UNIVERSITI SAINS MALAYSIA

Renewable Energy and Waste Management Innovation for Future Yield

RENEWIFY

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Renewable Energy and Waste Management Innovation for Future Yield

|Bioenergy & Biomass Conversion | | Green Hydrogen | Waste-to-Energy | | e-Mobility | Net-Zero Technologies |

Prof. Ir. Mohd Zulkifly bin Abdullah
Chairman

Associate Professor Dr. Mohamad Yusof bin Idroas
Head

Advanced Propulsion

Assoc. Prof. Dr. Teoh Yew Heng
Member

Dr. Khairil Faizi bin Mustafa
Member

Associate Professor Dr. Mohamad Yusof bin Idroas
Member

Smart Mobility

Ir. Dr. Muhammad Iftishah bin Ramdan
Member

Abdul Yamin bin Saad
Member

Novel Power Generation

Assoc. Prof. Dr. Khaled Ali Mohammad Al-Attab
Member

Energy and Environmental

Ir. Dr. Chan Keng Wai
Member

Ir. Dr. Ahmad Fikri Bin Mustaffa
Member

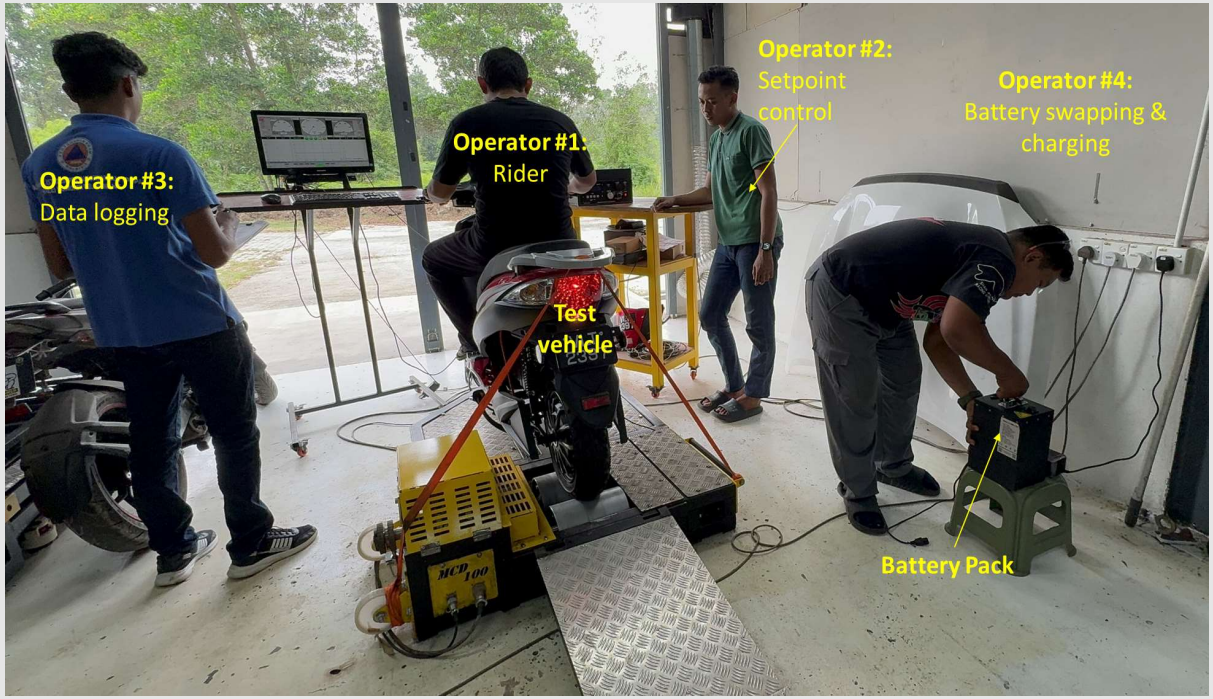
Muhammad Azman bin Miskam
Member

Industry Linkages and Consultation

Industry Linkages and Consultation_1

- Innovative Drive Cycle Testing System for Electric Vehicle (EV) Chassis Dynamometers: Design and Development

- Grant Amount: RM 400,000



Problem:

Their existing 2-wheeler dynamometer testing relies on at least FOUR human operators, leading to labor-intensive demands and constraints on testing precision. Manual testing introduces errors and limitations, especially in adhering to established drive cycles, impacting the reliability of test results.

