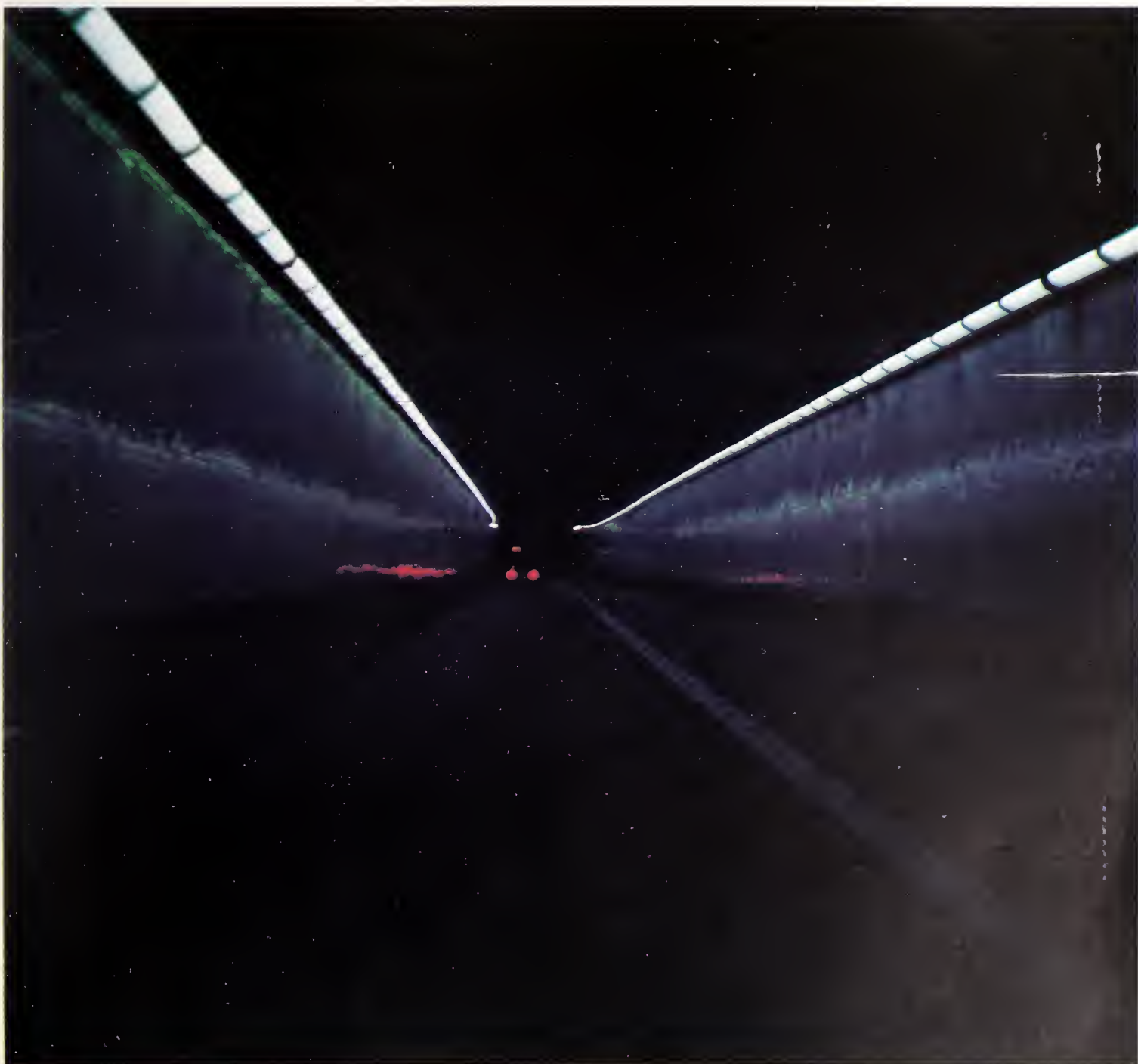


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C. Ramon Greenwood
Assistant to the Secretary
and
Director of Public Affairs

James L. Stafford
Assistant Director for
Communication
Programming

Edward O'Hara
Editor

DOT staff contributors, this issue:
John Demeter
Chris Ware

- 2 **Dashes from DOT**
- 3 **Overhaul Due for Airline Regulation**
An Editorial
- 4 **Morgantown Has a 'People-Mover'**
- 8 **Take a Ride on the T**
- 13 **Making Rescues from Sinking**
Ships
- 16 **Phones Are Ringing at TSC**
- 19 **Fund Transfers for Mass Transit**
- 20 **Women Learn to Build Highways**
- 22 **Making Transportation Policy**
- 24 **An Electric Car in Your Future?**
- 28 **Watch That Pedestrian!**
- 29 **For Your Information**
New Publications

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At 5 a.m., when cities sleep and rural America stirs for pre-dawn agrarian rituals, the tunnel achieves its moment of majesty. It is then, insulated from the blur and rumble of traffic, that the traveler becomes most keenly aware of the engineering technology that shortens his journey into hours rather than the days endured by prior generations.



[Front, Inside and back covers by Anne Tomczak]



Oil Spill Detection

The Coast Guard has completed successful testing of an aerial pollution surveillance system capable of detecting oil spills in all types of weather, day or night. The prototype Airborne Oil Surveillance System (AOSS) is able to detect, map and document oil spills on the high seas despite darkness or cloud cover. During a routine test flight, the AOSS detected a suspected pollution violator through 2,000 feet of cloud cover off the coast of California.

Studs Hurt Roads

Studded tires do more harm than good from a safety standpoint and cause extensive damage to highway surfaces, according to the Federal Highway Administration. As a result, the FHWA has urged the states to ban their use. Stopping distances, even on glare ice, are not greatly reduced by the use of studs. On dry pavement, it takes longer to stop when using studded tires. In addition, these tires have damaging effects on pavement. They destroy markings, wear away skid resistant surfaces and dig ruts into pavement. The damage caused by studded tires would require repaving heavily traveled roads every one to four years. Pennsylvania estimated its additional resurfacing costs caused by studs to be \$4 million per year. Massachusetts estimates an additional \$3.4 million annually for its interstate and primary roads alone.

FHWA In Iran

The Federal Highway Administration has announced the establishment of a division office for Iran. The action came about as a result of a request from Iran for U.S. technical assistance in completing an accelerated roadbuilding program. The Iran division office will provide advisory technical assistance in the fields of highway construction, maintenance, planning, design, training, research, safety, and laboratory improvement and modernization. The long-term roadbuilding program will include the completion of 7,000 kilometers of asphalt-paved primary and secondary highways and 15,000 kilometers of gravel roads. In addition, 3,500 kilometers of expressways are planned during the next 10 years.

Airport Weapons

The number of firearms and other dangerous articles detected at airport passenger screening stations doubled during the first six months of 1975. The Federal Aviation Administration said more than 60,000 firearms and other items, including ammunition and fireworks, were discovered compared to 30,000 detected in the last six months of 1974. Most of the increase was in the category of other weapons such as knives, clubs and mace spray. Of the 2,343 firearms detected, 958 were handguns which resulted in 637 arrests. There were five attempts to hijack U.S. airliners during the same time period, none of which was successful.

Carpools Save Money

The annual cost of driving 10 to 25 miles alone to work ranges from \$646 for drivers of subcompact cars to \$1,868 for standard size cars, reports the Federal Highway Administration. By sharing a car with one person, up to 50 percent of the transportation costs can be saved. With five persons per car, employees can save up to 80 percent, an annual after-tax saving of \$281 to \$1,390, depending upon the size of the car and distance traveled. Additional benefits include less driving, reliable transportation, a guaranteed seat, door to door service, energy saving, reduced air pollution and less highway traffic.

Commuter Lines Grow

Commuter air carriers were the fastest growing branch of commercial aviation in the 12-month period that ended in September 1974, the Federal Aviation Administration says. During that time, the number of operators who serve small and medium size cities rose from 175 to 190, an increase of 9 percent. The number of aircraft operated by commuter air carriers rose about 22 percent from 855 to 1,042. The greatest number of these air carriers operate in the Southeast and the Great Lakes regions.

Traffic Safety Spending

Nearly \$4 billion was spent in 1974 in major traffic safety programs to reduce accidents, deaths and injuries, according to the National Highway Traffic Safety Administration. The report

was based on national projections from a representative sampling of 10 states. The study, which examined the use of safety funds from 1969-1974, includes the following information:

An increased number of jurisdictions started drinking driver countermeasures in 1969-1974. Alcohol-related traffic arrests doubled, reaching 1.1 million in 1974 with 8 out of 10 offenders receiving tests to determine alcohol levels.

Police time spent on traffic enforcement increased by 28 percent from 1969.

Emergency medical services (EMS) capability improved with responses to traffic accidents increasing from 1.3 million to 2.3 million. Half of the EMS personnel have received training prescribed by NHTSA and 87 percent of the ambulances have direct communication with dispatchers and/or medical facilities.

About 3.2 million students were trained in driver education, a 28 percent increase since 1969.

Citizens and Airports

Citizens will have a chance to get more involved in airport planning under guidelines issued recently by the Federal Aviation Administration. Published as an advisory circular, the guidelines describe various ways to increase citizen participation including consultation with citizen advisory planning groups, news media information campaigns and workshops. The FAA circular emphasizes the early involvement of citizens in the planning process to help identify controversial issues such as site selection of a new airport or major expansion of an existing airport.

Recreation and Cars

It is usually more difficult to find a place to park the family car than to find a place to picnic, take a walk or play a game, according to a study done for the Department of Transportation. Required by the Federal-Aid Highway Act of 1973, the study found that the number of people who can use a recreation area depends upon the number of cars that can be accommodated rather than the size of the park.



President Ford's proposed Aviation Act of 1975 has a twofold purpose: to serve better the needs of the airline industry under today's economic conditions and to respond better to consumer demand for efficient and reasonably priced air transportation.

The proposal advocates changes in the ways air fares are determined and routes awarded. And because the recommended regulatory revisions intrude on long-standing traditions, industry reaction has been mixed. One leading airline executive suggests that the proposal does not go far enough. Another supports some elements of the bill, while opposing others. The Air Transportation Association argues that the bill will ultimately lead to less competition, reduced service and higher fares, damaging an air system it calls "the world's finest."

The United States civil air system is the world's best, but other than in safety, it—like most institutions, private or public—is far from perfect. The nation's airlines are dedicated to safety and to the comfort of their passengers. They are not, however, paragons of management efficiency. As late as the third quarter of 1975, the industry was forecasting losses of \$200 to \$250 million for the year.

The airlines blame rising fuel and overall operating costs, certainly red-ink factors of significant impact, but by no means the whole story. An average load factor of around 50 percent suggests too many airline seats are flying empty and that passengers who might be attracted to air travel by lower fares are staying home.

To some extent, airline fortunes logically ebb and flow with the state of the economy. Yet the industry operates under certain built-in economic handicaps that regulatory reform could relieve.

The structure of today's air transportation system is basically the one established in the late 1930s. There are cities on that system that were included in a carrier's original certificate primarily because speed and fuel capacities limited the distance a DC-3 could fly non-stop.

