Evaluating the Safety Cultures of Kentucky Transportation Cabinet Maintenance Crews

Report Number: KTC-21-25/SPR20-582-1F

DOI: https://doi.org/10.13023/ktc.rr.2021.25

Kentucky Transportation Center
College of Engineering, University of Kentucky, Lexington, Kentucky

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Research Report
KTC-21-25/SPR20-582-1F

Evaluating the Safety Cultures of Kentucky Transportation Cabinet Maintenance Crews

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August 2021

1. Report No. KTC-21-25/SPR20-582-1F	**2. Government Accession No.**	**3. Recipient's Catalog No**
4. Title and Subtitle Evaluating the Safety Cultures of KYTC Maintenance Crews		**5. Report Date** August 2021 **6. Performing Organization Code**
7. Author(s): Ashtarout Ammar, Zamaan Al-Shabbani, Hala Nassereddine, Chris Van Dyke, Gabriel B. Dadi		**8. Performing Organization Report No.** KTC-21-25/SPR20-582-1F
9. Performing Organization Name and Address Kentucky Transportation Center College of Engineering University of Kentucky Lexington, KY 40506-0281		**10. Work Unit No. (TRAIS)** **11. Contract or Grant No.** SPR 20-582
12. Sponsoring Agency Name and Address Kentucky Transportation Cabinet State Office Building Frankfort, KY 40622		**13. Type of Report and Period Covered** **14. Sponsoring Agency Code**
15. Supplementary Notes Prepared in cooperation with the Kentucky Transportation Cabinet		

16. Abstract

Highway work zones can be dangerous and unpredictable. Between 2003 and 2017, over 1,800 workers died on road construction sites. Eliminating injuries and deaths requires state transportation agencies to adopt robust safety cultures as there is a clear relationship between these cultures and worker behaviors. The Kentucky Transportation Cabinet (KYTC) is committed to improving safety performance by nurturing a positive safety climate among highway maintenance crews. To understand the safety cultures of KYTC maintenance crews, researchers administered a survey based on the Safety Climate Assessment Tool (S-CAT) developed by the Center for Construction Research and Training (CPWR). This is the first tool developed for the construction industry. The survey was used to quantified the existing safety climate and evaluate how effective safety programs and controls are at reducing workplace hazards. Survey respondents answered questions on 37 indicators across eight safety climate categories: employee risk perception, management commitment, aligning and integrating safety as a value, ensuring accountability at all levels, improving supervisory leadership, empowering and involving employees, improving communication, and safety training. For each indicator respondents assigned a rating on a five-point Likert scale — Inattentive (1), Reactive (2), Compliant (3), Proactive (4), Exemplary (5). Analysis of survey responses at the statewide and district levels found that KYTC's safety culture can be characterized as between compliant and proactive. Focus groups with maintenance superintendents generated recommendations to improve safety cultures and install multiple layers of preventive measures to further reduce the number and threat of jobsite hazards.

17. Key Words safety climate, highway maintenance, S-CAT, workplace hazards		**18. Distribution Statement** Unlimited with approval of the Kentucky Transportation Cabinet	
19. Security Classification (report) Unclassified	**20. Security Classification (this page)** Unclassified	**21. No. of Pages** 70	**19. Security Classification (report)**

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Executive Summary

Jobsites in the highway construction industry are hazardous and unpredictable. Over 1,800 workers died on road construction sites between 2003 and 2017, with thousands of other workers suffering injuries. To eliminate injuries and deaths, it is important for state departments of transportation and other agencies to embrace robust safety cultures. But what constitutes a good safety culture is often unclear — and even more difficult to measure. Highway agencies have traditionally used metrics like the Occupational Safety and Health Administration's (OSHA) Total Recordable Incident Rate (TRIR) to track safety performance. However, metrics such as these are reactive and do not necessarily generate information agencies can use to proactively improve safety cultures. Being proactive is critical because of the reciprocal relationship between safety culture and worker behavior. A sound safety culture fosters safe, consistent, and predictable worker behaviors; these behaviors in turn help to reinforce the safety culture. Conversely, a weak safety culture promotes inconsistent and ad hoc behaviors. Wanting to improve its safety culture, the Kentucky Transportation Cabinet (KYTC) commissioned this study to document the safety cultures of its maintenance crews.

To understand the safety cultures of KYTC maintenance crews, Kentucky Transportation Center (KTC) researchers administered a survey based on the Safety Climate Assessment Tool (S-CAT). This safety assessment tool is the first to be developed explicitly for the construction industry. The survey asked respondents to rate the Cabinet's safety performance on 37 indicators across eight safety climate categories: *Employee Risk Perception*, *Demonstrating Management Commitment*, *Aligning and Integrating Safety as a Value*, *Ensuring Accountability at All Levels*, *Improving Supervisory Leadership*, *Empowering and Involving Employees*, *Improving Communication*, and *Training at All Levels*. For each indicator respondents assigned a rating on a five-point Likert scale — Inattentive (1), Reactive (2), Compliant (3), Proactive (4), Exemplary (5). The scale for Employee Risk Perception was modified slightly and measured perceptions in terms of level of satisfaction. The survey was distributed via Qualtrics to all KYTC maintenance Superintendents I and Superintendents II. Prospective respondents were told that survey responses would remain anonymous. The survey generated 143 responses from staff across the Cabinet's 12 districts.

Table E1 provides mean scores at the state level for seven climate safety categories (because *Employee Risk Perception* adopted a different measurement scale, the average score does not accurately convey performance). The range in scores is narrow (3.47 – 4.21) and it highlights that respondents view KYTC's safety performance as compliant to proactive across all categories. *Aligning and Integrating Safety* and *Improving Supervisory Leadership* are the categories in which the Cabinet garners the highest scores. District-level averages for all categories were calculated as well. The scoring range shows good agreement with statewide data as mean scores fall between 3.47 and 4.22. Again, this indicates that district safety performance typically rates between compliant and proactive.

Table E1 Statewide Mean Scores for Climate Safety Categories

Category	Mean Category Score
Aligning and Integrating Safety	4.21
Improving Supervisory Leadership	4.02
Improving Communication	3.81
Demonstrating Management Commitment	3.69
Empowering and Involving Employees	3.57
Training at All Levels	3.53
Accountability at All Levels	3.47

After survey data were analyzed, KTC researchers convened focus groups with maintenance superintendents in two districts for in-depth evaluations of the Cabinet's safety culture. Focus group participants discussed eight elements of organizational life: Safety Controls, Routines, Rituals, Stories, Symbols, Power, Safety Structures, and Underlying Assumptions. Participants observed that KYTC will benefit from adopting formal incentives to recognize crews for positive safety performances. Routines — in the form of weekly safety meetings, job hazard analyses, and toolbox talks — are thoroughly integrated into Cabinet practices, while rituals are less common and generally reserved for trainings attended by new staff during their first year of employment. Participants agreed that stories are a powerful

way to communicate with personnel about potential jobsite hazards and preventive actions that can be taken to reduce the likelihood of injuries. However, communication with drivers approaching work zones could be improved. Importantly, KYTC staff feel empowered to assess jobsites and, if conditions are deemed unsafe, discontinue work until the hazard passes or can be mitigated. Indeed, one of the key underlying assumptions that guides decision making is that it is imperative to operate safely so all workers return home at the end of the day. Moving forward, KYTC can continue to build a strong safety culture by enacting multiple precautionary measures (or multiple layers of defense) to prevent accidents from happening.

Chapter 1 Introduction and Scope of Work

1.1 Introduction

Working environments in the construction industry are inherently volatile. In 2019, 1,061 fatal injuries were reported on construction sites, an increase of 5% over 2018 and the highest tally since 2007 (Slowey 2020). Many strategies have been adopted to lower fatal injury rates and improve occupational safety and health. These include prevention through design, improved engineering controls, new regulations, and enhanced personal protective equipment (PPE) (Probst et al. 2019). Safety in the road construction sector largely mirrors industrywide trends. Work zones are extremely hazardous for drivers and the workers who build, repair, and maintain highways. Between 2003 and 2017, 1,844 workers died on road construction sites — an average of 123 deaths per year (NIOSH 2019). However, the amount of research focused on the safety and health of highway maintenance workers has been limited.

Traditionally, safety performance has been tracked using metrics such as the Occupational Safety and Health Administration (OSHA) Total Recordable Incident Rate (TRIR), which is calculated using the following equation:

$$\frac{\text{Total Numbe of Recordable Cases} \times 200{,}000}{\text{Total Hours Worked By Employees During the Year Covered}}$$

Other metrics include injuries that require more than basic first aid, days absent following an injury, and days of restricted work following an injury. Longitudinal analysis of these measures is used to detect trends in safety performance. These measures can also provide good insights into the history of safety performance, however, they are reactive in that they reflect failures of safety systems rather than proactively flagging indicators of failures before they occur. This has prompted researchers to investigate new proactive safety measures (Probst et al. 2019). But currently state departments of transportation (DOTs) largely continue to rely on traditional safety performance measures.

Most researchers agree that safety climate is a leading indicator of safety performance and that it can positively influence a worker's safety knowledge, motivation, perceptions, and attitudes (Clarke 2010; Zohar 2010). To develop predictive relationships between safety climate and safety performance, researchers have investigated how the two are correlated. For example, researchers have found a negative correlation between safety climate and injury rates (Lingard et al. 2012; Chen et al. 2013; McCabe et al. 2017). Several meta-analyses of safety climate showed that safety climate can predict workplace incidents as well as under-reported safety incidents, near misses, safety knowledge, safety motivation, safety compliance, and safety-related organizational behaviors (Clarke 2010; Nahrgang et al. 2011; Jiang et al. 2019). Given that safety climate is related to worker safety behaviors and linked to safety performance, organizations must routinely measure and assess safety performance to continually improve the safety climate and establish a positive safety culture.

On jobsites DOT highway maintenance employees are exposed to hazards and extreme working conditions (e.g., working adjacent to high-speed traffic, exposure to heavy equipment that transports large quantities of materials (Al-Shabbani et al., 2018). Agencies use predictive safety measures to improve and track safety performance, assess their safety climates, and enhance occupational safety and health. Wanting to continue strengthening its safety climate and culture, the Kentucky Transportation Cabinet (KYTC) asked Kentucky Transportation Center (KTC) researchers to investigate several safety approaches (Al-Shabbani et al. 2018, Al-Shabbani et al. 2021) and evaluate and measure the safety climate among KYTC highway maintenance crews. Our team used modified version of the Safety Climate Assessment Tool (S-CAT) tool to carry out this evaluation.

1.2 Problem Statement

Safety culture refers to how employees integrate safety into occupational practices, especially when nobody is watching. At an organizational level, it is defined by shared values and beliefs and — when coupled with safety control systems — establishes behavioral norms. Regardless of the number and effectiveness of an organization's engineering and administrative safety controls, behavior and attitudes toward safety depend on safety culture. A safety climate is a measure of the perceived value placed on safety in an organization. It is a fluid snapshot of safety that can change relatively quickly. Because a culture embodies an organization's shared values it takes much longer

to change. Investing in safety climate and culture has recently become a focus of researchers and practitioners in the construction industry due to the increasing evidence that improving safety performance saves money. KYTC has focused of late on improving safety performance, especially among highway maintenance employees. To appraise how effective this effort has been, a safety culture assessment was needed.

1.3 Objectives

This study's primary objective was to evaluate and map KYTC's existing safety culture among maintenance crews and propose guidance to improve the safety culture. Analyses and ideas presented in this report will help KYTC understand the current status of different safety climate indicators and support decision making related to the agency's safety culture. Secondary project objectives included:

1. Identifying leading safety factors and indicators that apply to KYTC and can help measure the safety climate.
2. Measuring and assessing the current status of the safety climate of KYTC maintenance crews.
3. Conducting a cultural assessment to assess employee perceptions of the organizational culture.
4. Preparing recommendations to achieve continuous improvement in safety climate and overall safety culture.

