zero accidents
 - Compliance with regulatory requirements
- M Employee participation and involvement
 - Nurture kaizen culture
 - Suggestion scheme activity

4. METHODOLOGY

After rationalization detailed action plan and methodology was formulated to implemented TPM at key vendors .Methodology is as follow:

- Announcement of TPM cluster by FEIPL management
- Awareness Training
 - 5S & basic TPM awareness
 - TPM 5 Pillars (JH,PM,QM,KK,SHE)
- Establish TPM organization structure
- TPM declaration by business partners
- JH workshop (step 1,2,3) & Implementation
 - Setting TPM Policy and targets
 - Manager Model machine activity
 - P-Q-C-D-S-M target finalization
- Activation of JH,KK,PM,QM pillar on model machine
- P-Q-C-D-S-M targets and Master plan for plant
- TPM kick off
- Implementation of 5 pillar activity across plant

For better implementation, idea for FEIPL TPM Award was also put forth. Under this award supplier fulfilling the criteria to be awarded.

Table 4: Flash TPM Award criteria

Area	Parameter	UOM	Award Target (To be decided)
P	OEE	%	85% with set up change 90% without set up change
	Assembly line OEE	%	90%
	output/man	Nos	Min 10% up YOY
	output/hr	Nos	Min 10% up YOY
	Breakdown occurrences & time reduction	Nos	Min 70% reduction
	No of machines in Jh step 3	Nos	A rank machines-100%
		Nos	B rank machines -50%
	Nos	C rank Machines -25%	
Q	Customer complaints (PPM)	PPM	Zero straight 6 months & <1000 PPM in other months
	inhouse rejection (PPM)	PPM	70% reduction
	End customer-warranty/EFR/Line return	PPM	Zero
C	Power cost	Rs lacs	10% reduction
		cst/unit	10% reduction
	Rejection and rework cost	Rs lacs	50% reduction
		cst/unit	50% reduction
	Consumables cost	Rs lacs	10% reduction
	cst/unit	10% reduction	
D	Delivery schedule adherence	%	100% adherence to schedule
S	Major accidents	Nos	zero
	Minor accidents	Nos	zero
	Green bed area	%	25%
H	Impact on occupational health	Nos	Zero
E	Compliance to MPCB and legal norms		100%
M	Kaizens/employee/month	Nos	1
	Training	hrs/shift	2 mandays /month
	Dev.lead time reduction	%	10%
	First time right compliance	%	100%

Review mechanism for vendor TPM implementation also formulated and it is as follows:

Table 5: Review Mechanism

Sr.No	Steps	Freuency
1	Suppliers to attend trainings at FEIPL	Once in a Month
2	FEIPL team to visit supplier for training /workshops	Once in a Month
3	FEIPL team to review TPM implementation status at supplier end	Once in a Month

5. RESULTS

Vendor TPM was initiated at Shriram Rubbers India pvt.ltd .After successful implementation of TPM results were very encouraging.

Tangible Benefits:

On Time delivery improved from 78% to 95 % .which is very good result.

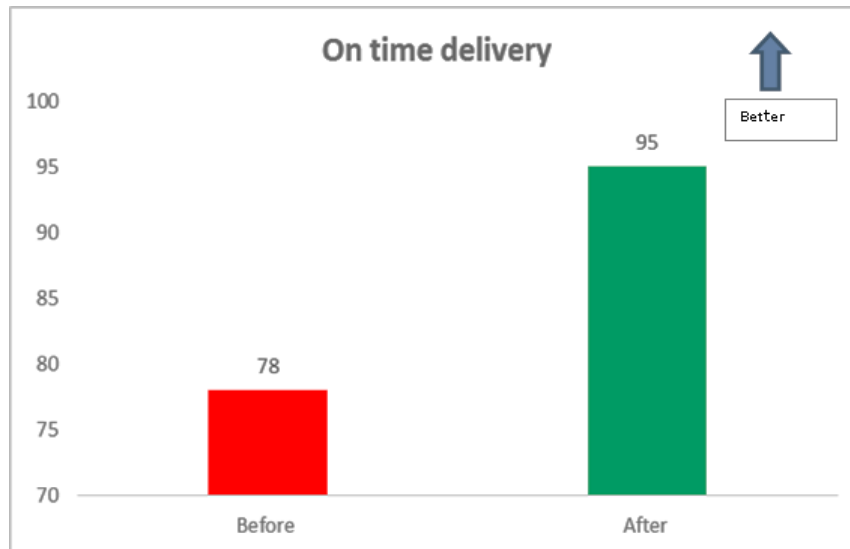


Fig 2:On Time delivery improvement

6. CONCLUSIONS

Rejection of supplier material at incoming stage reduced from 6648 PPM to 1230 ppm .This improves reliability of material provided by supplier.

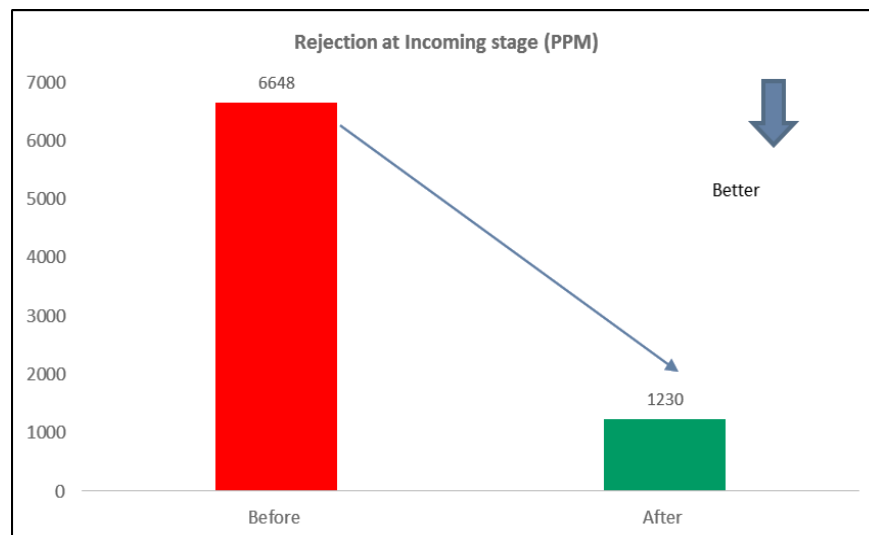


Fig 3:Rejection at incoming stage improvement

Intangible Benefits:

1. OEE of supplier equipment improved
2. Morale of Employees enhanced
3. Cost reduction at vendor end also help improve product cost of FEIPL products
4. Culture of continuous improvement implemented at vendor end

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