The Value of the County Engineer: Strategies to Expand the Shrinking Employment Pool

Project Number HR-338

A Final Report Submitted to

The Iowa Highway Research Board

And

The Midwest Transportation Center

Principal Investigator
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ACKNOWLEDGEMENTS

It would be inappropriate to submit this report without acknowledging my appreciation for the financial support from the Iowa Highway Research Board and the Midwest Transportation Center, without whose funding this research would not have been possible.

The invaluable assistance and continuous support this researcher has received during the past two years from the recently retired Director of the Office of Local Systems, Lowell Richardson has also been much appreciated. I hope your retirement is fruitful and happy, particularly the times you will spend on the golf course. Lowell, you have become a colleague and friend and I thank you. When the idea for this research was first initiated, Lowell Richardson thought it might be a "nice little project". It was -- for about two months. Then, following a telephone call from Lynn Olson, then President of the National Association of County Engineers, it "took off" and developed a life of its own. Without your continued support Lowell, and Lynn's assistance in spearheading the project, it never would have been possible to complete as thoroughly as it has been. Than you both for that. I also want to thank all of the members of the expert advisory groups in each of the participating states. Your tireless assistance and patience with my sometimes endless telephone calls has been much appreciated. Your graciousness in inviting me to your many conferences on County Engineering has provided me with insights into your profession that would not have been possible using only a few interviews.

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Sincerely and respectfully, to all of you

Kathleen M. Waggoner

Kathleen M. Waggoner
Honorary Member of NACE
[At least I think I am. My name is in the NACE directory]

ABSTRACT

Phase One: The first phase of this research involved an effort to identify the issues relevant to gaining a better understanding of the County Engineering profession. A related objective was to develop strategies to attract responsible, motivated and committed professionals to pursue County Engineering positions. In an era where a large percentage of County Engineers are reaching retirement age, the shrinking employment pool may eventually jeopardize the quality of secondary road systems not only in Iowa, but nationwide. As we move toward the 21st century, in an era of declining resources, it is likely that professional staff members in charge of secondary roads will find themselves working with less flexible budgets for the construction and maintenance of roads and bridges. It was important to understand the challenges presented to them, and the degree to which those challenges will demand greater expertise in prioritizing resource allocations for the rehabilitation and maintenance of the 10 million miles of county roads nationwide. Only after understanding what a county engineer is and what this person does will it become feasible for the profession to begin "selling itself", i.e., attracting a new generation of County Engineers. Reaching this objective involved examining the responsibilities, goals, and, sometimes, the frustrations experienced by those persons in charge of secondary road systems in the nine states[1] that agreed to participate in the study.[2]

Phase Two: The second phase of this research involved addressing ways to counter the problems associated with the exodus of County Engineers who are reaching retirement age. Many of the questions asked of participants asked them to compare the advantages and disadvantages of public sector work with the private sector. Based on interviews with nearly 50 County Engineers and feedback from 268 who returned surveys for the research, issues relevant to the profession were analyzed and recommendations were made to the profession as it prepares to attract a new generation. It was concluded that both State and Regional Associations for County Engineers, and the National Association of County Engineers are most well-situated to present opportunities for continued professional development. This factor is appealing for those who are interested in competitive advantages as professionals. While salaries in the public sector may not be able to effectively compete with those offered by the private sector, it was concluded that this is only one factor of concern to those who are in the business of "public service". It was concluded, however, that Boards of Supervisors and their equivalents in other states will need to more clearly understand the value of the contributions made by County Engineers. Then the selling points the profession can hope to capitalize on can focus on the strength of state organizations and a strong national organization that act as clearinghouses of information and advocates for the profession, as well as anchors that provide opportunities for staying current on issues and state-of-the-art technologies needed to maintain high quality secondary road networks.

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[1] There were initially eight states involved in this research including Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, Ohio, and Washington. Following participation at a conference in South Dakota, however, Dr. Waggoner was asked to include that state in the research as well. Responses from Missouri were low [only 18 of 66 surveys were returned] and, as such were of limited value. Because of this Missouri was eliminated from the analysis and South Dakota was substituted.

[2] Hereafter, when the term *County Engineer* is used, it shall refer to all persons in charge of secondary road systems within those counties represented in this study. This is in no way intended to denigrate the credentials of those holding the P.E. license. Four states, including Iowa, Minnesota, Ohio, and Washington, require the registered Professional Engineer's license for County Engineers, while the remaining states, including Kansas, Michigan, South Dakota, and Nebraska do not. Those responding to the survey, therefore, include "non"-P.E. Road and Highway Superintendents as well as "P.E.s".

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Preface to Introduction of Report Analysis

This project report will include an integration and analysis of data collected from phase one of this research with that collected during phase two. The insert below describes the objectives defined for each separate phase of the project. The ultimate goal of this research is to offer suggestions to the County Engineering profession regarding strategies that might be used to attract a new generation of professionals into this career path.

Primary Goals: Phases One and Two

Project Objectives:
Phase One: The first phase of this research involved an examination of the factors that will allow a better understanding of County Engineering as a profession. Only in this way will the profession begin to identify the strategies needed to attract new people into a profession that is facing serious personnel shortages, particularly in rural counties. Reaching this objective involved examining the responsibilities, goals, and, sometimes, the frustrations experienced by those persons in charge of secondary road systems in the nine states[1] that agreed to participate in the study.[2]

Phase Two: This second phase of the research involved addressing ways to counter the problems associated with the exodus of County Engineers reaching retirement age. Many of the questions asked of participants emphasized the advantages and disadvantages associated with assuming the position of County Engineer. Then those factors were compared/contrasted with those offered by the private sector. Based on interviews with nearly 50 County Engineers for phase two of this research, it was hypothesized that State and Regional Associations for county engineers, and the National Association of County Engineers present opportunities for continued professional development that can help to attract a new generation of County Engineers. As such, a number of questions asked of participants focused on these opportunities.

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Introduction and Background Information on County Engineering

The first phase of this research involved an effort to more clearly understand County Engineering as a profession. As such, it was designed to identify the range of skills and responsibilities shared by the diverse group that is responsible for the more than 10 million miles of county roads across the nation. Upon beginning this research, only one factor seemed clear. The objectives of County Engineers are somewhat nebulous, yet for each they include efforts aimed at providing a quality system of secondary roads. Some of those involved in this research are registered Professional Engineers with four year degrees from accredited Civil Engineering Programs. Others are high school graduates with many years of experience to their credit.

Understanding the skills needed by succeeding generations of County Engineers has led the researchers to use this exploratory research, in part, to offer an understanding of the profession from the points of view of those who work in sometimes very different types of county governments and who face the challenges of dealing effectively with the public, elected Boards of Supervisors, County Road Commissioners, and Executive Councils on a weekly, sometimes daily basis.[3]

Those County Engineers who are currently in office do not differ significantly from their colleagues of 25 or even 50 years ago. Their aim is to make county engineering as highly regarded and accepted as any profession.[4] County engineers face many obstacles in realizing this aim. One of those obstacles involves the growing complexity

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[3] For brevity's sake, the terms Board of Supervisors, shall also refer to County Road Commissioners, Executive Councils, and any other term used to refer to those elected officials to whom the County Engineer reports.

[4] Wendler, Glenn, County Engineer, Iowa County Marengo, Iowa, *Why Be a County Engineer?* Better Roads, P. 13, January 1967.

and scope of responsibilities associated with the position. Following World War II, those choosing this career path provided the impetus and technical/engineering skills needed to bring the nation's county roads into the twentieth century. Today they continue this critical function with fewer financial and human resources and increasing responsibilities for road and bridge reconstruction, rehabilitation, and maintenance. In order to effectively prioritize resource allocations for vital, and sometimes unrecognized county services, the coming generation of County Engineers will need much more than the high level of technical/engineering expertise possessed by their predecessors whose primary efforts were in the "construction phase of the job".

As the profession moves rapidly toward the twenty-first century, the services provided demand increasingly sophisticated management, administrative, public relations, and even legal skills -- the latter most notably relating to environmental and tort liability issues. The tort liability issue is one which has grown increasingly problematic for County Engineers. Most report it is a problem likely to grow more serious in the coming years. This is, in fact, one of the key factors that would discourage many current County Engineers from considering the same career choice again. All states participating in this research reported they anticipate an increase in liability exposure as time goes on. Liability issues reported to be of most concern included the following:

- vegetation which reduces sight distance;
- shoulder design;
- narrow shoulders;
- roadside obstacles;
- signs and markings, including sign theft and vandalism; inadequate signs;
- low road friction;
- low maintenance on pot holes;

- alcohol related accidents;
- bridge functional obsolescence;
- attorneys who convey the message that the county has money and will pay;
- too many attorneys;
- an increase in traffic on county roads;
- narrow bridges;
- dust;
- highway design;
- low visibility and snow removal accidents;
- sharp curves -- steep river valley rivers;
- construction areas;
- minimum road widths;
- excessive speed on county roads;
- insufficient guardrail placement;
- bridge overload causing later collapse under normal weight of vehicles; and
- old, functionally deficient roads which must accommodate high speed traffic due to inadequate law enforcement.

Because the staffs of so many county offices are small, many County Engineers have been forced to develop expertise and skills in areas that have not ordinarily been perceived within their realm of responsibility. It is important to realize that these skills will be needed **in addition to** the broad scope of technical and engineering skills already required for County Engineers. Perhaps this is one reason why a County Engineer from Minnesota said "the P.E. should be the minimum requirement for the position."

When such a broad spectrum of job qualifications is set forth, however, the problems associated with projected turnovers [due primarily to retirements and secondarily to attrition for other reasons] and shortages of qualified County Engineers become magnified. That is, at the same time the demand and scope of the position have expanded, many of those who are currently so well-qualified to fill the positions are expected to be lost to retirement as early as 1996 [See **Table 1** for the age distribution of County Engineers nationwide in 1984]. According to the 1985 TRB report, 34.2% of those serving as County Engineers in 1984 would have been expected to retire by 1989.

AGE GROUPS	NUMBER	PERCENTAGE
Less than 26 years old	2	0.3%
26-35 years old	46	6.5%
36-45 years old	185	26.1%
46-55 years old	234	33%
56-60 years old	147	20.7%
61-65 years old	76	10.7%
66 yrs. old and older	20	2.8%

Table 1. Age Distribution of County Engineers Nationwide. 1984. Taken from *Local, Regional, and Federal Agencies*, P. 150, Transportation Professionals: Future Needs and Opportunities. Transportation Research Board, National Research Council Special Report 207, 1985.

While retirements have not affected all states equally, many of the County Engineers who participated in phase one of this study in 1992, are reaching the point where, within 5-15 years, many will be making their exodus from the work place [See **Table 2**]. In 1993, in the state of Iowa alone -- with only 99 counties represented -- it is anticipated that more than 30 County Engineers will begin phasing out of their positions. This represents a potentially significant turnover in positions. It is especially disturbing to note that some County Engineers are also opting for early retirement. This serves to deepen the void left by the exodus of these skilled professionals. Such factors weigh heavily on county Boards,[5] whose jobs are to identify replacements for these persons who will take with them a lifetime of knowledge and expertise, much of which is not taught, except in the "classroom of experience". This realization presents an extraordinary challenge, particularly for many rural counties that must strive toward the

[5] County Boards refers to County Boards of Road Commissioners, County Boards of Supervisors, Executive Councils, and any other equivalent body of elected officials.

sometimes impossible job of filling vacancies with people of comparable depth and scope of expertise and experience.

PARTICIPATING STATES	NUMBER OF COUNTY ENGINEERS 46 YRS + [Represents number of those 55 yrs. old and older]	PERCENTAGE OF COUNTY ENGINEERS 46 YRS. + [Represents percentage of those 55 years old and older]
Iowa (46 Responding)	27 (15)	59% (32.6%)
Kansas (29 Responding)	18 (12)	66% (41.3%)
Michigan (29 Responding)	19 (12)	66% (27.5%)
Minnesota (40 Responding)	18 (9)	45% (22.5%)
Nebraska (27 Responding)	18 (6)	66% (22%)
Ohio (30 Responding)	22 (6)	73% (30%)
South Dakota (30 Responding)	12 (2)	63% (9.5%)
Washington (21 Responding)	11 (2)	56% (9.5%)

Table 2. Ages of respondents aged 46 and over responding in Phase 1 of this research. Numbers and percentages in parentheses represent those ages 55 years and older.

As far back as the 1930s, strategies were being developed and implemented to attract people to the field of County Engineering.[6] Yet since the 1950s many counties nationwide have been forced to confront the difficulties associated with efforts to avert shortages, i.e., gaps that occur between the time one County Engineer leaves the position and a replacement is found. At one point recently, the state of Iowa had five counties where positions had not been filled following retirements of County Engineers.

Many argue that the lack of visibility of the profession coupled with low salaries is the problem. They insist that salary remains a key factor discouraging the "best" qualified from considering County Engineering positions. Lowell Richardson recognizes, for example, that "professionally registered" engineers are typically looking

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[6] Better Roads Forum, *Attracting Engineers to County Work*, November 1962].

for well paying positions that will provide them with challenges **and** with the potential for advancement. These two factors alone present the state of Iowa in particular with a *dilemma, because Iowa salaries for County Engineers are generally* 15-20% below those offered by many other states.

The primary complication of the job includes the number of years required for registration [4-5 years in school, passing the E.I.T., and another four years of experience as pre-requisites to taking the P.E. test.]. This factor coupled with the broad range of knowledge needed to do the job, act as serious dis-incentives for County Engineer aspirants. Added skills needed to meet the demands of the office, and a more active role in public relations, these in addition to the norm of reduced public tolerance, also appear to be important considerations in efforts to proactively resolve the "projected shortages dilemma".

Many County Engineers, regardless of their state affiliation, express growing frustration levels with [1] the low compensation for the valued contributions they make *and/or* [2] *the realization that subsequent generations will need to be better* compensated if the profession expects to draw in quality applicants. Two Highway Superintendents from Nebraska, for example, commented that

> **the public perceives county employment as a welfare type of employment where only the uneducated work. They are not treated as equals and instead a prejudice is developed. Until these feelings are changed, the wages will not increase. This results in a less appealing profession.**
>
> **Until the pay is raised to decent levels, it would be cruel to try to recruit innocent young people into this dead end profession. If the pay is raised to decent levels, the young people will find the profession without recruitment.**

The person who made the latter statement also noted he found it difficult to respond to the survey because, as he comments

> I have no sympathy with your objective, which is to attract more people into county engineering. I would like to see just the opposite happen. That is, I would like to see large numbers of colleagues leave the profession. then perhaps several counties would *bid against each other for my services and I could earn a decent salary for a change.* In my opinion, the counties in my state, at least, already have far more and far better engineers and highway superintendents than they are paying for.

The concern over low salaries is not restricted to states that do not require the Professional Engineer's license.

Dennis Carlson, state-aid engineer from Minnesota noted a recent change in the state statute regarding the appointment of County Engineers. In *§163.07, Subdivision 1* of the Minnesota Code it states that

> The county board of each county shall appoint and employ, as hereinafter provided, a county highway engineer who ***may*** have charge of the highway work of the county and the forces employed thereon, and who shall make and prepare all surveys, estimates, plans, and specifications which are required of the engineer. . . . . .

The term "**may**", highlighted above, formerly read "**shall**". The implications of this change in Minnesota's statute are disturbing for Carlson. He commented that county Boards in Minnesota now have the option of appointing persons who are not registered Professional Engineers to be in charge of maintenance operations. Currently this entails approximately 40-50% of the County Engineer's operations work load. The County Engineer is still responsible for making decisions related to design, construction, and anything else related directly to "engineering administration". The rules say that a County Engineer must be in charge before state-aid dollars can be dispersed. The position taken, however, is that "we want the County Engineer in charge, but some are poor managers."[7] This has resulted in the formation of a perspective held by some in Minnesota who are working to change the distribution formula so that 60% of state-aid

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[7] Comment made by Dennis Carlson, State-Aid Engineer, Minnesota.

funds are spent for maintenance while 40% are allotted for construction and design. The concern is that this could have an effect on salaries for subsequent generations of County Engineers.

Other County Engineers argue that local public pressures to reduce taxes, cut costs, and "contain" any proposals involving expansion of public employment, compound the problem further by restraining county Boards in their efforts to attract qualified people to the profession. This is not a problem unique to the 1990s. More than fifty years ago, an Iowa County Engineer commented on the "public pressure" issue and its relationship to county government in his statement that

> Boards are bombarded by insistent agitation {by the public} that taxes be contained or reduced regardless of consequences. In many instances reductions are made beyond all economical justification. Proper and careful studies are not made to determine where economy can be effected without interfering with efficiency.[8]

This is an important consideration in an era where there is a need to develop long-range strategies that reflect a commitment to continuity <u>and</u> quality in the "management of the infrastructure". It will become increasingly important for County Engineers to work "with" their Boards to improve services to the counties. This will mean designing both short and long-range plans that may seem difficult, if not impossible to "sell" to elected officials who are often oriented more to short-range objectives. Efforts to educate Boards on the need to proactively develop long-range maintenance/rehabilitation/reconstruction strategies will continue to challenge County Engineers primarily because short-term thinking is one of the handicaps of

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[8] Mavity, J.W. *The Importance of Technical Direction of County Highway Operations*, Better Roads, P. 5, May, 1933.

politicians. Nearly 80% of County Engineers responding to a 1987 Better Roads survey said their elected and appointed officials have only short-term objectives.[9]

Yet another problem is also raised by the compensation scale for County Engineers. Some states have gone so far as to fix, by statute, the maximum salary that a County Engineer can be paid, using a graduated scale based on the population of the county.[10] the 1987 article in *Better Roads* noted also that salaries of County Engineers in Missouri are limited to no more than $10,000 annually. Such practices may well have the effect of depriving some counties of competent engineering services and, in the final analysis, be more expensive. County Engineers argue this rule was imposed by "politicians" and means "work will be done on a part-time or consulting basis, <u>or</u> that engineers must be shared among counties."[11]

According to Lynn Olson -- Minnesota County Engineer and former President of NACE -- this can become problematic. He argues that "consultants do not have a sufficient understanding of the counties' needs to be able to consider the long-range interests of the county from a holistic perspective." Their goal, and, therefore, their singular objective is to "bid for a particular job". As a County Engineer from Washington State commented:

> The County Engineer must live with and pay for projects. Consultants get paid and walk away from those projects. . . . . Private sector opportunities are market driven, County Engineers are driven by the needs of the county.

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[9] *Politicians or Professionals: Who Really Runs Your Highway Department?* Better Roads, P. 24, February, 1987.

[10] *Ibid.*

[11] *Politicians or Professionals: Who Really Runs Your Highway Department?* Better Roads, P. 24, February, 1987.

While the consulting firm may well be competent to complete the work, absent an in-depth understanding of the county's needs, it may not be in the latter's best interests to consider a broad range of external contracting jobs for road and bridge work. Another County Engineer from Minnesota also commented he saved the county as much as 40% of costs by completing work in-house. These County Engineers are, of course, from states where the professional engineer's license is a requisite for the position. Those in states where that is not the case have no choice but to contract out for engineering related jobs.

At the other end of the continuum, in states such as Ohio, County Engineers are elected and their salaries are set by the State Legislature. In that state, levels of compensation are perceived as more competitive than in states such as Nebraska, Kansas, South Dakota, and, as iterated earlier, Iowa. The Ohio Association of County Engineers and County Road Commissioners does not share the concerns expressed by most states as they relate to shortages of qualified people, even though 73% of Ohio County Engineers currently in office will be retiring within the next 5--15 years.

Nationwide, County Engineers' salaries most often fall within the $41,000 to $50,000 range. In Ohio, however, salaries range from $51,480 to $76,687.[12] As a 1990 *Better Roads* survey reported, "Nationally, 39.1% of County Engineer's salaries fell into brackets lower than those paid in Ohio.[13] The span of salaries is most significant among urban County Engineers who are registered Professional Engineers. Their

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[12] If an Ohio County Engineer chooses to continue private practice while in service, $12,500 is deducted from his/her salary [Robert Morrison, County Engineer [ret.].

[13] *County Engineers: What They Earn.* Better Roads, Pp. 26-7 March, 1990.

salaries range from $26,000 to more than $70,000. In those counties where there is an urban/rural mix, there is also a fair number earning more than $70,000 per year, while most who do not have the P.E. license are in the $26,000 to $32,000 bracket. Because compensation level is so critical a factor in attracting qualified people to the job, it is one which must be addressed by county Boards. It is also the factor, according to many County Engineers, to which their Boards are least likely to respond.

Some County Engineers in Iowa say their Boards use the argument that the County Engineer is already the highest paid person living within the county. As such, it is unrealistic to expect a salary that is any higher. The issue Boards too often do not address is that while the salary of the County Engineer may be the highest in the county, it may well be relatively low when compared to the County Engineer's valued contributions to the county. These persons may well be saving the counties several times the level of their salaries each year. Nonetheless, the Boards are reluctant to vote for any significant increases. This perspective indicates that compensation [i.e., salary] is perceived narrowly by some Boards solely as a cost **to** the county and **not** as an investment **in** the county's infrastructure. If county Boards **and** the public could be made to realize the worth of the experiences and depth of knowledge needed to adequately fill the position of County Engineer, it seems feasible that they might be more likely to shift their collective perspective on this issue. Many County Engineers commented on whether people understand what it is they do. Some of their concerns are shown in **Box 1** on page 13.

- Most people don't know what I do, but most perceive us as overpaid employees [Iowa].

- Most people do not know what I do. the County Engineer's motto is We do the impossible with the inadequate, for the ungrateful." When the weather is bad the public wants good roads. When the weather is good, the roads are good, and the people don't care [Minnesota].

- We need to work harder to make the community and the public aware as to the complex nature of our jobs. Most people including a lot of commissioners [especially rural] think all there is to the job is grading roads. A lot of rural communities do not even understand a budget and what it takes to maintain roads [$$] let alone the changes in type of and amount of traffic increase on the system each year and competition for federal dollars [South Dakota].

- We must let people know more about what we do [Nebraska].

- Most people do not know the difference between county paved roads and state roads. They do not realize the engineering design that goes into projects. The state association needs to get the message to the public. The engineer needs to communicate better with the news media. Engineering schools need to understand the responsibility of a county Engineer in our transportation system and explain this to students as a career option [Iowa].

- It would help if the Board understood our responsibilities. If it did, the public would as well [South Dakota].

Box 1. Question 45. Do you find that people just don't understand what a County Engineer is?

If the issues of high numbers of retirements, lack of visibility and understanding of the profession, and consistently low salary structures are not addressed and resolved, over time, states -- including Iowa -- may realize a decrease in the overall quality of their secondary road systems. Many counties in states where the P.E. license is required by statute, particularly rural counties, are already concerned about facing issues related to the hiring and/or promotions of less qualified and less experienced engineers. In states where the P.E. license is not a statutory requirement for the job, Boards may find themselves hiring technicians for the counties' top highway jobs who are unprepared both technically and administratively. As the position expands even further to include a higher level of public relations than ever before, with more emphasis on sophisticated solutions to technical maintenance problems, there could be a negative impact on some counties.

As the Transportation Research Board's Special Report 207 pointed out nearly ten years ago, as one-third of the current generation prepares to retire

> the quality of county transportation management and engineering could begin to erode. To avoid this negative consequence, compensating training must be given to provide new entrants with the necessary mix of skills. . . . . Even with qualified entrants, there is an adjustment process as on-the-job and other special training take place to provide technical, and management and administrative skills.[14]

Enhanced levels of training are unlikely to occur so long as budgets are restrained and compensation and even professional development opportunities for County Engineers remain limited because of their perceived "cost" to the county.

