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**TECHNICAL  
CONSULTANTS**

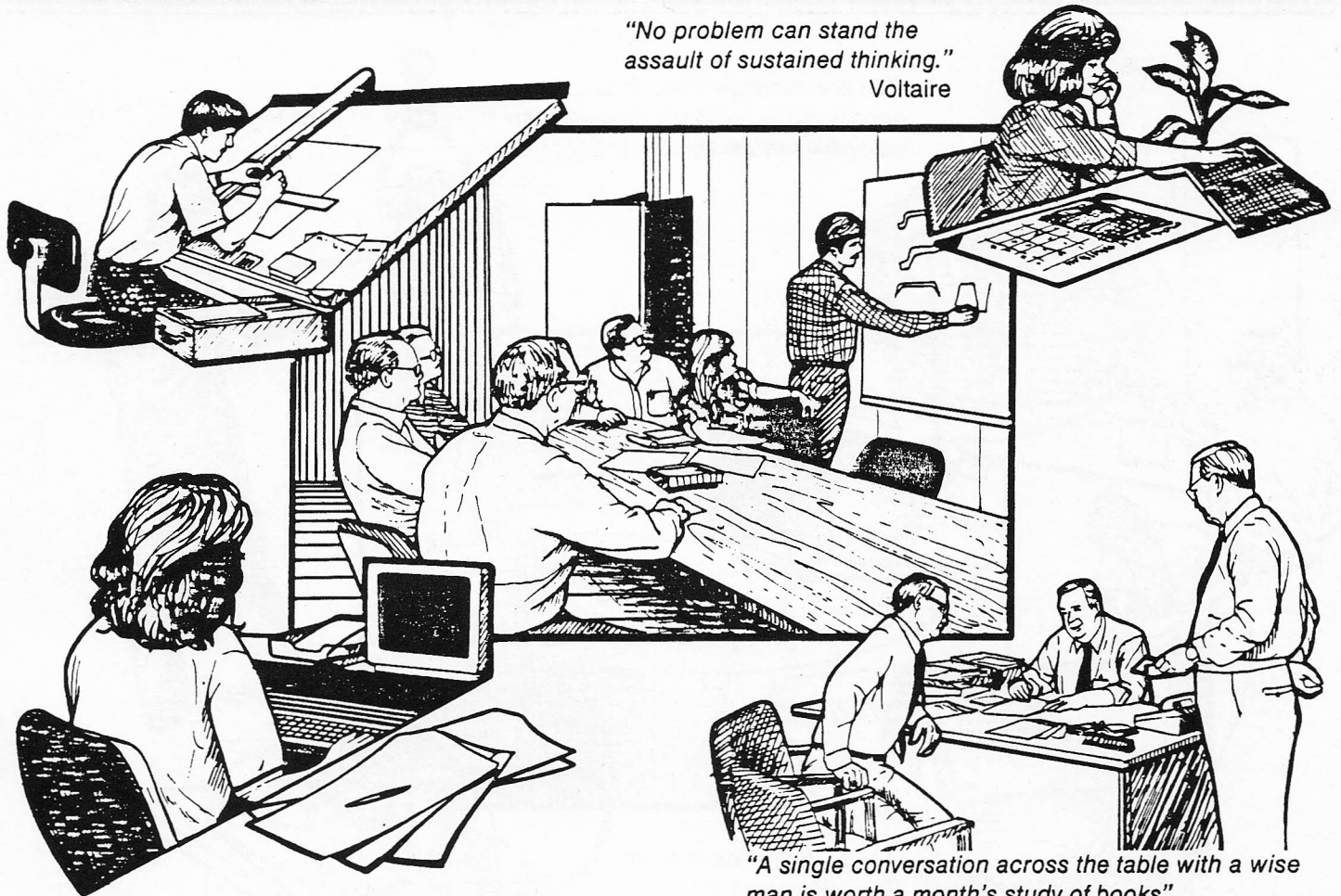
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**THE SNOW CORPORATION**

**OUR THINKING IS "PLASTIC".  
WE MOLD IDEAS.**

"No problem can stand the assault of sustained thinking."  
Voltaire



"A single conversation across the table with a wise man is worth a month's study of books"

Chinese Proverb

The Snow Corporation maintains high standards for personnel and product quality. Management has carefully developed a team of experienced people who study, design, plan and implement solutions to problems, projects and processes. This team approach consists of management, designers, pattern makers, mold builders, machinery builders, and plastic production people. Our team is well experienced in engineering, materials, tooling and fixturing, and production methods. The input from each team member's specialty helps to focus quickly on objectives, design methods, and solutions to sometimes complex problems. Experience has proven our team concept to be fast and efficient.

The team at Snow Corporation has served literally hundreds of companies in all kinds of industry and over many countries with its process techniques, mold-building expertise and machine building capabilities.

