Student's Extruded Aluminum Solutions Enhance Our World

Winners of International Extrusion Design Competition

The Aluminum Extruders Council and the ET Foundation announced the winners of the 2013 International Aluminum Extrusion Design Competition, which was open only to student entries this year. A total of 12 students received recognition for their designs that creatively utilize aluminum extrusions. First, Second, and Third Place prizes were awarded, as well as Fourth and Fifth Place prizes for the first time due to the overall quality of the entries. In addition, the Sustainable Design Award and six honorable mentions were also awarded. The annual competition once again shows how design solutions for every kind of need can be addressed with aluminum extrusions. Winning designs included a semi-permanent solar-powered bulletin board, a new or retrofit lighting system for existing buildings, an emergency medical stretcher, a climate control system, an adaptable workstation for home construction, and a multipurpose shelter and water collection/filtration system for refugee camps.

Judging of the entries was performed by Todd Boyer, director of Sales and Marketing at Mid-States Aluminum; Craig Werner, principal at Werner Extrusion Solutions LLC; and David Asher of Bonnell Aluminum. The 2013 competition was sponsored by Sapa Extrusions North America and ALMAG Aluminum.

Figure 1. First Place was awarded for the Solarboard, a semi-permanent solar-powered bulletin board.

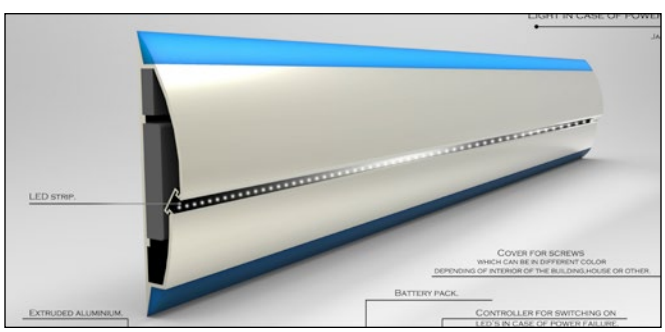

Figure 2. An emergency lighting system for use during power failures was awarded Second Place.

Winning Entries

Dominic Atibil from Purdue University was awarded the First Place prize with a scholarship of $3,000 for his Solarboard design (Figure 1). This semi-permanent bulletin board incorporates solar-powered LED lights to illuminate posters and information on the board, as well as provide a minimal amount of security lighting during nighttime hours. Atibil said he came up with the idea for Solarboard while walking across campus and seeing student flyers on the existing poorly lit sign areas. The design requires only seven parts, incorporating many elements into a single aluminum frame, such as a shelf and cavity for the solar panel and battery, groove for the LED lights, a slot for the end cap to fit in, a flexible joint to fit the frame to the cork board, and heat sinks for the battery. Extruded aluminum legs support the aluminum frame and corkboard.

"The Solarboard is intended for outside use, so aluminum was chosen as the material," noted Atibil, "because of its anti-corrosive properties. The ease of finishing is a manufacturing advantage of aluminum extrusion that lowers manufacturing and finishing costs. Other properties of aluminum were also advantageous, such as its formability, as well as its high strength-to-weight ratio."

The judges selected this design because of how it incorporates the use of eco-friendly aluminum along with solar power and LED lights. "I can see it on bike paths, in parks, and so on," said Boyer. "The design is really a snapshot of life today in 2013. It's self-sustaining and shows off the use of aluminum in a solar and LED lighting application."

Second Place with a $2,000 scholarship was awarded to Jasnic Milan at FUD Megatrend University in Serbia for his design of an emergency light in case of power failure (Figure 2). This system could be installed in stairwells or other potentially dark areas of new or existing buildings in order to provide lighting during power failure. According to Milan, the wall-mounted system would work automatically with a controller detecting when a power failure has occurred and switch on battery-powered LED lights. The system would be housed within a single extrusion made of 6061 alloy. "This design points the way to similar applications for existing handrails with these features built in," suggested Werner. "The market for this application is huge."

