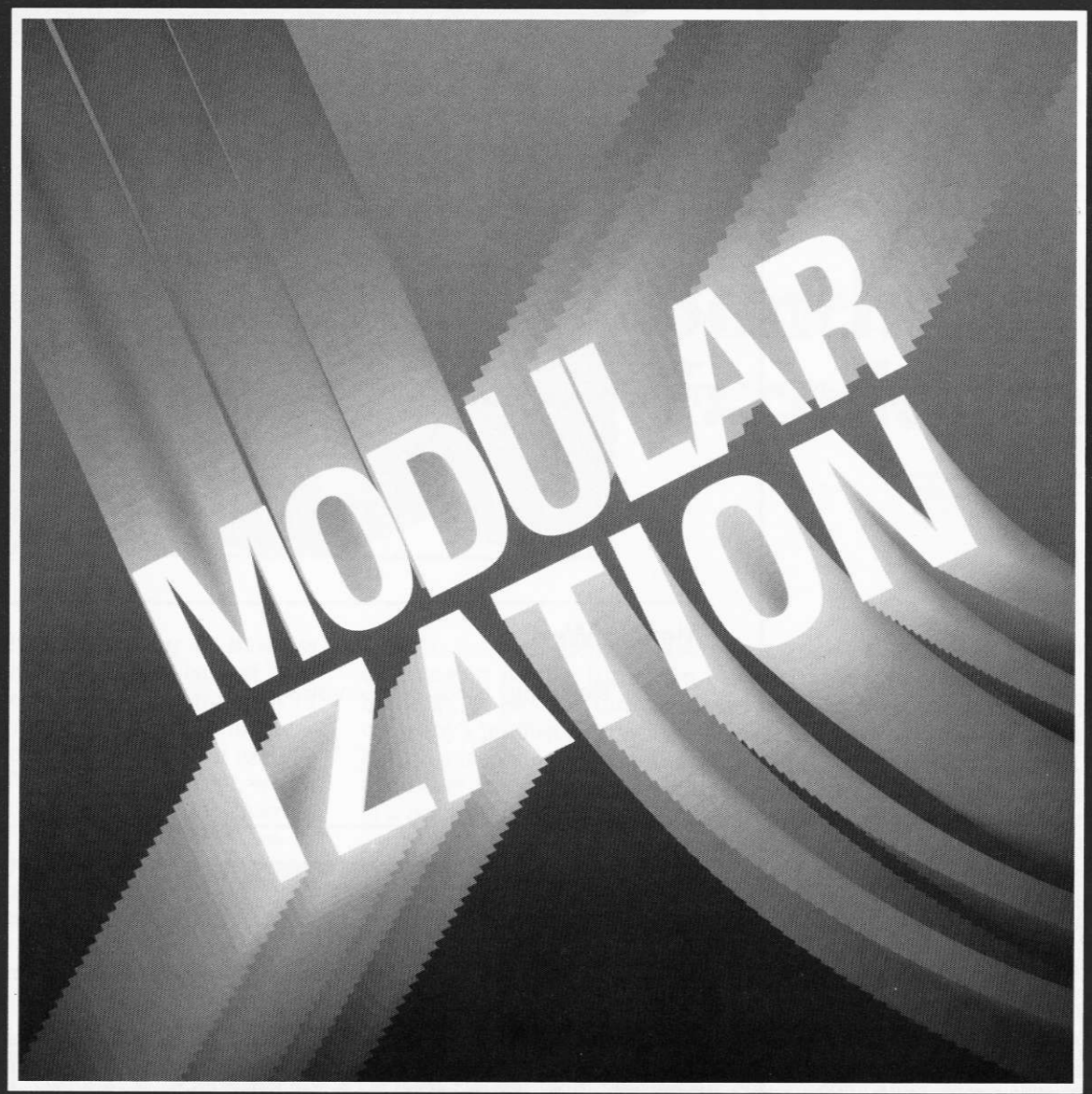
Volume 1, Number 2

Sept./October 1990

The Packard Electric GLOBE

The divisional magazine covering Packard's worldwide operations



Modularization
Putting it together in the '90s

Globe contents

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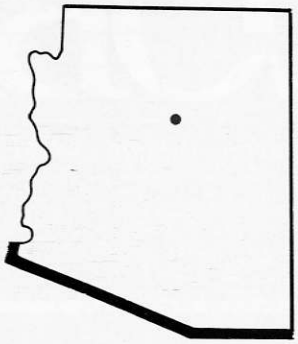
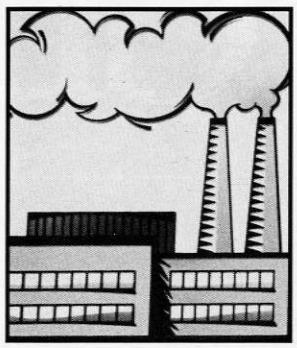
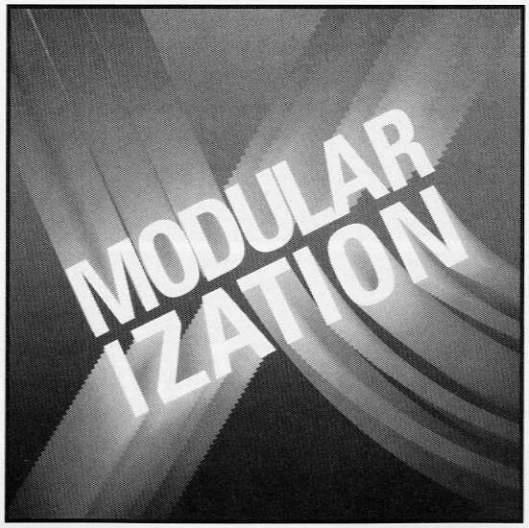






On the cover:

Rick Muccio's illustration depicts the modularization trend sweeping the auto industry.

See pages 10 and 11 for a related story.

The Packard Electric Globe
Packard Electric
Division of General Motors
P.O. Box 431
Warren, Ohio 44486
An equal opportunity employer

Patricia K. Hawkins
director of Public Relations

Ryndee S. Carney
executive editor

Sharon M. Roncone
editor
phone: (216) 373-3029
GM network: 8-531-3029

Benchmarking Excellence

There's a saying in business that if you take care of your customers better than any of your competitors, your business will take care of itself.

Packard's Excellence concept, which focuses us on satisfying our internal and external customers, continues to be our major objective. Going forward, we don't intend to change our focus, but increasing global competition is forcing us to intensify our efforts.

Every activity and function we perform affects customer satisfaction. In addition to manufacturing perfect products, we each provide a variety of services to our customers. Defects occur whenever we don't meet a customer requirement: missing a deadline, running the wrong part or preparing a letter with typographical errors.

Excellence is an attitude that colors everything we do, going far beyond the quality of our products. It's the key to achieving customer satisfaction. To succeed in the future, we must concentrate on the activities which best satisfy our customers' needs.

First, we must identify these needs. One way to do this is through benchmarking, a process that measures a company's products, services and practices against its toughest competitors and other companies that are the best in a particular business or function.

