CHAMELI DEVI GROUP OF INSTITUTIONS

INDORE (M.P)

INDUSTRIAL PROJECT

AT

Kach Motors Pvt. Ltd.
Striving for Excellence
Automobile | Industrial |Engineering
Components

KACH MOTORS PVT.LTD

ON

TO IMPROVE QPPM OF JOHN DEERE PARTS AT UNIT-2 (AVENGERS)

JOHN DEERE

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DEPARTMENT OF MECHANICAL ENGINEERING

2019

VERIFICATION STATEMENT

I hereby declare that RISHABH GUPTA (0832ME161038), student of Department of Mechanical Engineering, Chameli Devi Group of Institutions has successfully completed Engineering Industrial Training from 9th January 2019 till 9th March 2019 at Kach Motors PVT.LTD. This report is prepared by me as a partial fulfilment of this training. All information given in this report is true and does not contain any confidential information or classified data might in a way or other abuse the company's policy.

RISHABH GUPTA

KACH MOTORS PVT LTD

PLANT HEAD

ACKNOWLEDGEMENT

Engineering Internship Training (EIT) is a coursework entitled to every engineering student. Each student is given opportunity to choose their own preferable company to undergo the EIT. I am grateful that I was granted a golden opportunity to complete my EIT in KACH MOTORS PVT LTD.

First and foremost, I would like to express my gratitude to **Dr.Arvind Kumar shrimali** for giving me the strength to complete my internship in two months without facing a lot of difficulties. In addition, I would also like to thank Plant head **Mr. Abhinav Pradhan** and Quality head, **Mr Darpan Dubey** for his undivided attention and help through my training. During my two months of internship, He always helped me and gave a lot of beneficial lesson in the working field to me. Besides that, I would like to thanks fellow executives in Kach Motors unit for their help and experience sharing in working with me. It would not be easy for me to endure these two months of office works without them.

Here, I would also like to thank **Mr.Ashok Kumar Bhawsar**, who kindly spent his time to visit me at the company and who will also be the assessor of my Engineering Industrial Report (EIT) final report. I was really grateful to him for his warm and comfortable attention during the visit. He was also very kind and friendly towards me and my supervisor. After the visit, my supervisor got a different perspective towards the lecturer and respected them more. On top of that, I would like to thank my parents and friends who always supported me during this period. Last but not least, I would like to express our gratitude to Chameli Devi Group of Institution for giving me a golden opportunity to gain experience in such a great company.

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INTRODUCTION

Background of the Company

Kach Motors Pvt. Limited was started in the year 1996 with the luminary vision of eminent promoters, having penetrating knowledge and experience of over three decades, with the spirit of managing large scale engineering corporations.

The organisation started with manufacturing of Steel Bright bars supplying to Major Ancillary to the OE's in country. In 2005 it got an opportunity to do forward integration and started making automotive components and became the OE's Supplier.

With the objective of Customer delight, they further entered to various families of component to meet the customer need and expanding since then.

Recently, they have also started Kach Unit -2 to meet the growing customer needs and cater to new Customers.

They manufacture a wide range of high precision-fully machined and heat-treated automobile, engineering parts and assemblies, high tensile U bolts, carburized/ induction/ through hardened components, steel bright bars, pins, spacers and alike, for Original Equipment Manufacturers (OEMS) across the globe.

Vision and Mission of Kach Motors

To become the most preferred supplier to their reliability and leadership in technology and quality by focusing on their core competencies and continuous improvement for sustained profitability and accelerated growth.

Their Mission:

- ✓ Best HR practices
- ✓ Operational Excellence
- ✓ 5S culture
- ✓ Involve and empower employees to shape their future.

Total Commitment to Customer

Kach Motors is committed to enhance customer satisfaction through continual improvement in quality, productivity and services by involvement of its employees and other agencies.

CUSTOMER

Their customers are VE Commercial vehicles, MAN, FORCE Motors, AMW the Global truck, JOHN DEERE, Jamna Auto Industries Ltd, AVTEC HENDRICKSON, CAPARO, CASE NEW HOLLAND, HINDUSTAN MOTORS LTD, MHINDRA and many more....