For many of the County Engineers interviewed for this research, the issues of job qualifications and salary are also intricately tied to the politicization of the office of the County Engineer. In general, there has been a long-expressed their resentment of the degree to which their offices are sometimes politicized. They show a strong reluctance to subordinate sound decision making for political reasons. Some, however, find they do so at a high cost. Since most County Engineers do not have long-term contracts [either written or oral] with their Boards, they stand in jeopardy of losing their positions with little or no notice. One County Engineer in Iowa whose contract was recently not renewed commented as follows: "The Board informed me it was disappointed with my lack of activity on bridge repairs within the county." He responded by saying

> I lacked the number of employees to repair many of the county's bridges. The board froze our manpower . . . if you can't get the manpower you can't get a bridge crew put together. You can't do it if you don't have the crew.

This County Engineer felt the Board's refusal to renew his contract did not introduce the question of his competency. Rather, it was an issue of politics. The Board itself

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[14] *Local, Regional, and Federal Agencies*, P. 143 In Transportation Professionals: Future Needs and Opportunities, Transportation Research Board National Research Council, Special Report 2071985.

conceded the "termination" was not carried out in the "normal sense of the word". After serving in his position for 12 years, this County Engineer was given just 30 days notice of termination. This is not an isolated incident. Some say it occurs all too often.

As another example, a County Engineer from Michigan was fired after 23 years on the job. He too notes that he lost his position because of political pressures. Following his refusal to act on what he believed was an unethical request from a member of his County Road Commission, his tenure was revoked. Even more disturbing, however, was his comment -- "Following retirement from my next position, I told one of my County Road Commissioners that I would be willing to stay on and provide assistance until a replacement could be found. His response was , 'Well that may be okay. Why don't you tell us exactly what it is you do as a County Engineer'?"

As a result of scenarios such as these, some County Engineers argue they

> especially find themselves at the mercy of political strategies -- more often than their city or state peers. More than half say their success is greatly subject to good gamesmanship. This isn't surprising since most County Engineers report directly to a group of elected officials.[15]

They point out that maintaining an untarnished image for their departments involves critical and intricate proficiencies in maneuvering. Many find themselves taking responsibility for any problems, while granting elected officials credit for agency accomplishments. One commented, "When tempers flare, it is important that the County Engineer has the skills needed to meet, discuss, and resolve the problem as quickly as possible."[16]

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[15] *How to Play Departmental Politics Successfully*, Better Roads, P. 41 February 1989.

[16] *Ibid.* at 42.

Summary of Introductory Remarks and Background Information

More than 85 County Engineers were interviewed over the two years of this research and another 503 responded to the two surveys conducted. An overwhelming majority express a fierce sense of pride in the jobs they are able to complete, sometimes with limited funds and inflexible Boards. They are in strong agreement that beginning salaries for the coming generation of County Engineers will be one of the key factors determining the qualifications of those applying for available positions. Moreover, they consistently and invariably express concern for the legacy they will leave to their successors. Nearly all agreed that despite their job titles or scope of responsibilities, the coming generation will be expected to possess qualifications **coming into the job** that the current generation was able to learn over a lifetime of service, sometimes only through its collective mistakes. They worry that their successors will have a much narrower margin of error for the mistakes they were allowed to make in the "learning process".

They also agree that the norm in experiences required for the position will include design, drainage, material property characteristics, and to a lesser extent, vehicle operations and traffic control skills such as signing and signalization. Less tangible, yet critical expertise and experience that will be needed to adequately fulfill the challenges of the job will include administrative experience related to the management of labor relations, and personnel matters. Both are expected to become more difficult to coordinate as County Engineers organize their work forces with a sensitivity to [1] disadvantaged classes, [2] gender relations in work force participation, and

[3] alcohol and drug use in the work place.[17] Unforeseen occurrences in the one-year and five-year budget plans required by state statutes, including catastrophes such as the widespread flooding of 1993 in the Midwest, will further require extraordinary engineering and administrative skills that encourage responsible and knowledgeable prioritization of expenditures for services to the public.

The following section of this report outlines the rationale for the research methodology and the structure that will be followed in addressing what factors will be instrumental in "selling" County Engineering to a new generation of professionals. Each section will be designed so that, in conclusion, it will lead logically to a set of issues and insights that may be used by the County Engineering community to encourage qualified people to consider this dynamic and exciting career path.

Rationale for Approach Taken

This research was designed to include a random sample of County Engineers from a number of states with different systems of county government and different statutory requirements for the position. Lowell Richardson, the Iowa DOT's technical monitor for the project, assisted in the identification of the eight participating states. One of his hypotheses was as follows:

> without implying existing county road supervisors are not doing a "good job", those familiar with the nationwide state of secondary roads agree, states that have registered P.E.s also have higher quality county roads.

The researchers want to take this time to note that while the approach taken in this research is by no means intended to denigrate the qualifications or extensive education,

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[17] *Local, Regional, and Federal Agencies.* In Transportation Professionals: Future Needs and Opportunities, Transportation Research Board, National Research Council, Special Report 207, Committee for the Study of Transportation Professional Needs, P. 153, 1985.

training, and experiences of the County Engineers who are also registered P.E.s, neither is it meant to imply that county road superintendents and their equivalents are not "doing a good job." To reiterate, as would most professionals, the latter often compensate for their lack of engineering expertise by hiring consultants, or by seeking advice from state-aid engineers [and their equivalents], and from their state departments of transportation. Because many of those interviewed have been in their positions for more than a decade [and some as long as 35 years], they have been presented with innumerable opportunities to gain needed expertise in many areas of their jobs through experience.

The concern is **not** that these individuals are unqualified for the jobs they are doing, but rather that their successors must have educational preparation, skills, and experience which exceed those of the current generation. Because of the high numbers of retirements anticipated over the next five to fifteen years, this concern appears to be legitimate.

Understanding the skills needed by succeeding generations of County Engineers has led the researchers to use this exploratory research, in part, to offer an understanding of the profession from the points of view of those who work in sometimes very different types of county governments and who face the challenges of dealing effectively with the public, elected Boards of Supervisors, County Road Commissioners, and Executive Councils on a daily basis.

- **Research Methodologies and Discussion of Issues for Phase One and Phase Two of the Research**
  - Identification of expert advisory group members for each phase of the research

- Description of state requirements [and description of sample by state] for position of County Engineer

- Conferences attended and collection of field data for each phase of the research
  - Types of data collected

- Job Titles for those participating in the research

- **Why Be a County Engineer?**

- **What is a County Engineer?**

- **Public vs. Private Sector Employment: A Comparison**
  - Perceived Advantages and Disadvantages of Public Sector Employment
  - *What are the Selling Points of County Engineering?*

- **Illustrations of Professional Enhancement Opportunities**
  - The Iowa Experience
  - *The Washington State Experience*
  - General Discussion of Professional Development

- **What is the Problem?**

- **Critical Issues, Insights, and Recommendations**

- **Conclusions**

Research Methodology

Phase One: Expert Advisory Groups: At the outset of this research, a five person expert advisory group was established to work with the researchers in identifying issues most relevant to the profession. They included Lowell Richardson, the Iowa DOT technical monitor for the project, and four County Engineers from Iowa including Del Jespersen, Story County, Steve Holcomb from Grundy County, **Eldo Schornhorst, advisory group Chair, Shelby County**, and Jerry Hare from Pottawattamie County. Interviews were designed to develop a basic set of questions that would be asked in a questionnaire to be sent to a random sample of County Engineers in the eight participating states.

After some discussion it was decided that because the issues confronting County Engineers would differ among the states, it would be necessary to expand the number of expert advisory groups to eight, one group from each state. Each would be comprised of five members. In this way, persons from each of the participating states would be assured of input into issues relevant to the profession from their states' points of view. It was also agreed this would permit the researchers to expand the points of reference offered solely by the Iowa experience. The objectives were [1] to become more sensitive to the similarities **and** distinctions among County Engineers in different states; **and** [2] to better understand the challenges facing County Engineers. A questionnaire aimed at diverse groups needed to be relevant to all who participated in the study, yet one which would also offer a set of common questions designed to gain as many insights as possible into the profession in general.

With Lynn Olson's[18] assistance, initial contacts were made with key persons in each of the remaining seven states. Mr. Olson served as advisory group Chair from Minnesota. Other chairs of the expert advisory groups included

- **James Pickett**, P.E., L.S., Public Works Director, Leavenworth, Kansas.
- **John Pemberton**, Engineering Manager, Antrim County Road Commission, Mancelona, Michigan.
- **Robert Meister,** Road Superintendent from South Dakota.
- **Delmar Motycha**, Nebraska.
- **Glen W. Sprowls**, P.E., Executive Director, County Engineers Association of Ohio, Columbus, Ohio.
- **John Trent**, P.E., County Engineer in Washington state

Phase Two, Expert Advisory Groups: There were County Engineers from each of the eight participating states involved in the expert groups set up for phase two of this research as well. At that time, South Dakota was added to the research and the state of Missouri was dropped from the study because of an extremely low response rate [only 27% (18 questionnaires out of 66 returned) for the first phase of the research and only 18% (12 questionnaires out of 66 returned) for phase two] . Missouri has a system of county government that differs so significantly from the other states included that more than 10 people from that state wrote letters explaining why they did not complete the questionnaire. Since South Dakota made a strong request for participation, and asked to receive questionnaires for both phases of the research, it was decided to replace Missouri with South Dakota. Finally, Iowa County Engineer Steve Holcomb,

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[18] Lynn Olson was then President of the National Association of County Engineers. He was instrumental in spearheading the project. Without his assistance the scope of this project would have been much more narrow than it is.

who has left County Engineering, was replaced by Robert Haylock, Butler County Engineer, and Jim Hague from Kansas replaced Jim Pickett , who has also left the profession. Finally, Dan Hostler replaced Delmar Motycha from Nebraska.

At the 1993 annual meeting of the National Association of County Engineers, Dr. Waggoner met with at least six County Engineers from each of the participating states for one to two hour sessions during which time questions were asked that aimed at a better understanding of [1] the issues confronting those counties trying to make the profession more attractive to qualified professionals interested in public sector employment and [2] the advantages and disadvantages of a public sector career path. Those issues will be discussed in the section describing the phase two collection of field data.

Description of state requirements for position of County Engineer in each participating state [The discussion in the following section of this report is valid for both phase one and phase two of the research].

Description of Sample by State. Researchers involved in this project have sought to understand the differences as well as the similarities in County Engineering in the eight states participating in this study. Those states include -- Iowa, Kansas, Michigan, Minnesota, Nebraska, South Dakota, Ohio, and Washington. Because of differences in statutory requirements, the responsibilities assumed by County Engineers depend upon a number of factors, in part determined by the needs of the counties. The important issue to note is that the requirements for the position of County Engineer differ, sometimes significantly among states. When this project was initiated, the objective was to gain a representative sample of states.

The decision was arbitrarily made [by members of the expert advisory group in Iowa] to include four states where the P.E. is required by state statute and four where it is not [In one of these latter four states (Kansas), the P.E. is required, but the statute is not enforced]. Initially, this seemed to be the ideal sample for purposes of analysis. At a later point, however, it was pointed out by a faculty member from the T^2 Center Program at the University of Montana, that only about 20% of County Engineers nationwide are registered Professional Engineers. As such the sample is not representative of "all" County Engineers nationwide. This is one reason the research is considered to be exploratory. It is the professional opinion of the researcher that the sample chosen nonetheless allows many insights to be gained and issues to be identified and evaluated.

The following is a listing of the requirements for the position of County Engineer for the states participating in this research:

Nebraska. Road and Highway Superintendents are required to sit for a written exam to qualify for the job, except for counties with populations greater than 50,000, in which case the County Engineer is elected and required by state statute to be a registered Professional Engineer. One Highway Superintendent commented that the certification test is difficult, with an average pass rate of only 30-35%.

Kansas requires the registered P. E. license for its County Engineers, but the statute is not enforced. One County Engineer from Kansas noted the decision as to whether to hire a P.E. is up to the Commissioners and some choose not to, perhaps to save dollars on compensation. Some who hold the title of County Engineer in Kansas were hired prior to the change in the statutory requirements. These individuals were

permitted to keep their titles as "County Engineers" even though they are not registered P.E.s. Kansas is, however, currently in the process of re-examining its system of County Engineering and has, in all probability, identified these issues and those relating to the enforcement of its state statute requiring the P.E. for all County Engineers.

South Dakota. This state currently has no certification process or statutorily defined requirements for its Road and Highway superintendents. It is, however, in the process of developing a test for certification. Many from South Dakota commented that while certification is meeting with some resistance, once it is set into place, it will help to increase the pay scale and serve to attract more qualified people.

Michigan. The trend in this state is toward the use of managers, engineering managers and consultants. The registered Professional Engineer's license is not a statutory requirement for the position.

Iowa, Minnesota, and Washington. Each of these states requires County Engineers to be registered P.E.s by statute and each enforces it.

Ohio. The system of county government in Ohio allows for the election of its County Engineers to four-year terms. Their salaries are set by the state legislature and are some of the highest in the nation. Ohio has the most stringent requirements for the job nationwide. Both the Professional Engineer's license and the Professional Land Surveying [P.S.] license are required [The P.S. license can be earned only if the County Engineer fulfills a recently enacted state requirement of 24 credits from an accredited Surveying Engineering program in addition to the Civil Engineering degree.]. Many Ohio County Engineers commented that dual registrations are needed to carry out the demands of the office. Yet they also express their concern that dual registration [i.e.,

P.E. and P.S. licenses] may serve as a dis-incentive for some because of the time involved in earning the credentials to run for office.

Conferences Attended/Collection of Field Data – Phase One

Between October of 1991 and February of 1992, Dr. Waggoner was invited as a guest speaker at the following County Engineering conferences:

- Missouri, Iowa, Nebraska, Kansas [MINK] Regional meeting of County Engineers;
- Minnesota's Association of County Engineers' annual conference;
- Kansas Association of Counties' annual conference;
- Ohio County Engineers Association's annual conference; and
- The National Association of County Engineers' [NACE] 1992 annual conference.

During these visits, and other special trips made within Iowa and to Nebraska, in-depth open-ended interviews were conducted with expert advisory group members. Those interviewed were identified by the Chairs of the advisory groups in each of the states. The total number of official advisory group members was expanded to forty County Engineers, each of whom provided valuable input for the project. Another thirty County Engineers served as *ex officio* members and participated in the more than 45 hours of interview sessions at the NACE meetings in Frankenmuth, Michigan, in February of 1992.

It was important to use open ended interviews in order to encourage these individuals to talk as much as **they could** about issues **important to them.** In this way it became possible to develop a questionnaire that reflected **their concerns**, not those imposed upon them by the researcher's assumptions about the nature of the profession. Every effort was made to phrase questions in a probing manner, yet not in a way that

would lead to predetermined responses. Some of the questions used included the following:

- How would you describe your responsibilities, your job, and just generally what you do on a daily basis?
- In an ideal setting, what do you think a County Engineer's responsibilities should be ? Picture yourself accomplishing the ideal objectives of a County Engineer, including long range planning.
- What are some of the qualities that make a P.E. irreplaceable as a road supervisor?
- Could a professional administrator without your background do as good a job as you are doing?
- If you are not a registered P.E., do you find that this acts as an obstacle in your job? Why or why not?
- How would you classify/categorize/assess percentages to your responsibilities, i.e., technical, engineering, managerial, administrative, political, e.g., public relations and meetings with the Board?
- How do decisions made by Road/Highway Superintendents differ from those that would be made by a P.E.?
- It could be assumed that experience is very important in your profession, but is there a limit between what one can learn through on the job experience and professional preparation, e.g., college education?
- What is your relationship with the public? Does this demand take an excessive amount of your time?
- What should an engineer's program of study include to prepare him/her for a future position as a County Engineer?
- How important are human relations, administration, management and planning? Will it be necessary for future County Engineers to be college graduates, i.e., to major in civil engineering in an accredited college program?
- If you are not a P.E., how do you deal with the engineering decisions that you make in your job? By using consultants? Contacting your "state aid engineer" or his/her equivalent? By using your state DOT/Department of Roads as a consultant? Other?

- How do you deal with calls from the public? Is there any standard procedure to take care of "complaints" or requests from the public?

- Have budget problems affected your ability to respond to public requests to e.g., fix pot holes, seal coat roads, paving needs?

- When preparing your budget each year, do you have an analytical strategy/plan to help you select projects with the highest benefit-cost ratio for a given budget constraint, or the utilization of a pavement management system?

- Do you or does your office use management, design, or accounting computer software to help deal effectively with jobs? [e.g., preventive maintenance management programs for equipment, scheduling programs for construction job planning, and/or Auto-Cad?]

- Could you briefly describe your road network? e.g., miles of dirt roads, gravel, treated, and paved, and any other infrastructures for which you are responsible?

- How many people work in your office --winter? summer? Do you have an assistant? Is this person a student intern? co-op student? technician? EIT? a P.E.? Other? If you had your choice, what type of assistant would you want?

- What jobs are left to consulting engineers? What percentage of what you have to design is done by consultants? How do you select consultants? What type of procedures do you use in selecting consulting engineers? Sealed bidding? Requests for Proposals? Other?

- Are you going to be forced to "signalize" some roads with "enter at your own risk" or "minimum maintenance" signs in your county? Is this a political issue? In what way?

- Increasing numbers of County Engineers are reaching retirement age. A shortage of qualified people appears to be a growing problem. Would you comment on this?

- How would you rank your salary with those of County Engineers in other counties within your state? How about with other states?

- Could you comment on tort liability in your county? Have you ever served as an expert witness in another county? Have you ever been called to testify in a case involving your county? Do you think it matters who is in charge of the county road system regarding liability? Does a P.E. make the county less vulnerable to liability?

- Would it be feasible to encourage hiring EITs to act as assistants to the county engineer and then groom those persons to fill the position of County Engineer when the latter retires?

The interview questions were candid and the responses honest. The results of the interviews served to help in an assessment of the issues identified. Often one question would lead to others which the researchers had not anticipated. The simple question as to what type of contract the County Engineer had with the county led to innumerable different responses ranging from "Yes, my contract is written into the minutes of the Board meeting every year, yet I still serve at the pleasure of the Board which makes me very uneasy in terms of my overall job security" to "I am elected and do not serve the Board , but rather am accountable only to the public every four years when I am up for re-election." Most of those interviewed talked about what was going right in their counties as well as problem areas and frustrations, particularly those of a political nature. In several instances five to ten County Engineers were interviewed at the same time. This allowed an interplay of dialogue leading to questions that might not have emerged in one-on-one interviews. The interactive effect of the discussions allowed much more depth to be gained from the time spent. Among the various conferences attended during the five months of phase one of the project designed for the collection of field data, more than seventy County Engineers were interviewed.

Following the NACE conference in February of 1992, a draft questionnaire was developed and sent out to each member of the five person advisory groups from each of the states. From the total of forty questionnaires sent, thirty were returned, many with extensive comments that brought out new perspectives on issues discussed in the interviews.

There were two key advantages to using a draft questionnaire. The first was that it allowed a small pilot study to gain additional insights and feedback from those interviewed -- information that might have been overlooked using only the interviews. The second was that it became a tool used to gain insights into the manner in which the researchers' perceptions of interviewer responses may have influenced the way in which the questionnaire was designed or the way in which the questions were phrased. Over a period of a month, with a significant level of written input from expert advisory group members, and additional telephone discussions with some of them to clarify their comments, the questionnaire was revised and finalized.

Questionnaires were mailed to a random sample of 400 County Engineers in the eight participating states. Federico Irrgang, a Transportation Engineering graduate student on the project, wrote a computer program that randomly chose who was to receive questionnaires. The key factors used in determining the composition of the sample were the number of counties in each state, population size, and region. The number of County Engineers receiving questionnaires differed depending on the number of counties within the state. Fifty-three percent of County Engineers in Iowa [with 99 counties], for example, were sent questionnaires, while 64% [with 39 counties] of County Engineers in the state of Washington received questionnaires. The numbers and percentages of County Engineers responding from each state are as follows:

- **Iowa:** 46 of 53 questionnaires sent out were returned [87%];
- **Kansas:** 29 of 62 questionnaires sent out were returned [47%];
- **Michigan:** 29 of 44 questionnaires sent out were returned [66%];
- **Minnesota:** 40 of 48 questionnaires sent out were returned [83%];

- **Nebraska**: 27 of 56 questionnaires sent out were returned [48%];
- **So. Dakota**: 30 of 66 questionnaires sent out were returned [45%];
- **Ohio**: 30 of 47 questionnaires sent out were returned [64%]; and
- **Washington**: 21 of 25 questionnaires sent out were returned [84%].

Types of Data Collected for Phase One

Data collected and analyzed for this report about the counties included the following information:

- State;
- Job titles;
- *Age and tenure on the job;*
- Responsibilities that County Engineers assume in their jobs;
- Importance of public relations;
- Status recognition;
- Problem solving strategies;
- Tort liability;
- Elected County Engineers;
- Projections on shortages of County Engineers;
- Self-perceptions of the County Engineers' contributions to their counties;
- Importance of salary in continuing to attract new people into the profession; and
- Factors that would discourage the current generation of County Engineers from making the same career choices again.

Each of these factors was included in the questionnaire because the expert advisory group members agreed each was important to the profession. Questions asked allowed a focus on issues relevant to all systems of county government.

Data Collected for Phase Two of the Research

Conferences Attended. Between May of 1992 and February of 1993, Dr. Waggoner was invited to speak at annual County Engineering conferences in [1] Michigan, [2] South Dakota, [3] Ohio, [4] Iowa, and [5] again at the annual 1993 NACE meeting. She also attended a professional development seminar sponsored by

the Washington State Association of County Engineers/Public Works Directors [WSACE/PWD] with the assistance of the County Road Administration Board [CRAB].[19] Her participation in this event in May of 1992 allowed her to gain additional insights into the level of professional development activities used in Washington State to encourage County Engineers to become active members of their state association. At each of these conferences County Engineers were interviewed in preparation for development of the survey to be used in phase two of the research.

Again, open-ended interviews were used in order to maximize the depth of feedback from those in the profession [from their points of view]. Some of the questions included those aimed at [1] understanding the advantages and disadvantages of being a County Engineer and [2] the degree to which the strength of the state and national associations for County Engineers act as vehicles for continued professional growth. Some of the interview questions used were as follows:

- From your experiences, what professional opportunities are offered to County Engineers that someone deciding to enter the private sector would not find available?
- What is your view of a County Engineer leaving your state to take a position in another state, and then coming back to his home county as a County

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19 Comments by Reid C. Wheeler, Washington State County Road Administration Board [former Washington State County Engineer]. CRAB is a state agency charged with developing and enforcing various 'standards of good practice' that all the counties must follow in their administration of road issues. The Board, which directs the agency staff is comprised of six county commissioners and three county engineers who are selected by the chief county legislative authority organization, the Washington State Association of Counties [comprised of all county commissioners and councilpersons, with its own small administrative staff]. the CRABoard is responsible for the hiring of its Executive Director [Currently Mr. Vern Wagar], and overall setting and acting on issues of a county's non-compliance with a 'standard of good practice' [administrative rules adopted and published as Washington Administrative Code or WAC rule. The process involves advertisement, hearing[s], and official action to adopt.]. Most of the agency top management staff [4 of a total of 15 staff] have been County Engineers in Washington. A large share of the agency's work involves providing guidance and assistance of County Engineers and Public Works Directors on roadway and related issues including specialized computer software development and training. The WSACE/PWD is a self-governing association of all the County Engineers/Public Works Directors in Washington. It is a formally recognized affiliate of the Washington State Association of Counties as are similar organizations for planners and public health professionals. The WSACE/PWD is very active in both representing and promoting issues of concern in the broad spectrum of public works in general.

Engineer? Does that pose a conflict of interest regarding working with people on the Board that he might know? Or people in the county placing pressure on him regarding politics?

- How can you begin to attract new people into the profession, particularly in rural counties?

- What are some of the specific benefits/rewards of being a County Engineer in a rural county? What are some of the costs of doing so?

- How important is continued professional development for County Engineers and does your state association provide opportunities for such continued growth?

- Is County Engineering an effective springboard for future advancement for those in the profession? If so, how can this be used to attract new people into County Engineering?

- How strong is your state association?

- What are the benefits of belonging to your state association?