Webster's dictionary defines a benchmark as a standard by which something can be measured or judged. Benchmarking is the search for the best industry practices which will lead to superior performance. It can be used to evaluate how successfully a company meets customer requirements.

How can benchmarking help Packard Electric better satisfy our customers? An ancient saying by the Chinese general Sun Tzu captures the essence of the benchmarking process: "If you know your enemy and know yourself, you need not fear the result of a hundred battles."

Benchmarking is based on Sun Tzu's urging to view and understand not only the internal company world, but more importantly to constantly assess the external. This involves comparing ourselves to our toughest competitors, to the best practices for our particular function, regardless of industry, and developing strategic plans to adopt the best practices found.

It's up to each of us to seek ways to serve our customers better. You don't need special training to use benchmarking — think of a business or service which does an outstanding job for you personally. It could be a grocery store where the clerk who sacks your purchases also takes them to your car, or a mail order clothing company that cheerfully replaces an item which fell apart when you washed it. Analyze why these companies make you feel special and apply this to your own customers.

Being willing to compare ourselves with the best companies in the world is one way to achieve innovation and continuous improvement — the third absolute of Excellence. To win the battle in the global marketplace, we must truly be the best of the best in the eyes of our customers.

— Rudy Schlais
General Manager

Electronic Products

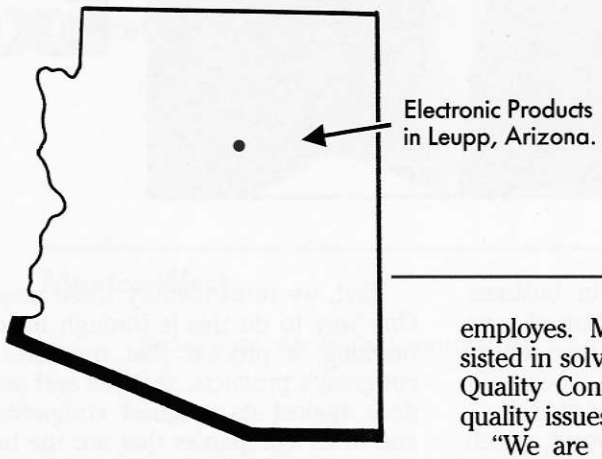
Tooh Dineh Plant features state-of-the-art technology

The sun beats down on the desert in Arizona.

