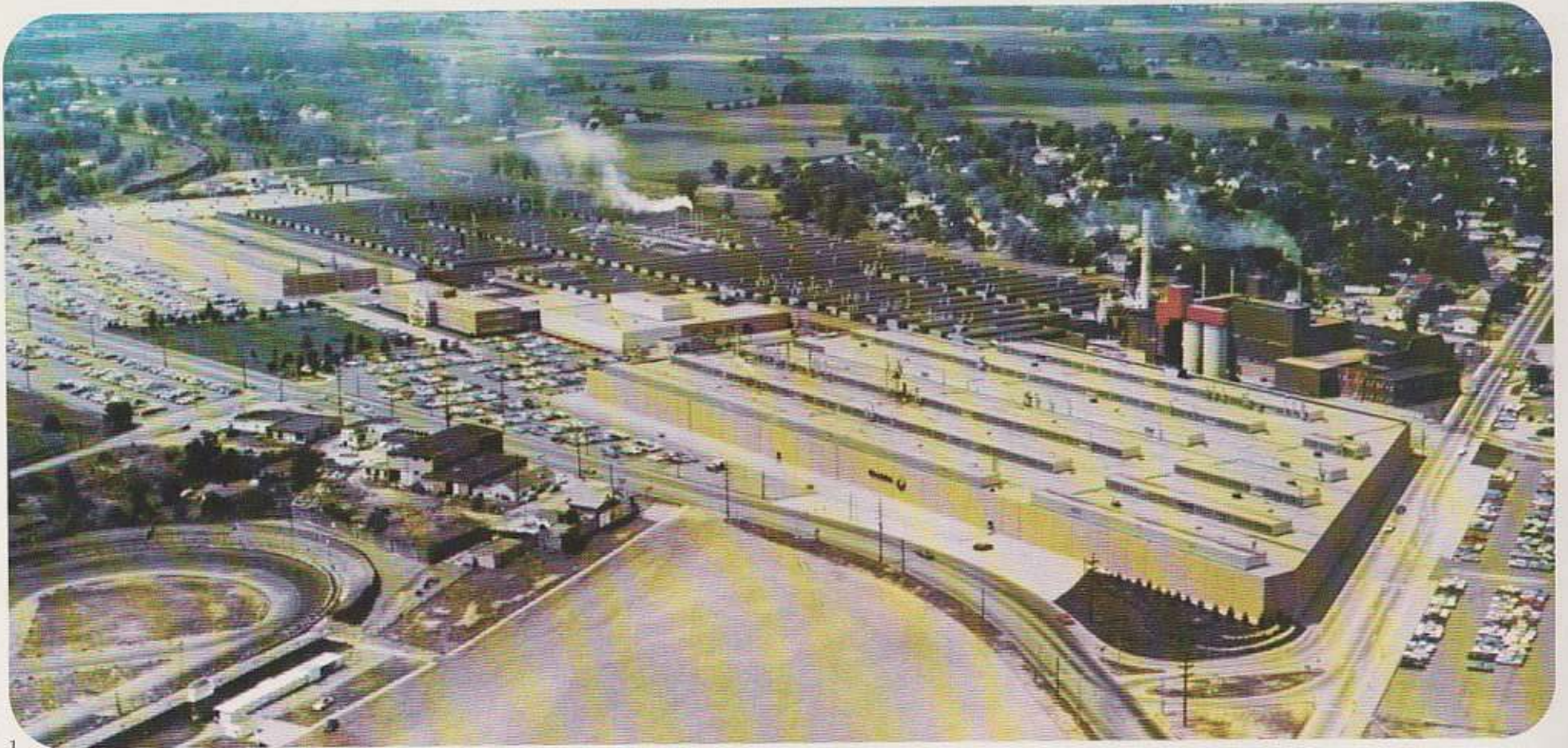
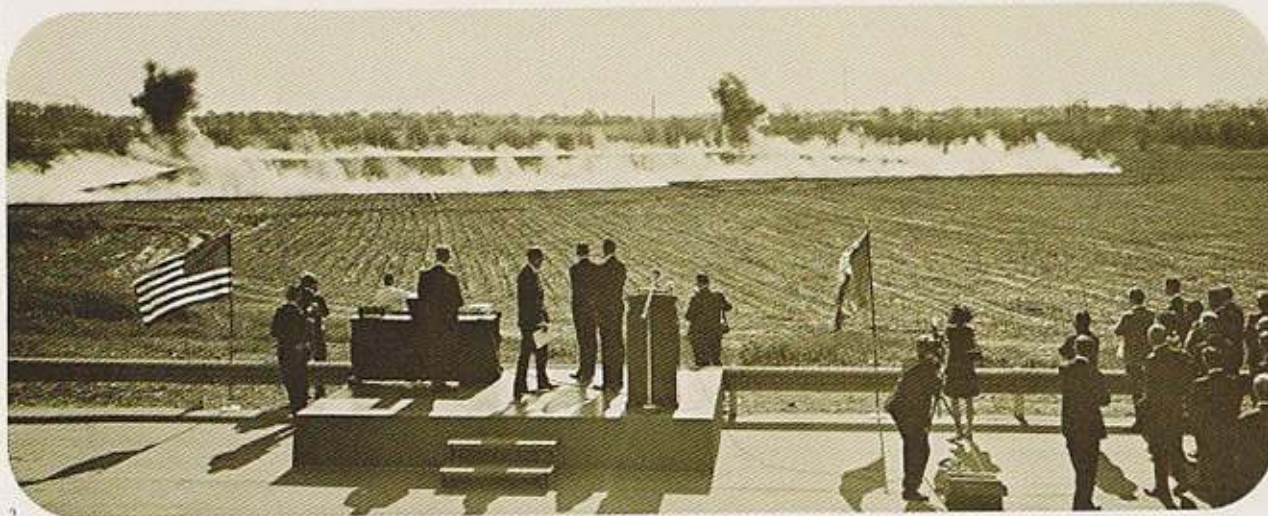


GUIDE

PLASTICS



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(1) Guide's extensive research, engineering and manufacturing facilities occupy 54 acres of floor space on a 226-acre tract in Anderson, Indiana.

(2) Symbolic of Guide's forward thinking is this "space-age" ground-breaking ceremony in April, 1968. James M. Roche, Chairman of General Motors, used a laser beam to trigger an explosion outlining the foundations of a new 300,000 square-foot manufacturing and shipping plant, one of several recent additions to Guide's building complex in Anderson.

This is the story of Guide plastics. It began in 1947 when we started to use plastics in some of our major lens applications for automotive lighting.

But first, a brief word about Guide. We started in 1906 as a vehicle lamp repair business. Two years later—in 1908—we developed and began manufacturing the first successful electric headlamp for automobiles. The rest is history, with practically every subsequent development in automotive lighting either a Guide introduction or influenced by us. Today, Guide produces more automotive lighting equipment than any other company—67,000,000 lamps annually.

Let's get back to plastics. Pioneering in this new field, our growth here parallels our growth in lighting. Our development of plastics for lenses led to other exciting new automotive applications in plastics—sports consoles, seat backs, instrument panels, lamp housings and many others. Our production of plastic parts has soared to an unprecedented annual output of more than 175,000,000 parts, molded of 120 different plastics in 1,400 designs.

New materials, new processes, application studies—all point to a fantastic future growth in plastics. In the following pages, it is a pleasure to review with you what Guide is doing today in plastics and also acquaint you with our capabilities in this field.



