ARAI Update
Progress through Research
Transformation towards Progressive Mobility
Design, Development and Testing Services at ARAI

Driving Mobility through Innovation since 1966

OctMar2526

New Capabilities / Development / Workshop / Conferences

- ADAS Smart City Test Track
- ARAI Unveils National Level Gaseous Cylinder Test Facility Supported by Ministry of Heavy Industries
- Symposium on International Automotive Technology (SIAT) 2026 – Brief Overview
- International Conference on Hydrogen Electrolyzers & PEM FC / SOFC Technology for Mobility & Power Generation Applications
- ADAS Show at ADAS Smart City Test Track, ARAI-MRC, Takwe (near Pune)
- Workshop on Sensitization on Automotive Ergonomics
- ARAI Onboarded as a Certification Body (CB) under Certification Scheme for Unmanned Aircraft Systems (CSUAS) of DGCA
- Development of Facility for CCTV Installation Testing as Per ISO 16001:2017 (ROTAKIN MANIKIN)
- Facilities and Expertise for Diesel Emission Measurement in Mining Applications (Surface & Sub - Surface Level)
- Comprehensive Performance and Structural Durability Evaluation for Electric Buses
- Advanced Friction Torque Testing Service for Engine Oil Optimization and Fuel Economy Improvement
- Vendor Development Drive & Buyer Seller Meet
- ARAI Journal of Mobility Technology (Volume 6, Issue 1 January-March 2026)

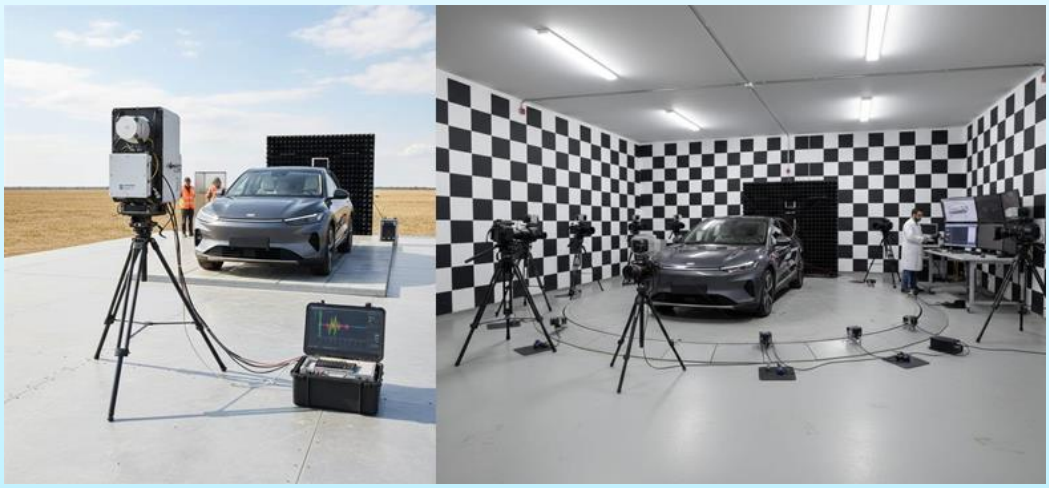
❑ ADAS Smart City Test Track

To facilitate industry-led on-track testing of Advanced Driver Assistance Systems (ADAS) and autonomous driving technologies under representative Indian driving conditions, ARAI has established advanced testing facility known as ARAI Intelligent Mobility Test City (IMTC). Spanning over 20 acres, IMTC is designed to replicate real-world Indian road environment through comprehensive simulation of urban and semi-urban infrastructure.

As a part of Phase 1 commissioning, the test track incorporates features, such as four-lane highway road, inner city roads, various junctions, roundabouts, etc. constructed to IRC standards. The test track also includes dynamic perception track, which replicates undulating nature of Indian roads, including crests and dips that cause intermittent visibility—thereby simulating scenarios where objects may suddenly appear or disappear from the sensor field of view, a common challenge in Indian driving conditions. The four-lane highway road is designed to validate ADAS features, such as Autonomous Emergency Braking System, Lane Departure Warning System, Lane Keep Assist, etc. Additional features include bus stops, manholes, street lighting and footpaths. The test track also incorporates Euro NCAP-compliant junction, designed to test various junction crossing scenarios. The test track also includes supporting infrastructure for testing such as EV charging stations, tyre inflation systems and RFID-based boom barrier system that enables timestamped entry and exit along with controlled access to specific sections of the track.

