



OLYMPIC ASSIST

A new welding system will be used
in the construction of the 2020
Summer Olympics stadium in Tokyo

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The Koala welding system is designed for welding the circumferential joint between two square box steel columns standing in the vertical position. The mechanics of the system, along with the new SpinArc torch, enable fabricators to weld joints faster and with better quality.

The new system was developed to aid construction of a new Olympic stadium in Tokyo for the 2020 Summer Olympics.

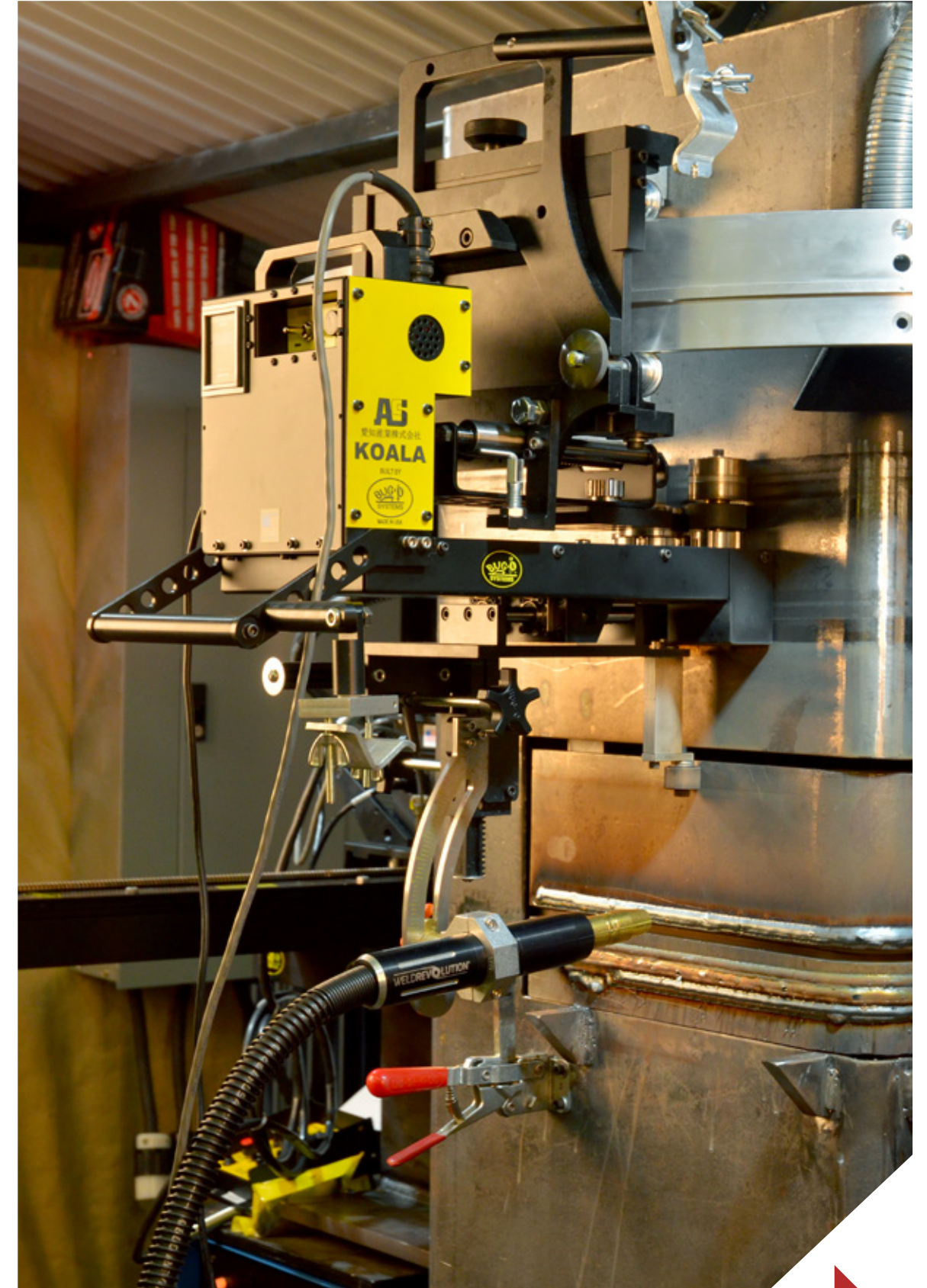
Tokyo will use as many existing competition venues as possible, including those built for the Olympics in 1964. However, the Tokyo National Stadium, where the Opening and Closing Ceremonies and some competitions will be held, will be completely revamped and replaced by a new arena.

