



JAYAWANT SHIKSHAN PRASARAK MANDAL'S  
**Jayawantrao Sawant College of Engineering**  
(Approved by AICTE, New Delhi, Govt of Maharashtra and Affiliated to University of Pune)



Prof. Dr. T.J. Sawant  
D.E.E., B.E. (Electrical), MISTE, Ph.D  
FOUNDER SECRETARY

S. No. 58, Handewadi Road, Hadapsar, Pune - 411028  
Ph. : 8484897374      Telefax : 020-26970860  
Email : principal@jspmjsoe.edu.in  
Website : www.jspmjsoe.edu.in

Dr. Rajendra D. Kanphode  
M.E. Ph.D. (Electronics Engg.)  
UMISTE, PIETE, SMIEEE  
Principal

## Department of Engg. Sciences

### Industrial Visit Report

#### Introduction

We take this opportunity to introduce, JSPM's Jayawantrao Sawant College of Engineering, Pune 28. established in 2004, as one of the self-financed Engineering Institutes, affiliated to Savitribai Phule Pune University, Pune; and approved by AICTE New Delhi, DTE and Government of Maharashtra.

The Institute offers undergraduate Engineering programs in Computer Engineering, Electronics & Telecommunication Engineering, Electrical Engineering, Information Technology and Mechanical Engineering.

In order to have rapport with industry trends, we have had arranged industry visit of F.E. (All) students to your esteemed organization. The visit will help the students to know about Emerging technologies & Quality service to Customers using environment friendly management which is part of their curriculum.

#### Details of Industrial Organization:



**Pune Mahanagar Parivahan Mahamandal Ltd.**

**Address:**

**PMT Building Shankar Sheth Road,  
Swargate, Pune – 411037  
Maharashtra**



## About PMPML

PMPML takes pride in being the lifeline of one of the fastest-growing cities in India – Pune. While the cultural capital of Maharashtra boasts of an enriching heritage and an expanding horizon, PMPML takes you on a journey through her crossroads of a glorious past and glitzy modernity. Be it for education, employment or entrepreneurship endeavors, Pune has become a center of excellence. A regular influx of people from all over the country and even outside requires an efficient public transportation system. PMPML by providing access through transport for educational, cultural, markets, economic activities, etc. plays a pivotal role in the sustainable development of the city. As a public transport service provider, we have been able to connect every nook and corner of the city in the most ecologically sustainable manner, by deploying the best in technology, while also making traveling safe and economic for our commuters.



## The History of Wheels

Pune's transportation system has developed gradually over the years. In the early 1940s, tangas were the only mode of transport. It was Pune Nagarpalika that conceived the idea of coming up with a public transport service. The dream took shape when the RTO permitted and M/s Silver Jubilee Motors was assigned the task. Back then there were just 4 routes with 20 buses plying across them. The fleet grew to 46 by 1948.



### **Formation of PMT**

Pune Nagarpalika, in its new Avatar as Pune Municipal Corporation, took charge of the bus service in 1950. Pune Municipal Transport (PMT) was thus started in compliance with the BPMC Act of 1949. The number of buses now stood at 57 and they were plying across 14 routes. By 1960, these figures had gone further up.

### **Formation of PCMT**

It was on 4th March 1974 that Pimpri Chinchwad Municipal Transport (PCMT) came into being. Their first depot started off with 8 buses plying between Pimpri village and Bhosari. The second one came up in 1988 at Gavhane Vasti, Bhosari and later shifted to Dhawade Vasti in Bhosari itself. By 1988, PCMT had 101 buses plying across 13 routes and 45 schedules.

### **Formation of PMPML**

With the aim of providing competent and better transport services to the citizens of Pune city and the adjacent city of Pimpri-Chinchwad, the Maharashtra Government has merged Pune Municipal Transport(PMT) and Pimpri-Chinchwad Municipal Transport(PCMT) into Pune Mahanagar Parivahan Mahamandal Ltd. The company was incorporated under the Companies Act, 1956. It was on 19th October 2007 that PMPML came into being as PMT and PCMT merged into a single entity. Ever since, PMPML has been dedicated towards providing commuters with a safe, affordable and convenient transportation service.