Chapter 2 Literature Review

When researchers first turned their attention to workplace safety, they generally focused on individual safety performance indicators, work injuries, and accidents. As the 1990s came to a close safety researchers began paying attention to how a number of factors influence safety, including teams, leadership, and organizational roles (Hofmann et al., 2017). New safety models emerged and the investigation of applied psychology by federal agencies, such as OSHA and the National Institute for Occupational Safety and Health (NIOSH), assumed greater stature (Colligan and Cohen 2004). New work on safety climates represented a milestone because it confirmed the importance of a broader organizational safety concept (Hofmann et al., 2017). Among researchers, there is a consensus on the value of safety culture and safety climate in improving safety and preventing injuries (e.g., Lingard et al. 2013; Hofmann et al. 2017).

Because working environments in the construction industry are unpredictable, it is critical to examine what factors support a positive safety climate and an improved overall safety culture. But defining and measuring safety climate and safety culture remains contested (Zohar and Hofman 2014). Zohar and Hofman (2014) identified 54 different definitions of safety culture in the research literature. For the construction industry, safety culture and climate have not been well defined, with work often ignoring jobsite characteristics (Al-Bayati et al., 2019). The following sections discuss key definitions of safety climate and safety culture, focusing on those most salient to the construction industry.

2.1 Safety Climate and Safety Culture Definition

Zohar (1980) was the first to define safety climate and develop and test the validity of a measurement scale. He described safety climate as "shared employee perceptions about the relative importance of safe conduct in their occupational behavior." Perceptions of safety climate are reinforced when employees share their experiences and opinions related to the level at which management cares and invests in their safety and health (Hofmann et al. 2017). Several agencies have also proposed definitions of safety climate, including the National Construction Agenda (NCA) and the Center for Construction Research and Training (CPWR). NCA defines safety climate as shared employee perceptions and attitudes about safety at a workplace (NCA 2018). CPWR sees it as a leading indicator that reflects the extent to which a safety program is integrated into an organization to ensure safe practices. Safety climate represents the shared perceptions and the degree to which safety is emphasized relative to competing organizational priorities (Gillen et al., 2014). The NCA definition highlights norms, values, and commitments from an organization, while CPWR focuses on an organization's implicit safety perceptions. OSHA and the US Nuclear Regulatory Commission (NRC) have not defined safety climate (Al-Bayati et al. 2019).

Besides the ambiguity in definitions of safety climate, current approaches to measurement do not clearly distinguish between safety climate and safety culture (Al-Bayati et al. 2019). Some researchers contend that safety climate is a subcomponent of safety culture (Cooper 2000). Others regard safety climate as a snapshot of safety culture for a specific period (Cooper and Phillips 2004). A few researchers have argued that safety culture is an antecedent of safety culture (Martínez-Córcoles et al. 2011).

The concept of safety culture first surfaced in a 1986 report investigating the Chernobyl disaster — a poor safety culture was blamed for the catastrophe (Huang et al. 2010). OSHA defines safety culture as the shared beliefs, practices, and attitudes within an organization. Culture is the atmosphere fostered by these beliefs, attitudes, and perceptions, which shapes behavior (OSHA 2000). The NCA views safety culture as the underlying organizational principles, norms, commitments, and values related to how safety and health are operationalized and the result of the relative importance accorded to safety and health relative to other workplace goals (NCA 2018). CPWR defines safety culture as unspoken safety-related beliefs interacting with an organization's systems, practices, people, and leadership to set the foundation for how things are done in an organization. In general, safety culture is a subset of and directly influenced by organizational culture (Gillen et al. 2014). NRC interprets safety culture as the core values and behaviors resulting from a collective commitment of leaders and individuals to safety over competing goals to protect people and the environment (NRC 2018). In general, researchers propose that a nonformal relationship

exists between safety culture and safety climate, where safety culture affects safety climate levels (Al-Bayati et al. 2019).

2.2 Safety Climate and Safety Culture in the Construction Industry

The construction industry is distinctive because it yokes together businesses of varying sizes and disciplines. This results in a broad spectrum of relationships between workers and employers and a range of long-term and short-term employment arrangements with a single employer or multiple employers that last for days, months, or years (NCA 2018). However, this variability may harm the construction industry's safety climate (Schwatka et al. 2016).

In a comprehensive literature review of safety climates in the construction industry, Schwatka et al. (2016) identified 56 research publications authored since 2008. Most researchers evaluating safety climates adopted surveys developed for other sectors, with the most common options being the United Kingdom Health and Safety Executive (HSE) safety climate questionnaire and the Climate Survey Tool (CST) (HSE 1997). Others have adopted a safety climate survey from Zohar (2000) developed for manufacturing companies, a scale proposed by Nael et al. (2000), and the NIOSH tool for health care workers (Dejoy et al. 1995). Geller's (1990) general safety climate assessment tool and Burt et al.'s (1998) scale have been tested with workers from a variety of occupations.

Jiang et al. (2019) found that using industry-specific measures of safety climate generates better predictions of employee safety behaviors and attitudes than generalized measurement tools. Few researchers have developed industry-specific surveys. Some examples include Dedobbeleer and Béland (1991), who validated their study in the US construction industry; Mohamed (2002), who developed and tested a tool in the Australian construction industry; and Kines et al. (2011), who designed and tested a tool in the construction industry across five Nordic countries. However, the survey tools used most often fail to capture the construction industry's true nature, where management usually oversees multiple projects at various construction sites. In such cases, management indirectly affects safety climate levels while frontline supervisors and workers play a crucial role in determining the safety practices in the field (Al-Bayati et al., 2019).

2.3 Indicative factors of Safety Climate and Safety Culture in the Construction Industry Context

Several researchers have tried to define what makes for a good survey of safety culture and safety climate in the construction environment (e.g., Esmaeili and Hallowell 2012; Alruqi et al. 2018; Al-Bayati et al. 2019).

Alruqi et al. (2018) reviewed surveys that measure construction safety climate dimensions, identified critical dimensions of safety climate, generated a consistent definition of each safety climate dimension, and assessed to what extent safety climate dimensions can predict construction safety performance. They described safety climate dimensions that are common across all studies:

1) Management commitment to safety dictates how effective top management is at ensuring safety is an organizational priority.
2) Safety responses among supervisors illustrate how first-line leaders implement organizational safety procedures during daily activities.
3) Safety rules and procedures estimate to what extent workers believe and follow their organization's safety rules and procedures to prevent accidents and injuries.
4) Communication refers to how top management is communicating with employees regarding occupational safety and health and whether they are receptive to worker concerns about safety and health.
5) Worker involvement describes the degree to which upper management encourages worker participation in the organization's safety establishment, (e.g. creating safety policies).
6) Training refers to how well workers are educated and instructed about occupational safety and health.
7) Risk-taking behavior is the amount of risk that workers might take to get the job done even if doing so could violate safety rules and regulations.
8) Workload pressure is the degree to which workers under pressure could push to do the work unsafely.

Al-Bayati et al. (2019) reviewed work on identified 12 key safety climate indicators that upper management, safety personnel, frontline supervisors, and workers are responsible for implementing and which are highly important injury prevention techniques. They include:

- Emergency response planning
- Frequent worksite inspection
- Safety and health orientation and training
- JHA
- Upper management support
- Employee involvement and evaluation
- Subcontractor selection and management
- Safety manager onsite
- Substance abuse programs
- Safety and health committees
- Project-specific training and meetings
- Recordkeeping and accident analysis

Researchers factored into the assessment the issue of upper management and safety personnel challenges related to managing projects in multiple locations by generating rules and allocating resources.

CPWR developed the Safety Climate Assessment Tool (S-CAT) to help management and safety professionals collect data on leading indicators of safety climate so that good practices can be reinforced, boosting jobsite safety climate and safety outcomes for the construction industry (CPWR 2018). It is the first rubric-based safety climate measure designed for the construction industry. Any construction organization can adapt the S-CAT to assess safety climate. Companies can receive feedback on their organization's score for each safety climate factor and how their scores compare to industry benchmark scores in the S-CAT database. Moreover, companies can receive guidance and information on how to improve each area. Scores can be used to track and assess safety-related interferences implemented by an organization over time since they are adopting a uniform way to evaluate the safety climate (Probst et al., 2019). Probst et al. (2019) validated the S-CAT by evaluating how well S-CAT scores correlate with organizational safety outcomes. They tested the hypothesis that S-CAT scores are negatively associated with TRIRs by comparing average safety climate scores to TRIRs. They found a significant negative correlation between the organizational–level safety climate and the corresponding TRIR. The researchers suggested that the S-CAT be tested against other safety measures (e.g., safety management interventions) to evaluate how effectively they improve safety outcomes.

Chapter 3 Methodology

3.1 S-CAT Survey

We chose the S-CAT to survey KYTC maintenance personnel on the agency's safety climate. It is an ideal option because construction organizations can adapt the tool to their particular needs. Survey respondents assessed KYTC's safety climate based on 37 indicators across eight categories identified by construction industry subject-matter experts. Each category contained between three and seven indicators. For each indicator, respondents provided a rating using a five-point Likert scale (Probst et al. 2019). We tailored the S-CAT to the Cabinet's unique organizational structure. Because the category of *Encouraging Owner/Client Involvement* is not relevant to KYTC, we replaced it with another category — *Employee Risk Perception*. Several researchers have acknowledged that employee risk perception is an essential indicator of an organization's safety climate (Zohar 1980; Chen et al. 2013; Schwatka et al. 2016). Table 3.1 lists safety climate categories, number of indicators, and the scale respondents used to rate KYTC on each indicator. Figure 3.1 illustrates the S-CAT in its original form. Appendix A includes the full survey, which was distributed via Qualtrics to all KYTC maintenance Superintendents I and Superintendents II. Respondents were informed at the outset that all of their answers would be anonymous. We received 143 responses from the Cabinet's 12 districts. We calculated summary statistics at the district and statewide levels to identify trends and pinpoint safety climate categories and indicators that could warrant greater attention from KYTC.

Table 3.1 KYTC S-CAT Safety Climate Categories and Indicators

Safety Climate Categories	Number of Indicators	Scale
1. Employee Risk Perception	7	5 level Likert Scale {Strongly disagree, Disagree, Agree, Neutral, strongly agree}
2. Demonstrating Management Commitment	6	5 level Rubric-Based Scale {Inattentive, Reactive, Compliant, Proactive, Exemplary}
3. Aligning & Integrating Safety as a Value	6	5 level Rubric-Based Scale {Inattentive, Reactive, Compliant, Proactive, Exemplary}
4. Ensuring Accountability at All Levels	4	5 level Rubric-Based Scale {Inattentive, Reactive, Compliant, Proactive, Exemplary}
5. Improving Supervisory Leadership	3	5 level Rubric-Based Scale {Inattentive, Reactive, Compliant, Proactive, Exemplary}
6. Empowering &Involving employees	3	5 level Rubric-Based Scale {Inattentive, Reactive, Compliant, Proactive, Exemplary}
7. Improving communication	3	5 level Rubric-Based Scale {Inattentive, Reactive, Compliant, Proactive, Exemplary}
8. Training at All Levels	6	5 level Rubric-Based Scale {Inattentive, Reactive, Compliant, Proactive, Exemplary}

3.2 District Focus Groups

After evaluating S-CAT responses, we collected additional data on employee perceptions of safety climate through focus groups in two Cabinet districts. Material drawn from the Cultural Web Assessment Toolkit provided the basis for group discussions. The toolkit was developed by Johnson (1992) to assess employee perceptions of organizational culture, but it can also be used to evaluate an organization's safety culture for purely diagnostic purposes or inform the development of an action plan to strategically improve an organization's safety culture. We adopted a semi-structured format for focus groups, with participants having the opportunity to speak extemporaneously on a variety of issues. Chapter 5 lists questions asked of the focus groups and summarizes key findings.

Safety Climate Assessment Tool (S-CAT)

Demonstrating Management Commitment

S-CAT #1

Management demonstrates commitment by engaging in the following activities:

1. Being present and visible on the jobsite.
2. Always using safety behaviors and safety practices on the jobsite.
3. Identifying and reducing job hazards.
4. Having processes for corrective action following a safety incident.
5. Compassionately reacting to employee injuries.
6. Reviewing and analyzing safety policies, procedures and trends.