WORKING EXPERIENCE

Projects Carried Out: **To Improve QPPM of JD(JOHN DEERE) Parts in Unit-2**

John Deere is the brand name of Deere & Company, an American corporation that manufactures agricultural, construction, and forestry machinery, diesel engines, drive trains (axles, transmissions, gearboxes) used in heavy equipment, and lawn care equipment. Jhoun deer is potential customer of kach motors pvt ltd they provide transmission parts to them.

This project is done by DMAIC Methodology (lean six sigma). DMAIC refers to a data-driven quality strategy for improving processes, and is an integral part of the company's Six Sigma Quality Initiative. DMAIC is an acronym for five interconnected phases: Define Measure, Analyze, Improve, and Control.

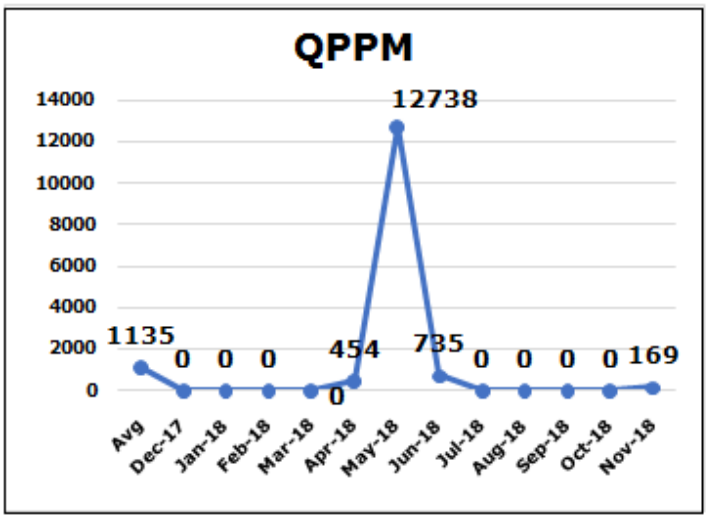
- Define the Problem

The Define Phase is the first phase of the Lean Six Sigma improvement process. In this phase, the leaders of the project create a "Project Charter", create a high-level view of the Process, and begin to understand the needs of the customers of the Process. This is a critical phase of Lean Six Sigma in which your teams define the outline of their efforts for themselves and the Executives of organization.

The JD parts Manufactured in unit-2 are Rails (R247315, R247316, R25735, and R257352).Rails are the transmission part used in the Gear box. JD Requires 100% quality as per there control plane they do not compromise with their quality, if any single Part find defective they send it return for segregation after the segregation if any more parts are find defective they reject that lot which directly affect the company relationship, money, time and overall QPPM of Company with their competitor. In this project our main task is to improve QPPM of JD parts at unit-2.

REJECTION DATA

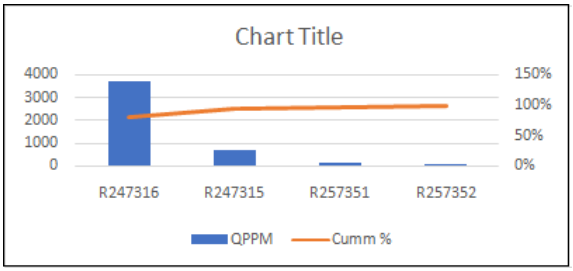
- Rejection data Month wise. Table 1



Part No	QPPM	Cumm %
R247316	3677	81%
R247315	687	96%
R257351	101	99%
R257352	66	100%

From above data we can analyse that rejection in Month of May QPPM is highest. According to PARETO Principle if we control the amount which contributing 80% in rejection the rest is automatically controlled.

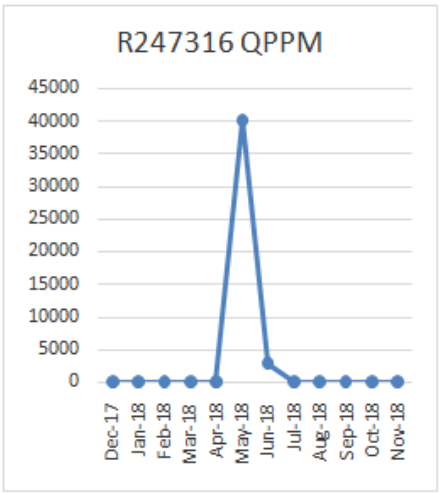
PARETO: The Pareto principle, also known as the 80/20 rule, states that 80 percent of the output from a given situation or system is determined by 20 percent of the input



R-7316 & R-7315 is contributing more in QPPM. If we eliminate this 80% contribution it will directly control rest.