Statistics on PMPML Electric bus Division

PUNE MAHANAGAR PARIVAHAN MAHAMANDAL LTD. PUNE 37  
E- Bus Service Statistical Report for the Month of FEB. 2023  
[ FOR OFFICE USE ]

| No | Particulars  | Hadapsar | P. Station | Nigadi   | Bhekrail | Baner    | Wagholi  | Total FEB. 2023 | Total JAN. 2023 |
|----|--|----------|------------|----------|----------|----------|----------|-----------------|-----------------|
| 1  | Total Number of buses held   | 15       | 93         | 70       | 100      | 70       | 106      | 454             | 458             |
| 2  | Average Buses on road  | 15       | 91         | 68       | 97       | 69       | 103      | 443             | 444             |
| 3  | Average Buses off road   | 0        | 2          | 2        | 3        | 1        | 3        | 11              | 14              |
| 4  | Number of schedules planned  | 15       | 93         | 70       | 100      | 70       | 106      | 454             | 454             |
| 5  | Average Number Of schedule operated                                  | 15       | 91         | 68       | 97       | 69       | 103      | 443             | 444             |
| 6  | Planned Schedules Kilometer  | 84000    | 520800     | 480500   | 602318   | 391878   | 632318   | 2711814         | 3042294         |
| 7  | Effective Kilometer  | 66052    | 542946     | 402680   | 584543   | 389989   | 606679   | 2592890         | 2913374         |
|    | Daily average Kilometer Per Bus Per day (Vehicle Utilization)        | 2359     | 19391      | 14381    | 20877    | 13928    | 21667    | 92603           | 93980           |
| 8  | Cancelled Kilometer  | 157.27   | 213.09     | 211.49   | 215.22   | 201.86   | 210.36   | 209.04          | 211.67          |
|    | Daily average %of Cancelled Kilometer to Planned Scheduled Kilometer | 17948    | -22146     | 77820    | 17775    | 1889     | 25639    | 118925          | 128919          |
|    |  | 641      | -791       | 2779     | 635      | 67       | 916      | 4247            | 4159            |
|    |  | 21.37    | -4.25      | 16.20    | 2.95     | 0.48     | 4.05     | 4.39            | 4.24            |
| 9  | Ticket Sale Earning (₹)  | 2704584  | 17427936   | 15069809 | 20838039 | 12954960 | 22137331 | 91132659        | 102566634       |
|    | Daily average of Earning (₹)   | 96592    | 622426     | 538207   | 744216   | 462677   | 790619   | 3254738         | 3308569         |
| 10 | Ticket Sale Earning Per Kilometer (EPK) (₹)                          | 40.95    | 32.10      | 37.42    | 35.65    | 33.22    | 36.49    | 35.15           | 35.21           |
|    | Earning / passenger / day in (₹)                                     | 14.18    | 15.68      | 14.88    | 14.18    | 14.39    | 16.05    | 15.03           | 14.84           |
|    | Load Factor on -   |          |            |          |          |          |          |                 |                 |
|    | 1) Ticket Sale in (₹)  | 66.99    | 52.52      | 61.23    | 58.33    | 54.35    | 59.70    | 57.51           | 57.60           |
|    | 2) All Traffic Earning (₹)   | 89.82    | 71.01      | 84.14    | 85.13    | 75.58    | 85.88    | 62.19           | 62.29           |
| 11 | % of fleet utilisation   | 100.00   | 97.85      | 97.14    | 97.00    | 98.57    | 97.17    | 97.58           | 96.94           |
| 12 | Total Ticket Sale Passengers   | 190751   | 1111392    | 1012951  | 1469093  | 900544   | 1378959  | 6063690         | 6910333         |
|    | Ticket Sale Passengers Per Day                                       | 6813     | 39693      | 36177    | 52468    | 32162    | 49249    | 216560          | 222914          |