For each item below, carefully read the descriptions in each box going from inattentive all the way to exemplary. Circle the one that best describes management's commitment to that activity.

	INATTENTIVE →	REACTIVE →	COMPLIANT →	PROACTIVE →	EXEMPLARY	
1. In my company, management…						
	Rarely comes to the actual jobsite.	Only comes to the jobsite after an incident has occurred.	Only comes to the jobsite when required, or makes infrequent visits.	Makes regular visits to the jobsite. Interacts mostly with management.	Frequently visits the jobsite; seeks out interactions with employees.	NA
2. When management is present on the jobsite, they…						
	Typically act as poor safety role models by breaking regulatory and organizational safety policies and procedures.	Are only concerned with adhering to OSHA regulations and organizational policies and procedures after an employee injury has occurred.	Strictly conform to required OSHA regulations and organizational safety policies and procedures, never more or less.	Demonstrate safety behaviors above and beyond what is required.	Consistently model safety behaviors above and beyond what is required and recognize employees who do the same.	NA
3. In my company, management…						
	Does not participate in safety audits.	Only participates in safety audits in response to an employee injury or adverse safety event.	Participates in safety audits only when required.	Initiates and actively participates in internal safety audits.	Actively participates in internal safety audits and uses the information for management performance evaluation.	NA
4. In my company, management…						
	Does not want to know about any safety incident, unless it's a fatality. There are no investigations into incidents or close calls.	Resists taking steps to correct or prevent future incidents. Investigations into incidents or close calls result in punitive action toward employees.	Investigates incidents but not in a "blame-free" manner. Initiates corrective actions that comply with owner or regulatory directives.	Includes employees in both a root cause analysis and helping to come up with solutions to prevent future incidents and foster continued improvements.	Relies on a formalized process for conducting a detailed root cause analysis that reviews both processes and behaviors. Findings are discussed with everyone and preventive solutions are implemented.	NA
5. When employees are injured, management…						
	Immediately blames and punishes the employee (e.g., fired).	Typically blames employees for injuries, threatening them with suspension or even termination.	Only holds employees accountable for injuries according to organizational guidelines.	Demonstrates appropriate organizational support for the employees involved in injuries.	Proactively provides support to injured employees to facilitate return to work. Seeks to learn from employee injuries.	NA
6. In my company…						
	There is no formal safety management system; safety trends are not analyzed.	The safety management system is reviewed and safety trends are only analyzed in response to employee injury or an adverse safety event.	The safety management system is reviewed and safety trends are analyzed from time to time.	The safety management system is reviewed and safety trends are analyzed annually to ensure effectiveness and relevance.	The safety management system is reviewed and safety trends are analyzed bi-annually to ensure effectiveness and relevance.	NA

Figure 3.1 S-CAT Example — Demonstrating Management Commitment

Chapter 4 S-CAT Survey Results

This chapter presents findings from the S-CAT survey. Each section focuses on a safety climate category and its respective indicators. The beginning of each section includes a brief narrative that describes key findings at a high level and notes for which indicators the range of district mean scores exceeded 1.00. If the range is greater than this threshold value, KYTC may want to take a closer look at the indicator to determine why significant inter-district variability exists and identify potential steps to mitigate disparities. A series of tables follows each narrative. Each table presents summary statistics for an indicator (Figure 4.1). The table heading lists the indicator/question. It does not provide the full range of responses survey participants could choose from (see Appendix A). Rather, the heading distills the theme of the indicator in a short phrase. Below the indicator are data on the percentage of survey respondents who chose each rating — the box for the response which garnered the highest percentage is shaded. Underneath this information the table is divided into three columns. The first two columns summarize district-level responses. The first column lists the number of survey respondents in each district, and the second gives the district mean scores. Because all surveys were anonymous we do not identify the actual districts. The third column provides the range of district mean scores. At the bottom of each table is the indicator's statewide mean score.

Q18: Frequency of management visits to jobsites

NA	Inattentive (1)	Reactive (2)	Compliant (3)	Proactive (4)	Exemplary (5)
6.29%	11.89%		18.18%	24.48%	**36.36%**

Number of Respondents	District Mean Score	Range of District Mean Scores (Spread)
8	4.62	**2.54 – 4.62 (1.92)**
11	4.45	
6	4.17	
14	4.07	
20	3.75	
14	3.64	
10	3.50	
14	3.29	
10	3.00	
16	2.88	
7	2.71	
13	2.54	

Statewide Mean: 3.52

Figure 4.1 Example of S-CAT Indicator Data Summary Table

4.1 Risk Perceptions Among Employees

Although respondents generally feel that there is a high probability of workers being involved in a job-related accident (Q9, mean = 2.22), most do not believe that workers expose themselves to risk to complete activities (Q10, mean = 3.47) or that productivity is valued more than safety (Q11, mean = 4.41). A high percentage of respondents believe that workers are more likely to be involved in a traffic-related accident than a work-related accident (Q12, mean = 2.66). Despite this perception, work-related accidents spark greater concern than traffic-related incidents (Q13, mean = 3.48). However, for both of these questions the mean values are not far removed from what would be deemed a neutral opinion. Respondents lack a strong opinion on whether injury risks are a natural part of a job in highway maintenance (Q14, mean = 3.36). There is a consensus that safety shortcuts *are not* taken when necessary (Q15, mean = 4.27). The range of district-level mean scores exceeds 1.00 on three questions:

- (Q10, range = 1.80) At work we take the risk of getting hurt in order to get the job done.
- (Q12, range = 1.29) In our work, the probability of being involved in a traffic accident is higher than the probability of being involved in a work-related accident.
- (Q14, range = 1.30) In highway maintenance work, the risk of getting hurt is part of the job.

Despite these ranges, it is unlikely closer scrutiny of inter-district variability is needed as they reflect the propensity of respondents in some districts to adopt a more neutral position rather than voicing explicit concerns about safety practices.

Q9: In highway maintenance work, there is a high probability that workers are going to be involved in a work-related accident.

Strongly Disagree (5)	Disagree (4)	Neutral (3)	Agree (2)	Strongly Agree (1)
3.38%	3.38%	23.03%	**50.56%**	19.66%

Number of Respondents	District Mean Score	Range of District Mean Scores (Spread)
16	2.50	**2.00 – 2.50 (0.50)**
11	2.36	
10	2.30	
20	2.20	
10	2.20	
6	2.17	
14	2.14	
14	2.14	
8	2.12	
13	2.08	
14	2.00	
7	2.00	

Statewide Mean: 2.22

Q10: At work, we take the risk of getting hurt in order to get the job done.				
Strongly Disagree (5)	**Disagree (4)**	**Neutral (3)**	**Agree (2)**	**Strongly Agree (1)**
22.47%	**35.58%**	16.85%	19.66%	8.43%

Number of Respondents	District Mean Score	Range of District Mean Scores (Spread)
6	4.50	**2.70 – 4.50 (1.80)**
8	3.88	
10	3.80	
11	3.73	
14	3.71	
14	3.71	
14	3.64	
7	3.57	
10	3.40	
13	3.15	
16	3.12	
20	2.70	
Statewide Mean: 3.47		

Q11: In our work, productivity is more important and valued than safety.				
Strongly Disagree (5)	**Disagree (4)**	**Neutral (3)**	**Agree (2)**	**Strongly Agree (1)**
54.49%	35.39%	6.74%	1.69%	1.69

Number of Respondents	District Mean Score	Range of District Mean Scores (Spread)
6	4.83	**4.10 – 4.83 (0.73)**
14	4.71	
7	4.57	
11	4.55	
14	4.50	
14	4.50	
13	4.46	
10	4.40	
8	4.25	
30	4.20	
26	4.12	
10	4.10	
Statewide Mean: 4.41		

Q12: In our work, the probability of being involved in a traffic accident is higher than the probability of being involved in a work-related accident.

Strongly Disagree (5)	Disagree (4)	Neutral (3)	Agree (2)	Strongly Agree (1)
2.25%	14.61%	**39.89%**	37.64%	5.62%

Number of Respondents	District Mean Score	Range of District Mean Scores (Spread)
10	3.00	**1.71 – 3.00 (1.29)**
11	2.91	
10	2.90	
14	2.86	
20	2.70	
13	2.69	
14	2.64	
16	2.62	
8	2.62	
6	2.50	
14	2.43	
7	1.71	

Statewide Mean: 2.66

Q13: In our work, we are more concerned about traffic-related accidents than work-related accidents.

Strongly Disagree (5)	Disagree (4)	Neutral (3)	Agree (2)	Strongly Agree (1)
15.73%	**40.45%**	29.78%	11.80%	2.24%

Number of Respondents	District Mean Score	Range of District Mean Scores (Spread)
11	3.82	**3.00 – 3.82 (0.82)**
8	3.75	
14	3.71	
13	3.54	
6	3.50	
14	3.50	
20	3.45	
14	3.43	
10	3.40	
16	3.31	
10	3.30	
7	3.00	

Statewide Mean: 3.48

Q14: In highway maintenance work, the risk of getting hurt is part of the job.				
Strongly Disagree (5)	**Disagree (4)**	**Neutral (3)**	**Agree (2)**	**Strongly Agree (1)**
17.98%	**33.12%**	19.66%	23.60%	5.62%

Number of Respondents	District Mean Score	Range of District Mean Scores (Spread)
10	3.80	**2.50 – 3.80 (1.30)**
8	3.75	
14	3.71	
6	3.67	
16	3.50	
11	3.45	
20	3.40	
14	3.36	
7	3.29	
13	3.15	
10	3.00	
14	2.50	
Statewide Mean: 3.36		

Q15: In our work, we take safety shortcuts when necessary.				
Strongly Disagree (1)	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**
45.51%	39.33%	11.80%	2.25%	1.12%

Number of Respondents	District Mean Score	Range of District Mean Scores (Spread)
11	4.55	**3.94 – 4.55 (0.61)**
6	4.50	
13	4.46	
7	4.43	
14	4.36	
20	4.30	
14	4.29	
8	4.25	
14	4.21	
10	4.10	
10	4.10	
10	3.94	
Statewide Mean: 4.27		

4.2 KYTC Management Commitment to Safety

Overall, respondents believe that KYTC's management demonstrates a robust commitment to safety. Mean scores for indicators in this category are generally between 3 and 5, with only a small fraction of respondents questioning how safety is handled. On the question of management visits to job sites, most respondents grade management as proactive or exemplary (Q18, mean = 3.52), but as the range of mean scores shows there is significant inter-district variability in respondent attitudes. Management commitment to sound safety practices is rated similarly (Q19, mean = 3.62), with a majority of respondents saying that management is proactive or exemplary. Notably, the range for this indicator is much narrower than for Q18. Most respondents hold a positive view of the degree to which management participates in safety audits(Q20, mean = 3.36) and feel confident about management's commitment to investigating safety incidents and introducing appropriate corrective measures (Q21, mean = 3.77). The overwhelming majority of respondents contend that management support for injured employees is proactive or exemplary, with this indicator producing the highest mean score in this category (Q22, mean = 4.32). In terms of the quality of safety management and reviews, respondents are a little more split in their opinions, however, a large proportion ranks management as compliant or better on this metric. The range of district-level mean scores exceeds 1.00 on four questions:

- (Q18, range = 1.92) Frequency of management visits to jobsites
- (Q19, range = 1.15) Commitment of management to sound safety practices on job sites
- (Q20, range = 1.38) Management level of participation in safety audits
- (Q21, range = 1.09) Management commitment to thoroughly investigating and correcting safety incidents

Of particular note is the spread for Q18, which is nearly 2.00. This level of discrepancy suggests it is an area that merits greater scrutiny from district-level management and perhaps Cabinet leadership to ensure parity among district offices.