The Navaho Indian Reservation, which stretches through Arizona, Utah and New Mexico, is the largest Indian reservation in the U.S., consisting of 225 square miles (about the size of West Virginia) and a population of 225,000.

In the extreme southwest corner of the reservation, the Tooh Dineh, which is Navaho for "water people," provide a refreshing, quenching alternative.

Packard's Electronic Products business — staffed by Tooh Dineh Industries Inc. and managed by Packard Electric — is growing as a profitable alternative in the electronics industry.



Innovative alternatives add to Packard's competitive position.

The division's Electronic Products business on the Navaho Indian Reservation in Arizona is a good example.

In the 1970s, Packard got out of electronics manufacturing. Still wanting to maintain the division's understanding of electronics, Packard decided to look for alternatives.

High quality, competitive and Packard-managed were the key considerations, according to Bob Bucklin, engineering manager for Electronic Products. The site selection team saw potential for these qualities in the Navaho Nation.

Electronic Products started operating in 1984. This relationship between Packard Electric and Tooh Dineh Industries Inc. (TDII) is growing rapidly. Tooh Dineh is a private company owned by Dineh Cooperatives Inc., which is a non-profit corporation for Navaho Indians.

John Rowlands, business manager, Electronic Products, said sales were nearly $9 million in 1989. Projections for 1990 are about $20 million. By 1992, that figure is expected to be $40 million.

"We don't see why we can't grow to $100 million a year by the end of the decade," said Rowlands.

"Electronic Products is noted for its state-of-the-art technology in electronics, which is made possible through the support and investment of Packard," he noted.

For example, the Excellence Training Center provided training for TDII employes. Materials Management assisted in solving material problems and Quality Control supplied expertise on quality issues.

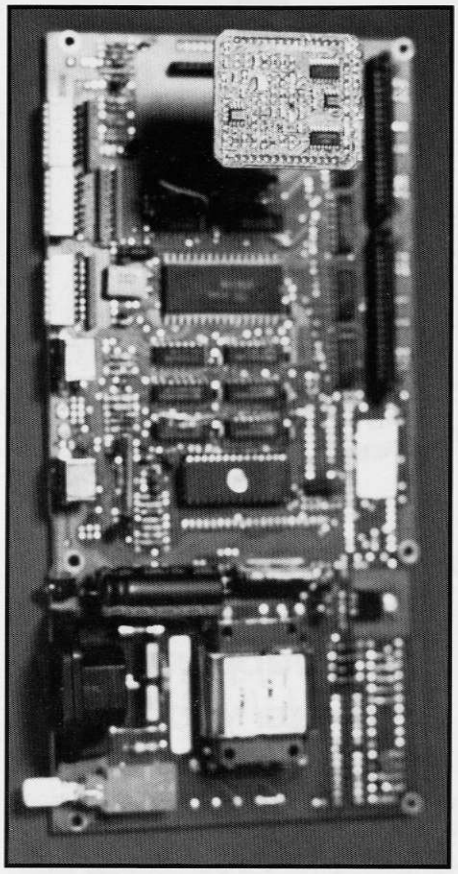
"We are growing so fast. We have lots of reasons to be enthusiastic about the expansion of the electronics industry," Rowlands said.

In 1989, there were fewer than 50 hourly employes. Currently, TDII employs about 180 hourly employes plus 50 administrative and salaried people — all of whom are Navaho Indians living on the reservation. Electronic Products has seven Packard salaried employes at the Tooh Dineh Plant.

Rowlands said one reason Electronic Products is attracting non-automotive customers is many are seeking minority supplier credits.

In the future, the Tooh Dineh Plant will be assembling electrical components into electrical centers for Saturn Corp.

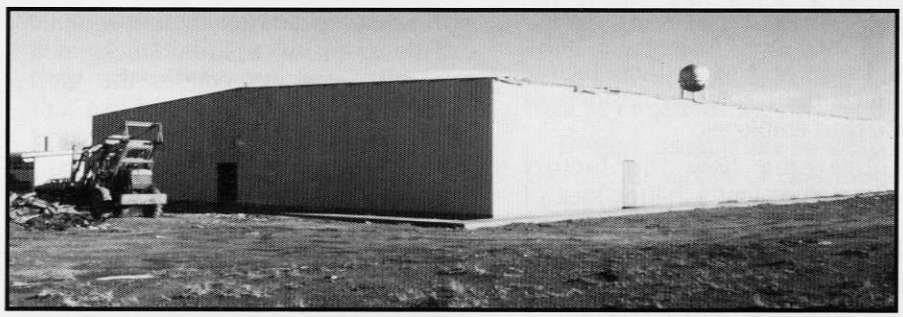
Rowlands cited other growing busi-



photos: Courtesy of Electronic Products

Left: The Tooh Dineh Plant produces control modules for tablets on Kurta Corporation's personal computers.
Top right: Electronic Products' new building provides 24,000 square feet of space.
Bottom right : A Navaho operator runs an in-circuit tester.

