

Furukawa-Oxford Technology: High-Tech Competitor

By Darryl Gibson

On the surface, international technology transfer seems little more than a few negotiations, the signing of a contract or two and a quick reproduction of the original technology in some far-flung location.

The reality, as Antony Ford, director and chief engineer of Furukawa-Oxford Technology (FOT), can attest, is far different.

FOT, set up five years ago to produce Oxford Instruments Group superconducting magnets in Japan in a joint venture with Japanese wires and cables specialist Furukawa Electric Co., is a ¥450 million manufacturing company based in Chiba Prefecture at the edge of Tokyo.

And only now, five years in, is the venture "moving in the right direction" in terms of paying off the massive investment by the two firms and turning a profit. But Ford, the only full-time representative of Oxford Instruments Group

at FOT, has no regrets or doubts about whether the two firms made the right decision when they decided to set up FOT.

"We are a medium-sized company with annual turnover of about ¥100 million and setting up our own manufacturing and marketing in Japan would have been out of the question," Ford, a 30-year-old mathematician-cum-technology transfer specialist, said in an interview with the *Journal*.

Good potential

And while FOT's road from inception to its current strong foundation in the Japanese marketplace—last year's sales were ¥1.3 billion—has been somewhat longer than Ford at first expected, FOT is now poised to act as a springboard for the introduction of other Oxford Instrument Group technologies and products into the Japanese market.

"Japan now accounts for roughly 10% of

global group sales and our research instruments division had a particularly good year in Japan last year.

"We also see a good potential for our semiconductor manufacturing equipment—photolithography and photo etching—cyclotrons, and a broad scale of other products. Overall our prospects in Japan are bright and expanding."

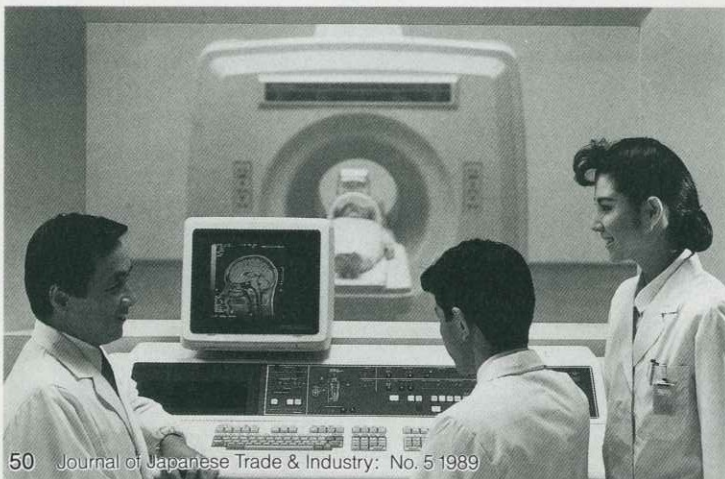
At FOT, Oxford, which maintains strict control over its basic technological innovations, is already planning to introduce new technology and products for the Japanese market and, Ford said, will be embarking on research and development in Japan to expand the Japanese and Asian markets for FOT's main products—superconducting magnets for Magnetic Resonance Imaging (MRI) machines for medical use.

MRI, widely used in sophisticated medical diagnostic procedures, is finding many applications in several countries, Ford said, but countries which already

Antony Ford, director and chief engineer of Furukawa-Oxford Technology



A superconducting magnet (above) and magnetic resonance imaging (MRI) equipment



have a rich medical infrastructure in place, such as in Japan, Europe and North America, offer the greatest potential markets. "But no market is the same," he cautioned.

In Japan, FOT and Oxford are learning that the generally smaller bodies of patients undergoing MRI diagnosis mean the bore of the superconducting magnets, the heart of the MRI machines, can be reduced and that the physical size of the entire MRI unit can be made smaller to fit the limited space available in many Japanese and other Asian hospitals.

In addition, the cost of liquid helium in Japan can be 10 times higher than the cost in North America or Europe, so FOT has worked to design superconducting magnets and container vessels which reduce the amount of liquid helium required to maintain the cryogenic levels required for superconduction.

