

1991 FORD ESCORT AND MERCURY TRACER





A blueprint for the future

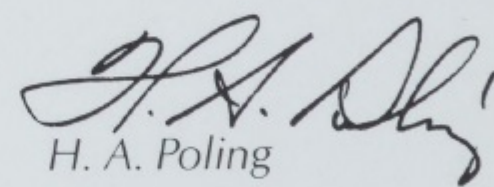
The heart and soul of competing is knowing how to appeal to your customers. If you can't provide the products they really want, you won't succeed. We at Ford Motor Company believe the 1991 Ford Escort and Mercury Tracer will provide the quality and value our customers really want.

To bring these new cars to market, we changed the way Ford cars are built. For example, the Escort and Tracer program is the first to make complete use of Ford's Centers of Responsibility concept, which utilizes the best of Ford's global resources as well as those of our partner, Mazda. As a result, Ford has brought the world's most advanced manufacturing technology home to its own North American facilities.

In addition to dramatic advancements in technology and processes, one of the biggest stories about the Escort and Tracer program is people working together. Thanks to the commitment of the United Auto Workers, production people now work in teams on the plant floor. There is a renewed dedication to improving both manufacturing quality and the quality of life.

With the new Escort and Tracer, Ford Motor Company unveils its "blueprint for the future:" our plan to compete with the best in the world during the challenging decade of the 1990's and beyond.

Please take the time to drive a 1991 Ford Escort or Mercury Tracer, cars that are full of "surprises and delights." They are truly customer driven and are a fitting tribute to our employees and the American "can do" ethic.


H. A. Poling
Chairman
Ford Motor Company



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1991 Ford Escort and Mercury Tracer





PHILOSOPHY
A new direction

The most difficult task facing American carmakers is to build cars that surprise and delight their owners, cars that deliver more than the buyer hoped for. It is a task that requires everyone who designs and engineers cars to be sensitive to the fine points. And it demands leadership that will point the troops in the right direction and back them up with the resources necessary to do the job right.

*Car and Driver
January, 1990*

Ford Motor Company emerged as the maker of the best quality American cars during the 1980s. But that is not good enough in a global market. Ford is moving to a new level of excellence, leaving behind its traditional domestic competitors. Ford's mission in the coming decade is to challenge the toughest imports and establish itself as a world-class leader in product quality, value, function and customer satisfaction.

To accomplish this, Ford has changed the way it does business. All phases of bringing a car from concept to the customer...design, engineering, development, manufacturing and marketing...have been reviewed, modernized and improved. Ford is committed to continuous improvement in all the products it delivers. The first products of this new direction are the 1991 Ford Escort and Mercury Tracer. Their success will provide the blueprint for Ford Motor Company in the 1990s.

COMMITMENT

World-class quality isn't a luxury anymore. It's the price of admission to the most competitive new car market in history.

Today's car buyers insist upon ever-higher

standards of quality and excellence...and Ford is listening.

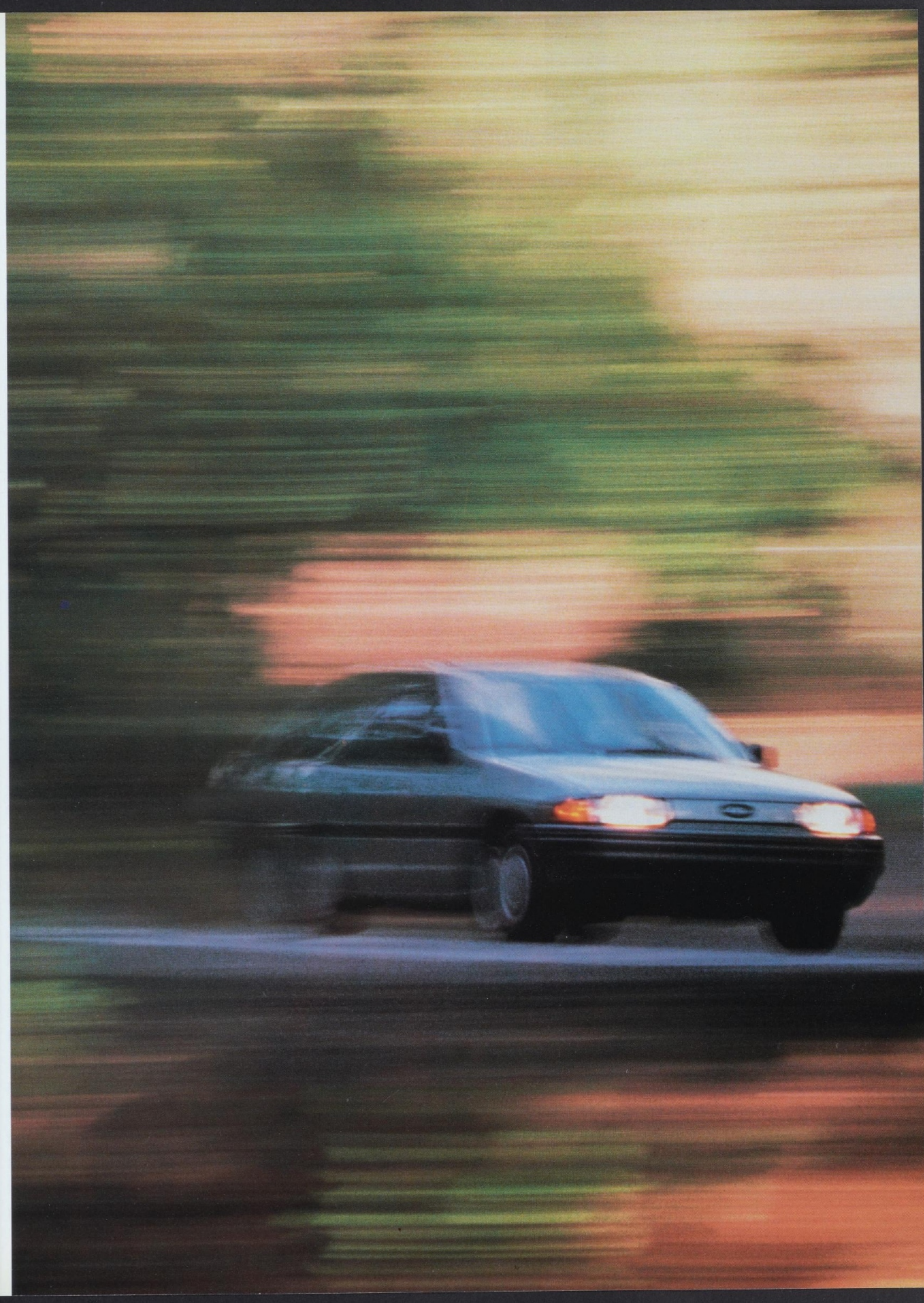
Ford is committed to developing and bringing to market products that reflect the customer's priorities. The new Ford Escort and Mercury Tracer demonstrate that Ford has made the customer's passion for quality its own.

Making better cars means more than simply changing sheet metal. It means making full use of the Company's global capabilities, modernizing facilities, introducing world-class manufacturing systems, unleashing human potential and committing resources to improving product quality and satisfying customers.

Ford insiders have given their own name to this passion for quality: CT20. That's the code name for the program bringing the 1991 Ford Escort and Mercury Tracer to North American markets.

It is the biggest program at Ford Motor Company since the Ford Taurus and Mercury Sable, involving a total investment of \$1.9 billion. With the CT20 Program, Ford has brought the best of the world's production technology home to its own U.S. facility.

This program is crucial to Ford Motor Company's success in the 1990s. The new Escort and Tracer have been engineered to play a major role in ensuring that Ford meets federally mandated Corporate Average Fuel Economy (CAFE) standards in the decade ahead. That's one of the reasons why Ford intends to produce and sell 500,000 Escorts and Tracers annually. In doing so, Ford will be able to continue offering a full product



lineup, from small to full-size cars, that North American car buyers want and need.

Ford is also committed to making the new Escort and Tracer a success because of their importance to the well-being of Ford and Lincoln-Mercury dealers. Escort, for example, has accounted for almost one out of every four sales at Ford dealers in North America in recent years. With the potential that the new Escort and Tracer now have to "conquest" sales from current import owners, Ford expects its dealers to benefit with increased sales and market share.

TEAMWORK

It all begins with a corporate culture that encourages teamwork and employee involvement. People are the source of Ford's strength. They provide the corporate intelligence, determine the Company's reputation and deliver the overall vitality. Employee involvement and teamwork are Ford's core human values.

It is in this spirit that everyone who worked on the CT20 Program was given a stake in its success and a say in how it was implemented.

