

Summary of Discussions with Focus Groups from the Professional Engineers and Engineering Associates Occupational Group

Overview of Findings

In the professional engineers and engineering associates occupational group, both the professional engineer and the engineering associate roles have multiple sub-divisions. The positions are responsible for consultation, investigation, evaluation and planning, design, design review and approval, and/or determination of environmental and safety impacts of work processes and products (infrastructures, buildings, utilities, systems, sites, or mapping); provide project management oversight; oversee or review infrastructure, environmental and geomatic projects; and manage implementation of projects/plans according to codes and regulations, which may include approval authority. This broad range of work requires different skill sets within the engineering fields. Currently, this work is divided into three fields in state government: civil, environmental, and building systems, and within each of these fields there are multiple sub-divisions.

In each area and discipline, the complexity levels of the work assignments and decision making are different depending on the agency's usage of the classes and its organizational structure. In general the professional engineers are seen as project managers or administrative supervisors, and the associates as designers and compliance enforcement personnel. This current separation of responsibilities may limit career opportunity. It was stated from the engineering associate participants that many of them are not looking at moving into professional engineering positions due to the managerial and/or supervisory responsibilities required for these professional engineering positions. They like the technical aspect of their discipline and want to remain as technical professional, even though, the agencies generally don't recognize the professional license one might possess as an engineering associate. This non-recognition of a license by the agency does not encourage an associate in getting their professional license. In addition, there are no distinctions made between the different sub-divisions in engineering associate classes as it relates to complexity of work. As for the professional engineers, the difference between the I and II levels are size of the project or the geographic area of responsibility. Again, there is no distinction made in complexity of work between the different sub-divisions.

In addition, it is very difficult for employees to move from one discipline area to another. The skill sets and training required for each discipline area varies considerably. This is why Kansas Department of Transportation has created a rotation program for their Engineering Associate Is. This program is to help these employees decide what area they would like to work in within KDOT. Other agencies do not have similar programs; therefore, these agencies recruit and select candidates that have the necessary skills that are required for their positions.

Inadvertently, then, it may appear that organizational structure is not flexible enough to reflect the training and experience that their own employees possess or willing to possess. In those agencies, professional engineers and associates can find themselves held back within an agency despite their recognized expertise due to reporting structures. The participants indicated that there is an increasing tendency for those experienced employees to leave the agency to find other

jobs where their skills and capabilities are valued as much or more than any leadership position they may have held.

Distinction Between Technicians and Associates

Technicians are specialists with training and experience suited to carrying out the structured work in the field and the lab, and require expert knowledge in particular tasks, such as testing, sampling, inspection, servicing and some level of analysis. Generally, their most important job skill is to follow instructions carefully and consistently in accordance with relevant rules and procedures. Technicians may become the recognized expert in a certain processes, and may have to obtain certification in these processes. Often, other technicians and associates learn from the experienced technician, at least when it comes to the “how to” type questions (the “why” questions are reserved for the more advanced engineers to answer).

In addition, partially due to the inability to retain engineering associates and professional, the advanced technicians or other occupations have taken on more and more of the engineering duties that once were seen being performed by associates, making it more difficult in some situations to distinguish the work of advanced technicians from that of an engineering associate. To emphasize this issue even more, technicians’ work in some sub-divisions is becoming more specialized and technical. Therefore, technicians are now seen in these sub-divisions as experts due to their acquiring of additional certification or education to perform the work in these sub-divisions. Again, this makes it more difficult to distinguish the levels of work between technician and engineering associate’s roles. In addition, participants indicated that in some instances, engineering associates who are not able to pass the Fundamentals of Engineering test occasionally are move into some of the roles filled by technicians.

Engineering associates as mentioned previously are project designers and or compliance enforcement personnel, and require a bachelor’s degree in an engineering field and at some point posses the certification in passing the Fundamentals of Engineering test. The participants all stressed the need for continual learning, and in some sub-divisions this is confirmed by possession of special certification

Minimum Qualifications

The majority of the participants agreed that the current minimum qualifications are required. Some of the reoccurring comments from the participants are as follows:

Associates –

- Some experience in a discipline are would be helpful.
- Most of the work is learned on the job, but the engineering degree’s focus is also very helpful.

