





1-4 December 2014

Universiti Tun Hussein Onn Malaysia

Batu Pahat, Johor, Malaysia.

[iies.uthm.edu.my](http://iies.uthm.edu.my)

## Foreword



Various initiatives have been designed and implemented at the ministerial level to enhance the innovation among students and graduates. At the university level, I hope International Integrated Engineering Summit IIES2014, Innovators X6 and Regional Tetrural 2014 programs will provide the convenience of the innovations produced by students and graduates to be showcased at the international level. Through these programs, I believe that it will facilitate the creativity, products and workforce from rural areas. However, these products may require value-added in terms of processing, manufacturing or production that I believe the existence of such programs can make rural products became more competitive and able to penetrate the domestic and international markets.

Universities and industries need to work together with experts in various fields to overcome limitations of some aspects, such as expertise and technological knowledge. This is where workshops, testing facilities, professional skills and research available in the institutions of higher learning can be utilized and offered. These efforts should be continued and enhanced the quality of education. Furthermore, hopefully it will be in line with globalization as the country is now underway to raise the country's name to the world. Therefore, technologies developed have to cover various areas of technologies in the fields of construction industry, manufacturing, production, transmission technology, electrical and electronics, food processing and packaging technology as well as others.

I would like to urge the participants involved in this program to take the opportunity to enhance their ability to develop creative ideas that can equally develop the society toward the era of globalization.

**Prof. Dato' Dr. Mohd Noh Dalimin**  
Vice-Chancellor  
Universiti Tun Hussein Onn Malaysia  
Patron  
International Integrated Engineering Summit (IIES2014)

## Preface



On behalf of the organizing committee, I would like to warmly welcome all participants to the International Integrated Engineering Summit (IIES2014), held in Universiti Tun Hussein Onn Malaysia, from December 1 to 4, 2014.

This is the first conference in Malaysia that combines three major engineering disciplines, namely Mechanical and Manufacturing Engineering, Civil and Environmental Engineering, and Electrical and Electronic Engineering. It consists of THIRTEEN conferences from above engineering fields and TWO exhibitions that makes the IIES2014 is really unique and able to attract more than 500 participants to register with the system at first. Out of this number, after undergoing several stages, about 350 participants have submitted the full paper and participated in this conference. In terms of the exhibitions, more than 71 products will be displayed which involved more than 300 project members. We would like to thank to all reviewers who have given their full commitment in ensuring the completeness of the review process.

In line with the conference's theme which is "Driving Ideas Towards New Horizon", IIES aims to bring all prominent scientists and researchers as well as industrial players together in one place so that they can share and exchange ideas, knowledge and expertise, widen networking among each other and promote new technology towards the new brighter future. As a second largest city in Johor state, Batu Pahat is chosen to be the organizing venue as it is believed to be able to provide a different view and experience in enjoying the rural life compared to other city in Malaysia.

Finally, special gratitude to the Honourable Deputy Minister of MOSTI, all participants, reviewers, keynote speakers, national and international collaborators, conference committees, UTHM management and all parties that involved directly or indirectly in making this conference successful. We are hoping that this conference can provide something meaningful to all participants and we are looking forward to seeing you again in the future.

**Prof. Dr. Wahid Razzaly**  
Deputy Vice-Chancellor (Research and Innovation)  
Universiti Tun Hussein Onn Malaysia  
Executive Chairman  
International Integrated Engineering Summit (IIES2014)

## Scope

IIES2014 integrates three major engineering disciplines which are Mechanical and Manufacturing Engineering, Civil and Environmental Engineering, and Electrical and Electronic Engineering, covering a wide range of topics related to these disciplines. It is divided into 13 technical conferences and 2 product exhibitions:

Conferences:

