Training Curricula for the Kentucky Transportation Cabinet Department of Highways

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16. Abstract

Most state departments of transportation (DOTs) offer their employees professional development opportunities (e.g., training courses) so they can build their expertise and in doing so facilitate agency efforts to fulfill their business mandates. The Kentucky Transportation Cabinet (KYTC) is no different in this regard. While professional development opportunities are invaluable, and while the Cabinet offers a number of trainings to its staff, currently there exists no comprehensive training curricula to help professionals and paraprofessionals systematically grow their knowledge and skills and ensure KYTC maintains a robust portfolio of technical competencies across the organization. The inconsistent and ad hoc manner in which trainings are made available in turn produces unevenness in the distribution of knowledge and skills across the Cabinet. To address the challenge, researchers at the Kentucky Transportation Center (KTC) were asked to develop training curricula for different subject-matter areas. Before devising these curricula, researchers examined practices and programs in place at other state DOTs which are designed to improve professional development as well as the trainings currently available from at or through the Cabinet. Additionally, previous course offerings and attendance figures were analyzed to understand which trainings have proven the most valuable. Based on these analyses, researchers prepared training curricula for five categories: construction, maintenance, roadway design, project management, and section engineers. Within each category, curricula identify training opportunities for personnel classified as entry, mid-level, and advanced. Undoubtedly, the curricula outlined in this report serve only as a starting point; they will need to undergo refinement as the needs of both KYTC and its employees continue to evolve.

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Executive Summary

Faced with declining funding and reduced staffing levels, it is more critical than ever for state departments of transportation (DOTs) to provide their employees with professional development opportunities (e.g., training courses) through which they can built their expertise and in turn facilitate agency efforts to fulfill their legally designated missions. Agencies face numerous challenges related to professional development. With DOTs more reliant than ever on consultants, agencies are suffering from the loss of in-house technical competencies. Similarly, while agencies are striving to meet the professional development needs of its employees, many have trouble paying for training, providing sufficient training, and keeping the materials presented in courses, workshops, and seminars up to date. This is worrisome because professional development activities carry a number of benefits: they help improve the efficiency and productivity of workers, bolster employee motivation, help agencies prepare for the future, nurture the next generation of agency leadership, and facilitate operations. The Kentucky Transportation Cabinet (KYTC) faces many of the same challenges confronting other DOTs. Although the Cabinet makes a number of professional development opportunities available to its staff, it does not currently have in place comprehensive training curricula to help professionals and paraprofessionals systematically grow their knowledge and skills and ensure KYTC maintains a robust portfolio of technical competencies across the organization. Trainings are offered inconsistently and in an ad hoc manner, which results in knowledge and skills being distributed unevenly across the Cabinet. Wanting to strengthen its professional development offerings, the Cabinet asked researchers at the Kentucky Transportation Center (KTC) to develop training curricula for different subject-matter areas.

After reviewing the benefits of professional development initiatives, KTC researchers looked at the strategies and practices adopted by other state DOTs to develop quality professional development opportunities for its employees. Agencies have devised an array of solutions to this problem, such as offering formal classroom trainings, inaugurating peer-to-peer training programs, hosting webinars, giving staff opportunities to work on projects throughout an organization, establishing mentorship programs, and introducing course sequences on a variety of topics. Next, researchers evaluated KYTC's policies and procedures relating to professional development, emphasizing training opportunities currently made available to staff, either through in-house instruction or external resources. Some of the course or course series described in the report include the Highway Technician Series, Advanced Leadership Academy, Construction Management Academy, Project Manager's Boot Camp, and the Supervisor Training and Resources Program. To develop curricula that will meet KYTC's needs, researchers then analyzed current and previous course offerings, as well as attendance figures, to document which trainings have been both offered and attended most frequently. On the basis of this appraisal, researchers then prepared training curricula for five categories: construction, maintenance, section engineers, roadway design, and project management. Within each category, curricula identify training opportunities personnel classified as entry, mid-level, and advanced. Readers are directed to the pages listed in the table below to review the curricula for each subject-matter area:

Subject-Matter Area	Page Range
Construction	37 – 54
Maintenance	55 – 64
Section Engineers	65
Roadway Design	66 – 76
Project Managers	77 – 82

The curricula and recommendations outlined will provide a sound foundation upon which the Cabinet may build current and future professional development programs. As the needs of both KYTC and its employees evolve, these curricula should be revisited and updated accordingly.

Chapter 1 Introduction

1.1 Study Overview

The Kentucky Transportation Cabinet (KYTC) is responsible for addressing a continuously growing portfolio of assets and projects. This includes operating and maintaining over 27,000 miles of roads and 8,800 bridges; managing the projects and programs documented in Kentucky's Highway Plan, which amount to approximately $1 billion annually; and providing a safe and reliable transportation system that promotes economic development and enhances the quality of life for all Kentuckians. This is a massive undertaking, one that KYTC relies on its statewide workforce as well numerous consultants and contractors to execute.

Like organization, the Cabinet's most important asset is its employees. The success or failure of KYTC depends on its employees' ability to work toward and achieve organizational goals and objectives. To help its employees succeed and ensure that it soundly manages existing assets and deliver new projects, the Cabinet is committed to employee professional development training. This training lets workers build their technical competencies — the knowledge and skills needed to accomplish a task, job, or conduct business. Professional development helps employees acquire new skill sets and grow their expertise, which translates into better job performance. Training also gives workers access to the intellectual and practical resources they need to move upward within KYTC's organizational structure. Perhaps the most significant benefit of training is that it helps create better, more knowledgeable employees. Accordingly, training is essential if KYTC is to meet its business objectives. Training is particularly important given that the Cabinet has lost significant institutional knowledge due to retirements, decreases in staffing levels, and other organizational changes. The number of KYTC employees has declined from nearly 10,000 in 1975 to just over 4,200 today, making the need for well-trained and well-equipped employees more important than ever if it is to fulfill its mission.

Although KYTC offers many professional development training opportunities, no comprehensive training curricula have been developed to guide professionals and paraprofessionals and ensure the Cabinet maintains essential competencies. Training, especially programs focused on technical competencies, is offered in an ad hoc manner. The informal nature of the training offerings produces inconsistencies in the knowledge and skills across KYTC's workforce. Additionally, different fields of work require different forms of expertise and therefore require disparate technical competencies. Mastering the subject-specific technical competencies of a particular occupational specialty is necessary if an employee is to become a skilled professional or paraprofessional. Letting employees simply pass through a sequence of substandard or unrelated training courses is not an appropriate framework to foster professional growth. Thus, the kind of training an employee receives is very important, and training requirements are unique to the different fields or disciplines within KYTC.

1.2 Research Objectives

This project has two objectives:

- Identify the requisite technical competencies and professional development goals for KYTC's professionals and paraprofessionals.
- Develop training curricula made up of course sequences applicable to various subject-matter areas.

1.3 Structure of Report

Chapter 2 look at the practices used to facilitate technical competencies, professional development, and generate training curricula. Chapter 3 covers professional development and training initiatives available at other state transportation agencies, while Chapter 4 reviews current course offerings and trainings available to KYTC employees. Chapter 5 contains proposed training curricula for construction, maintenance,

roadway design, section engineers, and project managers (preconstruction). Chapter 6 provides concluding remarks and comments on the potential for further curricula development.

Chapter 2 Literature Review

We reviewed literature on training and other facets of professional development to identify methods and approaches that will best serve departments of transportation (DOTs). A key takeaway message from this literature is that providing employees with clear career development goals linked to training will only serve to improve workforce performance. Training and professional development come with challenges, but offer DOTs the opportunity to shape the knowledge of their workforces to best meet agency missions.

In NCHRP Report 685, Cronin et al. (2011) describe some challenges facing state DOT workforces. Of note, the cost of training, difficulty providing sufficient levels of quality training, and failure to apply and update training were significant issues. To improve training, the authors advocate the use new technologies to support training. These technologies allow employees to more easily find and access training offerings, access off-site and higher education training opportunities, and facilitate easy documentation of past training participation. Additionally, a lack of training for leaders and supervisors was identified as a problem. Possible strategies for improving leadership development including leadership training, leadership development for demographic groups such as women and minorities, and mentoring/coaching programs.

The increased use of consultants has revealed that contract administration and policies regarding contracts differ from more traditional DOT project management skills (Gen and Kingsley 2007) and management structures (Tupper et al. 2014). This lack of clarity regarding contract administration and DOT personnel that are not properly equipped to manage consultant contracts has demonstrated a need for training (Gen and Kingsley 2007). By developing a training program for consultant contract management, DOTs can help promote consistency across contracts (Cochran et al. 2004) and affirm the roles of contract managers (McCullouch and Land 2011).

Career development plans can assist in the definition of goals. Accordingly, it is important for employees to have a list of goals, completion targets, standards to measure completion, and resources. There is an important difference between training and employee development. Training is generally mandatory and focused on the present, while employee development is voluntary and oriented toward the future.

Hansen et al. (2007, p.30) list several reasons why career development is important:

- Improve efficiency/productivity,
- Pinpoint deficiencies and their causes,
- Increase employee motivation,
- Anticipate/prepare for the future,
- Cross-train personnel, and
- Succession planning.

Successful employee development requires assessments of current skills and performance so that areas for improvement can be identified and planning undertaken to address them. Assessments can include personality and ability tests. Hansen et al. (2000, p.4) identify benefits and the responsibility for professional development.

> Benefits of employee development include: employee retention; strengthening the workforce; succession planning; business planning. Employee development is recognized as a joint effort with different responsibilities residing with the employee; the corporation; and each manager.

As Noe et al. (2000) note, professional development is the combination of formal education, work experience, relationships, and assessments. Training should also be considered a key component of

development, particularly as it relates to experience and enhancing existing skills while developing new skills. Boone and Kurtz (1999) identify three training methods for employees including on the job, apprenticeship, and off the job (e.g., classes, conferences, lectures). Work-based education such as internships and on-the job training can provide advantages over classroom training due to their content being directly related to job tasks (Frase et al. 2016). Muench (2006, p. 209) posits that "employer-centered training model is inefficient" and that using a self-managed learning approach is the best option as it helps employees find training that matches individual needs. Moving toward a self-training model generally requires more training offerings, such as the expanded use of online training. After comparing the strengths and weaknesses of both available training, including instructor-led and self-directed training, and training models, including standard and self-managed learning, Muench concludes with observations about current training practices and future opportunities (p. 215):

- Lack of current knowledge needs to be counteracted with ongoing training.
- Training participation is dependent on motivation and barriers.
- Current training is more focused on instructor-led classes.
- The standard training model of giving employers primary training responsibilities is inefficient.
- Self-managed learning can better meet civil engineering training needs.
- A major barrier to self-managed learning is a lack of options.

In the face of declining resources and staff attrition, many state agencies are using information and communication technologies to facilitate training and professional development (Laffey 2017). Compared to traditional in-person trainings, these programs reduce the need for travel and facilities, provide quicker access to more training offerings, and ensure consistent delivery across multiple sessions.

Warne (2005) describe how across the nation, the workforce is aging, retiring, and shrinking. For years, a state DOT could graphically represent its workforce in the shape of a bell curve, with a limited number of new employees, a few employees approaching retirement, and most employees somewhere in between. In response to the aging workforce, this bell curve has shifted, with an ever-increasing percentage of employees approaching retirement age. Warne (2005), in a previous study, shows that transportation agency employees are aging and retiring at a rapid pace, which has caused a significant number of vacancies. Often younger, less-experienced employees fill these vacancies, and require training to get up to speed. The radical change in the workforce composition has created unique challenges for DOT leaders as they strive to prepare younger employees for roles with greater responsibilities (Warne 2005).

Agencies have also had difficulty recruiting and retaining qualified individuals, despite record funding available to states after the passage of the "Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users" (SAFETEA–LU). In a survey conducted by Warne (2005), 52% of agencies anticipated a static workforce, and 35% felt they would see a decline in their workforce.

Finally, the type of work expected of state DOTs is changing too. The vast majority of state DOTs focus their energies not on major construction projects, but rather on operating and maintaining existing road and highway networks. They do not exist solely as "Interstate building organizations." but instead perform important functions to preserve existing transportation networks (Warne 2005).

The aging workforce, difficulties with retention, and changing agency responsibilities have created a radically different professional development agenda for state DOTs than they have been accustomed to. Based on interviews with HR professionals and DOT leaders on about in-service training, Warne identifies several important objectives for professional development — including the core and complementary skills needed — and notes that many skills are applicable across all job classifications such as communication,

teamwork, customer service and safety. [1]Based on surveys of state training managers, a facilitated session with human resources directors, and state DOT leader discussions, Warne identifies several goals for future trainings that will be most beneficial for employees in light of the challenges facing state DOTs (p. 1-3):

- Train technicians and recognize them as paraprofessionals,
- Teach/train program/project management as a core skill,
- Migration of skills from complementary to core,
- Training management/coordination,
- Using more effective alternative training methods versus traditional methods,
- Partner with other organizations/institutions,
- Make the case for training,
- Offer/promoted leadership training,
- Understanding global issues (e.g., finance, technology, research and development)
- Develop soft skills (e.g., innovation, creative thinking)

TRB Special Report 275 (Diewald, 2003, p. 2) summarizes the overall challenge DOTs face related to training.

> It is evident that in recruiting, training, and retaining employees in transportation agencies, one size does not fit all. Agencies must adopt and adapt practices that are best suited to their individual circumstances from a wide range of possible alternatives.

One of the report's findings is that workforce training expenditures were insufficient and require improvement. Benchmarks of successful organizational trainings indicated that two percent of salaries were spent on training (Becker et al. 2001); thus it is recommended that two percent be set as an investment goal for training. This would situate training as a priority for transportation agencies, which need to consider the wide range of skill sets needed to deliver transportation infrastructure. Failure to provide adequate training could decrease agency effectiveness, efficiency, and result in higher costs related to future needs. Additional recommendations from the report focus on the U.S. Department of Transportation (USDOT) collaborating with transportation agencies, the private sector, and educational institutions to tackle areas of concern such as recruitment, training, and retention as well transportation agencies individually partnering with educational institutions to meet training and development needs. Without taking these steps, agencies will fail to take advantage of opportunities for partnerships that could enhance workforce development and training.

Selman et al. (2016) highlight several reasons for the increasing shortage of transportation engineers for leadership positions in state DOTs: engineering graduates choosing not to work at DOTs, those who do work at DOTs lack knowledge in important areas, DOTs have trouble retaining engineers, and experienced staff are retiring in large numbers. In response, some DOTs are offering training programs to unlicensed engineers to provide rotations, instruction, leadership development, and preparation for the professional engineer exam. After reviewing a training program in the Texas DOT Dallas District and surveying participants and non-participants Selman et al. (2016) advance several recommendations which are listed below (p. 42):

- Flatten the organization structure for trainees to eliminate internal conflicts and area self-interests that can delay trainees from moving into different functional areas of the agency.
- Enforce functional-area rotation for trainees because that allows them to broaden their knowledge of various core functions of the agency earlier in their professional development.

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[1] See Tables 1-7 for a list of core and complementary skills across various positions.

- Customize area rotations based on the potential, talents, and interests of trainees.
- Ensure that trainees work in core areas of the agency so they can gain insights into how areas work together, and to foster experience in each core area as a means of career development.
- Monitor and standardize the number of classes taken each year to ensure a functional mix of training time and work time for each trainee.

A number of agencies have partnerships with colleges and universities not only for recruitment purposes, but also as a supplement for in-house training with other experts (Diewald 2003). In addition to these partnerships, a number of training offerings are available from various trade associations.[2] Regardless of the delivery method, one idea Diewald underscores (2003, p. 95) is that "[t]raining is essential to transportation agencies as they address expanded agency missions, the need to keep skills current, changing skill needs in downsized organizations, and rapidly changing technologies." Practices that could improve training are listed as follows (p. 128):

- Management and financial commitment to training based on a benchmark (e.g., a percentage of employee salaries), to support strategic agency needs,
- Advancement based on skills improvement: union and agency–employee agreements regarding advancement focused on skills attainment rather than seniority,
- Focusing training programs on specific licensing and certification goals aimed at strategic agency needs, and
- Using a range of techniques — job rotation, on-the job training, self-directed learning (often technology-based), mentor relationships, and on-the-job coaching — based on agency need and resources.

As Diewald (2003, p. 112) notes, organizations successful at training use a number of different approaches.

> Successful organizations use a range of techniques for training, including job rotation, on-the-job training, self-directed learning (often technology-based), mentor relationships, on-the-job coaching, special projects and assignments, and electronic learning technologies.

Holland et al. (2016) conducted a scan focused on how public agencies use cross-training[3] to improve efficiency and responsiveness: "Cross-training (CT) is an established employee-development approach many public and private sector organizations use to improve performance, create a culture that enables innovation, and reduce disruptions associated with workforce transition" (p. 1-1). Some of the factors motivating state DOTs to pursue cross training include (p. 2-4):

- Better utilization of workforce during peak seasons,
- Career development,
- Cross-utilization,
- Foster better leaders,
- Improved teamwork,
- Succession planning, and
- Trained backups for coverage.

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[2] See Table 3-3, p. 74.
[3] "Teaching an employee hired to perform one job function the skills required to perform other job functions" (p. 2-1).

Table 1 lists programs and tasks falling under the umbrella of cross training (Holland et al. 2016, Table 3.2, p. 3-3).

Table 1 Cross-Training Approaches

Task	Description	Target Group
Development of Leaders		
Rotation Program	Employees work in one or more new areas	Employees with leadership potential
Leadership Program	Employees receive agency exposure	Employees with leadership potential
Trained Backups		
Informal cross training program	Focus on job functions	Work areas with high turnover and critical needs
Flexible Workforce		
Maintenance and Construction	Consolidate job classes	Work areas with overlapping functions

Forms of resistance to cross-training efforts include lack of supervisory commitment, lack of a champion, state laws and/or rules, and resistance to change generally. However, positive business outcomes, such as improved efficiency, employee relations, and effectiveness, demonstrate the value of cross training and should be cited in support of it.

Chapter 3 Other State Department of Transportation Employee Development Initiatives

To better understand potential competencies and professional development programs, we examined programs at other state departments of transportation (DOTs). The goal of evaluating continuing education programs and employee development models at a representative sample of state DOTs was to generate potential best practices and approaches KYTC could use to model its future efforts. While workforce development efforts may differ due to staffing needs and other goals, the general mission of state DOTs is relatively similar.

The Wisconsin DOT surveyed other state DOTs through the American Association of State Highway Officials (AASHTO) Research Advisory Committee to determine if other agencies were engaging in transportation engineering professional development programs (CTC & Associates LLC, 2011). The agency received 17 responses. Seven respondents indicated their state DOT was engaged in a program of that type. All survey questions are included in the Appendix and a summary of the results indicated the following (p.1):

- All agencies use classroom teaching as a learning format, four use peer-to-peer training/mentoring, two use Webinars, and none use white papers.
- Three states include coursework and professional development participation from professional organizations, including the National Highway Institute.
- Five states report that universities support the agency's current standards and training.
- Six state transportation engineering professional development (TEPD) programs include training for new employees.
- Six states offer training to DOT staff, four to consultants and two to municipality staff; one DOT noted that training is offered only to newly hired civil engineers.
- Five states use an internal database to track participation and credit hours, one uses a web-based learning management system, and one has a dedicated human resources staff member for this purpose.
- All states use DOT staff to teach courses, four also use consultants, four use universities, and one uses the National Highway Institute.
- Five agencies use training plans developed by supervisors to determine whether a TEPD program is needed, two use training plans that were self-developed by employees, one state draws on formal testing, and three agencies employ other methods.
- Two agencies always test employees upon course completion, three sometimes do, and two never administer tests.

Table 2 summarizes the results by state, with program names included if the respondent noted them. The content these programs cover generally pertains to many aspects of DOT operations but varies across states from job rotations to training. A small sample of content offerings provided by survey respondents included: planning, roadway design, right of way, maintenance, traffic operations, safety engineering, bridge design, construction, construction safety, and environmental.

Table 2 Survey Results by State

State	Learning Formats	Inclusion of coursework from professional organizations	Support from state universities for current standards?	Training for new employees?	Program offered to:	Participation tracked by:	Who teaches courses?	How do you assess the need for such a program?	Test employees upon completion?
Colorado (CDOT University)	Classroom teaching	No	No	Yes	DOT staff, consultants	Internal database	DOT staff, consultants	Training plans developed by supervisors and employees	Never
Florida (Professional Engineering Training Program[4])	Classroom teaching, peer to peer training	No	Yes	Yes	DOT staff	Internal database	DOT staff	Recruited for program; supervisor training plans in second year	Always

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[4] Four-year training program for entry level engineers; rotation for 15-18 months; four core competencies for program: leading people, change, communications, results-oriented, and mentoring.

State	Learning Formats	Inclusion of coursework from professional organizations	Support from state universities for current standards?	Training for new employees?	Program offered to:	Participation tracked by:	Who teaches courses?	How do you assess the need for such a program?	Test employees upon completion?
Georgia (Professional Engineer Development Program[5])	Classroom teaching; Peer-to-peer training/ mentoring; Hands-on projects (real or simulated) in most offices, those having longer duration assignments. Lectures and presentations for the offices with short training durations.	No	Yes	Yes	Newly hired civil engineers	Human resources	DOT staff	Training plans developed by supervisors. Program's learning objectives are developed and updated under the auspices of the Division Directors of GDOT's engineering divisions.	Never
Illinois	Classroom teaching, webinars	Yes (National Highway Institute)	Yes	No	DOT staff, consultants, municipality staff	Web-based system	DOT staff, consultants, universities	Steering committee	Sometimes
Mississippi	Classroom teaching, webinars, Peer-to-peer training/ mentoring	Yes (outside consultants and FHWA)	Yes	Yes	DOT staff, consultants, municipality staff	Internal database	DOT staff, consultants, universities	Training plans developed by supervisors and employees	Sometimes

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[5] For new engineers, consisting of 6 months in assigned area, 6 months in rotations, visiting 15-20 offices, and working with peers.

State	Learning Formats	Inclusion of coursework from professional organizations	Support from state universities for current standards?	Training for new employees?	Program offered to:	Participation tracked by:	Who teaches courses?	How do you assess the need for such a program?	Test employees upon completion?
North Carolina	Classroom teaching, some university resources	No	No	Yes	DOT staff, consultants	Internal database	DOT staff, universities	Training plans developed by supervisors	Sometimes
Texas[6]	Classroom teaching, peer-to-peer training/ mentoring, eLearning	Yes (outside contractors, National Highway Institute (NHI))	Yes	Yes	DOT staff	Internal database	DOT staff, consultants, universities, NHI	Formal training, training plans developed by supervisors	Always

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[6] EA Career Development Program for unlicensed engineers includes training, mentoring, rotations, and help preparing for the PE exam.

