Winners know the basics count when they compete. Being the best requires peak performance, reliability, ingenuity and determination. Now, more than ever, the basics of product quality and innovation are vital for achieving success in a market teeming with global competition. With more choices, customers have become more demanding. They want higher performance, better products and improved cost savings. To win in today’s economy, you must meet — and even exceed — those expectations.

The North American Die Casting Association (NADCA) knows that competition improves the competitor. With its annual International Die Casting Competition, NADCA recognizes, rewards and publicizes the outstanding casting designs of the year. Each entry is judged on its design, quality, cost savings, ingenuity, innovation and industry-changing potential. But the competition does more than highlight the winning designs — it also promotes the increased use of die castings in the automotive, consumer and aerospace end markets.

**WINNING BRINGS VISIBILITY**

According to Stephen Udvardy, NADCA’s director of research, education and technology, the winners are typically featured in publications such as *Design News, Die Casting Engineer, Machine Design, Product Design & Development* and *Purchasing* magazine. Udvardy points out that customers take notice of award winners. They recognize these die casters excel and are ahead of the competition. “Entering and winning,” he adds, “is one of the most effective ways to gain visibility with OEM decision-makers.”

**DESIGNING SUCCESS**

For examples of what goes into exceptional design, NADCA is featuring the 2005 winners as part of this article round up. NADCA wants to thank all the die casters for their submissions to the 24th annual competition and congratulate the winners. The winning die castings were showcased at CastExpo’05 this past April in St. Louis. The event — sponsored by NADCA and the American Foundry Society (AFS) — was the largest metalcasting event held this year in North America with more than 10,000 attendees. If you have a casting that fits the criteria, participate. You could be a winner, too, and gain the recognition you deserve. But you must enter — why not do it now for the 2006 International Die Casting Competition? Winners will be presented during the 110th Casting Congress, April 18-21, in Columbus, Ohio. What better way to celebrate the Silver Anniversary of the International Casting Awards Competition!

Send in entries today for the 2006 26th International Die Casting Competition: www.diecasting.org/castings/competition
COMPETITION

The competition is open to three alloys: aluminum, magnesium and zinc die castings. Within those alloys, there are more specific levels: aluminum under 1 pound; aluminum 1-to-10 pounds; aluminum over 10 pounds; aluminum squeeze/semi-solid; zinc under 6 ounces/non-electroplated; zinc over 6 ounces/non-electroplated; zinc any size with decorative finish; magnesium under 1 pound; and, magnesium over 1 pound.

Any number of castings may be entered. Send a separate entry form for each casting or assembly of castings. As-cast entries are required. The metal surface cannot be improved or concealed by tumbling, shot blasting, coating or other surface treatments. NADCA encourages sending secondary processed samples, but these must be in addition to the as-cast parts.

All castings submitted for the competition must have approval in writing from the customer indicating the customer consents to allowing NADCA to showcase the casting(s) in exhibitions, magazine articles and other special promotions. When possible, information and photographs describing the design process will be printed in Die Casting Engineer, but due to proprietary reasons, not all information can be shared. Such exceptions should be noted in the entry.

Judging is conducted by an independent panel of die casting industry experts, with no ties to eligible casters.

You can download the entry form at www.diecasting.org/castings/competition. Send it, along with a sample casting and description to:

NADCA • 241 Holbrook Drive • Wheeling, IL 60090
All entries must be postmarked no later than:
Friday, February 3, 2006.

For more information, please call Director of Membership & Marketing Leo Baran at 847.808.3153.
ALUMINUM UNDER 1 POUND

WHAT: Nesting Latch for a folding table

PROBLEM: The first design was a three-piece assembly, requiring five parts. The metal connector came in three sizes. The short length of the casting prototype allowed the latch to rock, binding the latch assembly instead of releasing smoothly. Assembly was difficult because of the multiple parts.

SOLUTION: Use a two-piece design requiring only two parts. A longer casting for the latch allows modification for the two smaller table sizes. This lowers tooling and part costs and increases productivity.

PROJECT LEADER(S): Mark Kottman, Allsteel Product Business Manager; Alan Loeffelman, President, Production Castings, Inc.; Chad Loeffelman, Plant Manager, ABM Manufacturing; Jeff Loeffelman, Tooling Design Manager and Mark Preuss, Quality Manager, both with Production Castings, Inc.

ALLOY: Aluminum 380

WEIGHT: 0.365 lb.

CASTER’S COMMENTS: “The Allsteel Nesting Latch was designed to run as a single cavity in a 15x18 Heavy Duty DME unit holder. This was done to keep tooling costs down and allow for quick die changeovers so we can meet our customer’s short lead times. The design of the vents, overflows, gating, fill times, release agents and hot oil lines are critical for this type of thin wall aluminum casting.”

