



STOP! In the name of innovation. A Purdue student's design shows a new way for roadway safety signals.

Competition. Fellow Purdue classmate Shivangi Narke, a graduate student in industrial design, won first place for a traffic signal system previously considered outside the realm of either affordability or capability for the technology.

The designing duo are proving extrusion applications can be exciting, underscoring the momentum also inspired by the other student contestants in this year's International Aluminum Extrusion Design Competition.

The third place winners—a team of four students at University of Bridgeport in Bridgeport, CT also went the product route, with their inventive design for a miter brace for sheds. Students on that team included: Orlando Nunes, Timothy Trevor Smith, Scott Marrone and Valerie DiClerico, all juniors in the university's industrial design program.



If you build it, they will come. A shed as an open invitation to design innovation.

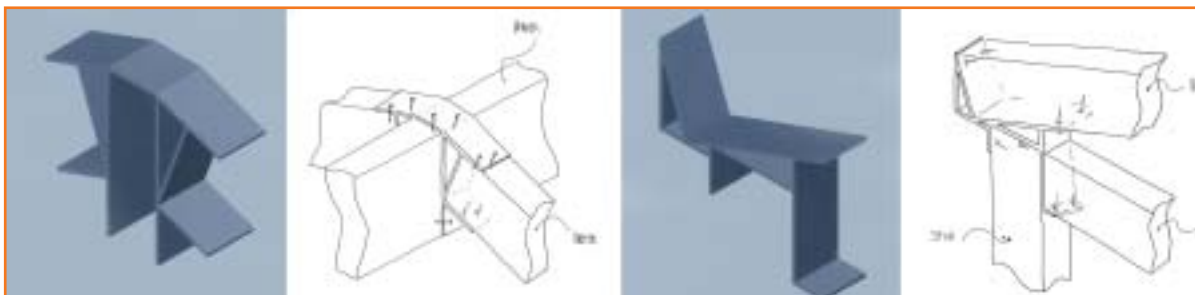
These innovative ideas could substantially extend aluminum extrusion design possibilities, their faculty advisors agree.

"The student's ideas have strong potential for the consumer market," notes Steve Visser, associate professor of industrial design at Purdue, and faculty advisor for the first and second place winners.

"Their innovation and creativity is certainly very inspiring," says Visser. "It's always amazing to see the concepts they create between what's important in their worlds and the relationship of extrusion to it." Other concepts that



STUDENT



Innovation Know-How: It takes a team to dream up some of the most creative ideas for aluminum extrusions. Here, a miter brace for sheds.

came out of his classrooms this semester included: a baseball bat, ball and glove rack, napkin holders, and salt shakers.

“The wine racks, for example, take full advantage of the complexity of design that can be created by extrusions,” says Robertson. The interesting shape of the cross-section and repetition created by its modular form give the racks a very modern, stylish feel. The miter brace for sheds, solves the age-old problem of the construction project’s most difficult task: assembling a roof. The aluminum extrusion miters allow the roof rafters to fit together easily, making this complex task simple.

First-place winner Narke’s traffic signal is something that just now is popping up on the drawing boards of city planners, as new lighting technologies will allow the sleeker design.

Narke’s design involves creating a more aesthetically pleasing traffic light post. She says her goal was to streamline the typical traffic light post now found in urban centers to make it environmentally and architecturally more functional. Her minimalist design includes two extrusions connected by a plate, which offers extra stability. In her model, aluminum extrusion replaces the existing heavy and bulky hot-rolled steel posts found on most street corners. She selected aluminum extrusion through a process of elimination and found it provides ease in forming the shape of constant cross-section that is required in the design, along with flexibility of height, ease of assembly and the ability to customize for location.

A native of India, the Purdue graduate student’s idea was inspired through personal experience, and she’s set her sights on bringing it to market.

“I was driving with a friend and this traffic light was totally blocking our vision, plus the dangling wires were so ugly,” recalls Narke. “I said to my friend, ‘you know I CAN do something about this and I’m going to.’ And, she did. ■

structural stability. Solid profile 6xxx aluminum alloys lower cost and maximize performance. Factory anodized finishes provide dozens of quality choices to a low-cost housing market in great need.

The Smartframe home design integrates into a neighborhood with infinite flexibility in the plan and exterior appearance, allowing self-expression and community identity to emerge. The Smartframe concept could also be used as emergency shelter, disaster relief or military operations housing, due to its lightweight, reusable components. The modular layout offers more than 40 floor plans, with a typical three-bedroom home of approximately 1,440 square feet costing an estimated \$40 per square foot, after start up and initial tooling costs are amortized by mass production.



One of many extruded profiles used in the Sequoia 2-Post system.

Mobility Equals Freedom For Disabled of All Ages

Disabled persons now have the freedom to move comfortably from bed or couch to wheelchair and back again, whether home or away, thanks to first-place Co-winners in the residential category: Almag Aluminum, Inc., of Brampton, and Waverly Glen System, Ltd., of Concord, Ontario, Canada. This is much more than a helping hand. It's a freestanding extruded aluminum lift system for home health care.

The Sequoia 2-Post System vastly improves mobility for physically disabled children and adults. The lightweight, portable and adjustable freestanding lift and transfer system for home use is strong enough to lift 400 pounds, yet small enough to be carried by one person and fit inside the average car. Sequoia's strength and versatility enables physically challenged people to travel, camp and vacation at will. Importantly, Sequoia also saves the prohibitive expense of purchasing and installing a permanently mounted lift system in one's home.