For evaluation of parking-related ADAS functionalities, IMTC houses dedicated two-level facility known as Auto Park Assist Test Complex (APATC). This complex is designed to address wide range of indoor and outdoor urban parking scenarios. It includes outdoor parallel parking, 30° and 45° angled parking, uncovered and covered perpendicular parking and viewing gallery for observation. APATC also features inclined ramps at 8° and 15°, along with circular two-level ramp for gradient-based testing. Indoor facilities at APATC include controlled parking bay environment and Driver-in-the-Loop (DiL) dark room for immersive simulation studies. For operational and technical support, the facility is equipped with office spaces, centralized track control room functioning as mission control and laboratory dedicated to equipment maintenance and calibration. Customer-oriented infrastructure includes workshop areas, conference rooms, weighing pads, vehicle scissor lifts, dedicated Wi-Fi connectivity and weather monitoring station.

Looking ahead to Phase 2 commissioning, IMTC aims to further augment the facility with advanced capabilities such as adverse weather simulation systems, including day/night environment and rain/fog tunnels to replicate diverse Indian climatic conditions. Additional planned enhancements include Radar Cross Section (RCS) measurement set up for sensor calibration and pre-testing as well as dedicated LiDAR and camera calibration laboratories for both component-level and vehicle-level validation. Further, the track will be equipped with private 5G infrastructure to support Vehicle-to-Everything (V2X) communication, enabling validation of next-generation technologies including V2V (Vehicle-to-Vehicle) and V2I (Vehicle-to-Infrastructure) systems. These developments aim to position IMTC as a comprehensive, future-ready test facility for ADAS and autonomous mobility solutions in India.



❑ ARAI Unveils National Level Gaseous Cylinder Test Facility Supported by Ministry of Heavy Industries

ARAI has established state-of-the-art National Level Gaseous Cylinder Test Facility with the support of Ministry of Heavy Industries (MHI), under the Capital Goods Scheme – Phase II. The facility was formally inaugurated by Shri H. D. Kumaraswamy, Hon'ble Minister of Heavy Industries and Steel, Government of India, on 26th January 2026, during Symposium on International Automotive Technology (SIAT) 2026.

This first-of-its-kind project in India facilitates Type Approval Testing, Batch Testing and Periodic Testing of Gaseous Cylinders. A pioneering initiative enabling indigenous development and testing of Type-I to Type-IV gaseous cylinders under Make in India initiative. This Centre is equipped to conduct comprehensive testing of gaseous storage cylinders for Compressed Natural Gas (CNG) in accordance with applicable national and international standards, for both domestic use and export. Additionally, the facility offers essential testing capabilities for hydrogen cylinders, covering pressures 200 bar to 700 bar, thereby supporting India's growing focus on hydrogen-based mobility and energy systems. These facilities will soon be further augmented to enable comprehensive hydrogen cylinder testing. With this initiative, ARAI reinforces its leadership in mobility-related research, testing, homologation and certification, providing globally benchmarked infrastructure to accelerate innovation in clean transportation technologies. These facilities also support obtaining of PESO approvals for gaseous cylinders for both domestic and international manufacturers.

Major equipment installed:

- Hydrostatic Burst Rig
- Hydraulic Pressure Cyclic Rig
- Volumetric Expansion Rig (Hydraulic)
- CNG Pressure Cyclic Rig
- CNG Permeation Rig
- Ultrasonic Machine
- Universal Testing Machine
- Cyclic Walk-in-Chamber
- Material Level testing facility
- Drop Test facility
- Fire test facility

❑ Symposium on International Automotive Technology (SIAT), 2026 – Brief Overview

SIAT 2026 Entrance & Arches

19th edition of Symposium on International Automotive Technology 2026 (SIAT 2026), organized by ARAI in association with SAEINDIA and SAE International, from 27th – 30th January 2026 at PIECC, Pune, was a memorable event and has set a new benchmark in terms of scale, participation and quality in all respect. The theme for SIAT 2026 was "Innovative Pathways for Safe and Sustainable mobility", focusing on innovative and sustainable solutions for evolving mobility challenges.

SIAT 2026 was inaugurated at the auspicious hands of Shri H. D. Kumaraswamy, Hon'ble Union Minister of Heavy Industries & Steel in the august presence of Shri Shailesh Chandra, MD and CEO - Tata Motors Passenger Vehicles Limited; Shri Prasan Firodia, Managing Director- Force Motors Limited and Vice President - ARAI GC; Dr. Reji Mathai - Director ARAI & Chairman - SIAT 2026 Advisory Committee and Dr. N H Walke, Sr. Deputy Director & Convenor – SIAT 2026.

Inauguration of SIAT 2026 by Shri H. D. Kumaraswamy, Hon'ble Minister (Heavy Industries & Steel)

Total 613 papers published as a part of SIAT 2026 proceedings have unique SAE numbers. The Symposium witnessed presentation of 286 technical papers and 38 keynotes (in 64 Technical Sessions) by eminent experts from 18 countries, covering Automotive Cyber Security, E-mobility, ADAS, Hydrogen Fuel Cell, Alternate Fuel, Advanced Powertrain, Vehicle Dynamics, Testing and Evaluation, NVH, Software Defined Vehicle (SDV), Autonomous Vehicles, etc.