Professional Engineers –

- If the candidate does not have professional work experience in the specific engineering discipline the substitution of experience in other sub-divisions is not effective.
- Most of the work is learned on the job.

Full Performance

Amount of Time to Reach Full Performance

For Associates, participants indicated that it takes anywhere from one and three years to be capable of full performance work as a higher level Associate III. The distinction between an entry-level Associate I and full performance Associate III is primarily based on time and the experience acquired through on the job training. The time periods are more defined due to specific testing and licensure requirements of the classification. However, some Associate positions are required to complete specific certification or training requirements before being able to moved to the higher level Associate III classification.

For Professional Engineers, in general, participants indicated that it takes anywhere from two to five years to be capable of full performance as a Professional Engineer. The distinction between the Associates and Professional Engineer classes is primarily based on the complexity/specialization of the work being performed as well as the level of independence in the performance of the employee's duties. Again, as with Associates, the participants indicated that time reflects the experience acquired through on the job training and actual performance of the duties.

Some participants also indicated that this length of time can be dependent on cyclical or seasonal issues, depending on the particular discipline.

Type of Supervision Received

Associates generally receive limited supervision and the work usually does not require the use of independent judgment or discretion. While supervision is limited, employees generally do not have authority to make independent decisions outside of standard operating procedures or guidelines. As one becomes advanced or seen as a expert in their processes, employees are given more independent judgment to act on their own discretion requiring the use of technical knowledge to resolve complex problems. Supervision exists to provide general direction, review judgments made by employees, and clarify standards, policies and procedures that are normally seen as the day-to-day work activities of a supervisor. Additional, specific instructions are given for new, difficult, or unusual assignments.

Professional engineers generally receive limited supervision and the work requires employees to use independent judgment or act on their own discretion, requiring the use of initiative and creativity to resolve problems or interpret policy to develop solutions. Major work assignments are examined for soundness or technical judgment and for general effectiveness and adequacy. At this level, employees have a broad and comprehensive knowledge of theories, concepts and practices with the ability to apply those skills to complex, difficult and/or unprecedented situations. Supervision exists to provide administrative direction in the planning, organizing and implementation of the work activities, as well as to oversee the budget responsibilities, respond to legislative and media inquiries and complaints, and to see to human resource issues. In general, the supervisors and managers handle the more potentially controversial matters, or far-reaching implications, and other administrative/managerial types of problems. While these positions focus on their assigned projects or assignments.

What Criteria Should Compensation be Based? There seemed to be a consensus that performance and skill sets that the employee brings to the job (should be one of, if not the primary criteria for the basis of compensation for both Associate and Professional Engineering positions. The participants indicated that this would be especially important criteria during the period of time when a new employee is working toward the full performance level. There was also consensus that, due to the importance of experience and on-the job training, longevity was also important criteria on which employees' pay should be based, especially after the point when an employee becomes capable of full performance of his or her job duties. Longevity coincides with an employee's continued career growth and additional responsibilities. Pay for an employees' certification, licensure or completion of specific training, where such accomplishments enhance the employee's ability to perform the duties of their position or allow the employee to perform additional duties associated with their position, was also agreed to be something that would be a benefit to positions.

In addition, the participants indicated that they were all in favor of a system that would allow an employee to progress in pay as they progressed in their career. They also would like to see different sub-divisions in the engineering fields be surveyed.

Occupational Survey Summary on the Professional Engineers and Engineering Associates