- Rejection data of parts contributing 80%.

➢ Month wise QPPM of R-247316.



Baseline	3677
Entitlemen	0
Gap	3677
80% of Ga	2942
Target	735

QPPM in month of May-40316 and June-2975

Increase of QPPM in month May and June due to following rejection:

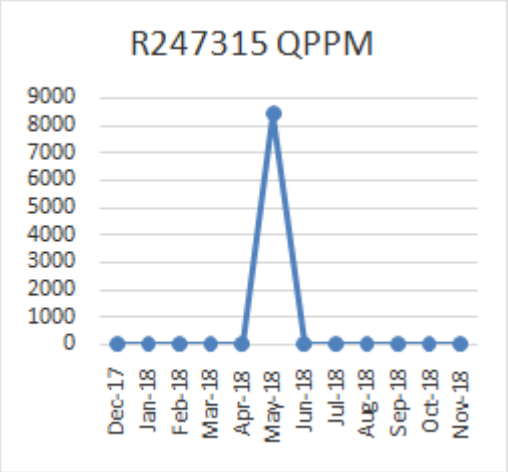
	DATE	PROBLEM DISCRIPTION	REJ.QTY
7316	14May2018	TPG M6*1 6H GO GAUGE NOT QUALIFIY. THIS ISSUE REPORTED AT RECEIPT CONDITION AFTER THIS ISSUE REPORTED WE HAVE WEAR HOUSE AND LINE LOCATION SEG TOTAL SEG.466 QTY. AND FOUND 102 QTY NOT OK PART.VIVEK VERIFIED THUS CLOSING Q-NOTE RC98400	102
	06Jun2018	TAPPING (M6*1-6H) GO GAUGE NOT QUA THIS ISSUE REPORTED AT RECEIPT CONDITION AND SUPPLIER SEG. TOTAL 100 QTY AND FOUND 8 QTY NOT OK. VG40302 VERIFIED THUS CLOSING Q-NOTE RC98400	8

Issue is of TPG GO gauge not qualified.

- Month wise QPPM of R-247315.

QPPM in month of May-8425

Issue is of outer diameter over size.



Baseline	687
Entitlemen	0
Gap	687
80% of Ga	550
Target	137

	DATE	PROBLEM DISCRIPTION	REJ.QTY
7315	09May2018	IMP: SHAFT NOT ENTER IN THE FORK "SHAFT NOT ENTER IN THE FORK ON LINE DURING ASSEMBLY. AFTER ANALYSIS WE HAVE OBSERVED DIA.15.98±0.02 MM OBSERVED 16.003,16.005 MM.AFTER THAT SUPPLIER HAS VALIDATE OF THIS ISSUE. BATCH CODE-74 " JA47417	2
	12May2018	SHAFT NOT ENTER IN THE FORK "SHAFT NOT ENTER IN THE FORK ON LINE DURING ASSEMBLY. AFTERANALYSIS WE HAVE OBSERVED DIA.15.98±0.02 MM OBSERVED 16.003,16.005 MM.AFTER THAT SUPPLIER HAS VALIDATE OF THISISSUE. BATCH CODE-74 SUPPLIER SEGREGATED TOTAL 432 QTY AND FOUND 17QTY PART NOT QUALIFIY IN FORK. IMP HIT 2 QTY ALREADY BY Q- NOTE NO.203658613	17
	14May2018	DIA.15.98±0.02 MM OBS16.002 "SHAFT NOT ENTER IN THE FORK ON LINE DURING ASSEMBLY. AFTER ANALYSIS WE HAVE OBSERVED DIA.15.98±0.02 MM OBSERVED 16.002 MM. BATCH CODE-74 VG40302 VERIFIED THUS CLOSING Q-NOTE RC98400	1

Total Rejection

Part No	Total	
	Rejection	Production
R247315	20	29133
R247316	110	29918
Total	130	59051

From this we clearly define that the issues of R-247316 and R-247315 have to be reduced.