1. International Forum and Exhibition on Engineering Design (iNFEED)
2. International Conference on Industrial Engineering (ICIE)
3. International Conference on Advances in Mechanics (ICAM)
4. International Conference on Energy and Combustion (ICEC)
5. International Conference on Additive Manufacturing Research (ICAMR)
6. International Conference on Fluid Mechanic and Heat Transfer (FMHT)
7. Tropical Soil International Conference (TSIC)
8. International Conference on Sustainable Construction (ICSC)
9. International Conference on Environment and Green Technology (ICEGT)
10. International Conference on Green Transportation (ICGT)
11. International Conference on Nanoelectronic Engineering (ICNEE)
12. International Conference on Integrated Electrical and Electronic Engineering (ICIEEE)
13. International Research in Engineering Education Symposium (IREES)

Exhibitions:

14. Regional TechRural
15. Innovators X6

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## General Conference Program

Day 1	Dec 1, Monday
14.00~17.00	<b>Registration</b>
Day 2	Dec 2, Tuesday
9.15~10.15	Keynote Speaker 1 – Prof. Dr. Yoshimi Watanabe, Department of Mechanical Engineering, Nagoya Institute of Technology, Japan. Title: <i>Functionally Graded Materials - Fundamentals and Application</i>
10.15~11.15	Keynote Speaker 2 - Prof. Ir. Dr. Riza Atiq Abdullah O.K Rahmat, Deputy Vice-Chancellor Academic and International, Universiti Kebangsaan Malaysia (UKM) Title: <i>The Implementation of Green Transportation in Malaysia: Issues and Challenges</i>
11.15~13.00	<b>Opening Ceremony</b>
13.00~14.00	Lunch
14.00~15.00	Keynote Speaker 3 - Prof. Dr. Hashim Saim, Deputy Vice-Chancellor Academic and International, Universiti Tun Hussein Onn Malaysia (UTHM) Title: <i>Spintronic - Technology for Future Energy Generation</i>
15.00~18.00	Presentation – Parallel Session
Day 3	Dec 3, Wednesday
9.00~9.45	Keynote Speaker 4 - Prof. Ir Dr. Amir Hashim Bin Mohd Kassim, Deputy Vice-Chancellor Student Affairs and Alumni, Universiti Tun Hussein Onn Malaysia (UTHM) Title: <i>Integrated Engineering and Green Technology For A Sustainable Future</i>
9.45~10.30	Keynote Speaker 5 - Prof. Dr. Sulaiman Hj. Hasan, Faculty of Mechanical and Manufacturing Engineering, Universiti Tun Hussein Onn Malaysia (UTHM) Title: <i>Producing Biodiesel from Jatropha Curcas Oil Using Ultrasonic Process</i>
10.30~13.00	Presentation – Parallel Session
13.00~14.00	Lunch
14.00~18.00	Presentation – Parallel Session

<b>Day 4</b>	<b>Dec 4, Thursday</b>
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9.00~13.00	Presentation – Parallel Session
13.00~14.00	Lunch
14.00~18.00	Presentation – Parallel Session

