

AU3712

SUMMER INTERNSHIP

A Report

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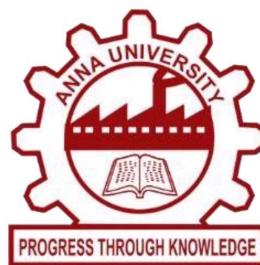
in partial fulfillment for the award of the degree

of

BACHELOR OF ENGINEERING

IN

AUTOMOBILE ENGINEERING



UNIVERSITY COLLEGE OF ENGINEERING -BIT CAMPUS

TIRUCHIRAPALLI

ANNA UNIVERSITY-CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this Internship report “ **TAMIL NADU STATE TRANSPORT CORPORATION (TNSTC), PUDUKOTTAI** ” is the bonafide work of “ **HEMANTH S , SIVA M P , SANJAI M**” who carried out the project work under my supervision.

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ACKNOWLEDGMENT

I would like to express my heartfelt gratitude and appreciation to all those who have been instrumental in the successful completion of my internship and the submission of this internship report to the college. This journey has been a significant learning experience, and I am deeply thankful for the support and guidance I have received along the way.

I would like to express my sincere gratitude to the **Tamil Nadu State Transport Corporation (TNSTC), Pudukottai ,Head Office**, for providing me with the opportunity to undertake this enriching two-week internship in the FC Unit.

I also extend my gratitude to **University College of Engineering(BIT campus) Trichy**, particularly the Department of Automobile Engineering, for their continuous support and encouragement in facilitating this internship.

I would like to express my sincere gratitude to our Dean, **Dr. T. SENTHILKUMAR**, for providing a conducive academic environment with learning opportunities through this internship in my academic journey.

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ABSTRACT

This report presents a summary of my two-week internship at the Tamil Nadu State Transport Corporation (TNSTC), Pudukottai Head Office, in the FC (Fitness Certificate) Unit. The primary objective of the internship was to gain hands-on experience in vehicle maintenance, performance testing, and the procedures involved in ensuring vehicle compliance with fitness certification standards.

During the internship, I participated in various activities, including performance testing, front and rear axle servicing, wheel alignment and balancing, brake lining replacement, tinkering, and glass replacement. Additionally, I observed and assisted in RC (Registration Certificate) documentation processes, enhancing my understanding of the administrative aspects of vehicle fitness compliance.

This internship provided an opportunity to apply my academic knowledge in a practical environment, develop technical skills, and familiarize myself with tools and techniques used in the automobile industry. It also offered valuable insights into the maintenance practices and operational standards of TNSTC.

Overall, the experience enhanced my technical competence, problem-solving skills, and understanding of industry-specific workflows, laying a strong foundation for my future career in the automotive sector.

INTRODUCTION

Tamil Nadu State Transport Corporation Ltd. - (TNSTC) is a government owned public transport bus operator in Tamil Nadu, India. It operates Intercity bus services to cities within Tamil Nadu, and from Tamil Nadu to its neighbouring states. It also operates town busses from major cities and towns of Tamil Nadu to its neighbourhoods, with the exception of Chennai, where the public bus service is operated by MTC, a subsidiary of TNSTC. It is a bus operator with over 20258 buses and 17 million daily ridership.



Fig.1

Overview of TNSTC and Its Operations

The Tamil Nadu State Transport Corporation (TNSTC) is a public sector undertaking committed to providing affordable, efficient, and reliable bus transportation services across Tamil Nadu. With a fleet of thousands of buses, TNSTC caters to both urban and rural populations, connecting remote areas to major towns and cities. It operates under a structured hierarchy, with various divisions and depots responsible for the maintenance, operation, and management of buses.

TNSTC plays a crucial role in promoting economic growth by enabling the movement of goods and people. Its operations include passenger transport services, special services during festivals, contract carriage, and parcel services. The corporation also emphasizes sustainability through the adoption of eco-friendly practices, such as regular fleet upgrades and adherence to pollution control standards.

