MRC INDUSTRY LINKAGE FUND

Industry-University Interaction Session 2021

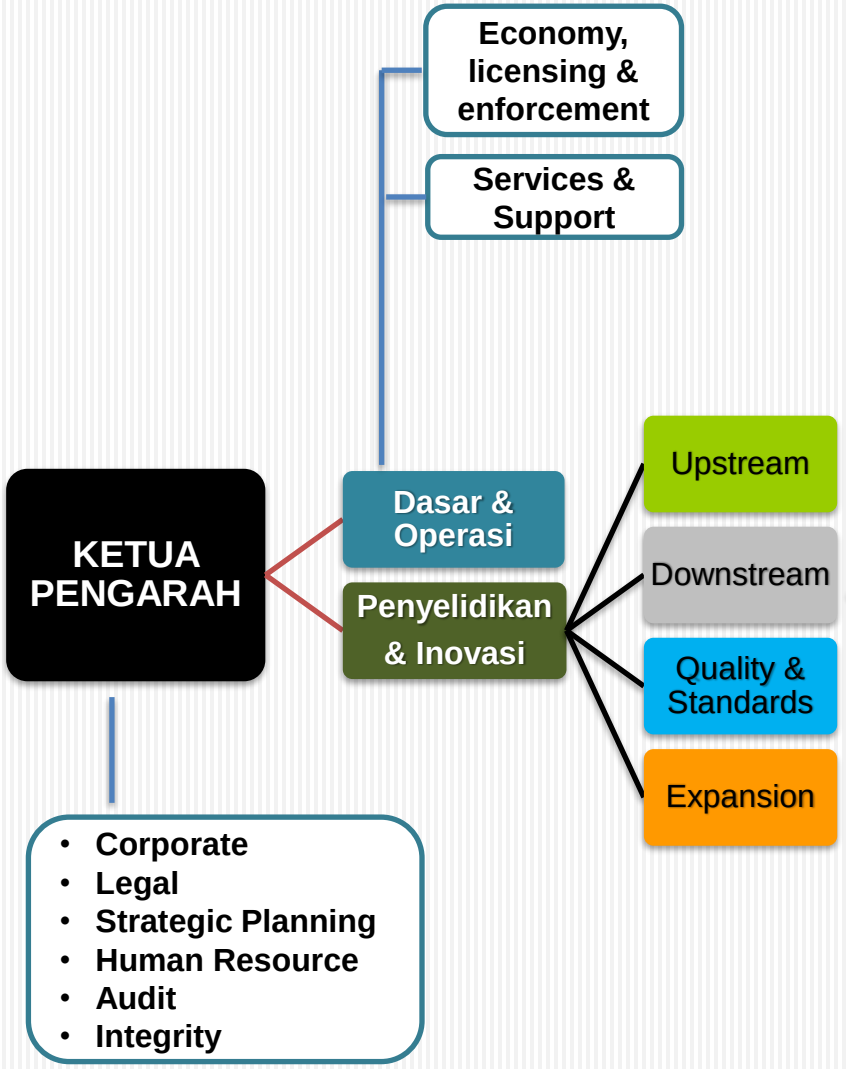
MALAYSIAN RUBBER BOARD

29 Jun 2021

LEMBAGA GETAH MALAYSIA

Kreatif • Inovatif • Progresif

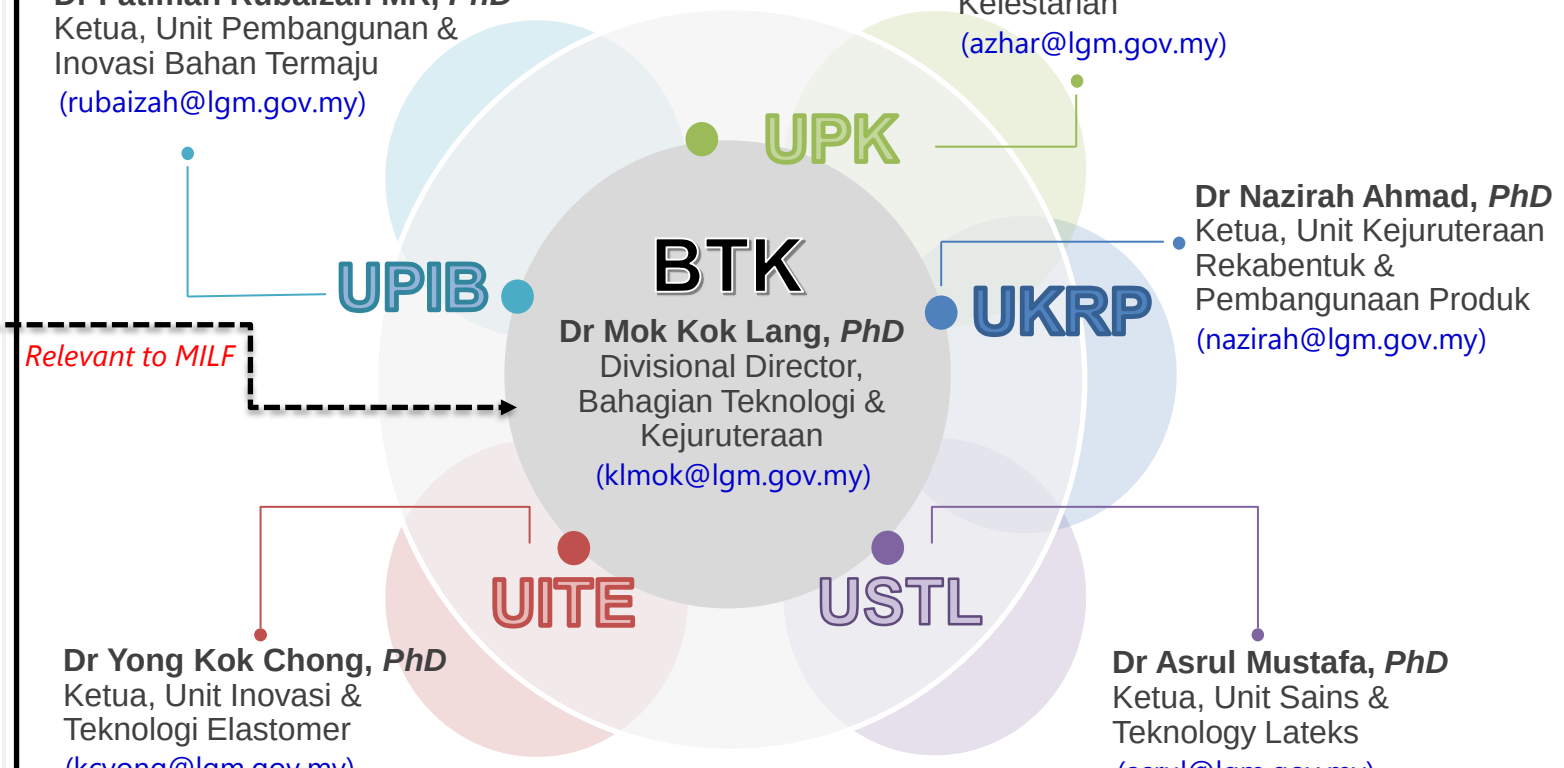
MALAYSIAN RUBBER BOARD : OVERVIEW



TECHNOLOGY & ENGINEERING DIVISION

(BAHAGIAN TEKNOLOGI & KEJURUTERAAN, BTK)

DOWNSTREAM R&D, CONSULTANCIES AND SPECIAL SERVICES



SCOPE, OBJECTIVE & FUNCTION of UNITS

01 UPK (Process & Environment)

- Develop and enhance **raw natural rubber processing technology** for better quality and cost effective of midstream sector
- R&D and technical advisory on **environmental** management, **effluent** and **malodour** treatment, **sustainability** of rubber processing
- **Bioprocess** technology and explore potential use of **non-rubber** for new product applications

02 UITE (Dry Rubber Products)

- Develop and diversify value-added **dry rubber products**
- Focus on **Industrial Rubber Goods, General Rubber Goods, Tire Technology and advanced composites**
- Provide **consultative and technical** advisory services on **dry rubber science and technology** for manufacturers and consumers

03 UKRP (Engineering Products)

- Develop **rubber engineering products** for infrastructure, automotive and locomotive
- **Consultancy & technical services** for compound development, product design & prototyping, material & product performance tests
- **Testing, validation and manufacturing facilities** for rubber industries in rubber engineering projects
- **Technical support** in problem solving of rubber engineering product design, manufacturing and process

04 USTL (Latex Products)

- R&D in **natural and synthetic latex**-based thin-wall and foam **products**
- Product **degradation, energy efficiency** in product manufacture, latex **stability** and preservation**, blends**, **nanocomposite** materials
- Development of **non-traditional latex products** such as adhesive and coating.

05 UPIB (Materials)

- **Fundamental research** and development of **natural and synthetic materials**, and **new rubbers** for product applications
- Development / **optimisation** of production **processing techniques** associated with new rubber materials
- Enhance **utilisation** of rubbers towards **sustainability** and efficient use of **natural resources**

MRB STRATEGIES 2020 - 2025

INRS 2010-2020	MRB STRATEGY 2020 - 2025
1.INCREASING THE LOCAL SUPPLY RAW MATERIALS	1. Development and adoption of technologies for upstream sector to increase tree productivity