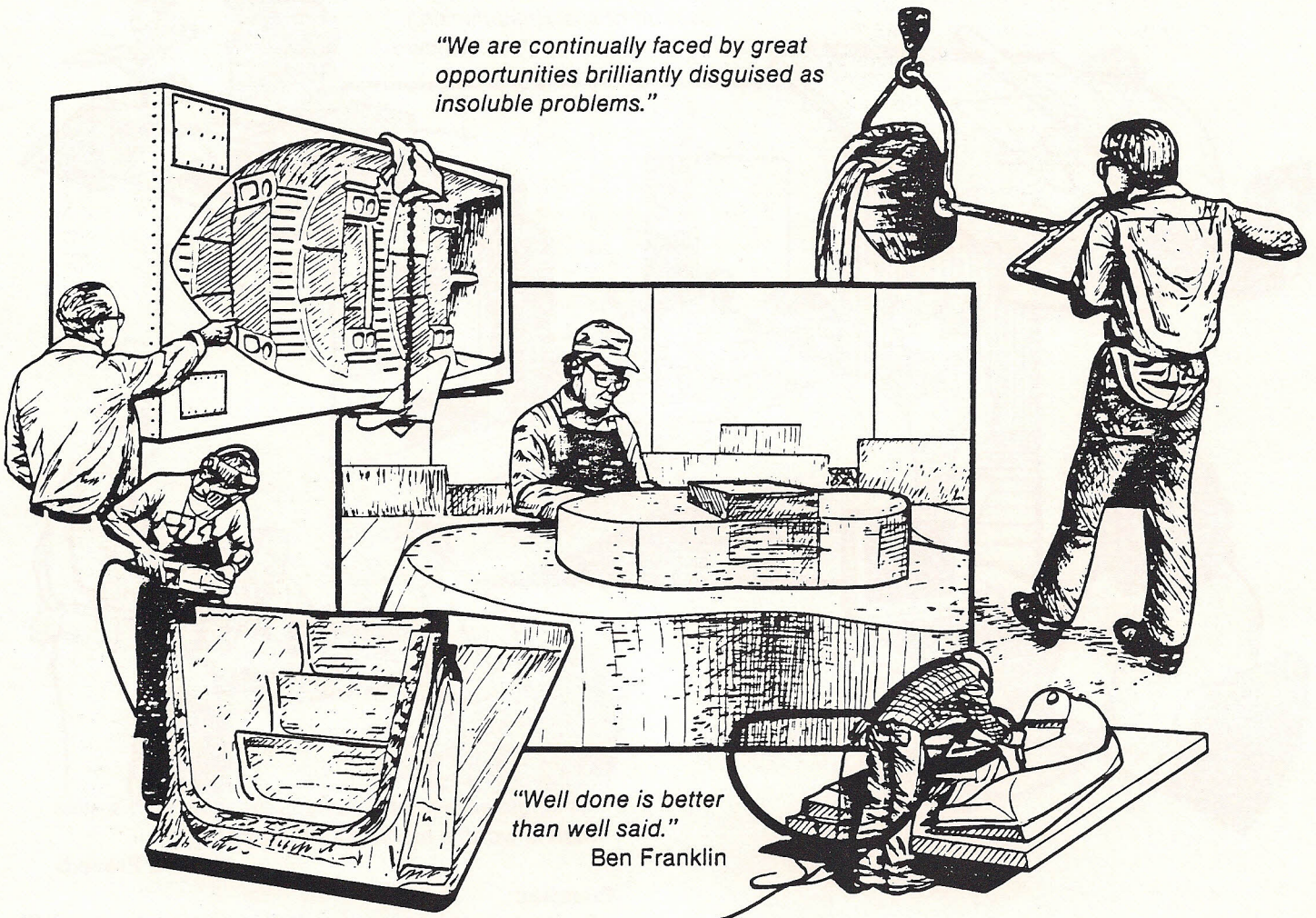
Examples:

- Design and produce pressure-formed furniture parts — U.S.
- Design and build molds and machinery for ice chests and water coolers — Mexico
- Design and build molds and machines for bath tubs and other plumbingware — Indonesia
- Design and build molds and machines for swimming pool steps, boats, and automotive parts — U.S.
- Build molds, presses and thermoformers for entire car bodies — Canada
- Design and build molds, presses, thermoformers for acrylic/fiberglass swimming pools — Canada
- Build RTM molds for seating (fiberglass) — U.S.
- Design and build molds and presses for RTM automobile parts (fiberglass) — U.S.
- Design and build forming machines for non-metallic honeycomb (aircraft) — U.S.
- Design and build aluminum forming machines (aircraft) — U.S.
- Design and build molds and thermoformers for pick-up bed liners — U.S.
- Develop forming methods for advanced composites, build molds and machinery — U.S., U.K.
- Build molds and machinery for deep draw soaking tub — Japan
- Design and build thermoplastic fiberglass mat pre-forming machines — U.S., Canada



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*"We are continually faced by great opportunities brilliantly disguised as insoluble problems."*



*"Well done is better than well said."*  
Ben Franklin

The success of all plastic products depends on the degree of accuracy required, the degree of esthetics required, and the economies of scale to be reached in production, and of course, the way they are sold. All products must start with a mold and the quality of the mold can most times either make or break the product. Many products are short lived because of decisions on the type of mold that may be the cheapest.

