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A Near Miss: The Lived Experiences of Telecommunication Technicians' Injurious Accidents and Near Misses

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Due to a dearth in the literature, this study was conducted to explore the lived experiences of telecommunication field technicians who have experienced near miss and injurious accidents. Using protection motivation theory (PMT), we sought to explore if, after an accident, a technician would alter behaviors and insights regarding safety practices while executing their job duties. Participants for this qualitative phenomenological study included six telecommunication technicians with an average of 19 years' experience and who had experienced an injurious or near miss accident at work. Findings suggested that after experiencing such an event, technicians demonstrated PMT characteristics including a heightened perception of the severity and probability of a threatening event. Technicians also hold themselves and crew members accountable for safety, believe the industry views worker safety as inconsequential, and that companies and oversight entities should be accountable for enforcement of workplace practices. While many factors influence workplace safety, adopting and enforcing a safety climate that encourages safety practices, quality training, and employee input into the safety climate of the organization, could result in lower injurious accident or near miss accident rate, larger profit margins, and also create a culture of safety that is supported and sustained by employees. Keywords: Health & Safety, Safety & Hazards, Accident, Mental Health, Near Miss, Band of Brothers, Brotherhood, Qualitative, Interview

Introduction

Workplace injuries account for $60 billion in worker's compensation costs per year, which translates to $1 billion dollars spent by employers to pay for these injuries (Smith, 2017). More importantly, workplace accidents cost lives. In 2018, 5,250, or 14 workers per day, died across the United States, a 2% increase from 2017; this equates to a fatal work injury rate of 3.5 per 100,000 full time workers (BLS, 2019). Additionally, the death rate for the wireless construction industry was 7 per 100,000 workers, or double the average rate for all workers, representing a 75% increase from the four fatalities reported in 2018 (Lekutis, 2019). It is also reasonable to assume that many injuries may go unreported to worker's compensation. Often times, workers, regardless of industry, will not report injuries to the employees' fear of dismissal, or other reasons (Moore, et al., 2013; Pransky, et al., 1999; Tucker, et al., 2014). Likewise, many injuries in the workplace go unreported by employers for fear of raised premiums or damaging a positive workplace safety record (Fagan & Hodgson, 2017; Pransky et al., 1999). The telecommunications industry is no exception to these issues.

The Occupational Safety and Health Administration (OSHA) considers telecommunications a subset of the general construction industry. When there is a reported injury or fatality, an OSHA investigator can issue a citation to a telecommunications company under OSHA telecommunications, general industry, and construction standards (OSHA, 2019).

The Bureau of Labor Statistics (BLS) uses the North American Industrial Classification System (NAICS) to code a company. Within that company, employers code employees with the Standard of Occupational Classification (SOC) code based upon the duties they perform. This may result in incomplete information, as not all employers may accurately code workers for the duties which they perform. Commonly used SOC codes for technicians are 492021, 492022, which are labeled *construction* within those SOC categories (Stephens, S., personal communication, January 25, 2019). Furthermore, there are other SOC codes not within construction that may apply to technicians, but it is difficult to determine if the workers coded in those SOC categories actually climb tower structures, and as such, obtaining a completely accurate injury rate is arguably difficult.

There is a plethora of literature worldwide regarding risk assessment, safety behaviors, falls, injuries, and deaths within high-risk occupations and the construction industry, (e.g., Abdelhamid & Everett, 2000; Banik, 2010; Caponecchia & Sheils, 2011; Chi, et al., 2005; Ghani, et al., 2008; Al-Bayati, & York, 2018; Ringen, et al., 2018; Schwatka & Rosecrance, 2016), but a void of research related to telecommunication field workers. A qualitative study is the most appropriate fit to understand the experiences of telecommunication technicians that have experienced injurious or near miss accidents in the field. By understanding the experiences of these workers following an accident, management and industry stakeholders may better understand how to manage crews following an injurious accident or near miss and how to best approach creating a productive and effective safety culture specific for these high-risk workers.

Theoretical Framework

Within the context of this study, protection motivation theory (PMT) is the theoretical lens through which the worldview of the participants is viewed. Introduced by Ronald Rogers, PMT is a model for an individual's reaction to fear appeals, a strategy to motivate people to take a particular action by arousing one's fear (Maddux & Rogers, 1983). Stated most plainly, if an individual faced with a potentially, and likely harmful situation, and there is a reasonable protection strategy to avert the situation, such as a change in one's attitude or behavior (Maddux & Rogers, 1983; Rogers, 1975), PMT suggests individuals will engage in one or more available protection strategies. For example, after experiencing an injurious accident or near miss accident on a worksite, it is possible that a worker may view continued work in the field as noxious, viewing another serious accident or near miss accident as possible. With the availability of a coping response used to divert such an event, such as safety equipment, it is reasonable to assume that a technician's PM would engage, thereby possibly dictating a change in that technician's safety practices or insights regarding job safety while executing their job duties.