Technological needs:

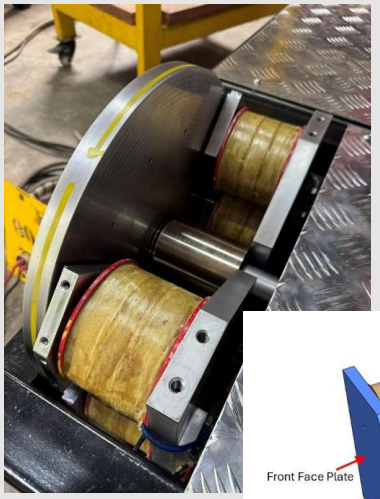
They seek automation to meet growing demands for electric motorcycle tests. The new system should handle various drive cycles and include automatic EV battery charging. This will improve precision and consistency in testing.

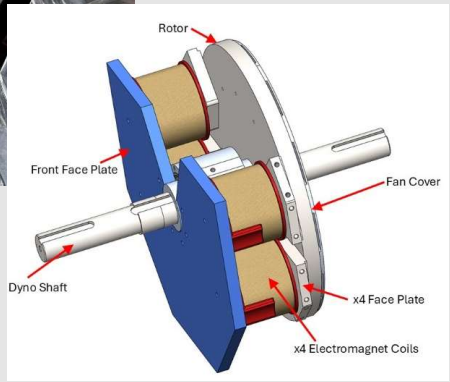
GERAN PENYELIDIKAN
PROGRAM PADANAN INDUSTRI
***Industry Matching Programme* (IMaP)**
TAHUN 2024

Industry Linkages and Consultation_2

- Design and Development of a Low-Cost Air-Cooled Eddy Current Dynamometer for Electric Vehicle (EV) Applications

- Grant Amount: RM 135,000





Problem:
Their existing air-cooled eddy current dynamometers are optimized for high-speed petrol engines. The rise in electric vehicle (EV) testing presents challenges for the existing design. The current dynamometer model, built for petrol engines, is: Costly to produce, Overly complex for EV testing needs & Lacks the fast torque response required for electric motors.

Technological needs:
The company needs a technological solution on redesign their air-cooled eddy current dynamometer to:

i. Lower manufacturing costs.
ii. Improve torque response.
iii. Simplify mechanical design.

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Industry Linkages and Consultation_3

- USM Partners with Blueshark Ecosystem Sdn. Bhd. for Electric Motorcycle Proof of Concept Program

The primary objective of the program is to study the feasibility of replacing ICE motorcycles with electric alternatives as part of the university's long-term sustainability strategy.

This collaboration not only furthers USM's sustainability goals but also positions the university at the forefront of green transportation innovations, contributing to the broader national agenda of reducing carbon emissions and promoting clean energy solutions in Malaysia.

blueshark

Industry Linkages and Consultation_4

- Malaysian Electric 2-Wheeler Demonstration Project

- Focus Applied Technologies + United Nations Environment Programme (UNEP) + NI HSIN EV TECH SDN BHD +DONGGUAN TAILING ELECTRIC VEHICLE CO., LTD

- TailG donated 50 units of BOLD motorcycles for the project
- 60kph max, 80km nominal range, up to 100km+, 2 x 72V 22Ah Lithium-Ion battery.

This research is to assess the performance and suitability of the Electric 2-Wheeler to a range of real-world users in Malaysia, and contrast that with conventional combustion vehicles.

