JKR 29201-0018-20

INOVASI 2019

JKR MALAYSIA

TONGUE & GROOVE CONCRETE DRAIN

Nilai tambah bagi sistem saliran sedia ada

Strategi Pelaksanaan
DASAR PENYELIDIKAN DAN INOVASI JKR

Konvesyen KIK JKR
mencetus idea inovasi

Commercialisation
& INTELLECTUAL PROPERTY (IP)

Pusat Kecemerlangan Kejuruteraan dan Teknologi JKR (CREaTE)

KANDUNGAN

Sidang Redaksi

Kata - kata Aluan

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Pengarah Bahagian Inovasi, Penyelidikan dan Pembangunan Kejuruteraan (BIPPK)
Menjalankan Tugas Pengarah Kanan
Pusat Kecemerlangan Kejuruteraan dan Teknologi JKR (CREaTE)

Assalamualaikum w.b.t dan Salam Sejahtera

Alhamdulillah, bersyukur ke hadrat Illahi kerana dengan izinNya majalah **INOVASI JKR CREaTE** yang pertama kali dapat diterbitkan. Tahniah dan syabas saya ucapkan kepada sidang redaksi yang di ketuai oleh Ketua Unit Inovasi Kejuruteraan, BIPPK, CREaTE dan penyumbang artikel di atas usaha dan komitmen dalam menghasilkan **INOVASI JKR CREaTE** ini.

Penerbitan **INOVASI JKR CREaTE** amat penting sebagai wadah bagi membudayakan inovasi dalam kalangan warga JKR serta memupuk warga JKR agar sentiasa berfikiran kreatif dan inovatif bagi mempertingkatkan kecekapan di dalam sistem penyampaian perkhidmatan JKR kepada pelanggan selaras dengan Tema 5 Pelan Strategik JKR 2016-2020 dan aspirasi negara ke arah Revolusi Industri 4.0.

Selain itu melalui penerbitan **INOVASI JKR CREaTE**, seluruh warga JKR akan dapat mengetahui maklumat dan perkembangan terkini berkaitan inovasi JKR terutamanya berkaitan program dan aktiviti yang dilaksanakan, produk inovasi yang telah dihasilkan melalui program Konvensyen Kumpulan Inovatif dan Kreatif (KIK) serta penyelidikan, pencapaian produk inovasi JKR di pertandingan inovasi di peringkat dalam dan luar negara, pembangunan produk inovasi, adaptasi dan pengkomersialan produk inovasi JKR.

Justeru, dengan penerbitan **INOVASI JKR CREaTE** ini ianya dapat memberi idea kepada warga JKR untuk mencetuskan inovasi-inovasi terkini yang bukan sahaja bersifat baru, unik dan bermanfaat, malahan sesuatu hasil yang mampu berfungsi sebagai pemangkin kepada transformasi serta kesejahteraan negara.

Sekian, terima kasih.

UNIT INOVASI KEJURUTERAAN BIPPK CREaTE JKR

PEMBUDAYAAN INOVASI

- Pelaksanaan strategi dan pelan tindakan dibawah Dasar Penyelidikan Dan Inovasi JKR Malaysia
- Khidmat sokongan berkaitan penghasilan produk inovasi
  - Kempen kesedaran dan bengkel inovasi
- Penganjuran program pembudayaan Inovasi
  - Pertandingan Inovasi CREaTE dan Ibu Pejabat
  - Konvensyen KIK JKR
- Penerbitan dan dokumentasi projek inovasi
- Pengurusan pertandingan produk inovasi JKR di dalam dan luar negara

PEMBANGUNAN INOVASI

- Khidmat perundingan penyelidik dan perekacipta inovasi bagi projek pembangunan produk inovasi JKR (dalaman dan kolaborasi)
- Pengurusan dana projek pembangunan inovasi
- Pengurusan kolaborasi dengan IPTA/IPTS dan pihak luar JKR

PENGURUSAN HARTA INTELEK

- Khidmat nasihat dan perundingan berkenaan pengurusan harta intelek JKR
  - Paten / Hakcipta / Cap Dagang dan Rekabentuk Industri
- Pengurusan pendaftaran harta intelek dengan MyIPO
- Pengurusan pembayaran insentif

PENGKOMERSIALAN

- Pengurusan pengadaptasian produk inovasi JKR dalam jabatan
- Pengurusan pra-pengkomersialan dan pengkomersialan bagi produk JKR
  - Perjanjian pelesenan/ market validation / technology validation antara JKR dan pihak luar JKR
- Promosi produk inovasi JKR yang telah dikomersialkan
- Pengurusan pembayaran royalti
- Pengurusan data dan sistem maklumat inovasi

Carta Organisasi Unit Inovasi Kejuruteraan

Dasar Penyelidikan dan Inovasi JKR Malaysia

Dasar Penyelidikan Dan Inovasi Jabatan Kerja Raya Malaysia merupakan satu dokumen rangka kerja untuk pembangunan penyelidikan yang berinovatif dan Inovasi di JKR dalam usaha untuk menjadi peneraju penyelidikan dan Inovasi yang bertaraf dunia di dalam bidang Kejuruteraan dan teknologi. Dokumen Dasar Penyelidikan dan Inovasi ini menjelaskan halatuju, prinsip dan strategi pelaksanaan projek penyelidikan yang seragam dan usaha-usaha Inovasi yang kreatif dan dinamik untuk dijadikan panduan warga JKR.

Selaras dengan perkembangan semasa perkhidmatan awam, inovasi yang dihasilkan oleh JKR hendaklah berkonsepkan Cepat, Tepat, Integriti – *Productivity, Creativity and Innovation* (CTI-PCI).

Disamping itu, ianya hendaklah menyokong Strategi Lautan Biru atau *Blue Ocean Strategy (BOS)*, prinsip Inovasi Nilai (Value Innovation) dan konsep Merakyatkan Perkhidmatan Awam (MPA),berfokuskan kepada penciptaan nilai, penambahan nilai, pengurangan kos, perkhidmatan yang memenuhi aspirasi dan harapan jabatan yang berimpak tinggi selaras dengan konsep Horizon Baharu Kumpulan Inovasi dan Kreatif (KIK) dan Revolusi Industri 4.0 *(IR 4.0)*.

STRATEGI PERLAKSANAAN

DASAR PENYELIDIKAN DAN INOVASI JKR

- Menyediakan persekitaran penyelidikan yang kondusif
- Membudaya dan meningkatkan kreativiti dan inovasi dalam kalangan staf jabatan
- Menggalakkan penyelidikan dan inovasi horizon baharu yang merentas disiplin
- Menyediakan dan menyenggara infrastruktur dan kemudahan asas bagi penyelidikan
- Berusaha menyediakan sumber manusia yang mencukupi dan terlatih untuk menggalakkan aktiviti penyelidikan dan memberikan penekanan kepada penggunaan sumber secara optimum
- Menggalakkan penyelidikan secara dalaman
- Memperkasa dan memperluas pembangunan penyelidikan dan inovasi di peringkat jabatan
- Berusaha mempelawa penyelidik yang dikenali dan berwibawa di peringkat nasional dan antarabangsa untuk menjalankan penyelidikan di CREaTE
- Menggalakkan aktiviti kolaboratif atau jaringan kerjasama dengan Institusi Pengajian Tinggi, Agensi Kerajaan lain, dan/ atau industri, di dalam dan luar negara, untuk tujuan penyelidikan dan inovasi
- Merancang strategi untuk memastikan peningkatan bilangaan penerbitan dalm jurnal berimpak tinggi
- Menubuhkan institut kepakaran penyelidikan sebagai peneraju sesuatu *niche area*, dan memastikan keahlian pegawai dan kakitangan di dalam institut kepakaran penyelidikan tersebut
- Memanfaat dan mengadaptasi teknologi/ kombinasi teknologi di bawah Revolusi Industri 4.0 (*IR 4.0*) di dalam aktiviti penyelidikan dan pembangunan kejuruteraan, dan inovasi
- Merancang dan melaksanakan sistem penganugerahan untuk menggalakkan kecemerlangan di dalam penyelidikan dan pembangunan kejuruteraan, dan inovasi
- Menyediakan platfom bagi perkongsian penemuan atau dapatan penyelidikan oleh penyelidik dalam jabatan dan yang akan dilaksanakan secara kolaboratif
- Mengadakan bengkel/ seminar/ persidangan bertujuan memberi pendedahan kepada staf JKR berkaitan penyelidikan dan pembangunan kejuruteraan
- Pengadaptasian dan pengkomersialan hasil penyelidikan dan inovasi jabatan

INNOVATION : Art or Science?

Ts. Shahril Bin Azizi (Author)
Mohamed Zhaidi Bin Baharin (Co-Author)
Ir. Kamaruddin Bin Othman (Co-Author)

Introduction

In the 21st century or the era of the Fourth Industrial Revolution (IR 4.0), challenges in business environment have increased intensively and these include climate change and the demands of an ageing society. This phenomena has caused an organization to embrace creativity and innovation as the core driver of its business growth, performance and valuation (McKinsey, 2008) in order to gain competitive advantage (Regent University, 2008) against its competitors and also to stay sustainable in the business environment. The rise of global challenges brings about rapid innovation activities, causing technological spillovers which create significant opportunities and new lucrative emerging markets for technology-based products and services (Drucker, 1985).

Innovation

According to Poole N and Buckley CP, (Imperial College, 2006), innovation means novelty, new things being done or old things being done in new ways. Moreover, the detailed definition is the application of technological, institutional and human resources as well as discoveries to productive processes, resulting in new practices, products, markets, institutions and organisations that become improved and efficiency-enhancing. Furthermore, creative innovations require one to have the ability to connect between the arts and sciences. Albert Einstein as the exemplar, "Einstein got stymied while working out General Relativity, he would pull out his violin and play Mozart until he could reconnect to what he called the harmony of the spheres" (weforum.org) while Steve Jobs mentioned "It is in Apple's DNA that technology alone is not enough - it's technology married with liberal arts, married with the humanities, that yields us the results that make our heart sing." Similarly, looking forward to the next phase of digital revolution, plenty of technology fusion or interdisciplinary innovation will be involved between engineering and creative industries (weforum.org) (Alan FB, Lee W, Alice S, Charles B, John K, Cambridge University, 2009).

Managing Innovation

There are two types of innovation, namely radical innovation and incremental innovation. Radical innovation characteristics comprise disruptive technologies involving fundamental rethink of a technology, enabling new markets, having high impact to the market and requiring technology-driven strategy to penetrate the market while incremental innovation develops improvements on existing sustainable technology, adds value to current cultural routine and norms, provides short gains, has lower impact to the market and the

technology is normally driven by the market (Melissa A. Schillng, 2010). Managing innovation or knowing the characteristics of each innovation is essential to an organization. Likewise, systemic process and leadership are also essential in assuring that the technology would be properly managed, leading the organization to make better decisions regarding Capital Expenditure, Operational Expenditure and Return of Investment on a technology development or technology transfer (commercialization) project (Melissa A. Schillng, 2010). Moreover, a study has shown that only one (1) product was successfully commercialized out of three thousand (3000) raw ideas Figure 1.0 (Melissa A. Schillng, 2010), further indicating how crucial managing innovation is.

Managing Innovation in the context of PWD (JKR)

Globally, the arrival of IR 4.0 has been widely known, however the technology revolution 4.0 is not something that the industry has experienced before. It is said that the IR 4.0 is moving at exponential rather than linear pace and it is disrupting industries in every country (weforum.org). Although the velocity of disruption is difficult to comprehend, it is learned that technological innovation is vital and organization must respond comprehensively by involving policy, process, systems and procedures as well as competencies. The Public Works Department of Malaysia (PWD) has taken initial steps to include innovation as one (1) of the five (5) main pillars of its organization's strategic framework 2012 – 2020. The initiative is to become an innovative organization through four main strategies. The PWD is committed in developing an innovative workforce (strategy 5.1) as the foundation of the strategy. The PWD believes that enhancing its employees with core competencies will enable the development of new knowledge in terms of improving research capabilities (strategy 5.2) and a set of knowledge database, better known as Enterprise Content Knowledge Database (strategy 5.3). Capitalizing these research capabilities and knowledge database will eventually lead the PWD to achieving its ultimate aim of providing innovative solutions (strategy 5.4) to customers. Besides, the PWD has set up its Technology Transfer Office also known as 'Unit Inovasi Kejuruteraan' (UnIK) and Research Labs from the Division of Research, Development and Innovation (BIPPK) under the wing of the Centre of Technical Excellence of Engineering and Technology (CREaTE), Public Works Department of Malaysia to manage the technology created by the PWD. Until now, in general, 129 of Intellectual Property Assets involving patents, copyrights and trademarks are protected under the Intellectual Property Office (IPO) of Malaysia. Specifically, there are 34 products have been filed (product disclosure) for patents to the IPO of Malaysia while 1 patent has been granted by the said office. Furthermore, 11 products are at the pre-commercialization and commercialization phase with 3 of the products having been commercialized via licensing agreement.

Conclusion

The intensified and fast changing environment has forced the PWD to embark into a new journey of producing technology innovation. The establishment of CREaTE and Innovation as one of the main pillars in the PWD's Strategic Framework further clarifies that the PWD understands future needs and is ever committed to its ultimate goal of becoming a world-class serviceprovider and the centre of excellence in asset management, project management and engineering services for the development of the nation's infrastructure through creative and innovative human capital and state-of-the-art technology.

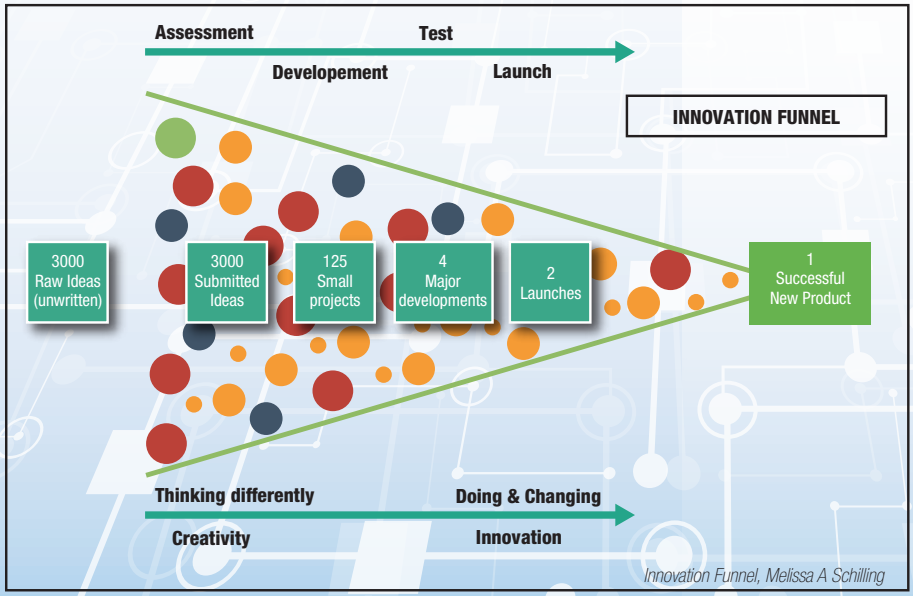

Figure 1.0 : Innovation Funnel

Sources:

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3. Strategic Management of Technological Innovation, Melissa A Schilling, McGraw Hill International Edition(2010)

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LEAKAGE CURRENT DETECTION DEVICE

1. NASRULLAH B. ABDUL MALIK 2. AZMAN B. BAHARI 3. ZUBIR B. IDRIS
4. MOHAMAD ZAILI B. BAHARUDDIN 5. NORSHAHRIWAN B. ABDUL RAHMAN
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Product Description

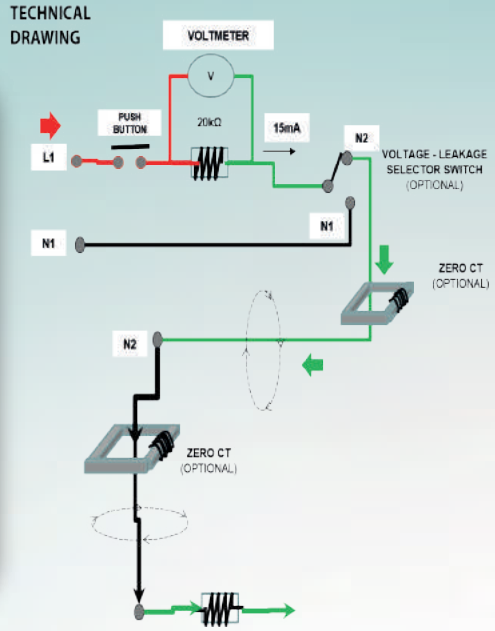
LEAKAGE CURRENT DETECTION DEVICE (LCDD) an apparatus to **DETECT INTERMITTENT AND NUISANCE TRIPPING** by using 3 E's method:

1. **EASY -** The leakage current exist can be measured only by push one push button switch. LCDD incorporated with built-in digital/analogue feature which able to identify the leakage current exist in the domestic wiring system before it reaches the default setting value of the RCCB.

