

ARROW GEAR News

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Arrow supplies gears for winning car at Daytona 24 hour race

Arrow gears were used in the winning Chevrolet Corvette C5-R car at the 24 hours of Daytona endurance race on February 3-4. Notably, this event was the first time that the Corvette has finished first overall and first in class at a 24-hour race.

Arrow became involved with the project through Pratt & Miller who produces the CR-5 car. Arrow was called upon to supply ring and pinion gears for the rear axle after problems were

experienced with a previous gear design.

Arrow's association with P&M dates back to the early 1990s. Arrow supplied gears for the Intrepid GTP cars, which were produced by P&M for Chevrolet. This program was later canceled. When the Corvette program began in 1998, P&M initially used some remaining parts from the previous Intrepid program. However, increases in the car's power eventually led to the need

for a new gear design. At this point, Arrow was approached to address the various gearing performance problems.

The Corvette C5-R begins as a production frame from the Corvette assembly line. P&M then modifies many of the car's components. The suspension is changed significantly due to the larger tire size. The brakes are modified, as well as the drive train - due to the increase of horsepower from 350 to 650.

Racing is a demanding application because of the high torque that is required. On the Corvette, 600 foot pounds of torque is supplied to the 14 inch wide tires. This creates a great deal of stress on the ring and pinion gears and was a critical variable during the design work performed by Arrow. To meet



Arrow's products were used in the winning Corvette CR-5 at the grueling 24 hour race.

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Arrow implements new computer system

Arrow has recently embarked on the last phase of implementation of a new computer system that promises to significantly increase productivity.

The new system is primarily based around a software package called Visual Manufacturing, which is produced by Lilly Software. This software, combined with Arrow's extensive computer integration, will have a powerful impact on every aspect of Arrow's operation. The system will be used to capture and report on all activities of the company, including financials, purchasing, manufacturing, quality, and human resources.

A primary benefit of the new system will be the enhancement of communication between various departments - thus increasing the speed of information. For example, when an order is placed with the sales department and is entered into

the system, pertinent information is automatically routed through the production process. The system can best be described as a proactive tool - as actions are no longer contingent on someone remembering to perform a task or manually routing information. Instead, all required tasks will automatically appear in an activity report or "to do" list. When the task is completed, the system will forward notification of the next step to complete to the applicable person or department.

Another key benefit of the system is that personnel can gain real time access to information on any order in the plant. This capability is available for both current and closed orders. This feature will virtually eliminate the need to physically go from

one location of the plant to another to retrieve information.

Arrow has invested a great deal of resources in the implementation of this system. In June of 2000, the selection process began with Arrow looking at 40-50 software suppliers. The challenge was to find an efficient system that

would work in Arrow's "engineering to order" environment. To assess the available software packages, Arrow formed teams from each department and eventually narrowed the list down to 3 suppliers. The evaluation teams spent an entire day using

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each product and decided unanimously on the Visual Manufacturing package.

Due to the extensive scope of the system, it is being introduced in phases. At the end of March, the financial operations were activated. This involved Accounts Payable and Receivable, the General Ledger and Payroll. On May 1st, the gearbox assembly process was put online. The remaining manufacturing operations are scheduled for July 1st.

Following the activation of these areas, ongoing integration of the software's numerous features will take place to maximize system functionality.



70 data input devices will be located throughout the plant - allowing real time access to information on all jobs.

To facilitate data input, 20 input devices will be located throughout the shop. Similar in nature to the terminals that were used with the previous system, the new workstations will utilize thin client technology. This refers to a networked device that is connected to a main server, yet does not require an operating system and hard drive. Information input at these workstations will update information to the database in real time. Bar coding and scanning for labor reporting and materials transfers will be utilized to supplement data entry.

Once the system's functionality is fully implemented, numerous capabilities will be available to Arrow personnel. For example, at each operation of the production cycle, a process drawing can be attached to the job - allowing the operator to view it electronically on the shop floor.