Participation Rate: 75%

SUMMARY BY ROLES

	Engineering Associates	Professional Engineers
<u>Participation Rate:</u>	85%	77%
<u>Time Worked in Occupation:</u>	Approximately 81% of the employees in this field have over 1 year or more work experience; 40% have five or more years; and 26% have ten or more years.	Approximately 11% of the employees in this field have up to 1 year work experience; 34% have one to five years; and 55% have ten or more years
<u>Work Experience</u>	Most positions at entry will extensive skill, knowledge, and experience requiring up to and including 4 years.	Beyond the professional license requirements, many positions require extensive skill, knowledge, and experience requiring over 2 years, up to and including 4 year additional years
<u>Behavioral:</u> (Core)	<ol style="list-style-type: none"> 1. Working with Computers 2. Communications 3. Processing Information 4. Coordinating Work 	<ol style="list-style-type: none"> 1. Communications 2. Interpreting Information 3. Problem Resolution 4. Prioritizing Work
<u>Work Context:</u> (Every Day)	<ol style="list-style-type: none"> 1. Contact with Others 2. Face to face Discussions 3. Work in teams 4. Decisions affect other people 5. Making decision without supervision 	<ol style="list-style-type: none"> 1. Contact with Others 2. Face to face Discussions 3. Interaction with external customer/public 4. Decisions affect other people 5. Work in teams 6. Writes letters and memos
<u>Level of Complexity:</u> (Level 4 or Higher)	40% - Level 3 -You evaluate the relevance and importance of theories, concepts, and principles. You develop different approaches or tactical plans to fit specific circumstances. Guidelines may, exist, but are flexible and open to considerable interpretation. Independent judgment, personal direction, and resourcefulness are	1. 49% - Level 3 -You evaluate the relevance and importance of theories, concepts, and principles. You develop different approaches or tactical plans to fit specific circumstances. Guidelines may, exist, but are flexible and open to considerable interpretation.

	needed to interpret and apply guidelines	Independent judgment, personal direction, and resourcefulness are needed to interpret and apply guidelines.
<u>Supervision Received/Independence:</u> (Level 4 or Higher)	45.8% - Level 2+ - Receive limited supervision and the work requires employees to use independent judgment or act on their own discretion. Requires the use of initiative and creativity to resolve problems or interpret policy to develop solutions. A manager may be available to provide general direction or advice, but employees usually act independently based on their own judgment.	1. 48.2% Level 3+ – Receive general direction, working from broad goals and policies. Desired results are communicated to the employee and alternative methods may be suggested but are not explicitly prescribed. Major work assignments are examined for soundness or technical judgment and for general effectiveness and adequacy.
<u>Supervision Given:</u>	Response generally has equal distribution between not having any supervisor responsibility; supervising others who perform essentially the same work, supervising others and where one's time is spent in supervisory tasks, and managing others	42.4% of positions manager others, through a subordinate supervisor, including selection, recommending terminations, performance appraisal and professional development
<u>Decision Making:</u>	<ol style="list-style-type: none"> 1. 47% - Decisions may affect a work unit or area within a department/division. May contribute to business and operational decisions that affect the department/division. 2. 18%- Decisions have major implications on the management and operations of an area within a department/division. Job may contribute to important strategy, operational and business decisions that affect the department/division. 	<ol style="list-style-type: none"> 1. 45.7% - Decisions have major implications on the management and operations of an area within a department/division. Job may contribute to important strategy, operational and business decisions that affect the department/division. 2. 17.2% - Decisions may affect a work unit or area within a department/division. May contribute to business and operational decisions that affect the department/division.

<p><u>Problem Solving:</u></p>	<ol style="list-style-type: none"> 1. 67.7% - Problems are varied, requiring analysis or interpretation of the situation. Problems are solved using knowledge and skills, general precedents and practices. 2. 24.1% - Problems are highly varied, complex and often non-recurring, requiring novel and creative approaches to resolution. New concepts and approaches may have to be developed. 	<ol style="list-style-type: none"> 1. 43.7% - Problems are varied, requiring analysis or interpretation of the situation. Problems are solved using knowledge and skills, general precedents and practices. 2. 41.1% - Problems are highly varied, complex and often non-recurring, requiring novel and creative approaches to resolution. New concepts and approaches may have to be developed.
<p><u>Fiscal Responsibility:</u></p>	<p>Only 34% of the positions require assisting in planning, monitoring and/or managing budget in functional area of a program.</p>	<p>Only 43.0% of the positions require assisting in planning, monitoring and/or managing budget in functional area of a program. 15.2% of the positions have full responsibility for planning, monitoring and managing a program.</p>