2.INCREASING LAND PRODUCTIVITY AND SMALLHOLDERS INCOME	
3.ENHANCING COMPETITIVENESS OF MALAYSIAN RUBBER AND RELATED PRODUCTS (DRY AND LATEX)	2. Sustaining and enhancing Malaysia rubber product technologies through R&D and technical services
4.PROVIDE EFFECTIVE AND EFFICIENT SUPPORT SERVICES	
5.IMPROVING MARKET TRANSPARENCY & ENHANCE COMPETITIVENESS OF MALAYSIAN RUBBER INDUSTRY	3. Transforming Malaysian Rubber Industry through effective economic and management services
6.INCREASING MRB INTERNALLY GENERATED INCOME (INGEIN)	4. Towards generating income for self-sustaining

SOME CURRENT / ON GOING / KEY R&D WORKS (MIDSTREAM & DOWNSTREAM)

Priority Areas

SOURCE: MRC

- The focus will be given to projects that have the potential to improve the competitiveness of Malaysian rubber products in the global market. Research proposal can be submitted throughout the year. Focus areas and products for research are:

DOWNSTREAM

BY-PRODUCTS & SUSTAINABILITY

- Cosmeceuticals (high-ends inositols)
- Animal feeds (proteins)
- Odour treatment
- Wastewater recycling system
- Crepe rubber & serum
- Sustainability tools
- Integrated Processing Centre

MIDSTREAM

- Specialty rubbers (epoxidized & deproteinized)
- Material & Process optimization for specialty rubbers
- Liquid NR & ENR
- Skim latex for product use
- ENR latex for enhanced product properties
- Flame retardant rubbers
- New grade of low protein NR
- ENR Specifications (ISO)

DRY RUBBER PRODUCTS

- Tire compound (green, enhanced)
- Electrostrictive elastomers
- Fabric reinforced products
- Advanced rubbers (nanocomposites)
- 3D printable rubbers
- New formulations for rubber products

ENGINEERING PRODUCTS

- Bituminous cuplump
- Cuplump modified bitumen
- Rubberized asphalt for heavy traffic pavement
- Smart materials in anti-vibration automotive products
- Design and prototyping of customised rubber products

LATEX PRODUCTS

- Antimicrobial properties
- Anti-adherent films
- Biodegradation
- Nanocomposites
- Energy efficiency
- Paints & adhesives
- Foams
- Blends for enhanced properties
- Novel preservatives
- Enhanced vulcanization efficiency

MIDSTREAM
&
DOWNSTREAM
(zooming-in)

UPK : UNIT PEMPROSESAN & KELESTARIAN

UPK

RUBBER PROCESSING

- SMR
- Latex Concentrate
- New Grade

- Raw rubber processing – compliance of solid rubbers and latex concentrates
- Efficient & cost-effective processing technology
- New rubber grades (crepe rubber)
- Raw rubber quality evaluation and testing
- Rubber supply chain system
- Training - rubber processors & smallholders (latex production)

