A Report on Summer Training

Carried out at

**MERI SCHOLARSHIP PVT. LIMITED, JAIPUR**

Submitted in Partial Fulfillment of The Requirements For The Award Of Degree Of

Bachelor of Technology

In

Computer Science & Engineering



by

Pankaj Tanwar (2016UCP1381)

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

**MALAVIYA NATIONAL INSTITUTE OF TECHNOLOGY, JAIPUR**

**@**

**CERTIFICATE**



**MALAVIYA NATIONAL INSTITUTE OF TECHNOLOGY**

JAIPUR (RAJASTHAN)-302017

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

**DECLARATION**

I,

Pankaj Tanwar ( 2016UCP1381 )

Declare that this project titled “Back end Development” and the work presented in it are my own. I confirm that :

* This project work was done wholly or mainly while in candidature for a B.Tech. degree in the department of Computer Science & Engineering at Malviya National Institute of Technology, Jaipur (MNIT).
* Where any part of this project has previously been submitted for a degree or any other qualification at MNIT or any other institution, this has been clearly stated. Where I have consulted the published work of others, this is always clearly attributed. Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this Dissertation is entirely my own work.
* I have acknowledged all the main sources of help.

Signed \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Pankaj Tanwar (2016UCP1381)

Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**ACKNOWLEDGEMENT**

Industrial training is an indispensable part of any engineering curriculum. It provides the students an opportunity to gain experience about the practical applications of their knowledge.

I take this opportunity to express my gratitude towards everyone who supported me throughout the course of this training. I am thankful for their inspiring guidance, invaluable constructive criticism and friendly advice during the project work. I am sincerely grateful to them for sharing their truthful and illuminating views on a number of issues related to the company.

I would like to take the opportunity to thank and express my deep sense of gratitude to Mr. Dharmendrafor giving me the opportunity to work with MeriScholarship Pvt. Ltd.

I wish to express my deep sense of gratitude to Mr. Ravi Verma (Mentor) who through his benevolent guidance has enabled me to complete my project. He has been a great source of inspiration and knowledge to me all the way. Without his keen interest, incessant encouragement and invaluable suggestions, this report could not have attained its present shape.

I would also like to thank entire team of MeriScholarship for helping and supporting me in completing my project work. My deepest gratitude to all the persons who were involved during course of this project outside MeriScholarship.

**ABSTRACT**

**Problem Statement** –

Develop an application which facilitates poor students to study online as per their own schedule anywhere. There are such courses available in the market but they are charging too much and poor students can’t afford them. Along with that, student is not able to revise properly what he has been taught in the school after going back to home. Teacher teaches with his/her own pace of teaching & it is not possible to all students to get it in one go.

**Problem Solution** –

MeriScholarship E-learning software ( MEAN Stack Web Application) which offers online course videos, online quiz, quick notes to study & much more for those who can’t afford high paying online courses as BYJUs, Toppr.com etc. Student can revise anytime he wants.

Every student has its own pace of learning and at MeriScholarship student can study at his own pace. He can give online test series with each chapter to brush up his/her skills.

**Functional Description –**

* User registration is offered. Then registered user can login to his account.
* Student can view all available subjects as per his/her class.
* Student can select any class & view any chapter.
* In chapter, student can see all available chapter videos there.
* Student can read short notes, memory tips provided by teacher in text format to quick revise the chapter.
* Student can ask his/her doubt to teacher.
* Student can view exercise files and after completion of chapter, he/she can give online test for the same.
* His/her AIR rank will be published on his profile page along with AI bases analysis of his/her test.
* Admin can manage all the course, quizzes, students, teachers, Sales managers & sales persons.
* Admin can add, update, delete all courses, quizzes, teachers, sales managers, sales persons.

**Aim of this Project –**

Aim of this project was to develop a high scalable & efficient e-learning web application using latest technology stack.

**TABLE OF CONTENTS**

Certificate ii

Declaration iii

Acknowledgement iv

Abstract v

Table of Contents vi

List of figures vii

List of tables viii

CHAPTER 1: INTRODUCTION

[1.1 COMPANY PROFILE 1](#_Toc517708135)

[1.2 MISSION AND VISION 3](#_Toc517708138)

[1.2.1 Mission 3](#_Toc517708139)

[1.2.2 Vision 3](#_Toc517708140)

1.3 [ORGANIZATIONAL STRUCTURE 4](#_Toc517708141)

[1.4 CODE OF CONDUCT 4](#_Toc517708142)

[1.4.1 Responsibility towards Employees 4](#_Toc517708143)

[1.4.2 Responsibility towards outside Business Entities 5](#_Toc517708144)

[1.4.3 Responsibility towards Customers 5](#_Toc517708145)

[1.4.4 Responsibility towards Government and the Law 6](#_Toc517708146)

[1.4.5 Responsibility towards the Environment 6](#_Toc517708147)

[1.4.6 Implementation of the Code 7](#_Toc517708148)

[1.5 THE TEAM 7](#_Toc517708149)

CHAPTER 2: DEPARTMENTS & PRODUCTS

[2.1 DEPARTMENTS AT MANU 8](#_Toc517708151)

[2.1.1 Blanking Department 8](#_Toc517708152)

[2.1.2 Barrel Tumbling Department 9](#_Toc517708153)

[2.1.3 Transfer Press Department 10](#_Toc517708154)

[2.1.4 Vibration and Stacking Department](#_Toc517708155) 11

[2.1.5 Riveting Department 1](#_Toc517708156)3

[2.1.6 Oiling Department 1](#_Toc517708157)3

[2.1.7 Packing Department 1](#_Toc517708158)4

[2.1.8 Quality Lab 1](#_Toc517708159)5

[2.1.9 Tool Room 1](#_Toc517708160)5

[2.2 PRODUCT RANGE 1](#_Toc517708161)5

[2.2.1 Metal Bearing Cage 1](#_Toc517708162)5

[2.2.2 Polyamide Bearing Cage 1](#_Toc517708163)6

[2.2.3 Dust Shields 1](#_Toc517708164)7

[2.2.4 Valve Stem Seal Stampings 1](#_Toc517708165)7

[2.3 APPLICATION 1](#_Toc517708166)8

[2.4 LOCATION 1](#_Toc517708167)8

CHAPTER 3: PROJECTS AND WORKING EXPERIENCE

[3.1 OBJECTIVES 20](#_Toc517708169)

[3.1 STUDY IN VARIOUS DEPARTMENTS - PROCESS FLOW DIAGRAM21](#_Toc517708170)