Our firm belief is that the best mold anyone can buy is always the cheapest although it may cost more than other alternatives. Money may be saved on a lesser cost mold, but you will generally pay for this decision in every part produced from it. The lesser cost mold may require more plastic material to run or it may require a considerably longer forming cycle which causes additional labor and machine time. If production time

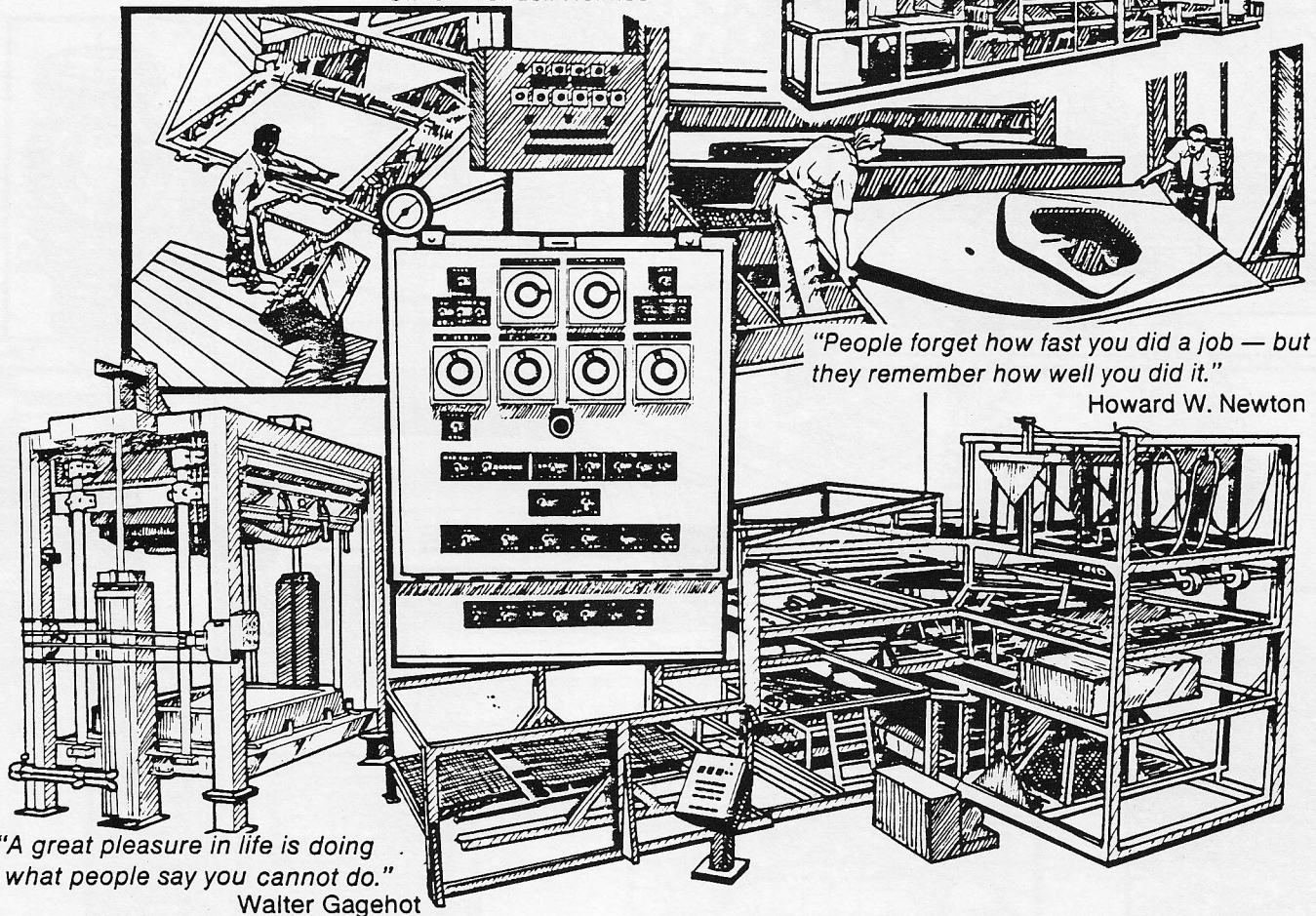
and cost have no relevance, generally market forces (customer or competition) will force you to contract for the best mold you can buy in order to reduce production cost to optimize profits.

Prototype molds for deliberate, short test runs are the only exception. Otherwise, we have seen the evidence over all our years that a quality cast-aluminum mold with either cast-in water lines or electrically controlled for high temperature thermoplastic forming will cost the least in the long run. At Southwest Pattern and Casting we use only the best materials, combined with our people's skills and expertise to make molds. There is no short cut. The design and building of a mold is very basic. It must be as good as man has the ability to make.



*"Man's mind, once stretched by a new idea, never regains its original dimensions."*

Oliver Wendell Holmes



*"People forget how fast you did a job — but they remember how well you did it."*

Howard W. Newton

*"A great pleasure in life is doing what people say you cannot do."*

Walter Gagehot

E.M.C. Machinery Division builds a full line of sheet fed Thermoforming Machines: Single Station, Double Station, 3 Station Rotary, 4 Station Rotary and most models are available with automated load/unload systems. Sizes range from 24"x36" with 10" depth of draw to 10'x20' with 4' depth of draw. Most sizes are available with any type of electric infrared heating system. All sizes beginning with 4'x6' with 20" d.o.d. and up are also offered with infrared gas heat systems, atmospheric, pre-mix and Power-Pulse\*. All sizes of E.M.C. Thermoforming Machines are also offered with twin-sheet forming capability. All sizes of E.M.C. Thermoforming Machines are offered with Pressure Forming Platens.

\*E.M.C.'s Power-Pulse infrared gas heat control system is the most energy efficient heating system ever perfected. Twelve years of Research and Development after the energy crisis in 1973 resulted in this system for which the company has patents applied for. This system has been approved by Industrial Risk Insurers.