The industry has grown tremendously since airline routes were laid out and economic regulations written. Aircraft sizes and performance capabilities have changed dramatically. Economic conditions are vastly different. And today's

three-tiered air transportation system, consisting of trunk, regional and local service carriers, is structured to provide the level of service commensurate with a community's needs at a cost affordable to the user and economic to the operator.

The legislation President Ford has proposed is intended to recognize the airline industry not as an infant to be protected, but as a mature free-enterprise entity capable of responding to natural market forces and consumer demand.

Under the terms of the Aviation Act, airlines will be free to raise or lower ticket prices, within limits, without government approval. Entry of new companies into the commercial air market—and exit from it—will be eased. Fares will no longer be set collusively, nor competition limited to such frills as menus, beverages and entertainment.

One quality of airline performance *not* affected by the President's bill is safety. The government, through the Federal Aviation Administration, will continue to maintain and enforce strict safety standards.

What the Aviation Act *will* do is put a new and proper emphasis on efficiency. It will enable the well-managed air carrier to earn a fair and reasonable return on investment. It will make air

travel available to large numbers of people for whom it is now financially inaccessible.

Alterations in the 37-year old federal regulatory structure will not be achieved overnight. The bill provides for an orderly transition period of up to five years, permitting the gradual introduction of new features and the systematic relaxation of the controls which have insulated the industry from the realities of free market competition.

The aviation legislation is one of three proposals designed to meet President Ford's goal of comprehensive reform of transportation regulation. As in the case of the railroads and motor carriers, regulatory reform of the airline industry has been long overdue. Existing regulations have outlived their original purposes. The public and the industry are no longer well served by the present system. It is time to bring the regulatory process into the mainstream of contemporary economic conditions, promote fuel and economic efficiencies and make flying an even better bargain than it is today.

William T. Coleman, Jr.
Secretary of Transportation



[by Don Webster]



The structure that sweeps across Morgantown, W. Va., looks like a streamlined but small-scale elevated rapid transit system. However, there is no sound of steel wheels running on tracks. The small, square, yellow and white cars with tinted windows quietly traverse a concrete guideway carrying people from one place to another. The cars seem to act on their own, stopping at the right place, sounding a buzzer when too many people board a car, and remaining stopped while passengers get off.

This is Personal Rapid Transit (PRT), a new breed of transportation system which began passenger service last fall. It is a unique system that was designed for the Department of Transportation's Urban Mass Transportation Administration under contracts with the Boeing Aerospace Company. It is undergoing a year of test operation to determine whether the technology is feasible for widespread application. Since it is rare that a really new mode of transport is

developed, the PRT is one of the most exciting systems to be built in this country.

Morgantown, a city of 37,000 nestled in the mountains, has unique transportation needs. West Virginia University (WVU) is split into two campuses—one downtown and the other on the outskirts of town. With only 10 minutes between classes, the students used to have great difficulty getting from campus to campus in time. The university began running buses between campuses but the trip took 10 to 20 minutes and proved unsatisfactory. As one student said, "It was really a problem trying to get to class by bus. You could never tell exactly how long it was going to take but you always knew that it would take too long."

The gap between classes was extended to 20 minutes but as the student population grew, so did the traffic jams in Morgantown. As a last resort, students were requested not to schedule back to back classes at separate cam-

puses, which again proved unworkable. In addition, the townspeople did not like the continuous daily traffic jams.

The PRT—sometimes called a "people-mover"—has dramatically shortened travel times. It now takes 5 minutes to ride between the uptown and downtown campuses. The PRT has been performing well.

During the first 6 weeks, the system carried more than 200,000 riders and logged 150,000 fleet miles.

Steven Barsony, Morgantown PRT project director for the Urban Mass Transportation Administration, said, "The system is working very well. It is operating up to the level of our expectations or perhaps a little better."

"We expect to achieve system maturity in one year," Barsony said. Based on the first weeks of operation, he said, "I think we have nearly reached the point where we can call this a proven technology."

Since it is undergoing start-up operation, the system is sometimes shut

Morgantown Has a 'People- Mover'

Students Approve New Transit Mode

By Barbara Danahy

The PRT system currently operates until 8:30 p.m. By the end of the test year, the system will operate 24 hours daily.

[photos by Jay Carroll]

The PRT's nearness to the downtown WVU campus makes it very convenient for most students.

down for debugging purposes. However, the lost time as a result of shut-downs has been much less than was predicted and the system's reliability has been much higher than expected. It has been running over 80 percent. After the conclusion of the test year, reliability is expected to reach 96 percent. It is expected that the campus buses will be phased out of operation.

In the late 1960s, West Virginia University became interested in small-city rapid transit systems because of its unusual transportation problems. In 1969, under the leadership of Dr. Samy E. G. Elias, chairman of the college of industrial engineering, the university drafted a proposal for a PRT system and sent it to DOT. The department approved the project, partly because it wanted to develop a PRT system that could be applied broadly. Also, Morgantown's hilly terrain and snowy winter weather made it a suitable site to test the PRT under various conditions. DOT could have purchased existing technology,



but the only type available was found to be unsuitable in view of the broad application envisioned for the project. In addition, communities wishing to use the technology would have been required to pay royalty fees. DOT decided to develop its own technology, on the ground it would produce a better system for future users of PRT.

The first three stations, guideway construction, cars and other equipment cost about \$62 million—40 percent of which went for research and development. Last year, the university and DOT agreed to build two more stations at a cost not to exceed \$53.8 million. The department and the university have worked closely to put the project into place.

"The department has stuck with us," Dr. Elias says. "We have talked with them, met with them, and fought with them. But when we needed them, they were there."

It was estimated in 1971 that the research and development for the system

would require two years and construction another two years. That estimate proved to be accurate.

In the first week of October, the PRT started passenger service for a few hours a day. In the last week of October, the system began operating 13 hours a day.

The present system consists of three stations and 5.4 miles of guideway running the 2.3 miles from the upper WVU campus along the Monongahela River to the downtown campus and the business district station.

"I always said I'd never trust anything without a steering wheel," says one coed. "But, you know, I really like these little cars."

The lack of a visible steering wheel and driver may prove disconcerting to some at first, since the entire system is computer controlled. In the control room, located along a section of the guideway, technicians monitor the system and are prepared to handle any problem that may arise. There are visual



The electronic map and computer read-outs enable control room personnel to monitor the location and condition of every car.



TV cameras located in each station provide the control room with a view of the passengers as they enter and leave the cars.

and audio signals to warn of trouble. The system can be manually controlled should any malfunction occur.

A special electronic map of the system shows the progress of each car on the guideway. Sensors along the guideway cause lights on the map to flash as a car passes over. Closed circuit television cameras at each station allow the control room to view station activities.

The system has 45 cars running 13 hours each day from 7:30 a.m. to 8:30 p.m. About 7,300 people a day ride the system. It is expected that when the system operates 24 hours a day, it will carry over three million riders a year. After the remaining two stations are built, an estimated 14.5 million persons a year will ride the PRT.

For this year, WVU students have received free farecards for unlimited use of the PRT. For non-students, farecards cost \$10 for each semester. After the test year is completed next October, farecards will cost \$25 per semester for all riders. Thus most students will ride

for about 17 cents a day, one of the best bargains in town. The fare for a single ride is 25 cents.

Revenue is expected to cover all operating and maintenance costs, as unusual occurrence even for more conventional transportation systems.

Before riding the PRT, a rider inserts his fare card in the turnstile and presses a button indicating the destination. The fare card is picked up and the rider can proceed to one of the cars.

“I think we have nearly reached the point where we can call this a proven technology.”

Each car is about 15 feet long and 6 feet wide. Although cars were designed to hold 21 passengers (8 seated, 13 standing) students have found that a maximum of 16 or 17 can ride com-

fortably at one time. As the door opens to admit passengers, a sign over the car lights up indicating its destination. The doors will not close if the car is overloaded and it will not move until some of the passengers get off.

Each car has a two-way radio, which enables passengers to talk with the control center in case of a malfunction. Control room personnel can stop a car or automatically change its destination. Once a car is stopped, the door can be opened manually from outside or inside. If anyone tries manually to open the door while the car is in motion, it stops immediately. “We have had some problem with people deliberately stopping the cars in this manner,” says Dave McDonald, engineering scientist with the PRT. “But I think that once the novelty wears off, we won’t have much trouble with this sort of thing.”

Once underway, the cars travel at speeds up to 30 mph. The rubber wheel-
ed vehicles are powered by an electric motor which draws power from an elec-



Students at the Engineering Station wait for a ride to the downtown area.

A car glides from downtown to WVU's outer campus. The entire trip only takes 5 minutes.

trified line on the guideway. They are steered by a guide rail mounted on the guideway's inner wall. During the winter, the guideways are heated to prevent ice and snow from accumulating. The ride is fairly smooth and very quiet. All the rider hears is the faint hum of the electric motor.

When it arrives at a station, the car stops first to let riders out and then moves to the front to pick up more passengers.

After 6 p.m. the PRT system becomes "demand operated." When an entering rider selects a destination, a car is sent to the station. Then it travels directly to the destination without stopping at any other station.

As Barsony points out, "The Morgantown PRT is the only automated system in the world that has a non-stop origin-to-destination capability."

Free parking is provided at one of the stations for those with PRT fare cards. This has proven quite popular with students and residents of Morgantown. On

Saturdays, many people drive to one of the parking areas and take the PRT downtown to shop.

On the PRT, it takes about 5 minutes to get from the downtown campus to the uptown campus. The trip from the business district station to the downtown campus takes 2.5 minutes. Most of the students like the service. Cynthia Brown, a WVU senior says "It sure beats taking the bus through town to school. The 15 or 20 minute (bus) trip now only takes me 3 to 5 minutes. My only complaint is that they waited until I was a senior to start running it."

Applications for contracts for the remaining two stations and related hardware are expected to be submitted by WVU this spring. It is estimated that construction will take about two years. When the entire system is completed, 70 cars will operate on 8.2 miles of guideway 24 hours per day.

Transportation planners are closely watching what happens in Morgantown. If the PRT succeeds there, chances are

it will be adopted in other places.

If it proves economically feasible, the PRT may be ideal for use in the downtown areas of large cities, airports, shopping areas or sections with large factory concentrations.

A procurement package containing designs and plans of the Morgantown PRT system is available to interested communities from the Office of Public Affairs, UMTA, Washington, D.C. 20590.

The PRT already seems to be a success in Morgantown. Even the skeptical student body at WVU has given its stamp of approval via the student newspaper.

As one student put it, "When they first started building this thing, I thought it was just another rip-off. But now that I've ridden it, and I use it every day, I really think it's great."

Barbara Danahy is on the staff of Transportation USA.



Take A Ride On the



By Edward O'Hara

It is a sunny autumn morning in Boston. An out-of-town visitor enters the Park Street subway station under Boston Common and boards a Red Line rapid transit train composed of shiny brushed-aluminum cars. It is 11:31 a.m.

All the seats are filled and 25 people are standing in the aisle. The train is heading for Quincy, a suburban town south of Boston.

11:32 a.m. Train stops at Washington Station. A voice says on the speaker system, "Change here for the Orange Line...Watch your wallets and pocket-books." Many passengers get off to visit Boston's leading department stores and other shops. Above the door they exit from is a map of the entire Red Line route from Cambridge to the northwest, to Quincy.

