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Command vs. self-regulation in construction safety : a case study of CHASE

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COMMAND VS. SELF-REGULATION IN CONSTRUCTION SAFETY

A CASE STUDY OF CHASE

BY

AMELIA SCHARRER

B.S., RENSSELAER POLYTECHNIC INSTITUTE – 2004

THESIS

Submitted in Partial Fulfillment of the

Requirements for the Degree of

Master of Science

Civil Engineering

The University of New Mexico

Albuquerque, New Mexico

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Dedication

This thesis is dedicated to the strong, smart, educated women who blazed my path. You made it possible for me to be a 3rd generation woman holding a master's degree.

Mom, Grandma – I love you.

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ABSTRACT

According to the Bureau of Labor Statistics in 2009 there were 816 fatal injuries in the United States in the construction industry. Reducing injuries and fatalities on construction sites is good for workers, contractors, and owners. Occupational Health and Safety Administration (OSHA) was created to ensure the safe and healthful working conditions for all working men and women. In order to achieve this goal OSHA has been setting and enforcing standards with a "command-and-control" system, outreach, education and assistance. However, incidents still occur on construction sites. The gaps within the "command-and-control" system have lead researchers and industry to look at other methods to improve the safety and health of workers. One such method is self regulation. Self-regulation allows companies with a proven history to regulate themselves. Self-regulation involves delegating some of the authority formally held by the government to industrial associations and individual firms.

The OSHA and the Associated General Contractors of America founded the Construction Health and Safety Excellence (CHASE) partnering program. Using the CHASE program in New Mexico as a case study, the effectiveness of the self-regulation vs. “command-and-control” approaches on injury and incident rates has been studied.

This research determined that there was evidence that members of the NM CHASE program have lower incident rates then non-members. This research also determined that joining the NM CHASE program had an impact on contractor’s safety culture.

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List of Terms

American Bar Association (ABA)

Associated General Contractors (AGC)

AGC New Mexico Building Branch (AGC NM)

Bureau of Labor Statistics (BLS)

Construction Health and Safety Excellence (CHASE)

Construction Safety Excellence Demonstration Program (CSEDP)

Environmental Protection Agency (EPA)

Experience Modification Rate (EMR)

New Mexico Occupational Health and Safety Bureau (OHSB)

New Mexico CHASE (NM CHASE)

Occupational Health and Safety Administration (OSHA)

OSHA Field Operations Manual (FOM)

Total Recordable Cases Rate (TRCR)

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Chapter 1: Introduction

1.1 Background

In 2009 there were 816 fatal injuries in the United States in the construction industry (US Bureau of Labor Statistics, 2009a). Fatal work injuries involving construction laborers accounted for approximately one out of every four private construction fatalities in 2009. The construction industry is a very dangerous field.

> Assuming a 40 year work term for the average worker, the current fatality rate in construction corresponds to a 1:165 chance of being killed at work. It is almost inevitable that an individual worker will experience several reportable non-fatal injuries over the course of a working lifetime in construction. (Vedder & Carey, 2005)

Within the last several years, reductions in accidents and injuries have reached a statistical plateau (Construction Industry Institute, 2008;US Bureau of Labor Statistics, 2009), and it appears that governmental compliance is ineffectual in further advancing the cause of safety in the workplace (Rechenthin, 2004; Weil, 1996). Research into improving construction site safety is moving away from prescriptive legislation and focusing on improving the "culture of safety" on construction sites (Antonsen, 2009; Choudhry, Fang, & Mohamed, 2007; Crossman, 2008; Jaselskis, Anderson, & Russell, 1996). Current research is being done to increase the development of safety culture within the construction industry (Artis, 2007; Tanner, 2003). Researchers have declared that, "a safe

workplace is central to our ability to enjoy health, security, and the opportunity to achieve the American dream" (Soediono & Kleiner, 2002). In addition researchers are increasingly acknowledging that organizational factors are important in workplace safety (Hofmann, 1995; Hurst, Bellamy, Geyer, & Astley, 1991). This trend indicates that as an industry, the construction field needs to implement new methods to continue bringing down the rate of injuries.

Currently the Occupational Health and Safety Administration (OSHA) oversees the health and safety of all workers in America. OSHA has traditionally approached regulation with a "command-and-control" approach. Compliance is won due to fear of punishment in this punitive system. (Rees, 1988). The OSHA model also "presumes that market incentives to reduce hazards are so imperfect that the threat of citation and penalty is necessary for worker protection" (Silverstein, 2008). The current OSHA model assumes that when all employees are held to the same standards, with the same punishments it becomes difficult for unscrupulous employers to attain a competitive advantage by saving on health and safety measures (Silverstein, 2008). Since OSHA's inception this method has been part of the decrease in injuries seen on job sites. However, researchers disagree if this is the best model for regulation. Research has shown that inspection has a modest effect on a firm's OSHA compliance (Weil, 2001). Research has also shown that the cost associated with injuries such as workers' compensation policy pricing plays a role in safety complacence (Weil, 2001). However, even with OSHA in place the cause of most workplace fatalities are predictable and preventable (Silverstein, 2008). The construction

industry is vocalizing these concerns and seeks regulator relief from the faulty traditional “command-and-control” model.

One method that is attempting to provide regulatory relief is partnerships between governing bodies and the construction industry, such as a partnership between OSHA and contractors. Partnerships are a form of responsive regulation which creates a voluntary compliance system. These partnerships allow for different standards of regulation. Companies that have a proven track record of compliance are allowed to self-regulate, which leads to higher voluntary compliance. Due to a lower cost, the voluntary compliance model claims to be more effective than the “command-and-control” method currently used (Shapiro & Rabinowitz, 2000). Researchers have also shown that voluntary compliance can overcome the hostilities and resistance to regulation often exhibited by the regulated (Ayres & Braithwaite, 1991). However, there are faults in every system. There is fear that if companies are not treated equally, some may try to take advantage of the system by skirting responsibilities once they have become self-regulating.

Both the “command-and-control” and the self-regulating approaches are essential to regulatory policy programs. Neither approach can be dismissed, and yet both approaches have drawbacks. OSHA and the Associated General Contractors of America (AGC) founded the Construction Health and Safety Excellence (CHASE) partnering program. Using the CHASE program as a case study the effectiveness of the self-regulation vs. “command-and-control” approaches on injury and incident rates has been studied.

1.1.1 Purpose of the Study

The CHASE partnership charter mutually recognizes the importance OSHA and AGC in providing a safe and healthful work environment in the construction industry (Associated General Contractors of America, 1998). To achieve each party's goal, the partnership strives to create a relationship that encourages mutual trust and respect for each organization.

The New Mexico CHASE (NM CHASE) program started in 2001 with an agreement between New Mexico Occupational Health and Safety Bureau (OHSB) and the AGC New Mexico Building Branch (AGC NM). The goal is to reduce injuries, illnesses, and fatalities in the construction industry. According to a study done in 2002 and 2003, the rate of incidences measured by days away, or with restriction and/or transfer, dropped for contractors that participated in the NM CHASE program (Associated General Contractors - New Mexico Building Branch, 2007). This study seeks to understand if that drop was a one year phenomenon or if lowered incidence rates has become a long term trend. If the NM CHASE program is effectively lowering incidence rates this study also seeks to understand what makes the NM CHASE program effective.

In addition this study also seeks to look at the difference in injury and incident rates of companies currently under the "command-and-control" regulatory approach, non-NM CHASE members and the CHASE members who self-regulate.

1.1.2 Research Questions

The following research questions were developed to guide the study.

1) Is the NM CHASE program, a self-regulatory program, effective at lowering incident rates below that of the standard “command-and-control” program?

2) How does joining the NM CHASE program change safety culture within a company?

Guidelines for each research question were developed in order to limit the scope of this research. To assist in the first answering question, incident rates and EMRs were collected. The incident rates for NM CHASE members and non-NM CHASE members were compared. There was also a comparison of a company’s incident rates pre-NM CHASE and post-NM CHASE. In addition, the EMR of NM CHASE members and non-NM CHASE members were compared.

To assist in answering the second question, in person semi-structured interviews were completed. The questions in the interview centered on three topics.

1) How did the health and safety program at your company change after joining NM CHASE?

2) How did your relationship with OHSB and other safety professionals change after joining NM CHASE?

3) From the perspective of your employees - how did your company's overall safety culture change after company joining NM CHASE?

If the interview indicated that there was a perceived change in safety, a series of follow-up questions was asked regarding the apparent reasons behind the change.

1.2 Methodology Overview

This research began with an extensive literature review pertaining to current safety standards, the NM CHASE program, partnerships with regulatory bodies, and construction safety culture. The literature review led to the development of the research questions. To answer the research questions, two methods were used, a survey and a case study. An online survey was developed to answer the first research question. This survey consisted of questions regarding a company's membership status in NM CHASE and reported incidents for the past five years. A copy of the survey can be found in Appendix A. The qualitative data from the case study was analyzed using standard statistical analysis including techniques suggested by Mulberg (2002) and Yin (2010).

The data collected from the survey showed minor difference in the incident rates of NM CHASE and non-NM CHASE members. During the first stage of research, a series of very informal interviews took place to gauge AGC-NM members' opinions about NM CHASE. These surveys indicated that although very little difference was seen between the incident rates of NM CHASE

members and non-members, NM CHASE members truly believe that NM CHASE is important and useful program. These results lead to the development of a case study that asked why NM CHASE led to a change in perceived safety culture. The case study consisted of in-person semi-structured interviews. A protocol was developed and utilized during the interview phase to increase the reliability of the study (Yin, 2003).

Chapter 2: Literature Review

To help facilitate the research goals, an extensive literature review was performed. The review included the following topics: safety on construction sites, OSHA, governing body partnerships, and safety culture. The literature review includes: journal articles, conference proceedings, books and dissertations.

2.1 Safety on Construction Sites

Researchers have made it clear that accidents on construction sites harm everyone involved. With this in mind, measuring safety performance may be a critical part of limiting accidents. OSHA is in charge of collecting and collating data regarding illnesses and injuries that occur on the job. This data allows for the calculation of safety performance indexes such as: number of disabling injuries, injury frequency rates, injury severity rates, accident costs, number of deaths, number of first-aid cases, recordable occupational illnesses, and total injury rates.

2.1.1 Safety Metrics

Even with these metrics in place, there is no standard method for measuring safety performance on construction sites. OSHA requires companies to fill out the 300a reporting form (Occupational Safety and Health Administration, 2002a). To fill out the 300a companies must report on the following data:

- Cases with days away from work -
- Cases with transfer or restriction

- Other recordable cases
- Workplace fatalities
- Hours worked by all employees

A different method that is used to measure safety performance is the Experience Modification Rate (EMR) (Everett, 1995). The EMR is not collected by OSHA but is frequently adopted by insurance companies to adjust worker compensation premiums (J. Hinze, Bren, & Piepho, 1995). A company's EMR is based on the past three year's experiences. Some researchers believe that using EMR to measure safety performance is a dated method (Hinze & Godfrey, 2003). The EMR is based on claims to a company's worker compensation. If a company can self-insure for some injuries, or if they simply chose to pay a worker out of pocket, their EMR will not reflect their actual incident rate.

2.1.2 Safety Performance Measuring Frameworks

Several researchers have also developed frameworks for companies to measure their own internal safety levels. Ayomoh and Oke (2006) proposed a model that treated optimization factors as goals while using a hybrid structural interaction matrix. Nine safety factors were given different levels of priority and then applied to the interaction matrix. The result was an easily adaptable and integratable model of a company's safety program. The goal was to use this model to create an enduring awareness of safety to all stakeholders.

Shannon et al. (1998) presented a series of questions that should be asked about safety programs before implementation. Research was also done

comparing different safety programs. One method of checking the validity of a safety program the researchers presented, was to have firms to adapt one another's programs. The researchers understood that this proposal would be difficult to implement, and suggested that a company could have a more effective program simply by asking the presented questions (Shannon et al. 1998).

These frameworks stress the importance of evaluating workplace safety. There is evidence that many safety programs are implemented with no way to prove their effectiveness. Johnston et al. (1994) collected and investigated studies that had been done on training programs between 1978 and 1992. The study that Johnston et al. (1994) completed looked at each previous study's outcome variable, method to test success, and results. In many cases the methods to test the success of the training programs were lacking or incomplete. Johnston et al. (1994) called attention to the need for effective training, which includes follow-up to assure that the training was, in fact, effective.

Schulte et al. (1996) suggests that the field of occupational safety and health does not fully understand what works, and what does not work, to control and prevent occupational diseases and injuries. This is due to not having a rigorous history of research. In order to correct this, Schulte et al. (1996) suggest the following three prong approach. The occupational safety and health field needs to focus on intervention research. They need to draw from other research fields such as epidemiology and clinic trials. And lastly they need to understand that both experimental and non-experimental approaches have value. If these

strategies can be put in place, the occupational safety and health field could grow into a better understanding of how to keep workers safe.

The goal of the frameworks presented is to give companies tools to optimize their safety goals. All of these techniques have been used widely by companies, academics, safety professionals, and the government. However, all measures of safety are passive, they assess injuries after their occurrence. The goal of safety programs is to prevent accidents.

2.1.3 Accident Causation Theories

In order to understand accidents, the factors that caused the accident must also be understood. Researchers have been working since the beginning of the 20th century to develop accident causation theories. (Goetsch, 2009; Heinrich, 1980; Vincoli, 1994) Some of the theories that have been developed are listed.

Domino theory - Heinrich believed that accidents result from a chain of sequential events. If a key event is removed (such as unsafe condition or unsafe act) the metaphorical line of dominoes will not fall, which prevents the accidents from occurring (Heinrich, 1980).

Human factors theory (Goetsch, 2009) – The premise of human factor theory is that human errors cause accidents. The errors can be categorized into three areas.

