

Turnover and Factors in the Retention of Highway Engineering Personnel

ELLIS DANNER, Professor of Highway Engineering
University of Illinois

● IN DEVELOPING its program of research, the Highway Research Board Committee on Education and Training of Highway Engineering Personnel found that the education and training problems were complicated by the apparently high rate of turnover of engineering personnel in the highway departments. The effectiveness of education and training programs in the highway field would be greatly reduced if a considerable number of the persons developed by these programs were lost to other engineering fields. Some definite information on the extent of turnover of engineering personnel seemed desirable as a starting point.

The verification of a high rate of turnover in the face of a greatly expanded highway program emphasized the need for immediate study of the causes of turnover so that corrective measures might be initiated. To meet the engineering manpower requirements for the national highway program it is equally, if not more important, to retain the experienced personnel already in the highway departments than it is to recruit additional engineering staff. The real problem is to obtain the true reasons for engineers leaving the highway departments and not merely assumed or commonly stated reasons. If highway departments are to take effective action to make highway engineering a reasonably attractive career, they must have factual information on the favorable and unfavorable factors affecting highway engineering employment or time and effort will be wasted. A pilot study was initiated to see how this factual information could be obtained.

TURNOVER OF ENGINEERING PERSONNEL IN 1955

To get specific data on the turnover situation for 1955, a questionnaire was developed (See Appendix A) and sent to the 48 state highway departments and the District of Columbia. The data obtained are given in Table 1.

Engineering losses for 1955 were approximately 10 percent of the entire engineering staffs of the state highway departments at the end of the year. Total additions of engineering personnel were somewhat greater than the losses, but a large number of these were promotions from preprofessional grades and therefore were not additions to total available staff. The number of new personnel hired in the preprofessional grades was not included in the data. Considerably fewer new engineering personnel were hired than were lost, although the states desired to increase their engineering staffs by an average of about 20 percent for 1956. This 1956 estimate was based on needs for the normal 1956 program and did not include additional requirements for the expanded National Highway Program, which became a reality in 1956. Indications are that most of the state highway departments employed all of the engineering personnel that they could attract in 1955, therefore, it appears unlikely that they could fill their estimated requirements for 1956, because of relatively little increase in the available supply or in their ability to attract engineers from other employers.

The total of 1,760 for those departing on leave (mostly military leave) and those resigning was up mostly of younger engineers. This number is only slightly less than the total (1,843) of new engineering personnel hired and those returning from leave. A real training problem exists when the highway departments in an expanding program lose almost as many experienced engineers each year (not counting the normal losses from death, retirement, and dismissal) as they add new and inexperienced personnel. Furthermore, the increased manpower needs of the expanded highway program are still to be met.

Serious and concerted attention to the problem of making highway engineering a more attractive career in all of the highway departments to reduce losses seems justified.

TABLE 1
SUMMARY OF DATA FROM STATES ON TURNOVER OF HIGHWAY ENGINEERING PERSONNEL FOR
PERIOD JANUARY 1 THROUGH DECEMBER 31, 1955
(Total Number of States Reporting and D C - 49)

State	New HEP Hired	Returning from Leave	Promoted from Preprofessional Grades	Total Ad- ditions	Deaths or Retired	Dismissed or Sepa- rated	Departed on Leave	Reassigned	Total Losses	Net Gain + or Net Loss -	Total HEP Dec 31, 1955	Desired Addi- tional HEP for 1956
Alabama	67	5	14	86	2	0	37	36	75	+11	403	60
Arizona	5	0	6	11	2	0	0	5	7	+ 4	53	17
Arkansas	7	0	5	12	1	1	2	2	6	+ 6	120	100
California	416	42	235	693	39	63	62	285	449	+244	3451	410
Colorado	16	0	26	42	12	1	1	11	25	+17	328	50
Connecticut	21	1	23	45	8	0	4	14	26	+19	402	0
Delaware	0	0	0	0	0	0	10	0	0	0	70	15
Florida	30	5	15	50	5	0	10	20	35	+15	693	50
Georgia	31	2	71	104	3	1	3	11	18	+66	524	160
Idaho	20	0	8	28	3	2	4	29	38	-10	130	20
Illinois	145	21	5	171	20	3	51	141	215	-44	1002	400
Indiana	75	2	0	77	1	0	17	26	44	+33	368	172
Iowa	30	3	0	33	4	0	15	0	19	+14	336	50
Kansas	9	0	0	9	2	0	10	18	30	-21	317	98
Kentucky	16	1	6	23	3	0	6	50	59	-36	617	100
Louisiana	50	0	5	55	3	2	4	11	20	+35	309	109
Maine	15	3	3	21	2	0	11	8	22	- 1	174	21
Maryland	4	1	0	5	2	0	2	20	24	-19	350	30
Massachusetts	26	1	20	47	12	0	3	35	50	- 3	702	110
Michigan	38	15	0	53	7	0	26	41	74	-21	601	174
Minnesota	21	1	65	87	15	0	13	35	63	+24	530	50
Mississippi	7	3	0	10	0	0	1	13	14	- 4	111	47
Missouri	71	1	6	78	15	2	7	34	58	+20	702	40
Montana	12	3	6	21	0	0	2	5	7	+14	214	26
Nebraska	17	2	22	41	4	3	2	17	26	+15	239	40
Nevada	3	0	3	6	0	0	1	1	2	+ 1	89	20
New Hampshire	16	0	8	24	4	0	0	9	13	+11	237	79
New Jersey	16	0	5	21	9	0	2	21	32	-11	420	140
New Mexico	15	2	12	29	2	1	2	10	15	+14	124	35
New York	14	5	97	116	41	0	10	72	123	- 7	1377	650
North Carolina	17	1	14	32	4	2	2	30	38	- 6	437	50
North Dakota	3	0	3	6	0	1	2	2	5	+ 1	63	26
Ohio	99	6	32	137	12	0	46	18	76	+61	636	200
Oklahoma	3	0	2	5	2	0	0	7	9	- 4	115	50
Oregon	33	8	36	77	6	3	6	46	58	+24	495	50
Pennsylvania	5	0	9	14	3	10	0	0	13	+ 1	480	130
Rhode Island	4	0	0	4	1	0	0	0	1	+ 3	73	87
South Carolina	13	0	0	13	3	1	1	16	21	- 8	241	80
South Dakota	15	0	2	17	1	0	0	2	3	+14	91	15
Tennessee	30	6	18	54	5	6	5	18	34	+20	216	50
Texas	93	10	0	103	4	2	34	57	97	+ 6	922	100
Utah	8	0	14	22	3	1	0	10	14	+ 6	175	25
Vermont	12	0	7	19	1	0	0	12	13	+ 6	158	57
Virginia	9	5	20	34	2	0	7	17	26	+ 6	360	60
Washington	48	4	32	84	7	7	2	38	54	+30	966	0
West Virginia	19	0	8	27	2	3	0	49	54	-27	226	100
Wisconsin	38	2	1	41	6	0	11	29	46	- 5	398	60
Wyoming	11	2	10	23	4	0	1	10	15	+ 8	92	28
Dist of Columbia	7	0	10	17	0	0	1	2	3	+14	92	30
Totals	1,680	163	881	2,724	289	115	426	1,334	2,164	+560	21,229	4,465 ¹