In a few minutes, the train emerges from the subway into daylight and onto a surface right of way. The cars ride smoothly and quietly. The seats are roomy and comfortable with arm rests on the aisle side. The cars have wide picture windows, recessed lighting, clean tile floors and molded plastic walls. They are about six years old, the newest cars on the "T"—the system run by the Massachusetts Bay Transportation Authority, which serves 79 cities and towns in the Boston metropolitan area, eighth largest in the country.

Craig Richmond, 17, a college student, is heading for his home in Whitman, south of Quincy.

"I like these trains," he says. "They have a pretty good atmosphere." He normally drives his car to Quincy and takes the train downtown where he attends junior college. He gets from Quincy to the school in 30 to 40 minutes. He says it would take him an hour to drive in on the freeway and that parking is costly.

The train is moving along the six-mile South Shore Line extension which linked Quincy to the T in 1971. The line is to be extended three more miles into South Braintree.

11:50 a.m. Train arrives at Quincy Center, end of the line. As passengers get off and walk toward the exit, a young mother is shepherding two children and a wagon down the escalator.

Mrs. Cheryl Romano, 26, says she has ridden the train two stops from North Quincy. She took her two-year-old twin boys to downtown Boston the previous day.

"The boys didn't mind the trip," she

Boston Message: Riding Cheaper Than Driving

says. "They stood up all the way home from downtown."

It has taken 19 minutes to travel 9 miles from Park Street Station to Quincy Center. The Quincy station is a concrete structure that includes a five-level parking garage for 850 cars and several shops. Outside the station, yellow MBTA buses are waiting to pick up riders.

The South Shore extension carries 21,000 passengers daily and serves 15 communities with one-third of a million people. Because of the extension, several insurance companies and the University of Massachusetts have located facilities in Quincy and created, according to one estimate, some 10,000 jobs.

The South Shore line is an example of how the MBTA is expanding and improving its system. This effort began about ten years ago. When existing projects are completed, the entire rapid transit, trolley and bus fleet will be either new or modernized. A major north-south rapid transit route, the Orange Line, is being extended north to Malden, where a new station has been completed.

When Robert Patricelli, administrator of the Department of Transportation's Urban Mass Transportation Administration, attended the dedication of the Malden Center station last October, he said that MBTA and the Boston Redevelopment Authority had provided nearly \$79 million of the \$143 million cost of the Haymarket North extension. He noted the Boston area had provided local initiative as well as funds. Patricelli said he favors expansion of transit systems on an incremental basis, as was done on the Haymarket North line. MBTA is making other improvements in stations and equipment and has built new maintenance facilities, including some of the most modern rapid rail shops in the world.

Most of the new equipment, extensions, and improvements have been carried out with financial assistance from UMTA. The Boston transit authority, a major recipient of capital grant funding, currently has \$312 million in approved grants. About \$273 million represents improvements in the rapid transit and trolley rail system, with the remainder going for improvements in the bus system.

The T is one of the most diversified and most heavily used transit systems

Each day 135,000 commuters board the Green Line trolleys.

[photos by Don Webster]

The Blue Line provides fast, economical service between downtown Boston and the airport.



The Green Line trolleys run underground through part of downtown Boston, thus alleviating traffic congestion.

in the U.S. It operates 352 cars on 32 miles of rapid transit lines, 290 streetcars (mostly 1940s vintage) on a 27-mile system, 1,200 buses, and 50 trolley coaches. The system also operates 13 commuter rail lines which, while they carry only 15,000 riders daily, extend into areas not reached by rapid transit or light rail. In addition to the Orange and Red lines, Boston has an East Boston rapid transit (Blue) line linking downtown to the airport and Revere Beach. The light rail service, the Green Line, links four lines west of the city with the Central Subway which goes through the heart of the business district. Another light rail service is operated as an extension of the Red Line. The Green Line is the most heavily traveled and most crowded part of the system, with 135,000 riders daily. Most of the fleet is scheduled to be replaced, starting this year, with 175 American Standard Light Rail Vehicles, the first new streetcar design in more than 30 years. (See *Transportation USA*, Fall, 1975, p. 6) For its faithful Green Line straphangers, MBTA has issued a leaflet asking them to "hang in there" until the sleek new cars arrive, starting early this year.

A New York research organization, the Council on Municipal Performance, studied the transit systems of 28 cities and concluded that Boston had the best performance rating. It found that nearly two out of five people in Boston used public transit for the trip to work. It said Boston is one of the few cities where public transit is used as intensively on the average as at peak hours. While a high proportion of Boston workers use transit, many drive their cars to within a five or ten-minute transit ride and cause parking problems in close-in areas such as Cambridge and Back Bay.

Two years ago, a basic change was made in the way the MBTA is financed and administered. In 1973 and 1974, the legislature passed laws permitting the state to pay one-half of the agency's operating deficit for those years. The legislation concentrated responsibility and accountability more firmly in the state.

"Nobody was accountable for running the system at that time," said Frederick Salvucci, Executive Secretary of the Massachusetts Department of Transportation and Construction. He said that under the old system, the governor chose the MBTA board of

directors and the general manager, but the bills were paid by the 79 cities and towns represented on the MBTA. Management decisions, including the negotiation of collective bargaining agreements, were made by people who were not held publicly accountable and who were not responsible for paying the bills.

"The state was the only level of government that had the power to run the agency," Salvucci said. Under the law, the chairman of the board serves also as the chief executive officer and the state pays part of the bills.

Robert Kiley, a former deputy mayor under Boston Mayor Kevin White, has been chairman and chief executive officer since last May. He is candid in discussing the shortcomings of the system and modest in describing his goals.

When asked about the council's top rating of the Boston system, he said it was probably correct by their measures.

"They measured peak use in various modes and the authority came off very

Robert Curley, 26, a lawyer, who... seldom gets a seat: "It's great. It's very interesting, I see lots of people. And I read my paper."

well. I think only in our bus service did we not do as well. That doesn't mean everyone likes the service, but they tend to use it during peak hours. Our problem is that we don't get a lot of off peak use—or as much as we would like."

It is 8:15 a.m. on a Wednesday morning, as commuters emerge from the Park Street station. Here are some of their comments:

Robert Curley, 26, a lawyer, who rides 18 minutes on the Green Line and seldom gets a seat: "It's great. It's very interesting, I see lots of people. And I read my paper."

A female law student who rides the Green Line trolley for 15 minutes: "I don't especially like it. Either it's too hot or it's too cold—and it's crowded."

Pat Urban, 50 a computer programmer, who has a 5-minute trip on the Red Line from Harvard: "It's great, a smooth and comfortable ride."

Last fall, a Boston underground paper, *The Real Paper*, ran an article titled "What's Wrong with the MBTA? Everything." While the headline did not really fit the article, the article reflected several problems facing MBTA—such as high operating costs and declining ridership.

While Boston has one of the best systems in the country, it is more expensive than in other cities of similar size. Its operating costs and deficit are rising dramatically. At the same time, ridership has been declining by 3 to 5 percent a year. So MBTA is looking into the possibility of raising fares and preparing to wage a vigorous effort to lure more commuters out of their cars.

The operating deficit increased from \$25 million in 1968 to an estimated \$154 million in 1975. About one-half of the 1975 deficit will be paid through legislative appropriation. The other half will be paid by the 79 cities and towns of MBTA through real estate taxes, a long standing source of support for Boston area transit. Secretary Salvucci says that over 70 percent of municipal revenues—twice the national average—come from property taxes in Massachusetts.

Wages and salaries for MBTA's 6,400 employees account for 70 percent of operating costs. The work force is much larger than in comparable transit systems. Labor costs are far greater than gross revenues, in contrast to most systems in which fares often cover direct labor costs and fringe benefits.

A built-in cost escalator is the labor contract provision giving employees full cost-of-living increases computed four times a year. Salvucci said this clause is the "single biggest factor" in raising costs.

"We simply can't afford it on the public side," Salvucci says. "With 14 percent inflation, the effect is devastating," He said he hopes to see the provision revised, so that the cost can be made more predictable. Kiley said he would try to change the provision in negotiations with MBTA unions.

Kiley says the heavy burden on taxpayers raises the question of increasing fares. "The rider is carrying only 20 to 25 percent of the cost," he says. However, a dramatic increase in fares is likely to drive away riders. Kiley discussed the possibility of a regional tax of some kind dedicated to public transportation, such as an increased sales

The MBTA is presently working to upgrade and extend the T. As part of the program, the Orange Line, a major rapid transit line, is being extended and a new station has been completed.



"Straphangers" on the Green Line will soon ride more comfortably. Replacement of the old cars is scheduled to start this year.

tax, a tax on gasoline, or raising revenue through an increase in parking charges.

"We have a basic fare of a quarter," Kiley said. Except for Atlanta, which has a 15 cent fare, he called it the "cheapest ride in the country."* Because of the operating deficit, Kiley said "it may simply be unavoidable to raise the basic fare to 35 cents." During 1976, a task

*MBTA permits transfers only among rail lines in the central business district. The longest ride for 25 cents is about 12 miles.

Edward O'Hara is chief of the publications division in DOT's Office of Public Affairs.



force will consider whether to change the basis of setting fares and whether to introduce a system of fare zones.

MBTA wants to persuade commuters that riding the T is cheaper than driving. Mayor Kevin White of Boston also wants people to stop driving to work, partly because on-street parking by commuters in neighborhoods adjoining the downtown is causing problems. Several years ago, the mayor banned further construction of off-street parking facilities.

Emily Lloyd, the mayor's transportation advisor, said commuters will be prohibited from parking on downtown Boston streets from 7 a.m. to 9:30 a.m. under regulations to be phased in during the next year. This will reduce the total number of spaces available to commuters and those who drive will have to pay for off-street parking.

"We just can't accommodate automobile traffic. We don't want people to drive downtown and we have an excellent transit system."

"We just can't accommodate automobile traffic," she said. "We don't want people to drive downtown and we have an excellent transit system."

James King, MBTA's director of marketing and community affairs, wants to flood the public with information about how to use the whole system and on the high costs of driving a car compared with public transit. He plans to do some selective promotion of underutilized lines to win new riders and in the process to develop effective community relations strategies.

"We've got to start competing," he says of the T, which he admits, has no public competition. In a sense, private cars are its major competitor.

Kiley has no inflated promises for the future, as did some of his predecessors. He is building a staff with fresh ideas—Jim King is one of them. He thinks it will be two or three years before he produces "any real results." He hopes to take some major progress in modernizing the system, to replace the bus fleet and to create various programs that make the T more "appealing to people."



Making Rescues from Sinking Ships

"Haul in, boys. Bring ashore the breeches buoy."

Back in the 19th century, that command signaled the start of a rescue of people from ships in danger of sinking off the coast. The breeches buoy was part of the "beach apparatus" used by surfmen of the old Life Saving Service. The apparatus was makeshift, consisting of a small cart, a miniature cannon (carronade), ropes and pulleys, wooden poles and the breeches buoy.

Before the rescue, a line with instructions was shot from the cannon to the ship in distress. When the ship's crew caught the line, the full set of lines and pulleys was fed to them from shore. The heaviest line, the hawser, was tied to the ship's mast. Raised and stretched out across the water, the lines and breeches buoy hung out like a giant clothesline.

