

OLYMPIAN LOGISTICS

BY CANDI S. CROSS



Courtesy Arup/Zhou Ruogu Architecture Photography

JUST AS ATHLETES MUST ACCEPT THE PRESSURE AND prestige associated with participating in the Olympics Games, host cities must train and perform like champions.

Nearly a century ago, the Olympics in Stockholm, Sweden, were hailed as a model of efficiency for using electronic timing devices in the track events. Twenty years later, the twin Bavarian towns of Partenkirchen and Garmisch achieved a different stamp of efficiency for Germany with the seamless bus service of 500,000 people during the Winter Olympics.

And perhaps the mother of all engineering feats occurred in 1964, when Innsbruck, Austria, was threatened by a lack of snow for skiing contests. The Austrian Army took on the cause, carving out 20,000 ice bricks from a mountain top and delivering them to the bobsled and luge runs. They also carried 40,000 cubic meters of snow to the Alpine skiing courses. And when rain splattered the setting before the Opening Ceremony, the army packed down the slopes by hand and foot.

Today, Beijing holds the torch. The honor of serving as host city to the Olympics carries more challenges and implications

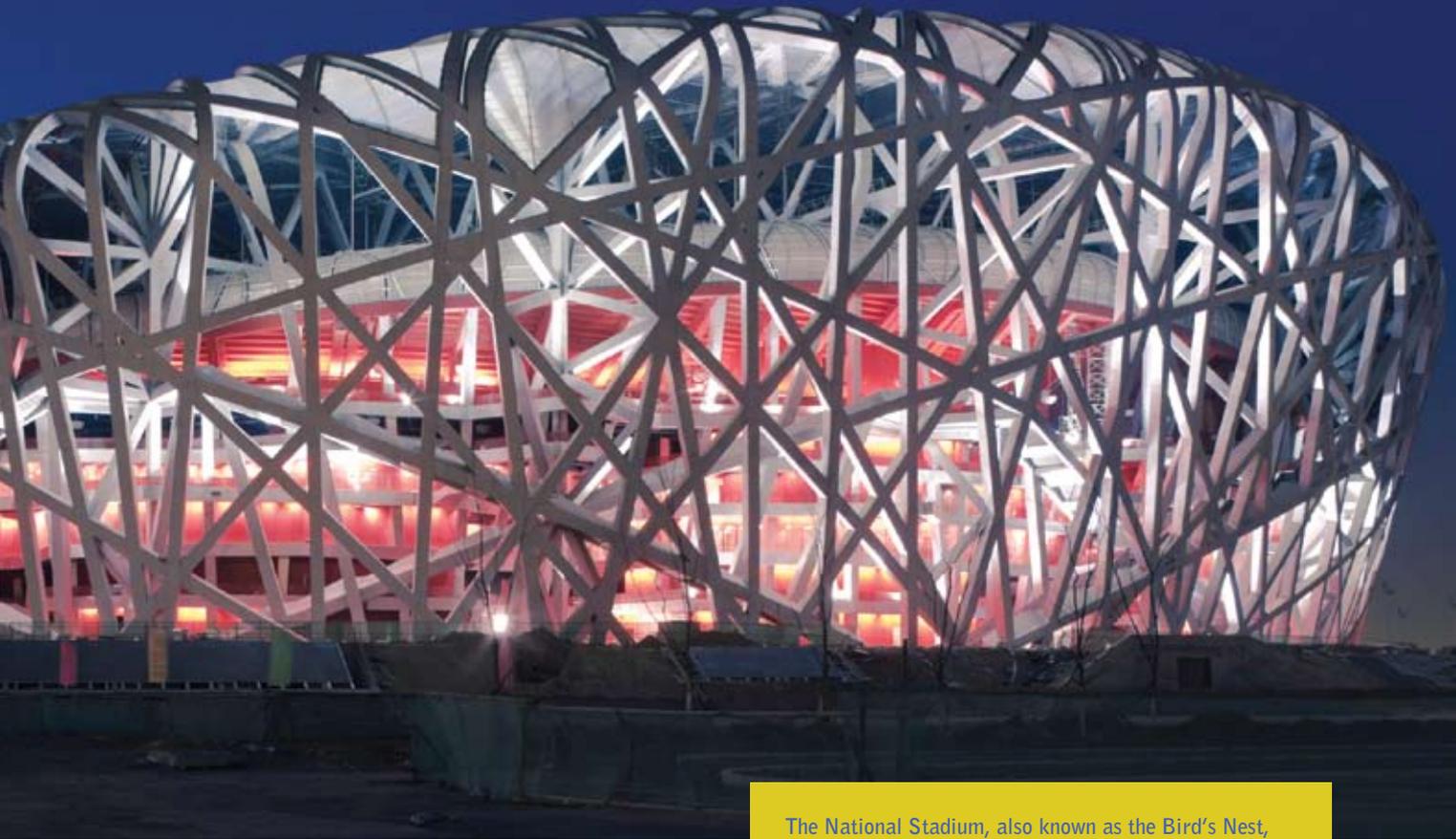
than ever before. According to the Beijing Organizing Committee for the Games of the XXIX Olympiad (BOCOG), the most pressing challenges of preparing for their 17-day event are “standardizing the English menus of 10,000 restaurants in the vicinity of 302 sporting events and improving air quality, manners, and hotel service.”