¹ Estimate based on needs for the normal 1956 program and does not include requirements for an expanded National Highway Program which has since become a reality

Unfavorable employment conditions in any of the highway departments become generally known and make more difficult the problem of attracting and retaining engineering personnel in other highway departments. Thus, the efforts should be directed toward improving engineering employment conditions in all highway departments up to at least certain minimum desirable standards.

PROCEDURE FOR STUDYING FACTORS IN RETENTION OF ENGINEERING PERSONNEL

Any highway department that wishes to change its organization and administration to improve its engineering career opportunities needs specific information on what engineering employees consider as important favorable and unfavorable employment conditions. A proper remedy can't be prescribed unless the correct diagnosis is made. How can the factual information be obtained?

Several state highway departments have a policy of interviewing each person who submits a resignation, as to his reasons for leaving. As a part of this Committee study some persons who have left highway departments have been questioned about this procedure and it appears likely that only partially complete and sometimes incorrect information may be obtained when a senior person in the highway department conducts such an interview. Many engineers, when they have decided to leave, don't wish to make an issue of their reasons for leaving; they don't wish to offend someone, or they may not have clearly in their own minds the specific combination of factors which caused them to make their decision. They give a reason which comes first to mind—it may or may not be the primary reason, and usually it is only one of several

real reasons. Dependable information from persons not planning to resign, at least immediately, is even more difficult to obtain.

While this conclusion is not verified by specific studies, there seems to be general agreement that true and complete information can best be obtained from the engineering personnel concerned by someone outside the highway department who has their confidence. Staff members of the engineering colleges in a state may know personally a number of the engineers in the highway department and may be able to conduct an effective study. In any case the information given must be treated with confidence and the person giving it must be assured that what he says will not be associated with him personally in the study or otherwise.

After some personal interviews indicated that both present and former highway engineers have developed either a favorable or unfavorable attitude toward highway employment as a composite feeling, usually without any particular analysis of the reasons, some help in determining specific reasons was needed. It was decided to try a comprehensive questionnaire which would first establish factual information about highway employment from the point of view of the particular engineer, and would then give him a guide for selecting the favorable and unfavorable factors in order of their importance. The questionnaire used and the letter of transmittal are shown as Appendix B. It was realized that the questionnaire was quite lengthy and would require considerable time to complete. It would be useless if a reasonable number of engineers could not be sufficiently made aware of its importance to be willing to fill it out accurately and completely.

For the pilot study 136 questionnaires were mailed out, 68 to engineers still employed by highway departments, and 68 to engineers no longer employed. This was done on a paired basis, that is, for each engineer selected at random who had formerly worked for a highway department, a present employee was selected who had started to work with that highway department at approximately the same time and in the same subdivision of the department. With only a few exceptions none of those selected had started to work for the highway departments more than 10 years ago. Former employees returned 21 questionnaires, of which 15 were complete and 6 were incomplete or were received too late to be included here. Present employees returned 40 questionnaires, of which 37 were complete. No followup to the original letter of transmittal urging the return of the questionnaires has been sent out as yet. Inadequate forwarding addresses for former employees reduced the percentage of those returns. It is believed that with suitable followup letters a sufficiently high percentage of return of these questionnaires can be obtained to justify their use in spite of the length.

