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The $228 million Early Action Program conceived by the Port Authority of Allegheny County in 1969 and funded by the local, state, and federal governments in 1970 was intended to end the seemingly endless series of biennial transit studies and begin the construction of a countywide rapid transit system on an incremental basis. It was to use various technologies, including existing trolleys, exclusive busways in the east and south, and the Transit Expressway (Skybus)—rubber-tired computer-controlled vehicles tied to an exclusive guideway—in the South Hills sector. Perhaps no rapid transit effort, especially the Transit Expressway element, has undergone as close public and technical scrutiny as has the Early Action...
The issue of fixed-guideway rapid transit development in Pittsburgh and Allegheny County has been debated for more than 70 years by engineers, planners, politicians, and the community at large. Each group has had to contend with the rugged topography, existing development patterns, and its own hopes and fears in trying to arrive at an acceptable course of action.

Surprisingly, lack of funding has not been the reason for not proceeding with the construction of a fixed-guideway system. Funds were committed for construction in 1919 as well as in 1970. The issue in the early 1920s was where to begin rail construction; in the early 1970s, it was disagreement over the selection of a system of rubber-tired vehicles after construction was already under way.

To break the local impasse and permit construction to proceed, the Port Authority of Allegheny County commissioned independent consultants in early 1975 to compare four modes for the South Hills corridor and to make a recommendation for implementation. A light-rail transit (LRT) system was recommended in place of the rubber-tired system. Today, an engineering and environmental impact study for the first stage of the LRT line is under way. To give the reader a better understanding of the present LRT situation, it is important to review the key events leading to this decision.

In 1959, the Pennsylvania legislature assigned to the Port Authority of Allegheny County responsibility for acquiring, operating, and coordinating mass transit in Pittsburgh and Allegheny County. By 1964, the Port Authority had purchased 33 independent bus and streetcar companies and consolidated them into an integrated operation on a regional scale. Instead of 33 independent companies with 39 separate locations in Allegheny and contiguous counties, the Port Authority's 1000 buses and 90 streetcars are now operating from six strategically located divisional garages. Around-the-clock administration is conducted from a new main office complex, which also houses the primary maintenance shop. At the same time that bus operations were being consolidated, the board of the Port Authority and community leaders directed their energies toward the long-standing issue of rapid transit to achieve a balanced transportation system for the region.

After World War II, plans for the Pittsburgh renaissance, which was brought about by business and governmental interest in improving the city, placed improved mass transportation high on the agenda, along with new buildings, new jobs, and the checking of floods and air pollution. The public leaders in the early 1960s clearly noted that mobility was the key to sustained community development and regional growth. They posed the following question: "If trolley systems are not being built and are unavailable for medium-density cities such as Pittsburgh, if people are clearly in love with the riding qualities of automobiles, if buses are singularly inadequate to meet ridership demand as well as to negotiate the hills and narrow twisting streets of Pittsburgh, then how do we meet our local transit needs?" The answer proposed was the Transit Expressway, commonly referred to as the Skybus.

Skybus can best be described as a 10.7-m (35-ft) rubber-tired vehicle that is capable of being operated either singly or in multiple-car trains and that cannot leave the fixed track because the vehicle system is locked to a continuous center guideway. The concept was the brainchild of Westinghouse Electric Corporation and was made into a reality by the combined capabilities of at least 30 major companies in Pittsburgh that contributed to its development. Skybus is a product of Pittsburgh.

The first-generation vehicles and test track were funded by local, state, and federal governments and constructed in 1965. The 3.2-km (2-mile) test track located in a county-owned regional park (South Park) still exists today as the only high-speed test track for rubber-tired transit vehicles in the United States. Although no trunk-line rapid transit application exists today, the concept is being successfully used in downtown people movers in four locations in the United States.

EARLY ACTION PROGRAM

On the basis of the recommended staging priorities for constructing a 96-km (60-mile) rapid transit system in Allegheny County (1) and the successful test results of the rubber-tired Skybus, the Port Authority in 1969 developed a series of early actions aimed at proceeding quickly with the first steps of the countywide rapid transit system by using various systems in the high-priority corridors as well as demonstrating the feasibility of the Skybus technology in revenue operations.

As approved and funded in 1970 at the local and federal levels, the Early Action Program consisted of four major elements: the exclusive busways (a) to the south-7.2 km (4.5 miles)—and (b) east-12.9 km (8 miles) and (c) the rehabilitation of a portion of the existing South Hills trolley system-27 km (17 miles)—in order to continue operations until the final element—(d) the 18.9-km (10.5-mile) Skybus system—was operational in the remaining sectors. These early actions affecting transit improvements were estimated to cost $228,000,000. The southern and eastern sectors of the county had high priorities for rapid transit improvements because of the growth and development in these sectors, the age and deterioration of the existing South Hills trolley fleet, and the availability of right-of-way. From the inception of the Early Action Program in 1968, the Skybus demonstration element was embroiled in controversy at the local level. Argument and counterargument were advanced by both sides in response to such questions as: Is the system safe? Will it perform day in and day out? Will it perform in rain and snow? Are not steel wheels better than rubber tires? Will it cost more than the estimate? Why must I lose my favorite trolley stop? Should the vehicle operate automatically? Meanwhile, as each year passed by, Pittsburgh's transit controversy continued to build only a historic paper trail. It was the first transit program to have public hearings (not federally required) televised in their entirety on public television (1969), the first major Urban Mass Transportation Administration (UMTA) project to undergo the environmental impact procedure (1971), the subject of a 69-d hearing in the Court of Common Pleas of Allegheny County on a request for a preliminary injunction (1972), and the recipient of technical support from UMTA for fixed-guideway rubber-tired vehicles for line-haul service on two separate occasions (1970 and 1974). As a result of changing political leadership during this period at all levels,
steadily increased cost escalation due to delay and inflation, and the resurgence of the light-rail vehicle (LRV) in the United States, the Skybus controversy became deadlocked in mid-1974.