| No | Particulars                         | Hadapsar | P. Station | Nigadi   | Bhekrai  | Baner    | Wagholi  | Total FEB. 2023 | Total JAN. 2023 |
|----|-------------------------------------|----------|------------|----------|----------|----------|----------|-----------------|-----------------|
| 13 | Number of Accidents (Hired Buses)   |          |            |          |          |          |          |                 |                 |
|    | 1. Fatal                            | 0        | 0          | 0        | 0        | 0        | 0        | 0               | 0               |
|    | 2. Major                            | 0        | 0          | 0        | 0        | 0        | 2        | 2               | 0               |
|    | 3. Minor                            | 0        | 1          | 0        | 1        | 0        | 0        | 2               | 1               |
|    | 4. Insignificant                    | 0        | 0          | 0        | 0        | 0        | 0        | 0               | 0               |
|    | Total Number of Accidents           | 0        | 1          | 0        | 1        | 0        | 2        | 4               | 1               |
|    | Rate of Accidents /1 lakh Kilometer | 0.00     | 0.18       | 0.00     | 0.17     | 0.00     | 0.33     | 0.15            | 0.03            |
| 14 | Electricity Consumption in Unit     | 104953   | 743715     | 524443   | 715104   | 572105   | 850655   | 3510974         | 3597800         |
|    | E. Consumption Per Day              | 3748     | 26561      | 18730    | 25539    | 20432    | 30381    | 125392          | 116058          |
|    | Kilometer Per Unit (KM/PU)          | 0.63     | 0.73       | 0.77     | 0.82     | 0.68     | 0.71     | 0.74            | 0.81            |
| 16 | All Traffic Earning (₹)             | 3625953  | 23563138   | 20708221 | 30414814 | 18014671 | 31842685 | 98559971        | 110924734       |
|    | Daily Average (₹)                   | 129498   | 841541     | 739579   | 1086243  | 643381   | 1137239  | 3519999         | 3578217         |
|    | Earning per kms. (₹) (Total EPK)    | 54.90    | 43.40      | 51.43    | 52.03    | 46.19    | 52.49    | 38.01           | 38.07           |
|    | Earning Per Bus per day (₹)         | 8633     | 9248       | 10876    | 11198    | 9324     | 11041    | 7946            | 8059            |
| 17 | Total Number of Passenger travelled | 271067   | 1640623    | 1497925  | 1687988  | 1034725  | 1584424  | 7716753         | 8777674         |
|    | Passenger travelled per Day         | 9681     | 58594      | 53497    | 60285    | 36954    | 56587    | 275598          | 283151          |
|    | Average Passenger per Bus per day   | 645      | 644        | 787      | 621      | 536      | 549      | 622             | 638             |
|    | Earning per passenger per day (₹)   | 13.38    | 14.36      | 13.82    | 18.02    | 17.41    | 20.10    | 12.77           | 12.64           |



## **JSCOE At PMPML Electric Bus Depot**

For the visit purpose after completing approvals and formalities from Institute as well as PMPML, it was scheduled on 05/04/2023. Students were already informed the schedule of visit, accordingly students gathered early in the morning on visit day. For heading towards visit venues of buses were arranged.

On arrival at visit locations i.e. Bhekrainagar & Pune station Depot managers from PMPML welcomed the attendees from our Institute, Upon welcoming they were felicitated by Senior Teaching staff Dr. Sudhir Rangari With Prof. R. B. Wakchaure at Pune Station. Felicitation at Bhekrainagar was done by Prof. Santoshkumar Lawate with Prof. Kalyani Khobragade.

