Tort Liability Related to Utility Pole Accidents in Florida

FAZIL T. NAJAFI, FADI EMIL NASSAR, AND PAUL KACZOROWSKI

Although many statistical data are gathered on pole accidents, very little information is available on the tort liability associated with utility pole accidents. Tort information is difficult to obtain. No organizations keep track of tort claims against public agencies, and utilities are generally reluctant to disclose tort information for fear of jeopardizing their defense against similar claims. A continuing study conducted at the University of Florida to assess pole-related tort liability in Florida is reported. It was found that for the state and most cities, tort liability related to pole accidents is minimal. Utilities' liability presents a mixed picture. Florida court rulings related to pole accident claims have so far been favorable to utilities and public agencies. If this situation changes, however, liability cost can increase significantly in the future, as is the trend in some other states. Therefore, a prudent policy to deal with pole-related tort liability consists of developing guidelines to relocate hazardous poles and to maintain a data base containing tort information and summaries of related court rulings.

State transportation agencies have to deal with a large number of tort claims every year. This coincides with increasing emphasis on highway safety by federal, state, and local agencies. The public is expecting safer and more forgiving roadways and is demanding adequate compensation to victims. Tort claims can result in substantial monetary awards when deaths or disabling injuries are involved, even if the design and operation of the highway system are not the primary cause of accidents.

Utility poles located on highways' rights-of-way (R/Ws) have been identified as a major roadside hazard. Studies have estimated that between 2 and 5 percent of all accidents involve a utility pole (1,2). In 1990, highway accidents involving roadside hazards caused 12,780 deaths, of which 1,263 resulted from crashes with utility poles (3). Florida accounted for 10 percent of these fatalities. Pole-vehicle accidents in Florida caused 123 deaths, 6,195 injuries, and more than \$24 million in vehicle damage in 1990 (4).

According to one study (5), a utility pole accident is 6 times more likely to result in a fatality and 3 times more likely to result in an injury than the average highway accident. Another study conducted at the University of Alabama (6) stated that because of the loss of the sovereign immunity status by most states, the number of tort claims against state highway agencies grew between 1978 and 1987 by an estimated 20 percent compounded annual rate to more than 27,000 in 1987. One study stated that utility poles had become frequent topics for tort liability actions (7). The University of Florida is con-

F. T. Najafi and F. E. Nassar, Department of Civil Engineering, University of Florida, 345 Weil Hall, Gainesville, Fla. 32611. P. Kaczorowski, Florida Department of Transportation, Office of Surveying and Mapping, 605 Suwannee Street, Tallahassee, Fla. 32301-8046.

ducting a study to assess the tort liability associated with utility pole accidents in Florida. The study is sponsored by the Florida Department of Transportation (FDOT) and FHWA. The study findings are presented next.

FDOT'S TORT CLAIMS

Florida and other states have benefited from the increased federal and local funding for highway safety programs. It is estimated that in the past 15 years, the fatality rate on U.S. highways was reduced from 5.2 to 2.7 per million vehicle miles of travel (8). The reduction in pole-vehicle accidents in Florida is given in Table 1. However, unlike some DOTs that face a rapidly increasing liability cost, FDOT's general liability has been declining since 1988 as indicated in Table 2. FDOT's total losses from all claims and the premiums paid to the Department of Insurance (DOI) for the past 10 years are presented in Figure 1.

A cap of \$100,000 per person and \$200,000 per accident was imposed by a Florida statute on tort awards against state agencies. Tort suits against FDOT are handled by its Claim Office. Although the office handles several thousand claims every year, its files are not yet computerized. With the assistance of a legal secretary, claims related to utility pole accidents were sorted out. In addition to the files transferred to the Risk Management Office, only four additional claims were filed by accident victims that were related to utility poles. In the most recent case, the claimant sued FDOT on the basis of negligence in the installation, maintenance, and inspection of a utility pole. FDOT refused to pay damages because it has no maintenance responsibility. Another claim accused FDOT of not replacing a broken light bulb on a state road where the accident took place. FDOT rejected any responsibility because it was not notified of the broken lamp. The other two claims did not involve injuries. Plaintiffs accused FDOT of negligence and requested compensation for the repair costs of their vehicles. FDOT refused to accept responsibility. These four cases remain in litigation. However, no significant payments, if any, are expected.