But if you asked any of the 10,500 athletes and expected 550,000 foreign visitors what they’re concerned about, it probably won’t be if *hamburger* will be spelled correctly at the hotel bistro.

How can officials breathe easy about infrastructure, transportation, material handling, emergency preparedness, and security?

Since Beijing was selected as host city in 2001, BOCOG and China have banked on partnerships with United Parcel Service of America, ProLogis, Argonne National Laboratory’s Transportation Technology R&D Center, and the University of North Carolina’s Frank Hawkins Kenan Institute of Private Enterprise, among many other logistics and business devel-

Beijing hopes to bring home the gold for best facilities planning



The National Stadium, also known as the Bird's Nest, will host the opening and closing ceremonies of the Olympics as well as track and field events.

opment firms. Approximately \$41 billion has been budgeted for Beijing's preparatory transformation with the majority of it in improving the environment and expanding the city's infrastructure.

With the Olympics as a catalyst for changing Beijing permanently and positively in almost every way possible, the athletes have arguably been upstaged. Political figures, activists, economic developers, logistics consultants, and public relations firms vying for the gigantic campaign of personifying China as a peaceful and progressive nation dominate the buzz.

Friends in the business

"Beijing is on the world stage and thus in the news daily. It is the capital of the world's fastest growing economy that is expected to become the largest by mid-century or before," said John Kasarda, management professor and director at the Frank Hawkins Kenan Institute of Private Enterprise of the University of North Carolina's Kenan-Flagler Business School. "There is high scrutiny of China's human rights record

and foreign policies by Western countries that are using the Beijing Olympics as a visible lever to raise these issues around the globe and protest certain policies. The European and U.S. protests against the Olympic torch runs illustrate this."

Concerns about Beijing's readiness to be a host city have seemingly inspired the government to work overtime to ensure that visitors are not discouraged. The Olympic committee's tagline "One World One Dream" has been embroidered in every product, location signage, event ticket, and travel package affiliated with the event. Kasarda and his staff from the Kenan Institute have consulted Chinese officials in the areas of advanced digital technology, airport-driven economic development, security, and supply chain management.

According to Kasarda, the Beijing Capital Airport has been substantially expanded and upgraded for the Olympics with the addition of housing and commercial services and a logistics park within the cargo facilities. The new passenger terminal

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at the airport will be critical to handling the surge in Olympic participants and visitors who will begin arriving in July.

“The terminal has already opened, and it is spectacular in scale and architecture,” said Kasarda. “The Chinese government also sees the new terminal as a symbol of its nation’s modernization. The new terminal is but one example of how the Chinese government is leveraging the Olympics to send a vivid signal to international visitors of its striking emergence in the 21st century.”

The airport will play a significant role in handling an estimated 1.2 million pieces of equipment alone weighing more than 75,000 tons. Other than air transport, at least 2,000 transport vehicles will be stationed in and around the airport to carry products and materials. Four logistics parks will facilitate the receipt, warehousing, picking, packing, and distributing of these materials to Olympic venues in a time-definite manner as well as their return to origin nations.

To educate the BOCOG, Kasarda’s team hosted symposiums both in the United States and in Beijing. For example, “Olympic Logistics: Learning from the Past and Planning for the Future” highlighted lessons of the Athens Games from warehousing to venue logistics. Athens had more than 28 million items shipped for its Olympics in 2004, and the number of items shipped for the Beijing Olympics this year will be con-

siderably higher. The shipments must be examined for security, clear customs, and be scheduled for timely delivery to venues requiring materials handling systems that can trace, track, and control their movements at every stage. Kasarda says that Beijing must capitalize on technologies that have been developed for global supply chain purposes just in the past four years.