THREE main justification of this research collaboration are:

- to demonstrate the viability of existing electric two-wheelers to perform significant useful work.
- to support low-carbon initiatives and addresses the pressing issue of climate change
- to lead in progressive technologies and policies

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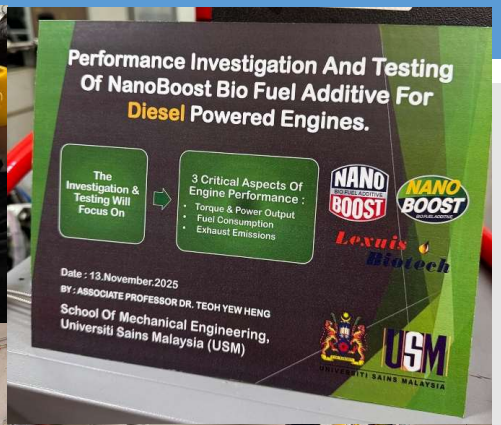
KAMI MEMIMPIN

FOCUS APPLIED TECHNOLOGIES

Industry Linkages and Consultation_5

- Bio-based fuel additive Consultation & Demonstration Project
- Lexuis Biotech Sdn Bhd
- Grant Amount: RM 23,220.00



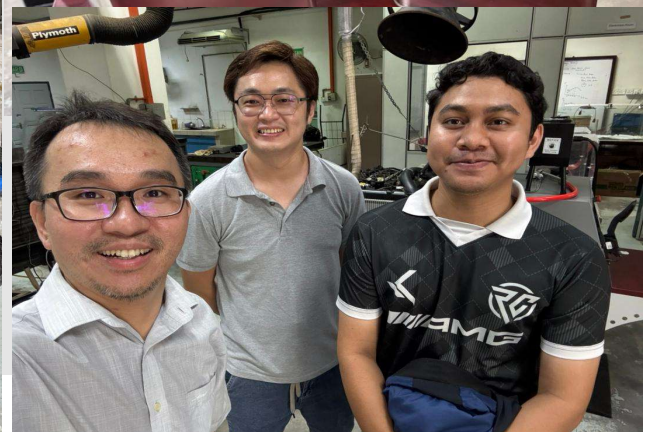
This consultation project is to assess the performance and suitability of their bio-based fuel additive on the modern advanced diesel engine test system, which is available in our Engines Laboratory.

This marks another meaningful milestone in strengthening academia–industry collaboration. Through our consultation services, we support partners in validating innovative fuel technologies that can lead to higher fuel efficiency, cleaner engine operation, and reduced environmental impact, especially for heavy-duty vehicles on Malaysian roads.

Their bio-based fuel additive demonstrates promising potential to contribute towards national aspirations aligned with the UN Sustainable Development Goals (SDG 7: Affordable & Clean Energy, SDG 9: Industry, Innovation & Infrastructure, and SDG 13: Climate Action).

Industry Linkages and Consultation_6

- Comparative Study on Engine Performance, Emissions, and Combustion Characteristics of Baseline Diesel (B0) and a 10% Algae Biodiesel Blend (B10) - ECO RESEARCH SDN. BHD.
- Grant Amount: RM 4,750.00



This industrial research aims to evaluate engine performance based on key parameters including brake torque, fuel consumption, and engine power.