The Risk Management Office handles tort claims against all state agencies. Because the office deals mainly with claims that result in payments, it uses a computerized data base for storing basic information about each claim. There were 19 cases involving a utility pole. All claims except three were indemnifications to utilities for damages caused by FDOT crews to utility poles. The largest indemnification was less than \$2,000, and the average payment was \$670. Only three claims were filed by individuals as a result of a pole accident, and none resulted in a monetary settlement.

TABLE 1 Utility Pole Accidents in Florida

YEAR	# ACCIDENTS	FATALITIES	INJURIES	VEHICLE DAMAGES
1989	8,355	181	7,254	\$28,603,000
1990	6,873	123	6,195	\$24,294,000
1991	6,211	128	5,733	\$31,944,000

TABLE 2 FDOT's General Liability

YEAR	LOSSES	NUMBER OF CLAIMS	AVERAGE CLAIM
1991	\$1,564,000	564	\$2,772
1990	\$2,629,000	942	\$2,791
1989	\$3,309,000	853	\$3,879
1988	\$4,668,000	1,962	\$2,379
1987	\$4,139,000	858	\$4,824
TOTAL	\$16,309,000	5,179	\$3,149
AVERAGE	\$3,262,000	1,036	\$3,149

The Florida Public Service Commission (FPSC) has recently conducted a study on the cost-effectiveness of undergrounding electric utility wiring. FPSC located 115 sites of fatal pole accidents. Every site was visited, a descriptive form was completed, and several photographs were taken. These photographs, forms, and police reports were obtained and reviewed to estimate, somewhat subjectively, how many of these accidents could have been a good tort claim candidate. According to police reports, the principal cause of injury for about half of the accidents was excess speed. The other causes were loss of control at curves, impairment related to alcohol, collision with another vehicle, distraction, weather, or falling asleep. In addition, the photographs indicated that most poles had adequate lateral clearance. The few poles near the edge of the road were located in areas with limited R/W and would have been classified as special cases. Thus it is our opinion



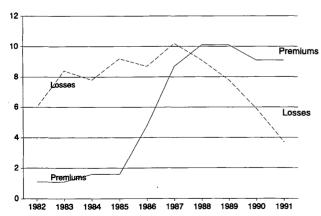


FIGURE 1 FDOT's premiums and losses, self-insurance (source: FDOT).

that very few accidents would have been a "good" tort case in Florida courts, although in other states, the courts have disagreed with the opinions of police officers and have found that DOTs or other parties contributed to accidents.

In summary, the review of FDOT and DOI tort files revealed that the tort liability related to pole accidents is not a problem for state agencies in Florida. This is the result of two factors: (a) the cap on awards and (b) favorable rulings by Florida courts as will be discussed later. There is, however, no guarantee that this favorable situation will continue into the future.

FLORIDA CITIES' TORT LIABILITY

A city can be named in a lawsuit if an accident happens on a road under its jurisdiction and the plaintiff has reasons to believe that the city did not design or maintain a safe road. Although the average speed is higher on state highways, resulting in more severe accidents, utility poles in urban areas are usually located closer to the traveling lanes.

The 20 most populous cities in Florida were identified as well as 5 smaller cities having a high rate of pole accidents. We requested information on completed tort cases related to pole accidents and conducted interviews with risk managers and safety engineers. We obtained the requested information from all surveyed cities except one major city. The survey's results are as follows:

1. More than half of the responding cities (mostly smaller cities) indicated that their records did not include any successful claim related to utility pole accidents. One large city paid more than \$100,000 several years ago to settle a claim in which two persons were injured in a pole accident. This city successfully defended itself against other utility-related claims. The remaining cities had to deal with few claims. The settlement amounts varied from a few thousand dollars to a maximum of \$30,000 per case. None of these cities, however, considered the number of such claims excessive.