Plenary Sessions & Panel discussions

Technical Paper Presentations

The concurrent SIAT EXPO 2026 was the biggest ever in the history of SIAT, which hosted 387 stalls divided into five zones. There were 275 exhibitors from 10 countries, which is a testimony to the popularity of SIAT across the globe. There was a dedicated special pavilion for Start-ups and Micro & Small Enterprises that had participation of 70 such entities. The EXPO also showcased pavilions, viz. UK Pavilion represented by 15 UK based companies. There was ARAI@60 Pavilion showcasing ARAI's journey, current spectrum of capabilities, future plans and new initiatives, as ARAI is celebrating year 2026 as its Diamond Jubilee year.

SIAT EXPO 2026

To encourage upcoming generation for bringing up its technical skills, **Student Poster Presentation Competition** was organized, which showcased 15 posters in the area of Safe Mobility, Sustainable Mobility and Intelligent Mobility. This gave students an opportunity to showcase their work to the practicing professionals.

Technology Pavilion showcased upcoming automotive technologies presenting futuristic mobility. It highlighted key areas such as Renewable Fuels, Eco-System, Alternative Motor and Battery Technologies with life-cycle analysis, Drive-by- Wire Systems, Connected Vehicles, Software-Defined Vehicles (SDV), Functional Safety (FuSa), Cyber Security, AI applications, Drone demonstrations, etc.

ARAI Technology Pavilion

Shri Bhupathi Raju Srinivasa Varma, Hon'ble Minister of State, Ministry of Heavy Industries & Steel, in his address at the Valedictory Function, applauded ARAI's efforts for successful organization of SIAT 2026, emphasizing the significant role of automotive sector in India's economic growth.

Shri Bhupathi Raju Srinivasa Varma
Hon'ble Minister of State, Ministry of Heavy Industries & Steel at the Valedictory Function

Award for best StartUp Exhibitors

Valedictory Function of SIAT2026 was presided by Shri Vikram Kasbekar, Executive Director and CTO - Hero MotoCorp Limited, in the presence of Dr G. Nagarajan, President - SAE India.

Valedictory function & Address by Shri. Vikram Kasbekar

SIAT 2026 and SIAT EXPO 2026 received overwhelming response in terms of delegate participation, technical and keynote paper presentation as well as participation in SIAT Expo 2026. Visit of over 15,000 visitors, in addition to over 2500 delegates, to Expo Stall, set a new record at SIAT EXPO 2026.

❑ International Conference on Hydrogen Electrolyzers & PEM FC / SOFC Technology for Mobility & Power Generation Applications

International Conference on Hydrogen Electrolysers & PEM FC / SOFC Technology for Mobility and Power Generation Applications jointly organized by ARAI and SAE India-WS on 27th and 28th February 2026 in Pune, brought together industry leaders, researchers, policy experts and academia to deliberate on the rapid developments in hydrogen technologies and their applications in mobility and power generation.

The conference aimed to provide platform for knowledge sharing on green hydrogen production, fuel cell technologies, system integration, safety standards and regulatory frameworks, while encouraging collaborations among the stakeholders working towards sustainable hydrogen ecosystem.

The event was held under the patronage of Dr. Reji Mathai, Director - ARAI and Chairman - SAEINDIA Western Section.

Mr. Siddharth Gupta, Chief Executive of L&T Electrolysers Limited, presided over the function as a Chief Guest, addressed the gathering and emphasized the importance of accelerating hydrogen technology adoption and strengthening the ecosystem for green hydrogen production in India. In his address, Dr. Sushil S. Ramdasi, Deputy Director, In-charge-Powertrain Design and Convenor of the Conference, highlighted and summarized the importance of the Conference.

The conference witnessed active participation from industry professionals, researchers, academicians and students from India and overseas. Over 100 delegates participated in the conference. Experts from leading organizations such as CSIR National Chemical Laboratory, NTPC Limited, KPIT Technologies and John Cockerill participated and shared their insights.

An industry expo was also organized concurrently where companies showcased hydrogen technology solutions, components and testing systems.

Companies Participated in the Expo:

Pilz India, Nanosol Energy, Super Spares & Services, Simerics Technology India, CSIR - National Chemical Laboratory, h2e Power Systems, Alfa Laval, Dorle Controls

The conference successfully created a comprehensive platform for dialogue and collaboration on hydrogen technologies and significantly contributed to strengthening industry–academia partnerships to advance India's transition towards hydrogen-based clean energy future.