Rationale for Evaluating an Injurious or Near Miss Accident

The aim of this study was to explore the lived experiences of telecommunications technicians that have experienced an injurious accident or near misses while on a telecommunications worksite. While an injurious accident is a straightforward concept—an accident that results in an injury—the definition of a near miss accident requires an operational definition in terms of this study. For purposes of this study, a near-miss is an accident on the worksite in which the worker may have suffered a minor injury but eluded a catastrophic or life-threatening injury or possible death. The inclusion of a near miss accident is important because, it is reasonable to assume that a worker may evaluate the experience of a near miss accident as having the potential to have had a much more serious outcome. If the worker

reflects upon a near miss, and understands that it could have ended with a serious injury or death, it is more likely to expect that they would engage in a reasonable protection strategy to avert a similar situation in the future. Given the dangerous conditions under which telecommunication technicians work, accidents that result in minor injuries (i.e., broken appendages, bruises, bee stings, injuries from wildlife, etc.) would not qualify as a near miss accident for this study unless circumstances dictated some possible fatal or catastrophic outcome.

Literature Review

Telecommunications are the collection of networks, applications, technologies, and equipment that allow people to remain connected across distance (National Research Council, 2006; OSHA, 2018). Telecommunication technicians, as they relate to these networks and structures, are a specialized set of construction workers that erect, dismantle, and maintain cellular and wireless communications infrastructure (Bureau of Labor Statistics, 2018b).

The telecommunication technician's employment is transient in nature. Technicians face hazardous workplace conditions, including, but not limited to, exposure to extreme temperatures, animal and environmental hazards, pressurized deadlines from carriers, and extensive overtime requirements (Mroszczyk, 2015). Other hazards include extended work hours, extended periods of driving time from worksite to worksite, poor training, a lack or improper use of personal protection equipment (PPE) from employers (Mroszczyk, 2015), or freeclimbing, the absence of PPE altogether. While many hazards may remain out of the control of the worker or management, others are not. For example, it is a reasonable conclusion that one might expect workers to be more likely to sustain injuries the longer one has worked in the industry, and longer periods that workers remain on worksites (Mroszczyk, 2015). Researchers have validated this conclusion both qualitatively and quantitatively (Dong, 2002; Goldenhar, et al., 2003) by reporting longer working hours over an exacerbated period may increase the risk of injury.

Another element that may influence accidents and injuries is the use of subcontractors. According to Ofori and Debrah (1998), subcontracted workers are at greater risk for injury or accidents because payments and or future returns hinge upon completing the work in the shortest possible timeframe possible. This in turn makes it more likely that contractors or subcontractors will encourage or increase pressure on workers to take short cuts or perform in an unsafe manner, in order to complete the task (Dedobbleer, et al., 1990; Smallwood & Ehrlich, 1999). Additionally, research bears out that smaller companies consider safety a lesser priority and struggle to implement adequate safety programs that will satisfy both general contractors and safety oversight entities such as OSHA (Wilson & Koehn, 2000). The use of subcontracting is a concern in the construction industry regarding accidents and injuries of workers, of which telecommunications is a subset (Blank, Anderson, Linden, & Nilsson, 1995; Collinson, 1999; Lamare, et al., 2015; Muzaffar, et al., 2013; Nenonen, 2011; Quinlan & Bohle, 2008; Rousseau & Libuser, 1997; Saleh & Cummings, 2011). One may reasonably argue this could contribute to a disregard for individual safety measures and the safety culture of the industry as a whole, thereby placing workers at increased risk for injury or death, while other researchers indicated that subcontracting may increase the likelihood of injuries and fatalities being shared throughout the layers of contractors (Johnstone, et al., 2000; Liao & Chiang, 2015). Furthermore, as seen in the literature of construction subcontracting, we believe it is reasonable to assume that such a model could potentially impact other elements of a worksite such as the hierarchy of multi-employer worksites (Wagenaar et al., 2012), safety management by companies (Jacobsson, 2011; Nenonen & Vasara, 2013), and the safety climate of companies and worksites (Bahn, 2013; Lingard, et al., 2010; Wadick, 2010).

Lastly, two other factors are also important workplace safety considerations: company safety culture, and the mental health of workers. Definitions of safety climate vary within the literature. Cooper (2000) defined safety climate as the policies of a company that shape employees' attitudes and actions toward the company's safety and health guidelines. Determining employees' perceptions of a company's safety culture can be of salient value, as it is the potential yardstick to determine if that company's safety climate is considered *good* (Carver, 2014). Conversely, Cox and Cox (1991) posited that the safety climate is the reflection of the collective attitude of an organization's employees towards safety and health initiatives. While safety, training, and business models are important to the workplace, mental health status of employees also play a role in safety. Some of those elements are extended periods of unemployment, travel, drugs, alcohol, dangerous and physical demands of one's occupation, and the relationships of workers with other workers as well as their relationships with their families (Carter, et al., 2012); all of which are pertinent aspects of field work in telecommunications. Telecommunication technicians often spend an inordinate amount of time with one another. Not only do they travel together, and work together, they often live with one another while working on the road, often sharing hotel rooms or small living quarters with up to six people. If crew relationships are unharmonious, it is possible that the stress and distractions of strained crew relationships could lead to mental distraction, an increase in occupational injury, and possible near miss accidents (Iverson & Erwin, 1997; Morgeson & DeRue, 2006). We hope that findings may address this point, as it is unknown how or if workers perceive relationships among crew members as a possible contributing factor to injuries or near misses.