- 2. City officials did not regard the tort liability related to utility pole accidents as a major problem. On a scale of 1 to 10 (10 being a very serious problem), most officials gave a rank of 2 or 3. When asked to list priority highway safety improvements that would reduce tort claims against their city, relocating hazardous poles was generally not among cited improvements. Fixing pavement edges and broken sidewalks, improving intersection clearance, clearing obstructed Stop signs, trimming trees, relocating concrete poles used to support traffic signals, improving storm drainage curbing, and providing additional guardrails are a few of the priority safety improvements mentioned most often. Officials from cities that had to pay significant monetary awards to the parents of children killed or injured by falling from a bridge or injured by a culvert edge were very sensitive to similar cases and ranked these problems high on their priority list.
- 3. Most city officials consider the liability associated with utility poles to be a primary concern for utilities. They seemed confident that pole permits shifted liability to utilities responsible for maintaining the poles. City officials have to deal with more immediate problems where no one else shares responsibility. Many officials were surprised to learn about utility court cases in other states where DOTs and cities had to pay significant compensations.

UTILITIES' TORT LIABILITY

A one-page questionnaire requesting information on tort liability related to pole accidents was mailed to 63 utilities located in Florida (17 phone companies, 28 power companies, and 18 cable companies). More than half of the utilities responded to our survey. These companies can be divided into three groups: small utilities, public utilities, and large independently owned utilities. Most smaller utilities indicated that they were not subject to pay any court awards or other settlements to individuals injured by pole accidents. One company indicated that it paid less than \$6,000 over a period of 3 years for eight out-of-court settlements. Many respondents indicated that they do not keep this kind of data. Most cable and small phone companies stated that most of their wiring is underground. Smaller utilities usually lease space on poles owned by large utilities.

Public utilities such as the Jacksonville Electric Authority and Gainesville Regional Utility benefit from the cap on tort awards against public agencies. Their records of completed tort cases are open to the public. Risk managers of public utilities indicated that the liability related to pole-vehicle accidents was not a major concern to them. Liability exposure due to environmental and health-related issues, electric contact accidents, and damages caused by storms and power failures were their main concerns. Their limited exposure and the favorable court ruling related to pole accidents in Florida helped keep this type of tort liability under control.

Southern Bell is the largest phone company in Florida. It owns 440,000 utility poles in Florida. The company informed us that for the past 5 years it was subject to 291 tort claims. Only nine of these claims were the result of pole accidents.

The total monetary awards paid by Southern Bell was less than \$60,000. Only one case is still being litigated. Regarding the liability related to joint use agreements of poles with other utilities, Southern Bell wrote: "Costs associated with liability and damages . . . have traditionally been shared with each party being liable for 1/2 of all injuries to any person or property. In recent years however, Southern Bell has taken the position that fifty percent liability is unfair considering the higher electric voltage in equipments used by electric companies. Consequently, recent agreements are void of language governing liability and damages and cases arising under these agreements would be decided by Florida Law."

The remaining phone companies, such as U.S. Sprint, MCI, Gulf Telephone Company, United Telephone Company of Florida, and Alltel Florida, and many television cable companies indicated that most of their cables and wires are underground. AT&T wrote that with the divestiture in 1984, 95 percent of utility poles went with the operating companies and AT&T exposure is minimal at best.