[3.3 EXPERIENCE 2](#_Toc517708171)3

[3.4 PROJECT WORK 2](#_Toc517708172)4

3.4.1 Finding the Faulty Sensors……………………………………………………………………24

3.4.2 Study and Implementation of POKA-YOKE……………………………………….….28

CHAPTER 4: CONCLUSION

[4.1 OVERVIEW](#_Toc517708187) 33

[4.2 SKILLS DEVELOPED](#_Toc517708188) 35

REference…………………………………………………..............................37

**List of Figures**

|  |  |  |
| --- | --- | --- |
| **Figure** | **Figure Caption** | **Page No.** |
| 1.1 | Organizational Structure | 3 |
| 2.1 | Blanking Department | 8 |
| 2.2 | A Sample Blank | 8 |
| 2.3 | A Barrel Tumbler | 8 |
| 2.4 | Centrifuze Machine | 8 |
| 2.5 | Tp Department | 9 |
| 2.6 | A Vibrator | 10 |
| 2.7 | A Stacking Machine | 10 |
| 2.8 | Riveting Department | 11 |
| 2.9 | A Riveting Machine | 11 |
| 2.10 | An Oiling Machine In Operation | 12 |
| 2.11 | Packing Department | 12 |
| 2.12 | Metal Bearing Cages (Riveted) | 13 |
| 2.13 | Polyamide Taper Bearing Cage | 14 |
| 2.14 | Dust Shields | 14 |
| 2.15 | Valve Stem Seal Inserts | 15 |
| 3.1 | Misfeeding Sensor | 21 |
| 3.2 | Safety Curtain | 21 |
| 4.1 | Problem Solving Approach | 29 |

**List of Tables**

|  |  |  |
| --- | --- | --- |
| **Table no.** | **Table Caption** | **Page No.** |
| 1.1 | Fact table | 2 |
| 3.1 | Over all process flow diagram | 20 |
| 3.2 | Sensor checking in blanking department | 22 |
| 3.3 | Sensor checking in riveting department | 24 |

CHAPTER 1

**1. INTRODUCTION**

**1.1 Problem Statement** –

Develop an application which facilitates poor students to study online as per their own schedule anywhere. There are such courses available in the market but they are charging too much and poor students can’t afford them. Along with that, student is not able to revise properly what he has been taught in the school after going back to home. Teacher teaches with his/her own pace of teaching & it is not possible to all students to get it in one go.

**1.2 Project Objective –**

The purpose of MeriScholarship e-learning is to allow students to study as per their own schedule online.

Existing traditional education system is not up to the mark. Students need interactive classes with personalized learning. Every student has difference pace of learning. Each student has its own unique requirements. Our objective is to provide online video course that are designed to meet the need of every student. Digital approach of teaching integrates different concepts on one platform. It helps students to identify their strengths and areas for improvements.

Objective is to give smart preparation with adaptive learning. Using videos to communicate ideas and concepts make learning engaging an insightful. They improve learner’s performance by and help to understand and explore the content at their own pace.

**1.3 Project Scope** –

The proposed software is a web application for E-learning. The system will be basically used by students to watch videos online and give online tests. The intentions of the system is to reach out to the students who can’t afford exorbitant prices offered by other e-learning platforms.

**1.4 Project Perspective –**

MeriScholarship is a self-contained and totally independent system that helps students who can’t afford high prices for online videos. This will help them provide all videos related to their curriculum on a single click.

**2. TECHNOLOGY REVIEW**

**1.1 MEAN Stack** –

MEAN Stack is a user-friendly full stack JavaScript framework, ideal for building dynamic websites and fast, robust and maintainable production web applications. This free and open source stack offers a quick and organized method for creative rapid prototypes for web-based applications. It is hard to accomplish much on the web without JavaScript, which is the single language that runs the entire MEAN full stack and boasts one of the most active developer communities. Because every part of MEAN programming is written in one language, it allows unique server side and client-side execution environments. Valued for its versatility in building fast, robust and maintainable production web applications. MEAN is in high demand with numerous startups and employers.

MEAN is an acronym for MongoDB, ExpressJs, AngularJs & NodeJs. From client to server to database, MEAN is full stack JavaScript.

* **NodeJs** –

NodeJs is a server-side platform built on Google Chrome’s JavaScript engine (V8 Engine). NodeJs was developed by Ryan Dahl in 2009 and its latest version is v0.10.36. The definition of NodeJs as supplied by its official documentation is as follows –

NodeJs is a platform built on Chrome’s JavaScript runtime for easily building fast and scalable network applications. NodeJs uses an event driven, non-blocking I/O model that makes it lightweight and efficient, perfect for data intensive real time applications that run across distributed devices.

NodeJs is an open source, cross platform runtime environment for developing server-side and networking applications. NodeJs applications are written in JavaScript, and can be run within the NodeJs runtime on OS X, Microsoft Windows and Linux.

**NodeJs = Runtime Environment + JavaScript Library**

Some important features of NodeJs are Asynchronous and Event Driven, very fast, Single threaded but high scalable & no buffering.

/\* NodeJs diagram from Tutorial point \*/

For I/O bound applications, Data streaming applications, Data intensive real time applications (DIRT), JSON APIs based & single based applications NodeJs is providing itself as a perfect technology partner.

* **MongoDB** –

MongoDB is an [open source](https://whatis.techtarget.com/definition/open-source) database management system (DBMS) that uses a document-oriented database model which supports various forms of data. It is one of numerous nonrelational [database](https://searchsqlserver.techtarget.com/definition/database) technologies which arose in the mid-2000s under the [NoSQL](https://searchdatamanagement.techtarget.com/definition/NoSQL-Not-Only-SQL) banner for use in big data applications and other processing jobs involving data that doesn't fit well in a rigid relational model. Instead of using [tables](https://whatis.techtarget.com/definition/table) and [rows](https://searchoracle.techtarget.com/definition/row) as in [relational databases](https://searchdatamanagement.techtarget.com/definition/relational-database), the MongoDB architecture is made up of collections and documents.

1. MongoDB **stores data in flexible, JSON-like documents**, meaning fields can vary from document to document and data structure can be changed over time
2. The document model **maps to the objects in your application code**, making data easy to work with.
3. **Ad hoc queries, indexing, and real time aggregation** provide powerful ways to access and analyze your data.
4. MongoDB is a **distributed database at its core**, so high availability, horizontal scaling, and geographic distribution are built in and easy to use.
5. MongoDB is **free to use**. Versions released prior to October 16, 2018 are published under the AGPL. All versions released after October 16, 2018, including patch fixes for prior versions, are published under the [Server Side Public License (SSPL) v1](https://www.mongodb.com/licensing/server-side-public-license).

* **AngularJs** –

AngularJs is a Javscript open source front-end framework that is mainly used to develop single page web applications (SPAs). It is a continuously growing and expanding framework which provides better ways for developing web applications. It changes the static HTML to dynamic HTML. It’s features like dynamic binding and dependency injection eliminates the need of code that we have to write otherwise. AngularJs is rapidly growing and because of this reason we have different versions of AngularJs with the latest stable being 1.7.7 . It is also important to note that Angular is different from AngularJs. It is an open source project which can be freely used and changed by anyone. It extends HTML attributes with Directives, and data is binded with HTML.

AngularJs was originally developed in 2008-2009 by Misko hevery and Adam abrons, and is now maintained by google.

Reasons to use AngularJs -

1. **Easy to work with:** All you need to know to work with AngularJs is basics of HTML, CSS and Javascript, not necessary to be an expert in these technologies.
2. **Time saving:** AngularJs allows us to work with components and hence we can use them again which saves time and unnecessary code.
3. **Ready to use template:** AngularJs is mainly plain HTML, and it mainly makes use of the plain HTML template and passes it to the DOM and then the AngularJS compiler. It traverses the templates and then they are ready to use.