Goal Statement	**To Improve QPPM of JD Parts in Unit-1**				
Type	**Description**	**UOM**	**Baseline**	**Goal**	**% Change**
Business	Customer QPPM of JD Parts	**QPPM**	1135	227	80%
Primary	QPPM of R247316	**QPPM**	3677	335	80%
Secondary	QPPM of R247315	**QPPM**	687	137	80%
Consequential	Delivery Compliance	**%**			80%
Financial	Cost of Poor Quality	**Value**			80%

Above table defines Goal statement.

- Measure

Measurement is critical throughout the life of the project and as the team focuses on data collection initially they have two focuses: determining the start point or baseline of the process and looking for clues to understand the root cause of the process. Since data collection takes time and effort it's good to consider both at the start of the project.

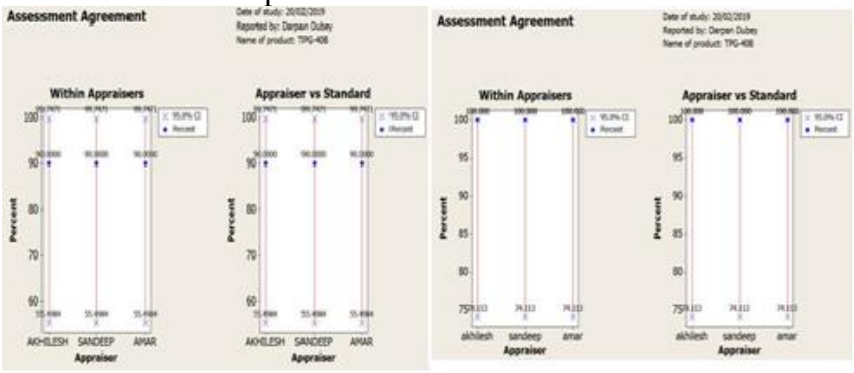
As after defining the major issue now we go for occurrence and detection of that issue. In this phase we do MSA and SPC.

MSA(Measurement System Analysis) : An experimental and mathematical method of determining how much the variation within the measurement process contributes to overall process variability. There are five parameters to investigate in an MSA: bias, linearity, stability, repeatability and reproducibility. There are two types of MAS Attribute data type and discrete data type. In this we analyse the accuracy of operator and gauge.

DISCRETE DATA: To perform a study, you should first obtain a sample and establish the reference value compared standard. For gages or instruments used to collect variable continuous data**,** Gage Repeatability and Reproducibility can be performed to evaluate the level of uncertainty within a measurement system.

Then we perform the following steps:

- Obtain at least 10 random samples of parts manufactured during a regular production run.
- Choose three operators that regularly perform the particular inspection.
- Have each of the operator's measure the sample parts and record the data.
- Repeat the measurement process three times with each operator using the same parts.
- Calculate the average (mean) readings and the range of the trial averages for each of the operators.
- Calculate the difference of each operator's averages, average range and the range of measurements for each sample part used in the study.
- Calculate repeatability to determine the amount of equipment variation.
- Calculate reproducibility to determine the amount of variation introduced by the operators.
- Calculate the variation in the parts.



For TPG

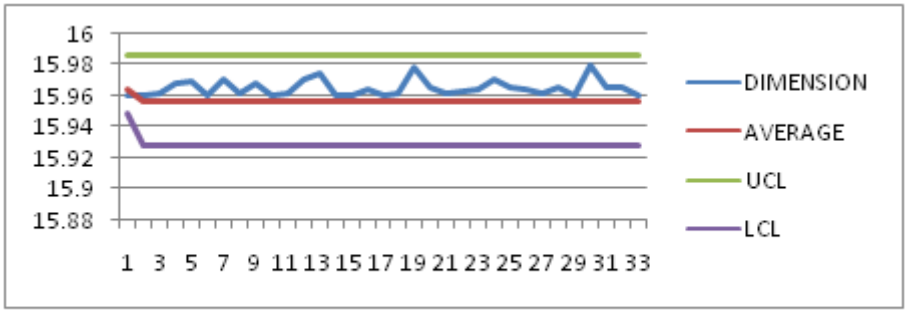
ATTRIBUTE DATA: Attribute measurement systems can be analyzed using a similar method. Measurement uncertainty of attribute gages shall be calculated using shorter method as below:

- Determine the gage to be studied
- Obtain 10 random samples from a regular production run
- Select 2 different operators who perform the particular inspection activity regularly
- Have the operators perform the inspection two times for each of the sample parts and record the data
- Next, calculate the kappa value.
- When the kappa value is greater than 0.6, the gage is deemed acceptable
    - If not, the gage may need to be replaced or calibrated

The attribute gage study should be performed based on the same criteria listed previously for the Gage R & R study.

SPC (Statistical process control): SPC is method of measuring and controlling quality by monitoring the manufacturing process. Quality data is collected in the form of product or process measurements or readings from various machines or instrumentation. The data is collected and used to evaluate, monitor and control a process. SPC is an effective method to drive continuous improvement. By monitoring and controlling a process, we can assure that it operates at its fullest potential.

SPC data is collected in the form of measurements of a product dimension / feature or process instrumentation readings. The data is then recorded and tracked on various types of control charts, based on the type of data being collected. It is important that the correct type of chart is used gain value and obtain useful information. The data can be in the form of continuous variable data or attribute data.

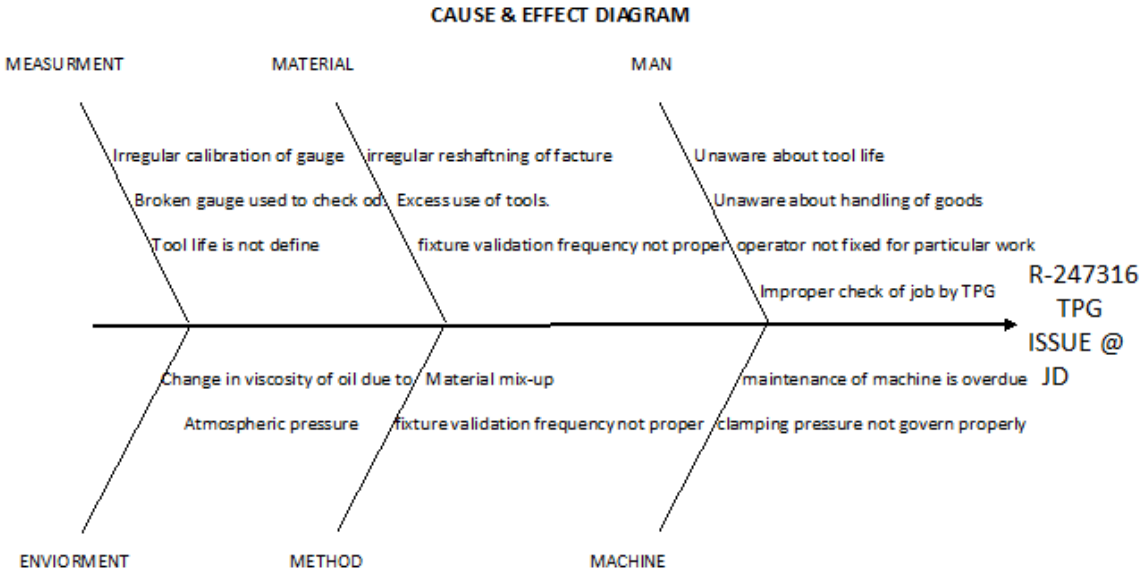


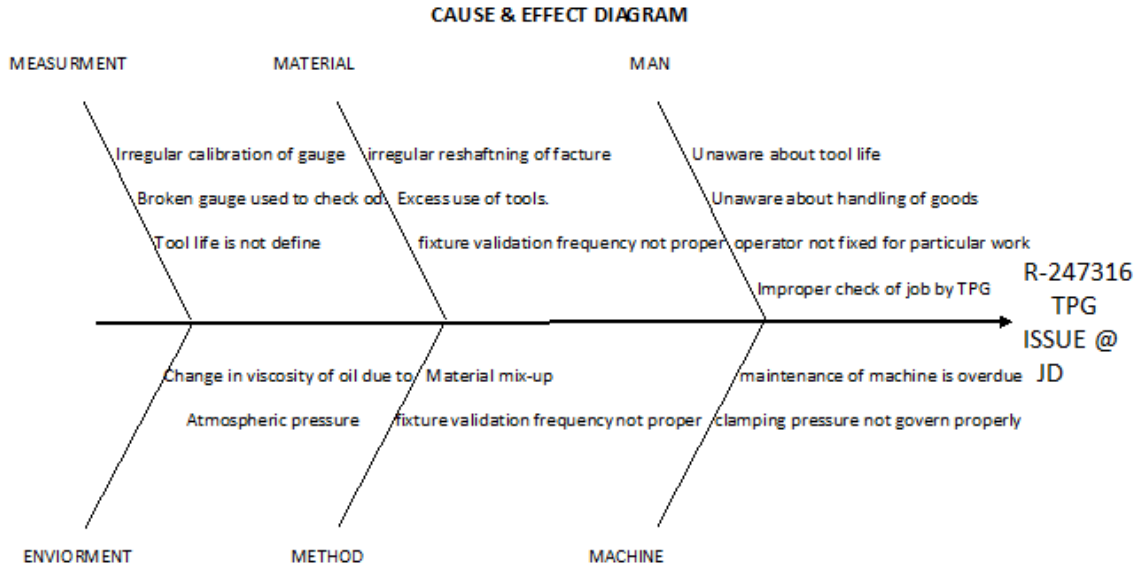
