Foam Cushioning

Twenty years ago, Ames Research Center conducted a research program aimed at improving crash protection for airplane passengers. One innovation developed by a contractor in that program was an open cell polymeric foam material with unusual properties. Intended as padding for aircraft seats, the material offered better impact protection in an accident and also enhanced passenger comfort on long flights because it distributed body weight and pressure evenly over the entire contact area. Called a "slow springback foam," it flowed to match the contour of the body pressing against it and returned to its original shape once the pressure was removed.

Initially marketed under the name Temper Foam®, the material has become one of the most widely used spinoffs from NASA technology. It is used for the applications originally intended, as aircraft and helicopter seat cushions for impact protection and fatigue attenuation. It is also employed as padding for furniture and for autos, trucks and offroad vehicles; in office chairs, dental stools and other types of seats that get long daily usage; as portable cushioning for travelers and attendees at the theater or sporting events; in a variety of athletic equipment, such as football helmets, body pads or chest protectors; and in a very wide range of medical applications.

Temper Foam was originally manufactured by a

company formed by the contractor's employee who had invented it, Dynamic Systems Inc. (DSI), Leicester, North Carolina. DSI subsequently sold the rights to the original formula but later returned to the slow spring-back foam field with different formulations. The rights for the original Temper Foam were acquired by Temper Foam, Inc., jointly owned by Kees Goebel Medical Specialties, Inc., Cincinnati, Ohio and AliMed®, Inc., Dedham, Massachusetts. DSI and AliMed have introduced a number of evolutionary innovations, spinoffs from the original spinoff.

DSI markets a line of orthopedic support cushions for reducing fatigue and improving circulation. They come in various sizes, thicknesses and pressure qualities under the trade names Sun-Mate, Pudgee and Laminar. Of particular interest is DSI's Foam-In-Place Seating (FIPS), developed primarily for severely disabled people to slow progressive deformities and to ease soreness and fatigue due to long periods in wheelchairs.

FIPS is a process wherein liquid Sun-Mate ingredients are mixed, poured and contour-molded to the individual's body and chair. At far left, a disabled child is leaving The Children's Hospital at Stanford Rehabilitation Engineering Center with a brand new FIPS chair; she is now able to sit for periods of 3-8 hours where her earlier chair caused her physical discomfort in as little as 15-30 minutes.

The photo sequence shows the step by step FIPS process at The Children's Hospital at Stanford. At upper left, opposite page, the Sun-Mate ingredients are mixed, then (adjacent photo) the mixture is poured into a plastic bag, which is used as a mold. At left center, seating specialists work with the patient and chair to be contoured to assure the most therapeutic body position. In minutes, the liquid forms and sets. After trimming, the seat is ready for upholstery. The final product is shown at left above.

In addition to The Children's Hospital at Stanford, other therapy/rehabilitation centers using the FIPS process include the O'Berry Center, Goldsboro, North Carolina and the Heinzerling Developmental Center, Columbus, Ohio. FIPS is also being widely applied in Canada.

AliMed, Inc. markets the original Temper Foam and a newer, fire retardant formulation called T-Foam™—which incidentally, is used in Space Shuttle seats. Both products are offered in several classifications of firmness and thickness for a great variety of cushioning applications, such as wheelchair cushions, bed pads, take-along portable cushions, seat inserts for any type of chair, cervical collars and operating table pads.

AliMed's foam materials are also used in many specialty items, for example, the T-Foam Pressure Wrap for reducing swelling in an injured finger; the T-Stick for padding splints and braces; T-Foam Hand Exercisers (top); and the Tennis Elbow Strap (above) designed to support forearm muscles and relieve pain. ▲

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