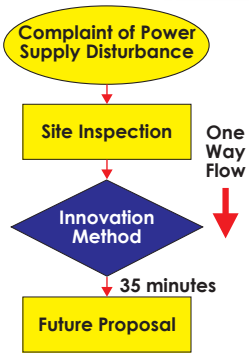
2. **EARLY -** LCDD to plan for preventive maintenance activity during RCCB in operation mode.

3. **EFFICIENT -** This invention introduce a combination of :-
An efficient new method of detecting the real cause of power disturbance in less than 35 minutes.
Terminal port inside Distribution Board (DB) where it suit to be connected to the LCDD for new and existing DB.

TECHNICAL DRAWING



Objective



- Power Supply Disturbance Solution.
- Permanent Solving Problem.
- Downtime saving.
- Man Power Solving.

Application

- Testing Device for Electrical Trouble Shooting Activities.
- Trouble Shooting Method (Simplified Method).
- Facilities Management – preventive maintenance.
- Domestic Electrical Distribution Board.
- RCCB, 240 Voltage Supply – Double pole type.
- Terminal Port/Adapter.
- Sensor/ Transducer.

Novelty

SIMPLIFIED METHOD OF ELECTRICAL TESTING DEVICE

- Reduce the number of testing devices required from 4 (Voltmeter, Ammeter, Test Lamp and Testpen) to only 1 (LCDD).
- Sensor/Tranducer and Adapter – user friendly – can be operated by non- competent personnel.
- Trouble Shooting Device.
- Minimum cost – Operation cost saving.

Market Potential

- Market Potential (RCCB is widely used in all kind of installation such housing area, office, schools, shopping complex etc).
- Huge volume due to the enforcement in PWD Standard Operating Procedure.
- Representing such large organization consist of 700 electrical technical stuff throughout Malaysia.
- Coordinating with 500 electrical company.
- Dealing with 100,000 Nos of RCCB throughout Malaysia (Gov. Building only).
- Also has potential in Non-Gov. Building (approx. 10 Million).
- The best Facilities Maintenance Prospect.
- Society benefit (main facility such as schools, clinics, shopping center etc).

Pencapaian Inovasi

MTE 2018 – SPECIAL AWARD

Pertandingan Inovasi

- Juara Inovasi JKR Malaysia 2016
- Pertandingan MTE 2018 (*Gold Award & Special Award*)
- Pertandingan ICAN 2018 (*Gold Award & Special Award*)
- Pertandingan Icompex 2019 (*Gold Medal* dan Naib Juara Kategori Elektrik, Electronic & Komunikasi)

Pertandingan KIK

- Juara Kementerian Kerja Raya 2016
- Juara Jabatan Kerja Raya Malaysia 2016

Penyeragaman prototaip peringkat KJEN 2019

Seminar & Pameran Keselamatan Elektrik – Suruhanjaya Tenaga & Gas peringkat Negeri Perak 2019

MTE 2018 – Komitment Pihak Pengurusan

Fakulti Kejuruteraan Elektrik UiTM Pulau Pinang 2017

Juara KIK JKR Malaysia 2017

Introduction

The aim of the Government of Malaysia is to encourage an environment whereby research and innovation will flourish. Innovation is the key to spurring economic growth in a developing country such as Malaysia. The Government of Malaysia adheres to the principle that knowledge and ideas should be harnessed for wealth creation and social well-being. The traditional resource-based economy is fast being replaced by knowledge-based economy.

Thus, Intellectual Property (IP) will become the key factor in driving this knowledge-based economy into the future. Under these circumstances, it is crucial that researchers in the respective industries continuously create new innovations. To encourage and facilitate such innovations, the Government of Malaysia has put in place various funding schemes for the necessary research and development to be conducted.

For this purpose, it is also imperative to provide a conducive environment, a secure mechanism and platform with which such innovations can be protected and exploited for the benefit of both the Government being the fund provider and also the researchers/inventors.

Intellectual Protection Rights AND INCENTIVES

In Jabatan Kerja Raya Malaysia

Ir. Kamaruddin Bin Othman
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(Co-Author)

Ownership of Intellectual Property

Where an Employee of a Relevant Body (Government Agencies) creates Intellectual Property, the ownership of such Intellectual Property shall vest as follows:

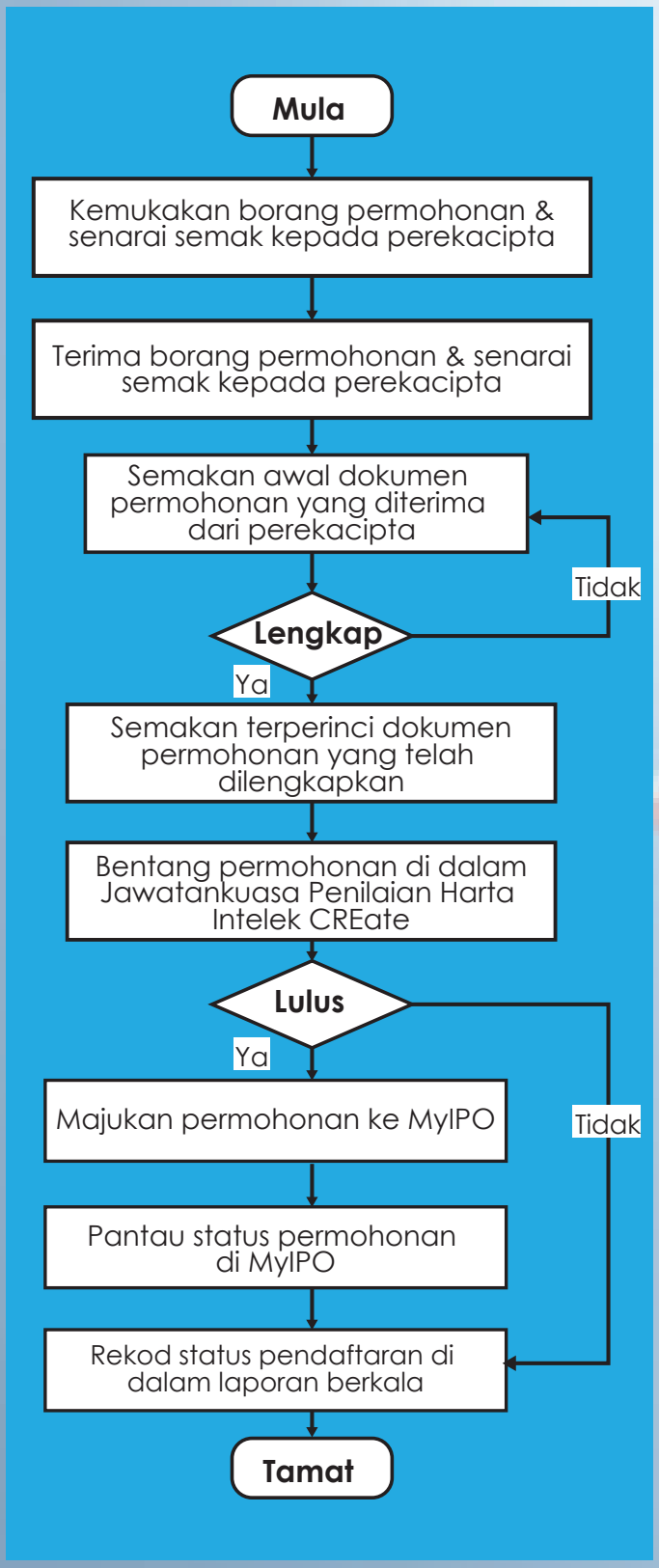
a) Where an Employee of a Relevant Body creates Intellectual Property in the course of his employment, the ownership of the Intellectual Property shall vest with the Relevant Body;

b) Where an Employee of a Relevant Body, whose contract of employment does not require him to engage in any inventive activity, creates, in the field of activities of his employer, an Invention using data or means placed at his disposal by his employer, the ownership of the Invention shall vest with the employer.

Managing Intellectual Property from JKR's Experience

As a Government Agency, Jabatan Kerja Raya Malaysia (JKR) has created Intellectual Property by way of research or organising programs such as Konvensyen Kumpulan Inovatif dan Kreatif (KIK). The protection process for these Intellectual Property is as follows:

Depending on the technology readiness of the Intellectual Property, JKR will determine the best possible way to exploit the Intellectual Property by way of commercialisation. The commercialisation process implemented in JKR is as follows:



Protection of Intellectual Property in JKR

Commercialisation of Intellectual Property in JKR

It is the intention of JKR as a Government Agency to encourage and reward innovation and creative activity within the organisation. Therefore JKR is required to encourage and motivate researchers/inventors in a manner that is equitable to all parties involved as well as for public benefit. One way of encouraging and rewarding innovation and creative activity is through the sharing of revenues and other income generated from commercial exploitation of the Intellectual Property rights.

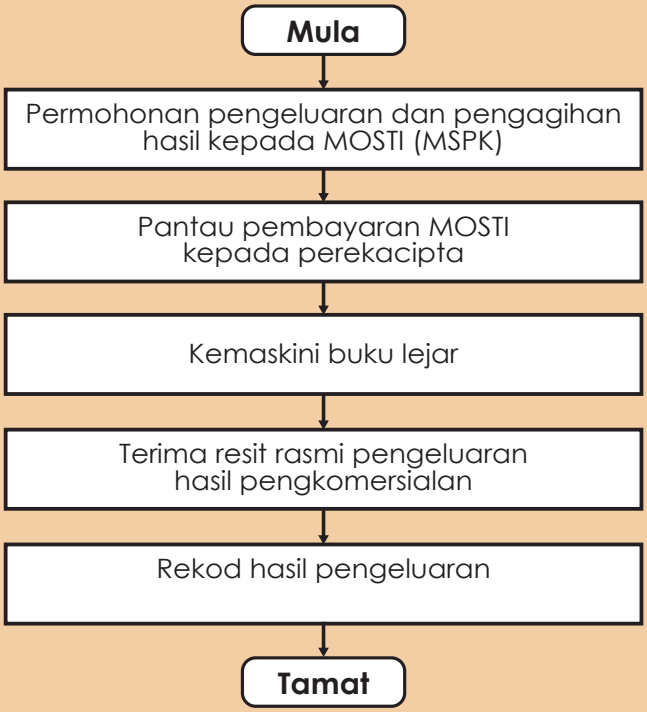
Thus any financial returns from the commercial exploitation of the Intellectual Property, such as net revenues shall be divided between the Government and the inventors. This view is in line with the Intellectual Property Commercialisation Policy developed by the Ministry of Science, Technology and Innovation in 2009.

	Disbursable Amount	Investor	Receipents
1	First RM250,000.00	100%	0%
2	Next RM250,001.00 to RM1,000,000.00	80%	20%
3	Next RM1,000,001.00 to RM2,500,00.00	60%	40%
4	Next RM2,500,001.00 to RM5,000,000.00	50%	50%
5	Next RM5,000,001.00 and above	40%	60%

Table 1 : Royalty Distribution Table

Process of Receiving Commercialisation Royalty in JKR

Process of Distributing Commercialisation Royalty in JKR



WHAT IS COMMERCIALISATION?

Commercialisation is to use, apply, publish, manufacture, assign, licence, sub-licence, franchise, sell, exploit, market or otherwise use or dispose of the Intellectual property (IP) for the purpose of generating financial or other commercial returns – Intellectual Property Commercialization Policy for Research & Development (R&D) Projects – MOSTI (June 2009)

Commercialisation in JKR

1. Identify product to commercialise
2. Obtain approval from Jawatankuasa Adaptasi from Cawangan Pakar
3. Receive Letter of Intent (LOI) from collaborators
4. Obtain agreement to commercialise from JKR Negeri & Cawangan
5. IP Valuation on the product
6. Decide commercialisation strategy
7. Discuss & Finalise Commercialisation terms
8. Prepare Memorandum of Agreement (MOA) for KKR (PUU) approval
9. Signing of MOA between Government & collaborators

Intellect Property (IP) Valuation

IP valuation is a process to determine the monetary value of subject IP

Income Approach	**Core concept:** Determine value of economic income that the IP asset is expected to generate, adjusted to its present day value	**Advantages:** Useful when IP assets generate stable or predictable cash flows	**Disadvantages:** Subject to many assumptions: future cash flows and discount rate
Cost Approach	**Core concept:** Determine value by calculating cost of developing a similar or exact IP asset	**Advantages:** Useful indication when no income stream or economic benefits	**Advantages:** Useful indication when no income stream or economic benefits
Market Approach	**Core concept:** Determine value by comparing with the actual price paid for similar IP asset under comparable circumstances	**Advantages:** Simple and accurate if compareble data is available	**Disadvantages:** Lack of comparability of IP; limited formal markets; lack of comparable data

Commercialisation Strategy

LICENSING

- Granting IP ownership rights from the IP owner to a recipient with terms and conditions attached to it on how to use the licensed to generate revenue
- Method of receiving the revenue from the licensor either by up front payment or royalties

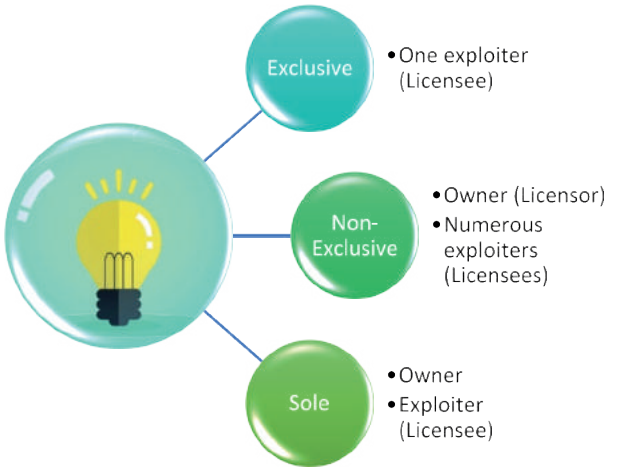
OUTRIGHT SALES

- No ongoing or continuing involvement between the IP owner and the purchaser after the sale phase
- There are no special competencies required to execute the strategy (apart from good marketing and negotiating skills during the sale and purchase phase)

SPIN OFF

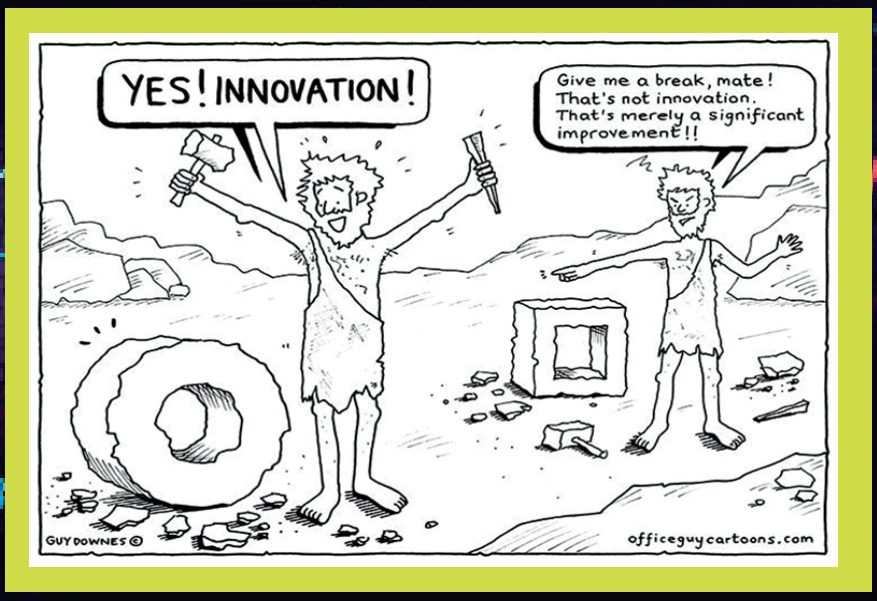
- Common practice in Universities and Research Institutions (RI)
- Parent organization (Universities & RI) creating a company in order to exploit and maximize the economic benefit from the IP

Licensing Strategy



Related Policy & Guidelines on Intellectual Property Commercialisation

- **Intellectual Property Commercialization Policy for Research & Development (R&D) Projects – MOSTI (June 2009)**
- **Intellectual Property Commercialization Manual – MOSTI (June 2009)**
- **Tatacara Pengurusan Aset Tak Ketara Kerajaan (1PP) – MOF (July 2014)**



WHAT IS INTELLECTUAL PROPERTY

Intellectual property (IP) refers to creations of the mind, such as inventions; literary and artistic works; designs; and symbols, names and images used in commerce – World Intellectual Property Organisation (WIPO)

A commercially valuable product of the human intellect, in a concrete or abstract form
– Black's Law Dictionary (9th Edition 2009)

Reasons for protection?