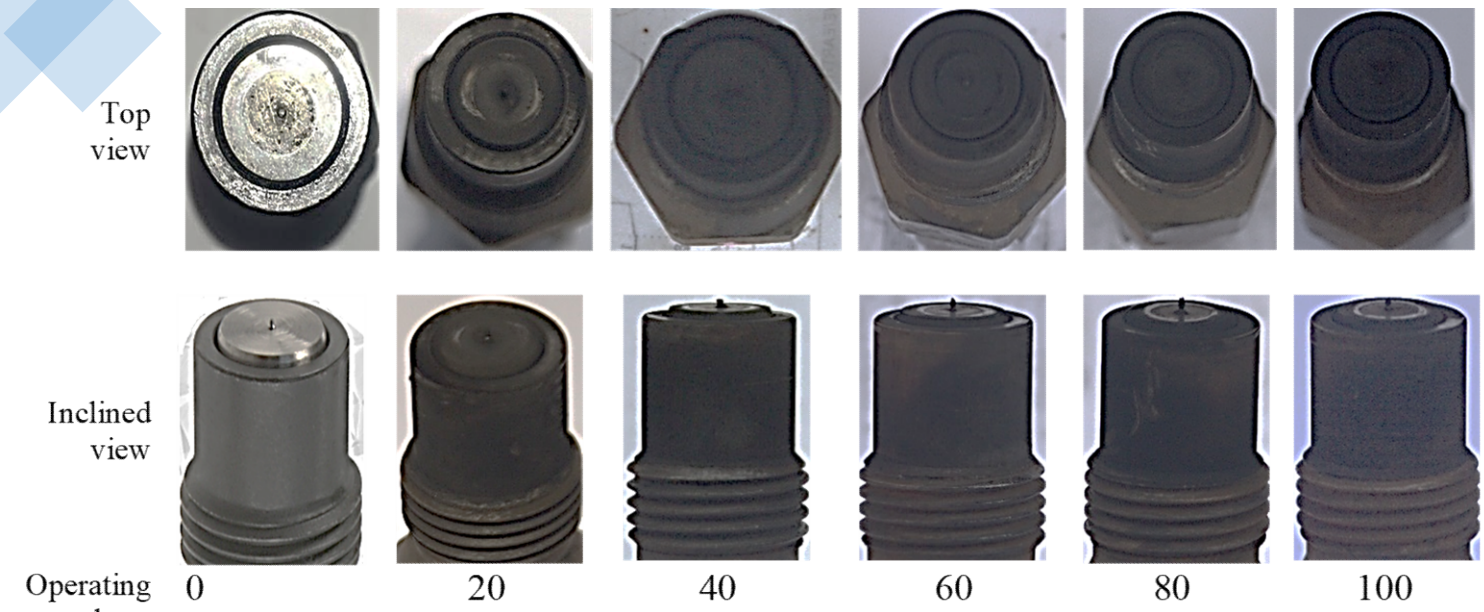
In addition, exhaust emission characteristics were measured, including Carbon Monoxide (CO, % vol.), Carbon Dioxide (CO_2, % vol.), Unburned Hydrocarbons (HC, ppm), Nitrogen Oxides (NOx, ppm), Oxygen (O_2, % vol.), and Smoke Opacity (%).

Furthermore, cylinder combustion pressure analysis was conducted, including pressure versus crank angle, peak pressure magnitude and its location, heat release rate (HRR) versus crank angle, peak HRR and its location, and ignition delay.

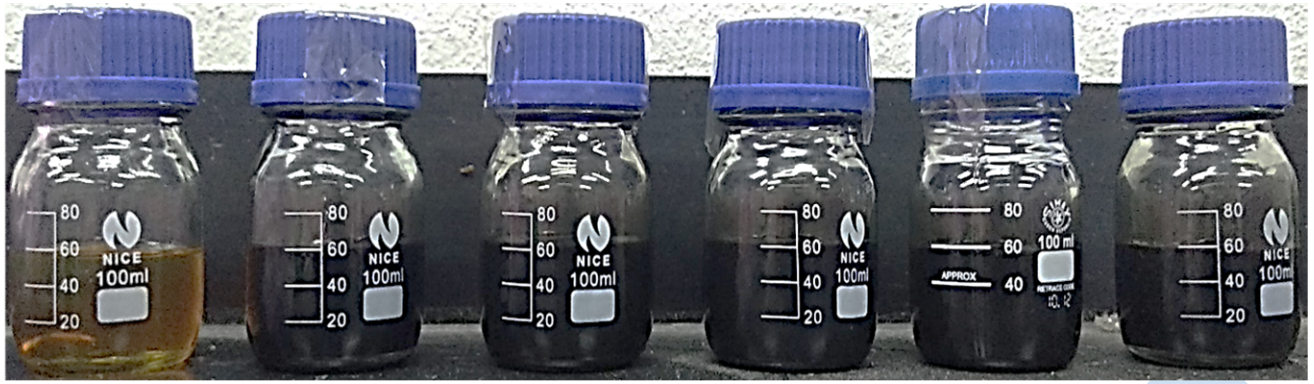
Industry Linkages and Consultation_5

- Engine Performance and Emission Test with KLK Oleo Chemical

- To study the effect of Palm biodiesel-diesel blends (i.e., B10, B20, B40, B60, B80 and B100) operation in a multi-cylinder diesel engine.
- Part A: Engine performance and emission test (3 times)
- Part B: Engine endurance test scheme (i.e., 100 hours)



Top view and inclined view of injector nozzles at various operation hours.