Key Features of AngularJs -

**1. Model View Controller (MVC)** :  
An architecture that is basically a software pattern used to develop an application. It consists of three components in general, they are:

1. Model: used to manage the application data.
2. View: responsible for displaying the application data.
3. Controller: main job is to connect the model and the view component.

Normally when we talk about MVC architecture, we have to split our applications into these three components and then write the code to connect them. However, in AngularJs all we have to do is split the application into MVC and it does the rest by itself. It saves a lot of time and allows to finish the job with less code.

**2. Data Model Binding** :  
Data Binding in AngularJS is a two-way process,i.e the view layer of the MVC architecture is an exact copy of the model layer. You don’t need to write special code to bind data to the HTML controls. Normally in other MVC architectures, we have to continuously update the view layer and the model layer to remain in sync with one another. In AngularJs it can be said that the model layer and the view layer remain synchronized with each other. Like when the data in the model changes, then the view layer reflects the change and vice versa. It happens immediately and automatically which helps in making sure that the model and the view is updated all times.

**3. Templates** :  
On the main advantage of using AngularJS is how it makes use of the templates. Normally what happens is that the templates are passed by the browser into DOM, then DOM becomes the input of the AngularJS compiler and then AngularJS traverses the DOM template for rendering instructions which are called directives. The other siblings of AngularJS work differently as they make use of the HTML String whereas AngularJs does not manipulate the template strings. Using the DOM is what gives us the privilege to extend the directive vocabulary or even abstract them into reusable components.

**4. Unit Testing ready** :

The concern of Google’s designer was not only developed Angular but also developed a testing framework called “Karma” which helps in designing unit tests for AngularJS applications.

Benefits of AngularJs :

Dependency Injection is a software design pattern. It works on the basis of Inversion of Control. Inversion control means objects do not create other objects. Instead, they get these objects from an outside source. The dependent object is not created by the primary object after that then use its methods. Instead, an external source creates the dependent object and gives it to the source object for further usage. On the basis of dependency injection, we create a service to acquire all the information from the database and get into the model class.

In Angular.JS, dependencies are injected by using an “injectable factory method” or “constructor function”.

These components can be injected with *“service”* and *“value”* components as dependencies.  
The $http service is normally defined from within the controller in the following manner.

sampleApp.controller (‘AngularJSController’, function ($scope, $http)

1.1 COMPANY PROFILE

Manu Yantralaya (P) Ltd. was established in 1988 for initially manufacturing gasket for spark plugs at Jaipur. In 1989, it started manufacturing semi-finished Ball Bearing Cages for NEI & within a span of two years; the company was manufacturing finished Ball Bearing Cages for NEI. Soon they started manufacturing “Turned Races” of ball bearing for FAG and NEI. The year was 1993.

Then it developed Ball Bearing Dust Shield and started supplying them to FAG. Soon the company had set up press lines from Japan for the production of Ball Bearing Cages and Pre-riveted Cages.

Ever since their inception, they have established their identity in the global market, catering to the ball bearing and automotive industry. Apart from supplying to major bearing companies such as SKF, FAG, NBC, NSK, NACHI, TATA, NRB, SKF SEALING SOLUTIONS, INA, etc., they are also exporting bearing parts and auto parts to global players across the world.

MANU have been recognized as ZERO defect Quality and Best Class Delivery as a supplier to SKF among all their global suppliers which have given a good image to their product and Indian engineering quality worldwide. Its products such as Ball Bearing Cages and Shields have not received any quality complaint from any of their customers in last 20 years for the dimensional defect. Developing unique technologies, continuously improving the manufacturing process and environment, every day the company strives to make the products with more efficiency and sustainability. The company has been setting higher and higher targets each year, and all at MANU have been working hard to achieve them.

The company's plan is to seek exponential growth in every endeavor, developing global relations & try removing all the possible friction from this world with its components.

Table 1.1: Fact Table

|  |  |
| --- | --- |
| Established | 1988 |
| Employees | 200 (as in 2019) |
| Products Manufactured | Sheet Metal & Plastic Components for bearings & auto industry |
| Existing Customers Domestic | FAG, SKF, NBC, NRB, TATA, INA, NSK, SKF SEALING SOLUTIONS |
| Existing Customers – Exports | SCHAEFFLER GROUP, SKF GROUP |

Milestones

MANU at Jaipur was established in 1988 to manufacture Bearing Cages and Dust Shields. In 2000, a technical collaboration was made with M/s TOHO Industrial Co. In 2003, a Joint-Venture with CMSP Group, Italy was established for production of Insert & Pronged Cages. In 2008, MANU received "Best Supplier" award from SKF Group Worldwide for delivery. In 2009, the company won National Award for "Outstanding Effort in Entrepreneurship" by Govt. of India. In 2010, it won Rajeev Gandhi National, "Best Supplier SKF" award for Quality. In the same year it got TS16949 certified. In 2011, it was ISO 14001 certified. In 2012, MANU established a Joint-Venture (TMKI Machine Parts Pvt. Ltd.) with TOHO Industrial Corporation. In this year, the manufacturing of plastic cages was started. In 2013, Rajeev Gandhi National Award for quality was received. In 2014, OHSAS certification was got and awarded with Rajeev Gandhi National Award for quality. In 2015, the company got ISO 50001 certification. Also in the same year, a rooftop captive solar power plant of 100kW was installed.

1.2 MISSION AND VISION

1.2.1 Mission

“MANU’s aim is to strive to be able to meet and exceed our customer's expectation. Customer delight is our mantra and concern for the environment is our first priority.

1.2.2 Vision

“Manu is committed to manufacture best in class and global quality products which are accurate and precise, with economical cost, in sustainable and socially responsible manner.”

1. 3 ORGANIZATIONAL STRUCTURE

Figure 1.1 Organizational Structure

**1.4 CODE OF CONDUCT**

1.4.1 Responsibility towards Employees

**Working Ethics**

All employees shall be provided equal opportunities with respect to work, training and continuous enhancement of skills and shall be treated with respect and dignity. MANU does not engage in or support the use of forced or child labor and complies with applicable laws and industry standard on working hours, wages and other related benefits.

**Health and Safety**

MANU is committed to offering a safe and healthy workplace for all employees supported by the provision of safety gear, adoption of programs like zero-accident, conducting safety drills and first aid training.

**Social Ethics**

MANU aims to incorporate various programs like family planning among its employees and supports education for the underprivileged sections of society. A no smoking and no tobacco policy is followed within premises and employees are encouraged to permanently quit all such habits.

1.4.2 Responsibility towards outside Business Entities

**Business Ethics**

All members of the organization shall ensure that dealings with customers and suppliers are made with utmost professionalism, honesty and integrity and without compromising confidential information. It is prohibited to give or receive any illegal gratification, bribes or similar payments of any sort to influence business decision. This does not include gifts which are customarily given and are of a commemorative nature.

1.4.3 Responsibility towards Customers

**Commitment to High Standards**

MANU is committed to continuously build and foster our reputation of providing quality products and services to our customers.

**Responsiveness to Customer Needs**

MANU manufactures all its products as per the specific requirements of our customers. While incorporating any unforeseen changes as far as possible, the organization shall ensure all products reach the customer timely, in a ready-to-use condition. MANU shall also ensure that all the problems highlighted by the customers are addressed sincerely, diligently, and promptly.