Only a partial analysis has been made of the data obtained to date. The most effective procedure for tabulating, classifying, and interpreting the great amount of data made available by these completed questionnaires is yet to be studied. Some business machine method may provide the most effective means of processing the data to its fullest utilization. Hand methods of tabulation and analysis were used to obtain the information presented in this report covering the 15 complete questionnaires from engineers no longer employed and 37 questionnaires from engineers still employed.

SUMMARY OF EMPLOYMENT EVALUATION DATA

1. The average length of highway department employment by those no longer employed was 3 years.
2. The average monthly salary increase at the time of changing employment by those no longer employed by the highway department was \$65.
3. The present average monthly salary of those no longer employed is \$624, whereas the present monthly salary of those still employed is \$555.
4. The favorable and unfavorable employment factors for both those no longer employed and those still employed by the highway department are shown in Tables 2, 3, 4, and 5. The score shown was computed as a composite value after assigning a value of 10 to the most important of the ten factors as marked by each engineer, and 1 to the least important, with proper scale values between these two. The score indicates something of the relative importance of the factors listed.

TABLE 2
FAVORABLE EMPLOYMENT FACTORS LISTED BY THOSE NO LONGER
EMPLOYED BY THE HIGHWAY DEPARTMENT

	<u>Score</u>
1. Reasonable assurance of continued employment even in depression.	59
2. Interesting and enjoyable work.	55
3. Steady future highway development and the corresponding demand for engineering services offer a high degree of security of employment in the highway engineering field.	39
4. Good bosses or supervisors, well-trained, know their job and how to handle people.	31
5. Doing type of work on which the engineer makes important decisions and does independent work.	30
6. Expanded highway program and prospective retirements indicate good opportunities for advancement for some years to come.	27
7. Associates friendly and helpful.	27
8. Good opportunity to learn and gain valuable experience in my field of interests.	27
9. The technical and engineering staff below a few top level positions are free from transfer or removal for political considerations.	25
10. Liked the community and people in the area.	22
11. Salary levels satisfactory for starting and for the first few years of engineering work.	21
12. Challenging and stimulating work most of the time.	20
13. Work of the highway department essential to national economy, feel that total accomplishment is important.	20
14. Satisfactory sick leave and compensation policies in effect.	20
15. Amount of paid vacation allowed per year satisfactory.	18

TABLE 3
FAVORABLE EMPLOYMENT FACTORS LISTED BY THOSE STILL EMPLOYED
BY THE HIGHWAY DEPARTMENT¹

	<u>Score</u>
1. (3) Steady future highway development and the corresponding demand for engineering services offer a high degree of security of employment in the highway engineering field.	162
2. (2) Interesting and enjoyable work.	136
3. (1) Reasonable assurance of continued employment even in depression.	113
4. Retirement plan including deductions and benefits satisfactory.	102
5. (6) Expanded highway program and prospective retirements indicate good opportunities for advancement for some years to come.	100
6. (12) Challenging and stimulating work most of the time.	87
7. (13) Work of the highway department essential to national economy; feel that total accomplishment is important.	62
8. (10) Liked the community and people in the area.	52
9. Progress in increased responsibility reasonably regular and certain.	50
10. Promotions generally made from lower engineering grades and not from outside the highway department.	49
11. Wide choice of employment and employers in the highway field.	44
12. Good working hours.	40
13. Adequate housing available in assigned area.	38
14. (7) Associates friendly and helpful.	35
15. (15) Amount of paid vacations allowed per year satisfactory.	35

¹ Numbers in parentheses indicate corresponding position of the same item in Table 2.

TABLE 4

**UNFAVORABLE EMPLOYMENT FACTORS LISTED BY THOSE NO LONGER
EMPLOYED BY THE HIGHWAY DEPARTMENT**

	<u>Score</u>
1. The chances of getting up to a reasonably comfortable living salary in later years are too slim to make a career with the highway department attractive.	58
2. Engineering salary scale in general too low as compared with private industry and other opportunities.	49
3. Salary progress too slow, either adjustments not given often enough or the amount of adjustments too small.	36
4. Too much political interference in general with the work and operations of the highway department.	34
5. Undesirable and unnecessary changes in highway department policies occur with changes in administration.	24
6. Rate of advancement very slow and discouraging after first few years of employment.	21
7. No pay given for overtime work.	21
8. Services used below the level of professional engineering talent.	21
9. No recognition or consideration given for overtime work.	20
10. Other employees dissatisfied and disgruntled with the highway department, continued talk of all the things that are wrong.	20
11. Members of the legislative group responsible for laws and regulations of the highway department show little respect or consideration for the technical and engineering staff.	19
12. Chief engineer removed and replaced with changes in administration.	19
13. Salary levels too low for older engineers in technical work not classified as supervisory or administrative in nature.	18
14. Not assigned to duties that I was informed I would have.	17
15. No distinction made between good and poor work and hence no encouragement to do good work.	17