1) Overload - The accident was caused as a result of the task being beyond the worker's capability

2) Inappropriate Worker Response
    a. The worker did not appropriately prepare for hazards and did not take appropriate safety measures
    b. There was an incompatible work station as a result of management decisions or environmental factors
3) Inappropriate Activities - The worker had a lack of training

Accident/incident theory (Goetsch, 2009) – The accident/incident theory is an extension of the human factors theory, with three new possible factors added on.

1) Ergonomic traps – Management failures due to poor work stations or tools
2) Decision to err – Personal failures either conscious or unconscious
3) System failure – Management failure such as poor policy or incomplete training.

Epidemiological theory (Goetsch, 2009) – Epidemiology theory studies the relationships between environmental factors and disease. It can be broken down into two sets of characteristics: predisposition and situational. Predisposition characteristics take into account how susceptible individuals are, while situational characteristics take into account characteristics that are unique to the situation, such as peer pressure or priorities.

Systems theory (Goetsch, 2009) – The system theory speculates that accidents arise from interactions among humans, machines, and the environment. In order to reduce accidents it is important that the system be less complex.

Behavior theory (Goetsch, 2009) – There are seven basic principles of behavior theory: intervention, identification or internal factors, motivation to behave in the desired manner, focus on the positive consequence of appropriate behavior, application of the scientific method, integration of information, and planned interventions.

The human causes of accidents cannot be underestimated. The domino and the human factor theories both take human behavior into account. Tarrants (1980) said “human behavior is an important factor in determining the frequency, severity, and incidence of accidents in a wide variety of situations”. Human behavior is one the most frequently cited factors causing safety issues (Goetsch, 2010).

2.2 Cost of an Accident

It is in everyone’s best interest to avoid accidents on construction sites. There are two types of costs associated with an accident. The most often thought of costs are the direct costs. These can include worker compensation, fines from OSHA, and the cost to repair equipment or other damages (Goetsch, 2009). However, there is a second set of costs which are often overlooked. These are the indirect costs of an accident. These can include the lost time to care for an injured worker, the extra time spent on record keeping and paper work, and the loss of productivity on the site (Hinze & Appelgate, 1991; Occupational Safety and Health Administration, 1996).

In addition, the impacts of accidents on construction sites are much deeper and wider reaching then simple monetary losses (Goetsch, 2009). For example, if a worker is seriously or fatally injured, the impacts might include: delays to the schedule, bad press for the employer, and a negative impact on worker moral at the site. Even if no one is hurt during an accident, there can still be impacts to worker moral, schedule, and there may still be the cost of the cleaning up the accident. In addition, the employer may face liability questions and possible criminal charges.

The negative impact an accident has on a company's public profile should also not be under estimated. Adverse publicity that can result from a bad accident or from apparent disregard for workers' safety will damage a company's reputation. This in turn may affect the company's ability to obtain work (Coble, J.W. Hinze, & Haupt, 2000). Overall, it is beneficial to all parties involved to prevent accidents on construction sites.

2.3 Occupational Safety and Health Administration

2.3.1 OSHA History

The Occupational Safety and Health Act of 1970 created OSHA. Congress passed the act to ensure safe and healthful working conditions for working men and women. This was done by setting and enforcing standards and by providing training, outreach, education and assistance (Occupational Safety and Health Act of 1970). Today OSHA oversees worker safety in 23 states. The

other 27 states are overseen by OSHA approved state plans. New Mexico has a state plan, meaning that a local agency- the OHSB- oversees workers' safety and health in the state.

2.3.2 Command Regulation

In 1970 when OSHA was founded, the approach for keeping workers safe was one of "command-and-control". This is a punitive model based on the idea that for companies to comply with regulations, there must be a threat of punishment for non-compliance. Research has shown that aggressive enforcement strategies can foster compliance, because noncompliance is a decreasing function of the probability of getting caught (Becker, 1974; Stigler, 1970). Within the "command-and-control" model there are two reasons an employer may change their behavior. The first is a result of direct enforcement activities. As an example, if OSHA fines a company, the company may change its ways. The second reason for behavior change is a general deterrence. This occurs when a generic threat of sanction leads an employer to behavioral changes (Gray & Scholz, 1993). This system has served OSHA from its inception in 1970. As Figure 1 shows, in 1970 there were 13,800 deaths per 100,000 workers. In 2008 there were 4,300 deaths per 100,000 workers (US Bureau of Labor Statistics, 2008). OSHA's regulations have contributed to this reduction in death rates (Weil, 1996). The current OSHA model is a simple way to translate the broad policy goal of a safe workplace into practice (Noble, 1989).

The "command-and-control" method acknowledges that neither regulators nor employers can know which violations might lead to an injury or incident. With

this concern in mind an OSHA inspector must follow the OSHA Field Operations Manual (FOM). This manual sets forth a set of regulations that is applicable and known by everyone (Occupational Safety and Health Administration, 2009). Because both inspectors and employers know what to expect during an inspection, there are no surprises when penalties or citations are issued. Research shows that thorough and consistent enforcement makes companies more safety conscious (Pearce & Tombs, 1990). These facts have lead regulators to keep enforcements consistent and honest by using the FOM to the letter.

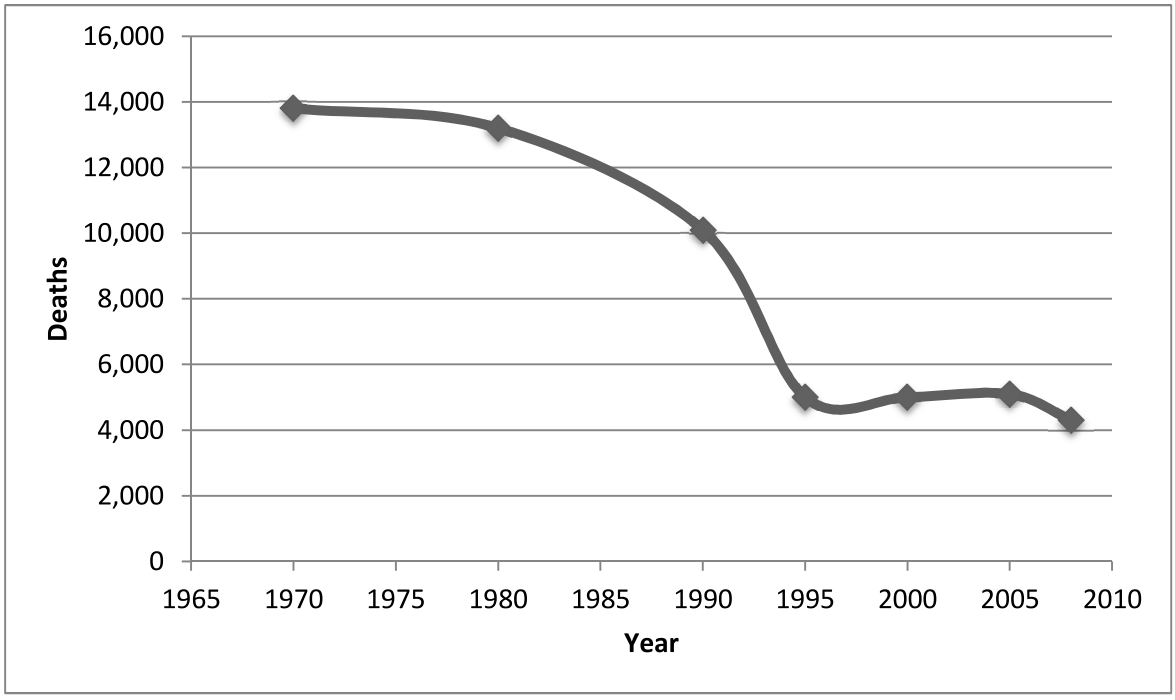


Figure 1: Deaths per 100,000 Workers
(US Bureau of Labor Statistics, 2009)

Research has also shown that "specific deterrence from enforcement actions can be effective in changing business behavior in ways that advance the goals of

regulatory statues (Gray & Scholz, 1993)." By applying the same rules and regulations to all companies, regardless of past performance, OSHA is regulating a broad notion of safety for all workers.

Even with these safeguards in place, workers are exposed to many dangers that should have been eliminated decades ago (Silverstein, 2008). The "command-and-control" approach does come at a cost, both in terms of monetarily costs to companies, and in terms of relationship between companies and OSHA. Research has shown that "command-and-control" regulations have had limited success in terms of occupational health and safety (Aalders & Wilthagen, 1997). In addition, it appears that current governmental compliance is ineffectual at further advancing the cause of safety in the workplace (Rechenthin, 2004; Weil, 1996).

2.3.3 Self-Regulation

The gaps within the "command-and-control" system have lead researchers and industry to look at other methods to improve the safety and health of workers. One such method is responsive regulation. Responsive regulation allows rules and regulations to respond to different situations. Where "command-and-control" type regulations require that every company be treated the same regardless of past performance, responsive regulation allows companies to be treated as individuals with different needs (Ayres & Braithwaite, 1991; Pontell & Shichor, 2000). Self-regulation is a form of responsive regulation that allows companies with a proven history to regulate themselves. Self-regulation involves

delegating some of the authority formerly held by the government to industrial associations and individual firms.

Researchers have shown that self-regulation can encourage more creativity and innovation in promoting compliance. Aalders and Wilthagen (1997) claim that by allowing companies to play a more dominate role in policy compliance, they have an enlightened self-interest which in turn leads to a stronger desire to meet all regulations. Researchers have also shown that self-regulation has the potential to achieve safety goals far better than deterrence policies and adversarial relationships (Aalders & Wilthagen, 1997; Gunningham, 1995; Teubner & Farmer, 1994). Gunningham (1995) lays out two reasons that self-regulation has the potential to be more effect then "command-and-control." First, with self-regulation, standard setting and identification of breaches is done by practitioners, who are responsible and have working detailed knowledge of the industry. Therefore more practical and effective standards and policies can be designed. Secondly, self-regulation promotes companies creating a higher ethical standard. These standards move beyond the letter of the law and may significantly raise standards of behavior.

Self-regulation can provide for a more effective regulation for all parties within an industry, because self-regulation allows regulatory assets to be used most effectively. Aalders and Wilthegan (1997) shows the tremendous efforts that have been put into legislative activities to promote safety, but have not brought about the expected results, due to the incapability of legislation to achieve an acceptable degree of compliance. They go on to show that self-

regulation could reduce government's burden in seeking control, by allowing companies that already have a strong safety record and a strong commitment to safety to self-regulate, the governmental regulators will be free to focus on those companies that need more oversight. Gunningham (1995) back up this theory by showing that self-regulation can offer speed, flexibility, and sensitivity to the market.

While self-regulation can provide advantages to companies and regulators, there can also be disadvantages. Supporters of "command-and-control" legislation often distrust proponents of self-regulation, because they fear that self-regulation is a stepping stone to deregulation (Beder, 1998). Baumeister and Heatherton (1996) explain several ways that self-regulation can break down. The two most common ways are under-regulation and mis-regulation. If a company is exposed to under-regulation, there may be no stable, clear, or consistent standards. This will lead to a lack of understanding about what is expected of the company. A company is mis-regulated when they have been exposed to a set of false assumptions.

2.4 Partnerships

Partnerships are a form of self-regulation. This literature review seeks to examine the effectiveness of such partnerships, both within the construction industry and other industries.

2.4.1 Construction Safety Partnerships

In May of 1996 the OSHA Office of Training and Education introduced the Construction Safety Excellence Demonstration Program (CSEDP). This program was a first draft of the CHASE program. The goal of this program was to demonstrate contracting construction companies' capability to develop and self-administer comprehensive safety and health programs. This program needed to provide excellent worker protection. OSHA set up five requirements that participants in the program must fulfill.

1) Each applicant must submit an application that covers the all elements of their health and safety program. This application must detail the implementation and enforcement strategies of the health and safety program that will allow the applicant to meet all CSEDP requirements.
2) Each construction site that the applicant is responsible for must meet the CSEDP program requirements.
3) The three-year average Days Away From Work Injury Rate (excludes restricted cases) for company employees must be at least 50 percent below Bureau of Labor Statistics (BLS) average for the applicable Standard Industrial Classification Code.
4) Subcontractors at each designated site must demonstrate:
    c. Injury Incidence Rates and Lost Workday Injury Rates at or below the most recently published BLS industry average for the applicant's industry

d. Days Away From Work Injury Rates at or below 50 percent of the most recently published BLS average for the applicable industry

5) All stated rate requirements must be maintained. If an employer's Days Away From Work Injury Rates climbs above the stated limit, that employer may be removed from the CHASE program.

The CSEDP program established an application review procedure, which included a site evaluation that understood the uniqueness of the construction industry. The CSEDP program application process also considered the substance of each company's safety and health program. Follow-up site evaluations were conducted based on previous safety records and OSHA's experience with the company.

The original demonstration period for CSEDP was five years. The program successfully demonstrated that contracting construction companies can develop, implement, and maintain a safety and health program with very high standards. Once the demonstration period had ended the CSEDP program became the CHASE program.

Following the five year demonstration period, local AGC branches could enter into partnerships with the appropriate OSHA partner at either the state or national level. These partnerships began forming in 2001. There are currently eleven CHASE partnering programs in ten states. Table 1 shows the complete list of partnerships.

