ONE COMPANY'S SOLUTION TO COPING WITH ENVIRONMENTAL REQUIREMENTS OF HIGHWAY IMPROVEMENTS

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This is an example of how, through good negotiation and coordination, Commonwealth Edison Company in Chicago, Illinois resolved what at one time was felt to be an insurmountable economic obstacle involving a request to remove approximately 200 overhead poles to clear an area for a highway improvement project.

The improvement involved the widening of a four-mile stretch of Mannheim Road, a major arterial highway handling over 1,000 vehicles per hour during rush hours, which constitutes the eastern boundary of O'Hare Airport in Chicago, Illinois.

This project was like "The Dance of the Seven Veils," as there were seven years of history involved from the first public hearing in 1970 to the initial contract let in 1977, with the job just now nearing completion in 1980.

In January 1971 Edison received formal notification from the State requesting "a general upgrading of appearance of the highway right-of-way." The notification called attention to "the overabundance of overhead facilities along this street," and included the photograph in Figure 1. The photograph, taken with a high-powered telephoto lens, over emphasized the situation; although there were poles 25, 40, 60 and 80 feet apart in this area and at the edge of pavement. The company was requested to remove the overhead facilities or place them underground. The Permit Section of Edison's Real Estate Department was looking at what was felt to be a monumental project.

In the three-mile stretch where Edison was involved there were approximately 200 poles carrying 34 kv single and double circuits with 4 and 12 kv circuits under for local distribution. There were also approximately 50 overhead roadway crossings with street lights on some poles.

The road was being widened from 4 to 6 lanes which would require an additional 17 feet on each side. This would place the new right-of-way line at the front wall of many present business establishments. Complicating the project even more was the fact that it passed through five villages.

Edison's Engineering Department estimated the cost to place these facilities underground at $3,500,000, if space could be found for them. Many other facilities were already underground. An overhead relocation at the new right-of-way line was estimated to cost approximately $500,000.

Approximately 110 customers were served with overhead meters from the existing line. If this line was placed underground each customer would have to pay from $300 to several thousand dollars, depending on the load size, for their underground connection. Suitable locations would have to be determined for compartmental transformers and switchgear in front of commercial establishments.

The State felt that in the interest of beautification Edison should absorb the customer cost and build the vaults underground. Commonwealth Edison could not deviate from policy as set up with the Commerce Commission. Also, there was insufficient room available to place the required underground vaults.

The State and the villages wanted to eliminate overhead structures on the roadway, especially since they were spending millions of dollars to widen and improve the appearance of the road. Many off-the-cuff meetings with various State department heads were held to investigate alternatives to going underground.

The State then delayed the project for a while because of a financing problem and main drainage design difficulty. By the time the job was reactivated in 1973 two years had elapsed and the State had decided to place the main drainage down the middle of the road. This provided more space for Edison's facilities.

In one of the many meetings the State requested Edison to consider something different than the typical wood pole. Edison's specification group felt that the standard stock pole should be used. However, when presented with the situation where an overhead relocation on Mannheim Road would cost about $500,000 vs an underground run costing $3,500,000, Company officials gave approval to begin research on a totally different pole type.

One of the first designs developed was a wood pole with fiberglass cross arms. This design was rejected by the villages. Their main reason for this position was that they were expecting the State to provide street lighting along with the improvement. Consequently, there would be too many overhead structures on the roadway. When the State advised that any street light system would have to be furnished by the villages Edison was provided with the opportunity to sell the idea of an overhead installation combined with a lighting system.

A general meeting was held in December of 1973 with all five villages and their consultants; the Illinois Department of Transportation's representatives of design, construction and lighting and Commonwealth Edison personnel from real estate, engineering and marketing. At this meeting the State advised that the villages would be responsible for the street lighting. Edison then made a proposal which consisted of using approximately 120 poles with mast arms and illumination by 1000 watt mercury vapor lamps (Figure 2). This proposal utilized a basic wood pole of esthetic quality made of quality penta treated Douglas fir and with fiberglass cross arms.

The State was not too receptive to the wood poles but indicated that, if the village accepted, they might accept some kind of a steel or concrete pole. However, three of the villages objected strongly, and the task began to seem impossible.

