Washington Decoded

April 1989

When Burgmaster Lost Its Edge

The Burgmaster plant in Gardena, California, closed its doors for the last time on September 19, 1986. Contents of the plant were sold at auction.

It its 40 years of existence as a machine-tool builder, the company founded in 1944 by Czech immigrant Fred Burg had risen to prominence as an innovative manufacturer of turret-type drilling and milling machines – in fact, the largest American machine-tool builder in the West. In 1965, it was the object of a friendly takeover by conglomerate Houdaille Industries (Buffalo, New York) and in 1979 was acquired in a leveraged buyout. This article, which focuses on events at Burgmaster 20 years ago, is adapted from the book When the Machine Stopped*, published this month by Harvard Business School Press.*

By Max Holland

The new Burgmaster president, Allan Folger, was not so much a Houdaille man as a machine-tool man.

He had spent most of his working life in the machine-tool industry but had been with the conglomerate only three years, since 1966. He had a degree in mechanical engineering from the University of Cincinnati and had worked at the Cincinnati Milacron–the GM of the machine-tool industry–before acquiring an MBA from the University of Chicago. He was employed as a consulting engineer in Phoenix in the mid-1960s when a close friend, who was head of a large machine-tool dealership, told him about executive openings in Houdaille's expanding machine-tool group.

Folger moved to Buffalo in 1966 and was president of Strippit when Houdaille CEO Gerald Saltarelli asked him to swap jobs with Tom Norton, president of Burgmaster. "Burgmaster is not generating a sufficient return on its assets," Saltarelli told Folger.

The CEO was proud that, with profits measured as a percentage of equity, Houdaille was among the most profitable machine-tool builders: his machine-tool group averaged a 14-16% return on investment. Burgmaster's contribution, though, was about 8-10%. To be sure, Norton had done better than the 3.75% figure that stigmatized Joe Burg's last year as president. But overall, Burgmaster remained a drag on the entire group.

Saltarelli did not have to add why this displeased him so. Wall Street regarded the profits/equity measure as the best indicator of corporate performance, far better than net income, and it figured prominently in Wall Street's calculations of Houdaille's price-to-

earnings ratio. That figure, in turn, was the key to Saltarelli's ongoing efforts to boost the price of Houdaille stock and toward further conglomeration.

Folger had come to know his predecessor slightly during group meetings and like everyone else, considered Tom Norton personable and intelligent. Although Folger did not blame him for Burgmaster's problems, neither did he subscribe to Saltarelli's credo that "a good man in one product is good in any." Folger believed that the head of a state-of-the-art machine-tool company needed experience in the industry, if only because the industry defied easy analysis and Buffalo put a premium on meeting forecasts: the more attuned a division president was to the industry vicissitudes, the better.

But Norton, and many other Houdaille executives, were taken aback when Saltarelli handpicked Folger. "I was surprised that he got the Burgmaster job," recalled Norton. "They needed someone strong in manufacturing and engineering. Allen did not have the strongest background."

That was true. For all his years in machine tools, Folger's experience had been mostly limited to one segment, marketing. He was unusually adept at figures but had risen to the top of Strippit without the customary seasoning that Saltarelli preferred to give his division presidents. Houdaille executives ordinarily came up steadily through the ranks, spending a year or so in various departments, until they were distinctly comfortable with every aspect of a company's operations, from labor relations to accounting.

Shore Up Marketing

But Saltarelli had come to the conclusion that Burgmaster's foremost problem was marketing. He was determined to bring Burgmaster up to a level of financial performance commensurate with the money Houdaille had poured into the company. And in one period of slumping sales, it seemed sensible to rely on a man of Folger's expertise. He was confident that Gene Dobmeier, the plant manager, would prevent bottlenecks if and when there was a surge in orders.

For this reason, Folger's Burgmaster was quite different from that of its predecessors. In place of the once thoroughly integrated operation stood a company with clear separations of responsibility and power. Burgmaster's president was in only nominal control of the entire operation. Saltarelli's implicit intention was that Folger let Dobmeier run the entire manufacturing end of the business without interference.

