

Promat fire prevention at new Terminal 3 of Changi International Airport  
**PAGES 2 & 3**



Designing better fire safety features into buildings friendly to the disabled  
**PAGE 6**



Promat safety built into tunnel of Kallang-Paya Lebar Expressway  
**PAGE 8**

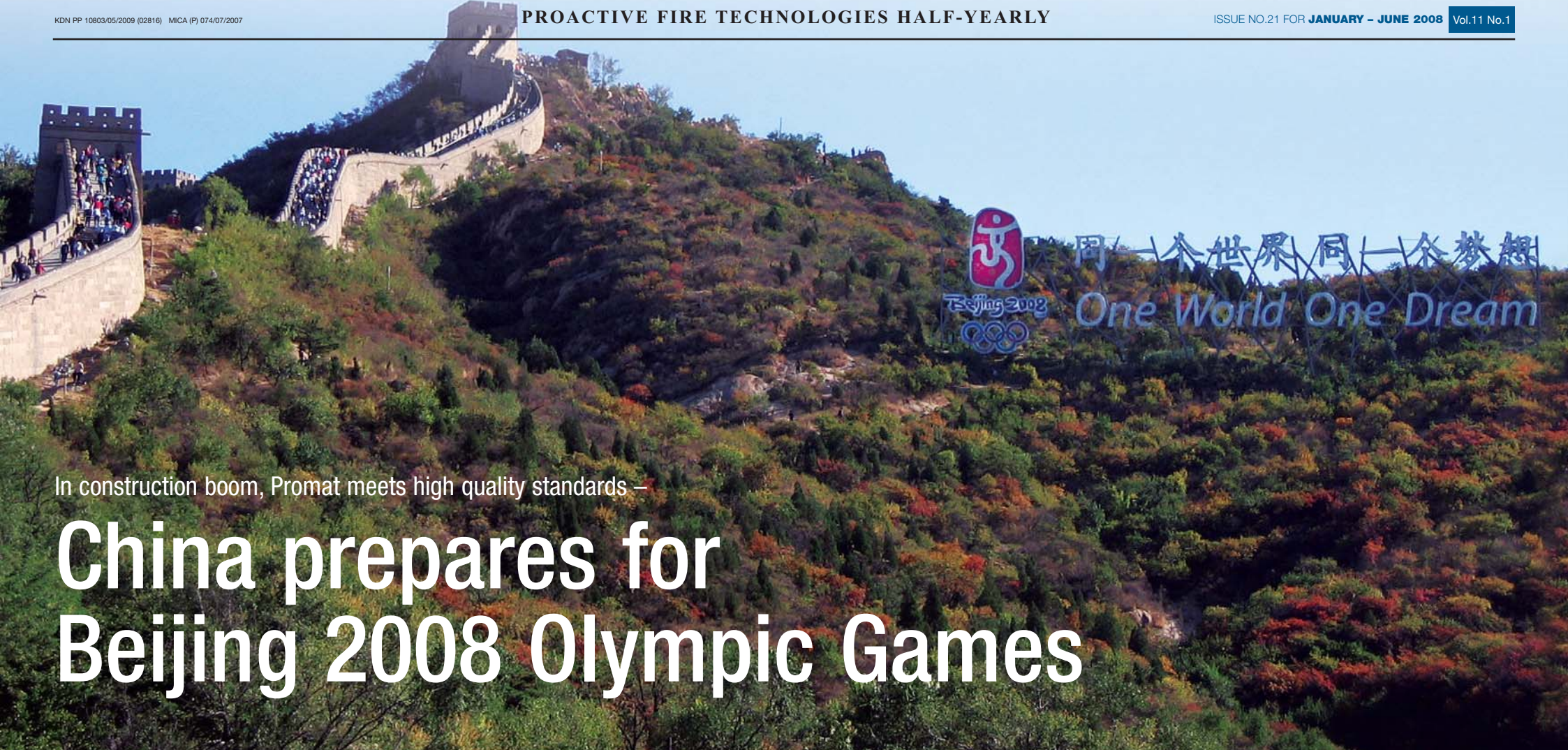
# PROACTIVE FIRE TRENDS

• AUSTRALIA • CHINA • HONG KONG • INDIA • MALAYSIA • SINGAPORE • VIETNAM

KDN PP 10803/05/2009 (02816) MICA (P) 074/07/2007

PROACTIVE FIRE TECHNOLOGIES HALF-YEARLY

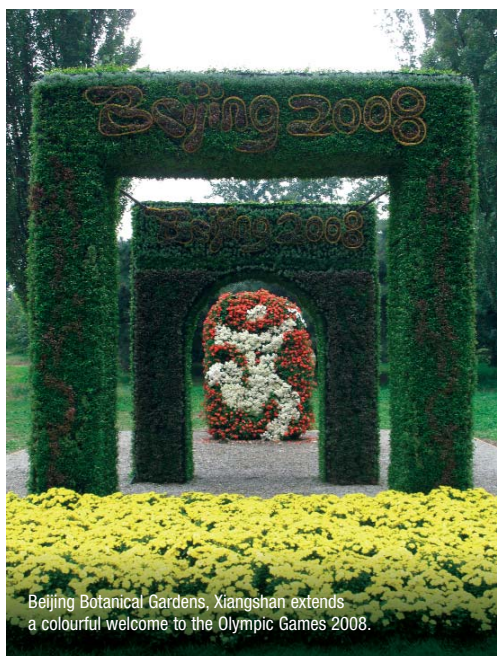
ISSUE NO.21 FOR JANUARY - JUNE 2008 Vol.11 No.1



In construction boom, Promat meets high quality standards –

## China prepares for Beijing 2008 Olympic Games

The view from the top of Coal Hill in Jingshan Park, central Beijing is justifiably emblematic of traditional China. Across a palace moat can be seen the towering dull matt red walls and the elliptical tiled roof tops of the ancient and huge Forbidden City. Little appears to have changed here since the palace was designed and first laid out during the Mongol rule of Genghis Khan in the mid 1400s. Times might have changed elsewhere but the old palace remains timeless.



Beijing Botanical Gardens, Xiangshan extends a colourful welcome to the Olympic Games 2008.

A wide angle perspective from the same quiet spot, however, reveals a skyline punctuated by new structures. The reality of Beijing nowadays is one of a major metropolitan area in the process of perpetual motion and constant, significant change.

In fact, ever since the country began a process of liberalisation in the early 1980's, change has been particularly conspicuous in the streets of China's major cities. The capitol is no exception and in many respects leads the country forward.

### Olympic Games adds considerable impetus to development process

As long stagnant business sectors were overhauled they unleashed potent market forces. It didn't take long for China to catch up with the rest of the world.

Indeed, in the eyes of many, China is now considered the "factory of the world". It's red hot economy has propelled the country into the leading ranks of international trade. China today consumes more raw materials than most other major industrialised nations.

Terminal 3, Beijing International Airport, started in early 2004, nears completion.

Many aircrafts now sport the unique, official Beijing Olympic Games 2008 mascot as part of their stylish livery.