Guide Lamp Division - General Motors Corporation

2915 PENDLETON AVENUE • ANDERSON, INDIANA 46011

FIRST IN LIGHTING — FIRST IN PLASTICS.

We hope you have found this brief review of Guide plastics interesting. But the story is unfinished. It is still being written, and we'd like you to help us write it. The challenges and opportunities of the future promise to open great new dimensions for Guide and for our customers.

Guide's skilled manpower, technical know-how and experience, equipment and other facilities are second to none. We have some 200 plastic machines in operation, ranging up to 2,700-ton clamp pressure with 265-ounce shot capacity. These machines are used for injection molding, compression molding, extruding or vacuum forming of plastics, as well as in the dispensing and curing of plastic foams.

We use more acrylic plastics than any other molder in the world. We are also one of the largest compounders and molders of reinforced and filled thermoplastics and of polypropylene. In addition, we use vast quantities of polystyrene, SAN, ABS, nylon and other plastics.

Anticipating customer needs in plastics and conducting aggressive developmental programs to do the best possible job has often enabled us to meet requirements with new approaches—and at substantial savings. We would welcome the opportunity to help solve your plastics problems and work with you to explore new avenues of mutual progress. Please write, call or visit us.

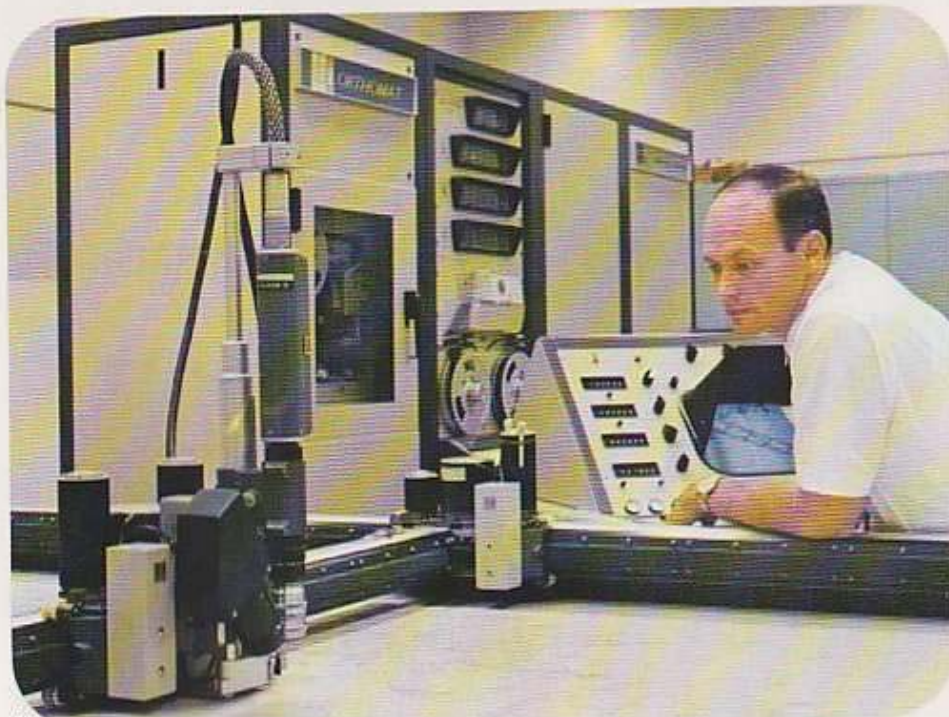
(32) A customer-contact engineer and a designer review details of a foam-padded console, an assembly of plastic and metal parts.

(33) In conjunction with a computer, this tape-controlled machine assists in the design of plastic parts and produces tapes used to control the cutting of patterns and molds. Not only does this help insure precision mold cutting, but it is more economical as well.

(34) Guide has extensive tool room facilities, including numerically controlled mills such as this one, for machining and maintaining plastic molds.



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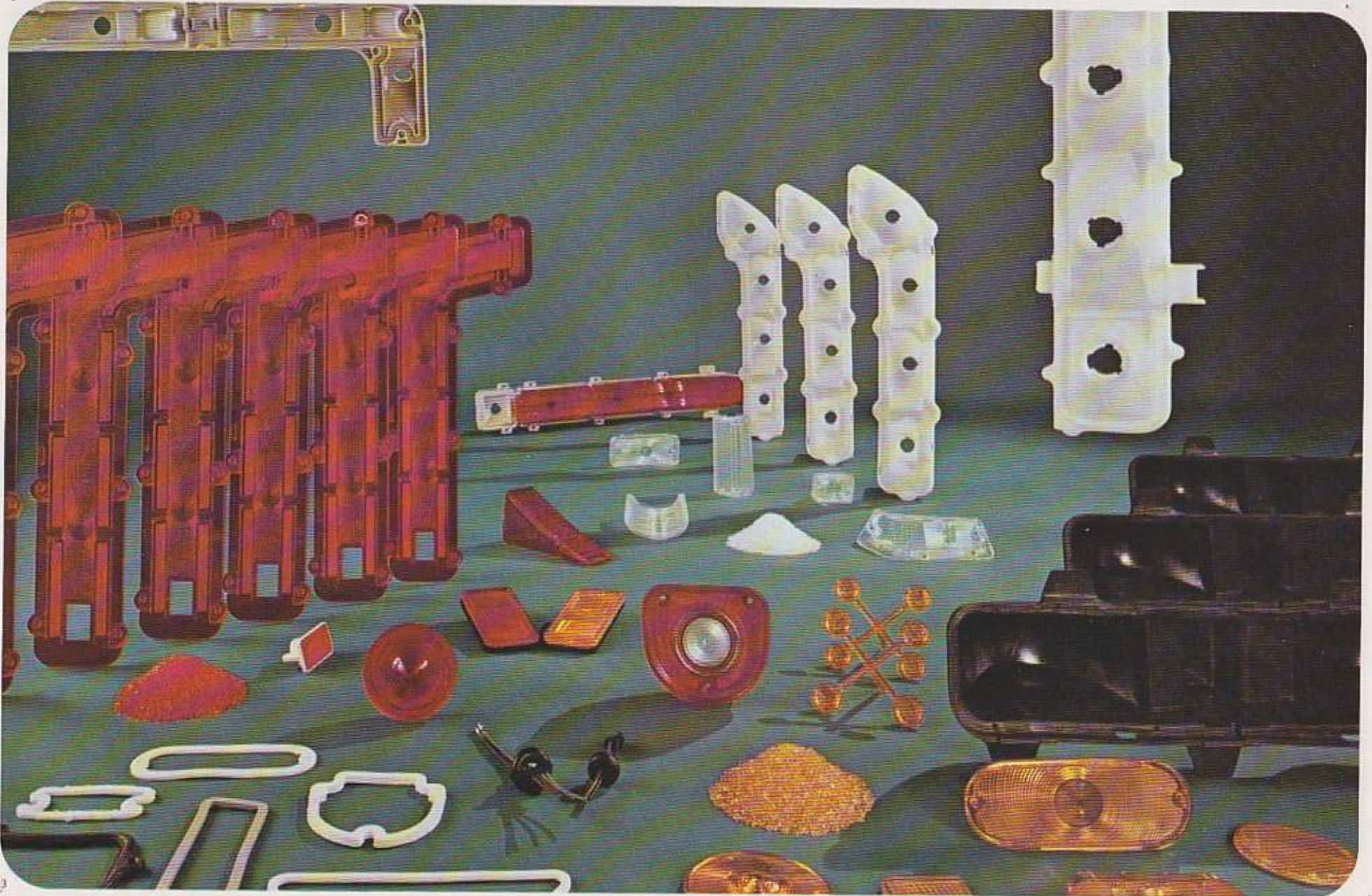
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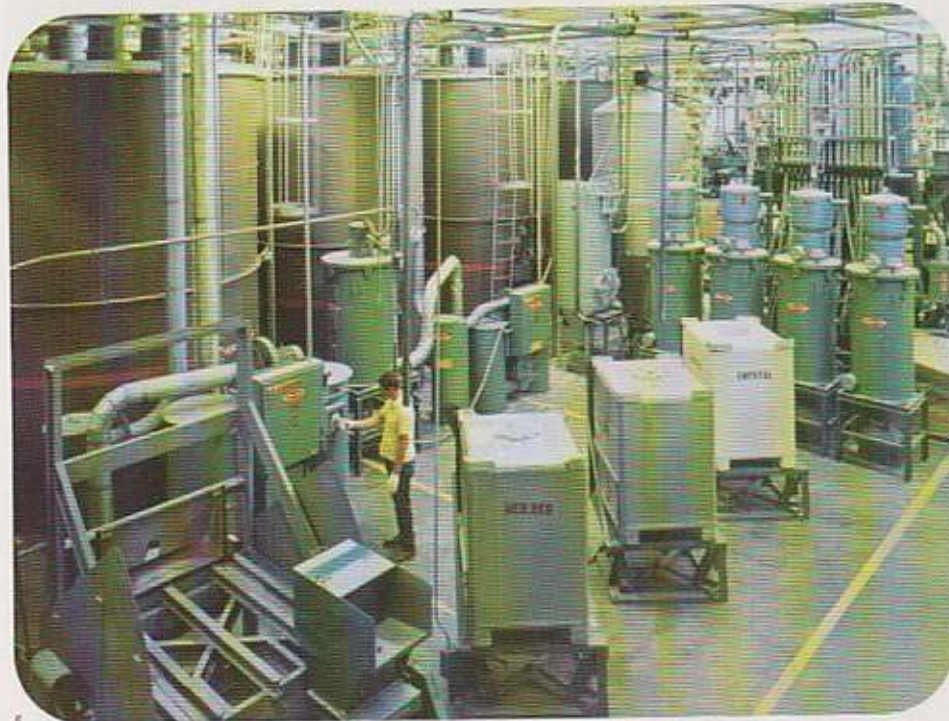
(3) Guide is a major supplier of plastic components for automotive lighting. Lenses, lamp housings, gaskets, and wiring harness components are some of the results of Guide advanced design.