There are five independently owned electric companies (IOECs) in Florida. The IOECs are not required to report tort information to FDOT or to other public organization such as FPSC or other regulatory agencies. These companies regard tort information as very confidential and at first did not answer our survey. One agency wrote: "Plaintiffs in pole cases oftentimes seek to discover the same type of information. We regard such information as proprietary, privileged and confidential. We think that our successful defense of such requests would be jeopardized by responding to your survey." The IOECs must prepare two specific budgets every year: one for FPSC and the other for the Federal Energy Regulatory Commission (FERC). The IOECs report to FPSC on their payments for injuries and fatalities due to electric and nonelectric contacts. This reporting, however, is too general and not broken down by type of liability. Similarly, their reports to FERC include Sections 924 and 925, which deal with property insurance and injuries and damages, respectively, as indicated in Table 3.

Florida Power & Light (FPL) is the largest IOEC. The company's senior attorney elected not to provide specific information on tort liability. He said, however, that the liability related to pole-vehicle accidents is not a major concern for FPL. Environmental and health-related lawsuits are its primary liability concern. He also said that the favorable court decision in Spiegel v. Southern Bell & Florida Power and Light in 1977 has been upheld in Florida courts in recent cases. He wrote: "It is generally recognized that fault in connection with pole accidents lies with the driver who leaves the roadway out of control. Except in rare circumstances, the owners of structures, trees, or other objects located within the road rights-of-way are not deemed liable by Florida courts for damages or injuries to vehicles and their occupants who leave the travelled portion of the roadway and strike such objects. For that reason, we and other owners of properties and objects adjacent to roadways are rarely in the position of defending claims and lawsuits of this nature."

Tampa Electric Company is the third largest IOEC. Although the company did not answer our survey, we learned from an informed source that the company paid a significant amount to settle a 1985 claim. According to the same source, this seems to be the only case resulting in a large settlement.

UTILITY COMPANY	NUMBER OF EMPLOYEES	ELECTRIC OPERATION (\$MILLION)	PROPERTY INSURANCE (\$MILLION)	INJURIES & DAMAGES (\$MILLION)
Florida Power and Light	15,500	\$3,171	\$16.30	\$24.00
Florida Power Corporation	6,135	\$1,050	\$3.71	\$4.77
Tampa Electric Company	3,218	\$568	\$1.92	\$2.84
Gulf Power Company	1,615	\$323	\$1.78	\$1.65
Florida Public Utility Company	73	\$27	\$0.06	\$0.31

TABLE 3 Independently Owned Utilities' Insurance Costs for 1990

Gulf Power Company is the fourth-largest IOEC and owns about 400,000 poles. Gulf Power was sued jointly with FDOT by a driver who hit one of its poles (Kay v. Gulf Power). A circuit jury returned \$7 million compensatory damages against both defendants and \$4.2 million punitive damages against Gulf Power only. This verdict was later reversed and remanded by the First District Appellate Court in 1986. This case is discussed in a later section of the paper. After the case rehearing was denied, Gulf Power settled with the plaintiff out of court. In February 1988, Gulf Power settled another case. Although we were given the settlement amounts for both cases, we were requested not to publish them. We were also told that these were the only pole-related cases settled by Gulf Power in recent years.

In summary, tort liability related to pole-vehicle accidents is not a problem for phone and cable companies. However, the situation is unclear for IOEC. This favorable situation is due primarily to sustained favorable court rulings. Privately owned utilities can be subject to significantly more expensive claims if Florida courts become more sympathetic to accident victims. Although this happened in other states such as California, utilities' officials seemed confident that the legal situation will not change significantly in Florida.

INSURANCE COMPANIES' RESPONSES TO THE SURVEY

A one-page questionnaire was mailed to the 50 largest insurance companies. Twenty-five responded, but none completed the questionnaire. Although most respondents commended the university for the study and many requested a copy of the study's final report, some of their representative key statements are as follows: "We are currently unable to retrieve such specific information"; "the information requested is not captured on any of our automated systems"; "we do not have the ability to break down the information as requested"; "we have no way of extracting the information you seek." Some insurance companies simply indicated that they do not insure utility poles. State Farm Insurance Company, the nation's largest insurance company, stated that "we are unable to identify, from electronically encoded records, accidents involving collision with highway poles. In any case, State Farm auto liability insurance would not pay on behalf of the owner of a pole for liability arising out of its faulty design or placement."

