

(Continued from the front page.)

## University Study

The statistical analysis involved the averaging of the pressure readings from all 24 sensors for each material tested. The materials were then ranked accordingly. All of the tested inserts were found to provide a measurable improvement in pressure relief. "...SunMate performed second best, with Pudgee being the material producing the lowest interface pressure readings on average."

Dimitris attributes the exceptional performance of the two foams to "their viscoelastic nature which provides a stable sitting-surface providing...a sufficient stress relief...for small movements."

He continues, "It has to be stated that the outcome of this study allows [one] to conclude which of the tested materials should be favoured by the clinical wheelchair seating teams. After all it is possible to express the overall impression that the two foams and especially Pudgee are a good choice to be used as a seat insert for this type of wheelchair seating system."

If you would like to know more about the study and the materials involved, or would like to obtain a copy of the findings, contact Dimitris P. Apatsidis at the following address:

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University of Strathclyde  
106 Rottenrow  
G4 0NW Glasgow  
United Kingdom

Good News!

## Ready for 2000

PC Services, Dynamic Systems' computer division, has been steadily upgrading the office computers to insure that they are Y2K compliant. The most critical systems to be upgraded — accounting, shipping and process control — are ready for the 21st century. Customers can expect their accounts with DSI to be in order when the year turns. All products will continue to be quality inspected before they ship, and will be shipped on schedule.

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The Dynamic Systems newsletter is a free, quarterly publication. It gives a firsthand look at new products, makes important announcements and offers a personal look at the people behind the products.

If you or a friend would like to be on our mailing list, just give us a call.

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# dynamic systems

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## University Study

### SunMate & Pudgee Show Highest Pressure Relief

Dimitris P. Apatsidis, a student in the Bioengineering Unit at the University of Strathclyde in Glasgow, presented his graduate thesis this past August. Entitled, "Study of the Effect of Various Materials on the Distribution of Seating Interface Pressure in Severely Disabled Wheelchair Users," this document takes a very detailed, scientific look at the effectiveness of selected seating products. For Dimitris, solving the problem of pressure relief represents only a small part of a greater goal. He would eventually like to expand the study to further research the causes of skin ulceration, so that improvements can be made in the quality and effectiveness of wheelchair seating systems.

### The Study

The ten patients involved in the study are severely disabled and confined to wheelchairs. Most suffer from neurological diseases like cerebral palsy. Members of this group were selected because they were at risk for developing pressure sores, and were already using the materials to be tested. The materials examined in the study included SunMate and Pudgee viscoelastic foams. To locate and accurately measure patients' pressure points, a pressure sensor mat with 24 pneumatic sensors and a Talley Pressure Monitor was fabricated especially for the study.

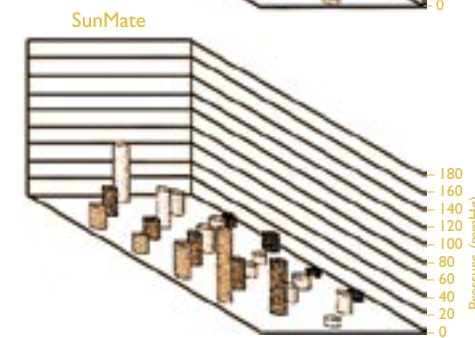
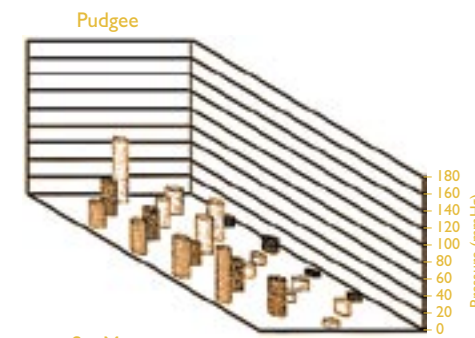
### The Process

Data was obtained for each patient by placing them in the wheelchair, first, without any special seating materials in place to obtain comparative control measurements. Then they were placed on each of the four materials to be tested, and data was recorded for analysis.

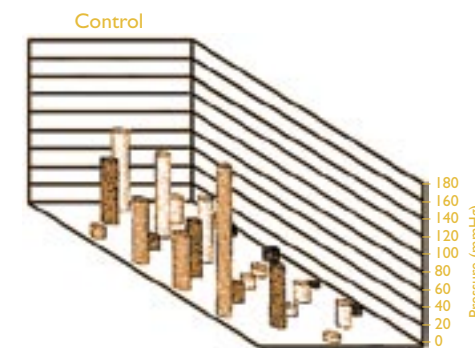
The study was thorough and tried to account for all the variables at play, such as: construction and placement of the sensor mat; positioning and individual condition of each patient; factors promoting tissue breakdown; and construction, dimensions and placement of the materials being examined.