Table 1: CHASE partnering programs

State	State Level OSHA?	AGC Signing Partner	1st Year CHASE was Signed
AK	Yes	AGC of Alaska	2002
CO	No	AGC - Colorado	2004
FL	No	Florida East Coast Chapter	2005
FL	No	Florida South Coast Chapter	2008
KY	Yes	AGC - Kentucky	2001
MA	No	Mass Building Trades Council	2003
MN	Yes	AGC - Minnesota	2002
ND	No	North Dakota - AG	2003
NM	Yes	NM Building Branch	2001
RI	No	RI Building Trades Council	2002
SD	No	AGC - South Dakota	2005

Sources: (AGC Alaska, 2011; "AGC Colorado: Association of General Contractors | AGCC-OSHA Partnership," n d; AGC Minnesota, 2011; AGC NM, 2011; Labor Kentucky, 2011; Occupational Safety and Health Administration, 2011)

This literature review has chosen to look at the Colorado CHASE partnerships as an example. This agreement between OSHA and AGC – Colorado began in 2004. Participants in the Colorado CHASE program have also seen a quantifiable reduction in injury incidents. "Since the program started in 2004, the number of injury incidents has dropped 46 percent, from 5.7 incidents per 100 employees in 2004 to 3.1 in 2009," said DeMario, president of

Heath Construction in Fort Collins. “We’ve demonstrated that the program with OSHA works” (“AGC Colorado: Association of General Contractors | AGCC-OSHA Partnership,” n d). There has also been a change in attitude towards working with OSHA. “Typically a contractor’s relationship with OSHA can be adversarial,” said Ed Davis, AGC-Colorado safety director. “This program shows that the relationship can be a partnership and create even safer jobsites” (“AGC Colorado: Association of General Contractors | AGCC-OSHA Partnership,” n d). The CHASE partnership program is not the only safety partnership found in construction. The AMEC partnership is an example chosen by this literature review to highlight other types of partnerships.

AMEC Construction Partnership - The AMEC Construction Partnership started in April 2002. It originated in the Calumet City, Illinois, OSHA Area Office. This partnership offers comprehensive safety and health management systems that have been developed and implemented at participating job sites.

This partnership has led to a measurable reduction in the total recordable case incident rates for the participating AMEC sub-contractor. The rates have declined from 9.1 in 2002, to 2.8 in 2004, a 69 percent reduction (Occupational Safety and Health Administration, 2002b). This partnership not only has quantifiable results, but people regard it as a “win-win” situation. Andrew Schaeffer, AMEC's Central Region Safety Manager, says that in the Chicago area the partnership "has been a win-win situation, in that we have decreased incident rates across the board and received no citations since the inception” (Occupational Safety and Health Administration, 2002b). Gary Anderson, the

Area Director of OSHA's Calumet City, Illinois office, calls the AMEC/OSHA Partnership "a good example of how government and the private sector can work together cooperatively, to bring about a safe work environment" (Occupational Safety and Health Administration, 2002b).

Associated Builders and Contractors (ABC) – ABC also has a merit based safety recognition program. The Safety Training and Evaluation Process (STEP) program was developed and written by contractors, for contractors. This program consists of a 20 point guide to starting, updating or auditing a company-wide safety program (ABC, 2011). There are several levels at which a contractor can join STEP. The high level contractors are STEP Platinum. The STEP Platinum is similar to the CHASE program in terms of standards and benefits of joining.

2.4.2 Non-Construction Related Self-Regulation

Self-regulation exists outside of the construction industry. For example, the American Bar Association (ABA) is the largest voluntary professional association in the world (American Bar Association, 2011). There is currently no governmental oversight of lawyers. Instead, the ABA self-regulates as they see fit. As a group of well educated, like minded individuals, they are able to oversee their own profession in a productive and efficient manner.

The Environmental Protection Agency (EPA) is a branch of the US government, much like OSHA. The EPA has a set of compliance incentives which allow the EPA to reduce or waive penalties in given situations. In short, if

a business or industry voluntarily discovers, discloses, and corrects environmental problems, there in a policy in place to forgive (US EPA, 2011). This allows dilemmas to move from lose-lose situations to win-win outcomes. Companies and governments can adopt and nurture practices that signal their cooperative intentions (Potoski & Prakash, 2004).

As these two examples have shown self-regulation can be an effective method of regulation. Self-regulation allows for partnerships to form which has a positive effect on all involved.

2.5 Safety Culture

Figure 1 shows that within the last several years, reductions in accidents and injuries have reached a statistical plateau (Construction Industry Institute, 2008; US Bureau of Labor Statistics, 2009a). Research is beginning to show that governmental compliance is ineffectual in further advancing the cause of safety in the workplace. Rechenthin (2004) suggests that “winning” is very important to companies, and that those companies that consistently “win” have multiple advantages over those who do not. The paper goes on to explain that safety can be one of those advantages. By having an impeccable safety record a company gives itself a sustainable edge. This drive towards the best safety record possible is not caused by compliance with governmental regulation, but instead by the desire to be competitive in the market place.

Hale and Hovden (1998) declared that the construction industry is currently in a third age of safety. The first stage of safety was concerned with technical measures that would guard machinery or stop explosions. The second stage of safety, which occurred between the world wars, was concerned with the development of personnel. During this second phase, there was an upswing in training and motivation as safety prevention measures. The third phase of safety, which we are currently in, focuses on safety management and safety culture. This shift has necessitated a new set of terminology.

Weil (1996) compared injury and illness rate data to lower work day injury rates from 1973 to 1993. The paper suggests that while there is a long term decline in injury rates, there is not a decline in lost work day rates. From this Weil surmises that compliance with regulation may reduce less-serious injuries but compliance did not have an appreciable effect on more serious injuries. The paper goes on to suggest that policy-makers must craft standards carefully to ensure that compliance ultimately leads to desired safety outcomes.

Research into improving construction site safety has started moving away from “command-and-control” legislation and focusing on improving the “culture of safety” among construction companies (Antonsen, 2009; R. M. Choudhry, Fang, & Mohamed, 2007; Crossman, 2008; Jaselskis et al., 1996) .

Researchers have come up with a spectrum of definitions for the term “safety culture” (DeJoy, Schaffer, Wilson, Vandenberg, & Butts, 2004; Hale & Hovden, 1998; Mearns, 1999). Even with the variety in definitions there is a

central theme. The safety culture of a company consists of a commonly held set of beliefs, norms, and attitudes that drive the behaviors and actions of individuals as related to safety (R. M. Choudhry et al., 2007; DeJoy et al., 2004; Turner, Pidgeon, Blockley, & Toft, 1989).

Antonsen (2009) chose to compare company's culture regarding safety and the company's actual level of safety via a survey. In order to complete this task, culture was defined in terms of cognitive and symbolic aspects of human activity. Antonsen admits that this is a loose definition but calls attention to the more important analytical perspectives and methods through which cultures are studied.

Crossman (2008) chose to look at safety culture through the lens of worker motivation and the economic bottom line. For the purpose of this research, safety culture is seen as the development of an ideal beyond compliance strategy, which is thought to be simultaneously socially responsible and economically advantageous. Crossman finds that communication, resource availability, and incentives are all part of safety culture and all exert influence on safety motivation.

Choudhry, Fang, & Mohamed (2007) present a conceptual model of safety culture. This model recognizes that human, technical, situational, and organizational elements all interact to influence safety culture. Their model serves as a logical basis that can be used to determine how to analyze safety culture.

Current research is being done to bridge cultural gaps and developing a culture of safety on construction sites (Artis, 2007; Tanner, 2003). Artis (2007) studied different ways to train Latino construction workers. By studying the organizational factors and social exchange theory Artis was able to increase perceptions of safety climate on tested job sites. This acknowledgement of the need for safety culture is critical in developing new safety programs.

Each company has a unique safety culture. Within this culture there may be many codes (Philipsen, Coutu, & Covarrubias, 2005). Each code is a way to understand and define a particular term. Therefore it is possible for differences in cultural terms and term's definitions to cause a breakdown in understanding (Katriel & Philipsen, 1981). Yin's (2003) method of pattern matching logic allows a researcher to organize these different codes into patterns that can be studied. The affinity diagramming method can also be used to sort responses into similar clusters (White, Behara, & Babbar, 2002).

Chapter 3: Research Methodology

3.1 Overview of Methodology

This chapter presents the methodology that was used to answer the questions posed in Chapter 1. The research methodology for this study followed a three phase approach. The first phase consisted of an intensive literature review to gather background information on current safety regulation practices, industry/regulatory partnerships, and data analysis. The next two phases were designed based on the information gathered during this background research. The second phase of research consisted of a survey that collected information from AGC-NM members regarding NM CHASE status and incident rates. The difference in incident rates between NM CHASE members and non-NM CHASE members was observed in this phase of research. The third phase of research was a case study of members of NM CHASE who participated in semi-structured interviews. These interviews were designed to answered questions about perceived changes in safety culture that arose from joining NM CHASE.

The literature review consisted of an in-depth study of past research relating to the topics laid out in Chapter 2. During the first phase literature review, no formal studies comparing incident rates of NM CHASE and non-NM CHASE members were found. To fill in this safety and incident data, it was determined that a survey needed to be complete to gather the existing, but uncollected data.

The third phase of this research chose to look at this perceived change in safety culture among NM CHASE members. In order to answer the research questions, a case study method was used. Hancock and Algozzine (2006) explain that a case study should be an "intensive analysis and description of a single unit or system bound by space and time." This research focused on the NM CHASE system over the last five years in New Mexico. This third stage of research seeks to identify common themes or cultural codes among the NM CHASE participants. To assist with this research two research questions were developed.

1) Is the NM CHASE program, a self-regulatory program, effective at lowering incident rates below that of the standard "command-and-control" program?

2) How does joining the NM CHASE program change safety culture within a company?

3.2 Survey Design

In order to answer the first question presented by this research, incident rates from members and non-member of NM CHASE were needed. This data allowed a comparison between incident rates for self-regulated companies, and companies that were under a more traditional "command-and-control" form of regulation. Incident rate data is not publicly available. The sources that collect the data, OHSB and AGC-NM, were not willing to release the data. With these

limitations in place it was decided that a survey was the best method to gather this data. Orlich (1978) explains that the decision to conduct a survey should only be made after having considered all other alternatives. This research did consider several alternatives for gathering the data and came to the conclusion that a survey was the only feasible choice.

Rosander (1977) claims that there are six phases of a sample study: planning with a purpose, design, implementation, processing, interpretation, and appraisal. The importance of planning with a purpose is echoed by Orlich (1978), when working with surveys, the emphases should be on planning the survey. With this in mind, the first step taken was planning the specific data that was to be collected by the survey. It was decided that for this research, historical data was needed on incident rates for both members and non-member of NM CHASE.

After the needed data was decided upon, the survey needed to be designed. This research project determined that the information from the OSHA 300a form would be the most useful, easiest data to collect. Companies are required to file the OSHA 300a form every year and they are required to keep the forms for at least 5 years. With this in mind the survey asked for five years of historical data. The data that was collected off the 300a form included:

- Total number of deaths
- Total number of cases with days away from work
- Total number of cases with job transfer or restriction
- Total number of other recordable cases

- Number of hours worked by all employees

This data was collected because it provided an overall picture of each company's injuries and incidents. In addition this data could be used to find a company's total recordable case rate. Companies were also asked to share their historical EMR rates for the last five years. Because the EMR rate is a 3 year running average it allows for a longer term view of a company's safety record.

Incident data is very sensitive. Due to concerns over confidentiality issues it was decided that all data collected would be anonymous. This meant that the survey did not ask for the respondent name, company name, or any other identifying information.

In order to compare NM CHASE members with non-members, the survey did ask about NM CHASE membership statues. If the company was a member of NM CHASE, the survey asked when the company joined NM CHASE and what level of membership they held.

After the first draft of the survey was completed Orlich (1978) suggests checking some specific areas to assure the most effective survey possible: parsimony, specificity, and respondent knowledge. Parsimony involves assuring that the simplest path to knowledge is taken. In regard to surveys, it ensures that only questions that must be asked to answer the presented question are asked. The survey presented did not include any extraneous questions or try to collect data that would be of minor interest. The specificity of a survey states that that every attempt should be made to ensure that all questions are as clear as

possible. A majority of the questions asked in this survey involve copying data from the OSHA 300a form. This request is very clear. All other questions were double checked for clarity. Before this survey could be completed, respondents needed access to their company's OSHA 300a form and EMR data. They also must have been familiar with when their company joined NM CHASE. In order to prepare the respondent for this fact, the introduction to the survey explained what information would be requested.

Once the survey had gone through this rigorous planning phase, it was pilot tested. This involved releasing the survey to a small number of individuals knowledgeable in the construction safety industry and asked for feedback. Based on the feedback given, minor modifications were made to the survey which was then ready for a mass release. This release fit in with Rosander (1977) recommended third stage of implementation.

It was decided that the survey would be released on-line. Some of the reasons for this decision included: saving time and money (no return envelopes or postage) and ease of transferring the data to the computer. However, the biggest factor in deciding to release the survey online was that it provided the greatest measure of anonymity to the respondents. By working with AGC-NM, an e-mail which included a link to the survey was sent out to all AGC-NM members. The e-mail also included a letter explaining the research, detailing the survey questions that would be asked, and assuring anonymity. The survey, complete with cover letter, can be found in Appendix A.

Rosander (1977) processing phase involves checking all the data for accuracy and sensibility. The survey link was active for six weeks. Within this period two additional e-mails were sent encouraging potential respondents to take the survey. Once the link was deactivated, the data was downloaded and transferred to spreadsheet software. The data was carefully considered to assure that it was practical. The raw data received from the survey can be found in Appendix B.

The interpretation phase of research involves important statistical analysis (Rosander, 1977). The survey for this research was designed to determine if joining NM CHASE lowered injury and incident rates. Therefore, the interpretation phase of this research compared average and median incident rates for NM CHASE and non-NM CHASE members. The complete interpretation of the survey can be found in Chapter 4 of this thesis. Finally the appraisal phase that Rosander (1977) recommended was completed by checking to assure that the survey answered the applicable research question.

3.3 Case Study Design

Before starting research three questions must be asked (Yin, 2003):

1) What form will the research question take (how, why, where, etc.)?

2) Will the research require control of behavioral events?

3) Will the research focuses on contemporary events?

This research asked how and why, but will not require control of behavioral events, and will focus on contemporary events. For this overall situation Yin (2003) recommends a case study.

Research question number two asks, how does joining the NM CHASE program change safety culture within a company? To assist in answering this question, in-person semi-structured interviews were completed. The interviews were planned and conducted using Hancock & Algozzine's (2006) seven step plan.