ABOUT THE DIE CASTER: ABM Manufacturing, located in Sedalia, Missouri, provides aluminum casting alloys 380, 383, 360, volume production of utility aluminum parts, an in-house design and tooling shop including CAD/CAM, full in-house secondary machining capability, component assembly, a complete finishing facility (PC Plating), a fully equipped QA department and a commitment to continuous quality improvement.
Imperial Die Casting

ALUMINUM 1 TO 10 POUNDS

WHAT: Diesel Engine Oil Filter Housing

PROBLEM: This was a complex, multi-function new product, which must be leak tight after machining. It required service access, must support other components and sensor and oil supply ports.

SOLUTION: Improved the castability of the part, including changes in radii, relocation of the parting line, elimination of some thin tool steel sections, and the addition of bosses to provide locators and clamp points for machining. The goal was to improve the design and make it more easily castable at low rates of scrap, at high productivity, and at lowest cost. The casting now incorporates multiple features and functions into one near net shape part.

PROJECT LEADER(S): R.A. Buchhop, Vice President, Manufacturing, Imperial Die Casting

ALLOY: 380 Aluminum

WEIGHT: 2.2 lb.

CASTER’S COMMENTS: “Bringing this very difficult part into production has been a success for all involved. Up-front engineering and careful project management have again been proven to be major factors in the success of such a project.”

ABOUT THE DIE CASTER: Imperial Die Casting, a division of RCM Industries, maintains full-service capabilities in a modern plant. RCM Industries includes three other casting operations with other capabilities and machine sizes. The company has expertise in producing high quality castings including those requiring close tolerances, pressure tightness, good surface finish and secondary operations involving machining, shot blasting and vibratory deburring. Imperial Die Casting is a custom shop in Liberty, South Carolina, that has produced aluminum alloy high-pressure die cast parts in its 90,000 square foot plant since 1966.
SPECIAL CATEGORY: ALUMINUM 10 POUNDS AND UP, NON-AUTOMOTIVE

WHAT: Impeller used in industrial and commercial blowers

PROBLEM: The impeller is an integral component for a blower system, which spins to move large amounts of air. The part was originally a sand casting, which was heavy and porous. It did not produce efficient speed and made too much noise.

SOLUTION: The die casting process allowed a more complex configuration of part design, reduced the overall weight of the part, and was less porous than the sand cast version. As a result, less motor power was needed to spin the impeller. Patent-pending features were added to enable higher speeds, allowing for better efficiency at a lower noise level.

PROJECT LEADER(S): George Garrick, Sales Engineer, Bardane Manufacturing Company.

ALLOY: Aluminum 380

WEIGHT: 10.29 lb.

CASTER’S COMMENTS: “Using design features such as the gating system, vacuum track and mold flow simulation, a quality part was produced, allowing for tighter tolerances. The die cast part enabled the unit to operate at higher speeds, with less noise, while also reducing the amount of secondary machining that had to be done on the casting. With all components of design and engineering knitting together, the end result was a quality part, which proved to be beneficial in numerous ways.”

ABOUT THE DIE CASTER: Since 1968, Bardane Manufacturing Company has been one of the leading die casting companies in the northeastern U.S. They offer a complete range of precision metal casting services including zinc and aluminum alloy casting, CNC machining and rapid prototyping of parts. Their 64,000 square foot facility features 26 machines from 75 to 1,200 tons. Finishing capabilities include burnishing, deburring, painting, coating and assembly. Bardane is located in Jermyn, Pennsylvania.
ALUMINUM 10 POUNDS AND UP

WHAT: Transaxle Case for Consumer Vehicle

PROBLEM: The previous transmission case was poured from cast-iron using the sand-cast process. The price of the machined case was high due to thick walls, the high cost of steel, and poor as-cast dimensional tolerances that required a lot of final machining.

SOLUTION: Designing the transmission case for aluminum die casting reduced the casting weight, resulting in reduced raw material content and a lighter assembly — all leading to a lighter vehicle. Tolerances were improved and machine stock was minimized to reduce final machining requirements. Many features that had been previously machined are now used as-cast. Cycle times were reduced. All together, this resulted in lower cost per piece compared with other processes.

PROJECT LEADER(S): Edd Ingram, Engineering Manager; Wayne Ingram, Senior Tooling Engineer; Jason Hinds, Sales Engineer, all of Walker Die Casting.

ALLOY: A380

WEIGHT: 61.75 lb.

CASTER’S COMMENTS: This casting has an important role in the function of the vehicle. The case is the anchor for various attachments and must withstand repeated cyclic loading. We used casting simulation to design gating and cooling to yield a high integrity casting.