A $1,000 scholarship was awarded to the Third Place winner, Dajing Li of Purdue University, for her design of a two-in-one collapsible stretcher (Figure 3), which provides secure and stable transport of patients in out-of-hospital care situations. The design includes a foldable cart constructed of aluminum extrusions and tubes, as well as a separate stretcher comprised of extruded tubes and nylon fabric. The cart has S-shaped protective pieces that improve the stability of the stretcher, locking it in place when it is on the cart in order to make the patient feel as comfortable as possible during transportation. The cart can be folded down easily to save space in the ambulance. Aluminum was selected for its light weight, durability, and corrosion resistance. Judges appreciated the stretcher's dual-purpose design and its well engineered use of aluminum extrusions. "It's simply fabricated and joined to excellent utility," explained Asher.

Figure 3. A two-in-one collapsible stretcher.

Ryan Krauskopf of Purdue University was awarded Fourth Place with a $750 scholarship for his AirLam climate control system (Figure 4). The system uses convection heating and thus requires no external duct work, only a connection to a grounded three-prong outlet. "This makes it the perfect solution for locations requiring large scale climate control, but where series of ducts and vents are implausible, [such as] boats, RVs, cabins, and older structures," explained Krauskopf, noting that it can also be used in large open rooms up to 400 sq ft. The system can supplement full scale heating in the winter and reduce air conditioner usage in warmer months. Uniform extruded components allow many different lengths to be produced from the same tooling, saving production costs. Aluminum's excellent heat conductivity, light weight, and resistance to the elements allow this system to be utilized nearly anywhere. Anodizing provides a sleek look that can match various décors.

Figure 4. AirLam is a compact climate control system, adaptable to a variety of spaces.

Fifth Place and a $500 scholarship was awarded to Christopher Capen of Purdue University for "Architect," a portable workstation (Figure 5). "Anyone who has ever started a home DIY project, or has been to a construction site can tell you that a lack of space is more than just frustrating; it can be a hindrance to the entire project. This is where Architect comes in," explains Capen. Stored in a 3 ft long aluminum case, Architect can be quickly assembled with simple tools into a workstation with over 8 ft of space that can be configured to fit the user's needs. The height of the workstation can also be adjusted via four collapsible legs, which allow the system to be set up on rough or uneven terrain. Constructed from durable, lightweight extruded aluminum parts, the station is held together with a combination of galvanized steel bolts and fasteners. The system will never rust even in harsh environments, noted Capen. "The case forms the work bench, it has substantial structure to it, and it marries aesthetics, strength, and functionality," said Werner, discussing the ingenuity of the design.

A number of entries were recognized with Honorable Mentions, each of which will receive a $250 scholarship. These include Chloe Condon of Purdue Univesity for her Capture Cane; Robert Jewett and Atniel Quetz of Andrews University for their Custom Contour Furniture; Jessica Novitski of Purdue University for her Essuye outdoor bench; Zvezdan Nedelinovic of FUD Megatrend University for his Inculta Bench; and Gorana Nesic of FUD Megatrend University for her REwater hydropower mill.

Figure 5. Architect is a full workstation that fits into a 3 ft long aluminum case.

Sustainable Design Award

The Sapa Sustainable Design Award honors the entry that not only meets the four basic competition criteria of creativity, practicality, process improvement, and market potential, but also addresses societal and/or environmental concerns. This is the first time the award has been sponsored by Sapa Extrusions North America. The award with a $2,500 scholarship was given to Nicholas Desjardins of Dawson College for his Refugee Tent design, which provides temporary living space and safe drinking water for refugees (Figure 6). The tents are constructed of aluminum extrusions, glass-reinforced ABS connectors, waterproof canvas, and active carbon cloth. The stable structure and durable materials are designed to withstand harsh conditions for multiple years.

Figure 6. This refugee tent provides a water collection system in addition to shelter.

"The tent can easily be assembled alone without tools thanks to two similar extrusion profiles that can easily slide into one another, [and] every component fits into a 55 gallon barrel," explained Desjardins. The drum is then used to collect rainwater, which is processed through the carbon filter mounted on the structure's roof. The filter can also be removed to filter water from other sources. The judges appreciated that the tent kit is easy to transport and erect and provides efficient water filtering.

Honorable Mentions for the Sustainable Design Award with $250 scholarships were given to Dominic Atibil, Purdue, for his Solarboard (which also won First Place in the general category) and Cameron Sweeney of Purdue for his Focal Water Purification System.

Editor's Note: For more information on the International Aluminum Extrusion Design Competition, the award winners, and the Sapa Sustainable Design Award, visit: www.etfdesign.org.