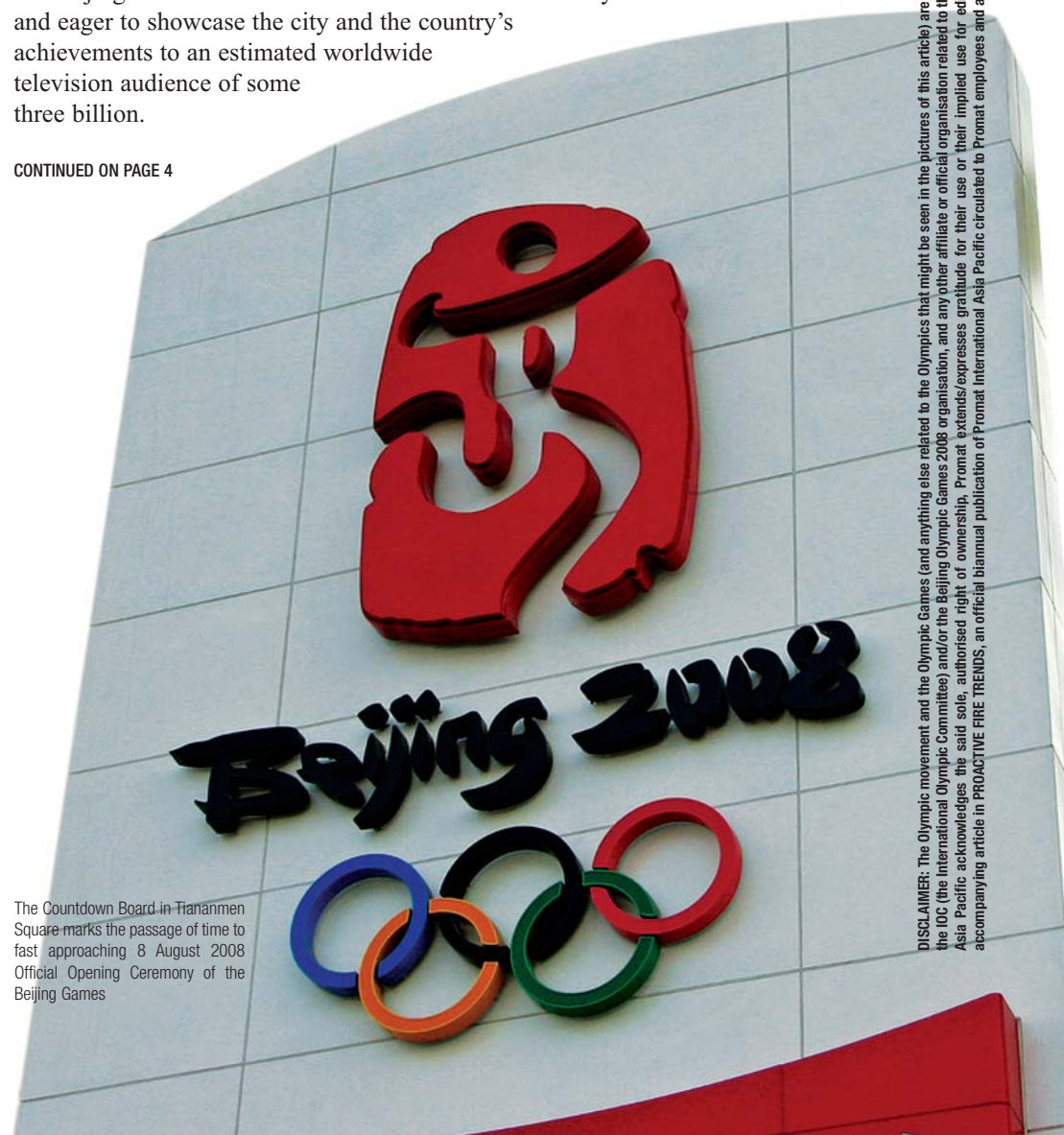
For the past two decades, Beijing has witnessed a construction boom without precedent in its long history.

However, the long and sometimes torturous run-up to the Beijing 2008 Olympic Games has added considerable fuel to the process of development.

In addition to many new and architecturally remarkable structures, the city today is decked out in all the paraphernalia that usually make the Olympic Games a memorable and enduring phenomena on the world stage.

Beijing and its 17 million residents are understandably anxious and eager to showcase the city and the country's achievements to an estimated worldwide television audience of some three billion.

CONTINUED ON PAGE 4



The Countdown Board in Tiananmen Square marks the passage of time to fast approaching 8 August 2008 Official Opening Ceremony of the Beijing Games

DISCLAIMER: The Olympic movement and the Olympic Games (and anything else related to the Olympics that might be seen in the pictures of this article) are registered trademarks of the Olympic Games, the IOC (the International Olympic Committee) and/or the Beijing Olympic Games 2008 organisation, and any other affiliate or official organisation related to the Olympic Games. While Promat International Asia Pacific acknowledges the said sole, authorised right of ownership, Promat extends/expresses gratitude for their use of their implied use for editorial and information purposes only in the accompanying article in PROACTIVE FIRE TRENDS, an official biannual publication of Promat International Asia Pacific circulated to Promat employees and associates primarily in the Asia Pacific region.



Now at Singapore's Changi International Airport –

# New Terminal 3 builds in a high level of invisible but very reassuring protection

In a notable departure from usual policy, Singapore will host the world's first Formula 1 night race in later September 2008. Two integrated casino resorts, currently being built, are slated for completion in 2009. In 2010 the first Youth Olympics will be held on The Little Red Dot for a worldwide audience.

An energetic, regional economic powerhouse, aiming to develop its international brand, the island city state has become a cool and funky destination, abuzz with activity and high on the "must see" list for many travellers.

Last year, annual Singapore tourist arrivals surpassed the 10 million mark, up 5.4% over the previous year. Estimated tourist receipts have been posted at S\$13.8 (US\$12.4) billion, an 11.3% increase over the same January to December period in 2006. These trends are forecast to continue.

## Changi International regularly voted best airport

Changi International Airport, the main entry portal for most visitors to Singapore and the immediate neighbourhood, handled a record 36.7 million passengers, a 4.8% increase over the 2006. This pegs Changi as the 20th busiest airport in the world and the fifth busiest in Asia for passenger traffic.

In addition to being an important passenger traffic hub, the airport is also one of the busiest cargo airports on the international scene. In 2007, Changi International Airport handled in excess of 1.8 million tonnes of cargo.

Terminal 4 has already been proposed and is expected to come on stream in 2015.

The new Terminal 3 (T3) at Changi International Airport was opened for business in January 2008 and it is already a hit with visitors and locals alike.

It's is bright, cool, spacious and airy. A calm oasis in a humid tropical city. T3 has been described as a modern city within a world class terminal within an up-to-date globally connected 21st century city.

It features a wide range of F&B outlets, shopping and entertainment facilities, ideal for arriving, transiting and departing passengers as well as local residents.

With a second-to-none reputation to uphold and much at stake, it is not surprising at all that Terminal 3, like the rest of Changi International Airport, is well equipped with high levels of international quality proactive fire protection.

## Principles of fire compartmentation applied to baggage conveyor areas

The efficient handling of luggage of millions of travelers through Changi Airports relies on baggage conveyor systems traveling through various fire resistant compartment walls and floors of the airport terminal building.

In Terminal 3, PROMATECT®-H fire resistant enclosures are built around the conveyors to ensure the integrity of the fire compartment.

The construction is comprised of 9mm thick PROMATECT®-H facing boards sandwiching a steel framework cage structure around the opening in the floor slab where it is "penetrated" by the baggage conveyor. The enclosure is then clad with a designer-look translucent glazed and stainless steel grid finish (see picture below).

The ingress for baggage entering the enclosure is fitted with a specially tested sliding fire door unit. Recessed niches, also formed with the PROMATECT® system, house the electrical junction boxes.

The overall results are immaculate and generally enhance high aesthetic levels of the T3 check-in facilities while adequately meeting the functional design demands of a world class airport terminal.

CONTINUED ON OPPOSITE PAGE



120 minute fire resistant enclosure made of PROMATECT®-H boards secured to steel framework.

Below: Complete fire resistant enclosure finished with cosmetic cladding of tempered glazed panels.







### Smoke reservoirs designed to collect and disperse

Smoke reservoirs high in the open plan ceilings of Changi's new T3, form part of an efficient engineering smoke control system designed to prevent the lateral spread of smoke. The reservoir system collects smoke for removal.