- Do you have a central information data base in your state association so that all County Engineers in your state, even non-members can gain access to information relevant to the counties?

- At your state meetings, do you discuss problem areas that County Engineers have? How often? Are these meetings formalized or are they informal, e.g., lunches with colleagues?

- Do you hold recruitment activities to draw new members into your state association? If so, is this information and its importance made available to the Boards within each county? If no, why not?

- How might your state association be used to expand public exposure so as to make County Engineering more visible? What is the primary purpose of your state association?

- Does your state association adequately serve your needs as a County Engineer? Does your association serve to evaluate and strengthen the profession?

- Do you share legislative and regulatory information across counties? Do you have an executive committee that acts as a mechanism to orient new County Engineers into the profession?

- Of the total number of County Engineers in your state, how many are represented by/belong to your state association? How many counties is that of the total within your state?

- Of those County Engineers who belong to your state association, how many are active participants, i.e., attend meetings, serve as officers?

- How could you or your state association be more successful in strengthening your state association?

- What are the benefits of belonging to NACE?

- How many County Engineers within your state belong to NACE?

- How many County Engineers in your state are active participants in NACE?

- Why is the NACE membership as low as it is? How could your state association play a role in improving these numbers?

- What does it mean to say that you are active in NACE? What does this organization offer you and your colleagues?

- Do NACE and your state association work to groom members for higher positions within the profession?

- Do you share your assistant County Engineers with other states, that is, do you work with other states in grooming your assistants for County Engineer positions interstate, or are your efforts directed primarily intrastate?

- How important are professional activities [i.e., professional development seminars] in your state and national association?

- Could you make a list of the benefits of belonging to your state association?

- Are there any mini-support groups actively working in your state associations? What purposes do they or might they serve for the retention of County Engineers?

- Does your Board support your activities in your state/national association and see them as an investment or are these involvements viewed as a cost to the county? Why is this?

- How could County Engineering as a profession gain more public exposure so that you could better publicize the contributions you make to the counties' infrastructure?

- Does your state/national association work to recruit new people into the profession? Why or why not?

- Does your state/national association work to retain people in the profession? Why or why not?

- Does your state/national association serve as a support network for County Engineers who lose their positions as a result of political problems with the Boards?

- Have current members of your state/national associations been surveyed on a regular basis for problem areas experienced in counties across the state[s]?

- Are professional development workshops set up in your state to assist County Engineers in becoming more effective managers/supervisors? Or are most of the sessions set up to gain technical information?

- Do your state/national associations serve as facilitating mechanisms for new County Engineers at annual conferences?

- Do your state/national associations serve as technical consultants for County Engineers? Is there any forum for such assistance for County Engineers in your state?

- What is your state/national association doing to encourage expanded participation in activities they sponsor?

- Does your state association work to aggressively seek participation from County Engineers in all counties within the state?

- How does your state association work to recognize members? Is there a mechanism for recognizing/reaching out to non-members even though they may never have attended a state meeting?

- Do your state/national associations serve in an advocacy role when problems arise within the count[ies]/state[s]?

- Do your state/national associations offer opportunities for developing leadership status for County Engineers?

- Do your state associations express open interest in staying current on technology issues and on personnel/liability and other important issues and is this reflected in the annual/semi-annual meetings held?

- Would you be open to speaking to student groups at high schools, technical colleges and universities to talk about your profession to young people?
- What types of forums are there in your state that could be used to improve the visibility of County Engineering? How could these forums be used to get your message across so that the public better understands the profession?
- How well does your Board understand the decisions you make and the responsibilities you have for the secondary road network in your county?
- Does your Board see your salary as an investment in the quality of the road network in your county, or as a cost? If as a cost, how might this be overcome?

During interviews for phase two as well, questions were candid and the responses honest and open. Following the NACE meeting in February of 1993, a draft questionnaire was developed and mailed to members of the expert advisory groups for each participating state [See **Appendix B** for copy of the draft of the questionnaire for phase two]. The response rate again was high and few revisions were suggested. Revisions suggested were made and the final draft was mailed to 366 County Engineers in the eight states participating. Of those mailed, 248 responses were received for an overall response rate of **68.8%**. The response rates broken down for each state are as follows:

- **Iowa:** 41 of 51 questionnaires sent out were returned [80%];
- **Kansas:** 24 of 60 questionnaires sent out were returned [40%];
- **Michigan:** 26 of 44 questionnaires sent out were returned [59%];
- **Minnesota:** 41 of 44 questionnaires sent out were returned [93%];
- **Nebraska:** 27 of 48 questionnaires sent out were returned [56%];
- **S. Dakota:** 41 of 49 questionnaires sent out were returned [84%];

- **Ohio**: 30 of 46 questionnaires sent out were returned [65%]; and
- **Washington**: 18 of 25 questionnaires sent out were returned [72%].

Job Titles

Respondents were asked to identify their job titles on the questionnaire for phase one of the research, but not for phase two. Once job titles had been identified for each state it did not seem necessary to ask the question a second time. The qualifications and responsibilities of those participating in this study were as diverse as their titles, including one whose title is "Weed Control Officer". A majority of those from Iowa and Washington State hold the title of County Engineer. Those from other states, however, noted the diversity of their job titles as follows:

Kansas

- Road and Bridge Supervisor
- Road and Bridge Superintendent
- Highway Administrator

Michigan

- County Road Commissioner Manager
- County Highway Engineer
- County Engineer and Manager
- Secretary Manager
- Managing Director
- Engineering Manager
- Engineering Supervisor

Minnesota

- County Engineer/Director of Public Works

South Dakota

- Road Superintendent
- Highway Superintendent

Nebraska

- Weed Control Officer
- Weed Superintendent and Bridge Inspector
- County Surveyor
- Consultant for of Supervisors

Ohio

- County Engineer, P.E., P.S. [Professional Land Surveyor]

While assessing the implications of these differences in job titles and their accompanying credentials is a critical objective that bears further consideration, at this time the types of responsibilities and quality of work that "all" County Engineers involved in this study are doing to maintain their secondary road systems seems to be in order. In a sense this study will allow a qualitative evaluation of each county system within itself, while at the same time providing insights into comparisons and contrasts among the different systems.

Why Be a County Engineer?

It cannot be emphasized strongly enough that salary remains a major drawback to being a County Engineer. At the same time, however, this is but one of the key factors for consideration. Perhaps just as importantly, as Glen Wendler wrote in *Better Roads* on the profession in 1967, "There is no reason to be anything if what you are trying to be presents no challenge." William Dannhausen, Publisher of *Better Roads*, and one of County Engineering's staunchest supporters elaborated on Wendler's, comments on the profession as follows:

> A County Engineer must meet the administrative challenge of the office he holds, as well as new ideas, incorporating the latest methods into his operation. He must meet the challenge of public relations, something not taught engineers in college. It is a duty to state our views not only to the Board, but the general public. The third challenge is an eager desire to solve engineering problems confronting us daily. County Engineering calls for spur-of-the-moment decisions founded on good, solid engineering judgment.[20]

Yet another County Engineer responded with the following in a comment in *Better Roads Magazine*: "Adequate compensation remains a problem. However, I am able to live where I want to and the work is great."[21] This comment and some of those listed in **Box 2** on page 39 were provided by those responding in this research. Each provides additional insights into why someone would want to "be a County Engineer."

As it can be seen from the diversity of the responses, the answer to the question, "Why be a County Engineer?" is as difficult to operationalize as the objectives of these professionals. There is no single, definitive answer. There may, in fact, be as many responses to the question as there are County Engineers. The paths they take to attain their objectives are not always clear-cut; their reasons for continuing to meet the challenges of their office may not always be definable. Nonetheless, County Engineers, by and large, hold firmly to their collective conviction that there are factors more important than either salary or the politics that are too often interjected into the decisions they must make on a daily basis.

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[20] Dannhausen, William O., *Why Be a County Engineer?* Better Roads, Publisher's Comments, P. 11 September 1991.

[21] *County Engineers: What They Earn.* P. 27, Better Roads, March 1990.

- I get the most satisfaction out of my job knowing that I am trying to approach problems with a long range outlook. I try to plan for future growth and make decisions based on the long term needs of the county [County Engineer from Minnesota]

- We took the ignored lowest volume roads and regraded them, saving maintenance expense forever. We have taken advantage of every outside dollar opportunity including bridge grants, extra Federal Highway Administration dollars, Federal Aid System dollars, and demonstration money [County Engineer from Minnesota].

- I just try to be honest and fair with all people we deal with and treat everyone the same [Road Superintendent from Nebraska].

- My budget is lower now than it was when I took the job eight years ago, yet we operate more efficiently than ever before [County Engineer from Iowa].

- When a position came up in my hometown community, I saw an opportunity [County Engineer from Iowa].

- I enjoy the survey work and the county realizes a savings because I do it. Working as a troubleshooter, solving the problems that come up during construction, and seeing the project come out okay [County Highway Superintendent from Nebraska].

- There is so much more to this job than the money. We do it for public service [County Engineer from Ohio].

- I do the impossible, with the inadequate, for the ungrateful [tongue in cheek comment from a County Engineer from Minnesota].

- As a County Engineer, you can kind of be your own boss. You can set your own priorities on what needs to be done and when. Demands from the Commissioners and others are not that frequent and I can work around them. Also, the work load is steady. There is always something that can be looked at and done. You don't have to worry about the ups and downs in business like in the private sector. You also don't have to worry how long it takes to design, inspect some project to stay under a "not to exceed amount or proposed budget". There is also the satisfaction of following a project from start to finish [County Engineer from Michigan].

- I like the ability I have to stay in one location and to have an area I can call "home"; where I am known and respected for my abilities and accomplishments. It is also nice to be able to help the citizens in my area, even if it is only to give advice or direct them to someone else who can help [County Engineer from Minnesota].

- I like the wide variety of challenging problems I tackle, the opportunity to work directly with the public, and the opportunity to see a project through from inception, through design, to construction [County Engineer from Iowa].

- I have limited resources, but that presents me with challenges.

- I like being able to provide a needed improvement. It is very satisfying. I have an opportunity to work directly with the people affected by my projects [County Road Supervisor from South Dakota].

- It makes me feel good to be able to respond to local [public] concerns [County Engineer from Iowa].

Box 2. Why Be a County Engineer?

What is a County Engineer?

Perhaps J.W. Mavity, former Kansas County Engineer described the position and its challenges most articulately as he discussed the profession from the perspective of the years the County Engineer spends in preparation for the job. He said grooming oneself for the position encourages a person to

> keep in touch with the **best work** elsewhere and to maintain an analytical attitude of mind. Moreover, it makes him qualified to select the most economical design for a road and for all of the structures involved. He is qualified to superintend the construction of the road and assure the public of value spent. He is qualified to furnish the correct and most economical maintenance for every type of road. Because of his qualifications, it follows that the engineer should be in charge of these operations.[22]

Fifty years after Mavity made this statement, a County Engineer from Kansas wrote in response to this research that

> training and experience in management and personnel should be a requirement for the job. On the job experience as an assistant to the County Engineer should also be required. There needs to be a revision in the entire county government system in Kansas. The system set into place over 130 years ago does not efficiently or effectively serve the public today.

The requirements that are most well-suited to prepare a County Engineer to meet the challenges of the position may be those that the coming generation will find the most discouraging -- or, if the profession increases its visibility and begins to command the same respect as professionals in the medical and legal communities, perhaps the most challenging.

Ideally, the responsibilities and skills of County Engineers should reflect the needs, activities, and overall objectives set for the counties by the county Boards. It is, after all, the Boards that set county policy. They do so, however, only after hearing

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[22] Mavity, J.W., County Engineer, Harvey County, Newton, Kansas, *The Importance of Technical Direction of County Highway Operations.* Better Roads, P. 5, May, 1933.

recommendations from their County Engineers as to the most economically feasible, practical, and sound decisions to make. A majority of those who commented on this issue argued strongly that the registered P.E. license should be a requisite for anyone applying for the position. *Educating and keeping their Boards informed of needed* projects and providing a rationale for prioritizing projects requires professional skills. Absent adequate credentials, Boards will find themselves attracting more "unqualified" people. This is undesirable under any circumstances. Again, this is not to imply that the non-P.E.s **currently in office** are not doing a good job. It cannot be emphasized strongly enough, however, that their successors will need current expertise to evaluate the quality and scope of engineering services required to maintain the county's roads [i.e., they may not have the luxury of learning from experience]. Absent this expertise, states not requiring the P.E. may need to reconsider their qualifications criteria for new applicants.

Public vs. Private Sector Employment: A Comparison

Box 3 on page 42, presents a list of some of the comments made on the need for County Engineers to be licensed P.E.s.

Question 42. Does the certification/licensing requirement imposed by your state make it more or less *difficult to attract qualified people to County Engineering?*

- It makes it more difficult, but the fact that these people have licenses means they have been trained to solve problems in a methodical manner. Even some of these individuals have difficulty with the management side. Requiring licensing, however, will in most cases mean that you have a professional and responsible individual heading the department [Iowa]

- The requirement of the P.E. is essential to guaranteeing a certain source of qualified people [Iowa].

- County Engineers must be licensed P.E.s or the system fails. I cannot conceive what would happen with non-engineers in these positions. I have experienced what happens in semi-government agencies and government agencies when non-engineers have jobs and job titles of engineers. A multitude of problems occur which cost the public many dollars [Minnesota]

- The licensing requirement should **not** be made easier. Today's County Engineer is expected to perform responsibly and competently in many areas. We need the best people we can get [Minnesota]

- There are many engineering technicians who could possibly function as County Engineers about 75% of the time. Consultants could be retained to do the remainder of the work. This is not, however, a good situation as the P.E. in most cases can save the county much more than his salary every year [Iowa].

- It is important to have a licensed P.E. for a County Engineer. Many County Commissioners, however, are not willing to pay a reasonable salary [Kansas].

- I would strongly oppose any change in the P.E. requirement [Iowa].

- Licensing attracts committed engineers [Iowa].

- The P.E. should be the minimum requirement for a County Engineer [Iowa].

- I strongly believe that the P.E. license is a valid requirement for public sector engineers. Public agencies are getting their money's worth for additional salary requirements of engineers over non-engineers. Most public engineers are of the same opinion and share a pride of achievement in becoming a registered engineer [Minnesota].

Box 3. Why Should a County Engineer be a registered Professional Engineer?

According to most County Engineers, particularly those in states where the P.E. license is required by state statute, the county Board's objectives will inevitably include a need for engineering expertise and the methodical analytical thinking that it invariably involves. One County Engineer from Minnesota commented that even the decisions he makes that are not directly related to engineering *per se* are "better decisions" because

of his engineering background [i.e., his engineering training provided him with the "analytical attitude of mind" that Mavity discussed.].

Lowell Richardson, recently retired Head of the Office of Local Systems at the Iowa DOT, commented in a 1987 address to the Kansas County Engineers Association that there are many advantages to having a professionally registered engineer in charge of secondary roads in a county. He pointed to Iowa, which has one of the best and most complete secondary road systems in the United States. His perspective parallels Mavity's in that both would agree the background needed to meet the demands of the position is broad in scope and requires the County Engineer

> to be qualified to [1] select the most economical design for a road and for all of the structures involved; [2] determine the detailed cost of the road; [3] superintend the construction of the road and assure the public of value received for every dollar spent; and [4] furnish the correct and most economical maintenance for every type of road.[23]

As County Boards continue the task of hiring the most qualified person for County Engineer in their respective states, they will need to remain sensitive to the complexity of the position and of the demands it entails. "Selling the profession" will become increasingly challenging in that county budgets continue to make it difficult for some Boards to offer salaries that are competitive with the private sector.

The remainder of this report will emphasize responses from phase two of this research, with a particular focus on the perceived advantages of public sector employment, the strength of professional associations, and the degree to which the profession itself needs to become involved in assuring high quality secondary roads.

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[23] Mavity, J.W., *The Importance of Technical Direction of County Highway Operations*. Better Roads, P. 5, May, 1933.

Phase Two, Data Analysis

Perceived Advantages and Disadvantages of Public Sector Employment. As it was iterated on page one of this report, the second phase of this research has involved addressing ways to counter the problems associated with the increasing number of County Engineers who are retiring from the profession. Many of the questions asked of participants in this phase of the project emphasized the advantages associated with assuming the responsibilities of their positions. In order to gain some comparison base, they were asked to rank the advantages of public sector employment with the advantages offered by the private sector, i.e., whether the public sector offers more or fewer opportunities. One reason this approach was taken is because so often students in the universities are "courted" by private sector interests. As a result, the public sector sometimes has a tendency to lose out on the "best and the brightest".

Many counties are dealing with predictions of shortages that parallel those confronting state departments of transportation. Positions available are not perceived as exciting or glamorous, particularly in rural areas where job opportunities for spouses are limited. Civil engineering is just not viewed as exciting. Recent research on civil engineering majors has yielded evidence that,

> when interviewed, students are quick to point out that there are more lucrative opportunities in other niches of the job market, notably other branches of engineering, and, of course, business. The situation even has the prospect of becoming a self-fulfilling prophecy; starting civil engineers are underpaid; a lower echelon of talent is attracted into the profession. The result is that status and challenges are reduced concomitantly.[24]

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[24] Corlis, P. 118 1989

This finding compounds the difficulties related to the issue of public sector salaries. The perception, actual or not, is that compensation rates for County Engineers are set by averages of the recent past. They may even be based on an established scale so that applicants for the position, irrespective of qualifications will be offered the same salary. This would serve as a dis-incentive to those looking for a competitive beginning salary and may result in the perceived absence of full competition for the profession. If this is in fact occurring, many of the most capable and well-qualified candidates in the years ahead may head for the private sector absent an adequate consideration of the challenges presented by County Engineering.

Based on interviews with nearly 50 County Engineers for phase two of this research, yet another factor that emerged as problematic is the nearly unanimous agreement that the "fresh college graduate" would not survive long with the demands of the job the County Engineer performs. This does not, however, mean that university professors and administrators should not be focusing on "selling the profession" to students. Repeatedly, comments were made regarding ways in which the current generation of County Engineers groomed itself for the positions now held. As it was pointed out earlier, some worked at other jobs/positions in both the private and public sectors for as long as 10-20 years before assuming their current positions as County Engineers.

County Engineers themselves suggest that whenever possible, counties should groom qualified staff to replace those expected to leave. Realistically this does not appear to be an attainable objective. Some say their Boards feel that because of other more pressing budgetary needs of the county, the cost of any type of grooming of

"assistants to the County Engineer" is too high. One Iowa County Engineer who will be retiring in 1993, commented that his preference would be to hire an assistant for the six months prior to his retirement so that he would be able to "teach" this person the way the county works. His concern is that he will take the knowledge of more than 30 years as a County Engineer with him when he retires. His fear is that the work he has accomplished over the years may not be maintained. This type of frustration again raises issues that counties view such strategies as costs rather than investments in the county's infrastructure. This same County Engineer noted that the cost of not considering this option is likely to be much higher than the investment in an assistant.

In Minnesota, several County Engineers interviewed during phase one of the research commented that when they hire E.I.T.s to work as assistants, as soon as these persons complete the P.E. examination, they leave. Then the hiring process and learning curve must begin again. The downside of this experience involves the loss of qualified people who have spent a great deal of time "learning the system" only to leave. On the other hand, it may also be a positive in that these persons will have gained expertise working at the county level. Following work experiences in other positions, it may be likely they will one day consider coming back into County Engineering, as have many in the current generation.

Nonetheless, a large number of those participating in this research reported, they do have some type of assistance, most often in the form of technicians rather than "Assistant County Engineers". One insight that demonstrates the value in such a position is that many in the current generation of County Engineers served as assistants prior to assuming their current positions. A majority in Iowa [89% of those

responding], Minnesota [58% of those responding], Ohio [57% of those responding], and Washington state [48% of those responding], for example, had been assistant County Engineers. Most noted the experience was a prerequisite to **and** an invaluable *preparation for their current responsibilities.* One County Engineer from Minnesota who served on the expert advisory group said he had purposefully groomed himself over a period of years for his current position.

In Kansas, 41% of those responding were assistant County Engineers, in Michigan, 38%, and in Nebraska 15%. Those in non-P.E. states seemed more likely to rise through the ranks to their current positions as Road and Highway Superintendents than to have served as any kind of "technical assistant". Most acknowledged that work experience as an assistant County Engineer or its counterpart, however, will be a prerequisite for future generations of County Engineers.

Young people need to be aware and informed about the opportunities <u>and</u> the challenges those opportunities present. At the same time, they need to become sensitive to the frustrations of the position and the degree to which it has a tendency to become politicized -- and to ways to overcome these frustrations. The best way for them to prepare themselves to be successful as County Engineers is to seek out an understanding of the expertise and experience needed to competently perform the duties so intricately a part of public service.

An overwhelming majority of those interviewed and surveyed for this research said that the rewards of the position **<u>are not all in the salary</u>** they are able to command. Rather, they are in a job well done, sometimes against difficult odds. It was, for example, noted by a Highway Superintendent from Nebraska that he had "spent twelve

years trying to convince his County Commissioners that roads with average daily traffic volume of 400 or more should be hard surfaced." He said, "We now have one such project under consideration." According to another County Engineer, the bottom line for many, if not most, is, "working within budget constraints to provide the best possible road and bridge system and providing technical assistance on all types of local communities and commissions."

What are the Selling Points of County Engineering?

One of the issues that is intricately related to maintaining high quality county road networks is the profession's capability to attract qualified people. The primary objective of this research has been to identify strategies to accomplish this. The other issue, which is equally important, is retaining County Engineers in their positions once they have made the choice to work in the public sector. The following sections of this report focus on an analysis of responses. A strong emphasis is placed on ways the profession can identify selling points most likely to offer County Engineering a competitive advantage with/against the private sector for qualified applicants to positions that become available as a result of high numbers of retirements.

Respondents were asked to provide their perceptions on a number of factors related to opportunities for continued professional growth and ways in which those opportunities compare with the private sector. Identifying these factors as strengths or selling points for the profession may well be the first step in working toward attracting a new generation of County Engineers. A secondary result of this research could well be a self-reflective examination of the profession by those who are already committed to public service.

The list of factors deemed important to the profession is presented in **Box 4** below. It is by no means all-inclusive or exhaustive. It does, however, identify many factors County Engineers can emphasize in their efforts to make themselves more visible and more attractive to the coming generation of County Engineers.

- Leadership development
- Professional development
- Diversity of work/projects
- Salary increases
- Professional contacts
- Sense of contribution to the profession
- Recognition of accomplishments
- Problem solving skills relating to technical issues
- Problem solving skills relating to personnel issues
- Problem solving skills relating to management issues

Box 4. Questions asked to compare public sector engineering with the private sector were prefaced with the following statement: In the following areas, from your perspective, do County Engineers have more, the same, or fewer opportunities than those with similar skills in the private sector. A ranking scale from "fewer opportunities" to "about the same level of opportunities" to "more opportunities" was used.

From the perspectives of those responding, states requiring the P.E. seem to provide a slightly increased level of opportunity for professional development than those not requiring the P.E. license. Providing opportunities for professional development is important, particularly for County Engineers because they frequently work without having regular contact with others in similar positions. Some report, for example, they rarely find the time or opportunity even to interact with their peers from other counties within their respective states or with colleagues from other states. Their relative

isolation requires them to take special steps to acquaint themselves with improvements in highway, maintenance, and construction practices or with the most recent interpretation of state and federal regulatory guidelines.

The state-of-the-art in engineering practices is expected to change dramatically over the next decade. Keeping abreast of changes will require continuous retraining and exposure to new information as technologies evolve. This makes it increasingly important to create a mechanism for the exchange of information on administrative, managerial, and engineering techniques within the County Engineering community to help to overcome the isolation and lack of exposure to needed information.

Two Illustrations of Professional Enhancement Opportunities

The Iowa Experience. In an effort to facilitate communication between the Iowa Department of Transportation and Iowa's County Engineers, the Iowa Transportation Center, through funding from the Iowa Highway Research Board, has established an Electronic Bulletin Board System [BBS]. This system provides a communication and file-sharing tool that encourages Iowa's County Engineers to share information and leave messages for their colleagues on a toll-free line. The BBS is perceived as an electronic stepping-stone that will help to computerize and link counties that have been relatively isolated from such communications in the past.

