

## Technical Member Profile: High Tech Research, Inc.

High Tech Research, Inc. (HTR) develops software and turnkey systems for manufacturing plants. Founded in 1985 and currently headquartered in Chicago, HTR is led by Dr. Stephen P. Birman, whose primary work has involved the development of a new generation of computer systems for integrated control of processes, quality and efficiency.

With the development of its Micronite software, HTR is considered a pioneer in process control for metalworking. The knowledge-based system is designed to reduce manufacturing costs through defect prevention, accurate process diagnostics and tool control.

"Our goal is to uncover all elements of manufacturing inefficiency and put our intelligent, decision-making software in charge of production and quality," says Dr. Birman, who holds more than 50 patents in the manufacturing and metalworking industries. "Micronite is a unique system for processes with perishable tools."

The software can be used by companies ranging from small job shops to captive manufacturers. The system establishes a methodology that involves four phases: planning, control, analysis and improvement. The methodology and software tools are used to control all aspects of machining and grinding performance. It provides operators, supervisors and engineers with an integrated technique to control processes while improving quality and efficiency.

"Process profiles in machining and grinding are not repetitive from tool to tool, and they are even changing after machine adjustment or tool offset," Dr. Birman explains. "Every step of tool wear or pattern of process instability has a short history and can-

not be used for modeling of the steps that follow or for the behavior of the next tool. There are infinite dynamics in perishable tools. They cannot be controlled with statistical tools like SPC, which require a relatively long history. Micronite knowledge-based dynamics provide a method that is capable of controlling every step in process and tool evolution."

The software is designed to control everything that is happening on the shop floor, not just the processes. "Micronite also controls quality, efficiency and tool life," he continues. "It is one complete system that uses knowledge-based rules and multi-level modeling for machining and grinding. The future of zero-defect control lies in expert manufacturing systems," he continues. "One reason why practices such as SPC, DOE, Six Sigma and others die so quickly on the shop floor is that their underlying philosophies are not flexible enough to fit into highly specialized and ever-changing working environments. Their analytical tools and software designs lack predictive abilities and cross-functional features."

Dr. Birman explains that Micronite has the best chance for survival on the shop floor because of its user-friendliness. "The advantages of this expert system over human experts include 24/7 availability, ideal process-related memory, the ability to make the right decisions in complex situations and unlimited testability ahead of deployment," he says.

As a PMPA technical member, HTR has a customer base that currently includes dozens of PMPA members. "With our software, PMPA customers stay on the cutting edge of process control," Dr. Birman states. "This helps them retain their customers dur-

ing business slowdowns by enabling them to achieve the highest standard of quality and efficiency."

HTR has sent representatives to the PMPA technical conferences and the Precision Machining Technology Show (PMTS). "We believe the PMPA technical conferences are very good and very useful," Dr. Birman says. "We appreciate the mutual knowledge-building between PMPA and our company."

He points out that HTR's PMPA membership gives potential customers greater confidence in his company. "Customers who are PMPA members know what it means to belong to the organization, so they are more likely to trust our software. They know that we provide a solid, reliable product.

"PMPA gives us a foundation for building confidence in Micronite," Dr. Birman sums up. "That's important because there are more than 200 types of SPC software on the market. When fellow members want to select one, they see that High Tech Research has a track record of involvement with the PMPA, so they are more confident in their decision to buy from us."

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