“The Athens Olympic Steering Committee was far too focused on the sport department and paid insufficient attention to the logistics and operations departments,” said Kasarda. “This impacted the efficiency of materials handling and resulted in distribution problems. There were also language and multicultural business barriers. From a tracing, tracking, and flow management standpoint, the ERP (enterprise resource planning) and related systems used in Athens were selected by the technology department, not the logistics department, resulting in problems in warehouse and logistics management that could possibly have been avoided.”

At the time of the conference, Noel Greis, co-organizer of the symposiums and director of the Kenan Institute’s Center for Logistics and Digital Strategy, said that the Olympics committee was not confident that RFID would be mature enough to handle the Games in any way. However, with the accelerated advent of scanners and other components, RFID is set to manage event admission. An estimated 12.2 million tickets to

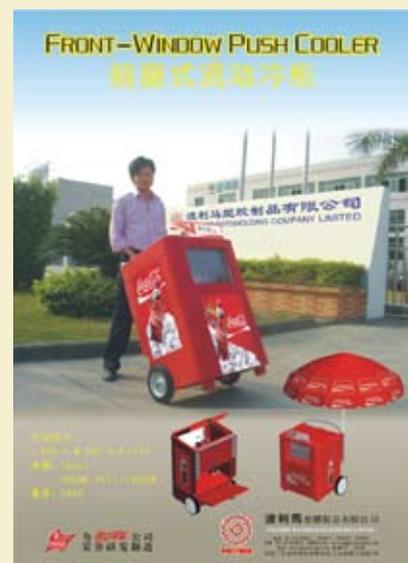
IIE MEMBERS: “BEIJING IS READY.”

“Around 10 years ago, when China was preparing for the 2008 Olympics application, Beijing local government collaborated with IE departments from domestic colleges to make sure that mass transportation would not be a serious bottleneck. The greatest challenges to transportation and logistics will be the time accuracy and quick response. In Beijing and most metropolis cities of China, private cars are booming. New drivers, careless drivers, and narrow downtown roads make traffic speed very slow, especially in rush hour. The Beijing government is going to control traffic by reducing private cars and commercial vehicles during the Olympics. It will be helpful and painful.”

— David Feng, *industrial engineering*

manager, Yum! Restaurants China

“A street in my university, which is a routing segment of a marathon in the Olympics, was reconstructed last summer. Taking into consideration the heavy traffic during the Olympics, Beijing has been developing the subway system. The new fifth subway line is used now. The 10th line, the Olympic sub-line, and the line connected to the airport, will be put into use before June. Some streets have been broadened and the third terminal of Beijing Airport was constructed. The price of public traffic was reduced. As for manufacturing and air quality, the huge amount of materials necessary in the Olympics will still require the support of many manufacturers, from



IIE member Paul Lam’s manufacturing company Polymer Rotomolding Co. Ltd. has supplied cooler hardware to The Coca-Cola Co. for the upcoming Beijing Olympics.

the Beijing events will have contactless RFID chips to validate tickets and prevent counterfeiting.

The Kenan Institute's second conference in 2006, titled "Crisis Management and Emergent Response: Beijing Olympics and Beyond," focused on the management of potential disruptions and threats (from bird flu to disruptions of the power grid to logistics crises).

"China does not have a history of crisis management as we do in the West, and we introduced new technologies and practices being developed by global companies from IBM to EDS," said Greis. "There will be 37 venues for the Olympics with Beijing being the site of all but six of the sites. Twelve of the structures are new. Five more venues for soccer and sailing are located outside of Beijing, and equestrian events will be held in Hong Kong."

Specialized distribution centers have been built to link Beijing with Hong Kong's designated sites in what is considered the Olympics Logistics Network. The network includes approximately 6,000 highway cargo yards and loading stations, 122 railway cargo terminals, and hundreds of cargo terminals, cargo yards, and warehouses connecting smaller railways.

Race for change

As reported by event sponsors, architects, and construction

companies, the Beijing Olympics boasts a green emphasis. Stressing the importance of a healthy environment for the Games and beyond, the Chinese government has been praised for quickly enforcing astounding measures to reduce pollution such as shutting down dozens of factories and developing clean vehicles. However, questions remain about the 10 million trucks on Chinese roads. Many of them burn diesel fuel contaminated with more than 130 times the pollution-causing sulfur that the United States allows in most diesel engines. There's also the steel industry, which continues to pollute more than any other industry in China.