This technology and other efforts used by County Engineers to remain current on state-of-the-art information can be realized only if there is an interest on the part of the County Engineers, a strong state association with active membership, a national organization [NACE] that continues to serve as a clearinghouse of information for the

profession, and county Boards that believe strongly that professional development opportunities for County Engineers are critical to the recruitment and retention of County Engineers who are committed to maintaining high quality secondary road networks.

Making County Engineers visible to each other and encouraging interactions among them both within their own state boundaries and beyond those boundaries has the potential to encourage [1] the level of professional development needed to relieve the frustrations associated with ongoing problems associated with budget restraints, [2] current knowledge of changes in state and federal regulations, and [3] an understanding of the ways in which they can address and resolve the ever-present political pressures. The key will be to remember that the challenge has been issued not only to the new generation of County Engineers as individuals, but to the profession as a collective.

For many County Engineers, professional development opportunities are presented when the state association of County Engineers sponsors its annual meetings and/or when University T^2 Centers [e.g., the Iowa Transportation Center] sponsor workshops and seminars on topics of special interest for County Engineers. In Iowa, the technology transfer program through Iowa State University works with the Iowa County Engineer's Association in identifying topics of interest to the County Engineering community. Some of the topics of the more than 80 such program topics sponsored by the ITC in recent years include the following:

- vehicle fleet management/maintenance,
- pavement maintenance/management systems,
- roadside design,
- supervisory management skills,
- liability and traffic signing,

- garage waste management,
- regulatory issues [e.g., meeting federal and state regulations],
- excavation safety, and
- training in bridge inspections,

The ITC is also involved with the Iowa County Engineer's Association Special Schools Committee, which is one of 13 committees that serves to identify topics of interest for Iowa's County Engineers. Other committees include the following:

- Public Relations Committee,
- Legislative Conference Committee [Engineers and Technicians],
- Nomination and Awards Committees,
- Research Board Committee,
- Design Guide and Management Systems,
- Functional Classification and Highway Needs Committee,
- Computer Program and Information Coordinating Committee,
- Technology Transfer Committee,
- Constitution Bylaws and Auditing,
- Cost-Accounting Committee,
- Iowa Department of Natural Resources Committee, and the
- Contractors Coordination and Specifications Committee.

The ITC develops and sponsors training programs, workshops, and seminars aimed at providing informative updates on equipment, materials, and any other needed sessions identified by the Iowa County Engineers Committees.

The electronic bulletin board as well as other mechanisms used by County

Engineers to remain current on state-of-the-art technical, management, and administrative data can be realized only if there is an interest on the part of [1] the County Engineers, [2] a strong state association with active membership, [3] a national organization [NACE] that continues to serve as a clearinghouse of information for the profession, **and**, perhaps most importantly [4] County Boards that adhere strongly to the *belief that professional development opportunities for County Engineers are critical to* the latter's ability to maintain a high quality secondary road network.

Finally, the ITC employs Ed Bigelow, a former Iowa County Engineer, as a "safety circuit rider" who travels the state of Iowa putting on workshops and programs designed to assist County Engineers in improving safety within their counties. Bigelow has put on nearly 70 accident analysis workshops designed to provide County Engineers with assistance in evaluating accident data. Data are fed into a computer in Des Moines, and the data base is made available for use by counties for reducing traffic accident rates.[27] Bigelow serves as a direct contact for the County Engineers. He assists them in analyzing the data. In a sense, he notes, "I make housecalls." The safety circuit rider program is a mechanism by which County Engineers can connect with the university and a way in which they can learn from each other, in part because Bigelow provides them with comparison data among counties.

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[27] Bigelow says one of his areas of focus is to examine the night-day ratio of accidents . In Iowa, 3 times as much traffic flows during the day as during night time hours. Theoretically, 75% of accidents then should be occurring during daylight hours. This, however, is not the case. When the number of night times accidents appears high, Bigelow examines the reasons that night driving conditions cause accidents. He looks at accident rates and compares them with rates on similar types of roads in different parts of the states. He also examines the severity of accidents and if that rate is higher than it "should be", he works with the County Engineers to identify ways to lower those rates. *Bigelow notes that this is a complex process. He looks for* trends over time in order to see if traffic conditions have changed. Bigelow also has a sign management program in place wherein he is able to use the federal highway computer program for counties. The ITC holds a conference annually on the management of county traffic signs. Bigelow notes the safety circuit rider's services are part of the Inc technology transfer program.

The Washington State Experience. In May of 1992, Dr. Waggoner was invited opportunity to attend a professional development seminar sponsored by the Washing ton State Association of County Engineers/Public Works Directors [WSACE/PWD], with the assistance of the County Road Administration Board [CRAB]. At that time, Washington's County Engineers were exposed to a management consultant who presented a *Responsive Leadership Seminar.*[28] During one of the sessions, participants were asked to identify areas where they believed WSACE/PWD might become more aggressive. These are included in the analysis because it is assumed that a strong state association may well be a selling point for the profession. The stars next to each point indicate the number of people at the conference who identified each point as important for the group to expand its efforts.

- Incorporate social/recreational events [Informal times allow for the exchange of information that may not be exchanged during formal sessions. This encourages a release of frustrations as well as the positive exchange of information on equipment, materials, administrative, management, and personnel issues] ********
- Clarify mission goals and action steps [So that WSACE/PWD has a more well-defined sense of purpose that it can pass on to its members. This fosters a sense of belonging among County Engineers] **********
- Continued professional development [so that professional growth becomes a normative part of being a County Engineer. This also serves to increase the strength of the profession] ********
- Orientation for new members [in order to make them feel a part of the professional community. Again, this fosters a sense of being a part of a professional community] **********

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[28] Richard L. Baron, President, Responsive Management Systems. 1818 25th Ave. Seattle, Washington 98112 Responsive Leadership Seminars. Responsive Management: Core Competencies for Creating Adaptive Organizations. Advancing Service and Product Quality Through the Development of Self-Directed Individuals and Work Groups.

- Develop a central information data source [This appears to parallel Iowa's efforts to facilitate communication among County Engineers through the Electronic Bulletin Board System] *********

- Better communication about WSACE/PWD [The better informed the County Engineering community is about the activities of its associations, the more likely County Engineers will become involved in the state association.] ****

- Allow for continuing education [Many County Engineers argue this is the only way to stay current on issues relevant to the practicing professional. One Washington County Engineer commented that eventually a Master's Degree will be a prerequisite to adequately fulfill the responsibilities of the position.] ****

- More informal regional meetings [This suggestion parallels a function that is already working in Kansas where one group of County Engineers makes it a point to have lunch together on a weekly or monthly basis. During that time they are able to raise and discuss issues related to the job.] **

- Designated greeter at meetings to encourage new people to become more involved in CRAB [Active involvement by all County Engineers is one way to assure a strong organization that can act as an advocate for the County Engineers within the state.] *****

- Actively recruit new members from among the ranks of County Engineers across the state [This is not an extremely high priority for Washington because it already has a high level of participation from its members.] ***

- More public exposure/visibility [This issue is controversial. One County Engineer from Washington commented that he would just as soon remain invisible. When you are visible you may get more complaints from the public. Others say the public needs to become more aware of the broad scope of responsibilities the County Engineers have. This is one way that the issue of salary could be addressed.] **

- Facilitate networking at conferences [This will allow Washington's County Engineers to interact with one another and also facilitate interactions with County Engineers from other states at the annual NACE meeting.] **********

- Clarify who can be a member of WSACE/PWD [This may not be as important an issue for those states that have the P.E. as a requirement. One person who responded in this study, however, indicated that he was not eligible to belong to the state association because he is not a registered P.E.] **

- The executive committee should involve new county engineers [This could be construed as an effort aimed at retaining County Engineers in their current positions.] **

- Mentorship [This can be important for new County Engineers orienting themselves to the complexity of demands of the position.] **

- Focus association activities on common needs of County Engineers. *******

- Share legislative and regulatory information [This is a top priority for a majority of County Engineers who point out that new legislation seems to be generated almost on a daily basis.] *****

- Encourage group discussions of common problems [Working together will be more likely to lead to strategies that will assist County Engineers in resolving common problems.] ******

- Establish demographic groups to meet on an informal basis [Certain regions of the state may share issues in common. Discussion of those issues may lead to solutions to problems.] ***

In part because of this wide scope of opportunities for professional development, County Engineers from Washington State appear to find it somewhat less difficult to attract people into the profession than those from other states involved in this study.

A General Discussion of Professional Development. Engineers from Washington, Iowa, Minnesota, and Ohio [i.e., P.E. states] ranked their professional development opportunities as somewhat better than those presented by the private sector [**See Figure 1**].[29] Waggoner, however, has attended conferences in South Dakota, Kansas, and Michigan as well [non-P.E. states]. Attendance appeared generally high at these conferences. At the same time, many who do attend commented that some of their peers do not seem to have the support of their Boards to "take time off" for such

[29] The scores were summed and a mean was derived. Each responses for Figures 1-9 was placed on a 0-7 point scale with a ranking of 0-2 = fewer opportunities than the private sector; 3-5 about the same level of opportunities as the private sector; and 6-7 more opportunities than the private sector.

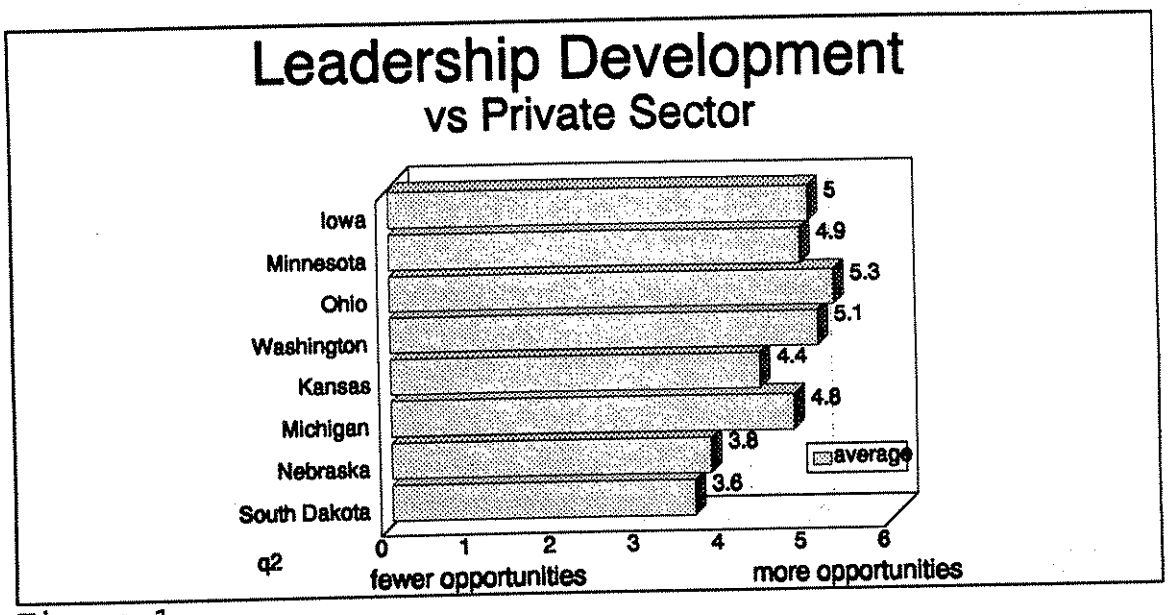


Figure 1

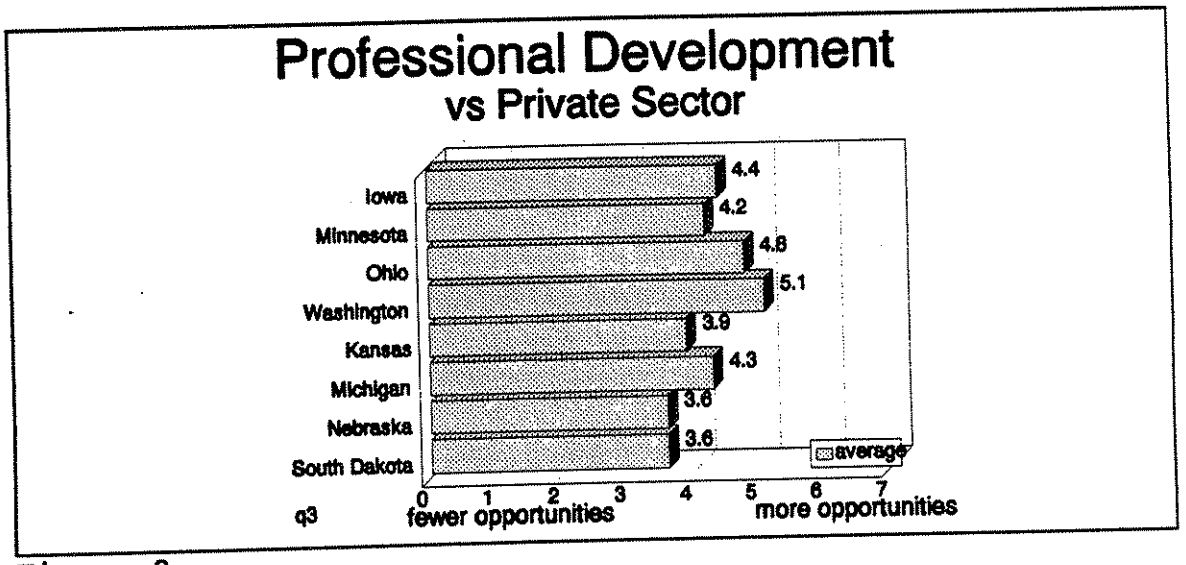


Figure 2

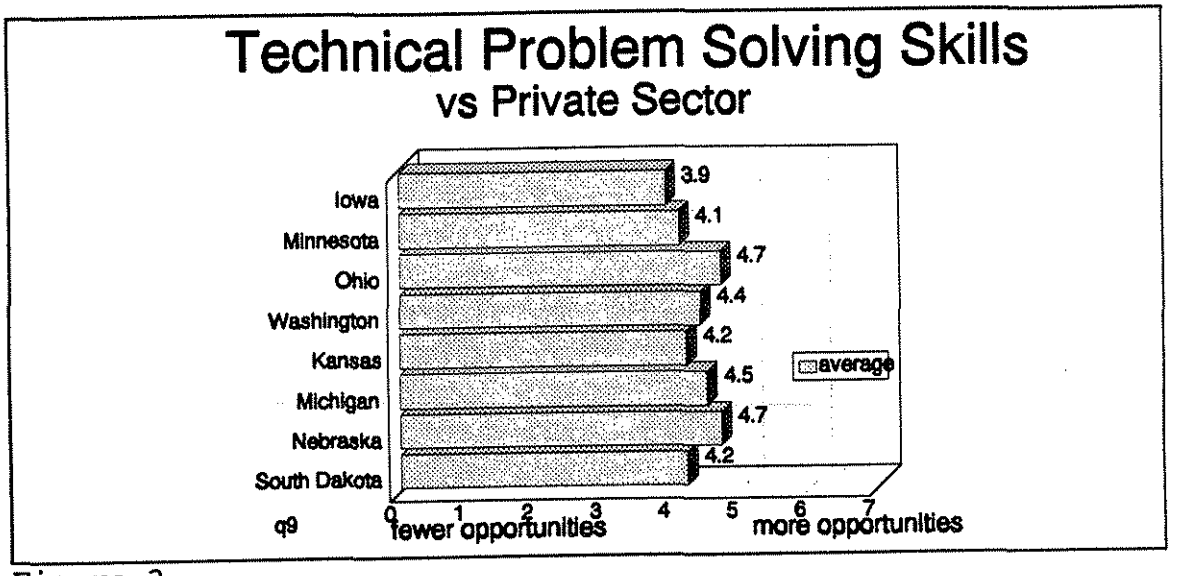
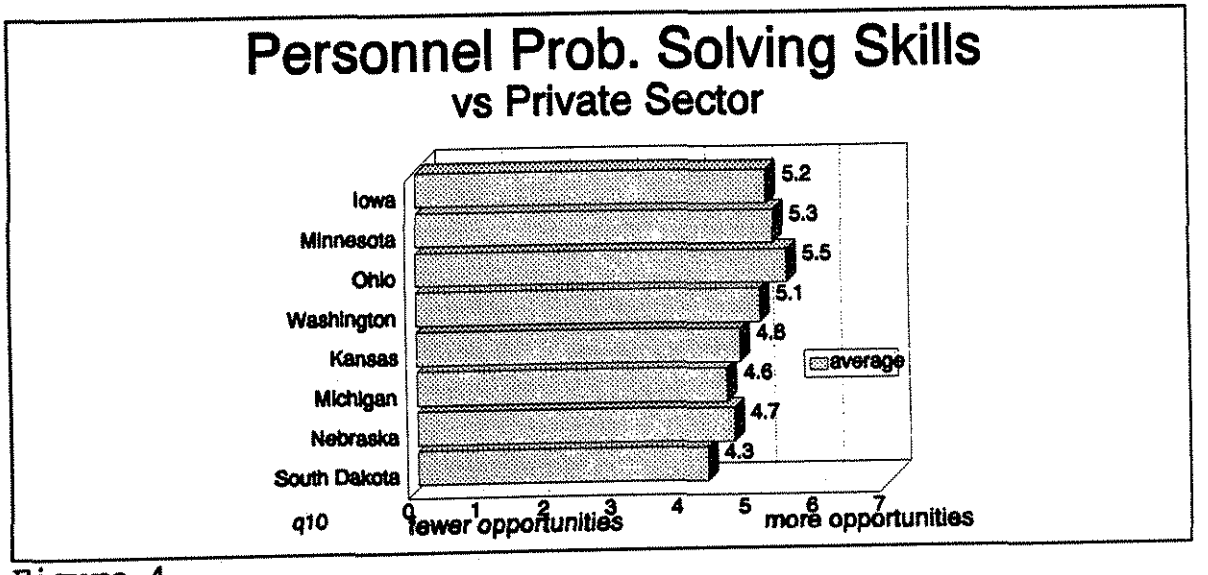


Figure 3



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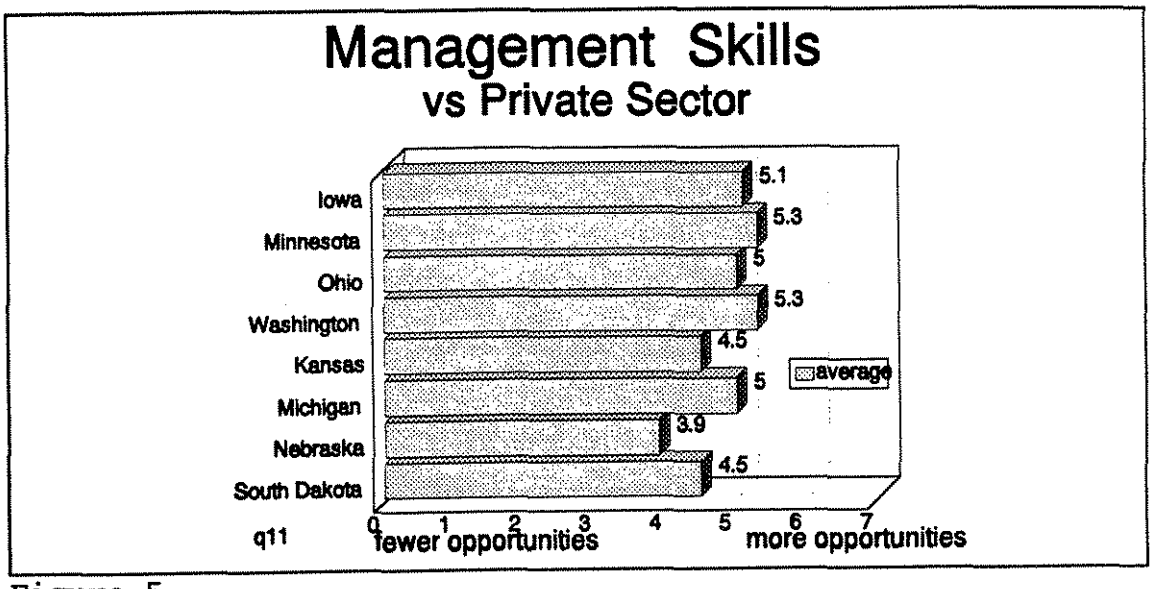
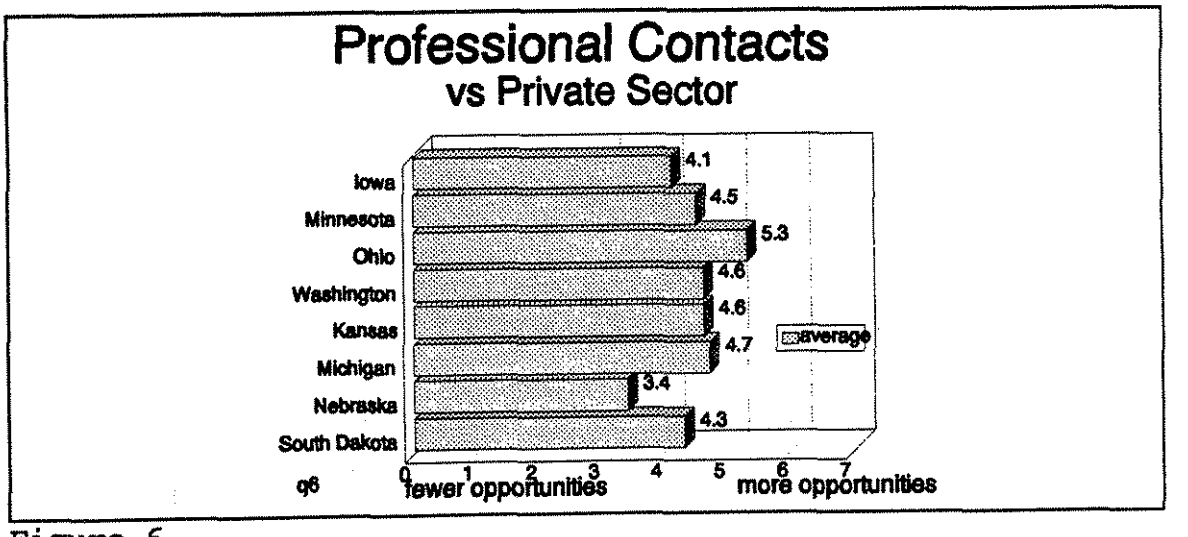


Figure 5



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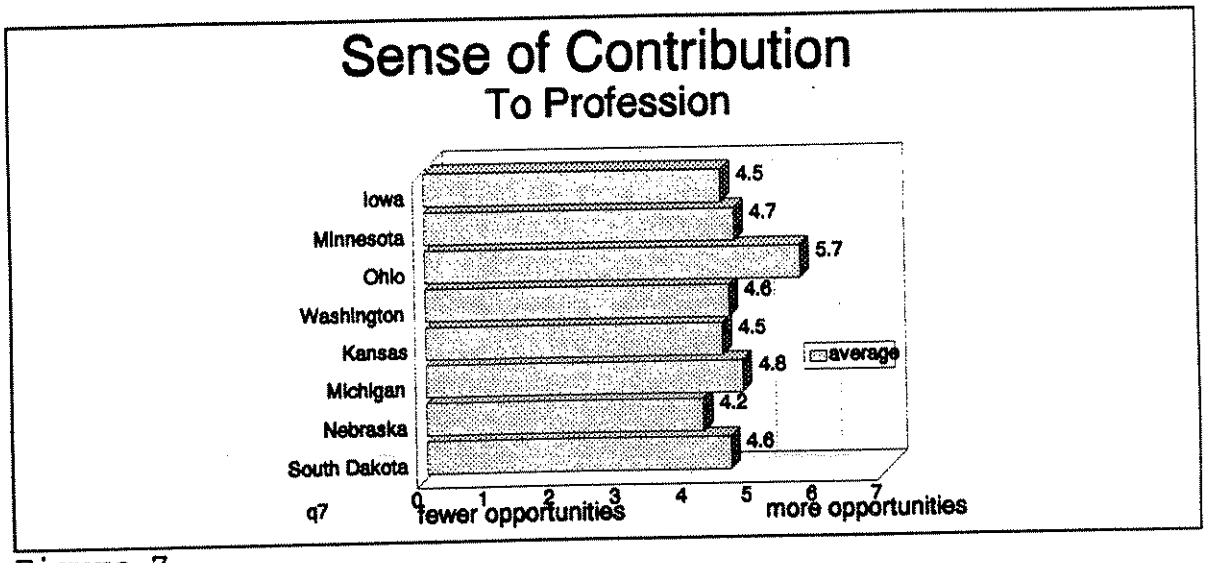