BIOPROCESSING

- Non rubber products
- Zero Discharge

- Natural rubber serum (NRS) - protein, sugar & water components
- Optimizing NRS Processing Technology
- NRS animal feed trial (chicken & fish)
- NRS for cosmeceutical application
- Synthesis & value-addition of quebrachitol and its derivatives (pharmaceutical grade)
- GMP-ready (Good Manufacturing Practice) infrastructure for Bioprocess Centre @ IPC

ENVIRONMENTAL

- Effluent
- Odour
- Sustainability

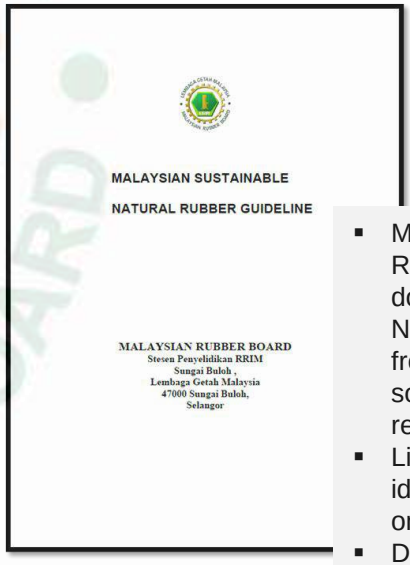
- Odour control management (raw rubber processing)
- Malodour control (drying activity of raw rubber processing)
- Carbon footprint

- Effluent treatment system and recycling technology for raw rubber processing & latex product manufacturing
- Pilot scale membrane bioreactor as high-performance effluent treatment system for rubber industry
- Pre-commercialize wastewater (effluent) recycling technology for latex-based products manufacturing
- Characterize & evaluate effluent treatment system for Crepe Rubber and Serum Processing
- Effluent treatment centre @ IPC

IPC

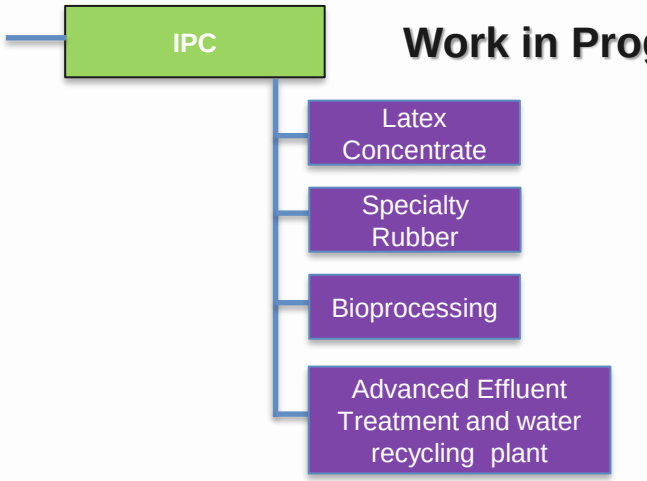
- Comprehensive R&D facilities (rubber processing & pre-com)
- Advance & sustainable rubber processing models (pre-com & Transfer of Technology)

- Latex Concentrate
- Specialty Rubber
- Bioprocessing
- Advanced Effluent Treatment and water recycling plant



- Malaysian Sustainable Natural Rubber (MSNR) Guideline documentation on sustainable NR production, deforestation-free & compliance to Malaysian social and environmental regulations
- Life Cycle Assessment study to identify environmental hotspots on production of NR
- Dipping tank coagulum of NR glove factories
- Inventory analysis (input-output) for NR production

Integrated Processing Centre (IPC), Kota Tinggi, Johor



Comprehensive facilities for long-term R&D in rubber processing and pre-commercial production

Advanced and sustainable rubber processing models on a pre-commercial scale for the purpose of technology transfer

Enhancing knowledge and skills of researchers in planning and developing rubber processing centers

Facilities (Sg Buloh):

Raw rubber/latex and SMR testing laboratories, FIR dryer, Membrane separation system, Spray dryer, RRIMETER, Membrane bioreactor, Air sampling, Flux chamber, Portable weather station, Anemometer, pH meter dosing pump, Particle monitor, GC-FID/FPD, LCMS, UV spectrometer, chemical pre-treatment system, submerged and pressurized membrane system, Reverse Osmosis(RO) Skid, Activated Carbon Filter Vessel (ACF)

UKRP : UNIT KEJURUTERAAN & REKABENTUK PRODUK

AREAS OF RESEARCH

Civil Engineering
- Rubberized road technology
- Structural dynamics and earthquake engineering

Mechanical Engineering
- Automotive rubber components
- Noise, vibration, harshness
- Fatigue of rubber
- Railway engineering

Chemical Engineering
- Polymer science and technology
- Application of specialty rubber in engineering
- Rubber to metal bonding
- Corrosion

General Engineering
- Mathematics for engineering application
- Finite element modelling and analysis
- Applied physics

The 4th Industrial Revolution (IR 4.0)

CURRENT R&D PROJECTS

- Smart Materials in Anti-Vibration of Automotive Products
- Design and Prototyping of Customized Rubber Products
- Cuplump Modified Bitumen (CMB) for Malaysian Road: Design & evaluation of CMA for road
- Commercialisation of CMB for Road Construction under RMK11
- Rubber Seed as Bio-Additive for Engineering Application
- Mathematical Modelling for the homogeneity of Stirring process Using Non-Newtonian Fluid
- Base isolation technology for the construction of earthquake-resistant structures in Malaysia
- Rubber-based road furniture
- Enhancement of wear resistant characteristic for Engineering rubber products
- Tree-to-Road Program

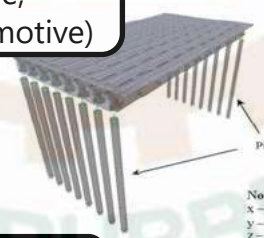
SERVICES

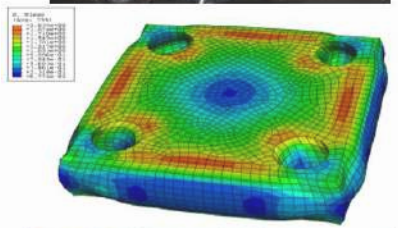
R&D (infrastructure, automotive, locomotive)