When the command was shouted, the surfmen began to haul in the breeches buoy—a life preserver fitted with trousers—in which a person had been placed. As they hauled in, the breeches buoy moved away from the ship, inch by inch, over the churning surf to the beach.

This rescue method was called the beach drill during practice sessions. There are still a few people who remember the beach drill and the Life Saving Service. One of them is Cmdr. Robert F. Bennett of the Coast Guard, who has researched the subject and written a history of the service titled *Surfboats, Rockets and Carronades*. He is a native of the New Jersey coast line where the beach drill was practiced in the 19th century. He provided valuable information for this article.

The first surfmen stood on shore whenever the winds and the tides came up. They patrolled the capes and lakes long before the Life Saving Service became part of the Coast Guard in 1915.

Recovering drowning humanity is no easy task. Pounding surf and changing tides could swallow even the best surfmen. To be a surfman took every ounce of strength and dedication.

One of the greatest surfmen, Joshua James, worked at it from the age of 15 until the age of 75. In 1902, when James heard that almost an entire crew of lifesavers was lost in a violent gale, he took out his crew for a practice session. He worked his men for more than an hour. James took an oar and demanded more and more from his men as they



The breeches buoy looks bizarre but it saved countless lives.

[Illustration reprinted from Scribner's Monthly, January 1880, "The United States Lifesaving Service" by J. H. Merry.]

In the 19th and early 20th centuries, heroic surfmen of the old Life Saving Service used a crude but effective apparatus to shoot a line out to a ship in distress and haul survivors ashore on a vehicle attached to a series of pulleys.

Surfmen Saved Lives in Stormy Seas

practiced in the still churning surf. When he was finally satisfied, he ordered the boat ashore. As he jumped from the boat, he said, "The tide is ebbing" and fell dead.

The Massachusetts Humane Society, modeled on the Royal Humane Society of England, proposed in 1785 to promote a service designed to recover drowning persons. It established small stations at points open to the sea and gave small rewards for outstanding rescues.

Rep. Robert McClelland of Michigan initiated legislation in 1847 to provide funds for lifeboats to be used by federal lighthouse keepers. This was the first legislation to support shore rescue assistance.

Rep. William A. Newell of New Jersey, after several disasters along the coast, introduced a bill in 1848 to provide money for "surf boats, rockets, carronades and other necessary apparatus for the better preservation of life and property from shipwrecks on the coast of New Jersey." Later, other legislation was enacted which provided for the protection of lifesaving stations, the purchase of station equipment, support for the stations and pay for the surfmen.

When appropriations were made available in 1848, Revenue-Marine Service Captain Douglas Ottinger was assigned to study the techniques used by surfmen. Two basic methods were in use. One involved an oarsman in a life boat. The other was the beach apparatus, widely used as a result of Ottinger's investigations. His studies were a giant step toward better organization of rescue methods. When Sumner I. Kimball became chief of the Revenue-Marine Division of the Treasury Department in 1871, he inspected all the lifesaving stations and reported his findings to Congress. Congress responded with larger appropriations. In 1878 the Life Saving Service became a separate unit within the Treasury Department.

After 1871, lifesaving stations were set up from Maine to Florida, along the Great Lakes, and on the West Coast. Funds were made available to develop new equipment. Lt. David A. Lyle of the U.S. Army perfected the small cannon (Lyle gun) used with the beach drill apparatus. The selfbailing boat was invented in 1795 and some of these were used on the Great Lakes and the West Coast. But, bulk and weight prevented their practical use on the sandy Atlantic

beaches. The strong tides and sandy shoals on the East Coast were especially hazardous to small boats. When boats could not be used, the beach apparatus method was the only alternative. The beach apparatus was widely used along the East Coast.

"You had to stay on the beaches," recalled the late Paul Midgett. He had been recruited as a surfman in 1915 to serve on the Outer Banks of North Carolina in the newly formed Coast Guard. Surfmen patrolled the beaches on horseback.

From August until June, the surfmen on the East Coast kept watch. Great Lakes watches were held only when

ships were traveling the lakes. The West Coast watch was year-round, but the sea squalls were different and fewer rescues were required. More ships ran aground on the East Coast because there was a heavier volume of shipping.

Ten men hauling a cart across the dunes so that they could drill must have proved a curious sight to youngsters playing among the rocks and dunes.

After the cart was set in place, the keeper shouted "action" and the drill began. Once the sand anchor was buried, the "faking box" was taken from the beach cart. The box was used to keep the 700 yard shot line from tangling. The "box" was actually a

board with a row of nails around its sides, like a picket fence around a yard. When the line was ready for shooting, the surfmen tipped over the faking box, taking care not to disturb the line. The line spilled from the box in a diamond pattern.

The 24-inch-long lyle gun was readied. Into the muzzle was placed a projectile. Attached to it were the shot line and a card bearing instructions in two languages to tie the line to the ship's mast. A drill pole was used to represent the ship's mast.

The gun shot the line toward the ship. Several shots were often necessary, because strong winds blew the



Beach drills are conducted each summer on the Outer Banks of North Carolina. At the command of "action", the equipment is taken off the cart and set up (upper right). Next, the faking box is buried and the gun primed (upper left). After the gun has been fired and the lines secured, the crotch is set up to keep the lines taut (right).

[courtesy of United States Department of the Interior, National Park Service, Cape Hatteras National Seashore]

Donna Maguire, a graduate of Mount St. Agnes College, Baltimore, (now Loyola-Mount St. Agnes College) is with the DOT Public Affairs Office.

projectile off course. Once the shot line was cast over the wreck, the surfmen began to "haul away" the whip

Pounding surf and changing tides could swallow even the best of surfmen. To be a surfman took every ounce of strength and dedication.

line, which was brought to the ship by the shot line.

A continuous line run through a pulley, the whip line was used to convey other lines to the ship. After the whip line was sent out to the ship, a heavier line, the hawser, was bent to it and hauled out. Once the hawser reached the ship, it was freed from the whip and tied to the mast.

On the beach, the surfmen readied the breeches buoy, which hung from the hawser. The breeches buoy was tied to the whip line and sent out to the ship. When a person was put into the breeches buoy, the crotch, two crossed poles shaped like an A, held the lines taut and the rider above the water. The breeches buoy was sent out to the ship

as many times as necessary to complete the rescue. If many people were on board, a life car was used in place of the breeches buoy.

As the sailing ships disappeared, the beach drill declined. Steam-powered vessels were less likely to be driven aground and motorized surfboats came into wider use.

Yet, until 1957, some surfmen were still practicing the beach drill so it would not disappear totally into history.

On the Outer Banks of North Carolina, the beach drill is performed in the summer every Thursday at 2 p.m. by members of the National Park Service.



In less than 5 minutes, the victim is "safe on shore" (below) and the hawser can be lowered and the equipment stored until the next drill. (above)

The hawser is then tightened to support the breeches buoy (upper left). Once the victim has been helped into the breeches buoy (above) the command is given to haul ashore (above right).



Phones Are Ringing at TSC

In towns and cities all over the United States, people who want to know what's happening in transportation research pick up the phone and put in a call to Cambridge, Massachusetts.

Bud Giangrande likes it that way.

"Every year the Department of Transportation spends about \$400 million on research and development," he points out. "We're conducting that research program largely in the name of state and local people. We have an obligation to make sure the results of that work get back to the ultimate users."

Chances are, when a call comes, it will ring in Giangrande's office at the Transportation Systems Center, DOT's major research facility at Kendall Square. Giangrande, who is in charge of "technology sharing", is the center's main connection to those who need research information.

Giangrande's office takes the raw data and technical reports produced by TSC researchers and gets them out to the people who need them, in a language they can understand and in a format they can use.

His "clients" include mayors, governors, state and local transportation officials, and local activist groups or organizations like the League of Women Voters. Giangrande estimates he receives about 2,000 calls a year for information either generated by TSC or received from the field, despite the fact that no one has ever advertised the center's technology sharing service.

TSC plans to install a special toll-free phone line to make DOT resources more accessible. It also manages the Transportation Research Information Service (TRIS on-line) automated telephone computer service.

The phones are ringing a lot these days at TSC. Since it opened in 1970, the center has conducted a wide range of research projects and has provided technical data for many major policy decisions. TSC staffers have made contributions to the decision process on such issues as the proper separation between jumbo jets and light planes landing at the same airport, the impact and effectiveness of year-round daylight saving time, traffic control requirements for urban corridors, effectiveness of dial-a-bus operations and hundreds of others.

TSC, for example, provided some of the information used in determining the

Administration's proposals for improvements in the Northeast Corridor, the Washington-New York-Boston rail passenger route. TSC projected and analyzed ridership, return on investment, cash flow and other financial variables. That information enabled the department to weigh one investment option against another in order to choose the most cost-efficient alternative.

Research and development are not new concepts in the field of transportation. From the time men discovered that heavy objects could be rolled on logs more easily than they could be dragged, the methods of getting from one place to another have been fertile ground for the dreamers and the tinkerers. The

Center employees say, only half facetiously, that they can now recognize an emergency call by the insistent sound of the ring.

Wright brothers may have been some of the most successful early experimenters with powered flight, but they were hardly the first. That honor probably predates even Leonardo da Vinci, who designed and built crude "flying machines" in the 15th century.

As transportation increases in world importance, the need for research also increases. Previous research has concentrated largely on developing technological improvements. The need today is not only for improved technology, but also for ways of measuring the effect of that technology on a society increasingly concerned about energy, safety and environmental factors.

The Transportation Systems Center developed largely in response to that need. Although it is attached to the Office of the Secretary under Hamilton Herman, the assistant secretary for systems development and technology, TSC provides services to DOT's operating administrations.

From their six-building complex near the Massachusetts Institute of Technology and a short subway ride from Harvard University, researchers may travel to Pueblo, Colo., to test new transit vehicles for the Urban Mass Transportation Administration. They may be at London's Heathrow Airport conducting

wake vortex measurements for the Federal Aviation Administration or parked along a highway in rural Maine measuring the effectiveness of various forms of highway signs.

TSC engineers, working for the National Highway Traffic Safety Administration, have developed a method of testing the internal structure of automobile tires with lasers and infrared photography, without tearing them apart. TSC chemists developed a portable breath testing device for NHTSA which police officers can carry in squad cars. Staff members have evaluated methods of making oncoming trains more visible to automobiles and other trains. As a result, Amtrak voluntarily equipped its



Center Produces Data for Decisions

locomotives with xenon strobe lights to increase their visibility. Other railroads are studying the possibility of using such lights.

Callers often need information in a hurry. Frank Hassler, the center's director of systems research and analysis, recalls that his staff found itself in the energy research business as the result of an urgent phone call just before Memorial Day, 1973.

"The caller said, 'It looks like we're going to run out of gas over the weekend. What would happen if we raised the price four cents?'" Hassler says.

"Well, we had a computer model and had been playing that game, and the answer turned out to be the best of our

knowledge—not much. Raise it ten cents and it still wouldn't make much difference."

Although the nation didn't run out of gas that weekend, it came perilously close to doing so later that year when the Organization of Petroleum Exporting Countries slapped an embargo on oil shipments to the United States. TSC's model was put to the test in the real world, and it proved accurate.

Center employees say, only half facetiously, that they can now recognize an emergency call by the insistent sound of the ring.

