



REPORT
On



**Dr. PADHMANABHAM MEMORIAL
ELECTRIC TWO-WHEELER DESIGN
COMPETITION - ETWDC 2024.**

**Organized
by
SAEINDIA
Southern Section**



**Submitted
to
The Principal**



(An Autonomous Institution -Affiliated to Anna University, Chennai)
SriperumbudurTk -602117,TamilNadu

svce.ac.in



Respected Sir,

Sub: Submission of final report on SAEISS DR G PADAMANABHAM MEMORIAL ELECTRIC TWO-WHEELER COMPETITION - ETWDC 2024, Team Traxion Electro Knights and Traxion Volt vanguards - Reg.

SAE Collegiate Club of SVCE is delighted to inform that our college teams both team TRAXION VOLT VANGAURDS AND TRAXION ELECTRO KNIGHTS members comprising of 15 Automobile, 4 Electrical and Electronics and 1 Electronics Communication Engineering students participated in **Dr. G. Padmanabham Memorial Electric Two Wheeler Design Competition (ETWDC) 2024** organised by SAEISS held at Rajalakshmi Engineering College, Thandalam from 17.02.2024 to 18.02.2024. Overall, the **Team Traxion Electro Knights** have achieved **23rd Rank** and **Team Traxion Voltvanguards** have achieved **37th Rank out of 38 teams** in the **Main event**. The competition involves designing and fabrication of an Electric Two Wheeler from scratch by the students and competing its performance with several other teams from all over the INDIA. Previously our college team have participated in M-Baja and E-Baja events. This is the first time the team have represented our college in ETWDC event.



Team Traxion Voltvanguards & Traxion Electro Knights

The ETWDC event consists two phases: Virtual phase and the dynamic phase.

In **Virtual phase** specification of the components to be used and the CAE analysis, Design validations, Calculations for components and the simulation results.

In **Dynamic phase** the teams which have cleared the virtual phase are allowed to participate in which the Electric Two Wheeler fabricated by the teams will be evaluated under the electrical and mechanical inspection, After clearing the inspection the team will allow to participating in dynamic events like Acceleration test, Maneuverability, Bump test, Braking test, Vehicle Range test and Gradeability test.

This year, Mr. R. Sakthivel, Assistant Professor & Mr. A. K. Boobalsenthilraj, Assistant Professor accompanied the student team for the final dynamic phase.

The team was mentored by the following members: Dr.V. Ganesh ASP/AUT, Mr.R. Sakthivel AP/AUT, Mr. A.K. Boobalsenthilraj AP/AUT, Dr. S G Bharathidasan ASP/EEE, and Dr. M. Sankar AP /EEE.

REPORT OF THE COMPETITION

Fabrication:

Fabrication played a crucial role in the competition, as it determined the physical realization of the design concepts. This section evaluates the fabrication process undertaken by participants as per the timeline given by the organizer in our laboratory.

Materials Selection: Analysis of the materials chosen for the frame, body, and other components, considering factors such as weight, strength, and durability.



During Fabrication of Frame

Manufacturing Techniques: Assessment of the fabrication methods utilized, such as welding, 3D printing, or CNC machining, and their suitability for producing high-quality components.

Assembly Quality: Evaluation of the precision and accuracy in assembling various parts to ensure structural integrity and functionality.



Assembled the components in laboratory

Finish and Aesthetics : Review of the final appearance of the electric two-wheelers, considering factors like surface finish, paint quality, and overall aesthetic appeal.

VIRTUAL EVENT

The virtual event has categorized into Design Review 1 & 2. The Design Review 1 will include the virtual events evaluation such as Design, cost and sales presentation, The team have presented the design and analysis of the vehicle on 29.11.2023. On 29.12.2023 the team have done their presentation for cost event and sales event. The Design Review 2 will include Manufacturing drawings, Inspection report with the Material Specification of the parts and The Interim Design Log. The presentation will be evaluated by the judges and points will be provided accordingly. Based on the points secured by the team, The teams will be selected for the final phase-Dynamic phase.

DYNAMIC PHASE

The final round is conducted physically from 17.02.2024 to 18.02.2024. The dynamic phase was categorized into two that are Design Review 3 & 4. In this Design Review the Electric two Wheeler fabricated by the participating team will be physically evaluated, and the teams which have passed the physical evaluation will be allowed to participate in the dynamic event such as acceleration event, Maneuverability event, Suspension, Brake test, Vehicle Range test and Gradeability test.