In order to accommodate the new system, Arrow has purchased two new servers. There will be a total of 70 data input devices throughout the plant. As a result, email will be more widely available. This presents numerous benefits, such

Manufacturing personnel can log notes pertaining to the job and this information will be retained for future production runs.



as the ability for personnel on different shifts to share important job information. Also, employees can log notes on the job that will be permanently attached to the house order and part number for future reference - an ideal method of communicating information from an operator to an engineer for the next time the job is run.

With a system change of this depth, training was an essential issue. To insure the success and ease of the transition, Arrow committed to a substantial training cost - bringing trainers onsite and setting up a training room. So far, all office personnel and supervisors have received a one-day orientation on the entire system. Specific training on each module by key personnel in various areas of the company has also taken place.

One of the ultimate measurements of the system's impact involves on-time delivery to Arrow's customers.

Computer integration goes back to the mid 1970s when Arrow was among the first in the gear industry to implement such a system. At that time the company invested \$90,000 for a state-of-the-art minicomputer which was equipped with 40MB of hard drive storage and 36K of memory. As suitable software was not available, Arrow embarked on a two-year project of writing custom software. Over the years, as Arrow's requirements increased, the software was modified, but essentially this system was functional for nearly 20 years.

The new software is an "off the shelf" product, which was an essential selection criterion. This feature will allow Arrow to easily upgrade the system to accommodate future needs as the software supplier produces new releases.

One of the ultimate measurements of the system's impact involves on-time delivery

to Arrow's customers. In the high precision gear industry, where quality is an assumed variable, it is the ability to offer fast delivery, which defines a company's competitive posture. With the enhanced capabilities resulting from the new system, Arrow anticipates significant timesavings for processing orders. In certain areas, processing time is expected to be improved by nearly 80% as compared to current methods.

The enhancement to Arrow's operation, resulting from the introduction of the new computer system, highlights Arrow's continuing commitment to reinvestment in the latest technologies. ▽

Don't Forget...

Be sure to check out the online version of Arrow's newsletter.

The online version can be accessed at www.arrowgear.com and includes additional features. A gallery of past newsletter issues is also available.

A new feature available from the site is the opportunity to register and automatically receive the newsletter electronically.

Arrow utilizes multimedia for employee recruitment

Arrow is now using multimedia technology to enhance personnel recruitment efforts with the release of a CD-ROM based orientation program.

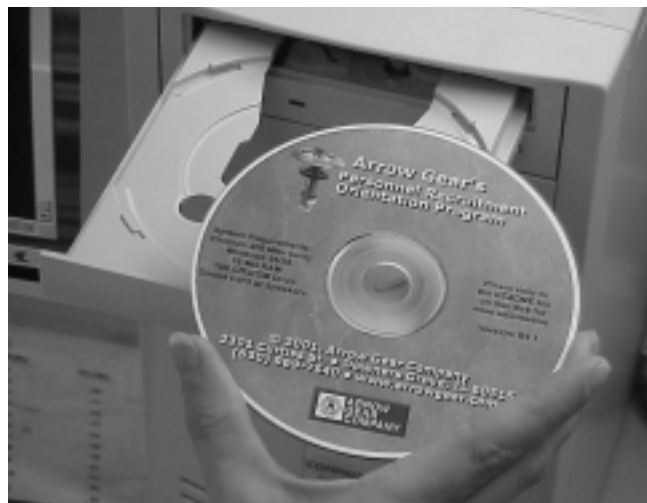
The program is targeted at individuals who would like to learn more about Arrow Gear, as well as those who would like to know more about the gear industry in general. Playable on most current multimedia capable PCs, the program contains video segments on topics ranging from Arrow's history and philosophies to an overview of the company's various departments and the methods used to produce gears. There is also a photo gallery which features the diverse range of products produced by Arrow.

Arrow Gear's CEO, James J. Cervinka, conceived the idea of using this technology for the

purpose of recruitment. The process and challenges of acquiring people for the highly skilled manufacturing environment have changed significantly over the past few years. To address these changes, Cervinka suggested the use of the CD-ROM based program to portray Arrow's operation more accurately. He also felt this program would highlight Arrow in the job market when compared to the recruitment efforts of other companies in the manufacturing sector.