Testing & fabrication

Technical expertise (problem-solving)

Consultancy (compound, testing & prototyping)





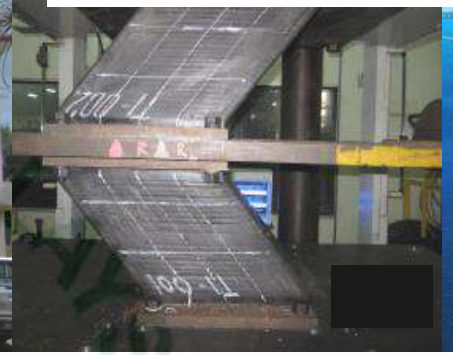
UKRP : KEY HIGHLIGHTS ON SOME CURRENT PROJECTS

Rubber bearings for earthquake protection of buildings and bridges


LANGKAWI


LAHAD DATO

EVALUATION & MONITORING OF SEISMIC DATA

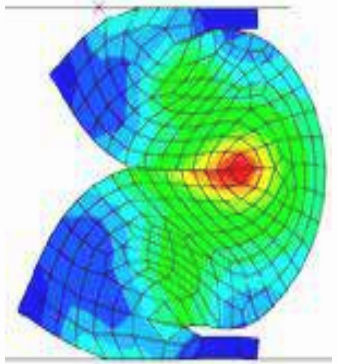



PENANG

Rubber products development and testing

DESIGN AND PROTOTYPING OF CUSTOMIZED RUBBER PRODUCTS

- Engineering rubber products based on finite element analysis (FEA) analysis as reference by rubber manufacturers for engineering rubber product development
- Performance of automotive component via experimental and prediction (ABACUS). Mould design, formulation, product manufacture & testing of prototypes for comparison with predictive analysis
- Implementing IR4.0 elements into rubber engineering products models



Development of rubberized road technology and construction of rubberized road

- CMA road pavement (265 km, federal, city & rural)
- Pavement Assessment Condition (PCA) - 5 km CMA road under pilot study at 4 locations and 2 km under commercial study at 2 locations; 3 km CMA road for low volume road study at 3 locations. All road pavement in good conditions. After 5 years, no maintenance needed yet
- Design new grading for high volume roads - collaboration with university
- Program “tree-to-road” - every chain of roadwork is implemented with target to increase rubber consumption and socio-economy of smallholders
- Initiatives by Ministry to promote use of CMA road pavement to MARRIS, IRDA and PBT

DESIGN, EVALUATION & COMMERCIALISATION OF CMB FOR CMA ROAD PAVEMENT

AVAILABLE RESEARCH FACILITIES

OUR SERVICE

RESEARCH FACILITIES

Elastomer Testing Machines
- MTS 830
- MTS 831
- MTS 322 Biaxial
- MTS Multiaxial
- Temperature Chamber

NVH Instruments
- Impedance Tube
- Magnetic Shaker
- Impact Hammer

Bitumen Testing Intruments
- Dynamic Shear Rheometer
- Rolling Thin Film Oven
- Penetration Test
- Ring & Ball Softening Point
- Brookfield Viscometer

CNC Machines
- 5-Axis Milling
- 3-Axis Milling
- Lathe
- Wire Cut

Computer Aided Solutions
- AutoCAD
- CREO
- Mastercam
- ABAQUS
- SAP2000
- MATLAB

MTS 322 Biaxial Machine

Dynamic Shear Rheometer

Impedance Tube

CNC 5-Axis Milling Machine

USTL : UNIT SAINS & TEKNOLOGI LATEKS

CURRENT R&D PROJECTS

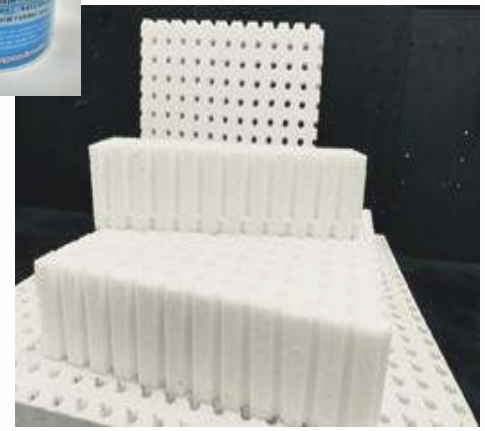
- Sprayable Natural Rubber Latex Based Paints for Metal Substrate
- Downstream Latex Products Based on Advanced Materials (nanocomposites)
- Blends for Enhancement of Latex Films Properties
- Environment Friendly and Energy Efficient Systems for Product Manufacture
- Biodegradability of Natural and Synthetic Rubber Gloves
- Antimicrobial NR Dipped Film and Glove
- Non-adherent Thin Film Surface for Microbe Repellence in Minimizing Hospital Acquired Infection (HAI)

1. RRIMglue™
Natural Rubber Latex Water-based Adhesives
Water based Adhesive Composition.
Malaysian Patent Application No. PI2020003559.
Epoxidised Natural Rubber latex-based Stationery Paper Adhesive. TS2020-01.
Ekoprena Latex Wallpaper Adhesive. TS2019-1.
LATZ based Stationery Adhesive with Improved Odour. TS2019-2.

2. Colouring Adhesive.
TS2018–6.
Natural rubber latex composite paints

3. RRIMcolor™
Paint Composition for Artwork. Malaysian Utility Innovation Application No. UI 2017703241
Natural Rubber Latex Interior Paint
Malaysian Utility Innovation Application No. UI2020005720

4. RRIMfoam™
Alternative compounding formulation for natural rubber latex foam
Natural rubber latex (NRL) foam
Malaysia Patent No: MY-163021-A
Composition and method for producing natural rubber latex memory foam and applications thereof
Patent Application No.: PI2017703435
Composition and method for producing epoxidized natural rubber latex foam and applications thereof.
Patent Application No. PI2018700712
Deproteinized natural rubber (DPNR) latex composition, product and method thereof.
Patent Application No. PI2020004246



Facilities :
Rheometer, Attritor, Ball mill, Universal Tensile Machine, Contact Angle, Liquid foam analyzer, Particle Sizer, Raman, AFM, Mist Atomizer, dipping apparatus