Electronic Products' Automotive Products	GM customer
adaptive lamp monitor	Chevrolet Pontiac Oldsmobile Buick
auto door lock	Cadillac
check engine lamp driver	Chevrolet Pontiac Oldsmobile Buick Truck & Bus
daytime running lamp	Truck & Bus
diode array	Various customers
resistor array	Various customers
lamp monitor	Pontiac
gear shift position transmitter	Oldsmobile Buick
rear defog switch	Pontiac
delayed unlock auto door lock	Cadillac Oldsmobile Buick



nesses for Electronic Products including: power controllers for diesel locomotives; control modules for tablets for personal computers for Kurta Corp.; delayed accessory bus and illumination entry (DABIE); five resistor array for the Supplemental Inflatable Restraints and the automatic lighting control module.

Because Electronic Products attracted so much new business, a building was added on the reservation. The building was funded through a federal grant obtained by TDII due to the reservation's high unemployment rate.

The new facility consists of 24,000 square feet. About 6,000 square feet will be used for office space, Rowlands said. The rest will be used for Saturn business, shipping, receiving and material storage, and other new programs.

Bucklin concluded, "The future looks bright for Electronic Products. The key to continued success is to focus on our original goals; briefly stated, Excellence."

How the auto business works

A quick guide to market factors

How is the auto market doing? The question is easy, but the answer is not.

That's because there are so many factors at work in the auto business. Each one affects the others.

How GM reacts to those factors affects the day-to-day business of Packard employes.

Learning how the factors relate gives you a better idea of why the industry works as it does. Basically, it's a matter of supply and demand.

Production

How many vehicles should you make?

An automaker's goal is simple: build exactly as many cars and trucks as it can sell. Doing so creates the most profit and the least waste.

If a company makes too many vehicles, its profit goes down. Why? Because it ties up money to build a surplus it can't sell.

What if it cuts production to make sure it always sells out? Then profits are still low because it must stop selling before market demand is satisfied.

The decision isn't easy. Look at plant capacity, for example. Most assembly plants are set up to build about 125,000 cars per year per shift. But what if you need 200,000 cars to sell? That's not enough work for two shifts. Yet it's too much overtime for one shift.

What to do? You could try to make consumers buy even more of your cars. You could add a second shift for a while, then cut back again. Maybe you run two shifts and tell them both to work at less than full efficiency. Or you could give up those "extra" sales.

Changeover

What happens when the model year ends?

Keeping production on track is hard enough. It gets even tougher when it's time to shift from one model year to the next.

The problem isn't so much on the production end. You just stop building this year's models and start building next year's vehicles. The trick is matching the changeover to the market.

Suppose you're ready to retool a replacement for a model that has been selling well. When you stop production, sales dip. That's because your dealers sell off their supplies of the old model before you get the new one into production.

It's the opposite problem for a model that isn't selling so well. This time you start cranking out new cars before your dealers have sold off the old models.

What to do? That's where sales incentives can help balance supply and demand.

Buying factors

What affects the sale of new cars?

So how many vehicles can a carmaker sell?

It depends. Is it spring or winter? What products are the competition offering? Which people are shopping for cars or trucks, and which aren't? What about pricing? Will fuel costs go up? How about interest rates?

These are the questions that GM faces every day. It considers dozens of factors and sets schedules about three months ahead. It adjusts them as conditions change.

The problem is, nobody knows for certain what "normal" sales really are. People buy more cars in the fall when the new models come out. They buy fewer in mid-winter and more again in spring. Sometimes sales taper off in late summer and sometimes they don't.

The experts sort it all out by studying past trends. They "adjust" sales numbers according to "season factors" to decide what's normal. Even then they don't always agree. That's because the forces that influence today's market are not always the same ones that influenced it in the past.

Incentives

Do rebates and sales incentives really help?

Rebates and other sales incentives change "normal" sales levels. When they work, they generate extra sales that pay for the cost of offering incentives in the first place.

But using sales incentives is tricky. Analysts say special deals only work for a few months. After that, incentives can lose impact.

Even when they work well, they only "borrow" sales for the future. How? Suppose you were going to buy a Chevrolet in a few months. But a big rebate offer convinces you to buy now instead.

That boosts current sales. But what happens a few months from now? Your purchase was "pulled forward" by the rebate. To make up for it, GM would need a new sales incentive — or hope the market heats up by itself.

That's why experts say that incentives only help for a while. Sooner or later, they warn, the market must "correct" itself by falling below normal sales rates.