XBAR CHART FOR OD

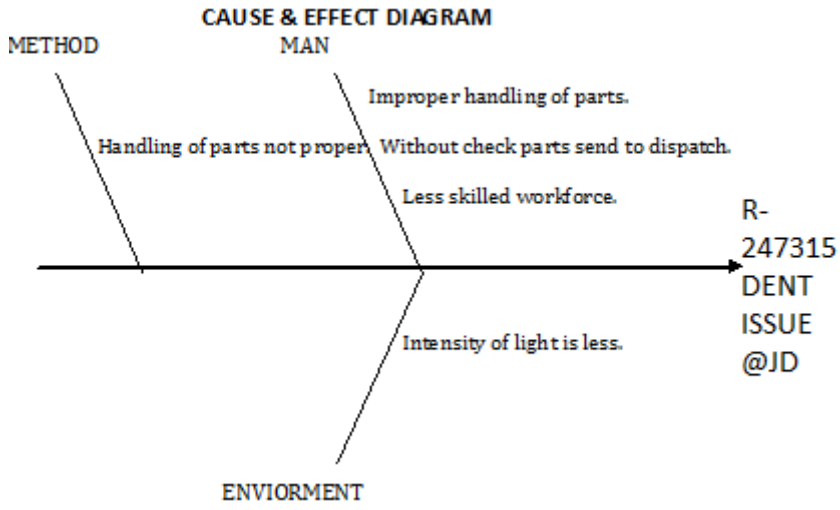
- Analyze

This phase is often intertwined with the Measure Phase. As data is collected, the team may consist of different people who will collect different sets of data or additional data. As the team reviews the data collected during the Measure Phase, they may decide to adjust the data collection plan to include additional information. This continues as the team analyzes both the data and the process in an effort to narrow down and verify the root causes of waste and defects.

FISHBONE (ISHIKAWA) DIAGRAM: An Ishikawa diagram basically helps in understanding the 'cause and effect' relationship for solving a problem. It is a very helpful tool as it gives a pictorial representation of what is the cause of a problem or a phenomenon, what factors have a high/low impact to those problem/phenomena and how can the situation be resolved. The Ishikawa is drawn like a fishbone and helps a person to 'see' the causes and effects in a particular relationship.







PFMEA (Process Failure Mode Effects Analysis): A Process Failure Mode Effects Analysis (PFMEA) is a structured analytical tool used by an organization, business unit, or cross-functional team to identify and evaluate the potential failures of a

process. PFMEA helps to establish the impact of the failure, and identify and prioritize the action items with the goal of alleviating risk. It is a living document that should be initiated prior to process of production and maintained through the life cycle of the product.

