GEORGIA DOT RESEARCH PROJECT RP13-12

FINAL REPORT

"JOB SEEKER"
(Job Shadowing for Employee Engagement through Knowledge and Experience Retention)

Georgia Department of Transportation

OFFICE OF RESEARCH
15 KENNEDY DRIVE
FOREST PARK, GA 30297-2534

GDOT Research Project No. RP13-12

Final Report

"JOB SEEKER"
(Job Shadowing for Employee Engagement through
Knowledge and Experience Retention)

By
J. David Frost, Ph.D., P.E.
Principal Investigator

Georgia Institute of Technology

Contract with

Georgia Department of Transportation

In cooperation with

U.S. Department of Transportation
Federal Highway Administration

May 2016

TECHNICAL REPORT STANDARD TITLE PAGE

1.Report No.: FHWA-GA-16-1312	2. Government Accession No.:	3. Recipient's Catalog No.:	
4. Title and Subtitle: "JOB SEEKER" (Job Shadowing for Employee Engagement through Knowledge and Experience Retention)		5. Report Date: May 2016	
		6. Performing Organization Code:	
7. Author(s): Dr. J. David Frost, Ph.D., P.E.		8. Performing Organ. Report No.:	
9. Performing Organization Name and Address: Georgia Institute of Technology School of Civil & Environmental Engineering 790 Atlantic Drive Atlanta, GA 30318		10. Work Unit No.:	
		11. Contract or Grant No.: 0011820	
12. Sponsoring Agency Name and Address: Georgia Department of Transportation Office of Research 15 Kennedy Drive Forest Park, GA 30297-2534		13. Type of Report and Period Covered: Final; May 2013-May 2016	
		14. Sponsoring Agency Code:	
15. Supplementary Notes: Prepared in cooperation with the U.S. Department of Transportation, Federal Highway Administration.			
16. Abstract: The main objective of this study was to explore how to optimally use the particular knowledge retention/transfer technique of "job shadowing" as an informal method for knowledge capture and transfer as well as increasing communication and employee engagement. Some of the pertinent conclusions from this study are: 1. Job shadowing is a very effective mechanism for transfer of tacit (i.e., experiential) knowledge, which is often difficult to capture. 2. It can facilitate creation and/or transfer of explicit (i.e., formal or codified) knowledge. 3. It is an "informal" mechanism, which allows incorporation of other Knowledge Management (KM) techniques such as story-telling, coaching, mentoring, etc. 4. It is a motivational and networking tool for personnel development, which helps to develop relationships, generate employee interest, and increase engagement. 5. It works well in a variety of environmental conditions, which in turn makes it a well-suited strategy for knowledge transfer in a diverse organization such as the GDOT. 6. A job shadowing program, program guidelines, and training materials have been developed for the Georgia Department of Transportation, which incorporate important factors that are critical for successful job shadowing.			
17. Key Words: Job shadowing, knowledge management, attrition		18. Distribution Statement:	
19. Security Classification (of this report): Unclassified	20. Security Classification (of this page): Unclassified	21. Number of Pages: 124	22. Price:

Form DOT 1700.7 (8-69)

TABLE OF CONTENTS

APPENDIX A – GDOT Job Shadowing Program Guidelines

APPENDIX B – Job Shadowing Training Module

LIST OF TABLES

LIST OF FIGURES

EXECUTIVE SUMMARY

In recent years, the Georgia Department of Transportation (GDOT) has seen a dramatic decrease in the number of employees from over 5,000 just a few years ago to the current number of about 4,000 employees. In addition, many long-time employees are nearing retirement age, creating a potentially critical loss of personnel, knowledge, and experience for the department. Further, the number of retiring employees far exceeds the number of new hires as a result of budgetary restrictions, retirement plan restructuring, and other external factors. This net loss of personnel can result in "lost knowledge" and create a "knowledge gap", meaning knowledge and experience possessed by long-time employees are not being transferred to the new hires.

Knowledge and experience within GDOT are both a major investment and a valuable resource. Equally well, these are some of the most vulnerable assets that can be easily impacted or lost. As such, developing strategies for knowledge retention and transfer to minimize these impacts is an important opportunity for GDOT to invest with a significant "return on investment" and can impact every level throughout GDOT. In addition, developing strategies can go beyond "loss prevention" – making it part of the GDOT culture can be a game-changer with regard to employee satisfaction and ultimately, employee retention.

The "Job Seeker" project addresses these issues by identifying some of the most effective methods for capturing and disbursing knowledge between the "near-retirement" generation and the "new generation" of workers. More specifically, the goal of the project was to explore how to optimally use the particular knowledge retention/transfer

technique of "job shadowing" as an informal method for knowledge capture and transfer as well as increasing communication and employee engagement.

Job shadowing can be described as having a less experienced employee (i.e., protégé) paired with a veteran employee (i.e., mentor) for a period of time, with the mentor asked to share knowledge including dealing with the most difficult situations faced on the job. The intent is to have the protégé observe, internalize, and eventually collaborate with the mentor. In this regard, the job shadowing program designed for GDOT is also intended to take place over a longer period of time (e.g., several months) than the more traditional programs where the shadowing takes place over a short-period of time (e.g., one or two days). This longer duration is chosen to ensure that knowledge can be transferred more effectively.

Job shadowing can be used not only as a knowledge transfer tool, but also as a motivational and networking tool for personnel development. It has many benefits, including:

- It is a very effective mechanism for transfer of tacit (i.e., experiential) knowledge ("tricks of the trade"), which is often difficult to capture.

- It can facilitate creation and/or transfer of explicit (i.e., formal or codified) knowledge, if protégé codifies the knowledge acquired.

- It is an "informal" mechanism, which allows incorporation of other Knowledge Management (KM) techniques such as story-telling, coaching, mentoring, etc.

- It is a motivational and networking tool for personnel development, which helps to develop relationships, generate employee interest, and increase engagement.

- It works well in a variety of environmental conditions, which in turn makes it a well-suited strategy for knowledge transfer in a diverse organization such as the GDOT.

The job shadowing program developed for GDOT and presented in this report not only incorporates important factors that are critical for successful job shadowing, but also considers the environment in which job shadowing will take place. The program includes a modular framework for evaluation of knowledge loss risk (KLR) potential, as well as identification of a mentor-protégé pair for participation in a job shadowing program. The framework allows knowledge loss risk associated with any knowledge-holder to be objectively quantified, then provides tools for systematic identification of a suitable mentor and protégé so that job shadowing can take place to preserve the knowledge.

The framework is also coded into a spreadsheet format, titled the "Job Shadowing Evaluation Tool", or JSET. JSET is a multivariate analysis evaluation tool which provides an objective, transparent, and consistent way to evaluate knowledge loss risk, as well as suitability of mentor and protégé(s) for participation in a job shadowing program. In addition, a program guidelines document and a training module have been developed for the job shadowing program and refined using feedback obtained from a pilot study, so that GDOT personnel can administer the program to future participants.

It is anticipated that the tool developed as part of the "Job Seeker" project and presented in this report will help to minimize knowledge loss due to attrition within GDOT, while simultaneously increasing employee engagement through the use of job shadowing and in turn helping GDOT achieve its stated mission of providing a safe, connected, and environmentally sensitive transportation system that enhances Georgia's economic competitiveness by working efficiently and communicating effectively to create strong partnerships.

ACKNOWLEDGMENTS

1. INTRODUCTION

In recent years, the Georgia Department of Transportation (GDOT) has seen a dramatic decrease in the number of employees from over 5,000 just a few years ago to the current number of less than 4,000 employees. In addition, many long-time employees are nearing retirement age, creating a potentially critical loss of personnel, knowledge, and experience for the department. Further, the number of retiring employees far exceeds the number of new hires as a result of budgetary restrictions, retirement plan restructuring, and other external factors. This net loss of personnel can result in "lost knowledge" and create a "knowledge gap", meaning knowledge and experience possessed by long-time employees are not being transferred to the new hires.
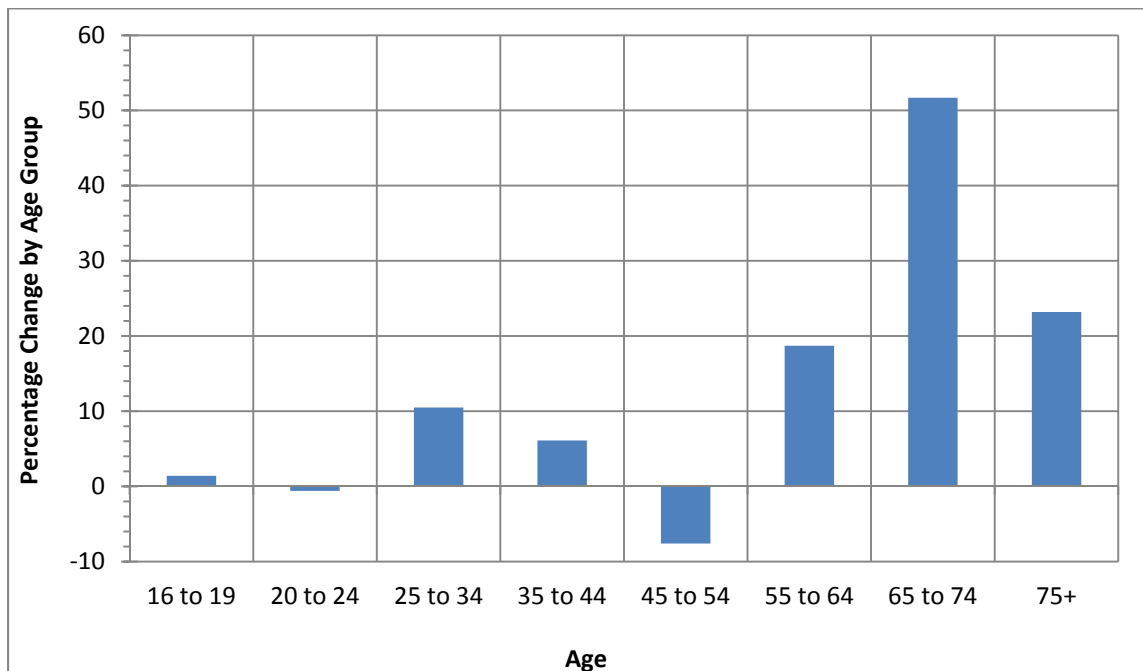
Figure 1 – Changing Distribution of the Workforce 2010-2020
(Source: US Bureau of Labor Statistics)

The aging workforce and the potential for "lost knowledge" is not just a GDOT problem; it is in fact a nationwide (and worldwide) problem. For the period from year 2010 to 2020, information obtained from the United States Bureau of Labor Statistics, as shown on **Figure 1**, indicates a significant growth of those aged 45 and higher in the workforce in comparison to those less than 45 years of age.

Continuing to provide and maintain quality transportation systems in the state of Georgia with current GDOT employees who are experiencing significantly increased responsibility with limited preparation and without an increase in compensation further challenges the system. Many employees are required to perform tasks with minimal previous training, ultimately resulting in losses in both quality and efficiency. The culmination of these factors is that GDOT's ability to effectively accomplish its stated mission of providing a safe, connected, and environmentally sensitive transportation system that enhances Georgia's economic competitiveness by working efficiently and communicating effectively to create strong partnerships is put in jeopardy.

1.1 PURPOSE

Knowledge and experience within GDOT are both a major investment and a valuable resource. Equally well, these are some of the most vulnerable assets that can be easily impacted or lost. As such, developing strategies for knowledge retention and transfer to minimize these impacts is an important opportunity for GDOT to invest with a significant "return on investment", and can impact every level throughout GDOT. In addition, developing strategies can go beyond "loss prevention" – making it part of the GDOT

culture can be a game-changer with regard to employee satisfaction and ultimately, employee retention.

The "Job Seeker" project aims to address these issues by identifying some of the most effective methods for capturing and disbursing knowledge between the "near-retirement" generation and the "new generation" of workers. More specifically, the goal of the project was to explore how to optimally use the particular knowledge retention/transfer technique of "job shadowing" as an informal method for knowledge capture and transfer as well as increasing communication and employee engagement.

The job shadowing program is also intended to serve as a successful motivational tool, which keeps employees engaged and excited about their work environment and career path while helping to reduce turnover rates. In the end, the creation of an effective job shadowing program will help GDOT to accomplish its aforementioned mission more effectively.

1.2 METHODOLOGY

First, a literature review of current practices related to knowledge management (KM) as well as knowledge transfer (KT), and knowledge retention (KR) was performed. The review included practices utilized by other state transportation departments and governmental agencies, as well as private companies and industry organizations. The goal of the review was to identify and document the effective components of these programs and to explore other relevant aspects such as effective structures, innovative strategies for training, and unique methods to identify and capture knowledge and

experience from seasoned employees. The findings from this review were compiled into a database to assess metrics such as program functionality, employee time requirements, overall quality and effectiveness, cost, and ability to implement within GDOT.

In addition to literature review, several meetings were held with GDOT personnel, including those with Human Resources (HR) representatives as well as the technical advisory board for the project, to present the relevant literature review findings, to get feedback with regard to the research and program specifics, as well as to select suitable candidates for participation in a pilot study for the job shadowing program.

Upon review of literature and other relevant documents (such as the 2013 GDOT Knowledge Management Survey results), as well as meetings with GDOT personnel, a framework was developed for a job shadowing program considering the characteristics and needs of the GDOT organization. The framework included tools for systematic identification of knowledge loss risk for the "near-retirement" generation of employees, as well as mentor and protégé identification for participation in job shadowing. The framework was codified in a spreadsheet format, called "Job Shadowing Evaluation Tool" or JSET. In addition, a policy guidelines document and a training module were developed to help GDOT personnel administer the program to future participants.

Lastly, a pilot study was conducted with a group of selected participants. The main goal of the pilot study was to obtain relevant feedback from the study participants so that refinements could be made in order to maximize the program's effectiveness prior to full-scale implementation. The findings from the pilot study were used to revise and finalize the policy guidelines document for the project. The findings were also incorporated into the final report.

1.3 REPORT ORGANIZATION

The project report is organized as follows:

- Section 1 provides a brief introduction, as well as purpose and methodology for the research study.

- Section 2 contains an overview of knowledge and knowledge management, as well as results of a knowledge management survey conducted by GDOT in 2013. This section also contains an overview of job shadowing in the context of knowledge management.

- Section 3 provides a description of the job shadowing program and the Job Shadowing Evaluation Tool (JSET) developed for GDOT, including objective and systematic identification of knowledge loss risk as well as mentor-protégé pair for participation in job shadowing, and a summary of the policy guidelines and training module developed for the job shadowing program.

- Section 4 contains conclusions and recommendations for future work, including the use of data mining and pivot tables/charts for identification of at-risk positions in GDOT, the use of spatial analysis techniques such as Geographic Information Systems (GIS) for analysis and presentation of data geographically, and lastly the use of network analysis techniques for identification of critical knowledge and connectivity of individuals within an organization, which in turn can have important implications for knowledge capture and transfer using techniques such as job shadowing.

- Section 5 contains report references.

Appendix A contains the program guidelines document prepared for the project. Appendix B contains the job shadowing training module developed for the project. A copy of JSET and the job shadowing training module (in PowerPoint presentation format) are also attached to the project report as electronic files.

2. LITERATURE REVIEW

2.1 KNOWLEDGE: AN OVERVIEW

What is knowledge? It is difficult to assign an exact definition to knowledge; in fact, the entire field of epistemology is dedicated to the theory of knowledge. As defined by Plato, knowledge is "justified true belief" (Small & Sage, 2005/2006). For the purposes of this report, we adopt the following working definition as suggested by Davenport & Prusak, 1998:

"Knowledge is a fluid mix of experience, values, contextual information and expert insight that provides a framework for evaluating and incorporating new experiences and information".

With this definition, Davenport & Prusak suggest that "knowledge is not neat or simple. It is a mixture of various elements; it is fluid as well as formally structured; it is intuitive and therefore hard to capture in words or understand completely in logical terms."

It is important to note that knowledge is based on data and information: knowledge derives from information (i.e., a conveyed message, usually in the form of a document or an audible or visible communication) as much as information derives from data (i.e., facts and figures without context and interpretation). Data in and of themselves do not have inherent meaning; instead, they are the basis of creating information through

interpretation and judgment (Davenport & Prusak, 1998). In fact, O'Dell & Grayson, Jr., 1998 describe knowledge as "information in action".

It is also important to note that "information moves around organizations through hard and soft networks". Hard networks are infrastructure-dependent, while soft networks are informal and typically based on social interaction. That said, information–or knowledge–should not be confused with the technology that delivers it. After all, it is the information delivered, and not how it is delivered, that is important (Davenport & Prusak, 1998; Malecki, 2002).

Knowledge comes in two basic varieties (O'Dell & Grayson, Jr., 1998):

1) <u>Tacit Knowledge</u>: informal or uncodified knowledge that resides in the minds of the people. It is highly experiential and difficult to catalogue.

2) <u>Explicit Knowledge</u>: formal or codified knowledge that is documented in a memo, published in a book or journal, catalogued in a database or in a manual, etc.

Organizational knowledge can then be described as the collective knowledge possessed by an organization, formed through data and information, present either in tacit or explicit form, and conveyed through networks. It is the best asset an organization has: in the words of Benjamin Franklin, "An investment in knowledge pays the best interest".

2.2 KNOWLEDGE MANAGEMENT

In the context of an organization, knowledge management (KM) can be described as "a conscious strategy of getting the right knowledge to the right people at the right time and helping people share and put information into action in ways that strive to improve organizational performance" (O'Dell & Grayson, Jr., 1998). In other words, KM is a framework to capture and share knowledge within an organization.

In general, KM can be broken into two main strategies (Hansen, et al., 1999):

1) Codification: storing and sharing of knowledge through repositories (databases).

2) Personalization: sharing of knowledge through direct person-to-person communication.

Typically, these two strategies are used simultaneously, although some organizations may place a greater degree of emphasis on one over the other, depending on the organizational culture. For instance, Western cultures (such as the US) tend to place greater emphasis on codification or explicit knowledge, while Eastern cultures (such as Japan) tend to place greater emphasis on personalization or tacit knowledge (Nonaka & Takeuchi, 1995; Small & Sage, 2005/2006).

Knowledge retention (KR) and knowledge transfer (KT) are integral parts of a KM program. Often, the objective is to capture and preserve the organizational memory and transfer the knowledge to the next generation of workers, while keeping in mind that not all knowledge needs to be retained or transferred.

Many different KR/KT strategies were identified during the course of literature review (CALTRANS, N.D.; Ward, 2007; Perkins & Bennett, 2012; CII, 2013). Some of the most common strategies have been compiled and are summarized in **Table 1**. Some of these strategies focus primarily on codification and some primarily on personalization, while others can be considered a combination.

Table 1: Partial List of KR/KT Strategies

Document Repositories	Double Fills
Process Documentation	Job Shadowing
Knowledge Mapping / Inventories	Job Rotation
On the Job Training	Grooming Assignment
Communities of Practice	Attending Meetings as Observer / Learner
Lessons Learned / Critical Incident Reviews	Exit Interviews
Job Aids	Knowledge Fairs
Storytelling / Narrative Database	Lunchtime Seminars
Mentoring / Coaching	Training (Classroom instruction, web training, etc.)
Deskside Reviews	IT Collaboration / Communication
Best Practice Meetings / Studies	Keeping Retirees Connected
Expert Interviews	Facilitated Classes

The Construction Industry Institute (CII) performed a recent study, during which some of the above mentioned KT strategies were investigated for suitability in transferring and retaining primarily experiential (i.e., tacit) knowledge in an organization (CII, 2013). The results are presented in a slightly modified form in **Table 2**.

It can be seen from **Table 2** that the effectiveness of a given KT strategy is largely dependent upon the relationship between the knowledge source and the knowledge receiver (e.g., one-on-one, or one knowledge source for many receivers), the time and duration available for knowledge transfer to take place, as well as whether or not the knowledge source and receiver are co-located and whether or not Information Technology (IT) structure exists to help facilitate KT. Some of the strategies, such as narrative databases/storytelling, mentoring/coaching, job rotation and job shadowing, were found to perform well across a variety of environmental conditions.