The smoke reservoirs here are unobtrusive and blend well with the overall design and human scale aesthetic that do much to make Changi International Airport a memorable place to use and visit.

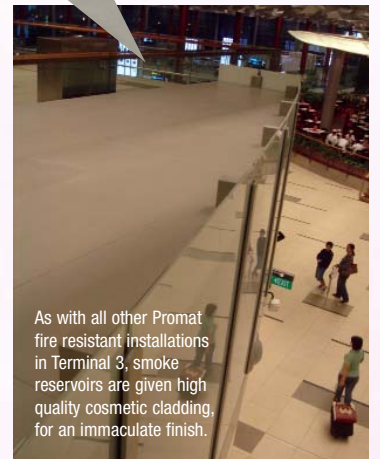
Smoke screens used to form a smoke reservoir or as channelling screens must be of non-combustible construction and able to withstand the high design temperature.

Promat has various fire resistant screen systems constructed from such as PROMALINE® and PROMINA®-HD. These are tested to meet the same performance requirements of smoke curtains, e.g. BS7346.

Out of sight but not out of mind for owners and building designers, it is reassuring indeed that such Promat smoke channeling screens are employed extensively above the shopping outlets in the public areas and departure hall of T3 at Changi International.



Smoke reservoir under construction.



As with all other Promat fire resistant installations in Terminal 3, smoke reservoirs are given high quality cosmetic cladding, for an immaculate finish.

### Fire resistance helps make striking design statement at Terminal 3's Crystal Jade Restaurant


The Crystal Jade Restaurant not only offers diners a choice of fine cuisine but dominates the F&B area of T3 with a visually striking design presence. The view is best appreciated from a slight elevation.

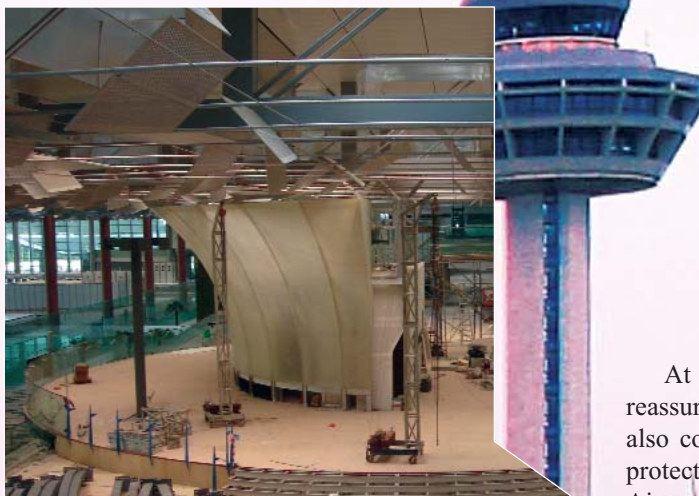
Crystal Jade's diffused lighting arrangements and its sleek, open lotus-like shape tell diners and T3 visitors alike that they can expect sophisticated dining, despite the surround rush of an airport setting.

The restaurant sits on an elevated stage circular in shape. It is raised by approximately 1,000mm from the structural floor slab and is more than 20 metres in diameter.

In order to fulfill the cavity barrier requirements in Section 3.11 of the Singapore Fire Code, Promat fire resistant products and systems are effectively employed.

The entire floating floor is sectioned horizontally with a two hour fire resistant PROMATECT®-H ceiling membrane system. This divides the concealed cavity spaces, limiting both height and volume. As such, the PROMATECT®-H ceiling membrane adequately forms the compartmentation requirements of a "floating" restaurant.

At Crystal Jade Restaurant fine dining is guaranteed and diners are reassured by sense of security and well being that positive protection also comes from beneath. It is typical of a level of Promat proactive protection and security well employed throughout Changi International Airport's new and ultramodern Terminal 3. 



The off-white under floor of the restaurant, seen here during construction, is 120 minute fire resistant PROMATECT-H ceiling membrane.



The completed Crystal Jade Restaurant sits secure on its raised, fire resistant platform.

### POINT VIEW

In the run-up to the Olympic Games – scheduled to begin with lavish opening ceremonies on 8th August 2008 in China's National Stadium, by now affectionately known around the world as the Beijing Bird's Nest – it's always a good idea to pause for a cause and think about what might be involved in this momentous and at times rather dramatic event.

Here we have a truly global event, one that will be watched by a very high percentage of the planet's total population. Numerous new sports venues have been constructed especially for this Olympian sports spectacular always rich in tradition and pageantry. Many thousands of participants will travel long distance to arrive in historical Beijing to compete in this once-in-a-lifetime (for most athletes) opportunity. They have all spent many years in intensive training, honing their will and their bodies to perfection, just to compete for a few fleeting moments of temporary, passing notoriety. Few, a mere handful at most, will step triumphantly up to a medal on the winner's podium.

Why do we humans endure all the pain and suffering to get to the pinnacle of success? No doubt there are many motivations but I believe for most it is simply an intrinsic part of our genetic structure. Humans like to and are apparently programmed to compete. We certainly like to be recognised as amongst the best in the world. We do it for personal satisfaction and increasingly national glory.

I also believe that the competition, the person or the team in the lane next door for example, has an essential and important role to play in this heady adventurous mixture of toil and triumph, whether it is Olympic Games or a neighbourhood football match. In this context, he competition is actually the first and probably most important validation of winning. It is therefore essential to recognise and honour the competition because, to put it very simply, without competition there would be few winners.

I think it is more or less the same in business, too. The competition drives us ahead, keeps us energised. This is certainly the case, as we all know, in the fire protection industry. To provide better, more effective products and services, to deliver their various promises and their life and property saving potential, a competitive market place is one of the forces that pushes Promat ahead. Another dimension in the pursuit of excellence at the heart of our business.

To honour these and other ideas, in this our 21st issue of PFT, we are proud to put the Beijing 2008 Olympic Games on our cover, continuing the story in our centre spread on pages four and five. In this brief overview we outline some of the Olympian projects to which Promat is a proud supplier.

On these two pages we look at some of the fire protection measures built into the new Terminal 3 at Singapore's award winning Changi International Airport. From baggage handling units to smoke reservoirs and restaurant facilities, Promat plays an invisible and quietly reassuring role in optimising fire protection in an airport that handles in excess of 36 million annually.

## The Value Of Competition

On page six our article fire safety measures to make buildings much more user friendly for disabled people aims to increase awareness for this vexing problem. Quite frankly, not enough has been done for people who, as a matter of interest, will be competing for real world achievement and recognition in their own Paralympic Games to be held soon after the Beijing Olympics at the end of August.

Speaking of competition, on page eight we overview a story about the new Kallang-Paya Lebar Expressway (KPE) in Singapore. It is 12km long and will, by the time it is fully operational at the end of this year, star Southeast Asia's longest expressway tunnel. The latter incorporates many safety features including Promat fire protection. The task of winning this major project was long and arduous. I am very proud indeed of all who had a hand in this remarkably Promat success, even the competition for they kept us on our toes.

As we witness history unfold at the Beijing Olympic Games there will undoubtedly be many stirring stories to be told. It is worth remembering I think that behind every success it is the spirit of genuine competition that made victory possible.

I encourage each and everyone of Team Promat Asia Pacific to winning better business in the months ahead, just as I look forward to doing whatever we can to ensure the Promat stays victorious on the winner's podium.

Erik D. van Diffelen  
Managing Director  
Promat Asia Pacific Organisations  
Second quarter 2008





# China prepares for Beijing 2008



## State-of-the-art buildings incorporate stunning design and safety features

Visitors arriving by plane in Beijing, for example, will enter an ancient culture through an imposing new ultramodern air terminal designed by Sir Norman Foster, the award winning British architect responsible for some of the world's most memorable modern structures.