Figure 7

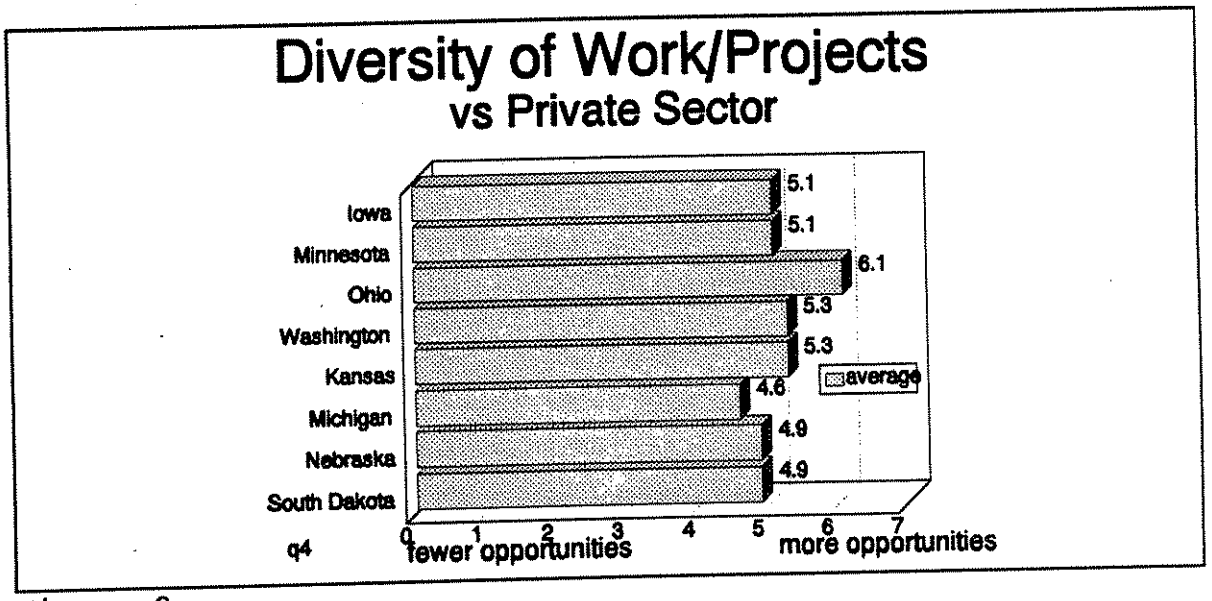


Figure 8

activities. This does seem to be more problematic for those wanting to attend the NACE conference than for regional/state conferences. For one non-P.E. state [Michigan], the average ranking for professional development was somewhat higher than that from one P.E. state [Minnesota]. The trend in Michigan, toward engineering "managers", may account in part for this ranking. That is, managerial skills held by these persons may be preparing them to more adequately address the wide range of responsibilities of County Engineers. Some argue that these managerial skills are as important as engineering skills as prerequisites for the job.

Professional development opportunities may also have an effect on the County Engineer's opportunities for developing leadership skills [**See Figure 2**], as well as for improving technical, personnel, and management problem solving skills [**See Figures 3 - 5**]. The P.E. states, again with the exception of Michigan, consistently rank these opportunities -- against those offered by the private sector -- higher than the non - P.E. states.

Opportunities for continued professional growth through contacts with colleagues and recognition for accomplishments [**See Figures 6 - 7**] appear to be intricately related to the strength of the state associations of County Engineers and to the level of the County Engineer's involvement within those associations. It is likely that these affiliations, along with the challenges and diversity of the work projects [**See Figure 8**] are factors that led many to report the public sector presents more opportunities than the private sector. In fact, one of the questions asked of respondents in phase one of this research was

How would you describe your most significant contributions to your county? These may be described in terms of dollars saved or public relations, or any other contributions you feel have made the job challenging, exciting, and satisfying.

Responses to this question are reported in **Box 5** on page 59. A significant number reported, for example, that the satisfaction received from seeing a project develop from inception, through design, to construction and maintenance provides a genuine sense of accomplishment. This may have influenced them to report that on-the-job benefits are greater than those in the private sector.

Responses may well be a function of the County Engineer's understanding of the county's needs as a whole. Some argue this differs from external consultants for whom each job presents an isolated "obligation" that ends with completion of a project. As one County Engineer commented, "We live with the results of our projects. We can't and don't walk away from them. That makes it special." As yet another commented, "It takes a special person to do this job."

Each of these comparisons/contrasts with the private sector could be enhanced if County Engineers have the support of the Boards in assuring growth, opportunities for advancement, and high levels of job satisfaction. When meetings are scheduled that take them away from their offices, a majority report they do have the support of their Boards. This is consistent with reports of relatively strong levels of activity in state associations and in the National Association of County Engineers (NACE).

- Provided safe roads and bridges [Minnesota];

- For years I have managed the system and have brought credibility to the public works department and the Board of County Commissioners. I have an ability to work with state and federal agencies and with big business [Washington].

- I feel the most satisfaction in my job knowing that I am trying to approach problems with a long range outlook. I try to plan for future growth and make decisions based on the long term needs of the county [Minnesota]

- I aggressively seek out grants and upgrade staff educational levels. I have also helped to computerize much of our operation [Ohio];

- Public relations, staff efficiency [e.g., properly trained motivated, and rewarded], and increased levels of professional ethics [Michigan];

- At the time I was employed each Board member was running a section of the county road department. Now we operate a unit which results in a more competitive purchasing of supplies and organized road department [Nebraska];

- Working to find innovative ways to stay within my budget [Kansas];

- By using a P.E., my county has decreased its liability, risk, increased management and professionalism, and qualified services [Nebraska];

- We took the ignored lowest volume roads and regraded them, saving maintenance expense forever. We have taken advantage of every outside dollar opportunity including bridge grants, extra FHWA, Federal Aid System, and demonstration money [Minnesota];

- Providing engineering expertise on a day to day basis. Providing professional management to the department and to the county. Areas involved are finance, budgets, legal issues, management, and organization [Iowa];

- Being able to provide services in all areas in spite of lower funding. Things were so bad here 15 years ago [assume this is when he acquired the job], it would have been difficult not to make some improvements [Iowa];

- Just to be honest and fair with all people we deal with and treat everyone the same [Nebraska];

- Strive to keep bridges and roads in good condition. Advise county commissioner on many varied issues. Utilize federal aid money on roads and bridges. Coordinate various programs within the county [Michigan];

- Long term planning and service to the public when problems are identified [Ohio];

- Went to taxpayers for a bridge levy which has alleviated the most critical of deficient bridges and has freed some money for road improvements [Iowa];

Box 5. Q69. How would you describe your most significant contributions to your county? These may be described in terms of dollars saved or public relations, or any other contributions you feel have made the job challenging, exciting, and satisfying.

Nonetheless, not all County Engineers belong to NACE. Some report that the cost of membership is prohibitive, while others note they would be unable to attend the meetings, or that their state/regional associations provide them with adequate levels of information for their needs. Those who do belong to NACE, on the other hand, say the national organization provides them with opportunities to

- stay current on federal legislation affecting counties;
- learn more about state-of-the-art technology;
- learn of new equipment;
- meet with County Engineers from other states to share ideas;

They also say that NACE acts as

- an information clearinghouse for County Engineers; and
- as an advocate for County Engineers.

There are tangible benefits for those able to attend state and national conferences. Their exposure to new ideas has a tendency to result in savings to the counties [See **Box 6** below for the question asked, and **Figures 9-16** for responses by state].

a. equipment savings
b. materials savings
c. learned about liability issues that allowed preventive measures that saved the county dollars.
d. alerted to legislative changes that saved the county money.
e. gained understanding of personnel issues.
f. gained better understanding of working with restricted budgets [give county most for its dollar].
g. made contacts with consultants that saved the county dollars
h. made contacts that resulted in matching funds for projects for the county.

Box 6. Q. 33. What types of savings have you realized for your county as a result of your involvement in regional, state, and/or national conferences?

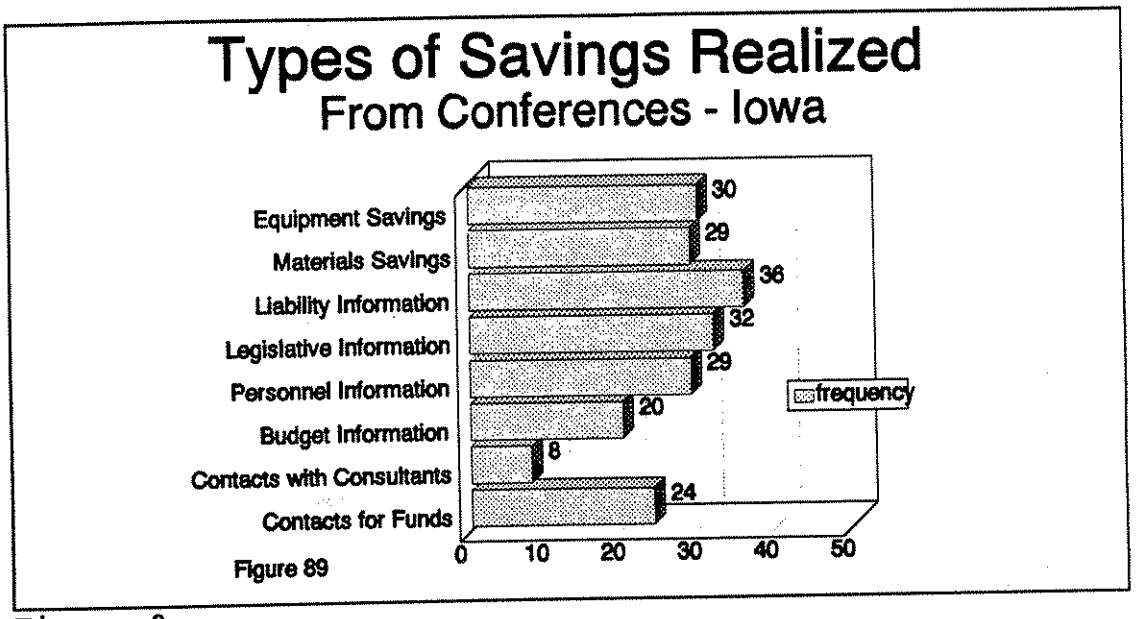


Figure 9

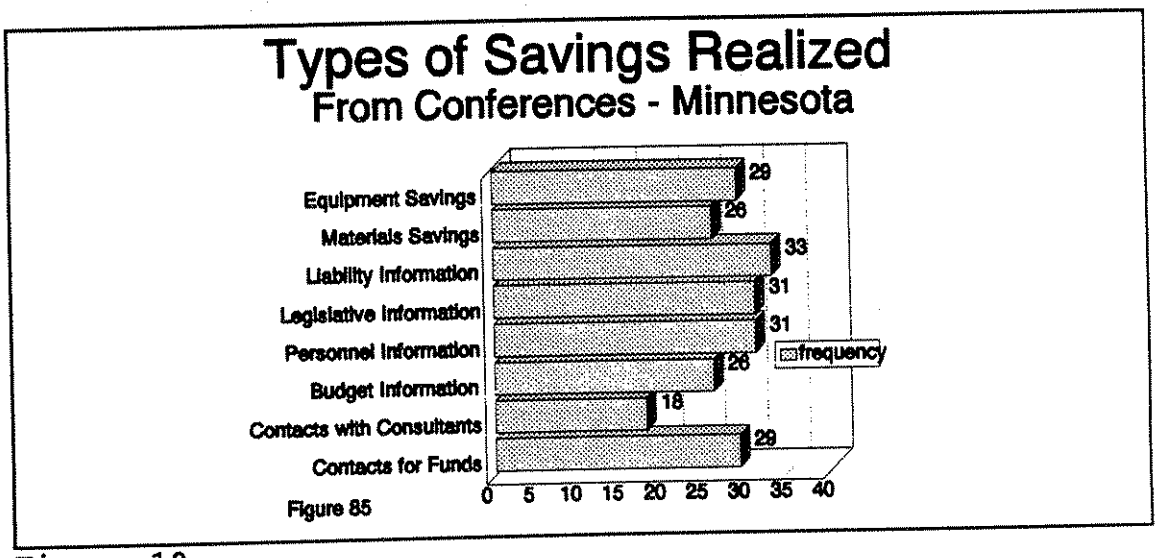
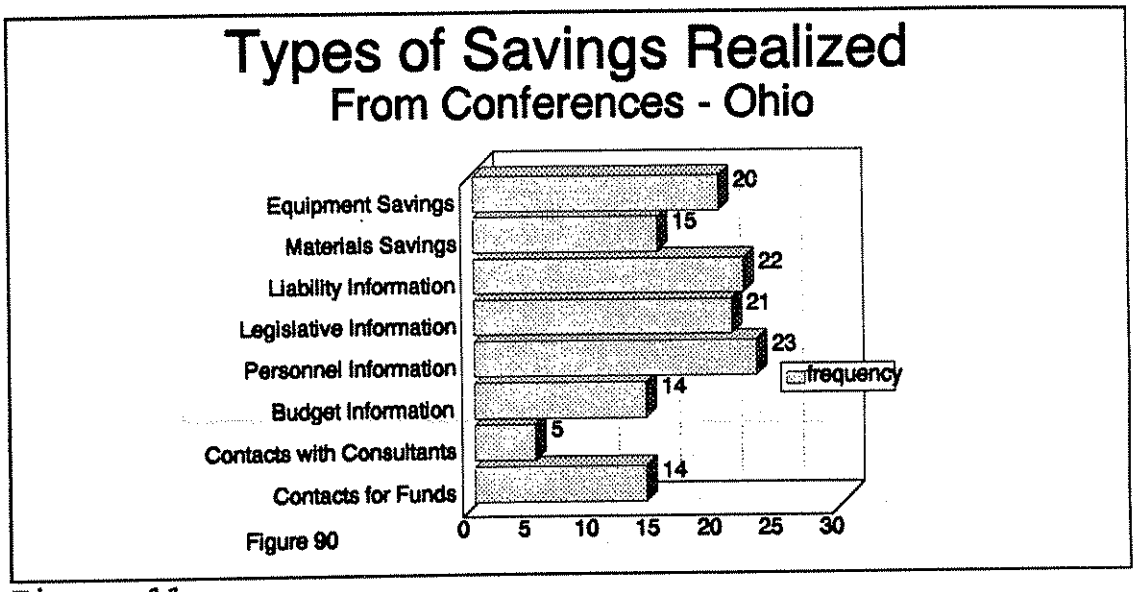


Figure 10



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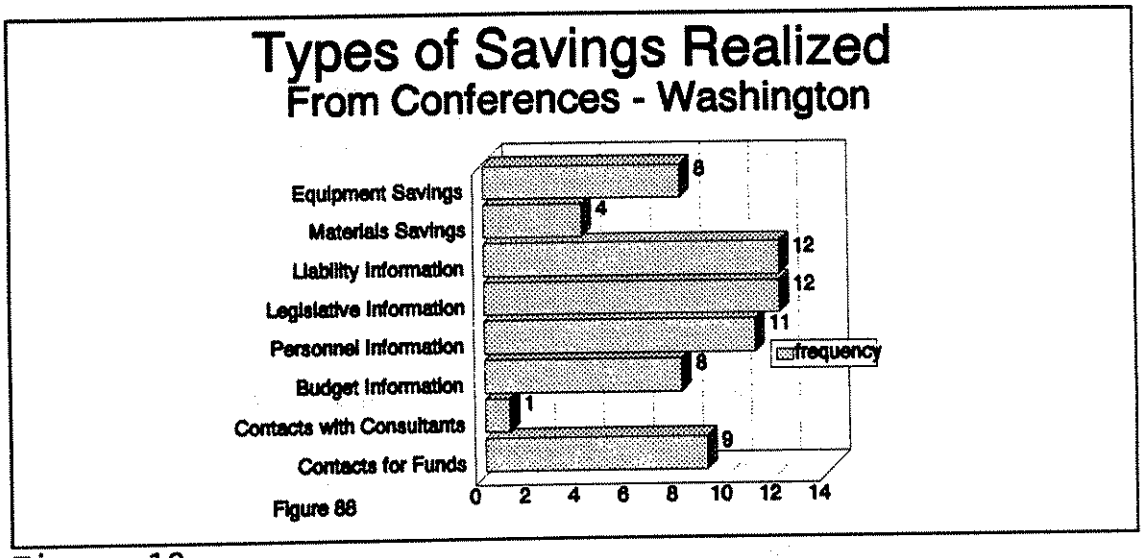


Figure 12

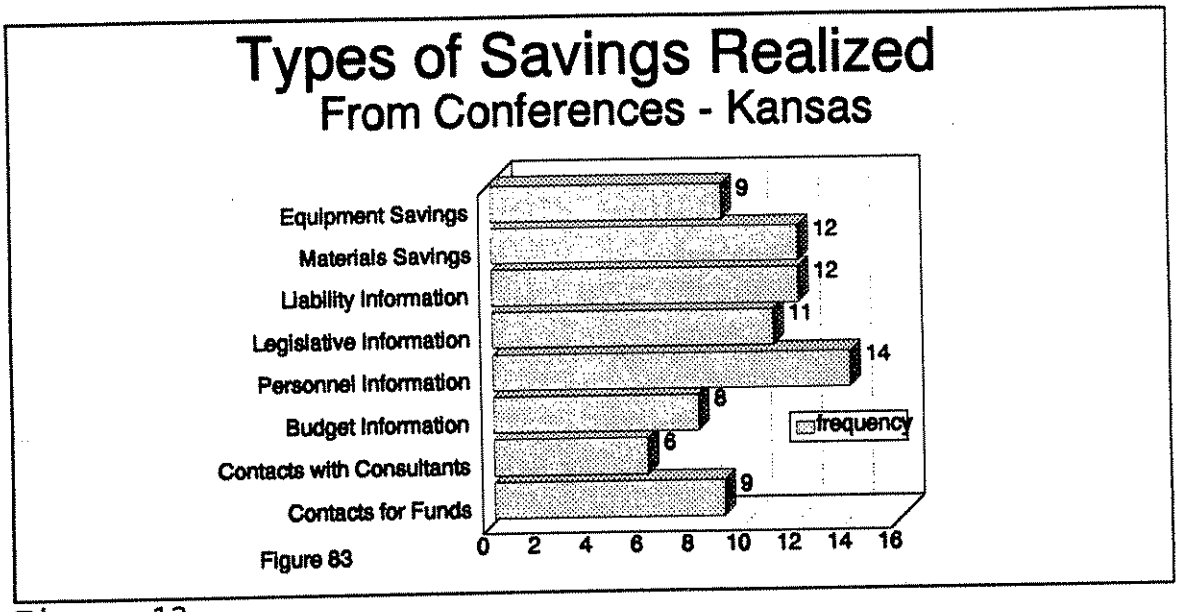
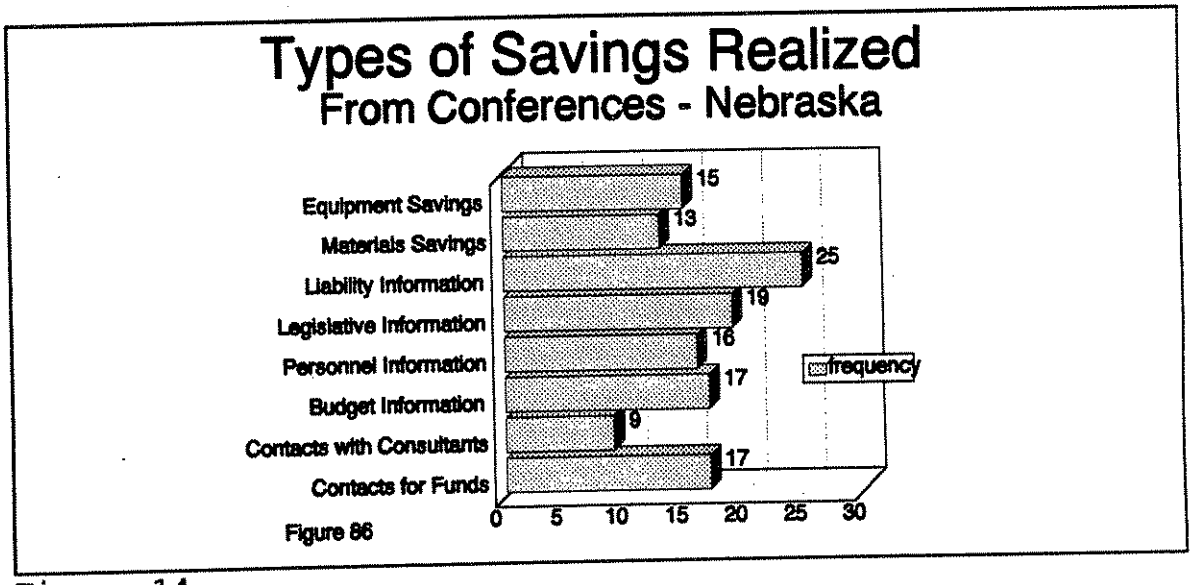


Figure 13



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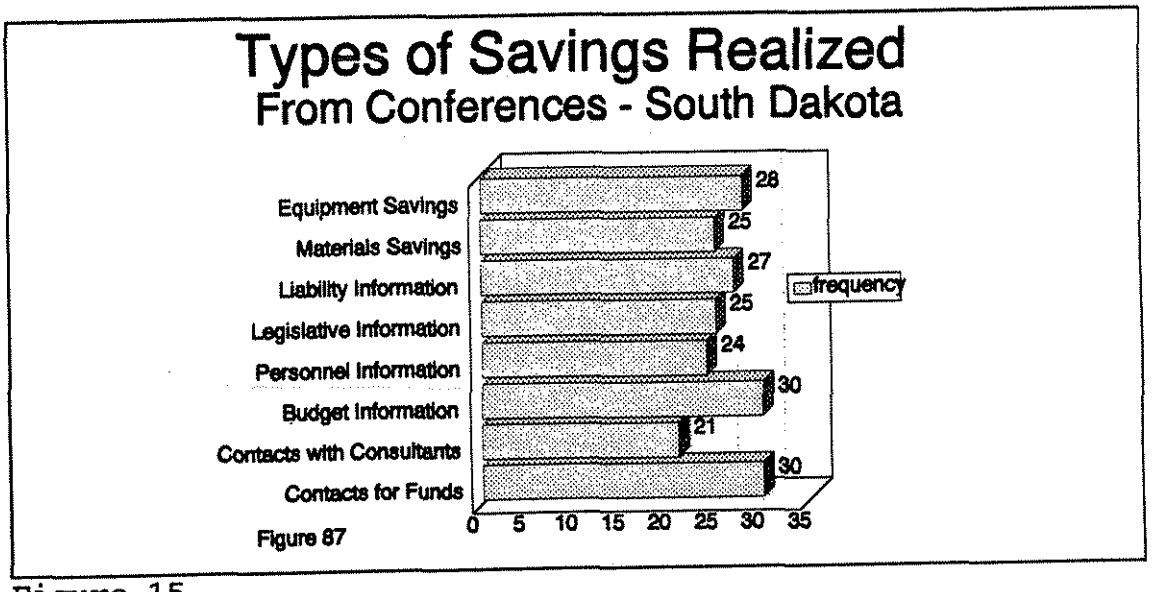

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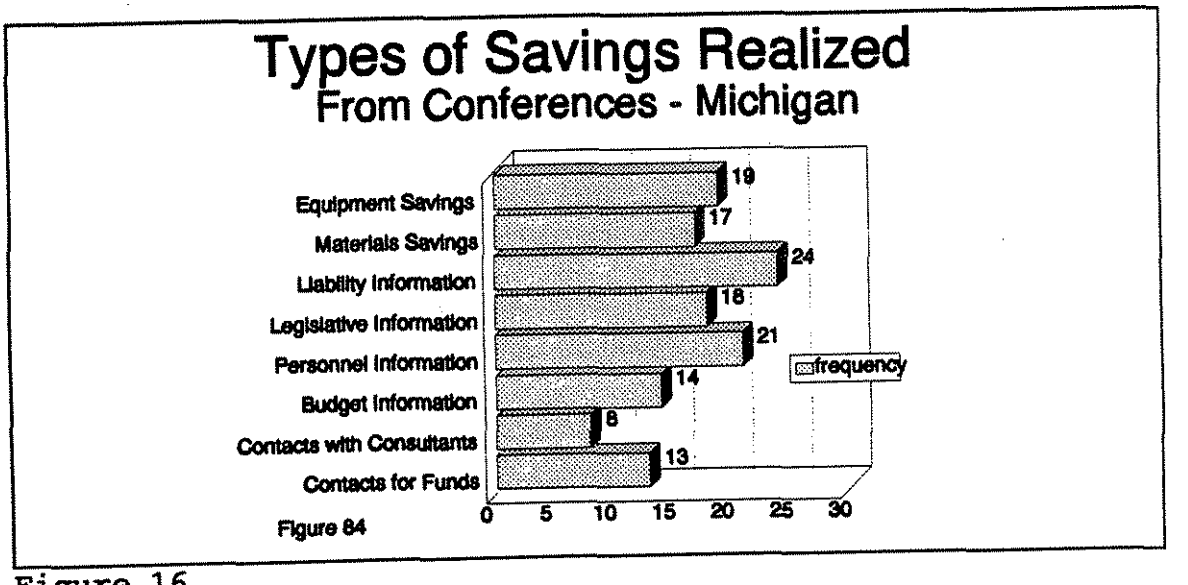

Figure 16

A majority also reported their Boards were somewhat supportive to very supportive of their participation in professional meetings [See **Box 7** below for question on support of Boards].

a. Very supportive. They provide funding each year so that I can attend the meetings because this is one way in which I can stay current on both technical issues and non-technical issues.
b. Somewhat supportive. *They sometimes provide funding, but only for about one meeting per* year.
c. Somewhat unsupportive. The Board feels the cost is too high because it is taxpayer money that would go to provide funding for such trips.
d. Very unsupportive. The Board has rarely agreed to provide funding for attending conferences because budgets are such a problem in my county.