The two men, thus, came to an understanding: Folger's job was to provide the numbers that kept Buffalo at bay, if not happy, and Dobmeier's was to ensure that production backed up Folger's numbers. Dobmeier would run Burgmaster in reality; Folger, in appearance.

The arrangement suited both men for different reasons. For Dobmeier, it was compensation for the fact that he was unlikely to rise any higher in the Houdaille hierarchy. He lacked a college degree, and Saltarelli firmly believed in higher education

for all his top executives. Tom Norton had been one of the exceptions to the rule, and some colleagues had referred to him as the “Mustang” president because of it. But Dobmeier, despite Saltarelli’s high regard for his abilities, was not going to become another Norton.

The situation also satisfied Folger because it relieved him of immediate responsibility for almost everything but Burgmaster’s numbers. Folger was not particularly comfortable dealing with people, whether peers or subordinates. To nearly everyone who worked with him he seemed fair but remote, almost to the point of being cold. Employees were paid to do a job, and he expected them to do it without being coddled or praised, although at times criticism was in order.

His predecessor, Norton, had tried to keep up the appearance of Burg’s hands-on involvement by touring the shop floor at least once a day, often with his shirtsleeves rolled up. Folger did not. He was rarely seen outside the executive offices, and many long-time employees soon dubbed him the “invisible man.” He thought of himself as a financial man and was “only into one thing,” recalled Burgmaster sales manager Ed Merk: “making forecasts.”

By mid-1969, a few months after taking office, Folger had developed a comprehensive view of Burgmaster’s prospects and problems. One reason for optimism was the company’s up-to-date plant, a fact driven home to Burgmaster employees whenever they attended a machine-tool show back East or took time to visit other builders. Houdaille had carried though on its plan to invest in Burgmaster, and, by the time Folger arrived, it boasted one of the most modern factories in the industry. Of Burgmaster’s 40 or so machine tools, Houdaille had financed the purchase of 21, which meant the bulk of productive equipment was less than five years old, although few machines were of the NC variety.

Retaining the skilled labor needed to operate the machines, however, was a growing problem. Perhaps two dozen machinists, all of whom had been with Burgmaster for two years or more, were so ensconced that they were unlikely to leave no matter what the outside inducements. But that mix of loyalty and inertia was rare.

To most of the blue-collar work force, Burgmaster was just another place to work now. Though still not quite as impersonal as some of the big aerospace plants in Southern California, it no longer offered the intangible benefits that had once made it such a satisfying machine shop. Often Burgmaster found that, if it did manage to find and hire two skilled machinists one month, it was robbed of three by the aerospace industry the next month. Worse, Burgmaster had come to function as part of a “farm system” for the aerospace industry.

The siphoning-off of machinists was not unique to Burgmaster or the result of its unusual situation. It was an industry-wide problem, made all the more acute by the Vietnam War, which drafted many young men who otherwise would have become apprentices.

Initially, the US government had been slow to respond to the industry's wartime problems, refusing at one point to include machine-tool production on the Department of Commerce "List of Currently Essential Activities." But congressional lobbying by the industry trade association, the National Machine Tool Builders Association (NMTBA), prompted the Labor Department to significantly expand and streamline its job-training program for machinists.

Holding On to Trainees

Burgmaster was one of the earliest and most enthusiastic participants in the joint NMTBA-Labor Department program. But the results were less than gratifying. With the government subsidizing wages, Burgmaster would hire 15 or so apprentices and give them on-the-job training as a supplement to after-hours schooling, also paid for by the government.

But, once the trainees became productive, they invariably left for higher aerospace wages. McDonnell Douglas and Lockheed "were stealing [Burgmaster] blind" in the late 1960s, with often chaotic results. For the time being, the downturn mitigated the labor problem considerably. But Folger knew he had to keep it uppermost in his mind if his forecasts were going to accurate once the pace of orders picked up.