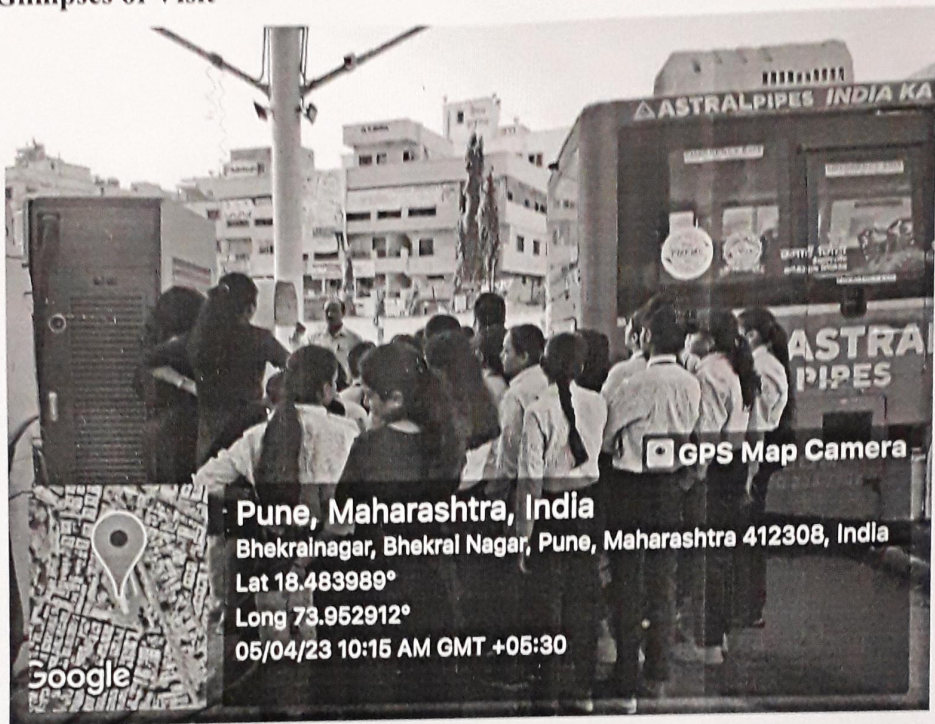
The Electric depots of PMPML Have Depot managers as well System Engineers from Olectra. Olectra Greentech Ltd is in contract with PMPML to run electric buses at various Depots around the PMC & PCMC area. The system Engineers deployed at the Electric Bus Depots are solely responsible all activities carried out upon buses. Except admin Division, all other sections dealing with Electric Bus are controlled by Olectra.

The System Engineers with their associates enthusiastically participated in explaining various systems in electric Buses. Students were divided into small groups and they were demonstrated with various Electric systems. While demonstration was going on it was astonishing to hear that the Battery cost of Electric Bus was around 50 lacs, and 2 batteries were used in Bus which costed around 1 Crore Rupees. Thus, the cost of bus on road reaches upto 1.5 to 2 crore rupees. After demonstration students were given a standalone cruise experience while keeping various systems on. The cruise Experience was useful for students to understand integration of various vehicular systems on board in actual working. Students were surprised to see the instrumentation system demonstrating the real time GPS tracking system which was used to integrate into various passenger services. After the cruising on board students were allowed to have refreshment available inside the Depot before rushing to the service pit area.

When students were taken to service pit area the buses taken for maintenance were seen. In service pit area all routine and accidental maintenance with servicing of buses is done. Student were also had demonstration on various parts of vehicle. At last thanking ceremony was conducted and students were instructed to head towards college buses for return.