## Tentative of Opening Ceremony

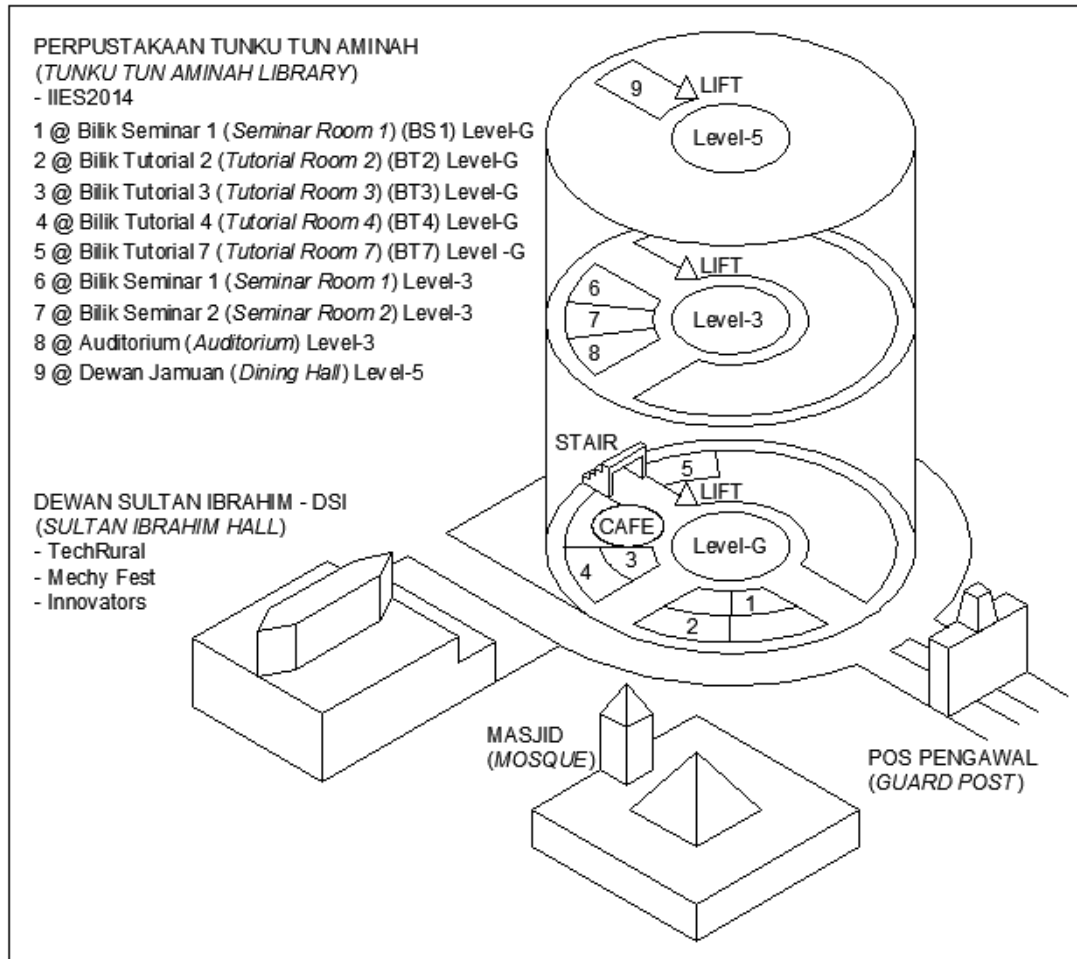
Time	Activity
11.15	Arrival of VIP and Guest
11.30	Arrival of Deputy Minister of Ministry of Science, Technology, and Innovation (MOSTI); <b>Honorable Datuk Dr. Abu Bakar bin Mohamad Diah</b> Accompanied by Vice Chancellor of UTHM; <b>Prof. Dato' Dr. Mohd Noh Bin Dalimin</b> , IIES Executive Chairman, and UTHM's senior officers
11.31	National Anthem
11.35	Du'a recitation
11.40	Welcoming speech by IIES2014 Executive Chairman
11.47	Opening speech by Deputy Minister of MOSTI
12.07	MoU Signing ceremony; <ul style="list-style-type: none"> <li>i. Makhostia Sdn. Bhd.</li> <li>ii. Topaz Integrated Technology Sdn. Bhd &amp; Euro Auto Gas Co. Ltd. Thailand</li> </ul>
12.30	Souvenir presentation to the Honorable Deputy Minister of MOSTI
12.35	Visit to exhibition booths
13.00	Lunch

## Transportation Schedule

Nov 30, 2014 (Sunday)	
Time	Details
1400 ~ 1700	UTHM bus will be waiting at KLIA
1715	Depart to UTHM
Dec 1, 2014 (Monday)	
1330	Transportation (UTHM bus) from hotel to UTHM - Katerina Hotel, Pelican Hotel, Landmark Hotel, Pine Tree Hotel, Hotel Novo Park and other hotels in Batu Pahat city.
1630	Transportation from UTHM to hotels in Batu Pahat city
Dec 2 – 4, 2014 (Tuesday – Thursday)	
0700	Transportation from hotels to UTHM
1800	Transportation from UTHM to hotels
Dec 5, 2014 (Friday)	
0800	Transportation from hotels to KLIA