ABOUT THE DIE CASTER: Walker Die Casting (WDC) is a privately owned aluminum die caster specializing in large, complex die castings. WDC has 37 die cast machines ranging from 850 to 3,500 tons. Founded in 1958, WDC has earned a reputation for delivering first-rate castings, even on the most complex and difficult casting designs. WDC utilizes casting simulation technology to ensure that programs are launched successfully and are right the first time. The company is QS/ISO certified and provides castings to the automotive, marine, outdoor equipment and other industries. Walker Die Casting is located in Lewisburg, Tennessee.
ZINC UNDER 6 OUNCES/NON-ELECTROLATED

WHAT: Precision Zinc Reversing Valve for Power Impact Wrench

PROBLEM: The new design of this reversing valve was extremely complex with demanding tolerances, but was to be produced in high volume to rigid specifications with minimal machining at a cost-effective price.

SOLUTION: A new, more complex design of the valve body allowed simpler parts in the overall assembly and more direct air flow in the wrench. This helped produce more power and torque in the wrench and allowed more efficient use of the pneumatic energy. Die casting in zinc was the most cost-effective method to produce the part in the volume and quality needed, and could not be matched by other production methods, including machining, powder metallurgy and metal injection molding.

PROJECT LEADER(S): Will Vogel, Engineering Manager; Samuel Heredia, Foreman, Raul Marquez, Senior Tool Maintenance Specialist, all of DeCardy Diecasting.

ALLOY: ZAMAK #5

WEIGHT: 1 ounce

CASTER'S COMMENTS: This geometry has seven different functions and was key in allowing design freedom for other aspects of the end product. DeCardy's team met the challenge of providing a quality part using creative die design.

ABOUT THE DIE CASTER: DeCardy Diecasting, Chicago, Illinois, produces miniature to mid-size zinc die castings for upper end customers. It serves markets from automotive to telecommunications to the medical market. It has engineering design expertise, state-of-the-art production equipment, and an ISO 9001:2000 quality system. The company uses precision casting design, rapid prototyping and tight process control. DeCardy Diecasting is a remarkably stable company, and its employees have been with the company an uncommonly long time. It is proud of its association with its casting machinery manufacturers (Frech & Techmire), its Union (Local 743) and its customers.
ZINC OVER 6 OUNCES/NON-ELECTROPLATED

WHAT: Snow Stop Roof Bracket

PROBLEM: The snow bracket is used on metal roofs in high snowfall areas to prevent dangerous accumulations of snow and ice from falling on passers-by. It’s part of a system that anchors extruded tubes or sheet steel to the roof trusses of a building. Previously, this bracket was a stamped steel piece, cost too much to produce, tended to corrode and lacked strength.

SOLUTION: Careful design and placing the cross member in the center of flanges as opposed to the side increased overall part strength. Die casting the part allowed for more accuracy and made it corrosion resistant. The part’s shape is more practical and pleasing, devoid of sharp edges, and more easily mounted. The new shape allows the customer to install parts length or width down and replaces seven steel parts with two similar die cast parts. The new part has resulted in significant cost savings.

PROJECT LEADER(S): Dan DiLiello, President; Monty Rutherford, Engineering Manager both of Dero Enterprises, Inc.

ALLOY: ZAMAC 3

WEIGHT: 2.01 lb.

CASTER’S COMMENTS: “We feel that our die cast snow bracket is proof that die casting offers customers strength, resistance and cost savings under adverse conditions.”

ABOUT THE DIE CASTER: Dero Enterprises, Inc., is located in Montreal, PQ, Canada. It provides custom and captive zinc die casting, assembly, tool design, toolmaking, tool maintenance, electroplating, painting, electrostatic painting, chromating, machining, drilling and threading. Dero has 10 machines ranging from 8 to 400 tons and provides service for the automotive and auto aftermarket, builders, hardware, plumbing and lighting industries.

www.diecasting.org/dce
MAGNESIUM UNDER 0.5 POUNDS

WHAT: The Ardent Xs Fishing Reel Frame

PROBLEM: Past applications for the fishing reel frame used plastic or aluminum die cast components. Aluminum weighed it down and plastic did not offer enough density or surface quality.

SOLUTION: A new part was made for Marsh Technologies using AZ91D, replacing plastic or aluminum parts used in previous designs. Its advantages included exceptional density and surface quality and the ability to create complex geometry with varying wall thickness, while maintaining tight tolerances of bores and surfaces for mating components.

PROJECT LEADER(S): Doug Simpson, Engineering Manager, Dave Coon, Project Engineer; Larry Winkler, Tooling Engineer, all of Phillips; Jeff Marsh, President, Marsh Technologies.

ALLOY: AZ91-D

WEIGHT: 31.3 g.

CASTER’S COMMENTS: “Combined with the two side plates, the components make up the backbone of this extremely light-weight ultra-smooth fishing reel.”

ABOUT THE DIE CASTER: Phillips Plastics Corporation, founded in 1964, is a privately held custom injection molder of plastic and metal with annual sales of $200 million. The company employs more than 1,500 people at 15 locations throughout the U.S. Supported by over 100 design, process and manufacturing engineers and 100 toolmakers, the company runs 226 presses corporate-wide. Phillips provides total solutions from design through production across a wide variety of markets. The company is located in Menomonie, Wisconsin.