

INTERNSHIP REPORT

BRAKES INDIA PRIVATE LIMITED AUTOMOBILE INDUSTRY
PADI, CHENNAI 600052, TAMIL NADU.



TRAINING PERIOD (13.09.2023-29.09.2023)

Submitted to partial fulfillment of requirements

For the award of degree of

MASTER OF SCIENCE

in

CHEMISTRY

by

AMAYA SIVA

Reg.no 42910002

BATCH-(2022-2024)

DEPARTMENT OF CHEMISTRY



SATHYABAMA
INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)

JEPPIAR NAGAR, RAJIV GANDHI SALAI, CHENNAI – 600119.

JANUARY 2024

DISCLAIMER

This internship report has been prepared by the author as an intern under 'Brakes India Private Limited'. The views expressed in the report are personal to the intern and do not necessarily reflect the view of the industry where the internship takes place or any of its staff or personnel. This report reflects personnel experience based on the level of interpersonal communication, interaction with the personnel, coordination level and information shared or perceived. There is always a room for improvement. However, it is not necessary for the readers to agree with the content, findings, conclusion and area of improvement as identify therein.

ACKNOWLEDGEMENT

The internship opportunity I had in Brakes India was a great chance for learning and professional development. Therefore, myself consider myself as a very lucky individual as I was provided with an opportunity to be a part of it. Am also grateful for having a chance to meet many wonderful people & professionals who led me through this internship period.

First and foremost, I would like to express my heartily thanks to **Mr. RAMESH GENERAL MANAGER OF SOURCING UNIT, BRAKES INDIA, PADI** who took a great part to recommend me in this big Industry also to **Mr. N. LAKSHMINARASIMHAN SENIOR GENEAL MANAGER PERSONNEL&HR UNIT of BRAKES INDIA PADI**, who in-spite of being extraordinarily busy with his studies, took time out to hear, guide & keep me on the correct path and allowing me to carry out my internship training.

Bearing in mind previous I am using this opportunity to express my deepest gratitude & special thanks to **Mr. VINAYA KUMAR GM OF PERSONNEL HR UNIT IN BRAKES INDIA, PADI** for taking part in useful decision and giving necessary advises and guidance and arranged all facilitates to make this training easier.

It's my radiant sentiment to place on record my best regards, deepest sense of gratitude to **Mr. PP VENKKATEESH HEAD OF E, R&D LABORATORY and also Mr. PAZHANI** who taught me all about the instrument and also for their careful and precious guidance which were extremely valuable for my study both theoretical and practically.

I perceive this opportunity as a big milestone in my career development. I will survive to use gained skills & knowledge in the best possible way.

THANK YOU ALL

1.ABOUT THE COMPANY

- Brake India is one of the largest Brake Manufacturer in India and has three main divisions these are Brake division, Foundry division and Polymer division. With over 50 years of history and rich experience behind it, Brakes India Private Limited as part of the six-billion-dollar TVS group is getting future ready for the opportunities ahead. Established in 1962, Brakes India Private Limited has grown to become the largest Brake manufacturer in India today. Headquartered in Chennai, Brakes India Private Limited has three main divisions; Brake division, Foundry division and Polymer division.

PRODUCTION OF AUTOMOBILE

- Over 25 new components in the air-brake system have been developed over the course of the past few years, and we are going into mass production with large original equipment manufacturers of well-known brands in the next few months, from our wheels and brakes that we typically manufacture, we have gone into the entire pneumatic or air braking system. So, there are a lot of components that we have showcased recently.
- Regarding exports, he said that they already have export contracts in Southeast Asia, while business development activities are going on across North America, Europe and Southeast Asia. The company is exploring the market across Southeast Asia, Europe and North America.

- There is a positive energy in the company right now that is driving our development over the next 5 years. This is also supported by the significant recovery in the automotive market across all segments combined with our growing export order book.