Source: **CPC Dimensions**

Retail Sales

Where does the dealer fit in?

An automaker sells vehicles wholesale to its dealers. The dealers sell them retail to consumers. It's a key relationship.

Dealers usually like to keep a two-month supply of cars available to sell. But suppose a sales offer was so good they ran out of cars. It would take another 60 days to refill the pipeline and regain balance. Until then, factories could be working overtime even though retail sales were still slow.

The opposite thing happens if dealers load up on cars and have trouble selling them. Now production might slow down even though sales are still strong.

With the high cost of carrying inventory, dealers won't buy any more cars from the factory until they sell the ones they already have. So automakers watch retail sales very closely. Their goal is to balance production rates with sales rates.

In other words, they want to make exactly as many cars and trucks as they can sell. That gets us back to the beginning of the cycle — and the end of the story.

photos: Courtesy of Plant Engineering and Construction, Mexico West.

Concrete panel construction of Guadalupe I in the state of Nuevo Leon took place in 1988.

Excellence applied to building engineering

By Michael Hissam

Better buildings bring better benefits.

Lessons learned by Packard Electric as it built plants for the Mexican Operations in the early 1980s will go far beyond any alliteration in the 1990s.

Applying Excellence to building engineering is the key, according to Ron Zombar, Plant Engineering and construction supervisor, Mexico West Operations.

"Quality construction based on U.S. standards and technology is what we are seeking when we build," he said. "It is no longer concrete-block walls with an asphalt roof covering several hundred thousand square feet.

"Technology is driving how these plants are built, and we're now building them smaller. The details cover foundation to roof and everything in between. Working to specs — our specs — is the key."

Mexico West buildings suffer from a problem others would like to have — too much sunshine. "The sun here 'eats' the asphalt roofs. We were lucky to get four or five years out of a roof system at the first plants."

Now they specify EPDM, a rubber membrane that is much longer lasting for re-roofing the existing facilities, and a standing seam metal roof system on all of the new facilities, Zombar said.

Although the sun shines more in those latitudes, climate differences within Mexico affect the planning for construction.

Zombar explained, "Precast insulated walls are part of our specs." In arid Mexico West, newer 'air wash' units cool the plants. With these units, water flows over a filter through which outside air is drawn. The cooler air then flows into the plant. In the more humid Mexico East area, refrigerated air is used for cooling.

Some heating is also needed for early mornings in winter, but by late morning, the outside temperature is high enough for the heating to be turned off.

Other aspects of Packard plant planning in Mexico go beyond manufacturing space. "There's no compromising safety — either in design or construction. Fire and security systems are stronger. We use U.S.-based standards and meet GM compliance directives."

Packard-Mexico has taken leadership in protecting the environment. The division meets Mexican and U.S.

standards. Packard closely monitors the laws of both countries and has gained clarification of those laws, Zombar pointed out.

"Packard plants even feature separate buildings for chemical and flammable material storage," Zombar said.

A newer trend in Mexico parallels the Ohio branch plant concept of the late 1970s and early 80s. "We're down-sizing the plants so that they range from 75,000 to 125,000 square feet. It's more conducive to the workforce and it enables better management of the production packages."

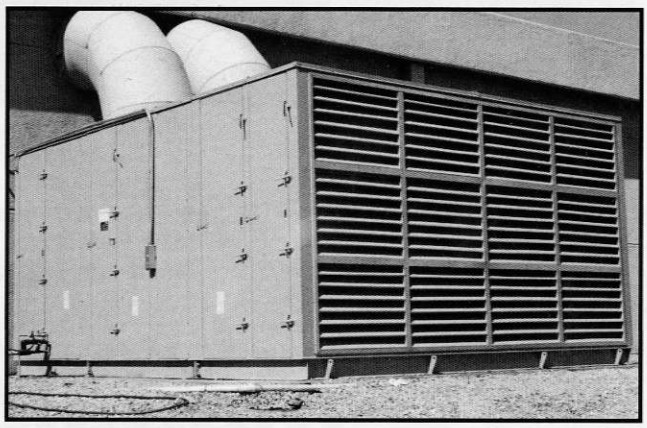
Also conducive to workers are the full kitchen facilities in the newer plants. "Good food service means keeping good people," he noted. In fact, some of the older plants have redone their cafeteria facilities.

To promote the advantages of competition, Packard does not "single source" when it comes to building contractors, Zombar said. "We interview various contractors and check out what they've done."