TABLE 5

**UNFAVORABLE EMPLOYMENT FACTORS LISTED BY THOSE STILL EMPLOYED
BY THE HIGHWAY DEPARTMENT¹**

	<u>Score</u>
1. (2) Engineering salary scale in general too low as compared with private industry and other opportunities.	121
2. Economic remuneration not in line with the responsibility of the work.	117
3. (6) Rate of advancement very slow and discouraging after first few years of employment.	95
4. (1) The chances of getting up to a reasonably comfortable living salary in later years are too slim to make a career with the highway department attractive.	90
5. (3) Salary progress too slow, either adjustments not given often enough or the amount of adjustment too small.	81
6. Too much consideration given to years of service and not enough to qualifications and ability in making selections for promotion.	78
7. (7) No pay given for overtime work.	77
8. Only a relatively few administrative positions offer any desirable future.	62
9. (9) No recognition or consideration for overtime work.	57
10. Very seldom am I informed about personnel actions affecting me until they have become effective.	57
11. Financial reward not adequate for education and training required.	56
12. (13) Salary levels too low for older engineers in technical work not classified as supervisory or administrative in nature.	53
13. Away from home too much.	48
14. (8) Services used below the level of professional engineering talent.	36
15. (4) Too much political interference in general with the work and operation of the highway department.	34

¹ Numbers in parentheses indicate corresponding position of the same item in Table 4.

5. Questions N-14, N-15, and N-16 were designed to find out the attitude of those still employed toward continuing employment with the highway department. These were marked as true statements by the following numbers of men still employed:

N-14 (Satisfied)	14
N-15 (Dissatisfied, but no decision to move)	9
N-15 and N-16	7
N-16 (Dissatisfied and looking for another job)	4
None of the three	3

6. The average over-all ratings given the highway department as a prospective career organization in item S are (a) by those no longer employed, 5.7; (b) by those still employed, 6.4.

7. For the question in item T as to whether the engineer thought that the highway department could be made into an excellent prospect as a career organization, 43 answered yes, 6 answered no, and 3 did not answer.

CONCLUSIONS OF THIS PRELIMINARY STUDY

1. The rate of turnover of highway engineering personnel is sufficiently high to justify coordinated and intensive study aimed at making highway departments more attractive career organizations.

2. The employment evaluation studies based on a questionnaire method and conducted by personnel outside the highway departments are practical and will give useful information for evaluating employment conditions and prescribing corrective measures.

3. This research should be continued, with several additional highway departments participating in parallel studies to develop effective procedures and to check the findings of this preliminary study.

4. Indications from the preliminary study are that salary levels in the highway departments, particularly for the higher grades, are not sufficiently high relative to other fields, to offer attractive career opportunities to young engineers, and this is a major factor to engineers in considering highway employment. However, a number of other factors influence the decision of engineers to leave highway employment and it is usually the effect of the combination of factors that results in the final decision for a change.

APPENDIX A

QUESTIONNAIRE TO STATE HIGHWAY DEPARTMENTS

Data on Turnover of Highway Engineering Personnel - 1955

(Note: The information given below should include only the highway or civil engineering personnel in the professional grades, that is, the personnel in highway or civil engineering positions that require graduation from an engineering college or equivalent engineering training and experience. Whether or not the persons are registered or licensed under state laws as professional engineers is not to be considered in your tabulation. Do not include preprofessional or subprofessional personnel, that is, rodmen, engineering aides, draftsmen, laboratory technicians, etc. who hold positions not requiring education and experience equivalent to the requirements for the professional grades. (See paper No. 761 of the American Society of Civil Engineers, August, 1955, for listing of requirements of professional grades of engineering position). No doubt most of you have some other professional engineering classifications such as chemical, electrical, mechanical, and landscape engineers, but as this number is relatively small do not include these persons in your report.

Name and address _____
 of organization _____

(Please give data for the period January 1 through December 31, 1955)

1. ADDITIONS TO HIGHWAY ENGINEERING PERSONNEL:

- a. New personnel hired during the year _____
 b. Personnel returning from military or other leave _____
 c. Personnel promoted from preprofessional grades _____
 d. Total additions _____

2. LOSSES OF HIGHWAY ENGINEERING PERSONNEL:

- a. Personnel deaths or retirements _____
 b. Personnel dismissed or separated for cause _____
 c. Personnel going on military or other leave _____
 d. Personnel resigning to go into other work _____
 e. Total losses _____

3. Net gain _____ Net Loss _____

4. Total number of highway engineering personnel on duty
 with your organization as of December 31, 1955 _____

5. Estimated number of additional highway engineering personnel that you would like to have in your organization for 1956
 if you could employ them _____

Name of person making report _____

Date _____ Title _____

(Mail to. Highway Research Board
 Committee on Education and Training of Highway Engineering Personnel
 201 Civil Engineering Hall
 University of Illinois
 Urbana, Illinois)

APPENDIX B
QUESTIONNAIRE TO INDIVIDUALS

To: Selected Engineering Employees and Former Employees of the _____
Highway Department.

Dear Sir:

With the approval by Congress of the Federal-Aid Highway Act of 1956 we are entering upon a long-range highway development program of immense proportions. The planning, design, construction, and maintenance of these highways will challenge our engineering capabilities to the limit.

In general, highway departments are understaffed for this enlarged program because of their inability to retain sufficient engineers in career positions. How can highway departments attract and hold the engineering personnel that they will need for years to come? The Highway Research Board is conducting a study aimed at providing some of the answers to this question. This study is being undertaken in several states.

Apparently changes must be made in the organization and operation of highway departments if they are to offer real career opportunities. What are these necessary changes? Only substantial factual information can be helpful in determining what these changes should be and in persuading the administrative authorities to make these changes. And only you people who have worked or are still working in the highway department can provide this factual information.