1) List the research questions that your study will explore

   This study will explore the change in perceived safety culture surrounding membership in NM CHASE.

2) Break research questions into researchable sub-questions

   a. How did the health and safety program at your company change after joining NM CHASE?

   b. How did your relationship with OHSB and other safety professionals change after joining NM CHASE?

   c. From the perspective of your employees, how did your company's overall safety culture change after company joining NM CHASE?

3) Develop possible interview topics or items for each sub-question

a-1. How were your company's safety programs affected by joining NM CHASE?

a-2. What changed about your company's overall attitude towards safety after you joined NM CHASE?

b-1. What, benefits do you feel you gained by joining NM CHASE?

b-2. How do you feel your relationships with other contractors and NM OHSB changed when you joined NM CHASE?

c-1. What changes have you noticed in your employees' attitude towards safety since joining NM CHASE?

c-2. How has reporting about safety or health concerns changed among your employees since joining NM CHASE?

4) Cross-reference interview topics or items with each research question to ensure that nothing is overlooked

Two questions have been developed for each research question. This should prevent missing critical information

5) Develop interview structure and protocol for interviews

a. Structure: Each person interviewed will be asked the same set of opening questions. After the basic questions are asked the interview topics will be discussed. The interview topics will be asked in an informal manner in hopes that an organic conversation can take place.

b. Protocol:

Opening Questions

i. When did your company join CHASE?

ii. What level of CHASE does your company belong to?

iii. What do you think the advantages of CHASE are?

6) Identify minimum information to be gathered for each respondent

a. Each participant must answer the first two questions.

b. It is the goal of the interviewer to gather responses on all interview topics.

7) Confirm appropriateness and adequacy of protocol and conduct interview

Validity is confirmed using Yin's (2003) methods.

3.3.1 Persons to be Interviewed

The goal in selecting persons to be interviewed is to cover a small, representative sample of the larger population (Oppenheim, 1992). The population that was selected to participate in this case study, were safety managers at companies currently members of NM CHASE. To select the individuals, convenience sampling was used. This form of sampling involves drawing individuals from the select population in a non-randomized manner (Williams, 1978). Convenience sampling was selected because of the relatively small sample pool and because of the sensitive nature of the questions being asked. Better results could be gathered if the case study participants were

excited to talk about the NM CHASE program (Piore, 1979). Individuals were selected from a pool of volunteers, after a short presentation asking for participants was done at an AGC-NM safety committee meeting. This population was selected based on their ability to speak to changes in safety programs, and how NM CHASE has affected those changes. Due to the limited scope of this research it was determined that the first round of case studies would consist of interviews with five individuals. When the individual case studies had agreement, it was determined that the sample size was sufficient.

3.3.2 Protocols of Interviews

Each interview was conducted at the interviewee's place of work. The researcher would start each interview by asking permission to tape the interview. In all cases permission was granted. The researcher took hand-written notes throughout the interview and used the recording as backup.

The interviews were completed in a semi-structured environment. Each interview started with the same three questions. When did your company join NM CHASE? What level of NM CHASE does your company belong to? What do you think the advantages of NM CHASE are? The goal of the third question in this series was to open the interview to the interviewee's stories. Each person interviewed cares deeply about safety, as evidenced by their membership in the AGC-NM safety committee. Each member was also vested in the NM CHASE program and wanted to talk about their experiences. The researcher used the methods set forth by Piore (1979) that allowed for open ended questions and long responses. If the interviewee needed prompting the researcher did have a

series of open-ended questions prepared, laid out in the previous section, which could be asked. This open format allowed the researcher to gain more depth and have a more natural, comfortable, conversation with each interviewee.

3.3.3 Data Analysis

The data gathered from the case study was analyzed to see if there are any commonly held beliefs about how NM CHASE changes safety culture within the companies. This was done using the two methods presented in the literature review. Yin (2003) method of pattern matching was applied to look for basic patterns in word choice and ideas. An affinity diagram was also created based on the method presented by White et al. (2002). This technique allows for natural patterns and groups to be identified.

3.3.4 Validity Testing

Cases studies are non-standardized and open to personal interpretation, yet their results are presented as facts. In order to assure that the research maintains credibility and trustworthiness, some form of validation must be completed. This research is using a method developed by Yin (2003) which exams four facets of research validity.

Construct Validity – Construct validity requires that research cover the following two steps. Select the specific type of change that is to be studied, and demonstrate that the selected measure of change reflects the change being studied. This research is looking at perceived changes, in safety programs and culture. Therefore the questions asked were related to this perception of change.

Multiple sources were questioned and their responses were characterized into matching context sub-groups.

Internal Validity – Internal validity is a concern when research attempts to infer if event X led to event Y. This research is trying to determine if joining NM CHASE leads to a change in perceived safety culture, therefore internal validity is a concern for this study. In order to insure that this study maintains internal validity, explanation building will be used. Explanation building requires looking at each case study individually, and as a group, and finding the explanation that will accurately reflect all cases.

External Validity – External validity questions how broadly the finding of a given case study can be applied. This study is contributing to the existing body of knowledge regarding the application of different regulation techniques (self-regulation vs. command regulation). Each piece of work considered, must be taken with its limitations and assumptions. This research is no exception. The following section lays out the assumptions of this study, the limitation of this study are explained in Chapter 6, and future research that can be built upon this study is presented in Chapter 6.

Reliability – Reliability of a study depends on the ability of another researcher to repeat this study and achieve the same results. The most strongly recommend method for achieving this reliability is a well-written case study protocol. The protocol for this study is written out in the previous section. These

clear step-by-step instructions will allow another researcher to complete the same research done in this study.

3.3.5 Study Assumptions

This study assumes that when a company decides to join NM CHASE, the changes that are made to the health and safety programs are solely a result of their desire to join NM CHASE. This study also assumed that all reporting done was done with good faith and best represented actual conditions.

3.3.6 IRB Approval

This research received approval from the University of New Mexico's Internal Review Board. The approval letter can be found in Appendix D.

Chapter 4: Survey Summary

4.1 Introduction

This chapter presents the survey that was used to determine if members of NM CHASE had lower incident rates then non-members. The design and rationale behind the survey are presented in the methodology chapter of this thesis. The survey was released on December 2, 2010 via in a link in an e-mail that was sent from the AGC-NM office to all AGC-NM members. The link was active for 21 days. There were twenty respondents to the survey. However, six responses were thrown out because the respondent did not fill out any incident data. Figure 2 shows the CHASE membership status of the fourteen valid responses.

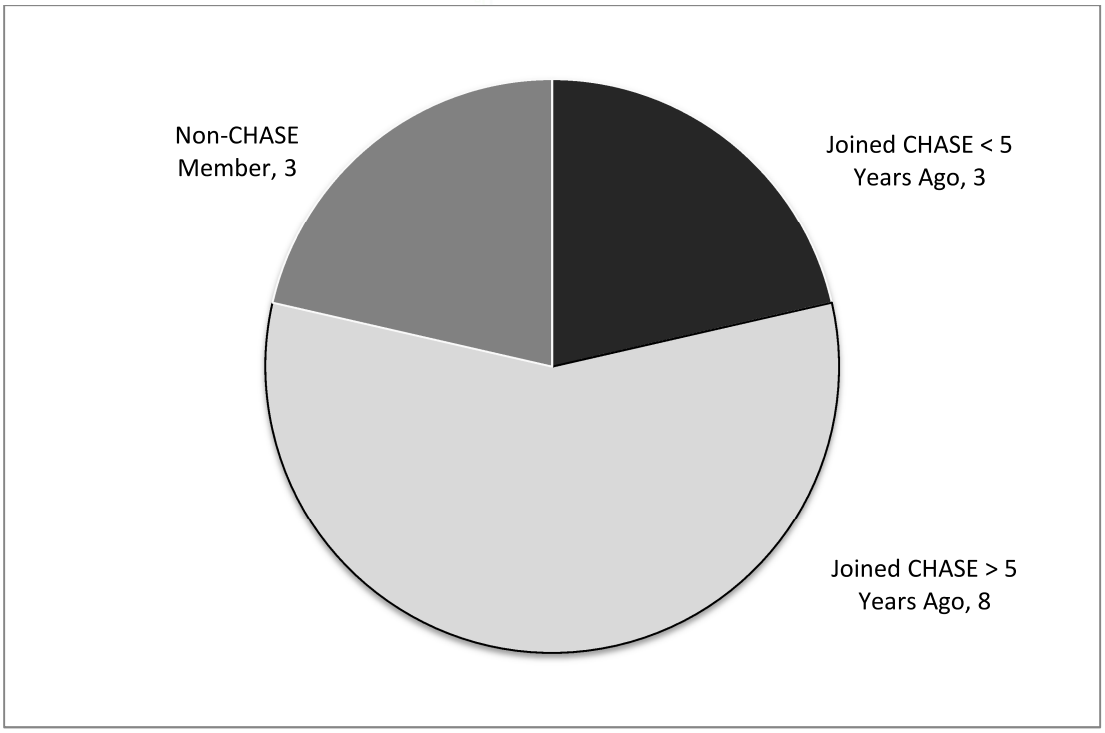


Figure 2: CHASE Membership of Survey Respondents

Three of the respondents were not members of NM CHASE during the survey time period, three of the respondents had joined NM CHASE during the past five years, and eight respondents were NM CHASE members of the course over the entire survey period. The raw data from the survey can be found in Appendix B.

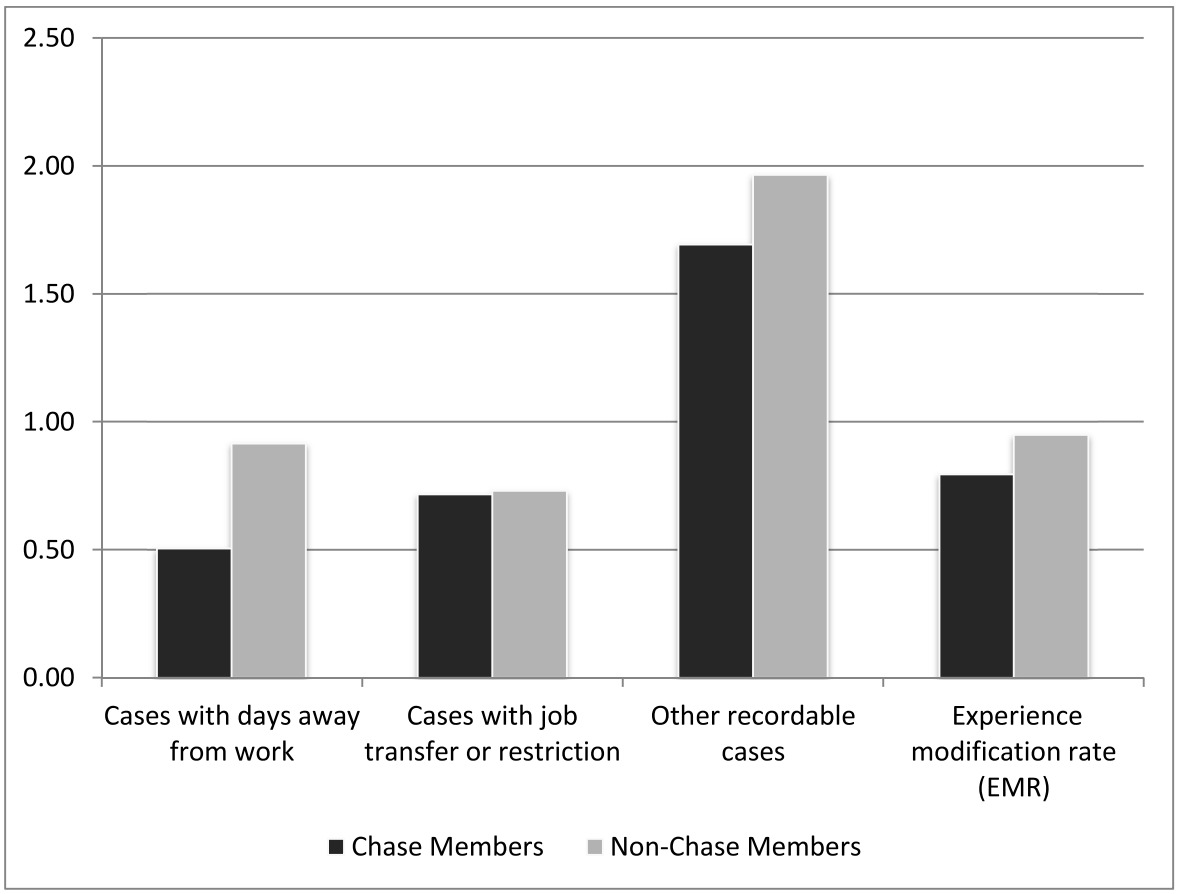


Figure 3: Median Number of Incident Rates and EMR

Figure 3 shows the median number of incident rates in categories that are defined by OSHA on the 300a form (Occupational Safety and Health Administration, 2002a). The left-hand bars shown in Figure 3 denote NM CHASE members and the right-hand bars denote non-NM CHASE members. As

the graph shows across all four categories the NM CHASE members have lower incident rates and a lower EMR rate.

4.2 Total Recordable Case Rate

One metric that can be used to measure a company's overall safety record is total recordable cases rate (TRCR). To calculate the total recordable case rate all reported incidents are added together, multiplied by 200,000 and divided by the total number of hours worked by all employees in the company. This gives a normalized value of incidents bases on the number of incidents per standardized worker. Table 2 shows the TRCR for each company that participated in the survey. The shaded cells indicate that the company was not part of CHASE. Some companies chose not to report all five years of historical data. A dash is used to indicate that data was not reported.