1.4.4 Responsibility towards Government and the Law

**Compliance with Prevailing Laws**

MANU is committed to follow all the prevailing rules, regulations and laws related to customs and excise duties, taxes, compensation, working hours, environmental regulations, etc. while conducting its business.

**National Interest**

MANU shall conduct its business affairs in accordance with the economic and foreign policies, objectives and priorities of the nation and shall not undertake any project or activity detrimental to the nation's interests, or those that will have any adverse impact on the economic, social or cultural life patterns of its citizens.

**Reporting and Record Keeping**

Every employee shall ensure, at all times, the integrity of data or information furnished by him or her to the company or to outsiders via website, catalogues, brochures etc. MANU shall prepare and maintain its accounts fairly and accurately in accordance with the accounting and financial reporting standards of the country.

1.4.5 Responsibility towards the Environment

**Environmental Pledge**

In addition to complying with applicable laws and regulations both in letter and in spirit, MANU shall adopt procedures for assessing the environmental effects of present and future activities. It is committed to prevent the wasteful use of natural resources and minimize any hazardous impact of its products and packaging on the environment. MANU is dedicated to resource reduction, recycling and other responsible methods of waste management. It shall, to the extent possible and considered appropriate, ask its visitors to plant a tree to commemorate their visit.

1.4.6 Implementation of the Code

**Applicability of the Code**

No employee of the company has the authority to engage in conduct that does not comply with this code of conduct. MANU encourages and requests all parties associated with them to follow similar standards of ethical behavior.

**Violations of the Code**

The company reserves its rights to take action, as deemed appropriate, against any person whose actions are found to be in violation of this code or any other policies of the company.

1.5 THE TEAM

There are around 200 employees working in MANU group as a whole. MANU provides a friendly environment to its employees and they in turn work as the owners of the company treating it to be their own. Each team member help each other succeed to accomplish the company's goals and provide their expertise on different projects and duties.

As the company policy is to provide best quality products to the customer, every employee is determined to give his/her best at the workplace. As a result, the products that MANU offers are of best quality with zero defects.

CHAPTER 2

DEPARTMENTS & PRODUCTS 2.1 DEPARTMENTS AT MANU

The plant in which I worked as an Intern constitutes of following departments –

|  |  |
| --- | --- |
| * Blanking Department * Transfer Press Department * Riveting Department * Packing Department | * Barrel Tumbling Department * Vibration & Stacking Department * Oiling Department * Quality Department & Tool Room |

The description of every department is given in the following section –

2.1.1 Blanking Department

[Blanking](http://www.advantagefabricatedmetals.com/blanking.html) is a metal fabricating process, during which a metal workpiece is removed from the primary metal strip or sheet when it is punched. The material that is removed is the new metal workpiece or blank. The blanking process forces a metal punch into a die that shears the part from the larger primary metal strip or sheet. These blanks are then removed from the punch by the help of air pressure. At MANU, compound dies are used to produce an annular part. For some pieces whose outer diameter is equal to the internal diameter of some other sized piece, special types of die-punch arrangement are used which cut two or three sizes at once. These sizes are then separated by special vibrating sieve-like equipment called “Separator”.

|  |  |
| --- | --- |
| Figure 2.1 Blanking Department | Image result for blank washer  Figure 2.2 A Sample Blank |

*(Reference: - 2.2- Google images)*

**Machine specifications: -**

**Blanking Machine (Press Machine) –**

Capacity – 30 ton

Power Required – 1492 W

RPM - 1440

2.1.2 Barrel Tumbling Department

|  |  |
| --- | --- |
|  |  |

Tumbling is a mechanical surface finishing used to eliminate defects in small size components. This preparation is performed in a barrel known as a “sifter” that rotates on an axis to impact onto the aluminum pieces with an abrasive material shaped for that purpose. During Blanking, Burr is produced on the workpiece due to clearance between punch and die. To remove this burr, barrel tumbling is performed in the presence of an oil. After barrel tumbling, another process called Centerfuze is done to remove excess oil from the pieces.



Figure2.3: -A Barrel Tumbler Figure 2.4: -Centrifuge machine

**Machine specifications: -**

* **Tumbler: -**

Oil Used – Anticorit + Standard Oil (Thin oil)

Manufacturer – S&S Engineering

RPM – 28

Motor Rating – 1764 W

Cycle Time – 25 minutes

2.1.3 Transfer Press Department

Sheet metal forming is completed through the use of a Transfer Press operating a number of dies as a complete system. Each die in the system is responsible for adding more shape to the part until the metal work piece attains its final shape. What makes transfer stamping unique is that a single press operates a number of tools, the movement of the sheet metal work piece from one operation to the next is performed by automation either built into the press or onto the dies. With each closing of the press the entire system of tools will close, each performing its designed work to the sheet metal. Upon opening the built in transfer mechanism moves the workpiece from one operation to the next in the sequence. The three tools used here are for –

* **Bending –** It is basically a deep-drawing process where the blank is bended in zigzag form.
* **Pocketing –** The pockets for balls are made by using special dies containing exact copies of the balls to be used.
* **Piercing –** Hole is then pierced for rivets.
* **Ejecting -**  the cage



Figure 2.5 TP Department

2.1.4 Vibration and Stacking Department

Vibratory finishing is a type of [mass finishing](https://en.wikipedia.org/wiki/Mass_finishing) [manufacturing](https://en.wikipedia.org/wiki/Manufacturing) process used to [deburr](https://en.wikipedia.org/wiki/Deburr), radius, descale, [burnish](https://en.wikipedia.org/wiki/Burnishing_(metal)), clean, and brighten a large number of relatively small workpieces. In this batch-type operation, specially shaped pellets of media and the workpieces are placed into the tub of a vibratory tumbler. The tub of the vibratory tumbler and all of its contents are then vibrated. The vibratory action causes the media to rub against the workpieces which yield the desired result. Depending on the application this can be either a dry or wet process. Unlike rotary [tumbling](https://en.wikipedia.org/wiki/Tumble_finishing) this process can finish internal features, such as holes. It is also quicker and quieter. The process is performed in an open tub so the operator can easily observe if the required finish has been obtained.

After giving the shape to the cages, they are then finished by a vibratory tumbler in which small pieces of mild steel are present. After this process, the centrifugal washing is performed to remove the oil.

For further processing, the cages are required to be stacked in pipes. This is performed with machines called stacking machines.

|  |  |
| --- | --- |
| Figure 2.6 A Vibrator | Figure 2.7 A Stacking Machine |

2.1.5 Riveting Department

A rivet is a permanent mechanical [fastener](https://en.wikipedia.org/wiki/Fastener). Before being installed, a rivet consists of a smooth [cylindrical](https://en.wikipedia.org/wiki/Cylinder_(geometry)) shaft with a head on one end. The end opposite to the head is called the tail.