Lighting Parts Components

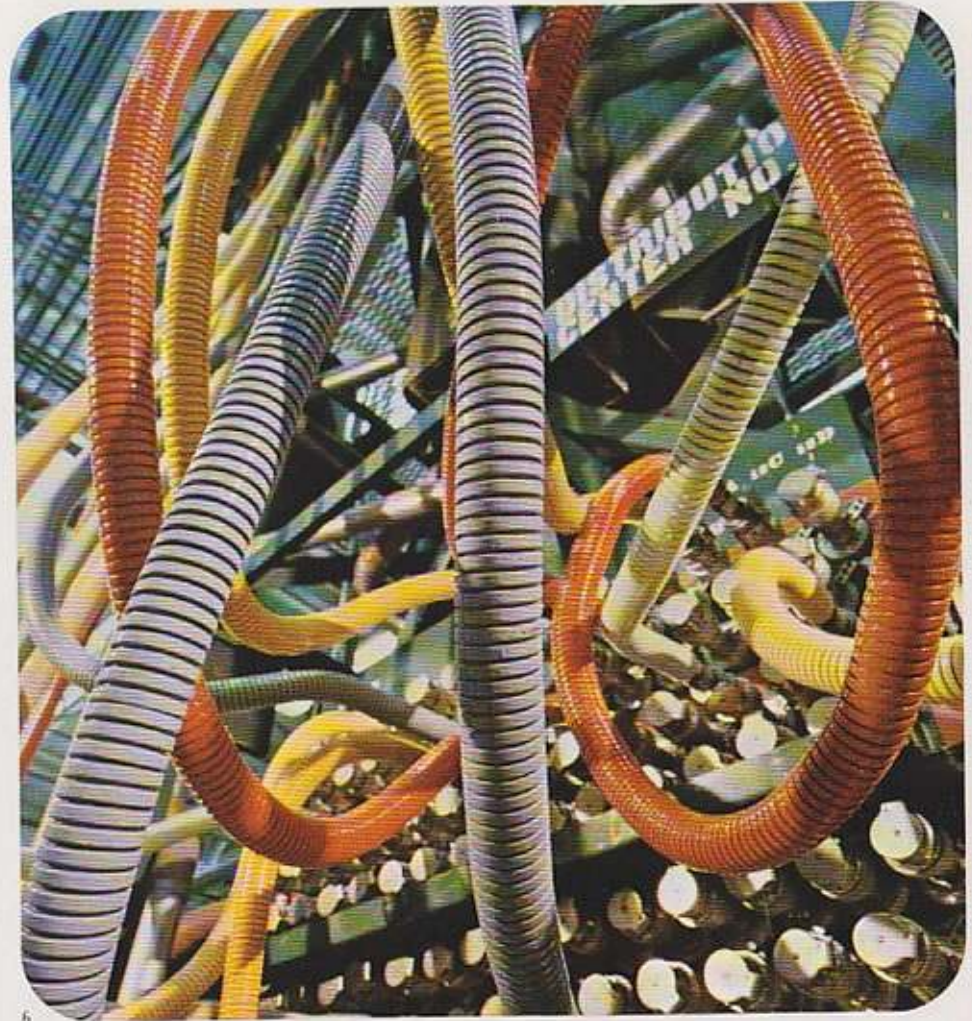




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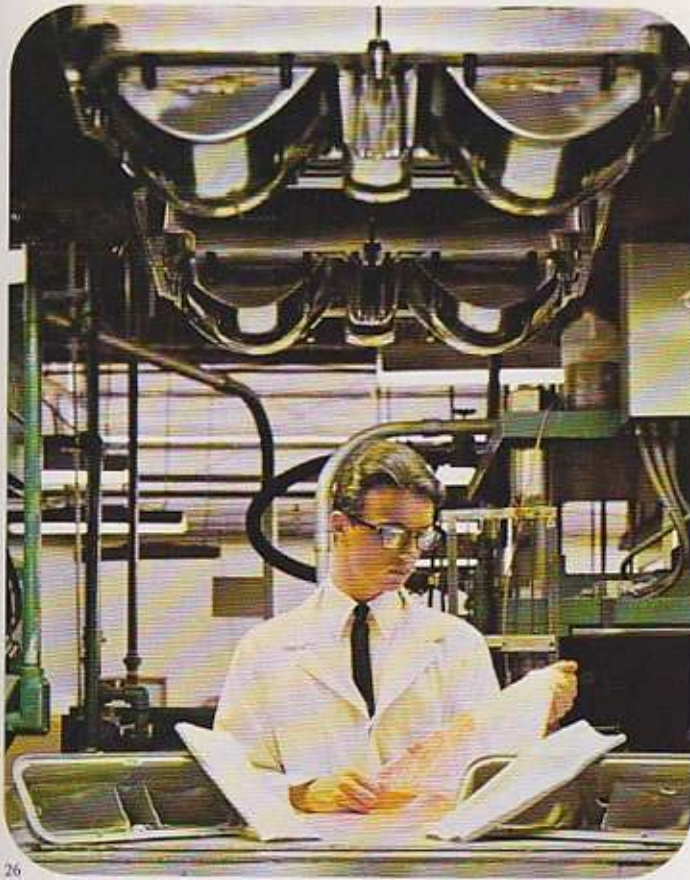
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(4) A typical installation for acrylic lens production is this line of injection molding presses. These modern machines eject molded parts onto a conveyor which carries them to a quality-control monitor. Uniformity of quality is the Guide "guideline."