Selman et al. (2016) supplement the Wisconsin DOT's findings (CTC & Associates LLC, 2011) using a survey and previous NCHRP report (Warne 2005). Table 3 summarizes this information, which is on p. 34 (Table 1) of the original report.

Table 3 Additional State Survey Results

State	Training?	Mentorship?	Is Training Mandatory?	Training Duration	Brief Description
Arizona	Yes	Yes	No	2 years	Engineering-in-training program with rotations across design and construction sections
Kansas	Yes	Yes	No	1 year	Rotational training program for new engineers; covers all functional units
Minnesota	Yes	Yes	No	Up to 2 years	Graduate engineer rotational program; includes 6 months in construction, 6 months in design, and 6-9 months in electives (must pass PE within 6 years of entering program)
New Mexico	Yes	Yes	No	Up to 4 years	Training academy and engineer licensure program with 2 phases of development and training until PE is passed, then job rotations and seminars
Oklahoma	Yes			1 year	Training to prepare engineers for PE exam; rotation across many divisions;
South Dakota	Yes	Yes	Yes	1 year	No information
Virginia	Yes	Yes	No	2 years	Goal is to develop specialist and generalist staff skills with rotation areas (also a scholarship and engineer development program)
New York	Yes	Yes	No	N/A	Various training courses done in-house or by consultants; regional offices may offer rotations while DOT uses mentoring; engineer-in-charge training annually

The AASHTO Subcommittee on Design reported the results of roundtable questions that included inquiries about training made available to new design engineers and program managers. The questions were posed to member states of Region 2 or (Southern Association of State Highway and Transportation Officials (SASHTO)) which includes the following: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Puerto Rico, South Carolina, Tennessee, Texas, Virginia, and West Virginia. The questions and responses by state are provided below.

1. **Has your state developed any custom training (state-developed and not from a standard catalog such as NHI) that is focused on the development of new design engineers and new program managers? Did you partner with outside resources to develop the training? And please share the curriculum and any other course details if available.**

Alabama and Arkansas responded that they do not have any custom training. Arkansas assigns new engineers easier jobs to start with and do on- the-job training.

Florida
Florida has an intersection design training course for new design engineers. The Florida DOT (FDOT) Project Management Office is developing new training courses and a training program for new design project managers. This program will consist of new project management training mixed with existing Florida DOT courses on subjects like Mutual Gains Negotiations, Critical Path Method, Public Involvement, or Financial Management, and other design-related courses.

Georgia
Georgia has a formal training program for new engineers that includes mandatory and elective courses. The mandatory component consists of the Core Program, which is approximately one month in duration. The Core Program provides an overview of major engineering-related offices that contribute to project and program delivery. Subject-matter experts lead this training in a classroom setting. The program's schedule is described in Table 4.

Table 4 Georgia Core Program

Week # - Day # - Office Name	Training Duration	Notes
1-1-Senior GDOT leadership *	.5 hr.	Welcome and Intro.
1-1-PEDP Admin *	.5	Overview of program and participant deliverables.
1-1-Program Control *	1 hr.	PDP process and project programming.
1-1-Financial Management *	.5 hr.	Overview of funding sources
1-1-Program Delivery *	3 hrs.	Project Management.
1-2-Location Bureau *	1 day	At Aviation Circle
1-3-Right of Way *	.5 day	
1-3-Contract Bidding Admin *	.5 day	
1-4+5 Engineering Services *	2 days	Includes Environmental Compliance and Construction Office and FPR meeting if possible.
2-1-Planning	1 day	
2-2-Environmental Services	1 day	
2-3-Roadway Design	1 day	
2-4-Bridge Design	1 day	
2-5-Design Policy and Support	1 day	

3-1+2+3+4+5-OMAT	5 days	1 day at each bureau, including Research Office.
4-1-Utilities *	1 day	
4-2-Maintenance *	1 day	
4-3-Traffic Operations	1 day	Departure for home after work day, if feasible.
4-4-Make-up day if needed	1 day	If day not needed, departure for home.
4-5-Make-up day if needed	1 day	If day not needed, departure for home.
Denotes offering which will not be offered as part of the ELECTIVE program.		

The Core Program is followed by an elective program which is broken into modules with a minimum of three credits. This training requires smaller classes, but instructional durations are longer and training is more hands on. If all electives are chosen, the training lasts from 16 to 21 months. Below is a schedule of available electives:

Table 5 Georgia Electives

Office Name	Training Duration	Notes
Office of Roadway Design Office of Design Policy and Support	7.5 weeks .5 week	2 Elective Credits earned
Office of Bridge	5 weeks	2 Elective Credits earned.
Office of Materials and Testing	Opt 1: 6 weeks, District CE2s Opt 2: 6 weeks, Metro Atl. CE2s Opt 3: 8 weeks, OBD + OBM/I	2 Elective Credits earned. --------------------------------- Opt 1: 5-weeks OMAT plus 1 week at District Lab Opt 2: 6-weeks all at OMAT Opt 3: 8-weeks for Office of Bride Design and Bridge Maintenance staff only
Office of Planning Office of Environmental Services	3 days 2 days	1 Elective Credit
Office of Traffic Operations	1 week	1 Elective Credit
Field Construction	8 weeks+	2 Elective Credits
District-based rotations	2 - 4 weeks	1 Elective Credit
Ad hoc rotations to offices (case by case basis)	Depends upon engineer's need	Minimum 1 Elective Credit. Must be approved by PEDP Administrator.

Louisiana
Louisiana has training for interns which includes standard specifications, highway plan reading, flagging, and safety, among others. In addition, designers also take MicroStation and InRoads courses. Engineers also have the opportunity to take other courses such as those developed by the Federal Highways Administration (FHWA). Louisiana also has developed some very high-level Project Manager training.

Mississippi
Mississippi has hired consultants to deliver design manual training following an update to the design manual. A training manual provides more information and examples than the design manual. The final product will be a training manual that designers can refer to with more information, and potential future supplemental videos. Furthermore, Mississippi assigns new engineering interns to work in design teams with more experienced designers, who provide mentoring and on-the-job training.

North Carolina
The North Carolina DOT's Office of Human Resources manages a 5-level leadership program called Legacy Leadership. The program has as its foundation the following sources:

1. Leadership principles outlined in *The Leadership Challenge* by Barry Posner and Jim Kouzes.
2. Emotional intelligence as outlined in the *EQ Edge* by Steven Stein.
3. Federal Government's Office of Personnel Management Executive Core Qualifications (and competencies) for leadership success.

Legacy Leadership includes elements of experiential learning, independent reading, 360-degree assessments, self-reflection, and intensive team workshops focused on developing and improving critical leadership skills. The levels in the program complement the Department's leadership hierarchy, which allows the program to meet the needs of all personnel, including those whose positions fall outside of traditional leadership development. Figure 1 delineates the current levels in the program.

Legacy Leadership Program Levels Description

	Level 2 **Leading Others**	Level 3 **Leading Managers**	Level 4 **Leading at the Executive Level**
	NCDOT LEGACY LEADERSHIP — Learn Today, Lead Tomorrow	NCDOT LEGACY LEADERSHIP — Learn Today, Lead Tomorrow	NCDOT LEGACY LEADERSHIP — Learn Today, Lead Tomorrow
Program Level Overviews	The Leading Others program is designed for those seeking a leadership opportunity or new to leadership and management responsibilities. Participants focus on customer service, accountability, conflict management, team building, problem solving and other critical leadership skills. Utilizing resources such as Harvard Business School, Wharton School of Business and many noted leadership authors and educators, Legacy Leadership program staff will design workshops based on the needs identified by Level 2 participants. Legacy Leadership staff and professional facilitators will guide participants through a variety of experiential exercises, business simulations, panel discussions, self-assessments and other insightful activities. Participants will meet with senior NCDOT staff for small group discussions, networking and broadening their knowledge of NCDOT issues and projects.	The Leading Managers program is designed for the early to mid-career employee wanting to further develop their leadership and management skills. This level builds on the leadership principles outlined in *The Leadership Challenge* by Jim Kouzes and Barry Posner. Working with a master facilitator, participants explore the five practices of *The Leadership Challenge*: Model the Way, Inspire a Shared Vision, Challenge the Process, Enable Others to Act and Encourage the Heart. Participants work through a variety of experiential exercises, join in lively debates and complete case studies as they build leadership competencies such as financial management, human capital management, partnering, influencing, negotiating, customer service, employee engagement, accountability and change management. Utilizing resources such as Harvard Business School, Wharton School of Business and many noted leadership authors and educators, program staff will design workshops based on the needs identified by Level 3 participants. Participants will meet with senior NCDOT staff for small group discussions, networking and broadening their knowledge of NCDOT issues and projects.	In the Leading at the Executive Level, participants focus on financial management, human capital management, technology management, political savvy, accountability, employee engagement, strategic thinking, visioning, external awareness, developing others, leveraging diversity and public service motivation. In addition to these leadership competencies, the program will take a deep look into the emotional intelligence of leaders with participants examining self-perception, self-expression, interpersonal skills, decision making and stress management as outlined in *The EQ Edge* by Dr. Steven Stein. Participants work through a variety of experiential exercises and business simulations. Professional facilitators and speakers join the group throughout the year on topics ranging from developing employees, leadership in government, working with elected officials and other critical leadership skill areas. Participants will meet with senior NCDOT staff for small group discussions, networking and broadening their knowledge of NCDOT issues and projects.
Program Length	14 - 16 months	14 - 16 months	14 - 16 months
Number/Length of Sessions	Seven Sessions - 2.5 Days Each	Seven Sessions - 3 Days Each	Seven Sessions - 3 Days Each
Time Commitment	In addition to attending the sessions, participants should expect to spend approximately 6 to 8 hours per month on additional assignments (reading, webinars, coaching/mentoring, job-shadowing assignments, etc.)	In addition to attending the sessions, participants should expect to spend approximately 8 hours per month on additional assignments (reading, webinars, coaching/mentoring, team meetings, etc.)	In addition to attending the sessions, participants should expect to spend approximately 8 hours per month on additional assignments (reading, webinars, team meetings, mentoring/coaching, board meetings, etc.)
Years of Professional Work Experience and Supervisory Responsibilities	No minimum professional experience or supervisory experience required. Preferred: Minimum one year length of service with NCDOT.	Preferred: 7+ years of professional experience and minimum one year length of service with NCDOT. No current direct or indirect supervisory experience is required; however, position should be one that requires use of leadership skills.	Preferred: 12+ years of professional experience with at least one year length of service at NCDOT. While having current direct reports is not required, past experience supervising direct reports is preferred due to subject matter and participating in group discussions.
Sample Roles of Participants (Please note all employees are welcome to apply. Titles provided give an indication of the levels of current and past participants but are not absolutes.)	- Business System Analysts and Supervisors - Communication Officers and Coordinators - Contributing and Journey Engineers - Contributing Engineering Supervisors - Contributing and Journey License and Theft Agents - Driver License Examiners - Finance Unit Supervisors and Analysts - HR Supervisors, Coordinators and Analysts - Program Managers - Project Managers - Right of Way Agents	- Advanced Engineers - Advanced Management Engineers - Business System Supervisors and Managers - Communication Officers - Journey and Advanced Engineering Supervisors - Journey and Advanced License and Theft Agents - Senior Driver License Examiners - Finance Unit Supervisors and Managers - HR Supervisors and Coordinators - Experienced Program Managers - Experienced Project Managers - Senior Right of Way Agents	- Experienced Advanced Engineers - Senior Business Unit Managers - Senior Communication Officers - Advanced Engineering Supervisors - Advanced License and Theft Agents - DMV Directors and Managers and Senior Supervisors - Senior Finance Unit Managers - Senior HR Managers - Senior Program Managers - Senior Project Managers - Senior Right of Way Agents - Technology Managers
Class Size	TBD	TBD	TBD

Figure 1 North Carolina Legacy Leadership

Tennessee
The Tennessee DOT has developed courses for topics such as MicroStation, Geopak Road, and Drainage Contract Plans Reading. Also, it is developing a new how-to guide for designing a project from beginning to end.

Virginia
Virginia lacks specific trainings for new design engineers and program managers. The agency has several programs for all staff through the Learning Center for Development, including the Career Development Program (CDP) for recent college graduates and the Leadership Enhancement and Development (LEAD) Program for internal staff, which are geared towards growing individuals in their current and future roles.

2. **What methods do you use for training young engineers?**

Alabama
Alabama uses job rotation, on-the-job training, and classes.

Florida
Florida has established a 4-year PE Trainee program to expose young engineers to various parts of FDOT. It includes mentoring as well as cross-training opportunities. There is also a cross-training program that allows all levels of engineers to exchange positions for periods up to one year. Furthermore, FDOT has an annual Design Expo with updates and training on a variety of design topics. Attendance is open to staff, consultants, and local governments. Lastly, FDOT conducts frequent webinars on a wide variety of topics.

Louisiana
Louisiana has mandatory structured training programs and optional workforce development training. New engineering interns can be hired into a rotation program and have the option to participate in mentoring programs or pursue cross-training. Staff participation is encouraged across projects and monthly meetings facilitate issue resolution.

South Carolina
South Carolina employs dedicated training staff focused on classroom-based training for new engineers. Some organizational units also engage in formalized cross-training. Leadership training is a newer initiative that aims to expose employees to all areas of the organization. For young engineers, outside of the classroom-based training, learning is best done through on-the-job training.

Tennessee
Tennessee has two-week training sessions for new engineers that are developed and are overseen by David Lipscomb University. These sessions include a panel discussion with the commissioner and other higher-level management. Each director has the opportunity to explain the workings of their division. Additionally, the Human Resources section works with each division to ensure that training needs are met, offering classes such as *Contract Plans Reading*.

Virginia
Virginia has a Core Development Program (CDP) for entry-level employees in the fields of Environmental Science, Accounting, Business Administration, Engineering, Finance, and Real Estate. CDP is a 24-month program that combines technical, leadership, and core competencies through on-the-job training, workshops, individual/group assignments, and coaching. Virginia also has an Engineering Scholar Program (ESP) to help recruit civil engineering students through educational support and summer job opportunities. Upon graduation, ESP participants rotate into the CDP and a full-time, two-year position with varied work assignments.

The program also focuses on developing technical competencies and leadership skills. Young engineers cross-train in various engineering disciplines and learn about other core business functions within the agency using the 70-20-10 principle:

- 70% of the learning is on-the-job rotational assignments.
- 20% is from mentors and experts.
- 10% is classroom based.

In addition to the states that responded to the Wisconsin DOT survey and the AASHTO Subcommittee on Design roundtable, additional states have professional development programs (Selman et al. 2016; CTC & Associates LLC, 2011). The California Department of Transportation (Caltrans) offers Professional Development Training Courses.[7] Design Training Curriculum was offered as a sample of Caltrans' efforts. The curriculum is designed to develop knowledge of highway design and Caltrans' processes and design manual. Iowa has an Employee Training Academy[8] that focuses on materials using classroom presentations and webinars. The program currently partners with the Des Moines Area Community College for course instruction; current and former DOT staff to develop and teach courses. Participants include DOT staff, consultants, and municipality staff. Program participation is tracked by an internal database. The Idaho DOT has a 4-5 year engineer-in-training program that includes job rotations, mentoring, and on-the-job training. Illinois offers training in highway design, construction inspection, traffic operations, safety engineering, and career development. This training includes rotations, cross-training, and mentoring as part of the program. Maryland has an advanced leadership program and a leadership education and development program. These give employees opportunities to acquire leadership training through mentoring, rotations, and a personal development plan. The Mississippi DOT offers employees conference training and on-the-job training. Pennsylvania has a 15-month training program for new engineers that provides participants opportunities for career advancement. Additionally, a mentoring program called LEAD is available. The Utah DOT has a rotational program in which engineers-in-training work under supervisors. Mandatory rotations are construction, design, maintenance, and safety.

Outside of the programs discussed above, several states have related initiatives. McCullouch (2012) developed documentation for Indiana DOT to generate a technical training plan and created a web tool that provides employees training information. Training information was divided by provider: in-house, outside consultants, and colleges and universities. With respect to a technical training plan, McCullouch offered several recommendations: inserting training requirements into position descriptions, surveying employees and supervisors to gather training needs, centralizing records management for professional development hours, and promoting the Educational and Licensing Assistance Program[9].

North Carolina has initiated a program called *Skill-Based Pay* that focuses on developing job skills through training. Participants also earn pay increases when milestones are met (Aschbrenner et al. 2000). The foundation of the program is skill blocks, which are skills and abilities management deems important and work groups from areas including bridge maintenance, road maintenance, environmental, and traffic services. These are categorized in four levels: entry, intermediate, journey, and advanced. Skill blocks are attained in four steps (p. 4):

- Testing after studying the skill block booklet;
- Training on the job under the guidance of a certified instructor or trainer for that skill block;

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[7] http://www.dot.ca.gov/hq/tpp/offices/owd/training.html
[8] http://www.iowadot.gov/training/academy.html
[9] Provides reimbursement for post-secondary coursework up to $1,500 per course if it is related to the employee's duties or prepares them for advancement.

- Instructor certification for that skill block, with additional signatures by superiors attesting that all requirements have been met; and
- Compensation for the skill block through the payroll system.

Skill blocks have also facilitated the development of progress worksheets so that employees and supervisors can plan years of training and identify future goals. Training generally consists of written tests through self-study followed by field training with an instructor, certification by the program coordinator, and finally compensation. Other methods that do not require an instructor can be done in a classroom, workshops, or with supervisor observation.

New Jersey identified education as a key component for meeting safety goals (Hansen et al. 2007). This requires a focus on skills related to safety goals and tracking training progress. To accomplish this, a database was developed to track training needs and progress. The Transportation Safety Professional Development Clearinghouse allows employees to find training sources and what training should be conducted to improve safety education.

The Louisiana Department of Transportation and Development (DOTD) first issued a policy in 2001 which stated that training is a critical for developing qualified personnel (Paul 2008). The DOTD's training program has a "progressive training curriculum that requires the completion of specific work-related training at each level of an employee's career path" (p. 7). The Louisiana Transportation Research Center (LTRC) oversees and updates the curriculum as needed for construction and materials, maintenance, and management development. Additionally, new employees are trained in the Engineering Resource Development Program, which is a 30-week rotation across 19 sections.

South Carolina DOT developed a training program for professional services contract managers to improve the efficiency and consistency of contract execution (Tupper et al. 2014). The study method consisted of exploration, training, and evaluation as shown in Figure 2 (Tupper et al., Figure 1, p. 30.) Notably, development included review of existing policy, interviews, and past contractual documents.
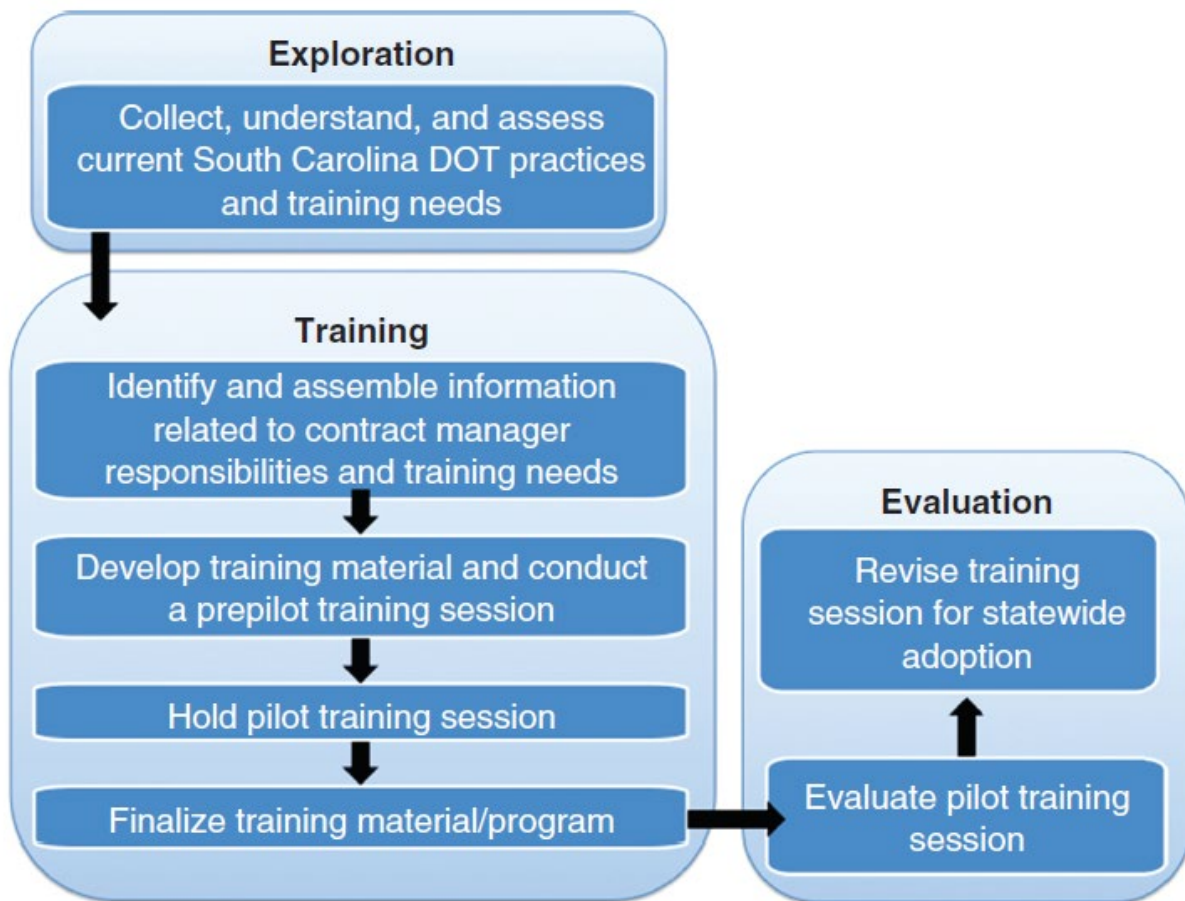
Figure 2 Study Method

Development of the training program yielded some lessons learned that are likely applicable to developing other programs and curricula (Tupper et al., p. 32):

- Consistent organizational action requires documentation of standard operating policies and procedures;
- Documented standard operating policy and procedure must be adequately communicated;
- Leaders must champion the development of policies, procedures, and training;
- Leaders and subject-matter experts must participate in the training;
- Training should be user friendly; and
- Training must teach policy, not set it.