The new Terminal 3, Beijing International Airport

Elsewhere, many of the venues for the Olympic Games incorporate stunning, state-of-the-art design features as well as the latest fire science technologies. These include the kind of standards Promat has long advocated as optimal proactive fire protection of today's modern built environment.

The National Stadium, for example, is possibly the most talked about sports stadium in the world. Labeled the "Birds Nest", this amazing structure has a total land surface area of 258,000m<sup>2</sup>.

It is designed to seat 95,000 spectators during the Olympic Games but can be easily reconfigured to 85,000 for post Games events.

Designed by Pritzker Prize-winning architects Herzog & de Meuron in collaboration with ArupSport and China Architecture Design & Research Group, the National Stadium cost some 4 billion yuan (approximately US\$500million/ Euro350million) and five years to build.

Its unique design feature is the use of 36km of unwrapped but interlaced steel that makes the entire elliptical structure looking remarkably like a futuristic bird's nest. A unique design system that relies on principles of hydraulics gives the National Stadium the required structural rigidity.

The stadium is 330m long by 220m wide. At a towering 69.2m tall, this unique and impressive-looking purpose-built sports stadium weighs in at a staggering 45,000 tons.

The new National Stadium incorporates PROMATECT® fire barrier systems.

Promat was chosen as the ideal solution provider for bulkhead system for high density E&M service penetration installations. The service penetration seals required 120 minute FRL. Again, PROMATECT® was seen as offering the ideal solution.

In addition to its obvious sporting functionality, the Bird's Nest stadium also houses visitors' centres, recreational, shopping and other facilities that make it a distinctive city within a city.

During the Olympic Games it will be the site of spectacular opening and closing ceremonies and most of the track and field events.

## Just a short walk to the future, the nearby H2O3 Watercube

The Beijing National Aquatics Centre, nicknamed "The Watercube", a description frequently abbreviated to H<sub>2</sub>O<sup>3</sup>, was initially designed by Australian firm PTW Architects in collaboration with CSCEC International Design and Arup. The latter structural engineers conceived the structural elements.

The structure was built by China State Construction Engineering Corporation (CSCEC).

Comprising a steel space frame, The Watercube is clad fittingly with bubble-like multiple layers of a modified co-polymer called ethylene-tetra-fluoro-ethylene (ETFE). It is the largest ETFE clad structure in the world with over 100,000m<sup>2</sup> of ETFE pillows that are only eight one-thousandths of an inch in total thickness.

Originally developed for the space industry, the ETFE material is unique in that it does not degrade under ultra-violet light or atmospheric pollution.

The aquatic skin-like cladding allows more light and heat penetration than traditional glass, resulting in a 30% decrease in energy costs.

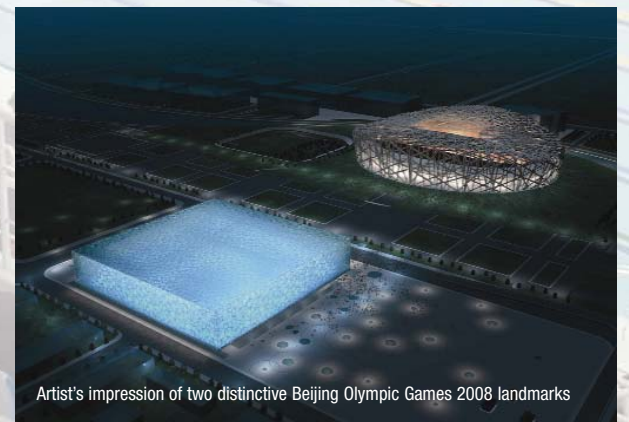
The pneumatic ETFE pillows are restrained in aluminium extrusions and supported by a lightweight structure. The pillows are inflated with low-pressure air to provide effective insulation and resist wind loads while providing a high level of comfortable climatic control within the stadium itself.

H<sub>2</sub>O<sup>3</sup> has a capacity of 17,000 for the actual games programme but this can be reduced with remarkable, designed-in adaptability to 6,000 seats for post-Olympic events. The Watercube has an all-in land surface of 65,000m<sup>2</sup> and covers a total of 7.8 acres.

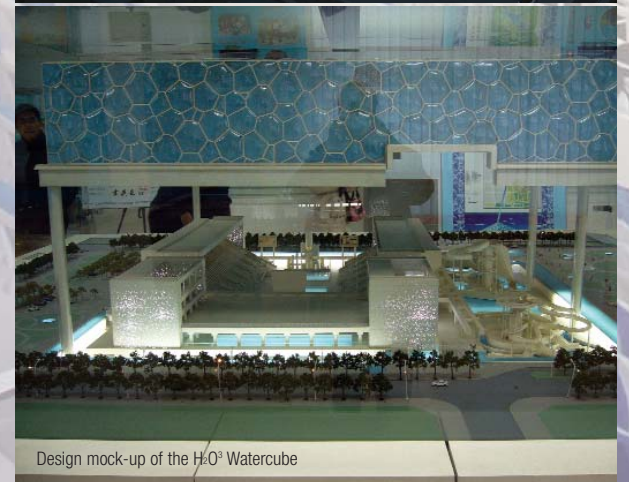
Where quality, performance and safety are paramount it is not surprising to see Promat quietly at work at The Watercube, in the form of an essential insulated fire damper OEM application.

Promat was chosen for the Watercube because it was considered ideal for an HVAC field channel partner relationship.

The Watercube has already won a number of design, structural and architectural distinctions. When it hosts the August 2008 Olympic Games swimming, diving and synchronised swimming events more medals are expected to be awarded the world's top aquatic athletes in well-protected built environment.



Artist's impression of two distinctive Beijing Olympic Games 2008 landmarks



Design mock-up of the H<sub>2</sub>O<sup>3</sup> Watercube





# Olympic Games

The breathtaking Beijing 2008 National Swimming Centre, also known as "The Watercube", designed by Australian firm PTW Architects in collaboration with CSCEC International Design and Arup. The nearby "Birds Nest" National Olympic Stadium was designed by Pritzker Prize-winning architects Herzog & de Meuron in collaboration with ArupSport and China Architecture Design & Research Group.



## Promat also helps to optimise safety levels at other Olympic Games venues

The following is an overview of a few of the many construction and fire protection projects Promat was involved in the run-up to the Beijing Olympic Games.

The Yingdong Swimming Centre, an established and re-furbished site allocated to aquatic events like water polo, also features retrofitted proactive Promat fire protection.

At Yingdong, PROMATECT® protects the space underneath the stairs leading to large spectator areas.

Promat was chosen thanks to well-known brand quality and convincing project experience for stadium smoke extraction systems. In this particular case, the smoke extraction duct was set underneath the audience stairs. With the aid of the concrete floor and wall, a two sided duct was built, providing a space effective solution in tight quarters and the expected reliability for smoke and fire proofing.

The archery field adjoins the Olympic Tennis Centre in the north of the Olympic Green and buttresses the Olympic Hockey Field in the south. With a total area of 9.22 hectares, it covers a floor space of 8,609m².

The venue has three archery fields, including one for ranking games and two for medal rounds. All are the traditional V-shaped fields characteristic of top level international archery tournaments.

The spectator stands are also typical of archery – tall, steep, shallow and cantilevered – minimising the structural footprint while maximising the amount of comfortable audience seating with the ability to clearly see the entire competition field.

The hi-tec steel structure stands feature PROMATECT® structural steel fire protection for beam and column cladding. Box type cladding for the beams and columns for the function rooms was required, so decision makers focused on suitable 120 and 180 minute FRL board systems.



