UNIVERSITI TEKNOLOGI MARA

CELEBRATING COMMERCIALISATION YEAR 2014

iideX 2014

invention innovation & design exposition 2014

AN INTERNATIONAL EXPOSITION ON RESEARCH AND INNOVATION

INNOVATEUR wannabe! 2014

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DEWAN AGUNG TUANKU CANSELOR (DATC)
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MALAYSIA

"Bridging the valley of death : advancing the commercialisation of research"

RESEARCH BOOK

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AN INTERNATIONAL EXPOSITION ON RESEARCH AND INNOVATION

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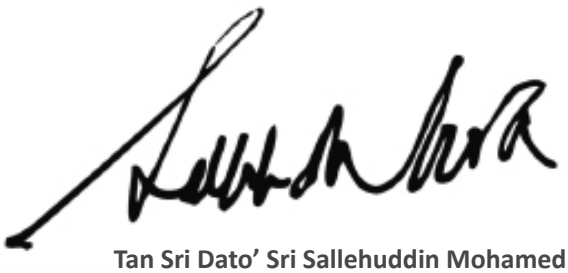


FOREWORD

The Honourable Minister of Science, Technology and Innovation (MOSTI) has launched 2014 as Malaysia Commercialisation Year 2014 (MCY2014) with the theme Science Technology and Innovation (STI) for Wealth Creation. In line with this theme, Invention, Innovation, Design & Exposition 2014 (iidex2014) is an annual exposition organized by UiTM and is the ultimate platform to highlight and commercialise new inventions and innovations. Researchers and inventors will exhibit their products which cater to the needs and wants of the community and the country.

The iidex2014 creates a new dimension by fusing two competitive concepts, a competition among innovative products and a competition to invite Innovateur Wannabes to perform live pitching of their products to the audience. The iidex2014 focuses on comprehensive commercialization and creating opportunities for entrepreneurs to carry out R&D as well as to provide avenue to commercialise their products. Through expositions such as iidex2014, MOSTI hopes to inculcate the culture of commercialisation of new technology designed and created by Malaysians.

I wish to congratulate all the participants of the iidex2014 and this is the opportunity for all researchers to show their ideas and exhibits their products and creativity. Apart from showcasing their products, innovators will have the opportunity to provide a window to the industry for business matching during the exposition.



Tan Sri Dato' Sri Sallehuddin Mohamed
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USING PULVERIZED FUEL ASH (PFA) AS AN ALTERNATIVE CONSTRUCTION MATERIAL

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The consumption of coal to generate electricity in Malaysia has caused concerns as it produces waste material which is PFA that can cause environmental pollution. Recycling the coal combustion by-product materials is the act of processing the waste material to creating an alternative product for construction materials. The use of pulverized fuel ash as a partial cement replacement for producing bricks will reduce the environmental pollution problem caused by excessive production of cement, as well as the requirements for disposing the ash. The use of this by-product would also give benefit status to the construction material. The ash has self-cementing properties that act as normal cement so the production of cement could reduce resulting in reduced carbon dioxide emitted during the manufacture of cement. Other advantages of using pulverized fuel ash are to decrease the permeability of the concrete and thereby increasing the corrosion resistance properties. Furthermore, with PFA utilization, especially in concrete, has significant environmental benefits including the increasing the lifespan of concrete roads by improving concrete durability, reduction in energy used and greenhouse gas when pulverized fuel ash is used to replace manufactured cement, reduction in amount of coal combustion products that must be disposed in landfills, and conservation of other natural resources and materials for making concrete. By adding polystyrene, which cannot decompose, to the brick mixed with the pulverized fuel ash, it will make the brick soundproof and as a great heat insulator because of the polystyrene properties. A normal brick has the strength of about 500 kPa while the PFA brick is 7 times stronger than an ordinary brick which is about 3500 kPa. By improving the shape of the brick into an interlocking stone, it may increase the strength. Even though it has a higher strength than an ordinary brick, it is also lighter because of the use of the pulverized fuel ash and the polystyrene is lighter than cement. By using by-product, such as the pulverized fuel ash it would reduce the prices of all the construction building therefore making it affordable. Not only that, safety is also a huge concern to many people in the world. The brick is lightweight and contains polystyrene; it could act as a shock absorbent material which could reduce the movement of building caused by earthquakes. This brick is made the same way as other bricks. By making a comparison with other bricks such as the Portland brick and the red clay brick, this modified brick containing PFA and polystyrene proved that it is the best performing brick in terms of life span, strength, durability, weight, cost, environmental disaster resistance and uses eco-friendly material.