For example, early on, outside suppliers were brought into the manufacturing process as Ford's partners in quality, not just "vendors." They helped to improve production capability and resolve quality concerns.

The renewed commitment between the United Auto Workers and Ford Motor Company at the Wayne Integral Stamping and Assembly Plant is an excellent example of teamwork on the plant floor. The partnership is based on a dedication to improving

manufacturing quality and the quality of life. Assembly technicians and skilled trades workers have had an important role in procedures and production operations. Their workmanship and pride in the products they produce are instrumental in maintaining quality standards.

WINNING THE WORLD OVER

The CT20 Program is the first to make complete use of Ford's worldwide "Centers of Responsibility" concept. It utilizes the best of Ford's global resources, as well as those of Mazda, which is 25% owned by Ford.

It is not easy to successfully manage a worldwide project, but the "Centers of Responsibility" approach has provided valuable lessons. It demonstrated, for example, that the key to developing a "world car" is to place lead responsibility for various activities with the experts within Ford's worldwide organization. Such an approach reduces duplication and takes maximum advantage of the capabilities and talents in each area of expertise.

To this end, Ford assumed sole responsibility for exterior and interior styling, as well as North American manufacturing. Mazda was responsible for most product engineering functions, working to Ford specifications and objectives in designing the vehicle's platform.

Ford was also the source for several important components. For example, Ford's Engine Engineers and its Dearborn, Michigan Engine Manufacturing Plant designed and are producing the new 1.9 liter engine that is standard on most of the 1991 Escorts and



Mercury Tracers.

To ensure that Mazda's platform development was consistent with Escort and Tracer's marketing objectives, Ford sent dozens of engineers and executives to Japan, time and again, to provide on-the-spot direction. In fact, Ford personnel supervised all development tests and engineering sign-off reviews.

Escort and Tracer are being built by Ford at plants in Wayne, Michigan and Hermosillo, Mexico. The Hermosillo plant has been producing previous Tracer models since 1986, at world-class levels of quality. The lessons learned at Hermosillo have taught the importance of blending the needs of Ford

employees with the technical requirements of manufacturing processes.

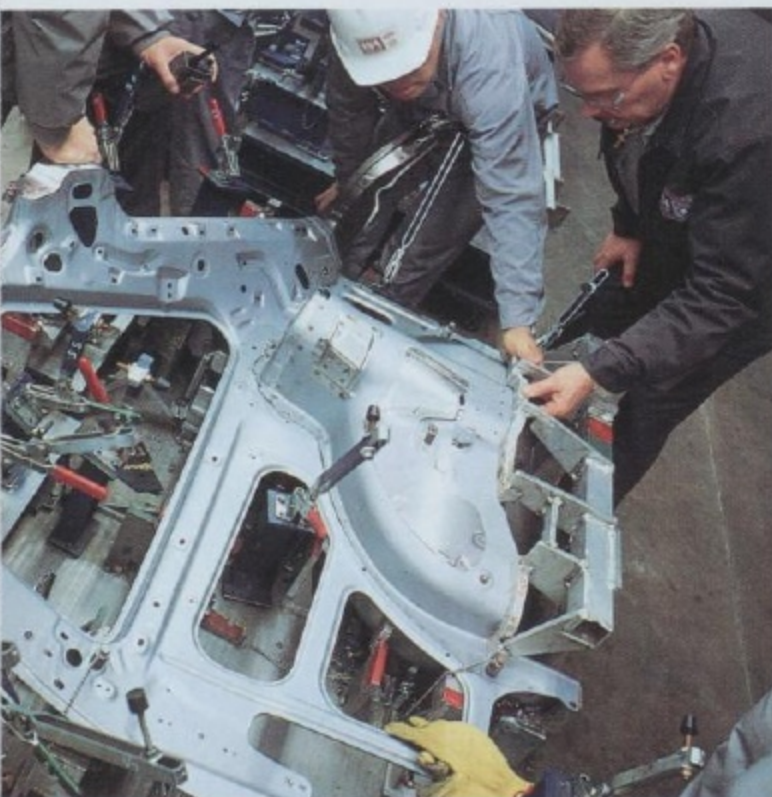
This global partnership has brought Escort and Tracer from concept to customer with the quality and product attributes customers desire. And it establishes the blueprint for future successful products.

TOTAL QUALITY EXCELLENCE

It's all part of Ford's commitment to Total Quality Excellence, the recipe for continuously improving customer satisfaction. Total Quality Excellence is based on some very simple, but powerful, principles:

- Quality is defined by customers. Customers want products and services that meet

Styling was the sole responsibility of Ford, while Mazda concentrated on engineering. The distinctive 4-Door notchback sedan is exclusive to Mercury Tracer.



A renewed commitment between Ford and the UAW established employee involvement, teamwork and pride in workmanship as the cornerstones of the CT20 Program.

their needs and expectations at a cost that represents value.

- Quality excellence is best achieved by preventing problems rather than by detecting and correcting them after they occur.
- All work that is done by Company employees, suppliers and dealers is part of a process that creates a product or service for the customer. Each person can influence some part of that process and, therefore, affect quality and, ultimately, customer satisfaction.
- Sustained quality excellence requires continuous process improvement. This means that regardless of how good present performance may be, it can be improved.
- People provide the intelligence and generate the actions that are key in achieving these improvements.

The CT20 Program is the foundation of the two most significant new product launches since the 1986 Taurus and Sable. By remaining faithful to customer expectations and rigorous new standards for product quality, Escort and Tracer will do for the small car segment what Taurus and Sable did for mid-size cars.

It's a big challenge. But Escort and Tracer meet it head on.

The CT20 Program is dedicated to producing consistently high quality components. Advanced manufacturing systems, such as automated parts handling, help achieve this goal.



DESIGN

Competing with the world's best

The small car segment is crowded with excellent vehicles. But the new Escort and Tracer won't have any trouble standing out in the crowd. From their overall conception down to the execution of the smallest details, each of these new car lines conveys a characteristic message of quality and style. That is because Escort and Tracer were designed to appeal to different groups of small car buyers, while competing head-to-head with the world's best in their class.

To compete successfully in today's rapidly changing and expanding small car segment, any new product must equal or surpass the world's best examples in overall performance, styling, features, quality and value. Why? Because customers expect it.

The new Escort and Tracer are examples of how Ford Motor Company is building on its past product successes as it positions itself to succeed in the coming decade and beyond. To look at these cars, and drive them, is to experience the future.

A NEW ATTITUDE

The 1991 Escort and Tracer are not just restyled versions of their former namesakes, they are all-new designs through and through.





Escort hatchback styling is both attractive and functional, with a 0.34 coefficient of drag that contributes to better handling, improved fuel economy and reduced wind noise.

These vehicles offer contemporary, aerodynamic styling and greatly improved functional capability.

To compete on an international basis, it is necessary to create automobiles that meet the wants and needs of a diverse market and have world-class appeal. Escort and Tracer achieve this objective. They give customers choices in body styles, trim levels and features, and provide interior compartments designed for comfort as well as function.

They're available in four body styles, each tailored to the needs and preferences of their individual buyers. Ford Division offers two-door and four-door hatchback body styles for the Escort. The Tracer four-door notchback sedan is a Mercury exclusive. And both divisions feature distinctive new four-door wagons styled for wide appeal.

The Escort GT hatchback and the Tracer LTS touring sedan have been designed to satisfy the needs of buyers of performance-oriented small cars. Although they share a new 16-valve, dual overhead cam perform-

ance engine, they have differently tuned suspensions and, of course, very different exterior appearances.

Escort and Tracer have been styled to give each a distinctive Ford or Mercury identity. Both cars, however, incorporate Ford Motor Company's hallmark "aero look" with lines that flow smoothly and harmoniously.

Ford designers have given the cars a longer, lower, more aggressive appearance. A longer wheelbase, wider tread, lower cowl, beltline, and overall height all contribute to the new, more modern and wedge-shaped look of each Escort and Tracer model.

Not surprisingly, the new cars have better aerodynamics than their predecessors. The Escort hatchback models, for example, have an improved coefficient of drag (Cd.): 0.34 versus 0.39 for the previous model. This contributes to better road handling, improved fuel economy and reduced wind noise.

EASY TO LIVE WITH

Drivers and passengers will enjoy what they find inside Escort and Tracer, especially their roominess and the attention to passenger comfort.

The spacious interior package provides 5-passenger seating, which is unusual in this class of cars. Furthermore, by applying the science of ergonomics, controls have been conveniently located, the seats have been constructed to be comfortable and supportive, and visibility from the driver's "command" position has been enhanced.