With experience dating back to 1963, when Oxford Instrument Group developed the world's first superconducting magnets outside the United States, adjusting to market demands is not a particularly overwhelming problem, Ford said. But meeting market demand may become a reason for considerable thought on the direction of FOT.

"We don't make the final product, we supply the magnets and cryogenic vessels, but we keep a strong watch on the end market and we can see potential for MRI in most hospitals in Japan, for example, with 50 beds or more.

Major market

"We are also pleased with the demand in South Korea, Taiwan and Australia and can see South Korea developing into a major market in five years or so."

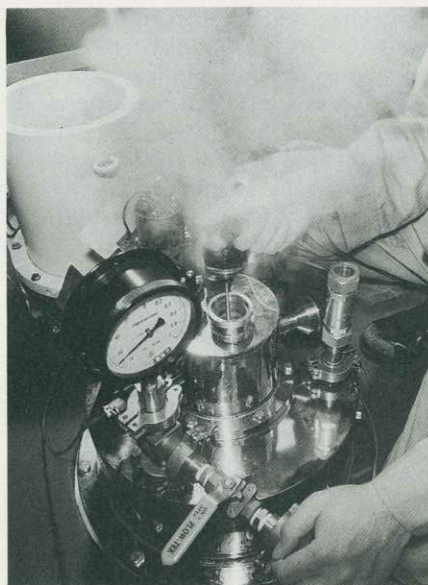
With the start-up phase of FOT now behind him—"It took much longer than I expected"—Ford sees the joint venture, which handles final assembly and the critical winding of the magnets exclusively, maintaining its hard-won ability to keep its current large market share of systems installed in Japan and moving toward expansion throughout Asia. As to the start-up time, Ford said it was not a "problem," but "something I took note of."

He said that while there was a strong contingent of small and medium-sized engineering firms near the company's plant and headquarters in Chiba Prefecture, there were few companies with the expertise required to make the sophisticated high vacuum and cryogenic vessels FOT requires. "We were introducing unique technology into Japan and it took time to educate the subcontractors."

"In Britain you can take the basic concept, the drawings, materials and procedures to a subcontractor and call in the engineers, the draftsmen, all the people behind the initial idea, bang your heads together, and come out with the product.

"In Japan, the subcontractors seem to require a lot more information, more details on the drawings and some of the basic engineering refinements are lacking. Because of that, there has to be a lot more discussion with the subcontractors on procedures and that ends up taking a lot of time in issuing drawings and reaching final assembly."

But Ford said the level of skill is becoming similar in both countries, the initial difference being that Japanese subcontractors have less experience with the rigorous demands of manufacturing which are required for MRI-related components.



Helium and nitrogen venting system on a high-field superconducting magnet for MRI

"I've been much impressed with the level of dedication to quality in Japan. But we are also much dedicated to quality and in general the quality at Oxford and in the joint venture is exactly the same.

"Some of my Japanese colleagues might have a different opinion, but we at Oxford have always had the highest standards and I always tell my colleagues in Britain that that is why we succeed here."

And while Ford does subscribe to the conventional wisdom that to succeed in Japan the "product must always be perfect," he takes exception to the currently vogue contention that "niche" companies, those with a unique product not found in Japan, are the only ones likely to succeed.

Bright prospects

"We sell MRI superconducting magnets to our competitors in Japan, for example to Toshiba which also manufactures MRI magnets, but we are able to compete with them fully.

"Niche tends to mean a corner peculiar to the technology, but we compete because we have a 20-year history in Japan of producing top products. We can compete in the niche, but we also compete on the open market with strong competitors.

"And unless a firm is ready to compete in that open market, against strong rival firms, the niche can easily disappear and the original firm be left out of the market."

"Your product has to be tops."

For Ford, FOT, which is already selling 20 to 25 MRI superconducting magnet units annually in Japan, is definitely at the summit of a very demanding high-technology field and plans to stay there.

"We are refining and developing new products and technology, we protect the intellectual property we have and, as I have said before, have bright and expanding prospects here."

Darryl Gibson is Tokyo correspondent of the Canadian Press.