WHEN OUTSOURCING PAYS

How one manufacturer saved several million dollars by outsourcing its creepfeed-grinding operations.

BY JOHN HARIG
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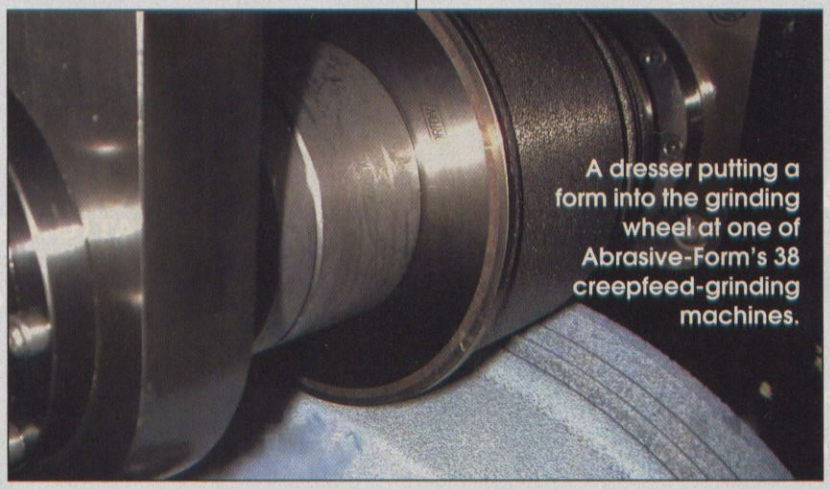
Creepfeed grinding is an exacting process, routinely delivering 0.0001 to 0.001-in. tolerances compared to typical milling or broaching tolerances of 0.001 to 0.010 in. Often, the process can slash per-piece costs 25% to 50% compared to comparable milling or broaching operations. But the technology isn't easy to master and requires a significant capital outlay. To reap the benefits of the process and avoid its pitfalls, a Midwest vertically integrated manufacturing operation transitioned to a complete outsourcing of its creepfeed grinding. In doing so, it realized an overall reduction in investment of several million dollars.

The manufacturer of heavy industrial equipment compared its production costs before and after outsourcing to Abrasive-Form, an outsourcing firm dedicated to creepfeed grinding. Specifically, it reviewed the investments needed for in-house creepfeed grinding and the return on investment (ROI).

The manufacturer used costs typical to what other manufacturing companies would encounter. In many cases, it significantly lowballed figures. For instance, it estimated the cost of a basic creepfeed-grinding machine at $500,000. However, a machine up to the rigors of more sophisticated creepfeed-grinding processes can cost as much as $1 million.



A dresser putting a form into the grinding wheel at one of Abrasive-Form's 38 creepfeed-grinding machines.

On top of this upfront investment were all the associated costs to set up the equipment, create an inventory of consumables, and train staff, all of which totaled another $100,000.

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In-house or outsource?