Although UMTA reassured the local area of its continued support for the rubber-tired vehicles, it was made clear that the Port Authority of Allegheny County must decide how it wished to proceed. While awaiting this decision, UMTA suspended further administrative actions on Skybus in October 1974. At the same time, UMTA also suspended further administrative action on the busway to the east as a result of the problems involving the Penn Central Transportation Company. (When the Consolidated Rail Corporation was created in April 1976, UMTA lifted this suspension; final engineering studies and acquisition of property are now under way, and construction is scheduled for completion in 1981.)

SOUTH HILLS CORRIDOR

In early 1975, key representatives of the city, county, and state governments began working together at the request of the Port Authority to try to reach a consensus on transit improvement in the Pittsburgh area. The deliberations of this special task force led to the conclusion that the various proposals for constructing fixed-guideway transit in the South Hills corridor should undergo a final independent evaluation—another study.

In accordance with the guidelines prescribed by the task force, De Leuw, Cather and Company began work in August 1975, under contract with the Port Authority, on a comparative analysis of four alternative modes of transit for the South Hills transportation corridor: (a) a rubber-tired, rapid-transit system, (b) a steel-wheeled, light-rail transit system, (c) a conventional rail rapid transit system, and (d) all-express bus transit. The study's basic objective was to provide sufficient data to determine which transit system would be most suitable for the South Hills communities, taking into account such factors as financing feasibility, operational efficiency, public acceptability, service characteristics, technological accessibility, safety, and environmental impact.

In March 1976, the independent consultant reported that, on the basis of these major considerations, "LRT would offer the most cost-effective and financially feasible alternative.... It would have sufficient advantages to allow it to be considered the leading candidate system for implementation in the South Hills corridor" (2). In comparison with the three alternative transit modes analyzed, the independent consultant concluded that the LRT system was preferable in the South Hills corridor primarily because

1. It had the lowest capital and operating costs per passenger and thus the lowest requirements for government subsidies, as well as being easily staged for construction and capable of expansion into other corridors;
2. It could produce the highest number of daily transit trips (particularly nontransfer trips) within the South Hills corridor and give the highest degree of accessibility to passengers;
3. It would require the least displacement of businesses and residences and was best in meeting noise, air-quality, energy, and land-use standards; and
4. It presented the least risk in terms of both technological reliability and opportunity for procurement since it is a tested and proven technology and does not rely on highly innovative or experimental features that could create an obstacle to commercial production.

In making the recommendation, the consultant stated that:

One of the most important advantages favoring LRT development in the South Hills corridor is that it would be compatible with the guideway technology that currently exists there. The system could be easily staged. Existing PCC [Presidents' Conference Committee] cars and new light-rail vehicles could operate interchangeably over the new and old parts of the system. Trolleys operate on downtown streets today in greater numbers and over greater lengths of street than would be proposed in the recommended plan. Were it not for the above factors, LRT possibly would not have had the cost and financial advantages over the other alternatives as determined in this study.

After review by the technical committee of the special task force and after public meetings, the independent consultant's recommendation to construct and equip the 35.7-km (22.3-mile) corridor with an LRT system substantially on the right-of-way now used by the existing South Hills trolley at a cost of $384.5 million (in 1975 dollars) was adopted by local and state officials and the Port Authority's board in April 1976 and forwarded to UMTA for its concurrence.

IMPLEMENTING STAGE 1

As the result of a 6-month joint review period with UMTA and the identification of new budgetary constraints at the federal level, a set of immediate improvements to the existing South Hills trolley system was proposed. These improvements would cost approximately $200 million and were consistent with the independent consultant's LRT recommendations as well as the Port Authority's operational objectives.

In April 1977, the Port Authority signed a contract with the joint venture firm of Parsons Brinckerhoff-Gibbs and Hill to undertake engineering and environmental impact studies for stage 1; see Figure 1. The draft environmental impact statement (EIS) and cost estimate, as well as other contract items were to be received by December 1977, and stage 1 should be 40 percent complete by August 1978. If the EIS and full funding have
been approved by August 1978, the Port Authority looks forward to the completion of contract documents and commencement of construction early in 1980. The object is to have the work completed and 80 new LRVs operational early in the 1980s.