OBJECTIVES OF THE INTERNSHIP

The internship at the Tamil Nadu State Transport Corporation (TNSTC), Pudukottai Head Office, in the Fitness Certificate (FC) Unit, was designed to bridge the gap between theoretical learning and practical application. The program provided exposure to various maintenance, testing, and certification procedures, crucial for ensuring the reliability and safety of TNSTC's fleet. The specific objectives of the internship are outlined below:

Gaining Practical Knowledge in Performance Testing and Maintenance

One of the primary objectives was to gain hands-on experience in the performance testing and maintenance of TNSTC buses. This involved:

- Observing and participating in the testing of critical performance parameters, such as engine efficiency, braking systems, and fuel economy.
- Engaging in maintenance tasks, including axle servicing, brake system repairs, and alignment of wheels.
- Learning to identify and address common mechanical and structural issues to enhance vehicle performance and safety.

ROLES AND RESPONSIBILITIES

During my internship at the TNSTC Depot, I undertook various responsibilities that provided hands-on experience and enhanced my understanding of vehicle maintenance and fleet management. My tasks included performance testing to evaluate engine efficiency and brake functionality, along with front and rear axle servicing to ensure smooth operation. I gained practical knowledge in wheel alignment, balancing, and brake system maintenance by replacing worn-out linings and ensuring hydraulic efficiency.

Additionally, I assisted in tinkering and body repairs, focusing on dent removal and structural alignment, as well as glass replacement for damaged windshields and windows. I was also involved in diagnosing and repairing electrical systems, including lighting and wiring, and contributed to engine and radiator maintenance by replacing faulty parts and ensuring proper cooling. My work extended to differential and propeller shaft servicing, steering system adjustments, and learning painting techniques for vehicle restoration.

On the administrative side, I observed the Fitness Certification process and helped maintain records for Registration Certificates and maintenance schedules. These roles helped me develop technical skills, a strong understanding of preventive maintenance, and a deeper appreciation for the detailed processes required to keep vehicles operational and compliant with safety standards.

WORK DESCRIPTION

This section details the tasks and activities undertaken during my two-week internship at the TNSTC Pudukottai Head Office in the FC Unit. The work primarily revolved around maintenance, repair, and testing operations critical to ensuring the roadworthiness of vehicles.

Week 1:

Basic Maintenance and Vehicle Inspection

1. Safety Handling:

1. Orientation on workplace safety procedures and the proper use of tools and equipment.
2. Learned about the importance of personal protective equipment (PPE) during maintenance tasks.

2. Performance Testing:

1. Assisted in testing engine performance for power output and efficiency.
2. Observed brake efficiency tests to ensure compliance with safety standards.
3. Learned about fuel economy evaluations to minimize operational costs



Fig.2 a

3. Front and Rear Axle Servicing:

1. Participated in the disassembly and inspection of axles for wear and tear.
2. Helped in lubricating and reassembling axle components to restore functionality.

4. Brake System Maintenance:

1. Inspected brake linings for damage and assisted in replacing worn-out components.
2. Adjusted brake systems to maintain stopping efficiency.

5. Tinkering and Structural Repairs:

1. Assisted in repairing minor dents and body damages to restore vehicle aesthetics.
2. Supported the alignment of structural elements to ensure stability and safety.

6. Wheel Service and Alignment:

1. Learned the process of aligning wheels to factory specifications.
2. Participated in wheel balancing to reduce vibrations and enhance handling.



Fig. 2 b

7. Painting (Preparation Phase):

3. Observed surface preparation methods such as cleaning and sanding before painting.
4. Learned about safety precautions during the painting process.

Week 2:

Advanced Maintenance and Repair Work

1. Glass Replacement Work:

1. Removed and replaced cracked or broken glass panels (front, rear, and side).
2. Ensured proper sealing to prevent water ingress and noise.

2. Differential and Propeller Shaft Maintenance:

1. Observed the inspection of differential gears and assisted in lubricating components.
2. Learned about the alignment and servicing of the propeller shaft to minimize vibrations.