Box 7. Q31. Is your Board of Supervisors supportive of your need to attend meetings and conferences?

Responses to **Question 31** above may be related to the involvement and scope of the Boards themselves at conferences where they are able to take advantage of opportunities to come together to share information and gain knowledge of issues important to their respective counties. Professional meetings, in each state, include sessions for Board members as well as sessions for County Engineers. Generally, those meeting sessions are separate -- one set of sessions is held for the County Engineers, the other for the Boards. While some Board members attend the County Engineer sessions, if sessions included topics common to both groups, the sharing of information among them would likely increase significantly.[30] This may be a choice that will be made as the two work together on strategies to continue improving services to the counties.

In the Best of All Possible Worlds, What's the Problem? With the exception of the sections on salaries and political issues that seem to be an inherent set of

[30] *This is not to imply that no* Board members currently attend meetings for County Engineers, only that a majority do not appear to do so.

controversies for the profession, this analysis has focused on the strengths of the County Engineering community rather than on its limitations. If this community of professionals [1] begins to work together to help identify and alleviate its limitations and [2] finds ways to enhance its strengths, shortages of qualified County Engineers should not be a critical issue because there would be sufficient numbers of applicants. This, however, is going to take a level of energy and commitment that the associations have not seen a need for in the past.

One of the strategies that has been and continues to be used to attract people is scholarships to university students [See **Figures 17-18** for breakdown of P.E. vs. non-P.E. states]. As it can be seen from **Figure 17,** Ohio does not offer student scholarships. This is, in all probability, because Ohio has not had difficulty attracting people to fill its positions. Ohio's County Engineers are elected. Their salaries are relatively high when compared with those of County Engineers in other states, and their length of tenure on the job is competitive with states where their counterparts are appointed by Boards. Most County Engineers from Ohio are in agreement that "Continuity is likely if the engineer is doing a good job."[31] In some instances, their length of tenure exceeds that of their appointed colleagues, i.e., the average tenure is three terms, or twelve years. Those who live in Ohio will also argue the office is not politicized to the degree it is in states where County Engineers are appointed. The position is, in all probability, one of the most misunderstood of those in all the states.

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[31] ***Should All County Engineers Be Elected?*** **Better Roads, P. 41 June, 1989.**

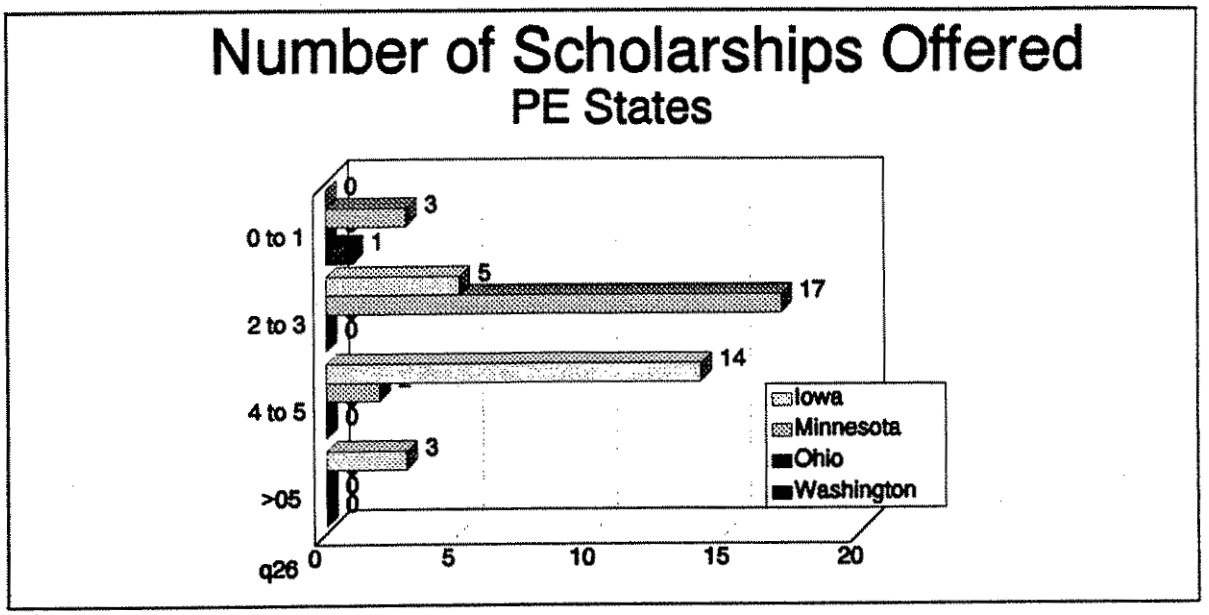

Figure 17

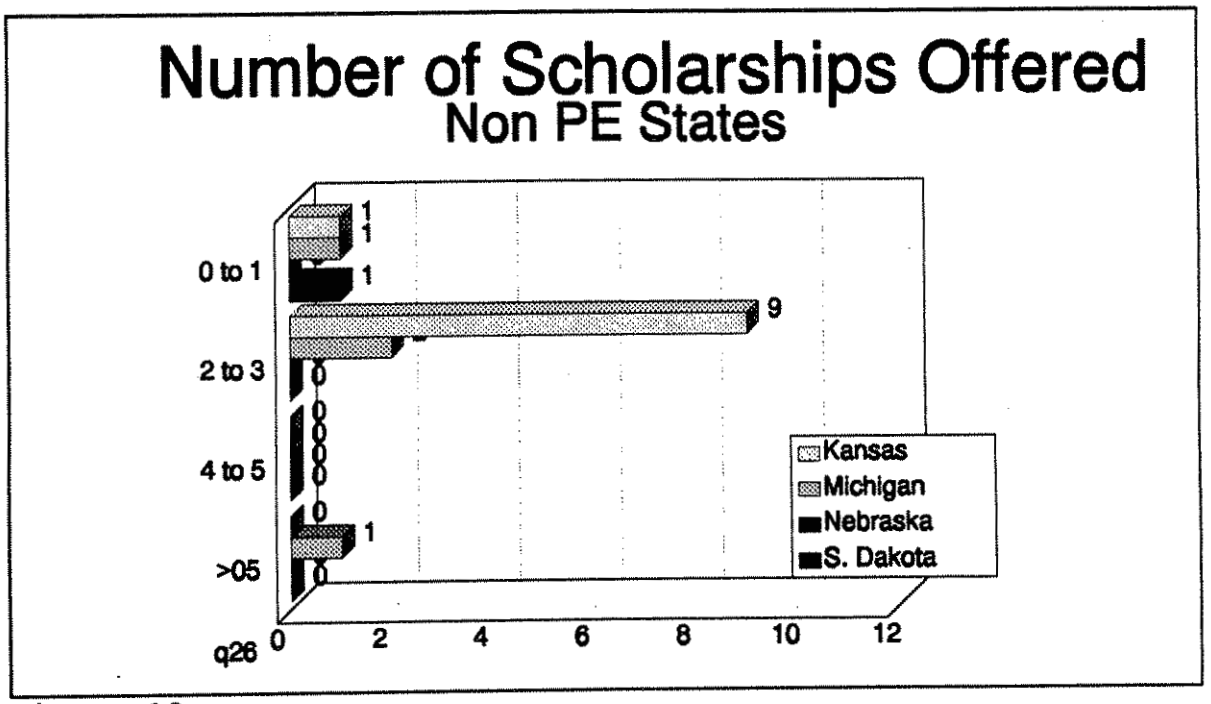

Figure 18

Box 8 below presents a list of comments on elected County Engineers reported by some of those who are **not** from Ohio.

- *The elected* County Engineer is basically on the same level as elected officials. The pressures to do or not to do, certain things because of political pressures or friendships would be extremely high. The time to campaign is not available.

- The election of County Engineers is a decision not based on merit, but on deep pockets and greased palms. It is like the fox guarding the chicken house.

- Competency cannot be determined in an election.

- Too much time would be wasted on politics that could be better spent on technical issues. Changes in personnel every four years would be likely to hurt the county.

- An elected position would reduce engineering considerations and increase political considerations.

- Political promises result in unwarranted projects. We have enough of those with the board being elected.

Box 8. Evaluations of elected County Engineers by County Engineers who are not from Ohio.

At the same time many criticize the elected County Engineer, others appear to be in favor of the elected office [See **Box 9** on page 65].

- While an engineer could be tempted to do certain projects to be re-elected to his job, a Board *member can also* try to force out an appointed County Engineer who doesn't "go along" [Minnesota].

- The elected County Engineer can determine road and bridge programs based on engineering decisions – not by special interest commissioners [Ohio].

- Being elected makes our positions **less** political because we make the engineering decisions. If we were appointed by a Board – an elected entity – the office would be much more political due to interference of the appointing agent [Ohio].

- I am an elected County Surveyor. I would hope that is because I am doing a good job and that it is **not** a political issue [Nebraska].

Box 9. Comments supporting elected County Engineers.

As of 1989, when *Better Roads Magazine* conducted a study on elected County Engineers, only 24.8% of those *responding* agreed that electing to the office is a "good idea". The reason for this may well be that "most engineers favor the system they know

best."[32] John Circle, County Engineer from Ohio suggests that it is "actually easier for an elected engineer to sell a project to the public than to a Board of Commissioners."[33] In this study, when compared with their appointed counterparts, Ohio's County Engineers appeared to find the issue of "politics" much less time consuming and frustrating. They also have a strong state association that is as active, if not more active, than any involved in this study. For all of these reasons, it is likely that Ohio's Association of County Engineers sees no need to offer scholarships to students.

Minnesota and Michigan appear to lead the states in offering scholarships to students. Some, however, note if the objective is to attract young people into County Engineering, scholarships may not be a good use of association dollars . The following comments were made on the benefits of offering scholarships to university and technical students [See **Box 10** on page 66].

Overwhelmingly, comments made were that scholarships did **not** encourage young people to seek out Assistant County Engineer positions upon graduation [See **Box 11** on page 66 for comments.]. One County Engineer from Iowa said he has been trying to

> identify ways to steer young engineering students into the profession. Scholarships have not been successful. The best way to get these kids into this field is to make the job more attractive. You can lead a horse to water [with scholarships] but you can't make him drink it [i.e., consider County Engineering as a career].

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32 *Ibid.*, at 39.

33 *Ibid.*

- It has given us a chance to publicize the county engineering profession and explain to students what the job is all about [Iowa].

- We recently hired a technical school student. Their curriculum is almost tailor-made for our type of work [Iowa].

- We are just starting to get involved in a scholarship program. We feel it will be a benefit in the future [Minnesota].

- We hire full and part-time employees from colleges and they work very well with us [Minnesota].

- The state colleges and technical schools bring students to the annual County Engineer's conference. This gives the engineers an opportunity to meet students. One student was hired as a result of this type of contact [Iowa].

- Any contact with the universities is a recruiting "possibility" [Washington].

- If nothing else, it is important to note that colleges are active in providing the scholarship opportunity [Minnesota].

.Box 10. Benefits of offering scholarships to university and technical school students.

- To date, our work with universities both through the grant fund and lecture groups like the ASCE Student Chapter have yielded no candidates for County Engineering positions [Iowa].

- I do not feel that scholarships necessarily benefit as a recruitment strategy, but rather that our active involvement with technical schools is most important [Iowa].

- Scholarship recipients do not get into County Engineering [Iowa].

- Our scholarship program is fairly new and low-key. The information about the program is not well-distributed or promoted [Michigan].

- We keep a good idea of class sizes and fields of interest. Technical schools have been a great source of recruiting opportunities for staff. The scholarships to the four-year universities, however, have only been "earmarked" for Civil Engineering. This could possibly be helped by County Engineering interest requirements for scholarships [Iowa].

- Our association offers scholarships, but does not specify it definitely has to go only to those individuals interested in County Engineering.

- We need a lot of work in this area [Washington].

Box 11. Benefits/costs of offering scholarships.

Respondents from most states involved in this study [other than Ohio] are experiencing some degree of difficulty in attracting qualified people. As such, one of the questions asked of respondents was for them to identify ways that the profession can

begin to attract more people. **Box 12** below shows some of the suggestions made by those within the County Engineering community.

- We could try forgivable loans in lieu of scholarships. Also some sort of co-op program is being considered in our state, but funding remains a problem. We need to start speaking at schools. We need to start with the youth of the state [Iowa].

- Many county highway departments hire students in the summer to give them a taste of the profession [Minnesota].

- We need to participate in college job fairs and in high school career days [Washington].

- The pay scale in the state for Highway Superintendents as a whole is not attractive to young people. We need to get the pay scale up. Fund some special school for the job [South Dakota].

- We need someone to urge legislators to increase incentive payments to counties for having full-time Highway Superintendents [Nebraska].

- We need to lobby for increased financial subsidies from the state. As its stands now, accountants, administrators, and managers, with no engineering licenses, have more authority and higher salaries than County Engineers [Michigan].

- Maybe revolving forgivable loans to student in return for working for the county would help [Iowa].

- We need new brochures and promotional materials [*This would make County Engineering more visible*] [Iowa].

- Get information out to the schools on what County Engineers do, what the challenges are, and what opportunities are available [Michigan].

Box 12. Q29. What are some of types of activities that your state association could or should be considering to make County Engineering an attractive career option to the new generation?

As it can be seen from the comments both in **Box 12**, above, and throughout this report, the recommendations made by those in the profession are many and varied. Most address the need to make the profession more visible, so that not only students, but the public, and their Boards better understand the types of contributions made by County Engineers.

Conclusions and Recommendations. As it was pointed out at the beginning of this report, this is exploratory research. Because of this it would be inappropriate to suggest that the researchers have learned all there is to know about what it will take to

"solve the current and projected shortages" of County Engineers. Nonetheless, there are many insights that have been learned from this research. These insights can provide the impetus for dialogue within the profession at both the state and national levels, and encourage further research into ways in which to attract the coming generation of engineers into this dynamic and exciting profession.

The following discussion presents the issues that have been raised most often by those in the profession. These are issues which County Engineers find the most challenging about their chosen professions as well as those they find most frustrating. Each should provide some understanding for state associations, NACE, and the Boards as they work with their County Engineers to continue to provide the "best services" to their counties' residents. Issues presented also provide insights for the profession as it seeks to attract the coming generation of County Engineers.

Salary structures are considered by many to be too low. This finding holds for all participating states except Ohio. This may be, in part because the Ohio County Engineer's Association has a strong lobby, and their salaries are set by the state legislature and not by the Boards. It might be argued that delegating the decision on salary structures to the legislature could further politicize the position. It may, on the other hand, also be a way in which the profession can enhance its recognition level. Until compensation levels are addressed as a primary factor discouraging public sector service, a majority of County Engineers agree that it will be difficult to continue to attract highly qualified people.

County Engineers argue [nearly unanimously] that "adequate" qualifications to perform the job must be viewed as an investment in the infrastructure, not solely as a

cost to the counties' taxpayers. While it was beyond the scope of this research, it may well become necessary for researchers to develop a mechanism by which to more clearly articulate and empirically measure the valued contributions made by County Engineers. In all probability, this is the only way in which the Boards that hire and set compensation levels will become sensitive to those contributions.

Salary is, of course, not the only factor of importance in attracting the coming generation of County Engineers. It is, nonetheless, likely to become more important than it appears to be for those currently in the profession. As one Highway Superintendent from Nebraska commented

> We tend to get too involved with ourselves and our everyday job situations and to overlook and neglect our successors. We need to take a more active role in promoting our profession, but we struggle with trying to promote it by just stating the personal growth and development obtained in County Engineering. Until we can offer appealing salaries, I think we are going to have a hard time competing with the private sector.

Many of those who currently report salary is not a problem may be satisfied with their own levels of earnings because they have been on the job for a relatively long period of time or are in urban counties where compensation levels are higher.

Those who are dissatisfied may have been hired at a salary that was disproportionately low and unrealistic considering the value of the contributions they perceive they bring to the position. Even though raises in subsequent years may have been "modest", they have not been high enough to compensate for low starting salaries.[34] As a 1990 *Better Roads* survey showed, if the engineer " never

complained, or never showed proof of what his peers made elsewhere, the low pay

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[34] *Ibid*. at 27 .

scale became exaggerated over time."[35]

Regardless of the need to increase salaries for County Engineers, this issue will likely remain a problem for small rural counties where it will remain difficult, if not impossible to raise salaries to a level that is perceived to be competitive with the private sector or with the urban public sector.

Rural counties are not perceived as attractive to the new generation of professionals. It is indeed the rural counties that do and will continue to experience the most significant problems in recruitment of County Engineers. It may be that the general quality of life in rural counties may serve to overcome part of this problem, including that associated with low salaries. Comments such as those in **Box 13** on page 72, for example, lead one to conclude that rural living may be a critical selling point for the profession.

One County Engineer noted that coming back to one's "home county" could raise ethical considerations in terms of politics. Nonetheless, comments such as those listed above could be very effective selling points for the profession, particularly if they are aimed at younger engineers who have already experienced some of the unattractive elements of big city living. As one engineer from the Iowa Department of Transportation noted, these factors could be used in advertisements of openings for County Engineers.

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[35] *Ibid*.

- I chose to raise my family in a rural environment. This job is one that is actually "fun" and allows me to practice my profession outside a large city area.
- I like working in my hometown and like small towns. The work is interesting. Clean air, no noise, and I like the country.
- Small community life, better for my children, and close to family.
- This is my home town.
- I like living in a small community.
- When the position came up in my hometown community, I saw an opportunity.
- I like the rural community I live in.
- Family, community roots.
- I enjoy a rural area and think it is a better place to raise children. I worked in Chicago for 5 years after graduation and did not like the competitive atmosphere.
- Moved back to home area and family.
- Serving in a community where my family has lived for five generations. Opportunity to raise my family in a good community.
- The position was available in my home community.

Box 13. Selling the advantages of living in a rural area.

The politicization of the position. In one Midwestern state, a county commissioner promised his constituents the following:

> "If I am re-elected, you will get that new bridge." The commissioner was re-elected, and the voters passed the bond issued needed to fund the work. The bridge was never built, though, since the two other commissioners on the board wanted the available money spent for more urgent work in other parts of the county. Today, 16 years later, the failure to keep that promise still haunts the Board. The public remembers and obstinately refuses to vote for new and needed projects. A commissioner currently serving says that as new commissioners are elected, they don't even know what happened and why the people are so uncooperative.[36]

While this appears as a no-win, intolerable situation that would serve only to discourage someone considering a position in county government, County Engineers suggest there are ways of overcoming "politics". The following advice offered by Herbert O.Klossner,

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36 *Politicians or Professionals: Who Really Runs Your Highway Department.* P. 22, Better Roads February, 1987.

retired Director of Transportation, Hennepin County, Minnesota,[37] could be used by universities and technical schools as they incorporate information about public sector opportunities into their curricula. Klossner suggests that County Engineers should apply the following strategies in dealing with the political aspects of the job:

- **Don't be partisan** because your Board has veto power over any construction project completed on your county roads. Sooner or later you know you will appear before the Board to sell a needed construction project.

- **Know your political bosses**. That is, find out everything you can about your Board members, including what political party they are affiliated with, their political aspirations, who their friends are, and most importantly, who their relatives are. The more you know about them, the better able you will be to work with them.

- **Keep a low profile**. There is no compelling reason for a County Engineer to maintain a high profile at the local level. High visibility just makes you a better target. Save your visibility for work within professional organizations, such as NACE.

- **Procrastination is your friend.** Most politically sensitive issues come to you as a crisis, but they seldom are, Klosser says. You are always given only one side of a politically sensitive issue. Time is the best ally you have. If you can procrastinate until both sides of the issue have been investigated, it can usually be solved. A straightforward, honest appraisal of the issue, with several alternative actions you can live with, will be appreciated by nearly any politician.

The County Engineers involved in this research would, in all probability, agree with each of Klossner's comments, except perhaps for the one espousing a low profile. Increasing visibility may well be critical to a profession that is so poorly understood and, consequently, so under-recognized. A majority of those responding agreed that absence of visibility is a problem integrally related to salary, recognition, and respect.

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[37] *The Secrets of Positive Political Involvement.* P. 36 Better Roads, February, 1987.

Box 14 below demonstrates some of the "visibility" recommendations for attracting more people into the profession:

- We need more visibility in the local media.
- We need press releases and publicity and more public contact.
- Visibility is important. It would help if the Board understood our responsibilities and not think of our position as just another employee. If the commissioners understood our job, then the public would as well.
- We need to lobby the legislature to make the County Engineer's wages at least as much as a school district superintendent's.
- We need to get more positive publicity. Most of the time only negative things appear in the press.
- We need a public relations effort to market our profession.
- We need to get motivated to work together and conduct some marketing, both to target students and the general public.
- *We must become more visible through the media by bragging about our accomplishments.*
- The County Engineer may be one of only 2 or 3 professional people in most rural counties and he is expected to be an expert on many problems. We need to provide this information to the public.

Box 14 Why should County Engineering become more visible?