National Cooperative Highway Research Program (NCHRP) Synthesis 365 titled "Preserving and Using Institutional Memory through Knowledge Management Practices" evaluated the state of KM practices within State Transportation Agencies (STA). Out of the 60 STA surveyed, only about half (33) reported specific efforts to capture knowledge within their organization. The most common effort made to capture knowledge was the exit interview. In general, the study found that very few STA have a purposeful and effective organization-wide program for KM (Ward, 2007).

Table 2: Database of KM Techniques and Their Effectiveness (after CII, 2013)

Environmental Characterization	1 Lessons Learned & Best Practices	2 Community of Practice	3 Facilitated Master's Classes	4 Lunchtime Seminar	5 Narrative Database / Storytelling	6 Standardized College Program	7 IT Collaboration / Communication	8 Outsourcing / Acquisition	9 Deskside Reviews	10 Job Shadowing	11 Mentoring / Coaching	12 Simulations	13 Job Rotation	14 Attend Meetings as an Observer	15 Grooming Assignment	16 Keep Retirees Connected
Only one knowledge source and one knowledge receiver	2	2	2	1	3	1	2	1	3	3	3	2	3	2	3	3
Only one knowledge source and many knowledge receivers	2	2	3	2	3	1	2	1	2	2	2	2	3	2	2	2
Knowledge source is available less than 5 hours a week	1	1	1	1	2	1	1	1	2	1	1	1	1	1	1	3
Knowledge source is available between 5 and 20 hours a week	2	2	2	2	3	1	2	2	2	2	3	2	2	2	2	2
Knowledge source is available between 20 and 40 hours a week	3	3	3	3	3	1	2	1	2	3	3	2	3	2	3	3
Information Technology (IT) structure exists to support / distribute knowledge	2	3	2	2	3	1	2	1	2	2	2	2	2	2	2	3
IT structure does not exist to support / distribute knowledge	1	1	2	2	2	1	1	1	1	2	2	1	2	1	1	1
Knowledge source and knowledge receiver are co-located	2	2	3	2	3	2	2	2	3	3	3	3	3	2	3	2
Knowledge source and knowledge receiver are not co-located	1	1	2	1	2	2	2	1	2	1	2	1	2	1	2	1
There is less than 3 months available for knowledge transfer to take place	2	2	N/A	2	2	2	2	1	2	2	2	3	2	1	1	1
There is 3 to 6 months available for knowledge transfer to take place	2	2	2	1	2	2	2	2	2	2	2	1	2	1	2	2
There is more than 6 months available for knowledge transfer to take place	1	2	N/A	1	3	1	1	1	3	3	3	1	3	1	3	1

1 = Low effectiveness   2 = Moderate effectiveness   3 = High effectiveness   N/A = Effectiveness unable to be quantified

A recent study sponsored by the Alaska DOT looked at the KT needs and methods within that organization, and included the performance of interviews and surveys to gather information on current KT practices within the organization. The study concluded that the effectiveness of a given KT method varies with the type of knowledge (i.e., tacit or explicit). In this regard, job shadowing and double-fills were mentioned as "excellent method[s] for transferring the tacit knowledge associated with a job to a likely replacement", and a recommendation was made to prioritize job shadowing and double-fills for training of the replacement (Perkins & Bennett, 2012).

While the need to retain and transfer knowledge within an organization is of critical importance, there are several logistical, structural, and cultural barriers that create difficulties in transferring knowledge. These barriers can cause a best practice to go unrecognized and unshared for years, and even when recognized, it can take a long time for the practice to be adopted across the organization (Szulanski, 1995; O'Dell & Grayson, Jr., 1998).

Some of the key barriers to KR/KT in an organizational setting can be summarized as follows (Szulanski, 1995; Davenport & Prusak, 1998; DeLong, 2004; O'Dell & Grayson, Jr., 1998):

- Lack of willingness / motivation: This can be applicable to both the source and the recipient of the knowledge. The source may be reluctant to share knowledge for fear of losing his/her position as an expert, due to a lack of trust on the recipient's ability to absorb the knowledge, or due to lack of financial or other motivations. On the other

hand, the recipient may be reluctant because of a preconceived notion of the usefulness / reliability of the source's knowledge.

- Lack of time / resources: The source and/or the recipient may feel that the work hours are long enough as-is without the added burden of time required for knowledge transfer. This is especially the case in organizational cultures that do not see knowledge management as a priority, and employees may be expected to perform KT activities on their own time. This is also applicable to lack of resources such as meeting places and IT support.

- Interpersonal dynamics / relationships: These are factors that can create an arduous relationship between the source and the recipient including, but not limited to, personality conflicts such as cultural or generational differences, the source and recipient valuing knowledge differently (e.g., a recipient may feel the source's knowledge is outdated and no longer relevant and vice versa), lack of trust between the mentor and the protégé, and close-mindedness.

- Teaching ability of knowledge owners: An expert may not necessarily be a good teacher for various reasons such as poor communication skills, intolerance for mistakes, and lack of patience.

- Lack of absorptive / retentive capacity by the recipient: Effective transfer of knowledge consists of two mechanisms: transmission of knowledge from source to recipient and absorption (and use) by the recipient (Davenport & Prusak, 1998). In this regard, lack of absorptive capacity refers to the capacity to receive, assimilate,

and use new knowledge, while retentive capacity refers to the ability of a recipient to institutionalize the utilization of new knowledge. The lack of these capacities are typically related to the lack of time, money, and/or management resources for knowledge transfer activities.

- Ignorance: This refers to the idea that sources may feel like their knowledge is not important enough to share, while the recipients may have no idea that someone in the organization already has the knowledge.

- Organizational culture: Effective transfer of knowledge requires organizational "buy-in"; otherwise, it may not be possible to dedicate the time, money, and management resources necessary for effective knowledge transfer.

2.3 KNOWLEDGE MANAGEMENT IN GDOT

A "Knowledge Management Techniques Survey" was administered internally by GDOT in 2013 to assess the different KM strategies that exist within the organization (see **Table 3**) and their effectiveness from the perspective of the employees.

Approximately 1% of the respondents were at the "Director" level, 38% at "Manager" level, 34% at "Technician / Specialist" level, 3% at "Administrator" level, and 24% at "Other" levels (see **Figure 2**). Additionally, approximately 45% of the respondents stated their area of expertise as "Engineering", 35% as "Other", 8% as "Administration", with categories such as finance, legal, human resources, political relations, and research making up the rest (see **Figure 3**). Lastly, approximately 13% of

the respondents had been with the organization for 0 to 5 years, 24% for 6 to 10 years, 19% for 11 to 15 years, 18% for 16 to 20 years and 26% for greater than 21 years (see **Figure 4**).

Table 3: KM Strategies Surveyed and Perceived Effectiveness

| Strategy	Perceived Effectiveness				
	Very Effective	Moderately Effective	Slightly Effective	Not Effective	No Opinion
Job Shadowing	38.7%	29.3%	13.1%	3.3%	15.6%
Cross Training	35.7%	35.6%	10.6%	3.2%	14.9%
Lunch and Learn	5.9%	16.4%	19.6%	9.4%	48.7%
Expert / Knowledge Interviews	18.8%	18.6%	8.9%	4.7%	49%
Desk Manuals	31.4%	28.7%	8.7%	4.3%	26.9%
Project Reviews / Lessons Learned	33.4%	27.3%	9.7%	3%	26.6%
Internal Training / Workshop	36.2%	42%	13.6%	4.5%	3.7%
External Training / Workshop	35%	39.8%	14.2%	3.2%	7.8%
Internal Procedural Manuals	31.7%	29.9%	9.9%	1.5%	27%
Program Monitoring and Evaluation	16%	23.6%	11.5%	2.6%	46.4%
Assessing / Documenting Skills & Capabilities of Co-Workers	17.8%	24.6%	11.1%	6.4%	40.1%
External Reports or Documentation	22%	29.6%	14.8%	3.7%	29.9%
Consult Outside Organizations for Supporting KR	15.9%	20.9%	11.2%	3.4%	48.6%
Communities of Practice	15.4%	21.6%	11.8%	3.8%	47.4%

Total No. of Respondents = 681
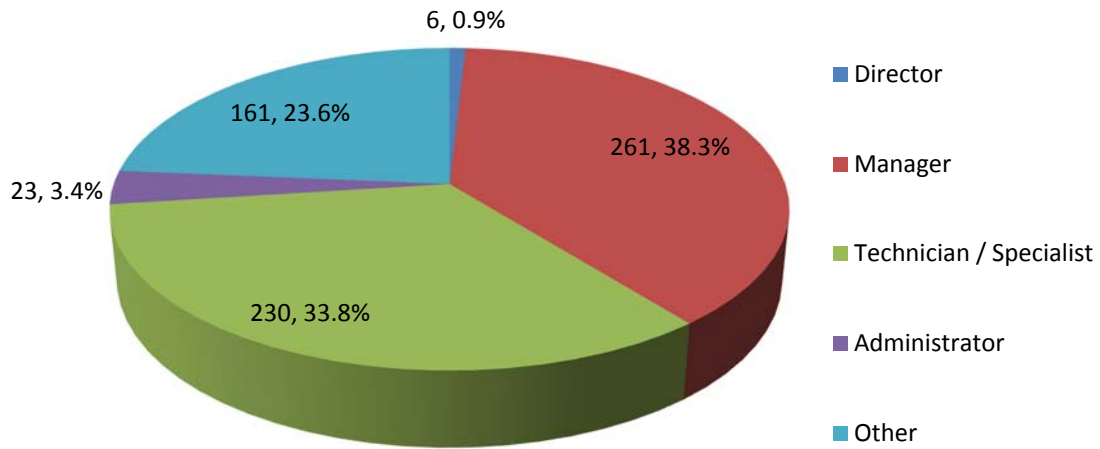
Figure 2 – Position of GDOT KM Survey Respondents
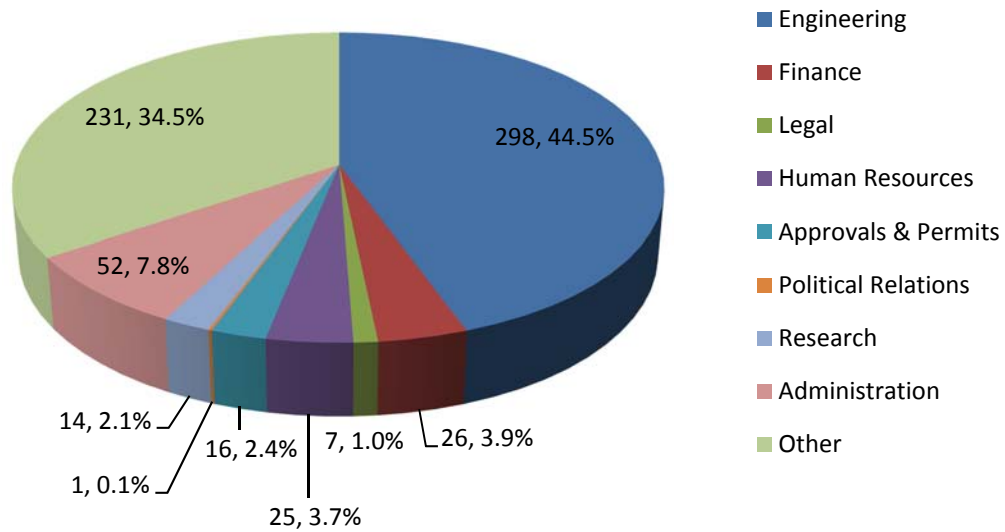
Total No. of Respondents = 670

Figure 3 – Area of Expertise of GDOT KM Survey Respondents
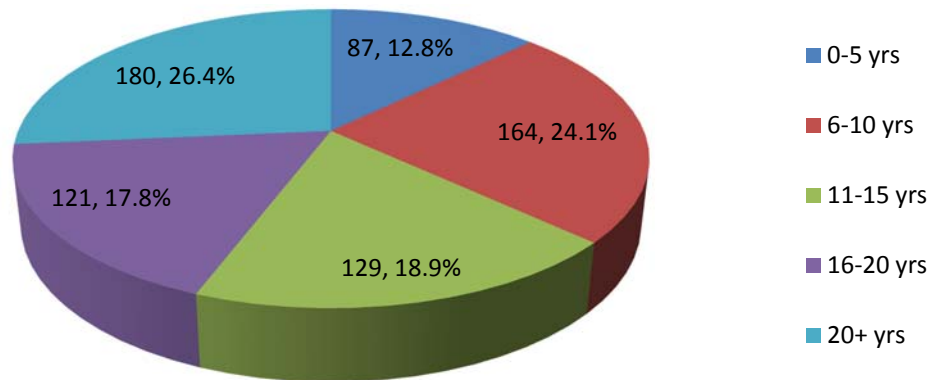
Total No. of Respondents = 681

Figure 4 – Tenure of GDOT KM Survey Respondents

Table 3 indicates that job shadowing, cross training, and internal or external training/workshops were rated as the four most effective strategies for KM by the GDOT survey respondents. The data also indicate that both codification and personalization based strategies can be effective with regard to KM. This is in agreement with the idea that knowledge in GDOT is both tacit and explicit, and both types of knowledge need to be retained and transferred equally well.

The survey responses were further analyzed specifically with respect to job shadowing. **Figure 5** shows approximately 59% of the respondents stated that they had participated in job shadowing at one point during their tenure at GDOT, while 41% stated they had never participated. **Figure 6** shows approximately 68% of respondents stated that job shadowing is moderately to very effective as a knowledge management technique. These results indicate that overall, GDOT employees view job shadowing favorably.
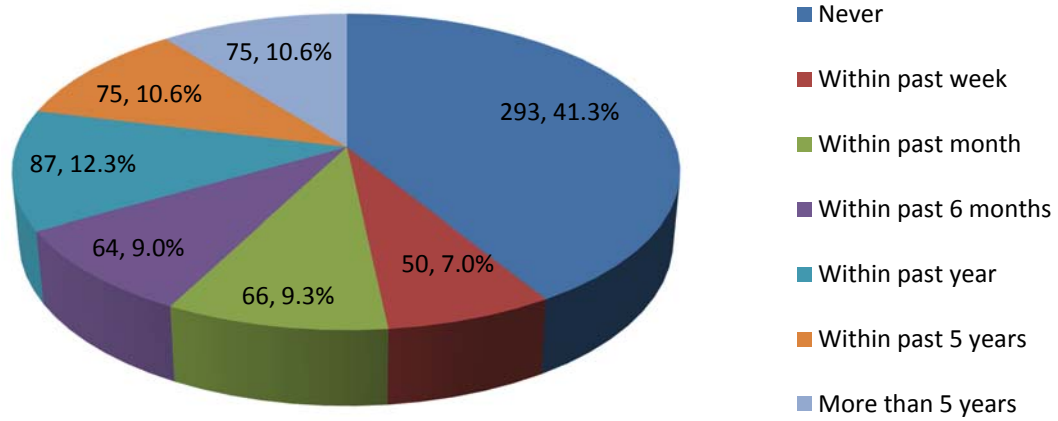
Total No. of Respondents = 710

Figure 5 – Survey Respondents' Participation in Job Shadowing
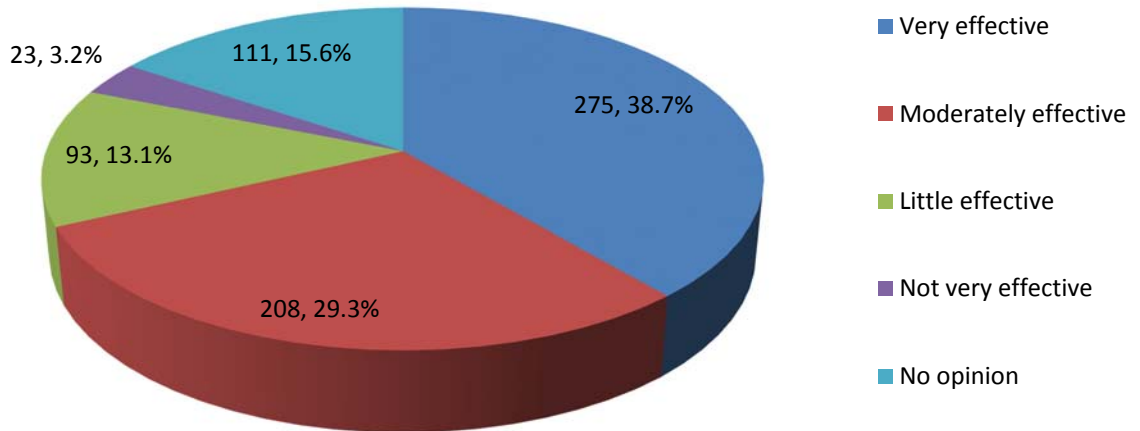
Total No. of Respondents = 710

Figure 6 – Survey Respondents' Perceived Effectiveness of Job Shadowing

2.4 JOB SHADOWING FOR GDOT

As stated previously, the goal of this project was to explore how to optimally use job shadowing as an informal method for knowledge capture and transfer as well as increasing communication and employee engagement. It can be seen from the data presented so far that job shadowing can be an excellent tool to achieve this goal.

Job shadowing can be described as having a less experienced employee (i.e., protégé) paired with a veteran employee (i.e., mentor) for a period of time, with the mentor asked to share knowledge including dealing with the most difficult situations faced on the job (Rothwell, 2004). The relationship between the mentor and the protégé can range from one-on-one collaborative work to mentor observing the protégé's work and vice versa.

In an observation-based arrangement, the roles are well-defined, and there is relatively little disruption to the work as the observation takes place while the participants go about their business as usual. However, this arrangement can limit the interaction between the mentor and protégé, and hinder the effectiveness of knowledge transfer. On the other hand, a collaborative work arrangement provides a greater disruption to the work day; however, it also encourages hands-on experience and exchange of information and facilitates discussion/interaction between the participants, which can enhance the effectiveness of knowledge transfer (University of London, 2015).

Job shadowing can also occur in a group setting; that is, there may be multiple protégés for one mentor. Nonetheless, the end goal is to have the protégé internalize the knowledge and eventually collaborate with and/or succeed the mentor, if job shadowing

is performed as part of a succession planning program. Otherwise, job shadowing can be an effective tool in building relationships between the mentor and the protégés.

It is worth noting that job shadowing can be related to, but differs from coaching and/or mentoring. In an organizational setting, coaching refers to training or development with the purpose of helping one to achieve a specific professional goal. Mentoring refers to an extended relationship in which advice-giving and role-modeling takes place for orientation and professional development purposes. On the other hand, job shadowing occurs for a relatively short and defined time period during the usual work hours and environment of the person being shadowed for knowledge transfer. Job shadowing can lead to ongoing coaching / mentoring if both parties agree to it (Roan, 2003; Lawrence, 2010).

Studies have shown that job shadowing can be a very effective mechanism for transfer of tacit (i.e., experiential) knowledge, as well as generating employee interest and engagement (Schmidt, 2007; CII, 2013; Martin, et al., 2014). It can also result in creation of explicit knowledge provided that the protégé can codify the knowledge acquired. Further, job shadowing can work well in a variety of environmental conditions (CII, 2013), which in turn makes it a well-suited strategy for knowledge transfer in a diverse organization such as the GDOT.

In this regard, an analysis of the employees' responses and comments on job shadowing from GDOT's KM survey revealed that job shadowing overall is viewed as a valuable tool within the organization. Three key points in particular were identified from a text analysis of the survey comments:

1) Time: respondents suggested that the strategy is effective if sufficient time is allotted for job shadowing to take place (though the respondents were not asked to specify exactly how much time would be considered sufficient).

2) Opportunity: respondents saw job shadowing as an opportunity to advance their careers. In this regard, it is important to note that lack of opportunity is frequently cited as one of the main reasons why employees leave an organization, often ranking it higher than factors such as greater pay/benefits (Grunewald, 2014; Sprunt, et al., 2014).