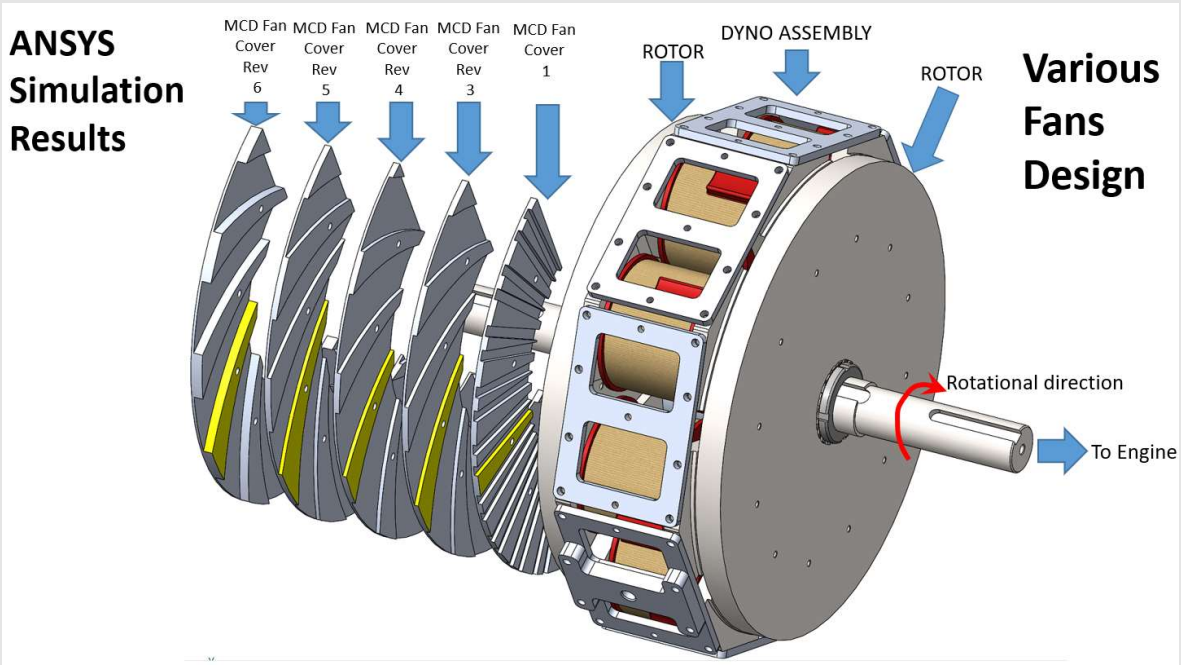


Sample of the extracted lubricant oil used after 0, 20, 40, 60, 80 and 100 hours.

Industry Linkages and Consultation

- Design and Development of High Speed Rotor For Air-Cooled Eddy Current Dynamometer with **Focus Applied Technologies**

- Grant Amount: RM 100,000



Problem:
The company has problem with limited operating speed range of air-cooled eddy current dynamometer for application in direct engine testing due to excessive heat generation.

Technological needs:
The company needs a technological solution that can improve the performance and efficiency of air-cooled dynamometer for high speed operation.

Video link:
https://www.youtube.com/watch?v=WR3aAQHc3Ck

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Internation Grant- ERASMUS+ Project SKYBELT

- Enhancement of engineering skills of students of all levels for application of evidence based sustainable renewable energy solutions in the built environment/SKYBELT

- Grant Amount: €108,762.48

SKYBELT is an Erasmus+ Capacity Building in Higher Education (CBHE) project, funded by the European Union, titled "Enhancement of engineering skills of students of all levels for application of evidence based sustainable renewable energy solutions in the built environment/SKYBELT".

The consortium consists of universities from Europe and Asia led by Università Telematica eCampus, Italy, with members from University of Northumbria, UK, University of Cukurova, Turkey, Beijing University of Technology, China, Lanzhou Jiatong University, China, Universiti Sains Malaysia, Universiti Putra Malaysia, Naresuan University, Thailand and Chiang Mai University, Thailand.

The project concentrates on three pillars; enhancement of modules at Bachelor and Master level and improvement of skills development of PhD students, familiarisation of academic, technical and administrative staff of partner universities with best practice at EU level and cooperation with industry stakeholders.

Co-funded by the Erasmus+ Programme of the European Union

PROJECT NUMBER: 610258-EPP-1-2019-1-IT-EPPKA2-CBHE-JP