Finally, one relevant recommendation that applies to training generally was to centralize training responsibilities — dividing the responsibility for training among departments made coordination and content updates difficult.

Hood et al. (2000) surveyed all 50 state DOTs on staffing plans and various aspects such as recruitment, training, and retention, finding that 34 states maintained information on training histories, 20 had information on formal education, 11 kept data on work experience, and seven inventoried skills. Flexible workforces in terms of cross-training was an important area and some states even offered incentives to employees who are cross-trained. Laffey (2017) surveyed state DOTs and National Local Technical

Assistance Programs (LTAPs) on their use of information and communications technologies for training. Respondents indicated that 34 state DOTs and 17 LTAPs use this format to offer training with common delivery methods, including web- and computer-based training across many subject matter areas with numerous participating partners, including universities, FHWA, and AASHTO. Those that reported not using information and communications technologies were generally planning to use it within three to five years. DOTs are also providing training to supplement the education of engineers across areas such as traffic engineering, maintenance, performance measurement, and planning (CTC & Associates LLC, 2011).

Finally, KYTC and many other state DOTs participate AASHTO's Transportation Curriculum Coordination Council (TC3).[10] It is a technical service program that develops trainings in various areas, such as construction, maintenance, and employee development. By pooling resources, TC3 helps states offer more trainings at a reduced cost. Over 120 courses are available to state DOT employees, and new courses are continually developed. TC3 has also developed Core Curriculum Matrices that identify competencies required in six technical areas: construction, employee development, maintenance, materials, pavement preservation, and traffic and safety. Each area includes important subject-matter categories broken into disciplines, with competencies divided amongst four skill levels: entry, intermediate, advanced, and project management.

Table 6 lists each subject-matter category under the technical area headers. Figure 3 is a snapshot from the TC3 website indicating several disciplines under the contract administration subject-matter category of construction. TC3 courses (and matrices) can be building blocks or provide supplemental training opportunities as part of larger curricula. A key to improving the use of TC3 may be integrating into broader curricula or seeking ways to market these opportunities to KYTC employees. As part of a survey related to knowledge management that sought to better understand employee knowledge of various programs, among other goals, Gibson et al. (2018) found that only 22 percent of respondents (total respondents numbered 319) were familiar with TC3 and just 14.5 percent had participated in TC3 courses.

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[10] https://tc3.transportation.org/

Table 6 Core Curriculum Matrices (Technical Areas and Subject Matter Categories) [11]

Construction	Employee Development	Maintenance	Materials	Pavement Preservation	Traffic and Safety
Contract Administration	Basic Skills	Maintenance Administration	Soils Testing	Pavement Preservation Theory	Personal Safety
Quality Assurance	Thinking and Learning Skills	Roadway & Shoulder	Aggregates	Chip Seals	Workplace Safety - General Industry
Environment	Personal Qualities	Drainage	Treated & Untreated Bases	Micro Surfacing	Construction Safety
Construction Surveying & Staking	Working with Others	Winter Operations	HMA Field Testing (Virgin Mix &/or RAP)	Fog Seals and Rejuvenators	Vehicles & Heavy Equipment
Utilities	Computer Technology Skills	Roadside Maintenance	Recycling: Field In-Place (Hot or Cold)	Crack Sealing and Filling	Work Zone Operations
Grading	Health & Safety	Bridge & Culvert Maintenance	HMA Production & QA Labs (Including Mix Design)	Diamond Grinding & Grooving	Work Zone Devices
Drainage		Fleet Management	Cementitious Material (Low Density Fill, Shotcrete and Other Cementitious Materials)	Dowel Bar Retrofit	Work Zone Design and Management Mobility
Aggregate Bases & Subbases Inspection		Work Zone Traffic Control	PCC Pavement Field Testing	Joint Seal Replacement	Traffic Control Devices
Geotechnical Construction		Traffic Services & Safety	PCC Bridges & Minor Structures	Full & Partial Depth Repair	Signing
New Structure Construction			PCC Production & QA Labs		Markings
PCC Pavement Field Inspection			Miscellaneous		Signals

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[11] https://tc3.transportation.org/training-resources/matrices/

			Quality Assurance		Traffic Operations Systems and Devices
Asphaltic Concrete Pavement Field Inspection Matrix					
Asphalt Recycling			Geotechnical Testing		Roadway Safety Appurtenances
Landscaping			Concrete Properties		Safety Strategies
			Materials Administration		Other Safety Competencies

DISCIPLINES	COMPETENCIES BY SKILL LEVELS			
	LEVEL I	**LEVEL II**	**LEVEL III**	**LEVEL IV**
Rights of Way (ROW) Management	Identifies stakes and easement limits		Obtains construction easements and work permits	
Contractor Payments	Computes quantity measurements	Develops contractor payment estimates	Verifies contractor payment estimates	Recommends contractor payment estimates
	Documents for application to contractor payments			Recommends/Approves contractor payment estimates
Supplemental Agreements (change orders)	Explains general change order procedures	Provides information to write change orders	Prepares change orders	Approves change orders
	Documents quantities			Recommends/Approves change orders
	Corrects quantities			Applies negotiation skills within contract limits
Force accounts	Explains general force account procedures	Prepares force accounts	Directs/Monitors labor, equipment and materials	Prepares plan and guide estimates
	Documents quantities/Production rates			
	Corrects quantities			
Cost Estimating	Computes quantities, Documents production rates	Applies basic principles of cost estimating	Utilizes historical bid prices to obtain prices for new or negotiated items	Develops estimate using labor, equipment, materials and historical item prices

Figure 3 Core Curriculum Matrices Snapshot[12]

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[12] https://tc3.transportation.org/training-resources/matrices/construction/

Chapter 4 Overview of the Kentucky Transportation Cabinet Policies and Procedures

In this chapter, we review current KYTC policies and procedures related to professional development and training as well as current program and training offerings. The breadth of KYTC's responsibilities was noted in Chapter 1, and as its portfolio of assets and mission statement[13] attest, a well-trained workforce is necessary to carry out its responsibilities. Additionally, several official forms are currently used related to training. Those forms are included in the Appendix.

4.1 Information Guide

The KYTC *Information Guide* is a product of the Organizational Management Branch located in the Office of Human Resources. The Information Guide has information about the Cabinet's organizational structure and the operations of various offices and divisions. Most closely related to training and education is the Office of Professional Development and Organizational Management, which is also in the Office of Human Resources Management. A summary of that office's functions taken from the *Information Guide* is provided below, and many of these are applicable to education and training for employees.

Office of Professional Development and Organizational Management[14]
- Develops and conducts training workshops, including orientation and in-service training
- Enrolls Cabinet employees in workshops conducted by other training providers
- Maintains Cabinet training records
- Administers Advanced Leadership Academy (ALA), Roadmap Program, Guiding Potential Supervisors (GPS) Program, and Supervisor Training and Resources (STAR) Program
- Oversees Educational Assistance Program for the Cabinet
- Manages Civil Engineering Scholarship Program and Civil Engineering Technology Scholarship Program
- Tracks budget and processes payments for external training, employee physical exams, and drug testing
- Tracks renewal of professional licenses of employees, including CDLs
- Oversees Employee Suggestion Program
- Administers Employee Performance Evaluation records
- Designs and administers Cabinet policy manuals, forms, organizational charts, management contact listings, and other organizational documents
- Drafts Executive and Administrative Orders for Cabinet reorganizations
- Drafts Official Orders for Cabinet
- Manages Intranet and Internet sites for Office of Human Resource Management (OHRM)
- Maintains distribution lists of all Central Office personnel and all Cabinet management personnel and serves as primary postmaster for the Cabinet
- Coordinates development and implementation of strategic plan for OHRM

4.2 General Administration and Personnel Manual

The *General Administration and Personnel Manual* is designed to "provide uniformity and guidance in the interpretation of laws, regulations, policies, and procedures governing the administration of the personnel of the Kentucky Transportation Cabinet and their operational relationship with one another and their customers." The manual is overseen by the Organizational Management Branch in the Office of Human Resources and was last updated in December 2014. Of most interest is the chapter on Training and

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[13] "To provide a safe, efficient, environmentally sound and fiscally responsible transportation system that delivers economic opportunity and enhances the quality of life in Kentucky"
http://transportation.ky.gov/Pages/AboutUsInfo.aspx
[14] http://transportation.ky.gov/Organizational-Resources/Documents/KYTC-Information-Guide.pdf

Licensing. This chapter contains sections governing procedures for training requests, programs, and other official policy related to employee training and education. Any recommended training curricula will need to adhere to official KYTC policy, thus it is important to review these relevant sections. The entirety of the text from the relevant sections is included in the Appendix.

The *General Administration and Personnel Manual* includes instructions for requesting training, both internal and external. Employees are instructed to assess their performance and seek training related to their performance development plans. It notes that management is "responsible for ensuring that their employees receive the appropriate training," along with other administrative responsibilities. The Division of Professional Development and Organizational Management (PDOM) oversees training records, prioritizes training requests, and develops and delivers some training.

4.3 KYTC Training Courses

In addition to the programs noted in section 3.2, KYTC has other training and professional development offerings available to employees.

Highway Technician Series

The Highway Technician Series is a new series of courses implemented through the Highway Technician Academy. Completing different levels within this series, combined with accumulating experience, provides staff the opportunity for advancement. The series was established to help attract and retain the staff necessary to perform core KYTC functions through compensation and a defined career path. Courses include mandatory Cabinet trainings for all employees as well as training from KTC's Technology Transfer Program, KYTC's Supervisor Training and Resources (STAR) and Guiding Potential Supervisors (GPS) programs (discussed in more detail later in this Chapter), and industry partners.

Structures Level I, Grade and Drain I, Grade and Drain II, and Field Engineer's Guardrail Workshops

Structures Level I is course designed to educate bridge and culvert construction inspectors. It is available to both KYTC and contractor employees who will perform inspections. Course topics covered include plan interpretation, geotechnical investigation, bearing piles, structural excavation, concrete placement and testing, structural steel, bridge decks, falsework, three-sided structures, reinforcement, metal arch structures, retaining walls, and specification of bridge and culvert construction.

Grade and Drain I is also for potential inspectors. The course provides enrollees with the information and tools needed perform grade and drain inspections. Course topics include soil sampling, interpretation of soil profile sheets, moisture and density testing by the nuclear method, developing moisture density target values by the one-point proctor method, visual identification of soil types, and specifications of grade and drain construction.

Grade and Drain II is a continuation of Grade and Drain I and builds on the initial foundation of that course. It includes additional training for inspectors and covers topics such as construction and design of cut slopes in rock, geotextiles, karst topography (sinkholes), subgrade stabilization, structural backfill and pipe installation. Grade I inspectors who will be working with thse topical areas are candidates for this course.

Finally, Field Engineer's Guardrail Workshops are offered to KYTC employees that work with guardrails. The course covers design and installation of NCHRP 350-approved devices.

Kentucky Qualified Testers and Laboratories

The Cabinet also provides links to a number of related trainings, conducted outside KYTC, for those who work in Materials. Those areas are listed in Table 7, along with the organization that offers the training.

Table 7 Kentucky Qualified Testers and Laboratories

Training	Offered by:
Aggregate	Kentucky Crushed Stone Association
Asphalt	Kentucky Transportation Center Technology Transfer
Bridge Coatings Inspection	Society for Protective Coatings
Concrete	Kentucky Ready Mix Concrete Association
Erosion Control	Kentucky Transportation Center Technology Transfer
Grading	Kentucky Transportation Center Technology Transfer
Pavement Markings	KYTC
Structures Level I	KYTC (see prior section)
Work Zone Traffic Control	KYTC

Advanced Leadership Academy

The Advanced Leadership Academy (ALA), is a two-year training program focused on developing leadership and management skills of current Cabinet employees. It is critical for ensuring the success of future Cabinet operations. To apply to the ALA, employees must have a 2-year or 4-year degree or professional license, worked at KYTC for the prior two years, and hold a position at Grade 15 or higher. The ALA selection process is competitive. The academy offers participants training through course work, mentoring with top Cabinet officials, and a final project that focuses on Cabinet issues and possible improvements to current processes or the development of new processes. Some of the topics that are a focus of the academy are managing work relationships, measuring personal leadership qualities, Cabinet organizational structure, media relations, finance and forecasting, and time management. Another training program for Cabinet employees is the Project Development Academy. It is for young KYTC engineers and provides an overview of many of the Cabinet's functions. Such broad information dissemination is designed to help young engineers deal with the myriad issues they may encounter during their time at the Cabinet.

Construction Management Academy

The Construction Management Academy (CMA) focuses on helping project engineers understand the responsibilities of a district-level construction crew supervisor and better serve as the project engineer of construction projects. The goal of CMA is: "To provide a Project Engineer with the skill needed to administer a construction project and manage a crew of inspectors thus providing a statewide consistency while minimizing claims and change orders." The training occurs across six days with instructors from both the districts and central office as well as outside partners such as FHWA. A course outline from KYTC is included in the Appendix and indicates the types of subjects that are covered.

Project Manager's Boot Camp

Project Manager's Boot Camp is an eight-day training course that has been offered to KYTC project managers over the past two years. The purpose of Project Manager's Boot Camp is to improve project delivery by focusing on all aspects of project management. As noted previously, KYTC's mission — which underwrites all of its activities — is to provide a safe, efficient, environmentally sound, and fiscally responsible transportation system that gives Kentucky's citizens access to economic opportunity while enhancing their quality of life. The Cabinet's Department of Highways helps fulfill this mission by persistently working to maintain and improve the Commonwealth's roads and bridges. To maintain and improve roads and bridges, the Department has two legislatively enacted programs — the *Highway Plan*, which is a construction program, and a maintenance program. The biennial budget process authorizes and enacts these programs. A primary goal of Project Manager's Boot Camp is to improve the Department's success rate in delivering the Highway Plan. A successful project is one that meets the defined scope with quality solutions and deliverables on schedule and within the budget specified in the Highway Plan**.** Improving the success rate of project delivery helps the Cabinet fulfill its mission and enrich the lives of all Kentuckians.

There have been times in past years when the Department of Highways has not attained the project delivery success rates set by Cabinet. In 2003, the Department held training sessions focused on project management which communicated to Project Managers the importance of understanding the numerous challenges associated with each phase of project delivery. This training challenged Project Mangers to take ownership of the *whole* project. The goal of this training was to improve the Department's project delivery success rate. Although the 2003 training was successful, in the years which followed there has been tremendous staff turnover. In addition to personnel losses, there has been no training for new and continuing Project Managers. These issues have contributed to the challenge of meeting project delivery success rates. The Department has created the Project Manager's Boot Camp training to meet its current needs and help the Cabinet fulfill its mission. Boot Camp objectives and an overview of the course are included in the Appendix.

Other

The Supervisor Training and Resources (STAR) Program is KYTC's supervisor training series. STAR "offers an in-depth orientation to the responsibilities and expectations of those who oversee and evaluate the job performances of others." The STAR Program focuses on improving supervisory skills as well as overall comprehension of KYTC policies and procedures. Some of the course topics include merit law, the disciplinary process, workplace conduct, and performance matters, among others. Employees are required to take this training within 12 months of being appointed to a management role.

The Roadmap Program is "a series of courses designed to help entry- to mid-level Cabinet employees develop and expand their administrative skills and maximize their potential as governmental administrators." The Roadmap Program contains a total of 12 half-day courses and is open to all KYTC employees who receive the approval their supervisor.

The *General Administration and Personnel Manual* covers professional licenses and certifications and fees associated with professional organizations. If professional licenses or certifications are needed based on an employee's class position, then they will be reimbursed. Professional organization fees or costs associated with attending meetings of these organizations are the responsibility of the employee. Professional Development Branch courses are also available to employees.

Finally, the Guiding Potential Supervisors Program (GPS) is a set of courses for employees whose goal is to become a supervisor: "The program offers insight into the skills and traits necessary to be an effective manager and leader of personnel." The GPS Program consists of six half-day courses and two videos covering subjects such as effective communication, employee engagement, and forward thinking.

Chapter 5 Training Curricula

To better understand previous course offerings, conference/meeting attendance, and the continuing education habits of employees, KYTC provided us with employee training history data for each of its 12 districts and the central office. Files contained employee names, work county, workplace (i.e., district office or central office), job title, pay grade, date of employment, names and codes of courses taken, and hours of credit received for the courses. Data extended back to 1999 for engineers and 1997 for non-engineers, yielding a large data set for analysis. The engineer data set contained 32,336 observations while the non-engineer data set had 349,968 observations. Data were sorted and frequencies tabulated based on the frequency of courses appearing in the data, although with many of the same courses being entered using slightly different terms the data compilation required more than a cursory sorting. After data were in a usable format, they were used a baseline to help populate course offerings identified in the curricula. Other resources used as a reference, cross-check against course offerings, and/or to build the curricula included the National Highway Institute (NHI)[15]; TC3; the Office of Diversity, Equality, and Training in the Kentucky Personnel Cabinet; in-house subject matter experts; and the states referenced in Chapter 3.

The resulting pilot curricula detailed below was developed for construction, maintenance, roadway design, and section engineers (combination of construction and maintenance) as well as project managers (preconstruction). These were selected due to their wide applicability across KYTC. The potential to utilize these templates to build out other engineering curricula also remains. The curricula for each subject matter area were divided in several ways. First, courses and skills were classified into categories and sub-categories that captured the overarching competency the courses and skills supported. Courses and skills in each category and/or sub-category were then grouped under three levels: entry, mid-level, and advanced. Entry-level personnel require new learning and need direct supervision. Mid-level denotes an employee who is competent at entry-level tasks with minimal supervision and is now learning specialized tasks. Finally, advanced refers to an employee who performs specialized tasks with minimal supervision, can train and/or supervise others, and manage resources and make decisions in this area. Courses and skills are listed separately under each of these groupings; if we identified a course that corresponded to a certain skill set, that course is listed under the course heading. If a skill set was identified that did not currently have an specified course available or was something that should be mastered at that level, it was listed under the skills heading. The remainder of this chapter details recommended curricula.

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[15] https://www.nhi.fhwa.dot.gov/home.aspx

5.1 Construction Engineers Training Curriculum

Construction Engineers Training

SECTION ENGINEERS TRAINING

CONSTRUCTION ENGINEERS TRAINING
- ADVANCED or MANAGEMENT
- MID-LEVEL
- ENTRY

MAINTENANCE ENGINEERS TRAINING
- ADVANCED or MANAGEMENT
- MID-LEVEL
- ENTRY

MATERIALS ENGINEERS TRAINING
- ADVANCED or MANAGEMENT
- MID-LEVEL
- ENTRY

TRAFFIC ENGINEERS TRAINING
- ADVANCED or MANAGEMENT
- MID-LEVEL
- ENTRY

STRUCTURES ENGINEERS TRAINING
- ADVANCED or MANAGEMENT
- MID-LEVEL
- ENTRY

PROJECT MANAGERS TRAINING
- ADVANCED or MANAGEMENT
- MID-LEVEL
- ENTRY

GEO TECH ENGINEERS TRAINING
- ADVANCED or MANAGEMENT
- MID-LEVEL
- ENTRY

PLANNING ENGINEERS TRAINING
- ADVANCED or MANAGEMENT
- MID-LEVEL
- ENTRY

ROADWAY DESIGN ENGINEERS TRAINING
- ADVANCED or MANAGEMENT
- MID-LEVEL
- ENTRY

TRAINING for KYTC ENGINEERS

Training for KYTC Employees

SKILL LEVELS

Entry: New, learning, needs direct supervision

Mid-Level: Competent at entry level tasks with minimal supervision, learning specialized tasks

Advanced: Performs specialized tasks with minimal supervision, train/ supervise others, resource management, decision making

Category: Base and Pavement

Sub-category
Concrete Pavement

Entry

Courses: **Construction of PCC Pavements**

Skill: Materials, Plants, Testing

Mid-Level

Courses: **ACI Level I**

Skill: Paving

Advanced or Management

Courses: **KCA Level II**

Skill: -

Category: Base and Pavement

Sub-category
Aggregate

Entry

Courses: **Aggregate Sampling Technician**

Skill: Subgrade and Base Construction

Mid-Level

Courses: **Aggregate technician level 2**

Skill: DGA and CSB, Drainage Blankets, Chemical Stabilization

Advanced or Management

Courses: -

Skill: Nuclear Density Operation for Aggregate base

Category: Surveying and Layout

Sub-category
-

Entry

Courses: Basic Plan Reading

Skill: Basics Of Surveying/Running A Level, Field Books, Plan Review

Mid-Level

Courses: -

Skill: Control And Staking, Structures, Equipment, Introduction To GPS Surveying

Advanced or Management

Courses: -

Skill: Roadway Geometry, Slides, 3-Day Survey Controller Access

Category: Environment and Erosion Control

Sub-category
Erosion Control And/Or Permits

Entry

Courses: **KEPSC for Roadway Inspectors**

Skill: -

Mid-Level

Courses: -

Skill: Landscaping, Temporary And Permanent Erosion Control (BMPs), Contractor And Section Responsibilities, Liquidated Damages

Advanced or Management

Courses: -

Skill: Noncompliance, Sinkholes, Streams, Acceptance

Category: Lighting, Signs and Signalization

Sub-category
-

Entry

Courses: **General Sign Inspection, Night Time Visual Inspection**

Skill: Submittal process for each

Mid-Level

Courses: **CARS Training, Traffic Signal Electrical Inspection, Pavement Markings Layout MUTCD/KYTC Standard**

Skill: **Sign Truss Approval & Erection**

Advanced or Management

Courses: -

Skill: -

Category: Environment and Erosion Control

Sub-category
Historic Preservation & Archaeological Coordination

Entry

Courses: -

Skill: Understanding The CAP Note (Communicating All Promises) Protocol When A Potential Site Is Shown On The Plans Or Discovered (SHPO Requirements)

Mid-Level

Courses: -

Skill: -

Advanced or Management

Courses: -

Skill: -

Category: Structures

Sub-category
-

Entry

Courses: **Concrete ACI Level 1, Structures Level 1**

Skill: Excavation, Cofferdams, Bearing Piles, Falsework And Forms

Mid-Level

Courses: **Drilled Shafts, Structures Level 2**

Skill: Friction Piles, Reinforced Concrete, Bridge Deck Overlay, Prestressed Concrete & Pre-Stressed Plant Inspection

Advanced or Management

Courses: **Bridge Coating Inspector Program**

Skill: Cast in place concrete, reinforcing steel, structural steel erection and shop inspection, welding, bridge painting, precast or prefabricated culverts