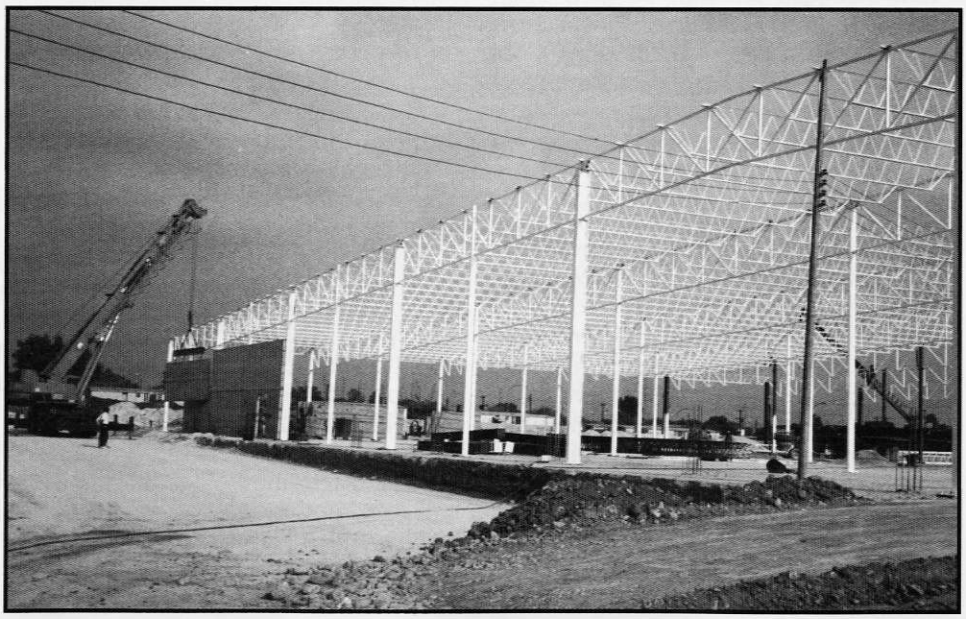
Zombar's organization also supports the construction by providing a site manager and a geo-technical engineer. "They assure everything is working to specifications. We have been training Mexican engineers in this area to U.S. specifications."

In all this work, the Absolutes of Excellence are stressed, so when the plants are built, Packard's Mexico team can say "We did the job right the first time."

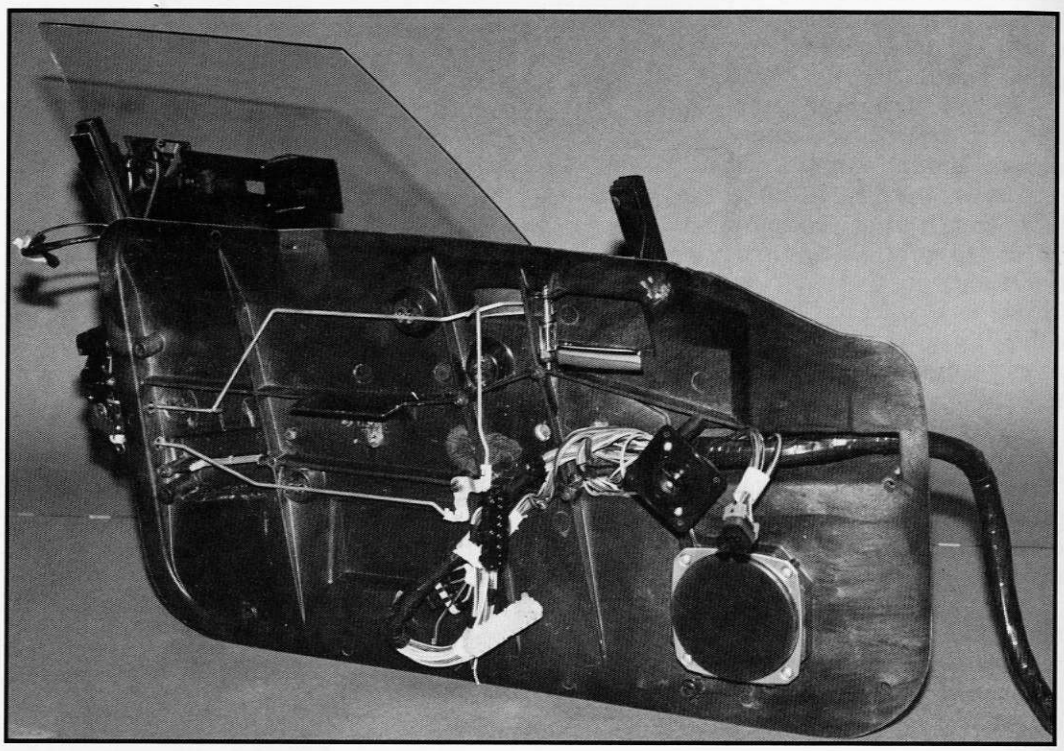
The latest roof system — a standing seam metal system — is used in all new construction.



New air wash units are replacing the roof top evaporating cooler units in Mexico West.



