Name of RIG/Centre: TRIBOLOGY FOR TRANSPORTATION INDUSTRI
CoRe: Green Technology and Sustainable Development (GTSD) (Frontier Material & Industry Application)
Faculty: Universiti Teknologi MARA
## Background of Members

<table>
<thead>
<tr>
<th>Name of Leader &amp; Members</th>
<th>Faculty &amp; Staff No.</th>
<th>Qualification</th>
<th>Area of Expertise</th>
</tr>
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<tbody>
<tr>
<td><strong>Prof. Dr Salmiah Kasolang</strong></td>
<td>Faculty of Mechanical Engineering</td>
<td>PhD</td>
<td>TRIBOLOGY; FLUID MECHANICS; QUALITY MANAGEMENT SYSTEM</td>
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<tr>
<td><strong>Dr. Mohamad Ali Ahmad</strong></td>
<td>Faculty of Mechanical Engineering</td>
<td>PhD</td>
<td>TRIBOLOGY; ENERGY MANAGEMENT; MACHINE DEVELOPMENT; TPM</td>
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<tr>
<td><strong>Dr Mimi Azlina Abu Bakar</strong></td>
<td>Faculty of Mechanical Engineering</td>
<td>PhD</td>
<td>NATURAL FIBER COMPOSITE; BIOMATERIALS; MATERIAL CHARACTERISTICS; MECHANICAL TESTING</td>
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<tr>
<td><strong>Dr Noor Azlina Mohd Salleh</strong></td>
<td>Faculty of Mechanical Engineering</td>
<td>PhD</td>
<td>QUALITY MANAGEMENT SYSTEM, LEAN MANUFACTURING</td>
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<tr>
<td><strong>Dr Mohd Faizul Mohd Idros</strong></td>
<td>Faculty of Electrical Engineering</td>
<td>PhD</td>
<td>INTEGRATED CIRCUIT DESIGN; EMBEDDED SYSTEM DESIGN; SENSORS</td>
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# Research grants (2013 - 2015)

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<th>Nama Projek</th>
<th>Jenis</th>
<th>Agensi Pembiaya</th>
<th>Status</th>
<th>Tarikh Mula</th>
<th>Tarikh Tamat</th>
<th>Jumlah (RM)</th>
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<tr>
<td>1</td>
<td>PROF DR SALMIAH KASOLANG</td>
<td>NEW FRAMEWORK MODEL OF INTEGRATED ISLAMIC QUALITY MANUFACTURING SYSTEM</td>
<td>GERAN</td>
<td>FRGS</td>
<td>COMPLETED</td>
<td>Nov-13</td>
<td>Nov-15</td>
<td>80,500.00</td>
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<td>2</td>
<td>PROF DR SALMIAH KASOLANG</td>
<td>HYDRODYNAMIC FLUID BEHAVIOUR OF BIO LUBRICANTS IN PLAIN BEARING</td>
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<td>4</td>
<td>DR MIMI AZLINA ABU BAKAR</td>
<td>HAP BLENDED PALM STEARIN BINDER; RHEOLOGICAL BEHAVIOUR IN POWDER INJECTION MOULDING</td>
<td>GERAN</td>
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<td>Jun-13</td>
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<td>5</td>
<td>DR NOOR AZLINA MOHD SALLEH</td>
<td>FUNCTIONALY GRADED ALUMINIUM FOAM WITH SPACE HOLDER REPLICATION</td>
<td>GERAN</td>
<td>RAGS</td>
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<td>6</td>
<td>DR NOOR AZLINA MOHD SALLEH</td>
<td>NEW SOCIAL RISK MANAGEMENT MANUFACTURING SYSTEM FRAMEWORK MODEL</td>
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<td>7</td>
<td>DR MOHD FAIZUL BIN MD IDROS</td>
<td>ASIC REALIZATION OF OPTICAL BASED LUBRICANT DEGRADATION FOR HIGHER UTILISATION</td>
<td>GERAN</td>
<td>DANA KECEMERLAN GAN</td>
<td>ONGOING</td>
<td>2015</td>
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Total RM 505,500
# Postgraduates (Research 2011-2015)