Q18: Frequency of management visits to jobsites

NA	Inattentive (1)	Reactive (2)	Compliant (3)	Proactive (4)	Exemplary (5)
—	12.25%	2.72%	18.37%	25.85%	**40.82%**

Number of Respondents	District Mean Score	Range of District Mean Scores (Spread)
8	4.62	**2.54 – 4.62 (1.92)**
11	4.45	
6	4.17	
14	4.07	
20	3.75	
14	3.64	
10	3.50	
14	3.29	
10	3.00	
16	2.88	
7	2.71	
13	2.54	
Statewide Mean: 3.52		

Q19: Commitment of management to sound safety practices on job sites					
NA	**Inattentive (1)**	**Reactive (2)**	**Compliant (3)**	**Proactive (4)**	**Exemplary (5)**
—	3.47%	2.79%	21.53%	**40.28%**	31.94%

Number of Respondents	District Mean Score	Range of District Mean Scores (Spread)
13	4.15	**3.00 – 4.15 (1.15)**
6	4.00	
8	4.00	
20	3.95	
14	3.86	
14	3.64	
16	3.56	
10	3.40	
11	3.36	
7	3.29	
10	3.10	
14	3.00	
Statewide Mean: 3.62		

Q20: Management level of participation in safety audits					
NA	**Inattentive (1)**	**Reactive (2)**	**Compliant (3)**	**Proactive (4)**	**Exemplary (5)**
—	2.92%	2.92%	24.82%	**38.69%**	30.66%

Number of Respondents	District Mean Score	Range of District Mean Scores (Spread)
8	4.38	**3.00 – 4.38 (1.38)**
13	3.62	
6	3.50	
14	3.43	
10	3.40	
16	3.31	
20	3.30	
14	3.29	
11	3.27	
7	3.14	
14	3.07	
10	3.00	
Statewide Mean: 3.36		

Q21: Management commitment to thoroughly investigating and correcting safety incidents					
NA	**Inattentive (1)**	**Reactive (2)**	**Compliant (3)**	**Proactive (4)**	**Exemplary (5)**
—	1.37%	1.37%	15.07%	**50.00%**	32.19%

Number of Respondents	District Mean Score	Range of District Mean Scores (Spread)
8	4.38	**3.29 – 4.38 (1.09)**
13	4.23	
6	4.17	
14	3.93	
20	3.90	
11	3.82	
10	3.70	
16	3.69	
10	3.60	
14	3.43	
7	3.29	
14	3.29	
Statewide Mean: 3.77		

Q22: Management level of support for injured employees					
NA	**Inattentive (1)**	**Reactive (2)**	**Compliant (3)**	**Proactive (4)**	**Exemplary (5)**
—	0.66%	—	6.62%	28.48%	**64.24%**

Number of Respondents	District Mean Score	Range of District Mean Scores (Spread)
8	4.75	**3.86 – 4.75 (0.89)**
7	4.71	
13	4.62	
14	4.57	
6	4.50	
20	4.45	
11	4.45	
16	4.19	
14	4.07	
10	4.00	
10	4.00	
14	3.86	
Statewide Mean: 4.32		

Q23: Quality of safety management and reviews					
NA	**Inattentive (1)**	**Reactive (2)**	**Compliant (3)**	**Proactive (4)**	**Exemplary (5)**
—	0.63%	3.80%	21.52%	**32.91%**	29.75%

Number of Respondents	District Mean Score	Range of District Mean Scores
14	3.93	**3.09 – 3.92 (0.84)**
10	3.80	
10	3.80	
14	3.79	
8	3.75	
6	3.67	
20	3.65	
14	3.43	
7	3.29	
16	3.25	
13	3.23	
13	3.09	
Statewide Mean: 3.55		

4.3 Aligning and Integrating Safety as a Value

Respondents believe that KYTC embraces a culture of safety. Mean scores for all metrics in this category are between 4 and 5. On four of the five indicators, the highest proportion of respondents rank the Cabinet and management as exemplary. Respondents view Cabinet employees as committed to safety (Q25, mean = 4.17) and observe that frequent discussions are held focused on safety (Q26, mean = 4.43). Ratings for the Cabinet's organizational commitment to safety (Q27, mean = 4.20), making sure safety considerations are integrated into policies and procedures (Q28, mean = 4.19), and implementation of safety measures (Q29, mean = 4.18) are practically identical. Respondents also feel that management is invested in safety programs and processes. (Q30, mean = 4.07). The range of district-level mean scores exceeds 1.00 on one question:

- (Q28, range = 1.29) Integration of safety considerations into policies and procedures

The lack of inter-district variability demonstrates safety is highly valued statewide at KYTC and that in all districts is safety treated as a high priority.

Q25: Employee commitment to safety

NA	Inattentive (1)	Reactive (2)	Compliant (3)	Proactive (4)	Exemplary (5)
—	3.29%	2.63%	1.97%	43.42%	**48.68%**

Number of Respondents	District Mean Score	Range of District Mean Scores (Spread)
11	4.55	**3.81 – 4.55 (0.74)**
6	4.50	
13	4.46	
14	4.43	
20	4.35	
14	4.14	
8	4.12	
10	4.10	
10	3.90	
7	2.86	
14	3.86	
16	3.81	
Statewide Mean: 4.17		

Q26: Frequency of discussions focused on safety

NA	Inattentive (1)	Reactive (2)	Compliant (3)	Proactive (4)	Exemplary (5)
—	—	0.67%	6.67%	26.00%	**66.67%**

Number of Respondents	District Mean Score	Range of District Mean Scores (Spread)
8	4.88	**3.81 – 4.88 (1.07)**
13	4.85	
6	4.83	
10	4.80	
14	4.79	
20	4.70	
14	4.50	
7	4.43	
11	4.09	
14	3.93	
10	3.90	
16	3.81	
Statewide Mean: 4.43		

Q27: Organizational commitment to safety					
NA	**Inattentive (1)**	**Reactive (2)**	**Compliant (3)**	**Proactive (4)**	**Exemplary (5)**
—	0.67%	0.67%	6.00%	43.33%	**49.33%**
Number of Respondents	**District Mean Score**			**Range of District Mean Scores (Spread)**	
14	4.64			**3.88 – 4.64 (0.76)**	
11	4.45				
8	4.38				
14	4.36				
6	4.33				
13	4.23				
10	4.20				
20	4.15				
7	4.00				
14	4.00				
10	3.90				
16	3.88				
Statewide Mean: 4.20					

Q28: Integration of safety considerations into policies and procedures					
NA	**Inattentive (1)**	**Reactive (2)**	**Compliant (3)**	**Proactive (4)**	**Exemplary (5)**
—	1.35%	2.03%	3.38%	35.81%	**57.43%**
Number of Respondents	**District Mean Score**			**Range of District Mean Scores (Spread)**	
6	4.67			**3.38 – 4.67 (1.29)**	
13	4.54				
14	4.50				
14	4.50				
20	4.20				
10	4.20				
10	4.20				
11	4.18				
7	4.00				
14	4.00				
16	3.81				
8	3.38				
Statewide Mean: 4.19					

Q29: Focus on implementation of safety measures					
NA	**Inattentive (1)**	**Reactive (2)**	**Compliant (3)**	**Proactive (4)**	**Exemplary (5)**
—	—	2.72%	6.12%	34.01%	**57.14%**

Number of Respondents	District Mean Score	Range of District Mean Scores (Spread)
6	4.50	**3.80 – 4.50 (0.70)**
14	4.50	
13	4.46	
20	4.40	
7	4.29	
8	4.25	
11	4.09	
14	4.07	
10	4.00	
16	3.94	
14	3.93	
10	3.80	
Statewide Mean: 4.18		

Q30: Management level of investment in safety programs and processes					
NA	**Inattentive (1)**	**Reactive (2)**	**Compliant (3)**	**Proactive (4)**	**Exemplary (5)**
3.21%	1.92%	1.28%	6.41%	**53.21%**	33.97%

Number of Respondents	District Mean Score	Range of District Mean Scores (Spread)
20	4.35	**3.70 – 4.35 (0.65)**
6	4.33	
14	4.29	
13	4.23	
7	4.14	
10	4.10	
14	4.07	
11	4.00	
16	3.88	
8	3.88	
14	3.79	
10	3.70	
Statewide Mean: 4.07		

4.4 Ensuring Accountability at All Levels

Although respondents generally view KYTC as working to ensure accountability on safety-related matters across the organization, mean scores for this group of indicators are little lower than for the previous category — valuing safety. Ratings for integration of safety practices into employee performance evaluations (Q32, mean = 3.69) and supervisor evaluations (Q33, mean = 3.63) are very similar, on the high side of compliant. Respondents see KYTC as being more proactive in terms of identifying safety expectations, roles, and responsibilities (Q34, mean = 3.94). One one area in which respondents view the Cabinet as lacking is the availability of incentives for good safety performance (Q35, mean = 2.62). For this indicator, the highest proportion of respondents viewed KYTC as being reactive, which suggests the agency may want to explore making tangible incentives available to staff. The range of district-level mean scores exceeds 1.00 on three questions:

- (Q32, range = 1.40) Integration of safety practices into employee performance evaluations
- (Q33, range = 1.81) Integration of safety practices into supervisor performance evaluations
- (Q35, range = 1.67) Availability of incentives for good safety performance

These ranges reflect considerable inter-district variability and argue for further investigating why discrepancies are present between districts and what steps can be taken to cultivate a more uniform commitment to accountability.

Q32: Integration of safety practices into employee performance evaluations

NA	Inattentive (1)	Reactive (2)	Compliant (3)	Proactive (4)	Exemplary (5)
—	—	6.67%	14.07%	**49.63%**	29.63%

Number of Respondents	District Mean Score	Range of District Mean Scores (Spread)
6	4.50	**3.10 – 4.50 (1.40)**
20	4.05	
7	4.00	
8	4.00	
10	3.90	
14	3.79	
16	3.75	
13	3.69	
14	3.43	
11	3.27	
14	3.14	
10	3.10	
Statewide Mean: 3.69		

Q33: Integration of safety practices into supervisor performance evaluations					
NA	**Inattentive (1)**	**Reactive (2)**	**Compliant (3)**	**Proactive (4)**	**Exemplary (5)**
—	5.30%	1.52%	16.67%	36.36%	**40.15%**

Number of Respondents	District Mean Score	Range of District Mean Scores (Spread)
6	4.67	**2.86 – 4.67 (1.81)**
13	4.08	
16	3.88	
11	3.82	
10	3.80	
14	3.79	
14	3.71	
20	3.60	
14	3.29	
10	3.00	
8	2.88	
7	2.86	
Statewide Mean: 3.63		

Q34: Identification of safety expectations, roles, and responsibilities					
NA	**Inattentive (1)**	**Reactive (2)**	**Compliant (3)**	**Proactive (4)**	**Exemplary (5)**
—	1.43%	1.43%	5.71%	**61.43%**	30.00%

Number of Respondents	District Mean Score	Range of District Mean Scores (Spread)
6	4.33	**3.50 – 4.33 (0.88)**
14	4.21	
11	4.18	
8	4.12	
10	4.10	
14	4.07	
13	4.00	
7	4.00	
20	3.90	
14	3.71	
10	3.60	
16	3.50	
Statewide Mean: 3.94		

Q35: Availability of incentives for good safety performance					
NA	**Inattentive (1)**	**Reactive (2)**	**Compliant (3)**	**Proactive (4)**	**Exemplary (5)**
16.78%	**27.89%**	0.68%	9.52%	24.49%	21.77%

Number of Respondents	District Mean Score	Range of District Mean Scores (Spread)
6	3.67	**2.00 – 3.67 (1.67)**
20	3.55	
10	3.20	
14	2.93	
14	2.50	
10	2.50	
16	2.25	
14	2.21	
13	2.15	
11	2.09	
7	2.00	
8	2.00	
Statewide Mean: 2.62		

4.5 Improving Supervisory Leadership

Respondents view supervisors as being committed to matters of safety, with mean scores for indicators in this category clustered around 4. Supervisors do a good job of clearly communicating their vision for safety (Q37, mean = 3.89) and possess a sound working knowledge of regulatory requirements while demonstrating ample leadership (Q38, mean = 4.20), with most respondents rating supervisors as exemplary on the latter attributes. Supervisors also actively participate in safety activities (Q39, mean = 3.97). The range of district-level mean scores exceeds 1.00 on two questions:

- (Q37, range = 1.42) Clarity and communication of visions for safety among supervisors
- (Q38, range = 1.03) Supervisor leadership abilities and knowledge of regulatory requirements

Given the range of responses for Q37, the Cabinet may benefit from looking at whether supervisors can do a better job in some districts to communicate a clear and proactive vision for safety.