Then there's the difference in the way the Escort and Tracer interiors "feel." Research

has revealed there are certain "touch zones" that are vital to satisfying the customer, areas that customers often touch, grab, move, feel or even look at for long periods of time. This is another area where Ford has abandoned the "business-as-usual" approach to make Escort and Tracer truly world-class cars.

Ford's designers have created interior environments that are more comfortable and pleasant to be in, and which reinforce the Escort and Tracer quality message. Overall fit and finish is excellent, and the new instrument panel neatly integrates with the door trim panel. The standard cloth seat and trim fabrics are available in textures and colors that look and feel good.

What's more, the interior trim is designed to continue looking good, with the use of fade-

resistant materials that stand up to daily usage and the damaging effects of the sun's heat and ultraviolet rays.

Open the hood of a new Escort or Tracer and you'll find a well organized, uncluttered engine compartment. Wires and vacuum lines are tied neatly back, out of the way. Fluid reservoirs are clearly labeled. And service points are conveniently color-coded. This makes it easy for owners to make routine service checks and replace fluids.

EASY TO LOVE

Escort and Tracer are full of pleasant surprises. But they are quite predictable in one important sense: They're designed to please their drivers and remind them that they made a smart purchase or lease decision.

The sleek styling of the Escort Wagon is reminiscent of Ford Taurus, the car that changed the way America looks at wagons.





MARKETING

Listening to the customer

Quality is something more than just a numerical characteristic, a thing that can be measured with scales or calipers. Ultimately, quality must be measured against the needs and expectations of the customer.

The 1991 Escort and Tracer story begins and ends with Ford Motor Company's dedication to its customers. By identifying potential buyers, determining their needs, and designing the cars accordingly, Ford has come to understand one of the most elusive components of quality: the human element.

MARKET RESEARCH

Ford Escort was one of the best-selling and most popular cars of the last decade. Approximately 3.7 million were sold in North America during the 1980s, about 700,000 more than the next best-selling car.

The continued success of Escort, and increased popularity of Tracer, are key elements in Ford's plan for success in the nineties. So it was very important that the new models address customer wants and needs. The new Escort and Tracer had to appeal to traditional domestic buyers, and be equally attractive to import prospects.

The 1991 Escort and Tracer are among the

most extensively researched cars in Ford's history. A ten-stage market research process helped Ford better understand market direction and refine Escort and Tracer based on customer preferences. This began almost four years before the first Escorts and Tracers rolled off the production line. The process included interviews with customers and owners of competitive models and involved these people in actual test drives.

Prospective buyers were asked what they liked and what they did not like about the new cars. And Ford used this feedback to refine Escort and Tracer to reflect these customer preferences and expectations.

One of the most fundamental Escort and Tracer characteristics evaluated during the ten-stage process was the length of the wheelbase of the new cars.

Potential buyers were shown two versions: a "short" package, comparable to the previous Escort, and a "long" package, one stretched by about four inches. Then they were asked to choose.

Potential buyers preferred both the appearance and spaciousness of the "long" package. This ultimately led to Ford's decision to stretch the wheelbase and significantly change the appearance of the new cars, in spite of the fact that the "short" package would have placed fewer demands on engineering and manufacturing resources.

Customers also expressed a preference for a variety of hatchback, sedan and wagon body styles. For example, the four-door notchback sedan researched particularly well and conveyed an upmarket image, well-suited for the





Market research was used throughout the product development process. The smoothly contoured Escort Wagon is an excellent example of what can be gained by listening to the consumer.

Mercury Tracer. As a result, it was added to Ford's North American small-car lineup for the first time, exclusively on the Tracer.

Feedback from potential customers was similarly used to refine various elements of the Escort and Tracer prior to production start-up. Some of the most constructive suggestions Ford received had to do with improving two of the "touch zones" on the Escort's interior: the seat fabric and door trim panels. Customers believed that early versions of the fabric did not match the quality communicated by the Escort's exterior styling, and the door trim panels didn't have the look and feel they wanted.

Both customer suggestions were acted upon. The Escort's seat fabric was changed, and its door trim panels redesigned before the vehicle went into production.

Through market research, customers were able to evaluate powertrain and chassis characteristics in Escort and Tracer prototypes. This research reinforced the need for a number of product refinements, such as the addition of a subframe to improve powertrain isolation; changing the standard four-cylinder engine's torque curve to improve responsiveness; and adding an electronic four-speed automatic transaxle. Research confirmed the

importance of getting these things right. Right from the start.

Ford understands that customer satisfaction is often a matter of simply listening. The 1991 Escort and Tracer clearly reflect the wants and expectations of buyers and have the potential of satisfying customers because Ford has listened and responded.

THE BUYING EXPERIENCE

Ford believes that the ownership experience begins as soon as the prospective buyer walks onto the showroom floor. By making the Escort and Tracer purchase decision easier, Ford expects to improve customer satisfaction and increase sales.

Between them, Escort and Tracer offer a full range of sedan, hatchback and wagon

body styles, allowing customers to select a vehicle that better meets their overall transportation needs.

But whichever model they choose, buyers will get a well-equipped vehicle at a competitive price. That's because Preferred Equipment Packages (PEPs) simplify ordering and increase value by logically grouping popular options and offering them at a discount (compared to purchasing free-standing options).

By reducing the number of free-standing options, Ford also has reduced the number of buildable combinations from millions to just under one thousand. Reducing complexity this way increases manufacturing quality and, based on research, contributes to greater customer satisfaction because it takes some of the confusion out of ordering a car.

The moment a customer takes delivery of a new vehicle can be as important to satisfaction as is product quality. That is why Ford has joined forces with its dealers to improve the vehicle delivery experience by preparing a seven-step process to train dealership salespeople.

This training program will help Ford sales personnel to explain thoroughly the new Escort or Tracer upon delivery, to familiarize new owners with all the operating features and characteristics of their cars. In this way, Ford and Lincoln-Mercury dealers and their salespeople will be contributing to a quality ownership experience for buyers of the new Escort and Tracer, an experience which began with an engineering effort that spanned the globe.

One of the best ways to market technology and precision manufacturing is with a true driver's car. The new Escort GT has been designed to involve and reward the driver, with a high-performance engine, specially tuned suspension and unique appearance.



4

ENGINEERING

A new level of competitiveness

With the imports continually improving the functional capability and quality of their products, it's simply not enough for Ford to make a good car. Ford has to make an outstanding car.

The new Escort and Tracer are outstanding cars, in ways drivers and passengers will recognize and appreciate. Ford's global engineering team has helped raise Escort and Tracer to a new level of competitiveness. With their new powertrains, new suspensions, improved body structure and other functional improvements, Escort and Tracer have been engineered to world-class standards of quality in an effort to meet the expectations of small car buyers.

Two of the best reasons to own a new Escort or Tracer can be found under the hood. The engines developed for 1991 incorporate advanced technology that pays off in improved performance, without compromising the fuel economy buyers expect from a small car.

This commitment to high technology also helps Ford in a time of uncertainty about future government regulations, particularly as they relate to Corporate Average Fuel Economy (CAFE) standards. It is expected that CAFE standards will become tougher in the U.S., but

it is not known by how much. Whatever the new standards are, however, the 1991 Escort and Tracer will be vital contributors in Ford's efforts to meet them.

1.9L SEFI ENGINE

Tracer, as well as Escort Pony and LX, are equipped with the new, Ford-designed and manufactured 1.9 liter Sequential Multiple-port Electronic Fuel-Injected (SEFI) four-cylinder engine as standard equipment. This engine features a number of technical improvements. Fuel delivery, air intake and spark control, for example, have been redesigned to improve overall driveability; that is, start-up, idling, accelerating and cruising.

Escort and Tracer models equipped with this 1.9 liter engine are the only cars in their class with Sequential Multiple-Port Electronic Fuel Injection. The sophisticated multiple-port system delivers fuel to each cylinder in firing sequence instead of sending fuel to groups of cylinders simultaneously. This precisely timed metering of fuel contributes to efficiency and driveability and provides more reliable cold starts.

A new high-efficiency mass air flow sensor works in concert with SEFI to enhance performance efficiency. By accurately measuring the flow of intake air, the mass air flow sensor allows the Electronic Engine Control (EEC-IV) system to determine the exact amount of fuel to deliver to the injectors.

Also new is a maintenance-free Electronic Distributorless Ignition System (EDIS). It eliminates the distributor cap and rotor by connecting each spark plug directly to the coil





Standard 5-speed manual overdrive transaxle is designed for smooth shifting.