Intellectual Property Rights (IPRs)

Intellectual property rights (IPRs) are the rights given to persons (by statue) over the creation of their minds. They usually give the creator an exclusive right over the use of his/her creation for a certain period of time – World Intellectual Property Organisation (WIPO)

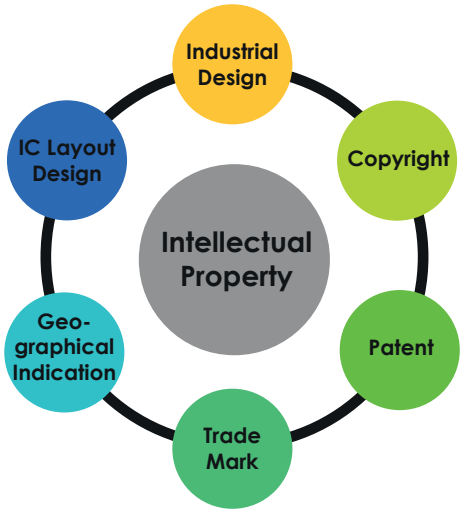
What are the exclusive rights?

The right to exclude others from producing, using or selling the IP

Intellectual Property Protection

- IP owner can exercise his exclusive right
- Territorial basis
- Limited period of time

Type of Intellectual Property



Patent

Patent protect the functional features foran invention that could be a product or a process that provides a new way of doing something, or that offers a new technical solution to a problem. Maximum duration of protection is 20 years.

Patentability Criteria

Novel/New

- New in the world
- Must not have been disclosed before the filing date to the public, anywhere in the world by written publication, oral disclosure, by used or in any other way

Involves an inventive step

- Must not be obvious to someone with knowledge and experience in the technology field of the invention

Industrially applicable

- Can be made or used in any kind of industry

Industrial Design

Industrial design means features of shape, configuration, pattern or ornament applied to an article by any industrial process or means, being features which in the finished article appeal to the eye and judge by the eyes. Maximum duration of protection is 25 years.

Integrated Circuit (IC) Layout Design

A layout-design of an integrated circuit is the three-dimensional disposition of the elements of an integrated circuit and some or all of the interconnections of the integrated circuit or such three -dimensional disposition prepared for an integrated circuit intended for manufacture. Maximum duration of protection is 15 years.

Trademark

Trademark is a sign which can distinguish the goods and services of one trader from those of another. It can be words, logos, pictures, names, letters, numbers or combination of those mentioned. Duration of protection is 10 years and is renewable for every 10 years.

Geographical Indication (GI)

A geographical indication (GI) is a sign used on products that have a specific geographical origin and possess qualities or a reputation that are due to that origin. Duration of protection is 10 years and is renewable for every 10 years.

What Can't Be Patented?

- A scientific or mathematical discovery, theory or method
- A way of performing mental act, playing a game or doing business
- An animal or plant variety
- A method of medical treatment or diagnosis

Related Policy & Guidelines on Intellectual Property for Government Agencies

- Intellectual Property Commercialization Policy for Research & Development (R&D) Projects – MOSTI (June 2009)
- Intellectual Property Commercialization Manual – MOSTI (June 2009)
- Panduan Pembudayaan dan Pemer-kasaan Inovasi dalam Sektor Awam (KIK Horizon Baru) – MAMPU (August 2016)
- Tatacara Pengurusan Aset Tak Ketara Kerajaan (1PP) – MOF (July 2014)

Intellectual Property Application Process in JKR

Receive IP Applications & Forms from JKR Negeri & Cawangan

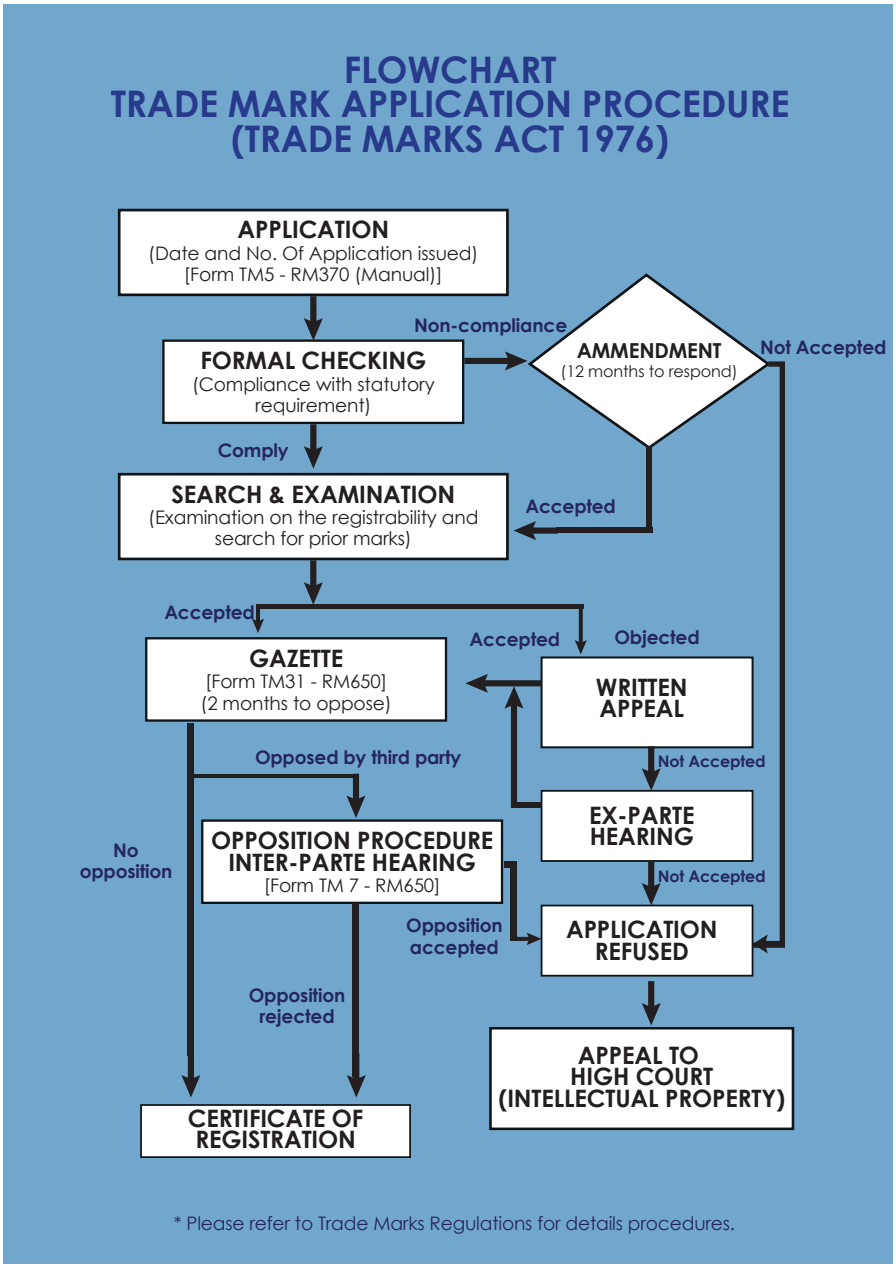
Peliminary Review of the Applications & Forms Received

Present the Applications in Jawatankuasa Teknikal & Pembangunan Inovasi (JTPI)

Detail Review of the Applications & Forms Received

Submit Applications & Forms to MyIPO

Registration of Trademark



Bend it ...like F-flex

Patent application no : PI2019000566

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Amir Asrol Bin Ahmad Bangi,
Rama Yadi Bin Abd Rashid,
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Faizal Bin Yusuf,
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INTRODUCTION

Construction of infrastructure such as drainage system over soft soil has been a challenge to infrastructure engineers due the insufficient bearing capacity, excessive post construction settlement and unstable excavation and embankment forming (Mohamad et. al, 2016). Soil settlement, which is defined as soil deformation due to the applied stress is affected by ground water level. If the ground water level is high, the fill material may become buoyant, thus affecting the total surcharge loading and the soil stability Insufficient pre-consolidation works to accelerate consolidation settlement as a preventive method would also lead to failure and instability of structure due to post construction settlement and differential settlement. (Lat et al, 2018)

The common design approach for the drainage system built over backfilled soft soil, particularly perimeter drain, is to design it as suspended system to the building apron. However, this approach has not solved the overall problem particularly at site where the settlement is very much active. It is observed that the drainage system failure normally occur at the rigid joints, which connect the rainwater down pipe to the perimeter drain or the distribution pipe.

CASE STUDY: POLITEKNIK SULTAN IDRIS SHAH, SABAK BERNAM, SELANGOR

The construction of 43 blocks in Politeknik Sultan Idris Shah (PSIS), Sabak Bernam, Selangor was commenced in 2000 and completed by 2003. The project was designed and supervised by Project Management Consultant (PMC). Severe soil settlement has damaged the infrastructure system within the compound of the campus. Public Works Department of Malaysia has been appointed by the Ministry of Education to investigate and to provide technical assessment on the soil settlement problem at PSIS on September 2013. Geotechnical report has been issued for the soil investigation works, laboratory tests and settlement monitoring at PSIS on January 2016.

The soil settlement analysis carried out using Terzaghi methods showed that the settlement is still active, and the balance of settlement until it reached stability ranges from 1427 mm to 2882mm. After 13 years construction, the recorded settlement ranged from 400 mm to 700 mm. The report also showed that immediate settlement has occurred and the primary settlement is still ongoing. The settlement is deemed to be stable when it reaches 90% of the settlement, which has been estimated will take place in 220 years to 370 years. This duration was due to the filling load, the thickness of the soft soil and the highwater table at site i.e. 0.00 m to 0.4 m from ground level (PWD, 2013).

At PSIS, the water from the rainwater down pipe is discharged to the main drain via distribution pipe which was buried or to the soak away pit. Only two blocks in this campus were equipped with perimeter drain. From the report, the damaged to the drainage system components were listed as in Figure 1. The broken rainwater downpipe due to the rigid joint damage were 1205 cases, broken joint to distribution pipe (205 cases) while differential settlement of the main drain is 6 cases and 2 cases of damaged perimeter drain.

Figure 1: Damage to the existing drainage system due to soil settlement at Politeknik Sultan Idris Shah, Sabak Bernam, Selangor.

Maintenance report by the PSIS Maintenance and Development Unit showed that the repair works to the drainage system were recurring, hence it is uneconomical to replace the damaged drainage pipeline, broken rainwater downpipe or perimeter drain using the normal design practice. Since the major cause of failure is at the rigid joint, innovation of this component is the key to the successful drainage system design at the soft ground area. The joint must be flexible as to accommodate the movement of the soil.

FLEXIBLE JOINT : F-FLEX

Material: The rigid joint is replaced with a flexible joint which can accommodate soil settlement through out its design life. The material of the joint, however, must be light enough as to minimize the soil deformation due to the applied stress. Since the flexible joint will be connected to the buried non pressured pipe, it is very important that the material must not be degradable or easily corroded by the soil acidity, and could sustain the differential settlement to the difference in building and infrastructure loading. PVC has been chosen for the material since it has a good corrosion resistance, lightweight and cheap besides it was the material used for rainwater down pipes.

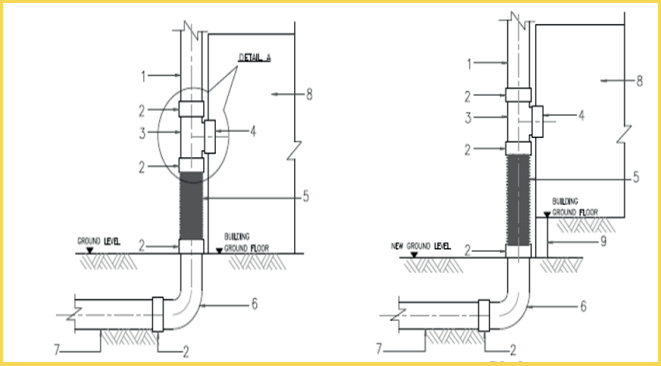
Length of the vertical part of flexible joint is the crucial part in the overall component since the minimum length must exceed the total settlement of the corresponding area throughout the design life of the joint . The minimum length of the flexible joint is calculated by first estimating the Factor of Safety. This is carried out via manual tensile test in which the maximum elongation of the proposed material is obtained. In the case of PVC flexible hose, the hose can elongate up to 4.0 times its original length. The F.O.S is then taken as 2.5.

One of the critical design issues of pipe system is the turbulent bubbly flows in vertical circular pipes such as rainwater down pipe. The radial residence of the bubble is very much depends on the diameter of the pipe. Since the flexible joint will be installed at the edge of rainwater down pipe to the distribution pipe, this effect should be reduced to avoid the flexible joint failure. An energy dissipator (i.e. strainer) is installed at the top of the flexible joint, which reduce the water velocity.

Figure 2(a) is a side view illustrating the flexible joint or F-flex prior ground settlement. It depicts the connection structure comprising rainwater down pipe and a drain pipe using a tee fitting, a flexible member formed by molding an elastic synthetic resin material such as synthetic rubber or soft vinyl chloride into a cylindrical shape and a 90° elbow. The lower end portion of the rainwater down pipe 1 is inserted and fixed to the upper end portion of the tee joint 3 via coupler 2, and this tee joint 3 is connected to the a flexible member formed by molding an elastic synthetic resin material such as synthetic rubber or soft vinyl chloride into a cylindrical shape 5.

The lower part of flexible member 5 is connected to 90° elbow 6 via coupler 2 to drain pipe 7 buried in the ground through its circular opening. In the connection structure of the vertical gutter and the drain pipe, it is possible to easily assemble the joint 5 into the drain pipe 7 simply by fitting it from the circular opening of 90° elbow.

For example, when the length of the rain water down pipe 1 is insufficient and there is a distance from the drain pipe 7, as shown in the side sectional view of Figure. 2(a), the length of the joint 5 is adjusted and the fitted portion of the joint 5 is set to a length that match the settlement rate, thus it is able to connect the upright pipe 1 and the drain pipe 7.