At this stage, the total number of lots are divided into two and named as “P” (or “Female”) and “R” (or “Male”) Cages. Here P stands for plane cages and the R stands for riveted cages. As clear by name, only the R part is provided with a rivet. In the Riveting department, a rivet is inserted in the hole pierced by the TP. 36 machines in total are present in the plant for this purpose.

|  |  |
| --- | --- |
| Figure 2.8 Riveting Department | Figure 2.9 A Riveting Machine |

2.1.6 Oiling Department

Oiling is performed to give final finish to the pieces. The male parts are oiled after the riveting process whereas the female parts doesn’t require riveting are thus, directly oiled after Stacking Process. In addition to imparting finish, it serves two more purposes – (i) Removes Impurities and (ii) Prevents Rusting in future.



Figure 2.10 An Oiling Machine in Operation

2.1.7 Packing Department

Packing Department performs several functions including – wrapping the cages to form packets, putting the packets into corrugated boxes and demagnetizing them. Finally, the boxes are poly-wrapped and packed in wooden boxes.



Figure 2.11 Packing Department

2.1.8 Quality Lab

Laboratory quality control is designed to detect, reduce, and correct deficiencies in a laboratory's internal analytical process prior to the release of patient results, in order to improve the quality of the results reported by the laboratory. Quality control is a measure of precision, or how well the measurement system reproduces the same result over time and under varying operating conditions.

2.1.9 Tool Room

Tool room is a place where tools are stored, or in a factory line where tools are made and repaired for use throughout the rest of the factory. Here, the tool room is equipped with modern EDM machines, Lathes, Drilling Machines and Grinding Machines to produce our dies in-house. The key to MANU’s success in all these years has been the accurate and precise tooling. The constant development of the tool room and the support of technical collaborators have given its products a place in global market. The work force is skilled enough to handle complicated designs and bring them to actual use. The goal of tool room is to meet the tool design expectation without creating defects. Tool storage and their life is also monitored and controlled. Tool maintenance of all dies is carried out in-house and continuous efforts are made to increase the same by adoption of latest technology.

2.2 PRODUCT RANGE

2.2.1 Metal Bearing Cage

Ball bearing cage (also known as ball bearing retainer or ball separator), is the component in a ball bearing that separates the balls, maintains the balls symmetrical radial spacing, and in most cases, holds the bearings together. Cages can also be utilized in providing lubrication by acting as a reservoir for oils, or by supplying a solid film via the cage material itself or a coating on the cage.



Figure 2.12 Metal Bearing Cages (Riveted)

2.2.2 Polyamide Bearing Cage

Polyamide cages or molded nylon cages reduces fluctuations in running torque and are suitable for high speeds. These types of cages are guided by the balls and their operating temperature range is from -300C to +1200C. These cages with glass fiber reinforcement or without, are characterized by a favorable combination of strength and elasticity, & are more rigid.



Figure 2.13 Polyamide Taper Bearing Cage (Ref – Company website)

2.2.3 Dust Shields

Bearing dust shields have been available almost as long as ball bearing itself. The main impetus towards shielded bearings comes from the growing use of “sealed-for-life” bearings in items such as white goods, cars and power tools. Shields are needed to stop the grease lubrication used in these bearings from leaking out. This is particularly important in applications where grease leakage may contaminate the product.

Figure 2.14 Dust Shield (Ref – Company website)

2.2.4 Valve Stem Seal Stampings

Valve Stem Seal Stampings are used for engine cylinder inlet/outlet valve rubber seal & are deployed in all sorts of automobiles. Valve stem seals are small relative to other gaskets and seals in an engine, but play an important role in lubrication. What makes valve stem seals different from almost every other type of seal is their ability to leak. Seals designed to leak may sound counter-intuitive, but the amount and way in which they leak is precisely controlled to achieve a specific goal.

****

Figure 2.15 Valve Stem Seal Inserts (Ref – Company Website)

2.3 APPLICATIONS

MANU is the leading manufacturer & supplier of bearing components such as bearing cages in metal & polyamide, dust shields and hub bearing parts. All these products find their application in various types of bearings such as ball bearings, roller bearings, taper bearings, etc.

Arguably the most common type of bearing, ball bearings is used in a wide variety of products and applications over hundreds of years. From hard drives to skateboards, ball bearings are designed to handle both thrust and radial loads. They work by transferring the load from the outer race to the ball and on to the inner race. Everything is able to spin smoothly since the spherical shape of the ball only touches the inner and outer race at very small points.

Since ball bearings have proven to do their job well and are also fairly easy to manufacture, they are used in many products and applications. Part of our everyday life, ball bearings are found in things such as blenders and exercise equipment. The list goes on and on. Bicycles, DVD players, water pumps, washing machines and fans are just a few of many day to day products that we use that use ball bearings. Aside from everyday objects, ball bearings are also used in more technologically advanced applications as well. For example, the Hubble telescope, the Mars Rover and weather satellites all use ball bearings.

2.4 LOCATION

Manu Yantralaya (P) Ltd. was established in 1988 at Jaipur to manufacture ball bearing cages & dust shields for bearing and auto industry. MANU have grown from a single small factory then to 4 manufacturing units at Jaipur. MANU has started its new (4th) plant at Mahindra SEZ (The Special Economy Zone) in 2016. We did our industrial training at Sitapura Plant. There are several factors which pull the industry to this particular place. Some of the major factors are:

* Ease of raw materials.
* Good transportation facility for carrying raw materials and finished products.
* Good availability of man power.
* Good availability of electricity and water.

CHAPTER 3

PROJECT AND WORKING EXPERIENCE

3.1 OBJECTIVES

The purpose of Industrial Training is to get exposure to real work of environment experience and at the same time, to gain the knowledge through hands on observation and job execution. From the industrial training, we also develop skills in work ethics, communication, management and others. Moreover, this practical training program allows us to relate theoretical knowledge with its application in the manufacturing industry.

The objectives of industrial training are:

* To provide us the opportunity to test our interest in a particular career before permanent commitments are made.
* To develop skills in the application of theory to practical work situations.
* To develop skills and techniques directly applicable to our careers.
* Internships will increase our sense of responsibility and good work habits.
* To get exposure to real work environment experience, gain knowledge in writing report in technical works/projects.
* Internship produces have higher levels of academic performance.
* Internship programs will increase our earning potential upon graduation.
* To build the strength, teamwork spirit and self-confidence in our life.
* To enhance the ability to improve our creativity skills and sharing ideas.
* To build a good communication skill with group of workers and learn to learn proper behavior of corporate life in industrial sector.
* We will be installed with good moral values such as responsibility, commitment and trustworthy during their training.
* The fundamental objective of Industrial Training is to prepare us for future employment in our chosen engineering discipline.
* Industrial Training enhances the academic material studied at University by allowing us to practice what have learnt and to develop key professional attributes.

3.2 STUDY IN VARIOUS DEPARTMENTS -

A flow process chart is a process chart setting out the sequence of the flow of a product or a procedure by recording all events under review using the appropriate process chart symbols. [1] A general Process Flow Diagram of the bearing cage is prepared to demonstrate the process easily.