Schedule of initial investments needed for creepfeed grinding		Investments needed to outsource creepfeed grinding	
Initial investment components			
Hard assets			
CNC creepfeed grinding machine and coolant system	$ 500,000		
Transportation and setup of system	$ 20,000		
Installation and training	$ 10,000		
Inventory of critical spare parts, etc.	$ 20,000		
Coolant cleaning system	$ 10,000		
Total initial investment — hard assets	$ 560,000		
Inventory of consumable supplies			
Coolant and oils	$ 4,000		
Grinding wheels	$ 6,000		
Total initial investment — consumable supplies	$ 10,000		
Soft costs			
Hiring and training of machine technicians	$ 15,000		
Training of management team	$ 15,000		
Total initial investment — soft costs	$ 30,000		
Work in process			
Value of partially processed parts — average	$ 50,000		
Total initial investment	**$ 650,000**	**Total initial investment**	**$ 25,000**
Schedule of annual investments needed for creepfeed grinding		**Annual investments needed if outsourcing**	
Annual investment components			
Hard assets			
Fixtures and tooling — estimated	$ 25,000	Annual tooling investment	$ 25,000
Machine and system repairs	$ 15,000		
Total annual investment — hard assets	$ 40,000		
Soft costs			
Training	$ 10,000		
Total annual investment	**$ 50,000**	**Total annual investment**	**$ 25,000**
Schedule of payback on investment		**Payback on investment by outsourcing grinding**	
Assumed dollar value per production hour	$ 100		
Assumed annual "full value" production hours	3,000		
Annual production value	$ 300,000	Annual production value	$ 300,000
Assumed cost per production hour (fully loaded)	$ 50		
Assumed annual production hours	3,000		
Annual variable production cost	$ (150,000)	Assumed cost of outsourcing production	$ (225,000)
Less: annual investment in hard costs and training	$ (50,000)	Annual investment	$ (25,000)
Less: depreciation of initial investment over 10 years	$ (65,000)		
Annual return on investment	**$ 35,000**	**Annual return on investment**	**$ 50,000**
Initial investment	**650,000**	**Initial investment**	**$ 25,000**
Annual % return on initial investment	**5.4%**	**Annual % return on investment by outsourcing**	**200%**

Cost comparisons of outsourcing versus in-house creepfeed grinding. The breakdown, which is supplied courtesy of Abrasive-Form, is for one of its customers, a manufacturer of heavy industrial equipment based in the Midwest.

And these numbers don't take into account the costs for dedicated floorspace, power, and the considerable costs of downtime and/or maintaining backup machines.

In addition to these were the expenses associated with work-in-process. The manufacturing company anticipated spending $50,000 to maintain an inventory of partially processed parts. For each year of operation, the firm required an additional $50,000 for tooling, maintenance, and training.

Reviewing the payback-on-investment figures, the company determined that production costs totaled $150,000, and it needed to invest another $50,000 annually to maintain creepfeed-grinding processes. Add to this the annual depreciation of the initial investment — which the manufacturer figured at $65,000 — and the result was an expected yearly ROI of $35,000, or somewhat less than 6% of the initial investments required. This, too, is an overestimate for simplicity's sake, given that various costs for consumables, maintenance, and even machine replacement are such that more than 20 years would typically be required for a complete 100% ROI.

Abrasive-Form's history

Abrasive-Form has more than a quarter of a century of experience strictly dedicated to tackling diverse creepfeed-grinding jobs.