Methodology

Research Method and Design

This study was approved by the Grand Canyon University IRB to explore the lived experiences of telecommunication technicians who have had an injurious accident or near miss accident on a telecommunications worksite. However, a qualitative methodology was best suited for this study, as we were interested in how participants expressed their own perspectives and world view of their experiences of the shared phenomenon. Giorgi (2009) posited that a phenomenological design considers the personal, cultural, and environmental influences of a lived experience (Giorgi, 2009). We used the approach by Giorgi to specifically explore such an environmental influence, namely the workplace environment.

Study Participants & Demographics

We utilized a purposeful sampling strategy by recruiting telecommunications that experienced an injurious or near-miss accident while in the field. Technicians were eligible for inclusion in the study if they were currently or previously employed as an industry certified telecommunications technician, were aged 18 or older, and had received no resource or monetary assistance from Hubble Foundation[1], the nonprofit which is managed by the lead author in this study. The authors were able to recruit 6 participants for this study.

Five participants were male, and one was female. The education levels of participants ranged from no high school to college graduate. One (1) participant did not finish high school, two (2) participants were high school graduates, two (2) had obtained bachelor's degrees, and

[1] Hubble Foundation is a nonprofit that provides services and monetary assistance to families of deceased or injured telecommunication climbers.

one (1) had completed trade school as a welder. The average experience as a telecommunications technician was 19 years, and the average age of participants was 47 years. All participants held active technician certifications save one, who reported never having been required by the industry to obtain such a certification in the late 1960s. Additionally, all participants hold additional training certificates pertinent and specific to the telecommunications industry. Three participants had sustained an injury from their workplace incident that resulted in the experience of pain and or medical treatment. All six of the participants reported having had more than one near miss incident in their careers, knowing another technician that had also experienced a near miss or injurious accident, and knowing either directly or indirectly, another technician that had died in a workplace accident.

Data Collection

Data collection for this study included individual, semi-structured, in-depth interviews, and notes recorded by the author during those interviews. All interviews were audio and visually recorded using the Zoom platform. The authors utilized a social media and email recruitment process directly to the technicians, technician training centers, and through industry published media outlets. Once technicians agreed to participate, they were sent consent forms, procedures, and participant rights information. All participants signed informed consent and returned the consent forms via email. All participants were interviewed via the Zoom platform due to the traveling work requirements of the participants. All names and identifiers were removed from the interview transcripts and replaced with identifiers P1-P6. The authors also made one page of handwritten notes per participant in which participants' moods, non-verbal gestures, or tone of voice was of interest and at what question was being addressed during the interview when these occurred. All data is kept in an encrypted database and on a password protected external hard drive, with only the lead author having access to the data.

Semi-Structured Interviews

Data collection included the use of open-ended, semi-structured interviews. Interviews were audio and video recorded. Interviews addressed telecommunication technicians' experiences of an injurious and near miss accidents on a telecommunications worksite, and safety perceptions following these incidents. Interviews ranged from 56-120 minutes, and averaged 32 pages of raw data, and one handwritten page of notes per interview. Interview questions 3-13 were based upon the theoretical model of PMT and the literature review. The PMT model asserts that once faced with a harmful situation, one's protection motivation activates and causes a change in attitudes or behavior during the incident or should such a situation arise again. Topics of the literature review included workplace safety, subcontracting, safety culture, and worker mental health; these topics were the basis for questions 14-21. Additionally, question one was asked to understand the circumstances of the event experienced by the participant, and question two, an open-ended demographic question, was included to gain a baseline of educational experience prior to entering telecommunications industry.

Per the design, during interviews, minor changes to phrasing of the questions or additional probing questions were used to elicit more robust explanations and to acquire data saturation. When no new data emerged from the interviews, and when we were unable to elicit new information using additional probing questions, requests for examples, or variations of the original questions, it was determined that data saturation was achieved. Member checking was performed fluidly through the interview with clarifying questions and verbal confirmation of meaning, and again after transcription. All participants agreed that transcriptions were an accurate reflection of their interview.

Data Analysis

After interviews were transcribed, the author sent the transcripts to the participants for member checking. All participants agreed that transcriptions were an accurate reflection of their interview. Giorgi's (2009) five-step process was used during data analysis. During the first step of analysis, each transcript was read as the researcher performed bracketing. This allowed the authors to identify and acknowledge, personal assumptions, thus allowing an understanding of the content from the participants' first-person view of the phenomenon (Sorsa et al., 2015).

The second step of analysis was to read each transcript in its entirety to attempt to understand the experience of the participant. Each transcript was printed and read and highlighted using a color-coded system for units to identify meaning, keywords, phrases, commonalities, quotations, and themes that reflected information pertinent to the research question and the theoretical basis of PMT. For example, codes that were interpreted to indicate self-protection on the worksite, changes in safety behavior after expiring an accident or near miss, or codes that indicated a technician's protection motivation were one color for codes related to the theoretical basis PMT, while codes that reflected the participants' experiences regarding companies' or the industry's responses to safety issues were coded another. Once transcripts were hand-coded, the interviews were uploaded into MAXQDA, and the handwritten notes were added to the corresponding transcripts and color coded within the software to match the hand-coded highlighting.

