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Impressions

SunMate, Pudgee & FIPS specialty cushion materials

Dynamic Systems, Inc.

Spring/Summer 2004 Vol. 12, No. 1

Inside: Special Offer on Discount Sculpture Foam

Great for art projects ◆ industrial design ◆ model-making ◆ theater set & prop building ◆ holiday props ◆ puppetry ◆ costume design ◆ furniture design ◆ sculpture support ◆ architectural applications ◆ archery targets ◆ building blocks for kids ◆ and more!

Student Explores the Potential of Pudgee

Shaun Modi, a student in the industrial design department at the **Rhode Island School of Design (RISD)** created a prototype for a lounge chair using a Pudgee ball for a course called "Material Potential." The objective of the course was to create a product or piece of furniture incorporating novel or unconventional materials. Shaun discovered Pudgee through the campus materials library and chose to use it for structural reasons, aesthetics and comfort.

Pudgee, a viscoelastic "memory" foam, is not springy and light like most furniture foams, but is a dense, solid gel-like cushion. It feels a little like dough, cool to the touch with a smooth surface that slides easily. It is extremely comfortable too which is one of the reasons why designers like to experiment with it in contemporary furniture designs, experiential flooring and wall padding.

The scale model in the photo shows the 2½" diameter Pudgee ball poking through the seat. The ball acts as a spring-like structural support and doubles as a cushion. Pudgee's unique cushion properties allow the chair to slowly compress under the weight of the sitter without collapsing. The dense, resilient cell structure of the ball supports the weight and returns to its original shape after the sitter stands.

SunMate and Pudgee cushions have appeared in several art exhibits featuring new and unusual materials applied in unconventional ways, from student exhibits at the Harvard Graduate School of Design and the Royal College of Art to major shows at the Museum of Modern Art and the Cooper-Hewitt National Design Museum. Dynamic Systems' Special Projects coordinator, Cathy Ramsey, is instrumental in assisting artists and designers with the technical details of making their cushion application concepts a reality. For more information on material application for the arts see www.sunmatecushions.com/art_projects.htm.

Photo courtesy of Shaun Modi

Modi uses unconventional materials like Pudgee and bright yellow tennis ball felt in this lounge chair design. Contact the designer: **smodi@risd.edu**.

Impressions, Dynamic Systems' newsletter, is published twice a year and is available to customers free of charge. It presents useful information on new product development, company announcements, project updates, product applications, and study results from product tests performed in-house and by other institutions.

Life Casting for Fashion Design

Marlietta Schock is president and owner of **Design Studios**, a gown tailoring service and a dress form design company in Snohomish, Washington. Marlietta has developed a method for creating custom dress forms for the tailoring industry and the home seamstress using Liquid SunMate Foam-In-Place (FIPS). The motivation to start her business came in 1989 when she was trying to find a wedding dress for herself. Marlietta had a difficult time finding a dress to fit so after much searching, she decided to make the dress herself. She bought a standard dress form at the fabric store, but discovered that the generic shape did not accommodate her individual features. She ended up making the dress without a dress form. After her dress was finished, she began tailoring gowns for other people. She discovered two important things in the process: 1) there is a consumer demand for custom dress forms that accommodate different shapes and sizes, and 2) repeated fittings and alterations required for making tailored clothing is awkward and time-consuming without an appropriate dress form – especially when sewing for yourself.

Marlietta began a quest to see if she could find either a dress form that matched her body or someone who could make one for her. When she couldn't find what she was looking for, she decided to take the initiative and develop the product herself. After consulting individuals from various industries on mold-making and reading how-to articles, she learned that the best castings begin with top-quality molds. She experimented filling these molds as a finished dress form in papier-mâché and fiberglass. She also began working with pourable foams. The first pourable foam she worked with, once set, was too rigid, shrank after coming out of the mold and became powdery with much use. The closest she came to finding what she was trying to create was a type of dress form called "Uniquely You". It was made of a soft foam, and it came with additional pieces of foam that could be layered on the form and a tight cover for reducing dimensions when reducing the size. Interested in having something similar in her product line, she continued her search.

A few years ago Marlietta got involved in a mentoring project with an area high school student interested in dressmaking. The project instigated a more extensive search for a "squishable" foam that would not shrink after molding, was more stable during the molding process, came in a range of hardness/softness, and was durable enough to withstand constant pinning and manipulation by the tailor. Marlietta found someone at an engineering lab in Millcreek, Washington who told her about Liquid SunMate FIPS. Immediately after a product demonstration, Marlietta knew she'd found her custom dress form material.

Marlietta contacted Dynamic Systems, and technicians helped her determine the appropriate formulations and number of FIPS units required to fill a full-size body cast at a rising pressure that wouldn't break the mold. After a few experimental FIPS pours, Marlietta refined her production process for making foam dress forms. Although she continues to produce papier-mâché and fiberglass dress forms as an option for her customers, she has been using FIPS ever since. She prefers the Liquid SunMate soft or medium formulations because the finished foam can be compressed to accommodate smaller size variations within a few sizes, and returns to its original shape when compression is no longer needed. She says that this is a rare quality she hasn't found in any of the other foams she's tried. It is also easy to trim and cover to create the finished dress form. Her favorite aspect of the custom dress form is that during the tailoring process, it only requires two fitting sessions with the customer because the forms are so exact.