Table 3.1: Overall Process Flow Diagram

|  |  |  |  |
| --- | --- | --- | --- |
| **MANU YANTRALAYA Pvt. Ltd. Jaipur**  **PROCESS FLOW DIAGRAM** | | | |
| **Component Name:** CAGE FOR BALL BEARING | | | |
| **Sr. No.** | **Operation** | **Machine/Equipment** | **Flow Diagram** |
| 1 | Raw Material (On Receipt & Usage) | Manual/Instruments |  |
| 2 | To Blanking Department | Mover Staff |  |
| 3 | Blanking | Power Press |  |
| 4 | To Tumbling Department | Mover Staff |  |
| 5 | Tumbling with Centerfuze | Barrel |  |
| 6 | To Transfer Section | Mover Staff |  |
| 7 | Cage Formation | Transfer Press |  |
| 8 | To Vibrator Section | Mover Staff |  |
| 9 | Tumbling & Oiling | Vibro Finishing Machine |  |
| 10 | To Stacking Machines | Mover Staff |  |
| 11 | Stacking & Visual Inspection | Manual/Stacking Machine |  |
| 12 | To Oiling (P) or Riveting (R) Department | Mover Staff |  |
| 13 | Rivet Insertion (R) | Auto Riveting Insertion Machine |  |
| 14 | To Oiling Department (R) | Mover Staff |  |
| 15 | Oiling | Oiling Machine |  |
| 16 | To Packing Department | Mover Staff |  |
| 17 | Visual Inspection & Packing | Manual |  |
| 18 | Box Packing | Manual |  |
| 19 | To Storage Section | Mover Staff |  |
| 20 | De-Magnetization | De-Magnetizer |  |
| 21 | Temporary Storage | - |  |
| 22 | To Ready-to-Dispatch Area | Mover Staff |  |
| 23 | Dispatch Inspection | Manual/Instruments |  |
|  | | | |
| Inspection Operation Transport Storage | | | |

This process flow chart is self-explanatory and does not require further description. All these processes have been discussed in detail while explaining each department.

3.3 EXPERIENCE

After joining the plant as an intern, **Mr. Ankit Sharma**, the Maintenance Head was assigned as my mentor. Ankit sir made me visit the plant and instructed the teammates who had joined earlier to explain every process in detail. Later, a minor project to optimize the timing for the hydraulic jet washing machine placed outside the main building. It took almost 3 days to complete this project. After the report for this project was submitted, our performance was analyzed.

**3.4 PROJECT WORK**

I have completed my operation control process project as (Processes are in sequence)

* Finding the faulty sensors
* Study and Implementation of poka yoke.
* Verification of FIFO

3.4.1 FINDING FAULTY SENSORS: -

OBJECTIVE: - To find out the sensors which are not working properly in Blanking and Riveting Department of Manu Yantralaya.

Sensors List in blanking section: -

1.Misfeeding sensor (sensor A): -This sensor checks either the feed rate is constant or not. It also ensures that the strip of raw material is uniform or not. If this happens then it will shut down the machine. This sensor controls the defective blanks.

Figure 3.1:-Misfeeding sensor (Ref:-Google Images)

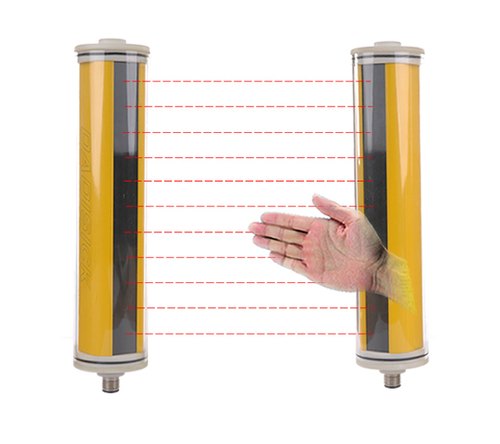
2.Safety curtain sensor (sensor B): -This sensor is for the safety of labor. if any body part or any other thing come into working zone the sensor will shut down the machine.

Figure3.2: - Safety curtain (Ref.: -Google Images)

There is the list of sensor checking every day. We observed following results: -

Table3.2: -Sensor checking in blanking department

|  |  |  |
| --- | --- | --- |
| DATE | SENSOR A | SENSOR B |
| 1/6/2019 | ✓ | ✓ |
| 2/6/2019 | Holiday | Holiday |
| 3/6/2019 | ✓ | ✓ |
| 4/6/2019 | ✓ | ✓ |
| 5/6/2019 | 🗶 | ✓ |
| 6/6/2019 | ✓ | ✓ |
| 7/6/2019 | ✓ | 🗶 |
| 8/6/2019 | ✓ | ✓ |
| 9/6/2019 | Holiday | Holiday |
| 10/6/2019 | ✓ | ✓ |
| 11/6/2019 | 🗶 | ✓ |
| 12/6/2019 | ✓ | ✓ |
| 13/6/2019 | ✓ | ✓ |
| 14/6/2019 | ✓ | ✓ |

Sensors list in Riveting section: -

**Sensor 1: -** Checks if cage has been loaded or not in pipe.

**Sensor 2: -** This sensor unloads the cage, and it loads cage on the die.

**Sensor 3: -** This sensor checks either table is rotating properly or not.

**Sensor 4: -** This sensor checks either cage is loaded on the die or not

**Sensor 5**: - This sensor provides the information to the rivet feeder about the rivet inserting plate’s TDC and BDC.

**Sensor 6:** - It opens a rivet feeder’s plate on the basis of info provided by sensor 5. And rivet comes into the hole.

**Sensor 7:** - This sensor provides up & down motion to the rivet check sensors on the basis of info provided by sensor 5.

**Sensor 8:** - This sensor checks either all the rivets are in the hole or not.

**Sensor 9: -** It has two parts which has two jobs to do. One is used to ON the pneumatic and pressing punch comes down. And second is used to ON hydraulic, due to this pressing punch provides hydraulic pressure on rivets and rivet pressing takes place.

**Sensor 10: -** Un-press cage pickup unit picks up the cage which has missing rivets from the die and put it into un-press cage box.

**Sensor 11: -** This sensor shows vacuum’s reading in sensor un-press cage pick-up unit.

**Sensor 12: -** This sensor picks up the cage from the table and puts it into NG box.

**Sensor 13: -** This sensor picks up the cage from the die and puts it into NG box.

**Sensor 14: -** On the basis of rivet missing sensor it is clarified that rivets are in the holes or not.

**Sensor 15: -** It is used for indexing of the final pipe.

We check the sensors regularly and observe the following data: -

Table3.3: -Sensor checking in riveting department

|  |  |  |
| --- | --- | --- |
| **DATE** | RIVET PRESS SENSOR | RIVET CHECK SENSOR |
| 1/6/2019 | ✓ | ✓ |
| 2/6/2019 | Holiday | Holiday |
| 3/6/2019 | ✓ | ✓ |
| 4/6/2019 | ✓ | ✓ |
| 5/6/2019 | ✓ | ✓ |
| 6/6/2019 | ✓ | ✓ |
| 7/6/2019 | ✓ | ✓ |
| 8/6/2019 | ✓ | ✓ |
| 9/6/2019 | Holiday | Holiday |
| 10/6/2019 | ✓ | ✓ |
| 11/6/2019 | ✓ | ✓ |
| 12/6/2019 | ✓ | ✓ |
| 13/6/2019 | ✓ | ✓ |
| 14/6/2019 | ✓ | ✓ |
| 15/6/2019 | ✓ | ✓ |
| 16/6/2019 | Holiday | Holiday |
| 17/6/2019 | ✓ | ✓ |
| 18/6/2019 | ✓ | ✓ |
| 19/6/2019 | ✓ | ✓ |
| 20/6/2019 | ✓ | ✓ |
| 21/6/2019 | ✓ | ✓ |
| 22/6/2019 | ✓ | ✓ |
| 23/6/2019 | Holiday | Holiday |
| 24/6/2019 | ✓ | ✓ |