Keynote Sessions:

Topic: Accelerating India's Clean Energy Transition Through Energy Efficiency & Waste Heat Recovery – Electrolyser & Fuel Cell by **Mr. Snehal Suryawanshi (Head of Cleantech -India, Alfa Laval)**

Topic: Mass Scale Implementations, Generation, Storage and Transportation of Cost-effective Green Hydrogen Production Technology by **Mr. Siddharth Gupta (Chief Executive of L&T Electrolysers Limited)**

Topic: Hydrogen Fuel Cell Electric Hybrids for Commercial Vehicles by **Mr. Tejas Kshatriya (Vice President KPIT Technologies)**

Topic: India's Energy Ambition & Green Hydrogen – From Vision to Reality by **Mr. Shekhar Kashalikar (Chief Executive Officer John Cockerill Greenko Hydrogen Solutions)**

Topic: NTPC's Green Hydrogen Business Plan – Riding on Pilot Experiences by **Mr. K. K. Hota (Chief General Manager NTPC)**

Panel Discussion 1:
Topic: Indigenisation of Electrolysers & Fuel Cells for Hydrogen Generation and Applications in Mobility and Power Generation

Panel Discussion 2:
Topic: Proliferation, Rules and Regulations, Testing & Certification - Electrolyzers & Fuel Cells

Mr. N. K. Vaidya, Dr. Sushil S. Ramdasi, Mr. Snehal Suryawanshi, Dr. Yogesh Aghav, Dr. Reji Mathai, Mr. Siddharth Gupta and Mr. Mohan Patil at the Inaugural Function

❑ ADAS Show at ADAS Smart City Test Track, ARAI-MRC, Takwe (near Pune)

ADAS SHOW 2026, jointly organized by ARAI and Aayera on 12th February 2026 at ARAI ADAS Test City at ARAI - Mobility Research Centre (MRC), Takwe, witnessed participation of over 1,200 industry professionals, including representatives of OEMs, Tier-1 suppliers, research organizations, technology providers and Government bodies. The event showcased ARAI ADAS Test City, a 20-acre, purpose-built pseudo-urban testing environment designed to replicate Indian road and traffic conditions. As India's first dedicated ecosystem for on-road ADAS validation, the facility demonstrated its capability to bridge the gap between simulation, controlled track testing and real-world deployment.

Key highlight of the event was the live, on-track demonstration of ADAS functionalities under realistic driving scenarios. Demonstrations included advanced safety and automation features, such as Adaptive Cruise Control, Automatic Emergency Braking, Lane Keeping Assist, Lane Departure Warning, Blind Spot Detection, Traffic Sign Recognition, Driver Monitoring Systems, Night Vision, Traffic Jam Assist, and Automated Parking.

The event also featured:

- Expert-led technical sessions on emerging ADAS technologies and autonomous mobility trends
- A fireside chat addressing industry challenges, opportunities and regulatory developments
- A technology showcase presenting state-of-the-art solutions from industry stakeholders
- Guided access to ARAI's testing infrastructure and validation capabilities at ARAI-MRC, Takwe

Participation of senior Government officials and global automotive leaders underlined strategic importance of ADAS in enhancing road safety and accelerating transition towards intelligent and automated mobility. Overall ADAS SHOW 2026 served as a significant platform for knowledge exchange, collaboration and demonstration of advanced testing methodologies, reinforcing growing role of ADAS technologies in shaping the future of safe and connected transportation in India.

❑ Workshop on “Sensitization on Automotive Ergonomics”

Presently ARAI is carrying out feasibility study for establishment of Ergonomics Lab in ARAI. To seek Industry inputs, ARAI had organized Workshop on “Sensitization on Automotive Ergonomics” on 12th Dec 2025 at ARAI-Kothrud. The event received overwhelming response from all major OEMs across India. Over 70 delegates from all the sectors, including OEMs from 2-wheeler industry, passenger cars, commercial vehicle segments as well as construction equipment manufacturers, like JCB India along with DRDO attended the workshop. Mr. Vijay Pankhawala, Sr. Deputy Director and Mr. Rahul Mahajan, Sr. Deputy Director-ARAI, delivered Welcome Address at the Workshop.

Esteemed guests and speakers:

- Dr. Soguata Karmakar from Depart of Design, IIT Guwahati
- Dr. Ravindra Rajhans having 36 years of OEM experience in Vehicle Design
- Mr. Ashish Rawat-AGM & Mr. Deepak Kumar-DGM from Ergonomics & Human Factors Department - Maruti Suzuki India Ltd, Gurugram, Delhi.
- Dr. Hans-Joachim Wirsching, Sr. Product and Project Manager for ergonomics at Humanetics, Online session from Europe.