(a) (b)

Figure 2 Side view of F-flex (a) prior (b) post settlemen

Figure 2(b) is a side sectional view showing how the connection structure between the vertical gutter and the drain pipe absorbs ground settlement, flexibly deforming the joint 5 comprising the flexible member, the tension generated in the connecting portion between the upright pipe 1 and the drain pipe 7 is absorbed, and the rainwater down pipe 1 is prevented from being damaged. The gap between the building ground floor level and the new ground level will be covered by lightweight brick made from foam 9.

Figure 3 is a partially exploded side view of the tee joint (Detail A), showing how the connection structure between the vertical gutter i.e. down pipe, tee fitting and the flexible hose. The partially cross sectional view showed a round shaped metal or plastic strainer 10 is provided at the inner side of the tee joint 3 of the connecting structure between vertical gutter and the drain pipe. The partially exploded cross-sectional view of the coupler with energy dissipator installed (section a1-a1) showed the strainer 10 is placed above a ring shaped coupler 2 with inner thread 11.

CONCLUSION

Successful implementation of the F-flex has solved the problem of damaged drainage system over soft ground. F-flex provides green, one-off solution and economic maintenance to the damaged drainage system at site where the soil settlement is very much active. It is also ecofriendly as it improves the surrounding by replacement of open surface drainage using precast concrete drain with a more sustainable buried drainage pipe. The installation does not require any concrete base (i.e. non energy generating material), besides utilizing a readily available material (PVC flexible hose) on market. F-flex requires minimum maintenance through its design life, hence reduces construction waste and the corresponding pollution. The conventional design of a flexible fitting is thus innovated into more than just flexible in term of the ability to bend compared to the rigid one, but flexible in term of deformation and the ability to absorb stresses as well. This calls for the designer to 'bend' the conventional flexible joint design rule…so bend it like F-flex.

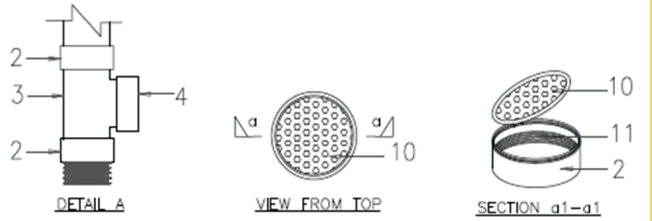


Figure 3 Detail A

Acknowledgement

Lithium Group wish to thank Ir. Badioezaman bin Ab Khalik, Design Director of Civil and Structural Branch , our fasilitators, Ir Hjh Atikah bt Abdul Hamid and Ir Hasrul Nizam bin Abdul Rahman from Civil Engineering Section, Civil and Structural Branch for their continouous support, guidance and ideas in establishing the FOS, reviewing the technical paper and providing useful insights of this invention.

Roadshow Konvensyen

KUMPULAN INOVATIF DAN KREATIF (KIK) JKR MALAYSIA 2019

Program *Roadshow* Konvensyen KIK JKR Malaysia merupakan satu inisiatif yang telah dilaksanakan oleh Unit Inovasi Kejuruteraan, Bahagian Inovasi, Penyelidikan dan Pembangunan Kejuruteraan (BIPPK), Pusat Kecemerlangan Kejuruteraan dan Teknologi JKR (CREaTE) bagi memberi penerangan berkaitan kaedah perlaksanaan Konvensyen KIK JKR Malaysia kepada semua kakitangan JKR.

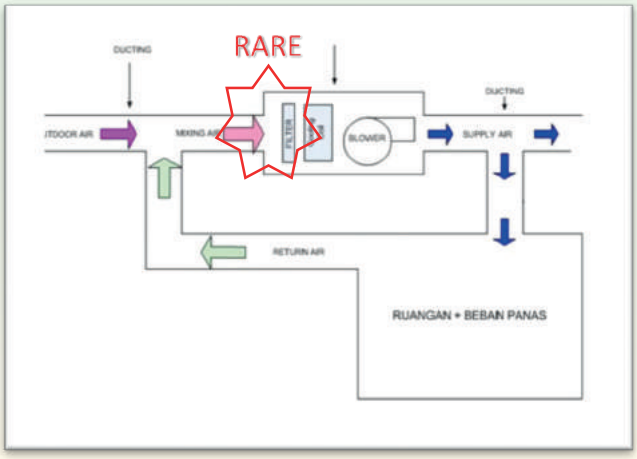
Roadshow ini juga merupakan satu medium untuk unit ini menguar-uarkan program inovasi seperti pertandingan, pameran, kursus dan sebagainya yang dilaksanakan sepanjang tahun 2019. Program ini telah dilaksanakan mengikut zon elatan, zon utara, zon timur, zon tengah dan zon ibu pejabat.

MAKMAL
PENYELIDIKAN
MEKANIKAL

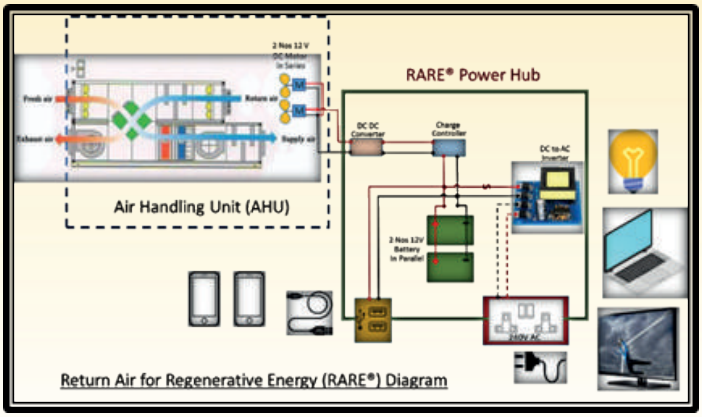
R.A.R.E

RETURN AIR FOR REGENERATIVE ENERGY

'RETURN AIR FOR REGENERATIVE ENERGY' merupakan inovasi baru yang berkonsepkan *Green Free Energy* yang memanfaatkan angin dari *Return Air Duct di bilik Air Handling Unit* (AHU). Potensi kelajuan angin pada return air duct mampu menjana tenaga elektrik di mana angin tersebut akan memusingkan bilah kipas yang bertindak sebagai peranti kemudian menukarkan tenaga kinetik kepada tenaga mekanikal dan seterusnya menjana tenaga elektrik.



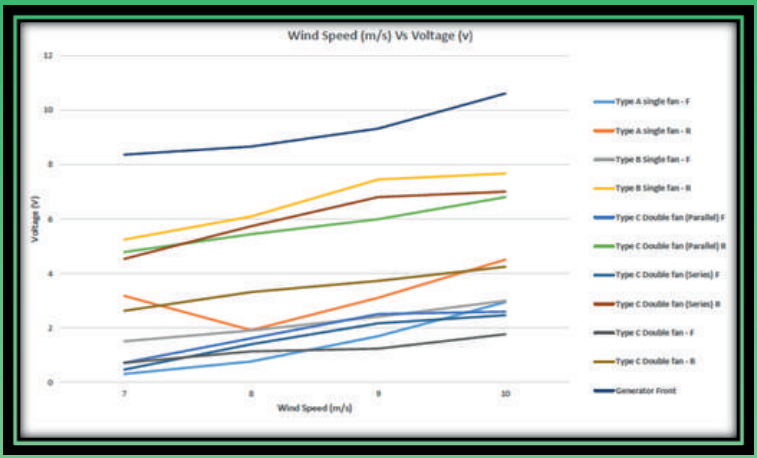
PRINSIP RARE



Angin yang tersedia dari *Return Air Duct* di bilik AHU akan memusingkan kipas untuk menggerakkan motor bagi menjana tenaga *DC* dan distabilkan oleh *DC Converter*. Tenaga DC yang telah distabilkan akan dihantar ke *Charge Controller* bagi pengecasan bateri. Tenaga *DC* boleh digunakan secara terus bagi pengecasan *USB*.

Tenaga *DC* juga akan ditukarkan kepada tenaga *AC* dengan menggunakan *DC* to *AC* Inverter sebelum digunapakai pada peranti elektrik.

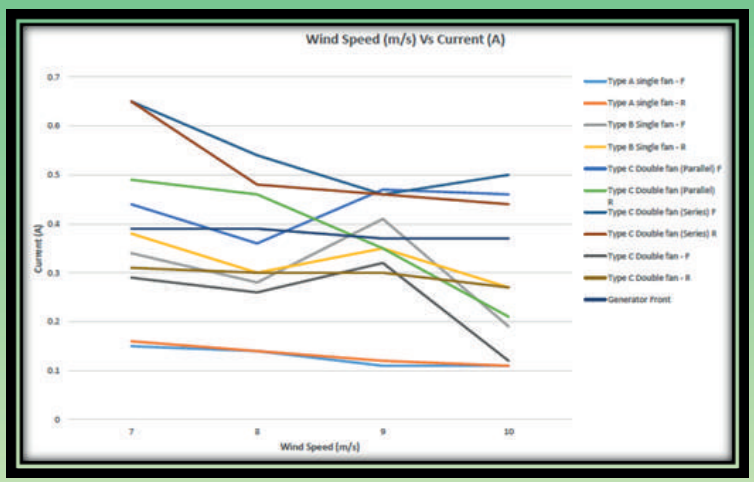
KAJIAN KES DAN ANALISA



ANALISA 1.

1. Generator boleh menjana voltage output yang tinggi walaupun dengan RPM yang rendah bagi semua jenis kipas.

2. Kajian lebih lanjut menggunakan generator dengan menumpukan peningkatan RPM dengan penggunaan bilah kipas yang berlainan.



ANALISA 2.

1. Type C double fan (semua litar) menghasilkan arus yang mencukupi berbandingan dengan jenis kipas yang lain.

2. Generator menghasilkan arus yang tinggi. Generator mempunyai potensi untuk kajian lebih lanjut dengan menggunakan bilah kipas yang berlainan

ANALISA 3.

1 NUMBER OF FAN BLADES

- For potential flow, a one-bladed system is the most efficient to generate electricity. Because of the decreased drag, one blade would be the optimum number when it comes to energy yield. However, it will cause unbalance in the system.
- On the other hand, using more blades would only cause a greater wind resistance, slowing the generation of electricity and thus becoming less efficient than those with less blades.
- For this reason, choosing number of fan blades is somewhat out of compromise: we want to reduce the stability or wobbling problem, but at the same time try not to reduce the efficiency of the fan by adding more blades.

2 DESIGN OF FAN BLADES

- Flat blades push against the wind, and the wind pushes against the blades. The resulting rotation is very slow because the blades that are rotating back on the up stroke after generating power are in opposition to the power output.
- This is because the blades are acting like huge paddles moving in the wrong direction, pushing against the wind giving them the name of drag-based rotor blades.
- The curved blade however has air flowing around it with the air moving over the curved top of the blade faster than it does under the flat side of the blade, which makes a lower pressure area on top, and therefore, as a result, is subjected to aerodynamic lifting forces which create movement.

3 TORQUE POWER

- Torque decreases with increasing wind force – while rotational speed remains unchanged.
- Higher torque means more force is needed for the prototype to operates. As RPM increasing, the torque will decrease. As more force is needed to operate the prototype, the use of high torque components may not be suitable if the wind force exerted on it is not even reach the minimum limit it requires.
- However it can generate a much better output than that of lower torque with more RPM in terms of generating electricity. Hence, that's why wind charger generator can produce high voltage despite obtaining lower RPM than the rest.

4 VOLTAGE AND CURRENT

- Power output is generated from the prototype in the form of voltage and current. To get the accurate power output generated, these 2 elements are essential in determining if the power output is enough to charge simple electrical devices.
- There is no use of high voltage if the current flow is too low, or otherwise. Hence, both elements need to be produced at their optimum level.
- Electronics components may be used in order to alter these values of voltage and current, such as transformers and regulators. But to ensure these components being utilised to their full potential, good raw data of voltage and current must be obtained first.

KELEBIHAN RARE

OUTCOME & IMPAK

Menghasilkan tenaga elektrik

Penjimatkan kos melalui pengoptimuman sumber tersedia

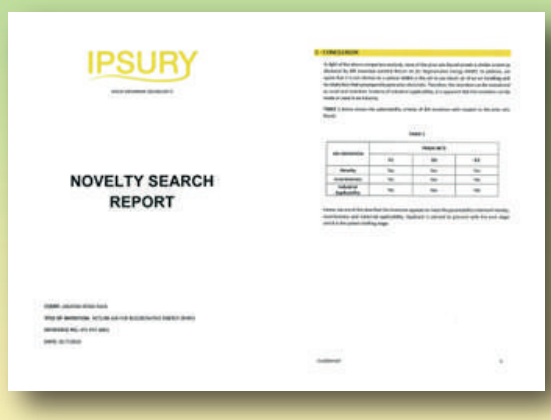
Boleh digunapakai pada peranti elektrik

Pengurangan CO_2

Pengurangan 'Carbon foot print'

Meningkatkan skor BGI, MyCREST & pH

NOVELTY & PATEN



TITLE:
A SYSTEM FOR GENERATING ELECTRICAL POWER

PATEN APPLICATION NO:
PI2019004771

FILING DATE:
20 AUGUST 2019

V-DER

Dari Alam Kepada Alam

A Mobile Leaves Collector & Shredder Complete With Composter **(V-Der)**

PENGENALAN

Dasar Teknologi Hijau Negara telah menggariskan usaha Malaysia dalam menangani isu penggunaan tenaga dan mengurangkan *'carbon footprint'* Malaysia serta mempertingkatkan kemampanan alam sekitar.

Di samping itu, semasa persidangan COP15 di Copenhagen pada 17 Disember 2009, Malaysia telah membuat komitmen bagi mengurangkan pelepasan karbon sehingga 40% menjelang 2020.

Pelbagai usaha dijalankan bagi merealisasikan komitmen tersebut, namun Malaysia masih berdepan masalah terbesar dalam menangani punca peningkatan peratusan gas rumah hijau iaitu dari sektor sisa pepejal di tapak pelupusan sisa pepejal (*landfill*).

Di Malaysia, pengurusan sisa taman dan landskap (organik) masih diakhiri dengan proses pelupusan di tapak pelupusan. Walaupun, umum mengetahui sisa taman yang bersifat organik ini boleh dikitar semula, namun sisa ini masih menambah bebanan kepada ketandusan tapak pelupusan di Malaysia. Malah pengurusan pembersihan sisa taman juga menelan belanja yang sangat tinggi kepada negara tanpa menjana sebarang ekonomi.

Menyedari masalah ini, kumpulan PutraVerve dari JKR Putrajaya telah membangunkan produk inovasi berkonsepkan 'Dari Alam Kepada Alam', yang mana berinspirasikan kelestarian alam dan seterusnya menyokong komitmen Malaysia dalam pembangunan hijau. *Mobile Leaves Collector & Shredder Complete With Composter* (V-Der) yang dicipta berupaya meningkatkan produktiviti keseluruhan operasi pengurusan sisa taman dalam penjimatan masa, kos dan pekerja dan mampu menjana ekonomi serta meningkatkan kelestarian alam.