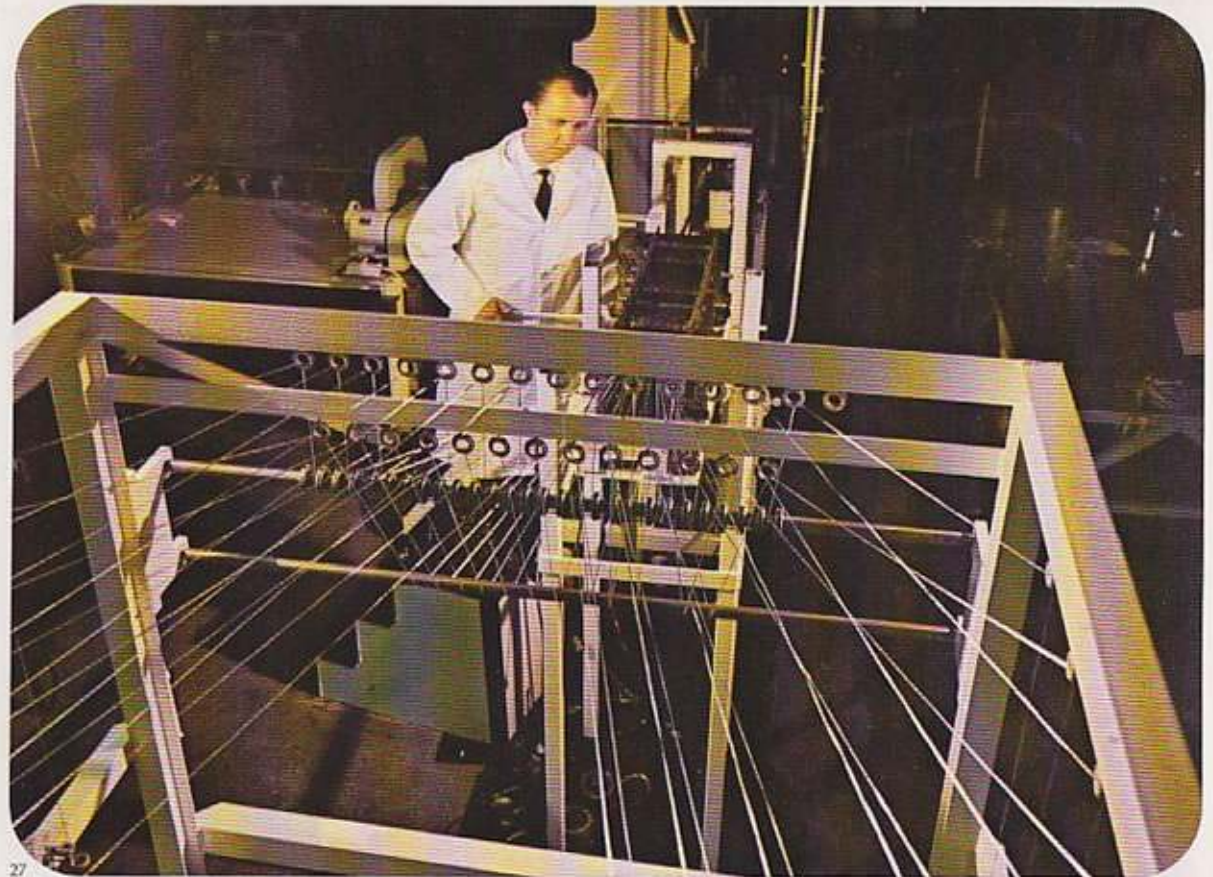
(5) Because of the quantity of plastic granules used, shipments arrive by hopper car and are stored in these large silos. Ranging in capacity from 10,000 to 325,000 pounds, the bulk storage containers hold acrylic, polystyrene, styrene acrylonitrile (SAN) and polypropylene granules.

(6) Raw materials are conveyed from storage to the injection molding machines via color-coded vacuum delivery tubes through a central distribution system.

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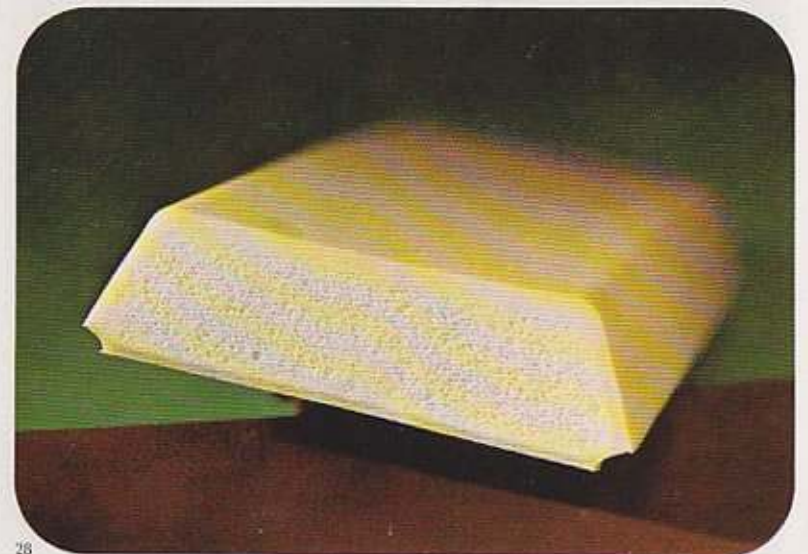


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(26) Fiberglass mat-reinforced sheet molding compound can be compression-molded into lamp housings. This material has very high structural strength and rigidity. It is also heat-resistant, and has an excellent surface finish for use in exterior body panels.

(27) Various components for many applications can be made from continuous fiberglass filament reinforced polyester and epoxy resins. These light, flexible, reinforced plastics are equal in strength to the strongest steel alloys. Guide is pioneering new applications in this field.

(28) Under development is soft and flexible, self-skinning urethane foam which requires no external covering for automotive applications such as arm rests, glove compartment doors, and instrument panels. Rigid, self-skinning urethane foam is being considered for structural molded panels to act as insulators against noise and heat.



28

Engineering, Product Design and Tooling



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(29) Procedures meeting applicable federal standards are followed by Guide's laboratories on plastic materials and other products. Here, tensile strengths and elongations of molded plastic test bars are determined. Equipment for the flexure, compression, shear, impact, and heat distortion testing of plastic parts from -40° to $+400^{\circ}\text{F}$ is available.

(30) Effects of salt spray and moisture on plastic, metal and painted parts are determined in salt spray cabinets. Such comprehensive investigative techniques as well as exacting testing procedures are one reason Guide plastic components look better . . . and keep on looking better through all kinds of weather and wear conditions.

(31) Vibration testing, which simulates actual conditions, is conducted on this magnetic vibrator.