1.9 liter overhead cam engine with distributorless ignition and Sequential Electronic Fuel Injection (SEFI).

Front-wheel drive puts engine weight over the driving wheels for better traction.

Rack-and-pinion steering system features a revised design for improved response.

Isolated powertrain subframe minimizes noise and vibration in the passenger compartment.

Power front disc brakes put the most stopping ability where it's needed, under the weight-bearing wheels.

Front and rear stabilizer bars help reduce vehicle roll when cornering.

Independent strut-type suspension system incorporates new geometry for enhanced handling.

Rear suspension includes both lower transverse arms and trailing links.

Lubed-for-life wheel bearings never need maintenance.

Tinted glass helps reduce glare and enhances the efficiency of optional air conditioning.

pack. This system is unique in that the EDIS module has a data processing capability of its own, resulting in greatly improved spark timing accuracy. Using a sensor which monitors crankshaft rotation at ten-degree intervals, the EDIS module processes data and relays it to the EEC-IV computer. This permits very accurate spark advance across the engine's entire operating range.

Ford engineers have also modified the torque characteristics of the engine to improve overall low-end performance, particularly start-up acceleration. This, combined with quick throttle response, makes the 1.9 liter SEFI engine feel especially responsive in city driving conditions, when passing or when

merging onto expressways. Exactly those situations where drivers expect an engine to respond without hesitation.

Ford engineers have also placed a high priority on making the 1.9 liter engine run quietly and smoothly.

Internal engine tolerances were narrowed, making the engine "tighter." Crankshaft bearing clearances, for example, were reduced to diminish the opportunity for vibration. The engine block was re-engineered to eliminate unnecessary weight, and the addition of structural ribs helps reduce engine noise.

Escort and Tracer also feature a powertrain

subframe. This assembly adds structural rigidity and helps isolate the engine and transaxle from the passenger compartment. A powertrain subframe is uncommon in Escort and Tracer's class and is typically found in more expensive cars, such as Taurus and Sable. Additionally, four rubber engine mounts, compared to three on the previous Escort, help reduce powertrain noise and vibration that might otherwise be transmitted to the passenger compartment.

1.8L DOHC ENGINE

The Escort GT and Tracer LTS standard powerplant is a high-performance 1.8 liter Dual Overhead Cam (DOHC), 16-valve, four-cylinder engine designed and produced by Mazda. This new multiple-port, electron-

ically fuel-injected (EFI) engine produces 127 horsepower, 17 horsepower more than the 1.9 liter High-Output engine in the previous Escort GT.

The secret is that this engine "breathes" better, with four valves per cylinder. Two intake and two exhaust valves ensure that the fuel-air mixture can be more efficiently delivered to, burned and expelled from the combustion chamber. This contributes to the relatively high power output for an engine of its size.

Powered by this high-technology engine, Escort GT is a truly competitive performance vehicle for the small car market. And, as the heart of the LTS, the 1.8 liter engine marks the first time Tracer has offered a performance-oriented model in the small car segment.

The optional electronically controlled 4-speed automatic transaxle delivers better start-up performance, smoother shifts and quieter cruising than its predecessor.



TRANSAXLES

The manual and automatic transaxles available on the 1991 Escort and Tracer are designed to increase driver comfort and enjoyment. Gear ratios have been carefully matched to engine performance, contributing to efficiency and driving pleasure, whether the driver prefers the personal involvement of the manual transaxle or the convenience of an automatic transaxle.

The standard 5-speed manual overdrive transaxle on Escort and Tracer features a hydraulically actuated clutch replacing the cable linkage on the previous design for smooth operation with less effort. The clutch is self-adjusting, an upgrade over the previous Tracer clutch.

The real transmission news, however, is the optional four-speed Electronic Automatic Overdrive Transaxle (4EAT). This new transaxle is a significant improvement over conventional three-speed automatics. It is available on all models and marks the first time an automatic has been offered on Escort GT.

Shift points of the 4EAT transaxle are controlled electronically for enhanced acceleration and smoother shifts. At highway speeds,

the torque converter locks the transaxle directly to the engine for improved fuel economy and quieter operation.

An electronic four-speed automatic transaxle is another important example of how Ford has engineered these cars to world-class standards of quality.

SUSPENSION SYSTEMS

Escort and Tracer feature new, fully independent suspension systems which contribute to major improvements in ride and handling over the models they replace. Actually, there are three unique suspension settings, developed by Mazda to meet Ford specifications in response to customer requirements.

The first is shared by Escort Pony and LX and the standard Tracer. It improves upon the ride of the previous Escort and Tracer by providing a quicker, more agile feel. The second, exclusive to Tracer LTS, features a handling bias with an emphasis on overall riding comfort. Escort GT's suspension, the third setting, delivers precise performance handling with solid road feel.

With three different suspensions, Escort and Tracer are able to satisfy the ride and handling expectations of several different target buyer groups.

One of the important features contributing to the handling and ride control of the 1991 Escort and Tracer models is the use of both front and rear stabilizer bars with all three suspensions. What's more, Escort GT and Tracer LTS are equipped with larger diameter stabilizer bars that contribute to the enhanced handling capability of these

performance-oriented cars.

The independent strut front suspension and new four-link, coil spring, strut-type independent rear suspension use a modified geometry to improve overall handling. Also new are variable rate rear springs, with relatively long rear suspension travel, closer to the travel more typically found in a full-size car. This contributes to Escort and Tracer's exceptional ride quality.

Another design improvement is the offset mounting of the shock strut and the coil spring on both front and rear suspensions. This counters the twisting effect the wheel exerts on the strut, reducing friction for improved responsiveness and road feel.

STEERING AND BRAKES

A new rack-and-pinion steering system complements the new suspension packages, enhancing road feel and improving maneuverability with a four foot shorter turning radius than the previous models. The optional power steering system, also redesigned, makes for easy parking and also provides a greater road feel at highway speeds.

All Escort and Tracer models are equipped with power-assisted, fade-resistant ventilated front disc brakes for quick, controlled stops. The Escort Pony and LX and the standard Tracer also have larger rear drum brakes compared to last year's models.

The performance-oriented Escort GT and Tracer LTS have power-assisted disc brakes on all four wheels for improved stopping power. Four-wheel disc brakes, not generally available on other cars in this segment,

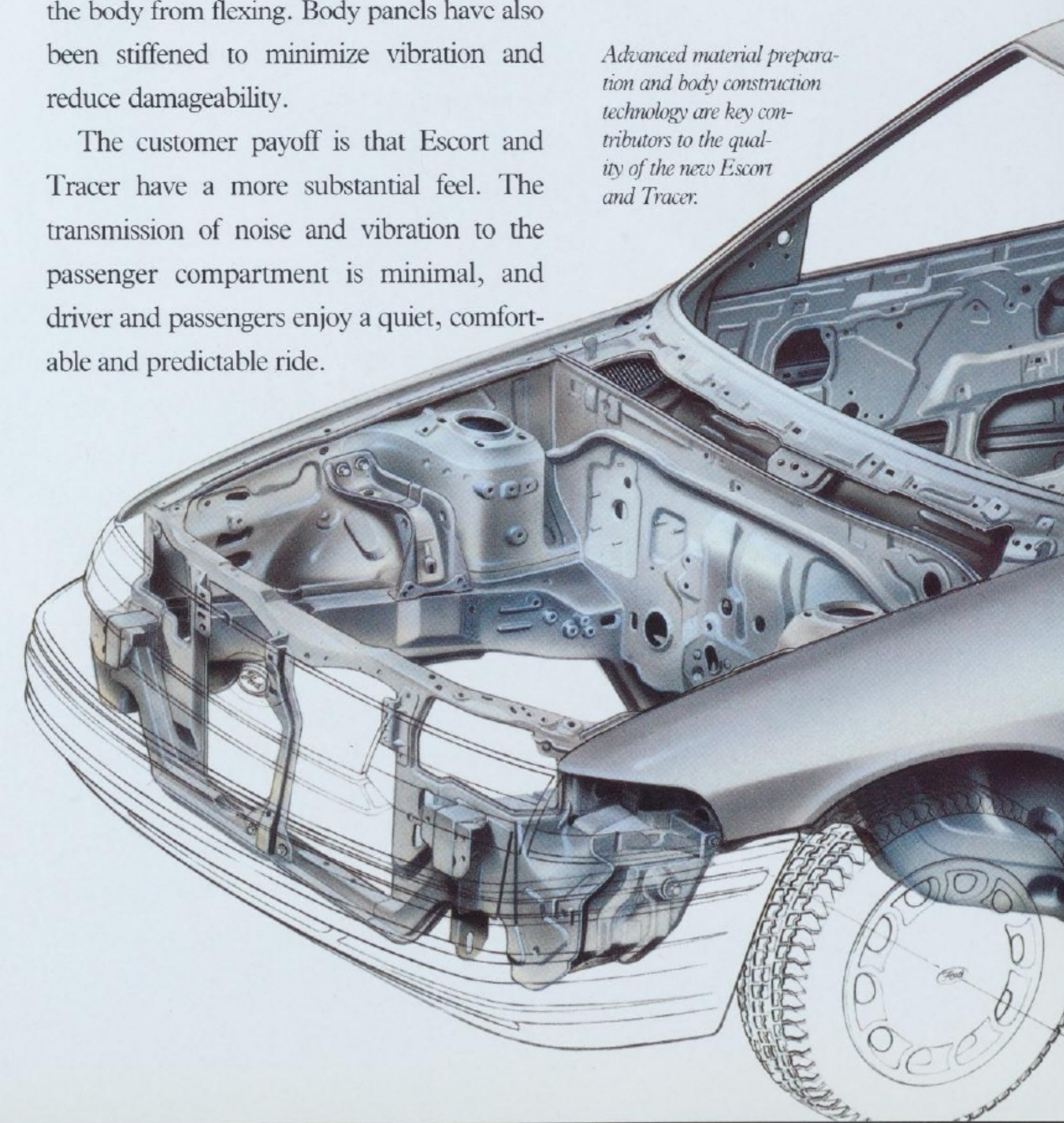
represent an important functional improvement, contributing to the competitiveness and overall value of the GT and LTS models.