3) Experience: respondents suggested that job shadowing is effective if the mentor is experienced (as opposed to a mid-level employee being a mentor).

The aforementioned barriers to knowledge transfer as discussed in Section 2.2 apply to job shadowing as well. In particular, the CII study found that personality conflicts, willingness, teaching ability, prejudice, and cultural differences were the biggest barriers to effective knowledge transfer when using job shadowing. The study also found that lack of time (defined as having less than 5 hours a week available for job shadowing to take place), and location of the mentor and the protégé (that is, whether or not the pair is co-located) are important factors influencing the effectiveness of knowledge transfer via job

shadowing (CII, 2013). As previously mentioned, lack of time was also identified as a key factor for job shadowing by the GDOT KM survey respondents.

In summary, among the many KM strategies that are available, job shadowing can be an excellent tool for capture and transfer of both tacit and explicit knowledge, as well as increasing communication and employee engagement in GDOT by helping to create a long-term relationship between the mentor and the protégé if both parties agree to it. The effectiveness of job shadowing is strongly dependent upon the time available for job shadowing to take place, compatibility of the mentor-protégé pair, and to a certain extent, the location of mentor and protégé. Barriers exist that could affect the effectiveness of knowledge transfer during job shadowing, and these must be recognized and addressed to the extent possible.

3. GDOT JOB SHADOWING PROGRAM

Based on the data gathered from literature review, while taking into account the characteristics and needs of the GDOT organization, a job shadowing program was developed that not only incorporates important factors that are critical for successful job shadowing, but also considers the environment in which job shadowing will take place. The program includes a modular framework for evaluation of knowledge loss risk (KLR) potential, as well as identification of a mentor-protégé pair for participation in a job shadowing program. The framework allows knowledge loss risk associated with any knowledge-holder to be objectively quantified, and then provides tools for systematic identification of a suitable mentor-protégé pair so that job shadowing can take place to preserve the knowledge.

A summary of the framework and the evaluation process is given in **Figure 7**. It can be seen from this Figure that four main factors were identified for knowledge loss risk, mentor evaluation and protégé evaluation tasks, respectively. These factors were identified based on findings from the literature review, as well as discussions with the project technical advisory board. The modular nature of the framework can also easily accommodate introducing additional factors into the evaluations, should additional factors be deemed necessary in the future.

In addition, a policy guidelines document and a training module have been developed for the job shadowing program, refined using feedback obtained from a pilot study, so that GDOT personnel can administer the program to future participants.
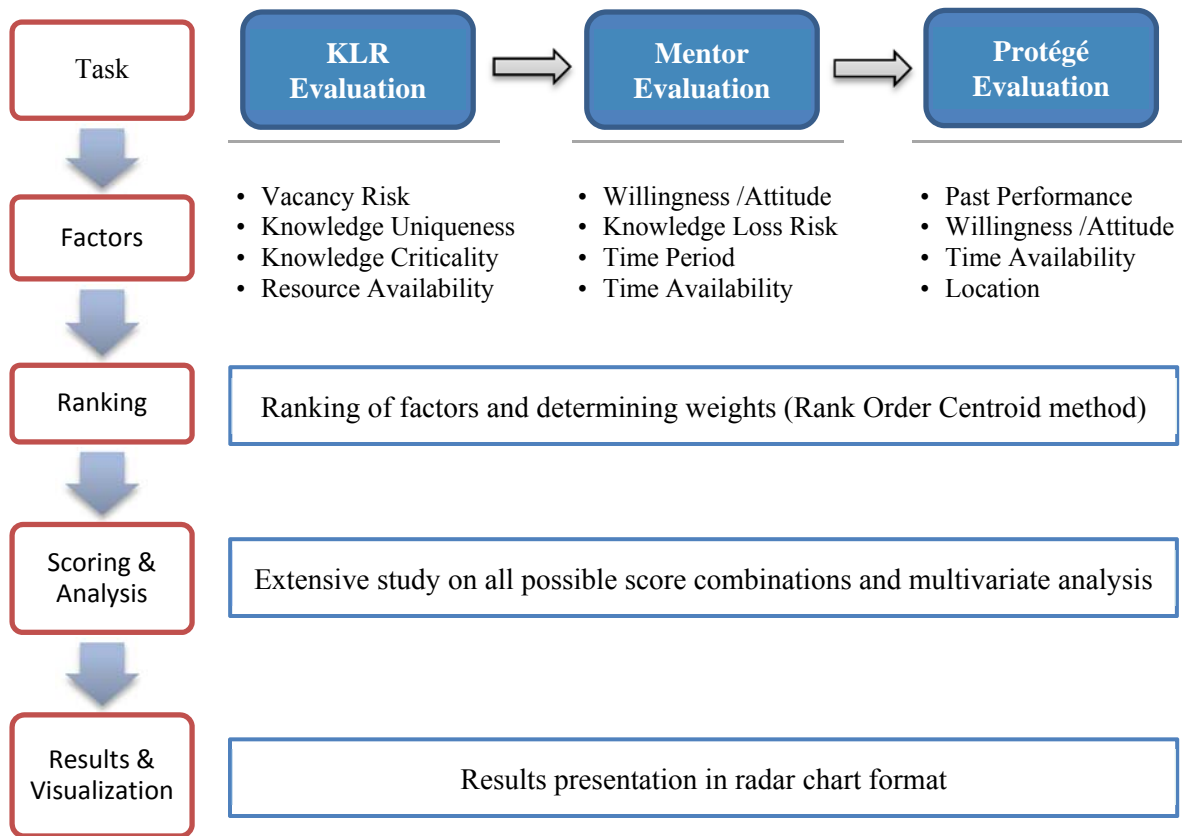
Task	KLR Evaluation	→	Mentor Evaluation	→	Protégé Evaluation
Factors	• Vacancy Risk • Knowledge Uniqueness • Knowledge Criticality • Resource Availability		• Willingness /Attitude • Knowledge Loss Risk • Time Period • Time Availability		• Past Performance • Willingness /Attitude • Time Availability • Location
Ranking	Ranking of factors and determining weights (Rank Order Centroid method)				
Scoring & Analysis	Extensive study on all possible score combinations and multivariate analysis				
Results & Visualization	Results presentation in radar chart format				

Figure 7 – Framework and Evaluation Process for the Job Shadowing Program

3.1 KNOWLEDGE LOSS RISK (KLR) EVALUATION

The Tennessee Valley Authority (TVA), the largest power public utility in the United States, has been downsizing since the 1980s due to increased competition and need to control costs. In the late 1990s, the agency realized that a large portion of its workforce was nearing retirement, and that significant attrition was likely to occur, in turn creating a potential for significant knowledge loss. This led to an internal team of Human Resources (HR) personnel and line managers developing tools to combat this issue, with the first

step being the identification of positions that posed the greatest threat to critical knowledge loss (DeLong, 2004).

TVA's method to identify critical knowledge consists of two main factors: retirement data gathered from employee surveys (called the retirement factor), and input from managers and supervisors to provide an estimate of the indispensability of their employees (called the position risk factor). The combination of these two factors is deemed the "total attrition factor", with the total attrition factor determining the level of effort required to effectively manage attrition (DeLong, 2004; Tennessee Valley Authority, 2015).

Building upon this general framework, a methodology has been developed to identify "at-risk knowledge" within GDOT; that is, knowledge that is at risk of being lost due to attrition. Identification of at-risk knowledge is of critical importance prior to job shadowing taking place for knowledge capture and transfer. In this regard, evaluation of knowledge loss risk (KLR) was based on the following main factors:

1) Uniqueness: knowledge possessed by only one or a select few individuals in the organization. In large organizations with many subsets that are not well connected, unique knowledge could exist within one or more subsets without the other subsets being aware of the presence of the knowledge. Further, knowledge can have different uniqueness depending on the spatial location, especially in organizations such as GDOT which cover large geographical areas. In such cases, uniqueness should be evaluated at the local subset scale.

2) Criticality: knowledge that is of crucial importance for continued and successful function of the organization. Similar to uniqueness, criticality should be evaluated at the subset scale in large organizations with many subsets that are not well connected or spatially disjointed. It should also be noted that not all knowledge is critical; in fact, some knowledge deserves to be lost and not transferred.

3) Vacancy risk: this refers to the risk associated with a knowledge holder leaving an organization, through retirement or other means. Knowledge may be both unique and critical; however, it is not at immediate risk of being lost until there is a vacancy risk associated with that knowledge holder.

4) Resources Availability: this refers to the fact that even though knowledge is identified as being at-risk, resources (time, money, etc.) may not be available to facilitate the transfer of knowledge from one to another.

3.2 MENTOR EVALUATION

Evaluation of the potential mentor to participate in a job shadowing program was based on the following main factors, which are based on literature review as well as discussions with the project technical advisory board:

1) Knowledge Loss Risk: this is related to the criticality and uniqueness of the mentor's knowledge (as discussed previously), which in turn is typically reflective of his/her level of experience. Having an experienced mentor (as

opposed to a mid-level employee) is an important factor for effective transfer of knowledge in a job shadowing program.

2) <u>Willingness / Attitude:</u> a potential mentor may hold both unique and critical knowledge; however, it is possible that he/she has no interest in being a mentor. Further, previous experience of the managers / supervisors may suggest that a particular employee may not be well-suited to being a mentor.

3) <u>Time Period:</u> this refers to the time period that a potential mentor has available for participation in a job shadowing program. For example, a potential mentor who has two weeks left with the organization may not be as effective in transferring knowledge as someone who has six months or more.

4) <u>Time Availability:</u> this is different from the time period factor, and refers to the time available as a percentage of total time that a potential mentor has available for participation in a job shadowing program. For example, a potential mentor who has only 1 or 2 hours per week available may not be as effective in transferring knowledge as someone who has 6 to 8 hours per week or more available.

3.3 PROTÉGÉ EVALUATION

Evaluation of the potential protégé to participate in a job shadowing program was based on the following main factors, which are based on literature review as well as discussions with the project technical advisory board:

1) <u>Past Performance:</u> this is related to a potential protégé's past performance on the job. Higher performing individuals are more likely (though not certain) to have a greater absorptive capacity, which is an important factor for effective transfer of knowledge in a job shadowing program. In addition, past performance can be easily quantified based on an employee's performance reviews, which makes the evaluation more objective.

2) <u>Willingness / Attitude:</u> it is possible that an employee has no interest in being a protégé, despite past performance and/or other relevant factors. Further, previous experience of the managers / supervisors may suggest that a particular employee may not be well-suited to being a protégé.

3) <u>Time Availability:</u> similar to the mentor, this refers to the time available as a percentage of total time that a potential protégé has available for participation in a job shadowing program.

4) <u>Location:</u> this refers to whether or not a potential protégé is co-located with a mentor. Being co-located, or at the very least having access to IT infrastructure that allows easy communication (e.g., video-conferences, desktop sharing, etc.), is a small but important factor in effective knowledge transfer during a job shadowing program.

3.4 RANKING OF FACTORS

    After identification of the main factors for each task, the concept of "ranking and ordering" was utilized to assign a weight to each factor. The idea is that it is often easier to rank items than giving a specific weight to them. In order to accomplish this, the "Rank Order Centroid" (ROC) technique was used. The ROC method provides a simple yet objective way of giving weights to a number of ranked items according to their importance by taking the ranking as inputs and converting them to weights for each of the items (Touran, et al., 2009). The mathematical formula can be expressed as follows:

$$W_i = \left(\frac{1}{M}\right) \sum_{n=i}^{M} \left(\frac{1}{n}\right)$$

    Where M is the number of items and W_i is the weight of the ith item. For example, if there are n=4 items, the item ranked first will be weighted $(1 + 1/2 + 1/3 + 1/4) / 4 = 0.52$, the second will be weighted $(1/2 + 1/3 + 1/4) / 4 = 0.27$, the third $(1/3 + 1/4) / 4 = 0.15$, and the last $(1/4) / 4 = 0.06$. The sum of all the weights must equal 1.

    There can also be a scenario where two items are weighed equally. In this case, the equation can be modified slightly to accommodate the equal weights. The ranking of each factor was based on discussions with the project technical advisory board, as well as findings from our literature review. A summary of the rankings used in the evaluations is given in **Table 4**.

Table 4: Summary of Rankings and Weights for Each Task

Knowledge Loss Risk

Factor	Vacancy Risk	Knowledge Uniqueness	Knowledge Criticality	Resource Availability
Ranking	1	3	3	4
Weight	0.479	0.229	0.229	0.063

Mentor Evaluation

Factor	Willingness / Attitude	Knowledge Loss Risk	Time Period	Time Availability
Ranking	1	2	4	4
Weight	0.500	0.250	0.125	0.125

Protégé Evaluation

Factor	Past Performance	Willingness / Attitude	Time Availability	Location
Ranking	1	2	3	4
Weight	0.521	0.271	0.146	0.063

It can be seen from this table that for evaluation of knowledge loss risk, vacancy risk was chosen as the most important factor. This reflects the fact that attrition and subsequent potential for knowledge loss is of utmost importance to GDOT. Knowledge uniqueness and knowledge criticality were assigned equal weights, and it is worth noting

that their combined weight is almost as high as the vacancy risk factor. This highlights the importance of preserving unique and critical knowledge within the organization. Lastly, it can be seen that resources availability was given a relatively small weight. This is indicative of the fact that an organization must do its best to find a way to preserve critical knowledge, despite challenges that might arise.

For mentor evaluation, willingness/attitude was chosen as the most important factor. This reflects the fact that if a potential mentor is unwilling or unsuited to participate in a job shadowing program, then it is very likely that knowledge transfer will be ineffective. Knowledge loss risk was ranked the second most important factor, to indicate that critical knowledge is worth preserving (and vice versa). Lastly, time period and time availability were given equal weights, and their combined weights are as high as the knowledge loss risk factor. This highlights the importance of having sufficient time available (both total time and percentage of available time) for participation in a job shadowing program.

For protégé evaluation, past performance was chosen as the most important factor to reflect the fact that higher past performance is typically indicative of higher absorptive capacity which is a critical factor in effective knowledge transfer. This also reflects the idea that higher performing individuals should be given priority for career advancement, as the job shadowing program is designed to not only capture and transfer knowledge, but also as a motivational tool to increase employee engagement. Willingness/attitude was ranked the second most important factor, highlighting the fact that if a potential protégé is unwilling or unsuited to participate in a job shadowing program, then it is very likely that knowledge transfer will be ineffective. Time availability was ranked the third most

important factor, indicating that while having sufficient time available for participation in a job shadowing program is important, having a higher performing and willing protégé participating in the program for a shorter period of time might be as effective or more effective than a lesser performing and less willing employee. Lastly, it can be seen that the location factor was given a relatively small weight. This reflects the fact that an organization must do its best to find a way to preserve critical knowledge, despite the possibility of a protégé not being co-located with a mentor.

3.5 Scoring & Multivariate Analysis

A simple scoring criterion was developed for each of the tasks and factors previously described. In the proposed scheme, a score of 1, 2, or 3 is assigned depending on the factor (see **Table 5**). These scores are then multiplied with their respective weights (see **Table 4**), then summed and scaled, and an overall score is then calculated for each of the three tasks. Under this scheme, the maximum possible score is 12, and the minimum possible score is 4.

Mathematically, the overall score for each task (S_t) can be expressed as follows:

$$S_t = n \times \sum_{i=1}^{n} W_i \times S_i$$

Where n is the number of factors (in this case, $n=4$), W_i is the weight, and S_i is the score for each factor.

For example, consider the task of evaluating knowledge loss risk. Assume the employee has the following scores for each factor:

- Vacancy risk = 3 (projected retirement within 1 year)

- Knowledge uniqueness = 2 (some redundancy)

- Knowledge criticality = 3 (critical)

- Resource availability = 2 (some organizational support)

The overall KLR score (S_{KLR}) can then be calculated as:

$$S_{KLR} = 4 \times [(0.479 \times 3) + (0.229 \times 2) + (0.229 \times 3) + (0.063 \times 2)] = 10.8$$

As part of the development of the scoring criterion as previously described, a "rating" system was also developed by studying all possible combination of scores to set initial values, and then applying additional constraints considering particular situations. These additional constraints (based on criticality and/or uniqueness of knowledge, as well as willingness to participate) were determined upon consultation with the project technical advisory board. Based on this analysis, a range of overall scores was determined for each task so that a rating could be assigned for the knowledge loss risk potential, as well as mentor and protégé suitability. A summary is provided in **Table 6**.

Table 5: Scoring Criteria for Each Task

Knowledge Loss Risk

Factor	Score = 3	Score = 2	Score = 1
Vacancy Risk	Projected retirement within 1 year	Projected retirement within 1 to 3 years	Projected retirement more than 3 years
Knowledge Uniqueness [1]	Unique	Some redundancy	Non-unique
Knowledge Criticality [1]	Critical	Important but proceduralized / well documented	Non-critical
Resource Availability	Full organizational support	Some organizational support	Little to no organizational support

(1) See Section 3.1 for definition of knowledge uniqueness and criticality

Mentor Evaluation

Factor	Score = 3	Score = 2	Score = 1
Willingness / Attitude	Willing and highly motivated	Willing and somewhat motivated	Unwilling and/or unmotivated
Knowledge Loss Risk [2]	High	Moderate	Low
Time Period	More than 6 months available for mentoring	3 to 6 months available for mentoring	Less than 3 months available for mentoring
Time Availability	More than 16 hours per week	8 to 16 hours per week	4 to 8 hours per week

(2) Calculated as part of knowledge loss risk evaluation

Protégé Evaluation

Factor	Score = 3	Score = 2	Score = 1
Past Performance	Above average	Average	Below average
Willingness / Attitude	Willing and highly motivated	Willing and somewhat motivated	Unwilling and/or unmotivated
Time Availability	More than 16 hours per week	8 to 16 hours per week	4 to 8 hours per week
Location	Co-located with mentor	Not co-located but have IT support	Not co-located and limited IT support

Table 6: Overall Scoring and Rating Criteria for Each Task

KLR Score (S_{KLR})	Mentor Score (S_M)	Protégé Score (S_P)
• **10-12**: High Risk (immediate action) • **8-9.9**: Moderate Risk (short-term action) • **4-7.9 AND (non-critical & non-unique)**: Low Risk (long-term action)	• **10-12**: High Suitability • **8-9.9:** Moderate Suitability • **4-7.9 AND (unwillingness):** Low Suitability	• **10-12:** High Suitability • **8-9.9:** Moderate Suitability • **4-7.9:** Low Suitability

The additional constraints previously mentioned can be seen in **Table 6** under the KLR Score and Mentor Score columns. In the KLR Score case, the constraint forces the overall score to be deemed "Low" if knowledge is deemed both "non-critical and non-unique", even though the score might indicate a different category. This constraint was imposed to ensure that non-critical and non-unique knowledge was not deemed worthy of immediate or short-term action to capture and preserve said knowledge.

Similarly, in the Mentor Score case, the constraint forces the overall score to be deemed "Low" if the mentor is deemed "Unwilling" (i.e., score of 1 for willingness/ attitude), even though the score might indicate a different category. This constraint was imposed to ensure that an unwilling employee would not be identified as being moderately to highly-suited for mentoring. No special constraints were required for the Protégé Score case.

Table 6 also shows suggested timelines for when action should be taken based on the KLR score of an employee. A high score indicating high risk of knowledge loss should attrition occur carries a recommendation of "immediate action", meaning that arrangements should be made as quickly as possible to ensure that knowledge transfer takes place prior to the knowledge-holder leaving.

A medium score indicating moderate risk of knowledge loss carries a recommendation of "short-term action", meaning that it may be a good idea to start thinking about the potential knowledge loss sooner than later. In this regard, it may be best to initiate job shadowing when moderate risk is detected; otherwise, leaving it to the last minute might result in knowledge loss due to attrition.

Lastly, a low score indicating low risk of knowledge loss carries a recommendation of "long-term action", meaning that the attrition status of the knowledge-holder should be monitored periodically to see if changes may occur that might warrant more attention.