Accuracy was crucial, because it was not going to be easy to placate Saltarelli. In the four years since the takeover, Burgmaster had become a sore subject with him. To begin with, the rather conservative CEO "never liked California. In fact, he hated it," recalled Folger. "He wasn't kidding when he said that nothing but a bunch of nuts lived out here." That, plus the fact that his semiannual visits always had to include a lecture to Burgmaster employees about their shortcomings, was probably more than enough to ensure Saltarelli's displeasure with the state.

The chairman of Houdaille preferred to expend his energies on making new acquisitions, rather than scolding old ones. Even the cautious and conservative Saltarelli had finally succumbed to the indiscriminate conglomerate fever. In early 1969, for example, Houdaille found itself making a $31-million bid for a beer brewery. Although the transaction was abruptly called off before being approved by Genesee Brewing and Houdaille stockholders, it revealed the pressures and risks Saltarelli labored under. The ongoing struggle for what was perceived to be corporate survival made underperformers like Burgmaster all the more vexing.

Nor did longtime Burgmaster employees enjoy being considered the "bad guys" of the machine-tool group. To workers as well as supervisors, the kind of attention that this brought, often in the form of visitors from Buffalo, was a source of concern and an occasion for sarcasm.

It often summed up Houdaille's topsy-turvy values. In the old days, employees were measured by one standard: how well they did their work – and the Burgs didn't tolerate

anyone who didn't do a good job. Now, among other things, neatness, as defined by Saltarelli, seemed the paramount issue.

It got to the point where employees could predict well in advance a visit from Saltarelli or another top-level executive from Buffalo. A few days before the official announcement, painters would apply a new coat of bright yellow paint on the safety lines in the factory. Like clockwork, a memo about the impending visit would soon follow with a simultaneous reminder to the employees to police their work areas and remove "sideburns, mustaches, and other psychedelic love charms," all items Saltarelli found offensive. To those few who maintain their desk and work area in an acceptable, orderly fashion, congratulations! And please ignore this memo," wrote Alf Celinder, the chief engineer, shortly before one of Saltarelli's visits in August 1969. "To the remainder, however, this memo constitutes instructions to clear up and establish semblance of order today."

The Need for a Tool Changer

Folger's chief problem, though, was not a disgruntled, sometimes understaffed work force or even pressure from corporate headquarters. Rather, his first order of business was to get into the manufacture of NC machining centers–and fast. In the nine years since Kearney & Trecker introduced the concept, the market for machining centers had grown to more than $100 million annually, and half a dozen builders had entered the sweepstakes, including Cincinnati Milacron, Giddings & Lewis, and Monarch. By contrast, following the abortive 20T, the only move Burgmaster had been able to make was to introduce the Econocenter line.

The days were long gone when Burgmaster manufactured a unique product, so far above what competitors could offer that the company defied the economic cycles affecting other builders. Over time, Folger believed, sales of Burgmaster's bread-and-butter turret drills, whether called Econocenters or not, would be limited. Burgmaster had to do more than come up with a marketing ploy on the industry buzzword "center" if it was to successfully adapt to a changing market. In other words, it had to have a tool changer. *[Several builders at the time tried to capitalize on the success of the machining center by dubbing their non-tool-changer-equipped* NC *milling machines "manual machining centers" or "turret machining centers." – Editor.]*

Shortly after Folger assumed the presidency, Houdaille decided that Burgmaster could not afford to wait the minimum two years that it would take to build an indigenous tool changer from scratch. So a two-track strategy was devised.

Burgmaster would continue to research and develop its own line of tool changers as rapidly as possible. But, while it played catch-up, it would sell, for the first time, another manufacturer's machining center. "We wanted to get into machining centers and believed that the fastest way was to acquire [another's] center," Folger recalled.

Hughes Aircraft's MC

That center was the Hughes Aircraft Company's MT-3, widely considered the Cadillac of machining centers. It was a horizontal machining center: the spindle approached the workplace from the side, as opposed to the vertical movement of the Burgmaster. This in itself was nothing unusual, but the machine had a number of extraordinary features: namely, three spindles and two tool changers.