BODY INTEGRITY

The integrity of a car body, how well it is designed and constructed, has a major effect on its Noise, Vibration, and Harshness (NVH) characteristics, long-term durability and occupant safety. It's only natural, therefore, that CT20 Program engineers set high standards for Escort and Tracer unitized bodies, which have been strengthened at key structural points. This added support keeps the body from flexing. Body panels have also been stiffened to minimize vibration and reduce damageability.

The customer payoff is that Escort and Tracer have a more substantial feel. The transmission of noise and vibration to the passenger compartment is minimal, and driver and passengers enjoy a quiet, comfortable and predictable ride.

Advanced material preparation and body construction technology are key contributors to the quality of the new Escort and Tracer.



A new suspension geometry promotes responsive vehicle handling and power front disc brakes provide good stopping ability.



MANUFACTURING

Redesigning the way Fords are built

It is not surprising, really, that Ford now has the capability to build a small car in the U.S. that can equal, in world-class quality and best-in-class value, any small car built anywhere in the world by any manufacturer. It is not surprising, either, that Ford is moving from being America's leading automotive manufacturer, to a position of worldwide leadership through advancements in technology, processes and people working together.

None of this is surprising because Ford has brought the best of the world's production technology home to its own North American facilities; global technology to help build world-tech cars.

The launch of the all-new Ford Escort and Mercury Tracer is a manufacturing event at Ford. The introduction of these new cars is as significant as the first moving assembly line at Highland Park in 1913 and the construction of the River Rouge complex of 1927, where ore boats unloaded raw materials at one end and the assembled cars came driving out the other.

Measured in investment terms, the CT20 Program is one of the most ambitious manufacturing undertakings in Ford's history:

□ Over \$600 million of the \$1.9 billion total

program investment was used to convert Ford's Wayne, Michigan Assembly Plant into the Wayne Integral Stamping and Assembly Plant; a fully integrated stamping, body and assembly operation dedicated to producing Escorts. Wayne is now the only Ford factory in the U.S. to build cars from sheet metal to final assembly.

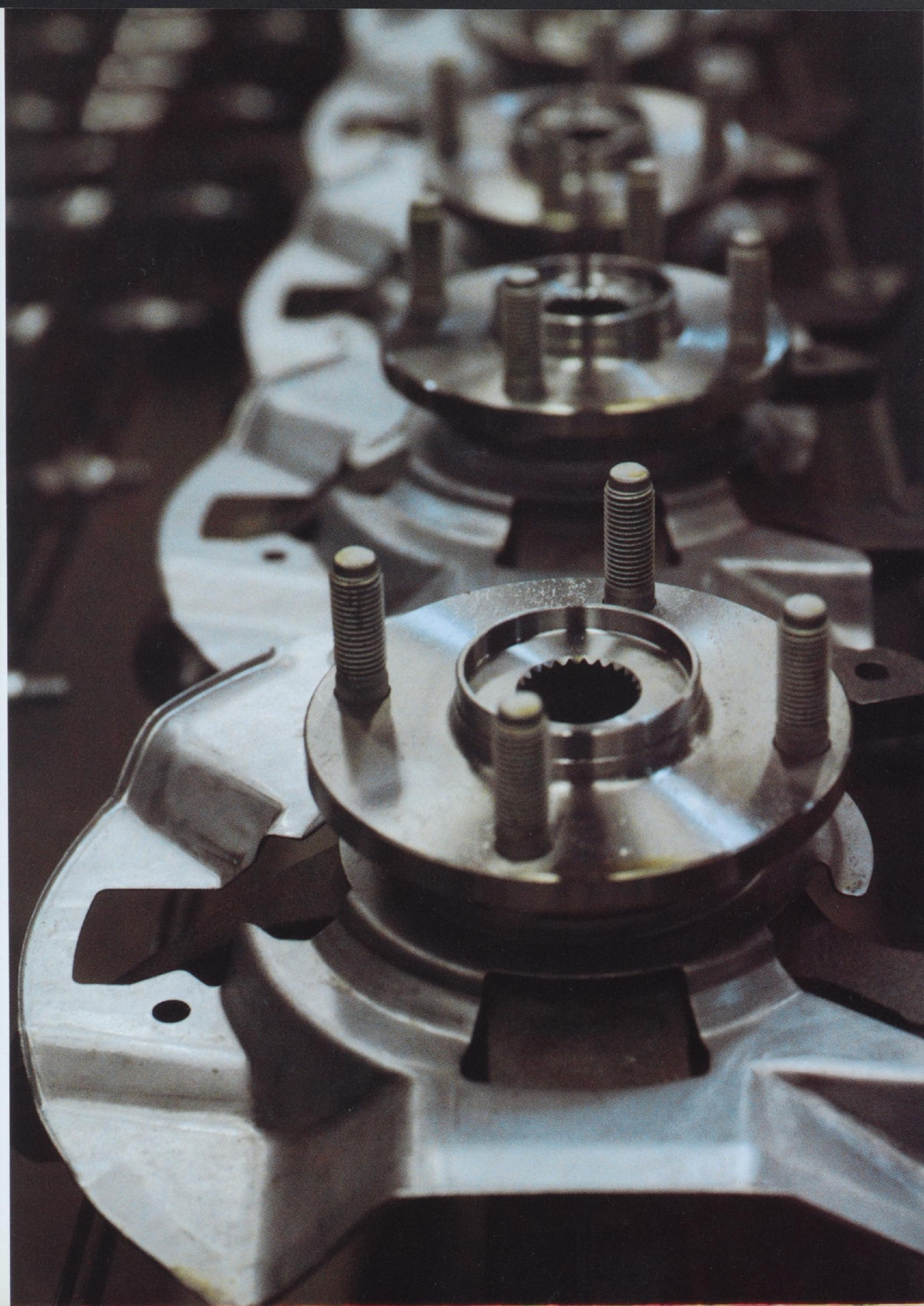
□ More than \$300 million was invested in the Hermosillo Stamping and Assembly Plant to modify and retool it to build the new Tracer and provide flexibility to produce most Escort models as well.

□ Over \$20 million was invested in training people, many times more than the spending that went into pre-production training for the launch of the 1986 Ford Taurus and Mercury Sable. Ford sent about 150 assembly technicians and engineers to Japan to discuss production tooling and processes with their counterparts at Mazda. Others visited Ford's Hermosillo, Mexico plant, where many innovative procedures and techniques were already in place to build the prior Tracer.

But the significance of the CT20 Program cannot be fully appreciated only in financial terms. There's more to the story than that. The new Escort and Tracer are high quality products of world-class plants, advanced manufacturing processes and involved, dedicated people working together.