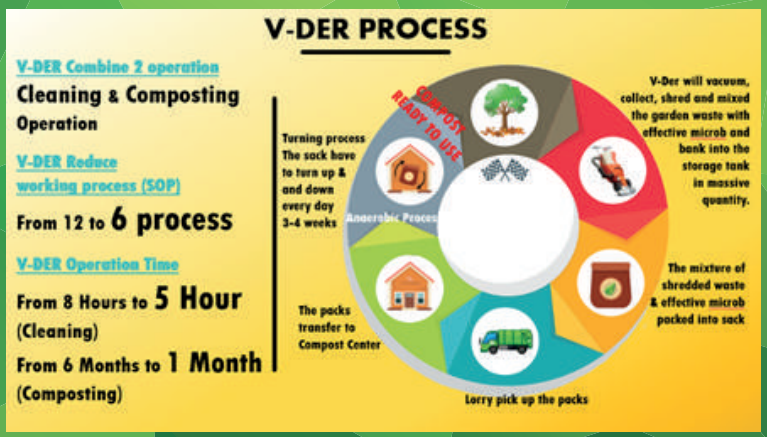
UJIAN LAPANGAN

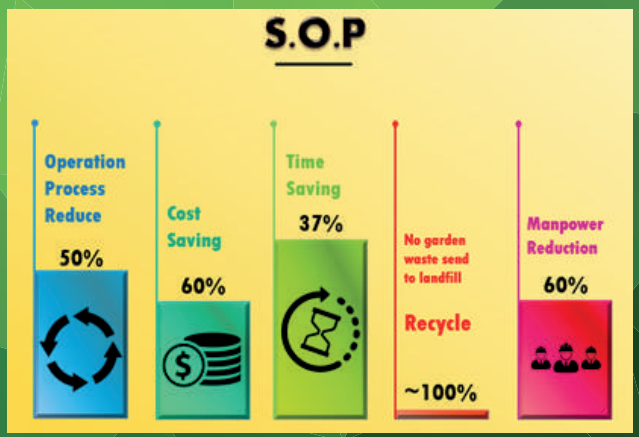
Putrajaya diiktiraf sebagai Putrajaya bandar Hijau 2020. Putrajaya dilitupi dengan penanaman pokok-pokok hijau yang dibangunkan hampir 40% daripada jumlah keseluruhan kawasan adalah taman, landskap dan jaluran hijau. Dengan pembangunan hijau berkeluasan hampir 2,000 hektar tersebut, negara perlu menanggung kos pengurusan pembersihan landskap mencecah 30 juta setahun. Malah, pada tahun 2016, Putrajaya pernah mengalami banjir kilat disebabkan sumbatan sistem saliran oleh lambakan daun kering dan sisa taman. Bertepatan dengan permasalahan yang dialami, PutraVerve telah memilih Putrajaya sebagai lokasi bagi ujian lapangan bagi menguji kefungsian V-Der dan seterusnya bagi membuktikan kemampuan V-Der dalam melestarikan alam sekitar.

V-DER

A Mobile Leaves Collector & Shredder Complete With Composter (V-Der) adalah mesin yang menggabungkan kesemua proses operasi pembersihan landskap sehingga ke proses pengkomposan iaitu penyediaan baja asas kompos. Dengan penggunaan V-Der proses kerja pembersihan landskap dan proses pengkomposan dapat dilengkapkan hanya melibatkan 6 proses. V-Der mampu menyedut dan seterusnya merincihkan sisa daun kering kemudian mengadunkan bersama pemangkin organik iaitu *effective microb* (EM) seterusnya proses yang terlibat akan menghasilkan semula kompos organik hasil daripada sisa daun kering tersebut. V-Der adalah gabungan mesin Penyedut (*Vacuum*), Perincih (*Shredder*), Pengumpul (*Collector*) dan Pengkompos (*Composter*).

Adunan rincihan sisa taman dan pemangkin organik (EM) ini kemudian dibungkuskan dalam guni yang bersesuian dan bungkusan ini akan menjalani proses pembalikan bagi menghasilkan kesan anarobik bagi mempercepatkan penghasilan kompos organik. Hasilnya, kompos organik tersebut sedia digunakan dalam masa 4 minggu atau 1 bulan. Umum tahu, pengkomposan merupakan proses yang rumit dan memerlukan tempoh masa yang panjang iaitu hampir 6 bulan. Walau bagaimanapun, dengan penciptaan produk inovasi ini, telah meningkatkan produktiviti keseluruhan operasi pembersihan dan seterusnya memudahkan proses pengkomposan sisa taman. Bagi faktor operasi, V-Der mampu meningkatkan produktiviti keseluruhan operasi pengurusan pembersihan landskap dengan menggabungkan operasi pembersihan dan pengkomposan.





Operasi kerja pembersihan dapat dikurangkan daripada 12 proses kepada 6 proses malah ditambah nilai dengan penghasilan kompos. Tempoh operasi pembersihan juga berjaya dikurangkan daripada 8 jam kepada 5 jam dan V-Der memerlukan tempoh masa hanya 1 bulan bagi menghasilkan kompos jika dibandingkan proses pengkomposan biasa yang memerlukan tempoh masa 6 bulan. Malah, V-Der mampu merealisasikan komitmen negara dengan berjaya membudayakan amalan kitar semula sisa taman secara holistik tanpa pergantungan kepada tapak pelupusan, penggunaan plastik dan seterusnya menyokong dasar hijau negara.

V-Der secara jangka panjang mampu memberi pulangan ekonomi kepada negara, dimana keseluruhan operasi pembersihan berjaya dikurangkan dengan pengurangan tenaga pekerja, peralatan, pengangkutan ke tapak pelupusan, kebergantungan plastik dan baja kimia. Hasil ujian lapangan yang dijalankan oleh pasukan PutraVerve, kos operasi berjaya dikurangkan daripada 24 juta setahun kepada 7.2 juta setahun iaitu sebanyak 60% penjimatan kos, malah mampu memberi pulangan kepada negara dengan menghasilkan baja kompos organik.

Mesin V-Der yang telah didaftarkan bagi perlindungan harta intelek (patent) tahun 2018 ini, telah digunapakai secara ujilari di sekitar Putrajaya dan dalam proses pembangunan prestasi keseluruhan mesin. V-Der berpotensi untuk dikomersilkan pada masa akan datang yang mana ia sesuai digunakan oleh setiap individu, kontraktor penyelenggaraan landskap, pihak berkuasa tempatan, agensi swasta dan juga agensi awam. Aspek mesra pengguna yang ringan, mudah digunakan, diselenggara, dipasang dan ditanggalkan serta ergonomik menjadi faktor utama dalam pembangunan produk inovasi ini. V-Der juga sangat praktikal untuk digunakan dimana sahaja termasuk di kawasan jalan, kawasan berbukit, longkang dan juga di kawasan yang sempit

V-Der berkonsepkan "Dari Alam Kepada Alam', sangat mementingkan aspek kelestarian alam sekitar. Disamping mengurangkan bebanan ketandusan tapak pelupusan, V-Der juga berupaya menghasilkan kompos organik yang bukan sahaja baik untuk tanah dan bekalan nutrisi kepada tanah malah menyokong pengurangan karbon dengan proses kitar semula yang dibangunkan. Produk inovasi ini dilihat sebagai satu-satunya alternatif dalam mengoptimumkan prestasi pengurusan landskap dan menyokong dasar hijau negara.

PENCAPAIAN

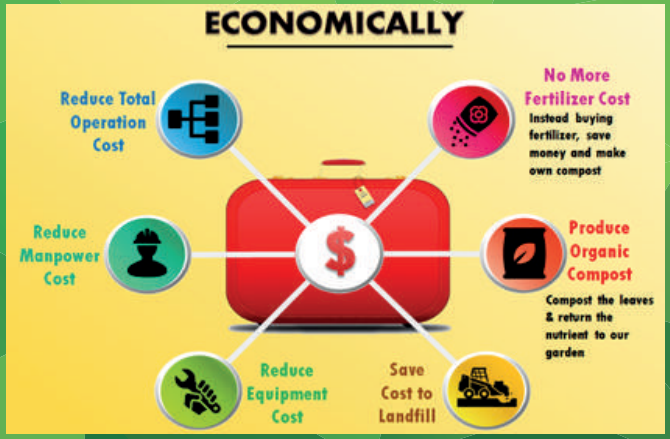
Produk inovasi ini telah memenangi pelbagai pingat dan anugerah di peringkat kebangsaan dan juga antarabangsa antaranya:

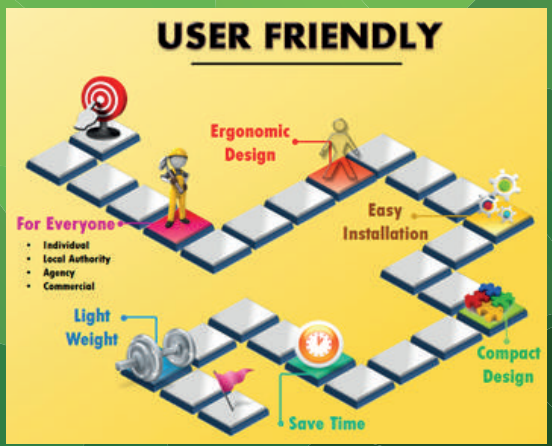
JOHAN
- Pertandingan Inovasi Kumpulan Inovasi & Kreatif (KIK) 2017, Peringkat Jabatan Kerja Raya

Anugerah Khas – *Best Green Invention*
- *International Invention Innovation Technology Exhibition* ITEX 2018, Peringkat Antarabangsa

Pingat Emas
- *International Invention Innovation Technology Exhibition* ITEX 2018, Peringkat Antarabangsa
- *International Invention Innovation Competition in Canada*, iCAN 2019 Peringkat Antarabangsa
- *Invention Innovation Award, Malaysian Technology Expo* MTE 2019, Peringkat Kebangsaan *Innovation and Invention Competition through Exhibition* (iCompEx) 2019, Peringkat Kebangsaan

Pingat Gangsa
- *Public Service Innovation Award, Malaysian Technology Expo* MTE 2019, Peringkat Kebangsaan





PERTANDINGAN & PAMERAN INOVASI

JKR Malaysia melalui Unit Inovasi Kejuruteraan, Bahagian Inovasi, Penyelidikan dan Pembangunan Kejuruteraan (BIPPK) Pusat Kecemerlangan Kejuruteraan dan Teknologi JKR (CREaTE) telah diberi tanggungjawab untuk menguruskan produk-produk inovasi JKR yang akan memasuki pertandingan dan pameran inovasi yang dianjurkan sama ada pada peringkat kebangsaan mahupun antarabangsa.

Pertandingan dan pameran inovasi merupakan satu platform bagi menguji tahap kompetensi dan daya saing produk inovasi JKR. Disamping itu, ianya akan memberi pendedahan kepada pegawai JKR untuk mempertingkatkan produk penyelidikan dan inovasi supaya mempunyai kualiti dan nilai komersil yang tinggi.

Kebiasaanya penyertaan di dalam acara sebegini akan menjadi pemangkin kepada perekacipta di JKR untuk terus berinovasi. Antara pertandingan dan pameran yang disertai sepanjang tahun 2019 adalah seperti berikut:

Penyampaian Anugerah iCompex

Peserta Pertandingan Inovasi CREaTE dan Zon Ibu Pejabat JKR 2019

Peserta Pertandingan Inovasi CREaTE dan Zon Ibu Pejabat JKR 2019

Penyampaian Anugerah iCompex

Peserta iCompex 2019

PRA PENGKOMERSIALAN

FLOAT RANGE POLE (FRP)

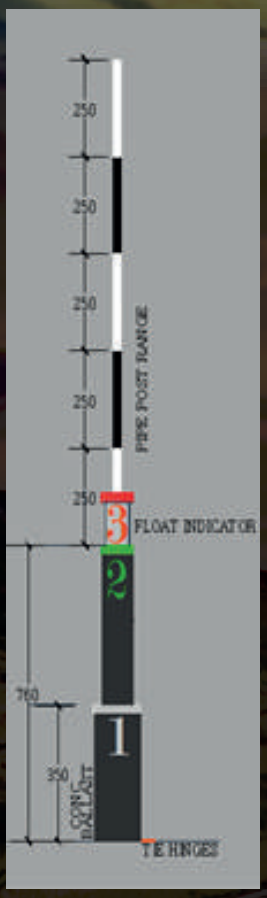
Pengenalan

Produk ***Float Range Pole (FRP)*** adalah merupakan produk inovasi yang terhasil daripada program Jejak Inovasi JKR Malaysia 2015. Ianya dihasilkan oleh kumpulan perekacipta dari JKR Daerah Kluang, Johor. Produk ini dihasilkan sebagai penanda kedalaman aras banjir yang mudah dipasang untuk pelbagai jenis dan keadaan bahu jalan. Pada masa ini produk FRP masih dalam fasa pra pengkomersialan kerjasama telah diadakan dengan Syarikat Asatek Lab PLT.

Deskripsi Produk

Tiang penanda aras banjir yang sering dipasang di bahu-bahu jalan yang berisiko banjir memerlukan masa yang lama untuk dipasang dengan sempurna. Masalah ini timbul disebabkan kebanyakan bahu jalan terdiri daripada lapisan tanah laterit yang keras dan kadang kala bercampur bersama batu baur yang berasal dari kerja-kerja pembinaan lapisan struktur jalan.

Selain daripada itu, masalah tersebut juga wujud di kawasan bandar, di mana jalan-jalan bandaran pada kebiasaannya mempunyai bahu jalan yang berturap. Solusi melekatkan tiang penanda aras banjir kepada struktur yang berdekatan dengan lokasi berisiko tidak menyelesaikan masalah, kerana tidak semua lokasi mempunyai struktur yang serupa. Bagi mengatasi masalah ini, ***FLOAT RANGE POLE (FRP)*** telah diilhamkan oleh perekacipta. FRP adalah tiang penanda aras banjir yang mudah dipasang dan pada masa yang sama mampu memberikan panduan yang jelas kepada pengguna jalan raya. Rekacipta ini juga boleh dipasang di pelbagai jenis permukaan bahu jalan dengan cepat.



Ciri-ciri Produk

FRP direkabentuk dan dihasilkan untuk mempunyai ciri-ciri seperti berikut:

- Terbahagi kepada 3 komponen iaitu ***bottom colum, middle column*** dan ***floating indicator***
- Setiap komponen ini mempunyai saiz dan fungsi yang berbeza untuk memberitahu maklumat tentang kedalaman air pada satu-satu masa
- Setiap komponen dipasang pelekat reflektif untuk memberitahu tahap kedalaman air dan jajaran jalan kepada pemandu terutamanya pada waktu malam dan hujan lebat
- Mempunyai *concrete ballast* di bahagian ***bottom column*** untuk berfungsi sebagai asas dan pemberat supaya FRP sentiasa stabil menghadapi arus banjir
- Mempunyai pancang keluli dan ***clamping plate*** untuk digunakan semasa pemasangan di lokasi bahu jalan berturap atau keras

Potensi Pengaplikasian

Rekacipta ini sesuai digunakan sebagai penyelesaian alternatif kepada solusi sedia ada terutamanya di jalan-jalan di bawah pengawasan JKR.

Anugerah dan Pencapaian

- Program Jejak Inovasi JKR Malaysia 2015
- *28th International Invention, Innovation & Technology Exhibition 2017* – Pingat Emas

Perlindungan Harta Intelek
No. Permohonan Paten – PI 2017001145

Perabut jalan yang memberikan panduan dan amaran kepada pemandu pada waktu malam terutamanya di kawasan jalan raya tidak berlampu

MEDIAN NIGHT REFLECTOR POST

Ciri-ciri Produk

MEDIAN NIGHT REFLECTOR POST direkabentuk dan dihasilkan untuk mempunyai ciri-ciri seperti berikut:

- Berbentuk silinder supaya dapat memantulkan cahaya dari semua arah (360o)
- Dihasilkan daripada paip UPVC bersaiz 50mm (diameter) x 225mm (tinggi) x 3mm (tebal) berwarna hitam
- Mempunyai kepala penutup silinder bersaiz 56mm (diameter) x 35mm (tinggi) x 3mm (tebal) berwarna hitam
- Pemantul cahaya berwarna kuning dan putih daripada gred *High Intensity Prismatic* (HIP) bersaiz 200mm (panjang) x 40mm (tinggi)
- Penyambungan rekacipta menggunakan skru M6 50mm panjang dan juga rivet berwarna hitam dengan saiz 56mm (diameter) x 35mm (tinggi) x 3mm (tebal)

Potensi Pengaplikasian

Rekacipta ini sesuai dipasang di lokasi-lokasi berisiko khususnya di jalan raya persekutuan, negeri dan bandaran.

Potensi Pengkomersialan

Jabatan Kerja Raya (JKR), Lembaga Lebuhraya Malaysia (LLM), Pihak Berkuasa Tempatan (PBT) dan kontraktor-kontraktor penyelenggaraan.