One County Engineer from Washington State would have agreed with Klossner on the visibility issue. He argued the prudence of keeping a low profile. Perhaps, however, the issue has become a trade-off -- visibility with the risk of increased requests from the public for county responses to problems vs. low visibility and continued problems with recognition. In addition to recommendations for increasing the visibility of the profession offered in **Box 14**, above, it might be in the best interests of County Engineers to follow the lead of those like Lynn Olson from Minnesota. Olson holds public information meetings at least once a year to let the public know what is going on in Alexandria County. He says in this way residents of the county feel they have input and he [Olson] has the opportunity to explain the strateg[ies] he uses to prioritize projects.

Tort liability issues are a problem in attracting people. Most County Engineers report this is both an existing problem and one which is likely to increase in severity as time goes on. It is an issue that, in fact, is one of the key factors that would discourage many County Engineers in the current generation from considering the same career choice again. Some suggest it is also an issue that could be a discouraging factor for those considering public sector service. One person commented that County Engineers perhaps lean on the negatives of the liability issue to an extreme. He noted that with firmer design standards, tort liability should not be perceived as a key frustration for County Engineers. At the same time, however, as it was noted earlier in this report, others comment that liability issues are persistent, can be expected to increase over time, and will not be limited to design issues. Traffic sign theft and vandalism which can increase liability risks in counties, roads which have been"posted" because of budget constraints, environmental regulations, and even management and labor relations will become more challenging to coordinate as County Engineers organize their work forces with a sensitivity to disadvantaged classes, gender relations, and alcohol and drug use in the work place. Selling a new generation of County Engineers on the challenges of these aspects of the job will require close relationships with the technical schools, colleges, and universities that prepare people for the profession [and offer continuing education opportunities].

Both state and national conferences sponsored for County Engineers serve as clearinghouses of information on state and federal regulations. Nonetheless, many report it is difficult to remain current because it seems the rules change almost weekly.

At the same time, however, active state/national associations that offer information on liability and safety issues make the job of the County Engineer manageable.

The strength of state associations. *State organizations* present invaluable opportunities for professional development for County Engineers. These opportunities should be well-publicized and should also be perceived as strong selling points for the profession. This researcher has attended conferences in all of the states participating in this research. In each state, annual meetings either had professional development session[s] or meetings were specifically designed for professional development [i.e., Washington State's WSACE/PWD *meeting/retreat* held in May of each year]. So long as opportunities such as these are offered, prospective County Engineers can be informed they will not be entering a profession that has a proverbial "glass ceiling" regarding professional development opportunities.

County Engineers may not be earning six-figure salaries, but as it has been noted in this report, there are more important things determining job satisfaction than salary alone [See **Box 2:** *Why Be a County Engineer?* **and Box 5:** Significant Contributions to the County]. These positive aspects of the job need to be relayed to students learning about the profession and to applicants applying for positions. In some areas of the nation, particularly small rural counties, there will always be problems surrounding levels of compensation and opportunities for spouses. At the same time, however, it is suggested that the target for jobs need not be young graduate engineers. Rather, it might be persons who have already amassed 15-20 years of experience in other types of positions from managerial or other positions within the private sector or with a State Department of Transportation.

Boards need to become more sensitive to the importance of County Engineers' attendance at professional meetings. The County Engineers themselves must assume responsibility for pointing out to their Boards the savings counties can/may realize when the former are able to be involved in conferences offered by state/national associations. [See pages 60a - 60h, **Figures 9-16** for savings by state]. County Engineers can enhance their Boards' awareness of the investment that flows from professional involvement and activities [i.e., remaining current on safety issues, state and federal regulations, and sharing ideas with County Engineers from other counties and other states].

Even though their profession is expected to change dramatically over the next few years, County Engineers recognize that not all of their departments will have the staff or the money to establish and conduct training programs designed to upgrade their skills. When opportunities arise where they and their staff can attend "association sponsored" conferences that may realize a savings and not solely a cost to the county, they must relate to their Board the benefits of these activities.

Budgets are so restrictive that it is difficult to meet the challenges of the job. On the contrary, meeting a budget appears for some to be the most challenging aspect of the job. While it is frustrating to realize that many County Engineers are forced to work on short-range planning strategies because of a "patch-and-go" philosophy held by the Board, many view this as just another challenge to be met. More important than budget constraints, comments were aimed at the need to educate the Board on the job the County Engineer does so that the salary levels can increase. The issue then becomes, "Who should educate the Boards?" County Engineers say they engage in this

process at each meeting held with their Boards. An additional mechanism for continuing education for Boards would involve more interaction between Boards and County Engineers at professional conferences, rather than meetings held separately for the two groups, which is often the case. Should the ultimate objective of such meetings be to examine strategies to improve service to the county, it might well be met positively.

The Board offers no long-term contract and, therefore, no job security. The County Engineer thus serves at the pleasure of the Board. Even though the majority of County Engineers has been on the job only between one and ten years, most reported they were somewhat to very secure in their perceptions of job security. While a small number were not disposed to perceive job security, this factor did not seem to be one that would discourage them from seeking the same career choice again. Perhaps job security in part stems from the effort these professionals expend on the job. Many note working an average of 49 hours per week to a maximum of 60 hours per week. Their reasons for doing so are varied, including early morning and evening meetings, quiet time to get caught up on quality work, administrative tasks, general county obligations, and the fact that their profession demands more than a 40-hour a week job.

It was of interest that even though many County Engineers "serve at the pleasure of the Board" and can be released with no more than 30-60 days notice, perceptions of job security were not significantly affected. For others, a yearly contract placed them in a somewhat tenuous position, particularly when they made recommendations to their Board to which it was, for some reason, resistant. In more than one instance it was noted that a County Engineer had lost his job because he had fallen out of favor with the Board. Yet nearly all respondents noted they had a good to excellent relationship

with their Boards and that the Boards recognize their contributions to the county. Again, however, the new generation of professionals coming into the positions may demand more than the types of contracts their predecessors have taken for granted for many years. One County Engineer from Michigan, for example, noted that it would be prudent for the Commission to offer at least a 4-5 year contract for new people coming in, as an incentive for job security.

Requirements for the job are too rigid. Many County Engineers in states where the P.E. license is required are concerned that if shortages become the norm, Boards will begin to move toward redefining the state statutes specifying job requirements [See page 8 for discussion of Minnesota's Code on job requirements]. As it was reported earlier in this analysis, a majority of County Engineers argue that the P.E. or at the very least some certification criteria are needed for anyone to adequately fill the position of County Engineer [whether the state requires the P.E. or not.].

In conclusion, the factors that are likely to keep the current generation in this career path and those likely to draw in a new generation remain as follows:

- the diversity of the position;
- being your own "boss";
- County Engineers can hold to high ethical standards;
- great personal rewards and even greater professional rewards;
- working on a project from inception, through design, to construction, and maintenance;
- the public service aspect of the position;
- the opportunity to apply investment in training and or education to the job; and

- providing a safe road network [even though one County Engineer pointed out that the concept "safe road" is oxymoronic, it is an issue that many County Engineers have raised].

If the shortages of qualified County Engineers are to be averted, it is suggested that both the state associations and NACE are going to have to become more involved in increasing the visibility of the profession [See **Box 13** for some suggestions on increasing the visibility of the profession]. Those who know the profession the best are the most well-situated to relate its advantages, benefits, and challenges to the coming generation. Each state's involvement in the perpetuation and integrity of the profession is an investment in the future of that profession.

The responses from a majority of County Engineers led to the conclusion that scholarships do not encourage students to consider becoming E.I.T.s in a County Engineer's office [See pages 63-69 and **Boxes 10-12** for discussion of costs and benefits of scholarships]. Nor are scholarships necessarily reserved for students who express an interest in County Engineering. "The scholarships to the four-year universities have only been "earmarked" for Civil Engineering. No interest in County Engineering is a requirement for applicants." As it was reported in **Box 10**, by one Iowa County Engineer, "To date, our work with universities both through the grant fund and lecture groups like the ASCE Student Chapter have yielded no candidates for County Engineering position."

Rather than offering scholarships, it is suggested that state associations could offer research paper competitions for engineering and technical school students to examine issues of concern to the County Engineering community. Students could be challenged to participate in a paper competition on topics that would be designated by

state associations [and which would reflect concerns relevant to particular states]. Students from each "region" within the state could engage in competition, with one student from each region selected to attend the state association's annual conference to present his/her research. The top paper from each state could be sent to a committee to determine a regional winner. Five regional winners [e.g. one each from the Southwest, Southeast, Northwest, Northeast, and the Midwest] could be chosen to present their papers at a special session at the NACE conference.

At each level, the award should carry an award of travel and expenses to the conferences and an honorarium to be determined by and paid by the state association. The five regional winners of the competition could receive a travel and expenses paid trip to the NACE meeting to present the results of their work [to be paid by NACE]. This strategy would [1] provide an opportunity for young people to interact with County Engineers from across the nation [give exposure to the profession (if the media could be informed), and [3] expose students at both technical schools and universities to the importance of issues facing County Engineers.

This type of hands-on contact with County Engineers could conceivably do much more to inform students of the benefits, dynamics, and professional opportunities presented by County Engineering than "the lecture" from the County Engineer who comes into the classroom to talk about the merits of the profession during the student's sophomore year in college. Again, rather than a cost, this could be viewed as a long-term investment in the counties' infrastructure. While the benefits of such a strategy would not be immediately realized, in the long term, the visibility to the profession would increase. This strategy, in addition, to the profession's involvement in job fairs and

career days, and continued hiring of E.I.T.s and assistants would be a positive step in the direction of a proactive remedy for projected shortages of County Engineers.

Conclusion

This research, in part, has sought to clarify the value of the contributions made by the County Engineering community. Ironically, this value appears, in large part, to be intricately related to the issue of salary structures. Whether this means that all states should opt for a statute requiring the P.E. is not for this research to recommend. It must be remembered that different states assign different types of responsibilities for their County Engineers.

It will become increasingly important for County Engineers and their Boards to work together to identify and clarify the value of contributions made by the former and in a sense quantify the worth of these contributions. This will be an important issue for dialogue and for research as so many of the current generation ready themselves for retirement.

APPENDIX A

COVER LETTERS
AND
QUESTIONNAIRES FROM PHASES ONE AND TWO

PHASE ONE
COVER LETTER AND QUESTIONNAIRE

May 5, 1992

FN~ MN~ LN~ TL~
CO~
AD~
CT~, ST~ ZC~

Dear Mr. LN2~:

The primary purpose of the enclosed questionnaire is to gather information needed to encourage professionals to consider public sector service as county engineers, road and highway superintendents, engineering managers, and public works directors. In this first phase of a two year project, you and your counterparts in eight states including Iowa, Minnesota, Nebraska, Michigan, Missouri, Kansas, Washington, and Ohio are being asked to participate in an effort designed to assess the valued contributions you make to your respective counties. Drawing on information you provide through this questionnaire, strategies will be developed to continue encouraging qualified persons to consider the challenges of your profession. This is an important issue in Iowa and was initiated by the Highway Research Advisory Board at the Iowa Department of Transportation. Interest has since grown to national proportions, and the project has been endorsed by the ***National Association of County Engineers*** [NACE].

As we move toward the twenty-first century, in an era of declining resources, it is likely that many of you will find [or have already found] yourselves working with less flexible budgets for the construction and maintenance of roads and bridges. That coupled with growing demands from your constituents presents you with many unique challenges that require ever increasing levels of expertise in prioritizing resource allocations. Information provided by each of you will provide critical information needed to understand the reasons why you and other professionals have been drawn to or discouraged from entering the profession.

I have talked with more than 70 of your colleagues [5-12 people in each of the participating states] over a period of more than eight months in an effort to identify the issues that are most relevant **to you** as public sector professionals. Your backgrounds and responsibilities are varied and challenging. I have sensed a fierce pride in your profession in each person with whom I have spoken, a pride that extends beyond the schedule of "duties" you perform each day. The enclosed questionnaire reflects your challenges and concerns, as well as your dedication to public service and enjoyment of the variety of work you perform each day.

In all honesty the questionnaire also reflects a need to understand your frustrations and your visions for future generations of professionals in your positions.

I am asking that you go above and beyond the call of duty in responding to the questions enclosed. Your colleagues have suggested that each one is critical to a clear understanding of your profession. Responses from each of you are important so that a sampling of the different county systems in each of the eight states can be fairly and equally represented. It is also important because little information has as yet been compiled on either of the many and varied responsibilities or of the challenges you undoubtedly face on a day-to-day basis.

If you are interested in receiving a summary analysis of the research, please contact me at the address or telephone indicated below.

Sincerely and respectfully,

Kathleen M. Waggoner
Interdisciplinary Research Associate

College of Engineering
Department of Civil and Construction Engineering
380 Town Engineering
Iowa State University
Ames, IA 50011

Office: (515) 294-2872
FAX: (515) 294-8216

THIS PROJECT HAS BEEN ENDORSED BY THE NATIONAL ASSOCIATION OF COUNTY ENGINEERS [NACE].

The Value of County Engineers and their Counterparts
Strategies to Expand the Shrinking Employment Pool

THIS RESEARCH HAS BEEN ENDORSED BY
NACE
[NATIONAL ASSOCIATION OF COUNTY ENGINEERS]

Please respond to the following questions as accurately as you can. Circle the letter of each response where requested. Where comments are requested, you may use as much room as you need. Feel free to add typed or hand written additions if you need more space. Each of the questions was designed from comments provided by your colleagues. If you feel additional comments are necessary, please feel free to use the blank sheet at the end of the questionnaire.

GENERAL

1. What is your state?
   a. Iowa
   b. Minnesota
   c. Nebraska
   d. Missouri
   e. Washington
   f. Ohio
   g. Michigan
   h. Kansas

2. What is your job title?
   a. Road Superintendent
   b. Highway Superintendent
   c. County Engineer
   d. County Engineer, P.E.
   e. Public Works Director
   f. Engineering Manager
   g. Other [Please Specify] _____

3. What are the statutory requirements/qualifications needed for the job you do?
   a. Sit for written examination [e.g., Highway Superintendent License].
   b. B.S. degree in Civil Engineering/Engineering Science and registered professional engineer's license [e.g., P.E.]
   c. There are no statutory requirements
   d. Other [Please specify]_____

4. What are the educational requirements/qualifications that would be needed by someone assuming responsibility for the job you do?
   a. high school degree
   b. 2 year technical school or junior college degree
   c. 4 year college/university B.S. degree in Civil Engineering/Engineering Science
   d. Other [Please specify]

5. How long have you been in charge of the secondary road system for your county?
   _____

6. What is your age range?
   a. 25-35 years
   b. 36-45 years
   c. 46-55 years
   d. 56-60 years
   e. reaching retirement quickly

ABOUT YOUR COUNTY

7. What is the population of your county? _____

8. Do you have intergovernmental agreements to help maintain roads for the special districts or townships [e.g. special districts, townships, small cities]? **Circle all that apply.**
   a. townships
   b. small cities
   c. special districts

ABOUT YOUR RESPONSIBILITIES -CURRENT AND PROJECTED

9. Break down by **percentages** the amount of time spent on each of the following responsibilities.
   a. *Engineering Administrative tasks* _____
   b. Other Administrative tasks _____
   c. Personnel matters _____
   d. Legal/statutory updates to control tort liability in the county. _____
   e. Salesman/Educator for the Board and the public _____
   f. Public works including sanitary landfill, wetlands issues, natural preservation.
   g. Financial/Budget issues/Planning _____
   h. Working with local units of government _____
   i. Other [Please specify] _____

10. What positions did you hold prior to assuming responsibilities as the person in charge of county roads? **Please circle all that apply.**
   a. assistant county engineer/county engineer in another county
   b. public works position/worked for state Department of Transportation
   c. private sector [Please specify] _____
   d. Other [Please specify] _____

11. What is the highest level of education you have attained?
   a. High school
   b. 2 year technical school
   c. 4 year degree in civil engineering
   d. 4 year degree in engineering science
   e. Other [Please Specify] _____

12. Do you have a written contract with the county?
   a. yes
   b. no

13. If your contract with the county is written, how would you classify it? **If your response is some combination of the following, please circle all that apply.**
    a. I serve at the pleasure of the Board/Commission
    b. The Board/Commission can terminate me with 30/60 days notice.
    c. I have a yearly contract
    d. I have a 3/4 year contract
    e. I am elected for a 2/3/4 year term.
    f. Other [Please specify] _____

14. If you **do not** have a written contract with the county, how would you classify your contract? **If your response is some combination of the following, please circle all that apply.**
    a. My agreement with the Board/Commission is oral.
    b. My agreement with the Board/Commission is written into the minutes of the meeting once a year.
    c. The Board/Commission can terminate me with 30/60 days notice.
    d. I have an oral contract that runs 1/2/3/4 years
    e. I am elected for a 2/3/4 year term. My contract/agreement is to serve the public, not the Board/Commission/Council.
    f. Other [Please Specify] _____

15. On an average, how many hours per week do you work? _____

16. If you work more than 40 hours per week, what drives the additional time spent on the job? **If your response is some combination of the following, please circle all that apply.**
    a. meetings with the Board/Commission held in the evenings.
    b. early morning meetings with my maintenance superintendent/road crew
    c. other county obligations, including development plans, meetings with advisory groups or community organizations such as Rotary Club, Lions, Jaycees, or other community based organizations.
    d. It is more than a 40 hour per week job.
    e. Quiet time I spend to get caught up
    f. Keeping up with administrative tasks
    g. Other [Please Specify] _____

17. As the person in charge of county roads, do you have hiring/firing power?
    a. yes
    b. no

18. For how many counties are you responsible? _____

YOUR ROAD SYSTEM, ITS CONDITION, AND THE BUDGET

19. What are the total dollar amounts annually allocated to each of the following?

	MAINTENANCE	CONSTRUCTION
ROADS		
BRIDGES		
TOTAL		

20. How many miles of each of the following types of roads do you maintain for your county.

Please rank the average range of the quality of the roads in your county using the following scale:

Excellent = 11-9 Good = 8-6 Fair = 5-3 Poor = 2-1

Type of Road	Number of Miles	Ranking
Dirt [minimum maintenance]		
Gravel		
Treated [e.g., seal coat]		
Asphalt		
Concrete		
Other		

Please enter number of miles and ranking for each type of road in your county.

21. Using the ranking scale in question 20, overall, how would you rate the condition of the roads in your county? _____

22. How many bridges [legal structures] are there in your county? _____

23. Using the ranking scale in question 20, how would you rate the general condition of bridges [legal structures] in your county? _____

BOARD OF SUPERVISORS/COUNTY ROAD COMMISSION/EXECUTIVE COUNCIL/EQUIVALENT

24. How does your contract with your Board/Commission affect your perception of job security?
    a. I feel very secure
    b. I feel somewhat secure
    c. I feel somewhat insecure
    d. I feel very insecure

25. How many times per month do you meet with your Board/Commission/Council?
    _____

26. How many people serve on your Board/Commission? _____

27. Are your Board/Commission/Council members elected or appointed?
    a. elected
    b. appointed

28. If your Board/Commission Council members are elected, what is their term of office?
    a. 2 years
    b. 3 years
    c. 4 years
    d. more than 4 years

29. If your Board/Commission/Council members are elected, are they elected by district or at large?
   a. by district
   b. at large

30. If your Board/Commission/Council members are elected, is there a turnover in persons who sit on your Board/Commission
   a. every election
   b. every other election
   c. there is a lot of stability in my Board/Commission/Council because elections are staggered.

31. Are there times when the Board/Commission/Council has not taken your recommendations in setting policy?
   a. The Board/Commission nearly always takes my recommendations
   b. The Board/Commission frequently takes my recommendations
   c. The Board/Commission sometimes takes my recommendations
   d. It seems as if the Board/Commission rarely takes my recommendations.

32. For which of the following reasons has the Board/Commission declined to take your recommendations?
   a. Political reasons
   b. My recommendation was inadequately supported with technical data
   c. To satisfy a friend's request.
   d. The Board/Commission did not understand the technical importance of the recommendation.

33. Using a scale of Excellent = 4, Good = 3, Fair = 2, and Poor = 1, how would you rate your relationship with your Board/Commission? _____

PUBLIC RELATIONS

34. When members of the public wants something done or want to provide information about the roads/bridges in the county, they are most likely to contact one of the following. **Rank order those to whom the public will most likely contact first. Use the scale: 1 = most likely to 8 = least likely**
   _____ a. Come directly to me because I am the one who is responsible to get the job done.
   _____ b. Go directly to the Board/Commission and bypass me.
   _____ c. Talk to one of my employees
   _____ d. Talk to the County Attorney
   _____ e. Leave a message with my secretary
   _____ g. Talk to one of my technicians
   _____ h. Talk to my foreman
   _____ i. Other [Please Specify] _____

35. What types of calls are most commonly received from the public? Rank order the following in terms of which is the most common type of call received from the public.
1 = most common to 7 = least common

_____ a. pot holes
_____ b. road needs paving, resurfacing
_____ c. haven't plowed snow fast enough to suit them
_____ d. ditch cleaning [summer]
_____ e. gravel road problems, e.g., roughness and dust
_____ f. culvert repair
_____ e. Other [Please Specify]
_____

36. How much of your time is spent in public relations?
a. less than 5%
b. 5-10%
c. 15-25%
d. 25-50%
e. A majority of my time is spent in public relations. My job is one of selling.

OFFICE-STAFF NEEDS

37. *What are the size and composition of your staff?* Feel free to alter category names to fit the titles given to your staff members. These differ by state.

Office Staff	Normal Size Staff	Additional Summer Staff
Secretarial		
Cleric		
Technician		
Co-op/Intern Student		
Engineer in Training		
Professional Engineer		
Professional Land Surveyor		
Department Head		
Other		
Shop/Field Staff		
Mechanics		
Maintenance Superintendent		
Foreman		
Operators		
Labor		
Other		

Please enter the number of staff persons for each category listed above.

38. Do you have an assistant?
a. yes
b. no

39. **Answer this question only if you have an assistant.** Is this person
   a. An Engineer in Training
   b. a technician
   c. a student intern
   d. a co-op student
   e. Other [Please Specify] _____

40. **Answer this question only if you do not have an assistant.** Why do you not have an assistant?
   a. My budget does not allow for an assistant.
   b. I don't need an assistant
   c. There are no people in the area whom I could hire.
   d. Other [Please Specify] _____

41. **Whether you do or do not have an assistant,** if you had your choice, what type of assistant would you want/require? **Rank order your preferences using the following scale: 1 = highest preference 10 = lowest preference**
   _____ a. An Engineer in Training with a B.S. in Civil Engineering
   _____ b. An Assistant County Engineer with a P.E.
   _____ c. A technician with a 2 year degree in Engineering Science
   _____ d. An Engineering Manager
   _____ e. a student intern from the university
   _____ f. a student intern from a junior college
   _____ g. a student intern from the local high school
   _____ h. a co-op student from the university
   _____ i. a co-op student from the junior college
   _____ j. I neither want nor need an assistant

Describe your reason[s] for wanting/needing the type of assistance you have described above.

STATUS RECOGNITION - EDUCATION - PROBLEM SOLVING

42. In your opinion, do you receive the status recognition you deserve for someone with so many diverse and critical responsibilities? **Please circle all those that apply.**
   a. The Board/Commission recognizes the contributions I make.
   b. My employees recognize the contributions I make.
   c. The public recognizes the contributions I make.
   d. It seems to be a rare occasion that someone recognizes the contributions I make.
   e. Please make any additional comments needed

_____

_____

_____

43. What kind of educational experiences will successors to retiring persons in your position need to successfully take care of the secondary road system in your county. **Please circle all that apply.**

a. A high school education is sufficient so long as these persons rise through the ranks. That is the only way they can get the experience needed to do this job.
b. Sit for the written examination the state requires for the job.
c. An engineering science degree from a technical school or junior college.
d. B.S. degree in Civil Engineering
e. B.S. degree in Civil Engineering and a registered professional engineer's license.
f. *Other [Please Specify]* _____

44. What kinds of work experiences will someone need in order to consider doing the type of job you currently have? **Please circle all that apply.**

a. assistant to the public works director/county engineer/road/highway superintendent.
b. private sector work in engineering
c. private sector work in management
d. private sector work in engineering management
e. work in the public sector such as State Department of Transportation
f. a position as an Engineer in Training
g. a person must rise through the ranks in order to one day assume the *responsibilities* I currently have.
h. internship/co-op experiences
i. Other [Please Specify] _____

45. What can you do to encourage young people to consider jobs similar to yours? **Please circle all that apply.**

a. Offer summer job experience
b. Offer internship experience
c. Offer co-op experience
d. Demonstrate the county is going to grow in the future.
e. Encourage students to complete college to prepare for this type of position.
f. There is nothing I can do. It is out of my hands.
g. Participate in job fairs/career days in high schools/colleges/universities.