UITE : UNIT INOVASI & TEKNOLOGI ELASTOMER

CURRENT R&D PROJECTS

- Advance Rubber Products
- Industrial and General Rubber Goods
- Applications and product development (crepe rubber)
- New thermoplastic natural rubber composites for fused deposition modelling (FDM) 3D printing
- Green Tyre and Tyre related Products
- Palm oil-based polymeric surfactants for rubber processing
- Rubberised Asphalt for Heavy Traffic Pavement
- New formulations for rubber products

HIGHLIGHT OF KEY PROJECTS

Antistatic Footwear (Electrically Conductive Rubbers)

Thermoplastic Vulcanisates (TPV)

Green Tyre Technology

Car Tyre
Bus Tyre
Truck Tyre
Motorcycle TYre

Tyre Products Collaborations

SUNTEX Tyre Retreads Specialist

GIIB RUBBER

NADI

PKT

prasarana rapidKL MRT rapidKL

SWM ENVIRONMENT

FGV Felda Transport

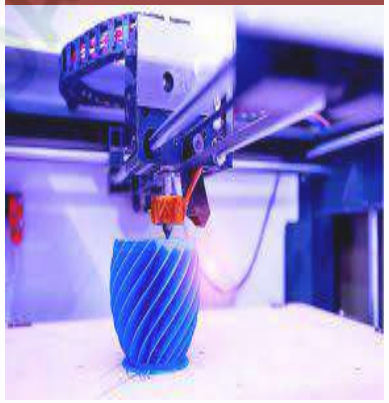
Century

Everthrough

SILVERSTONE

PROTON INSPIRING CONNECTIONS

3D Printing



UITE : Research Facilities (Dry Rubber)

Internal Mixers

Injection Moulding Machine

Hot Presses

Open Mills

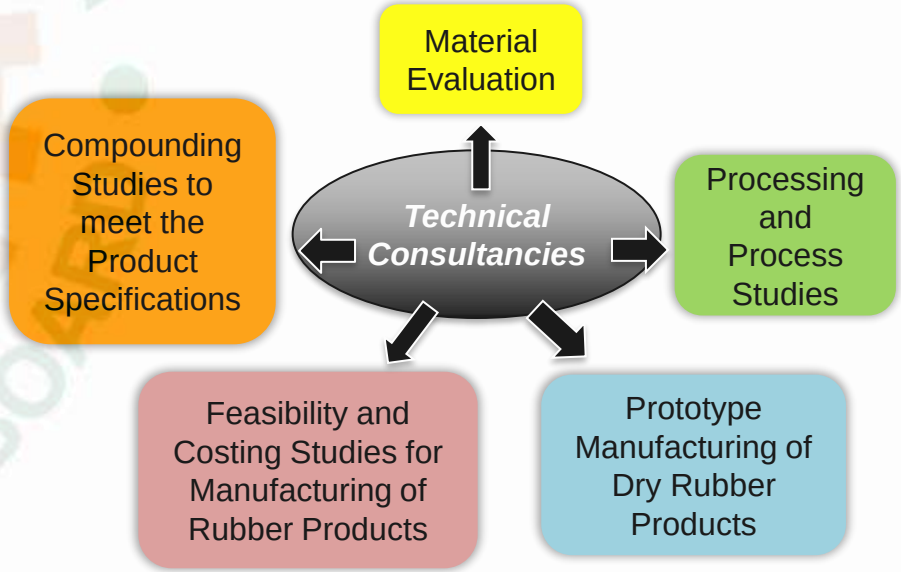
Mooney Viscometer

Rheometers

Rubber Processing Analyser

Capillary Rheometer

CONSULTANCY SERVICES



UPIB : UNIT PEMBANGUNAN & INOVASI BAHAN TERMAJU

CURRENT R&D PROJECTS

New natural rubber materials:

- *Epoxidised natural latex (ENR) concentrate*
- *Deproteinized natural latex (DPNR) concentrate*
- *liquid ENR, flame retardant NR, modified NR latex*

Laboratory and pilot scale

- New grade of low protein NR
- Epoxidised natural rubber specifications
- Natural-Flame Retardant latex
- Specialty rubber latex application in dipped latex gloves
- Utilization of skim latex for development of new rubber/latex material
- Methyl Methacrylate (MMA) Modified Natural Rubber Latex For Latex Film Application

CABOT

CardinalHealth™

University of Nottingham UK | CHINA | MALAYSIA

MONASH University

Matang Glove Manufacturing Sdn. Bhd.

UPSCALE RESEARCH AND PROCESSING

01

02

FUNDAMENTAL RESEARCH

04

TECHNICAL CONSULTATION RELATED TO DEVELOPED TECHNOLOGIES

03

QUALITY AND TESTING

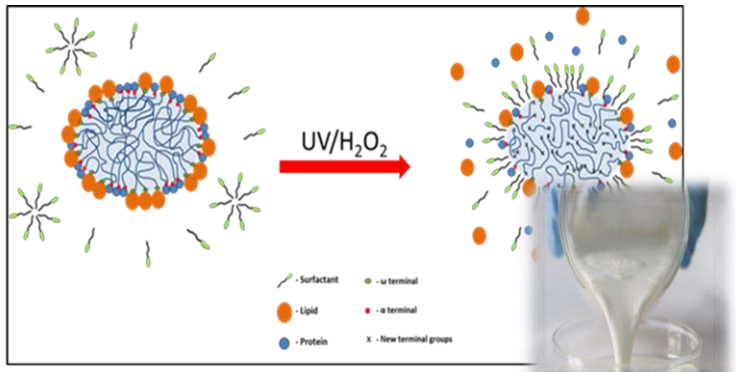
Facilities: Laboratory and pilot scale reactor (synthesis reaction), testing (FTIR, TGA, GPC, TEM, Cryo-ultramicrotome, Particle Size, Zeta Potential, Turbiscan, Microscope, Rheometer)

HIGHLIGHT OF KEY PROJECTS (UPIB)

A. Modification of latex either via chemical or physical routes

Improving drawbacks innate to NR via incorporation of additives (physical route) and attachment of pendant functional group or changing the NR structure (chemical route).