Category: Lighting, Signs and Signalization

Sub-category
-

Entry

Courses: **General Sign Inspection, Night Time Visual Inspection**

Skill: Submittal process for each

Mid-Level

Courses: **CARS Training, Traffic Signal Electrical Inspection, Pavement Markings Layout MUTCD/KYTC Standard**

Skill: Sign Truss Approval & Erection

Advanced or Management

Courses: -

Skill: -

Category: Roadside Devices

Sub-category
-

Entry

Courses: ADA Compliance for Sidewalks

Skill: -

Mid-Level

**Courses: Pavement Markings Inspector
Guardrail Installation**

Skill: -

Advanced or Management

Courses: -

Skill: -

Category: Materials

Sub-category
-

Entry

Courses: -

Skill: Material Acceptance, KY Methods

Mid-Level

Courses: -

Skill: -

Advanced or Management

Courses: -

Skill: -

Category: Earthwork, Demolition and Drainage

Sub-category
-

Entry

Courses: **Grade and Drain Level 1**

Skill: Excavation and waste

Mid-Level

Courses: **Grade and Drain Level 2**

Skill: Embankment construction, Post Installation pipe inspection, Rock Cuts Benching, Sinkhole Repair, Pipe Installation

Advanced or Management

Courses: -

Skill: -

Category: Contract Administration

Sub-category
Contractor Payments

Entry

Courses: -

Skill: The Contract, Project schedules, measuring quantities, Time extensions, The role of the inspector/ inspector training, Introduction to partnering concepts

Mid-Level

Courses: -

Skill: Claims Process, Extra Work, Measuring Work Days, Cost Plus/ Force Account, Construction Conflicts, Preconstruction Meetings, Effective Field Communication

Advanced or Management

Courses: -

Skill: Liquidated Damages, Other Penalties, Pay Adjustments, Subcontracts, Rental Agreements

Category: Contract Administration

Sub-category
Project Closeout

Entry

Courses: -

Skill: Final Inspection, Formal Acceptance, Corrective Work, As-built of finished construction project

Mid-Level

Courses: Final Estimate

Skill: Contractor Performance Evaluation, Verify Quantities

Advanced or Management

Courses: -

Skill: Post Construction Reviews, Project Completion Requirements

Category: Contract Administration

Sub-category
Construction Revisions

Entry

Courses: -

Skill: Change Orders

Mid-Level

Courses: -

Skill: Value Engineering, Plan Revisions

Advanced or Management

Courses: -

Skill: -

Category: Technology Tools

Sub-category
-

Entry

Courses: SiteManager Inspector Training

Skill: -

Mid-Level

Courses: LIMS (Materials certifications)

Skill: -

Advanced or Management

Courses: -

Skill: SiteManager Change Orders, Dates, Pay Estimates, Work Days

Category: Safety

Sub-category

Entry

Courses: OHSA 10, First Aid

Skill: PPE, Security Awareness, Hazmat Incident Training

Mid-Level

Courses: CPR

Skill: -

Advanced or Management

Courses: -

Skill: Foundation for Safety Leadership, Hazardous waste

Category: Work Zone Safety

Sub-category
-

Entry

Courses: Flagging

Skill: Traffic control

Mid-Level

Courses: Traffic Control Technician

Skill: Maintenance of Traffic Plan Revisions

Advanced or Management

Courses: Traffic Control Supervisor
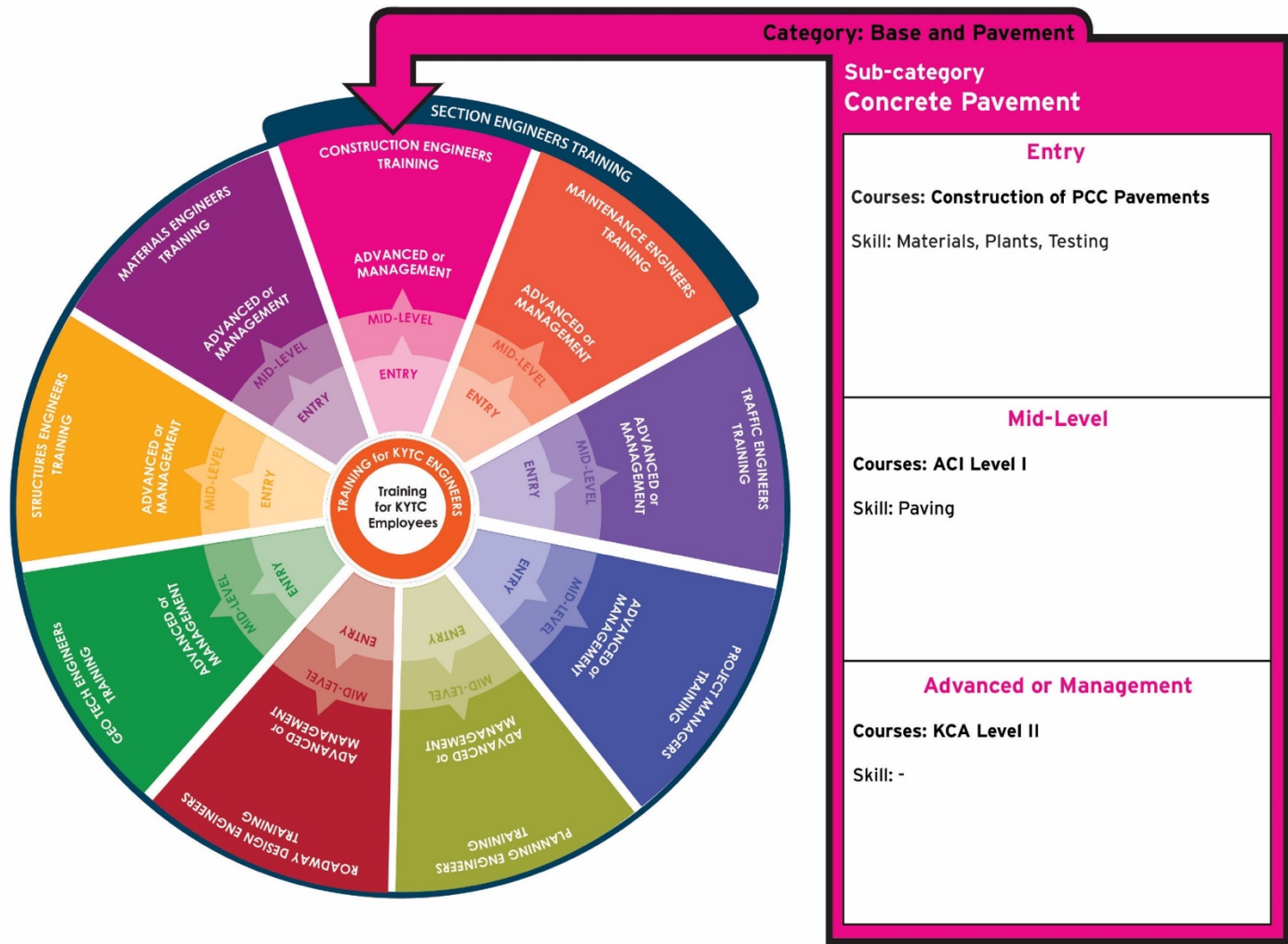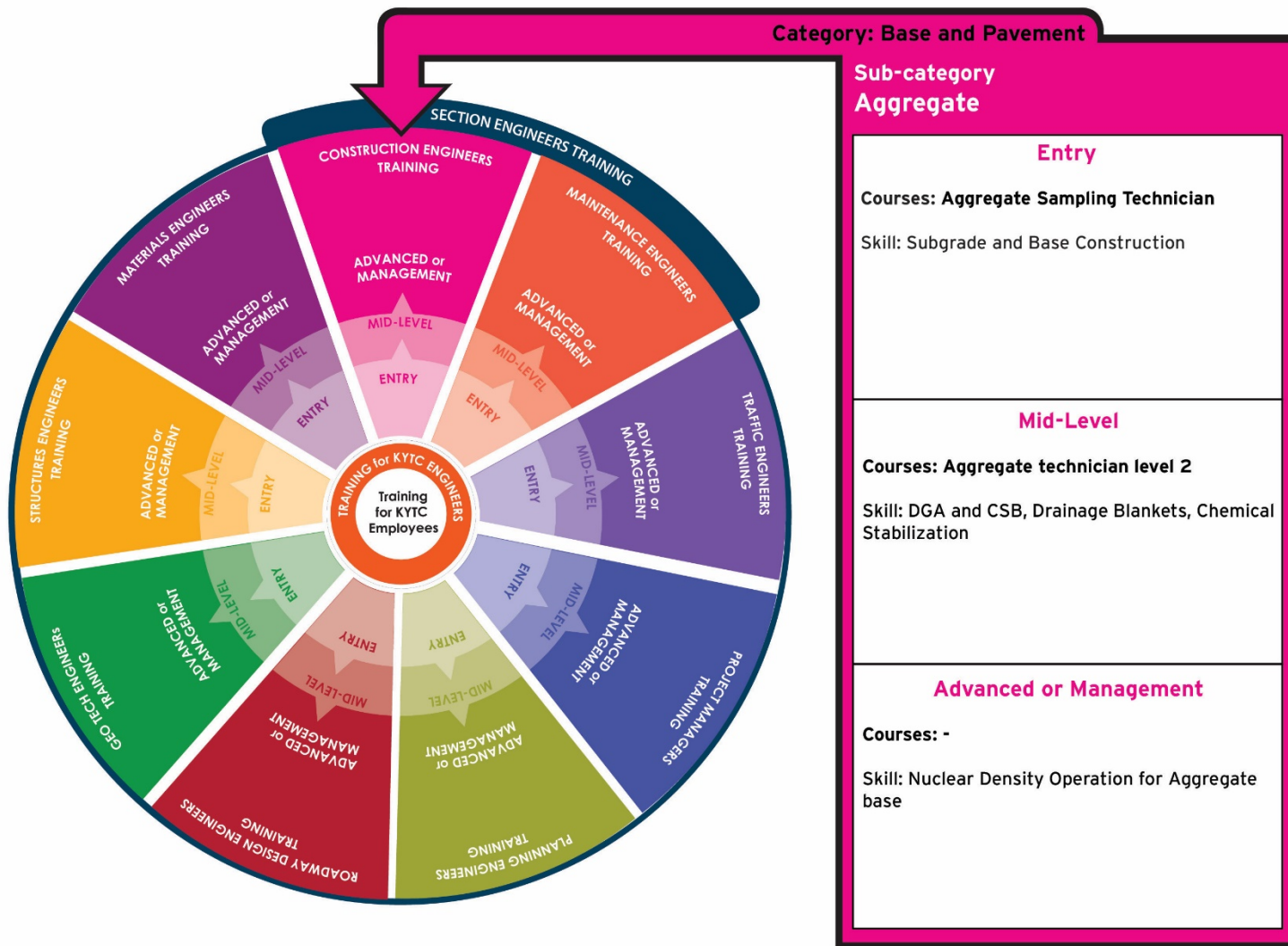
Skill: -

Maintenance Engineers Training

SKILL LEVELS

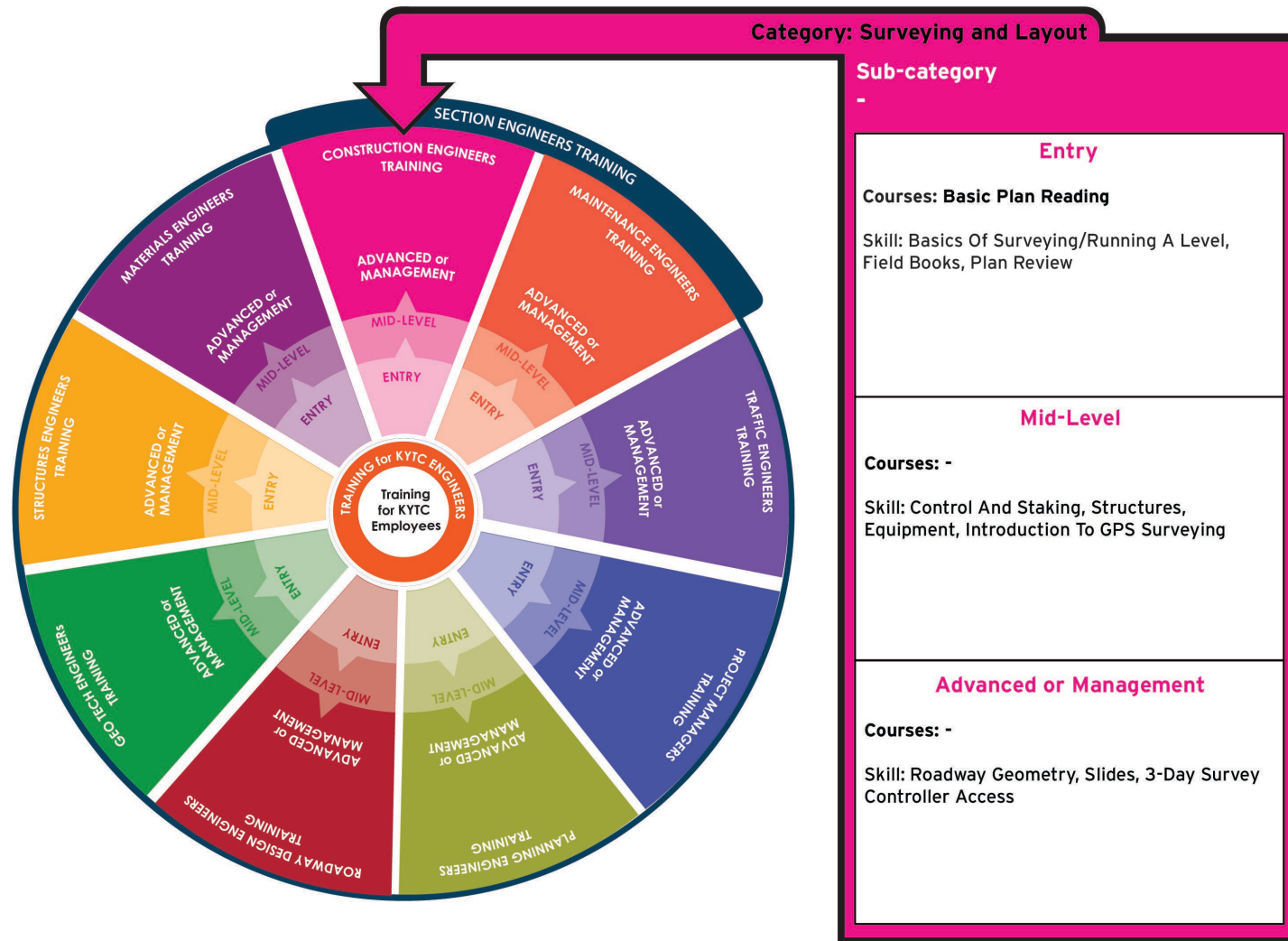**Entry:** New, learning, needs direct supervision