Will you be willing to contribute to this study by filling out the three parts of the enclosed questionnaire and returning them to me? It will take some time and careful thought on your part to be sure of the correct answers and only the correct and truthful answers will be of any value. I hope that you have sufficient interest in professional engineering development to give us the data that is needed. I assure you that your answers will be handled in a confidential manner and will not be associated with you in any way.

May I depend upon you to help by filling out and returning the enclosed items to me within the next week or two?

Very sincerely,

Encls.

Study of Factors in Retention of Highway Engineering Personnel

PART I
Identification Data

Highway Department: _____

Date _____

1. Name _____ Confidential File No. _____

2. Present mailing address _____

3. Business telephone number _____

4. Present employer _____

Signature

(Please return completed Parts I, II, and III in the enclosed stamped and addressed envelope to _____

_____. Parts II and III will be kept and used separately from Part I, will be identified by confidential file number only, and will not in any way be associated with your name in any of the studies and reports. Only the addressee above will have access to this identification data in Part I or will have any opportunity of associating Parts II and III with your name and that will be done only for the purpose of checking and verifying the return of this report. Access to Part II will also be limited to the addressee to prevent any possibility of identification from personal data shown therein.)

I hereby certify that the material returned by you will be treated in a confidential manner to prevent the data furnished from being associated in any way with you or your name by anyone except the undersigned.

Date _____

Name and Title

Study of Factors in Retention of Highway Engineering Personnel

PART II

Confidential Personal Data

Highway Department: _____

Confidential File No. _____ Date _____

1. Business of your present employer _____
2. Your present position and duties _____
3. Present monthly salary or income from above employment:

Total \$ _____ Regular monthly salary \$ _____ Average monthly overtime pay \$ _____ Average monthly expenses or other allowances \$ _____ Average monthly bonus or share in profits \$ _____ Average monthly commission \$ _____
4. Year of graduation from high school _____
5. Home town and state at time of entering college _____
6. B.S. degree.

Branch of engineering _____ Major or option, if any _____
Institution _____ Date received _____
7. M.S. degree:

Major field of study _____
Institution _____ Date received _____
8. Employment by _____ Highway Department:
 - a. How hired: (1) If personal interview, by whom? _____
(2) Contact through friend? _____
(3) Correspondence contact only? _____
 - b. Date of starting work _____
 - c. Monthly salary at time of starting work \$ _____
 - d. Bureau or district to which assigned when starting work _____
 - e. Position classification and duties now if still employed or just before resignation if no longer employed _____
 - f. Present monthly salary and expenses if still employed by the Highway Department or just before resignation if no longer employed. Total \$ _____
Regular monthly salary \$ _____ Average monthly expenses or other allowances \$ _____
 - g. Bureau or district to which assigned now if still employed or just before resignation if no longer employed _____
 - h. Effective date of resignation if no longer employed _____
 - i. Amount of temporary employment with the Highway Department before graduation (summers, vacations, etc.) Total in months _____
 - j. At the time of accepting employment how long did you expect to stay with the Highway Department? _____
9. Employment immediately after leaving the _____ Highway Department.
 - a. Business of new employer _____
 - b. Monthly salary or income when starting new employment:

Total \$ _____ Regular monthly salary \$ _____ Average monthly overtime pay \$ _____ Average monthly expenses or other allowances \$ _____ Average monthly bonus or share in profits \$ _____ Average monthly commissions \$ _____
 - c. Other benefits received with new employment _____
 - d. Are you presently working for the same employer that hired you immediately after leaving the Highway Department? _____
 - e. Did you actively seek new employment or did the opportunity come to you unsolicited? _____
10. Additional comments about personal data: _____

PART III**Confidential Employment Evaluation Data**

Highway Department: _____

Confidential File No. _____ Date _____

Please place the proper marks in Columns (1), (2), and (3) in accordance with the instructions below:

Column (1): Evaluation of attitudes and conditions affecting employment with the highway department.

a. Mark in the brackets in Column (1) for each numbered statement listed on the following sheets whether, according to your personal knowledge, experience, best judgment, and feelings, each statement is True (T), False (F), Unknown (U), or Not Applicable (N) as far as you are concerned.

Column (2): Favorable factors for employment with the highway department.

a. After marking all items in Column (1), go through the entire list of statements and select the ten conditions that you consider most favorable and important to employment as an engineer with the highway department (they may be either true or false statements as worded, as long as the actual conditions existing are favorable). Mark those ten conditions in the appropriate brackets in Column (2) with a (1) for the condition that you consider the most important favorable condition (having the greatest influence on your staying with the highway department) and rating the others (2), (3), (4), etc., in order of importance down to (10) for the one of the selected ten favorable conditions that you consider of the least importance.

b. In addition to the above ten rated favorable factors, mark in Column (2) with an (F) any other favorable conditions which you think important enough to have some influence on your decision about a career with the highway department.

Column (3): Unfavorable factors for employment with the highway department.

a. Go through the entire list of statements again and select the ten conditions that you consider most unfavorable and important to employment as an engineer with the highway department (they may be either true or false statements as worded, as long as the actual conditions existing are unfavorable). Mark these ten conditions in the appropriate brackets in Column (3) with a (1) for the condition that you consider the most important unfavorable condition (having the greatest influence on your leaving the highway department) and rating the others (2), (3), (4), etc., in order of importance down to (10) for the one of the selected ten unfavorable conditions that you consider of the least importance.

b. In addition to the above ten rated unfavorable factors mark in Column (3) with a (U) any other unfavorable conditions which you think important enough to have some influence on your decision about a career with the highway department.

