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NEWS RELEASE

FOR IMMEDIATE RELEASE

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ET FOUNDATION DESIGN WINNERS ANNOUNCED AT ALUMINUM USA

The Extrusion Technology for Aluminum Profiles Foundation (ET Foundation) announced the winning entries from the 2005 International Aluminum Extrusion Design Competition at the Aluminum USA show and conference during National Manufacturing Week in Chicago. The Foundation received nearly 100 entries for this year's competition—the most ever for the contest, which was open to students and professionals worldwide. Entries were received from as far away as Portugal, Nigeria, and India. The winning entries were announced at a special conference session on Monday, March 7, 2005.

Judging took place in the Chicago area in February. Judges, recruited from the aluminum extrusion industry, academia, and the trade press included Angel Rosario, Applications Engineer for Alcoa Engineered Products in Chicago; Dr. Joseph Benedyk, Contributing Editor for *Light Metal Age* magazine in South San Francisco and Research Professor in the Mechanical, Materials & Aerospace Engineering Department of the Illinois Institute of Technology in Chicago; and Bruce Kasten, Vice President of Sales and Marketing for Penn Aluminum in Murphysboro, Illinois.

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The Aluminum Extrusion Design Competition serves to promote greater understanding and use of extruded aluminum profiles, as well as to highlight innovations and recognize excellence in aluminum extrusion design. Winning entries were those that best demonstrated extruded aluminum's inherent attributes, including the effective use of close tolerances or complex profiles, extrusion process improvement, innovation in design, and/or likelihood of market success. Designs needed to be original and were required to make use of one or more extruded aluminum components. Cash prizes, sponsored by Hydro Aluminum North America, were awarded in three categories: a Grand Prize awarded across all Professional Categories, three Professional Class awards, and four Student Class awards, including the Hydro Sustainable Design Award. In addition, several Honorable Mention Awards were presented, although no cash prizes were associated with these.

The Grand Prize, with a cash award of $5,000, was presented to Randall Kearns, CAD Draftsman-Extruded Products for Hydro Aluminum North America in Ellenville, New York, for his design of a vertical windmill. Aluminum extrusion was used for this concept because "it turns windmills into a simpler design and lowers cost for remote locations. It will withstand harsh environment and weather," explained Kearns. The vertical design can produce 50 percent more power than conventional horizontal-mounted designs. The vertical windmill catches the wind from any direction. The use of extruded aluminum makes the vertical windmill lightweight and quieter than conventional horizontal windmills and, therefore, more practical.

First Place winners in the Professional Categories were each awarded $2,000. In the Commercial/Industrial Category, first place was awarded to Todd Kollar, Sales Engineer for General Extrusions, Inc. (GEI) in Youngstown, Ohio, for a heatsink used in a touch-screen kiosk. GEI solved a problem with their aluminum extrusion design. "Our

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customer's original design incorporated standoffs that were to be inserted into milled holes located on the bottom of the heatsink," explains Kollar. "The locations of the standoffs were directly under the fins and/or hollow areas of the profile. In addition, the locations of the standoffs could not be altered due to mating components and assembly requirements." To solve the problem, GEI came up with a unique solution: extrude the additional metal on the bottom of the heatsink where the standoffs were to be located and CNC (computer numerically controlled) machine the area to mill away the excess material to create the standoffs as built-in features of the extrusion itself. "GEI was able to use the extrusion process to create a more 'manufacturable,' less costly part without compromising the part's overall integrity with respect to the end use," Kollar stated. The judges were impressed with the complex shape of the part and GEI's solution to the standoff design problem. "Solving the problem by machining the base made this a winner," noted competition judge Angel Rosario. "That's what extrusions are supposed to do."

The judges decided to combine the Consumer and Structural Categories due to the nature of the entries and awarded the First Place prize jointly to two entries. Glenn A. Reynolds, V. Gary Curtis, and Dean R. Hackbarth of Gossamer Space Frames, Inc. in Long Beach, California, and Alfonso Feria and Asim Sehic of Jet Propulsion Laboratory, California Institute of Technology in Pasadena, California, won for their design of Co-Axial Joint (CAJ) technology applied to antenna backup structures. The judges chose to award this entry because of its innovative technology and versatility of application across multiple markets. "Space antenna designs need to be very precise in order to maintain a viable signal," commented Design Competition judge Dr. Joe Benedyk. "Traditionally, welding has been used to connect the joints, but welding can cause a variance in the antenna signal. This design solves that problem." The CAJ connection is a non-welded, non-bolted mechanical attachment used to rigidly join multiple round