The easy to gear-up Hockey Field readies for Olympic Games 2008



The Yingdong Swimming Centre



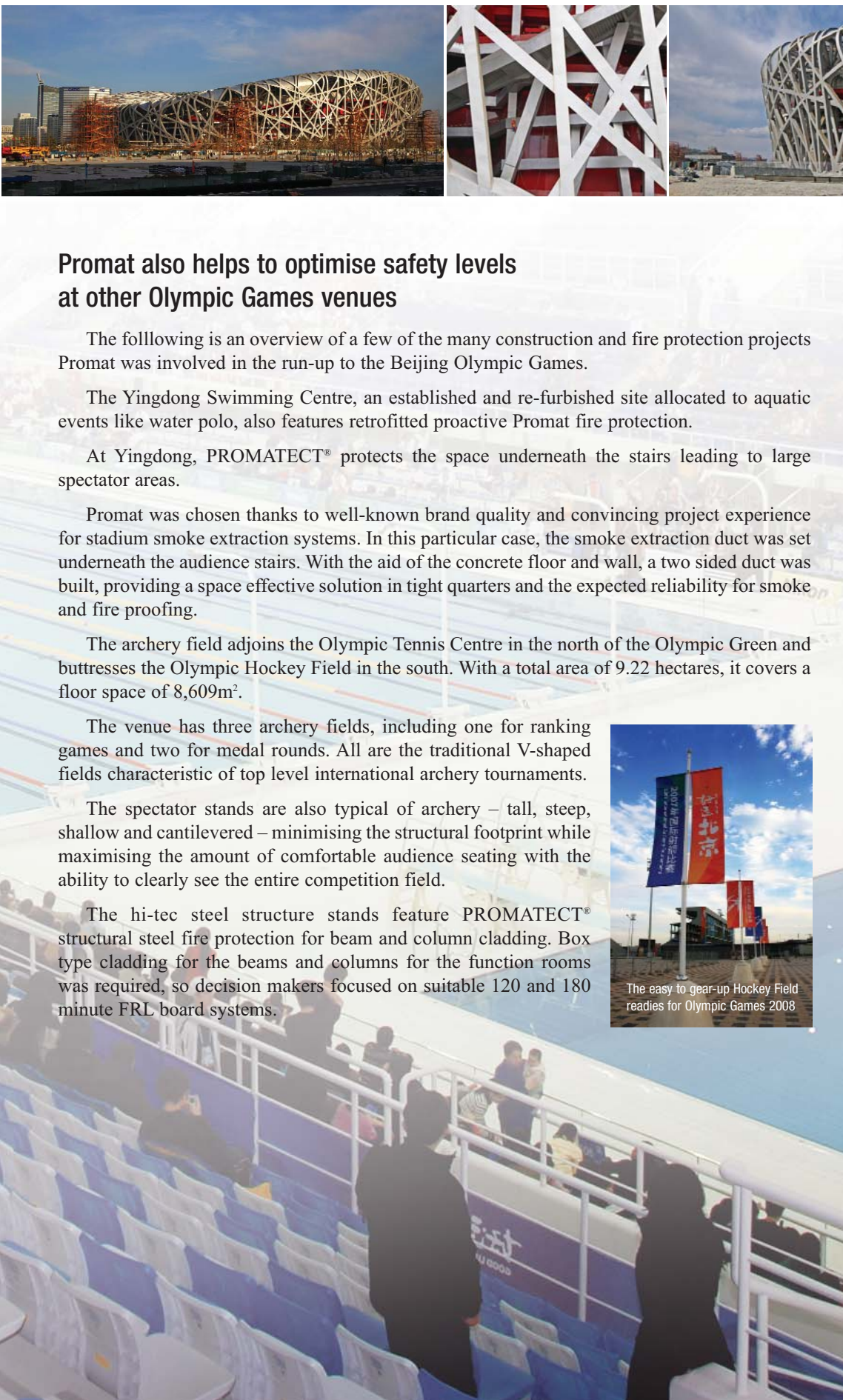
Clockwise from top right: The Hockey Field, located opposite the Archery Field



Promat was one of the few professional suppliers able to provide an appropriate technical solution and the required fire resistant level within a tight timeline for installation.

A similar fire protection solution was provided for the beams and columns of the spectator stands of the nearby Hockey Field venue. Like the Archery Field, this is also a temporary facility. It features two natural grass surface fields.

The all important Media Village, housing domestic and international news and media organisations providing critically important coverage of the Beijing Olympic, also features top quality Promat protection in the form of PROMATECT® for 120 minute FRL to smoke extraction ducts. **PFT**





Research and increasing awareness spotlight a problem while illustrating practical solutions show the way to a better future –

# Making the built environment easier AND safer for the disabled

**W**e spend a large part of our lives ensuring that fire in the built environment is minimised. The cornerstone of our successful business model is to optimise wherever possible the safety of property and users of built structures with the application of modern fire technologies and professional, proactive fire prevention systems.

Fortunately for “normal” able bodied members of most communities, these are nice neat concepts that understandably win increasingly large and loyal followings at virtually all levels of society. Indeed, more and more countries, recognising obvious trends, needs and cost effective benefits, are doing what they can to overhaul and improving their regulatory climates to better cope with increased levels of risk.

After all, cities and societies generally are becoming more crowded and more complex. Under the best of circumstances, improving safety is a painstakingly slow business, even in our fast changing increasingly globalised world of overlapping and shared destinies.

As a matter of fact, a large and competitive industry, built on continuing research and development and scientific innovation has grown up around these general ideas. Promat is a recognised worldwide leader.

## In a perfect world, all fires are extinguished immediately before they spread – Right?

One man or woman (able bodied or disabled) with a bucket of sand or water in hand, at the right time and right place, eliminate 99.9% of all fires. Reality, regardless of how we plan or how hard we try, is another matter entirely.

We know when most commonly used building materials lose their integrity and make the appropriate provisions accordingly, in many cases with tested and proven fire resistant solutions. Many years of research and abundant empirical evidence suggest, however, that people react in unexpected, illogical ways in the event fire. Rational, cognitive behaviour departs, instincts often incorrect take control. A recipe for disaster.

Sadly, the end outcome is nearly always tragic, despite the presence of abundant safety and escape features designed and installed to achieve the complete opposite. Such is human nature, regardless of the level of education and awareness. Fire, heat, smoke and fumes do strange things to normal people in extreme, life threatening situations. Understandably.

On the other hand, knowing these behavioural parameters, we continue to do everything we can to make sure the built environment and the users of that built environment are as safe as possible for everyone.

A series of well-organised safety exercises illustrate the point, all too well.

For example, imagine for a moment, any large building in any crowded city. It's the day for a routine fire drill. Pre-informed, practised and well rehearsed.

Alarms sound. Everyone goes to their assigned station, begin assigned tasks. Emergency services swing into action. Everything smooth. Buildings occupants, always orderly and well trained of course, know exactly what to do, how and when to do it. They escape from the building in a surprisingly orderly and efficient manner.

Fire and emergency personnel, along with building management are certainly impressed. Congratulations follow, a job well done. All very reassuring and comforting, even for the normal every day users of the complex.

Just like in real life, right? Wrong.

But before we rush off to hasty judgement and additional conclusions, wait a minute. What's that we hear? A distant cry for help perhaps? Oh yes, it's the disabled you say.

So what about the disabled, especially the disabled trapped in a building with impeded access to escape facilities? Not a nice thought. We inevitably forgot the physically and intellectually challenged of our society. Out of sight, out of mind as this and any other typical fire drill exercise illustrates all too clearly. They're still inside the building, unable or just too slow to effectively use the systems usually designed for their fully endowed colleagues and friends.

Fortunately, this is just a regular fire exercise. Reality would be an entirely different, fate tempting matter almost guaranteed to produce a heartbreaking outcome.