❑ ARAI Onboarded as a Certification Body (CB) under Certification Scheme for Unmanned Aircraft Systems (CSUAS) of DGCA

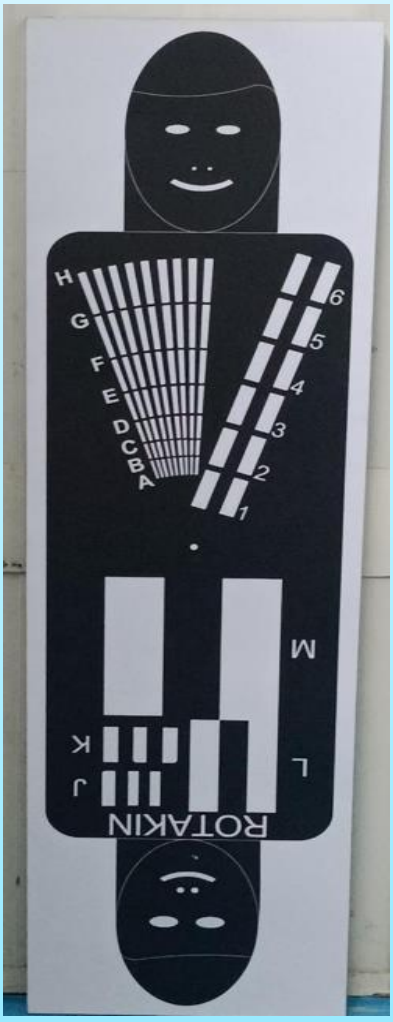
ARAI has established credibility with national and international accreditation bodies in automotive testing and certification. With the advent of drones, mode of transportation is changing and ARAI wanted to adopt this change by involving itself in drone certification activity. With this intent, ARAI has established an Unmanned Aerial Vehicle Certification Cell (UAVCC). For this, ARAI has aligned with the rigorous CSUAS competency standards. ARAI's UAVCC team has undergone rigorous training of ISO/IEC 17065:2012 for Product Certification Bodies and training required for the scheme. Post successful office assessment by Quality Council of India (QCI), ARAI received Approval as a Certification Body (CB) under the Certification Scheme for Unmanned Aircraft Systems.

In this new role, ARAI is authorized to evaluate drone models and issue Statements of Conformity (SoC) essential for DGCA Type Certification. This move marks ARAI's significant step in positioning the organization as a central player in the evolving new mobility landscape.

❑ Development of Facility for CCTV Installation Testing as per ISO 16001:2017 (ROTAKIN MANIKIN)

ARAI has successfully developed facility for CCTV Installation Testing as per ISO 16001:2017 using Rotakin Manikin. The Rotakin Manikin plays crucial role in evaluating CCTV camera performance in Construction Equipment Vehicles (CEVs) and Mining Vehicles, in line with IS/ISO 16001:2017 requirements. This was developed by ARAI and validated as per national and international standards. It is particularly valuable for assessing image quality, field of vision, resolution, surveillance effectiveness under standardized test conditions. This tool enables precise determination of camera's ability to capture critical details such as facial features, body movements and other key aspects necessary for safety and security applications. This tool is required for two parts of tests to meet the CCTV as per ISO 16001:2017, viz. Vehicle Level Testing and Component Level Test.

In India, ARAI is currently the only testing laboratory equipped with Rotakin Manikin, reinforcing its leadership in advanced testing infrastructure. This achievement positions ARAI as a go-to facility for organizations seeking globally recognized and standardized CCTV performance validation in Construction Equipment Vehicle / Earth Moving Machinery and On Mining Vehicles and potentially for other types of CCTV validation as well.



ROTAKIN MANIKIN

❑ Facilities and Expertise for Diesel Emission Measurement in Mining Applications (Surface & Sub - Surface Level)

Environment Research Laboratory (ERL) of ARAI pursues research efforts aimed at mitigating negative impact of air emissions on health and environment, and leverage their potential for positive contributions towards society in the field of vehicular exhaust and ambient air quality management. ERL's mission is to conduct research on the scientific, engineering and health aspects of both particulate and gaseous air pollutants.

The tail-pipe emissions released from the heavy-duty diesel-powered vehicles used in the surface and sub-surface level mines cause occupational health concern for the people working in the mine. In the underground mines, these emissions possess serious health hazards. Monitoring and controlling these emissions at mines poses unique challenges, especially in sub-surface level due to restricted access, varying conditions due to mining activities, harsh environments, limited air exchange rates, fluctuations in ventilation, and other geographical factors. Effective monitoring of these emissions is essential to estimate the safe level health index and identify potential health risks associated with the mine operation.

Core infrastructure specific to Mining Application:

- Field and in-situ measurement capability using portable emission exhaust gas analysers for concentration measurement of CO, CO_2, NO, NO_2, HCHO, H_2S, and O_2 directly from in-use vehicles in compliant with DGMS guidelines, enabling real-world and field-based emission characterization under actual operating conditions.
- ARAI developed portable test-rig, exclusively as per DGMS guidelines, for CO response evaluation with 1% Methane (CH_4) injection at the intake of the vehicle (Patent in-process).
- System for measurement of Diesel Particulate Matter (DPM) in the form of Elemental Carbon (EC) in compliance with the NIOSH 5040 method from stationary vehicles, along with near real-time measurement of DPM for occupational exposure assessment.