THE PLANTS

The Wayne Integral Stamping and Assembly Plant in Michigan and the Hermosillo Stamping and Assembly Plant in Mexico are



Stamping dies for Wayne's huge transfer presses can be replaced in 10 to 20 minutes, a process that once took hours.



truly world class. The Hermosillo plant began producing the prior Tracer model in 1986 at quality levels that have been consistently high. In fact, Tracers built in Hermosillo have been competitive with the best of the imports.

Hermosillo was the prototype plant for Ford's new manufacturing methods and systems. The lessons learned there have been applied to the newly integrated manufacturing operations at Wayne and used to improve existing processes at Hermosillo. Of the many changes to these plants, several have yielded noticeable improvements in manufacturing efficiency and product quality.

For example, new transfer presses at the Wayne Body and Stamping facility permit faster cycle times than older, stand-alone presses. Additionally, stamping dies that once took hours to change can now be replaced in ten to twenty minutes.

A computerized die maintenance system now provides for greater standards of accuracy. This is vital to quality in Escort and Tracer's unitized body construction, where precise alignment of structural elements

results in superb fit and finish of exterior sheet metal and solid installation of all chassis and powertrain components. Customers can see the benefits in the smoother opening and closing of doors, hoods, trunks and windows and in reduced noise and vibration from the suspension, engine and transaxle.

Technology and automation also contribute to the overall quality of the Escorts and Tracers built at Wayne and Hermosillo. For example, optical scanners check that body parts line up properly. If not, the scanners automatically stop the line so any problems can be corrected.

Robots perform over 90% of the welding at Wayne and approximately 80% at Hermosillo. The resulting body assemblies are dimensionally accurate and consistently sound.

Even parts handling at Wayne is automated. Sheet metal, subassemblies and related parts now require less frequent handling, reducing the chances for damage and increasing overall quality.

The Wayne and Hermosillo plants also feature robotic painting in "clean room" spray booths. The robots help do away with paint surface imperfections like runs, drips and thin coverage and the "clean room" spray booths help eliminate dust in the paint area. This results in paint finishes on the new Escorts and Tracers that are glossy, smooth and durable.

Before an Escort or Tracer body receives its first color coat, it must undergo a seven-step cleaning and conditioning process. In the first step, the body goes through a nine-stage phosphate system that prepares the metal so

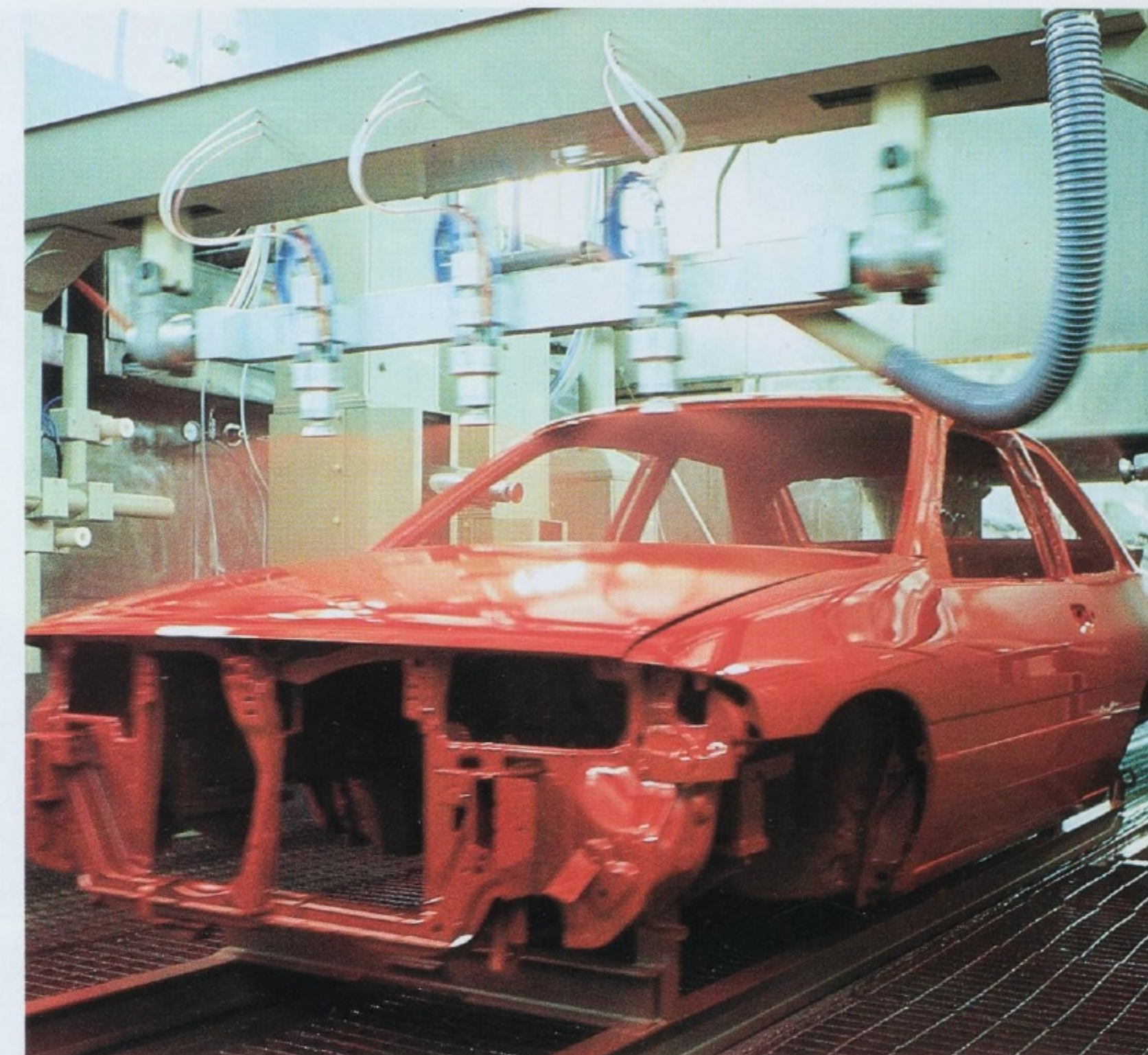
the primer will adhere. Next the body is cathodically electrocoated in a primer tank, providing an important corrosion barrier. After this the body is baked, sanded to eliminate defects, sealed, spray primed and sanded again.

Only then is the body ready for the final coat of enamel in the paint spray booth. After baking the enamel, a protective wax is liberally applied to the inner panel cavities of the hood, doors, decklid, rocker panels and underbody.

A quality detail, generally characteristic of higher priced cars, is the use of chip-resistant primers that are color-keyed to the exterior paint colors of Escort and Tracer. Coordinating the primer color with that of the exterior paint helps improve long-term appearance by making minor paint chips less noticeable.

In the Wayne assembly area, Ford has adapted facilities and processes to meet the needs of assembly operators. The most dramatic example of this is the replacement of traditional floor-mounted conveyors with an electrified overhead monorail using clamshell carriers similar to the system existing at Hermosillo.

These new carriers provide improved access to the vehicles and contribute to ergonomic improvements in work station design. The car bodies ride at various heights, changing at different stations. What determines the elevation is the height that is best, most ergonomically correct, for an operation to be performed. This is good for the operators because it makes their responsibilities less



tiring and more efficient. It's good for customers, too, because it contributes to improved overall quality.

In the trim section, car doors are assembled off line, providing easier installation of interior components and reduced opportunity for damage. Another way in which parts damage has been reduced is by supplying the lines with inventory on a "just-in-time" basis, minimizing the time that parts are exposed to handling and in-plant traffic.

PROCESSES

To take advantage of the new facilities and equipment at Wayne and Hermosillo

Thorough preparation, state-of-the-art paint facilities and stringent dust control combine to provide glossy, smooth and durable paint finishes.

and to achieve higher levels of quality, Ford undertook a rigorous effort to introduce advanced manufacturing processes in both plants. This "new way" of building cars was based on three fundamental principles:

- Early involvement of all affected people, particularly those responsible for manufacturing operations. This included plant management, skilled tradespeople, assembly technicians, suppliers and many others.
- Continuous improvement of all functions within the manufacturing process by repeated application of a proven and effective quality improvement technique: "plan it, do it, check it and adjust it." Everything can be improved, and everyone can contribute to these improvements.
- Identification and control of the "significant characteristics" associated with the manufacturing process. Significant characteristics are those things that ultimately determine a customer's satisfaction with a car's appearance and function. These include most of the things in the manufacturing process that can be measured and changed, such as parts dimensions, material specifications, timing of shipments, paint oven temperatures and paint thickness, to name just a few. Significant characteristics were defined early in the prototype stage for every piece of equipment, process, supplier and person involved in the production of the cars.