Marlietta teaches a class on making dress forms. For more information or to order a custom dress form or gown, contact designstudios@hotmail.com or call 425-357-0713.

The beauty and functionality of Design Studios' custom dress forms is that they are tailor-made for fitting any individual body shape.

photos courtesy of Design Studios

Left to Right: prepping the plaster cast; back and front halves of cast; preparation for pour; foam mannequin immediately after mold is removed.

Directory Assistance

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Product Questions?
If you have an idea for using SunMate products, but are unsure of how to proceed; or if you have begun a project, and have reached a problem area, give the DSI technical staff a call. Our staff will help you determine the best material for your use.

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Low-Toxicity Fire-Retardant Tested in FIPS for Race Cars

Mark Whitney is a mechanical engineer and owner of **Performance Analysis**. His company designs and manufactures motorsports products, sports safety products and other performance-demanding products that require custom engineering. Along with projects like radiator design for dirt track cars and thermal control for NASCAR race cars, Mark also designs driver seat safety systems. He recently contacted DSI with an interest in using Liquid SunMate Foam-In-Place Seating (FIPS) for professional race cars.

Liquid SunMate is often used for molding race car seats of all varieties. Drivers like using the FIPS system because it creates a seat tailored to their individual body. A FIPS seat not only fully supports the driver, it adds stability and absorbs much of the car's vibration. Another benefit of using FIPS is that it alleviates driver fatigue.

One of Mark's criteria for the finished cushion properties – along with impact absorption, custom contouring, and support capability – was that it be safe for the driver in the event of a fire. DSI does not put fire retardants in its cushions because SunMate is inherently low in toxic emissions in a fire.

Top to bottom: FIPS insert after pour, after trimming, and fabric-finished.

What's New

SunMate has a low-toxicity fire-retardant additive option for meeting regulations that require the material to pass specific tests.

DSI happened to be testing its new low-toxicity fire retardant when Mark called to talk to Special Projects coordinator, Cathy Ramsey. Cathy explained to Mark that the new FR ingredient, when added to the FIPS seating system, did not detract from the cushion properties and the results of in-house fire tests had been very encouraging. Mark, open and enthusiastic about trying promising new products, decided to use the FIPS system with the trial FR ingredient. He photographed the different stages of fabrication shown here. For more information about Performance Analysis, visit the company web site at www.perf-analysis.com.

Premium SunMate: Odd Sizes

SunMate cushion material starts as a large block, 36" x 82" x 12", which is trimmed down to customer order specifications. DSI often fills requests for custom sizes which result in first-quality trimmings in miscellaneous block sizes or non-standard cushion sizes. This material is still useful for many applications and is being offered to customers. Call for pricing and more information.

1970 SunMate & Pudgee production operates out of home in Leicester, NC.

1988 7,000 sq. ft. factory & office space constructed.

1994 3,000 sq. ft. administrative office addition built.

2000 First construction stage (3,600 sq. ft.) of Morrow Branch production facility completed.

A Business Close to Home

Dynamic Systems, Inc. has been fortunate to experience steady growth over the last 37 years, and in that time has been virtually unaffected by a fluctuating economy. The company attributes its strength and longevity to consistent product quality, personalized service and guaranteed customer satisfaction. Charles Yost, aeronautical engineer and founder and director of the company, built his business by reinvesting profits from sales into R&D, streamlined production, and new construction. Employees have been a major contributor to DSI's success as well. Hard-working and dedicated, some of the 30 employees have been with the company for more than 20 years.

DSI's specialty is the manufacture of viscoelastic polyurethane cushion material. Yost intentionally keeps the size of the company small to accommodate niche markets which demand technically specific requirements. Developing close relationships with its customers helps DSI to tailor the product to the application. The appeal of the various cushions manufactured at DSI can be attributed to their highly specialized support properties and versatility.

A Brief History of Construction

Yost started his company from a garage basement in Asheville, NC, in 1967. In 1970, he moved DSI to Leicester, NC, and hired his first employees. Still working out of his home in an adjacent lab built for production, Yost had to remodel several times to create more office space and increase production area as the business grew. In 1988, DSI had saved enough money to build its first dedicated, 7,000 sq. ft., manufacturing facility.

2004 Second construction stage (4,500 sq. ft.) of Morrow Branch production facility completed.

After 20 years, DSI had established a loyal customer base, and business continued to grow even with very little marketing. In 1993 DSI built a 3,000 sq. ft. addition to the factory for administrative space. Three years later, Yost began planning for the future of the company so it could continue to thrive beyond his retirement. The need for growth was already present with the current facility operating at capacity. DSI bought several acres of land near the original factory and in September of 1996, broke ground for a 24,000 sq. ft. expansion. The first construction stage of the new facility was completed in 2001.

Facility Expansion Update

The second major stage of construction was completed this year. The production office has been carpeted and painted and the office furniture has arrived. Bathroom fixtures, linoleum and lighting have been installed and a temporary break area is in place. On the production floor, ventilation and heating and cooling systems have been installed.