On the left side, two spindles were arrayed in the shape of a Y. While spindle A was machining, spindle B would get ready for the next cut by selecting the appropriate tool from a carousel of 30. This feature alone made the MT-3, from taking one cut to the next, or "chip to chip," faster than any other automatic tool changer on the market. It took the left-sided spindles approximately 4 seconds to go from milling a slot with one cutting tool to drilling a hole with another.

There was more. On the right side of the machine stood spindle C. It had 14 tools at its disposal, giving the MT-3 a total of 44. This modular construction, moreover, made the Hughes machine actually two machines in one package, either of which could be sold as a separate unit.

In any configuration, though, the MT-3 was extremely rigid and accurate, capable of milling as well as all drilling operations. Further, it was built to the highest engineering and manufacturing standards, more like a fine Swiss watch than a machine tool.

Yet the machine, for all its engineering accomplishments, had a checkered history. Hughes Aircraft Company was primarily a manufacturer of electronic controls for the aerospace industry, ordinarily not in the business of making machine tools. But, back in the mid-1950s, it had become fascinated by the concept of automatic tool changers, and their potential for cutting production costs. Eventually in 1956, it struck a deal with Kearney & Trecker Corporation of Wisconsin, the fourth-largest American tool builder: K&T would supply the tool changer, and Hughes would design and manufacture the NC device for it.

One month after the agreement was signed, Wallace E. Brainard, the top Hughes engineer involved in the project, left Hughes to work on the machine prototype with Kearney & Trecker. By 1958, he had filed several patent claims, which together formed the basis for K&T's innovative Milwaukee-Matic design.

Subsequently, however, K&T became dissatisfied with the electronic control that Hughes developed, their partnership soured, and the development agreement fell apart. K&T turned to Bendix for the NC device it needed, and Hughes Aircraft, despite its inexperience, developed the MT-3. Hughes proceeded as if the fruits of Brainard's work, including one all-important claim known as the Brainard patent, were not exclusively Kearney & Trecker's to exploit. K&T, not surprisingly, believed otherwise.

The Deal with Burkhardt & Weber

Then, about 1959, Hughes actually approached Burgmaster to see whether it was interested in manufacturing the MT-3, according to some accounts. The Burgs, swamped with orders for turret drills, declined the offer. With the dollar in a strong position compared with the mark and West Germany one of the few countries capable of manufacturing such a sophisticated machine tool, Hughes cut a deal with a German builder, Burkhardt & Weber, for overseas production.

During the early 1960s, of course, many American builders were establishing subsidiaries or making co-production agreements with European builders. But Hughes differed in that it did not really exist as an American manufacturer. The MT-3 was built in Reutlingen, after which it was disassembled, shipped to the United States, reassembled with motors and wiring supplied by Hughes, and then sold on the US market. It thus qualified as a machine tool "made in the United States" and was not subject to the tariff on imported machine tools.

Kearney & Trecker's Milwaukee-Matic became a rousing commercial success. The Hughes entry fared less well. Its NC system, as K&T had warned, was relatively difficult to operate. Many potential customers were also leery of Hughes Aircraft as a machine-tool builder or even an importer. Hughes was never able to capture more than a minuscule fraction of a booming market. By the late 1960s, only three dozen of its machining centers were in operation in the entire United States.

Despite this lukewarm success, Hughes was not actively trying to unload the MT-3 when Houdaille initiated serious discussions about the machine in 1969, shortly after Folger took office. The new Burgmaster president was enthusiastic about the idea, mostly on the grounds that any entry in the machining-center market was better than none.

There were several dissenters, including Ed Merk, the head of sales, and some of Burgmaster's own engineers. Merk was concerned about what he considered the machine's outdated design and had the usual qualms about the Hughes control. The engineers' reservations, though, were particularly revealing. Everyone recognized that the MT-3 was an impressive accomplishment. Yet a few engineers thought Hughes, because of its inexperience, had gone overboard, that the machine was in fact over-designed.

One such critic was Bob French, a design engineer who had learned his trade from Burgmaster founder Fred Burg. He knew that engineers, if left too much on their own, had a tendency to design "jewels and monuments" rather than good but inexpensive machines that simply worked as advertised and sold for a profit. He believed that the MT-3 fell squarely into this category. "It was the most over-designed machine I had ever seen," recalled French. "Anyone can design a complicated machine. Simple designers that work are the most difficult."