Table 2 shows how dramatically a company's total recordable case rate can change from year to year. Respondent 7 is a good example of this shift. In 2005 they reported a TRCR of 0, in 2006 13.44, and in 2007 they once again achieved a TRCR of 0. When looking at the raw data from respondent 7 the reason behind the shift in TRCR becomes clear. Respondent 7 is a small company and the jump in TRCR was caused by two incidents. Due to this incredibly variable data it was deemed practical to look at both the median rate and average rate of all gathered data to get a better sense of overall safety.

Table 2: Total recordable case rate

Respondent ID	2009	2008	2007	2006	2005
Respondent 1	10.99	12.86	11.20	1.80	3.63
Respondent 2	1.48	5.07	2.24	-	-
Respondent 3	2.01	2.30	1.97	2.16	0.88
Respondent 4	2.36	2.48	3.83	-	-
Respondent 5	1.44	3.03	4.32	3.01	1.65
Respondent 6	3.05	3.12	3.51	3.67	3.05
Respondent 7	4.36	5.54	0.00	13.44	0.00
Respondent 8	1.97	0.89	1.61	-	-
Respondent 9	8.00	-	-	-	-
Respondent 10	4.58	2.08	3.76	2.06	2.44
Respondent 11	2.27	2.21	1.54	5.32	2.70
Respondent 12	0.00	5.50	23.37	14.10	3.12
Respondent 13	0.73	1.36	0.00	3.23	3.06
Respondent 14	4.77	0.00	2.96	1.72	2.17
☐ - CHASE Members ▒ - Non-CHASE Members					

4.3 Number of Incidents Recorded

The survey asked respondents to report the number of incidents in given categories. Often the response was zero, there were no incidents in that category for the given year. Figure 4 shows the percent of respondents in three categories, reporting zero incidents, reporting a number of incidents greater than 0, and not reporting. As Figure 4 shows the number of reports of zeros incidents and the number of non-zero reporting answers is very close, 41% vs. 45%.

Figure 5 also shows the number of categories with and without reported incidents. Days away from work is often thought of as the most serious type of injuries. As Figure 5 shows, the number of reports of zero for days away from work is significantly higher than the number of reports of non-zero days away from work. However, the number of reports of zero for other recordable cases, is significantly lower than the number of reports of non-zero for other recordable cases.

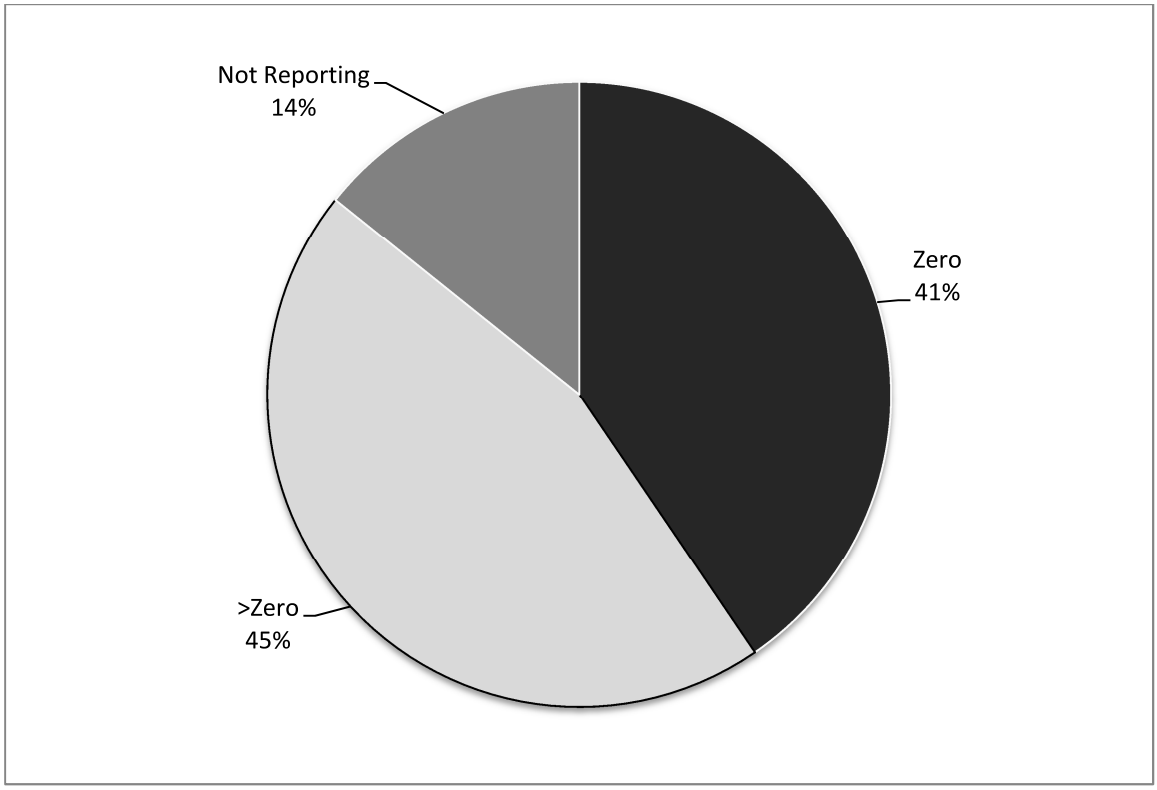


Figure 4: Total Number of Reported Value of Incidents

The number of zeros as responses often makes the difference between average and median rates very large. This was considered when presenting the data and both median and average numbers are presented.

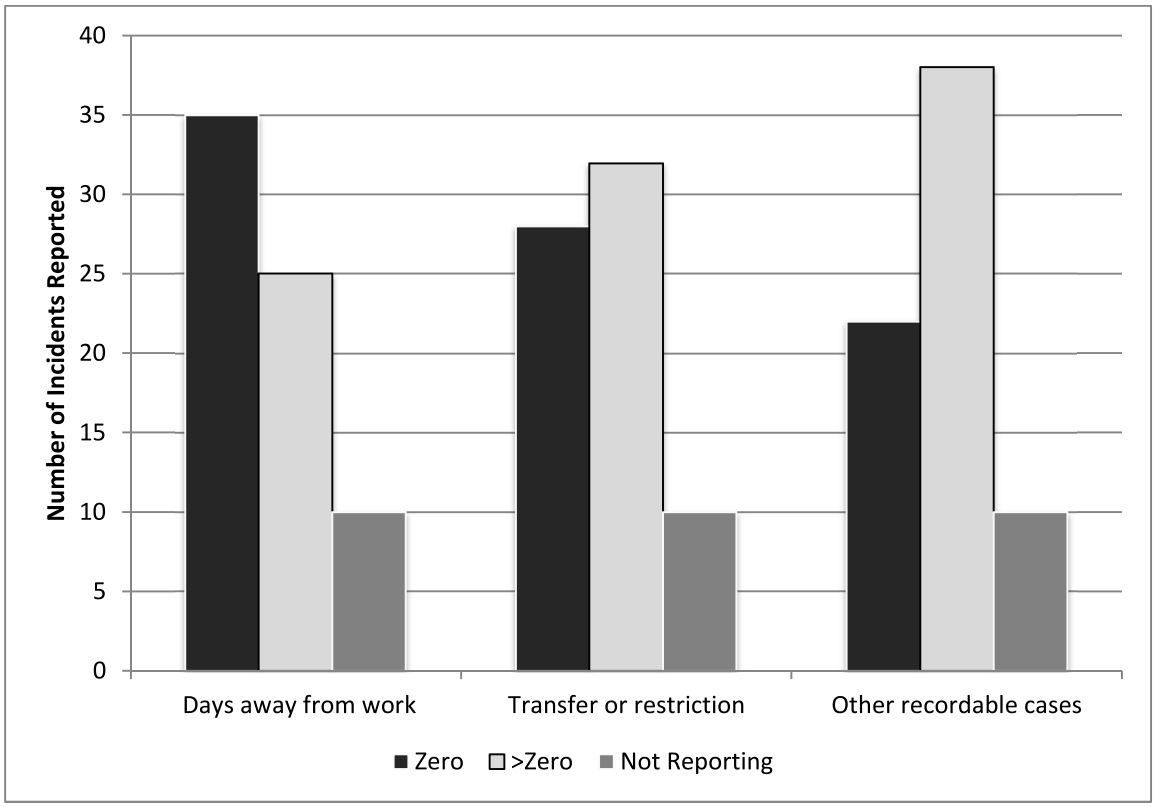


Figure 5: Total Number of Categories With and Without Reported Incidents

4.4 Fatalities

The survey results showed two fatalities. Both fatalities occurred within the same company and the same year. A note on the survey explained that the

fatalities were the result of a single equipment failure. Due to this single data point, fatalities were not studied in depth.

4.5 Days Away From Work

In order for an injury or illness to count as days away from work, an employee must be too ill or injured to work as a result of an incident on the job site. This often includes a doctor's instructions to stay home. The OSHA 300a form specifies that the day of the incident is not included in the count of days away from work and if the count exceeds 180 days the employer may stop counting (Occupational Safety and Health Administration, 2002a).

Figure 6 shows the median rate of cases with days away from work for NM CHASE and non-NM CHASE members over the five year period of the survey. In both 2008 and 2009 the median rate of cases with days away from work was zero for both NM CHASE and non-NM CHASE members.

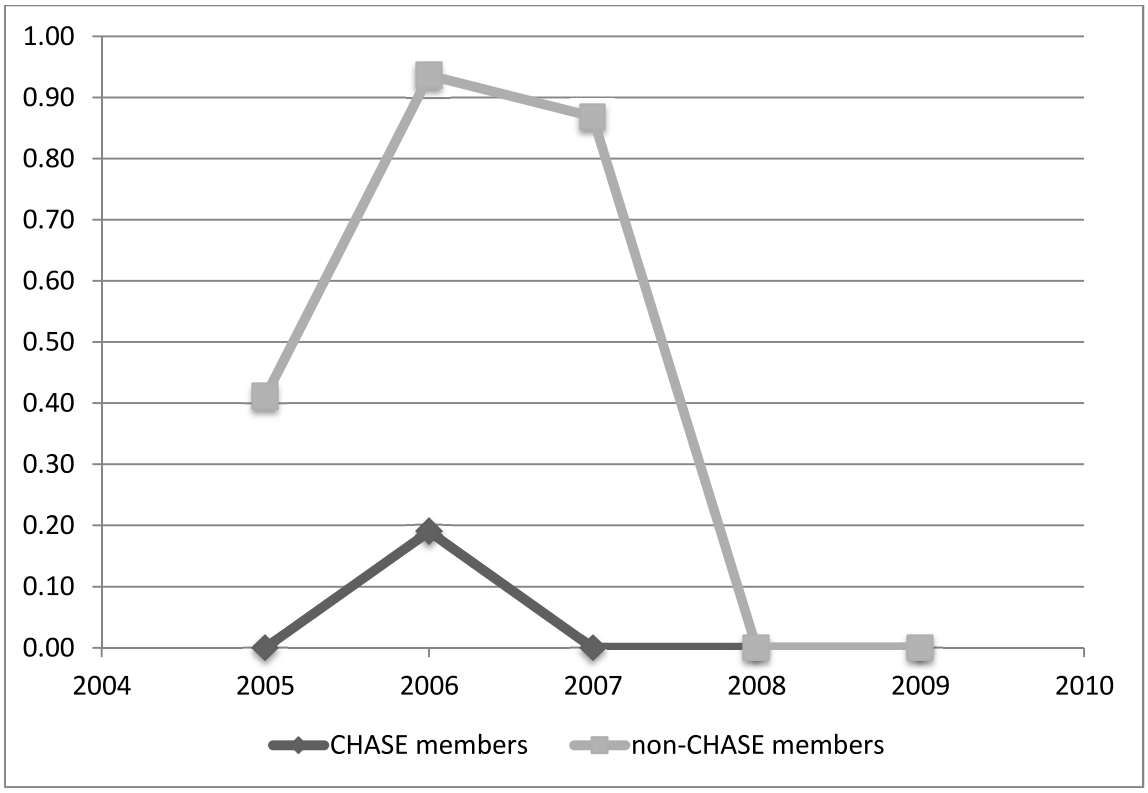


Figure 6: Median Rate of Cases with Days Away from Work

Figure 7 shows the average rate of cases with days away from work. Figures 6 and 7 are based on the same information shown in Tables 3 and 4. The figures vary so greatly because of the impact that one incident can make. Figure 6 shows that the median rate of cases with days away from work for NM CHASE members is lower than or equal to the median rate of cases with days away from work for non-NM CHASE members. Figure 7 shows that for the year 2006 the average rate of cases with days away from work for NM CHASE member is significantly higher than that of non-NM CHASE members.