Tools & Instruments for Emission Assessment

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<td>CH_4 Analyser</td>
<td colspan="3">Multiple Portable Gas Analysers for Emission Measurement</td>
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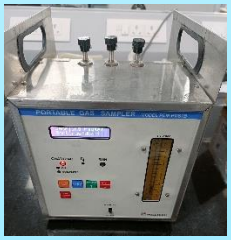
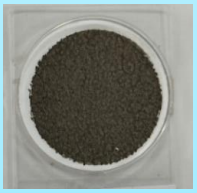
<td>  </td>
<td>  </td>
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<td>ARAI Developed Test Rig for ‘CO’ evaluation with 1% CH_4 Injection (Patent in-process)</td>
<td colspan="2">Collection of PM samples on quartz filter paper for TOA/TOR analysis</td>
<td colspan="2">Thermal Carbon Analyzer: Multi-wavelength Carbon Analyzer for EC Determination</td>
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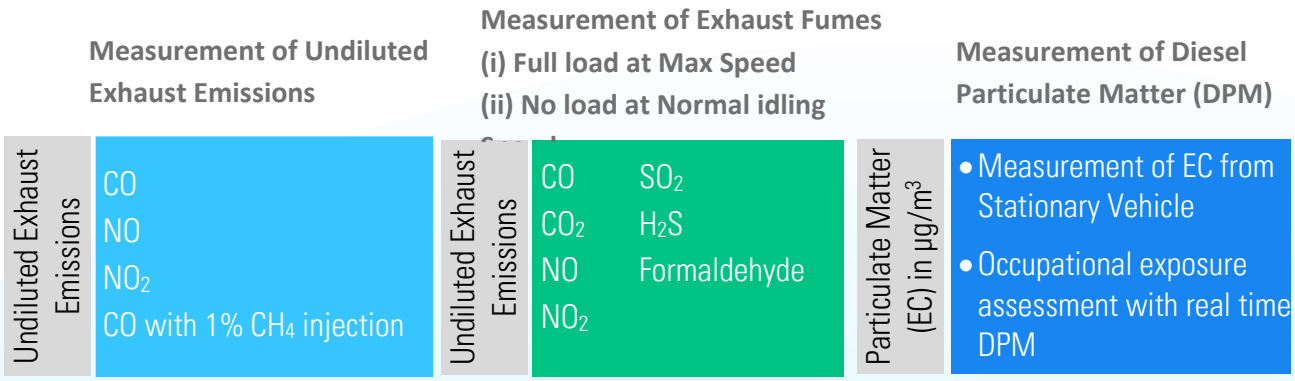
Emission Assessment as per DGMS Guidelines, 2018



ARAI is equipped with all the required tools, advanced analytical instrumentation and facilities including ARAI developed Test Rig, to cater to the needs of emission profile assessment of these diesel vehicles under field-operational level conditions in accordance with the guidelines of Directorate General of Mines Safety (DGMS).

❑ Comprehensive Performance and Structural Durability Evaluation for Electric Buses

Overview

Structural Dynamics Lab (SDL) of ARAI provides updated summary of Electric Bus Full-Vehicle Evaluation Program supported by advanced instrumentation, data measurement, analysis and 4-Poster Test Facility as an integrated suite. This initiative strengthens ARAI's capability to deliver end-to-end validation.

Expanded Scope of Testing

SDL is offering complete evaluation package for electric buses, covering benchmarking, ride comfort, handling characteristics, accelerated durability validation for ensuring structural adequacy using both subjective assessments and objective measurement systems.

These capabilities span full workflow from instrumentation to analysis and final validation, ensuring world-class evaluation aligned with OEM and regulatory expectations.

Instrumentation & Data Acquisition

Instruments used for real-world data collection on public roads, test tracks:

- Strain gauges for structural stress measurement and fatigue-life assessment
- Acceleration and displacement sensors for ride and vibration assessment
- Wheel-force transducers (WFT) and associated instrumentation for service load measurement
- CAN-based data logging for vehicle parameters
- High-speed, multi-channel DAQ hardware for durability load capture

The collected data supports high-fidelity simulation, road-load reconstruction and durability correlation.

Ride & Handling Evaluation (Subjective + Objective)

The ride and handling assessment combines subjective evaluation and objective measurement:

- Steering response evaluation
- Cornering, lane-change, and stability tests
- Ride comfort analysis in alignment with applicable ISO standards
- Expert driver-based subjective scoring
- Correlation of subjective feedback with objective metrics

This combined approach enables robust and quantitative assessment of passenger comfort and vehicle drivability.

Accelerated Durability Testing (ADT) Mix Finalization

Measured road loads are translated into Accelerated Durability Test (ADT) sequence that represents electric bus life cycle. The key activities include:

- Derivation of duty-cycle-specific load spectra
- Formulation of the ADT sequence to represent the target life
- Equivalence assessment between proving-ground and laboratory inputs
- Optimization to reduce test duration without compromising correlation and fidelity

The outcome is a validated, time-compressed test that simulates years of real-world usage with high confidence.