Large utilities in Florida are self-insured to a certain limit (e.g., \$1 million in the case of Gulf Power), and they buy layers of additional coverage from insurance companies. A blanket coverage is bought on the basis of historical and expected claims. Premiums are based on basic information about the company and its location and are adjusted every year to reflect a change in liability payments. Premiums, however, are not broken down by the type or number of utility poles. One national insurance company, AEGIS Insurance Services, specializes exclusively in insuring utilities. AEGIS was reluctant to provide us with any specific tort information about its clients. It later indicated that it will reconsider our request, but we still have not received any information.

TORT CLAIMS IN OTHER STATES

A one-page questionnaire was mailed to transportation agencies and risk management offices in other states. Most of the states completed the questionnaire. About half of the respondents stated that the utility permit's liability clause shifted poles' entire liability to utilities, and therefore they paid no compensations to pole accident victims. Pennsylvania paid more than \$0.5 million to settle 25 pole cases. The other respondents indicated that neither their insurance commissioner office nor their DOT compiles such information. About 20 percent of respondents mailed a copy of their state's utility permit. Most permits include a clause containing a sentence similar to the following: "Permittee hereby agrees to indemnify and hold harmless the State . . ."

A questionnaire was also mailed to 50 utilities located outside Florida. Only 10 utilities responded. Very little tort information was provided, except for one utility in California, which provided us with confidential information showing substantial settlements and court awards and a large number of unresolved cases. Clearly, the tort liability associated with utility poles differs among states.

Information was also requested from organizations representing private and public interests such as Public Risk Management Association, Insurance Institute for Highway Safety, Insurance Information Institute, and Edison Electric Institute. All of these organizations except Edison Electric Institute.

tute indicated that they do not collect the type of information we are seeking. Edison Electric Institute has decided not to participate in this study.

COURT RULINGS IN FLORIDA

The outcome of utility pole tort liability rulings depends on two main factors: (a) the state's immunity status and the maximum cap on monetary awards and (b) the utility permit's liability clause and utility pole design guidelines.

The state immunity status is enacted by the state legislative body and approved by the state supreme court as constitutional. Immunity status can be amended at any time by legislative action or after the state supreme court declares it to be no longer constitutional.

Each state has formulated its own utility permit document. Although most states use similar statements in their document's liability clause, a small change in wording can have a significant legal consequence. For instance, FDOT amended in 1989 its permit's liability clause. The amendment was challenged in court by utilities and finally struck down by the Florida Supreme Court.

Utility pole design criteria are related to the state's clear zone policy. Florida's *Utility Accommodation Guide*, published in 1990, provides design criteria for highways' clear zone and utility poles located on highways' R/Ws. In locations with limited R/Ws, these guidelines allow special cases and call for "reasonable judgments," which may be interpreted differently in courts. In general, negligence and nuisance are the leading basis for tort liability. A review of key court rulings in Florida is presented next.

Immunity

State agencies in Florida, including FDOT, benefit from a limited immunity. FDOT has immunity in planning or discretionary decisions but has lost its immunity in operational or proprietary decisions through the "waiver of immunity" statute. A state statute limiting monetary awards to \$100,000 per individual was enacted. Planning-level decisions are related to such matters as location and placement of traffic and pedestrian control devices (Perez v. FDOT, 1982; Lewis School v. Metropolitan Dade County, 1979; Gordon v. West Palm Beach, 1975), decisions on a road extension or on guardrail placement (Payne v. Palm Beach County, 1981; Hyde v. FDOT, 1984), and decisions on setting speed limits (Ferla v. Metropolitan Dade County, 1979), among others.