"One of the advantages of having the capability of working on longterm projects," says Dr. Robert K. Whitford,

acting director of TSC, "is that when the fire bell rings we have people who have the background in that area and can jump right in. The energy crisis sort of pointed that out."

Callers often need experimental data, as when the phone rang on the desk of Lou Roberts, TSC's director of engineering. The caller asked, "Do we have any noise measurements of the SST? It's coming to Alaska in two weeks. Can we get someone there?" In three days, an engineer and two technicians outfitted for Alaska duty, were on their way with measuring equipment to get the data.

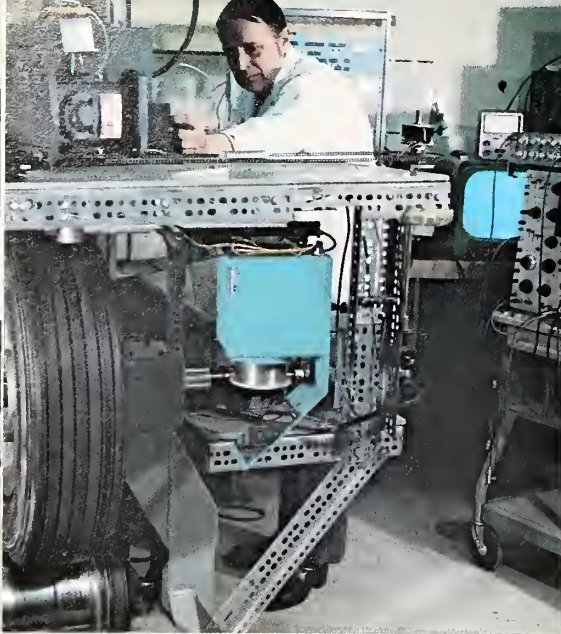
Increasingly, one research project leads to another. TSC staff members while working on a project in one field, sometimes identify problems likely to arise in a related field. Frank Hassler and his staff, for example, contributed much of the data used in the Department of Transportation's 1975 report on Alton Locks and Dam 26, a series of Army Corps of Engineers locks on the Mississippi River which was scheduled for major renovation. But their work had begun long before the official request came.

"Before we were asked to participate, starting in January or February of 1975, we had started not only agreeing to do a lot of water-related research projects, but actually cultivating some of them," Hassler says. "We said to ourselves, some of these issues—particularly the issue of investments in water systems—will be coming to a head, and sure enough we're going to start getting calls. We don't know what the specific question is going to be but we know what the topic is, and we might as well start down that path now."

The Transportation Systems Center came into existence in a sense because the National Aeronautics and Space Administration (NASA) was facing budget problems. In the late sixties, as the nation's massive commitment to the space program began to diminish, NASA had just constructed a new home for its Electronics Research Center which had been in Cambridge since 1964. Shortly after the new center opened in December 1969, NASA was forced to close it.

Researchers from TSC are developing systems which provide more complete information about aircraft both in the air and on airport runways.





Techniques developed at TSC make it possible for manufacturers to inspect each new automobile tire internally.

To find the answers to questions about aircraft wake vortices, TSC scientists and engineers developed equipment which simulates wake vortex effects on the ground.

Clyde T. Linsley, Jr., a DOT public information specialist, writes frequently for Transportation USA.

The Department of Transportation, then barely two years old, had been considering the need for a research center. Suddenly it had an opportunity to acquire a brand new, fully-staffed \$40 million complex which could be converted to its purposes with only minor alterations.

By March 1970, the transfer was approved, and DOT moved in. The fledgling center started with about 400 employees compared to the approximately 860 who had worked for NASA. Many were former NASA employees.

At the beginning, TSC's primary client was the FAA, whose needs were similar to those of NASA. For FAA, the center developed improved antenna patterns for the air traffic control radar beacon system and conducted air traffic communications experiments with NASA communication satellites.

Ground transportation has taken more of TSC's time in recent years. The Urban Mass Transportation Administra-

tion today provides the largest source of research funds for the center. TSC helped in the testing of UMTA's state-of-the-art rapid transit car, conducted surveys to determine the transit needs of the elderly and handicapped and experimented with bus scheduling and routing systems, among other projects.

The center has become adept at taking the techniques and procedures of one field and applying them to another. For example engineers using aeronautical design techniques have devised airfoils for use on commercial trucks to reduce wind resistance and increase fuel economy. Some FAA air traffic display equipment was modified by TSC staff members for use by traffic controllers on the St. Lawrence Seaway.

But research is not TSC's only function. It also has a major responsibility for compiling and distributing statistical information about transportation. Its Summary of National Transportation Statistics is widely used both by industry and state and local governments. The summary's popularity led to the addition of a supplement on energy.

Staff members periodically produce documents which detail the state of the art in various fields, for distribution to industry and government.

Research and development trends in transportation—and consequently at the Transportation Systems Center—are increasingly oriented toward systems and institutional analysis rather than toward the development of new hardware. Dr. Whitford says TSC has consciously worked to develop a social science and economic research capability in order to deal with increasing demands in that area.

The future, also, is likely to place increased emphasis on research which transcends the boundaries which have traditionally separated the physicist from the chemist, the natural scientist from the social scientist and the scientist from the engineer. That kind of multidisciplinary research, Dr. Whitford believes, is getting to be a TSC trademark.

"People come to the center and say they can see here the first glimpses of real multi-disciplinary work," he says. "We're trying to bring all these fields together with a genuine spirit of teamwork."



The \$40 million Transportation Systems Center complex is located at Kendall Square in Cambridge.

One of the center's major goals, says TSC director Robert Whitford (third from left, seated), is to develop the ability to approach problems from several different viewpoints—a "multidisciplinary approach."



grants and assistance



Fund Transfers for Mass Transit

City transit planners, concerned about escalating costs of construction and equipment and the increasing burdens placed on local taxpayers, often wonder where to get funds for needed improvements.

Many states have money available right now that can be used for mass transit—new buses, exclusive bus lanes, light rail and subway construction. It is unspent highway construction funds, which under certain conditions can be transferred to mass transit use.

The Federal Highway Administration and the Urban Mass Transportation Administration are working together to facilitate the transfer of highway funds for mass transit purposes. Two provisions in the Federal-Aid Highway Act of 1973 permit the use of authorized highway construction funds to finance, in part, mass transit needs.

Transit planners and operators should understand the provisions governing transfer of both Interstate highway and Urban System funds.

The Interstate transfer provision permits state governors and local officials to request the secretary of transportation to disallow an Interstate highway segment, and use the amount of money that would have been available to complete the withdrawn segment for mass transportation purposes.

The Urban System provision permits the flexible use of Federal-aid highway Urban System funds for highway or mass transportation purposes. Federal money available for mass transit projects under the Urban System provision comes from the Highway Trust Fund, while the funds for the Interstate transfer provision are drawn from general revenue funds.

Transit authorities, by using an Urban System transfer, can get 70 percent of a mass transit project's cost from the federal government. This is especially important in light of the fact that of the \$11.8 billion authorized for UMTA by the National Mass Transportation Assistance Act of 1974, only about \$2 billion remains uncommitted. And, there are close to 300 cities which need mass transit aid.

Obtaining federal approval for an Interstate transfer works like this:

The state governor and local officials request the U.S. Secretary of Transportation to withdraw an Interstate segment. Once the withdrawal is approved, the applicant works closely with UMTA to develop applications for the substi-

tute transit projects.

Not many communities have used the funds, but so far, Interstate segments have been withdrawn in Boston, Philadelphia, Hartford, Conn., Washington, D.C. and the Maryland suburbs of Washington, D.C. These withdrawals have made available \$1.1 billion for public transportation.

Thus far seven cities have used more than \$50 million in Urban System funds for public transit projects. They are New York City, San Francisco, Chicago, Cincinnati, Portland, Ore., Houston, and East St. Louis, Ill.

How can a community proceed to

use Urban System highway construction funds for mass transportation?

The application for an Urban System transit project may be developed by the governor or by any agency authorized by state or local law to plan, organize or operate mass transportation services. It must meet the requirements established by UMTA's External Operating Manual for a capital or technical studies grant, as appropriate. UMTA is ready to help applicants to develop proposals.

The application is then forwarded to the State DOT or highway department, which submits it to UMTA.



By James Clark
and
William E. Johnson

Women Learn to Build Highways



Highway construction is not traditionally thought of as "women's work" but the women in this program are causing a change in the traditional way of thinking.

[photos by Lance Strozier]

If you drive past a highway construction site this summer, don't be surprised if you see women operating bulldozers, driving trucks and doing bridge carpentry work. Who are the women that venture into a job field symbolizing the most virile of skills? Here are a few examples:

Doris Malaterre, 25, who has been working on a degree in education at the University of North Dakota. She wants to earn money to return to school.

Barbara Kotik, 22, of Fremont, Nebraska, 5 feet 1 inch tall, who last worked as a barmaid. "I was once the only woman in a crew constructing steel storage buildings. I was treated as an equal as long as I did my share of the work."

Lylyan Letcher, 33, mother of two children, and a former music student at East New Mexico University. She plans to work for a Minnesota construction company earning \$6 an hour.

These women have completed training in highway construction skills under a program financed by the Federal Highway Administration. The FHWA, in an effort to promote equal opportunity for women in the highway construction industry, contracted with the Northern Vocational Training Company, Cheverly, Maryland, to train 120 women in three skill areas. Under the \$416,000 award, 40 women receive 10 weeks of training as operating engineers of heavy equipment; a like number get five weeks

of training as off-the-road truck drivers, and the remainder take six weeks of training as highway bridge carpenters. The first women bridge carpenters were graduated last September at the training site at Virginia Beach, Virginia. The training program ended in January 1976, but follow-up work with the trainees will continue for the next two years. It is noteworthy that jobs were developed for each trainee before she entered training.

Immediately after the contract was awarded in mid-1975, Northern Vocational contacted 300 highway contractors in order to locate jobs. With assistance from Better Jobs for Women and equal employment opportunity groups, students were recruited from areas where jobs were located. After interviews with prospective employers, the women were brought to Norfolk for training. The trainees receive room and board and a weekly stipend.

Northern Vocational, which previously trained male bridge carpenters for FHWA, uses the same performance standards for training women.

Herman Stevens, a bridge carpentry instructor, said he was surprised to find very little difference between teaching the men and the women. "If anything, the women are somewhat easier because they are more eager to learn," he said.

Another instructor, Cecil W. Smith, said, "These women came here for one thing—to secure the type of training



It's No Longer a Man's World

that would qualify them for the work of their choosing. The attitude of the trainees has been phenomenal."

Training is designed to prepare women for entry-level jobs. The carpenters receive two weeks of orientation on the tools of their trade. They build their own tool box and receive the basic tools they need on the job. They spend four weeks at a mock construction site, where they build scaffolding, forming for concrete, columns and bridge decking. They learn to install and

"I have only one reason for being in the program. And that is to get a job that pays enough money for me to keep my family together."

tie steel reinforcement bars. Operating engineers spend 100 hours actually operating heavy equipment. Truck drivers receive 136 hours of behind-the-wheel experience.

Many of the trainees said they were interested in construction because it pays well and because it is more interesting than some other types of work.