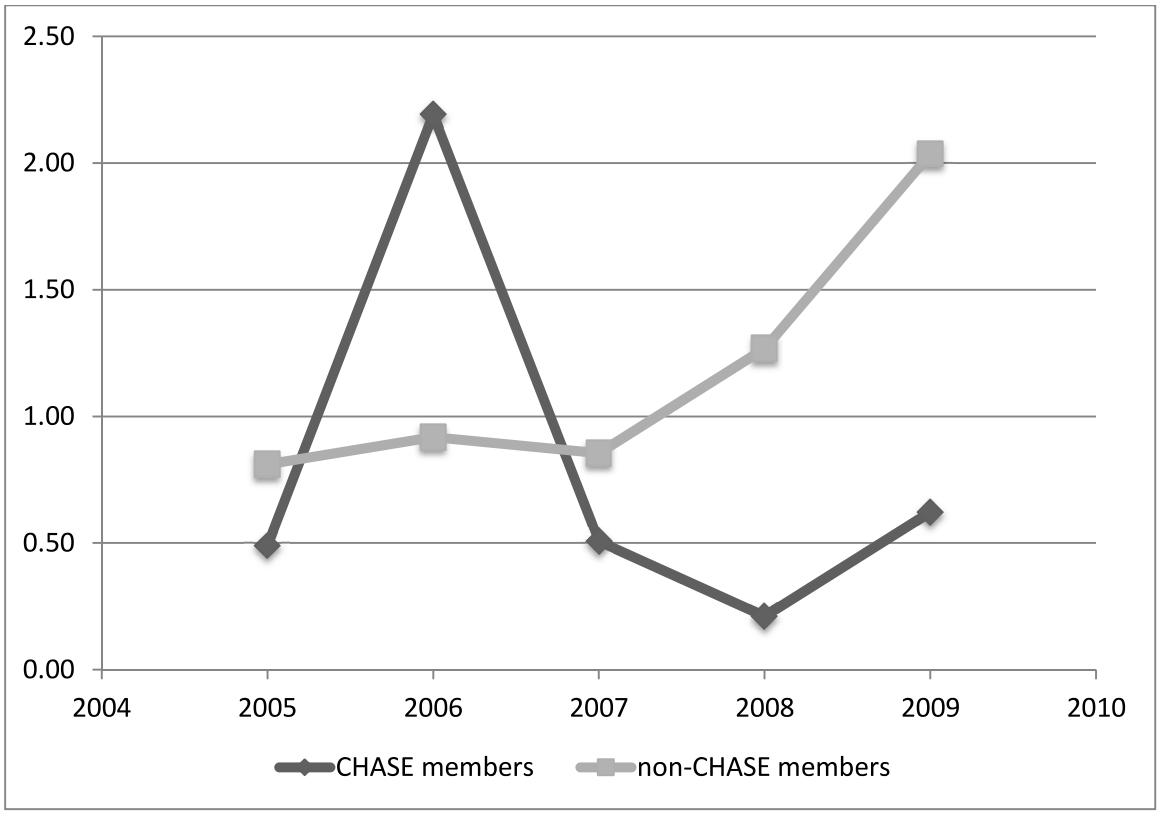


Figure 7: Average Rate of Cases with Days Away From Work

Tables 3 and 4 show the rate of cases with days away from work for each respondent over the five years of reporting history. Table 3 shows the rate of cases with days away from work of NM CHASE members, while Table 4 shows the rate of cases with days away from work for non-NM CHASE members. The data for the three respondents who became NM CHASE member within the five years of historical data is spilt over the two tables.

Table 3: Rate of cases with days away from work of NM CHASE members

Respondent ID	2009	2008	2007	2006	2005	Average	Median
Respondent 4	0.00	0.00	-	-	-	0.00	0.00
Respondent 5	1.44	1.51	1.44	-	-	1.47	1.44
Respondent 6	0.38	0.35	0.00	-	-	0.24	0.35
Respondent 7	4.36	0.00	0.00	6.72	0.00	2.22	0.00
Respondent 8	0.66	0.00	0.00	-	-	0.22	0.00
Respondent 9	0.00	-	-	-	-	0.00	0.00
Respondent 10	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Respondent 11	0.00	0.25	0.00	0.38	0.00	0.13	0.00
Respondent 12	0.00	0.00	3.12	6.04	0.00	1.83	0.00
Respondent 13	0.00	0.00	0.00	0.00	0.77	0.15	0.00
Respondent 14	0.00	0.00	0.00	0.00	2.17	0.43	0.00
Average	0.62	0.21	0.51	2.19	0.49	0.61	
Median	0.00	0.00	0.00	0.19	0.00		

The variance discussed in the Figures 6 and 7 can be traced back to Table 3. It becomes apparent that in 2006, two different companies had days away from work rates of over 6. In both cases, this was the highest rate seen by the company in the five years that were reported.

Table 4: Rate of cases with days away from work of non-CHASE members

Respondent ID	2009	2008	2007	2006	2005	Average	Median
Respondent 1	6.11	0.00	1.24	1.80	2.42	2.31	1.80
Respondent 2	0.00	3.80	1.68	-	-	1.83	1.68
Respondent 3	0.00	0.00	0.49	0.00	0.44	0.19	0.00
Respondent 4	-	-	0.00	-	-	0.00	0.00
Respondent 5	-	-	-	1.50	0.00	0.75	0.75
Respondent 6	-	-	-	0.37	0.38	0.37	0.37
Average	2.04	1.27	0.86	0.92	0.81	0.91	
Median	0.00	0.00	0.87	0.94	0.41		

4.6 Job Transfer or Restriction

Job transfers or restriction are counted on the OSHA 300a form when, as a result of a work incident, a worker can come to work, but cannot perform their normal work duties as scheduled (Occupational Safety and Health Administration 2002a). Job transfer or restriction rates are counted the same way that days away from work are counted, starting the day after the incident and ending if the count exceeds 180 days. Any single injury or illness can create a situation where the worker has both days away from work and a job transfer or restrictions but any given day is only counted once.

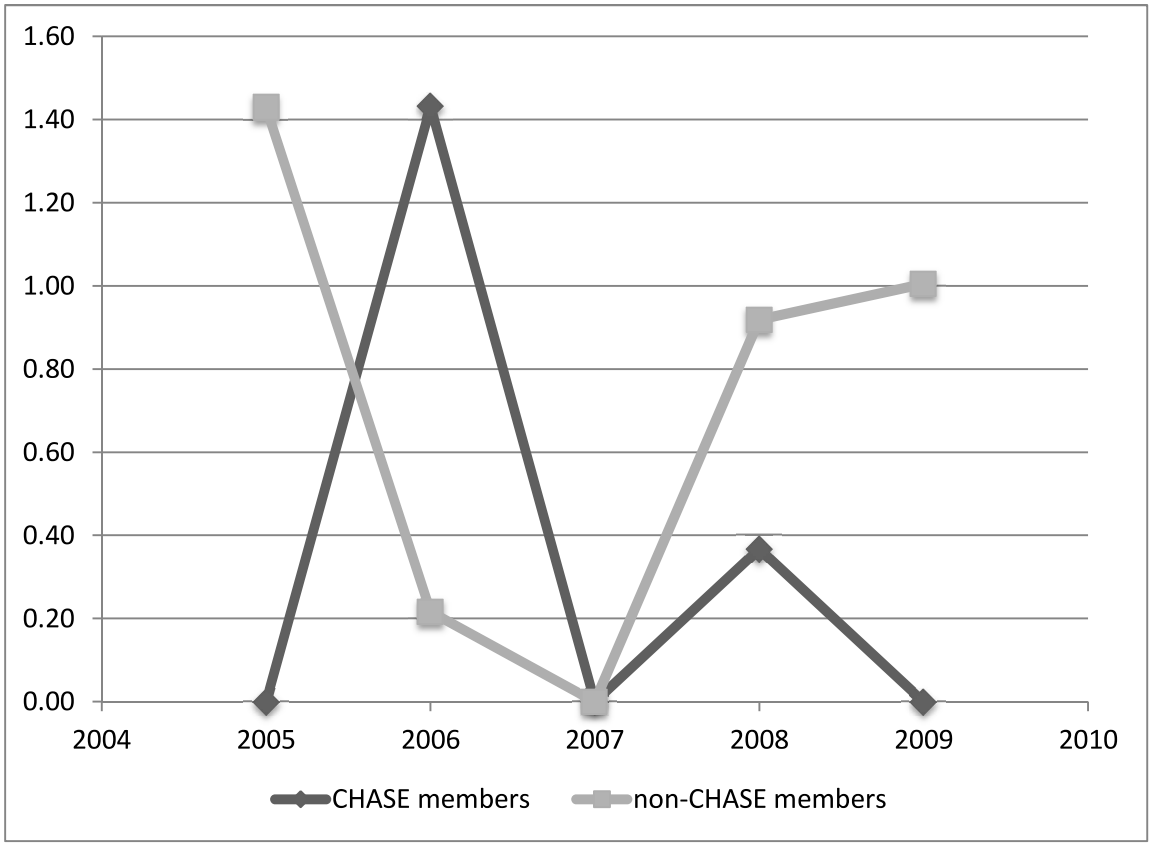


Figure 8: Median Rate of Cases with Job Transfer or Restriction

Figure 8 shows the median rate of cases with job transfer or restriction. In 2006 the NM CHASE members had a higher median rate of cases with job transfer or restriction then the non-NM CHASE members. In 2007 both NM CHASE and non-NM CHASE members had a median rate of cases with job transfer or restriction of zero.

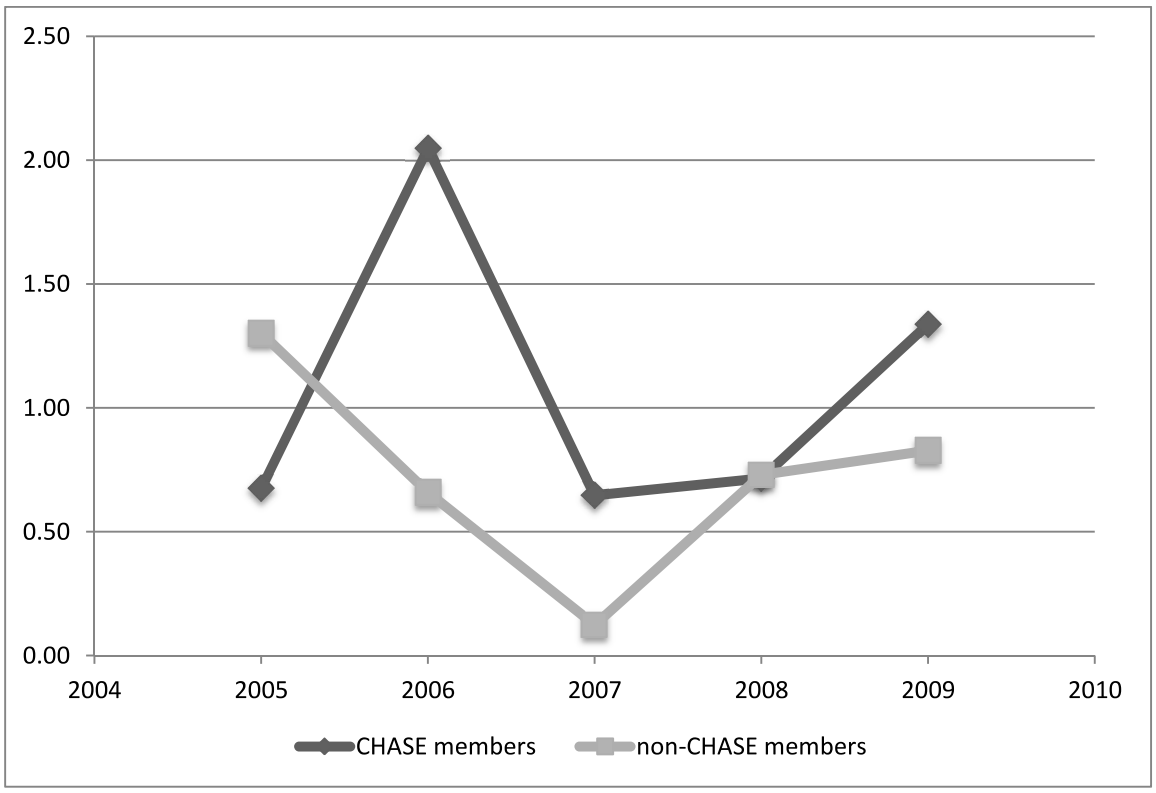


Figure 9: Average Rate of Cases with Job Transfer or Restriction

Figure 9 shows the average rate of cases with job transfer or restriction. In 2005 the NM CHASE members had a lower average rate of cases with job transfer or restriction. In 2008 NM CHASE and non-NM CHASE members had the same average rate of cases with job transfer or restriction. The three other years of gathered data show NM CHASE members with high average rate of

cases with job transfer or restriction. Once again this shows a large amount of variety in the data.

Tables 5 and 6 show the rate of cases with job transfer or restriction for NM CHASE and non-NM CHASE members respectively. These tables are the basis for Figure 8 and 9. The data from the three respondents that joined NM CHASE during the survey time frame is split across Tables 5 and 6.

Table 5: Rate of cases with job transfer or restriction of NM CHASE members

Respondent ID	2009	2008	2007	2006	2005	Average	Median
Respondent 4	1.77	1.24	-	-	-	1.51	1.51
Respondent 5	0.00	0.00	0.00	-	-	0.00	0.00
Respondent 6	1.52	1.74	2.46	-	-	1.91	1.74
Respondent 7	0.00	0.00	0.00	6.72	0.00	1.34	0.00
Respondent 8	0.00	0.00	0.00	-	-	0.00	0.00
Respondent 9	8.00	-	-	-	-	8.00	8.00
Respondent 10	2.29	2.08	1.88	2.06	-	2.08	2.07
Respondent 11	1.14	0.74	0.00	1.14	1.08	0.82	1.08
Respondent 12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Respondent 13	0.00	1.36	0.00	0.65	2.30	0.86	0.65
Respondent 14	0.00	0.00	1.48	1.72	0.00	0.64	0.00
Average	1.34	0.72	0.65	2.05	0.68	1.56	
Median	0.00	0.37	0.00	1.43	0.00		

Table 6: Rate of cases with job transfer or restriction of non-NM CHASE members

Respondent ID	2009	2008	2007	2006	2005	Average	Median
Respondent 1	0.00	0.00	0.00	0.00	1.21	0.24	0.00
Respondent 2	1.48	1.27	0.00	-	-	0.92	1.27
Respondent 3	1.00	0.92	0.49	0.43	0.44	0.66	0.49
Respondent 4	-	-	0.00	-	-	0.00	0.00
Respondent 5	-	-	-	0.00	1.65	0.82	0.82
Respondent 6	-	-	-	2.20	1.91	2.05	2.05
Average	0.83	0.73	0.12	0.66	1.30	0.78	
Median	1.00	0.92	0.00	0.22	1.43		

4.7 Other recordable cases

Other recordable cases include any injury or illness that requires medical treatment beyond first aid, but do not result in death or require days away from work, restricted work activities or job transfers. The OSHA 300a form gives a list of treatments that are considered first aid (Occupational Safety and Health Administration, 2002a). These include using non-prescription medication, applying basic bandaging and drinking fluids to relieve heat stress. In general terms, other recordable cases involve injuries or illness which require professional treatment but do not hinder the worker for more than a day.