E.M.C. Machinery builds in-line Roll-Fed Thermoforming Machines complete with in-line Die Station. Models are offered in either pneumatic or hydraulic powered machines.

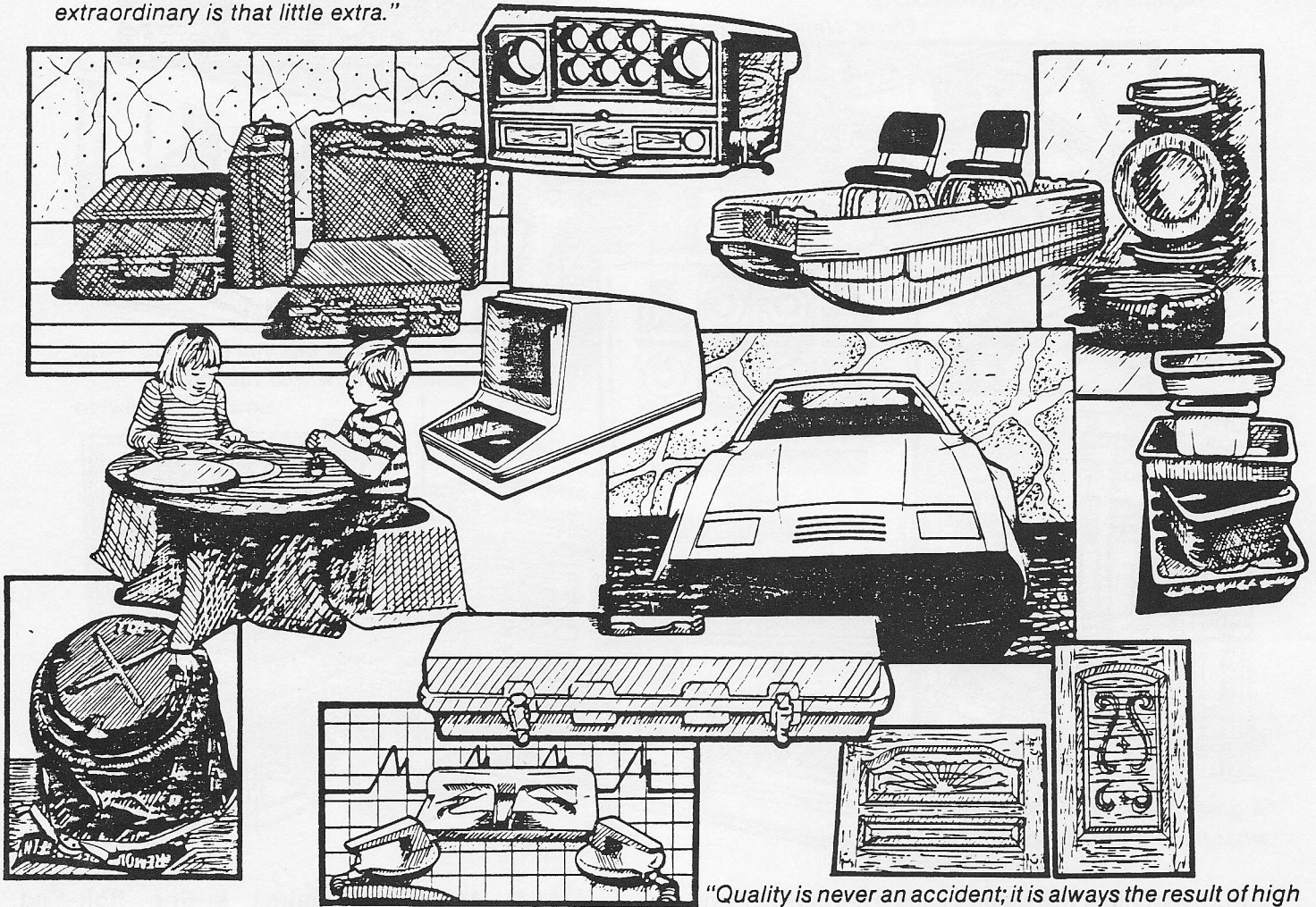
While the company has built a reputation on strong, dependable and long lasting Thermoforming Machines for the many Thermoplastic materials, it has also built a reputation for the same qualities in other special machinery:

Large Presses for RTM Fiberglass Molding, Super-Plastic Aluminum Forming Machines, Non-Metallic Honeycomb Forming Machines, Advanced Composite Forming Machines, Bladder Forming Machines, Thermoplastic Fiberglass Pre-Forming Machines, Spotting Presses, Automatic Trim Machines, Wrap Forming Machines

All E.M.C. Machines are built for quality and dependability and, with the operator always in mind, to be easily understood for operation and maintenance.



*"The difference between ordinary and extraordinary is that little extra."*



*"Quality is never an accident; it is always the result of high intention, sincere effort, intelligent direction and skillful execution; it represents the wise choice of many alternatives."*

Willa A. Foster

E.M.C. Plastics has one of the best equipped facilities to be found anywhere in the world. It has single station, double station, 3 station rotary and 4 station rotary for heavy gauge sheet forming up to 8'x10' and as deep as 42". It has roll-fed in-line machines in the thin gauge Packaging Department.