3.6 RESULTS / VISUALIZATION

The results of the evaluation and multivariate analysis can be presented in radar chart format. A radar chart is a graphical method which allows multivariate data to be displayed using a two-dimensional chart, with the contribution of each variable represented on an axis extending out from the origin. The radar chart format also allows the relative contribution from each variable to be assessed both quantitatively and qualitatively. For example, a uniformly distributed radar chart would provide a visual indication of a candidate that is equally strong in all four aspects, while a skewed radar

chart would provide a visual indication that the candidate might be strong in some areas but weak in others.
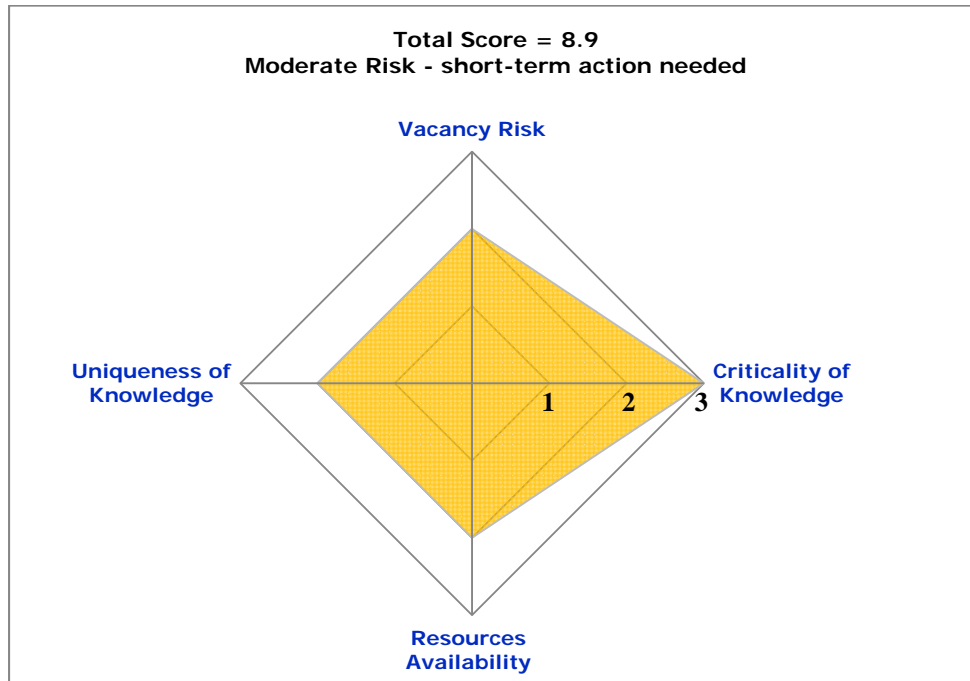

Figure 8 – Radar Chart for Results Visualization

An example for KLR evaluation is shown on **Figure 8**. In this example, there are four variables. The scale of each axis is from 0 to 3, in turn allowing the individual scores associated with each variable to be displayed on the chart. For example, in the example above, the "Vacancy Risk", "Uniqueness of Knowledge", and "Availability of Resources" variables each have a score of 2, while the "Criticality of Knowledge" variable has a score of 3. The total score calculated for the evaluation, as well as the assessment associated with knowledge loss risk (in the case of KLR evaluation) or suitability as mentor/protégé (in the case of mentor or protégé evaluation) is also shown in the figure.

Georgia Department of Transportation

3.7 JOB SHADOWING EVALUATION TOOL (JSET)

A macro-enabled Microsoft Excel ® spreadsheet titled "**J**ob **S**hadowing **E**valuation **T**ool", or JSET, was created as part of the "Job Seeker" project. The spreadsheet format was chosen because of its familiarity to the potential end users within GDOT. JSET is a multivariate analysis evaluation tool which provides an objective way for GDOT to identify critical knowledge and suitable candidates for participation in a job shadowing program. This tool is also intended to add transparency to the evaluations and provides consistent procedures across the organization.

Part 1
- Evaluate Knowledge Loss Risk (KLR)
  - Obtain KLR score and timeline for action

Part 2
- Evaluate Mentor
  - Determine suitability based on mentor score

Part 2a
- Select and Approve Mentor

Part 3
- Evaluate Protégé(s)
  - Can compare up to four different protégés, determine suitability based on protege score

Part 3a
- Select and Approve Protégé

Part 4
- Summary of Evaluations
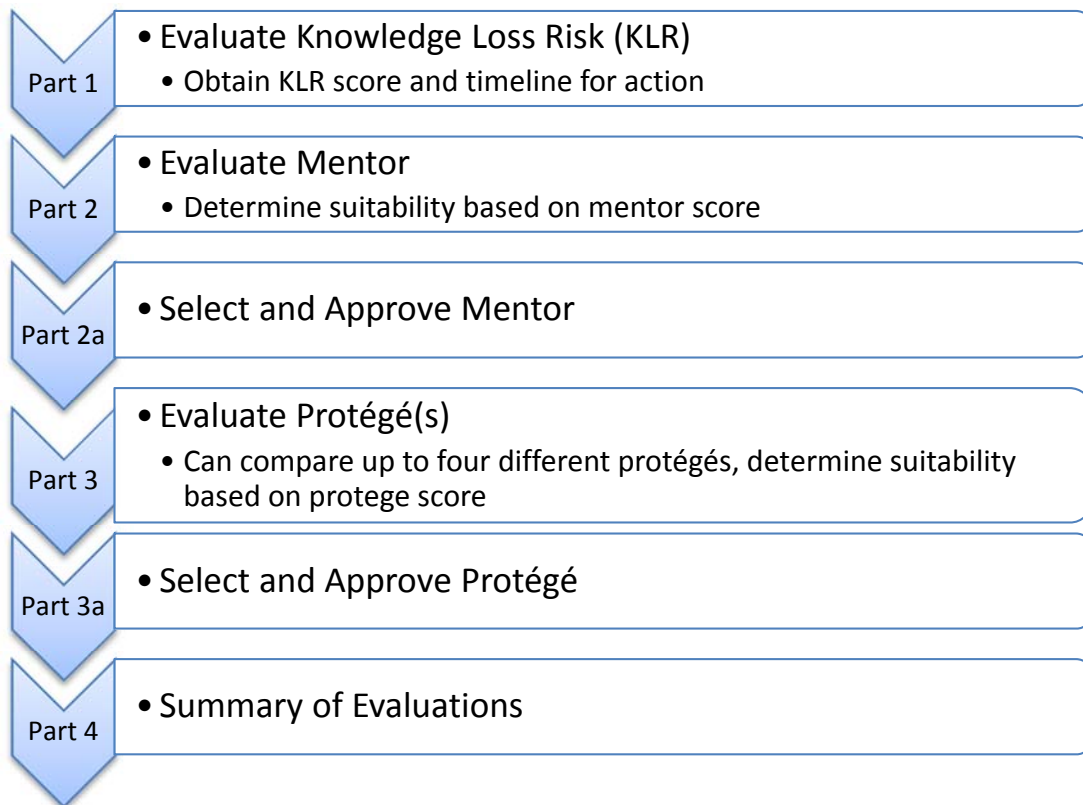
Figure 9 – JSET Flowchart
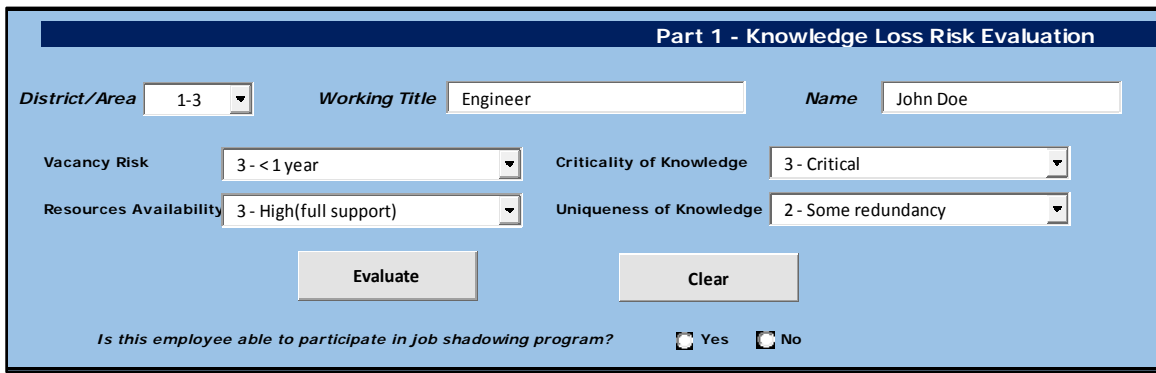
JSET is essentially a four-part process: Part 1 consists of Knowledge Loss Risk Evaluation, Part 2 consists of Mentor Evaluation, Part 3 consists of Protégé Evaluation, and Part 4 consists of a summary of the evaluations. Parts 1 through 3 are accessed through the "Evaluations" tab, while Part 4 is accessed through the "Results Summary" tab. **Figure 9** presents a summary flowchart of the evaluation process using JSET.

It is envisioned that the knowledge loss risk, mentor, and protégé evaluations would be performed by the Human Resources (HR) group within GDOT, with assistance from either a manager or supervisor familiar with the involved employees and their experience. HR personnel have access to objective information (such as performance reviews and other relevant information) that will aid in the evaluation process. The use of objective information in the evaluation helps to ensure fairness and reduce bias. Any mentor recommendation made by the HR group would need to be approved by the District Engineer or the office head or his/her designee.

Some basic information must be entered prior to evaluating knowledge loss risk. This includes selecting the district / area where the knowledge-holder is located from a pull-down menu, his/her working title, and name. Note that in the pull-down menu for "District/Area", "0-0" represents the GDOT headquarters in Midtown Atlanta, "1-0" represents the District 1 headquarters in Gainesville, "1-1" represents District 1 – Area 1, and so on.

Part 1 – Evaluate Knowledge Loss Risk (KLR):

After entering the basic information as described above, the first step is to assign individual scores for each of the four factors associated with KLR. The scoring should be in accordance with the guidelines provided in Section 3.5. Below is an example for engineer "John Doe" from District 1, Area 3:

After entering the individual scores, press the "Evaluate" button, which will generate a pop-up message titled "Risk Evaluation" with the Total Score and calculated risk category (High, Moderate, or Low) based on the selections:
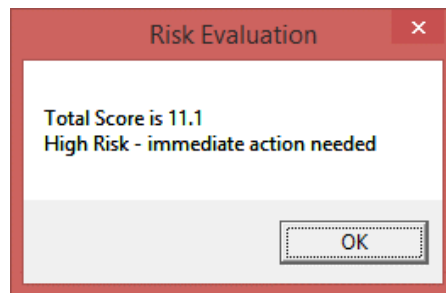
After pressing "OK", a radar chart will automatically be generated to the right that provides a visual representation of the contribution from each factor. Also shown on the radar chart are the total score and calculated risk category:
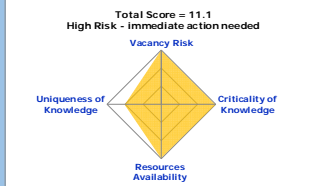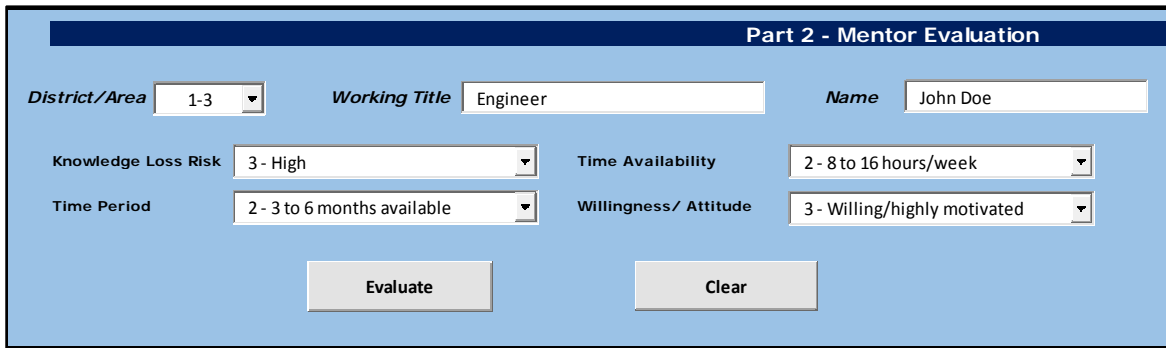
Pressing "Clear" will reset all the fields (for example, if a new evaluation is to be performed). Additionally, at the bottom of the KLR module, there is a question which asks: "Is this employee able to participate in job shadowing program?" If "Yes" is selected, then the information entered in Part 1 for the knowledge-holder (including his/her location, working title, name) will be automatically transferred into Part 2. Further, the score for the first field in Part 2 (Knowledge Loss Risk score) will be automatically assigned as well based on the information entered in Part 1. This is based on the assumption that the knowledge-holder whose knowledge is at-risk of being lost due to attrition is a good first-order candidate for being the mentor.

The answer to this question is most likely to be "Yes". However, there can also be a scenario where the knowledge-holder is unable to participate in the job shadowing program. For example, the knowledge-holder may leave the organization sooner than anticipated, or otherwise has no interest in participating in a job shadowing program prior to his/her departure. In such cases, selecting "No" will mean that the information for Part 2 will need to be manually entered.
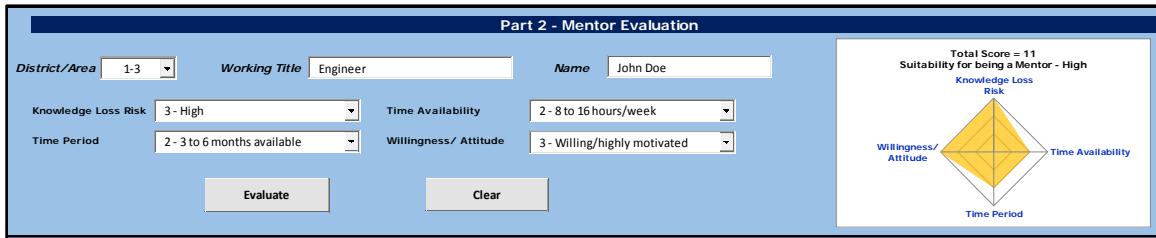
Part 2 – Evaluate Mentor:

After evaluation of the knowledge loss risk, the next step is to evaluate the potential mentor. This evaluation requires assigning individual scores for each of the four factors associated with the mentor module. The scoring should be in accordance with the guidelines provided in Section 3.5. Here, we continue the example from the previous part for engineer "John Doe" from District 1, Area 3 (i.e., "Yes" is selected as the answer to "Is this employee able to participate in job shadowing program?"). John Doe's KLR was previously determined to be "High" from Part 1.

After entering the individual scores, press the "Evaluate" button, which will generate a pop-up message titled "Mentor Evaluation" with the Total Score and calculated suitability (High, Moderate, or Low) based on the selections:
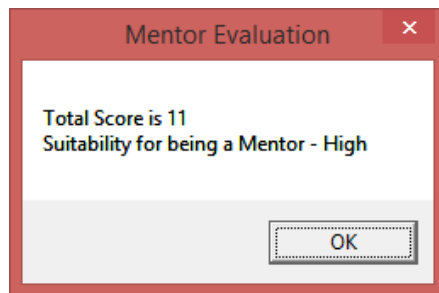
After pressing "OK", a radar chart will automatically be generated to the right that provides a visual representation of the contribution from each factor. Also shown on the radar chart are the total score and calculated suitability:
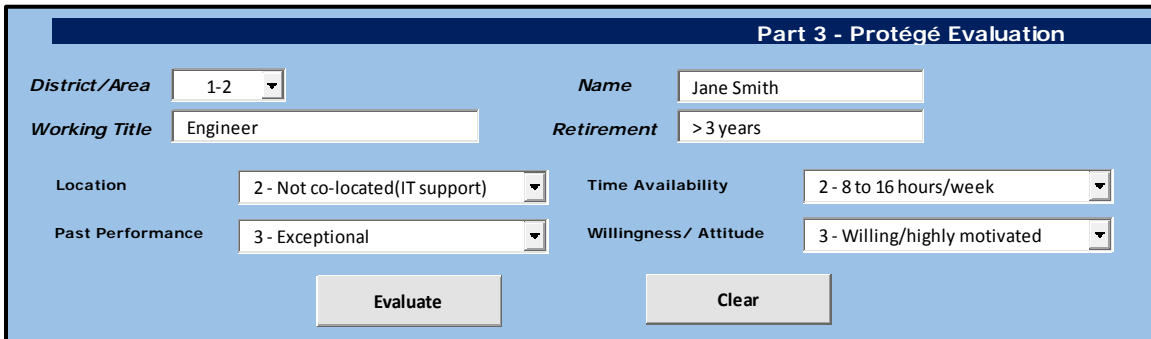

If the knowledge-holder is deemed not to be a suitable mentor candidate, then this procedure can be repeated until a suitable mentor is identified. Clicking the "Clear" button will reset all the fields prior to starting a new evaluation. As previously mentioned, it is envisioned that the selected mentor candidate would be approved by the District Engineer or his/her designee.

Part 3 – Evaluate Protégé(s):

After a mentor has been selected, the next step is to evaluate potential protégé(s). JSET allows evaluation of up to four protégé candidates at the same time. The location, working title, and name of each potential protégé should be entered first, as well as the anticipated retirement for each protégé. This is to verify that a potential protégé is also not planning on retiring very soon.
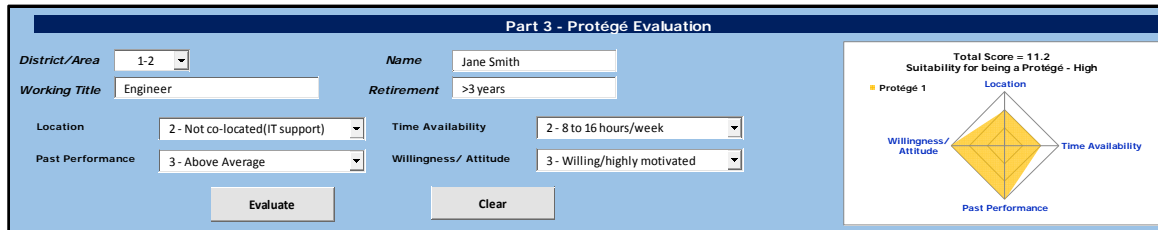
Then, individual scores should be assigned for each of the four factors associated with the protégé module. Below is an example for engineer "Jane Smith", who is also located in District 1, Area 2 (but there is IT infrastructure in place to support knowledge transfer), and whose anticipated retirement date is more than 3 years away:

After entering the individual scores, press the "Evaluate" button, which will generate a pop-up message titled "Protégé Evaluation" with the Total Score and calculated suitability (High, Moderate, or Low) based on the selections:

After pressing "OK", a radar chart will automatically be generated to the right that provides a visual representation of the contribution from each factor. Also shown on the radar chart are the total score and calculated suitability:

As previously mentioned, the protégé evaluation can be performed for up to four potential candidates. This can allow for a quantitative as well as qualitative comparison of different potential protégés to be made and documented. For example, there may be instances where having a protégé that scores high in a particular category is more desirable than a protégé that achieved the highest score. This in turn allows the most appropriate selection to be made for a given situation. The selected protégé should be approved by the District Engineer or the office head or his/her designee.

At the end of the evaluation, the user is given several options. Pressing "Save Results" will allow the user to save the evaluation spreadsheet, pressing "Close" will allow the user to close the spreadsheet without saving (or if the spreadsheet was saved, this command will simply close the spreadsheet), and lastly, pressing "Clear All" will reset all the fields in the spreadsheet. The spreadsheet should be saved as a macro-enabled workbook, if macro functionality is desired to be preserved.