Bottom line? Awareness of the disabled and their very special needs, particularly in large complex structures and likely scenarios an actual fire event would create is extremely low. This is a situation which needs to be corrected.

## Easier said than done to build user-friendly systems for the disabled into a modern built environment

Overlooking the disabled is a regrettable but all too human shortcoming. Disability is a problem which usually happens to someone somewhere else, a problem that is compounded by society wide attitudes rather than just an individual, able bodied person to disabled person basis. Not surprisingly, the disabled are inclined to see it somewhat differently, of course, if indeed they can see at all. The world they are obliged to live in and deal with on a daily basis is by and large incredibly user unfriendly.

As buildings, cities and towns become more complicated, the problems the disabled confront in their effort to function effectively and live useful, productive lives tend to exacerbate rather than diminish the problems they have to confront many times a day.

Very few countries in the Asia Pacific region actually require designers to build in user friendly provisions into their buildings. Awareness for the problem is highest in markets like Australia, New Zealand, Singapore and Hong Kong. More education and persuasion clearly needs to be applied before real solutions can be applied.

Developers cite cost and numbers as the main obstacles to improving better fire protection provisions for the disabled. After all, just how many people actually use this building or that facility?

On the other hand, one life endangered or lost, able bodied or disabled, is simply one life too many.

In many cases, designing and building many of the provisions that help the disabled survive a fire cost little more than normal safety provisions. It's all a matter of mind-set, awareness and actually doing something to correct and imbalance.

## The disabled come in all shapes, sizes and level of disability so people research must work hand in glove with building designers, owners and developers

The physically, visually, audibly and intellectually disabled must all be factored into the decision making process when assessing fire risk levels and occupant needs in planning any structure for the built environment.

Increasing awareness for the multiplicity of problems, especially for the disabled, must therefore begin with tailor-made research, preferably on a wide, generalised social scale leading ultimately to localised and specific, individual and building needs.

Assessing the number of people, able bodied and disabled, likely to use the building, and their level of disability, is critical to improving the fire safety of any construction.

After all, depending on location and plot size, each building is unique in the way it uses and optimises available space, as any owner, developer or architect will confirm.

Questions like people numbers and how they access and egress a building, in normal times and emergency situations and how the disabled react to external stimuli have to be first assessed, addressed and answered. How disabled people escape from fire is particularly important.

The means and efficiency by which people actually move and move about, especially the locomotion of the disabled and how they comprehend and react to any given situation in a building, are especially significant factors.

Local cultural, linguistic and societal conditions are also important and should not be overlooked in making a structures safer for all users.

## Improving facilities and increasing fire safety for disabled building users

In the final analysis, surviving a fire usually comes down to a matter of time. How quickly can escape be achieved and how quickly fire and rescue personnel arrive at the scene of the actual fire event are critical to saving as many lives as possible.

When considering fire precautions in the design and construction of buildings, professional and socially responsible architects, engineers, quantity surveyors, owners and developers should be aware that meeting the safety needs of the disabled requires enlightened, practical and realistic humane solutions in a number of different areas and disciplines.

These include:

- Accurate assessment of smoke and toxic fume control and management systems;
- Improved means of escape;
- Easier to access and use stairways, with the possibility of wheelchair lifts;
- Wider doors, easier to open and negotiate;
- Wider lift/elevator doors;
- Easier up and down ramps;
- Clearer, better illuminated signage;
- Louder, audible (perhaps multiple stage) alarms;
- Better and more accessible communication systems;
- Provision of fire and fume resistant, easy access refuge areas.

For more information, the professionals of Promat Technical Department have their fingers on and access to a number of relevant knowledge centres. Alternatively, please visit the websites of the Building Standards Institution at <http://www.bsi-global.com>, the Building Research Establishment at <http://www.bre.co.uk> and [http://www.moebuildingcontrol.co.uk/blind\\_fire\\_safety.html](http://www.moebuildingcontrol.co.uk/blind_fire_safety.html) as well as <http://www.communities.gov.uk/fire/about> and <http://www.firekills.gov.uk> for some of the ways buildings can be improved to provide fire safety for the disabled. **PF1**





在建筑业蓬勃发展下，保全(Promat)依然保持高品质的防火设备标准

# 北京2008奥运会，我们已经准备好了

从北京市区的最高峰 - 景山公园的煤山山顶 - 俯瞰过去，肃穆的紫禁城和环绕着它的金水河让所有人都能感受到这个六朝古都的风范。从1400年的成吉思汗时代，这个城市，如同景山脚下的紫禁城，成为中国历史的一个特殊而重要的见证。

历史和现实在这里相遇交融，就如同不远处那些同样雄伟壮观的摩天大楼一样，一场始于上个世纪80年代的经济改革，一场让中国的方方面面都发生了翻天覆地的革命，让北京，中华人民共和国的首都，走在了中国经济发展的最前沿，并最终成为了一座现代化的国际大都市。

## 奥运推进了中国的高速发展

这场经济发展的潜力现在无人能够最终预估，但是它改变了世界经济版图的事实却日渐成为不争的共识。中国不再是沉睡的巨人，它已经成为引领全球经济发展的主要力量。在过去的二十多年中，北京见证了这一段短暂而无比重要的历史，而现在，它又承载了中国人民的另外一项历史使命 - 2008年夏季奥运会。

为了这次万众瞩目的盛典，北京，这个即将站在全球目光焦点的古老而年轻的城市，投入了大量的人力物力，从建设不同风格的体育场馆到完善各项市政交通设施，无不在为打造一届成功的奥运会做着精心的准备。现在，在奥运圣火已经降临中国的时刻，在奥运会开始紧张倒计时的时刻，北京1700万人民翘首期待，希望能够通过本次奥运会，向来自世界各地的运动员、记者和游客，展示城市风采，宣扬奥运精神，向世界人民传达这个东方文明古国的问候。

比如，来到北京的游客，在亲历这个国家古老历史之前，他们都将由一所超现代的建筑开始，那就是崭新而功能齐全北京机场T3航站楼。这座承袭古老历史和现代文明都市的建筑设计者，诺曼福斯特爵士(Sir Norman Foster)，在全球范围内优秀的设计作品无数。T3航站楼，在他的手笔下，如一条延展的巨龙，气势磅礴。

拥有相同知名国际背景的保全公司，在这场改变城市，迎接奥运的建筑热潮中，同样在建筑防火方面发挥了重要的作用，并且为其中众多的项目提供了专业而全面的解决方案。

全球知名的国家体育馆 - 鸟巢(Birds Nest)，从开始设计的时候就一直备受瞩目。它占地258,000m<sup>2</sup>，能够容纳超过90,000名观众，是由中国建筑设计研究院与瑞士赫尔佐格和迪穆龙建筑师事务所(Herzog & de Meuron)合作设计，历时5年，耗资40亿元建造。整个体育场结构的组件相互支撑，形成网格状的构架，外观看上去就仿若树枝织成的鸟巢，其灰色矿质般的钢网以透明的膜材料覆盖，其中包含着一个土红色的碗状体育场看台。在这里，中国 传统文化中镂空的手法、陶瓷的纹路、红色的灿烂与热烈，与现代最先进的钢结构设计完美地相融 在一起。

鸟巢的建筑顶面呈鞍形，长轴为332.3米，短轴为296.4米，最高点高度为68.5米，最低点高度为42.8米，共计使用了45,000吨钢材。

## 保全防火封堵系统成功应用于国家体育馆

国家体育馆内结构复杂，管线众多，保全因其优质独特的防火封堵系统，成功地被选用于120分钟电缆防火的保护。奥运会的开幕和闭幕式将在这里举行，届时这里还将成为集游览、休闲、购物的综合建筑物。