The final decision to buy the MT-3 or not was Saltarelli's. Nothing of such import occurred without his express approval. He was aware of the criticism leveled by Burgmaster employees and took them seriously.

Some objections were easily overcome. It would be easy enough, for instance, to marry GE or Bendix controls to the machine in place of the awkward Hughes control. Meanwhile, to those who pointed out that only a relative handful of the machines had been sold, Saltarelli suggested that Hughes's marketing inexperience had been responsible. It was harder, though, for Saltarelli to rebut critics of the machine's fundamental design. Ultimately, the element that persuaded him to go ahead was not so much the machine itself but another integral part of the deal: namely, Hughes's right to the technology incorporated in the MT-3.

Superior engineering was the reason that Kearney & Trecker had cornered more than one-third of the $100 million market for machining centers. Saltarelli believed that acquiring much of the same technology, via Hughes, would enable Burgmaster to make up for lost time. Houdaille was buying not simply a machine but designs that would accelerate engineering and production of Burgmaster's own tool changers. It seemed a shrewd way to acquire technology that Kearney & Trecker was going to great lengths to deny others. Not content with simple domination of the market, K&T had sought iron-clad protection through vigorous application of patent laws.

Historically, continuous innovation, not lawsuits, had been the hallmark of success in the industry. Now Kearney & Trecker was writing a new page in the industry's history, one that was arousing a bitter controversy among machine-tool builders in the late 1960s. As one competitor put it, the Wisconsin builder was attempting to assert exclusive rights over "not only every tool-changing system now in use but also every tool-changing system that might be conceived in the future."

K&T brought patent suits against two of its biggest competitors in machining centers: Cincinnati Milacron in 1965 and Giddings & Lewis in 1966. Kearney & Trecker undoubtedly considered Hughes to be guilty of similar infringement but, presumably because sales of the MT-3 were so inconsequential, never bothered to file suit against its erstwhile partner. Saltarelli knew there was a risk involved. If Houdaille, a machine-tool builder of some consequence, bought the MT-3 and exploited its patents, Kearney & Trecker might well file a third suit. But, as part of the sale, Hughes agreed to indemnify Houdaille against patent-infringement claims. With this insurance, Saltarelli decided that the potential gains to Burgmaster outweighed the risks.

In August 1969, Houdaille paid about $4 million for the rights to "manufacture" the MT-3 in the United States, six unsold machines, and all of Hughes's associated patent rights. In addition, Burgmaster hired about a score of Hughes employees, ranging from engineers to MT-3 repairmen.

One important feature of the MT-3 did not change, despite the change in ownership. Although Burgmaster had an up-to-date plant, Houdaille decided to continue the

production arrangment with Burkhardt & Weber. “We thought of manufacturing in Gardena,” Folger recalled, “but an analysis showed we could not compete.”

That was true, given the overall economic climate in the United States. With both inflation and interest rates at post-war highs, it seemed far more prudent to keep the Germans responsible for bringing in the machine at a certain price. Burkhardt & Weber was not operating in such an uncertain environment.

In other respects, however, the purchase ushered in many changes, both in the machine and at Burgmaster. To give the MT-3 a fresh start, Folger promptly renamed it the “DUALCENTER” and took the necessary steps to offer GE or Bendix NC systems as an option. Simultaneously, the engineering department began adapting the Hughes technology to Burgmaster’s own line of tool changers on the drawing board.

Engineering was moving full speed ahead when Houdaille and Burgmaster received disturbing news in November 1969. A Wisconsin federal judge had reached a verdict in one of Kearney & Trecker’s two patent suits after three years of legal maneuvering and arguments. He ruled against Giddings & Lewis, validating Kearney & Trecker’s claim that its patents had been infringed. The amount of damages involved was not immediately clear; the 30-page decision instructed K&T to develop an estimate and submit figures to the court.