- Oil Extended Epoxidised Natural Rubber (OE-ENR)
- Methyl Methacrylate (MMA) Modified Natural Rubber Latex For Latex Film Application
- Epoxidised Natural Rubber for Latex Application
- Photochemical Degradation of Natural Rubber Latexes



NR chain cleavage and decomposition of protein and lipid during photodegradation

Concentrated ENR latex

Dipping Process

ENR Film

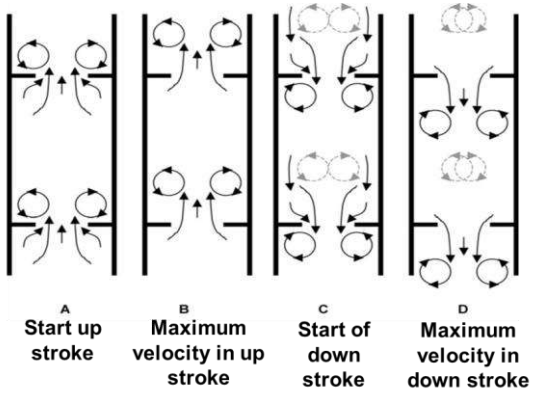
ENR Glove

Epoxidised Natural Rubber for Latex Dipping

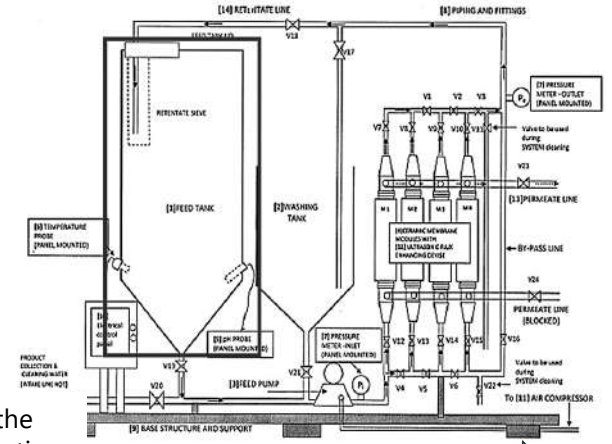
B. Development and improvement of rubber and latex processing techniques

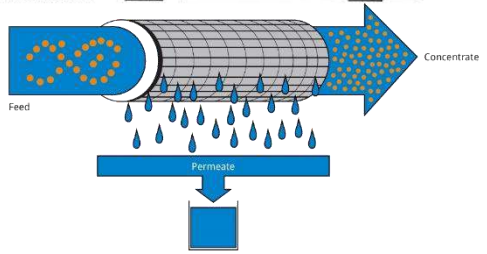
Sustainable approach to meet **demands** for **efficient use of natural resources** (eco-efficient).

- Epoxidised Natural Rubber (ENR) reaction using Oscillatory Baffled Reactor (OBR)
- Specialty Rubber Latex concentrates for dipped latex product application
- 3-in-1 machinery for production of low molecular weight polymer
- Optimisation for Process and Material of Specialty Rubber
- Scaling up and process optimisation of the Liquid ENR (LENR)



Oscillatory Baffled Reactor (OBR) research with the aim to optimise reaction process during modification of natural rubber



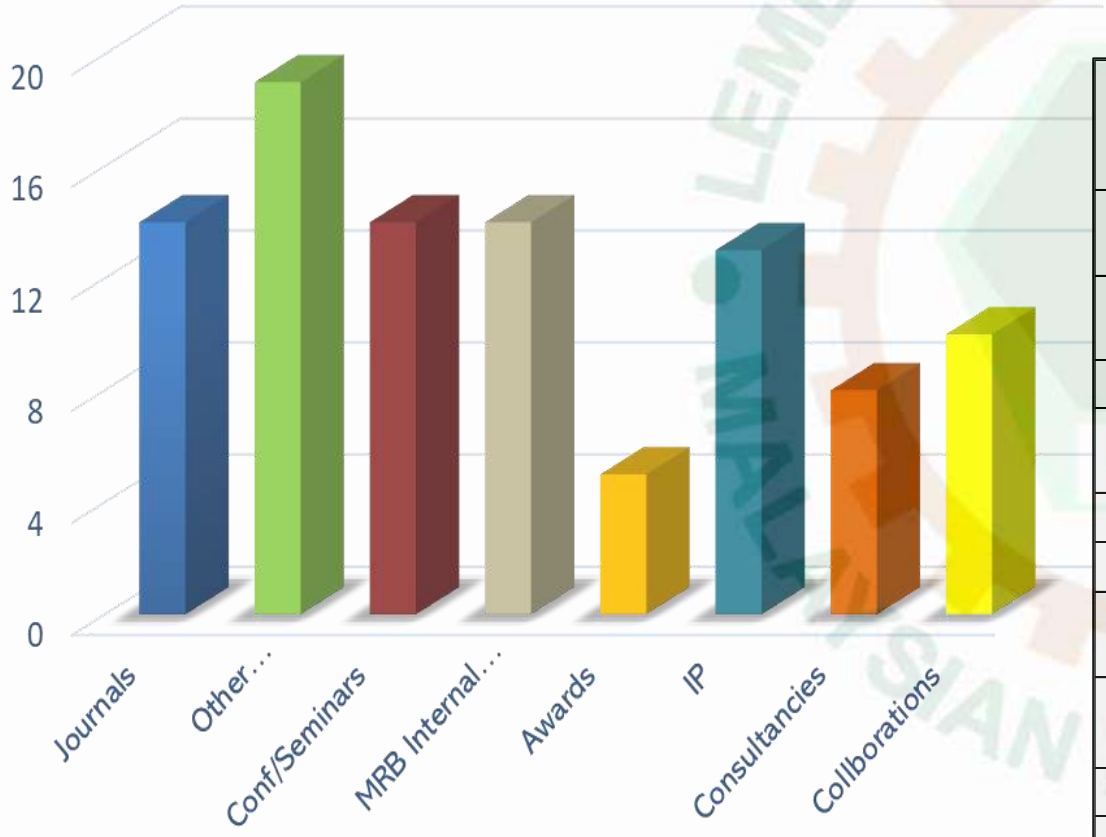


Membrane technology in latex concentration approach

Scaling up and process optimisation of the Liquid Epoxidised Natural Rubber LENR

OVERVIEW ON CURRENT PROJECTS & OUTPUTS (2020)