Third, during the second and third rounds of transcript coding sessions, the researchers delineated meaning units of information from the transcripts, marking places where shifts of meaning occurred within the transcripts, and rewriting them in third person. The coded units were also placed into categories and connected based upon how those categories addressed the research question and or the theoretical base. Themes, or a pattern of repetitive descriptions describing the participant's experience (Thomas & Pollio, 2002), also emerged during this step. The fourth step included taking the identified meaning units and into psychological expressions to try to assign possible psychological meanings to the units. Last, descriptive summations were constructed to allow the authors to see the meaning shared among the participants (Giorgi, 2009). During this analysis procedure, four distinct themes for the study emerged. These themes are presented in the next section, followed by a discussion of the results, limitations to the study, as well as recommendations for future research

Emergent Themes

Theme 1: Safety first

The first theme that emerged was that of technician safety as it related to experiencing an injurious accident or near miss accident on the jobsite. All participants acknowledged changing behavioral responses to safety issues on the jobsite after an injury or near miss accident in terms of three main domains: Personal protective equipment (PPE), personal and crew safety, and relationships among crew members.

PPE. Personal protection equipment (PPE) is a variety of equipment worn to minimize a worker's exposure to workplace hazards that may cause serious workplace injuries and illnesses such as "chemical, radiological, physical, electrical, mechanical, or other workplace hazards" (Personal protective equipment [PPE], 2019). Personal protective equipment is paramount to a worker at heights. Properly engaged, PPE can prevent a catastrophic accident or fatality. One hundred percent of participants in the current study made a point to inform the

investigator that safety was of the upmost importance on the worksite, and all reported taking consistent and belabored measures before execution of work to ensure that all crew members' equipment and was functional. After each injurious accident or near miss, all respondents characterized themselves as hypervigilant or overly cautious to ensure proper PPE was being used consistently and properly by crew members; all six participants noted respect and a personal responsibility towards coworkers, specifically as it related to checking their peers' PPE. Regarding the technicians' PPE, all six participants, whether PPE was used correctly, incorrectly, or not at all, at the time of the incident, acknowledged that PPE is not only a requirement, but important in keeping technicians safe from harm while on the job. Participant six's statement is an accurate representation of all participant responses, specifically after the occurrence of an accident of near miss:

> We paid a little more attention to every little detail and every... everything that you could. Watch for this, watch for that. Hey, did you hook this up? You got that on there, before you undo that knot." We were more vocal with each other on our steps and processes. This, not as so much like, I guess you say…, But, you know, trying to be you know, help remind. Because it's just that one little slip of the mind is what gets everybody."

Five participants (83%) all admitted to feeling fear in the injury/near miss incident, having a healthy fear of the job they perform, and grateful for their PPE. Additionally, five participants clearly owned responsibility for their actions regarding the injury/near miss regarding use or misuse of the PPE available to them at the time of their reported incident.

Personal and Crew Safety. It is unreasonable for one to assume that all workers will always remain vigilant, without exception, while on a worksite. For example, free climbing is an event when a worker at heights freely scales a structure with no PPE. Five of the six participants admitted they had free climbed during their career. This action is considered a serious violation in the telecommunications industry and is often a risk not only to the worker, but to coworkers as well. A poignant example from this study that is congruent with the findings of Woolford, Begeja, Driscoll, and Ibrahi (2017) was one participant's confession to free climbing during the near miss incident.

> I knew that I had to get up there because there was gonna be no way that she was gonna fall. I could have took my time to put on my harness, but I didn't think I had that time. It was a hundred feet; I could get there quick.

While workers may perform unsafe acts in an emergency or occasionally as a matter of complacency, participant number six made one comment that underscored the general feelings reported by five of the six participants regarding crew safety and accepting responsibility for not only themselves but others:

> I pay more attention to everyone, no matter how long I have worked with them... You know, before you'd give somebody a little bit more of a, "Okay, yeah, he says he can do this. Watch him for a second." Now it's like, "Okay, well no, let me watch you for a little bit longer there, because I just... I wanna make sure you really know what you're doing here when it comes to safety, because there's not going to be any kind of shortcut. We're not doing that around here.

Relationships with crew members. It was clear through comments made by the participants that telecommunication technicians hold not only themselves, but all crew members personally responsible for the safety on the worksite, including mistakes made that result in an injurious accident or a near miss. In addition, the crew members process conflicts internally as a pseudo family/brotherhood before bringing the incidents to the attention of management of the companies they work for, or other industry stakeholders. If mistakes were made by other crew members that caused an incident, all participants agreed that addressing an accident as a crew was important, and most technicians in this study didn't report accidents, unless very severe or accidently discovered, when they felt it could be handled within the crew. As was the case with one participant,

> They [management] would've had a safety meeting, everybody would've come in and... It would've been a huge ordeal, n' would've been a ton of money lost. In our case w-we were actually able to keep what could've been a very, very, very, serious injury- sigh- I probably shouldn't say this but, totally hidden until I accidentally spilled a salt shaker in my hand at the company Christmas party.