CONSULTANTS

46. Does your office use the services of consultants?

a. yes
b. no

47. **Answer this question only if you hire consultants.** When do you hire the services of consultants?

a. when there is no time to complete the work in-house
b. when needed expertise is unavailable in-house.
c. Other [Please Specify] _____

_____
_____
_____
_____

48. **Answer this question** <u>only if you hire consultants</u>. For which of the following reasons are consultants used? <u>Please circle as many answers as apply</u>.
   a. Bridge design
   b. Bridge inspection
   c. Road design
   d. Road construction
   e. Environmental assessments
   f. Surveying
   g. Public works related projects such as sanitary landfills
   h. For professional development seminars
   i. Other [Please Specify] _____

49. **Answer this question** <u>only if you hire consultants</u>. When you use consulting services, do you
   a. use competitive bidding where the lowest bidder is awarded the contract.
   b. use requests for proposals and negotiate the final price on the contract.
   c. call those with whom you are already familiar.

50. **Answer this question** <u>only if you do not use consultants</u>. If you do not hire consultants, is it because
   a. my office has all the engineering design staff needed to complete work in-house.
   b. my budget will not allow for hiring consultants.
   c. Other [Please Specify] _____

_____

DECISION MAKING

51. Which of the following do you consider in carrying out your responsibilities? **Please circle as many as apply.**
   a. Look for additional funds to improve the economic situation in the county.
   b. Patch and go [short term damage control; little if any room for creativity because of budget constraints].
   c. Patch and go because the Board/Commission is so political.
   d. Patch and go because I am resigned to dealing with a Board/Commission that is not progressive.
   e. Use public opinion and advisory groups because of need to stay in touch with the public.
   f. Explain and present projects to the public.
   g. Encourage county growth by promoting new road construction. to Board/Commission.
   h. Present long range plans [10-20 year plan] looking at future change and growth of the county.
   i. Collaboration with other agencies and intergovernmental units such as small cities, townships, and special districts.
   j. Educating/updating the Board/Commission is a continuing process.
   k. A lot of my job involves dealing with the political nature of my Board/Commission.
   l. The Board/Commission and I negotiate prior to making decisions so that each of us clearly understands the reasons for projects and the way in which they are ranked.
   m. Other [Please Specify]

_____

_____

52. What types of analytical tools do you use in managing your road network? **Please circle all that apply.**
   a. pavement management system
   b. bridge prioritization program
   c. sign management system
   d. equipment management program
   e. electronic bulletin board
   f. computer aids including
      i. AUTOCAD/ROADCALC/CAD
      ii. spreadsheets
      iii. word processors
      iv. data bases
      v. Other [Please Specify] _____

TORT LIABILITY

53. Is tort liability currently a problem in your county?
   a. yes
   b. no

54. Do you project that tort liability issues will become a problem in your county in the future?
   a. yes
   b. no

55. What are some of the causes and concerns you have regarding current and projected tort liability issues in your county? **Circle all that apply.**
   a. vegetation that reduces sight distance
   b. shoulder drops
   c. narrow shoulders
   d. roadside obstacles
   e. signs and markings [sign vandalism is a problem in my county]
   f. *signs and markings* [the cost of replacing aging and damaged signs makes it difficult to maintain them in the safest way possible]
   g. *low road friction* [skid problems in wet and icy weather]
   h. low maintenance on pot holes
   i. alcohol related accidents
   j. Other [Please Specify] _____

56. How many times during an average year do you act as a witness for your county in court in tort liability lawsuits? _____

57. How many times during an average year do you act as an expert witness for another county in tort liability lawsuits? _____

YOUR RELATIONSHIP WITH YOUR STATE DEPARTMENT OF TRANSPORTATION

58. How would you rate your relationship with your state Department of Transportation?
    a. Excellent
    b. Good
    c. Fair
    d. Poor

59. How would you rate your relationship with your state-aid-engineers or their equivalents?
    a. Excellent
    b. Good
    c. Fair
    d. Poor

60. How would you define your relationship with your state DOT?
    a. The DOT is a partner providing engineering/technical consulting and assistance
    b. The DOT is a partner providing legal consulting and assistance
    c. Other [Please Specify] _____
    _____

DUAL COUNTY RESPONSIBILITIES

61. What is your opinion on one person being in charge of two or more counties?
    a. I am indifferent
    b. I don't like the idea
    c. I like the idea
    d. Other [Please specify] _____

62. **Answer this question only if you like the idea of one person in charge of two or more counties.** Which of the following expresses your reasons? Circle all that apply.
    a. It would increase the salary of the position
    b. It would increase the status of the position
    c. It would be similar to a promotion
    d. Counties that cannot pay competitive salaries would benefit because they share the expenses.
    e. It would help to coordinate resources between counties.
    f. Other [Please Specify] _____

63. **Answer this question** <u>only if you do not like the idea</u> **of one person in charge of two or more counties.** Which of the following expresses your reasons? <u>Circle all that apply</u>.
   a. It would double the number of problems [e.g., two offices, two motor graders, two staffs, two Boards/Commissions]
   b. It would increase responsibilities too much for one person.
   c. It would reduce the effectiveness of operation in each county because the person's time would be split between two or more counties.
   d. it would increase competition for the services of the person.
   e. If the Boards/Commissions are political, the problems would be compounded.

ON ELECTED COUNTY ENGINEERS

64. What is your opinion on the elected county engineer?
   a. I like the idea
   b. I don't like the idea
   c. I am indifferent
   d. Other [Please specify] _____

Regardless of your opinion on elections of county engineers, please comment on your response.

MAINTAINING AN ADEQUATE SUPPLY OF QUALIFIED PERSONNEL

65. Are there **currently** shortages **in your state** of qualified persons to fill spots left by those retiring from positions such as the one you hold in your county?
   a. yes
   b. no

66. Are there **projected** shortages **in your state** of qualified persons to fill spots left by those retiring from positions such as the one you hold in your county?
   a. yes
   b. no

67. If there are current or projected shortages, how do you anticipate they will be addressed?

68. If there are no current shortages of people to fill positions left open by retirees in your state, to what do you attribute your success?
   a. Salaries are competitive
   b. Job offers challenges
   c. Other [Please Specify]

   _____
   _____
   _____
   _____

69. How would you describe your most significant contributions to the county? These may be described in terms of dollars saved or public relations, or any other contributions you feel have made the job challenging, exciting, and satisfying.

70. How important is salary as a factor drawing new people into positions like the one you now hold?
   a. Very important
   b. Somewhat important
   c. Somewhat unimportant
   d. Very unimportant

71. What are some of the factors other than salary that drew you to the position you hold? Please be specific. Our analysis of your responses to this question would be incomplete without your input on this issue.

72. If you had your career choice to make all over again, what are some of the factors that would discourage you from doing the job you are currently doing?

a. Salary
b. Public complaints
c. The political hassles
d. Environmental regulations
e. Tort liability issues
f. I would make the same choice.
g. Other [Please specify]

_____

_____

_____

_____

THANK YOU FOR YOUR PARTICIPATION IN THIS RESEARCH. The time you have taken to respond to these many and varied questions is much appreciated. IF YOU WOULD BE INTERESTED IN RECEIVING A SUMMARY ANALYSIS OF THIS RESEARCH, PLEASE INCLUDE YOUR NAME AND ADDRESS. If you will be attending the NACE meeting in 1993, I will be presenting the results of the research there. Again, if you have additional comments you wish to make, please use the blank sheet of paper attached.

Sincerely,

Kathleen M. Waggoner

PHASE TWO
COVER LETTER AND QUESTIONNAIRE

May 5, 1992

Dear Mr. :

Once again I am asking for your help in responding to a questionnaire asking about your profession. Its primary purpose is to gather information about your state's involvement in making the profession of county engineering more visible and attractive as a career option. In this second phase of a two year project, you and your counterparts in nine states including Iowa, Minnesota, Nebraska, Michigan, Missouri, Kansas, South Dakota, Washington, and Ohio are being asked to participate in an effort designed to assess the activities your regional and state associations are involved in and to gain additional insights into your own perceptions of your profession. Drawing on information you provide through this study, strategies will be developed to continue encouraging qualified persons to consider the challenges faced by county engineers, road and highway superintendents, engineering managers, and public works directors. This is becoming an increasingly important issue in Iowa and was initiated by the Highway Research Advisory Board at the Iowa Department of Transportation. As many of you know, interest in this research has since grown to national proportions, and the project continues to be endorsed by the ***National Association of County Engineers*** [NACE].

Over the past year I have attended meetings of county engineers in Washington state, South Dakota, Iowa, Ohio, and the NACE meeting in February of this year. During those meetings I spent time talking with approximately 65 of your colleagues in the states participating in this research. The objective has been to get a better understanding of what motivates you to stay in the profession and what selling points you have that can be used to draw new people in to replace those of you who are reaching retirement age.

Just as your backgrounds and responsibilities are varied and challenging, so are your reasons for staying in the profession. I continue to sense a fierce pride in the profession from everyone with whom I have spoken, a pride that extends beyond the schedule of "duties" you perform each day. Unlike the first phase of this research which was designed to provide a better understanding of your profession in general, this phase is specifically aimed at identifying the selling points you would deem critical to draw new people in.

Unlike the first questionnaire which was rather lengthy, this one is mercifully short. I ask that you take the time to fill it out and return it to me within a week to ten days. The interim report from the first phase of the research was submitted to the Iowa Department of Transportation in September of 1992. It is available to any of you who would like a copy. All you need to do is to indicate that you would like to have it and provide me with a name and mailing address. When the final report is completed, I would be pleased to provide you with that as well. Just make an indication to that effect on the last page of the questionnarie in the space noted.

Thank you so much for your participation in this study. T he last two years have been exciting and challenging for me as a researcher and as one who has met so many people who feel strongly about the public service aspect of the job you do. Whether you were able to find the time

to complete the questionnaire for the first phase of the reseach or not, I would encourage you to fill out the one that is enclosed. If I can be of any service in answering questions you may have, please feel free to contact me. If there are issues that you feel are important to your profession, but which I have omitted, please feel free to add your perspective on the attached page. Your insights will be critical as we work to analyze the data we will receive.

Sincerely and respectfully,

Kathleen M. Waggoner
Interdisciplinary Research Associate

May 18, 1993

Dear :

HELLO AGAIN! I hate to keep imposing on your already busy schedules, but this is a second mailing asking you to fill out a questionnaire to assist me in completing the second phase of this project on County Engineers. Nearly 200 of your colleagues in the nine states participating in the research have responded so far. **In Ohio, 22 out of 46 [48%] of your colleagues had already responded as of May 17.** I am betting the response rate from your state this time will reach 90%, but I cannot do it without your help. With a high response rate, we can work together to provide some critical evaluations about how to begin attracting a new generation of County Engineers into this important, but not always highly visible, profession. Just in case you have misplaced the first letter that was sent, the remainder of this letter will contain all of the information included in the first one.

In this second phase of a two year project, you and your counterparts in nine states[1] are being asked to participate in an effort designed to assess the activities your regional and state associations are involved in and to gain additional insights into your own perceptions of your profession. Drawing on information you provide through this study, strategies will be developed to continue encouraging qualified persons to consider the challenges faced by county engineers, road and highway superintendents, engineering managers, and public works directors. This is becoming an increasingly important issue in Iowa and was initiated by the Highway Research Advisory Board at the Iowa Department of Transportation. As many of you know, interest in this research has since grown to national proportions, and the project continues to be endorsed by the ***National Association of County Engineers*** [NACE].

I am hoping you remember about this time last year you received a questionnaire in the mail asking you to provide information about county engineers and their counterparts as professionals. Your response rate was overwhelming. I am please to say that 61% of you responded to a lengthy and involved questionnaire. After receiving your comments about the demands of your positions, I understand why those of you who did not respond perhaps simply did not have the time. Nonetheless, I am, if nothing else, persistent. Here is a second request. This time I am asking for your help in responding to questions about you and about your state's involvement in making the profession of county engineering more visible and attractive as a career option.

Over the two years of the project, I have spoken at meetings of county engineers in Kansas, Minnesota, Michigan, Washington state, South Dakota, Iowa, Ohio, and two NACE meetings. During those meetings and including one on one interviews my research assistants and I spent time talking with approximately 125 of you and your colleagues. The objective has been to

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1 Participating states include Iowa, Minnesota, Nebraska, Michigan, Missouri, Kansas, South Dakota, Washington, and Ohio.

get a better understanding of what drew you to the profession, what motivated you to stay in the profession, and what selling points you have that can be used to draw new people into the profession to replace those of you who are reaching retirement age and moving on to new challenges.

Just as your backgrounds and responsibilities are varied and challenging, so are your reasons for staying in the profession. I continue to sense a fierce pride in the profession from everyone with whom I have spoken, a pride that extends beyond the schedule of the "duties" you perform each day. Unlike the first phase of this research, which was designed to provide a better understanding of your profession in general, this phase is specifically aimed at identifying the selling points you would deem critical to draw new people in. Unlike the first questionnaire, which was rather lengthy, this one is also "relatively" short in comparison. I ask that you take the time to fill it out and return it to me within a week to ten days.

Thank you so much for your participation in this study. The last two years have been exciting and challenging for me as a researcher. A a professional, I am pleased to have met so many people who feel so strongly about the public service aspect of the job they do. Whether you were able to find the time to complete the questionnaire for the first phase of the research or not, I would encourage you to fill out the one that is enclosed. If I can be of any service in answering questions that you may have, please feel free to contact me. If there are issues that you feel are important to your profession, but which I have omitted, please feel free to add your perspective on the attached page. Your insights will be critical as we work to analyze the data we will receive.

Please note that the questionnaire is double-sided. The interim report from the first phase of the research was submitted to the Iowa DOT in September of 1992. It is available to any of you would like a copy. All you need to do is to indicate that you would like to have it and provide me with a name and mailing address. There is a space for this purpose on the last page of the questionnaire. When the final report is completed, I would be pleased to provide you with that as well. Just make an indication to that effect on the last page of the questionnaire in the space noted.

Sincerely and respectfully,

Kathleen M. Waggoner
Interdisciplinary Research Affiliate

Please respond to the following questions as honestly and candidly as you can.
In order to save space and reading time for you, whenever the term county engineer is used it should be interpreted as county engineer/road, highway superintendent/director of public works/other job title counterpart to the county engineer.

1. What is your state?

   a. Iowa
   b. Kansas
   c. Michigan
   d. Minnesota
   e. Missouri
   f. Nebraska
   g. Ohio
   h. South Dakota
   i. Washington

In the following areas, from your perspective, do county engineers have more, the same, or fewer opportunities than those with similar skills in the private sector. Use the following ranking scale --

Fewer opportunities [0-2]
About the same level of opportunities [3-5]
More opportunities [6-7]

2. Leadership development — 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7
   Fewer Opportunities — The Same — More Opportunities

3. Professional development — 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7
   Fewer Opportunities — The Same — More Opportunities

4. Diversity of work/projects — 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7
   Fewer Opportunities — The Same — More Opportunities

5. Salary increases — 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7
   Fewer Opportunities — The Same — More Opportunities

6. Professional contacts — 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7
   Fewer Opportunities — The Same — More Opportunities

7. Sense of contribution to the profession — 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7
   Fewer Opportunities — The Same — More Opportunities

8. Recognition of accomplishments — 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7
   Fewer Opportunities — The Same — More Opportunities

9. Problem solving skills relating to technical issues — 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7
   Fewer Opportunities — The Same — More Opportunities

10. Problem solving skills relating to personnel issues — 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7
    Fewer Opportunities — The Same — More Opportunities

11. Problem solving skills relating to management issues — 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7
Fewer Opportunities — The Same — More Opportunities

In the following areas, from your perspective, do county engineers gain more or less than engineers in the private sector.

12. On the job Benefits — 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7
More — Less

13. Salary Increases — 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7
More — Less

14. **From your perspective**, please list any other advantages that county engineering provides that the private sector might not.

Please indicate to what degree you have had opportunities to broaden your knowledge or skills in the following areas. Use the ranking scale provided –

Fewer opportunities [0-1]
About the same level of opportunities [3-5]
More opportunities [6-7]

15. Personnel management — 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7
Fewer Opportunities — The Same — More Opportunities

16. Technical/Engineering skills — 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7
Fewer Opportunities — The Same — More Opportunities

17. Financial management skills — 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7
Fewer Opportunities — The Same — More Opportunities

18. Public relations skills — 0 – 1 – 2 – 3 – 4 – 5 – 6 –7
Fewer Opportunities — The Same — More Opportunities

19. Does your state have an active association for its county engineers?

a. Yes
b. No

20. ***If you answered yes to question 18***, do you belong to your state association of county engineers?

a. Yes
b. No

21. Is there a regional association for county engineers in your state?

a. Yes
b. No

22. **If you answered yes to question 21**, do you belong to the regional association in your state?

a. Yes
b. No

23. Do the state/regional associations of county engineers design conferences to include opportunities to share information with the Road Commissioners Boards of Supervisors/Executive Councils/Other across the state/region?

a. Yes
b. No

24. How active are you in your state association of county road superintendents/highway superintendents/county engineers/Other?

a. Extremely active. I participate in a majority of the activities sponsored by the state association.
b. Somewhat active. I participate at a minimum in the annual meetings.
c. Somewhat inactive. I rarely attend meetings/conferences.
d. No active at all. I do not belong to any state associations for people in my profession.

25. Does your state/regional association offer scholarships to technical school/college/university students to interest them in county engineering?

a. Yes
b. No

26. **If your response to question 25 was yes**, how many scholarships does your state association offer each year? _____

27. **If your response to question 25 was yes**, have you found this type of involvement with technical schools, colleges, and universities to be a benefit as a recruitment strategy?

a. Yes
b. No

Please comment on your response to question 27.

28. Which of the following is your state association doing to recruit a new generation of county engineers? **Please circle all that apply.**

a. scholarships for college/university students
b. internships
c. participating in co-op programs with technical schools/colleges/universities
d. county engineers are speaking at high schools to make young people aware of the opportunities in county engineering.
e. county engineers are speaking at technical schools to make young people aware of the opportunities in county engineering.
f. county engineers are speaking at colleges/universities to make young people aware of the opportunities in county engineering.
g. Other [Please specify]

29. What are some of the other types of activities that your state association could or should be considering to make county engineering an attractive career option to the new generation?

30. What other suggestions do you have for recruiting?

31. Is your Board of Supervisors supportive of your need to attend meetings and conferences?

a. Very supportive. They provide funding each year so that I can attend the meetings because this is one way I can stay current on both technical issues and non technical issues.
b. Somewhat supportive. They sometimes provide funding, but only for about one meeting per year.
c. Somewhat unsupportive. The Board feels that the cost is too high because it is taxpayer money that would go to provide funding for such trips.
d. Very unsupportive. The Board has rarely agreed to provide funding for attending conferences because budgets are such a problem in my county.
e. Other [Please specify]

32. Can you recall instances where attending professional conferences has led to a savings for your county.

a. Yes
b. No

33. What types of savings have you realized for your county as a result of your involvement in regional, state, and/or national conferences?

a. equipment savings
b. materials savings
c. learned about liabilty issues that allowed preventive measures that save the county dollars.
d. alerted to legislative changes that saved the county money
e. gained understanding of personell issues
f. gained better understanding of working with restricted budgets [give county most for its dollar]
e. made contacts with consultants that saved the county dollars
f. made contacts that resulted in matching funds for projects for the county
g. Other [Please specify]

34. How would you rank your state association of county engineers, in terms of the degree to which it provides you with opportunities for professional development?

a. Outstanding
b. Excellent
c. Good
d. Fair
e. Poor

35. What are the advantages of belonging to your state association of county engineers? **Please circle all that apply.**

a. Opportunities to stay current on state legislation affecting counties
b. Opportunities to learn state of the art technology
c. Opportunities to learn of new equipment
d. Opportunities to meet with county engineers from other counties to share ideas.
e. Opportunities to meet with county engineers from other counties to share problem areas.
f. My state association acts as an information clearing house for county engineers
g. My state association acts as an advocate for the county engineering community.
h. Other [Please specify _____

_____
_____
_____
_____
_____

36. Do you belong to the National Association of County Engineers?

a. Yes
b. No

37. **If your response to question 36 was no**, what is your reason for not belonging to the national organization?

a. cost is too high
b. could not attend meetings anyway
c. the state/regional association provides me with all the information I need
d. Other [Please specify]

38. If you do belong to NACE, what are the benefits of being a part of this organization?

a. Opportunities to stay current on federal legislation affecting counties
b. Opportunities to learn state of the art technology
c. Opportunities to learn of new equipment
d. Opportunities to meet with county engineers from other states to share ideas.
e. Opportunities to meet with county engineers from other states to share problem areas.
f. NACE acts a an information clearing house for county engineers
g. NACE acts as an advocate for the county engineering community.
h. Other [Please specify _____

_____
_____
_____
_____

Using the scale listed below, please rank your responses to the following questions.

0-2 No problems
3-5- Somewhat Difficult
6-7 Very Difficult.

39 How difficult has it been to attract qualified people to county engineering in your state.

0 – 1 – 2 – 3 – 4 – 5 – 6 – 7
No Problems Somewhat Difficult Very Difficult

Please comment on your response to question 39.

40. Is your state projecting problems in attracting qualified county engineers?

0 – 1 – 2 – 3 – 4 – 5 – 6 – 7
No Problems Somewhat Difficult Very Difficult

41. How serious would you rank the problem of attracting qualified county engineers?

0 – 1 – 2 – 3 – 4 – 5 – 6 – 7
Not very serious at all Extremely serious

Answer the following question only if your state requires the P.E. license or certification for county engineers.

42. Does the certification/licensing requirement imposed by your state statute make it more or less difficult to attract qualified people to county engineering in your state?

0 – 1 – 2 – 3 – 4 – 5 – 6 – 7
Less difficult More difficult

If you answered question 42, please comment on your response.

43. If your state is experiencing current shortages in qualified county engineers or is anticipating shortages in qualified county engineers, for example, to what do you attribute these shortages? **Please circle all that apply.**

a. salaries are too low
b. political issues are becoming more problematic
c. liability issues are a problem
d. environmental issues are a problem
e. rural counties are not attractive to the new generation of professionals
f. budgets are so restrictive that it is difficult to meet the challenges of the job
g. the Board offers no contract, and thus, no job security. The county engineer serves at the pleasure of the Board.
h. fringe benefits are lacking, i.e., vacation, sick leave, insurance benefits
i. requirements are too strict [e.g., P.E. license/certification is required]
i. Other [Please specify]

44. If you were to list the most important factors in selling future generations on why they should consider county engineering as a profession, what would those factors include? **Please circle all that apply.**

a. diversity of the job
b. being my own boss
c. working on a project from start to finish
d. public service
e. public relations between the public and the county
f. providing a safe road network for the county
g. oppportunity to apply investment in training and/oreducation to the job
h. Other [Please specify]

45. Do you find that people just don't understand what a county engineer is?

a. Yes
b. No

46. **If your response to question 45 was yes,** how can you, your state association, and the schools work together to make the profession more visible?

Thank you very much for your participation in this research. If you would like to have a copy of the interim report or the final report, please check the selection of your choice and place your name and address on this page, or if you wish, send me a separate letter with your request.

___ Would like a copy of the interim report on this project.

___ Would like a copy of the final report on this project.

___ Would like copies of both the interim and the final report for this project.

Name

Address