## Glimpses of Visit

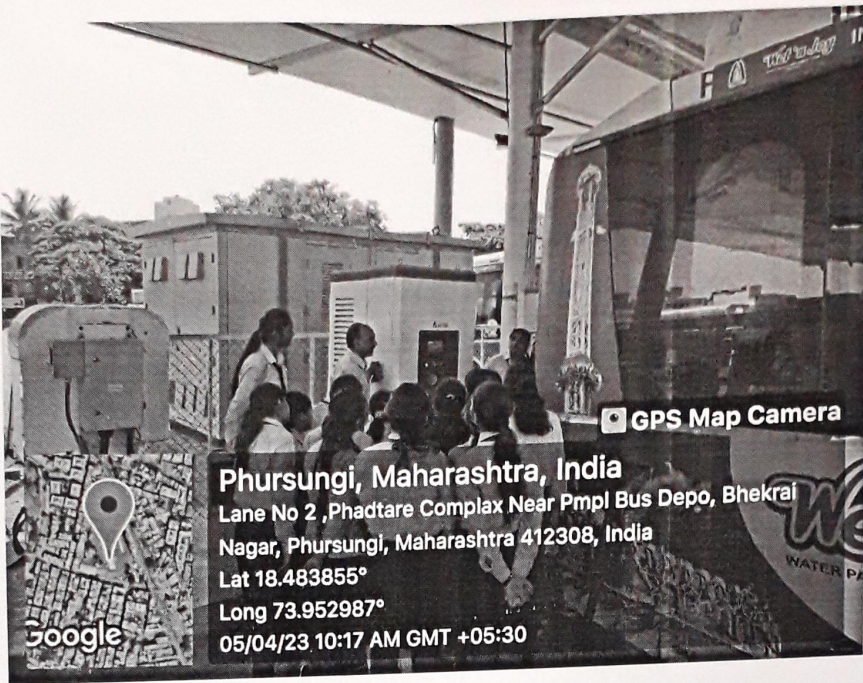


Expert Explaining the charging system



Student at PMPML Bhekralnagar





Charging system with transformer



Group Image of Attendees



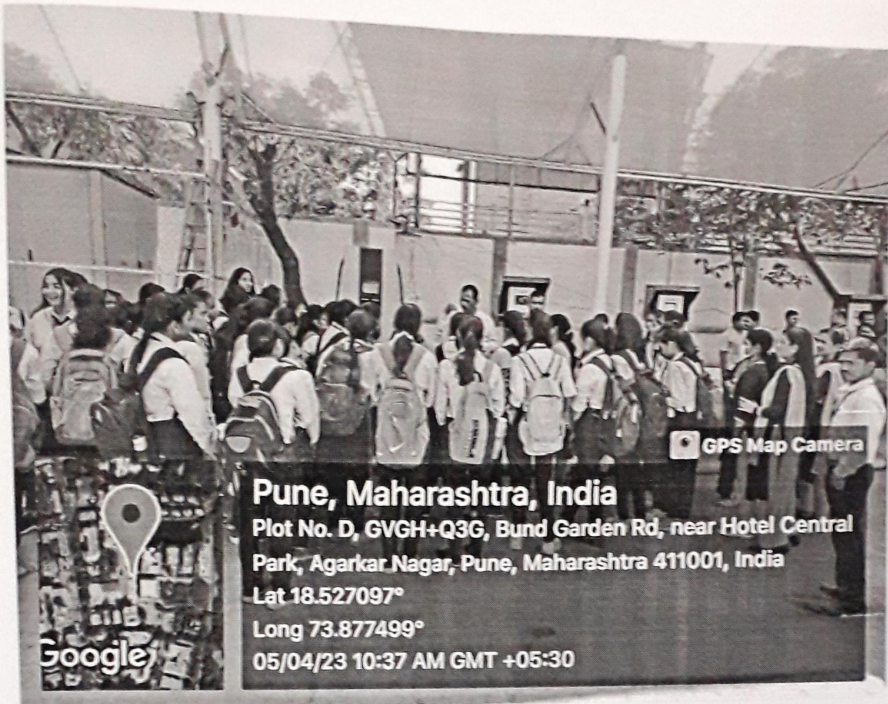


Felicitation of Depot Manager



Briefing by Expert





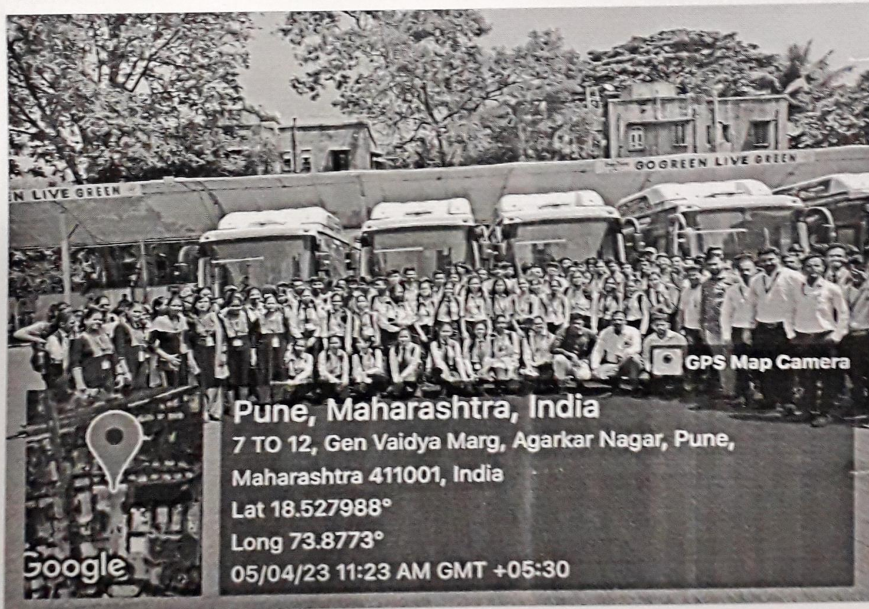
**Pune, Maharashtra, India**

Plot No. D, GVGH+Q3G, Bund Garden Rd, near Hotel Central  
Park, Agarkar Nagar, Pune, Maharashtra 411001, India  
Lat 18.527097°