Observation: -

As we observed that in blanking section there are sensors which are working improperly so for that we need to find out some solutions and in the riveting section every sensor was working properly and that’s why observation duration was increased by 10 days but we got the same result so it doesn’t require any solution

3.4.2STUDY AND IMPLEMENTATION OF POKA YOKE

**Objective:** To minimize the total defective pieces transferred to the next department. And keep the worker safe.

**About the Poka-yoke:** Poka Yoke is a Japanese term that means "mistake-proofing" or "inadvertent error [prevention](https://en.wiktionary.org/wiki/prevention)". A poka-yoke is any mechanism in any process that helps an equipment operator avoid (yokeru) mistakes (poka*).* Its purpose is to eliminate product defects by preventing, correcting, or drawing attention to [human errors](https://en.wikipedia.org/wiki/Human_error) as they occur.[[1]](https://en.wikipedia.org/wiki/Poka-yoke#cite_note-1) The concept was formalized, and the term adopted, by [Shigeo Shingo](https://en.wikipedia.org/wiki/Shigeo_Shingo) as part of the [Toyota Production System](https://en.wikipedia.org/wiki/Toyota_Production_System). It was originally described as [Baka](https://en.wikipedia.org/wiki/Baka_(fool))-yoke, but as this means "fool-proofing" (or "[idiot-proofing](https://en.wikipedia.org/wiki/Idiot_proof)") the name was changed to the milder poka-yoke.

The recognized types of poka yoke for detecting & preventing errors in a process are –

1. **The Contact method**: - Identify defects using part’s shape, size, color or other physical attributes
2. **The Constant number method**: - This method alerts the operator if certain number of movement are not made
3. **The Sequence or motion step**: - This method aims to ensure the prescribed steps of the process have been followed before starting the next stage.

**USAGE**

A simple poka-yoke example is demonstrated when a driver of the car equipped with a manual gearbox must press on the clutch pedal (a process step, therefore a poka-yoke) prior to starting an automobile. The interlock serves to prevent unintended movement of the car. Another example of poka-yoke would be the car equipped with an automatic transmission, which has a switch that requires the car to be in "Park" or "Neutral" before the car can be started (some automatic transmissions require the brake pedal to be depressed as well). These serve as behavior-shaping constraints as the action of "car in Park (or Neutral)" or "foot depressing the clutch/brake pedal" must be performed before the car is allowed to start. The requirement of a depressed brake pedal to shift most of the cars with an automatic transmission from "Park" to any other gear is yet another example of a poka-yoke application. Over time, the driver's behavior is conformed with the requirements by repetition and habit.

**BENEFITS**

A typical feature of poka-yoke solutions is that they don't let an error in a process happen. Other advantages include:

* Less time spent on training workers;
* Elimination of many operations related to [quality control](https://en.wikipedia.org/wiki/Quality_control);
* Unburdening of operators from repetitive operations;
* Promotion of the work improvement-oriented approach and actions;
* A reduced number of rejects;
* Immediate action when a problem occurs;
* 100% built-in [quality control](https://en.wikipedia.org/wiki/Quality_control);
* Preventing bad products from reaching customers;
* Detecting mistakes as they occur;
* Eliminating defects before they occur

**IMPLEMENTATION**

Poka-yoke can be implemented at any step of a manufacturing process where something can go wrong or an error can be made.For example, a [fixture](https://en.wikipedia.org/wiki/Fixture_(tool)) that holds pieces for processing might be modified to only allow pieces to be held in the correct orientation or a digital counter might track the number of spot welds on each piece to ensure that the worker executes the correct number of welds.

**Solution in Blanking section: -**

**1.Magnetic particle testing: -**

It is a [non-destructive testing](https://en.wikipedia.org/wiki/Non-destructive_testing) (NDT) process for detecting surface and shallow subsurface discontinuities in [ferromagnetic materials](https://en.wikipedia.org/wiki/Ferromagnetic_materials) such as [iron](https://en.wikipedia.org/wiki/Iron), [nickel](https://en.wikipedia.org/wiki/Nickel), [cobalt](https://en.wikipedia.org/wiki/Cobalt), and some of their [alloys](https://en.wikipedia.org/wiki/Alloys). The process puts a magnetic field into the part. The piece can be magnetized by direct or indirect magnetization. Direct magnetization occurs when the electric current is passed through the test object and a magnetic field is formed in the material. Indirect magnetization occurs when no electric current is passed through the test object, but a magnetic field is applied from an outside source. The magnetic lines of force are perpendicular to the direction of the electric current, which may be either [alternating current](https://en.wikipedia.org/wiki/Alternating_current) (AC) or some form of [direct current](https://en.wikipedia.org/wiki/Direct_current) (DC) (rectified AC).

The presence of a surface or subsurface discontinuity in the material allows the [magnetic flux](https://en.wikipedia.org/wiki/Magnetic_flux) to leak, since air cannot support as much magnetic field per unit volume as metals.

To identify a leak, ferrous particles, either dry or in a wet suspension, are applied to a part. These are attracted to an area of flux leakage and form what is known as an indication, which is evaluated to determine its nature, cause, and course of action, if any.

**2.Liquid penetrate testing :-**

This is a simple low-cost method of detecting surface-breaking flaws such as cracks, laps, porosity, etc. To be detected, the flaw must reach the surface to be tested.  
  
Penetrant testing is one step up from visual inspection and offers many advantages, such as speed, large-area coverage and cheapness. The principle of liquid penetrant testing is that the liquid penetrant is drawn into the surface-breaking crack by capillary action and excess surface penetrant is then removed; a developer (typically a dry powder) is then applied to the surface, to draw out the penetrant in the crack and produce a surface indication. Cracks as narrow as 150 nanometres can be detected. The indications produced are much broader than the actual flaw and are therefore more easily visible.  
  
Liquid penetrant testing can be applied to any non-porous clean material, metallic or non-metallic, but is unsuitable for dirty or very rough surfaces. Surface cleaning is a vital part of the penetrant testing technique. The method can be manual, semi-automatic or fully automated. Penetrant inspection, continuous-operation production lines in which the specimens are cleaned, dipped, washed, dried, etc on a time cycle are common.  
  
Recently, equipment to fully automate the visual inspection stage of the process, by robotic handling of the specimen on a programmed procedure with television camera viewing and pattern recognition to identify and recognise flaws, has been introduced. Television image enhancement processes can be included.