RMK11	REZAB	ISTC	OTHERS
(3)	(3)	(22)	(5)



INTELLECTUAL PROPERTIES (2020)

1	**Malaysia Patent : MY 176032-A**	A Rubber Compound for the Production of Motorcycle Tyre Treads, Process for Producing the Rubber Compound and the Motorcycle Tyre Tread Produced
2	**Malaysia Patent : MY 173465-A**	A Process for Introducing Filler Nanoparticles into a Polymer to Form a Nanocomposite
3	**Malaysia Patent : MY 175944-A**	Method For Preparation Coagulated Latex and Cuplump Rubber- Based Modified Bitumen
4	**Trade Secrets : TS2020-01**	Epoxisidised Natural Rubber Latex based Stationery Paper Adhesive
5	**Trademark: TM2020006633**	Watercolor Paint, watercolors for use in arts, interior, exterior paints,coatings and paint for vehicles
6	**Utility Innovation :UI2020005720**	Natural Rubber Latex Interior Paint
7	**Trademark**	BC & CMB Logo Malaysian Rubber Board
8	**Malaysian Utility Innovation Application No : UI 2020001157**	Natural Rubber Basecoat Composition for Automotive Paint
9	**Patent Application No: PI2020000792**	Partially Vulcanized Color Thermoplastic Elastomer And A Process Of Synthesizing The Same
10	**Patent Application No: PI2020005990**	Crepe rubber and natural rubber serum (NRS) processing technology
11	**Patent Application No: PI2020004583**	Non-cytotoxic palm oil fatty acid based alkyds, the method of producing the alkyds and uses of alkyds aqueous dispersion in field natural rubber
12	**Patent Application No: PI2020003559**	Water Based Adhesive Composition from Natural Rubber Latices

Achievements & Recognitions (2020)

ITEX 2020

Gold Medal (3) & Bronze (2)
Asian Invention Excellent Award
Best Green Invention
Best of the Best Award for Research Institution

MCY Awards 2020

- **Supreme Award**
- **Research-Business Collaboration Award**

TRSM TOP RESEARCH SCIENTISTS MALAYSIA
an Academy of Sciences Malaysia initiative

Top Research Scientist Malaysia 2020
Academy of Sciences Malaysia

OTHER SUPPORTING SERVICES FOR R&D

1. TESTING

Global Testing and Consultancy for Rubber (G-TAC$_R$)

G-TACR which is an acronym for Global Testing and Consultancy for Rubber (Figure 1) is the newly formed one stop centre for rubber at the Malaysian Rubber Board (MRB) under the NKEA project EPP#3 with the aim to increase world market share of latex gloves to 65% (RM30 billion) by year 2020. Under this project, MRB is responsible for the sub project E1 which is to consolidate MRB testing facilities for latex and latex based products in order to improve delivery system for commercial latex testing services offered by the MRB.

G-TAC$_R$

A Service by MRB

GLOBAL TESTING AND CONSULTANCY FOR RUBBER

G-TACR Laboratory

G-TAC$_R$ Thermal, Latex, Contingency & Raw Rubber Lab
G-TAC$_R$ Protein & Powder Lab
G-TAC$_R$ Microscopy & Spectroscopy Lab
G-TAC$_R$ Pollution Control & Bio Lab
G-TAC$_R$ SMR Control Lab
G-TAC$_R$ Physical Testing Lab
G-TAC$_R$ Calibration Lab
G-TAC$_R$ RRIM Tyre Testing Lab
G-TAC$_R$ Sg Petani Lab

Contact : Dr Kartini Abdol Rahim (kartini@lgm.gov.my)

Website : http://www.lgm.gov.my/gtacr

2. CONSULTANCY & ADVISORY

Unit Khidmat Teknikal & Pembangunan Peralatan

Dr Mohamad Asri bin Ahmad (asri@lgm.gov.my)

3. TRAINING

ACADEMY HEVEA MALAYSIA

Centre of Excellence for Natural Rubber

Welcome to the Official Web Site of the Academy Hevea Malaysia

- About AHM
- Training
- Accommodation
- Our Facilities
- Sitemap

Academy Hevea Malaysia
RRIM Research Station
47000 Sungai Buloh
Selangor
Tel: 03-6145 9400
ext 4403 / 4459
Fax: 03-6157 7637
Email: akademiheveo@lgm.gov.my
Contact Us

Academy Hevea Malaysia

The Malaysian Rubber Board (MRB) in its effort to address various issues and problems faced by the rubber industry will be conducting various types of courses on aspects of upstream, midstream and downstream activities for nation building and development towards achieving excellence in vision 2020.

As an instrument to implement this role, MRB had established Academy Hevea Malaysia (AHM) on 1 October 2006. The establishment of AHM is in line with the national aspiration to accelerate transfer of technology in rubber. The main objectives of AHM are:

- To provide industry oriented skills training for the rubber industry
- To produce adequate skilled manpower for the rubber industry
- To expedite technology transfer through technical training

Application for the training programme are opened to all staff of government agencies, statutory bodies and private companies from management and supervisory level who are involved directly or indirectly in the rubber industry. Individuals who are interested are also encouraged to participate.