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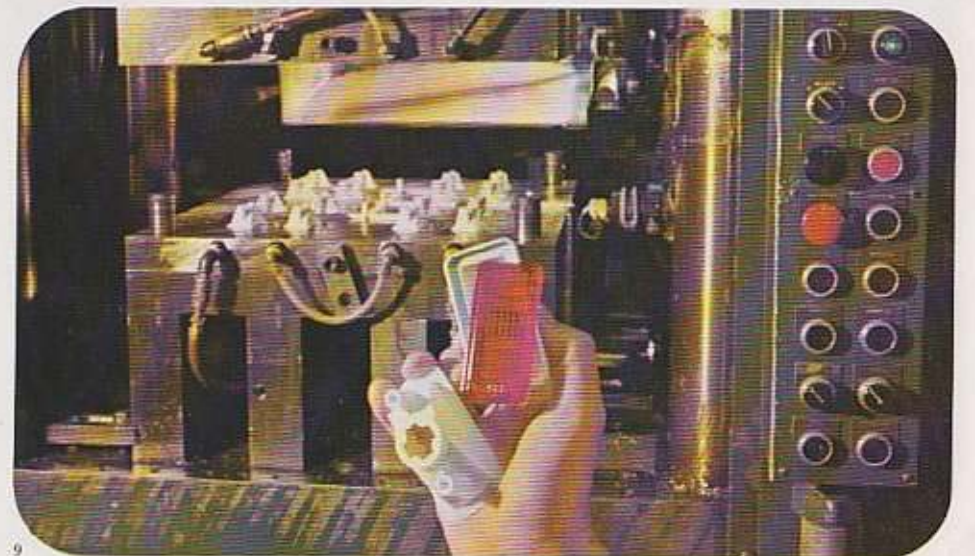


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(7) This dual-injection machine molds two-color acrylic lenses. An important technological breakthrough—two different colors or two different types of plastic can be injection-molded at the same time.

(8) Foam dispensing and curing operations produce vinyl gaskets for lamp seals. Guide developed the material formulas and equipment to make these parts, which in many applications possess sealing characteristics superior to conventional gaskets at considerable cost savings.

(9) Side marker lamp housings are injection molded. An exciting achievement—the sonic welding of the ABS housing with an acrylic lens is a Guide production development for joining two dissimilar plastics. Over 14 million such assemblies are produced annually.



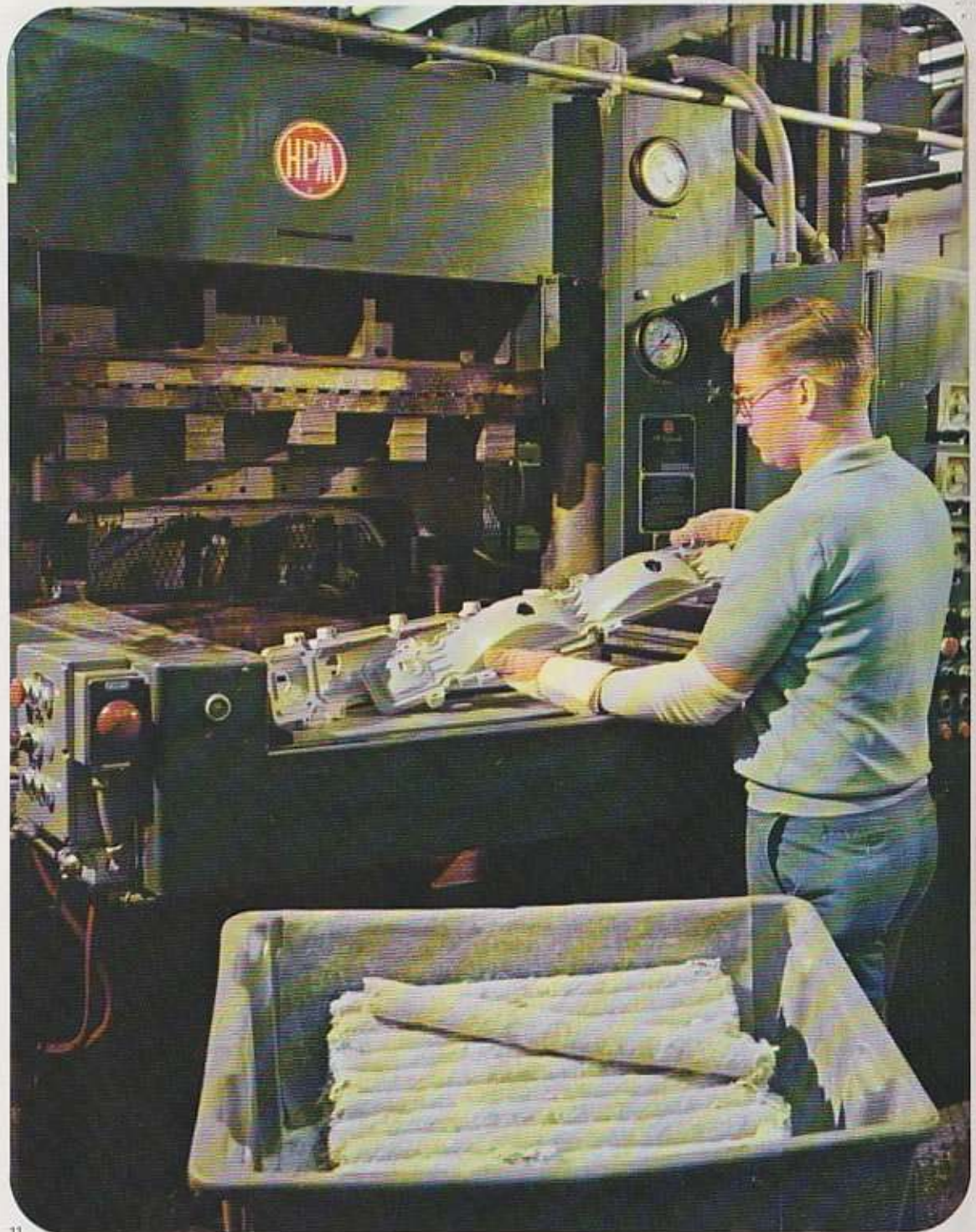
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(10) Guide introduced fiberglass-reinforced polypropylene rear lamp housings for the 1969 model year. Molded from the reinforced material which is formulated and blended at the machine, the housings are another unique development from Guide laboratories and engineering facilities.

(11) Another Guide achievement is the development and use of polyester premix for production lamp housings. This material consists of polyester resin filled with low cost inert fillers such as clay, ground limestone, and asbestos. Reinforced with glass fibers, it is tough, rigid and weather-resistant. Formulated, compounded and extruded into a log, it is then compression-molded in this press under heat and pressure to form a high-strength housing which traditionally has been die-cast zinc or stamped steel. Guide has also developed low profile or excellent surface finish polyester premix.



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(20) A leader in formulating, production blending and molding fiberglass and asbestos-reinforced thermoplastic resins, Guide is also capable of blending other materials such as talc, fly ash, wood fibers or glass beads with thermoplastic resins.

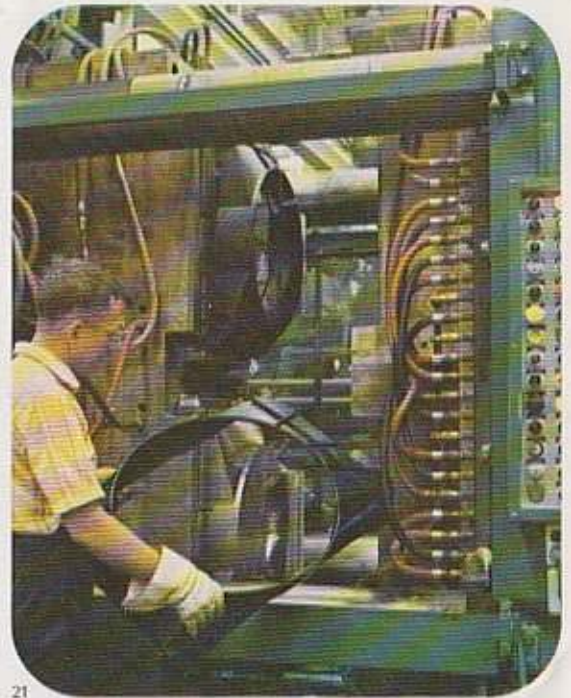
(21) Guide produces a major share of the fan shrouds used on General Motors automobiles—to the extent of more than 4,750,000 pounds of filled polypropylene annually.