From Burgmaster’s perspective, the news was deeply unsettling. If Burgmaster went ahead and used the technology, Kearney & Trecker would surely initiate another lawsuit. Even assuming that best outcome–an eventual court ruling in Houdaille’s favor–a court test would delay for years Burgmaster’s own tool changer. But, if Burgmaster desisted from using the technology, it would also take years to perfect a reliable design that skirted the Kearney & Trecker patents, and the purpose behind the purchase of the DUALCENTER would be largely negated. Either way, Burgmaster stood to lose time, the one thing it could least afford.

To make matters worse, by January 1970, the end of Folger’s first year as president, it was clear that the recession in the machine-tool industry was not going to be short-lived. New orders continued to drop, and everyone predicted a 15% decline in sales through 1970. That meant massive layoffs, perhaps as many as half of Burgmaster’s work force of about 400 employees.

The recession on top of the patent problems were two reasons that Jerry Saltarelli was beginning to sour on the whole machine-tool industry. But they were far from the only reasons.

Another was Houdaille’s costly and unsuccessful attempt to manufacture its own electronic controls. Back in the mid-1960s, when Houdaille’s enthusiasm for machine tools knew no bounds, Saltarelli figured that it would be logical for the conglomerate to enter the highly competitive market for NC systems. The Strippit and Burgmaster

divisions were buying more and more of the devices, and the market was expanding and lucrative.

Saltarelli spent millions to set up and staff Houdaille Electronics division. And, for a while, the investment looked as if it were going to produce large rewards. In 1968, at the Philadelphia Tool Show run by the Society of Manufacturing Engineers, Strippit exhibited the first NC machine tool to be linked directly to a full-fledged computer. This significant technological advance, which immensely facilitated part-program editing, was eventually dubbed computer numerical control, or CNC.

Within a decade, the more versatile CNC would eclipse NC as a preferred means of electronic control. A machinist operating a CNC tool could program the machine on the spot, whereas an NC tool was limited to reading coded instructions.

Yet Houdaille, despite its considerable investment and early lead, was never able to capitalize on the next generation of controls. It quickly lost the technological edge to much larger companies like General Electric. One reason was that the quality of Houdaille's controls left something to be desired. Burgmaster, which initially ordered 100 Houdaille controls, ended up using them on only three or four of its machines. The controls "simply didn't work," recalled Bob French, a Burgmaster design engineer.

The ill-fated venture into controls, moreover, had not been Houdaille's only costly mistake during these years. The machine-tool group was also witness to another debacle: the attempt to shift production of Burgmaster's small tools from Gardena, California, to McMinnville, Tennessee.

In 1967, Saltarelli had overcome the Burgs' opposition to the shift by pointing to hard economic facts. Burgmaster was operating at capacity but could not fill all its orders; in addition, its bench and table models were being manufactured by high-paid workers, whose skills could be used more profitably in reducing the backlog of NC machines.

Saltarelli wanted to transfer production of the 0, 1D, and 2 models to Houdaille's Powermatic machine division in Tennessee, which had lower wages, no union, and its own foundry. Inevitably, the dominant force within Houdaille prevailed.

Little more than two years later, it was obvious Saltarelli had forced a costly mistake. First, Powermatic became a union shop, and, suddenly, the wage advantage Tennessee enjoyed was substantially reduced. Yet the real reason the shift was disastrous became evident only in succeeding months.

Despite all its calculations, Houdaille had never figured in one unquantifiable factor: the skill of Powermatic's work force. It was as if Houdaille had believed its own advertising, that Powermatic was a builder of sophisticated machines. In truth, the Tennessee company had experience only in manufacturing rudimentary tools, and the workers on which Powermatic had to rely were insufficiently skilled. Although small in size, the 0, 1D, and 2 models were still precision machines, costing up to $10,000. The

turret mechanisms, in particular, required the labor of highly trained machinists. No matter how many trips Burgmaster employees made to McMinnville, the turret drills from Powermatic quickly became notorious for abysmal workmanship.