毗邻而立的国家游泳中心 - “水立方”(Watercube)，是由中国建筑工程总公司、澳大利亚PTW公司、澳大利亚ARUP公司组成的联合体设计的，体现出H<sub>2</sub>O“水立方”的设计理念。

它规划建设用地62,950平方米，总建筑面积65,000-80,000平方米，其中地下部分的建筑面积不少于15,000平方米，长宽高分别为177mx177mx30m。

“水立方”采用了独特ETFE膜材料，是当今最大的ETFE膜项目，其使用超过了100,000m<sup>2</sup>。ETFE膜材料制成的屋面和墙体质量轻，只有同等大小的玻璃质量的1%；韧性好、抗拉强度高。更大的优势还在于它们可以加工成任何尺寸和形状，满足大跨度的需求，节省了中间支撑结构。节省能源，同时起到保温隔热作用。此外，这种膜还具有自清洁功能，使用寿命超过25年。

同样的，保全旗下的优质的防火板材，也被采用在国家体育馆中，作为关键部位的防火阀使用。这种代表着业界最高要求和独特设计的具有绝热性的防火阀，历经多次技术论证，最终脱颖而出。

2008年奥运会期间，国家游泳中心承担游泳、跳水、花样游泳、水球等比赛，可容纳观众坐席17,000座，其中永久观众坐席为6,000座，奥运会期间增设临时性座位11,000个(赛后将拆除)。赛后将建设成为具有国际先进水平的、集游泳、运动、健身、休闲于一体的中心。

## 保全也为其他奥运场馆项目提供了优质卓越的防火解决方案

英东游泳馆是北京为数不多的大型综合游泳馆。在它的改造过程中，其防火系统的提高和改善是重中之重。在一些重要部位，比如看台下方的通风管道系统，在新的防火设计的要求中需要提高耐火极限。基于在大型体育场馆项目中的丰富项目经验和独特的技术解决方案，并充分利用了建筑结构本身的特点，保全最终提供了既能达到180分钟耐火极限的2个截面的防排烟风管系统，又保证了原建筑结构的最大程度的利用和不被破坏，完全满足了防火设计的要求。

毗邻而立的奥林匹克公园曲棍球场和射箭场，共计占地21公顷。其中曲棍球馆内为人工草坪铺设，而两个场地外为10万平方米的场地铺装绿化和上万个停车位。它们均为临时赛场，赛后将恢复为奥林匹克森林公园绿地。

这两个场馆均为钢结构工程，保全的钢结构防火保护系统在其中得到了大面积的应用。由于这里要进行奥运会之前的准备赛和邀请赛，因此施工周期极其苛刻紧张。保全提供的优质的板材钢结构防火保护系统，安装简便，结构合理，能够达到120分钟和180分钟钢梁钢柱防火保护。不但在规定时间内施工完毕，并且在奥运会结束后的材料回收中，最大限度地保证了钢结构构件未被损坏，可以二次利用，体现了绿色奥运(Olympic Green)的环保理念。

保全的防火吊顶和防火隔墙系统，也因其合理的结构和优质的技术解决方案而在这两个场馆中得到了应用。

奥运媒体村，是为奥运会各国媒体机构和工作人员提供舒适居住的场所。它位于奥运主场馆及奥林匹克森林公园的东北方向，紧临森林公园。建设用地上10.2公顷，总建筑面积约63万平方米。在这个项目中，保全的120分钟耐火风管应用在防排烟系统中。**PFT**

## ENQUIRY FORM

My Name: Mr. / Mrs. / Mdm. / Ms.

Designation

Company:

Nature of Business

Address:

City / District

Province / State

Postcode / Zip

Tel:

Mobile:

Fax:

Telex:

Email: <http://www.>

Business URL:

I would like to receive:

Just tick

- 2008 Promat Proactive Fire Protection Systems Application & Technical Handbook
- Promat tunnel fire protection handbook
- Others (Please specify) \_\_\_\_\_

Please update me in your mailing list.



Inside Singapore's newest vehicular tunnel,  
Southeast Asia's longest underground expressway –

# Promat makes a big contribution to fire protection of Kallang-Paya Lebar Expressway

Mr Chan Wee Bok\* was delighted to have a passenger, particularly during a normal day's mid afternoon slow time. He'd been waiting longer than usual outside the 5-star luxury hotel in the city centre. Until now, it had been a rather quiet day.

"Where to, sir?" he asked with his usual professional diffidence.

"To the airport, please, Changi International...but, I've got some time to spare so I'd like to see the new Kallang-Paya Lebar Expressway (KPE) tunnel along the way, too...is that possible?"

"Sure sir, Changi International it is, but via the new KPE...it's a slight detour, a bit out of the way and of course a little longer distance, but we will get you to the airport on time, no problem-lah," Mr Chan replied, referring to Singapore's newest tunnel by its commonly used abbreviation.

He quickly nosed his new Kia Sonata out into medium heavy traffic, proud to show a visitor a new feature in his hometown's forever changing cityscape. The meter once again started recording paid mileage.

The distance quickly smoothed away. Within minutes, the experienced Mr Chan – a been-there seen-it-all veteran driver with 20 years under his taxi seatbelt – had his spotless cab easing out of the Central Business District (CBD), heading towards the East Coast Parkway (ECP) and to the airport regularly recognised as one of the best in the world.

They soon approached Fort Road, in suburban Katong, just off the ECP, close to the entrance of the new KPE.

"The airport's actually straight ahead but we'll turn here and take the KPE as you want," Mr Chan told his passenger. They turned in and the car dipped slightly down into a subterranean but well lit, clean tunnel. Mr Chan's passenger, obviously a well-travelled international businessman, was clearly impressed.

This 3km first section of the KPE opened in October 2007 leads to the PIE – Pan Island Expressway – the arterial motorway which more or less dissects this crowded city state and energetic regional economic powerhouse on an east to west axis.

When it is finished, the 12km long Kallang-Paya Lebar Expressway will connect the central southern part of Singapore with Tampines Expressway (TPE) in the northeastern of the island. The nine kilometer underground tunnel of the KPE will be the longest underground expressway in Southeast Asia. The estimated overall cost of the KPE is reckoned to be in the vicinity of S\$1.7 (approximately US\$1.2) billion. The completed expressway is slated to be in full use by September 2008.

Fully operational, the KPE will cut travel time considerably while optimising usage patterns of Singapore's excellent but understandably limited road system.

Road users like cabbie Mr Chan and his passenger are quick to appreciate the advantages and benefits of expressways like the KPE. After all, time is money, as it is everywhere but in resource and time scarce Singapore it is a philosophy that has acquired additional dimensions of meaning.

As Mr Chan says, "I can get passengers to the expanding northeast districts of Singapore a lot quicker because going via the KPE and its safe, easy driving tunnel certainly avoids a lot of unnecessary traffic!" Passengers are generally inclined to concur.

## The Kallang-Paya Lebar Expressway creates engineering achievements

Singapore is small, no doubt about it, often described as just a Small Red Dot on the map. It can be congested at times, too, with close to five million people living, working and moving about on it on any given hot, humid tropical day.

In its short 40 odd years of independent history, Singapore has been obliged to create a number of distinctions along the way. A leading airline, a first class educational system, first world healthcare and a public transportation system without comparison, to name but a few.

Mindful of the expanding population and the ever diminishing supply of conventional use land, pressure is always on finding better ways to accommodate and move business and people, residents and visitors alike, as efficiently as possible around space starved Singapore.

Buildings therefore tend to minimise their footprint while reaching for the heavens. Roads and transportation facilities, amongst others, increasingly tend to look underground for sensible, pragmatic solutions.



In building the KPE, engineers had to cut tunnels under waterways, stadiums, airport runways, "live" mass rapid transport viaducts and existing highway systems while also building flyovers and other significant above ground works. No mean achievement for even the most seasoned engineer but considered all in a normal day's work for the engineers working on project KPE.