Part 4 – Summary of Evaluations:

After completing the evaluations, clicking on the "Results Summary" tab will allow the user to access a summary of the knowledge loss risk, mentor, and protégé evaluations (up to four). This sheet was created to provide a one-page summary of the evaluations, for ease of review and to facilitate printing and filing of the evaluation results. The results (including the employee name, location, working title, assigned scores for each factor, as well as total scores and an assessment) for each evaluation are presented in both a tabular summary format, as well as using radar charts. Other supplemental information, such as employee performance reviews and other relevant documents used in evaluating employees, can also be filed along with the summary of the evaluations for documentation purposes.

3.8 PROGRAM GUIDELINES

In addition to the development of JSET, a policy guidelines document titled "GDOT Job Shadowing Program Guidelines" and a training module (in PowerPoint presentation format) were also developed as part of the "Job Seeker" project. The goal of the policy guidelines document was to summarize the study findings, and provide guidelines/ instructions for participation in a job shadowing program. The training module, along with the Program Guidelines document, is intended to help GDOT personnel administer the job shadowing program to future participants.

The Job Shadowing Program Guidelines Document developed for the project is provided in Appendix A of this report. This document contains:

- An introduction to job shadowing and its benefits

- A brief summary of the mentor and protégé identification processes

- A description of the job shadowing process and guidelines for participants

- Forms to be completed by the program participants for evaluation and monitoring
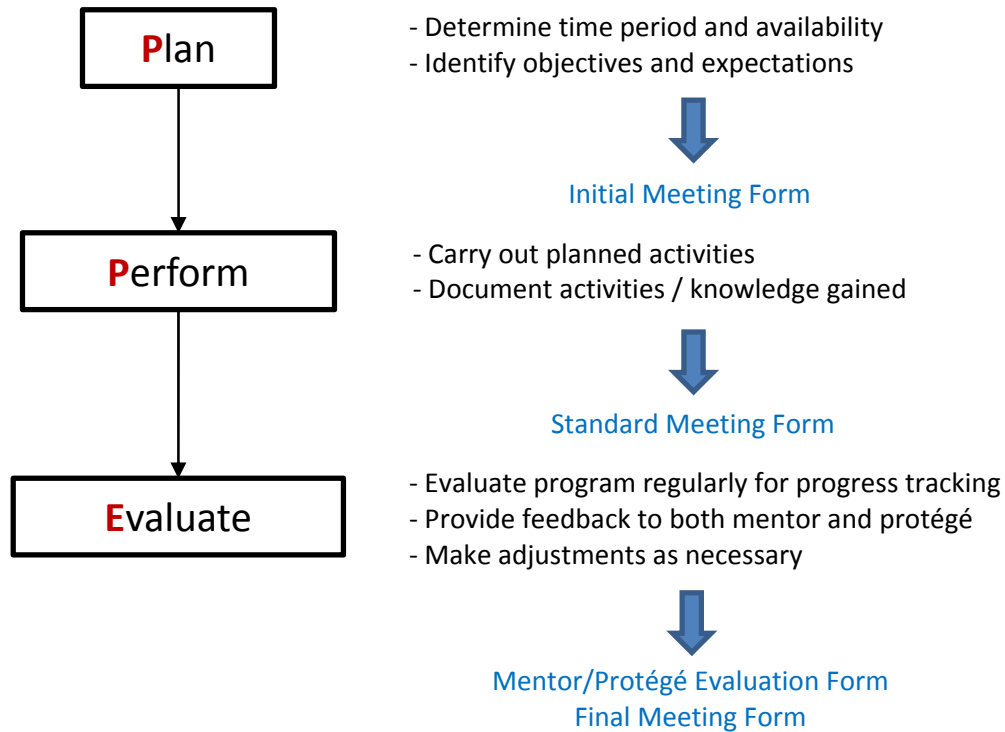

Plan
- Determine time period and availability
- Identify objectives and expectations

Initial Meeting Form

Perform
- Carry out planned activities
- Document activities / knowledge gained

Standard Meeting Form

Evaluate
- Evaluate program regularly for progress tracking
- Provide feedback to both mentor and protégé
- Make adjustments as necessary

Mentor/Protégé Evaluation Form
Final Meeting Form

Figure 10 – GDOT Job Shadowing Process

The job shadowing program developed for GDOT is essentially a three part process: planning, performance, and evaluation (see **Figure 10**). The planning phase includes the determination of the program duration and time availability of the program participants, as well as identification of the objectives and expectations. The planning phase can be documented using the "Initial Meeting Form" included as part of the guidelines document.

The performance phase consists of carrying out the planned activities and documenting the activities / knowledge gained periodically using the "Standard Meeting Form". The guidelines document also contains "dos and don'ts" for both the mentor and the protégé during the performance phase.

Lastly, the evaluation phase includes periodic assessments of both the mentor and protégé during the job shadowing process (to be documented using the "Protégé Evaluation Form" and "Mentor Evaluation Form" by the mentor and the protégé, respectively), as well as a final assessment at the end of the program (to be documented using the "Final Meeting Form" by both the mentor and the protégé.

Further details regarding the policy guidelines document and its associated forms can be found in the Job Shadowing Program Guidelines Document in Appendix A.

3.9 PILOT STUDY FOR JOB SHADOWING PROGRAM

3.9.1 PROGRAM DESCRIPTION

A pilot study was also performed as part of the "Job Seeker" project. The main goal of the pilot study was to obtain relevant feedback from the study participants so that refinements could be made in order to maximize the program's effectiveness prior to full-scale implementation.

The pilot study participants were identified by the project technical advisory board. JSET was not used as part of the identification process for the pilot study; instead, the suitability of mentor-protégé pairs was determined by their managers/supervisors. A total of sixteen (16) mentor-protégé pairs were initially identified.

Two kick-off meetings were held during the week of October 5, 2015, in order to introduce the participants to the Job Shadowing Program Guidelines Document and its associated forms, and to provide instructions for participation in the program. The participants were free to choose their desired program duration (with a maximum of five months) as long as frequency and duration of meetings, as well as the minimum suggested contact hours (100 hours total), were achieved.

While the pilot was ongoing, some participants' schedule was interrupted due to organizational changes. Instead of terminating the pilot study for these participants, upon consultation with the GDOT technical advisory board, a decision was made to create an "Emergency Job Shadowing" program, representing a potential scenario where only a

one-month long duration and four hours per week are available for knowledge transfer to take place (about 20 total contact hours, including initial and final meetings). Three out of the 16 total mentor-protégé pairs participated in this emergency program.

The pilot study participants were asked to hold an initial meeting to document their goals and objectives, as well as to decide the time period and their availability. During the pilot study, participants were asked to document their progress and perform periodic evaluations (of the program as well as their mentor/protégé) using forms provided at the onset of the pilot. A wrap-up meeting was then held on March 2, 2016, to obtain feedback from the program participants. The participants were also asked to hold a final meeting and complete a Final Meeting Form to provide written feedback on their experience with the job shadowing program, as well as rate the effectiveness of the program.

3.9.1 STUDY FINDINGS

Six out of 16 (38%) of the mentor-protégé pairs opted to take part in a 13-week long job shadowing pilot, meeting for 8 hours per week to achieve the minimum suggested 100 contact hours (see **Figure 11**). Three pairs indicated they would have a variable schedule and meet as needed to achieve the suggested contact hours, while one pair chose a program duration of 16 weeks and another pair a duration of 26 weeks. "No Response" (two pairs) indicates that the participants did not turn in an Initial Meeting Form indicating their schedule. Lastly, three pairs were asked to take part in the previously discussed 4-week long Emergency Job Shadowing program.
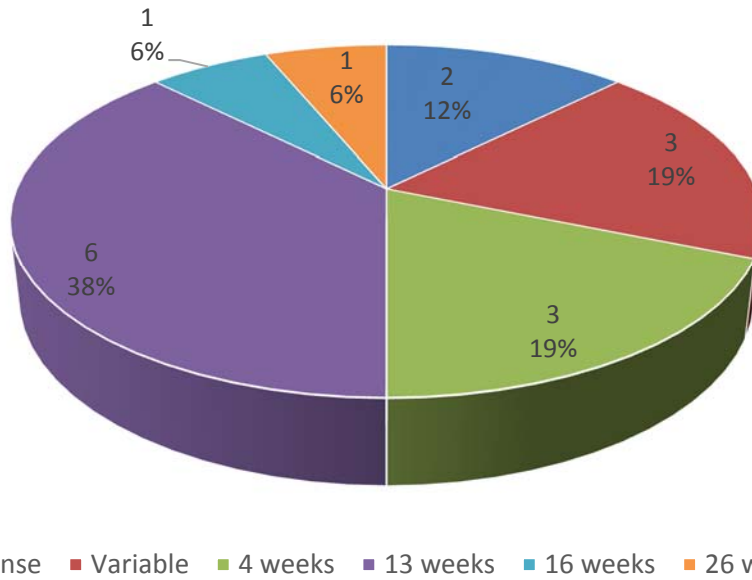
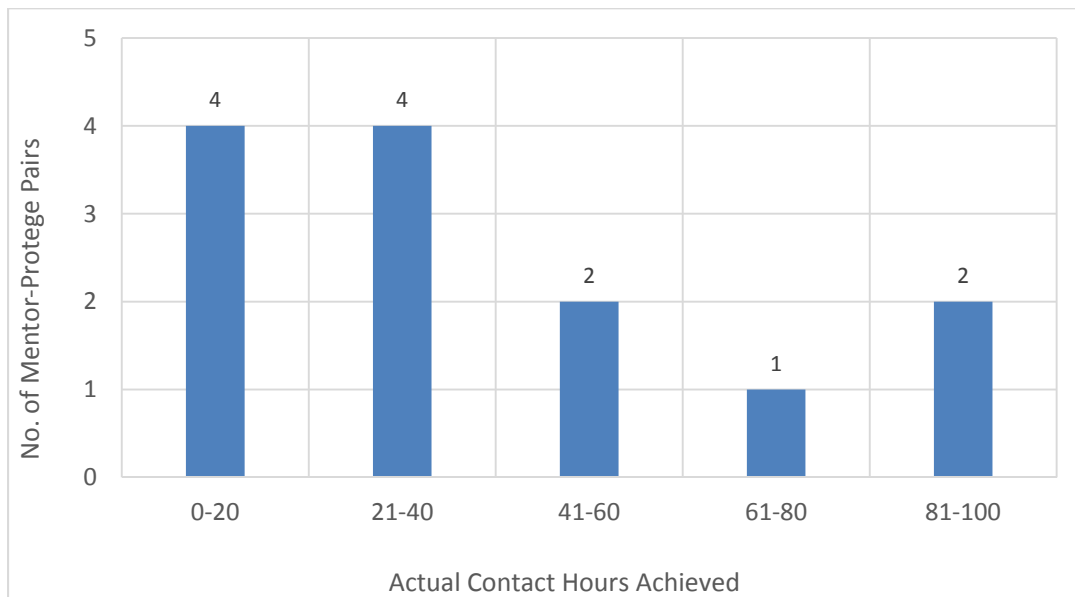**Figure 11 – Program Duration for Pilot Study Participants (self-selected)**

Figure 12 – Distribution of Actual Contact Hours Achieved by Regular Job Shadowing Pilot Study Participants (all of the Emergency Job Shadowing participants reportedly achieved the recommended 20 contact hours)

In the end, a majority of the mentor-protégé pairs who participated in the regular pilot study were unable to complete the minimum suggested 100 contact hours (see **Figure 12**). On the other hand, all of the "Emergency Job Shadowing" participants were able to achieve the suggested 20 contact hours. The most cited factor for those who were not able to achieve the suggested contact hours was the lack of time (this is discussed in further detail later in this report).

Overall, based on the feedback obtained on the forms and during the wrap-up meeting, the program participants indicated that the job shadowing program was effective in allowing knowledge transfer to take place and increasing employee engagement. **Figure 13** shows the distribution of the overall program effectiveness ratings for the mentors and the protégés, with the following rating scheme used:

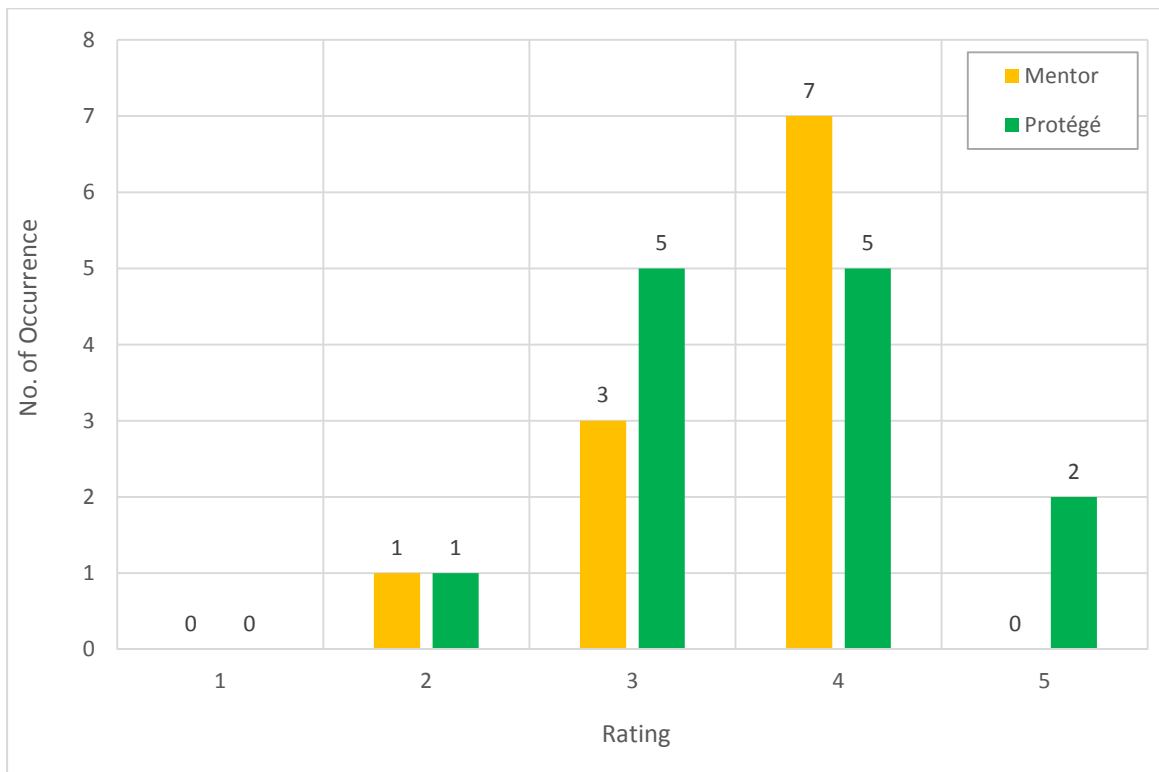| Rating	Description
5	Very effective
4	Effective
3	Moderately effective
2	Somewhat effective
1	Not effective

Figure 13 – Distribution of the Overall Pilot Program Effectiveness Ratings for the Mentors and the Protégés (no response from 8 out of 32 participants)

It can be seen that a majority of the program participants who completed the Final Meeting Form rated the pilot job shadowing program as being "moderately effective" to "effective". The average rating was 3.5 out of 5 based on the responses from the mentors, and 3.6 out of 5 based on the responses from the protégés.

Based on a review of respondents' feedback during both the wrap-up meeting as well as from a review of the Final Meeting Forms, several program participants mentioned having developed a relationship with their mentor/protégé, and several protégés mentioned having made new contacts/connections through their mentors. Additionally, several participants mentioned that job shadowing gave them the chance to experience

areas outside their own area of expertise and also helped to identify cross-training needs. While the job shadowing program developed as part of this project is intended primarily for capturing and transferring knowledge from the "near-retirement" generation of workers to the "new generation", these responses indicated that job shadowing may also be an effective method for cross-training purposes. These responses also indicate that job shadowing can increase employee engagement, which was an initial goal of the program.

Some issues were also identified during the pilot study. The main issue was being able to meet the recommended contact hours. As previously mentioned, most of the non-emergency pilot study participants opted for a 13-week long program, meeting 8 hours per week to achieve the minimum suggested contact hours (100 hours total). However, based on the feedback received, meeting for 8 hours per week was found to be challenging while maintaining existing responsibilities. This was especially the case for those participants who were not in complete control of their time/schedule (for example, non-managers or lower-level employees), as well as those who spent a considerable amount of their time in the field versus those who were primarily in the office. In this regard, it is important for the decision makers to identify experienced mentors and to make sure that both parties are able to dedicate sufficient time to participate in the program. This includes dedicating necessary resources (such as reducing workloads during the program, if possible) to ensure time availability. It should be noted that in JSET, time availability and experience of the mentor are both important factors in identifying a suitable mentor-protégé pair.

Another issue was the relatively low response rates related to progress form submittals. This was also related in part to lack of time. In addition, program participants cited that timely reminders to complete the forms would be beneficial. In this regard, much more regular reminders were sent to the "Emergency" pilot study participants, in comparison to the regular study participants, and it was found that regular reminders indeed improved the response rates significantly. Nonetheless, it should be noted that the forms are crucial for tracking progress and to identify potential issues (including inter-personal issues between mentor and protégé) in the early stages of the program. To partially address this issue, the frequency of form submittals was revised following the pilot study to lessen the time burden while still obtaining information regarding the program's effectiveness. However, as previously mentioned, an effort should also be made by the participants' managers/ supervisors to reduce the participants' workloads during the program to the extent possible to ensure time availability for participation in the program and completion of the progress and evaluation forms.

The findings from the pilot study were used to revise and finalize the program guidelines document prior to full-scale implementation by GDOT. This included modifications to the contact hour requirements, as well as modifications to the progress and evaluation forms to be completed as part of the job shadowing program. The final program guidelines documents prepared for the project are presented in Appendix A.

4. CONCLUSIONS & RECOMMENDATIONS

4.1 CONCLUSIONS

GDOT is an experience-rich and informal learning organization that is committed to preserving institutional knowledge as well as encouraging career development. In this regard, among many potential knowledge transfer techniques, job shadowing has been identified as a suitable tool to aid GDOT in achieving these goals.

Job shadowing can be described as having a less experienced employee (i.e., protégé) paired with a veteran employee (i.e., mentor) for a period of time, with the mentor asked to share knowledge including dealing with the most difficult situations faced on the job. The intent is to have the protégé observe, internalize, and eventually collaborate with the mentor.

In this regard, the job shadowing program designed for GDOT is also intended to take place over a longer period of time (e.g., several months) than the more traditional programs where the shadowing takes place over a short-period of time (e.g., one or two days). This longer duration was chosen to ensure that knowledge can be transferred more effectively.

Job shadowing can be used not only as a knowledge transfer tool, but also as a motivational and networking tool for personnel development. It has many benefits, examples of which are summarized as follows:

- It is a very effective mechanism for transfer of tacit (i.e., experiential) knowledge ("tricks of the trade"), which is often difficult to capture.

- It can facilitate creation and/or transfer of explicit (i.e., formal or codified) knowledge, if protégé codifies the knowledge acquired.

- It is an "informal" mechanism, which allows incorporation of other KM techniques such as story-telling, coaching, mentoring, etc.

- It is a motivational and networking tool for personnel development, which helps develop relationships, generate employee interest, and increase engagement.

- It works well in a variety of environmental conditions, which in turn makes it a well-suited strategy for knowledge transfer in a diverse organization such as the GDOT.

The job shadowing program developed for GDOT and presented in this report not only incorporates important factors that are critical for successful job shadowing, but also considers the environment in which job shadowing will take place. The program includes a modular framework for evaluation of knowledge loss risk (KLR) potential, as well as identification of a mentor-protégé pair for participation in a job shadowing program. The framework allows knowledge loss risk associated with any knowledge-holder to be objectively quantified, and then provides tools for systematic identification of a suitable mentor-protégé pair so that job shadowing can take place to preserve the knowledge.

The framework was also coded into a spreadsheet format, titled "Job Shadowing Evaluation Tool", or JSET. JSET is a multivariate analysis evaluation tool which provides an objective, transparent, and consistent way to evaluate knowledge loss risk, as well as suitability of mentor and protégé(s) for participation in a job shadowing program. In addition, a program guidelines document and a training module were developed for the job shadowing program to help GDOT personnel administer the program to future participants. The contents of the program guidelines document and the training module have been refined using feedback obtained from the pilot study performed as part of the project prior to full-scale implementation.