Deskripsi Produk

Kawasan jalan raya yang tidak berlampu boleh mengakibatkan kemalangan terutamanya kepada pemandu yang tidak arif atau tidak pernah melalui jalan tersebut. Pemasangan baru lampu jalan dan penyelenggaraannya pula memerlukan peruntukan yang besar.

MEDIAN NIGHT REFLECTOR POST adalah rekacipta yang diilhamkan bagi membantu pemandu memandu dengan lebih selamat di kawasan jalan raya yang gelap. Ianya praktikal dan mampu memberikan penyelesaian dengan kos yang lebih murah.

Rekacipta ini sesuai dipasang di kawasan-kawasan seperti *central median, divider, island* dan *roundabout*.

Perlindungan Harta Intelek

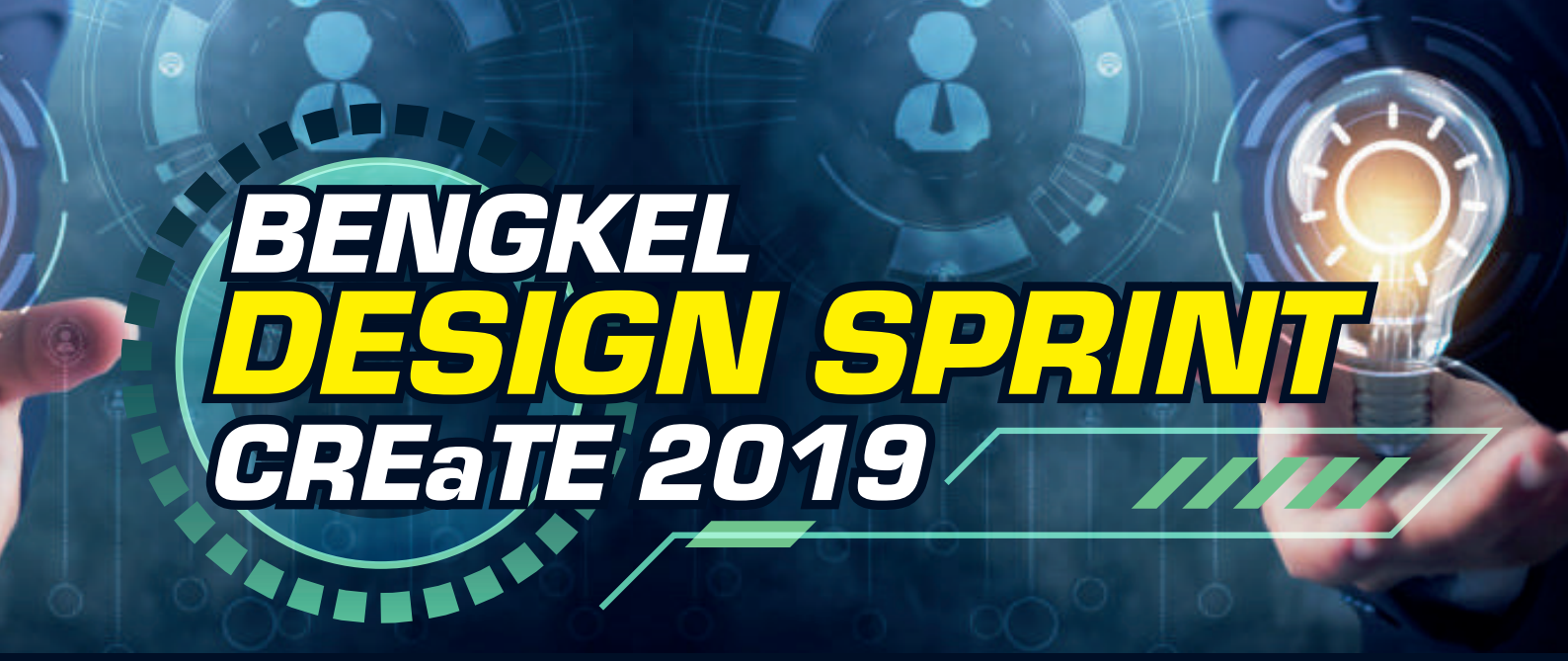
No. Permohonan Paten – PI 2014000817

Anugerah & Pencapaian

KIK Perkhidmatan Awam Negeri Perak 2008 – Johan
KIK JKR Perak 2009 – Johan
KIK JKR Malaysia 2009 – Naib Johan
Malaysian Technology Expo 2014 – Pingat Emas

Untuk maklumat lanjut, sila hubungi:
Perekacipta: **SAIFOL BAHRI BIN SHAARI**
Email: **saifol64@gmail.com**
Telefon: **017-420 9242**

Urusetia:
Unit Inovasi Kejuruteraan CREaTE
Telefon: **06-551 2232**



BENGKEL DESIGN SPRINT CREaTE 2019

Bengkel '*Design Sprint*' CREaTE ini telah dilaksanakan dengan jayanya diadakan pada 20 hingga 22 Oktober 2019 iaitu peserta terdiri daripada 47 warga kakitangan CREaTE bertempat di PDS Training Camp, Port Dickson, Negeri Sembilan.

TUJUAN

- Menjadikan warga CREaTE lebih berfikiran kreatif dan kritis / inovatif untuk membina idea baru bagi menjadikan CREaTE sebagai organisasi yang dinamik dan terbuka.
- Menyedarkan setiap warga CREaTE akan kepentingan berinteraksi secara aktif dan prospektif dengan persekitaran organisasi dan mencetuskan pemikiran kreatif dan berinovatif dalam usaha untuk membangunkan organisasi.
- Melahirkan warga CREaTE berinovatif bagi melahirkan organisasi yang berwawasan dan bijak merencana strategik.
- Membekalkan warga CREaTE dengan kemahiran proses pemikiran kreatif dalam merealisasikan idea baru dan penemuan baru di mana ia menuju ke arah yang lebih realiti.
- Kearah warga CREaTE dan organisasi yang kreatif dan inovatif dalam bidang :
  - ✔ Pengurusan
  - ✔ Kepimpinan
  - ✔ Budaya
  - ✔ Teknologi
  - ✔ Komunikasi Terbuka
  - ✔ Penyelesaian Masalah
  - ✔ Strategi

OBJEKTIF

Memahami (Understand)
Mengenalpasti masalah, keperluan dan tumpuan utama permasalahan yang dihadapi dalam organisasi untuk mencari strategi

Idea (Ideate)
Meneroka, mencari dan mengeluarkan sebanyak idea-idea untuk penyelesaian

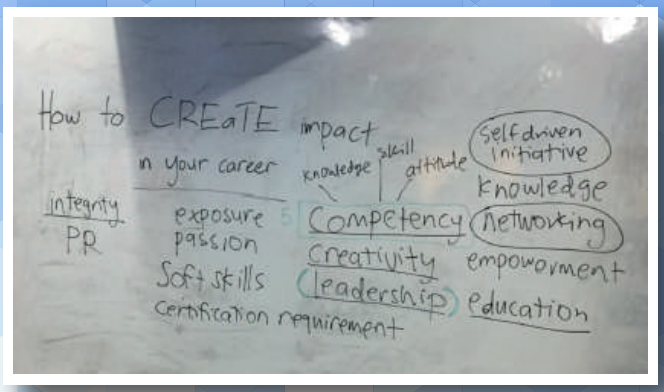
Memilih (Decide)
Memilih idea penyelesaian yang terbaik daripada idea-idea yang telah dikeluarkan

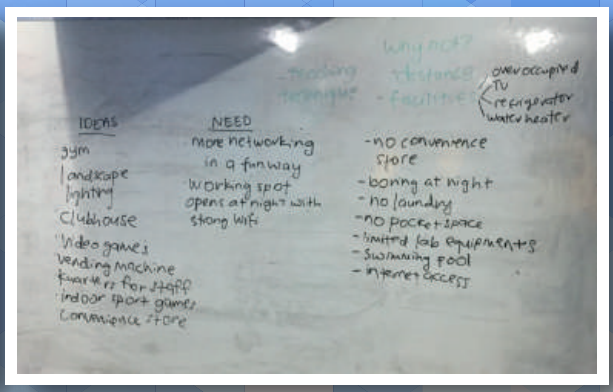
Prototaip (Prototype)
Membina dan menghasilkan prototaip untuk diuji cuba idea dengan pengguna

Ujicuba (Test)
Menguji cuba idea / prototaip yang dihasilkan kepada pengguna

Session 1: Understand

Identify problems we are solving & pick a focus area



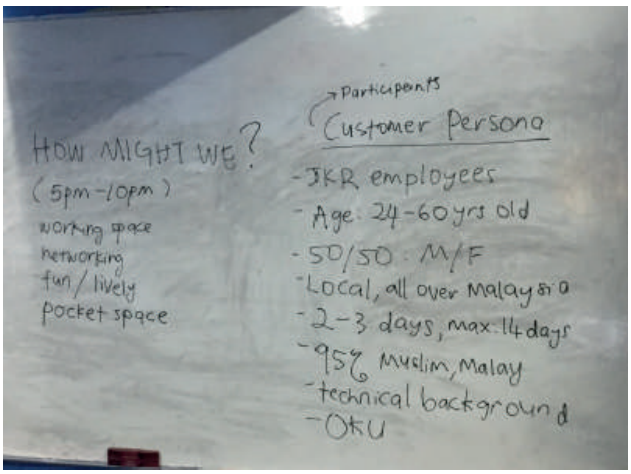


1. **Defining the role of CREaTE**
2. **Preliminary brainstorming for ideas to make CREaTE more appealing to participants**

- By framing the problems as opportunities (How Might We), participants shared unfiltered ideas to make CREaTE more appealing
- Each participant contributed to one or more ideas on post-it notes
- The ideas are then grouped into themes:
  - o Retail
  - o Sports
  - o Relax/Leisure
  - o Activities outside CREaTE
  - o Work-related
- Participants voted for the ideas they like most
- The most voted ideas are discussed pick a focus area, which are:

Activities between 5pm and 10pm
Working space
Networking sessions
Fun/Lively activities
Pocket space to work or rest

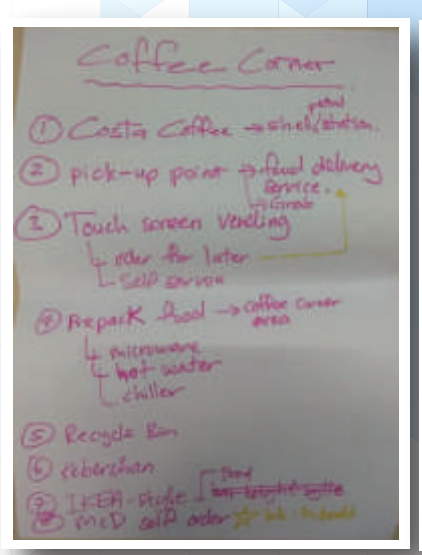
- In order to design the solution, we created a customer persona based on information of the customers of CREaTE

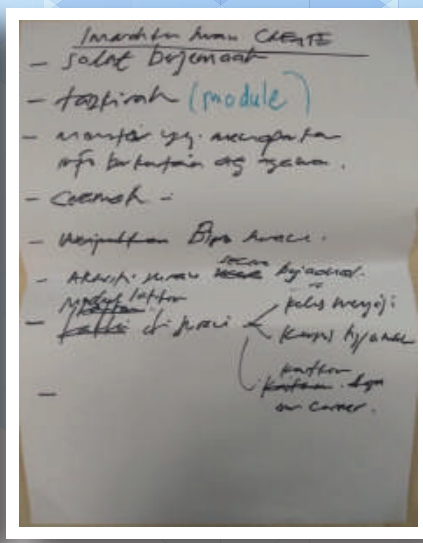


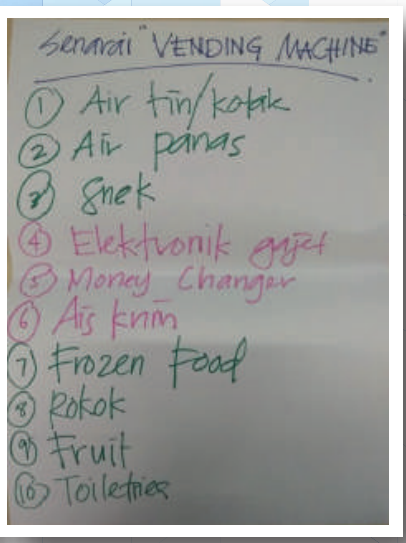
Session 2: Ideate

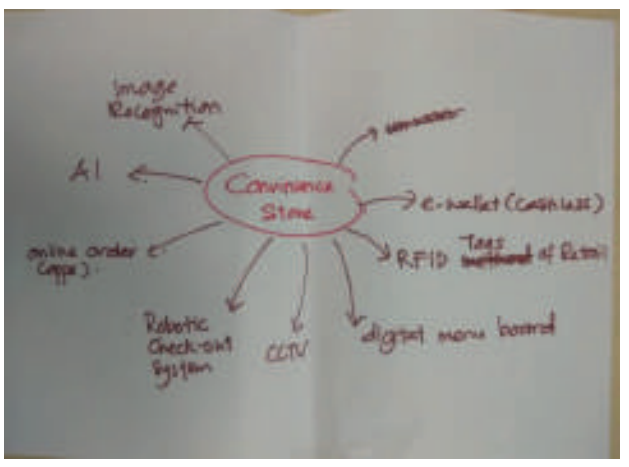
Research & compare existing solutions. Sketch the ideas

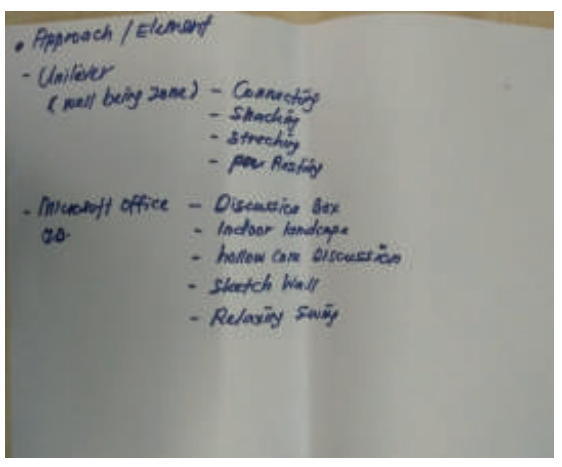
- The potential solutions from Session 1 are narrowed down to:
  - Convenience store
  - R&R area/gaming corner
  - Coffee corner
  - Making the surau livelier
  - Vending machines
- Participants researched and compared what other organisations have done in providing those solutions for their customers.