The division is experienced in production with every type of thermoplastic material. This includes Acrylic, ABS, Polypropylene, Polyethylene, Polystyrene, PVC, Polycarbonate, and high temperature - high strength materials such as Ultem. Whether the requirement is for deep draw, shallow draw, twin-sheet or pressure forming, E.M.C. performs with high quality and good service.

The large, well equipped Fabrication Department is staffed with experienced finishers who are particular to the needs of a customer whether it is for a finished computer housing, industrial housing, an instrument case or a complex aircraft or automotive part.

Care is given to every job to make sure that dimensions, colors and esthetics are correct. Quality Control is sensitive to customers requirements.

Customer Service is always available to answer questions on everything from job status to delivery information and is always quick to respond to the customer.



The Snow Corporation is located in Fort Worth, Texas in the lower mid section of the U.S.A. with excellent and plentiful air and ground transportation systems for shipping. Its 30 minute proximity to DFW International Airport is easily accessible to major airlines. Since our founding we have served customers in over 50 countries with machinery, tooling, technology and plastic products.



## THE SNOW CORPORATION

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• (817) 732-5554 • U.S. Wats (except Texas) 800-433-2108 • FAX No. (817) 737-3558

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The years of experience in the path of evolution of The Snow Corporation have uniquely developed a deep reservoir of technical manufacturing knowledge that is always available to serve its customers. Since the life of the company has been during the very years of more advancement in materials and technology than in all prior history of the Industrial Age, we feel fortunate to have been ready and able to make our contribution to the progress of manufacturing in plastic and we pledge that our team will continue to do so.

**Thermoforming Machines**

Sheet Forming: Single Station, Double Station, Rotary, Pressure Forming, Twin Sheet, Composites  
Roll Fed: In-Line Hydraulic and Pneumatic, Die Cutting. All types Infrared Electric, Infrared Gas

**Plastic Thermoforming**

Automotive, Aircraft, Industrial Components, Computers, Electronic Housings, Cases, Furniture, Seating, Plumbingware, Spas, Swimming Pools, Sports Products, Medical Equipment.

**Mold Building**

Complete facility for Patterns, Epoxies, and Cast Aluminum Thermoforming Molds, Matched Molds, Rotational Molds, Advanced Composite Pressure Form Molds. Single Mold Casting capability to 2,500 lbs. Matched Molds for RTM Fiberglass.



**THE SNOW CORPORATION**

"FULL SERVICE TO THE THERMOFORMING INDUSTRY"

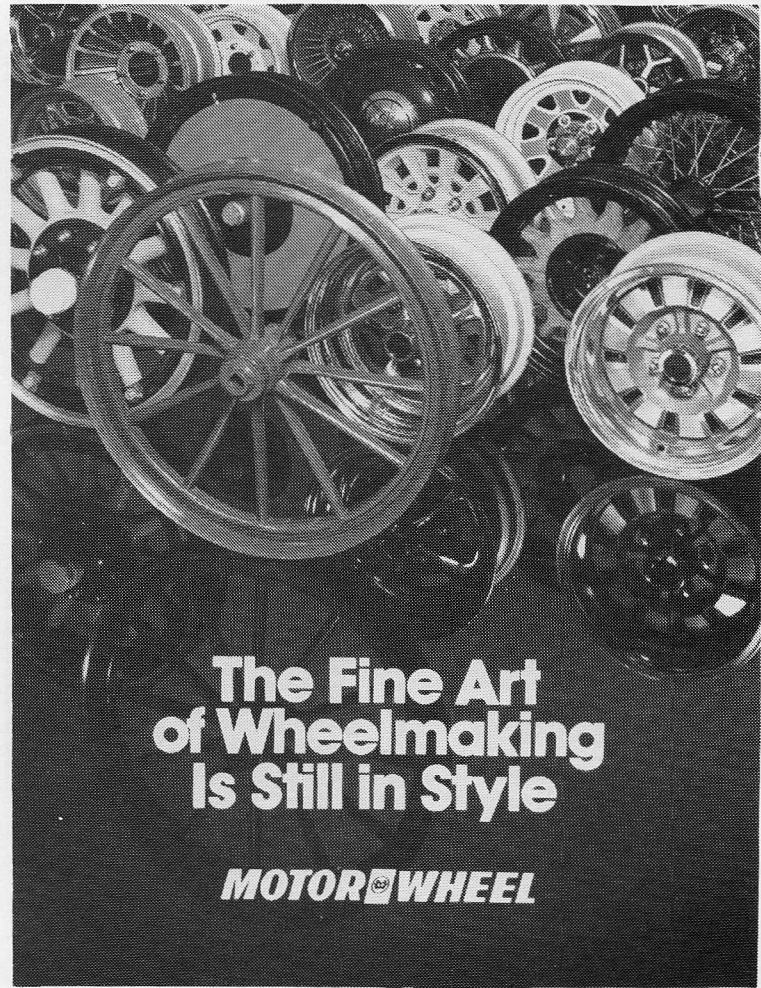
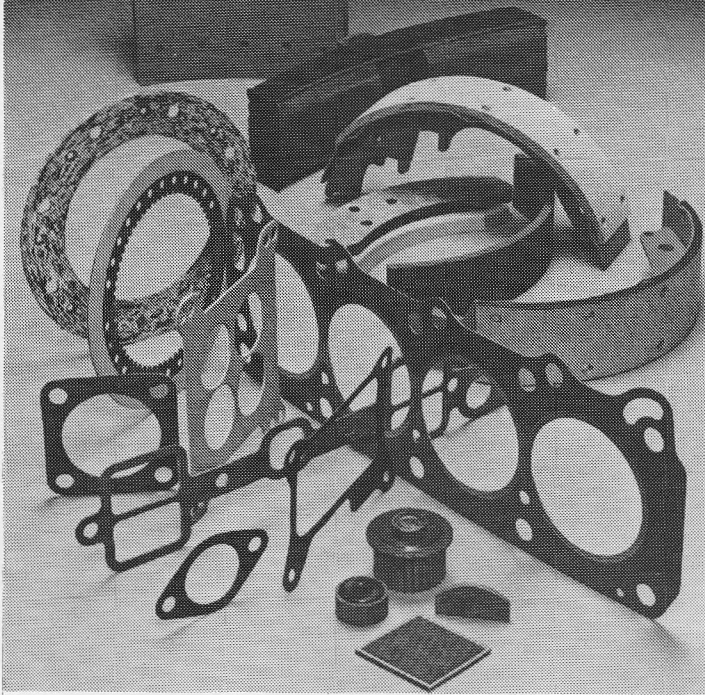
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**KEVLAR**  
aramid