Ford applied these principles from the

very beginning of the CT20 Program and continued to use them to "prove-out," or verify, the new processes needed to achieve desired quality levels. Three of the most important ways in which Ford accomplished this was through the use of "meaningful" prototypes, the early involvement and readiness of suppliers and rigorous prove-out, or verification, of all manufacturing processes.

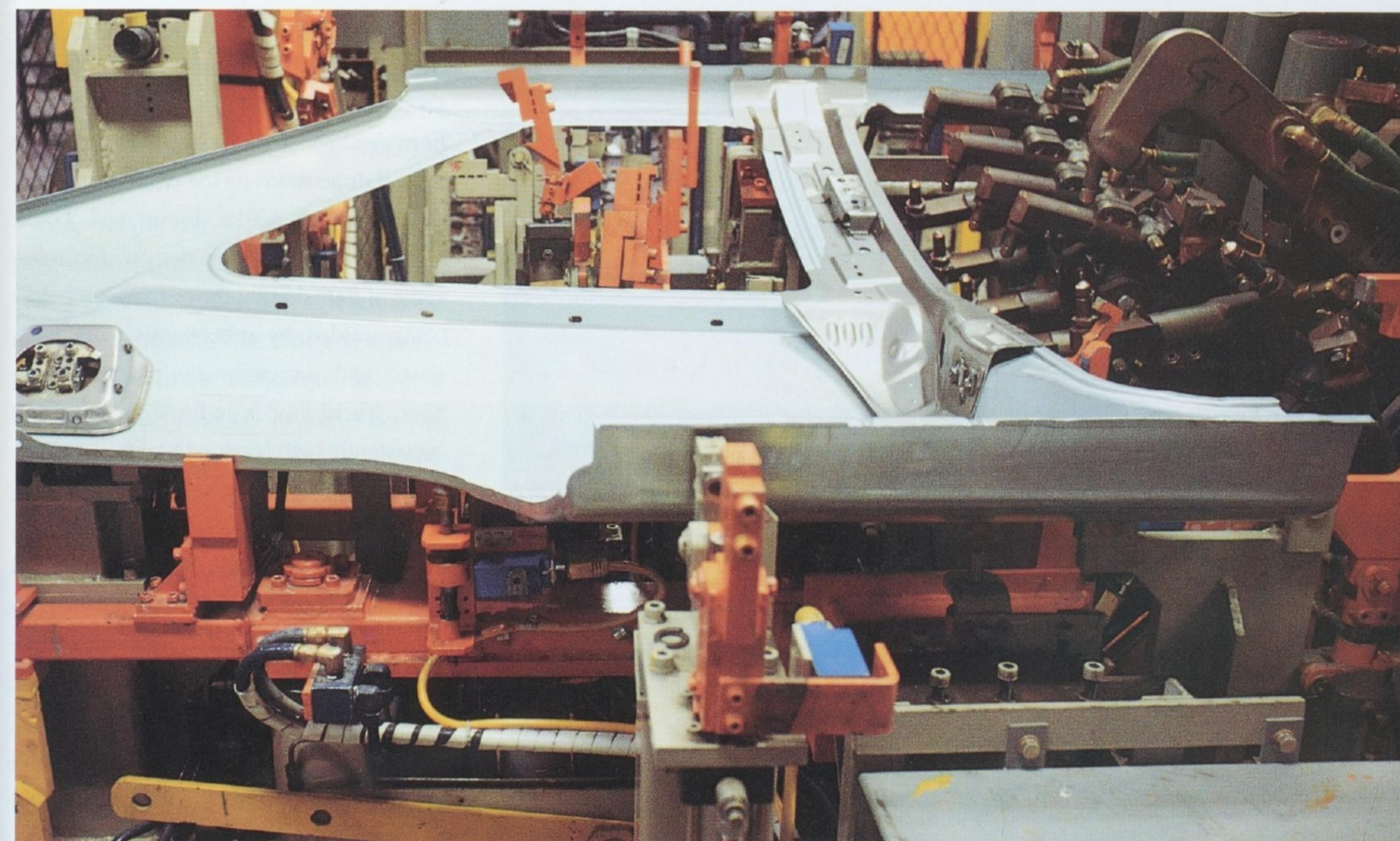
MEANINGFUL PROTOTYPES

Escort and Tracer prototype vehicles were available early and used to improve production capability during the development of manufacturing processes. For example, more than two years before the start of production, Ford had produced its first fully functional Escort and Tracer prototypes. In doing so, Ford was able to implement quality improvement plans earlier by identifying and correcting any shortcomings up front.

EARLY SUPPLIER INVOLVEMENT

Ford involved major suppliers, selected on a global basis, at the initial stages of the CT20 Program. Production suppliers were chosen as early as 42 months before the beginning of production and brought in as partners in the new process. As a result, many suppliers directly influenced the development of their own parts.

Ford suppliers even went to Mazda and supported the production of prototype vehicles in Japan. From the beginning, Ford and Mazda clearly established the quality



expectations for parts, and Ford reinforced these expectations during six workshops with all suppliers. Before the initial Escort and Tracer prototypes could be built, Ford assembled its quality requirements into a "road map" for supplier involvement that clearly set forth quality requirements.

Suppliers were held to stringent quality standards from the outset of the CT20 Program. If a part didn't meet Ford's requirements, the affected supplier had the responsibility to develop an improvement plan to correct the problem.

Communication was enhanced with hundreds of supplier meetings held throughout

the program. These meetings were conducted in the spirit of partnership. They confirmed that suppliers understood Ford's quality requirements and that Ford understood and met suppliers' needs. This is an example of how Ford ensured that the people responsible for producing Escort and Tracer "owned their operation" earlier than ever before.

RIGOROUS PROCESS "PROVE-OUT"

Early in the prototype vehicle stage, Ford began to define new manufacturing processes and verify their feasibility. This required the upfront participation of people

Special measuring devices confirm that critical parts fit together within tolerances of 4/1000 of an inch.

responsible for manufacturing, engineering and plant operations, as well as members of the UAW.

This verification process was judged to be so valuable that a new facility was constructed at the Wayne Plant specifically for this purpose. It is the Process Prove-Out Building and is dedicated to assessing the feasibility and benefits of new manufacturing processes. Here, plant personnel from both Wayne and Hermosillo were better able to agree on work flow, identify ergonomic improvements in work stations, develop tools and aids, train people and work with suppliers much earlier and more efficiently than ever before.

The prove-out process even extended across the Pacific to Japan, where Ford manufacturing people met with their Mazda counterparts to verify feasibility through a seven-stage stamping and body-assembly tooling development program. This seven-

stage process was a fundamental part of controlling all body dimensions on the new Escort and Tracer, making them the first Ford products to be built using a system to control dimensions on the entire vehicle.

This system works. Escort and Tracer body parts are positioned to within tolerances of four-thousandths of an inch before being welded by robots into structurally sound and dimensionally precise assemblies. Variability is reduced, resulting in consistently high levels of quality.

But this is only the beginning. Even the last parts to be installed during final assembly, such as seats and interior trim, fit together tightly and consistently. That's because all Escort and Tracer parts were developed and produced using the same dimensional control system.

All parts are carefully designed and accurately and consistently manufactured. Consequently, there is little need for the assem-

bly plants to have "adjustment capability." All Escorts and Tracers are assembled with precisely "sized holes," not slots, as in the past. These cars go together one way. The right way.