As Lylyan Letcher put it, "I have worked the gamut, you name it, from switchboard operator to traveling saleswoman, and I have never earned more than \$4.90 per hour. Then along came

this opportunity, and now I go into the second phase of training as an apprentice with a Minnesota construction company at \$6 per hour. It's unbelievable."

Mary Lee Gomez, 27, of Denver, mother of three sons, aged 10, 9 and 4, said she previously had no special skills. "I had been furloughed from my job at the local hospital and could not get a job through the unemployment office. I was desperate and as a last resort, I contacted the Better Jobs for Women organization and was selected for this program.

"Now I am returning to Denver with a great deal of pride and restored dignity," she said. "This program saved my family. I want my sons to obtain a good education. I only finished the 8th grade and still don't read very well."

Linda Paone, 22, of Spangler, Pa., who attended Penn State University, was rejected when she first applied because there were no jobs for graduates in Pennsylvania. She was accepted after she said she was willing to move. As a result, she was slated for a job to build bridge forms in Delaware.

Patricia Loper, 26, of Denver, a divorcee with two children, said, "I have only one reason for being in the program. And that is to get a job that pays enough money for me to keep my family together." Her youngest child has cerebral palsy, requires special schooling and is in a foster home. She had been caught between staying in a

low-paying job to keep her government subsistence payments or earning enough to carry all the expenses herself.

On the day before the first class was graduated, Federal Highway Administrator Norbert T. Tiemann visited the training site at Virginia Beach and talked with the trainees.

After watching the women work at their newly learned skills, Tiemann said, "This has been an illuminating day for me. It offers abundant proof that when women devote their full energies and talents to a cause or an effort, they far exceed what is expected of them and stop at nothing less than complete success."

Once again, women are demonstrating they can do what used to be considered a man's job. How far women progress in highway construction jobs remains to be seen. The trainees' comments illustrate how important it is to have access to a job field.

One woman in the program was released from prison recently and could not find a job. After completing the training program, she said:

"This opportunity is the greatest thing that has occurred in my life. Tomorrow I will graduate. It's a fairy tale come true. Can you imagine, a few short weeks ago, I was completely lost... Now here I am on the verge of a new life. God help me, I am going to make it."

Prospective heavy equipment operators (left) receive 10 weeks of intensive training and, like the other trainees, are assured of a job upon completion of the program.



For most women, the program kindles a sense of accomplishment and pride, plus the chance for a better life for themselves and their families.

James Clark is with the Public Relations Department of Northern Natural Gas Company, Omaha, Neb. William Johnson is a public information officer with Federal Highway Administration and executive editor of the FHWA News.

MAKING TRANSPORTATION POLICY



Six months after taking office, Secretary of Transportation William T. Coleman, Jr., developed the first official national transportation policy.

Donald T. Bliss, deputy general counsel of DOT, served previously as special assistant to Secretary of Transportation William T. Coleman, Jr.

When William T. Coleman, Jr., became secretary of transportation last March, he inherited a longstanding request by the Congress for a national transportation policy. Developing a comprehensive policy is an ambitious and complicated effort. But the secretary nevertheless became involved in that effort shortly after taking office. How long would it take to fashion a national education policy? Or a communications policy? Normally such policies evolve only over years and decades.

In 1808, Secretary of the Treasury Albert Gallatin proposed a 10-year plan for an inland waterway and road system. In 1940, the preamble to the Interstate Commerce Act set forth a national policy. President Kennedy's 1963 message to Congress on transportation was an important benchmark. Secretaries Volpe and Brinegar did substantial work on transportation policy which helped to lay the foundation. This enabled Secretary Coleman to develop the first official statement on National Transportation Policy after only six months in office. It was submitted to the Congress last September. As Secretary Coleman noted:

"Policy is an evolving process that reflects and builds on existing laws, precedents, programs and public perceptions. It indicates the changes that are required to move toward a better transportation system, consistent with other important national priorities."

There are some new ideas and more specific guidelines in the secretary's policy statement. For the most part, however, it is neither new nor revolutionary.

Although many principles underlying a sound transportation policy are time-honored, the development of programs to implement them efficiently calls for innovative thinking. As the secretary stated:

"Although there are old habits and ways of thinking, and strong forces of politics, precedent and program inertia at work, we must now seek new, more efficient ways of responding to the nation's transportation needs."

The transportation policy statement represents a coordinated effort under the leadership of the Department of Transportation. The Office of Management and Budget and other federal agencies participated. After months of negotiation, compromise and discussion, the staff presented Secretary

Coleman with a draft statement. In the spirit of interagency compromise, the cutting edge of some of the department's original policy thrust had been dulled. As various commentators suggested ways of avoiding criticism and broadening the acceptability of the statement to various groups, a common denominator of non-controversiality tended to dominate.

“Policy is an evolving process that reflects and builds on existing laws, precedents, programs and public perceptions.”

But the secretary strongly felt that the statement should be candid and specific, even though controversial. Thus, working in the evenings and on weekends, the secretary rewrote a substantial portion of the statement, sharpening its focus, imprinting many of his personal views and objectives about transportation policy and explaining the rationale that underlies decisions he has made and intends to make.

In so doing, Secretary Coleman was fully aware that he was laying bare before the public view the inevitable inconsistencies of policy and programs that arise from pluralistic political processes; the gap between the changes we believe should be made and what, in fact, we suspect is possible to achieve; outcries of concern from government and private interests that may feel threatened by the suggestion that the status quo cannot endure forever.

Although such candor may be a high risk course of action, he saw no alternative. The public demands from its officials integrity, clarity and candor in setting forth policy and in explaining the reasons for decisions.

By setting forth his own thinking, the secretary hoped to stimulate a dialogue that would lead toward a consensus. He stated:

“In our democratic constitutional society, a transportation policy statement issued by the head of one federal department does not become the nation's transportation policy....”

Since the public and the Congress had been asking the secretary of trans-

portation for a policy statement for many years, he thought it important to be responsive to the requests and to insure that the statement did, in fact, represent his views.

The secretary found the process of developing the statement helped him to see transportation in a broader perspective, to identify opportunities for intermodalism, and to assure that transportation policy supports national goals and objectives. As he said in the statement:

“The values and priorities of our society are changing as the land on which we live is changing, and transportation must blend with other national goals in seeking heightened quality in the American way of life.”

In working on the statement, Secretary Coleman kept two factors in mind. One involved the role of the Department of Transportation, the youngest Cabinet department. Most of its components preceded the establishment of the department by many years. These administrations were designed to respond to the transportation needs of particular modes. The department was created to encourage more comprehensive solutions, to coordinate efforts among transportation modes and to promote fairly the inherent advantages of each mode. The policy statement helps to establish a common sense of purpose for officials involved in different modal activities.

The other factor involves public credibility. In the past 15 years we have witnessed an apparent deterioration of public confidence in government. This credibility gap may be explained in part by the fact that people do not believe that government officials are seeking thoughtful, comprehensive solutions to the nation's problems. If they do not understand the reasons for decisions or the underlying policy, they tend to suspect that decisions are made for political reasons. A policy statement exposes to public view the guidelines that govern decision making. It offers standards by which the actions of public officials may be judged. It explains the rationale that underlies proposals for legislative reform and helps to elevate the dialogue to a discussion of the issues, the problems and solutions.

The secretary's strongly held view that public officials should explain the reasoning that underlies decisions is reflected in his propensity to produce written judicial-type opinions on major

decisions, as in the I-66 decision involving a controversial Interstate highway segment in Northern Virginia.

The transportation policy statement provides a rationale that reflects the Ford Administration's philosophy and legislative program. The statement helps clarify the responsibility of the federal government:

in an economy in which the private sector has primary responsibility for meeting the nation's transportation needs and can meet these needs most effectively;

in a federal system where state and local governments must be able to make sound transportation decisions in the context of broader community development goals;

in an era of increasing energy, safety and environmental consciousness;

when increasing interdependency calls for expanding U.S. commerce abroad and maintaining our international transportation system (manufacturers and carriers) as the finest in the world; and

when there is increasing recognition that government financial resources are limited.

With the policy statement, the secretary hopes to stimulate more people and concerned organizations to come forth with innovative ideas to improve transportation and to amend or modify the proposed policies. Those who want to join this dialogue may purchase a copy of the Statement of National Transportation Policy from the Government Printing Office, North Capitol and H Streets, Washington, D.C. 20402 (Price \$1.15, Stock Number 050-000-00103-2).

An Electric Car in Your Future?

By Howard Coan and Mike Scott

A prototype electric car developed by the Copper Development Association. Using 16 eight volt conventional lead acid batteries, the car has a range of 75-120 miles and a top speed of 55 mph.

[courtesy of Copper Development Association]

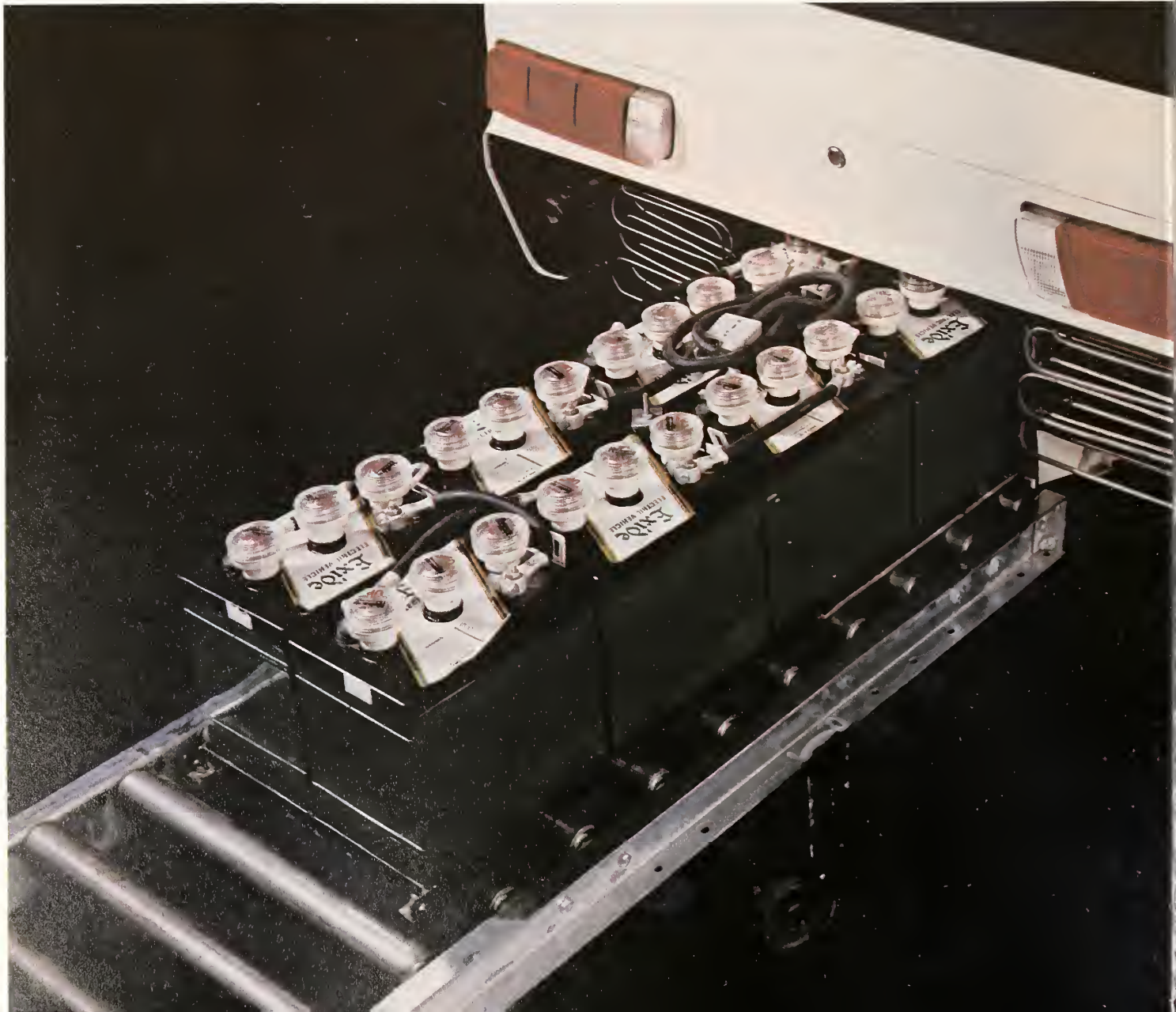
The car starts instantly without a sound. The only indication it is running is a small dashboard light flashing "on." The driver steps down on the accelerator pedal and the car pulls away smoothly with only a barely audible whine from the motor. To a puzzled bystander, the car appears almost silent.