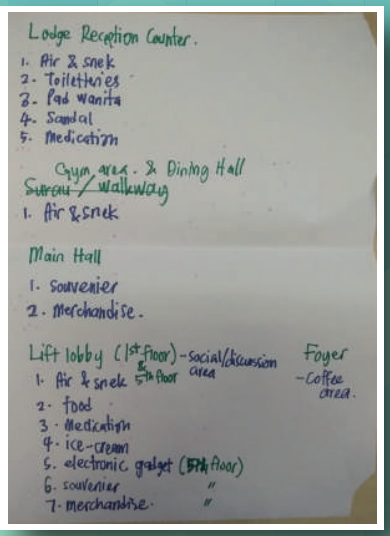


Session 2: Ideate

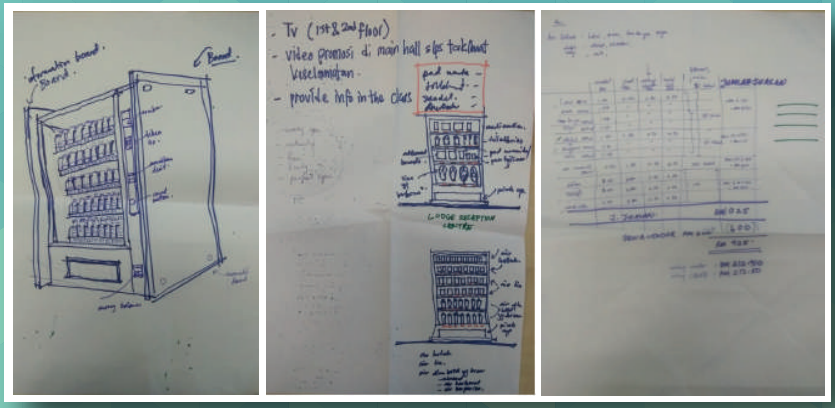
This idea is later combined with "gaming corner", "coffee corner", and "convenience store" ideas

Vending Machine

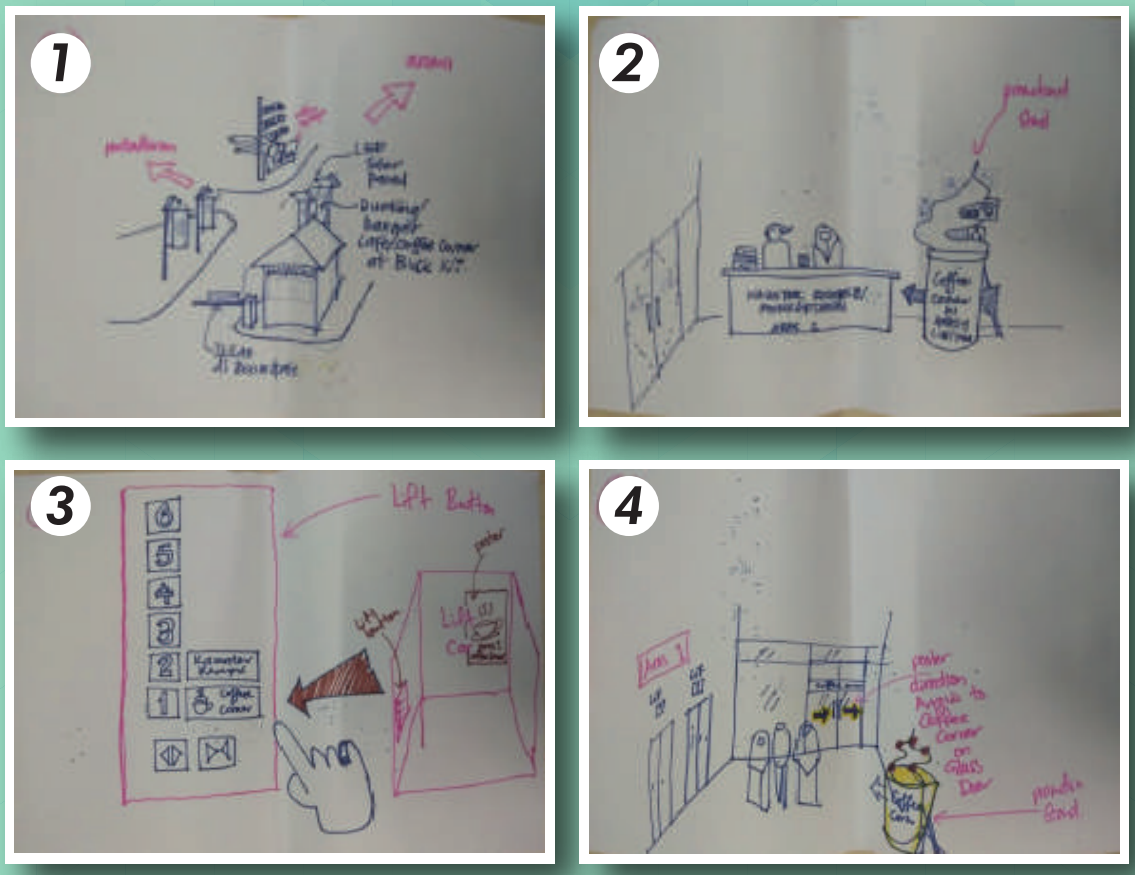
First Sketch



Final Sketch



Coffee Corner

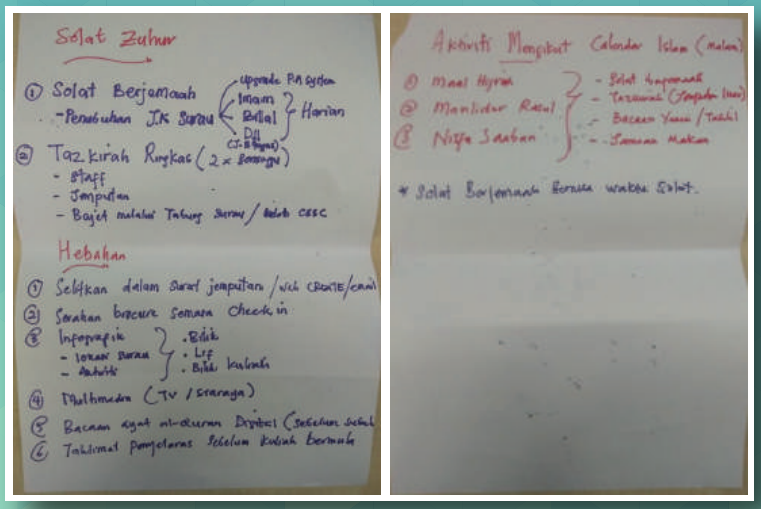


This idea is later combined with "gaming corner", "vending machine" and "convenience store" ideas

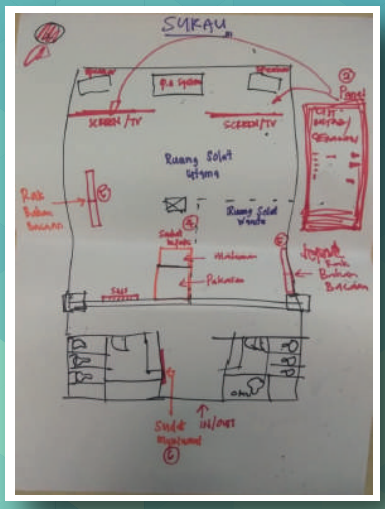
Session 2: Ideate

Mengimarah Surau

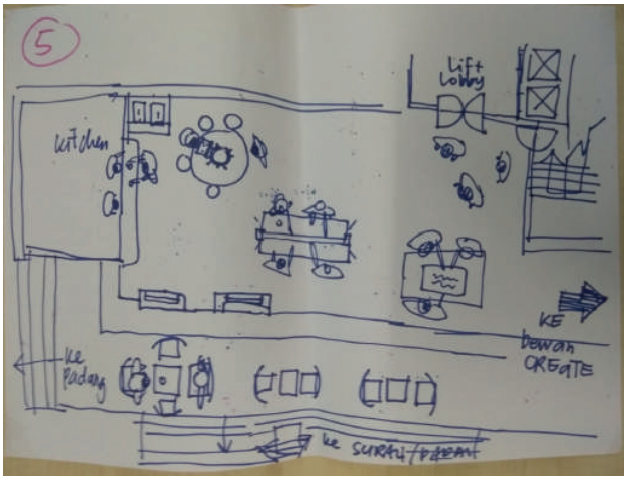
First Sketch



Final Sketch

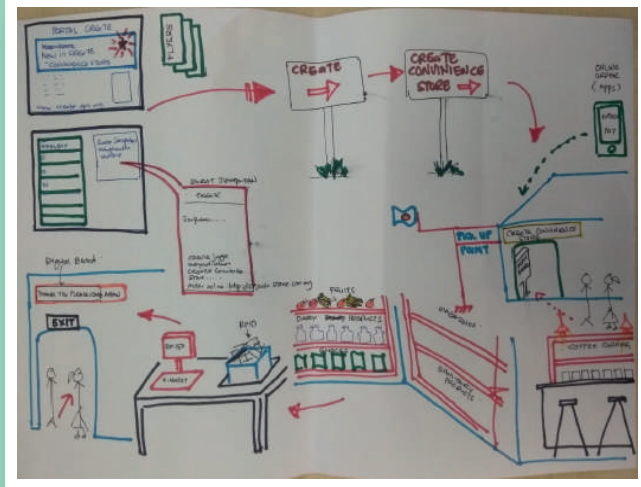


Gaming Corner



This idea is later combined with "coffee corner", "vending machine" and "convenience store" ideas

Convenience Store



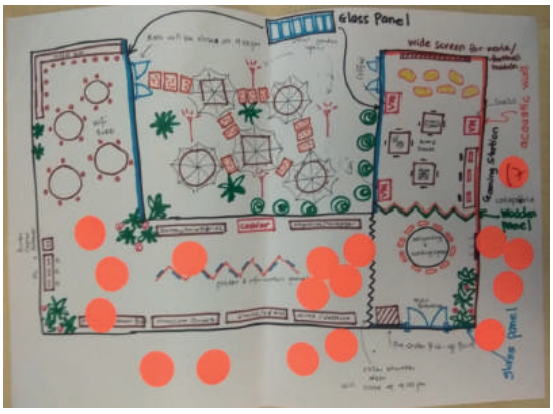
This idea is later combined with "gaming corner", "vending machine" and "coffee corner" ideas

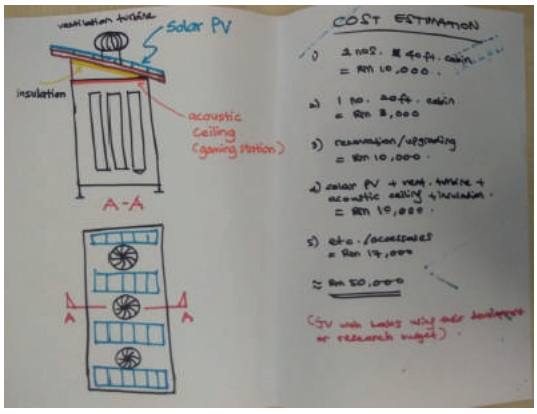
Session 3: Decide

Choose the best idea to be prototyped.

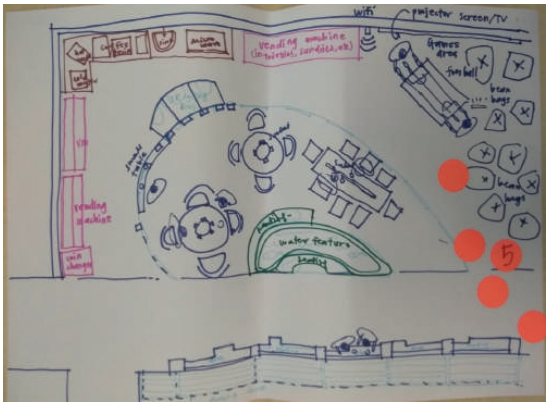
- All ideas from Session 2 – Ideate are discussed to refine the designs further based on suggestions and feedback
- Final designs are put up behind a board for "silent voting"
- Only designs for the combined ideas of "coffee corner", "convenience store", "gaming corner" and "vending machine" are voted because there were three different final ideas

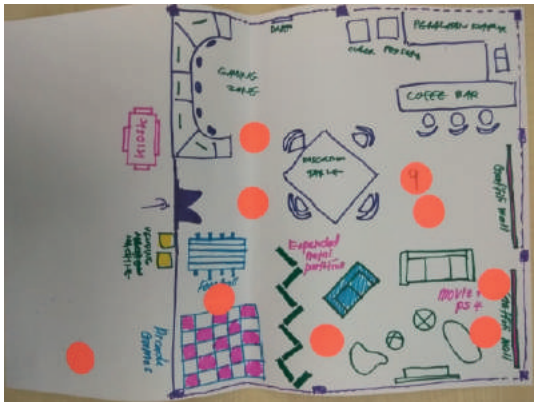
R&R Area (Most-voted Design)



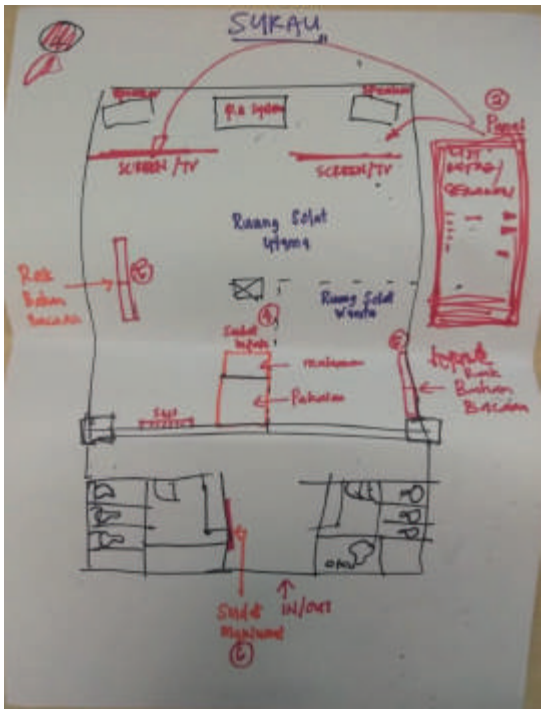


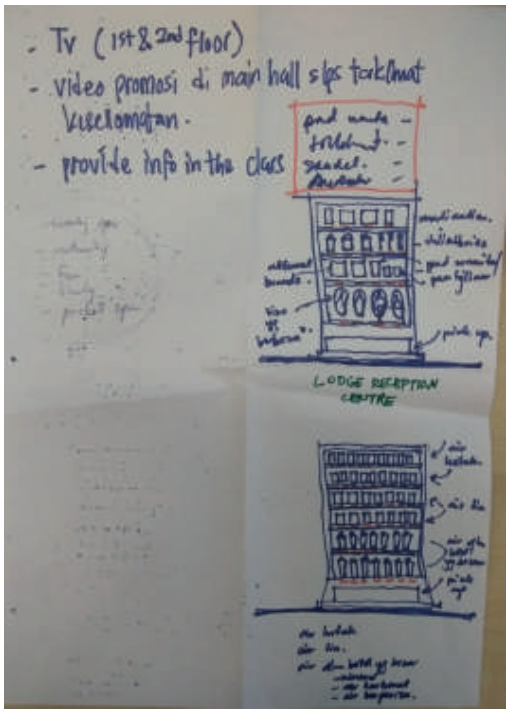
Other Final Designs of R&R Area





Final Design of Mengimarah Surau & Vending Machine (from Session 2)





Day 4: Prototype

Produce a realistic prototype

1. The final ideas that the participants produced could not be prototyped but Vectolabs is providing a Retropie (a retro gaming console) to be placed at the R&R Area.
2. Three groups/individuals have volunteered to drive the implementation of the selected solutions, which are R&R grea, vending machine and mengimarah surau.
3. Vectolabs will introduce CREaTE to an e-Payment/Cashless vending machine provider.

Program Saringan Konvensyen

KUMPULAN INOVATIF DAN KREATIF (KIK)

JKR MALAYSIA 2019

Program saringan KIK JKR Malaysia 2019 telah diadakan di JKR Selangor pada 17 &18 Julai 2019 bertujuan menilai 50 kumpulan KIK bagi mendapatkan 10 kumpulan terbaik untuk dipertandingkan dalam Konvensyen KIK JKR Malaysia 2019.

Program saringan KIK JKR Malaysia kali ini melibatkan 14 orang Panel Penilai yang terdiri daripada pegawai berpengalaman berkaitan KIK di JKR dan 15 orang urus setia yang terdiri daripada pegawai Pusat Kecemerlangan Kejuruteraan dan Teknologi JKR (CREaTE), Cawangan Kejuruteraan Elektrik (CKE) dan juga JKR Selangor. Program tersebut telah dirasmikan oleh YBrs. En. Azhar bin Mohamed, mantan Ketua Unit Inovasi Kejuruteraan, Bahagian Inovasi Penyelidikan dan Pembangunan Kejuruteraan (BIPPK) CREaTE.