- Notes: 1. In marking Column (1) you will find some statements that have essentially the same meaning as other statements in the list with a different wording or you will find some statements that mean just the opposite of other statements in the list. Please mark each statement individually on its own merits as it is stated and do not be concerned about the apparent duplication in statements. Answer each item on the basis of average or normal conditions and not for the exceptional case.
2. Please complete both Columns (2) and (3) regardless of whether you are still employed by the highway department or have resigned and accepted other employment.

3. All answers given should reflect your own personal views and those of your family and should not be the ideas of other engineers or associates except as those ideas have molded your own opinions.

Employment Evaluation Statements

(1) (2) (3)

A. Assignment and characteristics of work

- () () () 1. Not assigned to duties that I was informed I would have.
 () () () 2. People hired for engineering jobs and assigned to duties for which they are not qualified.
 () () () 3. Consideration given to likes and abilities in assigning to duties.
 () () () 4. Work too standardized and little opportunity to use new ideas.
 () () () 5. Prefer technical to non-technical or administrative work if responsibility and pay are commensurate.
 () () () 6. Interesting and enjoyable work.
 () () () 7. Dislike for the kind of work assigned to me.
 () () () 8. Training and ability effectively utilized generally.
 () () () 9. Challenging and stimulating work most of the time.
 () () () 10. Appointment or promotion to a position based on merit and qualifications.
 () () () 11. Services used below the level of professional engineering talent.
 () () () 12. Special or advanced education and training encouraged and effectively used.
 () () () 13. Boredom with too much routine work.
 () () () 14. Assigned an aim or work goal for each job that was understood.
 () () () 15. Not enough variety in type of work assigned over a period of time.
 () () () 16. Progress in increased responsibility reasonably regular and certain.
 () () () 17. Doing type of work on which the engineer makes important decisions and does independent work.
 () () () 18. Moved around to different types of work too much and not given the opportunity of staying with a particular job.
 () () () 19. No distinction made between good and poor work and hence no incentive or encouragement to do good work.
 () () () 20. Not the type of work available that I would want to do for very many years.

B. Working conditions

- () () () 1. General geographical location of the work not desirable.
 () () () 2. Disliked the immediate local area where assigned.
 () () () 3. Satisfactory office conditions, space, lighting, etc.
 () () () 4. Too much overtime work required.
 () () () 5. Paid for overtime work.
 () () () 6. Working under pressure too much of the time.
 () () () 7. Adequate supporting help, clerical, stenographic, etc., provided for work.
 () () () 8. Punching a time clock or an equivalent check on working hours required.
 () () () 9. Too much work and not enough engineering staff to permit doing a good job.
 () () () 10. Assigned a job and given considerable freedom in time and manner of getting the job done.
 () () () 11. Too little higher level long-range planning resulting in too much uncertainty about what is to be done from day to day.
 () () () 12. Good working hours.
 () () () 13. General attitude prevails that the important thing is to get a job done with little apparent interest in being sure that it is a good engineering job.
 () () () 14. No recognition or consideration for overtime work.

- () () () 15. Pleasant surroundings and atmosphere for work.
- () () () 16. Co-workers who are well known and have influence.

C. Living conditions

- () () () 1. Adequate housing available in assigned area.
- () () () 2. Away from home too much.
- () () () 3. Good shopping facilities easy to reach.
- () () () 4. Few recreational facilities available within a reasonable distance.
- () () () 5. Good schools in the community for the children.
- () () () 6. Required either to move too often or to live away from the family during the week.
- () () () 7. Liked the community and the people in the area.
- () () () 8. Living too expensive in assigned area.

D. Direct compensation

- () () () 1. Financial reward adequate for education and training required.
- () () () 2. Economic remuneration not in line with the responsibility of the work.
- () () () 3. Adjustments in salary reasonably regular and certain.
- () () () 4. Unfair discrimination in making salary adjustments.
- () () () 5. Provision not made for salary differentials adjusted to cost of living for different areas of the department territory.
- () () () 6. Salary progress too slow, either adjustments not given often enough or the amount of adjustment too small.
- () () () 7. Salary levels satisfactory for starting and for the first few years of engineering work.
- () () () 8. Salary levels adequate for higher level administrative positions.
- () () () 9. Salary levels too low for older engineers in technical work not classified as supervisory or administrative in nature.
- () () () 10. Engineering salary scale in general too low as compared with private industry and other opportunities.
- () () () 11. No pay given for overtime work.
- () () () 12. Regular pay increases given on a merit rating basis.
- () () () 13. The chances of getting up to a reasonably comfortable living salary in later years are too slim to make a career with the highway department attractive.
- () () () 14. Salaries are not sufficiently far out of line to make them a principal deciding factor regarding a career with the highway department.