Additionally, technicians reported experiencing aftereffects such as anxiety, depression, fear, or PTSD, from an injurious accident or near miss, but only one participant reported seeking professional help with his condition. A common response to this across participants is illustrated in comments made by participant 4: "we were just in there, kind of getting smashed, you know, talking about what happened," and participant 1: "it's kind of like paramedics and doctors, soldiers. Um, you learn coping mechanisms. Uh, you learn how to get it out without necessarily sitting down and talking to a psychologist, a psychiatrist, or, uh, a professional." Five of the six participants reported not receiving professional services in response to the accident or near miss, but due to the nature of one participant's injuries, that participant did report seeking assistance, in addition to speaking with crew members, and reported it was the best thing he has done since the accident: "now that I'm living it [PTSD], it's a whole different bear, you learn so much of it. And, uh, basically with uh- the counseling, it does help."

Theme 2: Accidents and near misses are everyone's responsibility

The second theme that emerged from the interviews was that that technicians believe injurious accidents or near misses to be the fault of both industry/company and the worker. While it was clear from participant responses that personal responsibility is important due to the self-guided work performed by technicians and crews in the field, the company owners, the telecommunications industry as a whole, and oversight entities such as OSHA, should be accountable for technician safety and enforcement of workplace practices. All participants in this study relayed feeing unappreciated, inconsequential, or endangered when the industry and individual companies' concerns lie with deadlines and profits rather than the safety and effectiveness of the crews in the filed performing the work.

Companies and Industry. One clear sentiment present with 100% of this study's participants was experiences and feelings of frustration, resentment, and anger with the telecommunications industry and the individual companies that have/had employed them, either presently or in the past for what can be interpreted as a lackadaisical, nonchalant, or grievous disregard for safety training among telecommunication technicians. Information from participants, one, two and three demonstrate the sentiment well. Participant one stated "it was pretty much like they didn't care. Um, you know, even, even when we pushed it up the food

chain, uh, and filed incident reports, uh, we still got burned the next day." Participant two recalled "They don't listen to what we have to say..." and participant three indicated resentment and anger by stating:

> But that fueled my anger because they had someone on the site who should've been trained to operate the cat-head, which is a piece of equipment that everyone should know how to operate, and they he- uh, was never properly trained and he attempted to correct what he thought was a mistake in the way that the hoist was secured, but he caused the capstan to fail, and subsequently, nearly caused me to lose my hand.

While a direct question was not asked of participants regarding company safety climate, safety climate is a reliable indicator of the regard a company has towards its employees (Cooper, 2000; Cox & Cox, 1991; Zohar, 1980). Responses from participants clearly indicated that few companies which employed them valued the safety of the technicians or a safety imbued workplace culture. Additional comments ranged from profits over people to disregard to unsafe work practices or unsafe structures they were required to climb as seen by these three participants.

> Participant 05: The industry is slowly getting worse now. There's that love and hate relationship with it, but unfortunately, the carriers are now saying our lives now worth a ittle bit less, because now, you know a P.O. for the subcontractor like us that would have been $80,000 dropped down to $30,000, $32,000. So, they show more and more every day they don't give a **** about us. We have to work more for less pay.

> Participant 02: You know, I, I've had, I've had my, for lack of better, I've had my ass chewed. Uh, because we shut down a site, uh, during a football game in Houston, Texas. And, uh, we got the lecture of, uh, "You, you cost us $20000 a minute."

> Participant 04: Every issue that comes up and they design these towers and just discuss with [regulating entity] and, uh, uh, we're in strict compliance with all the regulations. And some of them are just practically ridiculous. But I can't understand for the life of me how I can go out on one of these, uh, say [company name] towers and pack more work on them. I refuse to even do anything on some of these cell sites, uh, and especially monopoles… There's no consequence and I don't think it's going to change until the guys with the big bucks start, uh, you know, start where they have to suffer some consequences at this point in time.

Personal Worker Responsibility. Participants also agreed that workplace safety requires personal responsibility toward safety in the field. All participants made comments that not only their safety, but the safety of others was paramount, participant one's comment is a standard reflection of six participants:

> Participant 01: I've been called a safety nerd, a safety snitch, anything you can think of because, my only goal is life safety, no matter what. Whether it's my life safety, that of another tower hand, a bystander on the street. We can't afford, we can't afford the loss of life. We can't afford an injury.

Participant 05 was particularly clear how the perspective had changed since the near miss incident:

> I'm a lot more conscious now. I, where before, I would just push, push, push myself to do things, that maybe I couldn't do, or not couldn't do, but take long to do. Now I'm really quick to say no, I'm just not having it.

Furthermore, four of the six participants were clear to voice that they often made changes to ensure everyone knew the safety measures, regardless if they had been properly trained by the company. When situations of safety in the field are rectified, it is usually by the crew or crew member that experienced said injurious accident or near miss rather than management. One participant commented that after his accident, where a crew member had not been trained by the company properly, that the crew took training matters into their own hands:

> As a crew we started working with him, and he started learning on the cat-head. Uh, everybody got uh, a better game plan together, as far as how the cathead was to be operated. We went over the, the-the proper ways of, as we'd call "dogging it off," which is securing your load to the capstan hoist so that it can't slip through and un-spool itself.

Theme 3: The Industry does not take training seriously

The third theme that emerged from this study was that participants felt as though the industry does a disservice to technicians in the field by providing no training or substandard training to industry workers. All participants had made comments about companies that were exceptional in training, but every participant also noted that those companies are few. Often, participants voiced concerns that smaller companies did not adequately train workers, and even larger more established companies utilized training programs that participants believed are dangerous or ineffective; the promulgation of safety as a priority by industry stakeholders is often viewed as laughable by technicians in the field.