DIVISION OF COMPANY

- The Brake Division manufacturing sites are located at Chennai, Sholinganallur, Nanjing in Karnataka, Gurgaon in Haryana, Sanand & Jagatai in Gujarat, Waki in Maharashtra, Jamshedpur in Jharkhand and Sitar Ganj in Uttarakhand.

FUNCTIONS OF AUTOMOBILE & PRODUCERS UNIT

- Establishment of tyres and brakes into finished products.
- Electroplating the brakes and the equipment's.
- Collection of the products assembled.
- Supply of products.

2. PURPOSE AND SCOPE

The purpose of the internship is to obtain extra knowledge about the automobile and to know about the function and activities of instruments in this internship, I get to know about the automobile and the lab activity's-based processing methods of industry situated at Padi from 13/09/2023 to 30/09/2023 for 15 days.

I have attained a lot of information which includes production, products, sales, profit, loss etc in the company. In this project, we also took effect to know about, assessing the quality of the instruments via various tests and also learnt about the manufacturing of goods into final products.

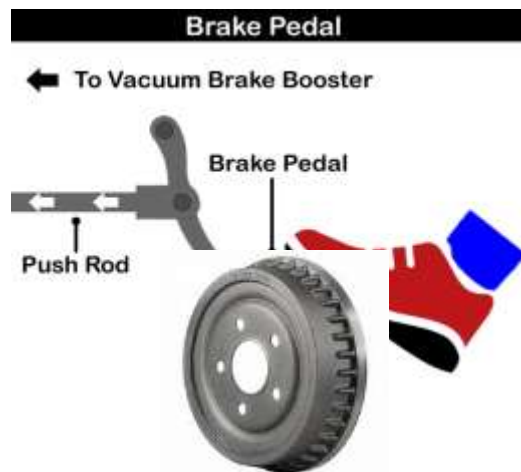
OBJECTIVE

1. To obtain extra knowledge about the work progression in the industry-based company.
2. To know about the functioning and activities of instruments.
3. To know about the financial highlight of the company.
4. To know about the process of a manufacturing in the industry.

3. PREPARATION & MANUFACTURING OF BRAKES



- The first process is from a blank steel sheet where they cut the sheets into circular shape and then comes Blanking, Dragging, Grewing, Filling, Piercing and then checking up the goods into finest product. From all these processes each one of the steels is cut down and made up into a circular hole with sharp edges which is being surrounded by the steel sheets.
- These sheets are being coated with the iron, painted and polished under the rust-free chemicals and manufactured.



- The upcoming process helps us to know on which basis the setup is being constructed and also the mechanism - Input rod crimping, Key assembly, Diaphragm plate crimping, Shear riveting, Stroking, Server crimping.

the systematic mechanism and the chemicals used behind the drum break. Asbestos is the chemical used to line up the rear shell and the drum break by the

processes of Greasing, Sagging, Performance testing, Drum fouling, Final viewing. As we all know that Asbestos is used in a wide range of manufactured goods, mostly in building material, ceiling and floor tiles, paper products, mainly in automobile clutch, brake, transmission parts etc.

4. INSTRUMENTATION

RESEARCH AND DEVELOPMENT LABROTARY-

It was a great pleasure and a generous experience to know and to learn about the instruments which were kept under the laboratory. The first instrument was

1. METTER BALANCE WITH THE SPECIFIC GRAVITY

PRINCIPLE:

It is an electronic balance density set up, to weigh weight in air and weight in wate. the setup is made with a plastic as a sample which is immersed in IPA (iso propyl alcohol)

CALCULATION:

For the calculation we 1st weigh in air (W1) and then weigh in solvent(W2) and calculate its weight difference. Now the specific gravity = weight of plastic in air(W1) / weight difference which is multiplied by density of the solvent used (IPA = 0.786).



METTER BALANCE TO CALCULATE THE SPECIFIC GRAVITY



2. MELTING RANGE APPARATUS

PRINCIPLE

To find out the Melting point of the Polymer.