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tubular elements to a node in a structure. The components, consisting of three couplings, the block connector, and the tubular member, are all machine-threaded. The advantages of CAJ technology over other methods of joining pipes are many, including design, manufacturing, and field assembly. “In design, CAJ supports centerline geometries, increased strength-to-weight ratios, the use of different building materials—including weld-sensitive and exotic materials—and hollow connections for routing power conduit, communication and data lines, as well as cooling/heating air,” Reynolds observed. In manufacturing, the components are easily machined in a standard CNC machine shop, part tolerances produced are inherently superior to conventional construction materials, and no welding is required. Field assembly advantages include hand tool assembly, ease of assembly in remote locations and quick assembly. The design translates across other markets, as well, including a unique pedestrian bridge in Long Beach, California, that employed the technology.

The other shared First Place prize in the Consumer/Structural Category was awarded to Jon Bricker, Industrial Designer and Manager of the Purdue University Exhibit Center in Lafayette, Indiana, for his design of the Super Wonder Wedge. The Super Wonder Wedge is an extruded aluminum joint construction device that is used to manufacture knock-down furniture. According to Bricker, the extrusion is designed to be sold in kits so that different leg lengths, styles, and colors can be selected by the consumer. “The Super Wonder Wedge also allows for versatility and ease in assembly because it is a device that solidly assembles and locks together furniture without the use of either hand or power tools,” explained Bricker. “We plan to use the Super Wonder Wedge in the fabrication of our knock-down exhibit furniture.” Aluminum was used because of high strength, light weight, and durability. The judges decided to recognize this entry in the Structural/Consumer Category because of its exceptional commercial viability.

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The Transportation Category yielded no winning entries among the Professional Class; however, the judges were so impressed with a student entry that they decided to award John Dutton, a sophomore majoring in industrial design at Purdue University in West Lafayette, Indiana, with the Transportation Category First Place Prize. Dutton designed the "Retractacycle" retractable motorcycle seat. The design allows for the rear seat to be retracted and stored under the front seat when not in use. "The motorcycle seat consists of two aluminum extruded pieces of chosen color, one for each seat," Dutton explained. "The pieces are designed to slide in and out. The tubes on the sides…are designed to mimic the exhaust pipes running along the bike." The extruded pieces are then fitted with leather seat cushions. The back seat, when retracted, is pulled out with a rear handle and then clipped into two separately formed latches to hold it in place. "This student's design is one that deserved to move up to this level," commented Rosario. "This is a great marketing idea offering a very practical application."

The judges also awarded an Honorable Mention to an entry that they felt deserved recognition. Andrzej Korbel and Wlodzimierz Bochniak of the Department of Structure and Mechanics of Solids at AGH University of Science and Technology in Krakow, Poland, received recognition for their work in developing Ultrafine Grained Products Extruded from Aluminum Alloys. The KOBO process, as it is known, is a patented extrusion process that was developed by Korbel and Bochniak.

"The KOBO extrusion process provides the capability of extruding hard alloys at room temperature by creating friction at the die in order to produce fine grain products," explained Benedyk. "The KOBO process is an emerging extrusion process with great potential for the industry. The process has been successfully applied to the extrusion of aluminum and copper alloys with the surprising results of extrusion force reductions of 40 percent and more," noted Benedyk. "This process could change the future of extrusion," commented Competition judge Bruce Kasten.

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Students Shine in the 2005 Competition

Seventy-six of the 99 entries were submitted from students studying design and engineering at colleges and universities around the world. “The student entries were outstanding in conception as well as in presentation of their ideas,” noted Benedyk. “One day in their role as product designers and developers, the lessons learned here will be applied to the real world.”

Three designs were chosen as winners in the Student Class. First Place, with a $3,000 cash award was presented to Diogo Mangas for his design of the Ramp XY. Mangas, a senior studying industrial design at ESAD, Escola Superior de Artes e Design, in Caldas da Rainha, Portugal, designed the aluminum extruded ramp “to solve some of the problems experienced in those places where vehicles have to cross difficult obstacles.” The ramp comprises several extrusions of different shapes and dimensions that combine to form a large number of ramps. Mangas explained that the ramp was designed to be articulate so that it can be used to traverse smaller obstacles such as wires, hoses, and doorsteps, as well as larger obstacles such as empty stairway spaces and other uneven surfaces. “This design is a very practical application for solving a problem,” commented Kasten.