The scope of work for stage 1 will set priorities for solving current trolley system problems within the budget constraints, while at the same time continuing trolley operations throughout the 35.7-km corridor. The tasks to be accomplished are exacting.

1. The existing trolley fleet is worn out and must be replaced. The current car barns at South Hills Junction were never intended to provide a full maintenance facility. This facility does not function properly today due to lack of space and could never accommodate the new LRVs and their sophisticated equipment needs. The Pittsburgh LRV is intended to use already available technology to the greatest extent possible. Competitive bidding consistent with UMTA's policy will be encouraged. Until the completion of stage 2 sometime in the late 1980s, both existing trolleycars and new LRVs will be operating over the same track.

2. There must be a river crossing into the Golden Triangle that is reliable and permits multicar operations in trains. The 100-year-old Smithfield Street Bridge can currently carry only 1 trolley/span in each direction. Multicar express operations on exclusive right-of-way are only possible into the downtown area without massive disruption if the soon-to-be-abandoned Fanhandle Railroad Bridge and right-of-way are used. This is the same alignment as that proposed for Skybus.

3. A systemwide signal system, power transmission, and distributors are needed. All existing facilities are old, obsolete, and in need of replacement. Stage 1 will include replacement of all such facilities throughout the 35.7-km corridor to ensure reliability and permit operations by both PCC cars and LRVs.

4. A track system must be built in areas previously proposed for abandonment. New track will be constructed along the alignment previously proposed for Skybus since no resources were allocated for renewing trolley in the 16.9-km corridor. The remaining South Hills corridor trackage will be reconstructed in stage 2, since initial upgrading has been accomplished as part of the current rail rehabilitation element by the Early Action Program.

5. Bridges located in the corridor formerly scheduled for a transit expressway will be renovated or reconstructed to support the LRV. Although further engineering study will be required, recent bridge work performed in the Saw Mill Run Valley and in the Library extension as part of the Early Action Program should prove satisfactory until stage 2 of the LRT plan is initiated.

6. The on-street operation of vehicles in downtown Pittsburgh is a subject of considerable discussion. The Parsons Brinckerhoff-Gibbs and Hills team is currently examining three basic schemes. One is the alternative recommended by the independent consultant; see Figure 2. This loop arrangement includes LRT tracks on selected downtown streets adjacent to the curb, the creation of an exclusive right-of-way between street intersections, and the operation of LRVs against the flow of vehicular traffic. The second is Pittsburgh's traffic management study alternative; see Figure 3. This stub-ended alternative places the LRT line exclusive on Fifth Avenue; the alignment is underground at Grant Street and operates at grade on the remainder of Fifth Avenue to Liberty Avenue. The third is an underground alignment yet to be determined that provides at least the same level of service as the recommended on-street alignment. The narrow streets—58-m (36-ft) travelway and 88 m (55 ft) between building faces—necessitate detailed engineering studies and trade-off analyses. No aerial alternatives have been suggested since they would have a negative visual impact.

Throughout the 35.7-km corridor, isolated improvements are scheduled to increase operational safety, efficiency, and reliability and to improve ridership. These items include (a) double-rather than single-track operations in restricted areas, (b) park-and-ride facilities at some stations, and (c) grade separations and extensions of exclusive right-of-way.

When the stage 1 improvements are completed in the early 1980s, stage 2 is planned to follow immediately thereafter; it is scheduled for completion in the mid-1980s. This will bring the South Hills LRT system to completion as planned.

CONCLUSIONS

Pittsburgh is now moving ahead with stage 1 of its LRT system as the result of an independent consultant's 1976
study of alternative systems in the South Hills corridor. The recommendation was based on a variety of measurements, including financing feasibility, operational efficiency, public acceptability, service characteristics, technological accessibility, safety, and environmental impact.

One of the most important advantages of an LRT system in the South Hills corridor was that it would be compatible with the existing guideway system; it could also be easily staged. Both PCC cars and the new LRVs could operate over both the old and the new parts of the system. Trolleys operate on downtown streets today in greater numbers and over greater lengths of street than was proposed in some of the recommended alternatives.

The process Pittsburgh underwent may hold some lessons that could be of assistance to other cities in completing rapid transit systems regardless of the mode selected.

1. We know that a consensus must be reached before transit actions and expenditures can be initiated; however, we have also learned that a consensus must be sustained for a long period of time.
2. Major capital expenditures for rapid transit programs may therefore have to be committed for the time that political office holders will remain in power. To sustain a program that is not well under way before a major political change is made seems to be difficult, if not impossible.
3. Planning incremental programs seems to be the correct approach to constructing large systems; however, they too must be completed expeditiously.
4. Pioneering new technology is exciting, but experimenting in a dense urban environment is demanding and exceedingly difficult. These efforts must be made with great care, great control, and great budgets to accommodate the unknown.
5. Wise allocation of scarce resources requires careful review of what is available and in place locally rather than initial advocacy of new programs that uproot and replace.

The 10-year controversy over the South Hills corridor seems to be at an end; perhaps progress will now indeed be rapid to assist the citizens of Allegheny County in moving more freely and reliably by public transit.

REFERENCES