Mid-Level: Competent at entry level tasks with minimal supervision, learning specialized tasks
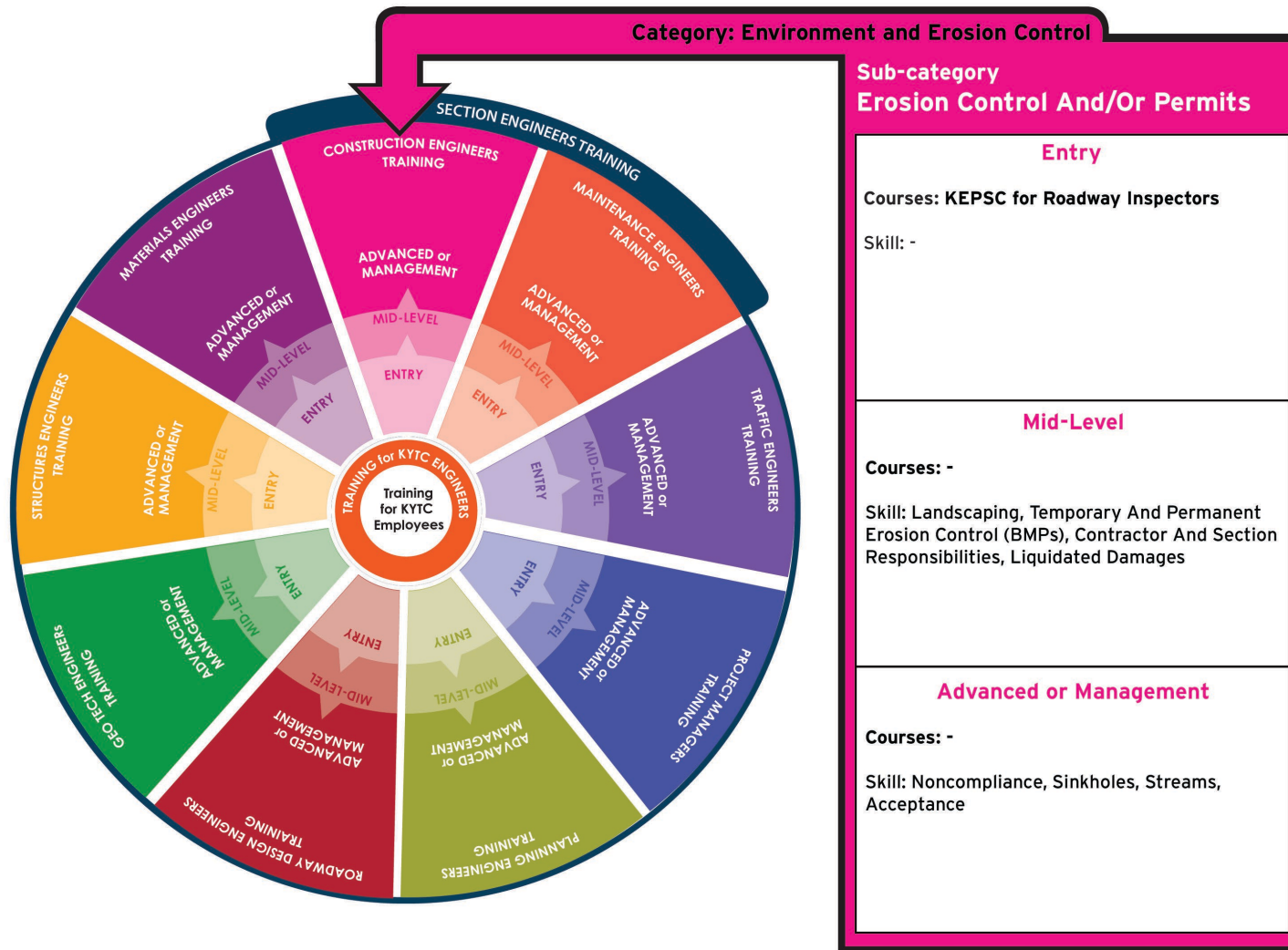
Advanced: Performs specialized tasks with minimal supervision, train/ supervise others, resource management, decision making
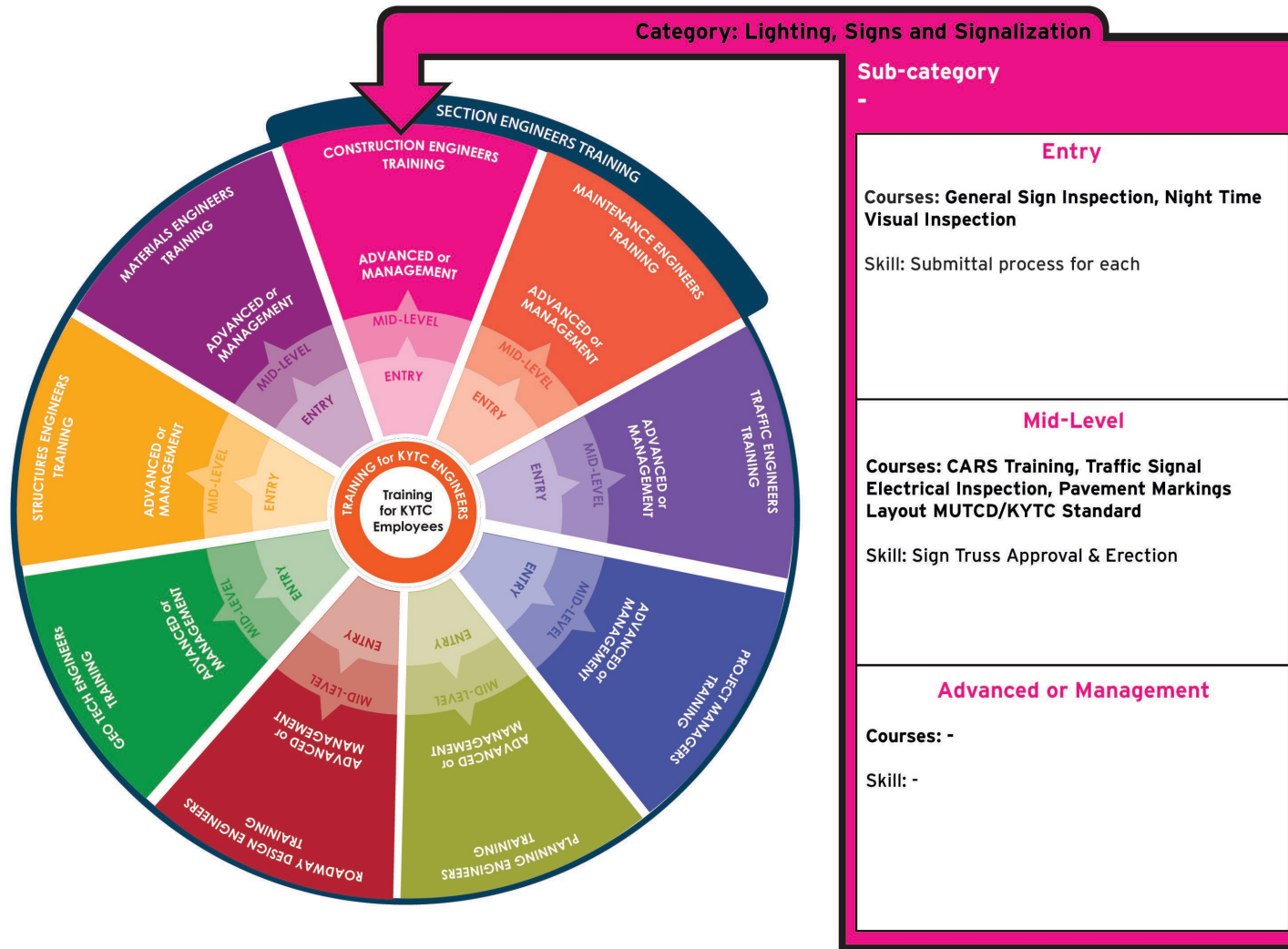
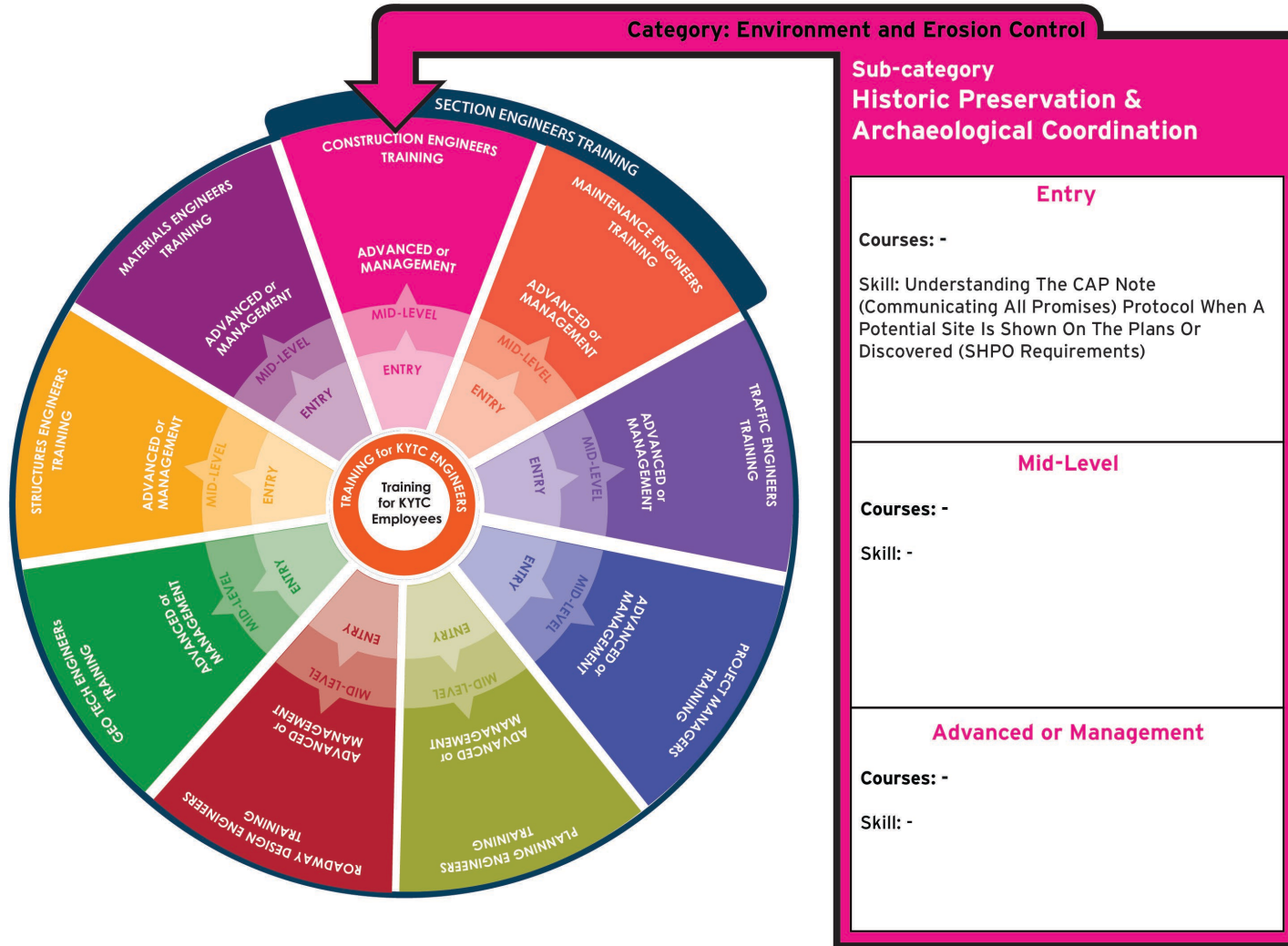**Category: Roadways**
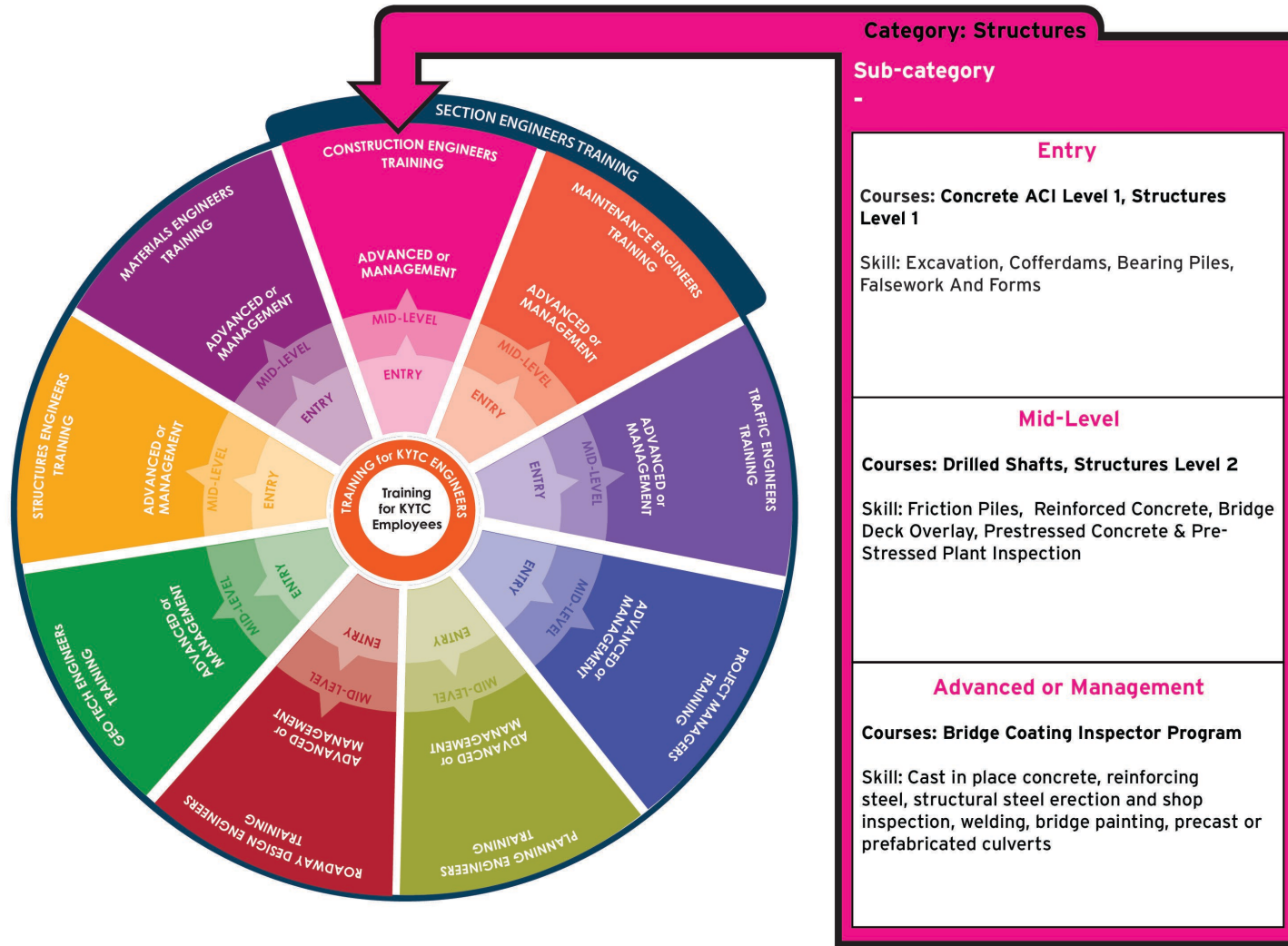
Sub-category
Asphalt Pavement

Entry

Courses: Asphalt Paving Best Practices
Skill: -

Mid-Level

Courses: -

Skill: Pavement Evaluation and Rehabilitation

Advanced or Management

Courses: -

Skill: -

Category: Roadways

Sub-category
Pavement Markings

Entry

Courses: **LTL Retroreflectomoter, General Sign Inspection**

Skill: -

Mid-Level

Courses: **ADA Compliance for Sidewalks, CARS Training Sign Placement and Layout**

Skill: Pavement Markings Layout MUTCD/KYTC Standard

Advanced or Management

Courses: -

Skill: -

Category: Roadways

Sub-category
Pavement Evaluation

Entry

Courses: **Basic Plan Reading and Basic Surveying**

Skill: Shoulder Best Practices, FD05 Estimate Preparation

Mid-Level

Courses: -

Skill: Pavement Preservation, Concrete Pavement Evaluation, Proposal Development

Advanced or Management

Courses: -

Skill: -

Category: Drainage

Sub-category
-

Entry

Courses: -

Skill: -

Mid-Level

Courses: -

Skill: -

Advanced or Management

Courses: -

Skill: -

Category: Winter Response

Sub-category
-

Entry

Courses: Snow and Ice Removal

Skill: -

Mid-Level

Courses: -

Skill: -

Advanced or Management

Courses: -

Skill: -

Category: Emergency/Disaster

Sub-category
TIM

Entry

Courses: TIM Responder

Skill: -

Mid-Level

Courses: -

Skill: HazMat Incident Training

Advanced or Management

Courses: -

Skill: FEMA/ Emergency Preparedness

Category: Environment

Sub-category
-

Entry

Courses: **MRP Training, KEPSC for Roadway Inspectors, Sign Nightime Visual Inspection, Guardrail Installation**

Skill: Embankment Repair & Protection, Highway Slope Maintenance & Repair

Mid-Level

Courses: **Roadside Design Guide, Wetland Preservation, Fence Management**

Skill: Sign Management, GHS for Pesticides, Roadway Departure Maintenance, Access Management, Low Cost Safety Improvements

Advanced or Management

Courses: -
Skill: Permits

Category: Technology

Sub-category
-

Entry

Courses: -

Skill: -

Mid-Level

Courses: OMS Training, Leadership Training

Skill: -

Advanced or Management

Courses: -

Skill: -

Category: Safety

Sub-category
-

Entry

Courses: **OSHA 10, Flagging**

Skill: PPE

Mid-Level

Courses: **CPR/ First Aid, Traffic Control Technician**

Skill: -

Advanced or Management

Courses: **Traffic Control Supervisor**

Skill: -

5.3 Section Engineers Training Curriculum

Section Engineer Training

SECTION ENGINEERS TRAINING

CONSTRUCTION ENGINEERS TRAINING — ADVANCED or MANAGEMENT — MID-LEVEL — ENTRY

MAINTENANCE ENGINEERS TRAINING — ADVANCED or MANAGEMENT — MID-LEVEL — ENTRY

MATERIALS ENGINEERS TRAINING — ADVANCED or MANAGEMENT — MID-LEVEL — ENTRY

TRAFFIC ENGINEERS TRAINING — ADVANCED or MANAGEMENT — MID-LEVEL — ENTRY

STRUCTURES ENGINEERS TRAINING — ADVANCED or MANAGEMENT — MID-LEVEL — ENTRY

PROJECT MANAGERS TRAINING — ADVANCED or MANAGEMENT — MID-LEVEL — ENTRY

GEO TECH ENGINEERS TRAINING — ADVANCED or MANAGEMENT — MID-LEVEL — ENTRY

ROADWAY DESIGN ENGINEERS TRAINING — ADVANCED or MANAGEMENT — MID-LEVEL — ENTRY

PLANNING ENGINEERS TRAINING — ADVANCED or MANAGEMENT — MID-LEVEL — ENTRY

TRAINING for KYTC ENGINEERS
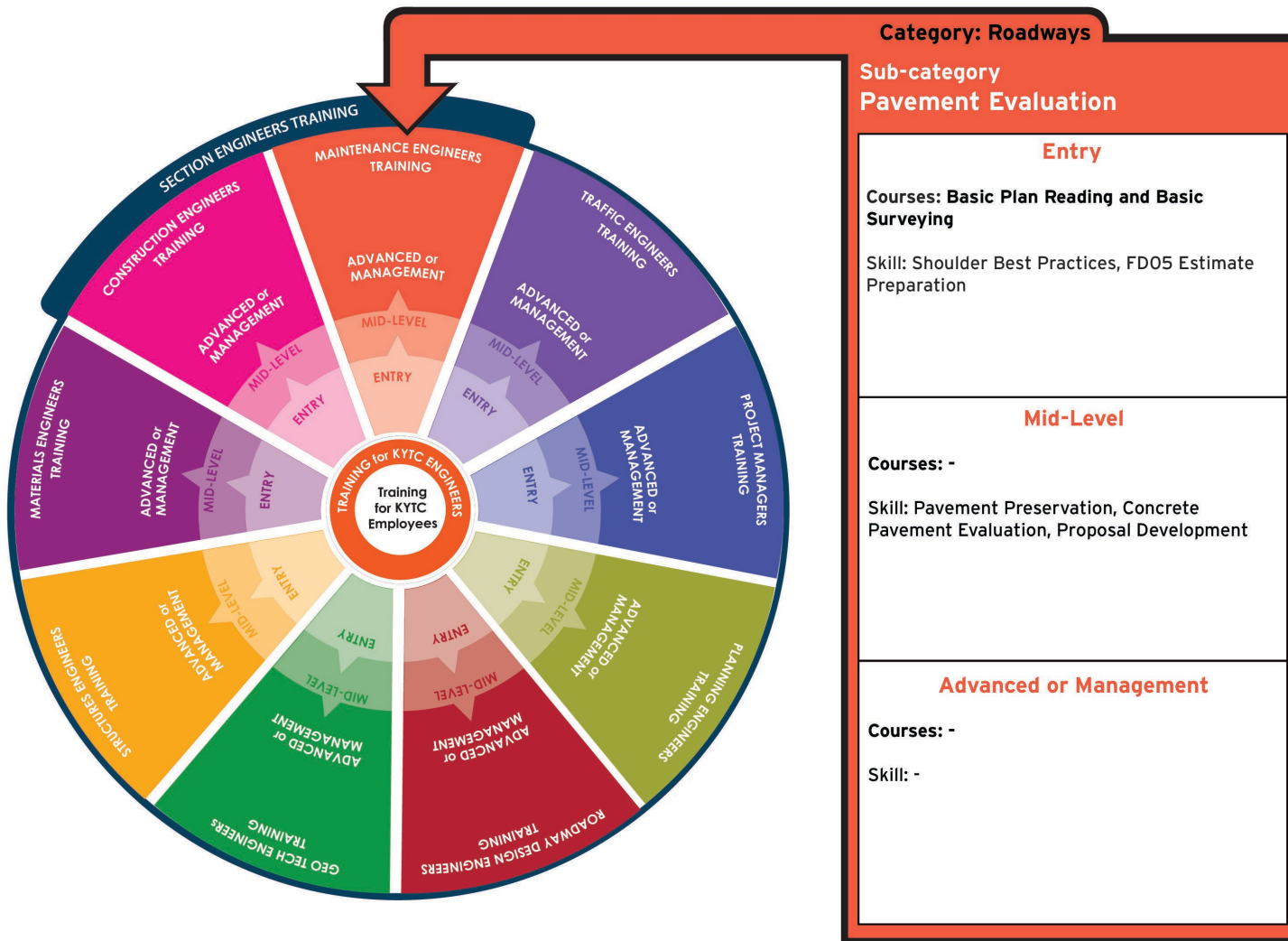
Training for KYTC Employees

SKILL LEVELS

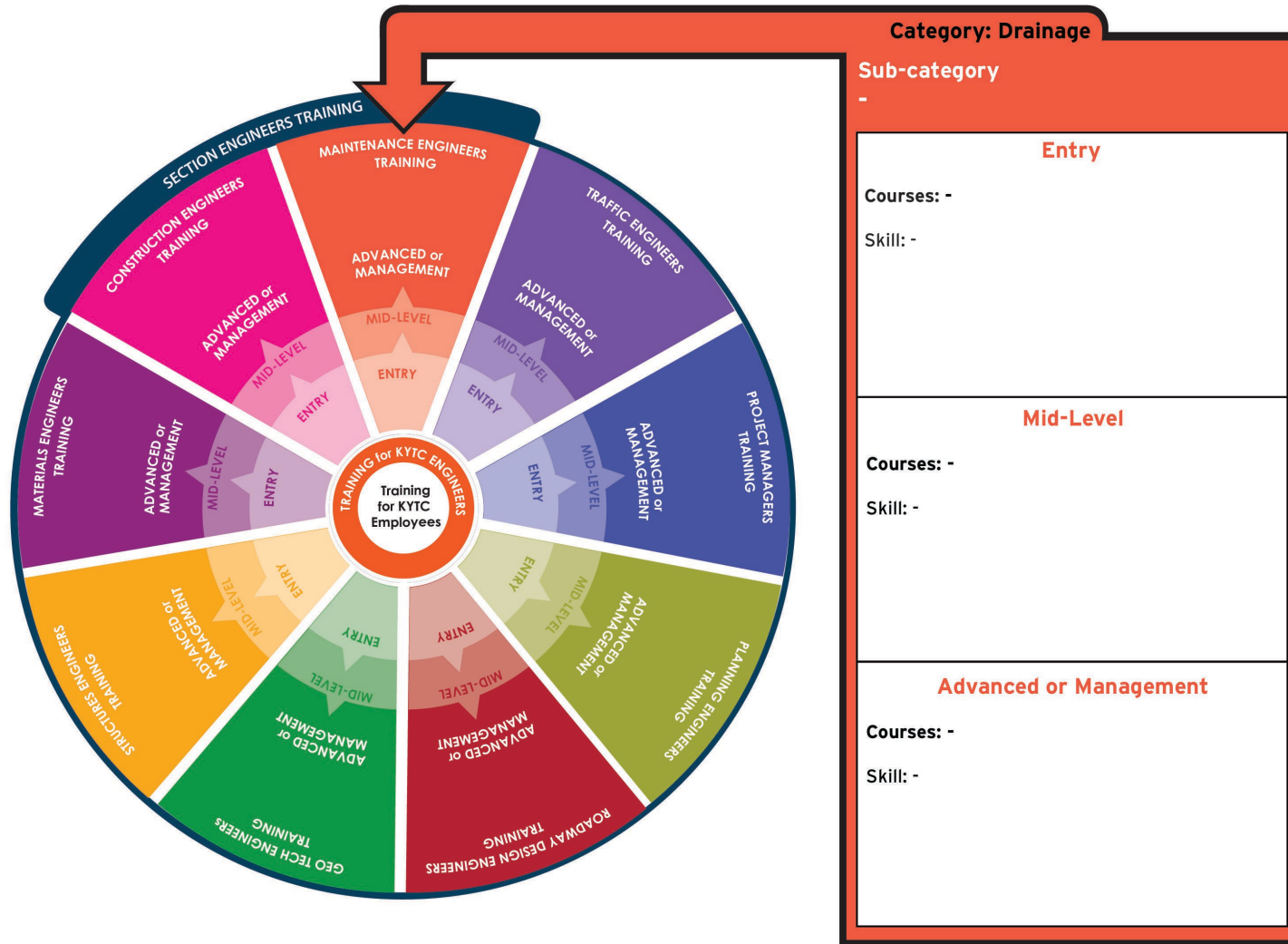**Entry:** New, learning, needs direct supervision

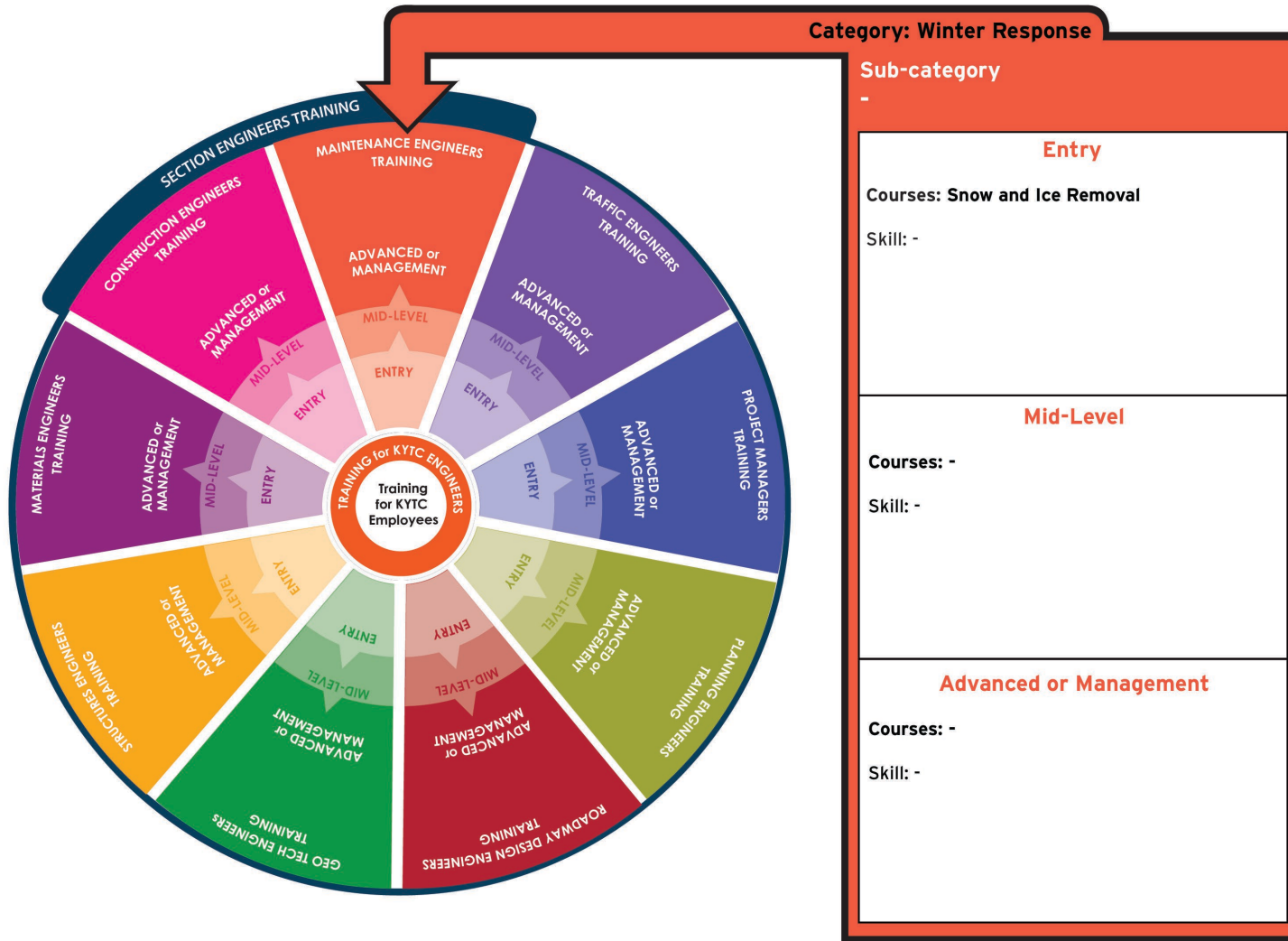**Mid-Level:** Competent at entry level tasks with minimal supervision, learning specialized tasks