"The concern is that respiratory problems could impede athletic performance and prevent records from being broken. Beijing is like an athlete trying to get in shape by walking on a treadmill yet eating double cheeseburgers at the same time," wrote Aaron Kuo-Deemer for *The New York Times* in an ongoing series examining the air quality in China. "Polluting factories have been moved or closed. But auto emissions are rising as the city adds up to 1,200 new cars and trucks every day. Dirty, coal-burning furnaces have been replaced, lowering the city's sulfur dioxide emissions. But fine-particle pollution has been exacerbated by a staggering citywide construction binge that shows no signs of letting up."

Larry Johnson, director of the Transportation Technology

those of souvenirs and everyday use to sports facilities and heavy industrial products. Quality of products is more emphasized to satisfy the requirements of the Olympics."

— *Fei Gao, professor of industrial engineering, Tsinghua University*

"I have been in Beijing maybe five to 10 times since the Olympics were awarded. Since then, Beijing has been one massive construction site. Other than the Olympic venues, the city has undertaken significant improvements in infrastructure. The government will require many factories around Beijing to close for several weeks before and then during the Olympics to improve the air quality. It's not just in Beijing; the

radius around Beijing extends for something like 90 kilometers. This type of undertaking must be unprecedented in Olympic history. My presumption is that the goods produced by these factories are in demand and that this shutdown will result in shortages. Still, I have lived in this country for a long time, and I have seen this country perform some incredible feats of mass mobilization. What might be logistically unthinkable in the U.S. or Europe is very possible here. I am sure that it will be a great event and one that the people of China will be very proud of."

— *Daniel Keefe, director of Asia Supply Operations, Kodak*

"Owing to very tight ticket availability, even as the major and continuous Olympics sponsor, Coca-Cola would not be able to guarantee any ticket for me and my family. As a Chinese national (I am a Hong Kong citizen), of course we are enthusiastic about the event, and personally I want to see how my product will be used in such a world-eye-catching event together with my service staff at the venues. We are seeing a different Beijing from that of five years ago. A substantial change in everything, not only in construction, infrastructure, and manufacturing but also the mindset of normal people and the officials."

— *Paul Lam, president of Polymer Rotomolding Co. Ltd.*

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R&D Center at the U.S. Department of Energy's Argonne National Laboratory, doesn't downplay the statistics but he is optimistic. Since 2003, Johnson's been integral in a five-year agreement with Chinese scientists and policymakers toward the goal of creating a cleaner Beijing and developing sustainable technologies for the 2008 Olympic Games and beyond.

"China, in general, has an unenviable reputation for severe air pollution; by one account, China has 16 of the world's 20 most polluted cities. Although Beijing is not one of the sixteen, it does have a severe air pollution problem. They have relocated much of the heavy industry that was among the most polluting sources. They have greatly expanded clean technology for the public transit system and aggressively pursued more stringent fuel efficiency standards and vehicle emissions standards for cars and trucks. But Beijing is a mega-city (15 million people, including the floating population of undocumented workers), and its size means that minor emissions (per vehicle, household, factory, et cetera) become overwhelming because of the sheer numbers."

That said, Chinese researchers have been trained in the use of two models that Johnson and his team developed at Argonne: GREET (Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation) and PSAT (Powertrain Systems Analysis Toolkit). Beyond the Olympic Games in August, the adoption of these models will have long-term benefits for China in making the best decisions about future vehicle technologies and fuels, said Johnson. The models evaluate China's existing vehicles and determine the interrelationships among performance, fuel economy, and emissions in the goal of designing new, advanced technologies.

Having returned from his final pre-Olympics trip to Beijing, Johnson applauds policymakers, scientists, and the Beijing Organizing Committee for working overtime to stabilize the environment and improve logistics.

"For transportation, Beijing has taken two approaches: short-term/pragmatic as well as long-term/showcase approaches," said Johnson. "To meet the rapidly growing transportation needs (Beijing adds 1,500 cars a day to its city streets as more and more people buy cars), Beijing has for some time been converting its bus fleet to cleaner natural gas buses, with over 2,500 buses now operating.

"China would like to leapfrog Western countries in fuel cell technology by developing breakthrough technology and then be the low-cost producer. Expect to see battery electric buses as a statement of their commitment to clean vehicles, and expect to see many, many electric bikes." ~

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The University of North Carolina at Chapel Hill and Tsinghua University, China's top technology university, launched a joint Research Center for Logistics and Economic Development in Beijing. Centered in Tsinghua's Department of Industrial Engineering, the partnership focuses on global supply chain management research that can enhance trade between the United States and China and address business issues such as outsourcing.

www.iienet.org/magazine/june08/Tsinghua