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# Magic Plastics Play Key Role in Modern Aircraft

The same "magic" plastics that rushed modern living to post-war homes are playing key roles in the production of four modern-day fighters through ingenious adaptations of the materials to a wide range of airplane parts at the Torrance facility of North American Aviation, Inc.

Known technically as acrylics, phenolics, and fiberglass, the materials are familiar to most housewives as their clear plastic containers, decorative plastic sink tops, and textured fiberglass drapes. Tomorrow, they may play an equally important role in the inter-continental flight of guided missiles.

Pioneers in this highly specialized field, North American turned to plastics during World War II to meet weight and cost demands for light, strong materials. Today, the F-86 Sabre Jet of the Korean War, the F-86D fighter-interceptor for continental defense, and the F-86K for NATO defense and the F-100 Super Sabre all depend to some degree on plastic parts.

At the same time, a similar development has progressed in the field of metal honeycomb, a structure, which the name implies, that combines lightness with bulk.

**Employment Grows**  
To manufacture both the plastics and honeycomb parts, North American in 1948 leased the 150,000 square foot building at 2321 Abalone Ave. in Torrance. Employment has grown steadily to its present level of 525 with an estimated annual payroll of more than \$2,750,000.

Responsible for the facility's operation is J. L. Barker, Cecil H. Clarke is the supervisor of plastics production and John H. Hollingsworth, the supervisor of metal honeycomb and fiberglass work.

Today's F-100 Super Sabre, first production airplane that is supersonic in level and climbing flight, is an example of the uses both honeycomb and plastics are being put to.

Included among the Super Sabre parts manufactured at the Torrance facility are the critical dive brake door, the trailing edges and tips of the wing and stabilizer, the canopy, heat vent ducts and chutes for the spent shells of its powerful 20 millimeter cannons.

**Techniques Vary**  
Production techniques at the facility are as wide and varied as the materials themselves. Clear acrylic plastics, for instance, are molded into a pilot's canopy with the care of an optician working a precision lens. Special handling equipment to prevent ruinous scratches is used to move the large "glass" sheets into a unique oven where the plastic becomes rubber-like under 300-degree heat.

After heating, the plastic, as flexible as a piece of bread dough, is draped over an air-tight frame, where a vacuum evenly sucks it into the familiar "bubble" shape where it cools and hardens. Later the plastic is trimmed and mounted in a metal frame, ready for delivery to North American's final assembly lines at Los Angeles International Airport.

**Must Be Perfect**  
Because pilot vision is critical at today's split-second, supersonic speeds, canopies are scrapped when careful inspection detects wavy or distorted view areas. To avoid this, scratches are hand rubbed by plastics specialists with wax and sapphire dust, a grit so fine it is almost indistinguishable to human touch.

The durable phenolic laminated sheet plastics are also worked or formed after heating. Instead of an oven, however, they are heated between banks of lights before being pressed into shape by special tools. Although variations of the non-transparent material are slightly different most phenolics become pliable under controlled temperature and pressure.

Perhaps the most unique of the materials processed at the Torrance facility is fiberglass cloth which enters production as the same cloth that is delivered to drapery shops and dry-goods stores. It is ordered in various forms for different parts.

**Cloth Molded**  
At Torrance, the cloth is unrolled and impregnated with liquid resin. Still in the form of cloth, it is cut into patterns, molded into various shapes and baked to harden. To gain thickness, several layers of cloth can be stacked and bonded together under heat.

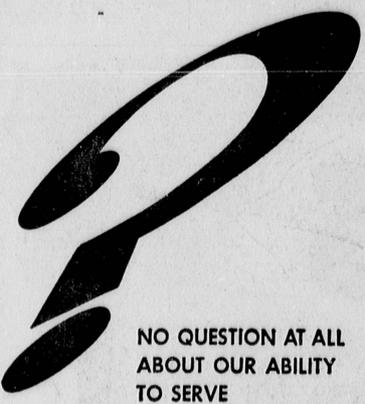
One of the key parts formed from the cloth is the black, bullet shaped radome nose of the F-86D all-weather fighter interceptor. A critical element in the fighter's radar system for intercepting airplanes, the radome is made of fiberglass skins covering other fiberglass formed elements. Among other functions these elements provide hot air channels to prevent formation of ice on the nose section.

**Porous Honeycomb** is stretched, cut into various shapes and then bonded to metal surfaces at the facility with special North American developed adhesives. Bonding is performed in 10 specially constructed auto-claves, each resembling from the outside huge, oval waffle irons. The auto-claves allow adhesives to be pressure treated under jets of steam.

**Seek New Materials**  
North American plastics engineers now are working on new materials that will resist greater temperatures than the current plastics and may hold the answer to damaging heat predicted in future flight. North American's Torrance facility will be the first to know whether the new materials can be practically made into airplane or guided missile parts.



INSPECTING PLASTICS PRODUCTS . . . Cecil H. Clarke, kneeling, shows plastic canopies made at Torrance by North American Aviation during visit to plant by city officials and directors of the Chamber of Commerce last week. Looking on (left to right) are Councilman Nick Draie, A. E. Thompson, Fred W. Mill, Paul Diamond, Henry W. Creeger, J. H. Paget, and R. S. Pyle.



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