In 2020, Japan will host its fourth Olympics, including the 1964 Summer Games and 1972 and 1998 Winter Games. When Tokyo was awarded the 1964 Games, it generated several urban development projects that

have continued to benefit the city, including new highways, sports venues, hotels, airports and railway lines. One of the best-known projects was the construction of the bullet train between Osaka and Tokyo, which demonstrated Japan's industrial and technological strength to the rest of the world.

Other long-term projects included the construction of 22 new highways, eight expressways and two subway lines. The city's excellent transport infrastructure was a key component of its successful bid to host the 2020 Games.

Due to the threat of earthquakes, the building codes in Japan are very stringent and require welded steel skeletons in most structures. The main frame of the new stadium will require the installation of more than 300 steel columns. These columns will be 600-mm-by-600-mm steel box sections that are more than 36 m tall. Each column will require the joining of several sections of the steel tubing to reach the required height. The joining of these sections will require hundreds of meters of welding. ▶

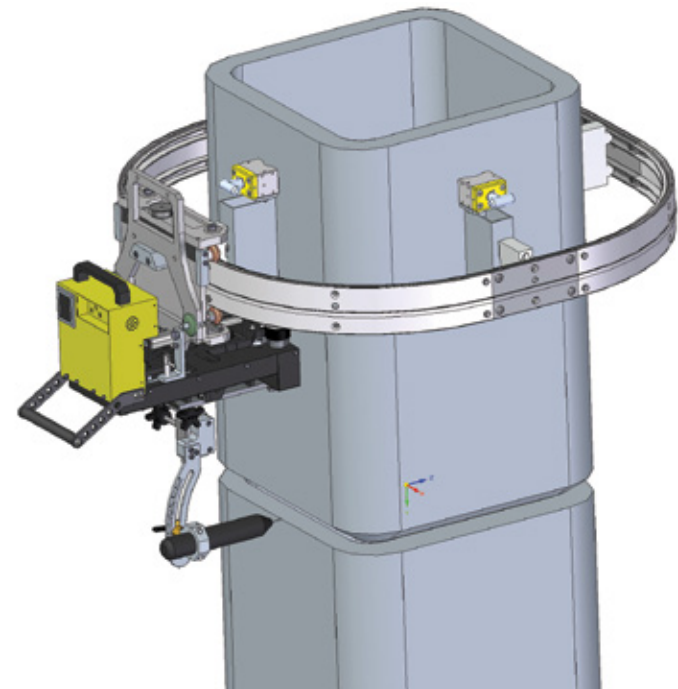


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The biggest challenge of welding so many joints is consistency. Each joint requires eight weld passes. So, the total length of weld bead required per joint is more than 19 m. Each weld pass must be performed with an exact torch angle, constant travel speed and welding parameters. Even the most expert welders could not accomplish the task manually.

ASK THE EXPERT

Engineers, quickly realizing manual welding would be too slow and costly and would not achieve the quality welds required for this massive structure, contacted one of most



prominent welding experts in Japan to help them find a solution.