The program also provides information on the numerous career opportunities for women in the gear industry. Manufacturing in the past was primarily a male oriented profession and the shop environment was widely

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Arrow's CD-ROM program will enable people interested in the company to view information interactively.

Race

Continued from page one

this challenge, Arrow engineers used Gleason software to model the tooth contact pattern - simulating loads and gearbox deflections. The result was a tooth contact pattern which insured trouble-free operation of the gears over the 24 hours of the race.

The success of the project can be further highlighted by the fact that, in the past year and a half since Arrow has been supplying these gears, there has not been a single gear failure.

"The gears were installed, went through practice, qualified and then ran the race. At the end of the race they were in great shape and could be used again," explained Arrow Gear Manufacturers Rep Larry Jacobs.

Arrow has a long history of producing gears for racing applications - having worked with March Engineering and Penske on cars for both the Indy and NASCAR circuits. ▽

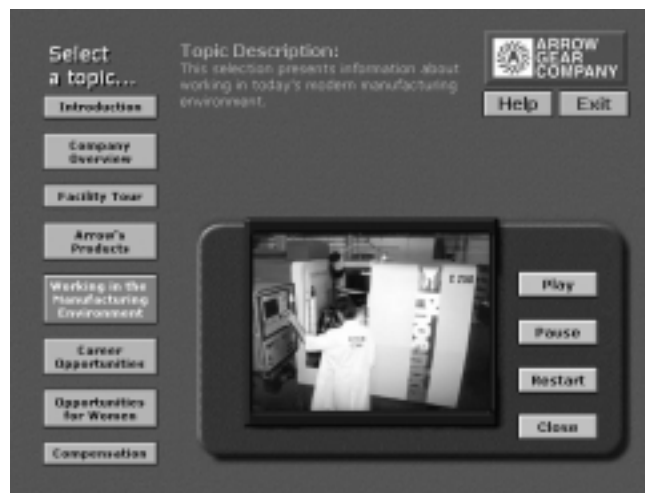
Recruitment

Continued from page four

perceived as a dirty place to work. Today, this is no longer the case. Arrow is recognized as one of the cleanest and most modern facilities of its type in the world, and women are involved throughout all areas of the company. Cervinka felt that communicating these facts to women in the job market and

dispelling any misconceptions about the shop environment was an important message.

For those wishing to receive a copy of Arrow's employee recruitment program, please contact Mary Ann Cervinka by phone at (630) 969-7640 x254, or by email at MACervinka@arrowgear.com. ▽



The intuitive interface was designed to allow for easy navigation to a wide range of topics on Arrow Gear.

Multimedia tools to communicate benefits of Closed Loop System and advanced design capabilities

Stemming from the use of CD-ROM based multimedia for employee recruitment efforts, Arrow is also using this communication technology as a capabilities orientation tool.

Arrow recently completed production of a CD-ROM presentation of "A New Era". This program, previously available on videotape, highlights the operation and dramatic benefits of Arrow's

Computer Controlled Manufacturing Closed Loop System.

A second presentation, which is currently in production, features detailed information on Arrow's advanced capabilities for gear design.

To request a copy of these programs, contact Arrow's inside sales team at (630) 969-7640 or by email at sales@arrowgear.com. ▽

Arrow launches new stock gear pages on website

Arrow has recently upgraded its website to include an enhanced section on stock gearing products.

Visitors to arrowgear.com will now have online access to detailed information pertaining to Arrow's stock gears. Previously this level of information was only available through the printed version of the stock gear catalog.

From the stock gear page, the user can view data on gear types, size ranges and AGMA quality ratings. In addition,

The stock gear pages feature extensive information on Arrow's wide variety of stock gearing products.

specifications on standard, non-stock and ground tooth spiral bevels is available. There is also a section that provides design considerations for customers. Other features include the ability to request a quote and download a copy of Arrow's stock gear catalog in Adobe PDF format.



Arrow's new stock gear pages feature an enhanced interface design.

To supplement these current updates, additional changes are anticipated in the near future. A price list will be added, as well as a search function. The search engine will allow the user to find a stock gear by submitting

specific criteria - including ratio, torque, and size.

The graphic design of the entire website will soon be updated and will be similar in appearance to the stock gear section.

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