The project took six years, from first groundbreaking to completion.

"The end result is certainly good for me, in fact its good for all of us, because in Singapore the traffic simply has to keep on moving, we can't afford to get jammed up, no way-lah," according to cabbie, Mr Chan.

## Promat involvement in the Kallang-Paya Lebar Expressway

Physical work on the KPE started in 2002 but Promat spent many years patiently building its international brand with awareness building strategies. These included large scale audience presentations to Singapore's Land Transport Authority (LTA), various Fire & Rescue Seminars and numerous Technical Presentations to relevant government and regulatory agencies.

At the same time Promat continued with its mission marketing products, professional systems and accumulated, specialist expertise wherever possible to improve fire safety in general in Singapore's well-regulated building code environment.

In doing so, the management of Promat Building System Pte Ltd made it a key priority to keep Promat branding consistent and within sight of Singapore's key decision makers. It was a patient deliberate strategy that would eventually pay handsome dividends when fire protection for the KPE came up for tender. It was an eventful and arduous process, not for the faint of heart, a process punctuated by as many turns as there are bends in the KPE itself.

PROMATECT®-H board was specified in the 2001 KPE tender and at the end of the day some 487,595m<sup>2</sup> of PROMATECT®-H were employed throughout this impressive and demanding contract that meets all globally recognised safety considerations. A testament not only to Promat's well-earned reputation for international quality standards but also to the never-say-die persistence and tenacity of Promat people.

As cabbie Mr Chan avers when he finally drops his passenger at the airport, "the new Kallang-Paya Lebar Expressway and its tunnel have a lot of built-in safety features and that's always good for business...very cool-lah!"

\*Mr Chan Wee Bok is a composite character, typical of many Singapore road users, understandably concerned how get from Point A to Point B as efficiently and as safely as possible. **PFT**

### DISCLAIMER

The Promat International Asia Pacific Network spans the region with innovative proactive fire protection products, systems and solutions: Australia, China, Hong Kong, India, Malaysia, Singapore and Vietnam, with distributors in Brunei, Indonesia, Japan, New Zealand, Philippines, South Korea, Taiwan and Thailand.

PROACTIVE FIRE TRENDS (PFT) is originally published by Promat (Malaysia) Sdn. Bhd. (PMSB) and Promat Building System Pte. Ltd. (PBS) for professional organisations and/or individuals interested in the fire sciences industry in the Asia Pacific region.

No part of PFT may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, recording or otherwise, without the prior written permission of PMSB/PBS. While every professional care has been taken to ensure that the contents of this publication are accurate and up-to-date, PMSB/PBS, its sister companies and associates, do not accept responsibility for errors or for information which is found to be misleading and/or inaccurate. The information in PFT is furnished for informational use only, is subject to change without notice and should not be construed as a commitment by PMSB/PBS, its subsidiaries or affiliates.

The design and technical recommendations in this publication are based upon the best knowledge available at the time of publication. However, no responsibility for any kind of injury, death, loss, damage or delay, however caused, resulting from the use of recommendations or information contained herein can be accepted by PMSB/PBS, its subsidiaries or affiliates associated with its preparation and presentation.

With suggestions for or descriptions of the end use or application of products and/or services mentioned in PFT or supplied or manufactured by PMSB/PBS, its subsidiaries or associates, customers should first fully satisfy themselves of their suitability. If further information or assistance is required, PMSB/PBS may, within the operational limits of its professional and legal limitations, often be able to help.

All rights reserved. Copyright © 2008 published by Promat (Malaysia) Sdn. Bhd. Unit 19-02-01, Level 2 PNB Damansara, No.19 Lorong Dungun, Damansara Heights, 50490 Kuala Lumpur, Malaysia – KDN PP 10803/05/2009 (02816) and Promat Building System Pte. Ltd. 10 Science Park Road, #03-14 The Alpha, Singapore Science Park II, Singapore 117684 – MICA (P) 074/07/2007.

## Promat International Asia Pacific Organisations

**Promat** The ProActive Fire Protection Systems Provider  
www.promat-ap.com

### ASIA PACIFIC REGIONAL HEADQUARTERS, MALAYSIA

**Promat International (Asia Pacific) Ltd.**  
Unit 19-02-01, Level 2 PNB Damansara, No.19 Lorong Dungun, Damansara Heights, 50490 KL  
Tel: +60 (3) 2095 5111 Fax: +60 (3) 2095 6111 Email: info@promat-ap.com

### AUSTRALIA

**Promat Australia Pty. Ltd.**  
1 Scotland Road, Mile End South, Adelaide, SA 5031  
Tel: +61 1800 PROMAT Fax: +61 (8) 8352 1014 Email: mail@promat.com.au

**Promat Australia Pty. Ltd.**  
Unit 1, 175 Briens Road, Northmead, NSW 2152  
Tel: +61 1800 PROMAT Fax: +61 (2) 9630 0258 Email: mail@promat.com.au

**Promat Australia Pty. Ltd.**  
3/273 Williamstown, Port Melbourne, VIC 3207  
Tel: +61 1800 PROMAT Fax: +61 (3) 9645 3844 Email: mail@promat.com.au

**Promat Australia Pty. Ltd.**  
Locked Bag 8, Subiaco, WA 6904  
Tel: +61 1800 PROMAT Fax: +61 1800 33 45 98 Email: mail@promat.com.au

### CHINA

**Promat China Ltd.**  
Room 503, Block B, Qi Lin Plaza, 13-35 Pan Fu Road, 510180 Guangzhou  
Tel: +86 (20) 8136 1167 Fax: +86 (20) 8136 1372 Email: info@promat.com.cn

**Promat North China (Division of Promat China Ltd.)**  
Room 1507 Building 5, SOHO Xiandaicheng, No.88 Jianguo Road, Chaoyang District, 100022 Beijing  
Tel: +86 (10) 8589 1254 Fax: +86 (10) 8589 2904 Email: info@promat.com.cn

### HONG KONG

**Promat International (Asia Pacific) Ltd.**  
Room 1010, C.C. Wu Building, 302-308 Hennessy Road, Wanchai  
Tel: +852 2836 3692 Fax: +852 2834 4313 Email: apromath@promat.com.hk

### INDIA

**Promat International (Asia Pacific) Ltd. (India Representative Office)**  
610-611, Ansal Imperial Tower, C-Block, Community Centre  
Naraina Vihar, Naraina, 110028 New Delhi  
Tel: +91 (11) 2577 8413 +91 (99) 6705 0813 (west area) +91 (99) 8994 0505 (south area)  
Fax: +91 (11) 2577 8414 Email: info-india@promat-asia.com

### MALAYSIA

**Promat (Malaysia) Sdn Bhd.**  
Unit 19-02-01, Level 2 PNB Damansara, No.19 Lorong Dungun, Damansara Heights, 50490 KL  
Tel: +60 (3) 2095 8555 Fax: +60 (3) 2095 2111 Email: info@promat.com.my

### SINGAPORE

**Promat Building System Pte. Ltd.**  
10 Science Park Road, #03-14 The Alpha, Singapore Science Park II, Singapore 117684  
Tel: +65 6776 7635 Fax: +65 6776 7624 Email: info@promat.com.sg

### VIETNAM

**Promat International (Asia Pacific) Ltd. (Vietnam Representative Office)**  
Room 606 Giay Viet Plaza, 180-182 Ly Chinh Thang Street, Ward 9, District 3, Hochiminh City  
Tel: +84 (8) 931 5964 (south area) +84 (4) 565 8101 (north area)  
Fax: +84 (8) 931 5964 (south area) +84 (4) 565 8677 (north area)  
Email: thai@promat-asia.com (south area) trangoc@promat-asia.com (north area)