It is anticipated that the tools developed as part of the "Job Seeker" project and presented in this report will help to minimize knowledge loss due to attrition within GDOT, while simultaneously increasing employee engagement through the use of job shadowing and in turn, helping GDOT achieve its stated mission of providing a safe, connected, and environmentally sensitive transportation system that enhances Georgia's economic competitiveness by working efficiently and communicating effectively to create strong partnerships.

4.2 RECOMMENDATIONS FOR FUTURE WORK

4.2.1 DATA MINING & PIVOT CHARTS / TABLES

During the course of the "Job Seeker" project, attrition data were provided by HR group in the form of a spreadsheet containing the location, working titles (i.e., positions), and anticipated retirement date of almost 4,000 GDOT employees, among other

attributes. It is understood that at the moment, the attrition data are not analyzed rigorously. In this regard, data mining and the visualization of the data using pivot tables and charts is one alternative for more rigorous analysis of the attrition data.

Data mining can be described as extracting knowledge from large amounts of data which are contained in a database (Han & Kamber, 2000). For instance, in the case of GDOT's attrition base, it can allow for extracting knowledge regarding not only the anticipated retirement date of an employee but also for a certain working title and at a given location within the organization.

A pivot table is a dynamic data summarization tool which can allow automatic sorting, counting, averaging, and performing many other mathematical and statistical operations of data stored in a database by displaying the results in a separate summary table. Similarly, a pivot chart is a data analysis tool that enables the visualization of the results of a pivot table. The use of pivot tables and charts allows for dynamic visualization of the results after relevant data are extracted from a database.

Based on the latest attrition database provided by GDOT in December 2015, a sample analysis was performed to demonstrate the capabilities of these techniques. In the first example shown in **Figure 14**, data mining and pivot table/chart techniques were used to identify the attrition risk for those employees with the title "Engineer, District" in the entire organization. In the second example shown in **Figure 15**, these techniques were used to identify the attrition risk for various positions (Equipment Operator 1 through 3 and Maintenance Equipment Operator) in District 7, Area 0 (i.e., the Chamblee Office).
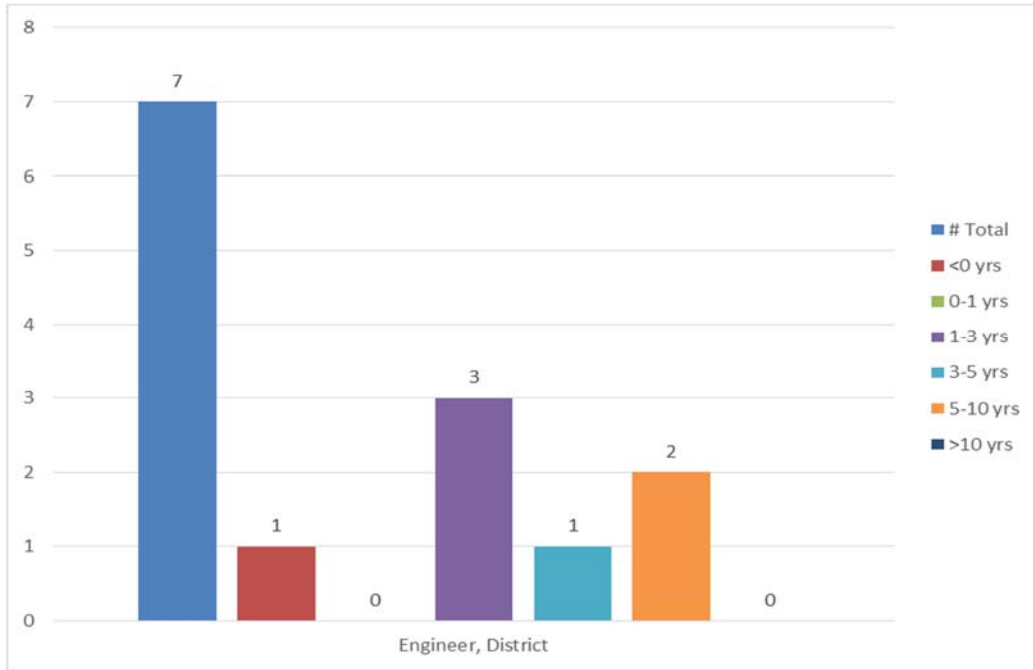
Figure 14 – Sample Pivot Chart Output for "District Engineer" Position in Entire GDOT Organization
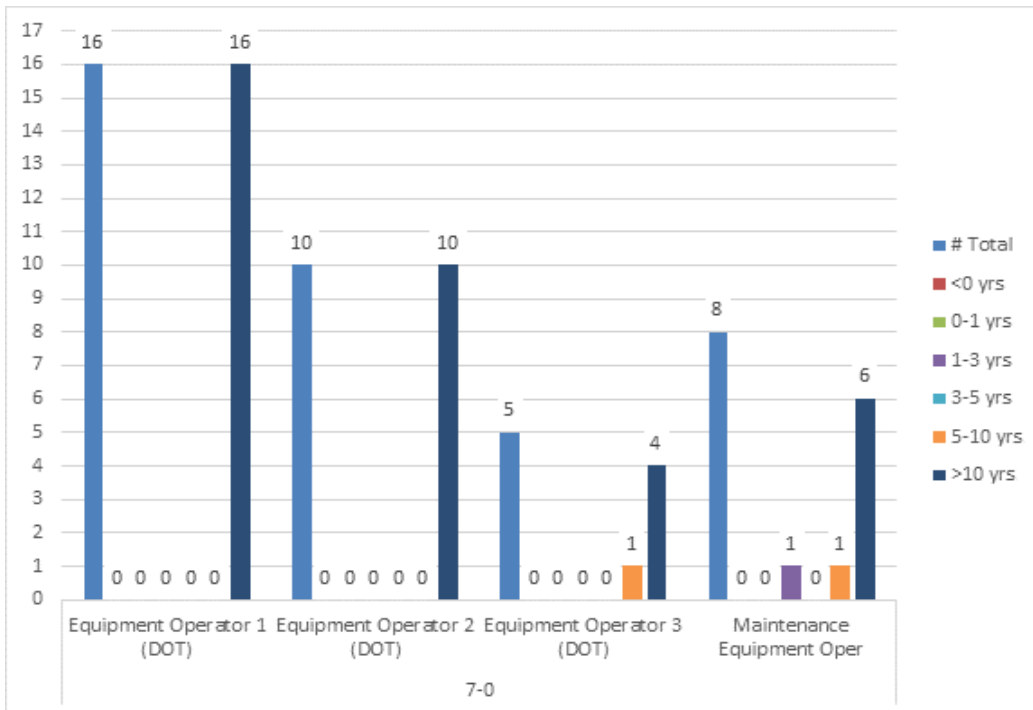

Figure 15 – Sample Pivot Chart Output for District 7, Area 0 (Chamblee) - Various Positions

As expected, **Figure 14** shows seven district engineers corresponding to the seven GDOT districts. **Figure 14** also shows that of the seven district engineers, one is already eligible for retirement but has not done so yet (indicated in the legend as "<0 yrs"), three are eligible for retirement in the next 1 to 3 years, one is eligible for retirement in the next 3 to 5 years, and lastly two are eligible for retirement in the next 5 to 10 years. **Figure 15** provides similar information for the various positions evaluated in District 7, Area 0.

Beyond visualization purposes, the application of these techniques can also provide a powerful tool that allows the identification of critical positions within the organization with respect to attrition risk, which in turn can be used for succession planning purposes and/or for facilitating knowledge capture/transfer via techniques such as job shadowing to address potential issues related to attrition. For instance, **Figure 14** shows that more than 50 percent of the district engineers are either already eligible for retirement or will be eligible for retirement in the next 1 to 3 years. Information such as this can allow the decision makers at GDOT to ensure that appropriate measures are taken to minimize disruptions and assure continuity.

4.2.2 SPATIAL ANALYSIS USING GIS

While pivot table/chart analysis of the attrition data can provide information for each office location, in many situations, it may also be desirable to have an idea of the spatial distribution of attrition risk across all of the offices. In this regard, the use a geographic information system (GIS) can allow for management, analysis, and visualization of attrition data spatially and dynamically to understand patterns, trends, and relationships.
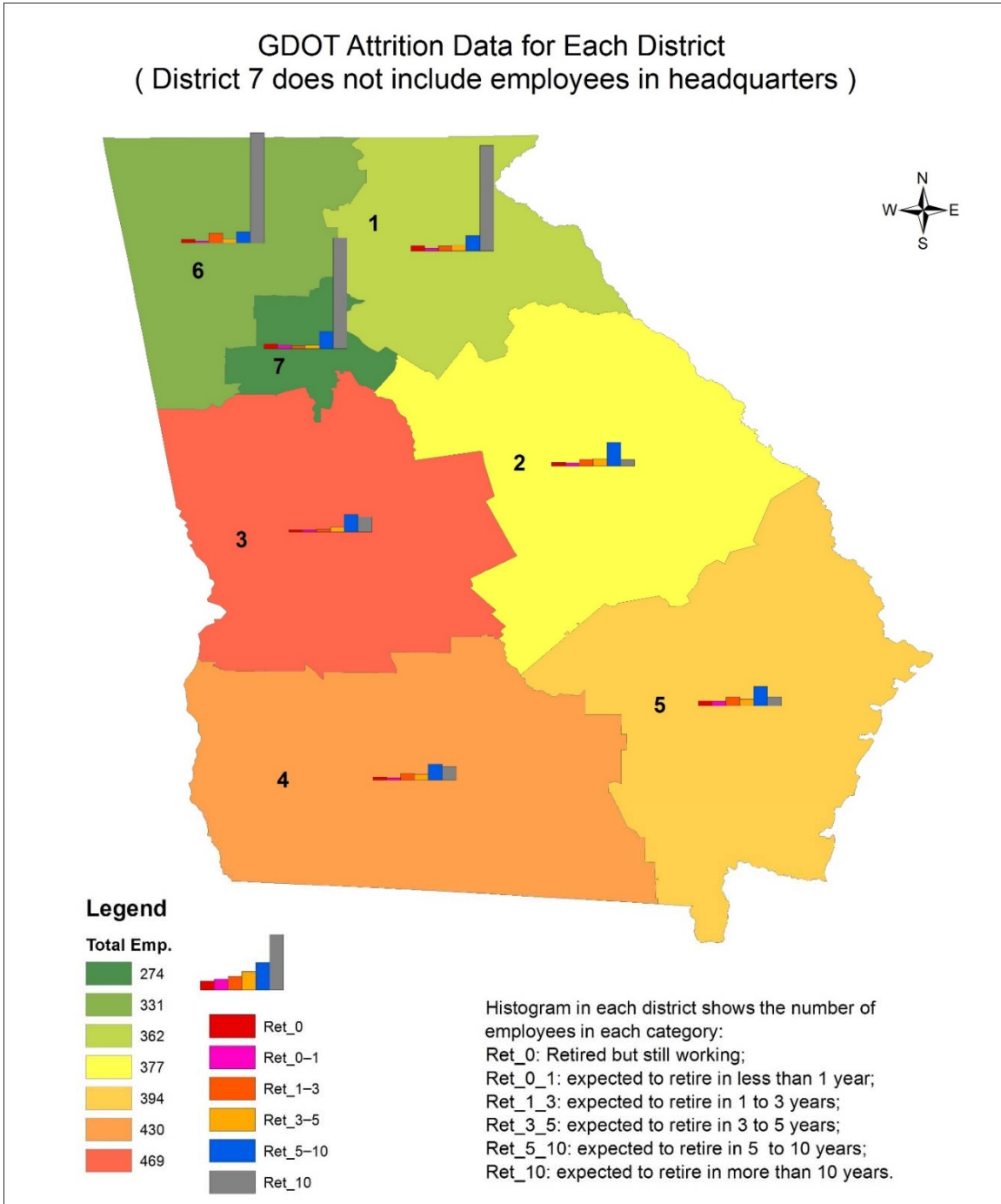
Figure 16 – Sample Spatial Analysis Output using GIS

Figure 16 shows an example of spatial analysis using GIS. In this figure, the seven GDOT districts are color-coded according to the total number of employees in each district. Then within each district, a color-coded histogram is shown (based on analysis of the provided attrition data) indicating the associated attrition risk. Please note that District 7 headquarters in Midtown Atlanta is excluded, because the large number of employees at that location makes the rest of the data more difficult to visualize due to scale effects. A quick view of this figure provides valuable information such as the distribution of attrition risk across the state, which can be used for decision-making purposes.

4.2.3 NETWORK ANALYSIS

Network analysis is a multi-disciplinary field which seeks to predict and examine the interaction and effects of objects inside a network which are connected to each other through a predefined relationship among the objects. Network analysis is a subset of graph analysis examining graphs as a representation of symmetric and asymmetric relations (directed and undirected graphs) between objects.

The concept of network analysis is employed in many fields, including physical and social sciences. A lot of valuable information could be inferred from the relationship between humans and communication within the structure of a network, such as finding the most influential person in a network and how fast an information can diffuse throughout the whole network. In this regard, the application of such network analysis techniques to an organization like GDOT can allow for the identification of critical knowledge and connectivity between individuals within the organization, which in turn

can have important implications for knowledge capture and transfer using techniques such as job shadowing.

In the context of an organization, a network can simply be defined as an interconnected group of people or things (such as such as computers, operations, etc.). As discussed previously in Report Section 2.1, information can move around organizations through hard networks (infrastructure-dependent) as well as soft networks (informal and typically based on social interaction). In organizations consisting of multiple sub-units such as the GDOT, social networks and the relationships between the network members are especially important in determining the flow and sharing of data and knowledge through the network (Hansen, 1999; Reagans & McEvily, 2003; Hansen, Mors, & Lovas, 2005).

Relative importance, or centrality, of the members also have important implications for social networks. One common technique to evaluate the centrality of a member in a social network is known as "betweenness" (Freeman, 1978/1979; Butts, 2008). Betweenness centrality is an indicator of a member's centrality in a network, with high betweenness individuals acting as "bridges" between different groups that may otherwise be loosely connected. These individuals tend to have a large influence on the sharing and transfer of knowledge through a network, assuming that the transfer takes place along the shortest paths associated with a given network member (Barthelemy, 2004; Butts, 2008).

An example demonstrating the concepts of network analysis and betweenness centrality can be derived in the context of organizational charts and job shadowing. In GDOT, there are many organizational charts showing "who reports to who". As an example, **Figure 17** shows a sample organizational chart for the Roadway Design group dated June 26, 2014.

This chart shows how people within this subset of the organization are connected to each other in the traditional sense. If certain attributes are assigned to each person (node) on this chart (in the case of job shadowing, there are four attributes: knowledge loss risk, mentor score, protégé score, and position in the organizational hierarchy), then a network representation of the organizational chart can be constructed as shown in **Figure 18**, which in turn can be used to identify critical knowledge (i.e., those with the highest KLR score), as well as a potential mentor and potential protégé(s).

In this example, the size of the circles corresponds to the betweenness centrality of the person (the bigger the node size is, the higher score of betweenness it has). The yellow circle indicates the potential mentor identified by the network, while the red circles indicate the potential protégés. The identification is done using an algorithm that evaluates the hierarchial position and other constraints (for example, a lower level employee cannot be a mentor to a higher level employee), as well as the mentor/protégé scores associated with each node.
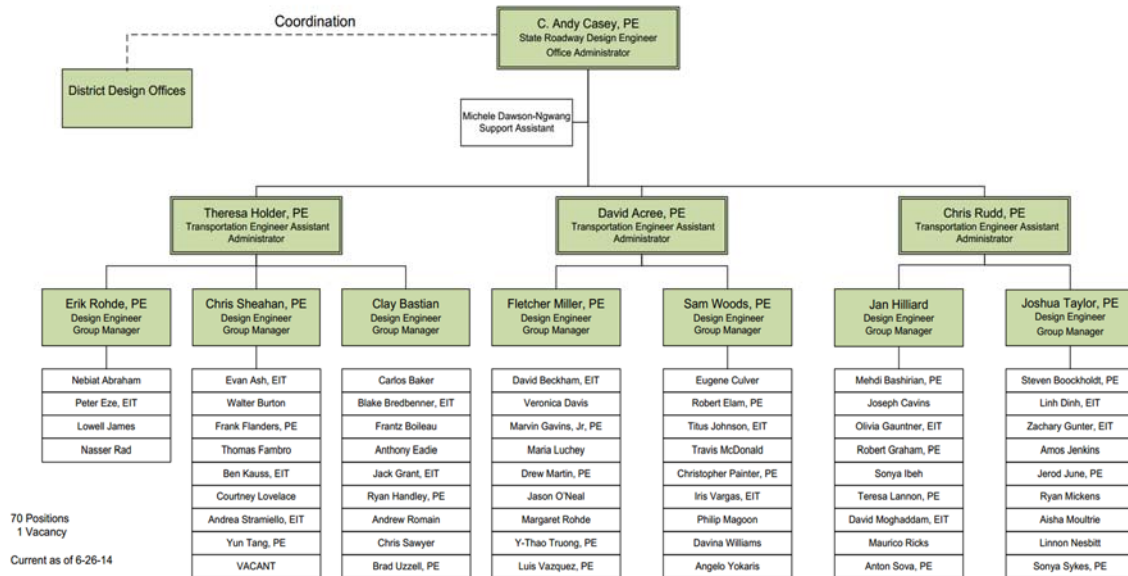
Figure 17 – Sample GDOT Organizational Chart

By representing the organizational chart as a network, it is possible not only to see who reports to who but also to visualize the connectivity of the individuals within the network. The implications are profound: network analysis can be used as a powerful technique to compliment or feed multivariate analysis, to identify critical knowledge holders within the organization, to prioritize amongst potential candidates (for any given position) by considering the position of the node (person) in a network and its connectivity, and to provide GDOT leadership with guidance for organization-wide training, development, and/or future hiring strategies. In other words, network analysis can allow transformation from an individual (i.e., one-on-one, such as job shadowing) to an organizational context with regard to knowledge management.
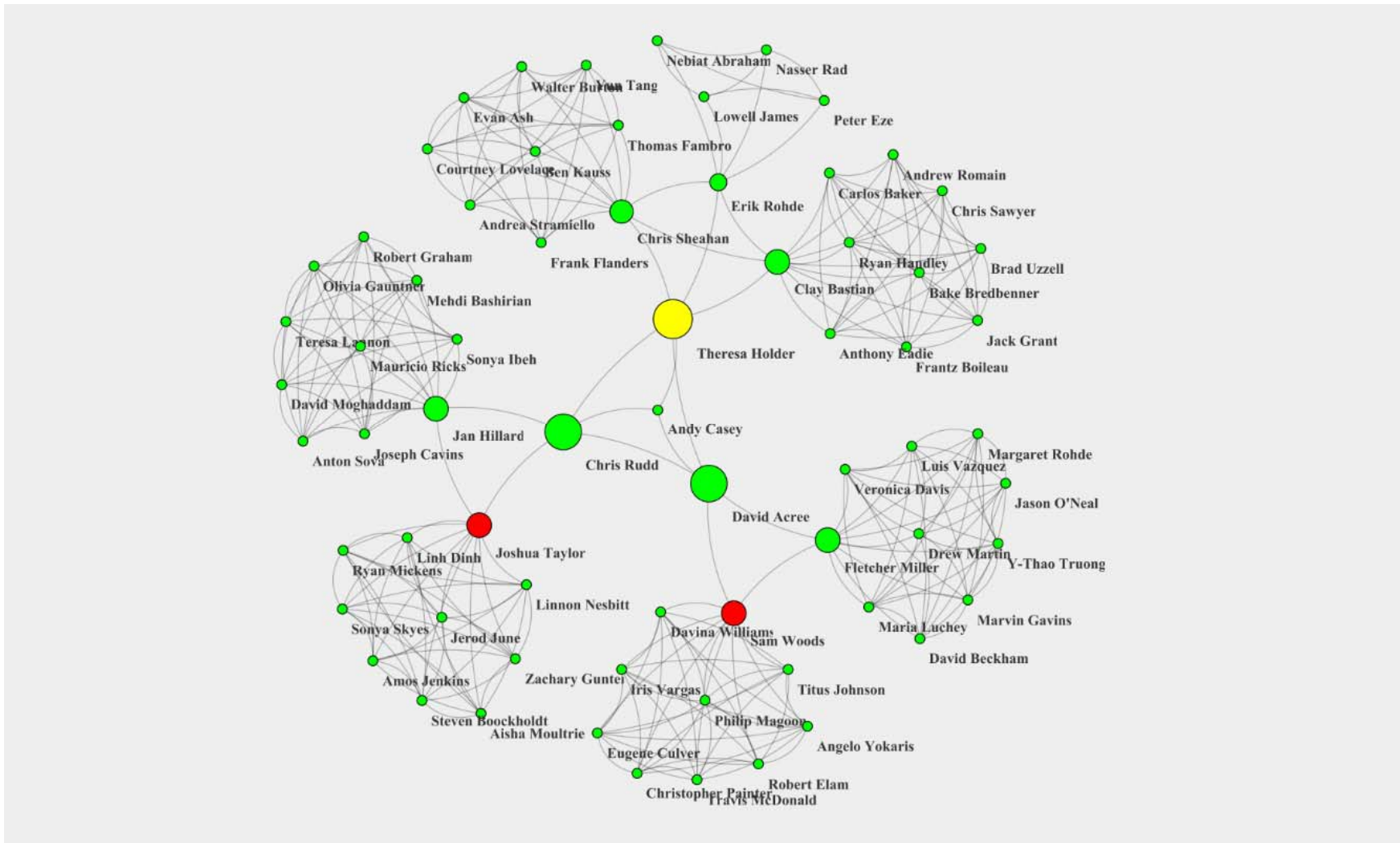
Figure 18 – Network Representation of Sample GDOT Organizational Chart

5. REFERENCES

Barthelemy, M., 2004. Betweenness centrality in large complex networks. *European Physics Journal B,* Volume 38, pp. 163-168.