PFMEA evaluates each process step and assigns a score on a scale of 1 to 10 for the following variables:

Severity — Assesses the impact of the failure mode (the error in the process), with 1 representing the least safety concern and 10 representing the most dangerous safety concern. In most cases, processes with severity scores exceeding 8 may require a fault tree analysis, which estimates the probability of the failure mode by breaking it down into further sub-elements.

Occurrence — Assesses the chance of a failure happening, with 1 representing the lowest occurrence and 10 representing the highest occurrence. For example, a score of 1 may be assigned to a failure that happens once in every 5 years, while a score of 10 may be assigned to a failure that occurs once per hour, once per minute, etc.

Detection — Assesses the chance of a failure being detected, with 1 representing the highest chance of detection and 10 representing the lowest chance of detection.

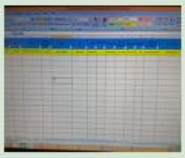
RPN — Risk priority number = severity X occurrence X detection. By rule of thumb, any RPN value exceeding 80 requires a corrective action. The corrective action ideally leads to a lower RPN number.

Failure issue	Cause	S	O	D	RPN	Actions taken
Tapping	Drill out/ under size, tool wear out	7	3	5	105	Thread 100% inspection by TRG at VMC & Final inspection.
Outer diameter over size	Improper Setting or Wheel worn out	6	3	5	90	OD 100% inspection by PRG at getting process & final inspection.

- Improve

Implement and Verify the Solution(s) How will you fix the problem? Once the project teams are satisfied with their data and determined that additional analysis will not add to their understanding of the problem, it's time to move on to solution development. The team is most likely collecting improvement ideas throughout the project, but a structured improvement effort can lead to innovative and elegant solutions.

Improvement for Tapping

Before	Problem/ Issue	Improvement	After
	TPG not Qualified	Toll life has inserted in machine program	
N.A	TPG not Qualified from manual counter operation side	Manual Tapping is started	
	TPG wear out Issue	Calibration Frequency has reduced from 6 month to 3month	

Improvement for outer diameter

Before	Problem/ Issue	Improvement	After
	OD Over size Issue	Wheel Dressing frequency is decided. After Avery 50parts we will do wheel dressing.	
N.A	OD Over size Issue	Training for inserting the rail has given.	
	Guide plate Wear out Issue	Gide plate Reshaftning frequency has decided between 8 to 10days.	

- Control

This phase is a mini version of process management. The team has been building a form of infrastructure throughout the life of the project, and during the Control Phase they begin to document exactly how they want to pass that structure on to the employees who work within the process.
The main objective of the project is to improve QPPM of JD parts at unit-2 which is achieved:

OTHER LEARNINGS:

- GEMBA AUDIT: The Gemba walk is an essential part of the Lean management philosophy. Its initial purpose is to allow managers and leaders to observe the actual work process, engage with employees, gain knowledge about the work process and explore opportunities for continuous improvement.

- POKA-YOKE: Poka-yoke is a mistake proofing method that eliminates mistake in defect insuring quality product and services.

- 7QC TOOL: The Seven Basic Tools of Quality (also known as 7 QC Tools) originated in Japan when the country was undergoing major quality revolution and had become a mandatory topic as part of Japanese's industrial training program. These tools which comprised of simple graphical and statistical techniques were helpful in solving critical quality related issues.

1. Stratification (Divide and Conquer)
2. Histogram
3. Check Sheet (Tally Sheet)
4. Cause-and-effect diagram ("fishbone" or Ishikawa diagram)
5. Pareto chart (80/20 Rule)
6. Scatter diagram (Shewhart Chart)
7. Control chart

CONCLUSION

I have completed two months of internship successfully at Kach Motors PVT LTD. During the period, the objectives of EIT were achieved. The objectives are to expose students with the working environment, to enhance and supplement the knowledge and skills of students, to develop students in term of ability, competence and interpersonal relationship, to expose and familiarize the students to rules and regulations including safety in industrial environment, and to develop the spirit of team working among students and other working group members. I also learn from the company that ethics is more important than skills.

Even though I encountered few problems during this training period, I am still glad that I have managed to learn a lot of new knowledge and gain more experience. Thus, I gladly finished my internship in this company, which I hope will pave my road in becoming a great engineer for this country.