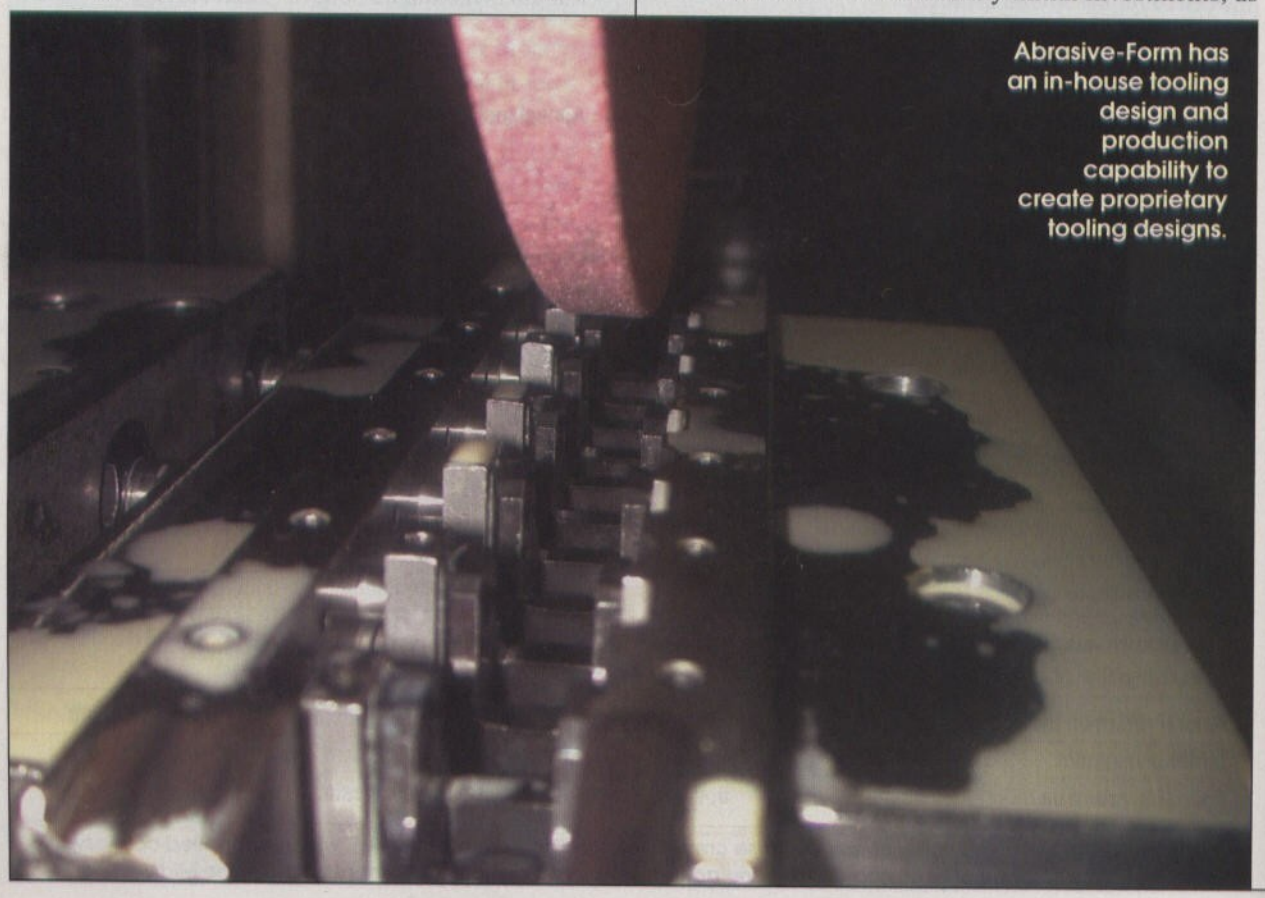
The company, reputedly the largest dedicated creepfeed-grinding resource in North America, says it can put any job in production within weeks, if not days. It does this by deploying its 38 creepfeed grinding machines; an in-house staff of engineers and toolmakers for tooling design, production, and quick repairs; extensive inventories of wearable fixture components; and highly trained and experienced personnel.

More information on the company and its capabilities is at *abrasive-form.com*.

The case for outsourcing

After considering the comparable economics projected (and later realized) by outsourcing, the Midwest manufacturer dismantled its existing creepfeed-grinding operation and outsourced this work.