Advanced: Performs specialized tasks with minimal supervision, train/ supervise others, resource management, decision making
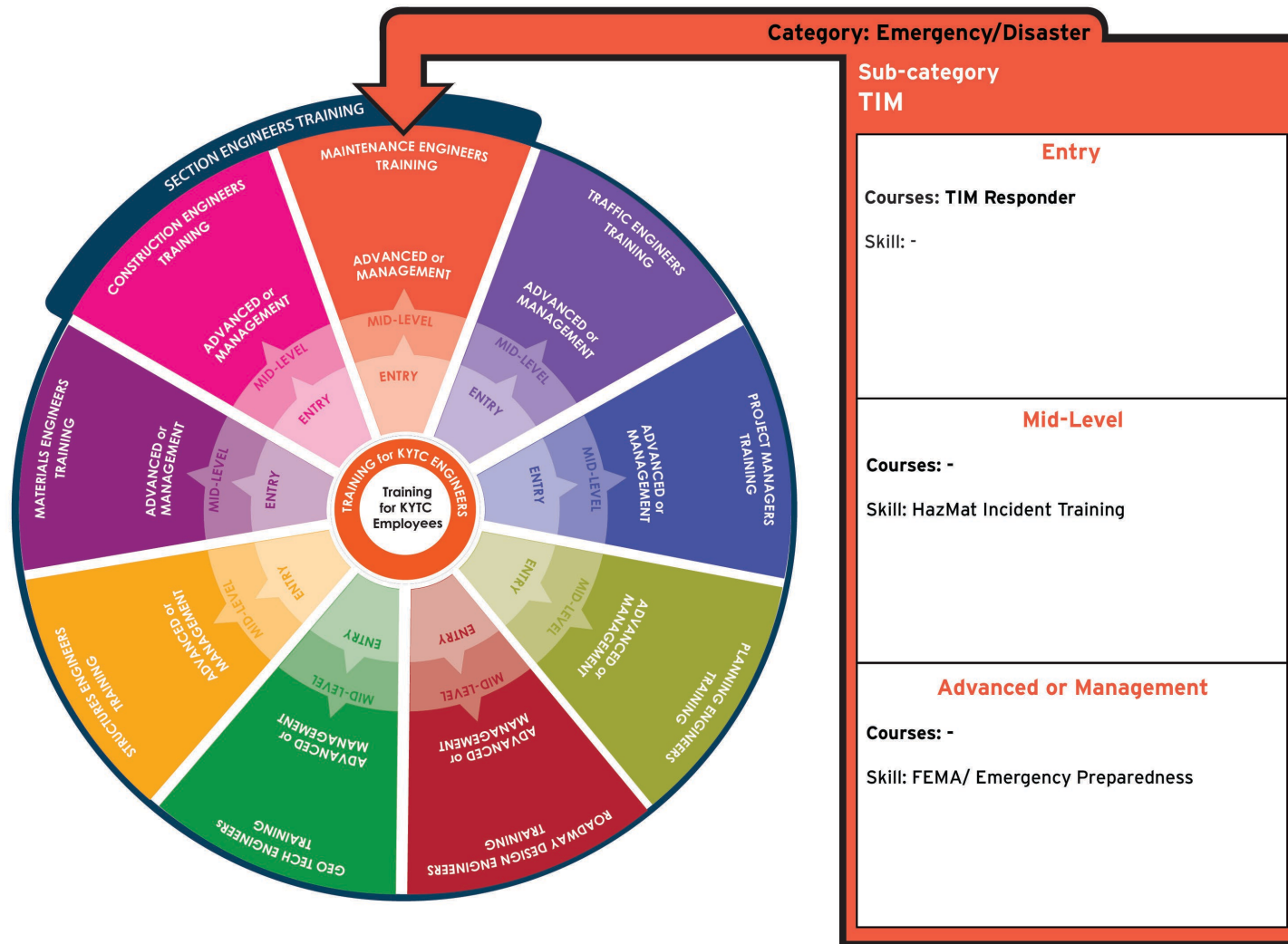
5.4 Roadway Design Engineers Training Curriculum
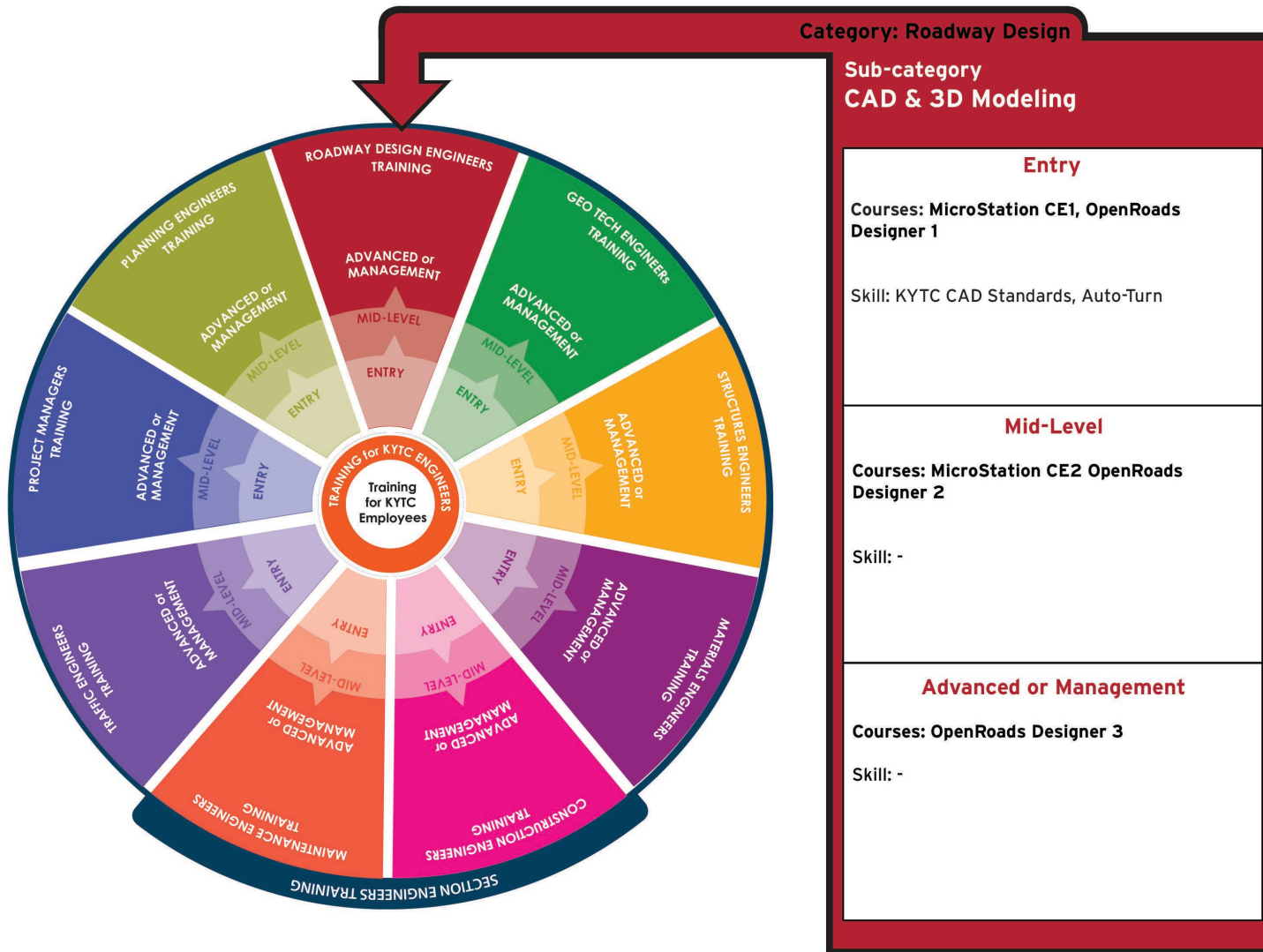
Roadway Design Engineer Training

SKILL LEVELS

Entry: New, learning, needs direct supervision

Mid-Level: Competent at entry level tasks with minimal supervision, learning specialized tasks

Advanced: Performs specialized tasks with minimal supervision, train/ supervise others, resource management, decision making

Category: Roadway Design

Sub-category
CAD & 3D Modeling

Entry

Courses: MicroStation CE1, OpenRoads Designer 1

Skill: KYTC CAD Standards, Auto-Turn

Mid-Level

Courses: MicroStation CE2 OpenRoads Designer 2

Skill: -

Advanced or Management

Courses: OpenRoads Designer 3

Skill: -

Category: Roadway Design

Sub-category
Surveying and Mapping

Entry

Courses: GIS Training, Basic Plan Reading, MicroStation C.E.1

Skill: Survey and Mapping Basics for Designers, Title Searches

Mid-Level

Courses: OpenRoads Survey

Skill: Coordinate Control & Project Coordinates Sheets, ROW and Easement Layout, Legal Description Writing, Troubleshooting Survey Data Files
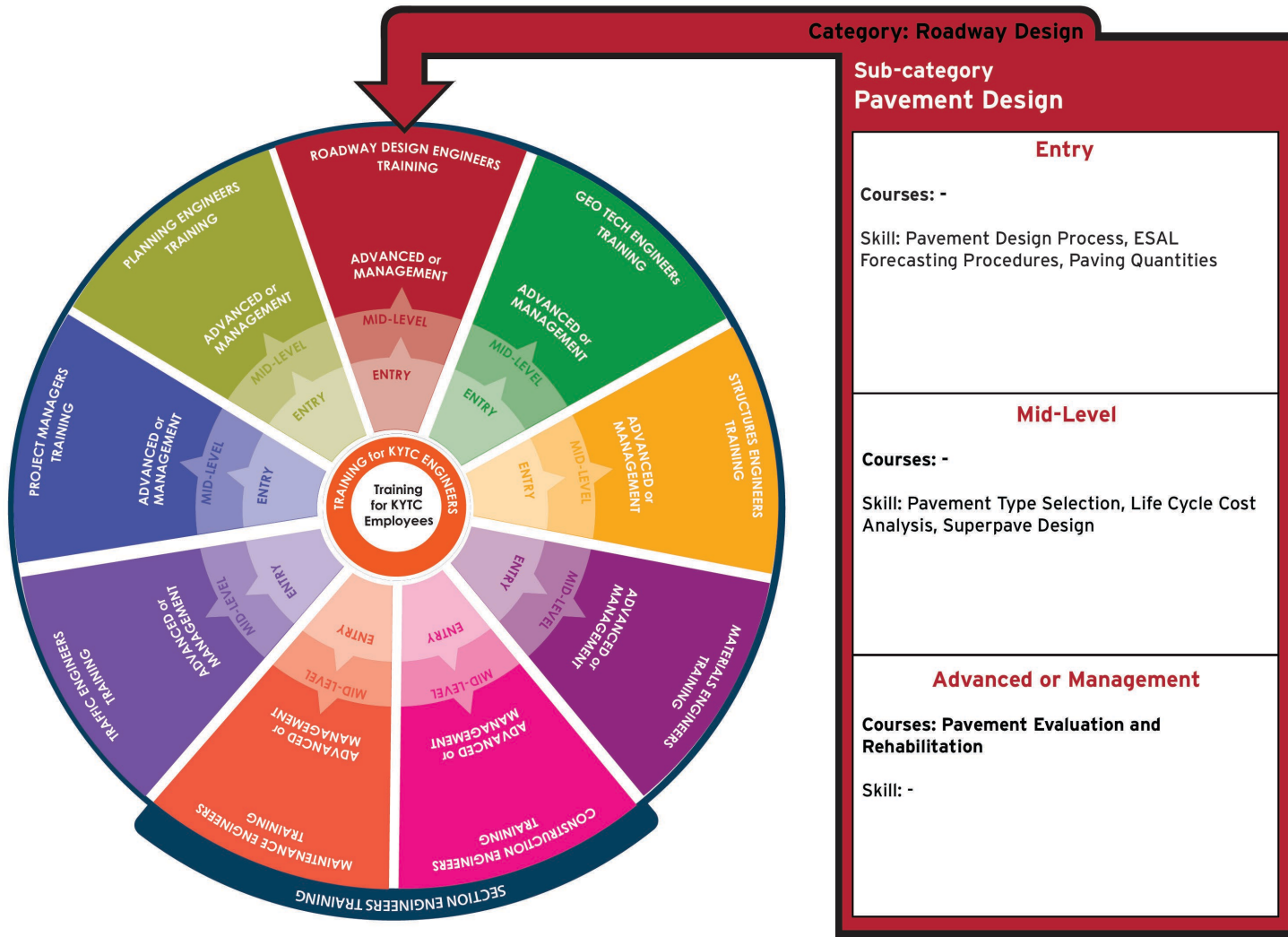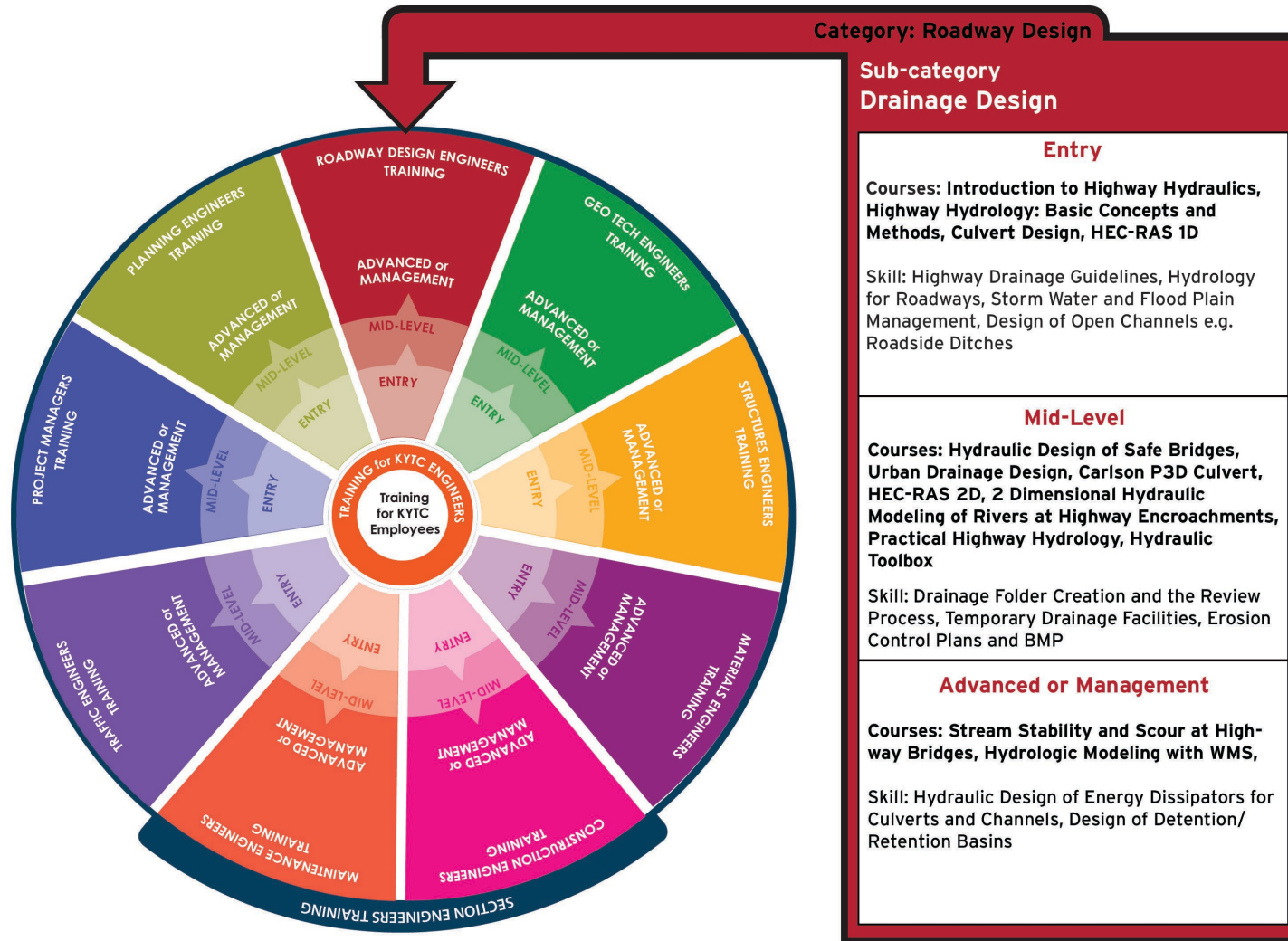
Advanced or Management

Courses: Carlson P3D

Skill: 3-D Model Inspection, Manipulating Terrain Data Files (LiDAR, DEMs, etc.)

Category: Roadway Design

Sub-category
Plan Creation and Submittal

Entry

Courses: MicroStation CE1, Working Days Calculator

Skill: KYTC Electronic Submittal Policy

Mid-Level

Courses: MicroStation CE2,

Skill: Project Estimating

Advanced or Management

Courses: -

Skill: Project Submittal (PS&E)

Category: Roadway Design

Sub-category
Roadway Geometrics

Entry

Courses: Design Controls and Criteria, Traffic Engineering Basics & Highway Capacity Analysis, Roadway Geometric Design Basics, Cross Sections and Typical Sections, Roadside Safety Design, Speed Management

Skill: Traffic Control Devices & Pavement Markings

Mid-Level

Courses: Flexibility in Design, Roadway Geometric Design Advanced, Highway Safety Manual for Roadway Design Practitioners, Advanced Roadway Modeling (InRoads III), At-Grade Intersection Design Basics, Intersections and Channelization, Pedestrian and Bicycle Facility Design, Design Executive Summary Preparation, Low Cost Safety Improvements, Introducing Human Factors in Roadway Design and Operations, Purpose and Need

Skill: Prioritizing Work, Assembling Project Teams

Advanced or Management

Courses: Interactive Highway Safety Design Model, At-Grade Intersection Design and ADA Design, Interchange Planning and Design, Fundamentals of Interchange Improvements, Fundamentals of Planning and Design of the Interstate System, Roundabout Design, Alternative Intersections and Interchanges, Roadway Project Planning and Estimates, Traffic Simulation, Value Engineering Workshop

Skill: Traffic Impact Studies, Delegation, Employee Discipline Training, eMARS

Category: Roadway Design

Sub-category
Pavement Design

Entry

Courses: -

Skill: Pavement Design Process, ESAL Forecasting Procedures, Paving Quantities

Mid-Level

Courses: -

Skill: Pavement Type Selection, Life Cycle Cost Analysis, Superpave Design

Advanced or Management

Courses: Pavement Evaluation and Rehabilitation

Skill: -

Category: Roadway Design

Sub-category
Drainage Design

Entry

Courses: Introduction to Highway Hydraulics, Highway Hydrology: Basic Concepts and Methods, Culvert Design, HEC-RAS 1D

Skill: Highway Drainage Guidelines, Hydrology for Roadways, Storm Water and Flood Plain Management, Design of Open Channels e.g. Roadside Ditches

Mid-Level

Courses: Hydraulic Design of Safe Bridges, Urban Drainage Design, Carlson P3D Culvert, HEC-RAS 2D, 2 Dimensional Hydraulic Modeling of Rivers at Highway Encroachments, Practical Highway Hydrology, Hydraulic Toolbox

Skill: Drainage Folder Creation and the Review Process, Temporary Drainage Facilities, Erosion Control Plans and BMP

Advanced or Management

Courses: Stream Stability and Scour at High-way Bridges, Hydrologic Modeling with WMS,

Skill: Hydraulic Design of Energy Dissipators for Culverts and Channels, Design of Detention/ Retention Basins

Category: Roadway Design

Sub-category
Access Management

Entry

Courses: -

Skill: -

Mid-Level

Courses: Access Management: Fundamental Principles and Application

Skill: -

Advanced or Management

Courses: -

Skill: -

Category: Roadway Design

Sub-category
Right of Way

Entry

Courses: Principles of Right of Way Land Acquisition

Skill: Title Searches

Mid-Level

Courses: Overview of Right of Way Acquisition under the Uniform Act

Skill: -

Advanced or Management

Courses: -

Skill: -

Category: Roadway Design

Sub-category
Utility Coordination

Entry

Courses: -

Skill: -

Mid-Level

Courses: Utility Coordination for Highway Projects

Skill: -

Advanced or Management

Courses: -

Skill: -

Category: Roadway Design

Sub-category
Environmental Impact

Entry

Courses: Introduction to NEPA & Transportation Decision-Making Process

Skill: -

Mid-Level

Courses: Design Outside the Lines, Context Sensitive Design

Skill: Permits and Certifications, Public Involvement

Advanced or Management

Courses: -

Skill: -

5.5 Project Managers Training Curriculum

Project Managers Training

SKILL LEVELS

Entry: New, learning, needs direct supervision

Mid-Level: Competent at entry level tasks with minimal supervision, learning specialized tasks

Advanced: Performs specialized tasks with minimal supervision, train/ supervise others, resource management, decision making

Category: Preconstruction Project Managers

Sub-category
Project Management

Entry

Courses: **Project Management Boot Camp, Project Cost Estimating, Project Scheduling & Time Management, CPM Scheduling MS Project Basics**

Skill: Project Scope Management, Federal-Aid Highway Program Guidance

Mid-Level

Courses: -

Skill: Project Risk Management

Advanced or Management

Courses: -

Skill: -

Category: Preconstruction Project Managers

Sub-category
Highway Project Decision Making

Entry

Courses: Purpose and Need/ Project Identification, Design Executive Summary Preparation, NEPA and Transportation Decision Making Process, Context Sensitive Solutions, Public Involvement, Overview of Right of Way Acquisition under the Uniform Act, Utility Coordination for Highway Projects, Constructability Review

Skill: -

Mid-Level

Courses: Value Engineering, Environmental Leadership, Advanced Seminar on Transportation Project Development: Navigating the NEPA Maze

Skill: Design Participation in Construction Phase, Innovative Bid Processes

Advanced or Management

Courses:

Skill: -

Category: Preconstruction Project Managers

Sub-category
Leadership

Entry

Courses: Leadership I – Leading Self, Leadership II – Leading Others

Skill: -

Mid-Level

Courses: Advanced Leadership Academy, Leadership III – Leading Organizations

Skill: -

Advanced or Management

Courses: -

Skill: -

Category: Preconstruction Project Managers

Sub-category
Management Soft Skills

Entry

Courses: -

Skill: Achieving Project Success, Performance Management, Communication Skills, Conflict Management, Critical Thinking, Effective Meetings, High Performing Teams

Mid-Level

Courses: -

Skill: -

Advanced or Management

Courses:

Skill: -

Category: Preconstruction Project Managers

Sub-category
Contract Administration

Entry

Courses: -

Skill: Contracting for Professional Engineering and Engineering-Related Services, Design Work-Hour Estimation, Consultant Management and Contract Administration, Professional Services Selection Process, Performance Management

Mid-Level

Courses: -

Skill: Life Cycle Cost design

Advanced or Management

Courses: -

Skill: -

Chapter 6 Conclusion

Like other state DOTs, the Cabinet is deepening its efforts to develop and leverage multiple approaches to training and employee development. New offerings, such as the Highway Technician Series and Project Manager's Boot Camp, have given employees new avenues for continuing their professional growth and advancing their careers at KYTC. However, no comprehensive training curricula have been developed for professionals and paraprofessionals. Continuing to monitor how other states equip their employees with the skills they need to succeed through individual course offerings and more exhaustive curricula is a worthwhile task. Maintaining an open dialogue with other state training coordinators and personnel will also foster the sharing of ideas and best practices. While not all approaches to training and employee development will be suitable for the Cabinet, emulating some of the best available methods is a strategy that merits consideration.