Meetings were then set up individually with each village. Each was presented the overall layout with concrete poles and fiberglass mast arm (Figure 3). When it was pointed out that Edison would install and maintain each pole and lumen with energy charges of $250.00 per light, per year, they began to soften somewhat. However, these meetings determined that two of the villages did not desire street lights as they had no funds to pay for the energy cost.

In the meantime the State supplied electrical data indicating the type of light pattern required on the pavement if this type of installation were allowed. Word was also received from design engineers that the two 400 watt mercury vapor luminaire design would not be compatible with the pole design (Figure 4). Marketing had been developing a two-light system for each pole which would illuminate the pavement to State specifications. The system was being designed to put poles and lights on both sides of the road at 130 feet spacing. The first presentation to the State of a complete system, with the concrete pole and fiberglass mast arm, was turned down since they wanted poles only on the east side of the street. Edison had not been aware of this previously.

Edison's district superintendents who generally deal with the village officials and customers advised that, because of the limited available right-of-way, standard overhead cross arms would overhang private property. Overhang easements along the entire three-mile run would have to be acquired and would be extremely time consuming and almost impossible.

As if these problems were not enough, the Chief Engineer in charge of the job and the Specifications Engineer who was responsible for the design of the pole were transferred to another area.

The villages were still the biggest problem. Additional meetings were set up with Edison's designers, the District Superintendent and the villages. When the villages finally realized that street lighting would cost them approximately $2,000,000 they began to reconsider their position.

Both General Electric and The American Light Company investigated the type of lighting needed to meet the State's requirements. General Electric came up with a suitable 1000 watt high pressure sodium lamp which could be mounted at a 50-foot height on a 14-foot mast arm. This would provide the necessary foot candle lighting on the pavement. However, since Edison did not have this type of lamp in their rate structure they had to go to their rate committee for a variation. The rate committee tried to discourage it as they felt it would be setting a precedent.

Edison's Design and Construction Departments were also having misgivings about the use of a concrete pole. Because reinforcing steel is used in the manufacture of concrete poles it is not advisable to install them in close proximity to existing energized lines on poles. Thus, a temporary rerouting of the existing line while installing the new concrete poles would be required. Extra heavy equipment would be required to haul, unload and set the poles. Proper setting of poles would be complicated because concrete poles are fabricated in predetermined mounting positions. Also, because of varied design and weight, storing of replacement poles was a problem. Spare 80-foot wood poles would have to be kept in stock for temporary replacement. The State of Florida was the only area where the concrete poles were being used for distribution facilities. Other utilities had used them on trial installations. While no specific problems were reported users did not seem happy with them and were not expanding their use.

Meanwhile, Edison's engineering had been doing some research on an ornamental wood pole design. A rectangular, tapered, laminated wood pole, 23 inches across at the bottom and 10-3/4 inches at the top, was proposed (Figure 5). In 1974 it was decided to do additional research with the idea of fitting the pole with a matching mast arm with insulators attached to the pole itself. An artist rendition of the proposed pole was prepared for presentation to both villages and State (Figure 6). The wood poles had up-swept arms, made of laminated Douglas fir, and would be stained gray. The poles would be 200 feet apart with the lights mounted 50 feet above the pavement to provide the light coverage required and reduce glare. Where no street lights were proposed, and through villages that did not desire street lights at this time, a short up-swept arm following the same contour as the long arm would be used. The additional mast arm and lamp could be attached later. In order to eliminate the possibility of overhang of private property the mast arm was to be built to accommodate 12 kv conductors on both sides of the pole.

Each pole was to be made from thirteen 2 x 10 inch laminae glued together under high pressure, tapered slightly through its 63-1/2-foot length and computer designed for the specific line loadings. Using known standards for laminated structures, proposals were received from two suppliers.

From this point on everything began to fall into place. In late 1974 final presentations, along with the artist's rendition, were made to the State and villages. Tentative approval was received from all parties.

Although approval was received the State wanted to see firsthand what the poles looked like. A single structure, complete with all hardware, was set up as an exhibit (Figure 7). This exhibit was also used to review the special handling and setting practices and procedures.

All parties concerned viewed the pole and each was very enthusiastic in their comments. Everyone felt that it was esthetically compatible with the highway improvements and most thought it was a concrete pole.