Sequoia's designers devised this system using 13 different aluminum extruded profiles, totaling 31 parts. Designers pushed the extrusion envelope by addressing more than 40 points of contact over two key profiles: the system's top and bottom tracks. The strong, lightweight tracks are manufactured to tight tolerances to allow the trolley to run seamlessly between each profile and maximize system



The Sequoia 2-Post lifts and transfers patients with ease.

stability. Twist, straightness and bow on both profiles is extremely tight, so that one profile slides inside the other over a 66-inch length, allowing profiles to easily extend up to nine feet in length. Satin clear anodized alloy 6005 provides needed strength, yield, tensile, and an appealing finish. Waverly Glen senior designer Mark Chepurny notes, "We relied heavily on Almag Aluminum's expertise throughout the design process and we refined components, based on their suggestions."

One home healthcare worker can safely and quickly set up the Sequoia without tools. If a client no longer requires assistance, the Sequoia disassembles for use by the next patient. The system adapts to many environments, adjusting from seven to nine feet high, and from six-and-a-half to nine feet wide, with set-up capability on uneven surfaces, since the posts can be independently leveled. The portable Sequoia is also ideal for hospital use, setting up around a disabled patient's bed upon admission, and storing easily when a patient is discharged.

Ingenious "New Wave" Spins Truss Design on its Ear

Another winning innovation in the commercial sector uses complex extruded web sections to form the New Wave Truss by Total Structures, Inc., of Ventura, California.



New Wave Truss presents limitless visual possibilities.

These eye-popping webs of light offer exciting alternatives to the standard aluminum trusses of old, offering aesthetic qualities in chords and structure never seen before. The range of colors, textures and branding opportunities is limitless. "There simply is no other truss on the market which allows this much flexibility in appearance," designer Peter Hind asserts, "Our greatest demand is primarily in the exhibition market for trade shows. The system is also extensively used in retail, corporate and entertainment markets."

Designers at Total Structures teamed up with an OEM composite manufacturer to develop an aesthetically pleasing truss structure in an array of finishes. Truss diagonals cut on an angle, and perpendicular end frames are formed from an extruded plate. The complex extrusion is a cost effective way to produce shear webs in the truss, and can also be cut using "electrical discharge machining" (e.d.m.) to incorporate logos directly into the truss.

The aluminum New Wave, or A-Wave is Total Structures' anchoring product line. Its aluminum chords with extruded plate technology are considered the most cost-effective, versatile modular truss available.

Attractive Form and Function Sets Roof Rail Apart



Erbsloeh's extruded roof rail is an attractive streamlined design.

The International Aluminum Extrusion Design Competition's Grand Prize Winner is a rounded extrusion profile from Erbsloeh AG, Germany, forming the roof rail in lightweight automotive body space frames, such as the prototype for Daimler-Chrysler AG. The KTL-coated and painted roof rail is extruded to extremely tight tolerances suitable for laser welding. The rounded component offers uniform, even surface topography, avoiding the pitfalls of an orange peel surface or grooves created by previous cold working methods. The rail reinforces the lightweight automotive body concept that is crucial to reducing fuel consumption.

The sleek aluminum roof rail design is extruded using the rounding method, realizing the material's full formability. Prototype roof rails have been manufactured in which the reflector foot and sun cover are hydroformed with ease. Precise component tolerances are met by rounded components with consistent radii. Rounding allows the extrusion to become a visible and elegant design element of structural components, such as laser marking of the Mercedes Benz logo on future cars with glass roofs.

Extruded End Cap Embraces Nuclear Power

The competition's first-place industrial winner is Sudal Industries' end-cap for uranium rod holders used inside nuclear reactors. This extruded aluminum end cap takes on a key role in making these uranium rod holders a safe haven in a potentially volatile environment.

By using aluminum extrusion, rather than the previous low-pressure die casting method, this essential part can be produced with high dimensional accuracy at a drastically reduced cost per piece, offering higher productivity, sound mechanical strength, porosity and shrinkage-free recovery, and no machining required for a smooth surface finish.

Aluminum alloy 5052 is the non-heat treatable alloy required for this end use, offering consistent, uniform strength and finish from piece to piece. Reliability and structural integrity are always of critical importance in nuclear power equipment.



Extruded end cap cradles uranium rods in a nuclear reactor.

Suspension Link Lightens Up Lincoln Town Car



Extruded suspension link revs up performance.



In the transportation category, Kaiser Aluminum, of Ontario, Canada's winning automotive application is an extruded aluminum suspension link for Tower Automotive, featuring weight reduction and improved suspension performance, currently in production on the Lincoln Town Car. The unique suspension link design possesses high strength-to-weight ratio and corrosion resistance.

An extruded 6061 T6 multi-void hollow design coupled with friction stir welding produces a two-piece component with a single weld that is 27 percent lighter than the previous steel design, with higher tensile strengths, higher fatigue testing, improved suspension performance, and overall, a more cost-effective suspension system. ■

For more information on Aluminum Extrusions, contact the Aluminum Extruders Council: 847.526.2010; Fax: 847.526-3993; email: mail@aec.org; <http://www.aec.org>
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