Training. Training of technicians was a major theme within the interviews that all participants regarded as extremely important to performing their job safely and effectively. As mentioned earlier, all participants expressed the importance of technicians being properly and formally trained. Fifty percent of participants noted that hands on training before job placement was critical. These three participants also stated that the best training they received had been not just classwork, but demonstrable, hands on training.

> Participant 03: There's a huge difference in doing a tower rescue off of a-a real tower, where you have to climb up to 120 feet and rig the rope with uh... You know, and you're not in a controlled environment, and you have the wind, and you've got the cars racing by you, and you have real distractions.

During the interviews, all the interviewees made statements that in addition to classroom training, on the job training was essential to learning the trade:

> P01: I believe in the old boy network. I think you need to learn from the ground up and start, you start on the ground. And you learn how to tie knots. You, uh,

> you learn how to terminate cable. Uh, you learn how to build a site before you ever get to climb or work at heights.
> P03: I couldn't have asked for a better way to get into the tower company. They didn't take shortcuts. They didn't screw around. Their crews, if you were green, you were taught from the ground up. You didn't get thrown a belt on and see how you do up there. You literally learned what the hell you needed to learn on the ground. Which is the way I've always after that always taught anybody that was underneath me.

However, one industry training practice vehemently disliked among participants is *train-the-trainer* program; sometimes referred to as *in-house training*. In the telecommunications industry, an industry-wide practice is for a company to send a technician to a training class, which would enable them to return to their company as a certified trainer. According to participants, train the trainer programs allow technicians to pass through training with no accountability. Three participants stated that many times, they, or in their training class, were provided answers by in-house instructors, or given a *pass* because of the number of years they had worked in the industry. Poignant statements from participants reveal their discontent with such practices:

> P06: [Some companies] give you a test that's designed for you to pass If you have done it before then, it's like here take a test, there you go... Bye!

> P02: I had one company come in for me workin' in Chicago, where they all had [X-Company] cards, they all had cert cards, they all had OSHA-30 cards, and half the xxx idiots couldn't even put a belt on right…. This guy gets a [X-Company] training certification and he gets pushed through because they just need a XXX body out there.

Theme 4: We are a brotherhood

The fourth and final theme that emerged across all participants was that of brotherhood. With no exception, all participants agreed that a crew that travels extensively together forms a pseudo-family unit. Terms indicating this brotherhood included references to 'intimacy' 'connectedness,' 'trust,' or 'respect.' Two participants noted the development of family roles among crew members, such as a 'crew mom', or 'crew disciplinarian', and three participants included viewing other crew members as a mentor or role model. Like family members following a serious incident, all six participants stated that relationships and evaluations of crew members were changed or altered, if only temporarily, following a near miss or injurious accident. While some participants noted being frustrated or angry with crew members after such an incident, five participants noted that the intimacy of brotherhood would enable a crew to regain equilibrium, except in cases where crew members were determined to be a safety risk to the other members due to drug use. Almost all comments regarding crews as family were similarly worded to Participant 5:

> Crews spend more time together than they do with their own families. You become a family unit because you're together so much. When you're having to worry about somebody else's welfare, it, it, it makes them part of your family.

After one participant described the injurious accident he endured, the participant noted that the incident was not immediately reported to management and, instead, the injury was

discovered by happenstance at a company gathering. The participant and his crew had collectively decided not to inform management, but rather, press forward to complete their deadline on time.

> We were all kinds of impressed with ourselves, as a crew. Had that have been any other crew... it would have shut the entire company down. They would've had a safety meeting. Everybody would've come in and... It would've been a huge ordeal and would've been A ton of money lost. In our case w-we were actually able to keep what could've been a very, very, very, serious injury totally hidden until I accidentally spilled a saltshaker in my hand at the company Christmas party, in front of the president of the company, no one knew. So, everybody was impressed that we were kind of able to keep going, and just roll straight through it.

The authors found this interesting in that the participant's comment could be construed as dismissive or deflective about not reporting the near miss/injury to supervisors. The participant's comment, while intended as an explanation, clearly illustrates the mentality of brotherhood among telecommunication technicians noted by all six participants in their interviews.

Discussion

The purpose of this study was to explore the lived experiences of telecommunication technicians that have experienced an injurious accident or near miss, and based upon a survey of the current literature, this is the first qualitative study of this under researched population. While we can make comparisons to construction, as telecommunications is a subset of the construction industry, this particular population of workers is also exposed to a substantially higher-risk work environment. However, through thematic analysis of the interviews, we did find consistency with existing literature and the chosen theoretical foundation.

Congruency with Theory. It was our assertion that after having experiencing an injurious accident or near miss accident on a worksite, technicians may still view work in the field as harmful and even dangerous, but that that one's protection motivation (PM) would engage. One's PM would theoretically promote the technician to utilize a coping response (e.g. appropriate safety actions, use personal safety equipment, safety changes to the way a technician addressed personal or crew safety issues with crew members) to address possible worksite threats or dangers. As expected, authors did find that after experiencing such an event, telecommunication technicians demonstrated PMT characteristics. Through participant responses, it was clear that after an accident, technicians' PM did engage after an accident or near miss incident, and afterwards in subsequent work related activities in the field, technicians did take additional precautionary measures to avert future incidents or to take corrective actions from mistakes that resulted in the injurious accident or near miss. In most of the injurious accidents or near miss incidents relayed to the authors, a technicians' PM did engage even prior to these incidents, although not in every instance. It could be that the engagement of PM is heightened after a serious accident or near miss due to hyper-awareness.