This quiet vehicle with feline qualities is the electric car, which was first produced in the early 1900s. Its limitations, however, prevented capture of any major share of the auto market. Until the last year or two, about the only electric vehicles available were golf carts and fork lifts.

However, environmental considera-

tions, the escalating cost of petroleum and the prospect of worldwide depletion of oil reserves by the end of the century have helped arouse new interest in the electric car. The House of Representatives has passed a bill to promote research, development and demonstration of electric vehicles. And for the first time in many years, companies are marketing electric cars. A handful of companies produced 500 electrics in 1974 and more than 1,200 in 1975, according to the Electric Vehicle Council.

In the early days of auto transportation, the electric car was widely popular. Drivers appreciated its instant start.



Maybe, But Don't Forget to Unplug It

Even in freezing winter weather, no warmup was necessary. Early in this century, more than 100 U.S. companies were producing electrics—with such names as Baker, Ford, Pope-Waverly and Studebaker. In 1915, Henry Ford even considered production of an electric Model T.

Since those days, batteries have been improved, but not enough to overcome their deficiencies when used in electric cars.

The two electric cars most frequently sold in the U.S. are the CitiCar, manufactured by Sebring-Vanguard, Inc. of Sebring, Fla., and the Elcar, an Italian-made auto distributed in this country by

Elcar Corporation of Elkhart, Ind. CitiCar sells for about \$3,000 and Elcar for about \$3,500. Both cars carry two passengers and weigh less than 1,500 pounds. CitiCar has a top speed of 38 mph and Elcar 34. Under ideal weather, road and traffic conditions they can go for 50 miles without a battery recharge.

A recharge of the batteries from household current can take up to eight hours and 13 or 14 kilowatt hours of power.

Sebring-Vanguard warns CitiCar owners to operate the vehicle only on roads with speed limits of 50 miles an hour or less. The Elcar is called "perfect on-street transportation for in-town use" by its distributor.

To promote the development of low-pollution vehicles, the federal government has granted electric car manufacturers certain exemptions from mandatory safety standards. Both the CitiCar and Elcar have been excused from

"It is definitely not a car for an introvert with a persecution complex."

meeting requirements for door locks and latches that hold in a crash. Elcar has been exempted from seat belt warning requirements. The CitiCar has also been excused from meeting requirements for strong, crash resistant side doors.

Consumers Union tested the two cars and reported the results in the October 1975 issue of *Consumer Reports*. Citing the lack of sufficient crash protection and other difficulties, the magazine said, "We believe it would be foolhardy to drive either car on any public road." The magazine rated both cars as "not acceptable." (The CitiCar tested by CU had a top speed of 32.5 mph and the Elcar's top speed was 30 mph.)

John Diamond, 28, of Washington, D.C., who drives a CitiCar as his only car, disputes the conclusions of *Consumer Reports*. Diamond lives about one mile from his job as director of student program development at American University. He finds the electric economical and convenient. He drives it about 500 miles a month around town. Since it has a top speed of 38 mph, he avoids roads where the speed limit is over 40. His electric bill rose \$4 in the first month he had the car. He esti-

mates it costs him 1 cent a mile for electricity and that it costs one-third as much to run as for a conventional car that gets about 20 miles per gallon.

"It has proven quite adequate to get me around town," he says. "It has more than enough room for shopping bags and enough room for one date." His women friends usually think it's "very cute." He said some passersby seem to ridicule the electric, while others give him thumbs-up gestures of support. "It is definitely not a car for an introvert with a persecution complex," he says.

"You must remember to unplug it before you drive off," he said. Describing himself as absent-minded, Diamond



A full view of the Copper Association's prototype car. The front wheel drive car accelerates from 0-30 mph in 11.8 seconds.

[courtesy of Copper Development Association]

A 1901 Columbia Electric on view at the Ford Auto Museum, Dearborn, Michigan.

[courtesy of Ford Motor Company]



The Citicar's size makes it maneuverable and an answer to the parking crunch.

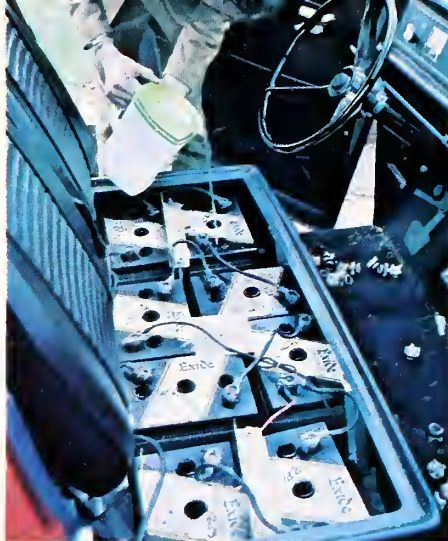
[by Jay Carroll]

said he has ruined several wall plugs in his garage by driving off without unplugging the car.

Two larger, family-size electric sedans are being produced in small volume. Both have higher maximum speeds than the two-passenger cars. Electric Fuel Propulsion Corp., Troy, Mich., is making the Transformer I, a five passenger car said to have a top speed of 60 mph and a range of 50 miles on one charge. It sells "in the price range of a Mercedes-Benz." Electric Vehicle Associates, Inc., Brook Park, Ohio, says its four-passenger Metro car has a top speed of 58 and a range of 40 miles on a single charge. It sells for about \$9,500.

In Japan, the government began several years ago a \$16 million, five-year program to develop an electric car with the performance of a conventional auto. Japan is the world's largest oil importer and has severe air pollution.

A prototype electric car with high-energy batteries developed by Toyota, the country's leading automaker, has met all the government's requirements. The goals reached include a top speed of 58 miles an hour, a driving range on one battery charge of up to 125 miles, acceleration from zero to 19 miles an hour in three seconds and the ability to climb a six-degree incline at a minimum of 25 miles an hour. The car weighs 2,800 pounds and can carry five passengers.



Despite recent research in the U.S., Japan, and other countries, the battery remains the major problem. A small car weighing about 3,000 pounds needs a battery that stores 35 kilowatt hours of electrical energy to have a range of 100 miles in typical urban driving. By comparison, a lead-acid battery (the type currently used in most electric cars sold to the public) storing that much energy would weigh about 3,000 pounds by itself.

A study done for the Environmental Protection Agency describes the present technology of electric car batteries as requiring up to 500 pounds of battery to provide the mechanical energy equivalent to a single gallon of gasoline. The report said the battery equivalent of a 3-gallon tank of gasoline would cost about \$1,200 with present battery technology.

The Argonne National Laboratory of the Energy Research and Development Administration (ERDA) has done research on a high-temperature, lithium-

Most people have to pull into a gas station for a fill up but John Diamond "energizes" his electric car at home.

[by Jay Carroll]

sulphur rechargeable battery for the Department of Transportation (DOT) under an interagency agreement. ERDA is sponsoring development of a prototype battery for use in electric cars by 1980. However, the lithium-sulphur battery is not expected to be completely developed much before 1985. It would weigh about one-fifth of a lead-acid battery for the equivalent energy output and would give electric cars greater range and acceleration.

Other batteries under development are the nickel-zinc, which could be available within five years and the zinc-chlorine, possibly in seven years. Nickel-zinc batteries would double the driving range over lead-acid. The zinc-chlorine may provide four times the range with good power.

In September 1975, the House passed a bill that would establish a five-year, \$160-million research, development and demonstration project on electric vehicles in ERDA. Its primary objectives would be to speed up the development of electric vehicle technology and demonstrate the commercial feasibility of the vehicles. The project would evaluate and demonstrate about 8,000 vehicles. ERDA would do research and development on batteries and hybrid vehicles. The hybrid combines an energy storage system, like a battery, with an internal combustion, or other type of engine.

Performance requirements would be set for electric cars based on tests of existing technology. ERDA would buy at least 2,500 electric vehicles and lease or sell them to individuals or companies. In the second phase of the program, 5,000 vehicles incorporating design improvements from the project's initial stage would be purchased in a similar way. In addition, federal agencies would be required to introduce electric vehicles into their fleets. A \$60 million loan guarantee program would help small businesses to bid for ERDA contracts and enter the electric vehicle industry.

The bill's supporters say the electric car would be satisfactory as a second, around-town vehicle since half of all driving consists of trips of five miles or less. The cars would reduce air and noise pollution and energy consumption. The project also would demonstrate the usefulness of electric cars by putting large numbers of them on the road, and influence public opinion.



The lithium sulfur battery currently under development will move a car up to 75 mph and will have a range of 125 miles.

[courtesy of Argonne National Laboratory]

The sodium/sulfur battery is currently being developed by the Ford Motor Company.

[courtesy of Ford Motor Company]

One Senate bill, S. 1632, is substantially similar to the House bill but refers only to electric vehicles and does not provide for a loan guarantee program. Senate committee hearings have been held on the electric car legislation.

In his recent transportation policy statement, Secretary of Transportation William T. Coleman, Jr., pledged that his department would strive to improve the auto's energy efficiency, safety and economic and social usefulness. DOT officials have investigated the electric car and drawn several conclusions.

It will apparently take at least 5 to 10 years to develop improved batteries. If such batteries can be developed, however, electric cars may bring significant benefits. Most importantly, they can

Early in this century, more than 100 U.S. companies were producing electrics...

use more abundant sources of energy, such as power from coal or nuclear plants, rather than petroleum, a more limited energy source. It may be possible to develop an electric vehicle with better overall energy efficiency than conventional cars in city driving.

Richard L. Strombotne, chief of the energy and environment division in DOT's office of the assistant secretary for systems development and technology, says, "Today's electric car is not more energy efficient than the best conventional vehicles. On the cost side, it's probably more economical to use petroleum for transportation and use nuclear power or coal to provide energy for residences, industry and commerce rather than for electric vehicles."

The benefit of improved air quality in urban areas from electric car use would be offset to some degree by increased pollution from power plants.