3. Electrical System Maintenance:

1. Assisted in identifying and repairing electrical faults in lighting, wiring, and control systems.
2. Observed the testing of batteries and alternators for consistent performance.

4. Steering System Maintenance:

1. Helped inspect the steering assembly for wear and tear, focusing on ball joints and linkages.
2. Participated in adjusting and aligning the steering system for better handling.

5. Engine and Radiator Repair and Replacement:

1. Observed the removal and replacement of faulty engine parts, such as gaskets and belts.
2. Assisted in flushing and replacing radiator coolant to ensure efficient heat dissipation.

6. Final Inspections and Fitness Certification:

1. Participated in final vehicle inspections, focusing on safety-critical systems.
2. Observed the preparation of documentation for the Fitness Certificate.

7. Painting (Application Phase):

1. Observed the application of primer and paint using spray techniques.
2. Ensured uniform paint coverage and learned about curing methods for durability.

WHEEL SERVICE AND MAINTENANCE PROCESS (BS-II, BS-III, BS-IV STANDARDS)

Wheel servicing in TNSTC involves several essential steps to ensure optimal vehicle performance and compliance with Bharat Stage (BS) emission standards. The procedures for BS-II, BS-III, and BS-IV vehicles remain fundamentally similar, with slight variations due to differences in mechanical designs and technological advancements. Below is a detailed explanation:

1. Removing Wheel and Nuts

- BS-II, BS-III, BS-IV:**

The process begins with safely lifting the vehicle using a hydraulic jack and securing it on stands. Pneumatic or manual tools are used to loosen and remove the wheel nuts. Care is taken to prevent damage to the threads or rims.

2. Cleaning Gears and Components

- BS-II and BS-III:**

- The gear assembly is disassembled, and dirt, grease, and contaminants are removed using a cleaning solvent.
 - Manual brushing and wiping are used to clean the surfaces thoroughly.

- BS-IV:**

- Cleaning is more precise, with an emphasis on ensuring the components meet stricter efficiency standards.
 - Advanced solvents and ultrasonic cleaning methods may be used for precision.

3. Applying New Gear

- **BS-II and BS-III:**
 - Worn or damaged gear components are replaced with new ones.
Standard tools are used to fit and align the gears properly.
- **BS-IV:**
 - Enhanced gear materials, designed for higher durability and efficiency, are installed. Strict quality checks are performed during assembly to meet BS-IV standards.



Fig.3

4. Assembling the Components

- **BS-II and BS-III:**
 - Once cleaned and replaced, the gears and wheel components are reassembled carefully. Bolts are tightened using a torque wrench to the manufacturer's specifications.
- **BS-IV:**
 - The process incorporates stricter guidelines to ensure proper alignment and reduced rolling resistance, aligning with BS-IV's focus on efficiency and reduced emissions.

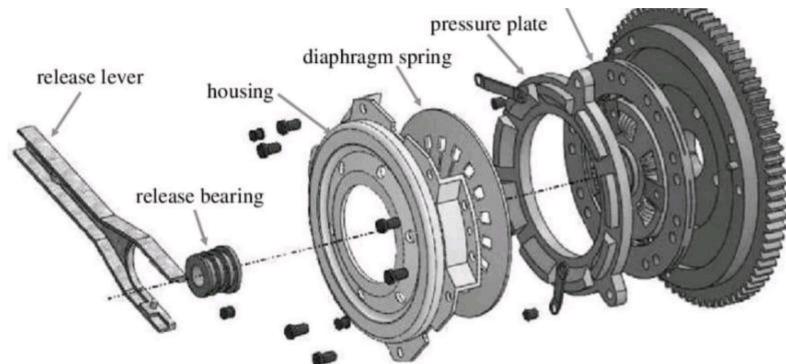


Fig.4

5. Balancing the Wheel

- **BS-II and BS-III:**
 - Wheel balancing is conducted using traditional methods, involving the addition of weights to ensure even weight distribution.