\*You can also visit <http://www.catchthatbus.com/bus-operator-airport-coach> for commercial airport coach KLIA-Batu Pahat-KLIA

## Venue Map



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[iies2014uthm](https://www.instagram.com/iies2014uthm)

### Presentation Schedule

Date	DEC 2, TUESDAY								
	LOCATION								
Time	DSI	BT2	BT3	BT4	BT7	BS1-G	BS1-3	BS2-3	Aud-3
900									
920									
940	Keynote 1 (0930~ 1030)								
1000									
1020	Keynote 2 (1030~ 1130)								
1040									
1100	Opening Ceremony (1130~ 1230)								
1120									
1140									
1200									
1220									
1240									
1~2PM	LUNCH								
1400	Keynote 3 (1400~ 1500)								
1420									
1440									
1500		1	10	19	28	37	46	55	64
1520		2	11	20	29	38	47	56	65
1540		3	12	21	30	39	48	57	66
1600		4	13	22	31	40	49	58	67
1620		5	14	23	32	41	50	59	68
1640		6	15	24	33	42	51	60	69
1700		7	16	25	34	43	52	61	70
1720		8	17	26	35	44	53	62	71
1740		9	18	27	36	45	54	63	72

Date	DEC 3, WEDNESDAY								
	LOCATION								
Time	DSI	BT2	BT3	BT4	BT7	BS1-G	BS1-3	BS2-3	Aud-3
900	Keynote 4 (0900~0945 )								
920									
940									
1000	Keynote 5 (0950~1035 )								
1020									
1040									
1100		73	91	109	127	145	163	181	199
1120		74	92	110	128	146	164	182	200
1140		75	93	111	129	147	165	183	201
1200		76	94	112	130	148	166	184	202
1220		77	95	113	131	149	167	185	203
1240		78	96	114	132	150	168	186	204
1~2PM		LUNCH							
1400		79	97	115	133	151	169	187	205
1420		80	98	116	134	152	170	188	206
1440		81	99	117	135	153	171	189	207
1500		82	100	118	136	154	172	190	208
1520		83	101	119	137	155	173	191	209
1540		84	102	120	138	156	174	192	210
1600		85	103	121	139	157	175	193	211
1620		86	104	122	140	158	176	194	212
1640		87	105	123	141	159	177	195	213
1700		88	106	124	142	160	178	196	214
1720		89	107	125	143	161	179	197	215
1740		90	108	126	144	162	180	198	216



Date	DEC 4, THURSDAY								
	LOCATION								
Time	DSI	BT2	BT3	BT4	BT7	BS1-G	BS1-3	BS2-3	Aud-3
900		217	241	265	289	313	337	361	385
920		218	242	266	290	314	338	362	
940		219	243	267	291	315	339	363	
1000		220	244	268	292	316	340	364	
1020		221	245	269	293	317	341	365	
1040		222	246	270	294	318	342	366	
1100		223	247	271	295	319	343	367	
1120		224	248	272	296	320	344	368	
1140		225	249	273	297	321	345	369	
1200		226	250	274	298	322	346	370	
1220		227	251	275	299	323	347	371	
1240		228	252	276	300	324	348	372	
1~2PM	LUNCH								
1400		229	253	277	301	325	349	373	
1420		230	254	278	302	326	350	374	
1440		231	255	279	303	327	351	375	
1500		232	256	280	304	328	352	376	
1520		233	257	281	305	329	353	377	
1540		234	258	282	306	330	354	378	
1600		235	259	283	307	331	355	379	
1620		236	260	284	308	332	356	380	
1640		237	261	285	309	333	357	381	
1700		238	262	286	310	334	358	382	
1720		239	263	287	311	335	359	383	
1740		240	264	288	312	336	360	384	



## Keynote 1

### Functionally Graded Materials: Fundamentals and Applications

**Prof. Dr. Yoshimi Watanabe**  
**Nagoya Institute of Technology, Japan**

Functionally graded materials (FGMs) are the advanced composite materials characterized by spatial variations in composition and/or microstructure that change over the volume. The coated-type or joined-type composite is a type of macroscopically inhomogeneous material with *material A* at one end and *material B* at the other. The most serious problem with the coated-type or joined-type composite is a macroscopic interface. Since the functions of this material change discretely from the *material A* part to the *material B* part at the macroscopic interface, cracking and/or delamination should occur near/at the interface during processing or use of the part. This problem can be overcome by eliminating the macroscopic interface where the composition and/or microstructure vary gradually. Thus, the properties should be changed continuously by the absence of a macroscopic interface in the FGMs.