By combing through past course data, cross-referencing outside offerings, and reviewing in-house subject matter expertise, we developed several pilot curricula. Wanting to develop curricula in areas that would be salient for the largest number of Cabinet employees possible led to our focus on construction, maintenance, roadway design, section engineers, and project managers (preconstruction). Courses and skills in each are grouped under the following levels: entry, mid-level, and advanced. While these were vetted by the Study Advisory Committee, training needs and curricula will continue to evolve as skills are developed into courses and as the requirements and needs for various skills change.

Given the breadth of KYTC's responsibilities and its declining staff levels, working to ensure that employees have the skills and expertise needed to meet their job requirements is of paramount importance. It takes on even greater urgency with personnel often being asked to take on additional duties. Employees are the backbone of any organization and the Cabinet is no exception. To help employees thrive and ensure it can fulfill its mission, the Cabinet is committed to employee professional development so that staff may cultivate their technical competencies and build expertise. Perhaps the most significant benefit of training is that it helps create better and more knowledgeable employees, thus making training essential if KYTC is to meet its business objectives.

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Appendix

A.1 Survey Questions

1. Does your agency have a transportation engineering professional development program?
   a. No. Please skip to the end and select "Finish." All questions relate to Transportation Engineering Professional Development (TEPD) programs.
   b. Yes. Please specify what content is offered (for example, traffic operations, roadway design and career development).
2. What types of learning formats are used by your agency's TEPD program? Check all that apply.
   a. Classroom teaching
   b. Webinars
   c. White papers
   d. Peer-to-peer training/mentoring
   e. Other (Please specify)
3. Does your agency's TEPD program include coursework and professional development participation from professional organizations (such as the Institute of Transportation Engineers and the American Society of Civil Engineers)?
   a. No
   b. Yes. Please explain.
4. Do state universities support your agency's current standards and training so that undergraduates are prepared for the workforce?
   a. No
   b. Yes. Please explain.
5. Does your TEPD program include training for new employees?
   a. Yes
   b. No
6. To whom is your TEPD program offered? Check all that apply.
   a. DOT staff
   b. Consultants
   c. Municipality staff
   d. Other (Please specify)
7. How does your agency tack participation and credit hours for the TEPD program?
   a. Internal database
   b. University of private entity assists in record keeping
   c. We don't track this
   d. Other (Please specify)
8. Who teaches courses offered through your TEPD program? Check all that apply.
   a. DOT staff
   b. Consultants
   c. Universities
   d. Other (Please specify)
9. How does your agency assess the need for the TEPD program? Check all that apply.
   a. Formal testing
   b. Training plans developed by supervisors
   c. Training plans self-developed by employees
   d. Other (Please specify)
10. How often does your agency (or those managing your TEPD program) test employees upon completion of a course to assess their understanding and retention of course materials?
    a. Always

        b.   Sometimes

        c.   Never

11.   Please provide the name and contact information for the person in your agency who WisDOT can contact for more information.

12.   Please provide links to course descriptions, course materials and program pages, if available.

A.2 KYTC Training Forms

TC 14-309 Trainee Classification Form and Notice of Selection of Training Program

<table>
<tr><td colspan="3" align="center">KENTUCKY TRANSPORTATION CABINET
Department of Highways
DIVISION OF CONSTRUCTION PROCUREMENT</td><td>TC 14-309
Rev. 06/2015
Page 1 of 1</td></tr>
<tr><td colspan="4" align="center">TRAINEE CLASSIFICATION FORM AND NOTICE OF SELECTION OF TRAINING PROGRAM</td></tr>
</table>

NAME (contractor)		Prime Contractor ☐ Subcontractor ☐	CONTRACT ID
ADDRESS (street)			FED/STATE PROJECT #
CITY		STATE	ZIP
TRAINEE REPRESENTATIVE		COUNTY	PHONE

☐ Kentucky Association of Highway Contractors
☐ Highway Contractors, Inc. & International Union of Operating Engineers, Local 181
☐ Heavy & Highway Contractors Multi-Employer Bargaining Assoc. & United Steelworkers of America, ALF-CIO, CLC
☐ Iron Worker Employers Assoc. & The International Assoc. of Bridge, Structural, Ornamental, & Reinforcing, Local 70
☐ Ohio Operating Engineers Apprenticeship & Training Fund
☐ Indiana/Kentucky Regional Council of Carpenters
☐ Whitney M. Young , Jr. Job Corps Center
☐ Other

CLASSIFICATION	TRAINEES (#)	SUB'S TRAINEES (#)	TENTATIVE STARTING DATE

CERTIFIED BY (contractor's authorized agent)	REPORT TO:
	Kentucky Transportation Cabinet Div. of Construction Procurement, Compliance Section 200 Mero St, Third Floor Frankfort, Ky 40622 (502) 564-3500

NOTE: This report must be filed for approval prior to commencing construction.

FOR TRANSPORTATION CABINET USE ONLY

☐ Approved	BY (Division of Construction Procurement)	DATE
REMARKS		

TC 14-310 Notice of Selection of Trainee and Trainee Work History

KENTUCKY TRANSPORTATION CABINET
Department of Highways
DIVISION OF CONSTRUCTION PROCUREMENT

TC 14-310
Rev. 07/2016
Page 1 of 1

NOTICE OF SELECTION OF TRAINEE AND TRAINEE WORK HISTORY

NAME (contractor)	COUNTY	FED/STATE PROJECT #	CONTRACT ID

NAME (trainee)		SSN (last four digits)	PHONE

ADDRESS (trainee's *street*)

CITY	STATE	ZIP

CLASSIFICATION	WAGE (per hour)	

ETHNIC GROUP (*Check one.*)
☐ American Indian or Alaskan Native
☐ Asian or Pacific Islander
☐ Black
☐ Hispanic
☐ Other: ____

GENDER (*Check one.*)
☐ Male
☐ Female

REFERRAL SOURCE

WORK HISTORY (*List all work experience related to construction work.*)

NOTE: This report must be filed and approved prior to trainee commencing work.
Return completed form to: Division of Construction Procurement, 3rd Floor West, 200 Mero Street, Frankfort, KY 40622

FOR TRANSPORTATION CABINET USE ONLY

BY (*Division of Construction Procurement*)   DATE

☐ Approved

NOTE: You must submit the "Weekly Training Report" on the TC 14-311 form each week with your weekly payroll attached reporting the hours worked on the project in accordance with the individuals "classification" training.

TC 14-311 Weekly Training Report

<table>
<tr><td colspan="4">KENTUCKY TRANSPORTATION CABINET
Department of Highways
DIVISION OF CONSTRUCTION PROCUREMENT</td><td>TC 14-311
Rev. 07/2016
Page 1 of 1</td></tr>
<tr><td colspan="5">WEEKLY TRAINING REPORT</td></tr>
</table>

NAME (contractor)		COUNTY	FED/STATE PROJECT #	CONTRACT ID
NAME (trainee)			SSN (last four digits)	WAGE (per hour)

CLASSIFICATION

ETHNIC GROUP (*Check one.*)
- [ ] American Indian or Alaskan Native
- [ ] Asian or Pacific Islander
- [ ] Black
- [ ] Hispanic
- [ ] Other: _____

GENDER (*Check one.*)
- [ ] Male
- [ ] Female

DATE (*training started*)

Reporting Hours in Accordance with Individual Training Program

TRAINING CATEGORY	PHASE I	PHASE II	PHASE II	TOTALS
HOURS TRAINED THIS WEEK				
HOURS REQUIRED				
TOTAL HOURS TRAINED				
TRAINING HOURS REMAINING				

REMARKS/WEEK ENDING

PREPARED BY	TITLE	DATE

Return completed form to: Division of Construction Procurement, 3rd Floor West, 200 Mero Street, Frankfort, KY 40622

A.3 General Administration and Personnel Manual

Chapter: Training and Licensing, Subject: Requests for Training

Request for Training

Employees have the right to receive required training from formal classes or from informal coaching sufficient to receive a "meets" rating on the employee evaluation. Training above and beyond this level (elective training) is discretionary on the part of the Transportation Cabinet. Cabinet needs and budgetary constraints affect the Cabinet's capability to support employees wanting to participate in elective training.

Responsibility of Employees

All merit employees have the responsibility to:
  ➢ Assess their strengths and their growth needs to maximize the effectiveness in the performance of their current duties
  ➢ Complete training on the basis of their agreements with their supervisors in respect to their performance development plans
  ➢ Complete workshops deemed mandatory by the Office of Human Resource Management or other Cabinet leadership
  ➢ Comply with all provisions of the policy and procedures stated herein

Note: Under no circumstances should an employee attend any training event without receiving official notification of approval prior to the event.

Responsibilities of Management

Managers and supervisors are directly responsible for ensuring that their employees receive the appropriate training. In addition, each manager or supervisor has the responsibility to:
  ➢ Determine and prioritize the individual and collective training needs of employees under his or her supervision and assist the Division of Professional Development and Organizational Management (PDOM) within the Office of Human Resource Management (OHRM) in meeting those needs
  ➢ Inform PDOM at least 10 working days in advance of upcoming training events that offices or departments are hosting or coordinating
  ➢ Provide employees with training on the objectives, policies, and programs of the work unit so that employees have a clear understanding of their assigned duties
  ➢ Ensure training is provided to employees in accordance with the KYTC Affirmative Action Plan
  ➢ Support in-service, interagency, and external training programs that contribute to effective use of human and fiscal resources
  ➢ Provide informal training, coaching, mentoring, career counseling, and cross-training to employees

Note: Managers and supervisors shall notify PDOM of programmatic details to determine whether training credit is applicable for these informal programs.
  ➢ Approve or deny employee training requests, subject to both employee and organizational needs, as well as to available funding
  ➢ Consider how approval of elective training might impact availability of funding for required training

> ➢ Ensure that employees comply with the provisions of the policy and procedures stated herein

Responsibilities of PDOM

PDOM serves as the administrator of the Cabinet's training program and as the Cabinet liaison with educational institutions, federal and state agencies, and other training resource agencies. Specifically, PDOM has the responsibility to:

> ➢ Oversee the official training records for Cabinet employees
> ➢ Prioritize training requests
> ➢ Deliver training related to Cabinet policies and procedures, office skills, and other job-related issues
> ➢ Make a reasonable effort to locate desired training for requests that PDOM cannot provide
> ➢ Pay registration fees for persons attending required outside training, subject to budgetary constraints and Cabinet priorities
> ➢ Assist managers and supervisors in the development of in-house training programs, including course development and preparation of objectives, outlines, agendas, and evaluations
> ➢ Serve as a resource to the district offices to ensure they:
>   • Facilitate assessments of district training needs
>   • Prioritize those needs
>   • Seek desirable sources to meet those needs
>   • Maintain training records for district personnel

Training Within State Government

For training opportunities within state government, the Cabinet's PDOM staff conducts training workshops to provide communication and understanding of Cabinet policies and procedures and state regulations and statutes. Moreover, the Cabinet has a contract with the Personnel Cabinet's Governmental Services Center (GSC) to provide job-related technical training.

PDOM and GSC provide catalogs, schedules, and procedures on their respective websites:

PDOM = https://business.kytc.ky.gov/apps/kytcu/Pages/Home.aspx
GSC = https://gsc.personnel.ky.gov/Pages/default.aspx

GSC is located in the Academic Services Building on the campus of Kentucky State University (KSU), 400 East Main Street, Frankfort. KSU requires parking permits, which protect visitors from receiving parking tickets and paying towing fees. Training attendees may receive parking
permits via email, along with notification of the scheduled classes. Permits are also available in the classrooms of the scheduled classes.

Training Outside State Government

Before submitting requests for training opportunities outside state government, the requesting office or department shall determine whether or not:

> ➢ PDOM or GSC can provide the desired training

➤ A contract with an external vendor that can provide the training exists Training resources outside state government include, but are not limited to, the following:

Kentucky Transportation Center: The Kentucky Technology Exchange Program at the center is designed to foster and improve information exchange among state and local governments and private industry. Training offered through the center includes workshops on roadway signs and markings, work zone traffic control, managing people, pavement maintenance and rehabilitation, computer familiarization, and others.

National Highway Institute (NHI): NHI offers many training programs available to Cabinet employees. PDOM maintains a catalog of courses and routes announcements of new course offerings to appropriate management personnel.

American Civil Engineering Center (ACEC): ACEC offers courses in MicroStation, InRoads Technology, and other engineering-related topics.

To establish a contract for training services with an external vendor, the requesting office or department shall submit requests for use of a sole- source vendor to PDOM at least 7 weeks prior to the date of the training event. To establish a contract with a vendor that is not sole-source, PDOM requires submission of requests at least 10 weeks prior to the training date.

For the contract, the requesting office or department shall provide the following information about the external training services to PDOM:
➤ Name of the workshop
➤ Estimated length
➤ Estimated cost
➤ Detailed explanation of the subject matter to be provided in the training
➤ Deadline for completion
➤ Vendors who can provide the training (list as many viable sources as possible and provide justification if they are considered to be sole- source vendors)
➤ Preferred location
➤ Number of employees to be trained
➤ Funding source

Required/Elective Training and Travel Costs

For <u>required</u> training, which is job-related training that the Cabinet deems mandatory for continued operations, PDOM shall pay the costs for registration and for any required training materials upon receipt of:
➤ Appropriate training request with sufficient justification and all signature approvals required on the request
➤ Evidence of attendance within 15 days after the training

The requesting office or department shall pay all travel-related costs and allow employees to use regular work time (and accrue compensatory time as necessary) to attend the required training.

For <u>elective</u> training, which is job-related training that employees or their supervisors may deem beneficial for their jobs but that the Cabinet does not require for continued operations, the office or department head, or designee, has discretionary authority to approve use of regular work schedule, as well as accrual of compensatory time, to attend the training and to bear the costs of any or all of the following:
➤ Registration fees for the training course

> ➢ Any materials required for the training course
> ➢ Travel, lodging, food, and other travel-related expenses

If training calls for travel, employees shall complete the applicable travel documentation and follow the approval procedures as outlined in the *Accounts Manual.*

If the external vendor provides continuing education units (CEUs) for Cabinet training, employees shall pay for any additional costs related to receiving CEUs. The Cabinet is not accredited to provide CEUs for training that it conducts.

Compensatory Time

The Cabinet approves compensatory time for required training that extends beyond the employees' assigned work schedules. Supervisors shall adjust employees' work schedules to avoid compensatory time when possible. Approval of compensatory time for elective training is at the discretion of the office or department head, or designee. If employees, while in travel status, take part in activities normally done outside scheduled work hours (for example, playing in a golf tournament), participation in such activities is not considered work time.

Internal Training

For requesting **internal training** (PDOM or GSC):
1. The employee shall complete TC 12-243 form, *Internal Training Request* (**Exhibit 9031**), and submit the document to his or her supervisor.
2. Upon providing signature approval, the supervisor shall submit the training request to his or her office office/department/division head for signature approval, who in turn submits the request to KYTC Internal Training Requests mailbox (in the global listing).
3. A staff member of PDOM or GSC shall enroll the employee and notify him or her by email identifying the course title, location, date, and time of the class. PDOM encourages all employees to read the emails carefully because occasionally the location of a class may change.

External Training

For requesting **external training** from a current Cabinet-contracted vendor (KTC, NHI, ACEC, etc.):
1. The employee shall fully complete Part I and Part II of the TC 12-242 form, *External Training Request* (**Exhibit 9032**), sign in Part III, and submit it to his or her supervisor at least 60 days prior to the start of the training event or in time to meet early registration (whichever comes first).
2. Upon providing signature approval in Part III, the supervisor shall submit the training to his or her office or department head, or designee, for signature approval to authorize the request for the training and the use of office or department funds to cover the costs of the training (if other Cabinet training funding sources are not applicable) and all travel-related costs.
3. Upon providing signature approval in Part III, the office or department head, or designee, shall forward the training request to the Assistant Director, or designee, of PDOM at least 10 days prior to the training event or may scan the request and forward in an email to KYTC External Training Requests mailbox (in the global listing). If applicable, evidence of out-of-state travel approval (a forwarded email

from the Office of Budget and Fiscal Management is sufficient) shall accompany the training request.

Note: For information on out-of-state travel authorization, see the *Accounts Manual*.

4. PDOM shall notify the employee and his or her supervisor of the final decision, with instructions on how to proceed. The office or department responsible for paying the costs of the training shall ensure registration of the approved employees for the training.

Multiple Attendees from Same Office for Same Event

If an internal or external training event has more than 10 prospective attendees of the same training event under the purview of the same supervisor, the supervisor may choose to complete the appropriate training authorization and registration form (TC 12-242 or TC 12-243) with his or her personal information on Page 1 of the form and with a list of the names and employee identification numbers of all the prospective attendees on Page 2.

The supervisor shall secure signature approval from his or her office/department/division head and then submit the form to PDOM. Upon review, PDOM shall notify the supervisor who, in turn, shall notify the prospective attendees, with instructions on how to proceed.

Intra-Office Training

Some Cabinet offices/departments/divisions conduct their own training for their staffs only and bear all costs for the training. Such training is considered intra-office training and does not require the submission of an official request for approval and enrollment from PDOM.

Upon completion of an intra-office training event, the office/department/division head of the organizational unit conducting the training shall follow the procedure pertaining to post-training (see below) to ensure accurate transcripts of training credit in Pathlore or KHRIS.

Note: If the host office decides to invite employees who are not part of its staff to attend the training, the event is no longer intra-office training but an internal or external training event, which requires requesting approval and enrollment by PDOM to attend the applicable training (see above).

Post-Training

Upon completion of any training event:
1. The employee shall submit evidence of completion to his or her supervisor within 10 working days.
2. The supervisor shall forward evidence of completion to the Assistant Director, or designee, of PDOM within 5 working days.
3. PDOM shall retain all records and forms associated with the completion of the training event in the employee's official personnel file.
4. PDOM shall record the training in Pathlore Learning Management System or Kentucky Human Resource Information System (KHRIS).
5. PDOM shall conduct periodic audits to ensure compliance.

Cancellation Procedure

If the employee cannot attend an approved training, he or she shall inform his or her supervisor and PDOM in writing (email preferred, sent to KYTC Internal Training Requests or KYTC External Training Requests mailbox in the global listing) within 2 working days prior to the training date to give the Cabinet time to possibly elicit a substitution.

> For example, if an employee is scheduled to attend a workshop at 8:30 a.m. on Monday but needs to cancel attendance, the employee shall contact the training provider via email by 8:30 a.m. on the preceding Thursday.

Employees shall select "read receipt" for cancellation emails and keep all correspondence regarding the workshop cancellation. Oral communication by telephone or in person is unacceptable. PDOM shall record as a no-show any employee failing to cancel his or her
confirmation or request to attend training. The employee's office or department may be held responsible for the cost of the training if the employee fails to comply with the cancellation procedure.

Chapter: Training and Licensing, Subject: Advanced Leadership Academy

Purpose

The Advanced Leadership Academy (ALA) identifies and develops the employee leadership skills essential to the success of future operations of the Transportation Cabinet.

Scope

The ALA is a two-year program designed to focus on expanding and enhancing leadership skills of Cabinet employees. The program provides experiential training opportunities (both in the classroom and in the field), mentor interactions, job-shadowing opportunities, and group and
individual studies.

The maximum enrollment in the academy each year is 20, and graduation from the academy requires of each participant 90 percent attendance.

Provisions

Submission of application does not guarantee acceptance into the academy. Employees may reapply each year.

Selection into or graduation from the academy does not ensure the participant or graduate of a promotion, a reclassification, or any other preferential treatment. Likewise, denial of, removal from, or lack of participation in the academy does not exclude any participant or graduate from opportunities for promotion or reclassification within the scope of merit laws and regulations.

Attendance in the academy does not relieve participants of their current job duties. Participants shall carry out all normal duties as assigned. Participation in this program shall not cause undue hardship to the Cabinet, any organizational unit within the Cabinet, or coworkers.