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<th>BIL</th>
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<th>PERINGKAT PENGAJIAN</th>
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<tr>
<td>1</td>
<td>AJMAIN BIN KASIM</td>
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<td>2</td>
<td>MOHAMAD MAZWAN BIN MAHAT</td>
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<td>3</td>
<td>NAJIBAH AB LATIF</td>
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<td>4</td>
<td>NOR SYAHIRAH BINTI MOHAMAD</td>
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<td>5</td>
<td>NURHIDAYAH ROZIEANA ZAMANI</td>
<td>Malaysia</td>
<td>2012</td>
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<td>6</td>
<td>SITI NORAZLINI ABD. AZIZ</td>
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<td>2013</td>
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<td>NURUL ALIAH ZULKEFLI</td>
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<td>8</td>
<td>SITI FARHANIZA ABD SAMAT</td>
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<td>2015</td>
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<td>MASTER</td>
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</table>
PUBLICATIONS (Salmiah)

1. **Kasolang, S.**, and Dwyer-Joyce, R.S. (2005), "Thickness measurement, turbulence, and bubbles in lubrication." Journal of Mechanical Engineering, Publications of the Universiti Teknologi MARA, 2(1), 63-78; ISSN:18235514; Index: SCOPUS, H Index, Q4


3. **Kasolang, S.**, Dwyer-Joyce, R.S., (2008), "Observations of film thickness profile and cavitation around a journal bearing circumference", Tribology Transactions, 51(2), 231-245; ISSN:10402004; Index: SCOPUS/ISI, H Index 38, Q1; IF 0.914


10. **Salmiah Kasolang**, Mohamad Ali Ahmad, Mimi Azlina Abu Bakar, Ahmad Hussein Abdul Hamid, (2012) Specific Wear Rate of Kenaf Epoxy Composite and Oil Palm Empty Fruit Bunch (OPEFB) Epoxy Composite in Dry Sliding, Jurnal Teknologi, 58 (Sains & Kej.) Keluaran Khas (2) , Ogos 2012: 85–88; ISSN: 01279696; Index: SCOPUS, H Index 1, Q4
PUBLICATIONS (Salmiah)


PUBLICATIONS (Salmiah)


**PUBLICATIONS (Salmiah)**

36. MA Ahmad, **S Kasolang**, R Dwyer-Joyce (2013) The Effects of Oil Supply Pressure at Different Groove Position on Frictional Force and Torque in Journal Bearing Lubrication, Procedia Engineering Vol 68, pp 70-76; ISSN:1877-7058; Index: SCOPUS, H Index 7, Q3
37. NA Resali, KM Hyie, MN Berhan, Z Salleh, **S Kasolang** (2013) Cobalt-nickel-iron Nanoparticles Coated on Stainless Steel Substrate, Procedia Engineering , Vol. 68, pp 30-36; ISSN:1877-7058; Index: SCOPUS, H Index 7, Q3


40. NA Nordin, FM Yussof, S Kasolang, Z Salleh, MA Ahmad (2013) *Wear Rate of Natural Fibre: Long Kenaf Composite*, Procedia Engineering Vol 68, pp 145-151; ISSN:1877-7058; Index: SCOPUS, H Index 7, Q3


42. MA Ahmad, S Kasolang, RS Dwyer-Joyce (2014) *Experimental study on the effects of oil groove location on temperature and pressure profiles in journal bearing lubrication*, Tribology International Vol 74, pp 79-86; ISSN:0301679x; Index: SCOPUS/ISI; H Index 56, Q1; IF 1.536

43. DI Ahmed, S Kasolang, A Bakar, M Yousif (2014) *Alternative Lubricant Based on Renewable Resources for Industrial Applications*, Advanced Materials Research Vol 894, pp 275-279; ISSN:16609336; Index: SCOPUS, H Index 12, Q4

44. MA Ahmad, S Kasolang, RS Dwyer-Joyce, A Jumahat (2014) *The Effects of Oil Supply Pressure at different Groove Position on Temperature and Pressure Profile in Journal Bearing* Jurnal Teknologi Vol 66 (3), pp 113-116; ISSN: 01279696; Index: SCOPUS, H Index 1, Q4


PUBLICATIONS (Mohamad Ali)


PUBLICATIONS (Mimi Azlina)


PUBLICATIONS (Noor Azlina)

1. NOOR AZLINA MOHD. SALLEH, SLMIAH KASOLANG, AHMED JAAFAR, NURUL HAYATI ABDUL HALIM (2015), LEANTQM LEADERSHIP MANAGEMENT PRACTICES IN MALAYSIAN AUTOMOTIVE COMPANIES, JURNAL TEKNOLOGI. 76,6,PP1-6.