In general, there are three approaches to fabricate FGMs. The first one is to eliminate the interface of coated-type or joined-type composite, eliminating discontinuities in the properties at the interface. Compositional gradient can be formed by elimination of the sharp interface by diffusion. The second one is to induce non-uniform distributions of dispersoids in a homogeneous particle-composite, creating multiple functions within the material. One example is centrifugal method. In the centrifugal method, a centrifugal force applied to a homogeneous molten composite assists the formation of the desired gradation. The composition gradient is then achieved primarily due to the difference in the centrifugal force produced by the difference in density between the molten metal and solid particles. The third one is carried out by sequential build up of layers. Powder processing, thermal spray processing, chemical vapor deposition (CVD), and physical vapor deposition (PVD) are the typical examples. Today, I will first describe some fabrication methods of FGMs, and then discuss some recent results about the mechanical and physical properties of FGMs fabricated under the centrifugal force.



## **Keynote 2**

### **The Implementation of Green Transportation in Malaysia: Issues and Challenges**

**Prof. Ir. Dr. Riza Atiq Abdullah bin O.K. Rahmat**  
**Universiti Kebangsaan Malaysia**

The concentration of greenhouse gases is increasing in the past 50 years at the alarming rate. The gases rise into the atmosphere and trap the sun's energy, causing global warming and climate change. In industrialized countries such as the US, motorized vehicles accounted for 23.6% of the total greenhouse gases emission and passenger cars accounted for almost half of the total emission. Malaysia is committed to reduce greenhouse gas emission by adopting multi prongs strategies, including in the transport sector which comprises of electric vehicle (EV), modal shift from private to public transport and active transport initiatives. There are issues and challenges in implementing the initiatives such as limited resources, political hurdle and lack of motivation. Inadequate charging stations and high price of EV are the main reasons of its very limited used in Malaysia. Inadequate funding is delaying the implementation of rail based public transport. Politically, initiatives to influence a modal shift from private vehicles to public transport such as transferring fuel subsidy to public transport is a suicide for the ruling party. The same goes with increasing parking charges. Creating dedicated bus lane is also facing strong resistance from road users and car industry players. The bus lane is perceived as the cause of a massive traffic jam as one lane at each direction is taken away from the special lane. To the car industry, the bus lane is perceived as stumbling blocks to car sale. Lack of motivation is another challenge in implementing green transport. Most car users do not realize that every time they use their cars, they are actually contributing to global warming, climate change and air pollution. As a result, they are not cooperating for any initiative to discourage them from using private cars. In the part of local authorities, encouraging commuters to use public transport or adopt active transport means reducing their income from parking charges. As for now Malaysia is subsidizing fuel amounting more than RM 20 billions a year that producing greenhouse gases. This must be stopped or reduced by having an integrated plan of action involving every stakeholder.



### **Keynote 3**

## **Spintronic - Technology for Future Energy Generation**

**Prof. Dr. Hashim bin Saim**  
**Universiti Tun Hussein Onn Malaysia**

The future energy sources should be clean and free from carbon emission. Therefore, fossil fuel is not an option. Solar cell is one of the renewable and green energy sources. A natural approach in the solar cell fabrication is using organic materials which offer lower manufacturing cost and lightweight for rooftop installation. However, due to electron-hole recombination, it suffers efficiency degradation. The exciton diffusion length and Van der Waal's force are the main parameter contributing to the low efficiency. An alternative effort of using spintronic theory is proposed to manipulate the electron spin to prevent recombination or at least minimizing it. Among the ferromagnetic materials, (ZnO) based layer employed into the organic structure will induce electron spin. With the electron spin, the recombination of electron-hole could be minimized and enhancing its performance. Therefore, power conversion efficiency (PCE) of the solar cell could also improve. This approach is the future technology for solar cell.