Burgmaster had transferred all the special tooling necessary to manufacture the small machines effortlessly, but it made no difference. When two parts didn't fit at Powermatic, workers thought nothing of forcing them together until they did. "We hammer it to fit," they would forthrightly explain when asked how they assembled a turret. On occasion, they even welded recalcitrant parts together. Burgmaster employees, returning from a trip to Tennessee, took to calling Powermatic's workers "barefoot machinists" because they had been hired right out of the fields.

Potential customers promptly learned not to pay any attention to the nameplate on what looked like a standard Burgmaster turret drill. What mattered was where the machines had been manufactured. If it said anywhere on the machine "Burgmaster manufactured by Powermatic," the machine was to be avoided at all costs. Distributors began to ship machines back to Powermatic because they were not salable. "I don't know how many millions were lost," recalled Gene Dobmeier, Burgmaster's plant manager and a frequent visitor to Tennessee. "It was a bad, costly venture."

With these reverses fresh in mind, in addition to the machine-tool recession, Saltarelli decided that some tough business decisions were in order in 1970. He was impatient with the idea of waiting for the market to recover and thought there had to be something the machine-tool group could do to boost its profitability. He considered many alternatives before settling on two, and both decisions affected Burgmaster directly.

First, Saltarelli decided to reshuffle manufacturing responsibilities within the machine-tool group. He closed down production at Houdaille's most recent machine-tool acquisition, Kaufman Tool & Engineering. The Chicago-based company had been purchased for cash just a few months before in October 1969. Saltarelli figured that Houdaille's assets would be more efficiently used if Kaufman's operations were transferred to the Di-Acro division in Minnesota.

In addition, as part of the reshuffle, Saltarelli decided to move Burgmaster's small machines back to Burgmaster. In a way, the shift was more of a rescue mission than a reshuffle, an attempt to salvage an entire line of machines that had always been a small but reliable source of profit.

The bottom had dropped out of the market for these machine tools, though not because of the recession: Powermatic had ruined their reputation. Burgmaster was going to be saddled with hundreds of thousands of dollars' worth of Powermatic's junk, much of which would have to be scrapped. It was going to be hard to restore a lost reputation.

Enter Yamazaki

Although not exactly cosmetic, neither of these redeployments promised to bring the machine-tool group out of its doldrums. The motive was simply to become more efficient and maximize profits, to eke the last dollar out of the machine-tool group at a difficult time.

Saltarelli's second major decision, however, carried more potential for boosting profits. In June 1970, after lenghy negotiations during which Houdaille was represented by Joe Burg, Saltarelli agreed to sell some of Houdaille's technological edge to a Japanese company, the Yamazaki Machinery Works in Nagoya.

The agreement between Houdaille and Yamazaki was not the only one that year between a major American and a major Japanese machine-tool builder. In 1970, more than a half dozen of the top US builders reached similar licensing or co-production arrangements: Kearney & Trecker forged a link with Toshiba Machine, Warner & Swasey with Murata Machinery, and Norton Company [then still a machine-tool builder] with Mitsubishi.

All these joint ventures were formed because Japanese builders wanted to produce technologically-advanced American machines. Equally important, they were possible because Japan was gradually becoming more integrated into the world economy. Rising exports had persuaded the Japanese government to relax its stiff controls on capital in the late 1960s and inaugurate the so-called five liberalizations of their economy. Scores of joint American-Japanese ventures followed, in many manufacturing realms besides machine tools, including automobiles and semiconductors.

The deals with the Japanese were unlike the foreign agreements American builders had commonly made during the late 1950s and early 1960s. Those were mostly one-sided affairs, under which US companies set up wholly owned subsidiaries or dealer networks abroad. The arrangements with the Japanese were more like partnerships, in large part because the Japanese government, even as it liberalized controls over foreign capital and investment, had no intention of handing over a basic industry to American builders. Acting through its Ministry of International Trade & Industry (MITI), the government insisted on foreign-equity controls that permitted joint ventures but virtually prohibited wholly owned US subsidiaries.

Houdaille, like many other builders, shared its most advanced technology in return for access to Japan's market. But Japanese builders would soon prove to be more than just eager students and junior partners.

This article first appeared in *American Machinist*, April 1989