Final approval from all parties was received in 1975 and Edison went into final engineering. The initial order of 70 poles was submitted to Joslyn Manufacturing late in 1975 and required a 12- to 15-month delivery time. In order to insure on-time delivery of the first shipment the railroad was paid an additional $1,000 to have a rider keep track of the rail car so it would not sit idle in any rail yard. The second shipment of 25 poles, which was even more critical because of a delay in fabrication, did get lost in one of Chicago's rail yards. In order to save some money the railroad had not been paid to have a rider keep track of this shipment.

This first highway contract was let in February 1977. In the final statistics the State's cost for the road was approximately $15,000,000. Commonwealth Edison Company's expenditure will be approximately $800,000. The number of poles was reduced from 190 to 90 and overhead crossings to 10.

Cost was approximately $400,000 above what would have been required to simply relocate the old line. However, over $2,000,000 was saved by avoiding a complete underground system. It was well worth everyone's seven years of effort even though there were times when it looked hopeless. In addition, a precedent for installing underground on major public improvements was avoided.

The value of good creditable negotiation and close general liaison with public agencies can clearly be seen in this case. Edison cannot place enough emphasis on this type of negotiation and liaison with public agencies.

Perhaps the article should end with the following three figures:

- Figure 8 shows the area in 1965.
- Figure 9 shows the area in 1975 after some poles had been removed.
- Figure 10 shows the area as it is today with new structures.

Figure 1. Mannheim Road project area 1965.

Figure 2. Wood pole concept with mast arms and mercury vapor lamp.

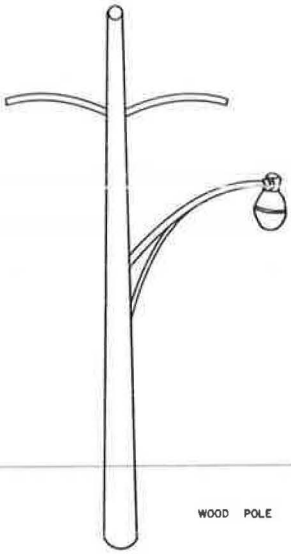

Figure 3. Concrete pole concept with fiberglass mast arm.

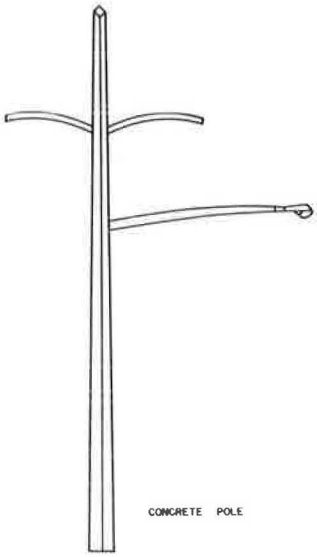

Figure 4. Double 400 watt mercury vapor luminaire.

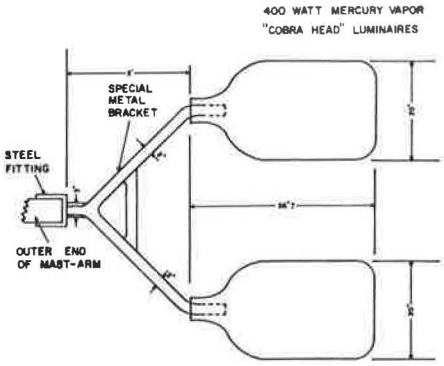

Figure 5. Laminated wood pole concept.

Figure 6. Laminated wood mast arm concept.

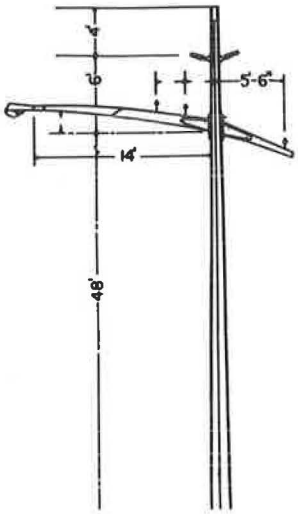

Figure 7. Exhibit of complete laminated wood structure.

Figure 8. Mannheim Road project area 1965.

Figure 9. Mannheim Road project area under construction.

Figure 10. Mannheim Road project area completed.