Pre-cast concrete panels are added to the structural steel of Guadalupe I.



Instead of sending all the parts that go into making a door to vehicle assembly plants, a completed, assembled and tested door unit is delivered.

photo: Courtesy of the Modular Products Business Segment

Sweeping the auto industry

The Modularization Craze

The trend in modular vehicle assembly is sweeping the auto industry and forcing suppliers to change their traditional way of doing business.

Modular vehicle assembly, a newly created market, requires that automotive suppliers combine their talents and products, rather than independently shipping loose piece components to the vehicle assembly plants.

Modularization — the pre-assembly of portions of the car off-site — is one way General Motors is fighting to reduce the number of hours it takes to build vehicles while improving vehicle quality.

Because of the introduction of modularization, Packard Electric formed the Modular Products Business Segment to poise the division to successfully participate in this new market, according to Paul Palovich, the segment's business manager.

Sixteen people make up the segment, which is aimed at providing the services needed to meet and exceed the expectations of the division's new modular customers.

Palovich said Packard is preparing for modularization by developing aggressive divisional plans as well as participating in the Automotive Components Group's (ACG) activities.

"The Modular Products Business Segment will spearhead Packard Electric's activities to become the technological and manufacturing leader of power and signal distribution systems in the modular industry," Palovich said.

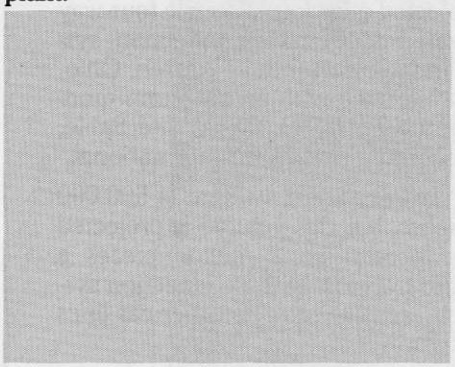
What is modularization?

If the concept of modularization were applied to eating in a restaurant, it would be like ordering a pot pie — with all the meat and vegetables baked in one crust — instead of choosing a meat, vegetable and potato a la carte.

While food cannot really be compared to car parts, the principle of modularization remains the same. In the auto industry, modularization means that many individual components of a vehicle are assembled off-site in their own environment and shipped to the vehicle assembly plant ready for installation as a complete physical segment.

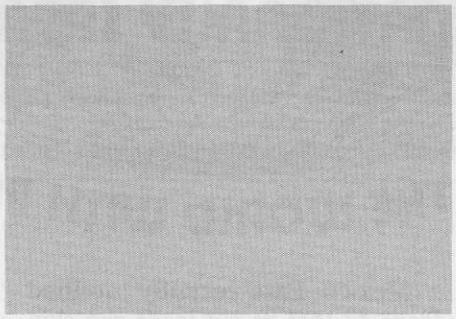
Areas where modularization is taking place in GM cars are doors, consoles, headliners, instrument panels, seats, tail lamps, front ends and fuel rails.

For example, instead of sending an assembly plant all the parts that go into making a door (such as the structure, glass, motors, switches, latches and wiring), a completed, assembled and tested door unit is delivered to the assembly plant.



What are the benefits of modularization?

- Decreasing the number of hours it takes an assembly plant to build a vehicle. Modularization supports the five manufacturing strategies being implemented by GM.
- Improving reliability and quality. Modules are pre-tested prior to installation.
- Lessening the design responsibility of the vehicle platforms. Now, module suppliers have more.
- Increasing flexibility in vehicle assembly plants. Different vehicle models can be built on the same assembly line.



Packard's perspective

In the 1993 model year, GM will purchase modules containing millions of dollars' worth of wiring. Packard has been awarded only a little more than half of this modular business.

The focus of the Modular Business Segment is to regain and retain the GM modular business.

Palovich said Packard's Sales Department "has done an excellent job maintaining a Packard presence while this new market was being established. The Modular Products Business Segment can now build on this presence and become a major player."

Currently, there are more than 30 modular suppliers to GM. Only three are ACG divisions. Each customer has specific requirements which must be included in Packard's design and manufacturing plans.

What our customers are saying

The Modular Products Business Segment is aggressively approaching the more than 30 modular suppliers that have wiring harnesses included in the modules.