4-Poster Test Facility – Core Capabilities

4-Poster Test System enables controlled simulation of real-world vertical road inputs using four independent actuators. Key capabilities include:

- Replication of vertical dynamic loads using recorded road data
- Full-vehicle structural durability and fatigue assessment
- Suspension performance and bushing stiffness evaluation
- Ride comfort assessment under controlled inputs
- Correlation between road, proving-ground, and laboratory responses
- Validation of design improvements and countermeasures

The facility provides support for electric buses up to 12m length as well as heavy commercial vehicle platforms.

Benchmarking & Comparative Evaluation

We offer technical benchmarking and comparative evaluation across:

- Ride comfort across models
- Suspension performance mapping
- Passenger comfort index development
- Structural stress evaluation
- Vehicle dynamics and handling comparison

These insights help OEMs refine design targets and strengthen competitive positioning.

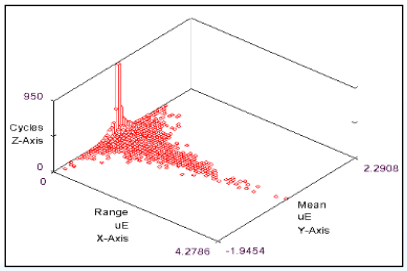
Benefits

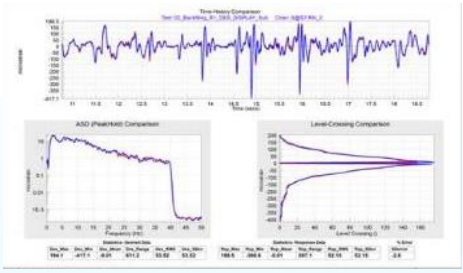
The combined facilities and evaluation methodology deliver:

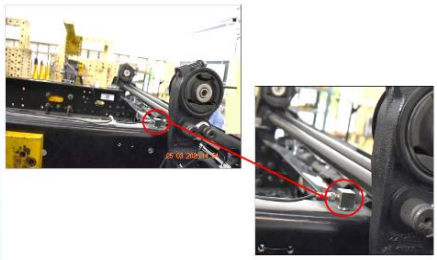
- Shorter development cycles through ADT and laboratory-based simulation testing
- Reduced dependency on prolonged on-road testing.
- Increased confidence in structural integrity, safety, and passenger comfort assessment with holistic evaluation
- Improved cross-functional collaboration across design, CAE, testing, and quality teams.

Conclusion

These testing capabilities demonstrate ARAI's commitment to delivering world-class validation services for electric bus manufacturers. This comprehensive set up at ARAI enables OEMs to achieve faster, safer and more efficient development through robust test execution and data-driven decision-making.







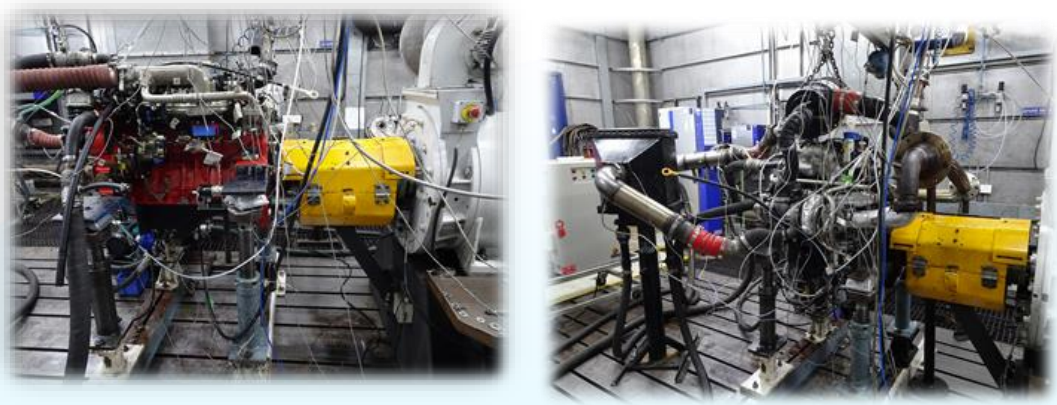
❑ Advanced Friction Torque Testing Service for Engine Oil Optimization and Fuel Economy Improvement

ARAI offers advanced Friction Torque Testing (FTT) service specifically designed for internal combustion engines. This new capability enables precise measurement and analysis of frictional losses in engine components across various operational conditions. Developed through comprehensive testing at ARAI, this service enables engine manufacturers, oil additive manufacturers and researchers to optimize engine efficiency, reduce wear and tear and improve fuel economy. The testing process simulates real-world operating conditions, providing valuable insights into the friction characteristics of engine parts, such as pistons, bearings and valvetrain components. By leveraging this capability, customers can enhance engine performance, extend component life and improve compliance with emissions and efficiency standards. This new capability was developed through the comprehensive development test conducted at ARAI, focusing on heavy-duty diesel engines.