Congruency with Literature. Themes that emerged from our study appear aligned with current literature in the construction industry and workplace safety. According to the literature, several factors can affect worker safety, including the company's safety climate (Cooper, 2000; Cox & Cox, 1991; Zohar, 1980) and co-worker perceptions (Brondino et al.,

2012; Brown & Holmes, 1986; Choudhry, 2012; Schwatka & Rosecrance, 2016). A company's safety policy determines that company's climate (Di'az & Di'az, 1997), and company safety practices affect training (Lindell, 1994), and coworkers' perceptions of safety affect the workers' safety behaviors and the company's commitment to safety (Schwatka & Rosecranceb, 2016). This is accomplished by creating a productive and effective safety climate including elements such as adequate training, motivation, communication, and teamwork (Misnan and Mohammed, 2007; Misnan, et al. 2008).

The theme regarding training that was bourne from this research appears consistent with the literature in that every participant reported experiences with companies, and the industry, of not taking training of technicians seriously. Often participants reported the telecommunications industry and individual companies as promoting profits and deadline expectations over a positive safety climate and policies address worker safety. One hundred percent of participants were adamant to point out that in their experience, training is not only poor, it is often times rigged or nonexistent solely to promote technicians to begin work, thus leaving technicians ill-prepared to execute their job duties.

Additionally, the results regarding the theme of accidents and near misses being the responsibility of everyone's responsibility, were congruent with the experiences of the participants. All participants indicated that safety of the crews working in the field were influenced heavily upon coworkers' perceptions and behaviors amongst crew members on the jobsite. Participants reported that crews that adhere to safety measures, and have good jobsite leadership were, in their experiences, more productive, and more apt to engage in higher quality on the job training experiences for crew members. Conversely, most participants indicated that when leadership is poor, and jobsite leadership is lacking or is promoting a poor safety climate promoted by the company, technicians are more likely to disregard rules to ensure job completion, even at the expense of worker safety.

We also found our findings regarding the theme of brotherhood to be consistent with the extant literature. A near miss or an injurious accident in telecommunications work is a crisis in the workplace. A crisis brings about stress which has an impact on how the team goes about the day-to-day function of the work. Stress is a relationship between demands and resources; one has the demand but may not have the resources to meet it (Zeynep, 2013). In the case of a crisis, the demand may be for stability, which may be in short supply in the initial hours of the crisis. Other potential sources of stress related are environmental factors (exposure to hazardous or high-risk work conditions), organizational factors (some may lose their jobs), and personal factors (an employee is injured during the crisis), as noted by Morgeson and DeRue (2006) and others. The consequences to employees are physiological, psychological, and behavioral because individual responses determine one's response to stress (Stewart, 2007). However, the social sharing of emotion through a brotherhood support system then transcends a short-term experience (a near miss) into a long-term emotional journey experienced through community (Rimé et al., 1991) to turn a negative experience into a positive one.

During the interviews, every participant agreed that there is a bond among telecommunication crews that is akin to a "brotherhood" or "pseudo-family." Each participant reported or described crew relationships as something that is crucial to the overall functioning of the crew. This bond is expressed in a variety of ways including intimacy among crew members by traveling for months at a time, sharing life events, concerns, frustrations, personal and work experiences, and by using corrective action among crew members similar to parent-child, or sibling relationships; one participant illustrated this by explaining that crew members have often been dubbed with family-like titles such as "crew mother." Another participant also went to great length to explain a father-like relationship / mentor relationship among a substantially older crew member, with that of a young, rather inexperienced crew member, that had been responsible for the participant's injurious accident. Descriptions of the relationship

between the older mentor and inexperienced crew member included constructs of guilt for not having taught the younger member more efficiently, like that of a father feeling guilt for not having taught a child well. Still, two more participants made distinctive statements that they often had experienced a relationship with crew members that were closer than those relationships shared with their own family members.

In terms of the first theme of safety related to personal and crew safety was consistent with the existing literature. It has been reported that when faced with procedures such as feedback, encouragement, incentives, or monitoring from an employer, that employees will alter behaviors to achieve a more favorable outcome (Choudhry, 2014). Similarly, the opinions of coworkers have also been reported to influence the behaviors of other workers in construction crews (Schwatka & Rosecrance, 2016). The claim of responsibility and the answers regarding decision making from the participants in this study is aligned with Schwatka and Rosecrance's study (2016) which reported that co-worker's safety commitment had a significant direct relationship with safety behaviors. While Schwatka and Rosecrance's study (2016) was quantitative, we also feel the experiences by our participants reflect consistency with this finding in that 83% of this study's participants reported changes to their own personal safety actions and those safety actions that related to their crews following an injurious accident or near miss event.