Butts, C. T., 2008. Social network analysis: A methodological introduction. *Asian Journal of Social Psychology,* Volume 11, pp. 13-41.

CALTRANS, N.D.. *Knowledge Transfer Guidebook,* s.l.: CALTRANS.

CII, 2013. *Transferring Experiential Knowledge from the Near-Retirement Generation to the Next Generation,* Austin TX: Construction Industry Institute.

Davenport, T. H. & Prusak, L., 1998. *Working Knowledge: How Organizations Manage What They Know.* Boston, MA: Harvard Business School Press.

DeLong, D. W., 2004. *Lost Knowledge.* New York: Oxford University Press.

Freeman, L. C., 1978/1979. Centrality in Social Networks: Conceptual Clarification. *Social Networks,* pp. 215-239.

Grunewald, M., 2014. *Why More Employees Are Considering Leaving Their Companies.* [Online] Available at: http://talent.linkedin.com/blog/index.php/2014/03/internal-mobility-exit-survey

Han, J. & Kamber, M., 2000. *Data mining: Concepts and Techniques.* New York: Morgan-Kaufman.

Hansen, M. T., 1999. The Search-Transfer Problem: The Role of Weak Ties in Sharing Knowledge across Organization Subunits. *Administrative Science Quarterly, 44,* pp. 82-111.

Hansen, M. T., Mors, M. L. & Lovas, B., 2005. Knowledge Sharing in Organizations: Multiple Networks, Multiple Phases. *The Academy of Management Journal,* 48(5), pp. 776-793.

Hansen, M. T., Nohria, N. & Tierney, T., 1999. What's your strategy for managing knowledge?. *Harvard Business Review,* pp. 106-116.

Lawrence, S., 2010. *A brief case for work shadowing - A workforce capability strategy for vocational education and training,* s.l.: Queensland Government.

Malecki, E. J., 2002. Hard and Soft Networks for Urban Competitiveness. *Urban Studies,* 39(5-6), pp. 929-945.

Martin, B. O., Kolomitro, K. & Lam, T. C., 2014. Training Methods: A Review and Analysis. *Human Resource Development Review,* 13(1), pp. 11-35.

Nonaka, I. & Takeuchi, H., 1995. *The Knowledge Creating Company.* New York, NY: Oxford University Press.

O'Dell , C. & Grayson, Jr., C. J., 1998. *If Only We Knew What We Know: The Transfer of Internal Knowledge and Best Practice.* New York, NY: The Free Press.

Perkins, R. A. & Bennett, F. L., 2012. *Knowledge Transfer Needs and Methods,* Fairbanks, AK: Alaska University Transportation Center.

Reagans, R. & McEvily, B., 2003. Network Structure and Knowledge Transfer: The Effects of Cohesion and Range. *Administrative Science Quarterly, 48,* pp. 240-267.

Roan, A., 2003. *Conversations on workshadowing: developing women's careers through better mentoring programs.* Gold Coast, Australia, IFSAM, pp. 12-17.

Rothwell, W. J., 2004. Knowledge Transfer: 12 Strategies for Succession Management. *IPMA HR News,* February, pp. 10-11.

Schmidt, S. W., 2007. The Relationship Between Satisfaction with Workplace Training and Overall Job Satisfaction. *Human Resource Development Quarterly,* 18(4), pp. 481-498.

Small, C. T. & Sage, A. P., 2005/2006. Knowledge management and knowledge sharing: A review. *Information Knowledge Systems Management,* pp. 153-169.

Sprunt, E., Howes, S. & Pyrcz, M., 2014. Talent & Technology - Impact Of The Big Crew Change On Employee Retention. *Journal of Petroleum Technology.*

Szulanski, G., 1995. *Unpacking Stickiness: An Empirical Investigation of the Barriers to Transfer Best Practice Inside the Firm,* Fontainebleau, France: INSEAD.

Tennessee Valley Authority, 2015. *Knowledge Loss Risk Assessment.* [Online] Available at: http://www.tva.gov/knowledgeretention/klra_guideline.html

Touran, A. et al., 2009. *TCRP Report 131 - A Guidebook for the Evaluation of Project Delivery Methods,* Washington D.C.: Transportation Research Board.

University of London, 2015. *SOAS Work Shadowing Scheme,* London, UK: The University of London.

Ward, M., 2007. *NCHRP Synthesis 365: Preserving and Using Institutional Memory Through Knowledge Management Practices,* Washington D.C.: Transportation Research Board.

APPENDIX A –

GDOT Job Shadowing

Program Guidelines

1.   Introduction

GDOT is an experience-rich and informal learning organization that is committed to preserving institutional knowledge as well as encouraging career development. In this regard, among many potential knowledge transfer techniques, job shadowing has been identified as a suitable tool to aid GDOT in achieving these goals.

Job shadowing can be described as having a less experienced employee (i.e., protégé) paired with a veteran employee (i.e., mentor) for a period of time, with the mentor asked to share knowledge including dealing with the most difficult situations faced on the job. It can be used not only as a knowledge transfer tool, but also as a motivational and networking tool for personnel development.

The relationship between the mentor and the protégé can range from one-on-one collaborative work, to the mentor observing the protégé's work and vice versa. In an observation-based arrangement, the roles are well-defined, and there is relatively little disruption to the work as the observation takes place while the participants go about their business as usual. However, this arrangement can limit the interaction between the mentor and protégé, and hinder the effectiveness of knowledge transfer. On the other hand, a collaborative work arrangement provides a greater disruption to the work routine; however, it also encourages hands-on experience and exchange of information and facilitates discussion/interaction between the participants which can enhance the effectiveness of knowledge transfer.

This document contains guidelines for participants in the GDOT Job Shadowing program, including the mentor, the protégé(s), and the program managers/supervisors. The focus is on a collaborative work arrangement as described above to achieve enhanced knowledge transfer. In this regard, the GDOT Job Shadowing program is also intended to take place over a longer period of time (e.g., several months) than the more traditional programs where the shadowing takes place over a short-period of time (e.g., one or two days).

Contained in this document are:

- An introduction to job shadowing and its benefits

- A brief summary of the mentor and protégé identification processes

- A description of the job shadowing process and guidelines for participants

- Forms to be completed by the program participants for evaluation and monitoring

2.   Mentor and Protégé Identification

Mentor and protégé identification is facilitated using the Job Shadowing Evaluation Tool (JSET), developed by Georgia Institute of Technology which considers several factors to help identify critical knowledge holders in GDOT, and helps to evaluate potential mentor(s) and protégé(s) for a future job shadowing arrangement. JSET is a macro-enabled Excel® file with a simple graphical user interface that allows consideration of several key factors in first determining the knowledge loss risk (KLR) of

a potential mentor, then assessing suitability of said mentor (with the option of assessing a different mentor if said mentor is unable to participate in job shadowing), and lastly, assessing up to four potential protégés with the ultimate goal of identifying a mentor-protégé pair for participation in the job shadowing program.

Details of JSET and its use to identify a potential mentor-protégé pair are discussed in the "Job Seeker" project final report.

3. Job Shadowing Process

The job shadowing program developed for GDOT is essentially a three part process: planning, performance, and evaluation:

Plan	- Determine time period and availability - Identify objectives and expectations
	Initial Meeting Form
Perform	- Carry out planned activities - Document activities / knowledge gained
	Standard Meeting Form
Evaluate	- Evaluate program regularly for progress tracking - Provide feedback to both mentor and protégé - Make adjustments as necessary
	Mentor/Protégé Evaluation Form Final Meeting Form
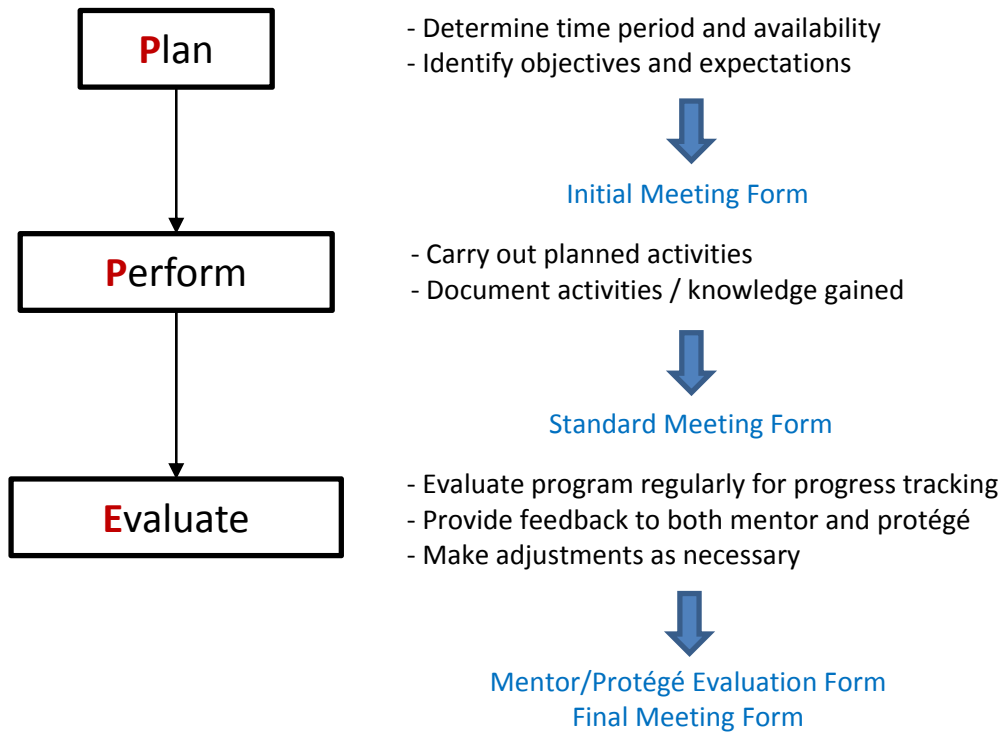
The planning phase includes the determination of the program duration and time availability of the program participants, as well as identification of the objectives and expectations. The performance phase consists of carrying out the planned activities and documenting the activities/knowledge gained. Lastly, the evaluation phase includes periodic assessments of both the mentor and protégé during the job shadowing process, as well as a final assessment at the end of the program.

3.1   Initial Meeting

After systematic identification of the mentor-protégé pair using JSET as described previously, the first step is to arrange an initial meeting between the mentor and the protégé. This meeting is typically hosted by an appropriate GDOT senior staff member. The purpose of the initial meeting is to introduce the mentor and the protégé, to determine objectives, and to establish a schedule and specific framework for the particular job shadowing experience.

The meeting should be moderated by the supervisor(s) and attended by the program manager if possible. This is to ensure that the participants' workloads are suitable to allow them to successfully participate in the job shadowing program while maintaining productivity and also to ensure that potential conflicts (personality, generation gap, mistrust, etc.) can be identified and appropriate actions/precautions can be taken prior to the commencement of job shadowing activities.

The initial meeting should at a minimum consider the following:

- Time period and availability: While the approximate duration of job shadowing, as well as time availability, are parameters that are factored into JSET during the mentor-protégé identification process, the exact time period and availability should be agreed upon. **The minimum recommended total time spent on job shadowing should be 50 - 100 hours depending on the position, preferably taking place over a time period of at least 3 months**. The lower bound of 50 contact hours may be appropriate for less technical positions or for personnel whose positions may involve a significant amount of field work, while the upper bound of 100 contact hours may be appropriate for technical positions with more complex knowledge transfer requirements.

  Some examples of achieving the minimum number of hours are:

  - Meeting 4 to 8 hours/week for a time period of 3 months (13 weeks)

  - Meeting 2 to 4 hours/week for a time period of 6 months (26 weeks)

  - Meeting 1 to 2 hours/week for a time period of 12 months (52 weeks)

Note that these combinations of weekly contact time and duration are equivalent to the amount of contact hours that a student attending a course at university or college would have in 1 to 2 full courses.

Also note that for a program less than 3-months long, a more condensed and accelerated schedule would need to be adopted to ensure that the at-risk knowledge is captured prior to its loss from the organization. Obviously, the above cumulative amounts of meeting time are intended as a guideline and the actual schedule for each Job Shadowing pairing should be customized to meet the preferences of the mentor and protégé but importantly should be agreed to at the start of the exercise. If a shorter or longer time period is necessary for job shadowing to take place due to other factors, then the schedule can be adjusted accordingly as long as the overall guideline above is met.

- Objectives & Expectations: The teaching and learning objectives should be discussed and documented, including but not limited to, topics/subjects to be covered and activities to be performed. In addition, each participant should identify the expected outcomes of the activities, as well as personal and other expectations such as confidentiality issues, areas of particular interest, preconceptions of the role to be shadowed, etc.

The initial meeting can be documented using the attached "Initial Meeting Form".

3.2   Job Shadowing

As mentioned in the Introduction section, the focus is on a collaborative work arrangement for job shadowing. Working together closely allows the mentor to share both tacit (informal/uncodified) and explicit (formal/codified) knowledge and experience, including dealing with the most difficult situations faced on the job. The intent is to have

the protégé observe, internalize, and collaborate with the expert towards capturing and preserving institutional knowledge.

Examples of a collaborative work arrangement include:

- Working on a specific problem together, with the mentor leading the discussion initially to make sure the key concepts (including preferred methodologies/ techniques, if any) are fully understood by the protégé. The roles can then be gradually reversed, allowing the protégé to demonstrate and apply the knowledge and experience captured.

- Mentor inviting the protégé to attend meetings. At first, the protégé would be expected to observe the mentor, but in subsequent meetings, the protégé would be expected to become a more active participant.

- Performing field trips/site visits, with the mentor pointing out key elements/issues for the protégé to observe and document. Over time, the protégé would be expected to identify and address key elements/issues without the mentor's guidance.

During job shadowing, the mentor should:

- Minimize time spent on sharing common knowledge or "chit-chat"; the focus should be to obtain knowledge in areas where the protégé is lacking.

- Include the protégé in the problem solving and decision-making processes as much as possible, including the most difficult situations faced on the job.

- Provide ample opportunities for questions during and after activities.

- Provide the protégé with constructive feedback.

- Provide some degree of flexibility, especially with regard to time. Notify the protégé in advance if absence from a scheduled activity is unavoidable, and immediately reschedule the activity.

- Maintain confidentiality related to professional and/or personal matters.

During job shadowing, the protégé should:

- Demonstrate commitment to the scheduled times, and arrive prepared for all scheduled activities.

- Listen actively (i.e., make a concentrated effort not only to listen but also to understand), ask questions as necessary, and take careful notes.

- Provide the mentor with constructive feedback and reflections on the activities.

- Notify the mentor in advance if absence from a scheduled activity is unavoidable, and immediately reschedule the activity.

- Maintain confidentiality related to professional and/or personal matters.

The mentor and protégé should complete the attached "Standard Meeting Form", in order to document the date and duration of the meetings, to summarize the primary activities and accomplishments, and to provide other relevant feedback/comments. If possible, the form should be completed together by the mentor and protégé immediately after completion of each meeting, so that the activities can be documented while the activities and accomplishments are still fresh in the participants' heads. The completed form should be submitted at least once a month.

3.3   Evaluation

The attached "Protégé Evaluation Form" and "Mentor Evaluation Form" should be completed by the mentor and the protégé, respectively, at the mid-point of the program, as well as at the end. These forms will allow the mentor and the protégé to reflect on their experiences, and allow the program manager and supervisor(s) to monitor and assess the effectiveness of job shadowing as well as the compatibility of the mentor-protégé pair. This way, potential issues can be identified so that corrections can be made as necessary. It should be noted that if there are issues, the program manager/supervisor should be notified as soon as possible (i.e., sooner than the first evaluation), so that corrective actions can be taken without the participants needing to wait until the first evaluation at the mid-point of the program.

With regard to potential issues that may arise during job shadowing, some of the most common barriers to effective knowledge transfer include:

- Ignorance: Sources may feel like their knowledge is not important enough to share, while the recipients may have no idea that someone in the organization already has the knowledge.

- Lack of willingness/motivation: This can be applicable to both the source and the recipient of the knowledge. The source may be reluctant to share knowledge for fear of losing his/ her position as an expert, due to a lack of trust on the recipient's ability to absorb the knowledge, or due to lack of financial or other motivators. On the other hand, the recipient may be reluctant because of a preconceived notion of the usefulness / reliability of the source's knowledge.

- Interpersonal dynamics: These are factors that can create an arduous relationship between the source and the recipient including, but not limited to, personality conflicts such as cultural or generational differences, the source and recipient valuing knowledge differently (e.g., a recipient may feel the source's knowledge is outdated and no longer relevant and vice versa), lack of trust between the mentor and the protégé, close-mindedness, and inflexibility to accommodate differences in teaching/learning styles.

- Teaching ability of knowledge owners: An expert may not necessarily be a good teacher for various reasons such as poor communication skills, intolerance for mistakes, fear of loss of status, and lack of patience.

- Lack of absorptive/retentive capacity by the recipient: Lack of absorptive capacity refers to the capacity to receive, assimilate, and use new knowledge, while retentive capacity refers to the ability of a recipient to institutionalize the utilization of new knowledge. The lack of these capacities are typically related to the lack of time, money, and/or management resources for knowledge transfer activities.

- Lack of time or meeting places: It is important to make sure that the agreed-upon times for job shadowing are adhered to, and that arrangements are made before-hand for a meeting space that can not only accommodate both the mentor and the protégé comfortably, but also provide the necessary tools/resources (such as a computer, a screen/monitor, etc.) for job shadowing to take place effectively.

At the end of the program, a final meeting should be held between the mentor, protégé, and the supervisor / program manager. The goal of this meeting is to assess the Job Shadowing program overall, and to provide feedback and suggested improvements. At the end of the meeting, these should be documented using the attached "Final Meeting Form (Mentor)" and "Final Meeting Form (Protégé)" to be completed by the mentor and

the protégé, respectively. The assessment and feedback provided can be used by GDOT personnel to make improvements to the Job Shadowing program as necessary.