Long 73.877499°

05/04/23 10:37 AM GMT +05:30

Demonstration of charging system



**Pune, Maharashtra, India**

7 TO 12, Gen Vaidya Marg, Agarkar Nagar, Pune,  
Maharashtra 411001, India  
Lat 18.527988°

Long 73.8773°

05/04/23 11:23 AM GMT +05:30

Group image of attendees at Pune Station



## Vehicle Specifications



| Vehicle Dimensions |                               |
|--------------------|-------------------------------|
| GVM (kg)           | 18000                         |
| LxWx H (mm)        | 12000/2520 x 3340             |
| Floor Height       | 400                           |
| Seating Capacity   | 39 + Driver                   |
| Chassis            |                               |
| Maximum Power      | 180 kW                        |
| Maximum Torque     | 800 Nm                        |
| Transmission/Gear  | Automatic Transmission        |
| Brake System       | Disk Brake with ABS           |
| Steering System    | Power-assisted                |
| Suspension Type    | Front and Rear Air Suspension |
| Tyre Size          | 295/80 R22.5                  |
| Kneeling Mechanism | Yes                           |



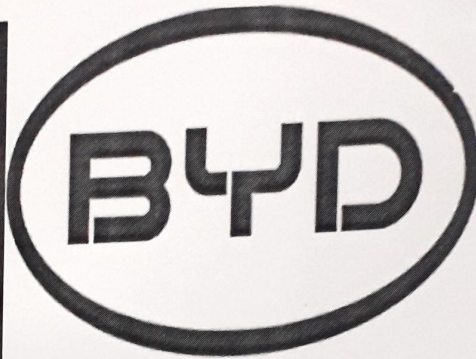
| <b>Battery</b>                 |  |
|--------------------------------|--|
| <b>Battery Specification</b>   | Li-ion Phosphate Battery   |
| <b>Electrical Regeneration</b> | Available  |
| <b>Vehicle Performance</b>     |  |
| <b>Range</b>                   | Up to 300 km   |
| <b>Charging Time</b>           | 4-5 Hours.   |
| <b>Max Speed (kmph)</b>        | 70 (With Speed Limiting Device)  |
| <b>Acceleration</b>            | 0-30 (kmph) < 10.5   |
| <b>Bus Body</b>                |  |
| <b>Body Description</b>        | Meeting AIS 052 Specification  |
| <b>Air Conditioner</b>         | Available  |
| <b>Charging Adapter</b>        |  |
| <b>Charging Mode</b>           | AC Charging <= 80 kW   |
| <b>Input Voltage</b>           | 3 Phase AC   |
| <b>Install Form</b>            | Wall-mounted   |
| <b>Safety</b>                  |  |
| <b>Protect Function</b>        | Short Circuit Protection / Over-temperature Protection /<br>Lightning Protection |

### **Additional features**

1. UBS 2 standard
2. Temperature sensors in battery
3. Longer range with single charge upto 200 km
4. Battery management system to ensure optimal performance
5. Used in more than 60,000 operational buses world-wide
6. Battery cooling system



7. Fire proof batteries and electric powertrain
8. Long life with minimal maintenance
9. Automatic fire extinguisher in battery pack
10. Low energy consumption per km enabled by BYD in-built motor
11. Electricity leakage sensors for batteries to hi tension wires



**Olectra's Joint venture for Manufacturing Electric Buses**

### **Vote of Thanks**

We behalf of Students and Faculty members, from Engineering Sciences Department Express our sincere gratitude towards Campus Directors Dr. V. A. Bugade & Dr. S. S. Sawant for providing all the facilities for Industrial Visit.

We are also thankful to our Principal Dr. R. D. Kanphade for constant direction and support. We also take this opportunity to thank our transport Co-ordinator Mr. Parbat & Consider the Industrial visit to be successful in gaining relevant knowledge to students.

A handwritten signature in blue ink, appearing to read "Lawate".

**Prof. S. A. Lawate**  
Visit Co-Ordinator

A handwritten signature in blue ink, appearing to read "Gardi".

**Dr. M. S. Gardi**  
FE Co-Ordinator

A handwritten signature in blue ink, appearing to read "Gawand".

**Dr. A. B. Gawand**  
HOD