Participants also reported experiences consistent with previous research in terms of personal safety, crew safety, and the use of PPE. Beheshtifar and Nazarian (2013), reported that cognitive processing, stress, mental health issues, and a host of other issues may distract even the worker most dedicated to safety We found similar parallels in that all participants in this current study reported their outlook and actions to safety on the work site during their careers, as sometimes complacent and forgetful, to safe and appropriate, to hypervigilant even before the accident / near miss incident, not just afterwards.

Two-thirds of the participants did explain instances where they had been distracted by personal matters, stress, or inattention and had made safety errors. In the case of two participants, inattention, the stress of the reported accident or near miss, anger, or frustration played some role in response to safety measures either after or during the incident. This appears congruent with literature that when confronted with a dire workplace safety event, such as a serious injury or possible fatality, workers may not logically think thoroughly scenarios before acting (Woolford, et al., 2017). A poignant example from this study that is congruent with the findings of Woolford, Begeja, Driscoll, and Ibrahim's (2017) was one participant's confession to free climbing during the near miss incident.

There is a dearth in the literature on the perceptions or experiences with mental health counseling following a traumatic event for those in construction or telecommunications, thus there is not any pertinent literature with which to specifically compare our theme. Based on mental health research we can only extrapolate the ifs and whys of workers in these occupations as it relates to the use of professional counseling. However, it is an important theme that emerged within this study. In terms of the first theme of safety related to relationships with crew members regarding workplace safety, five of the six of the participants reported experiencing health issues including disturbances of mood, increased stress or anxiety, and the occurrence of nightmares, the technician may be more likely to share those effects with other crewmembers rather than company management, other technicians not within that technician's work crew, or a professional counselor. The participants of the study readily reported that they hold themselves and crew members personally responsible for the safety on the worksite, but that even after an incident, they were unlikely to seek out or accept professional counseling to process the events leading up to or following an injurious accident or near miss. Rather, the participants reported that they were often more comfortable processing the events within the confines of the crew involved.

Unexpected Themes. In addition to the four themes discovered in our research, several unexpected or minor themes also appeared throughout the interviews. The minor themes include mental health/counseling, drugs and alcohol in the workplace, and relationships following an injurious accident or near miss. While not enough data was gathered on these minor themes, it may be beneficial to explore these areas regarding telecommunication technicians and other industrial occupations. Specifically, it may be beneficial to explore these areas to see how and if changes to a worker's mental health, use of substances, and relationships influence safety, use of PPE, or ability to perform job duties, even if the changes are only temporary.

Limitations. Several limitations were present with this study. First, telecommunications technicians often work long hours, and travel frequently, thus leaving little time for interviews. Due to the limited amount of participants, generalizing the study results to all telecommunication technicians as a population, or the entirety of the construction industry is limited. While the findings were interesting and offered researchers several possibilities for future research, a larger sample size may be needed to fully understand the influence of near-miss accidents on personal, crew, and company safety culture in a broader industry context. Third, five of the six participants reported they had acted as safety managers or safety leads on crews they managed, thus the data may have been skewed. Additional limitations included, fears of losing employment if employer believed participants were involved with the study, limited technological skill using the interviewing platform, and participant responder bias to the lead author. The lead author, as president of a nonprofit organization that advocates for safety and assists families after death or injury within the industry, may have consciously or unconsciously influenced participants' responses.

Implications & Directions for Future Research. Considering the findings and limitations of the study, researchers recommend several options for future research. First, because of the nature of the type of work involved with telecommunications, it may be beneficial to examine worker safety, safety culture of the industry, and effects from experiencing a workplace accident using a quantitative methodology. The availability of a secure online survey may garner more participants and large datasets and better generalizability. However, it is also recommended that future research continues to additional qualitative studies with longer periods for participant recruitment and participation. It may also be useful to use a narrative or descriptive design to ascertain the stories and descriptions of technicians regarding workplace safety, or other specific occurrences such as a fatality in the workplace. The work of these technicians is high-risk, and deaths of technicians are often violent and sudden, and based upon almost half of the participants witnessing, and all participants hearing of a fatality of someone they had worked with, it would be a valuable avenue of exploration, not only in regard to workplace safety, but to educate employers on best practices for addressing mental health issues of their employees following a fatality.

Other recommendations include exploring technician workplace accidents longitudinally, either quantitatively or qualitatively, as all participants had been involved in, or at a minimum witnessed, numerous accidents throughout their careers. Cumulative effects of experiencing such events would also be beneficial to creating safety cultures, and empowering workers to feel more empowered in the workplace in suggesting recommendations around creating that culture.

The personality of technicians also emerged as a point of interest within this study. during the interviews, participants often gave self-evaluative remarks indicative of their personality. Five of the six participants reported having an "alpha personality," three described themselves as "intelligent," "assertive," "brainy/nerdy," "introverted," or "persistent."

Arguably, intelligence, attention to detail, assertiveness, persistence, and introverted personality types are not mutually exclusive to also having a personality that one may describe as "tough" or "alpha," but it would be an avenue for research to see if there is any relationship between personality types and involvement in injurious accidents or near misses. Lastly, based upon the lead author's position in the industry as a non-profit provider for injured workers, families of deceased technicians, and as an industry safety advocate, this, it would be beneficial for a researcher in workplace safety to replicate the study with telecommunication technicians to see if results are congruent with this study.

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