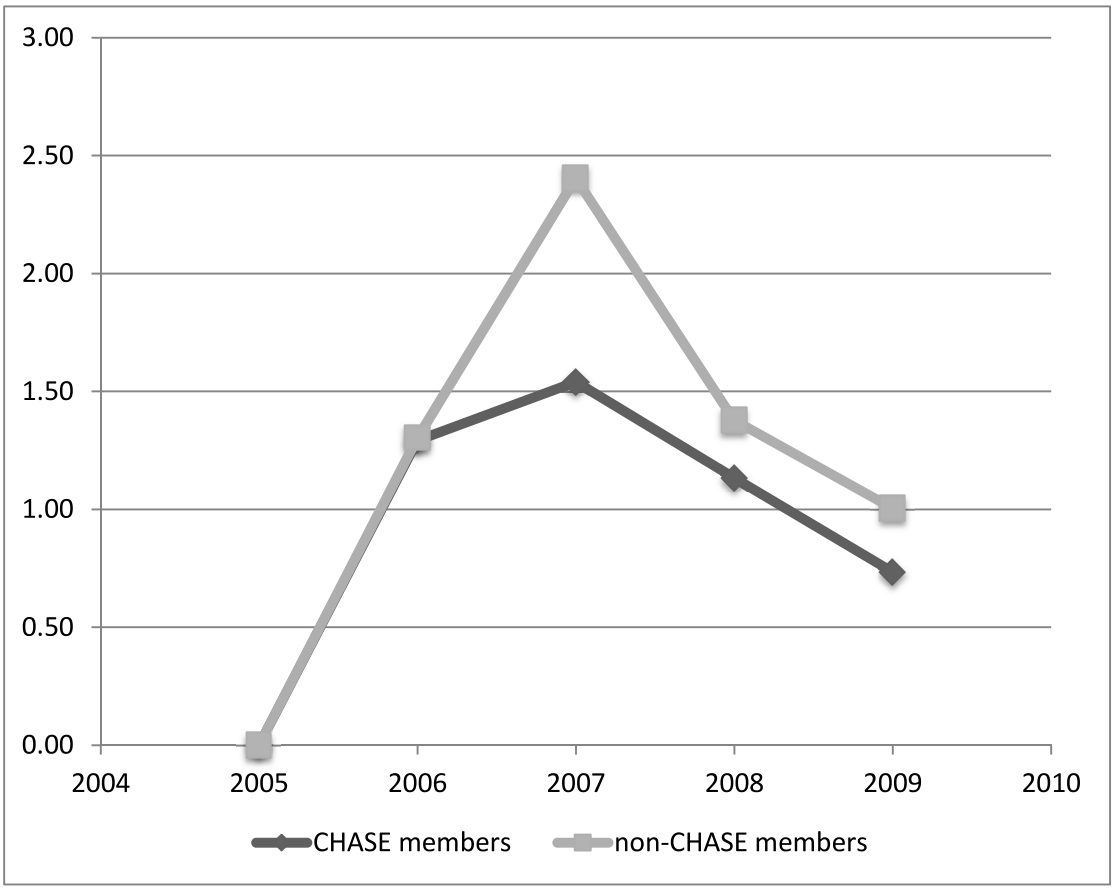


Figure 10: Median Rate of Other Recordable Cases

Figure 10 shows the median rate of other recordable cases. In 2005 and 2006 the median rate of other recordable cases for NM CHASE and non-NM CHASE members was the same. For 2007, 2008, and 2009 the median rate of other recordable cases for non-NM CHASE members was higher than that of NM CHASE members.

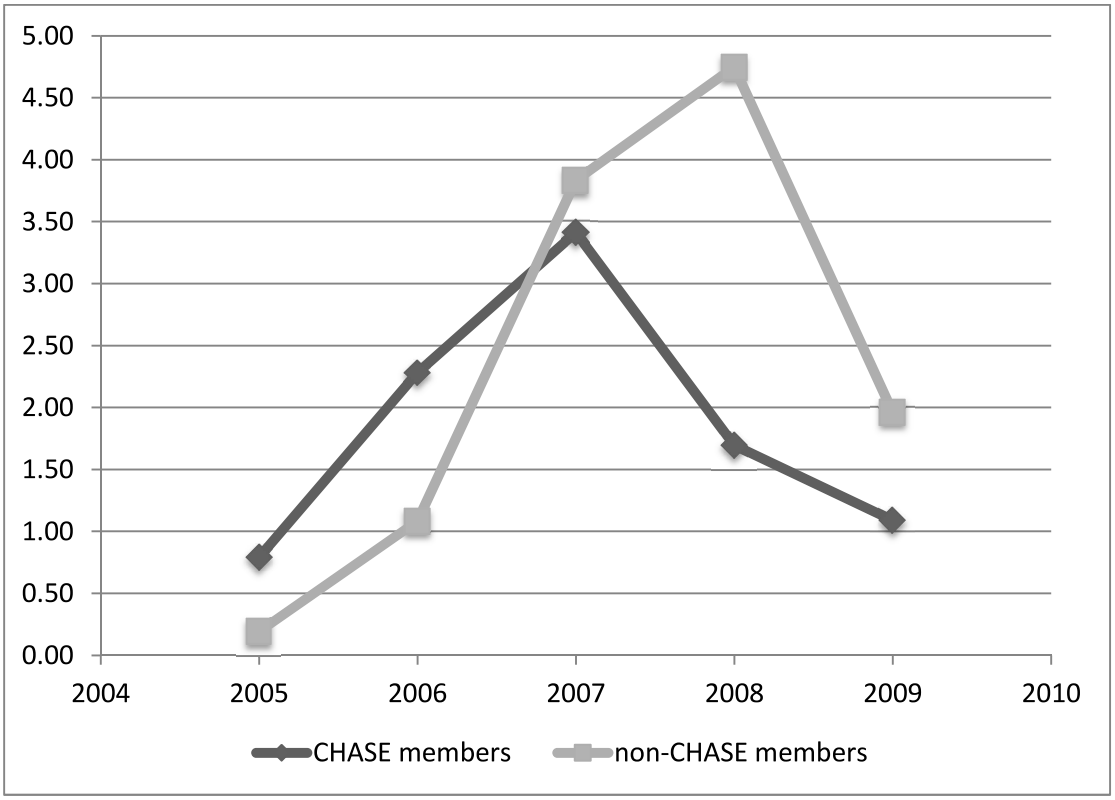


Figure 11: Average Rate of Other Recordable Cases

Figure 11 shows the average rate of other recordable cases for NM CHASE and non-NM CHASE members. In 2005 and 2006 the average rate of other recordable cases for NM CHASE members was higher than that of non-NM CHASE members. However, in 2007, 2008, and 2009 the average rate of other

recordable cases was higher for non-NM CHASE members than for NM CHASE members.

The difference in median and average values for rate of other recordable cases is similar to that of days away from work, and days with job transfer or restriction. Clearly, one or two incidents can make a huge impact.

Tables 7 and 8 show the rate of other recordable cases for NM CHASE members and non-members respectively. The data in these tables was used to created Figures 10 and 11. Table 7 gives a good example of how one incident can significantly change a company's other recordable cases rate. Appendix B shows that the total number of other recordable cases for Respondent 7 in 2008 was one, however, because they were such a small company that one incident gave them an other recordable cases rate of over 5, in 2008.

Table 7: Rate of other recordable cases of NM CHASE members

Respondent ID	2009	2008	2007	2006	2005	Average	Median
Respondent 4	0.59	1.24	-	-	-	0.92	0.92
Respondent 5	0.00	1.51	2.88	-	-	1.46	1.51
Respondent 6	1.14	1.04	1.05	-	-	1.08	1.05
Respondent 7	0.00	5.54	0.00	0.00	0.00	1.11	0.00
Respondent 8	1.31	0.89	1.61	-	-	1.27	1.31
Respondent 9	0.00	-	-	-	-	0.00	0.00
Respondent 10	2.29	0.00	1.88	0.00	0.00	0.83	0.00
Respondent 11	1.14	1.23	1.54	3.04	1.62	1.71	1.54
Respondent 12	0.00	5.50	20.25	8.06	3.12	7.39	5.50
Respondent 13	0.73	0.00	0.00	2.58	0.00	0.66	0.00
Respondent 14	4.77	0.00	1.48	0.00	0.00	1.25	0.00
Average	1.09	1.69	3.41	2.28	0.79	1.61	
Median	0.73	1.13	1.54	1.29	0.00		

Table 8: Rate of other recordable cases of non-NM CHASE members

Respondent ID	2009	2008	2007	2006	2005	Average	Median
Respondent 1	4.88	12.86	9.96	0.00	0.00	5.54	4.88
Respondent 2	0.00	0.00	0.56	-	-	0.19	0.00
Respondent 3	1.00	1.38	0.98	1.73	0.00	1.02	1.00
Respondent 4	-	-	3.83	-	-	3.83	3.83
Respondent 5	-	-	-	1.50	0.00	0.75	0.75
Respondent 6	-	-	-	1.10	0.76	0.93	0.93
Average	1.96	4.75	3.83	1.08	0.19	2.04	
Median	1.00	1.38	2.40	1.30	0.00		

4.8 EMR

Figure 12 shows the average EMR rate for NM CHASE member and non-CHASE members. The EMR rate for NM CHASE members is consistently lower than that of non-NM CHASE members. The EMR is a three year rolling average. The longer term view smoothes out many of the spikes seen in other data reporting forms. A lower EMR rate has a significant impact on the premiums a company pays for worker's compensation insurance. The lower the EMR rate the lower the premiums.

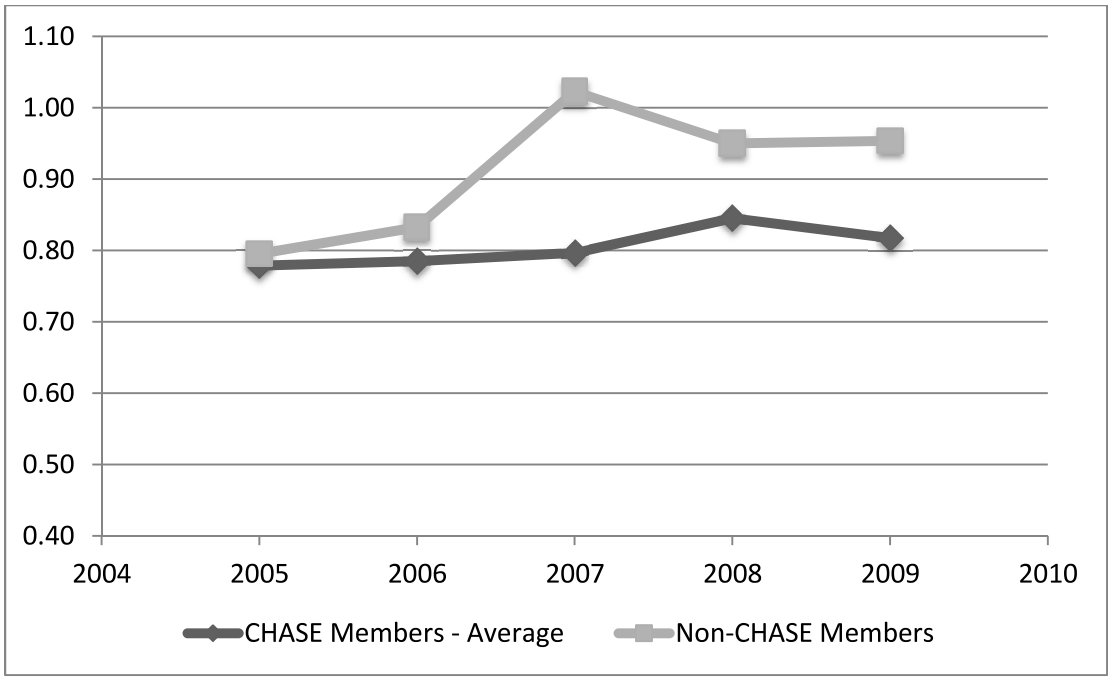


Figure 12: Average EMR Rates for NM CHASE Members and Non-Members

4.9 National CHASE Comparison

The survey looked at incident rates for a few specific companies. After analyzing the results it was determined that it would also be useful to look at aggregate data by state. This macro data will demonstration if states like New Mexico, which have safety partnerships programs, have lower OSHA recordable case rates than the US average.

Data from 2009 was the most recent available. Total recordable case rates were not available for all states. Figure 13 shows the total recordable case rate for several CHASE states, including New Mexico, it also shows the national average case rate of 4.3. Figure 13 shows that three of the five CHASE states for which data was available have total recordable case rates lower than the

national average. For the other two states, the total recordable case rates were considerably higher. Without further information on the participation rate of companies in CHASE programs in these states, it is not possible to draw any conclusions from this data.