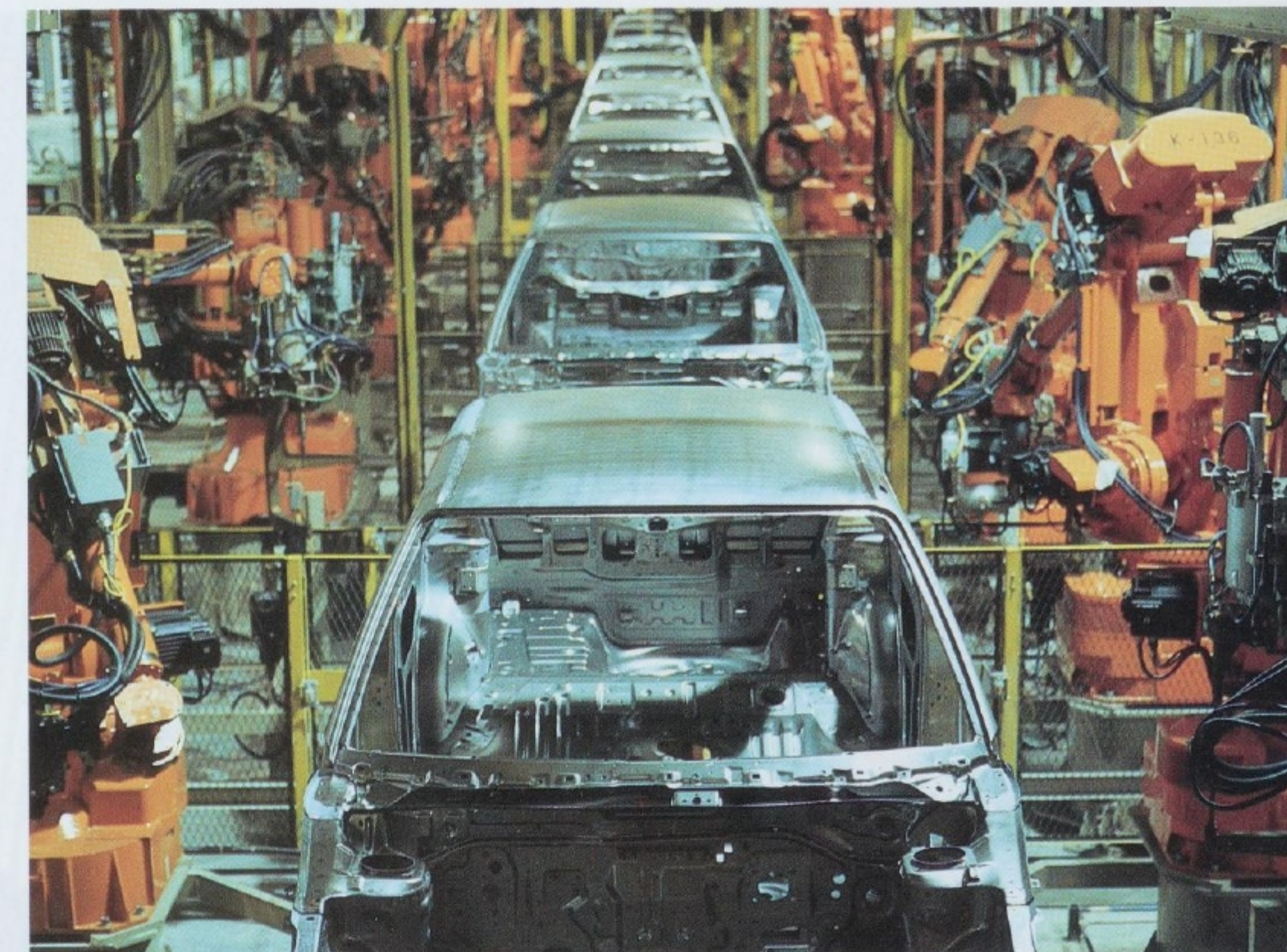
Assembly operations are now easier and product quality more certain, more predictable. Operators at Wayne and Hermosillo no longer need to devote time and effort to correcting assembly difficulties, like misaligned hoods or doors. Instead, they can spend more time being involved in improving the overall process and therefore improving quality and customer satisfaction.

PEOPLE

Modern, state-of-the-art plants and world-class manufacturing processes have created the potential for Escort and Tracer to be among the best cars in the world. But that potential cannot be realized without the creative application of human intelligence and cooperation. Ford has unleashed this potential through employee training, involvement and teamwork.

In fact, one of the biggest stories about the Escort and Tracer program is Ford's investment of over \$20 million in training people. For example, every Wayne employee in both the new stamping and body facility and the retooled assembly plant had training in Statistical Process Control (SPC), Continuous Improvement (CI) and the Quality Deployment System (QDS).

Training people to use the Quality Deployment System is important because the Hermosillo and Wayne plants have



depended on it to improve manufacturing quality through employee involvement. QDS provides a way for plant personnel to define how their jobs are to be performed. Employee input is clearly reflected in the design of work stations, task-related work groups and in tooling and process design.

The Quality Deployment System involves the people closest to the product so that they understand the importance of their jobs, their impact on quality and why it is key that they perform in a consistently superior manner. QDS is built on the successful lessons learned from Hermosillo and Mazda.

QDS, developed at Hermosillo, is the foundation of Ford's new methods at the plant level. Through training and the use of QDS, Ford gave assembly technicians a

Robots perform over 90% of the welding at Wayne and approximately 80% at Hermosillo. The resulting body assemblies are dimensionally accurate and consistently sound.

The CT20 production facilities are capable of producing consistently high quality vehicles. Robotic welders and brazers, for example, provide new levels of precision and accuracy.





Vehicle bodies at Wayne make the 687-foot trip from the stamping and welding facility to the assembly plant through a completely enclosed bridge.

"big picture" view of the entire assembly process that emphasized individual roles and placed responsibility, authority and control at the operator level. For example, operators have the responsibility and authority to shut down the line when they spot a production problem.

By identifying and correcting problems upstream in the manufacturing process, assembly technicians can directly affect the overall quality of the cars they build. Operator quality contributions such as these represent another one of the "big ideas" in the new Escort and Tracer program.

From the very beginning, Wayne employees have been intimately involved in the development of the new Escort and Tracer. Hourly employees participated in the initial engineering and process prove-out activities, making available a core of experienced workers during the critical production launch of the all-new cars.

Furthermore, efforts have been made to reduce the repetitiveness of operations and give employees greater variety on the job. The result has been a marked improvement in employee attitudes and an enthusiastic response to improved working conditions. This positive morale is expected to complement the new manufacturing technology and contribute to the improved quality of the new Escort and Tracer.

Another important contribution to the improvement in employee morale has been the renewed partnership between the United Auto Workers and Ford Motor Company at the Wayne Integral Stamping and Body

Assembly facility. This is a partnership based on a commitment to manufacturing quality and the quality of life.

A New Agreement was implemented to increase employee involvement and dedication to product quality by moving the decision-making process down to the assembly level. Job responsibilities have been re-evaluated and expanded. In this way, everyone will play a greater role in the total manufacturing process than ever before.

One of the most ingenious features of the New Agreement involves a rethinking of the traditional roles of management and labor. Evidence of this can be found in the "Natural Work Groups" that enable assembly technicians to work together in problem-solving teams on the plant floor. They are called "natural" work groups because the teams focus on performing logically related assembly tasks, such as front suspension and subframe installation.

The teams select the leaders for their natural work groups. The team leaders seek ideas from their team members as to how things should be done and share this information with management. The leaders are important communication links; they are instrumental in solving quality-related production issues on the plant floor as they arise.

Plants, processes and people: with them, Ford Motor Company has redesigned the way it is building cars in North America. As a result, the new Escort and Tracer can equal in quality and value any small car built anywhere in the world.



CONCLUSION

Blueprint for the future

The greatest thing in this world is not so much where we are, but in what direction we are moving.

Oliver Wendell Holmes

The CT20 Program is not a "business-as-usual" approach to competing in the global automotive industry. Rather, it distinguishes Ford as the first American automotive company to bring the best of the world's production technology to its own North American facilities. But the program, along with its products, the 1991 Escort and Tracer, is significant for a number of other important reasons.

- ☐ The CT20 Program is the biggest in Ford's history since Taurus and Sable involving:
 - A total investment of \$1.9 billion.
 - An investment of over \$600 million to convert the Wayne plant into an integrated stamping, body and assembly operation.
 - Over \$20 million to train workers (many times more than that spent on Taurus and Sable).
 - Capacity to produce a total of 500,000 vehicles annually at the Wayne and Hermosillo plants.
- ☐ The CT20 Program is crucial to Ford Motor Company's success in the nineties because:
 - It is required for Ford to meet federal

CAFE standards and achieve long-term share and profit objectives.

• The Escort and Tracer are key to the financial well-being of Ford and Lincoln-Mercury dealers.

- ☐ The CT20 Program is a watershed. It will provide a model, a "blueprint," for all other new Ford products slated for the 1990s.
- ☐ Having introduced the new Escort and Tracer, Ford remains the only domestic manufacturer committed to North American production of small, entry-level cars.
- ☐ The CT20 Program is Ford's first to make complete use of its Centers of Responsibility concept in a global effort that employs the best of Ford's and Mazda's resources.
- ☐ People working together have made the CT20 Program a success, starting with the New Agreement between Ford and UAW at the Wayne plant.
- ☐ Escort and Tracer are capable of satisfying customers with world-class quality and best-in-class value. They are among the best researched cars in Ford's history.
- ☐ The 1991 Escort and Tracer are fully competitive with import models in terms of quality, function, feature content and value.

*EPA mileage estimate
unavailable at press time.*