### Conclusion

Dimitris states, "...though it was not possible to draw absolute conclusions on the value of the tested materials, because of the complexity of the data acquisition, it was certainly visible that the two foams, Pudgee and SunMate, showed the highest pressure relief."



"...though it was not possible to draw absolute conclusions...it was certainly visible that the two foams, Pudgee and SunMate, showed the highest pressure relief."



**FIGURE 1** The charts above plot the pressures experienced by a patient seated on a SunMate insert, a Pudgee insert and a wheelchair with no special seating. Each vertical column represents the location and reading of a sensor on the pressure sensor mat.

### 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.

### Directory Assistance

Tel (828)683-3523  
Fax (828)683-3511

Product Development  
Ellie Brown

Orders & Samples  
Vickie King  
Pam Price  
Toni Brignon

Foam-In-Place Seating  
Cathy Ramsey

Publishing Department  
Susan Carswell  
Leslee Kulba

(Continued on the back cover.)

## New SunMate Fire Coatings

### Aircraft Fire Tests Passed

- Zero After-Flame
- Zero Burn Length
- Virtually No Smoke
- Minor Gas Emissions

Fire tests were performed this summer on products used to make SunMate cushions fire resistant. The tests were performed in England for RD Aviation Ltd., who uses SunMate products in aircraft seating.

One test was carried out on medium-density foam samples covered with Nomex® (Type 455) knitted fabric. Six specimens were conditioned and tested in accordance with Civil Aviation Authority requirements. After 12 seconds of exposure to flame, the foam's average combined after-flame and after-glow time was 0.0 seconds, and its average burn length was 0 mm, with no drip.

A second test was performed on the fabric itself in accordance with the same requirements. In this case, the average combined after-flame and after-glow time was 1.3 seconds, and the average burn length was 21 mm, with no drip.

In conclusion, the samples tested met the requirements of CAA Spec 8 (Vertical Test) and FAR/JAR 25853a, Appendix F, Part 1.

#### In House Testing

DSI has found that using silicone, instead of glue, to adhere Nomex® to SunMate greatly improves a cushion's fire retardancy. In house tests, which apply a propane torch to a cushion for one minute, show almost no burning or damage to the SunMate cushion.

Nomex® is a registered trademark of DuPont.



## Seating Symposium

### Foam-In-Place Seating Instruction Offered

Dynamic Systems is preparing once again for their annual trade show appearance. Last year, Cathy Ramsey presented the Foam-In-Place Seating system with two North Carolina therapists. It went so well, that she will be doing it again this year for the 16th Annual International Seating Symposium. The conference, scheduled for February 24-26, will be held in Vancouver, British Columbia. The event is being sponsored by Sunny Hill Health Centre for Children, the University of British Columbia's Department of Continuing Education in the Health Sciences, the University of Pittsburgh School of Health and Rehabilitation Sciences, and RESNA.

Foam-In-Place Seating (FIPS) is a method of fabricating a custom-contoured, molded seating system for clients with mild to severe orthopedic deformities. Ramsey's instructional session will expose participants to Liquid SunMate (the raw material used to create custom seating systems), a description of the chemicals involved, health and safety issues, pouring and molding procedures, client positioning, covering options and the appropriate disposal of waste products. Full demonstrations of the mixing and pouring techniques will take place using course participants as clients. Several inserts will be fabricated during the session, using both the bowl and bag pack methods. Afterwards, DSI reps and therapists will field technical and clinical questions.

If you are interested in attending the symposium, or the FIPS workshop, you may call (604) 822-6156. Further details about the conference will follow in the winter newsletter to be issued in February.

## FIPS on the Move

### Report from the Field

#### South Africa

September 4-13

The Orthopedic Congress was held in Pretoria, South Africa for English speaking orthopedic surgeons (from the US, England, Australia, Africa, and New Zealand). Dynamic Systems' representative, Cathy Ramsey, was there to introduce Foam-In-Place Seating, and educate the surgeons who write prescriptions for patients' Medical Aid about the benefits of the seating system. She also gave a FIPS workshop for 21 therapists.