E. Special reimbursements and benefits

- () () () 1. Amount of paid vacation allowed per year satisfactory.
- () () () 2. Not allowed expenses for trips to technical conferences and meetings.
- () () () 3. Satisfactory sick leave and compensation policies in effect.
- () () () 4. Allowances for travel and other expenses away from home not adequate.
- () () () 5. Vacation time can be accumulated from year to year.
- () () () 6. No group hospitalization or insurance plan.
- () () () 7. Retirement plan including deductions and benefits satisfactory.
- () () () 8. Car mileage allowance for private cars inadequate.
- () () () 9. No consideration for length of service in vacation plan.
- () () () 10. Adequate number of highway department-owned cars are provided for engineer use on difficult jobs or for lengthy travel.

F. Educational and development opportunities

- () () () 1. Training program for newly employed engineers effective.
- () () () 2. Not given opportunity to attend technical meetings and conferences.
- () () () 3. Assignments rotated to give broad experience and over-all view of the department's work.
- () () () 4. Not encouraged to study, improve, and develop.
- () () () 5. Encouraged to work on technical society committees.
- () () () 6. Co-workers from whom one can learn much.

- () () () 7. Lack of opportunity for professional level training and experience.
 - () () () 8. Given opportunity to exchange technical information with engineers in other organizations.
 - () () () 9. Training program was not what I was lead to expect.
 - () () () 10. Good opportunity to learn and gain valuable experience in my field of interests.
 - () () () 11. Very little in the way of department educational programs provided.
 - () () () 12. No planned opportunity for advanced or additional study at educational institutions.
 - () () () 13. Encouraged to take extension courses.
 - () () () 14. No planned program of training and experience in preparation for the next higher positions for which I might be considered.
- G. Opportunities and procedures for advancement
- () () () 1. Only a relatively few administrative positions offer any desirable future.
 - () () () 2. Not enough opportunity and remuneration for technical engineering work.
 - () () () 3. Procedure for evaluating ability and making promotions is well planned and fair.
 - () () () 4. Rate of advancement very slow and discouraging after first few years of employment.
 - () () () 5. Too much consideration is given to years of service and not enough to qualifications and ability in making selections for promotion.
 - () () () 6. Promotions generally made from lower engineering grades and not from outside the highway department.
 - () () () 7. Expanded highway program and prospective retirements indicate good opportunities for advancement for some years to come.
- H. Characteristics of direct supervision
- () () () 1. Good bosses or supervisors, well-trained, know their job and how to handle people.
 - () () () 2. Supervisor expected too much of me beyond my education and experience.
 - () () () 3. My progress reviewed regularly and guidance and help given.
 - () () () 4. Supervisory personnel lacked training and ability in supervision.
 - () () () 5. No particular interest in my welfare and success.
 - () () () 6. Didn't know generally where I stood with the boss.
 - () () () 7. Given too much close supervision.
 - () () () 8. Supervisor didn't try to teach me the job or give me an opportunity to learn.
 - () () () 9. Supervisor tolerant of errors or mistakes, considerate and helpful.
 - () () () 10. Given opportunity to make important decisions.
 - () () () 11. Not informed of personal progress and deficiencies.
 - () () () 12. Given recognition by my supervisor for the work that I did.
 - () () () 13. Supervisor had poor personal attitude and made life unpleasant.
 - () () () 14. Given opportunity of working independently and on my own initiative.
 - () () () 15. Given guidance and counsel along personal as well as professional lines.
- I. Professional status and recognition
- () () () 1. Treated as part of the management team.
 - () () () 2. Inadequate recognition of achievements for the department.
 - () () () 3. Not given time to participate in outside professional activities.
 - () () () 4. Registration as a professional engineer not required except for a few top level positions.
 - () () () 5. Treated, respected, and recognized as professional men.
 - () () () 6. Apparent lack of appreciation by top management of the value of the engineering work.

- () () () 7. Prospects for professional development good.
- () () () 8. Engineers and non-professional employees treated the same.
- () () () 9. Recognition and citations given for engineers doing outstanding professional work.

J. Political influences

- () () () 1. No political endorsement or sponsor required to get an engineering job.
- () () () 2. Too much political interference in general with the work and operations of the highway department.
- () () () 3. The technical and engineering staff below a few top level positions are free from transfer or removal for political considerations.
- () () () 4. All higher level positions filled on a political basis and subject to change with changes in administration.
- () () () 5. All highway department employees, technical and non-technical, are employed on a career basis, are trained to do their jobs well, and are removed only for inefficiency or misconduct.
- () () () 6. Political appointments of incompetent or unnecessary persons are made in the highway department.
- () () () 7. No political contributions are required from the technical and engineering staff.
- () () () 8. Undesirable and unnecessary changes in highway department policies occur with changes in administration.
- () () () 9. All technical and engineering staff employed and removed on a merit basis only, free of political patronage procedures and implications.
- () () () 10. Too much political influence brought to bear on engineering decisions.
- () () () 11. No pressure on engineers to actively work in political campaigns.
- () () () 12. Chief engineer removed and replaced with changes in administration.

K. Security of employment

- () () () 1. Wide choice of employment and employers in the highway field.
- () () () 2. Reasonable assurance of continued employment even in depression.
- () () () 3. Lack of stability of employment, not continuous work.
- () () () 4. Capricious removal from the job, demotion, or transfer, occurs too often.
- () () () 5. Steady future highway development and the corresponding demand for engineering services offer a high degree of security of employment in the highway engineering field.