Electric cars designed to compete with future conventional cars should be compared with the advanced technology that is likely to be available at the same time as the improved battery.

If an electric car is produced that can compete with the conventional car, substantial changes would be required in the auto sales, maintenance and repair industries. A new kind of service station would be needed where batteries could

CONCEPTUAL Li-Al/FeS BATTERY FOR AN ELECTRICAL AUTOMOBILE

"DODGE DART"
 MAXIMUM SPEED OF CAR = 75 MPH
 CRUISING RANGE = 125 MILES



Howard Coan and Mike Scott are with the DOT Office of Public Affairs.

be recharged or replaced.

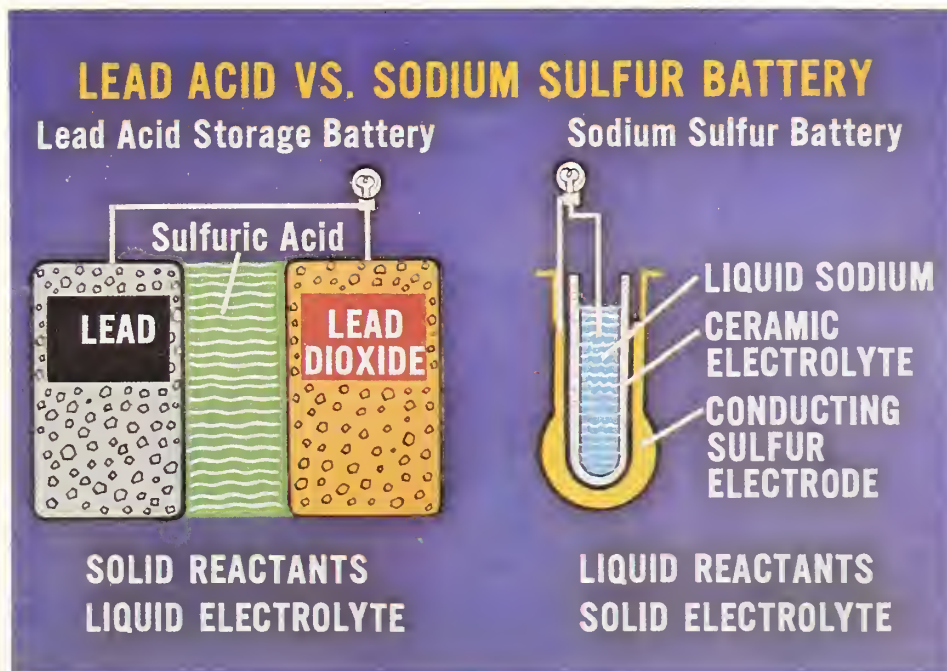
Electric cars, when produced in large numbers, should protect occupants from accidents to the same extent as conventional autos, according to DOT officials. Safety hazards associated with the electric's battery must be considered. While federal safety standards apply to all vehicles sold in the U.S., temporary exemptions from one or more standards might be granted appropriately on the ground that field testing and evaluation of an electric car might result in further improvements.

In view of the current state of battery technology, DOT officials say the federal government should not get involved in an electric vehicle demonstration program. Strombotne said a demonstration would not provide answers to technological questions that are not already known. He said it is unlikely the demonstration would result in improved batteries.

DOT officials have recommended federal funds be given to ERDA for advanced battery research rather than to demonstrate electric vehicles. The department also supports ERDA's program to conduct research in the development of advanced automotive propulsion systems.

The department is exploring alternatives involving conventional cars that may lead to greater reductions in fuel consumption and environmental impact. Officials suggest redesigned vehicle structures to reduce weight, engine control systems for internal combustion engines, improved drive trains and alternative engines, such as the stirling, diesel and gas turbine engine.

When substantially improved batteries are developed, perhaps in the early 1980s, they may offer some promise of an electric vehicle that is a viable alternative to more conventional gas-powered cars.



searchlight on safety



Watch That Pedestrian!

By Barbara Danahy

Sean and his best friend Mike, both 5 years old, were playing when their ball rolled into the street. Sean darted into the street and was hit by a car. The driver did not see him—until it was too late. Sean was dead on arrival at the hospital. While this incident is fictitious, similar accidents happen every day.

In 1974, 8,300 pedestrians were killed and over 120,000 were injured. While the great majority of injuries and deaths occur in urban areas, such accidents occur in all kinds of communities.

Approximately 2,200 of those killed in 1974 were children under the age of 15 and 75 percent of these fatalities were caused by an error on the part of the child. Most fatalities occurred during the day while the children were on their way to and from school.

One problem in pedestrian safety is a lack of uniform laws. Laws vary from state to state and, in some cases, from town to town within a state. For example, while residents of Massachu-

setts may know that a flashing red and yellow traffic light signals that the pedestrians may cross, out of state drivers and pedestrians might assume that the signal is out of order. The same holds true for Rhode Island, where a flashing green light is the pedestrian crossing signal.

Oftentimes, pedestrian laws are not enforced. It is unusual for pedestrians to be ticketed for jaywalking or crossing against a light. It is estimated that only two percent or less of the total police effort is directed toward pedestrian safety.

The Department of Transportation, through its National Highway Traffic Safety Administration (NHTSA) and Federal Highway Administration (FHWA), conducts research on pedestrian safety problems. NHTSA has analyzed and identified over 30 types of pedestrian accidents. A countermeasures program including education, safety messages and model regulations

has been developed for many of the most common pedestrian accidents.

NHTSA plans to establish a four-year, pedestrian/bicycle safety demonstration program in one community. This will include a complete countermeasures effort with the cooperation of local police, courts, highway designers, zoning commission, schools and community leaders in an attempt to reduce pedestrian and cyclist deaths. The program will be aimed at all segments of society, young and old alike.

NHTSA is also conducting a survey of police jurisdictions in order to obtain better accident data. By the end of this year, 350 police jurisdictions will have participated in the survey, enabling NHTSA to develop a national profile of pedestrian motor vehicle accidents.

NHTSA is developing a training program for children in kindergarten through third grade. The program uses film, street traffic simulators and supervised practice in crossing streets safely.

NHTSA plans to develop a nationwide pedestrian safety program and to encourage the states to devote more funds and personnel to such programs.

NHTSA is testing a set of model pedestrian safety regulations. If they prove effective, the states will be encouraged to adopt them. NHTSA is also testing a series of broadcast public service announcements on pedestrian safety practices which could be used as part of a national campaign.

Forty-one states and the District of Columbia have some type of pedestrian safety effort, usually aimed at children. Nine states allocate no funds for such programs. In fiscal year 1974, about \$23.5 million in state and federal funds was spent on pedestrian and bicycle safety programs.

FHWA is doing research to improve the safety and accommodation of pedestrians through traffic engineering. It is studying the feasibility of physically separating pedestrians from vehicles by using overpasses, underpasses, pedestrian paths, skyways and malls.

Based on this study, new criteria will be developed for community-wide separate pedestrian networks in new and existing communities. Special care will be taken to provide for the elderly and the handicapped.

Motorists, pedestrians, community members and educational groups must all work together to improve safety for pedestrians.



[by James H. Pickereil]

for your information



Recent DOT Publications

Lists of DOT Publications (order from office shown)

FAA Publications, Advisory Circular Checklist and Status of Federal Aviation Regulations, Federal Register, Part III, October 28, 1975, DOT Publications Section, TAD-443.1.

FHWA Publications, November 1975, Office of Public Affairs, Federal Highway Administration, DOT.

NHTSA Publications, Office of Public Affairs, National Highway Traffic Safety Administration, DOT.

Reports and Studies (order from office shown)

Citizen Participation and the Role of the Public Hearing, Environmental Programs Division (HEV-12), Federal Highway Administration.

1973 Accidents of Major Carriers of Property, Bureau of Motor Carrier Safety, Federal Highway Administration.

The Replacement of Alton Locks and Dam 26, September 1975, An Advisory Report of the Department of Transportation to the Senate Commerce Committee, Office of Public Affairs, DOT.

Statewide Highway Safety Program Assessment, A National Estimate of Performance, General Services Division, National Highway Traffic Safety Administration.

Acquiring Your Real Property for Federal-Aid Highways, (HRW-10), Federal Highway Administration.

R & D Implementation Catalog, Publications, Visual Aids and Computer Programs, September 1975, (HDV-20), Federal Highway Administration.

Tips on Car Care and Safety for Deaf Drivers, Office of Consumer Services, National Highway Traffic Safety Administration.

Transportation Energy Primer, Technology Sharing Program Office, Transportation Systems Center, Kendall Square, Cambridge, Mass., 02142.

Transportation Noise Bibliography, Technology Sharing Program Office, Transportation Systems Center, Kendall Square, Cambridge, Mass., 02142.

1972 National Transportation Study Population Projections by States, Urbanized Areas and Other Geographical Areas, DOT-P-5200.12. Office of Transportation Planning Analysis, Assistant Secretary for Policy, Plans and International Affairs, DOT.

Industrial Shipper Survey (Plant Level), September 1975, Office of Transportation Planning Analysis, Assistant Secretary for Policy, Plans and International Affairs, DOT.

Seventh Annual Awards, 1974—The Highway and Its Environment. Office of Public Affairs, Federal Highway Administration, DOT.

Single copies of these fact sheets available from Office of Public Affairs, DOT:

Federal-Aid Highway Act of 1975, June 26, 1975.

The National 55 mph Speed Limit, September 10, 1975.

The Voluntary Truck and Bus Fuel Economy Improvement Program, October 15, 1975.

Copies available from the National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia, 22161, at prices indicated:

Railroad Research Bulletin, Volume 2, Number 1, Spring 1975. FRA-ORD/D-75-42, PB-242 353/1WT, paper \$8.50, microfiche \$2.25.

FAA Issues Report on Commuter Air Carriers, Order No. AD-A014041.

Recreation Access Study. Volumes are available as listed below.

Recreation Access Study (as a set), Order No. PB 241993-Set, \$35.00 (\$9.00 in microfiche).

Summary Report, Order No. PB 241994/AS, \$7.00 (\$2.25 in microfiche).

Appendix 1: Inventory of Regionally Significant Federal and State Recreation Resources, Order No. PB 241995/AS, \$12.25 (\$2.25 in microfiche).

Appendix 2: Case Studies, Order No. PB 241996/AS, \$10.50 (\$2.25 in microfiche).

Appendix 3: User Access Survey, Order No. PB 241997/AS, \$8.75 (\$2.25 in microfiche)

Cargo Data Interchange System (Cardis): Data Elements, Functions and Information Standardization, Order No. PB 244072/AS, \$4.75.

Preliminary Functional Specification for a Prototype Electronic Data Interchange System. Order No. PB 244092, \$11.25.

Analysis of Fiscal Year 1976 DOT R&D Program, by R&D Management Objectives, DOT-TST-75-107. Order No. PB 243-700.

An Approach to Region-Wide Urban Transportation, July 1975.

Motor Common Carrier Freight Rate Study, May 1975.

Aviation Forecasts, Fiscal Years 1976-1987, September 1975, Report No. FAA-AVP-75-7.

Copies available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, at the prices indicated, payable by check or money order to the Superintendent of Documents.

A Statement of National Transportation Policy, by the Secretary of Transportation, September 17, 1975, S/N 050-000-00103-2, \$1.15.

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