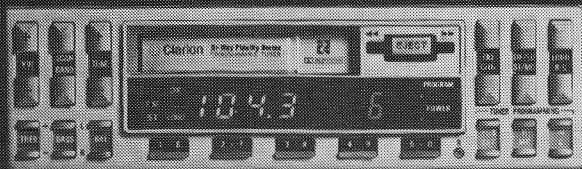
KEVLAR  
A Reinforcing  
Fiber Substitute  
for Asbestos



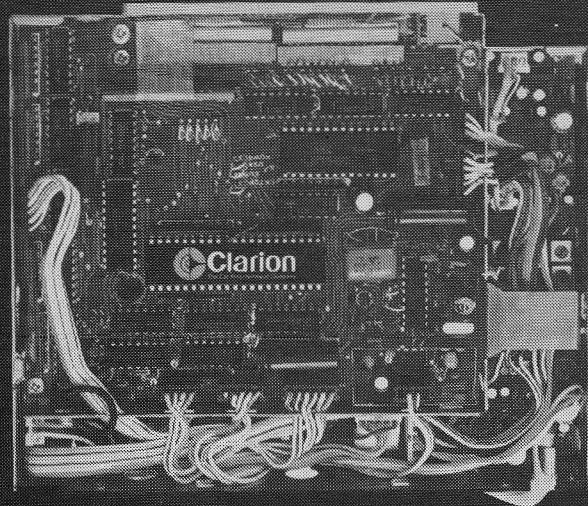
**The Fine Art  
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Is Still in Style**

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World's First Fully  
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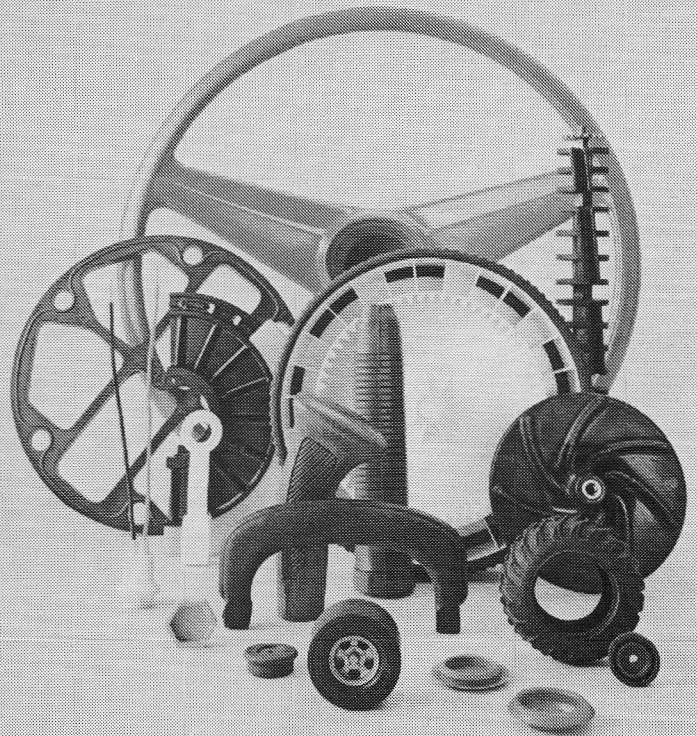