Operational-level decisions are primarily related to the operation and maintenance of roadways and shoulders (Wojtan v. Hernando County, 1980; Trumpe v. Coral Spring, 1976). Negligence in design or construction of a facility is also an operational decision (Gordon v. West Palm Beach, 1975). Failure to maintain a stop sign is an operational decision (Wallace v. National Mutual, 1979). However, unless negligence is proven in failing to repair a damaged or malfunctioning traffic signal, the defendant is usually not liable (Arenado v. FPL, 1988).

A court decision in 1982 ruled that the location of individual poles and guy wires to support power lines was an operational function falling outside governmental tort immunity and was therefore subject to liability on the basis of negligence (Austin v. City of Mt. Dora, 1982). Two subsequent court rulings disagreed with this decision. In the case of Miller v. Fort Lauderdale, the court decided in 1987 that the location of a street light pole was a planning-level decision that is immune from liability. In 1988, the court also decided in the case of Hosey v. Fort Lauderdale that the placement of a street light pole on a divided island was a discretionary planning-level decision and the city was shielded from suit.

Negligence

To recover against FDOT for injuries, it must be shown that the department was negligent for creating or knowing about a dangerous condition and failing to correct such condition or warn the public about it (Hodges v. WinterPark, 1983). Governmental entities have a duty to exercise reasonable care to maintain highways in a safe condition (Tamarac City v. Garchar, 1981). Utilities have a duty to exercise care, both in location or construction and in use and maintenance of their lines, poles, and equipment. They must do all that human care, vigilance, and foresight can do to protect the safety of the public. However, they are not under continuing duty to protect against unforeseeable or unlikely events (Padgett v. West Florida Electric Company, 1982). In the 1977 Spiegel v. Southern Bell & FPL case, plaintiff's attorneys alleged that the companies negligently maintained a pole so near the highway that driver was fatally injured when his vehicle collided with the pole. The Circuit Court for Dade County rendered a final judgment in favor of defendants. Plaintiff's attorneys appealed. However, the District Court of Appeal held that the trial court was correct in determining that the utilities were not liable. In the case of Gulf Power Company v. Kay, the District Court of Appeal found that DOT's guides and manuals were not applicable to Gulf Power at the time of accident, and the company knowledge of two previous car accidents hitting the same pole was not legally sufficient to warrant punitive damages, because of the lack of similarity of circumstances between accidents.

Punitive Damages

The Florida Supreme Court stated that the character of negligence necessary to sustain an award of punitive damages must be of a gross and flagrant character, evincing reckless disregard of human life, which would raise presumption of a conscious indifference to consequences or a gross disregard of the safety and welfare of the public. On this basis, the jury award of \$4.2 million in punitive damage against Gulf Power (Kay v. Gulf Power) by a lower court was reversed by the Appellate Court.

Design Criteria and Standards

A change to a code governing construction standards is not given retroactive effect to construction completed before its adoption, except under limited circumstances. That is why, in the case of *Gulf Power v. Kay*, DOT design standards were not admissible in court—they were not applicable at the time

of construction. However, these guides are applicable to reconstruction or major improvement projects. FDOT and utilities are liable for failing to comply with statutory standards and criteria for design, construction, and maintenance of public roads (FDOT v. Neilson, 1982; Ferla v. Metropolitan Dade County, 1979).

CONCLUSIONS AND RECOMMENDATIONS

Utility poles are a major roadside hazard for errant motorists who leave the roadway. They account for about 15 percent of accidents with fixed objects and cause many injuries and fatalities. Although tort claims against state highway agencies are increasing at a fast rate because of loss of immunity status and higher caps on awards, it was found that the situation in Florida did not conform to the national trend. No significant payments were made by the state to settle tort claims related to pole accidents. Furthermore, the state's indemnification to utilities for shared liability is almost nonexistent. City officials indicated that the tort liability resulting from pole accidents was generally not considered a serious problem. As for utilities, the situation is unclear. The tort information provided by independently owned utilities indicated that tort liability associated with utility poles is not a primary concern for them. Although Florida courts rendered generally favorable rulings in favor of utilities, utilities paid in a few cases substantial out-of-court settlements.