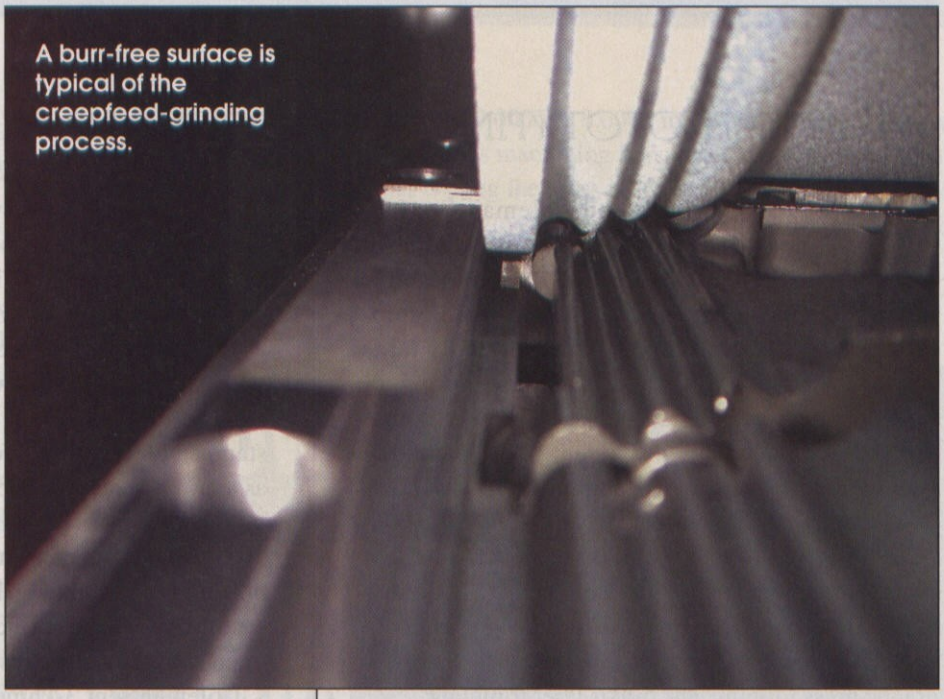
Because it elected to outsource, the company had no capital tied up in buying or setting up a new machine. Its $25,000 initial investment was for tooling alone. Consequently, the same production value — $300,000 — did not need to offset any initial investments, as



Abrasive-Form has an in-house tooling design and production capability to create proprietary tooling designs.

these costs are assumed by the company doing the outsourced work. This means that, allowing for an increased cost per part, the manufacturer gained an immediate 200% ROI in the first year.

As noted earlier, this figure is an intentional underestimation of expected returns from outsourcing, given other real-world costs involved in maintaining uptime, dedicating floorspace, and so forth. However, even with these omissions, outsourcing still allowed this company to reduce the direct costs of produced components.



A burr-free surface is typical of the creepfeed-grinding process.

Outsourcing creepfeed grinding provides much the same results to other companies. They no longer have to continually invest in both the hard and soft costs of running an in-house creepfeed-grinding department. Some of the savings in hard costs are obvious — machine tools, fixtures and jigs, consumable tools, abrasives, and cutting fluids.

Purchasing an outsourced finished component also eliminates the need to invest in work-in-process. Moreover, shops need not stock an inventory of machine repair parts or consumable supplies.

The soft cost savings are also impressive. There's a considerable learning curve involved in tackling creepfeed grinding, so it can be very costly to recruit and train technicians to run machines — not to mention the costs of skilled repairmen for these specialized systems. Other soft costs include logistics, expediting, and purchasing.

Beyond cost justifications

In today's fickle economy, the realities of risk reduction via outsourcing are more apparent. By outsourcing, a company eliminates the risks of uncertain parts volumes. Otherwise, it faces the potential nightmare of purchasing a complete machining system, or several, only to find that the life of an application is much shorter than the considerable time needed to pay back an initial investment.

Outsourcing also mitigates the impact of not achieving a projected production rate used to justify capital expenditures. On the other hand, by securing the services of a qualified outsource with ample capacity, a manufacturer eliminates the risk that a projected volume will double or triple and necessitate additional equipment purchases.

Shops also gain delivery advantages by outsourcing. A dedicated creepfeed-grinding operation often has plenty of experience in minimizing leadtime to get a project up and running. This leadtime compression facilitates getting a product to market quickly, such that a greater portion of a component's lifecycle is made profitable. Usually, this involves applying extensive cross-industry expertise to develop flexible fixturing and tooling in short order.

Shops should, however, note that not all creepfeed grinding outsources are alike. The right partner can help a company contain costs while achieving the higher quality and lower piece-part prices possible with creepfeed grinding. Therefore, shops should seek out an outsource with the breadth of experience and ample capacity necessary to handle their jobs. CT