Car technology brings you the most advanced car  
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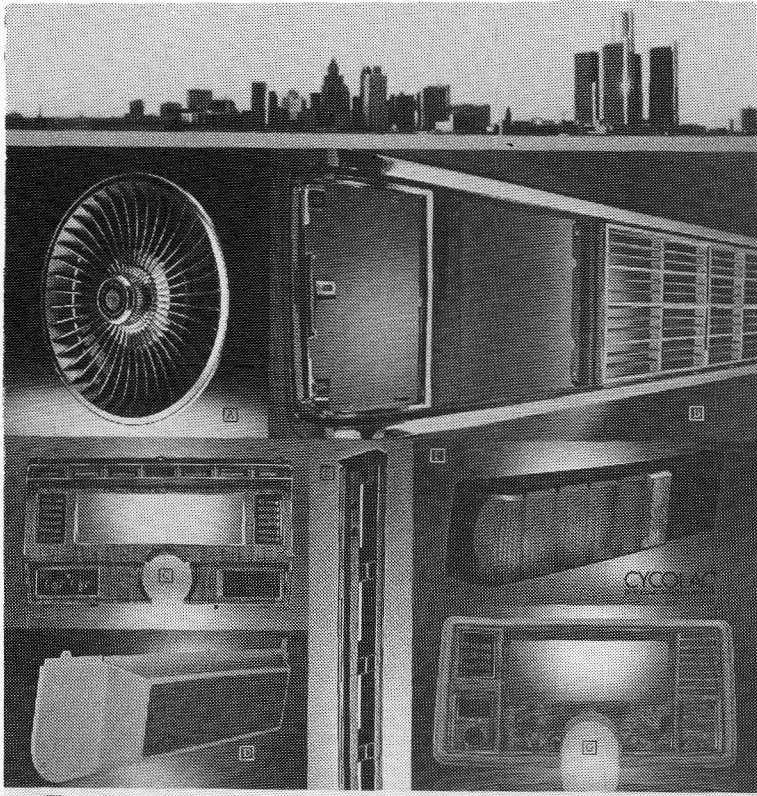


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- B. Cyclac® EPB reduced weight, gave better performance.
- C. Cyclac US/L appearance, processability, cost, heat polycarbonate.
- D. Cyclac X11 saved weight without saving toughness.
- E. Cyclac HBI, one way to get high impact and high heat.
- F. Cyclac AR, forward cost, robust rigidity, passability.
- G. Cyclac Z AB, more size, money than modified PPO.

© 1988, a registered trademark of Borg-Warner Corporation.

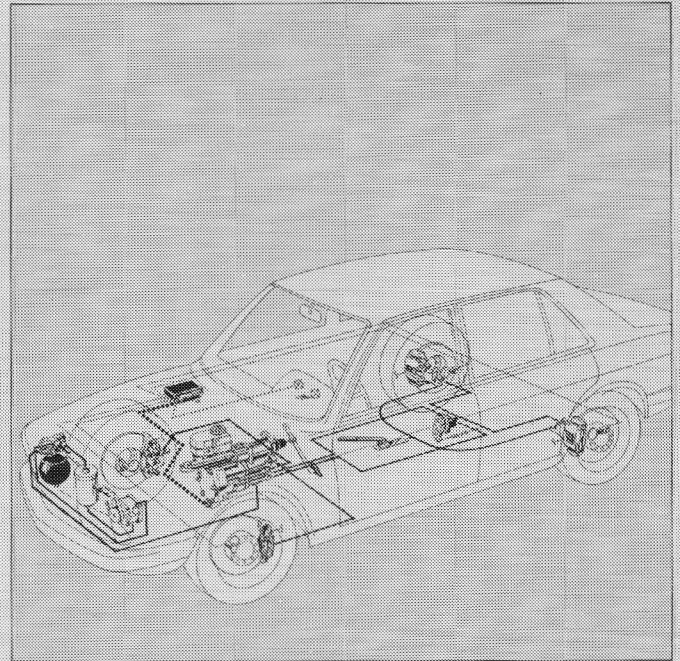


\*This is a registered trademark of General Motors.

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8th ESV-Conference – Wolfsburg October 21st – 24th, 1980  
SPECIAL ISSUE



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*South Wind*

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HEATER

STEWART-WARNER CORPORATION

Design News

Ideas for Solving Design Problems

"ODD JOB"

SELF-PROPELLED  
8/12V 24 VOLT  
SUPPORT UNIT

Polysulfone  
battery caps

# Universe Engineering Inc.

## *Design and Engineering Center*

Universe Engineering, a division of Vehma International Inc., and a Magna International company, is a vital link between vehicle concepts and the sound functioning of the ultimate automotive components or the vehicle itself. Located in Markham, Ontario, just north of Toronto, the Design and Engineering Center has the people and the equipment to serve the needs of the automotive industry.

An engineering, styling and experimental build facility located in the Detroit area enhances Universe Engineering's total vehicle capability. A unit of Vehma International, it also includes modeling in addition to sales and business management.

At the core of Universe Engineering is a dedicated team of talented automotive designers and engineers who concentrate years of worldwide expertise on every program. The company also draws upon the capabilities and resources of Magna International companies as well as suppliers to provide specialized product and process technology.

Universe Engineering is a Total Vehicle Design organization for both high and low volume production. Our people have extensive experience with a wide variety of vehicles—automobiles, trucks, vans, taxis, buses, four-wheel drive, cross-country, military as well as alternative energy and conventional power sources, including electric.

Universe Engineering has the latest in CAD/CAM/CAE equipment and features three-

dimensional modeling and sculptured surfacing. Our systems can be interfaced with those of our customers to provide efficient exchange of data. Our engineering analysis package provides the design team with virtually instantaneous analysis of designs to minimize prototype work.

As a total design and engineering resource, Universe Engineering's people have been divided into groups, comprising: Chassis Design; Body Design; Door System Design; Hardware System Design; Computer Aided Design; Computer Aided Engineering; Computer Aided Manufacturing; Computer Controlled Measurement; Prototyping; Testing and Evaluation.