#### **Keynote 4**

### **Integrated Engineering and Green Technology For A Sustainable Future**

**Prof. Ir. Dr. Amir Hashim bin Mohd Kassim  
Universiti Tun Hussein Onn Malaysia**

It is always of utmost concern to look into the future well-being of our fellow engineers. The practice of engineering in the future can no longer be a single discipline. A multi-and interdisciplinary approach is much to be required. From the choice of materials to the technique of construction methods, Green Philosophy is very much the norm from now on. The engineers of the future must be much more interdisciplinary-therefore lines between the conventional engineering disciplines must be much more flexible.

Future engineers will need to understand the equal importance of society, economy and the environment- i.e. the three underlying principles of sustainable development. We must be forward looking at allowing engineering degree programmes in new emerging engineering fields such as Green Technology, Nano Technology, Internet Engineering, Information Engineering, etc. Engineers will also have to join forces with physicists, biologists, chemists, economists, planners, political scientists, and community leaders in unprecedented ways to lead society on a sustainable path. Therefore, we must dramatically reduce the resource and energy throughput of our economy and minimize our ecological footprint to maintain the life support system that will make a sustainable future possible.



### **Keynote 5**

## **Producing Biodiesel from Jatropha Curcas Oil Using Ultrasonic Process**

**Prof. Dr. Sulaiman bin Hj Hasan**  
**Universiti Tun Hussein Onn Malaysia**

This study was conducted to obtain biodiesel from jatropha curcas oil (JCO) by ultrasonic method. In this study, jatropha curcas oil (JCO) was converted to biodiesel as JCO is easily available and does not disturb the food chain. To produce biodiesel from jatropha curcas oil (JCO), it needs two-stage process. The first stage is the esterification process; in this process free fatty acids of jatropha oil are lowered to 0.402% with a ratio of 18:1 methanol to jatropha oil and 1% catalyst sulfuric acid ( $H_2SO_4$ ) at a temperature of  $65^{\circ}C$  with a 20 minutes reaction time. The next stage is transesterification conducted with 6:1, 9:1 and 12:1 molar ratio methanol to jatropha for reaction times of 3, 5 and 7 minutes for 1% catalyst sodium hydroxide (NaOH) at a temperature of  $65^{\circ}C$ . The standard physical properties test to determine the biodiesel qualities are flash point, water content, acid value, density and dynamic viscosity. From the test, 89% yield biodiesel was obtained with molar ratio methanol to oil 6:1 at 7 minutes reaction time. Ultrasonic method has potential to be an attractive technology to produce biodiesel because it reduced processing time from 38 hours using conventional method for 4 to 5 hours. This saves cost and time.



### **Invited Speaker**

Versatile Formation of Fluorine Doped SnO<sub>2</sub> nanostructures on Glass Substrate (BS2-3, 3 Dec 2014, 11 a.m.)

#### **Prof. Dr. Kenji Murakami**

*Graduate School of Engineering, Shizuoka University, 3-5-1 Johoku, Naka-ku, Hamamatsu 432-8011, JAPAN*



### **Invited Speaker**

Confined molecules in self-assembled molecular corrals (BS1-3, 3 Dec 2014, 2 p.m.)

#### **Assoc. Prof. Dr. Masaru Shimomura**

*Graduate School of Engineering, Shizuoka University, 3-5-1 Johoku, Naka-ku, Hamamatsu 432-8011, JAPAN*



### **Invited Speaker**

Cobalt electrolyte for dye-sensitized solar cell (BS1-3, 3 Dec 2014, 11 a.m.)