#### New York

September 8-9

A workshop was held in New York for 13 therapists at Oswego Industries, which provides vocational rehabilitation and training programs for adults with disabilities. Services provided by Oswego include need assessment, purchasing and manufacturing of assistive devices and technology, and training in the use of such devices.

#### Washington

October 4

While on vacation, Cathy scheduled a tour of Adaptive Engineering Lab in Mill Creek, Washington. A long-time customer of Dynamic Systems, AEL has perfected molding techniques with Liquid SunMate, and makes beautiful POSAfit Lateral Supports.

#### Louisiana

November 3-7

While visiting one of the largest medical trade shows in the country, Medtrade in New Orleans, our FIPS rep attended a class given by Greg Skolaski, OTR/ATP, from Gundersen Lutheran Medical Center in LaCrosse, WI. In his class, "Seating Needs of Individuals with Deformities Using Modular Components," Greg demonstrated a method he developed using FIPS with Metalcraft exterior pans and hardware for making a back insert. If interested in learning more about this technique, contact Greg at (608) 791-6227.



## Applications

### Light Plane Seating

It's an easy thing to take for granted. Inadequate seating often goes unnoticed until you're half-way through a 6-hour flight and you've suddenly lost the feeling in your back side, and your legs and neck have become stiff and achy. Long-term seating is a practical health concern, particularly in vehicles where constant vibration only adds to the level of discomfort. Pilots are among those willing to invest a little more in a high-performance orthopedic seat cushion made to counteract such conditions.

An article from the September 1999 issue of *Light Plane Maintenance* gives one reader's account of his experience with the uncomfortable factory seating in his Piper Comanche. The quest to find a more comfortable cushion eventually led him to Dynamic Systems' Laminar, a cushion composite made of SunMate and Pudgee. The Laminar provides the extra pressure relief needed to counteract extreme soreness and fatigue. The Pudgee layer molds to the contour of the body with very low shear force, while the SunMate layer underneath provides distributed support.

Most of the cushions Dynamic Systems makes for the aviation industry are treated with a fire retardant and/or covered with fire-resistant Nomex® fabric, adding a protective layer to a cushion which is already low in toxicity and doesn't readily burn in a fire. (See "Aircraft Fire Tests Passed," at left.)

In this instance, the proper cushion thickness and density were determined according to the pilot's weight. A standard-sized cushion was coated and covered with fire-resistant layers, and shipped within a week. The pilot did all the retrofitting himself. Overall, he seemed very pleased with the results. His only complaints were that the cushion was a bit heavy (5.5 lbs) and a bit pricey (just over \$90), but he feels it was well-worth the investment and comfort afforded.

Adapted from "SunMate Cushions," *Light Plane Maintenance*, Vol XXI, No. 9, Sept. 1999, pgs. 20, 24.



## FIPS Winter Climate Caution

### Crystallized Chemicals

As autumn progresses and the winter months approach, the temperature steadily drops. Cold temperatures can affect the chemicals in the FIPS packs, so check them thoroughly before use. If the containers feel cold, or the chemicals look thick, cloudy or crystallized, use the following heating instructions to bring the chemicals back to their original state. This insures easier mixing, and the best cushion quality.

#### Crystallized Iso

As Iso gets colder, it tends to form tiny crystals which make it react poorly. The Iso is not damaged by the cold, and should not be discarded. Crystallization can be easily reversed by following these steps:

#### For Crystallized Bowl Pack Iso

- 1 Loosen the lid and place the bottle of Iso in a pot of water that has been heated to 120-150°F. Heating at this temperature dissolves the crystals, removing the cloudiness.
- 2 Leave the bottle in the water for 10-20 minutes, until the Iso clears.
- 3 Take the Iso bottle out of the hot water bath. It must be allowed to return to room temperature before using.

#### For Crystallized Bag Pack Iso

Due to the foil packaging, it is difficult to tell if the Iso in the Bag Pack has crystallized. To insure consistency of the chemical during the winter season, it is always a good idea to soak the Iso section of the Bag Pack in a hot water bath before use.

To heat, simply follow the same procedure as for the Bowl Pack, submerging the Iso section of the bag into the hot water bath.

#### Cold, Thick Polyol

The Polyol may also become cold and thick during shipping. By placing the Polyol container in a hot water bath, you can bring it back to a consistency which is easy to mix and will result in the best cushion quality. Just follow the same heating procedure you would for the Iso.

#### WARNING

**Never heat Iso, or any of the FIPS chemicals, in a microwave, over direct heat or over an open flame.**

**Always allow chemicals to return to room temperature before using.**