DYNAMIC PHASE Day 1 - 17/02/2024

REGISTRATION AND INAUGURATION

The registrations were on 17th February 2024. The team along with the faculty advisor reported to the event site at 9:00 A.M at Rajalakshmi Engineering College for the registration. At the registration desk, ID Cards and other supporting documents including the pass for the vehicle was collected. After the registration the Electric Two-Wheeler is transported to the event site from the shipping area. The vehicle is taken to the allocated PIT, the students carried out some minor works

in the vehicle to make it ready for the Technical Inspection, so after the registrations and other formalities, 5 team members from each team along with the faculty advisor attended the inauguration function that went on for an hour. Each team will be given two chances to clear the technical inspection. Only after clearing the technical inspection the teams will be allowed to participate in dynamic event.

TECHNICAL EVALUATION

All Two-Wheeler must pass technical evaluation in order to participate in physical dynamic event. The inspection will determine whether the Electric Two-Wheeler fabricated by the team adhere to the rules and requirements provided by SAEISS Dr G Padmanabham Memorial ETWDC 2024. The teams are allowed to carry out works in their allotted pit to make their vehicle comply for technical inspection. There will be two attempts to clear the technical inspection. If the vehicle does not get passed in first attempt, The team will be given an second attempt, If the vehicle failed in second attempt, The team will not be allowed to participate in any dynamic events. The judges suggested team Traxion Electro Knights to tighten loose wire which came out from body panel and also advised to cover both wheel by using mudguard. Team Traxion voltvanguards could not able clear the Technical inspection in the first attempt due to chain slack and brake bleeding was not done properly in the vehicle.



During Technical Inspection - Team Traxion voltvanguards



Chain Slack On The Vehicle - Team Traxion Voltvanguards

Technical inspection was postponed on next day for team Traxion voltvanguards. On the final day after resolving the issues the team Traxion Voltvanguards faced another issue where the rear suspension mount was broken. Then immediately went to the welding laboratory and welded the suspension mount. The Electrical and mechanical technical inspection had cleared by Traxion Electro Knights in first attempt. The team received the technical inspection clear stickers.

After working on the rear mount the team started to reassembling the vehicle and further proceed on the technical inspection round After many attempts team Traxion voltvanguards was not able clear the Technical inspection due to time constraint.



Vehicle During The Assembling - Team Traxion Voltvanguards



During Technical Inspection - Team Traxion Electro Knights

Inspection Stickers:

An inspected sticker will be issued after completing each technical inspection of the Team Electro Knights. The panel members of technical evaluation will paste the inspection sticker on the vehicle. The inspection sticker must remain on the vehicle throughout the competition. Vehicles which cleared mechanical and electrical inspection and brake test will be allowed to operate under power. After clearing the technical inspection round the team Electro Knights proceed to the further rounds.



Technical Inspection Cleared - Team Traxion Electro Knights

WEIGHT CHECK

After clearing the technical inspection, the team Traxion Electro Knights vehicle was taken to weight check bay and the vehicle weight recorded as 67 kg. After completing the Weight check the team was divided into two groups one for presentation and another for dynamic events. Because the events acting parallel at same time.

TECHNICAL PPT PRESENTATION

In presentation points are given based on the pictures to highlights vehicle specification and features, Innovation, Unique Selling point (USP), Potential market and Business Scope. After the presentation the evaluators shall ask the Questions which shall focus on, but not limited to the design log, Presentation, the components used in the vehicle. From each team 3 members together presented the PPT and answered the question asked by the evaluator. Both teams had cleared the technical presentation.



During Technical Presentation - Team Traxion Electro Knights

BRAKE TEST

The stopping distance for the given speed of the Electric Two-Wheeler will be recorded and vehicle with shortest braking distance would be ranked as best for its brake. There would be at least 2 speeds that the Electric Two-Wheeler would be tested. Brake Test ratio is calculated. It is expected to have the wheels lock when the brake is applied, It is mandatory to complete the Brake Test to be eligible to participate in the Dynamic tests. In an excited attitude, the team took the vehicle for brake test with good energy. Team Traxion Electro knights cleared the brake in first attempt and got “OK. Team Traxion Electro Knights geared up to participate in dynamic events.

ACCELERATION EVENT

A Straight Track of 100 m will be designated by the organizer for this test. Time taken to cover the distance and the maximum velocity will be noted to calculate the acceleration. With the same spirit after the completion of brake test the team lined up for the acceleration event. Team Traxion Electro Knights had cleared the acceleration event and got “OK”.



Vehicle At Acceleration Test

GRADEABILITY EVENT

The vehicle has to climb a 30deg slope 1st from beginning of the slope and 2nd from the middle of the slope in the test. Based on the performance of the vehicle and time taken to complete the course track will be noted. Team Traxion Electro Knights had cleared the Gradeability event and got “OK”.



Vehicle At Gradeability Test

MANEUVERABILITY EVENT

It is expected to design the Vehicle with stable Weight Balancing. There will be a Maneuverability curved Track. The Maneuverability track will be decided by the organizer. Rider is supposed to clear the Track for the fixed number of rounds (3 rounds, Subject to change) without going out of the track. The time taken for covering the rounds will be above-mentioned noted by the technical evaluator. Team Traxion Electro Knights had cleared the Maneuverability event and got “OK”. Dynamic events are closed for the day due to time concerns.