In this service, ARAI meticulously measures friction torque on engine dynamometer by motoring engines at various speeds, ensuring precise control of operational parameters. The testing conditions are standardized with engine oil and coolant temperatures maintained at 50°C and 90°C respectively, or may vary as per customer-specific requirements. This rigorous approach allows accurate comparison of friction characteristics of different oil samples.

The service was validated through the project sponsored by one of the world's leading oil additive manufacturers. Total 14 candidate oils and one reference oil on two of India's most popular heavy-duty diesel engines were evaluated. The primary objective was to determine how different oils (with different additive packages) influence engine friction and, consequent fuel economy.

By leveraging this capability, manufacturers can evaluate frictional performance of specific engine oils under real-world conditions, enabling informed decisions to optimize fuel efficiency and reduce operational costs. ARAI's Friction Torque Testing service offers scientifically rigorous, repeatable and industry-relevant solution for engine oil assessment and fuel economy improvement initiatives.



Test Engine set up on Engine Dynamometer for FFT Developmental Trial

❑ Vendor Development Drive & Buyer Seller Meet

The Vendor Development Drive, organized during SIAT 2026, with a clear vision to encourage participation of MSEs and start-ups under the Make in India initiative to create fresh and diverse pool of vendors across multiple categories, received overwhelming response. The initiative aimed at strengthening indigenous capabilities while fostering long-term, mutually beneficial partnerships.

Execution & Outcome

The drive featured an easy registration process through the QR code displayed at ARAI booth in SIAT EXPO, enabling quick onboarding of interested vendors. Personal interactions at the booth allowed meaningful discussions, faster clarifications and relationship building as well as vendor development. With the encouraging response from over 125 new vendor registrations**,** around 60% were MSEs, that significantly expanded ARAI's vendor base. Additionally, major negotiations were successfully concluded with the suppliers and OEMs during this interactive Drive, resulting in attractive optimization of cost and lead-time.

All-in-all, the Vendor Development Drive organized by ARAI during SIAT 2026 proved to be highly impactful engagement, not only strengthening supplier relationships but also delivering measurable business benefits. Combining ease of access, direct interaction and strategic focus on MSEs and start-ups, the initiative reinforced ARAI's commitment for inclusive growth, efficient procurement and larger *Make in India* mission. The success of the drive set a strong foundation for sustained vendor collaboration and future-ready procurement practices.

Buyer–Seller Meet at SIAT 2026

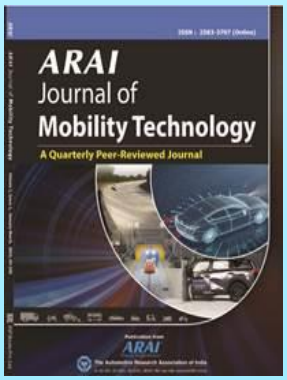
The Buyer–Seller Meet organized by ARAI aimed at strengthening collaboration between industry stakeholders and promoting transparent, efficient procurement practices. It focused on encouraging adoption of e-procurement platforms such as GeM, promoting national initiatives including Make in India (MII), MSE and Atmanirbhar Bharat, creating awareness on statutory compliances, integrity and vigilance. Emphasis was also laid on key 'dos' to ensure seamless and efficient procurement process.

Execution & Outcomes

The programme witnessed active participation from shortlisted A and B class suppliers and was conducted in the dedicated acoustic hall to facilitate effective interaction. An expert speaker from the GeM portal provided valuable insights, while the session was presided over by Dr. Reji Mathai, Director – ARAI, who addressed the gathering and highlighted ARAI's vision for inclusive and transparent procurement.

Several queries related to GeM, MII and MSE were resolved and supported by presentation of relevant facts and figures. The meet also enhanced awareness on integrity and vigilance and actionable points were discussed to further streamline procurement processes. Notably, many foreign OEMs expressed keen interest in supporting the Make in India initiative. The session was attended by large number of participants, marking it as a meaningful and impactful engagement at SIAT 2026.

❑ ARAI Journal of Mobility Technology (Volume 6, Issue 1, Jan-Mar 2026)



ARAI Journal of Mobility Technology is a technical journal that focuses on automotive and related topics. It is available in ONLINE and PRINT version.

This journal was started to help professionals, researchers and students to share their research in the field of mobility technology. One of its goals is to provide appropriate platform for publishing articles on variety of automotive and allied subjects. Papers published in this journal are well-promoted in the automotive and research communities.

The journal welcomes contributions from researchers all over the world as well as from scholars, academics and professionals in the automotive industry.

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