L. Human relations

- () () () 1. Didn't like the way my boss treated me.
- () () () 2. Associates friendly and helpful.
- () () () 3. Irritated by some of the administrative staff who reviewed my work.
- () () () 4. Enjoyed the people with whom I worked.
- () () () 5. Didn't care for the official contacts that I had to make with the public.
- () () () 6. Got along well and liked working with the contractor's organization on the job.
- () () () 7. Didn't get cooperation from the persons who worked under me.

M. Personnel management

- () () () 1. Proper methods of rating and evaluating performance used.
- () () () 2. No provision for handling grievances or complaints.
- () () () 3. Non-discrimination in personnel actions; fair treatment given all around.
- () () () 4. Little or no apparent concern about or attention to personnel problems.
- () () () 5. Position classification system well developed and adequate for technical and engineering jobs of the different levels of responsibility.
- () () () 6. No training for supervision and administration.
- () () () 7. Not enough delegation of authority to heads of major subdivisions to act on personnel matters.

- () () () 8. Personnel actions handled promptly and fairly.
- () () () 9. Performance rating system used is unfair and produces considerable dissatisfaction.
- () () () 10. Effective methods of evaluating jobs and establishing salaries for different positions provided.
- () () () 11. Inadequate personnel organization provided.
- () () () 12. Employee associations and activities encouraged.
- () () () 13. Personnel policies and actions too standardized and restricted.
- () () () 14. A personnel advisory committee appointed and active in study and recommendations for personnel improvements.
- () () () 15. Sufficient staff provided at all levels to handle personnel problems.
- () () () 16. No merit rating system in effect.
- () () () 17. Adequate personnel management plans and policies provided.

N. General morale

- () () () 1. Work of the highway department essential to national economy; feel that total accomplishment is important.
- () () () 2. Other employees dissatisfied and disgruntled with the highway department; continued talk of all the things that are wrong.
- () () () 3. Good public relations section that keeps the public properly informed on the work of the department and the engineering methods used to provide good highways.
- () () () 4. No interest taken in my personal problems.
- () () () 5. Given a feeling of fair treatment in relation to others.
- () () () 6. Highway department not respected by the general public.
- () () () 7. Made to feel that I am important to the highway department.
- () () () 8. Older supervisory employees have attitude of indifference and dissatisfaction with the department.
- () () () 9. Given a feeling that the job is important and worth doing.
- () () () 10. General feeling among employees and outsiders that the highway department is a poor organization for which to work.
- () () () 11. Made to feel a real pride in the department and the things that it does.
- () () () 12. Appreciation shown for extra effort and good work.
- () () () 13. Highway department organized and managed efficiently to stimulate pride.
- () () () 14. Satisfied with present work with highway department and am not interested in other employment.
- () () () 15. Am not satisfied with present employment with highway department, but haven't yet had sufficient urge to cause me to go elsewhere.
- () () () 16. Am not satisfied with present employment with highway department and intend to take another job when I find something to my liking.
- () () () 17. Members of the legislative group responsible for laws and regulation of the highway department show little respect or consideration for the technical and engineering staff.

O. Communications

- () () () 1. Established plans and procedures in effect for keeping employees informed on what is going on and planned for the highway department.
- () () () 2. Not kept informed on objectives of the department.
- () () () 3. Given free opportunity to make suggestions to improve employment conditions.
- () () () 4. Hear too many things indirectly about the highway department that I would much prefer to hear directly from my boss.
- () () () 5. Am encouraged to submit suggestions that will make a better engineering job.
- () () () 6. Very seldom am I informed about personnel actions affecting me until they have become effective.
- () () () 7. Communications from top level administrations are inadequate to develop close engineering-administration relations and a sense of teamwork.

P. Organization and general administration of the highway department

- () () () 1. Organization of the highway department adequate for efficient operation.
- () () () 2. Need a public relations section in the department.
- () () () 3. Need to hire or train many more engineering technicians as supporting help for the engineering staff.
- () () () 4. Decisions made at too high a level; not enough delegation of authority for efficient operation.
- () () () 5. Engineering manpower is effectively utilized.
- () () () 6. Too much delay in getting important decisions made.
- () () () 7. Strong and effective leadership provided at the several administrative levels.
- () () () 8. Much time and effort wasted by changes in decisions and assignments of work.

Q. Outside or other influences

- () () () 1. Offered a big salary outside that I could not refuse.
- () () () 2. Wife dissatisfied with moving, housing, my absence from home, type of work I did, associates and their families, living conditions.
- () () () 3. Offered position elsewhere with opportunity greater than anything possible in the highway department.
- () () () 4. Preferred to work nearer home.
- () () () 5. Received other important benefits in new job not available to me in the highway department.
- () () () 6. Preferred to work at a particular location.

R. Additional comments (Add here any other remarks about employment with the highway department not covered by previous statements that will be helpful in the evaluation.)

S. Over-all rating of highway department

In considering your lifetime engineering career, how would you rate the highway department as a prospective organization in which to develop that career? Please mark your rating with an X in the appropriate brackets below, marking (10) if you consider the highway department an excellent and desirable prospect, (1) if you consider it a very poor and undesirable prospect, or the appropriate number in between according to your judgment of the career prospects.

() () () () () () () () () ()
1 2 3 4 5 6 7 8 9 10

Very Poor

Excellent

T. If you have marked any number other than (10) in S above, please answer yes or no to the following:

From your experience do you think that is practical and possible to make the necessary changes in the highway department required to make it an excellent prospect for career employment?