- **BS-IV:**
 - Dynamic balancing machines are used to achieve higher precision, reducing vibrations and enhancing ride comfort, in line with BS-IV's performance-oriented requirements.



BS-II-Fig.5



BS-III-Fig.6



BS-IV-Fig.7



BS-VI-Fig.8

RC-Related Administrative Work

- Observed the preparation and verification of documents required for Fitness Certification (FC).
- Assisted in updating Registration Certificate (RC) details to ensure compliance with RTO guidelines.
- Learned about the administrative workflow involved in maintaining accurate records for vehicle certifications.

TOOLS AND EQUIPMENT

1. Spanners and Wrenches
2. Torque Wrench
3. Hydraulic Jack
4. Wheel Alignment Equipment
5. Brake Bleeding Kit
6. Pneumatic Tools
7. Glass Suction Cup
8. Grinding Machine
9. Spray Gun
10. Radiator Flushing Tool
11. Multimeter
12. Battery Tester
13. Impact Wrench
14. Calipers and Micrometers
15. Propeller Shaft Balancer
16. Differential Oil Pump
17. Brake Shoe Riveting Tool
18. Coolant Tester
19. Tire Balancer
20. Inspection Lamps

LEARNING OUTCOMES

The two-week internship at TNSTC Pudukottai Head Office in the FC Unit provided valuable insights into vehicle maintenance, testing, and certification processes. I gained hands-on experience in tasks such as performance testing, axle servicing, wheel alignment, and brake maintenance, which enhanced my technical skills. I learned the importance of precision in using tools like torque wrenches, multimeters, and alignment equipment. Exposure to advanced systems such as differentials, propeller shafts, and electrical circuits deepened my understanding of automotive systems.

I also developed problem-solving skills by addressing real-world issues like diagnosing mechanical faults and implementing effective solutions. The internship emphasized the importance of safety protocols and teamwork, as I collaborated with skilled technicians and adhered to workplace safety standards. Observing the Fitness Certificate process improved my knowledge of regulatory requirements, fleet management, and documentation.

Overall, the internship strengthened my practical skills, enriched my technical knowledge, and prepared me for future challenges in the automotive industry. It also reinforced my passion for automotive engineering and my commitment to contributing to the field.

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INPLANT TRAINING CERTIFICATE

TO WHOMSOEVER IT MAY CONCERN

This is to certify that S. HEMANTH, BE (Automobile) Engg IIIrd Year student of University College of Engg. (BIT) Campus, Anna University Tiruchirappalli has undergone Internship Training in our TRICHY Branch from 01.07.2024 to 15.07.2024 for 15 days only.

for TNSTC (KUM) LIMITED, PUDUKKOTTAI Region.



For TNSTC (KUM) Ltd.,
Pudukkottai Region

DEPUTY MANAGER (PERSONNEL & LEGAL).
Deputy Manager (Pers & Legal)

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This is to certify that MP.SIVA, BE (Automobile) Engg IIIrd Year student of University College of Engg. (BIT) Campus, Anna University Tiruchirappalli has undergone Internship Training in our TRICHY Branch from 01.07.2024 to 15.07.2024 for 15 days only.

for TNSTC (KUM) LIMITED, PUDUKKOTAI Region.

For TNSTC (KUM) Ltd.,
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DEPUTY MANAGER (PERSONNEL & LEGAL).
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Ref.No: TNSTC/KUM/PDK.R/PERS./P1/2008-3/2024 Date: 20.08.2024

INPLANT TRAINING CERTIFICATE

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This is to certify that M.SANJAI, BE (Automobile) Engg IIIrd Year student of University College of Engg. (BIT) Campus, Anna University Tiruchirappalli has undergone Internship Training in our TRICHY Branch from 01.07.2024 to 15.07.2024 for 15 days only.

for TNSTC (KUM) LIMITED, PUDUKKOTTAI Region,

For TNSTC (KUM) Ltd.,
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DEPUTY MANAGER (PERSONNEL & LEGAL).

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