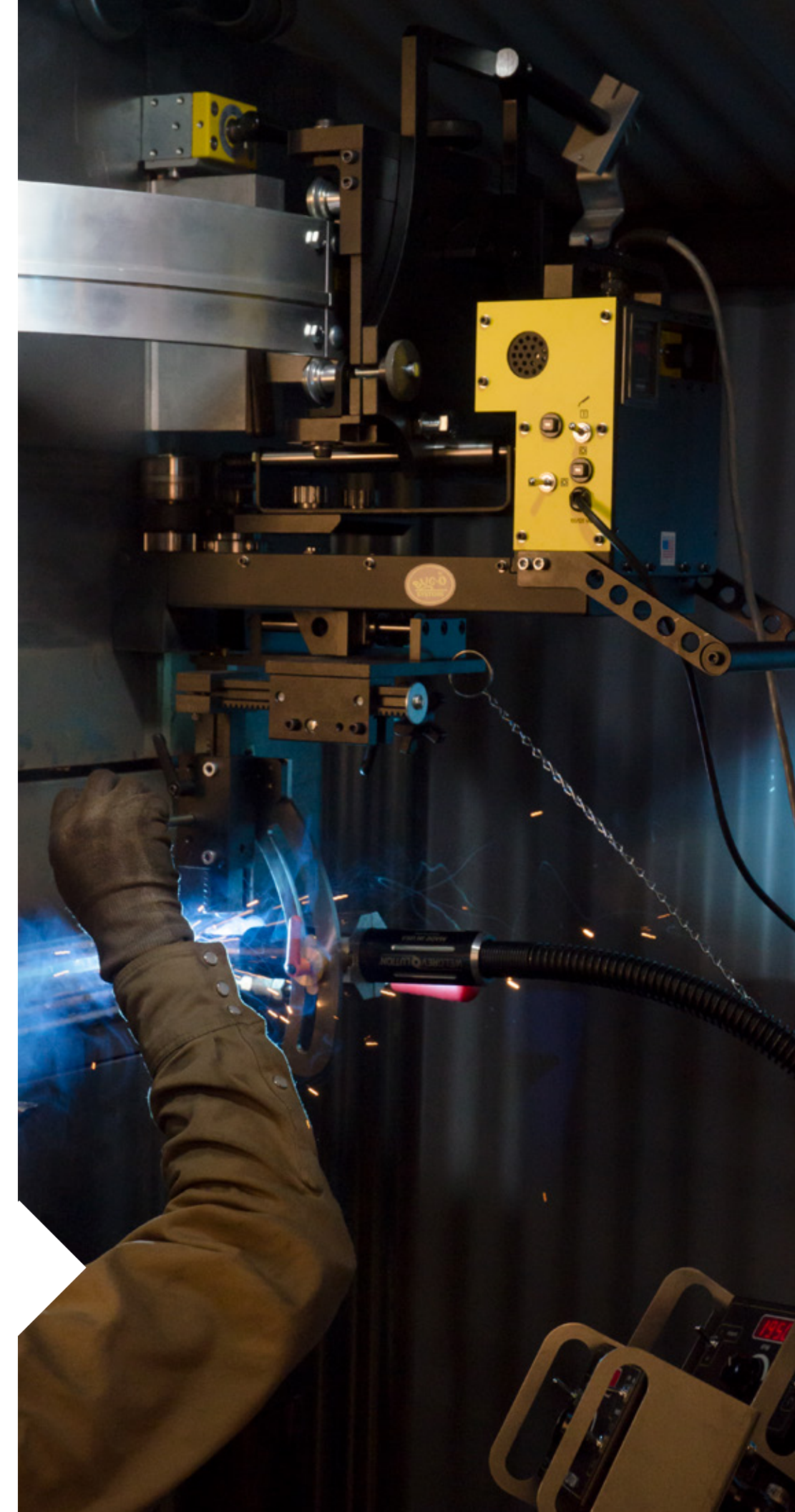
That expert is Hiroshi “Mickey” Imaizumi, who has been in the welding business for more than 50 years. His knowledge and experience is unsurpassed. Imaizumi works at Aichi Sangyo and has created many new welding processes and procedures in use around the world.

Aichi Sangyo’s capacity to address the request for this column welding application was being consumed by another big project, so Imaizumi contacted long-time partner, Bug-O Systems International, to assist.

Bug-O Systems and Aichi Sangyo have been partners for several decades. Together, they worked to create a better solution based on an existing technology from back in the 1980s, ▶

▲ The Koala system is supported by a specially designed square Bug-O Ring rail. ▲

With the Koala system, welding can be performed with an exact torch angle and constant travel speed.



where Aichi Sangyo had developed a machine for mechanized welding of round steel columns. Using Imaizumi's concept, Bug-O developed the new Koala welding system.

UP TO THE CHALLENGE

The challenge of the application is to maintain a constant travel speed for welding continuously around the square column. To maintain constant welding speed during the transition

from the straight portion to around the tight radius corners and back to straight again, the torch must whip around the corner. This motion would be almost impossible to do manually. The Koala provides a motion control system for consistent welding speed.

The entire machine is supported by a specially designed square Bug-O Ring rail. The rings include alignment tools to provide the operators with an easy

way to quickly install the ring in the perfect position, relative to the joint to be welded. Rings can be provided for any size column.