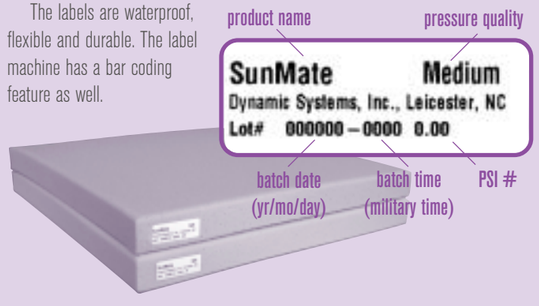
The factory is expected to be manufacturing cushion materials when the third stage of construction begins later this year.

New Cushion Labels

In May Dynamic Systems began a new labeling system for its cushion inventory. Now, every cushion shipped has a vinyl label adhered to it displaying important product information accessible to the customer at a glance. Each label shows:

- **product name**: e.g. SunMate or Pudgee
- **lot number**: indicates date and time cushion batch was made
- **PSI number**: indicates cushion's pressure reading
- **pressure quality**: e.g., soft, medium, firm
- **name and location of manufacturer**

The labels are waterproof, flexible and durable. The label machine has a bar coding feature as well.



Congratulations Akron!

The team of mechanical engineering students at the **University of Akron** finished second in this year's Midwest Mini-Baja competition. Racing teams, like Akron's, have been using SunMate and Foam-In-Place Seating (FIPS) since 1992. They specify SunMate cushion material for its impact and vibration absorption properties. Each driver molds his own custom seat using FIPS. This improves driver comfort and stability which can make a difference in performance. The main objective of the engineers in this competition is to design, budget, build and race their vehicle to out-perform over 100 other teams that participate. DSI enjoys working with the teams. Their feedback on material performance is a valuable asset.

Alternating Pressure Relief Wheelchair Seating

In the Spring/Summer 2002 issue of the company newsletter, DSI first reported the results of a study performed by the Calquhoun Foundation Center for Rehabilitation Research. The project aimed to design, fabricate, test, clinically evaluate and commercialize a seating system that would allow people suffering from decubitus ulcers (pressure ulcers) to sit up all day, every day, while encouraging the ulcers to heal. The resulting product is the patented Alternating Pressure Relief Wheelchair Seat (APRWS).

The Need for Pressure Relief

Disabled individuals suffering from decubitus ulcers (pressure ulcers) in their buttocks are compelled to lie down as much as possible for the healing process to take place. This relieves the seating pressure that cuts off blood and lymph flow towards the ulcers. A quadriplegic has an additional problem since the shearing stress on the surface of the ulcer, caused by the tendency of a disabled person to slide forward while sitting up, cannot be relieved by pushing up on the arm rests.

There are, however, mental and physical drawbacks to long-term bed rest, which has also not been very successful in healing large and deep pressure ulcers. It has also been noticed that long-term bed rest can give rise to additional pressure ulcers on the right or left trochanter areas because the patient is lying on his side in order to remove pressure on his buttocks.

How Alternating Pressure Relief Works

The APRWS system consists of a seat of six slats, each lined with SunMate XX-Firm cushion material and a layer of waterproof fabric. The system is designed to ease pressure points in the seat by periodically raising and lowering the slats electromechanically. By lowering a slat, seating pressure is reduced for short blocks of time, allowing the blood to be restored to the capillaries. Peak pressure time is reduced as well.

The APRWS system completely removes seating pressure by lowering each slat, one at a time, for a duration of 4 to 10 seconds. The cycle of sequential lowerings repeats every 3.5 minutes. In every cycle, the pressure relief starts in the front of the seat and moves to the rear. This provides a massaging action on the undersurface of the thighs and buttocks of the seated individual, from the distal to the proximal portions of the buttocks. The movement of blood from the capillary bed toward the heart is accelerated by skeletal muscle contraction, which "milks" the venous system. This action is diminished in a quadriplegic and the massaging action is intended to compensate. It is believed that this action stimulates the flow of blood towards the pressure ulcer allowing it to heal while the patient is seated.

Reducing Shear Forces

In addition to relieving seating pressure, seating shear forces are eliminated by a combination of methods. These include sloping the seat downward from front to rear, keeping the back of the wheelchair as nearly perpendicular to the seating surface as the disabilities of the seated individual will permit (The first human subject had scoliosis and a locked left hip joint.), and providing frictional restraining forces at the sides (wedged cushions) as well as on the back surface of the wheelchair.

Maintaining posture control while treating the effected areas helps accelerate the healing process. Disabled individuals suffering from large persistent decubitus ulcers under their ischial tuberosities who agreed to participate in the testing of the system have proven that the treatment method works. In each instance, the individuals who participated in the tests were well nourished and well cared for. The seating system was used as a supplement to conventional medical treatment and is not intended to overcome the effects of poor nutrition and poor wound care. For more information about the latest developments and availability of the Alternating Pressure Relief Wheelchair Seat, contact Arthur Ezra at ezraaa@aol.com.

APRWS FDA Registration No. 3003497136. Patent Nos. 6557937 & 6676215.