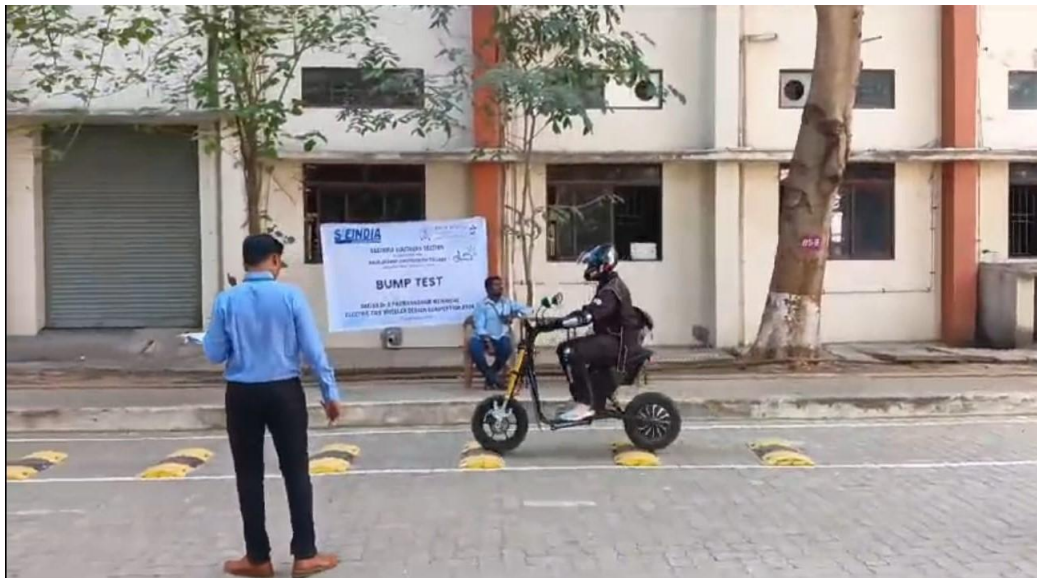
DYNAMIC PHASE Day 2 - 18/02/2024

RANGE EVENT

With the same spirit after the day1 TEAM TRAXION ELECTRO KNIGHTS lined up for the Range test event. The objective is to develop the vehicle with high efficiency to save energy. The vehicle is supposed to cover the distance as indicated by the organizer. Range will be estimated based on the energy consumption. Team Traxion Electro Knights had cleared the Range event and got “OK”.

BUMP EVENT

In this test the riding comfort, the suspensions will be evaluated. It consists of two parallel tracks. The track consists of specified number of bumps (24 Bumps) placed at in between distances of 1 meter in 1 track & 1.4 meters in 2nd track. The rider must ride Through both the tracks on the bumps. During this test if any component/parts drop from the vehicle or if the driver goes out of the track, the same will be noted and penalty will be Included to the Bump Test point calculation. Team Traxion Electro Knights had cleared the Bump event and got “OK”. Team Traxion Electro Knights finished all dynamic events.



Vehicle At Bump Test

VALEDICTORY FUNCTION

The valedictory function was started at 3.00 PM. All the guests who were present at the dais delivered their views and thoughts about the ETWDC event. The Prize distribution was started with the static event followed up by dynamic events. Around 4.00 PM the event was finished with the National Anthem.

LESSONS LEARNT

Participation in the event gave as an immense experience and practical knowledge, The team members have learnt many things, Problems faced in the design and controller selection will be corrected in future event, first Weight reduction should be considered as a key point while designing and manufacturing. Secondly the technical evaluation should be completed as early as possible in order to participate in other dynamic events.

ACKNOWLEDGEMENT

We sincerely thank our college management for continuously supporting the team for the participation in the event. We also thank the HoDs of Department of Automobile Engineering, Department Electrical & Electronics Engineering, Department of Marine Engineering and Department of Electronics and communication Engineering for their continuous support. We also thank all the faculty advisors and Mr. Ramesh R, Mechanic, Department of Marine Engineering for their valuable inputs during course of the event, and all faculties and supporting staff members of for college for accompanying the team during work, after college hours and on holidays.

Mr. A. K. Boobalesenthilraj

AP/AUT

Faculty Advisor - **Team Traxion Electro Knights**

Mr. R. Sakthivel

AP/AUT

Faculty Advisor - **Team Traxion Voltvanguards**

Dr. V. Ganesh

ASP/AUT

Faculty Advisor - SAE Collegiate Club of SVCE

Dr. J. Venkatesan

HoD/AUT

Patron, SAE Collegiate Club of SVCE