Universe Engineering plays an integral part in the development of product programs ranging from individual components through complete assemblies to the ultimate vehicle. Our people work closely with the tooling and production experts of other Magna companies as well as with the specialists of our suppliers and our customers at all design and engineering stages. This action ensures that the programs are integrated with the overall needs, including high productivity in manufacturing and superior quality control.

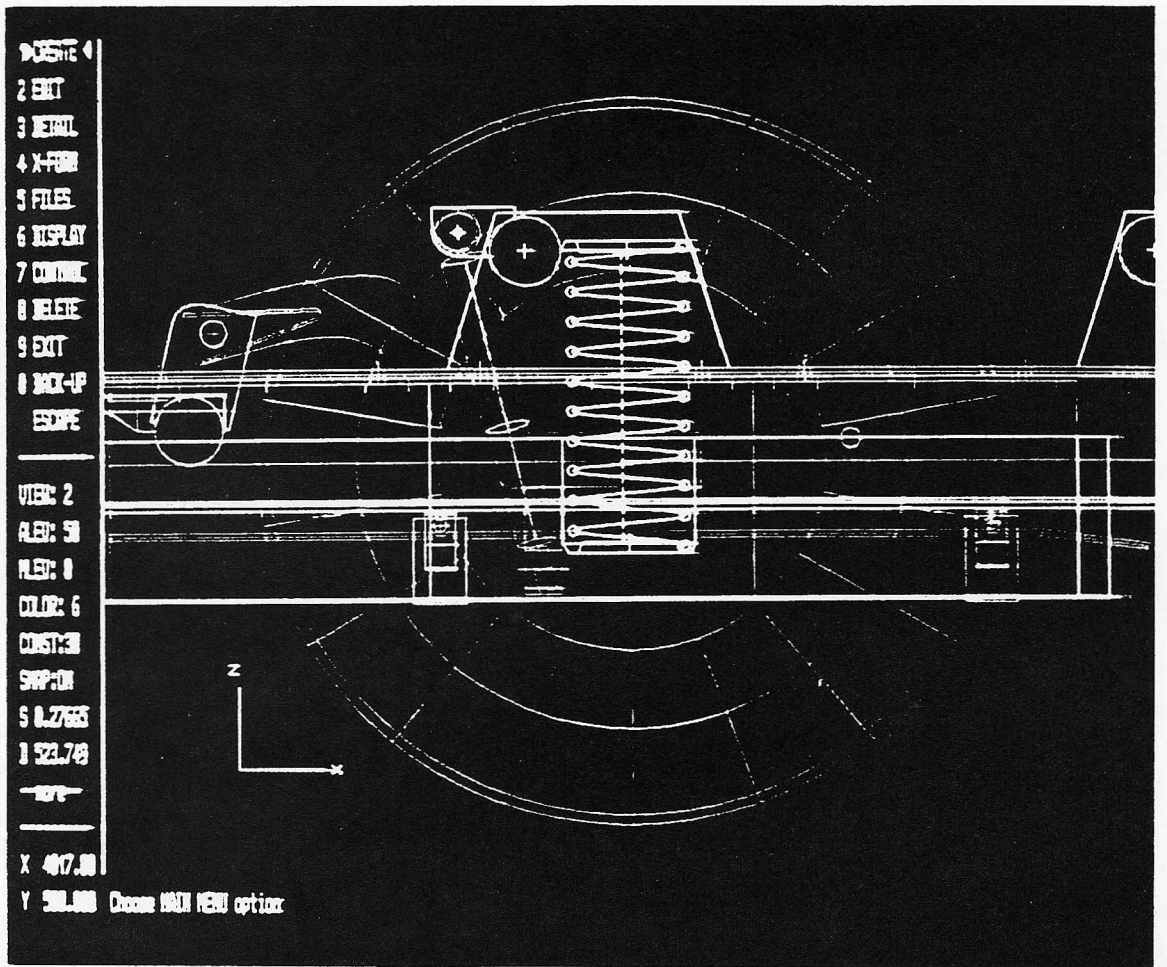
Universe Engineering people participate actively and effectively in every phase of a product's development—from vision to vehicle.

Universe Engineering—your assurance of efficient manufacturing and customer satisfaction.



Design of a transfer case housing.

Concept design of a rear axle.



# Vehma

## *Total Vehicle Capabilities:*

Vehma International is in business to meet the needs of North America's automotive original equipment manufacturers in total vehicle programs. From feasibility studies to the restyling of existing models, from development to final assembly of complete new vehicles, Vehma possesses a range of capabilities unique to the North American marketplace.

Vehma is a Magna International company and represents the apex of Magna's growth into a full-service automotive supplier. Drawing on Magna's extensive manufacturing and systems capabilities, Vehma is positioned to provide simultaneous design-through-manufacture of total vehicle programs. Its three operating divisions give Vehma complete capabilities in vehicle development.

Vehma has access to the full spectrum of resources offered by Magna's four systems corporations: Atoma International, Cosma International, Decoma International and Tesma International. Together these groups have development and manufacturing capabilities in every major area of vehicle systems and componentry. Like Magna's systems corporations, Vehma operates in a decentralized management structure to ensure a responsive, flexible approach to our customers and product programs.

Vehma has the expertise and the experience to offer complete development and production capability in total vehicles. This depth and range of capabilities allows Vehma to aggressively compete in emerging niche markets with superior efficiency in both cost and lead times.



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