2. NOORLEENA MOHD. NOORLAN, NOOR AZLINA MOHD. SALLEH (2015), CASE STUDY ON LINE BALANCING AT THE ENGINE TRANSMISSION MACHINING (ETM) LINE IN A MALAYSIA AUTOMOTIVE COMPANY, 5TH. INTERNATIONAL SYMPOSIUM ON TECHNOLOGY FOR SUSTAINABILTY, NATIONAL INSTITUTE OF JAPAN AND NATIONAL TAIPEI INSTITUTE OF TECHNOLOGY.

3. NASYITAH ADNAN, NOOR AZLINA MOHD. SALLEH (2015), CASE STUDY: DESIGN AND DEVELOPMENT OF KANBAN SYSTEM FOR SPIN ON-4 (OIL FILTER) LINE AT AN AUTOMOTIVE INDUSTRIES IN MALAYSIA, 5TH. INTERNATIONAL SYMPOSIUM ON TECHNOLOGY FOR SUSTAINABILTY, NATIONAL INSTITUTE OF JAPAN AND NATIONAL TAIPEI INSTITUTE OF TECHNOLOGY.

4. LUQMAN HADI AZAHAR, NOOR AZLINA MOHD. SALLEH (2015), CASE STUDY: KITTING SYSTEM IMPLEMENTATION IN MALAYSIAN AUTOMOTIVE COMPANY, 5TH. INTERNATIONAL SYMPOSIUM ON TECHNOLOGY FOR SUSTAINABILTY, NATIONAL INSTITUTE OF JAPAN AND NATIONAL TAIPEI INSTITUTE OF TECHNOLOGY.

5. LUQMAN HADI AZAHAR, NOOR AZLINA MOHD. SALLEH, NIK ROSELINA NIK ROSELEY, SLMIAH KASOLANG, AHMED JAAFAR (2014), THE SUSTAINABILITY OF KANBAN SYSTEM IN A MALAYSIAN AUTOMOTIVE COMPANY, 4TH. INTERNATIONAL SYMPOSIUM ON TECHNOLOGY FOR SUSTAINABILTY, NATIONAL INSTITUTE OF JAPAN AND NATIONAL TAIPEI INSTITUTE OF TECHNOLOGY.


PUBLICATIONS (Noor Azlina)


PUBLICATIONS (Mohd Faizul)


Niche Area and Relevance of RIG

Tribology is a study related to wear, friction and lubrication. Alternatively, it can be defined as the science and technology of interacting surfaces in relative motion and other areas related to it. The word tribology is relatively new among research community in Malaysia. Tribology was first coined in 1964 by British Physicist David Tabor and Prof Peter Jost.

In Malaysian Context, there is Malaysian Tribology Society (MYTRIBOS) providing a platform for different research groups to work together. We are active members of MYTRIBOS. Our niche lies in the specific areas of hydrodynamic lubrication specifically in bearings. Bearings are common components found in mechanical system such as automotive, railway, aeronautics, ships, agricultural machineries. In short, it is an important component of a transmission system.

We also do wear and tear testing as well as lubrication formulation and testing. Our recent attempts are on bio tribology specifically looking at blood dynamics and bio mimetics on plants (lotus, *Pistia stratiotes*).
The phase shift of an ultrasonic pulse at an oil layer and determination of film thickness
OPPORTUNITIES AND CHALLENGES

• There hasn’t been a specific tribology lab in Malaysia going for National Center for Tribology.
• We would like take this opportunity to be the leading/pioneering group that initiate the work towards establishing a National Center for Tribology.
• The main challenge is equipment. Currently we have limited equipment.
• Current competitors are UMP and UTeM
• We need to move fast and perhaps establish a synergistic collaboration.
Niche Area and Relevance of RIG

Transportation industry consists of many movable parts where the process of wear and friction are inevitable. This has caused billions in waste of resources and equipment breakdown. Our research interest group will focus on tribology properties especially in lubricants to reduce wear and friction. New technology and materials will be explored for green and efficient transportation system.
NATIONAL KEY ECONOMIC AREAS (NKEA)
RIG Research Roadmap (5/10 yrs)

2010-2015
Tribology group:
Investigation of hydrodynamic journal bearing at lower speed and load with partial integrated measurement system

2016-2020
Tribology Lab:
Investigation of hydrodynamic journal bearing at high speed and load with fully integrated measurement system

2021-2025
Center for tribology:
Testing facility for ISO/TC123; Nanotechnology of graphene in hydrodynamic lubrication system.