COLLABORATION
&
AGREEMENT

CLASSIFICATION & CRITERIA : OVERVIEW

Contact details:

Address:
Ketua Pengarah
Lembaga Getah Malaysia,
Tingkat 18, Bangunan Getah Asli (Menara),
148 Jalan Ampang,
50450 Kuala Lumpur

Intellectual Property, Collaboration and Commercialisation :

Ahmad Hamdan bin Othman
Pegawai Penyelidik
Unit Perundangan
Tingkat 17,
Bangunan Getah Asli (Menara),
148 Jalan Ampang,
50450 Kuala Lumpur
Email address:
hamdan@lgm.gov.my
Tel No : 03 9206 2120

Type	Brief description on the classification criteria and types of agreement / cost commitment involved
Collaboration	Working together on an agreed upon project as stipulated in the details on the obligations and commitments of the parties to achieve agreed upon objective/s
Contract Research	A party that conduct conduct research or service for a sponsor party
Consultancy	Activity of giving expert advice and/or conducting works on a particular subject upon agreed cost
Pre-Com	Activities aiming toward successful commercialization of a technology either with or without collaboration with external parties prior to actual commercialization such as up-scaling, proof-of-prototype/concept, fine-turning, demonstration or validation in relevant environment and so forth
Transfer of Technology	Transfer of technology activities relating to such as commercialization, technology licensing, knowledge transfer, technology outright sale, assignment and so forth
Commercialization	Process of transferring technologies from the research lab to the marketplace whether a product, service, process or organizational system to market by way of licensing, assignment, joint venture, outright sale and social contribution
Licensing	Owner granting rights to another party to exploit or commercialize technology or IP rights
Others	Outright sale for example, selling technology or IP rights to another party with the purpose of commercialisation or technology exploitation

MRB TECHNOLOGIES & PRODUCTS

INRS 2010-2020

1. INCREASING THE LOCAL SUPPLY RAW MATERIALS
2. INCREASING LAND PRODUCTIVITY AND SMALLHOLDERS INCOME
3. ENHANCING COMPETITIVENESS OF MALAYSIAN RUBBER AND RELATED PRODUCTS (DRY AND LATEX)
4. PROVIDE EFFECTIVE AND EFFICIENT SUPPORT SERVICES
5. IMPROVING MARKET TRANSPARENCY & ENHANCE COMPETITIVENESS OF MALAYSIAN RUBBER INDUSTRY
6. INCREASING MRB INTERNALLY GENERATED INCOME (INGEIN)

MRB STRATEGY 2020 - 2025

1. Development and adoption of technologies for upstream sector to increase tree productivity
2. Sustaining and enhancing Malaysia rubber product technologies through R&D and technical services
3. Transforming Malaysian Rubber Industry through effective economic and management services
4. Towards generating income for self-sustaining

INNOVATIONS (Product, Process & Technology)

MRB TECHNOLOGIES, PRODUCTS AND THEIR READINESS LEVELS

TRL	TECHNOLOGY READINESS LEVEL	
1	Basic principles observed and reported	Basic research
2	Technology concept and/or application formulated	
3	Analytical and experimental critical function and/or characteristic proof-of-concept	Proof-of-concept
4	Technology basic validation in a laboratory environment	Technology development
5	Technology basic validation in a relevant environment	
6	Technology model or prototype demonstration in a relevant environment	
7	Technology prototype demonstration in an operational environment	
8	Technology completed and qualified through test and demonstration	System development
9	Technology qualified through successful mission operation	Market ready

Testing & Services (G-TACr)

- Accreditation test (516 scopes)
- Quality Management System
- Standard Development (Rubber Products)
- Testing services & consultancies
- SMR Instrument Calibration

Certifications

- SMR
- SMG
- LMSTG

E-Portals

- RRIM Niaga
- MyRol
- IPG
- Pat-G

Products (Upstream & Midstream)

- Soil Filling Machine
- RRIM Hydrobest
- RRIMFLOW
- REACTORRIM
- G-Flex
- Mortex
- Rhizobium Compost
- RRIM-formulated fertilizer
- Pocketing fertilizer machine
- Ekoprena & Pureprena

TRL = ≥ 7

Products (downstream)

- Hardness button (reference material)
- Automatic Rubber Tapping System
- Rubber Road Bump
- Natural Rubber Latex based Paint
- Natural rubber Latex based stationary adhesive **RRIM Glue™**
- Natural rubber Latex based colour for Artwork, **RRIM Color™**
- Antistatic Footwear Shoe Sole
- PRI CUT machine
- Anti-Fatigue Mat
- Sport Flexible and Anti-slip Interlocking Flooring **RRIM Surf™**
- Poket Sandal
- Green sound rubber insulator
- SMR Std Sample Preservation **RRIM Pack™**
- RRIMETER
- Bituminous Cuplump (BC)
- Cuplump Modified Bitumen (CMB)

MORE PRODUCTS DESCRIBED IN BROCHURE

EKOPRENA® Pure

Content

Complimentary copies by MRB

EKOPRENA® Pureprena®

PIONEERING GLOBAL GREEN PRODUCT TECHNOLOGY

Contacts

MALAYSIAN RUBBER BOARD

www.lgm.gov.my

Dato' Dr. Zairossani Mohd Nor (Director General) — zairossani@lgm.gov.my

Dr. Amir Hashim Md Yatim (Deputy Director General, Research & Innovation) — amir@lgm.gov.my

RUBBER TECHNOLOGY CENTRE

Dr. Fatimah Rubaizah Mohd Rasdi	rubaizah@lgm.gov.my	Ekoprena/Pureprena
Dr. Siti Salina Sarkawi	ssalina@lgm.gov.my	Tyre
Dr. Mohamad Asri Ahmad	asri@lgm.gov.my	Footwear
Dr. Yong Kok Chong	kcyong@lgm.gov.my	Anti-static Footwear
Dr. Nik Intan Nik Ismail	nikintan@lgm.gov.my	Sport Flooring
Dr. Asrul Mustafa	asrul@lgm.gov.my	Paint
Ms Rohani Abu Bakar	rohani@lgm.gov.my	Adhesive
Mr Roslim Ramli	roslim@lgm.gov.my	Foam

EKOPRENA® Pureprena® RRIMCOLOR

RRIM SURF A product of MRB

RRIMGlue™ A Product of MRB

RRIMFOAM Natural Rubber Latex Slow-recovery Foam

RRIM BC
A Product of MRB

RRIM Glue™
A Product of MRB

SoFil
A product of MRB

POKET SANDLE
A Product of MRB

RRIM ROAD BUMP
A Product of MRB

RRIMCOLOR
A Product of MRB

Pureprena

RRIM CMB
A Product of MRB

RRIM PRi-Cut
A Product of MRB

MyRUL
A Service by MRB

RRIM SURF
A product of MRB

RRIMniaga
A Product of MRB

EKOPRENA

RRIMPack
A product of MRB

LEMBAGA GETAH MALAYSIA

Kreatif • Inovatif • Progresif