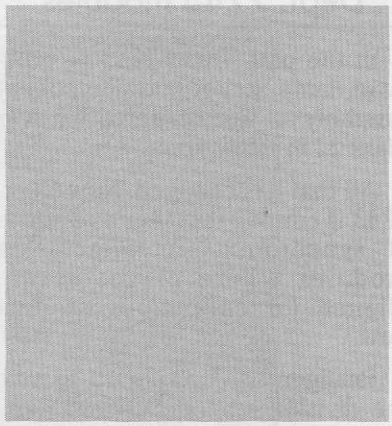
The modular suppliers are saying:

- If Packard can demonstrate it is the best supplier of power and signal distribution systems, then they will use the division for wiring in the GM modules.
- Most modular suppliers are looking for one wiring supplier to provide all the power and signal distribution systems. Modular suppliers are not in the wiring business and are not interested in dealing with multiple electrical suppliers.
- The opportunity for growth is tremendous. Winning GM business can lead to Ford, Chrysler, European and Asian modular business.

Customers' expectations

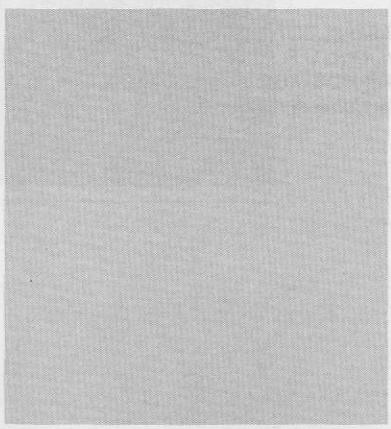
Modular suppliers expect Packard to:

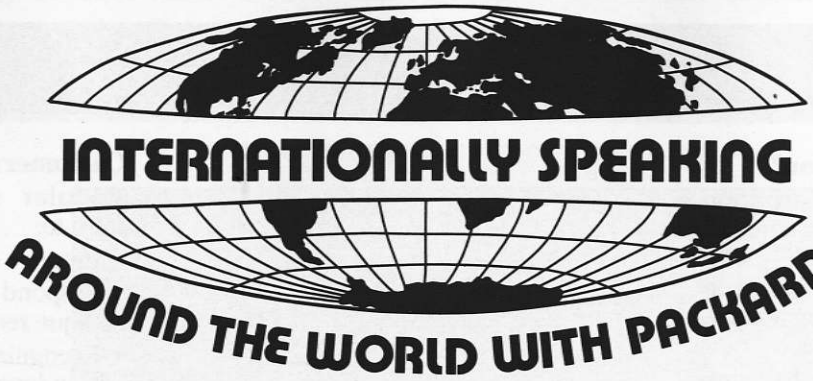
- Be price competitive.
- Respond quickly to numerous unique requirements.
- Recognize modular suppliers as independent, valued customers.



Modularization product trends

- Through the 1993 model year, traditional wiring harnesses will be installed on the module structure.
- In the 1994 model year, partial integration of the wiring system will occur into the structure. This means some parts of the harness may be molded into the structure.
- In the 1996 model year and beyond, the power and signal distribution system may be fully integrated into the modular structure.





Dept. 2243 modules

In the past, Dept. 2243 — bulkhead, lamp socket and component assembly — was scattered all over Plant 22 in Mississippi.

All that has changed. Now Dept. 2243 is coming together as a series of synchronous manufacturing modules where processes are aligned for continuous product flow.

Realignment is expected to save the division several hundred thousand dollars annually in labor, burden and inventory, said General Supervisor Jim Johnson.

Because of its improved competitive position, Bulkhead will also look at the possibility of adding new business.

Plant 47

Packard's Ridge Road Plant in Vienna, Ohio, is the first lead prep supplier in the division to achieve a 100 percent ship-to-production status.

Mexico East recently notified Plant 47 that its cut leads can skip receiving inspection, which is an extra check that adds cost to the product without adding value.

Bob Hocevar, Plant 47 superintendent, said, "Mexico East's decision to change this procedure is based on our plant's excellent quality performance during the past year and the fact that we have continued to show improvement every year."

VAZ

Two Volga Auto Works (VAZ) employes from Togliatti in the USSR recently visited Packard's Ohio Operations.

Yuri Turovski, deputy chief, Electrical Equipment, and Igor Potapov, chief, Automotive Electronic Development Department, toured Plants 42, 3, 10 and 11 to view the services and capabilities Packard offers to support VAZ.

Packard will supply wiring assemblies and connection systems for engine management emissions control subsystems and components. VAZ is the leading vehicle manufacturer in the Soviet Union.

Tallaght, Ireland

Packard Ireland officially opened its Excellence Training Centre this spring. The centre is "equipped with the most sophisticated training technology and systems," according to Desmond O'Malley, Ireland's minister for Industry and Commerce, who spoke at the opening ceremony.

Ford Motor Co.

Ford Motor Company has selected a Packard Electric four-way sealed Metri-pack connection system manufactured in Warren, Ohio, to interface with an air pump module on the 1993 Taurus and Sable, according to Packard International.

Initial annual volume is 500,000 pieces, but this volume is projected to increase to 2 million pieces a year by 1995 as the connection system is proliferated to other car lines at Ford.

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