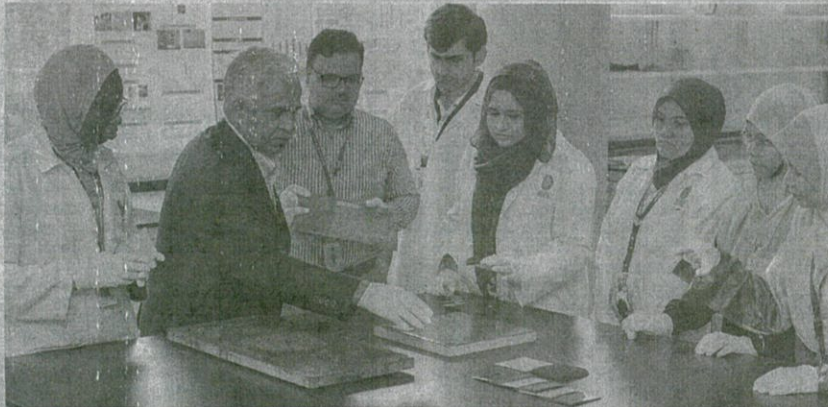


Fighting fire

An innovative intumescent fire retardant paint keeps flames and fumes at bay for up to two hours



Pushing boundaries: Faiz and his project team constantly modify their products for efficacy and cost.

THE phrase "spreading like wildfire" should not be taken lightly in case of a real fire. As soon as an ignition source is flared in the proximity of fuel and oxygen, not only does a fire begin, but it will spread very dramatically and rapidly too – moving from a mere flickering spark into a blazing disaster in a matter of minutes.

Fires spread in the way heat travels, through direct contact between materials and via electromagnetic waves reaching an object which absorbs it before combusting. As in many recent Malaysian fire tragedies claiming lives and destroying properties, many factors lead to uncontrollable blazes. From construction materials to on-site stores and walls or doors – the lack of fire protection for all these – can lead to fire spreading faster.

However, if these walls and doors can withstand the intense heat and instant damage from a fire, there may be a chance to put out the flames and save lives and structures.

Time is the critical factor

A leading Malaysian university has developed an innovative paint product that keeps flames and fumes

at bay for up to two hours. The paint is an insulating material designed to decrease heat transfer to a substrate structure. Its purpose is to delay the catching or spreading of fire. With some industries using almost 50mm insulating thickness, the fire or heat cannot penetrate steel, concrete or plastic surfaces.

"Collapsing structures and toxic fumes that cause loss of lives and destroyed assets will be minimised and people will have enough time to evacuate the premises," says Professor Dr Faiz Ahmad of Universiti Teknologi Petronas (UTP).

The material is designed to prevent fires from breaking out and spreading uncontrollably. After a certain level of heat, from its 2mm thickness, the paint can swell up to many times its thickness. And it does not catch fire even when the temperature rises.

According to Faiz, despite a raging fire, a structure will still stand without collapsing, and without releasing toxic fumes.

Market studies show a demand for this type of paint that protects the structure. One of the University's collaborators, Ramakrishnan Meenakshi Sundaram, Chief Technical and Operations Officer, TPG Oil & Gas (M) Sdn Bhd,

says it's a huge advantage that the product is locally produced. "The cost is lower, quality is high, and vending and production capabilities will be more pronounced," he adds, pleased with his role of introducing the product to the market.

Faiz is understandably pleased with this invention. In a small, crowded office crammed with books, he points to a few shiny square tiles laid out on a side table. These compact sample tiles, coated in muted shades of intumescent fire retardant paint, will radically change the way fire is controlled within a structure, he says.

“The paint can be used on every surface from factories and condominiums to shopping malls and airports.”

Prof Dr Faiz Ahmad

Although coated interiors can last a lifetime, exterior walls may require a fresh coat at least every decade. The fact that the fire retardant paint does

not need a primer is a cost advantage. Too often, Faiz asserts, safety is compromised because of cost, profit and aesthetic considerations.

When Faiz, a Metallurgy and Materials Sciences graduate, first began work on it 10 years ago, it was a totally new technology. Today, only 10 experts operate in this select field, six of them US-based.

Other than the business potential of intumescent coating paint, Faiz envisions its myriad benefits for society in terms of offering a better, safer life. "That sense of safety and peace of mind comes at not a very high additional cost," he proclaims. Its estimated cost is around 2% of a condominium purchase price.

The product, customisable and currently available in five colours, has been a decade in the making. During this time, it has been rigorously tested for its efficacy.

"We challenge the boundaries of what the product can and can't do," says Faiz, who has also sent the coating to be tested in Europe and to be verified by SIRIM Berhad. The toxicity of the coating is always a challenge, but experimenting with ceramic and nano-sized fillers shows reduced harmful fumes.

The product breakthrough was achieved when it reached the maximum charred residue, a process of incomplete combustion of certain solids when subjected to high heat. When the material transforms to char, it can give better protection."

With RM3 million initial funding, Faiz diligently led the sustainable project team of post-graduate and doctoral students. So far, companies both local and international, from as far as Belgium, Germany and Spain, have expressed interest. It is a matter of finding the right partner companies to commercialise the product.

"Commercial acceptance depends on the product's balance between cost and benefit," said another collaborator, Dr Chew Kong Chin, Head of Long Term Development Asia, Becker Industrial Coatings (M) Sdn Bhd, Beckers Group. He stated that, if the product was a significant improvement over existing ones and if its higher cost is acceptable

to users, then it will not be difficult to sell.

Chew found Faiz online and contacted him to find out more about his research work. After discussions and tests at UTP's facility, Chew discovered that the product was a great option among the fire-retardant coating technologies available today.

"It's highly effective and doesn't use undesirable chemicals such as the widely used brominated flame retardants that come with many environmental and safety issues."

Apart from developing products, Faiz, who has been with UTP for 14 years, is equally passionate about marketing them. He is involved in discussions right from the beginning and finds the positive responses satisfying. In his native Pakistan, Faiz worked in the government and used to run a steel factory. Although an academic by profession – he regularly teaches engineering materials subjects – his outlook is entrepreneurial.

He believes that commercialising a product is what ultimately makes it useful.

“If research is only for research purposes, mankind's problems will remain unsolved. All our products here are meant to help make people's lives better.”

Prof Dr Faiz Ahmad

Faiz and his team are constantly thinking of ways to modify existing products, either for efficacy or cost. Ramakrishnan, who met Faiz at an exhibition, is convinced of the devoted academician's belief, energy and drive. Admitting that to invent, produce and market such products takes time, energy and effort. "It's great that UTP has a strong relationship with industry players and is willing to push boundaries."



Fire power: Sample squares coated in long-lasting intumescent fire retardant paint that can be used on every surface.

Lab space

DR FAIZ Ahmad finds the space, facilities and freedom to experiment at what he considers the country's best facility most conducive to creativity and innovation. He finds it exciting to translate his ideas into useful products that benefit society at large. With cost and compatibility as his key considerations, he strives to develop items that ensure equal accessibility to all.

Among the products his department has produced is thermal management, a nano composite heat sync that has very high thermal conductivity and helps dissipate heat faster than current ones, offering longer life for electronic devices. This product has been sold for USD1 million and will be used in a commercial product.

Malaysia currently has 50 pending patents on thermal management, and five which have been granted. Two of these

belong to UTP and have been commercialised.

Other products include dental implants and brace screws. Once they pass all the stringent tests and processes, they will be available at much reduced cost. According to Faiz, the dental implant business is worth at least USD7 billion, and UTP has developed a new protective coating. "It's a nano coating, a very hard coating that protects from corrosion and leaching of toxic ions."