This generally favorable situation for public agencies and utilities in Florida is unlikely to change drastically in the near future. However, a long-term assessment of the situation may provide a different picture for the following reasons:

- 1. Poles will continue to account for a disproportionately high rate of accidents and injuries.
- 2. Many utility poles are located near the traveling lanes, especially in urban areas. Courts may be more sympathetic to drivers or passengers severely injured by colliding with such a pole even if these poles satisfy design standards.
- 3. The cap on awards against public agencies is likely to increase as is the case in other states, which can result in more claims.
- 4. Utilities' successful court challenge of Florida's amendment of its utility permit's liability clause indicates that future permit clauses may increasingly reflect utilities' interests.
- 5. The emphasis on highway safety will increase public expectation regarding the elimination of highway hazards.

The confidence in continuing favorable court rulings expressed by many city and utility officials cannot be justified in view of the national legal trend. It only takes one sustained court ruling sympathetic to drivers injured or killed by a pole accident to create a legal precedent and affect all subsequent cases. Therefore, it is prudent for utilities and highway agencies to institute new policies to deal with the tort liability risk related to pole accidents. This policy may include the following:

- 1. Relying on computerized data bases to store, retrieve, and evaluate tort claim data;
- 2. Developing a uniform method based on a well-structured coding system to collect and store tort information;
- 3. Requiring utilities to provide more detailed information on tort liability in their annual reports to regulatory agencies;
- 4. Standardizing the liability clause related to poles' joint use contracts among utilities;
- 5. Formulating criteria for an equitable sharing of relocation cost between FDOT, cities, and utilities when pole relocation is necessary as a preventive measure against tort claims;
- 6. Establishing an independent organization to provide national and state summaries of court rulings and jury awards in related cases; and
- 7. Developing a method to prioritize the relocation of existing hazardous poles. This method should preferably be based on an expert system model, because expert systems rely on rules to deal with nonanalytical problems and thus can incorporate experts' knowledge. An effective expert system program is capable of learning from every new case and automatically updating its rules and adjusting relocation priorities on the basis of new court rulings. However, this requires uniform and "automated" data reporting methods adopted by all parties.

Pole relocation priorities should be based on tort information and court ruling interpretations instead of on accident statistics. The reason is that accident frequency and liability cost do not necessarily depend on the same factors.

REFERENCES

- Selection of Cost-Effective Countermeasures for Utility Pole Accidents. Users Manual. Report FHWA-IP-86-9. FHWA, U.S. Department of Transportation, Dec. 1986.
- I. S. Jones and A. S. Baum. An Analysis of the Urban Utility Pole Problem. Calspan Field Services, Inc., Federal Highway Administration, Dec. 1980.
- 3. Roadside Hazards, Fatality Facts 1991. Insurance Institute for Highway Safety, Arlington, Va., July 1991.
- Report on Cost-Effectiveness of Underground Electric Distribution Facilities. Florida Public Service Commission, Tallahassee, Fla., Dec. 1991.
- G. B. Pilkington II. Utility Poles: A Highway Safety Problem. Public Roads, Vol. 52, No. 3, Dec. 1988.
- D. S. Turner, J. K. Davis, and B. T. Wood. Transportation Research Circular 361: Status Report: Tort Liability Among State Highway Agencies. TRB, National Research Council, Washington, D.C., July 1990.
- D. S. Turner. A Primer on the Clear Zone. In *Transportation Research Record* 1122, TRB, National Research Council, Washington, D.C., 1987, pp. 86-95.
- 8. J. A. Cirillo and F. M. Council. Highway Safety: Twenty Years Later. In *Transportation Research Record 1068*, TRB, National Research Council, Washington, D.C., 1986, pp. 90-95.

Publication of this paper sponsored by Committee on Tort Liability and Risk Management.