Second Place in the Student Class, with a $2,000 cash prize, was awarded to John Paul Gucciardo, a junior studying industrial design at Dawson College in Montréal, Quebec. His design of an extruded aluminum computer mouse in an array of anodized colors intrigued the judges. “It integrates design and new technology,” explained the designer. “It allows for a unique styling and may last longer than plastic.” “With the trend in the computer industry towards aluminum products, this extruded mouse would fit right in,” noted Rosario. “Wow! What a great idea,” commented Kasten. “While the

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idea of a computer mouse is not revolutionary, the application for aluminum extrusion is a concept the technology world should incorporate. The pizzazz this product offers combining extrusions and bright colors is consistent with marketability concepts currently employed by the computer industry."

Third place in the Student Class, winning a $1,000 cash prize, was awarded to David Rivera, a third-year industrial design student at Dawson College in Montréal, Quebec, for his design of the MiniBrite Task Light. "This new concept uses the rectilinear qualities of extrusion to enhance the overall aesthetic appeal of the final product and to create a retractable sliding mechanism," explained Rivera. "Using the extrusion process also simplifies assembling and reduces other costs related to secondary operations." The light is designed to be energy efficient by using recycled aluminum and using LED (light emitting diode) as a light source, which greatly reduces energy consumption, according to the designer. Rosario sees potential success with the design and offered some marketing advice. "Maybe the second and third place winners should get together and bundle their products to the computer industry," he remarked.

The Sustainable Design award, established by Hydro for the competition, recognizes the student entry that best addresses societal and/or environmental concerns. "We were most impressed by the overall quality of the entries," commented Lynn Brown, Vice President of Communications and External Affairs for Hydro Aluminum North America in Linthicum, Maryland. "The selection process this year was significantly more challenging. In the end, four entries stood out—both for the way they addressed sustainability issues and the originality of the applications and the design solutions." For those reasons, Hydro chose one winning entry and three entries worthy of Honorable Mentions.

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Jared Crooks, a senior mechanical engineering student from Ohio University in Athens, Ohio, won the Hydro Sustainable Design Award, earning $2,000, for his design of a Mobile Sediment Pond Barrier. "The aluminum extrusion design of the sediment pond barrier is the next step in sediment pond technology," explained Crooks. Lynn Brown agreed. "He has addressed the challenge of improving the runoff water quality around landfills. Today, cement walls are used as a sediment barrier. Jared's extrusion design is a portable, longer lasting, and more cost-effective solution. The grooves incorporated in the profile design enhance the sediment retention ability of the barrier," noted Brown.

Adam Bancroft, a graduate student studying industrial design at Purdue University in West Lafayette, Indiana, was recognized with a Hydro Sustainable Design Honorable Mention for his concept of a salmon ladder. The design provides several advantages over those made of concrete or wood, according to the designer. Aluminum offers reliable corrosion resistance and the modular, portable design allows the salmon ladder to be moved, taken down in the off-season, shortened or lengthened, or reoriented for more effective use. "This replaces permanent concrete structures typically used to provide access for salmon to their spawning grounds," commented Brown.

Paula Martins, a student studying for her Masters Degree at ESAD in Caldas da Rainha, Portugal, received an Honorable Mention for her aluminum container used for transporting and displaying fresh produce. The recyclable containers, consisting of two aluminum profiles and two plastic caps, can be easily assembled and stacked replacing single-use wood and cardboard containers. "The design and 'stackability' make this an effective merchandising system for produce at market," noted Brown.

Eric LaFay, a senior studying mechanical engineering at Ohio University in Athens, Ohio, was recognized with a Hydro Sustainable Design Honorable Mention for his

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concept of an extruded aluminum thermoelectric device. “The device joins two extrusions to generate or remove energy,” explained LaFay. “Cooling [is provided] without moving parts or refrigerant; power [is generated] by just having a temperature gradient,” according to the designer. “LaFay has designed a clever integral hinge assembly and uses the tight tolerances, thermal properties, and design flexibility of extrusion to create this pollution-free, energy-efficient device,” Brown remarked.

The ET Foundation 2006 International Aluminum Extrusion Design Competition will once again be open to professional engineers, designers, and manufacturers, as well as students. Details regarding the 2006 Design Competition will be sent to the aluminum extrusion industry and students early this fall. Winning designs from the 2005 competition, as well as previous contests, can be found at the ET Foundation's website at www.etfoundation.org.

The Extrusion Technology for Aluminum Profiles Foundation has been established for charitable, scientific, and educational purposes to develop, promote, provide, and fund education and research related to aluminum extrusion processes and technologies. For more information, contact the ET Foundation at 1000 N. Rand Road, Suite 214, Wauconda, Illinois 60084, USA. Telephone: 847/526-2010; fax: 847/526-3993; mail@etfoundation.org; www.etfoundation.org.

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