- The plastic is made into a small particle and put in glass slide.
- This setup is made inside the apparatus.
- Melting point is being observed.



MELTING RANGE APPARRATUS



3. LE CO APPARATUS

PRINCIPLE: CARBON CASTE IN IRON AND STEEL

- Carbon and Sulphur present in the sample are oxidised to carbon dioxide (CO₂) and sulphur dioxide (SO₂) and swept by the oxygen carrier through a drying reagent and then through the non-dispersive Infrared NDIR cell, where sulphur is detected as SO₂.
- Here the known value of carbon is given as 0.809 ± 0.010
- The standard sample is kept in the crucible and heated while we get the infrared peaks. Broad peak for sulphur is obtained as 0.0936 and carbon is obtained as 0.804 which is Narrowed.
- The main purpose is to estimate the carbon content present in the sample.



LE CO APPARATUS

4. NEUTRAL SALT SPRAY CHAMBER

- This is used to check the life of a material & to qualify it as corrosion-free material. It contains salt water, 5% of NaCl, we take 5kg of NaCl and dissolve it in 100 liters of water. While this water contains many other gases like Oxygen, Carbon. Thus, it becomes lesser ph. So as to remove these gases we 1st take the ph. as 6-6.5
- This process is called as before atomization. After that the ph. increases to 6.5-7 which is said to be After atomization period.
- Here the temperature and pressure are maintained as constant. Cabinet temperature is $35\pm 2^{\circ}\text{C}$. The whole chamber's temperature ranges $47\pm 2^{\circ}\text{C}$. The pressure is kept as 14-16psi.

PRINCIPLE:

- Water is being formed as fog & sprayed in the materials. Fog collection is from 1-2mil. Sample kept in the chamber are mostly METALS or PAINTS. Inside the chamber there will be temperature, humidity sensor, & nozzles. The position of the sample is kept in the angles of $15-30^{\circ}\text{C}$
- To create the fog, we keep the pressure in 14psi with temperature as 47°C as the tower temperature.
- To create the for we keep the pressure in 14psi with temperature as 47°C as the tower temperature.
- After the duration of Rusting the metal Zinc on oxidation forms Zano which is WHITE DUST forms as the 1st layer.

- Then, when the duration becomes longer it forms Iron rust which on oxidation forms Ferrous RED DUST which are usually seen in the iron metals or iron rods etc.



NEUTRAL SALT SPRAY CHAMBER



5. HUMIDITY CHAMBER

- This is used to check the life of a material & to qualify it as corrosion free material with which we can change the climatic condition inside the chamber.
- A humidity chamber creates controlled levels of humidity and temperature to simulate specific environmental conditions for testing or storing materials, products.
- It typically combines a heating and cooling system with a humidifier to achieve desired conditions, allowing researchers and manufacturers to assess how items react to various humidity and temperature levels.

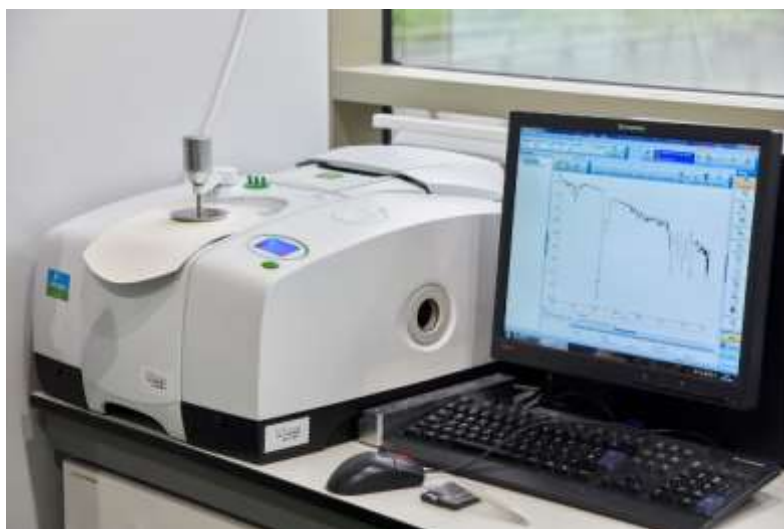


HUMIDITY CHAMBER

6. FTIR (Fourier-Transform Infrared Spectroscopy)

PRINCIPLE:

- FTIR SPECTROSCOPY works on the principle of measuring the absorption of infrared light by molecules and then converting the resulting interferogram into an infrared spectrum, which can be used for qualitative and quantitative analysis of chemical compounds. This technique is valuable in various fields, including chemistry, pharmaceuticals, polymer science, and environmental analysis.
- Material identification by FTIR. It works by passing infrared light through a sample, measuring how much is absorbed at specific frequencies, and using this data to create an infrared spectrum that reveals information about the sample's chemical composition its functional group and molecular structure.



FTIR SPECTROSCOPY

7. MUFFEL FURNANCE



PRINCIPLE:

- A muffle furnace is a heating device used in labs and industries. It consists of a chamber with a heating element that can reach high temperatures. Samples are placed in a separate compartment called the "muffle" to protect them from direct contact with the heating element. The furnace has digital temperature control for precise heating, and it's used for processes like aching, annealing, sintering, and heat-treating materials.



MUFFEL FURNACE



7. OPTICAL EMISSION SPECTROSCOPY

It is a thermal method to find out the presence of percentage carbon present in the sample material.

PRINCIPLE:

- Optical emission spectroscopy (OES), also known as atomic emission spectroscopy (AES), is a technique used to analyze the elemental composition of materials based on the principles of atomic emission. It works by exciting a sample, making its atoms emit light at characteristic wavelengths. By measuring this emitted light, it identifies the elements and their concentrations in the sample. Inside the spectroscopy it contains an inert gas ARGON which lets the sample to excite and emit the radiation and thus the other elements and carbon percentage is being detected.
- Its application is Chemical analysis of steel aluminum, copper, zinc.
- Parameter obtained Carbon, Silicon, Chromium, Manganese, Lead, Phosphorus, Sulphur, Cobalt, Titanium, Vanadium, Tin etc.
- It is being classified as HIGH ALLOW STEEL, LOW ALLOW STEEL
- Carbon obtained can be MILD CARBON STEEL, MEDIUM CARBON STEEL, HIGH CARBIN STEEL.

- Only the elements are formed as percentage and are detected.



OPTICAL EMISSION SPECTROSCOPY

8. ELECTROPLATING

- Electroplating is commonly used to improve the appearance and durability of metal parts. For example, chrome plating is used to provide a shiny, corrosion-resistant finish on automotive trim, bathroom fixtures, and motorcycle parts.
- Many industries employ electroplating to protect metal components from corrosion. A thin layer of a corrosion-resistant metal, such as zinc or nickel, is plated onto steel or other metals to prevent rust and extend the life of the components. This is common in the construction of bridges, pipelines, and machinery.
- Besides decorative chrome plating, electroplating is employed in various automotive components for corrosion protection and wear resistance.

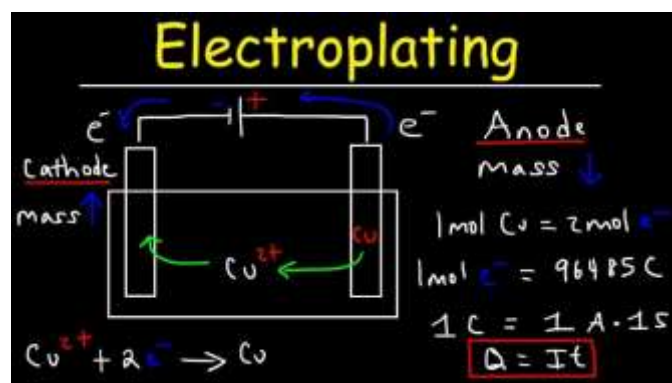
PRINCIPLE:

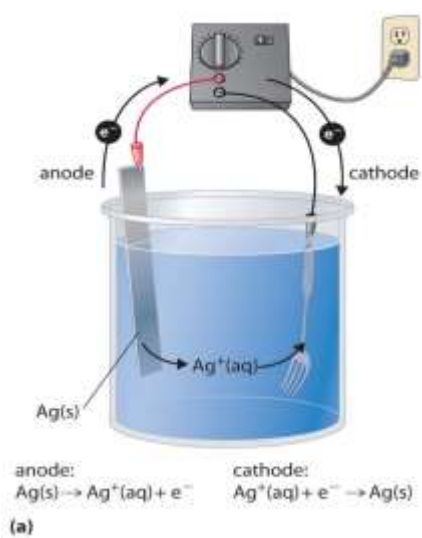
- **Preparation:**

The object to be plated (the substrate) is thoroughly cleaned to remove any dirt, grease, or oxides that could interfere with adhesion.

- **Electrolyte Bath:** The substrate is immersed in an electrolyte bath containing a solution of metal ions (e.g., copper, nickel, or gold) and a corresponding metal electrode.
- **Electroplating:** When an electric current is applied, metal cations from the electrolyte are reduced at the substrate's surface, forming a thin, adherent metal coating.
- **Finishing:** After electroplating, the coated object is typically rinsed and sometimes treated further (e.g., polished or passivated) to achieve the desired surface finish and quality.

This process results in a metal-plated surface with improved properties such as corrosion resistance, aesthetics, and conductivity.





CONCLUSION

On the whole, this internship was a useful experience. I have gained new knowledge, skills and met many new people. I achieved several of my learning goals and got insight into professional practices currently advocated in the industry. Related to our study I learned more about the Instruments. Furthermore, I have experienced that it is of importance that education is objective and we have to be aware of the industrial aspect of the topics to study. This internship program was not one sided, but it was a way of sharing knowledge, ideas and opinions. The internship was also good to find out what our strengths and weakness are. This helped us to define what skills and knowledge we have to improve in the coming time. I can confidently assert that the knowledge gained through this internship is sufficient to contribute towards our future endeavours. At last, this internship has given us new insights and motivation to pursue a career in chemical-based industry.

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Web : www.brakesindia.com

CIN : U35999TN1962PTC004928

29th September 2023

CERTIFICATE

This is to certify that Ms.Amaya Siva, 1st year M.Sc(Chemistry)

Student of **Sathyabama Institute of Science and Technology,**

Chennai has undergone "Internship Training" in our organization

from **13th September 2023 to 29th September 2023.**

She has evinced keen interest in learning.

We wish her success in all her future endeavours.



N Lakshminarasimhan
Senior General Manager (P &HR-LVBU)





Elite

NPTEL Online Certification

(Funded by the MoE, Govt. of India)



This certificate is awarded to

AMAYA SIVA

for successfully completing the course

Basics in Inorganic Chemistry

with a consolidated score of **64** %

Online Assignments	21.67/25	Proctored Exam	42/75
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Total number of candidates certified in this course: **450**

Jan-Feb 2023

(4 week course)

Prof. Sridhar Iyer
Head CDEEP & NPTEL Coordinator
IIT Bombay



Indian Institute of Technology Bombay



Roll No: NPTEL23CY02S44343238

To validate the certificate



No. of credits recommended: 1 or 2



NPTEL Online Certification

(Funded by the MoE, Govt. of India)



This certificate is awarded to

AMAYA SIVA

for successfully completing the course

Metals in Biology

with a consolidated score of **58** %

Online Assignments	20.83/25	Proctored Exam	37.5/75
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Total number of candidates certified in this course: **314**

Jul-Sep 2023

(8 week course)

Prof. Sridhar Iyer
Head CDEEP & NPTEL Coordinator
IIT Bombay

Indian Institute of Technology Bombay



23CY51S45330869

To verify the certificate



No. of credits recommended: 2 or 3