Q37: Clarity and communication of visions for safety among supervisors

NA	Inattentive (1)	Reactive (2)	Compliant (3)	Proactive (4)	Exemplary (5)
—	2.14%	0.71%	17.14%	**41.43%**	38.57%

Number of Respondents	District Mean Score	Range of District Mean Scores (Spread)
6	4.67	**3.25 – 4.67 (1.42)**
11	4.18	
7	4.14	
8	4.12	
10	4.10	
14	4.00	
14	4.00	
13	3.85	
20	3.85	
10	3.70	
14	3.64	
16	3.25	
Statewide Mean: 3.89		

Q38: Supervisor leadership abilities and knowledge of regulatory requirements

NA	Inattentive (1)	Reactive (2)	Compliant (3)	Proactive (4)	Exemplary (5)
—	2.16%	5.76%	0.72%	23.74%	**67.63%**

Number of Respondents	District Mean Score	Range of District Mean Scores (Spread)
6	4.83	**3.80 – 4.83 (1.03)**
11	4.55	
13	4.54	
8	4.38	
7	4.29	
16	4.25	
14	4.14	
20	4.10	
14	4.07	
14	4.00	
10	3.90	
10	3.80	
Statewide Mean: 4.20		

Q39: Active participation in safety activities among supervisors					
NA	**Inattentive (1)**	**Reactive (2)**	**Compliant (3)**	**Proactive (4)**	**Exemplary (5)**
—	—	2.17%	5.80%	**54.35%**	37.68%

Number of Respondents	District Mean Score	Range of District Mean Scores (Spread)
6	4.67	**3.70 – 4.67 (0.90)**
11	4.36	
7	4.14	
8	4.12	
16	4.06	
20	3.95	
14	3.93	
10	3.90	
14	3.86	
13	3.77	
14	3.71	
10	3.70	
Statewide Mean: 3.97		

4.6 Empowering and Involving Employees

For each of the indicators related to staff empowerment, mean scores hover around 3.50, or between compliant and proactive. Respondents generally have a positive view of their level of empowerment to maintain safety on the jobsite, with approximately 58% giving a rating of 4 or 5 (Q41, mean = 3.48). Employees feel like they have the ability to offer adequate input on safety-related issues, with a significant majority rating KYTC as proactive or exemplary (Q42, mean = 3.67). Safety committees appear to be a mainstay of Cabinet operations, with nearly 70% of respondents holding a very positive view of efforts in this area (Q43, mean = 3.57). The range of district-level mean scores exceeds 1.00 on two questions.

- (Q42, range = 1.10) Level of employee input on safety-related issues
- (Q43, range = 1.17) Presence of safety committees

As the ranges for both of these questions is near the threshold, they probably do not warrant significant attention, but KYTC can benefit from monitoring performance on these issues to minimize inter-district variability in the future.

Q41: Empowerment of employees to maintain jobsite safety

NA	Inattentive (1)	Reactive (2)	Compliant (3)	Proactive (4)	Exemplary (5)
5.59%	4.11%	2.10%	30.14%	**40.41%**	17.80%

Number of Respondents	District Mean Score	Range of District Mean Scores (Spread)
11	3.82	**3.12 – 3.82 (0.70)**
14	3.71	
13	3.62	
10	3.60	
7	3.57	
6	3.50	
10	3.50	
20	3.45	
16	3.44	
14	3.29	
14	3.12	
8	3.12	

Statewide Mean: 3.48

Q42: Level of employee input on safety-related issues					
NA	**Inattentive (1)**	**Reactive (2)**	**Compliant (3)**	**Proactive (4)**	**Exemplary (5)**
—	3.70%	3.70%	17.04%	**42.22%**	33.33%
Number of Respondents	**District Mean Score**			**Range of District Mean Scores (Spread)**	
8	4.50			**3.40 – 4.50 (1.10)**	
6	4.00				
10	4.00				
20	3.70				
14	3.64				
11	3.64				
14	3.64				
7	3.57				
16	3.50				
14	3.50				
13	3.46				
10	3.40				
Statewide Mean: 3.67					

Q43: Presence of safety committees					
NA	**Inattentive (1)**	**Reactive (2)**	**Compliant (3)**	**Proactive (4)**	**Exemplary (5)**
—	1.56%	7.03%	4.69%	**55.47%**	31.25%
Number of Respondents	**District Mean Score**			**Range of District Mean Scores (Spread)**	
6	4.17			**3.00 – 4.17 (1.17)**	
20	4.05				
7	4.00				
11	4.00				
14	3.71				
10	3.60				
13	3.54				
14	3.36				
10	3.20				
16	3.19				
14	3.14				
8	3.00				
Statewide Mean: 3.57					

4.7 Improving Communication

Respondents feel that KYTC performs well on communication-related indicators, although for two of the indicators inter-district variability is a concern the agency should attend to. Similar to other employee involvement metrics, respondents feel integrated into discussions and decision making focused on safety (Q46, mean = 3.65). Respondents generally approve of how the Cabinet goes about collecting injury and illness data, with approximately 70% scoring the agency as either proactive or exemplary (Q47, mean = 3.95). The quality and scope of safety-related communication also receives high marks, with nearly 80% of respondents holding a very positive view of KYTC's efforts (Q48, mean = 3.83). The range of district-level mean scores exceeds 1.00 on two questions:

- (Q47, range = 1.86) Collection of Injury and Illness data
- (Q48, range = 1.45) Quality and breadth of safety-related communication efforts

Although both indicators warrant a closer look, this is especially true of data collection given the nearly two-point gap between the lowest and highest district mean scores.

Q46: Involvement of employees in safety discussions and decision making

NA	Inattentive (1)	Reactive (2)	Compliant (3)	Proactive (4)	Exemplary (5)
—	3.68%	5.15%	8.82%	**66.18%**	16.18%

Number of Respondents	District Mean Score	Range of District Mean Scores (Spread)
11	3.91	**3.31 – 3.91 (0.60)**
10	3.90	
14	3.86	
6	3.83	
7	3.71	
20	3.70	
14	3.64	
8	3.62	
16	3.56	
14	3.50	
10	3.40	
13	3.31	
Statewide Mean: 3.65		

Q47: Collection of Injury and Illness data					
NA	**Inattentive (1)**	**Reactive (2)**	**Compliant (3)**	**Proactive (4)**	**Exemplary (5)**
—	1.48%	2.22%	17.04%	29.63%	**49.63%**

Number of Respondents	District Mean Score	Range of District Mean Scores (Spread)
6	4.67	**2.81 – 4.76 (1.86)**
11	4.36	
7	4.29	
20	4.15	
8	4.12	
13	4.08	
14	4.07	
14	4.00	
10	4.00	
14	3.93	
10	3.70	
16	2.81	
Statewide Mean: 3.95		

Q48: Quality and breadth of safety-related communication efforts					
NA	**Inattentive (1)**	**Reactive (2)**	**Compliant (3)**	**Proactive (4)**	**Exemplary (5)**
—	—	3.76%	16.54%	38.35%	**41.35%**

Number of Respondents	District Mean Score	Range of District Mean Scores
6	4.83	**3.38 – 4.83 (1.45)**
8	4.50	
11	4.27	
14	4.00	
20	4.00	
7	3.86	
14	3.71	
13	3.69	
14	3.50	
10	3.50	
10	3.40	
16	3.38	
Statewide Mean: 3.83		

4.8 Training at All Levels

Except for the availability of safety training (Q50, mean = 4.32), mean scores for indicators are in the compliant-to-proactive range, however, the presence of considerable inter-district variability demands reflection. In terms of safety trainings, roughly 80% of respondents have a very positive view of their availability. Certification requirements has the lowest mean score, with just over half of respondents rating KYTC as compliant (Q51, mean = 3.36). About 80% of respondents view the availability of leadership-oriented training in a very positive light (Q52, mean = 3.77), while a smaller fraction hold the same opinion about the role of employees and supervisors in identifying training materials and needs (Q53, mean = 3.55). Respondents harbor generally positive views of the level of rigor involved in training verification (Q54, mean = 3.52) and the qualification of trainers (Q55, mean = 3.62). Compared to other categories of indicators, higher percentage of respondents put down NA — approaching 10% for several indicators. The range of district-level mean scores exceeds 1.00 on all six questions:

- (Q50, range = 1.27) Availability of safety training
- (Q51, range = 1.85) Certification requirements
- (Q52, range = 1.33) Availability of training focused on leadership skills
- (Q53, range = 1.83) Supervisor and employee involvement in identifying training needs/materials
- (Q54, range = 1.64) Rigor of training verification
- (Q55, range = 1.59) Qualifications of trainers

There is significant variability in how respondents from district to district rate indicators in this category. For example, both certification requirements and staff level of involvement in identifying training needs/materials have large spreads — 1.85 and 1.83, respectively. In some districts respondents are content with the roles they play, but in others work must be done to improve the situation so the KYTC can achieve statewide consistency.

Q50: Availability of safety training

NA	Inattentive (1)	Reactive (2)	Compliant (3)	Proactive (4)	Exemplary (5)
—	—	1.50%	13.53%	**45.11%**	39.85%

Number of Respondents	District Mean Score	Range of District Mean Scores (Spread)
6	4.67	**3.50 – 4.67 (1.27)**
14	4.29	
7	4.14	
11	4.09	
20	4.05	
10	3.90	
14	3.86	
16	3.81	
14	3.79	
13	3.77	
10	3.60	
8	3.50	

Statewide Mean: 4.32

Q51: Certification requirements

NA	Inattentive (1)	Reactive (2)	Compliant (3)	Proactive (4)	Exemplary (5)
—	0.78%	1.55%	**60.47%**	20.16%	17.05%

Number of Respondents	District Mean Score	Range of District Mean Scores (Spread)
11	3.73	**1.88 – 3.73 (1.85)**
10	3.60	
14	3.43	
7	3.43	
14	3.29	
20	3.20	
10	3.20	
14	3.14	
6	3.00	
13	3.00	
16	2.88	
8	1.88	
Statewide Mean: 3.36		

Q52: Availability of training focused on leadership skills

NA	Inattentive (1)	Reactive (2)	Compliant (3)	Proactive (4)	Exemplary (5)
—	1.54%	1.54%	11.54%	**65.38%**	20.00%

Number of Respondents	District Mean Score	Range of District Mean Scores (Spread)
6	4.33	**3.00 – 4.33 (1.33)**
14	4.00	
11	3.91	
20	3.75	
7	3.71	
16	3.69	
14	3.64	
10	3.60	
8	3.50	
14	3.43	
13	3.31	
10	3.00	
Statewide Mean: 3.77		

Q53: Supervisor and employee involvement in identifying training needs/materials					
NA	**Inattentive (1)**	**Reactive (2)**	**Compliant (3)**	**Proactive (4)**	**Exemplary (5)**
—	1.52%	5.30%	23.49%	**49.24%**	20.46%

Number of Respondents	District Mean Score	Range of District Mean Scores (Spread)
6	4.33	**2.50 – 4.33 (1.83)**
11	4.00	
20	3.80	
14	3.71	
13	3.69	
14	3.64	
16	3.56	
10	3.40	
10	3.20	
14	3.07	
7	3.00	
8	2.50	
Statewide Mean: 3.55		

Q54: Rigor of training verification					
NA	**Inattentive (1)**	**Reactive (2)**	**Compliant (3)**	**Proactive (4)**	**Exemplary (5)**
—	1.63%	2.44%	25.20%	**45.53%**	25.20%

Number of Respondents	District Mean Score	Range of District Mean Scores (Spread)
6	4.33	**2.69 – 4.33 (1.64)**
11	4.00	
10	3.60	
14	3.57	
20	3.55	
13	3.38	
14	3.36	
8	3.12	
14	3.07	
7	3.00	
10	3.00	
16	2.69	
Statewide Mean: 3.52		

Q55: Qualifications of trainers					
NA	**Inattentive (1)**	**Reactive (2)**	**Compliant (3)**	**Proactive (4)**	**Exemplary (5)**
—	0.78%	10.08%	17.05%	**41.09%**	31.01%

Number of Respondents	District Mean Score	Range of District Mean Scores
6	4.67	**3.08 – 4.67 (1.59)**
7	4.14	
11	3.91	
14	3.79	
10	3.70	
8	3.62	
20	3.55	
10	3.40	
14	3.29	
14	3.21	
16	3.12	
13	3.08	
Statewide Mean: 3.62		

4.9 Safety Climate at the State and District Levels

Tables 4.1 and 4.2 offer a glimpse into statewide- and district level safety performance. Table 4.1 provides mean scores for each category at the state level. The range in scores is narrow (3.47 – 4.21), highlighting that respondents view KYTC's safety performance as compliant to proactive across all categories. *Aligning and Integrating Safety* and *Improving Supervisory Leadership* are the categories in which the agency garners its highest scores. Table 4.2 lists the mean safety climate score for each district. These scores were calculated by averaging the scores of the eight categories. Scores are presented in descending order. Note also that letters used to label districts do not correspond to actual district numbers. The range of these scores shows good agreement with statewide data as mean scores fall between 3.47 and 4.22. Again, this indicates that district safety performance typically falls between compliant and proactive in the eyes of survey respondents.