Candidate Eligibility

To be eligible for the academy, a candidate shall:
> ➢ Have a 2-year or 4-year degree or a professional license (experience substituted on a year-for-year basis)

- ➢ Hold a position of Grade 15 or higher (exceptions to be reviewed by the ALA Selection Committee)
- ➢ Have worked for Transportation Cabinet for the previous 2 years
- ➢ Submit a complete application packet that includes:
  - • Completed TC 12-208 form, *Advanced Leadership Academy Application* (**Exhibit 9033**), signed and dated by the candidate and his or her first- and second-line supervisors
  - • Completed leadership questionnaire
- ➢ Participate in an interview with the ALA Selection Committee, if deemed necessary

Exceptions: The candidate's second-line supervisor shall submit in writing to the Division of Professional Development and Organizational Management (PDOM) justification for considering the candidate for acceptance into ALA who does not meet the established criteria. Criteria for exceptions that the ALA Selection Committee may consider include the candidate's:
- ➢ Past job experiences or positions held
- ➢ Current job duties
- ➢ Programmatic responsibilities

Role of Selection Committee

The membership of the ALA Selection Committee consists of the:
- ➢ ALA Coordinator, Chairperson
- ➢ Cabinet Secretary or Deputy Secretary, or Designee(s)
- ➢ State Highway Engineer/Selected Department or Office Heads, or Designees
- ➢ Office of Human Resource Management Designee(s)
- ➢ ALA Oversight Committee Representative(s)

The committee selects candidates for the academy on the basis of:
- ➢ Qualifications/Experience
- ➢ Leadership questionnaire
- ➢ Interview results (if applicable)
- ➢ Equitable representation across organizational units of the Transportation Cabinet

Note: Per its Equal Employment Opportunity (EEO) policy, the Cabinet treats employees "impartially and without regard to race, color, religion, national origin, sex, age, disability, sexual orientation, or veteran status in all aspects of . . . selection for training programs and career development within the Cabinet."

Role of ALA Oversight Committee

The ALA Oversight Committee consists of:

- ➢ ALA Coordinator, Chairperson
- ➢ A representative sampling from previous graduating classes

Note: Each graduating class selects a graduate to serve on the ALA Oversight Committee.
The ALA Oversight Committee assists in:
- ➢ Developing curriculum for program
- ➢ Interviewing and selecting candidates
- ➢ Resolving disputes or grievances

> ➢ Determining cause for dismissal of a participant from the academy

Role of PDOM

PDOM shall:
> ➢ Establish and maintain guidelines
> ➢ Coordinate program
> ➢ Develop curriculum, select speakers, and provide practical experiences, with assistance from the Cabinet's major organizational units and the ALA Oversight Committee
> ➢ Establish evaluation process and criteria and oversee participants' progress
> ➢ Record participant progress and compliance to program guidelines and report to the ALA Oversight Committee
> ➢ Serve as a liaison between participants, mentors, and supervisors
> ➢ Recommend ongoing program needs to appropriate committee
> ➢ Develop mentor training and follow-up
> ➢ Provide administrative support (scheduling, maintaining records, purchasing supplies, etc.)

Role of Participant

The ALA participant shall:
> ➢ Coordinate work schedule and ALA schedule with first-line supervisor
> ➢ Keep supervisor informed of academy activities and obligations
> ➢ Adhere to academy attendance and participation requirements
> ➢ Select a mentor and schedule and attend monthly interactions
> ➢ Keep a log of the monthly interactions with mentor

Role of Mentor

The mentor shall:
> ➢ Be in a leadership position on a career path that is similar to or desired by the ALA participant
> ➢ Agree to adhere to the established mentoring guidelines as presented by the ALA participant
> ➢ Meet with the ALA participant according to an agreed-upon schedule that results in 24 hours of interaction before graduation (monthly meetings highly recommended)
> ➢ Provide ALA coordinator written feedback on interaction with the participant

Role of Participant's Supervisor and Staff

The ALA participant's supervisor and staff shall:
> ➢ Coordinate job duties and work flow
> ➢ Respect ALA training time
> ➢ Assess progress and provide feedback to candidate

Role of Sponsor

Each office or department with an ALA participant becomes a sponsor,

which shall assume the costs of:
- ➤ Travel (in-state and out-of-state) associated with Central Office and district office exchanges
- ➤ Accommodations necessary for participation in the ALA

Role of Cabinet

The Cabinet shall:
- ➤ Assure funding for and support the goals of the program
- ➤ Uphold the principles of best-performance practices for the organization and for the participants
- ➤ Formally recognize achievement of program participants

Causes for Dismissal

The Cabinet may dismiss an ALA participant from the program for the following infractions:

- ➤ Excessive absenteeism (absent <u>more than </u>a total of 10 percent of the program's pre-established course time, with no more than 12 hours of absenteeism in either year of enrollment)

Note: The ALA Oversight Committee may review participants with extenuating circumstances regarding absenteeism and recommend remedial actions to compensate for absences <u>up to 10 percent </u>of pre-established course time.

- ➤ Disciplinary action
- ➤ Decision by participant's supervisor
- ➤ Decision by the Executive Director of the Office of Human Resource Management to modify or rescind a participant's involvement upon determination that involvement no longer benefits the Cabinet
- ➤ Violations of **GAP-801** policy
- ➤ Participant's self-dismissal

The participant will receive an official written notification of dismissal, a copy of which will be forwarded to the participant's supervisor.

<u>Chapter: Training and Licensing, Subject: STAR Program</u>

Purpose

The STAR (Supervisor Training & Resources) Program serves as the Transportation Cabinet's primary source of supervisory training for Cabinet personnel. The program offers an in-depth orientation to the responsibilities and expectations of those who oversee and evaluate the job performances of others.

Scope

The STAR Program consists of courses designed specifically to develop and enhance supervisory skills and to increase understanding of Cabinet policies and procedures, thereby ensuring compliance with state and federal statutes and regulations.

Students receive 3.5 hours of training credit for completion of each half- day course and 6 hours of training credit for completion of each full-day course. Certification from the program requires 100 percent attendance. Upon completion of the program, participants receive a certificate of achievement.

Courses include but are not limited to such subjects as:

> Merit Law
> Disciplinary Process
> Selection and Hiring Process
> Performance Matters
> Workplace Conduct
> Time and Attendance Reporting
> Reasonable Suspicion Drug Training
> Antiharassment/Antidiscrimination
> ADA, FMLA, and TMDP

Provisions

The Cabinet requires that all employees newly appointed or promoted to a management role to complete the program's required courses within 12 months of their appointment or promotion.

Participation in the program does not ensure the participant or graduate of a promotion, a reclassification, or any preferential treatment in the selection and hiring process, nor does lack of participation in the program exclude any employee from opportunities for promotion or reclassification within the scope of merit laws and regulations. The program does not relieve participants of their current job duties. Participants shall perform all normal duties as assigned. Participation in this program shall not cause undue hardship to the Cabinet, any organizational unit within the Cabinet, or coworkers.

Candidate Eligibility

The STAR Program is open to all personnel of the Cabinet who are in a management role.

Role of Participant

The STAR participant shall:

> Complete the TC 12-269, *STAR Program Enrollment Request* (**Exhibit 9044**), obtain signature approval from supervisor, and submit request to PDOM
> Coordinate work schedule with his or her supervisor
> Adhere to program attendance and participation requirements

Role of Participant's Supervisor

The STAR participant's supervisor shall:

> Coordinate job duties and work flow
> Accommodate STAR training time

Role of PDOM

The Division of Professional Development and Organizational Management (PDOM) shall:

- ➢ Establish and maintain program guidelines
- ➢ Coordinate program enrollment
- ➢ Develop and deliver program curriculum
- ➢ Establish evaluation process and criteria and oversee participants' progress
- ➢ Record participants' progress and compliance to program guidelines
- ➢ Provide administrative support (scheduling, maintenance of records, purchase of supplies, etc.)

PDOM provides more program details, including course descriptions and a class schedule, online at: https://business.kytc.ky.gov/apps/kytcu/leadership/SiteAssets/STAR.aspx

Role of Cabinet

The Cabinet shall:
- ➢ Support the goals of the program
- ➢ Uphold the principles of best-performance practices for the organization and for the participants
- ➢ Formally recognize achievement of program participants

Chapter: Training and Licensing, Subject: Roadmap Program

Purpose

The Roadmap Program is a series of courses designed to help entry- to mid-level Transportation Cabinet employees develop and expand their administrative skills and maximize their potential as governmental administrators.

Scope

Roadmap consists of 12 required half-day courses. Students receive 3.5 hours of training credit for completion of each required half-day course. Graduation from the program requires 100 percent attendance of the required courses. Opportunities to attend courses are available throughout the year.

Provisions

The Roadmap Program is open to all Cabinet employees who have supervisor approval to attend. However, the number of participants for each enrollment period is limited.

Participation in the program does not ensure the participant or graduate of a promotion, a reclassification, or any preferential treatment in the selection and hiring process, nor does lack of participation in the program exclude any employee from opportunities for promotion or reclassification within the scope of merit laws and regulations.

The program does not relieve participants of their current job duties. Participants shall perform all normal duties as assigned. Participation in this program shall not cause undue hardship to the Cabinet, any organizational unit within the Cabinet, or coworkers.

Candidate Eligibility

All Cabinet employees are eligible to apply to the program.

Role of Participant

The Roadmap participant shall:
- ➢ Complete the TC 12-270, *Roadmap Program Enrollment Request* (**Exhibit 9045**), obtain signature approval from supervisor, and submit request to PDOM
- ➢ Coordinate work schedule with his or her supervisor
- ➢ Adhere to program attendance and participation requirements

Role of Participant's Supervisor

The Roadmap participant's supervisor shall:
- ➢ Coordinate job duties and work flow
- ➢ Accommodate Roadmap training time

Role of PDOM

The Division of Professional Development and Organizational Management (PDOM) shall:
- ➢ Establish and maintain program guidelines
- ➢ Coordinate program enrollment
- ➢ Develop and deliver program curriculum
- ➢ Establish evaluation process and criteria and oversee participants' progress
- ➢ Record participants' progress and compliance to program guidelines
- ➢ Provide administrative support (scheduling, maintenance of records, purchase of supplies, etc.)

PDOM provides more program details, including course descriptions and a class schedule, online at: https://business.kytc.ky.gov/apps/kytcu/kytctng/Pages/Roadmap.aspx

Role of Cabinet

The Cabinet shall:
- ➢ Support the goals of the program
- ➢ Uphold the principles of best-performance practices for the organization and for the participants
- ➢ Formally recognize achievement of program participants

Chapter: Training and Licensing, Subject: Professional Licenses and Certifications

Condition of Employment

The Transportation Cabinet reimburses employees for the costs incurred to acquire and maintain professional licenses or certifications (excluding the common driver's license) if the class specifications of their current positions require them as a condition of their employment. Reimbursement is limited to the costs for the required routine physical examination and the fees for obtaining/renewing the professional license or certification. The Cabinet continues reimbursement as long as the employee remains in a position requiring the license or certification. If an employee moves to a position that no longer requires the license or certification but still would like it to remain current, the employee shall then bear all the costs of renewal.

Authorization

To request authorization for obtaining a professional license or certification and subsequent reimbursement, each employee shall:

1. Obtain written pre-approval via email or memorandum from his or her office or department head verifying that the class specification of the employee's current position requires the license/certification as a condition of employment, detailing all costs for acquiring or renewing it, including, but not limited to, the costs of required:
   - Written/oral examinations
   - Skills tests
   - Physical examinations
2. Fulfill requirements for the license/certification, pay for expenses of securing it, and obtain receipts of payment for reimbursement

Note: For licenses/certifications requiring physical examinations (see **GAP-507** for more details about CDLs), employees shall be reimbursed up to $150.00 for the physicals. However, the Cabinet cannot reimburse for physical examinations paid through an employee's flexible spending account (FSA) or health reimbursement account (HRA) or for additional health- related examinations, treatments, etc., discovered during the routine physical examination.

3. Complete and sign the TC 31-21 form, *Travel Reimbursement Request* **(Exhibit 9035)**
4. Attach original printed receipts or other evidence of payment required for obtaining or renewing the license/certification
5. Attach a copy of official evidence of successful licensure/certification
6. Submit all documentation described above to the Office of Human Resource Management for review and approval

The Office of Human Resource Management shall:

1. Review all documentation for compliance with the class specification and with the requirements for reimbursement stated above
2. Process approved documentation through eMARS
3. Submit the TC 31-21 form to the Division of Accounts to signify approval (or return to the employee upon denial, along with an explanation for denial)

Leave Time

The Cabinet allows employees to attend initial appointments for knowledge examinations, skills tests, physical examinations, etc., required for acquiring or renewing a professional license or certification without having to use personal leave time. However, if an employee needs to repeat any examination due to unsuccessful initial results, he or she shall use personal annual or compensatory leave.

Travel Expenses

The Cabinet bears no responsibility for any travel costs incurred for acquiring or maintaining professional licenses or certifications. The Cabinet prohibits the use of a state vehicle for completing any requirement for obtaining or renewing a license or certification. Travel costs rest solely with employees.

Elective Licensure

The Cabinet is under no obligation to bear employee costs of any professional licensure/certification that is not a condition of employment. Employees shall bear the costs with the use of personal funds and personal time.

For elective professional licensure/certification that an office or department head may deem beneficial for their employees in the conduct of their duties, or in the best interest of the Cabinet, but that the Cabinet does not require as a condition of employment, the office or department head has discretionary authority to approve use of regular work schedule and to bear the costs of any or all of the expenses (excluding travel expenses) for acquiring or renewing the elective professional licensure/certification.

Chapter: Training and Licensing, Subject: Professional Organization Fees

Professional Organizations

The Transportation Cabinet is under no obligation to bear employee costs of membership dues to professional organizations or the expenses for attending meetings of professional organizations. Employees shall bear the costs with the use of personal funds and personal time.

If an office or department head deems membership in a professional organization or attendance of meetings of a professional organization beneficial in the conduct of the duties of the office or department, or in the best interest of Cabinet operations, the office or department head has discretionary authority to:

> ➢ Approve use of regular work schedule, as well as accrual of compensatory time
> ➢ Bear the costs of any or all of the expenses for membership in a professional organization or for attendance of meetings of a professional organization, which may include registration fees, costs of materials, and travel-related costs (travel, lodging, food, etc.)

Travel Expenses

If attendance of a meeting of a professional organization calls for travel,
employees shall pay for all travel expenses. Employees shall secure printed receipts as proof of payment for later reimbursement if office or department head has granted pre-approval for such reimbursement. To request reimbursement for travel expenses, employees shall:

1. Complete TC 31-21 form, *Travel Reimbursement Request* (**Exhibit 9035**)
2. Attach the original printed receipts or other evidence of payment
3. Submit the documentation to the office or department head for final approval

Note: The office or department head shall not approve reimbursement if evidence of payment does not accompany the request.

Chapter: Training and Licensing, Subject: Guiding Potential Supervisors (GPS) Program

Purpose

The Guiding Potential Supervisors (GPS) Program is a series of training courses designed for employees who aspire to become supervisors. The program offers insight into the skills and traits necessary to be an effective manager and leader of personnel.

Scope
The GPS Program consists of 6 half-day classroom courses and 2 online videos designed specifically to develop and enhance leadership and supervisory skills. Students receive 3.5 hours of training credit for completion of each half- day course. Certification from the program requires 100 percent attendance. Upon completion of the program, participants receive a certificate of achievement. Courses include but are not limited to such subjects as:

> ➢ Dealing with Difficult Behavior
> ➢ Effective Communication

> ➢ Employee Engagement
> ➢ Forward Thinking
> ➢ Supervisors' Secrets to Success
> ➢ First 90 Days

Provisions

The GPS Program is open to all Cabinet employees who have supervisor approval to attend. However, the number of participants for each enrollment period is limited.

Participation in the program does not ensure the participant or graduate of a promotion, a reclassification, or any preferential treatment in the selection and hiring process, nor does lack of participation in the program exclude any employee from opportunities for promotion or reclassification within the scope of merit laws and regulations.

The program does not relieve participants of their current job duties. Participants shall perform all normal duties as assigned. Participation in this program shall not cause undue hardship to the Cabinet, any organizational unit within the Cabinet, or coworkers.

Candidate Eligibility

Candidates shall be nominated for participation in the program by their supervisors. There is no other requirement for eligibility.

Role of Participant

The GPS participant shall:
> ➢ Complete the TC 12-275, *GPS Program Enrollment Request* (**Exhibit 9046**), obtain signature approval from supervisor, and submit request to PDOM
> ➢ Coordinate work schedule with his or her supervisor
> ➢ Adhere to program attendance and participation requirements

Role of Participant's Supervisor

The GPS participant's supervisor shall:
> ➢ Coordinate job duties and work flow
> ➢ Accommodate GPS training time

Role of PDOM

The Division of Professional Development and Organizational Management (PDOM) shall:
> ➢ Establish and maintain guidelines
> ➢ Coordinate program enrollment
> ➢ Develop and deliver program curriculum
> ➢ Establish evaluation process and criteria and oversee participants' progress
> ➢ Record participants' progress and compliance to program guidelines
> ➢ Provide administrative support (scheduling, maintenance of records, purchase of supplies, etc.)

PDOM provides more program details, including course descriptions and a class schedule, online at: https://business.kytc.ky.gov/apps/kytcu/kytctng/Pages/GPS.aspx

Role of Cabinet

The Cabinet shall:

➢ Support the goals of the program
➢ Uphold the principles of best-performance practices for the organization and for the participants
➢ Formally recognize achievement of program participants

A.4 Construction Management Academy Course Outline[16]

DAY 1: The first day is of course an introduction to the academy with an overview/history of the Division. The regulations and KRS which constitutes the authority that the Division of Construction operates under are explained along with various successes (such as the Natcher Bridge) and hardships (Kennedy Bridge Painting) as examples. Emphasis will also be on the Division of Contract Procurement and the letting process followed by the various resources available to the project engineer.

DAY 2: This date would cover the nuts and bolts of the construction crew itself and how they work together from day to day. Then the Contract, which is the direct and prime responsibility of the Division of Construction, is fully explained it along with how changes are made.

DAY 3: Explanations would be given concerning the roles of various functions, such as the precon meeting, that insure Contract conformance and documentation. Other project start-up functions such as dealing with the public and material sampling are also mentioned.

DAY 4: Inspection of the contract can make or break the final product thus this date will go over the inspector's responsibility and determine how the project engineer can direct and influence good work. His responsibility concerning inspection is explained along with how C.O. Construction reviews projects for compliance.

DAY 5: The biggest headaches for any project engineer is when good plans go bad. Discussion this date covers the various conflicts that arise during the work and methods to mitigate them. Students are left with at least some ideas of how to deal with issues, but also how every utility or property owner is different. Also a considerable discussion of Claims and their use by the contractor. Sitemanager is the overriding program used by Construction to document the project, but this date will not focus on program training. The discussions this date will be into the use of the program and more importantly the correct use of it such as an acceptable DWR and the review of the engineer. Then other odd topics will be discussed.

DAY 6: Many project engineers are very familiar with technical issues, but this day's discussions cover a side many never want to see – legal issues. Many of the legal issues and how the Cabinet deals with the Contract when lawyers are involved are discussed. It is suggested to have mock depositions/hearings. Since this is the last day of the Academy, the close out of the class will be accomplished by delving deeply into the closeout of the project. All the necessary headaches to call a project complete the shepherd it to payoff and the archives is discusses. Essentially when does the project engineer's responsibility ends?

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http://transportation.ky.gov/Construction/Documents/Construction%20Management%20Academy%20Course%20Description.docx

A.5 Project Manager's Boot Camp Objectives and Overview

Training Objectives

1. Describe how the Department of Highways supports the Cabinet's mission by delivering the *Highway Plan*.

2. Explain the goals of Project Manager's Boot Camp. Its success will be measured in terms of the improvements made to the project delivery process and their sustainability.

3. Project Managers must understand the critical role *they* play in helping the Department of Highways successfully deliver projects, which in turn supports the Cabinet's efforts to fulfill its mission.

4. Project Managers must understand they are responsible for the *whole* project and that meeting their responsibilities is essential for delivering successful projects.

5. Project Managers must have a deep knowledge of the whole project's needs and use this to build their teams and manage the critical path schedule within the project development process.

Training Overview

1. Explain the roles and responsibilities of different personnel in the delivery of the Highway Plan.
   - The State Highway Engineer's Office assigns a project either to the District Project Development Branch Manager through the Chief District Engineer or to an assigned project/program manager within the Department of Highways.
   - After receiving their assignment, the Project Manager assumes responsibility for the *whole* project.
   - For projects assigned to the District Project Development Branch Managers, Location Engineers are partners in the decision making. Project Development Branch Managers and Program Managers may designate Project Managers, who will report to them.

2. Emphasize that legislative processes are responsible for defining the scope, schedule, and budget of each project in the *Highway Plan*. It is a Project Manager's responsibility to deliver the project accordingly.
   - Project Managers must understand that their assigned projects are a part of the *Highway Plan*, and that any changes to a project's scope, schedule, or budget influences the Department's Highway Plan delivery success rate as well as the Cabinet's ability to fulfill its mission.

3. Improve Project Managers' understanding of the process areas which can influence the critical path schedule. To meet the project schedules established by the legislature, Project Managers must develop a comprehensive understanding of the critical path and the key processes and areas which influence it. Some considerations include:
   - Geotechnical needs that help define the right-of-way
   - Completing Section 7 consultations in order to apply for a permit
   - Establishing sign/sue dates to meet right-of-way clearance dates, which lets utility companies relocate
   - Locating abutments or signal poles, which may influence utility relocations

When a project does not remain on schedule, project delivery success rate goes down, which hampers the Cabinet's efforts to fulfill its mission.

4. Emphasize that Project Managers must assemble their teams during the early phases of project development based on a holistic understanding of how all elements of the project fit together. Project needs may include:
   - Engineering services (e.g., roadway, structures, traffic, geotechnical, utilities)
   - Environmental services (e.g., commitments deferred, BA, archeology, permitting)
   - Right-of-way (e.g., appraisals, acquisition, relocation, property management)
   - Utility relocation (e.g., agreement preparation, oversight, inspection)

   A project manager must build a team which through collaboration can accomplish the entire project. They cannot assume that everything will automatically and neatly fall into place.

5. Emphasize that Project Managers must be knowledgeable about the resources available to them as well as the strategies they can use to build their teams.
   - Critical resources include internal production, statewide contracts, and professional service advertisements

6. Underscore that Project Managers are responsible for building teams that will perform in an exemplary manner, and in doing so help increase the project delivery success rate.

7. Explain that it is critically important for the Department of Highways to maintain core competencies in each subject matter area. Project Managers can tap into this knowledge to make better transportation-related decisions.

8. Encourage internal production where practical, however, this should not come at the expense of a project's scope, schedule, budget, or quality.

9. Emphasize that once a team is assembled, Project Managers must remain firmly in charge and be willing to delegate responsibilities while closely supervising each team member to ensure tasks are accomplished on time.
   - It is the Project Manager's responsibility to ensure that all work is completed and all project components fit together.
   - Project Managers are assigned to deliver the project, not the bureaucracy.
   - Delivering the bureaucracy instead of the project may negatively influence a project's scope, schedule, budget, or quality, and have a detrimental impact on success rates.