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The Kondo Terminator

It was a beautiful spring day in April of 2005. The sun was shining and there were just a few cotton puff clouds in the azure sky. The humidity that I have come to expect in Tokyo was hardly perceptible and it almost felt like Southern California weather. A gentle breeze was wafting along the narrow streets of central Tokyo as we made our way towards the old quarters. The narrowness of the streets and the ingenuity with which the Japanese utilize space has never ceased to amaze me. We walked past a bicycle parking area, where the bicycles were stacked one on top of each other on a specially designed rack and used up every inch of the available space. There were a few hardy Sakura trees with blossoms still blazing brilliant white and pink swaying majestically in the wind, seemingly oblivious to the commonly repeated assertion that the cherry blossom season was over.



Sakura blossoms in Tokyo during April

The old homes and building that lined the cleanly swept road, along with the warm smell of cooking, seemed to me to be a scene right out of a history book. I half expected to run into Samurai warriors on their horses and swords as we turned the corner. I had to remind myself that this was 21st century Japan, and we were going to visit one of the premiere robot builders in Japan. Kondo Kagaku Co. Ltd. made servomotor-controlled robots that were used in a variety of applications ranging from entertainment to commercial. Kondo represented the Samurai spirit in the cutting edge of technology. Kondo is also a long time customer of MecSoft Corporation and has used VisualMill since version 3.0 and that is why we were visiting the company.

We walked into a small office that had an unpretentious sign, reading "Kondo". It looked like a showroom of sorts, with glass cases lining the walls. The cases were filled with model automobiles and trains. A man in a blue uniform met us at the door. After the usual exchange of deep bows and polite pleasantries, he led us to another building. We walked into a clean room where we had to exchange our shoes for slippers. We were met there by another gentleman, the chief robot designer, who walked into the room carrying a small robot. The room had a small table that looked

like a tabletop hockey rink. The engineer placed the robot at the center of the rink and then opened his handheld computer.



Robot controlled by 17 servos

With a few keystrokes, he had the robot walking around the rink. With a few more keystrokes, he made the robot balance on one leg and had it perform a cartwheel. As we watched in amazement at the robot's balancing skills, the engineer paused for maximum effect. Then, with a few deft keystrokes, he had the robot doing an imitation of a bodybuilder showing off his muscles during a competition. It was hilarious to watch and we couldn't but help burst out laughing.

The engineer explained that this particular robot had 17 servomotors controlling its various joints, and two gyro controls in each foot for balance and stability. The robot itself was controlled by radio signals that were sent from a device hooked up to the parallel port of the laptop. The robot came with software that included a motion editor to create and playback motion sequences. These robots were used in competitions where two opposing robots would battle each other to death. Therefore, the ability of these robots to take a beating, fall down, and get up on their own accord was important. He then proceeded to lay down the robot flat on its back and typed in a command. The robot accompanied by various whirring noises from its motors, slowly but surely stood up erect on its own accord and lifted both of its arms up in exultation. It was an amazing thing to watch. Hello, Terminator!

Once the demonstration was over, we moved to the production area. Kondo not only made robots, but all kinds of radio-controlled equipment, including remote controlled cars, aircrafts, and trains. All the designs for the parts were done using Autodesk Inventor and then transferred to VisualMill via IGES, where the milling toolpaths were programmed. The toolpaths are used to machine prototypes, as well as production runs of certain parts. Prototypes are machined in a Roland MDX-500, while the production runs are done in a more heavy duty Fanuc milling machine that boasted a 15-station tool changer.



MDX-500 used for prototyping

Fanuc production milling machine

The decision to buy VisualMill was made after the company outgrew the software product that came bundled with the machine tool. When 3D machining and machining efficiency became very important, they realized they needed software that they could rely on.



Example prototype part made using VisualMill

Kondo made the purchase decision after a thorough analysis of the market and finally settled on VisualMill, because it had the right mix of functionality and ease of use. They also believed the product was priced right, unlike several competing products with similar functionality, which cost at least twice as much. The company is quite happy with the performance and functionality of VisualMill. They look forward to continue using VisualMill as the product they design becomes more complex.

After I met the president of the company and looked around the facility one last time before we departed, I couldn't help but admire the spirit of the people of Kondo who, from quite humble settings, were producing leading-edge technological wonders. We at MecSoft are proud to be associated with a fine company such as Kondo and numerous similar companies across the globe using our products on a daily basis. As we walked out into the sunshine on that spring day, I felt that we were brother Samurai each battling our own unique challenges in our own unique way. Kanpai to that!