Table 4.1 Statewide Mean Scores for Safety Climate Categories

Category	Mean Category Score
Aligning and Integrating Safety	4.21
Improving Supervisory Leadership	4.02
Improving Communication	3.81
Demonstrating Management Commitment	3.69
Empowering and Involving Employees	3.57
Training at All Levels	3.53
Accountability at All Levels	3.47

Table 4.2 Mean Safety Climate Scores By District

District	Mean Safety Climate Score
A	4.22
B	3.90
C	3.82
D	3.82
E	3.76
F	3.71
G	3.67
H	3.65
I	3.62
J	3.60
K	3.58
L	3.47

***** Scores are sorted in descending order. District labels do not correspond to district numbers.

We compared the mean climate safety score for each district to the Total Recordable Incident Rate (TRIR) — a traditional safety measure used by KYTC. One important caveat when looking at these comparisons is that the climate safety scores and TRIR use different scales. A perfect TRIR score is 0 and a perfect score for safety climate is 5. Nonetheless correlation analysis is useful for uncovering a potential relationship between the two. Probost et al. (2019) found a negative correlation between safety climate scores and TRIR, however, we did not detect this in our data. Instead, there was a small, non-significant positive correlation ($r = 0.095$, $p = 0.76$). The random scatter of data suggests the lack of a pronounced relationship. Interestingly, the district with the lowest TRIR had the lowest safety climate score. However, given the lack of a generalizable relationships or trends, we would strongly caution against reading too much into a single data point.

Chapter 5 Safety Culture Assessment Focus Groups

Based on responses to the safety climate survey we selected two districts to participate in safety culture assessment focus groups. We used Johnson's (1992) Cultural Web Assessment Toolkit as a framework to structure focus group discussions. This tool can be used to investigate eight elements of employee perceptions of organizational culture. Focus group interviews adopted a semi-structured format, with the questions in Table 5.1 providing a starting point for discussions. Findings are presented for each element.

Table 5.1 Organizational Life Elements and Example Questions

Elements of Organizational Life	Example Questions
1. Safety Controls	• What does your organization measure, monitor and reinforce related to safety? • Do employees get rewarded for working safely or penalized for poor safety?
2. Routines	• How do people routinely behave towards each other about safety? • What routinely occurs concerning safety management/oversight? • Do the safety communication and the priority it is given reflect each other?
3. Rituals	• How does your organization reinforce safe behavior? • How well do we recognize safe behavior? • Do behaviors change based on how safety is recognized?
4. Stories	• What safety stories do people currently tell or do you hear about our department? • What do you talk about when you think of the safety of the department? • What messages are transmitted to new employees about safety?
5. Symbols	• What symbols are used to communicate the importance of safety to employees? • What symbols, actions, or discussions keep you focused on safety daily? • What kind of reminders would you like to see to remind you to work safely?
6. Power	• What beliefs about safety are held by the organization's leadership? • How does this translate into practice? • Do you feel you have the ability to make changes in safety and how we practice it?
7. Safety Structures	• What formal and informal safety mechanisms are in place? • Do you feel encouraged to report safety incidents?
8. Underlying Assumptions	• Summary description of your department's actual safety philosophy?

5.1 Safety Controls

These are safety-related items that are measured, monitored, or reinforced (e.g., number of near-miss reports completed, number of risk assessments completed, number of job hazard analyses [JHAs] completed). Safety controls communicated by maintenance superintendents are primarily related to incident investigations and the recording and monitoring injuries. Many controls are compliance-based (i.e., OSHA requirements). Documentation of near misses is being piloted. JHAs are used in both districts, however, frequency of use varies. Staff in both districts noted that a reward system was previously in place to recognize crews for positive safety performances; this involved buying personnel a meal. However, that program no longer exists and no incentives are available to reward safe work. Performance evaluations factor in safety actions but the manner in which they are currently structured does not provide a significant incentive.

5.2 Routines

Routines are safety-related practices that are engaged in regularly. Examples include weekly safety meetings that everyone attends and daily huddle meetings at which crews and superintendents gather to discuss safety before the

day's work begins. Routines described by superintendents are JHAs, which are completed for every task, and toolbox talks or job briefings — these are required twice per month but are regularly done every day. Job briefings cover topics such as traffic control, necessary personal protective equipment (PPE), and anticipated hazards for the upcoming day. Staff in both districts observed that safety committees meet regularly to discuss safety. Committees consist of a maintenance supervisor, someone from the highway technician (HT) series, an engineer, and an administrative person. Positions rotate annually. In one district, the safety committee meets once per quarter; in the other, every six weeks.

5.3 Rituals

Unlike routines, rituals do not occur at fixed time intervals, but rather as certain events occur. An example of a ritual is a mandatory safety orientation training for all new hires. The focus groups mentioned few rituals. There is an onboarding safety training for all employees conducted at the beginning and middle of the month. Training is provided by district safety coordinators. Other courses maintenance workers attend during the first year of employment include the OSHA 10 Hour training as well as classes on first aid, CPR, and flagging. Flagging training is a high priority because of demand. HTs receive additional training within the first year of employment. Other than training, monthly communications are sent out via email discussing safety — these take the form of a safety talk or advisory notice.

5.4 Stories

Stories are powerful ways to communicate information. Safety stories are especially important to reinforce the idea that accidents can happen and that outcomes are unique to the storyteller. Stories are regularly told throughout organizations because of the specific, unique, and memorable impact they convey. Safety stories can focus on topics such as accidents or instances of employees being recognized for working safely.

Maintenance staff in both districts shared a number of unique stories. Of all the elements of a safety culture captured in the focus groups, stories were the most powerful and frequently used mode of communicating the immediacy and importance of safety. One story involved new, inexperienced staff working in ice storms. Before going into the field, superintendents shared previous experiences on the frailty of trees and dangers of ice-coated electrical lines. Within the first 30 minutes of work, new hires went to their superintendent and noted how accurate and helpful the stories were. A few stories related to tree felling and kickbacks that caused serious injuries. They provided opportunities to discuss awareness, PPE, and proper tree felling techniques. Most stories involved work zone accidents. Occupational/personnel safety is the primary focus of any organization's safety culture, however, work zone accidents strike a chord with maintenance crews. Frustration was evident over the lack of awareness and lack of precautions taken by motorists in work zones. Perhaps this is due to the severity of incidents, the unpredictability of drivers, or that they have more control and thus responsibility for occupational accidents. Several examples of flagger fatalities or significant and permanent injuries were noted.

5.5 Symbols

Symbols are tangible or intangible representations that demonstrate the importance and value of safety in an organization. Examples include a monthly award for the safest crew and documenting good-catch stories in a safety newsletter. Focus group participants could not cite safety symbols within KYTC. They did, however, suggest the need for more and better communications with drivers approaching work zones. One suggestion was using road signage and navigation systems to alert drivers of upcoming work zones. Others commented on the need for hazardous duty pay, because the number of incidents and hazards, and for additional training in high school and driver's education classes on navigating work zones.

5.6 Power

This refers to how empowered staff feel to perform their jobs safely. Organizations that encourage employees to halt work when it is unsafe are considered high-power cultures. District staff noted that maintenance crews are told they have the authority to stop work if they encounter safety issues. No instances of an employee's safety concerns being ignored were given. Each crew has a leader that should be alerted if conditions are unsafe. They are responsible for communicating a stop-work message. Staff in one district noted that they had crews on a trenching

job where KYTC employees felt it was unsafe, so they discontinued work. A contractor was onsite as well, however, they did not feel as if conditions were unsafe. One of the contractor's employees entered the unsafe trench, resulting in a fatality.

5.7 Safety Structures

Safety structures are formal or informal administrative systems that protect workers from hazards. Examples include requirements to obtain a hot work permit for welding or acquiring a confined space permit if respiratory issues may be a concern. At KYTC these permits are not used. If work must be done in a confined space, a District 5 crew is called for support. Only minor spot welding occurs in equipment maintenance facilities. If digging is required, districts call 811 for utility checks. The 811 teams are generally responsive to KYTC needs and often get a crew out within an hour.

5.8 Underlying Assumptions

Although underlying assumptions are difficult to capture, they are critical because they often drive decision-making behaviors within an organization. We asked focus group members to briefly describe KYTC's actual safety philosophy. Unedited responses are provided below.

- The most important thing is that we all go home safely at the end of the day.
- Our friends and families live here and travel the highways just like everyone else, so let's keep it as safe as possible whether it's summer or wintertime.
- Getting home safely to our families
- Have been here 16 years and have seen so much work driving safety in this administration. It's the best I've seen. We have a long way to go, but it's the best I've seen. Every staff meeting starts with safety. We have to get the work done but not at the expense of someone getting hurt.
- We've all been taught to be effective and productive but if we're not safe, we won't be either one.

Chapter 6 Conclusion and Recommendations

Safety climate and culture significantly influence an organization's safety outcomes. Organizational culture drives behaviors, and those behaviors in turn sustain culture. If a strong and positive safety culture exists, it nurtures strong and positive safety behaviors. Strong and positive safety behaviors then reinforce and sustain that culture. A weak and negative culture produces weak and negative safety behaviors. Compounding that, a culture is fluid, not static. Awareness of an organization's climate and culture is thus critical. However, measuring climate and culture can be difficult as its themes and elements are subjective and abstract. Despite challenges, measurement is a worthwhile endeavor. For this study, we used an adapted version of S-CAT to measure KYTC's safety climate and then held focus groups with maintenance superintendents to further document safety culture using the Cultural Web Assessment Toolkit (Johnson 1992).

Based on surveys of maintenance crews, the overall safety climate score of KYTC is 3.71. Qualitatively, the Cabinet's safety climate can be characterized as compliant and transitioning toward proactive. Anecdotally, this aligns with efforts from KYTC's Office of Safety. Historically, it has sought compliance as the goal. But a few years ago Cabinet leadership recognized the moral imperative and value of achieving excellence in safety and dedicated effort and resources to bolster employee safety. The safety climate reflects these efforts, as it is moving in a more proactive direction. Changes in climate and culture do not happen swiftly or easily, but through constant dedication, attention, and effort by all employees. Promisingly, a couple elements of safety climate already qualify as proactive — *Aligning and Integrating Safety as a Value* and *Improving Supervisory Leadership*. This means that maintenance superintendents believe safety is valued at KYTC and that it is communicated through supervisors. Two categories — *Employee Risk Perception* and *Accountability at All Levels* — had lower scores, suggesting that improvements can be made to enhance risk perception skills and build robust accountability structures. When looking at demographic drivers of the safety climate score, level of training and frequency of experiencing a previous incident play significant roles. As employees receive safety training, they tend to assign lower ratings to the safety climate. In addition, the more safety-related incidents an employee has been directly involved in, the lower the safety climate scores reported. Notably, years of experience did not have an impact on scores.