(22) Lightweight, tough ABS sheets are extruded from pellets and embossed with a grain finish for vacuum forming.

(23) Extruded ABS sheets are vacuum-formed into consoles. Other Guide vacuum-forming equipment handles even larger sheets.



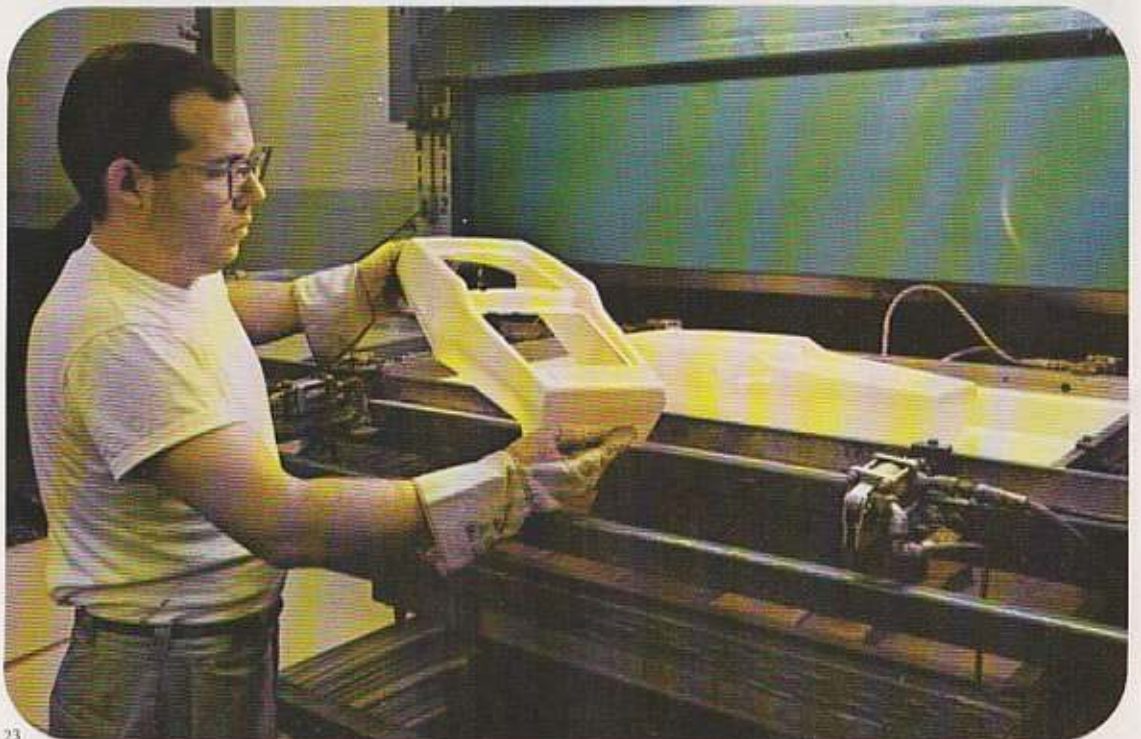
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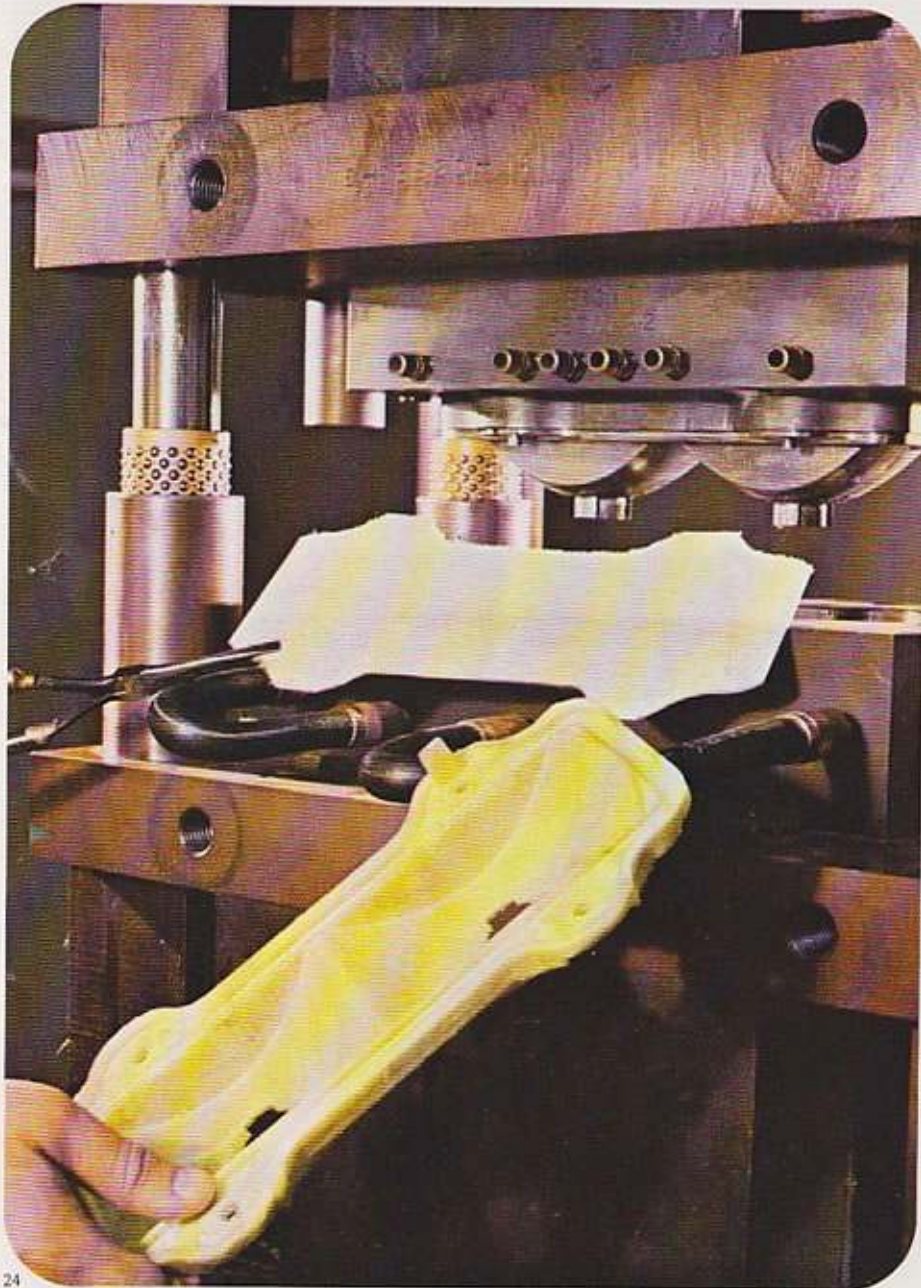