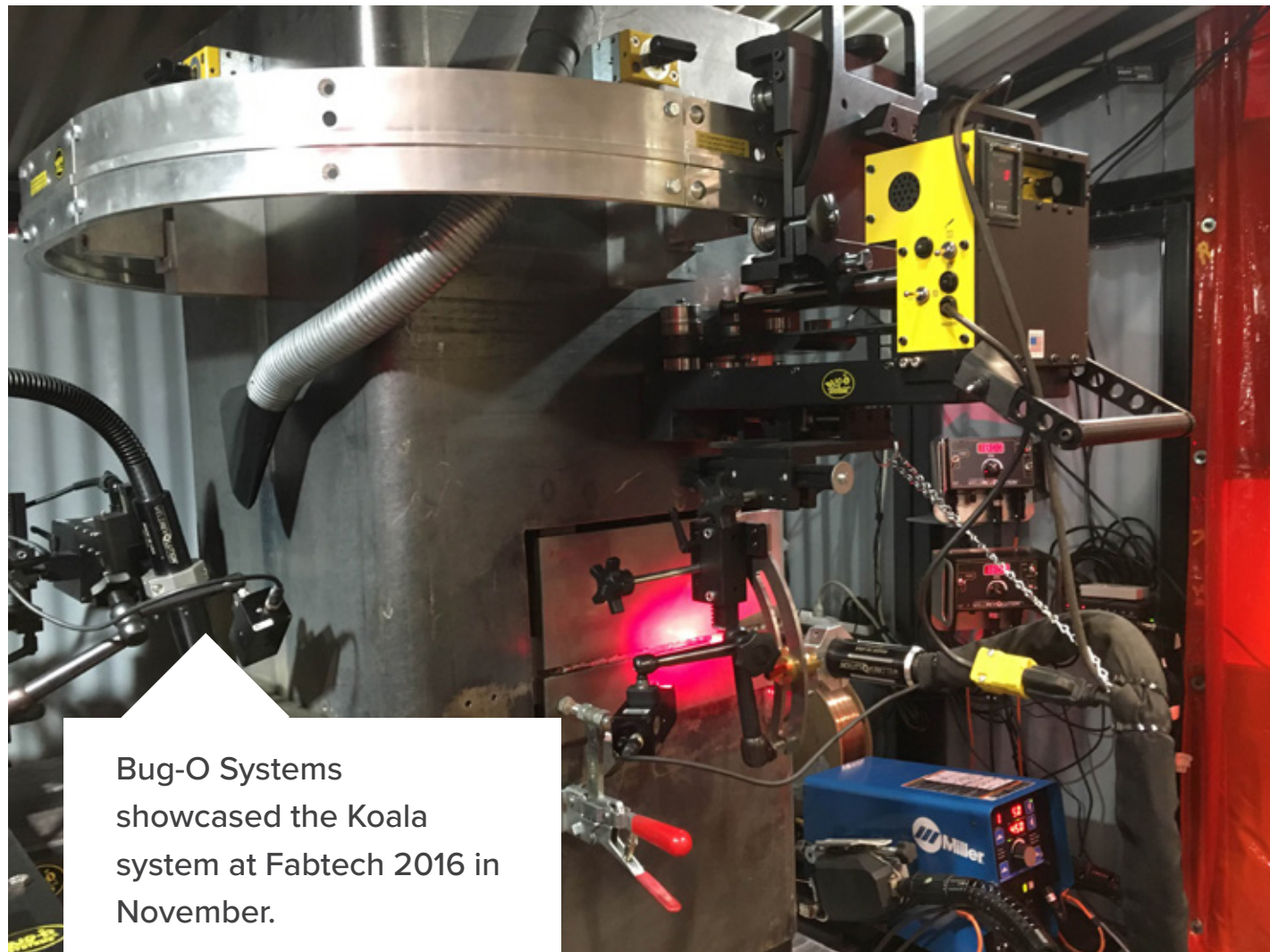
After the quick setup, the operator does not have to support any welding equipment during the long welding process. This greatly reduces welder fatigue creating a more productive environment.

A solid-state controlled, DC motor-driven drive train ensures consistent travel speed. The unique drive train utilizes magnetic rollers driving directly on the workpiece. The torch support floats independently to maintain constant distance from the work. As the drive system moves the torch around the corners at a constant travel speed, the rest of the machine whips around on the ring to keep up with the torch.

The Koala is also capable of welding round steel columns. The precision of the system will enable operators to perform the welding with very little need for corrections.

For the project in Japan, the Koala will also feature the new SpinArc torch from Weld Revolution. This torch spins the wire at the point of contact to provide better penetration, wetting action and deposition rates. This allows the joint profile to be reconfigured to reduce the total bevel required, thus reducing the amount of welding required. The SpinArc torch can be used with virtually any wire feeder. (For more information on SpinArc, [click](#) on this *Welding Productivity* article.)

With the motion control provided by the Koala and the improved performance of the SpinArc torch, operators will be able to produce high-quality welds, with much less effort. Bug-O Systems International is very proud to partner with Aichi Sangyo to provide this solution to enable Japan to build high-quality structures as it prepares for the 2020 Olympics and the future beyond. ■



Bug-O Systems showcased the Koala system at Fabtech 2016 in November.

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