**3.Eddy current probes** :-

In its most basic form the single-element ECT probe a coil of conductive wire is excited with an alternating electrical current. This wire coil produces an alternating [magnetic field](https://en.wikipedia.org/wiki/Magnetic_field) around itself. The magnetic field oscillates at the same frequency as the current running through the coil. When the coil approaches a conductive material, currents opposite to the ones in the coil are induced in the material eddy currents

**4.Eddy current array :-**

Eddy currents are currents which circulate in conductors like swirling eddies in a stream. They are induced by changing magnetic fields and flow in closed loops, perpendicular to the plane of the magnetic field. They can be created when a conductor is moving through a magnetic field, or when the magnetic field surrounding a stationary conductor is varying i.e. anything which results in the conductor experiencing a change in the intensity or direction of a magnetic field can produce eddy currents. The size of the eddy current is proportional to the size of the magnetic field, the area of the loop and the rate of change of magnetic flux, and inversely proportional to the resistivity of the conductor.

Like any current flowing through a conductor, an eddy current will produce its own magnetic field. Lenz’s Law states that the direction of magnetically induced current, like an eddy current, will be such that the magnetic field produced will oppose the change of magnetic field which created it. This resistance created by the opposing magnetic fields is exploited in eddy current braking, which is commonly used as a method of stopping rotating power tools and rollercoasters.

CHAPTER 4

CONCLUSION

4.1 OVERVIEW

Manu Yantralaya is an automotive industry that maintains a standard in all of its plants across different range of its products. The Manu plant has about 200 employees, and they all make a perfect example of discipline and punctuality that should be in an organization. The plant has single shift and all the staff have a lovely tendency to come at least 5 minutes earlier. There is a dress code for all the employees and is strictly followed. Mutual understanding between the employees of different departments is laudable. The company provides various perks and incentives to the employee who depicts outstanding performance. There is the full-fledged arrangement for the entertainment of the employees, as it has a dedicated canteen and also the HR dept. time to time conducts various outdoor activities for the workers.

The plant maintains quality in all of its products and processes. It uses different quality control standards like FIFO, management 5s technic, and have zero defect zero accident motive for a better workplace. Safety of the employees and workers is a primary concern at the plant, and for this many security, instruments are installed. These all standards lead this small plant to produce a significant turnover of about 90-95 crores annually, which is appreciable as compared to other plants of the company.

Figure 4.1 Problem Solving Approach

I studied various processes right from the arrival of raw materials to delivery of finished product. I identified key problems and proposed feasible solutions for the same. I also successfully completed the documentation tasks assigned to me by my mentor and provided satisfactory improvements in the documents to go ahead for internal audit. I had put up my one hundred percent in doing whatever task was given but it could not have been possible without the help of my colleagues at Manu.

I have learnt both technical and management skills at Manu Yantralaya. All the processes starting from raw material procurement to packaging of final product were surfacely observed and understood by me.

Theoretical knowledge is the base of doing thing practically and it is of no use until or unless it is not practically implemented. Sitting in classroom, discussing on certain topic is entirely different thing from that practically experiencing it in real work field i.e. “Learning a concept” and “Implementing a concept” both are different. Internship at such a humongous company (Manu Yantralaya Pvt. Ltd.) opened up a horizon for my career. I was feeling like professionals during the program. This internship helped me to resolve any kind of developmental process issue. It taught me to work productively under any environment. I learnt to work under the norms of industrial needs with projects and deadlines.

I successfully completed my project with the support of my team under the guidance of our mentor, Mr. Aditya Kankani. Despite the fact that he is very busy employee, he was very supportive towards the successful completion of my training and project. I have completed all my assigned projects with the help of constant support of our mentor and my team members.

4.2 SKILLS DEVELOPED

1. **Technical Skills:** The various projects given to me made me more comfortable with machines. Working with machines in real, brought me out of the bookish knowledge and rendered me numerous technical skills.
2. **Management Skills:** The internship experience at Manu Yantralaya taught me how to manage and lead a group to complete a project with team spirit. We were a group of three students and each of us got an opportunity to lead many times.
3. **Creativity:** My internship experience at Manu Yantralaya showed me how the creativity and skills of three people can work together to solve production related problems in an effective way.
4. **Collaboration:** Internship experience made me learn that if the minds of three persons collaborate in an effective and efficient way, it turns out to be an extra ordinary mind. Working together as a team with my two fellows was memorable and productive.
5. **Time Management:** Our mentor, Mr. Aditya Sir specified a time limit for us to complete our projects which was uncomfortable initially but mandatory for us. In teamwork, for effectiveness, individual’s time is not the only concern but team’s time management is indispensable.
6. **Adaptability:** Despite of desperate efforts by members of Manu Yantralaya to make the ambient comfortable, yet it is not easy for a beginner to adjust in surroundings of an industry. I faced some complications initially but adapted to the industry ambient within a few days.
7. **Critical Thinking:** While completing a project in a specified time, your mind needs to work fast and make logical decisions to the best of its ability. Analysis of the problems and facts related to it made my thinking more critical and smart. Smart work is way ahead than hard work while working as an intern in an industry.
8. **Communication and Interpersonal Skills:** Effective communication is the most important in teamwork. Until the mind of all members of a group work in the same direction, a fruitful result can’t be extracted. My internship experience taught me number of interpersonal skills.
9. **Receptiveness:** Receptiveness and adaptability are the most required qualities of an employee, student or an intern. Accepting every task given by our mentor made me a positive person and taught me that receptiveness is must in one’s life.
10. **Discipline:** All the employees at Manu Yantralaya work in a highly disciplined way which motivated me and other interns to obey rules and code of behavior at our work place which will definitely help us in our future professional life.

REFRENCES

|  |  |
| --- | --- |
| [1] | G. Kanawaty, "Introduction to Work Study," International Labour Office, 1992, p. 89. |
| [2] | "Manufacturing Throughput Time," [Online]. Available: https://www.accountingtools.com/articles/what-is-manufacturing-throughput-time.html. |
| [3] | "First in, First Out," [Online]. Available: https://www.investopedia.com/terms/f/fifo.asp. |
| [4] | "Infrastructure: Manu Yantralaya (P.) Ltd.," [Online]. Available: http://www.manujaipur.com/auto-automotive-parts.php. |
| [5] | "Laboratory quality control," [Online]. Available: https://en.wikipedia.org/wiki/Laboratory\_quality\_control. |
| [6] | "Manu Yantralaya," [Online]. Available: http://www.manujaipur.com/\*. |
| [7] | "Metal Blanking Process," [Online]. Available: http://www.advantagefabricatedmetals.com/blanking-process.html. |
| [8] | "Rivet," [Online]. Available: https://en.wikipedia.org/wiki/Rivet. |
| [9] | "Transfer stamping," [Online]. Available: https://en.wikipedia.org/wiki/Transfer\_stamping. |
| [10] | "Tumbling," [Online]. Available: https://www.lualma.it/en/surface-preparations/tumbling/. |
| [11] | "Vibratory finishing," [Online]. Available: https://en.wikipedia.org/wiki/Vibratory\_finishing. |
| [12] | "Standard operating procedure," [Online]. Available: https://en.wikipedia.org/wiki/Standard\_operating\_procedure. |
| [13] | G. N. R. III, "Role of a Supervisor in the Workplace," 30 1 2018. [Online]. Available: http://smallbusiness.chron.com/role-supervisor-workplace-11210.html. |