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Special Facilities



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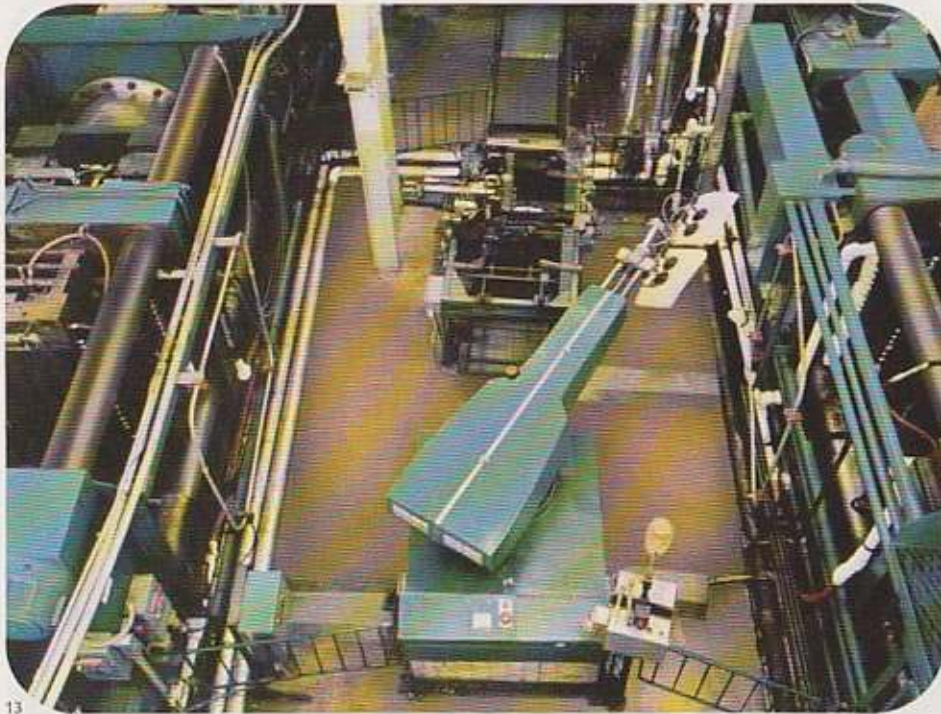
(24) Fiberglass mat-reinforced polypropylene blanks cold-formed on stamping presses are being developed for possible use in lamp housings. Such reinforced material is suitable for applications requiring high structural strength and high temperature resistance.

(25) Thermosetting plastics such as polyester premix, phenolics and rubber compounds are injection-molded in this special machine. Low profile polyester premix is tough, heat-resistant and provides an extremely smooth surface for parts such as fender extensions and headlamp housing panels.

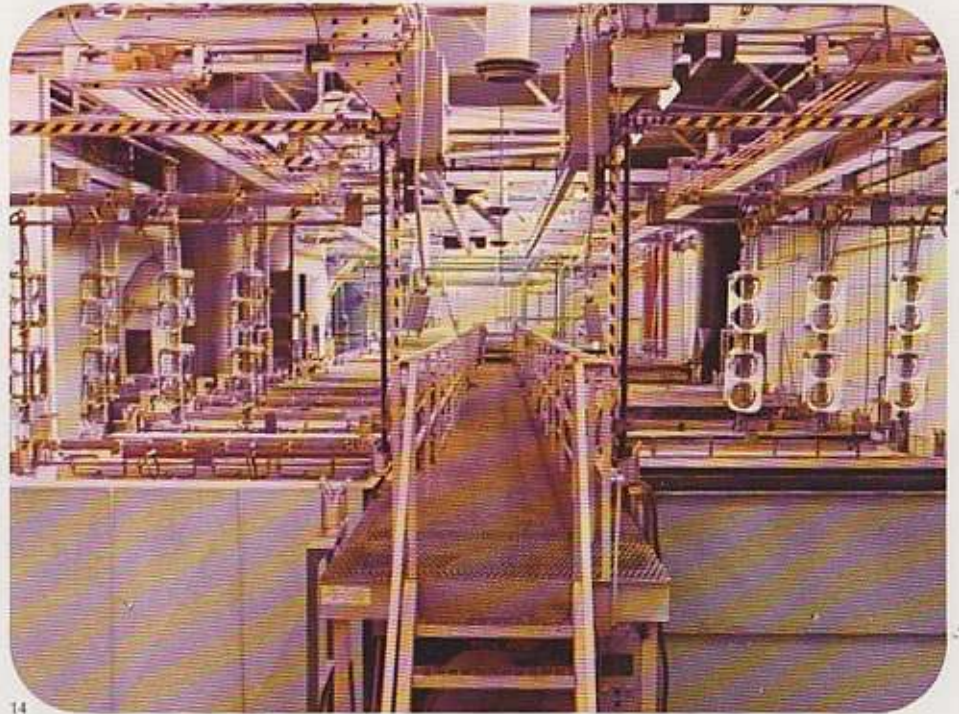
(12) Guide supplies plastic interior automotive parts such as bucket seat backs and side panels, bench seat backs, and vinyl-encased safety mirrors. Plastic exterior parts include bumper filler panels, radiator grille doors, chrome-plated decorative ornaments and lamp bezels.