Senarai 10 kumpulan terbaik yang dibahagikan kepada 5 kumpulan kategori teknikal dan 5 kumpulan kategori pengurusan yang layak ke Konvensyen KIK JKR Malaysia 2019 adalah seperti berikut :

Teknikal	Pengurusan
Kings 2.0 Mini Road Sweeper - JKR Daerah Sepang	Sistem Latihan Industri (Internship) - CDPK IPJKR
Auto Flood Indicator Reader (aFIR)- JKR Daerah Seberang Perai Utara	Sistem I-CANFLY - CDPK IPJKR
Return Air for Regenerative Energy (RARE) - CREaTE	Permohonan dan Kelulusan Pembekal Sistem Kekuda Bumbung Atas Talian (JTRUSS) - CKAS IPJKR
Penanda Banjir - JKR Daerah Jempol	JKR Energy Online System (JENOSYS) - CKM IPJKR
FLAGPOD - JKR Daerah Pekan	Electrical Engineering Design Buddy (BUDEE) - CKE IP JKR

Konvensyen KIK JKR Malaysia 2019

"mencetus IDEA inovasi"

Program Konvensyen KIK JKR Malaysia 2019 telah diadakan di Pusat Kecemerlangan Kejuruteraan dan Teknologi JKR (CREaTE) pada 30 Oktober 2019. Sebanyak 5 kumpulan bagi kategori teknikal dan 5 kumpulan bagi kategori pengurusan telah dinilai untuk dinobatkan sebagai johan bagi setiap kategori.

Seramai 3 orang Panel Penilai yang dilantik iaitu Prof. Ir. Ts. Dr. Sivarao Subramoniam (Universiti Teknikal Malaysia Melaka (UTeM)), En. Muhammad Haziq bin Abdul Rahim (Bahagian Kemajuan Tanah dan Wilayah) dan Pn. Norkamawati binti Kamal (Majlis Perbandaran Kuantan) bagi menentukan pemenang.

Program ini telah dijayakan oleh Unit Inovasi Kejuruteraan, Bahagian Inovasi Penyelidikan dan Pembangunan Kejuruteraan (BIPPK) CREaTE dengan kerjasama daripada Bahagian Pengurusan Korporat CREaTE, Bahagian Pengururusan Aset dan Fasiliti CREaTE, Makmal Penyelidikan Elektrik, BIPPK CREaTE dan Unit Mekanikal, Bahagian Kompetensi, Pensijilan dan Akreditasi Kejuruteraan (BKPAK) CREaTE.

Program ini juga telah dirasmikan oleh YBrs. Dr. Maziah binti Mohammad, selaku Pengarah BIPPK CREaTE yang juga menjalankan tugas Pengarah Kanan CREaTE. Berikut adalah senarai pemenang bagi setiap kategori yang dipertandingkan:

Keputusan	Kategori	
	Teknikal	Pengurusan
Johan	Return Air for Regenerative Energy (RARE) – CREaTE	Sistem I-CANFLY – CDPK IPJKR
Naib Johan	Auto Flood Indicator Reader (aFIR) – JKR Daerah Seberang Perai Utara	Permohonan dan Kelulusan Pembekal Sistem Kekuda Bumbung Atas Talian (JTRUSS) – CKAS IPJKR
Tempat ke-3	Kings 2.0 Mini Road Sweeper – JKR Daerah Sepang	Sistem Latihan Industri (Internship) – CDPK IPJKR

KONVENSYEN KUMPULAN INOVATIF DAN KREATIF (KIK)
HORIZON BAHARU SEMPENA HARI INOVASI KKR DAN AGENSI 2019
YANG TELAH DIADAKAN DI *CREaTE* JKR PADA 30 OKTOBER 2019

KONVENSYEN KUMPULAN INOVATIF DAN KREATIF (KIK) HORIZON BAHARU SEMPENA HARI INOVASI KKR DAN AGENSI 2019 YANG TELAH DIADAKAN DI *CREaTE* JKR PADA 30 OKTOBER 2019

Hari Inovasi KKR dan Agensi 2019

Hari Inovasi KKR dan Agensi 2019 merupakan acara kemuncak dalam memberi pengiktirafan serta penghargaan kepada warga KKR dan agensi dibawah KKR yang berjaya menghasilkan inovasi yang signifikan serta memberi impak yang besar kepada perkembangan dan kemajuan organisasi. Majlis ini telah berlangsung pada 31 Oktober 2019 di Pusat Kecemerlangan Kejuruteraan dan Teknologi JKR (CREaTE), dengan bertemakan "Warga Inovatif, Organisasi Produktif". Tema ini melambangkan komitmen KKR dan agensi selaras dengan usaha Kerajaan untuk melaksanakan pembaharuan dan penambahbaikan sistem penyampaian perkhidmatan awam berasaskan inovasi dankreativiti. Yang Berbahagia Dato' Dr. Syed Omar Sharifuddin Bin Syed Ikhsan, Ketua Setiausaha KKR telah hadir mewakili Menteri Kerja Raya merasmikan majlis tersebut dan seterusnya menyampaikan dua belas (12) hadiah Anugerah Inovasi yang telah dipertandingkan seperti senarai berikut:

1. Anugerah Inovasi Pengurusan Pejabat (AIPP) KKR
2. Anugerah Inovasi Pengurusan Kewangan (AIPK) KKR
3. Anugerah Inovasi ICT (AIICT) KKR
4. Anugerah Inovasi Pengurusan Pejabat Terbaik
5. Anugerah Inovasi Pengurusan JKR Daerah Terbaik
6. Anugerah Inovasi Pengurusan Pembinaan Terbaik Kategori Projek RM500 Ribu Hingga RM20 Juta
7. Anugerah Inovasi Pengurusan Pembinaan Terbaik Kategori Projek Melebihi RM20 Juta
8. Konvensyen Kumpulan Inovatif dan Kreatif (KIK) Kategori Pengurusan
9. Konvensyen Kumpulan Inovatif dan Kreatif (KIK) Kategori Teknikal
10. Anugerah Audit Terbaik Tahun 2018
11. Anugerah Kecemerlangan Perkhidmatan Pelanggan Kaunter Negeri dan Cawangan
12. Konvensyen Kumpulan Inovatif dan Kreatif (KIK) Lembaga Lebuhraya Malaysia (LLM)

Sebanyak 10 pempamer menyertai pameran sempena Hari Inovasi tersebut yang melibatkan JKR, Lembaga Pembangunan Industri Pembinaan Malaysia (CIDB) dan LLM. Majlis tersebut juga turut diserikan lagi dengan sesi ceramah inovasi yang bertajuk "Inovasi Dalam Industri 4.0 dan Smart City" yang disampaikan oleh Ts. Zulkiflee Bin Mohamad, Pengarah Program Malaysian Industry-Government Group for High Technology (MIGHT), Jabatan Perdana Menteri.

HARI INOVASI KKR
DAN AGENSI TAHUN 2019
YANG TELAH DIADAKAN DI DEWAN *CREaTE* JKR PADA 31 OKTOBER 2019

Lawatan Kerja Teknikal Ke DreamEDGE Sdn. Bhd.

Pusat Kecemerlangan Kejuruteraan dan Teknologi JKR (CREaTE) melalui Unit Inovasi Kejuruteraan, Bahagian Inovasi, Penyelidikan dan Pembangunan Kejuruteraan (BIPPK) CREaTE telah mengadakan lawatan kerja teknikal ke DreamEDGE Sdn. Bhd. yang terletak di Cyberjaya pada 12 November 2019.

Lawatan tersebut telah disertai oleh seramai 22 orang kakitangan CREaTE bertujuan untuk membincangkan potensi dan skop kerjasama yang boleh memberikan manfaat kepada kedua-dua pihak serta memberikan pendedahan kepada kakitangan CREaTE berkaitan aktiviti dan fasiliti yang terdapat di Dream EDGE Sdn. Bhd.

LAWATAN KERJA TEKNIKAL KE FAKULTI KEJURUTERAAN, UNIVERSITI PUTRA MALAYSIA (UPM)

Seramai 5 orang kakitangan daripada Unit Inovasi Kejuruteraan, Bahagian Inovasi Penyelidikan dan Pembangunan Kejuruteraan (BIPPK), Pusat Kecemerlangan Kejuruteraan dan Teknologi JKR (CREaTE) telah mengadakan lawatan kerja teknikal ke Fakulti Kejuruteraan, UPM yang terletak di Serdang pada 5 Disember 2019.

Lawatan kerja tersebut adalah sebagai sesi perkongsian ilmu daripada Assoc. Prof. Dr. Farzad Hejazi, *Innovation Coordinator of Engineering Faculty UPM* berkaitan proses pengkomersialan yang telah dijalankan di UPM untuk dijadikan panduan oleh pihak CREaTE dalam melaksanakan proses pengkomersialan produk inovasi di JKR.

Nilai tambah bagi sistem saliran sedia ada dengan tambahan kekuatan pada sambungan longkang

TONGUE & GROOVE CONCRETE DRAIN

Deskripsi Produk

Kerosakan dan kegagalan utama longkang sedia ada adalah pada sambungan longkang yang mana menggunakan mortar (campuran simen, pasir dan air) sebagai agen sambungan. Longkang biasa disusun dengan jarak 1 inci antara satu sama lain dan mortar diletak celah sambungan tersebut. Pemerhatian lapangan menunjukan mortar cepat retak dan pecah disebabkan cuaca dan mutu kerja.

Skop kajian perekacipta adalah untuk merekabentuk sambungan longkang menjadi lebih kuat dan kukuh dan tidak mengubah ciri-ciri asal longkang seperti gred konkrit, tetulang, panjang dan ketebalan longkang.

T&G DRAIN telah direkabentuk supaya dapat disambung secara bertindih seperti tanggam. Rekabentuk tanggam atas adalah 60mm dan tanggam bawah adalah 75mm. Perbezaan ini adalah untuk memberi ruang kepada proses pengembangan dan pengecutan konkrit.

Kekuatan sambungan ***T&G DRAIN*** telah diuji dengan menggunakan pancutan air bertekanan tinggi dan tekanan beban pada sambungan longkang. Hasil ujian menunjukan sambungan secara bertanggam adalah lebih kuat berbanding sambungan biasa menggunakan mortar.

Perlindungan Harta Intelek

Sijil Pembaharuan Utiliti – MY-162333-A

Anugerah & Pencapaian

KIK Perkhidmatan Awam Terengganu 2013 – **Johan**
Malaysian Technology Expo 2014 – **Pingat Gangsa**

Untuk maklumat lanjut, sila hubungi:
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Email: mnorhisham22@yahoo.com | Telefon: 012-301 0528

Urusetia: Unit Inovasi Kejuruteraan CREaTE
Telefon: 06-551 2232

Ciri-ciri Produk

Ciri-ciri utama rekacipta ini adalah seperti berikut:

- Hujung longkang direkabentuk menjadi tanggam
- Kurang menggunakan mortar. Kekuatan sambungan tidak bergantung pada mortar
- Senang untuk dipasang di tapak
- Digunakan untuk longkang berbentuk V bersaiz 450mm dan 600mm lebar
- Menghalang kebocoran air dan penumbuhan pokok kecil dicelah sambungan yang rosak

Potensi Pengaplikasian

Rekacipta ini sesuai untuk sistem saliran bagi kerja-kerja pembinaan infrastruktur jalan raya dan bangunan. Penggunaannya juga tidak terhad kepada projek-projek Kerajaan malah terpakai untuk projek-projek pihak swasta.

Potensi Pengkomersialan

Jabatan Kerja Raya (JKR), Lembaga Lebuhraya Malaysia (LLM), Pihak Berkuasa Tempatan (PBT), pemaju perumahan dan komersial serta kontraktor-kontraktor binaan.

MESYUARAT PEMANTAUAN PENGKOMERSIALAN PRODUK INOVASI LONGKANG BERTANGGAM (T&G) BIL. 2 / 2019

TARIKH : 1 OGOS 2019 (KHAMIS)

TEMPAT :
BILIK MESYUARAT PEJABAT SYARIKAT GTSB,
10736, TINGKAT 1, TAMAN CUKAI UTAMA, FASA 4,
CHUKAI, 24000 KEMAMAN, TERENGGANU.

Mesyuarat Pemantauan Pengkomersialan Produk Inovasi produk Longkang Bertanggam (T&G) Bil.2/2019 ini diadakan dengan objektif berikut:

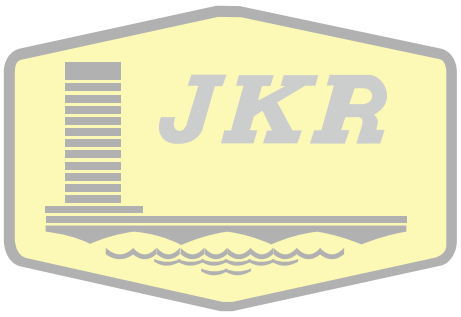
i. Mengenalpasti perkembangan hasil dan status pengkomersialan terkini produk.
ii. Mengenalpasti isu & kekangan yang dihadapi untuk pengkomersialan produk oleh Syarikat GTSB dan Perekacipta produk.

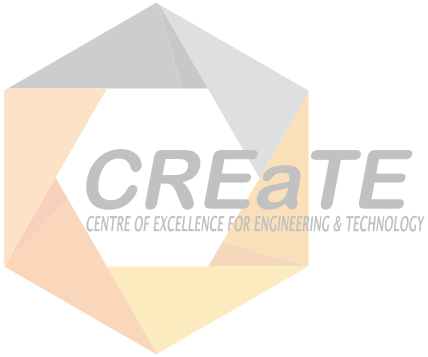
Lawatan ke Kilang Operasi dan Tapak Lapangan Syarikat Gerak Tekun Sdn. Bhd. (GTSB)

Tapak Kilang Operasi Syarikat GTSB,
KM8 Binjai, Jalan Air Putih, 24000 Kemaman, Terengganu

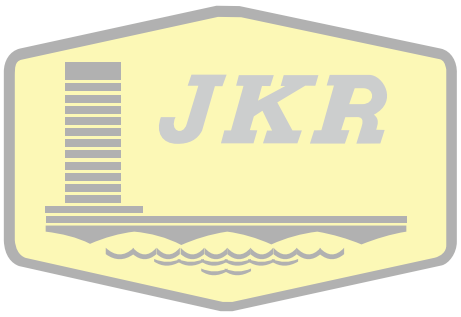
Lawatan ke kilang operasi dan tapak lapangan ini diadakan dengan objektif berikut:

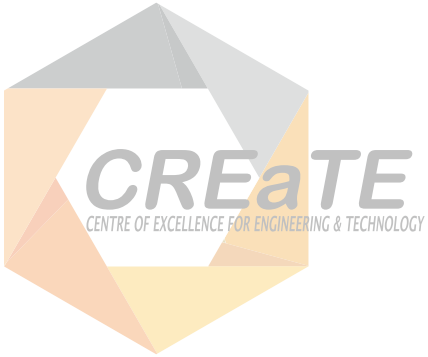
i. Mengenali tapak produksi & pengilangan Syarikat GTSB (Rakan Kolaborasi dengan JKR (Kerajaan Malaysia)).
ii. Mengetahui perkembangan terkini dan operasi syarikat GTSB.
iii. Meninjau proses kerja produksi dan operasi pengilangan yang dilaksanakan di tapak kilang operasi Syarikat GTSB.
iv. Melihat dan meninjau kecukupan jentera & loji untuk produksi termasuk bilangan pekerja di kilang.
v. Mempelajari teknik penghasilan konkrit pra tuang Longkang Bertanggam (T&G).
vi. Menyaksikan sendiri lebihan stok produk yang banyak di tapak lapangan Syarikat GTSB.





Pusat Kecemerlangan Kejuruteraan dan Teknologi JKR (CREaTE)





Pusat Kecemerlangan Kejuruteraan dan Teknologi JKR (CREaTE)

Pusat Kecemerlangan Kejuruteraan dan Teknologi (CREaTE)
Jabatan Kerja Raya Malaysia,
Jalan Kemus, Simpang Ampat,
78000 Alor Gajah, Melaka.

06-551 2232
createjkr@jkr.gov.my

Anda juga boleh scan QR Code untuk menyimpan maklumat telefon dan email CREaTE.