Focus group assessments revealed similar findings. Although there are encouraging signs that KYTC's safety culture is getting better, some gaps need to be filled. Focus groups suggested there are few safety controls, inconsistently practiced routines, no symbols, and few structures. Nonetheless, participants felt that safety is strongly valued at KYTC, is as important as ever, and is expected of all employees in their job performance. This speaks to a safety culture that is positive and in the process of becoming stronger. Additional levels of controls, symbols, structures, and routines can help address gaps in the overall safety performance of KYTC. Reason's (1990) Swiss Cheese Model visualizes this need (Figure 6.1).

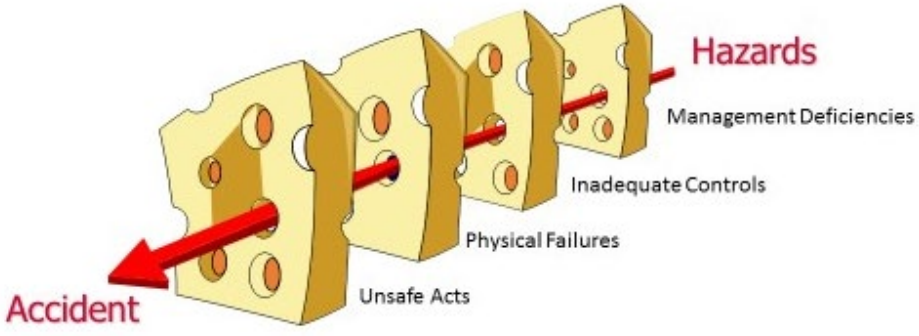

Figure 6.1 Swiss Cheese Model Adapted from Reason

Each slice of swiss cheese represents a layer of defense against a hazard (e.g., management, controls, physical environments, employee behaviors). But each slice is dotted with holes — management can be deficient, controls

may be inadequate, the physical environment may have failures, and people may act unsafely. Even though one slice may have a gap, multiple layers of defense can help prevent a hazard before an accident occurs. But when all the gaps align an accident occurs. As KYTC continues its pursuit of a more proactive and exemplary safety program it will be critical to add new layers of defense to prevent accidents from slipping through.

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Appendix A KYTC Safety Climate Survey

KYTC Safety Climate Survey

This anonymous and confidential survey is intended to capture your perception on the value of safety within your role and within the organization of KYTC. Your answers will be completely anonymous and will not be linked to you personally. To the degree identifiable questions are asked, they are strictly intended to understand information about where these perceptions originate generally. Your answers will directly go to researchers at the Kentucky Transportation Center at the University of Kentucky and no one from KYTC will be able to see them. When results are presented, they will be aggregated and anonymous, so that we, again, protect your confidentiality.

Please complete and submit this survey as soon as possible. We estimate that it should take no more than 20 minutes to complete. If you have any questions or problems with operation or access to the survey, please contact the project lead, Gabe Dadi, at (859) 257-5416 or at gabe.dadi@uky.edu.

Thank you for your time and expertise in completing this survey. This will help us advise KYTC on how safety is perceived by their most important asset, their employees.

Q4 What district do you currently work in?

▼ District 1 (1) ... District 12 (12)

Q5 What county do you currently work in?

_____

Q6 How many years of experience do you have in highway maintenance work (not necessarily just with KYTC)?

_____

Q7 What safety training programs have you completed before? (Check all that apply).

- ☐ OSHA 10 Hour (1)
- ☐ OSHA 30 Hour (2)
- ☐ Work Zone Traffic Control (WZTC) (3)
- ☐ Leadership Training (4)
- ☐ Other (5) _____
- ☐ Other (6) _____
- ☐ Other (7) _____

Q8 How often have you been directly involved in a work-related (non-traffic) accident while working in highway maintenance (not necessarily just with KYTC)?

- ○ Never (1)
- ○ Once (2)
- ○ 2-3 times (3)
- ○ 4-5 times (4)
- ○ More than 5 times (5)

Q9 In highway maintenance work, there is a high probability that workers are going to be involved in a work-related accident.

- ○ Strongly disagree (1)
- ○ Disagree (2)
- ○ Neutral (3)
- ○ Agree (4)
- ○ Strongly agree (5)

Q10 At work, we take the risk of getting hurt in order to get the job done.

- ○ Strongly disagree (1)
- ○ Disagree (2)
- ○ Neutral (3)
- ○ Agree (4)
- ○ Strongly agree (5)

Q11 In our work, productivity is more important and valued than safety.

- ○ Strongly disagree (1)
- ○ Disagree (2)
- ○ Neutral (3)
- ○ Agree (4)
- ○ Strongly agree (5)

Q12 In our work, the probability of being involved in a traffic accident is higher than the probability of being involved in a work-related accident.

- ○ Strongly disagree (1)
- ○ Disagree (2)
- ○ Neutral (3)
- ○ Agree (4)
- ○ Strongly agree (5)

Q13 In our work, we are more concerned about traffic-related accidents than work-related accidents.

- ○ Strongly disagree (1)
- ○ Disagree (2)
- ○ Neutral (3)
- ○ Agree (4)
- ○ Strongly agree (5)

Q14 In highway maintenance work, the risk of getting hurt is part of the job.

- ○ Strongly disagree (1)
- ○ Disagree (2)
- ○ Neutral (3)
- ○ Agree (4)
- ○ Strongly agree (5)

Q15 In our work, we take safety shortcuts when necessary.

- ○ Strongly disagree (1)
- ○ Disagree (2)
- ○ Neutral (3)
- ○ Agree (4)
- ○ Strongly agree (5)

Q17 **Demonstrating Management Commitment (Management refers to District Management and/or Safety Supervisor)**
For each item below, carefully read the descriptions in each box going from left to right. Select the one that best describes management's commitment to that activity.

Q18 In KYTC, management...

- ○ Rarely comes to the actual jobsite (1)
- ○ Only comes to the job site after an incident has occurred. (2)
- ○ Only comes to the job site when required or makes infrequent visits (3)
- ○ Makes regular visits to the job site. Interacts mostly with management. (4)
- ○ Frequently visits the job site; seeks out interactions with employees. (5)
- ○ N/A (6)

Q19 When management is present on the job site, they...

- ○ Typically act as poor safety role models by breaking safety policies and procedures. (1)
- ○ Are only concerned with adhering to OSHA regulations and organizational policies and procedures after an employee injury has occurred. (2)
- ○ Strictly conform to required OSHA regulations and organizational safety policies and procedures, never more or less. (3)
- ○ Demonstrate safety behaviors above and beyond what is required. (4)
- ○ Consistently model safety behaviors above and beyond what is required and recognize employees who do the same (5)
- ○ N/A (6)

Q20 In KYTC, management...

- ○ Does not participate in safety audits. (1)
- ○ Only participates in safety audits in response to an employee injury or adverse safety event. (2)
- ○ Participates in safety audits only when required. (3)
- ○ Initiates and actively participates in internal safety audits. (4)
- ○ Actively participates in internal safety audits and uses the information for management performance evaluation. (5)
- ○ N/A (6)

Q21 In KYTC, management...

- ○ Does not want to know about any safety incident, unless it's a fatality. There are no investigations into incidents or close calls. (1)
- ○ Resists taking steps to correct or prevent future incidents. Investigations into incidents or close calls result in disciplinary action toward employees. (2)
- ○ Investigates incident but not in a "blame-free" manner. Initiates corrective actions. (3)
- ○ Includes employees in both a root cause analysis and helping to come up with solutions to prevent future incidents and foster continued improvements. (4)
- ○ Relies on a formalized process for conducting a detailed root cause analysis that reviews both processes and behaviors. Findings are discussed with everyone and preventive solutions are implemented. (5)
- ○ N/A (6)

Q22 When employees are injured, management...

- ○ Immediately blames and punishes the employee (e.g., fired) (1)
- ○ Typically blames employees for injuries, threatening them with suspension or even termination. (2)
- ○ Only holds employees accountable for injuries according to organizational guidelines. (3)
- ○ Provides appropriate support for the injured employees. (4)
- ○ Provides support to injured employees, facilitate return to work, and seeks to learn from employee injuries. (5)
- ○ N/A (6)

Q23 In KYTC...

- ○ There is no formal safety management system; safety trends are not analyzed. (1)
- ○ The safety management system is reviewed and safety trends are only analyzed in response to employee injury or an adverse event. (2)
- ○ The safety management system is reviewed and safety trends are analyzed from time to time. (3)
- ○ The safety management system is reviewed and safety trends are analyzed annually to ensure effectiveness and relevance. (4)
- ○ The safety management system is reviewed and safety trends are analyzed bi-annually to ensure effectiveness and relevance. (5)
- ○ N/A (6)

Q24 **Aligning and Integrating Safety as a Value**
For each item below, carefully read the descriptions in each box going from left to right. Select the one that best describes how well safety is aligned and integrated as a value in KYTC.

Q25 In KYTC, most believe...

- ○ Our work is inherently dangerous, and nothing can be done to change it. (1)
- ○ Safety is costly and a burden; a necessary evil. (2)
- ○ Safety is only important because it is an OSHA requirement. (3)
- ○ Safety is very important to employees and management alike. (4)
- ○ Safety is a value of utmost importance and placed before all else. (5)
- ○ N/A (6)

Q26 In KYTC, safety is discussed...

- ○ Never. (1)
- ○ Only when accidents occurred. (2)
- ○ Only when required. (3)
- ○ At the end of most of our meetings. (4)
- ○ At the beginning of every meeting because it is a top priority. (5)
- ○ N/A (6)

Q27 In KYTC...

- ○ The primary focus is on productivity and reducing costs. Employees are rewarded for taking shortcuts to meet production goals. (1)
- ○ When work falls behind schedule, production becomes valued more than safety. (2)
- ○ As long as minimum safety requirements are being met, production and cost reduction are the main priorities in our work. (3)
- ○ For the most part, safety is not compromised for the sake of productivity. Work is completed as safely as possible. (4)
- ○ Safety is never compromised for productivity, schedule, or cost. Safety truly comes first. (5)
- ○ N/A (6)

Q28 In KYTC...

- ○ Safety is not integrated within organizational policies and procedures. (1)
- ○ Safety is not valued or enforced when management, OSHA, or safety professionals are not present. (2)
- ○ Safety is only integrated to the point of meeting minimum OSHA requirements. (3)
- ○ Safety language is formally integrated into most policies and procedures. (4)
- ○ Safety is formally and informally integrates into all policies and procedures. (5)
- ○ N/A (6)

Q29 In KYTC...

- ○ There is no focus on proactive or reactive safety measures. (1)
- ○ Safety measures are only examined in response to accidents. (2)
- ○ Safety measures focus solely on reactive measures (e.g. injury rate, EMR). (3)
- ○ Occasional attempts are made to measure and use proactive measures to improve job site safety climate. (4)
- ○ Proactive measures are regularly assessed and acted upon (i.e. changes made) to improve the job site safety climate. (5)
- ○ N/A (6)

Q30 In KYTC, management...

- ○ Does not invest in safety program development or provide adequate resources to conduct work safely. (1)
- ○ Only invests in safety program development and provides minimal resources to safety activities after an accident has occurred. (2)
- ○ Participates in safety program development and allocates resources to the extent that it is required by regulatory authorities (e.g. OSHA). (3)
- ○ Provides adequate resources to ensure a safe working environment. Develops a safety program that is shared with all employees. (4)
- ○ Provides ongoing financial support for ongoing development of safety policies, programs, and processes. Invests in systems to continually improve the job site safety climate. (5)
- ○ N/A (6)

Q31 **Ensuring Accountability at All Levels**
For each item below, carefully read the descriptions in each box going from left to right. Select the one that best describes how well management and employees in KYTC are held accountable for safety.