Functional and Decorative Parts

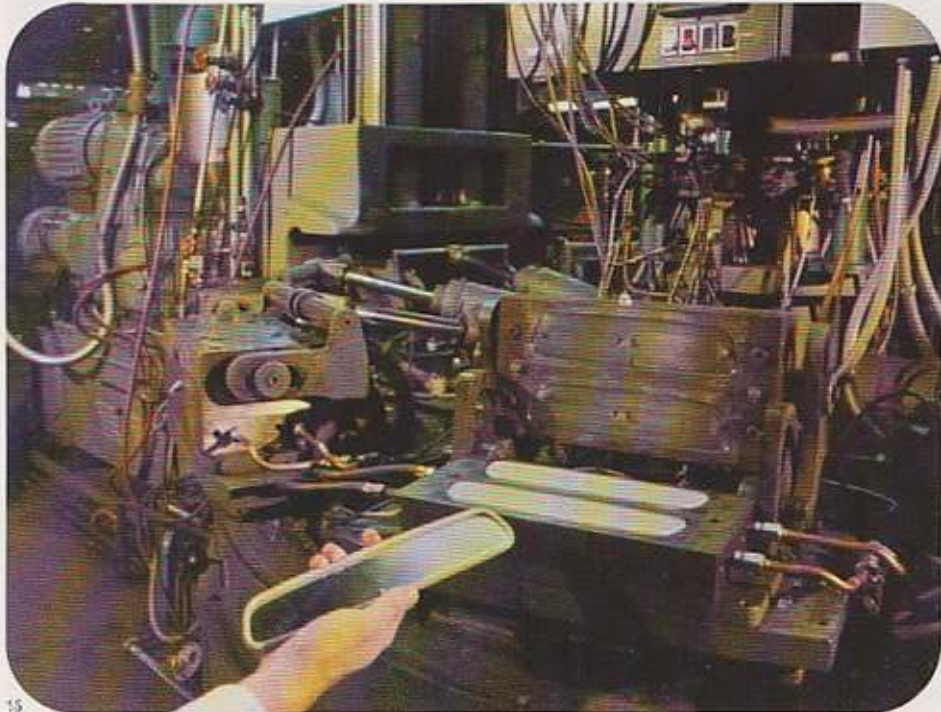




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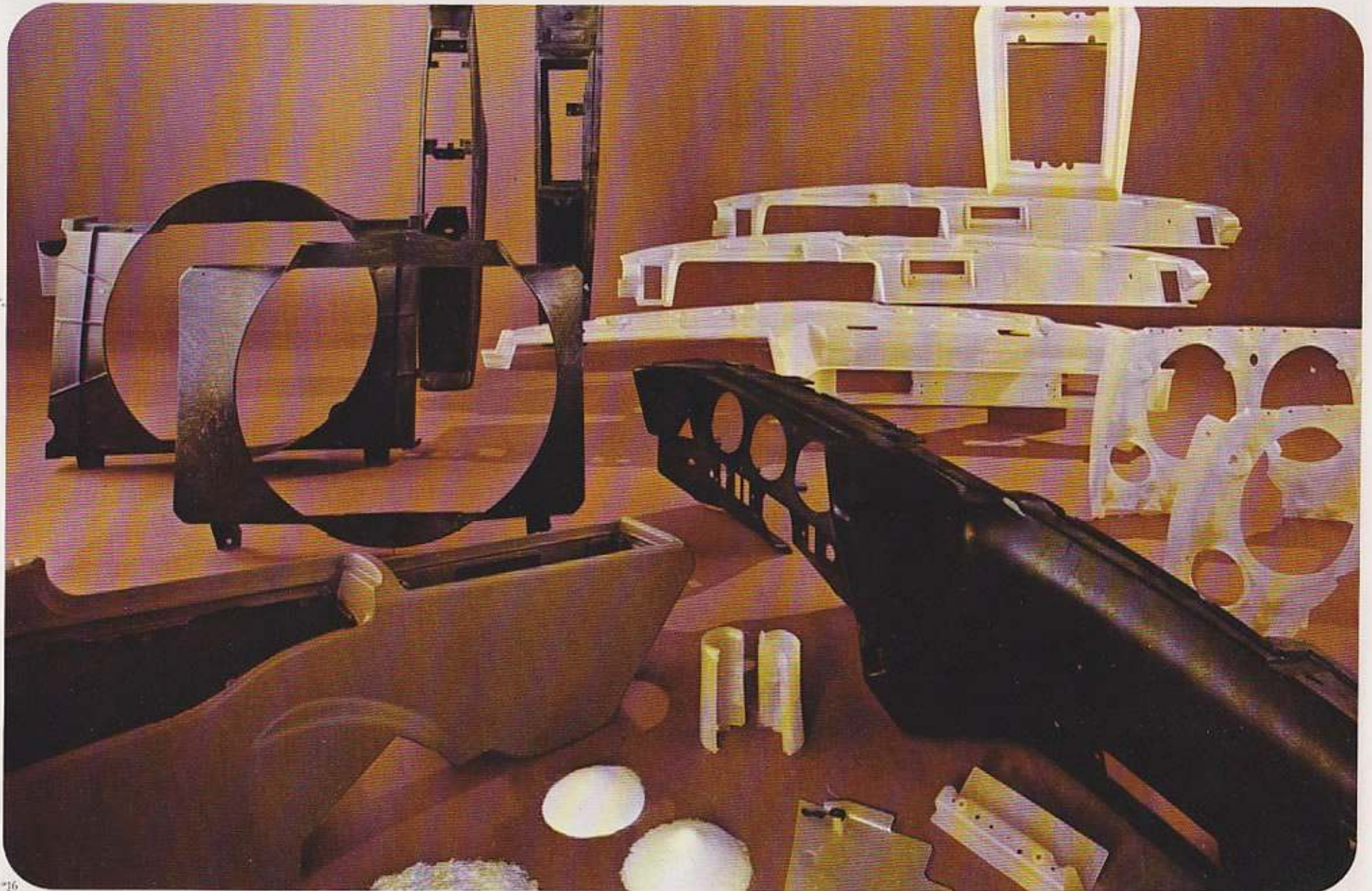
(13) For maximum speed and efficiency, a resourceful robot controlled by a digital computer operates two plastic injection molding machines producing polypropylene bucket seat backs in 25 different colors. Requirements for seat backs, fan shrouds, and lamp housings make Guide one of the largest users of polypropylene in the U.S., molding more than 11 million pounds annually.

(14) ABS and polypropylene headlamp bezels are chrome-plated in this cell plating conveyor system. It was completely designed, developed and built by Guide engineers.

(15) Vinyl is injection-molded around glass mirror blanks in the production of Guide Glareproof mirror assemblies, a significant contribution to automotive safety. Guide produces 25,000 such assemblies a day.

(16) Consoles, instrument panel inserts, kick panel inserts and fan shrouds are a few of the structural parts produced by Guide.

Structural Parts



(17) Injection molding of fiberglass-reinforced instrument panel inserts takes place in this machine with a 2,700-ton clamp and a 265-ounce shot capacity. This is one of several large molding machines included in Guide's manufacturing facilities.

(18) Guide manufactures a major portion of General Motors sport consoles. The use of fiberglass-reinforced SAN results in customer cost savings and greater part rigidity as compared to other commonly used materials.

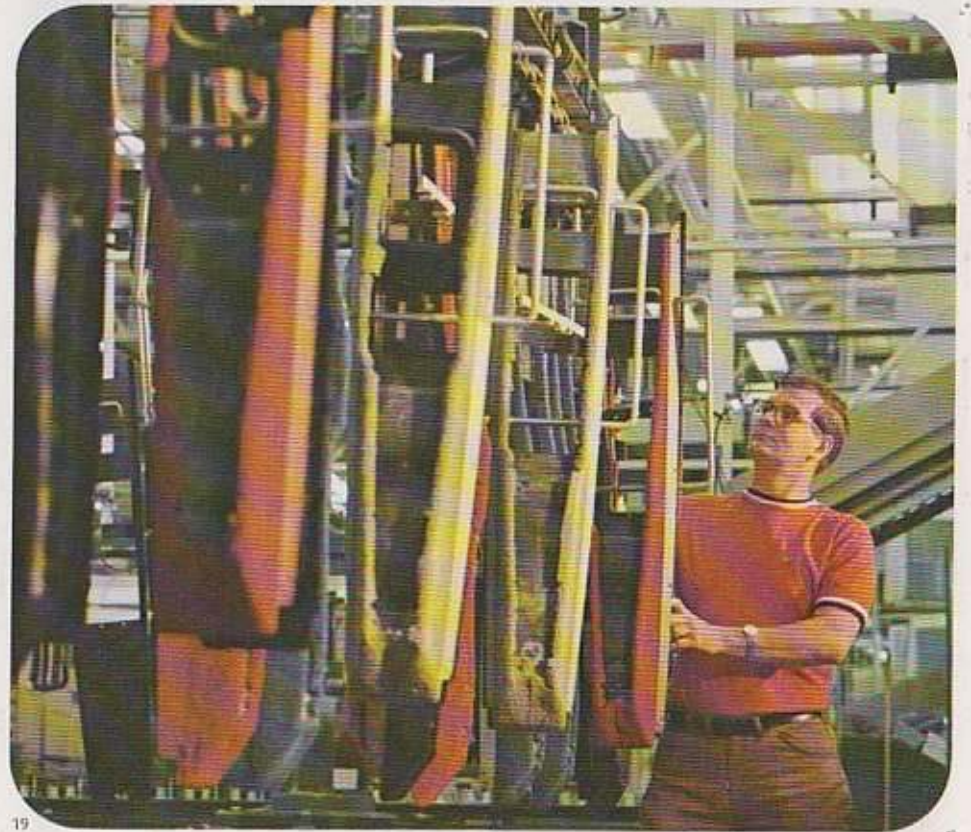
(19) Consoles may be painted interior car colors and partially covered with carpeting. Prime painting of the plastic material is not required, resulting in lower cost per unit.



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