#### **Prof. Dr. Oliver Amarasekera**

Department of Chemistry, University of Peradeniya Peradeniya, 20400 Sri Lanka

## List of Papers Accepted For Presentation

No.	Paper Title	Presenter
1	Surface Tension Effect on Sound Absorption Characteristics of a Cavity-Backed Semi-Permeable Membrane	M.H. Zainulabidin
2	Properties of Steel Fiber Reinforcement Concrete with Different Characteristic of Steel Fiber	Shahiron Shahidan
3	Theoretical Modelling of Plate with Attached Vibration Absorber	Izzuddin Zaman
4	Information Structure of STEP Convertor of STEP-CNC Mapping System	Noordiana Kassim
5	Perforated Impact Strength of Woven Kenaf Fiber Reinforced Composites	Al Emran Ismail
6	Oblique Perforated Impact Strength of Woven Kenaf Fiber Reinforced Composites	Al Emran Ismail
7	Analysis of Sound Produced By A Traditional Malay Musical Instrument "Kompang"	Al Emran Ismail
8	Weight Minimization of Helical Compression Spring Using Gravitational Search Algorithm (GSA)	Noor Hafizah Amer
9	Constant Amplitude of PSC Subjected To Three Coaches Train	Ikmal Rozli
10	Accelerometer Performance For Maker Faire Quadrotor With Kalman Filtering Using PID Controller	Muhammad Zaim Mohamed Pauzi
11	Novel Straight Type Aortic Cannula with Spiral Flow Inducing Design	Nofrizal Darlis
12	Fatigue Strength of High Strength Steel Sheets Joined By Hemming Process	Zamzuri Hamedon
13	The Study on Whole Body Vibration Exposure Induces Low Back Pain Among Uthm Bus Drivers	Ahmad Noor
14	Analysis of Vibration Effects on Floor of Office Building Due To Ground Vibrations From Passing Vehicles	Shurl Yabi
15	Steel Ball System Control Using T-S Type Fuzzy Logic	Mohammed Ahmed
16	A comparative Study of Reassigned Conventional Wavelet Transform for Machinery Faults Detection	Ahmed M. Abdelrhman
17	Time Frequency Analysis For Blade Rub Detection In Multi Stage Rotor System	Ahmed M. Abdelrhman
18	Integrating And Utilizing AHP And GIS For Landfill Site	Izni Mohamad
19	Bolts Gauge Effect on the Face Bending Behaviour of Concrete-Filled Hollow Section for Hollo-Bolted Connections	Ahmed Elamin
20	Crashworthiness Behavior of Hollow Al-Based Functionally Graded Material (FGM) Box under Quasi-Static Loading	S. Jamian
21	Hydroxyapatite extracted from Waste Fish Bones and Scales via Calcination Method	Najwa Mustapha
22	Green Strength Optimization in Metal Injection Molding applicable with a Taguchi Method L9 (3)4	Najwa Mustapha



No.	Paper Title	Presenter
23	Characterisation of Ti-6Al-4V Reciprocating Sliding Wear Test Behaviour	Nurarina Ahmad Nurdin
24	Axial Energy Absorption of Kenaf Yarn Winding Cylindrical Composites	Noorhaslinda Abdullah
25	Effect of Mechanical Mismatch on The Stress Intensity Factors of Inclined Cracks Under Mode I Tension Loading	Al Emran Ismail
26	Effect of Orientation Fabric on Mechanical Energy Absorption Natural Fibres Reinforced Composite: A Review	S.N.A. Khalid
27	Vibration Condition Monitoring: Latest Trend And Review	K.H. Hui
28	Review on Fluid Structure Interaction Solution Method For Biomechanical Application	Nazri Zakaria
29	Detection of Twisted Blade In Multi Stage Rotor System	Wai Keng Ngui
30	Challenges For Kenaf Fiber as A Reinforcement: A Review	M.A. Hassan
31	Integration of Artificial Intelligence Into Dempster Shafer Theory: A Review on Decision Making In Condition Monitoring	Muhammad Firdaus Bin Rosli
32	Effect of Beating Process To Soda Anthraquinone Pulp of Oil Palm Male Flower Spikes Fibre	S.R. Masrol
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