Q32 In KYTC...

- ○ Employee safety performance is not evaluated at all. If they mess up, they are fired. (1)
- ○ Employees are punished for not practicing safe behaviors, but they are not rewarded for proactively identifying hazards. (2)
- ○ Safety metrics for employee performance evaluation are given lip service and sometimes informally used to evaluate employee performance. (3)
- ○ Safety metrics are formally integrated into employee performance appraisal processes to evaluate and reward employees for maintaining and improving a positive job site safety climate. (4)
- ○ Safety metrics are formally integrated into employee performance appraisal processes to evaluate and reward employees for maintaining and improving a positive job site safety climate. Data are used to identify targeted training opportunities. (5)
- ○ N/A (6)

Q33 In KYTC...

- ○ There are no safety-related metrics included in managers' or supervisors' performance evaluations. (1)
- ○ The only safety metric used in managers' and supervisors' evaluations is the number of employee injuries, and often that is ignored. (2)
- ○ Managers and supervisors are held accountable for meeting the minimum required safety standards but poor safety performance carries few real consequences. (3)
- ○ Managers and supervisors are primarily held accountable for reactive safety measures (e.g. recordable injury rate), but some proactive measures (e.g. safety climate metrics) have been included. (4)
- ○ Managers and supervisors are held accountable for proactive (e.g. safety climate metrics) and reactive safety measures. Proactive safety leadership is a critical component of their evaluation and promotion. (5)
- ○ N/A (6)

Q34 In KYTC, safety expectations, roles, and responsibilities...

- ○ Are not identified nor articulated to individuals working at the job site. (1)
- ○ Are only clarified after an accident. (2)
- ○ Are only set to meet OSHA requirements. (3)
- ○ Are frequently, clearly, and consistently communicated to employees. (4)
- ○ Are discussed with employees across the entire Cabinet; they are reinforced on a daily basis. (5)
- ○ N/A (6)

Q35 In KYTC...

- ○ There is no safety incentive structure. (1)
- ○ Employees are informed that an event may impact whether or not they will receive a safety reward. (2)
- ○ Employees are told to work safely, and safety rewards are based on not getting hurt. (3)
- ○ Employees are recognized and rewarded for identifying hazards, reporting near misses and close calls, creating safety solutions, and for superior safety performance. (4)
- ○ Safety metrics (based on proactive and reactive measures) are benchmarked against other organizations and used for internal continuous improvement. Everyone is recognized and rewarded for safety performance. (5)
- ○ N.A (6)

Q36 **Improving Supervisory Leadership (Supervisor refers to your direct supervisor)**
For each item below, carefully read the descriptions in each box going from left to right. Select the one that best describes the level of supervisory safety leadership in KYTC.

Q37 In KYTC...

- ○ Supervisors don't have a safety-related vision to share with their crew. Their commitment is primarily to production. (1)
- ○ Supervisors don't have a safety-related vision. When an accident occurs, they tell employees they must work safely. (2)
- ○ Supervisory safety vision consists only of meeting regulatory requirements and avoiding accidents. (3)
- ○ Supervisors talk with their crew about their vision for creating a strong, positive work safety climate. They display that commitment by "walking the talk." (4)
- ○ Supervisors share with their crew their vision for, and display a deep commitment to, creating a strong, positive work safety climate. They inspire and motivate employees to share that same commitment. (5)
- ○ N/A (6)

Q38 In KYTC...

- ○ Supervisors have no supervisory training and have little understanding or knowledge of regulatory requirements. (1)
- ○ After an incident occurs or some regulatory action is taken, there is talk among higher level management about the importance of supervisory leadership. (2)
- ○ Supervisors take OSHA 30-hour training and thus are familiar with OSHA regulations, but they have little or no leadership training. (3)
- ○ Supervisors are trained not only on regulatory guidelines but have a minimal level of leadership training. (4)
- ○ Supervisors are provided with and required to take leadership training that includes topics such as: how to communicate with and motivate team members; how to conduct pre-planning meetings; and how to inspire crew members to also be safety leaders. (5)
- ○ N/A (6)

Q39 In KYTC, supervisors...

- ○ Manage and punish using intimidation, and focus only on individual behavior without taking what may have been a faulty process into account. (1)
- ○ Start caring for their crew and acting as safety leaders only after an incident occurs or regulatory action is taken. The behavior displayed is short-lived. (2)
- ○ "Talk the safety talk" but often do not follow their own advice and expectations. (3)
- ○ Initiate and actively participate in safety program activities that are focused on continuous improvement. (4)
- ○ Instill a sense of safety ownership at all levels. Serve as effective safety communicators, excellent role models for safety and are able to coach and teach. Infuse safety into every meeting. (5)
- ○ N/A (6)

Q40 **Empowering and Involving Employees**
For each item below, carefully read the descriptions in each box going from left to right. Select the one that best describes the degree to which employees in KYTC participate and are empowered to improve safety.

Q41 In KYTC...

- ○ Employees feel no sense of responsibility for their co-employees' or their own safety. (1)
- ○ Employees aren't engaged in promoting safety until after an accident occurs. (2)
- ○ Employees are engaged in promoting safety to the extent that is required. (3)
- ○ Employees participate in all aspects of ensuring a safe job site, beginning at the planning and design stages. (4)
- ○ Employees are empowered and rewarded for going above and beyond to ensure a safe job site. Employees always feel responsible for their and their co-employees' safety. (5)
- ○ N/A (6)

Q42 In KYTC...

- ○ Employee feedback regarding safety conditions and hazard reduction is not sought. They just want employees to "get the job done." (1)
- ○ Employees are asked for safety advice and feedback after an injury or adverse safety event has occurred. (2)
- ○ Employee feedback regarding safety is sought only when initiated by employees or during mandatory safety meetings. (3)
- ○ Management actively involves employees in identifying hazards and solving safety problems by including them in daily pre-job safety and crew task/hazard analysis. (4)
- ○ Management actively seeks employee input on safety. Safety and even non-safety meetings and walk-arounds focus on solving specific problems identified by employees and others. (5)
- ○ N/A (6)

Q43 In KYTC...

- ○ There are no safety committees. (1)
- ○ Safety committees are created only after an incident occurs and do not remain active very long. (2)
- ○ Standing safety committees may exist but they don't carry much weight; meetings may last only a few minutes. (3)
- ○ There is an active management-employee safety committee that provides suggestions and makes recommendations. (4)
- ○ The management-employee safety committee actively seeks suggestions from all employees on the job site and ensures that recommendations are seen through to completion. (5)
- ○ N/A (6)

Q45 **Improving Communication**
For each item below, carefully read the descriptions in each box going from left to right. Select the one that best describes how well management and employees communicate with each other.

Q46 In KYTC...

- ○ Management isn't interested in and therefore doesn't involve employees in safety discussions. No system exists for employees to voice concerns directly to management. Supervisors don't share crews' concerns with management. (1)
- ○ Employees feel comfortable voicing concerns to a supervisor, but not directly to management. Management passes safety messages down to employees only when there is an incident, injury, or negative event. (2)
- ○ Employees with concerns that involve a direct OSHA violation can raise the issue with their supervisor. Management shares safety information with supervisors and employees to the extent it is required (e.g. posting OSHA placards). (3)
- ○ Safety communication is a two-way street. Employees are encouraged to raise safety concerns at any time to supervisors or to management. (4)
- ○ Employees are continually encouraged and rewarded for raising safety concerns and suggesting improvements. Concerns are promptly addressed and resulting changes are communicated back to employees. (5)
- ○ N/A (6)

Q47 In KYTC...

- ○ Injury and illness data are not collected unless there's a fatality that must be reported to OSHA and other entities. (1)
- ○ Injury and illness data are collected, but they are only reviewed after an accident has occurred. Issues are not formally tracked nor are resolutions communicated across the organization. (2)
- ○ Injury and illness data are collected for the purpose of being compliant with OSHA requirements. Supervisors pass safety information onto their crew only when required by management. (3)
- ○ Injury/incident data are regularly and formally collected and shared with managers and supervisors; supervisors are encouraged but not required to share information with their employees (4)
- ○ There are formal systems for gathering injury/incident data and for regularly sharing the information and follow-up improvement actions with managers, supervisors, and employees. (5)
- ○ N/A (6)

Q48 In KYTC...

- ○ There are no safety-related communication efforts. (1)
- ○ Safety-related communication efforts occur only in response to an accident. And even that doesn't always happen. (2)
- ○ Safety-related communication efforts meet OSHA requirements. (3)
- ○ Safety-related communication efforts are made when there's a new standard or policy that needs to be followed. (4)
- ○ Safety-related communication efforts are formalized both vertically and horizontally throughout the Cabinet and on job sites. (5)
- ○ N/A (6)

Q49 **Training at All Levels**
For each item below, carefully read the descriptions in each box going from left to right. Select the one that best describes the degree to which safety training is provided to individuals at all levels of KYTC.

Q50 KYTC...

- ○ Does not provide formal safety training. Assumes employees are trained properly when they come on-site. (1)
- ○ Only provides formal safety training in response to accidents; commitment to training diminishes over time. (2)
- ○ Only provides formal safety training as often as required by OSHA. Majority of training is provided via toolbox talks. (3)
- ○ Provides frequent formal safety training for employees, supervisors, and managers. (4)
- ○ Ongoing safety training is viewed as being critical for continuous improvement. Provides frequent formal safety training to all employees. (5)
- ○ N/A (6)

Q51 In KYTC...

- ○ No certification is required for employees or supervisors. (1)
- ○ Employees and supervisors can voluntarily pursue the OSHA 10-hour certificate. (2)
- ○ Employees and supervisors are required to have only the OSHA 10-hour certificate. (3)
- ○ Employees are required to obtain the OSHA 10-hour certificate. Supervisors are required to obtain the OSHA 30-hour certificate. (4)
- ○ In addition to the OSHA 30-hour certificate, supervisors are strongly encouraged and provided with resources to obtain other certifications (e.g. Safety Trained Supervisor (STS)). (5)
- ○ N/A (6)

Q52 In KYTC...

- Training, if implemented at all, is very general. (1)
- The training that exists is aimed exclusively at individual employee behavior and is developed in response to an accident. (2)
- An off-the-shelf curriculum is used to meet OSHA and management system training requirements. (3)
- Supervisors and managers get training on safety leadership skills, as well as OSHA standards. (4)
- Supervisor-led training as well as peer training is implemented. Training has a heavy emphasis on leadership skills. (5)
- N/A (6)

Q53 In KYTC...

- Neither training nor training needs assessments are conducted. (1)
- Training needs assessments focus on recent accidents only (e.g. a ladder injury will result in training on ladder safety). (2)
- Training needs are based on OSHA standards. (3)
- Training needs are typically identified by supervisors but may also be initiated by employees. (4)
- Employees are integral to identifying training needs and developing materials. (5)
- N/A (6)

Q54 In KYTC...

- There is no training verification process. Fraudulent training cards may even be accepted. (1)
- Training cards or certificates are only investigated after an incident has occurred. (2)
- Training is verified only to the extent required by OSHA. (3)
- Training for all employees, including sub-contractors, is verified regularly. (4)
- Training for all employees, including all sub-contractors, is verified before work is conducted on every project. Knowledge and skill competence are regularly assessed. (5)
- N/A (6)

Q55 In KYTC...

- Trainers have no formal qualifications. (1)
- Because of job site experience alone, senior level employees (e.g. superintendents) are asked to conduct safety training. (2)
- A formal safety curriculum is developed and administered by trainers who meet minimal OSHA qualifications. (3)
- Safety curriculum is developed by highly qualified trainers. (4)
- Safety curriculum is developed and administered by highly qualified and experienced content experts with knowledge of adult learning principles. (5)
- N/A (6)