All completed evaluation forms should be submitted to the program manager shortly after the particular meeting the form is associated with is completed. The program manager will work with the supervisor(s) to monitor and assess the job shadowing program, to address and mitigate any issues that may arise during job shadowing, and to make improvements to the program.

	GDOT JOB SHADOWING PROGRAM **Initial Meeting Form**
Georgia Department of Transportation	

Date of Meeting:

Mentor Name:	**Protégé Name:**
Job Title:	**Job Title:**
Telephone:	**Telephone:**
Email:	**Email:**

Supervisor / Program Manager Name:

Time Period and Availability:

Mentor Objectives:

Georgia Department of Transportation

Protégé Objectives:

Mentor Expectations:

Protégé Expectations:

Supervisor / Program Manager Comments:

	GDOT JOB SHADOWING PROGRAM
Georgia Department of Transportation	**GDOT JOB SHADOWING PROGRAM** **Standard Meeting Form**

Mentor Name:

Protégé Name:

Supervisor / Program Manager Name:

Meeting No:	Date of Meeting:	Duration (hours):	Topics Covered, Activities and Accomplishments:
1			
2			
3			
4			
5			

Provide any other comments/remarks related to the meetings:

	GDOT JOB SHADOWING PROGRAM
Georgia Department of Transportation	**Mentor Evaluation Form**

Date:

Protégé Name:	**Mentor Name:**

Evaluation Period:

Rate the mentor's teaching ability (check the appropriate box):

3 – High ☐

2 – Moderate ☐

1 – Low ☐

Rate the mentor's willingness / attitude (check the appropriate box):

3 – High ☐

2 – Moderate ☐

1 – Low ☐

Overall, is the mentor meeting the objectives and expectations?

Yes ☐

No ☐

Comments / Notes (mention any specific issues, suggestions for improvements, activities most/least enjoyed, etc.)

GDOT JOB SHADOWING PROGRAM
Protégé Evaluation Form

Georgia Department of Transportation

Date:

Mentor Name:	Protégé Name:

Evaluation Period:

Rate the protégé's learning ability (check the appropriate box):

3 – High ☐

2 – Moderate ☐

1 – Low ☐

Rate the protégé's willingness / attitude (check the appropriate box):

3 – High ☐

2 – Moderate ☐

1 – Low ☐

Overall, is the protégé meeting the objectives and expectations?

Yes ☐

No ☐

Comments / Notes (mention any specific issues, suggestions for improvements, activities most/least enjoyed, etc.)

	GDOT JOB SHADOWING PROGRAM **Final Meeting Form (Mentor)**
Georgia Department of Transportation	

Date of Meeting:

Mentor Name:	**Protégé Name:**
Job Title:	**Job Title:**
Telephone:	**Telephone:**
Email:	**Email:**

Supervisor / Program Manager Name:

Time period and availability comments (was the program too short / too long, were you able to meet at the scheduled times; if not, provide reasons, etc.):

Objectives and expectations assessment (were the objectives and expectations set at the beginning met; if not, provide reasons, etc.):

Georgia Department of Transportation

Overall, how would you rate effectiveness of the Job Shadowing program?

5 – Very effective ☐

4 – Effective ☐

3 – Moderately effective ☐

2 – Somewhat effective ☐

1 – Not effective ☐

Reason(s) for the rating provided above:

Final thoughts/comments and suggested improvements:

Supervisor / Program Manager Summary Comments:

	GDOT JOB SHADOWING PROGRAM
Georgia Department of Transportation	**Final Meeting Form (Protégé)**

Date of Meeting:

Mentor Name:	**Protégé Name:**
Job Title:	**Job Title:**
Telephone:	**Telephone:**
Email:	**Email:**

Supervisor / Program Manager Name:

Time period and availability comments (was the program too short / too long, were you able to meet at the scheduled times; if not, provide reasons, etc.):

Objectives and expectations assessment (were the objectives and expectations set at the beginning met; if not, provide reasons, etc.):

Georgia Department of Transportation

Overall, how would you rate effectiveness of the Job Shadowing program?

     5 – Very effective ☐

     4 – Effective ☐

     3 – Moderately effective ☐

     2 – Somewhat effective ☐

     1 – Not effective ☐

Reason(s) for the rating provided above:

Final thoughts/comments and suggested improvements:

Supervisor / Program Manager Summary Comments:

APPENDIX B –

Job Shadowing Training Module

"Job Seeker"
(**Job S**hadowing for **E**mployee **E**ngagement through **K**nowledge and **E**xperience **R**etention)

Training Module

Developed by
Georgia Institute of Technology
For
Georgia Department of Transportation

Problem Statement

- Attrition (and subsequent potential for loss of knowledge) is a significant issue faced by GDOT (as well as other DOTs and private companies) with an aging workforce.
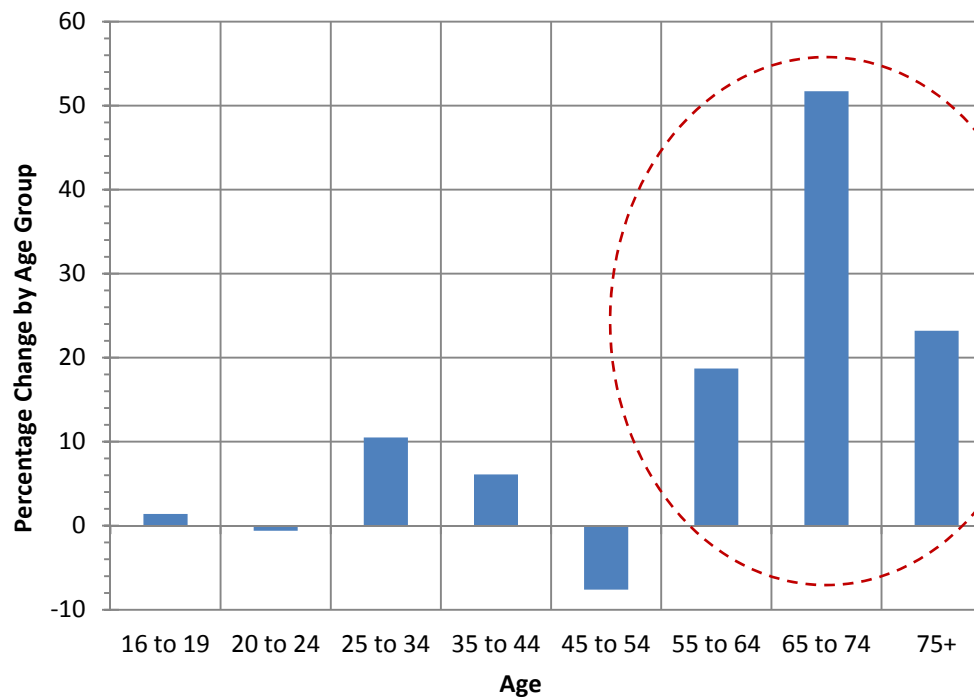
Significant growth of those aged 55 and higher compared to others.

Changing Distribution of the Workforce 2010-2020
(Source: US Bureau of Labor Statistics)

Program Goals

- GDOT's job shadowing program aims to:

  ➢ use job shadowing as an informal method for capturing and dispersing knowledge between the "near-retirement" generation and the "new" generation, and to minimize the risk of knowledge loss due to attrition; and

  ➢ use job shadowing program as a successful motivational tool which keeps employees engaged and excited about their work environment and career path, in turn helping to reduce turnover rates.

What is Job Shadowing?

- Job shadowing is an activity where a less experienced employee (protégé) is paired with a veteran employee (mentor), and the mentor is asked to share knowledge, including dealing with most difficult situations faced on the job.

- The intent is to have the protégé observe, internalize, and eventually collaborate with the mentor.

- The relationship between mentor and protégé can range from collaborative work, to mentor observation of protégé work or vice versa.

"Been following me around all morning. I think it's the new intern."

Why Job Shadowing?

- A very effective mechanism for transfer of tacit (i.e., experiential) knowledge ("tricks of the trade"), which is often difficult to capture.

- Can facilitate creation and/or transfer of explicit (i.e., formal or codified) knowledge, if protégé codifies the knowledge acquired.

- An "informal" mechanism, which allows incorporation of other Knowledge Management (KM) techniques such as story-telling, coaching, mentoring, etc.

- A motivational and networking tool for personnel development, which helps develop relationships, generate employee interest, and increase engagement: engaged employees are more likely to stay.

- Works well in a variety of environmental conditions, which in turn makes it a well-suited strategy for knowledge transfer in a diverse organization such as the GDOT.

2009 GDOT KM Study Findings

Position at GDOT

6, 0.9% — Director
261, 38.3% — Manager
23, 3.4% — Administrator
161, 23.6% — Other
230, 33.8% — Technician / Specialist

- Director
- Manager
- Technician / Specialist
- Administrator
- Other
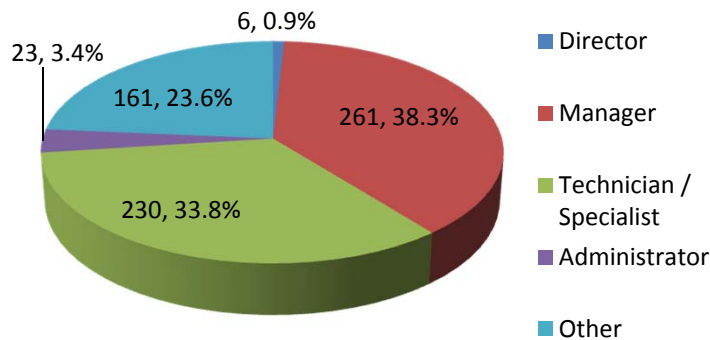
Total No. of Respondents = 681

Tenure at GDOT

87, 12.8%
164, 24.1%
180, 26.4%
121, 17.8%
129, 18.9%

- 0-5 yrs
- 6-10 yrs
- 11-15 yrs
- 16-20 yrs
- 21+ yrs
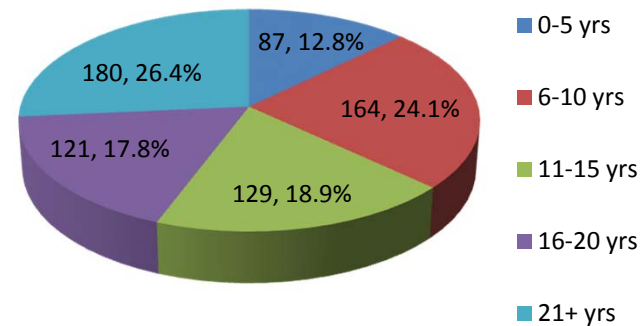
Total No. of Respondents = 681

Participation in job shadowing

75, 10.6%
75, 10.6%
87, 12.3%
64, 9.0%
66, 9.3%
50, 7.0%
293, 41.3%

- Never
- Within past week
- Within past month
- Within past 6 months
- Within past year
- Within past 5 years
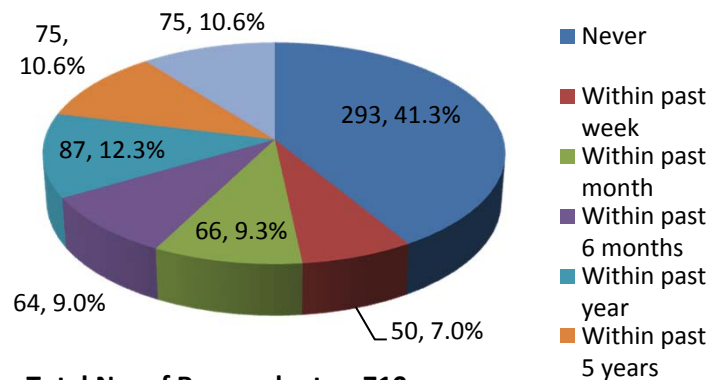
Total No. of Respondents = 710

Effectiveness of job shadowing

23, 3.2%
111, 15.6%
93, 13.1%
208, 29.3%
275, 38.7%

- Very effective
- Moderately effective
- Little effective
- Not very effective
- No opinion
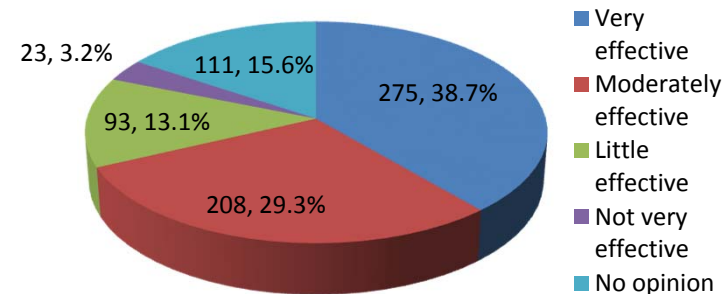
Total No. of Respondents = 710

2009 GDOT KM Study Findings

- Overall, 68 percent of respondents agreed that job shadowing is moderately to very effective as a knowledge management technique.

- Some important factors for success, according to respondents:

  - Experience: respondents suggested that job shadowing works best if the mentor is experienced (instead of a mid-level mentor).

  - Time: respondents suggested that job shadowing works best if sufficient time is allotted.

- Many agreed that job shadowing was valuable, and mentioned it as an opportunity for learning / career advancement.

Job Shadowing: Program Guidelines

Plan
- Determine time period and availability
- Identify objectives and expectations

Initial Meeting Form

Perform
- Carry out planned activities
- Document activities / knowledge gained

Standard Meeting Form

Evaluate
- Evaluate program regularly for progress tracking
- Provide feedback to both mentor and protégé
- Make adjustments as necessary

Mentor/Protégé Evaluation Form
Final Meeting Form

Job Shadowing: Program Guidelines

Plan   ⟶   Initial Meeting
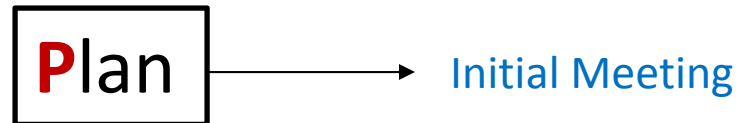
Time Period and Availability:
- The minimum recommended total time spent on job shadowing should be 50 to 100 hours depending on the position, preferably taking place over a time period of at least 3 months. Some possible combinations:

  - Meeting 4 to 8 hours/week for a time period of 3 months (13 weeks)
  - Meeting 2 to 4 hours/week for a time period of 6 months (26 weeks)
  - Meeting 1 to 2 hours/week for a time period of 12 months (52 weeks)

Note: this is equivalent to the amount of contact hours that a student attending a course at university or college has in 1 to 2 full courses.

Job Shadowing: Program Guidelines

Plan ⟶ Initial Meeting
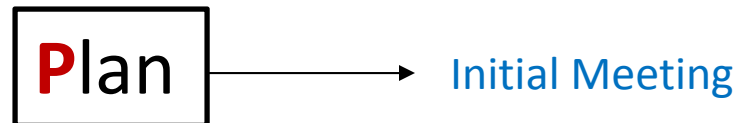
Objectives & Expectations:

- Discuss and document:

  - Topics/subjects to be covered and activities to be performed
  - Expected outcomes of the activities
  - Personal and other expectations such as confidentiality issues, areas of particular interest, preconceptions of the role to be shadowed, etc.

- Be specific!

Document using the "Initial Meeting Form"

Job Shadowing: Program Guidelines

Initial Meeting Form

Initial Meeting Form – Page 1 of 2

Initial Meeting Form – Page 2 of 2

Job Shadowing: Program Guidelines

$$\boxed{\textbf{P}\text{erform}} \longrightarrow \text{Job Shadowing}$$

Collaborative work:

- Working together closely allows the mentor to share both tacit (informal/ uncodified) and explicit (formal/codified) knowledge and experience, including dealing with the most difficult situations faced on the job.

- Examples:

  - Working on a specific problem together, with the mentor leading the discussion initially to make sure the key concepts (including preferred methodologies/techniques, if any) are fully understood by the protégé. The roles can then be gradually reversed, allowing the protégé to demonstrate and apply the knowledge and experience captured.

  - Mentor inviting the protégé to attend meetings. At first, the protégé would be expected to observe the mentor but in subsequent meetings, the protégé would be expected to become a more active participant.

  - Performing field trips/site visits, with the mentor pointing out key elements/issues for the protégé to observe and document. Over time, the protégé would be expected to identify and address key elements/issues without the mentor's guidance.

Job Shadowing: Program Guidelines

Perform ⟶ Job Shadowing
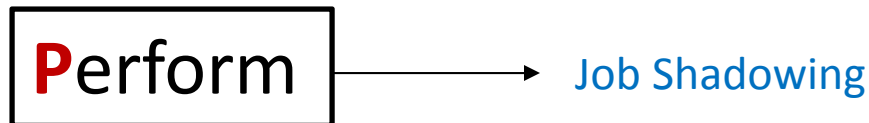
Best Practices:
- Minimize time spent on sharing common knowledge or "chit-chat"
- Provide ample opportunities for questions during and after activities
- Provide constructive feedback and reflections
- Demonstrate commitment to the scheduled times, and arrive prepared for all scheduled activities
- If absence from a scheduled activity is unavoidable, notify in advance and reschedule immediately
- Maintain confidentiality

Document at least monthly using the "Standard Meeting Form"

Job Shadowing: Program Guidelines

Standard Meeting Form

<table>
<tr><td colspan="2">GDOT Georgia Department of Transportation</td><td colspan="2">GDOT JOB SHADOWING PROGRAM
Standard Meeting Form</td></tr>
<tr><td colspan="2">Mentor Name:</td><td colspan="2">Protégé Name:</td></tr>
<tr><td colspan="4">Supervisor / Program Manager Name:</td></tr>
<tr><td>Meeting No:</td><td>Date of Meeting:</td><td>Duration (hours):</td><td>Topics Covered, Activities and Accomplishments:</td></tr>
<tr><td>1</td><td></td><td></td><td></td></tr>
<tr><td>2</td><td></td><td></td><td></td></tr>
<tr><td>3</td><td></td><td></td><td></td></tr>
<tr><td>4</td><td></td><td></td><td></td></tr>
<tr><td>5</td><td></td><td></td><td></td></tr>
<tr><td colspan="4">Provide any other comments/remarks related to the meetings:</td></tr>
</table>

Standard Meeting Form – Page 1 of 1

Job Shadowing: Program Guidelines

Evaluate ⟶ Protégé / Mentor Evaluation
Final Meeting

Frequency of Evaluation:
- At the mid-point during job shadowing

Document using the "Protégé / Mentor Evaluation Form"

- Final Meeting at the end

Document using the "Final Meeting Form"

- Forms to be completed independently by both the mentor and the protégé

Job Shadowing: Program Guidelines

Mentor Evaluation Form

Protégé Evaluation Form

Job Shadowing: Program Guidelines

Final Meeting Form (Mentor)

Job Shadowing: Program Guidelines

Final Meeting Form (Protégé)

	GDOT JOB SHADOWING PROGRAM Final Meeting Form (Protégé)

Date of Meeting:

Mentor Name:	Protégé Name:
Job Title:	Job Title:
Telephone:	Telephone:
Email:	Email:

Supervisor / Program Manager Name:

Time period and availability comments (was the program too short / too long, were you able to meet at the scheduled times; if not, provide reasons, etc.):

Objectives and expectations assessment (were the objectives and expectations set at the beginning met; if not, provide reasons, etc.):

	GDOT JOB SHADOWING PROGRAM Final Meeting Form (Protégé)

Overall, how would you rate effectiveness of the Job Shadowing program?

- 5 – Very effective ☐
- 4 – Effective ☐
- 3 – Moderately effective ☐
- 2 – Somewhat effective ☐
- 1 – Not effective ☐

Reason(s) for the rating provided above:

Final thoughts/comments and suggested improvements:

Supervisor / Program Manager Summary Comments:

Job Shadowing: Program Guidelines

<u>Some Barriers to Effective Knowledge Transfer</u>:

- "You don't know what you don't know"

  - Lack of willingness/motivation

    - Interpersonal dynamics

    - Teaching ability of mentors

    - Learning ability of protégés

  - Lack of time or meeting places