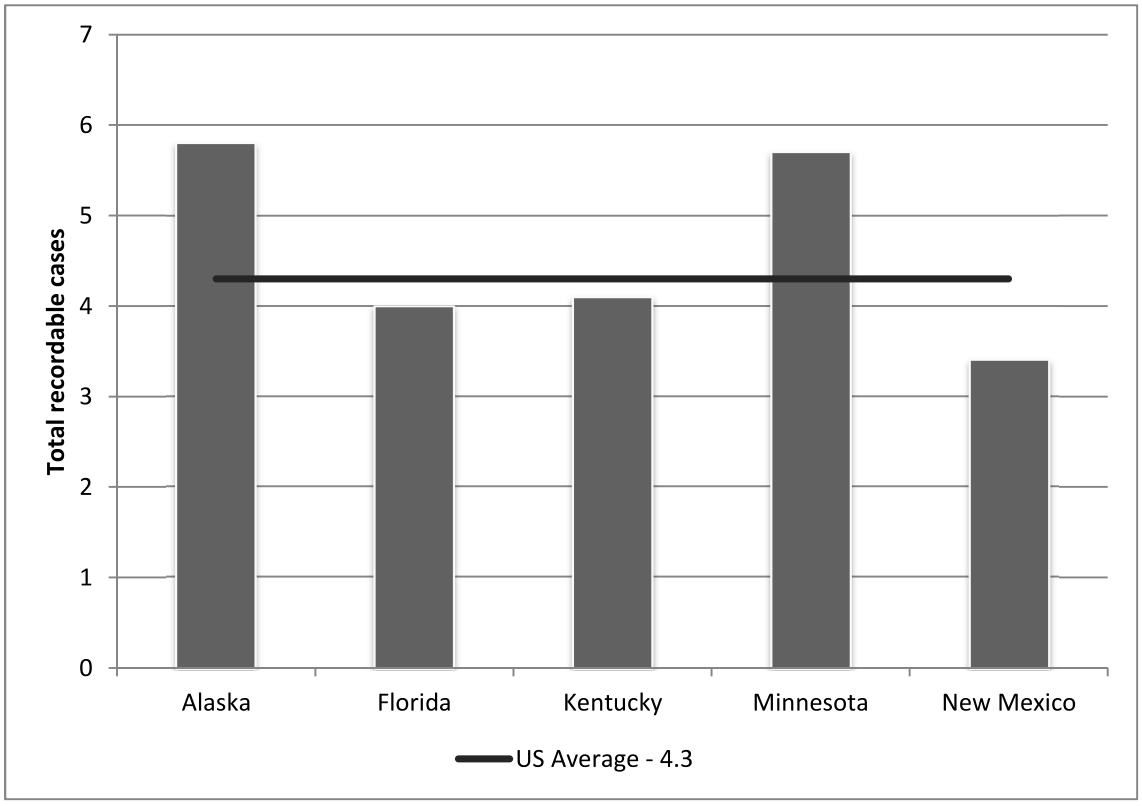


Figure 13: Total Recordable Case Rates – 2009, Selected CHASE States (US Bureau of Labor Statistics, 2009b)

4.10 Survey Summary

The results for the survey showed that in some limited cases, NM CHASE members have a lower incident rate. However, this data was not consistent with how NM CHASE members spoke about the partnership. With these differing

viewpoints the researcher decided to conduct a case study on effects joining NM CHASE had on the perceived changed to safety culture.

Chapter 5: Case Study Results

5.1 Introduction

This chapter presents the results of the case study done examining the perceived effects that joining the NM CHASE partnering program has on construction companies. This was done to answer the second research question: “How does joining the NM CHASE program change safety culture within a company?” Three topics were developed to help answer the research question. The first topic of consideration was how a company’s health and safety program changed as a result of joining NM CHASE. The second topic centered on how a company’s relationships changed with both OHSB, and other contracting companies as a result of joining NM CHASE. The third topic of consideration was how, from the perspective of the employees, a company’s overall safety culture changed. The case study then asked questions that centered on these topics, to fully explore the parameters of perceived benefits of NM CHASE membership.

In order to collect information on these topics, five interviews were done to populate the case study. Four interviews were done with safety managers of local Albuquerque, NM contracting firms. One interview was done with the NM CHASE liaison for ACG-NM. All of the interviews were conducted in a semi-structured format. This format meant that while there were topics the research

focused on, there was not a set list of questions (Oppenheim 1992). This technique was used to get the most complete answer possible without leading the interview toward a preconceived idea of what was correct (Piore 1979).

The researcher did not approach the interviews with a perceived minimum or maximum number of interviews to be done. Instead, when the interviewer stopped gleaning new information, the researcher felt that a saturation point had been reached (Oppenheim 1992). For this topic, that occurred after the first four interviews conducted with safety managers. The interview with the AGC liaison was done to gather information about how joining NM CHASE changed a company's safety culture from a different perspective. This fifth interview also used to confirm what the first four safety professionals had said.

5.2 Affinity Categories

The responses from the interviews were broken down into statements. Using the affinity diagram method presented by White et al. (2002) the natural patterns and grouping of the case study responces were sorted. The three interview topics were used as the primary categories. Figure 14 shows how each statement from the case study was sorted into a primary category. These statements were then further classified into sub-categories.

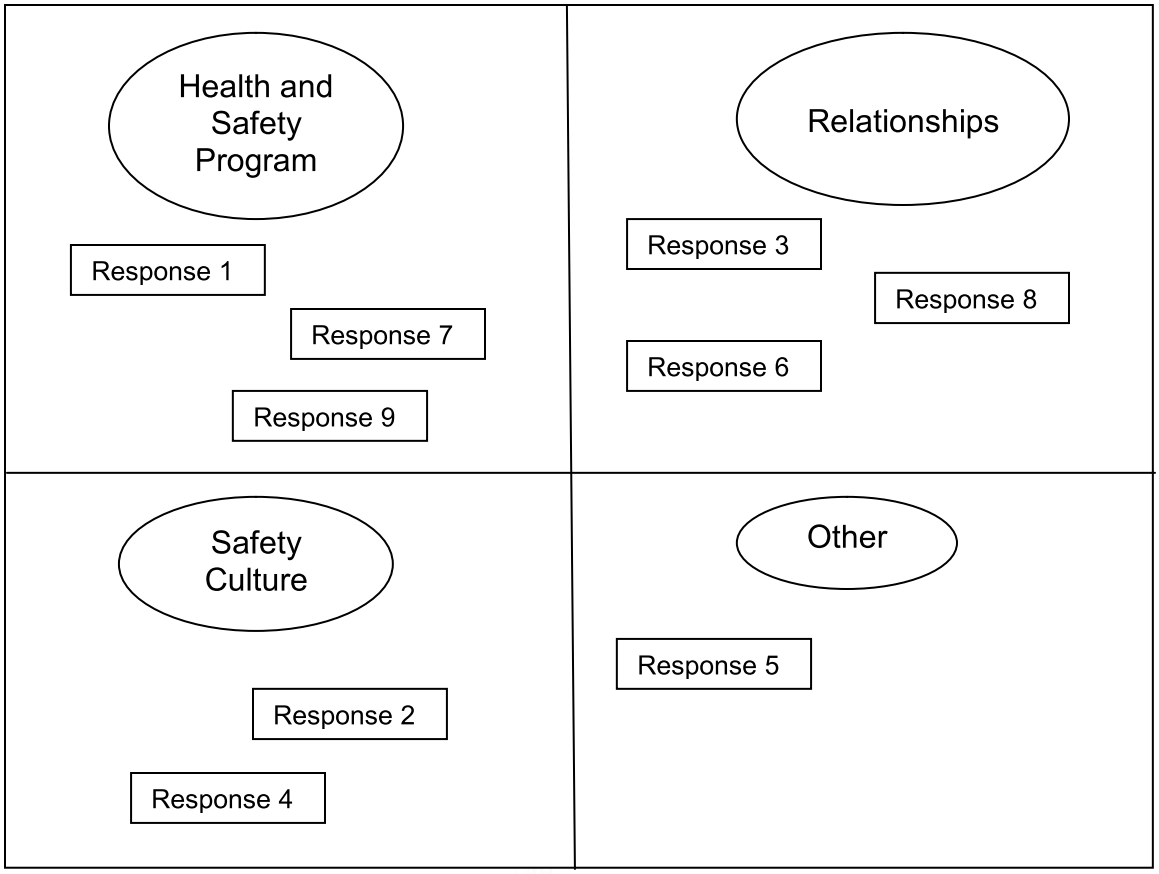


Figure 14: Affinity Diagram

1) How did the health and safety program at your company change after joining NM CHASE?
    a. Management's Commitment to Safety
    b. Company's Attitude Towards Safety
    c. Company's Ability to Improve Safety
2) How did your relationship with OHSB and other safety professionals change after joining NM CHASE?
    a. Company's Relationship with OHSB
    b. Forgiveness from OHSB

c. Improvement to Contractor's Network

d. Flexibility in Work Practices

e. Competition Among Safety People

3) From the perspective of your employees, how did your company's overall safety culture change after joining NM CHASE?

a. Craft Worker's Knowledge about NM CHASE

b. Teaching Safety

c. How the Safety Program is Implemented – Partner vs. Police

4) Other

a. NM CHASE allows OHSB to focus

The "other" category includes one topic that was not part of the researcher's original focus: "NM CHASE allows OHSB to focus." This statement came up several times in the interviews and in research (Aalders & Wilthagen, 1997; Gunningham, 1995). By having a program that rewards companies that have a good safety program and a strong commitment to safety, OHSB can use their recourses to police companies that have less commitment to safety. Even though this topic was not part of the original research question, the researcher felt that it was an interesting note that came up in three different interviews.

The subtopics were chosen based on grouping statements gathered in the interviews. Each category of statements is explained in detail.

How did the health and safety program at your company change after joining NM CHASE?

1a - Management's commitment to safety – Comments in this category were in regard to how joining NM CHASE proved or indicated upper management's commitment to safety. Most interviewees felt that joining NM CHASE was proof of upper management's commitment to safety.

1b- Company's attitude towards safety – Comments in this category were in regard to how joining NM CHASE changed a company's overall attitude towards safety, both in terms of how they expected their employees to act, i.e. more positively about safety, and in terms of comfort about being a model for safety. Several of the interviewees commented about being a role model or having more people watch their safety program and how \ they wanted to "set a good example".

1c - Company's Ability to Improve Safety – One of the topics the interviews covered was if the interviewee thought that joining NM CHASE would make a company with a poor safety record safer. Some parties answered yes, because there was network and good examples to follow. Some answered no, because NM CHASE is a self-driven program, and if the company has no desire to change NM CHASE cannot create that desire.

How did your relationship with OHSB and other safety professionals change after joining NM CHASE?

2a - Company's Relationship with OHSB – This category encompassed all comments about how joining NM CHASE changed a company's relationship with OHSB. Every interviewee indicated that their relationship with OHSB changed

for the better when they joined NM CHASE. This section also included comments about how NM CHASE helped remove OHSB from an adversarial role. It also includes comments about how NM CHASE helped improve communication between the company and OHSB.

2b - Forgiveness from OHSB – This category takes into account recorded comments about how NM CHASE helped companies prove their commitment to safety, which in turn allowed OHSB to be more forgiving when an accident did occur. Because as one interviewee said: “What’s an honest mistake?” The interviews indicated that OHSB was willing to grant this forgiveness to NM CHASE members because NM CHASE members have demonstrated that they want to fix their safety problems and they are willing to fix them quickly.

2c - Improvement to Contractor’s Network – This category encompasses changes to the relationship between contractors. Many interviewees talked about how joining NM CHASE allowed them access to a network of like-minded, safety conscious contractors. One interviewee said: “We're not partners, we’re friends.” There friendships and partnerships had grown from being part of the NM CHASE network. Many of the interviewees also talked about how it was possible to call other contractors with questions or concerns on a job site, because they now knew one another, knew each other’s names, and phone numbers.

2d - Flexibility in Work Practices – This category covered subjects regarding how it was not truly possible to follow all the OHSB rules and get work done on a

construction site. But when you were a member of NM CHASE you had more flexibility in bending the rules because it was known that safety was still your first priority. This category had some overlap with forgiveness from OHSB. However, flexibility was a proactive response while forgiveness is a reactive response.

2e - Competition Among Safety People – This category is about the lack of competition among safety people. This overlaps with the contractor's network category to some degree. However, several of the interviewees said flat out: "Safety people do not compete – we are all on the same team trying to keep people safe." Several gave example of giving safety gear to a fellow contractor's people or going on walk-through of one another's sites to help identify safety hazards.

From the perspective of your employees - how did your company's overall safety culture change after company joining NM CHASE?

3a – Craft Worker's Knowledge about NM CHASE – One of the topics discussed during the interviews was how knowledgeable the craft workers were about NM CHASE and if a company's NM CHASE membership statues mattered to current or potential employees. There was a general consensus from the interviewees that there was not enough educational outreach about NM CHASE to craft worker level employees. Several interviewees did remark that a company's safety record was important to employees, but among craft worker level employees there might not be a connection between NM CHASE and safety practices.

3b - Teaching Safety – This category encompasses responses that referred to teaching safety, as opposed to teaching rules or regulations. Several interviewees stated that teaching safety and making workers accountable for their own safety was significantly more important than teaching OHSB rules and regulations. In one interviewees words: “The guys do not care about regulations, they do care about going home each night.”

3c - How the Safety Program is Implemented – Partner vs. Police – Several interviewees stated that there were two ways to enforce safety. You could be a cop or you could be a partner. There were two different types of partner vs. police dichotomies spoken about. Several safety managers spoke about partnering with their employees and creating a sense of ownership in the safety program. They claimed that this was a much more effective approach to safety then always trying to police their employees.

Interviewees also spoke about how there was a partner vs. police dichotomy in the relationship between OHSB and companies. This extended to how OHSB should enforce safety regulations industry wide.

Each statement was assigned both a main topic and a sub-topic. The complete list of statements can be found in Appendix C.

5.3 Interviewee Statements

Figure 15 shows the number of statements from interviews that fit into each research topic. The topic with the most responses was Topic 2 “How did

your relationship with OHSB and other safety professionals change after joining NM CHASE?" There were eighteen unique statements made in this category that fit into over five interviews. This indicates that there is a change in relationships due to companies joining NM CHASE. Topic 1 "How did the health and safety program at your company change after joining NM CHASE," had ten unique statements. This indicated that the NM CHASE program serves as a catalyst for changes to company's health and safety program. Lastly Topic 3, "How did your company's overall safety culture change after joining NM CHASE," had seven statements. The interviewees did not indicate that there was a strong understanding about NM CHASE among craft workers. Instead NM CHASE seemed to have an impact on upper management and safety professionals.

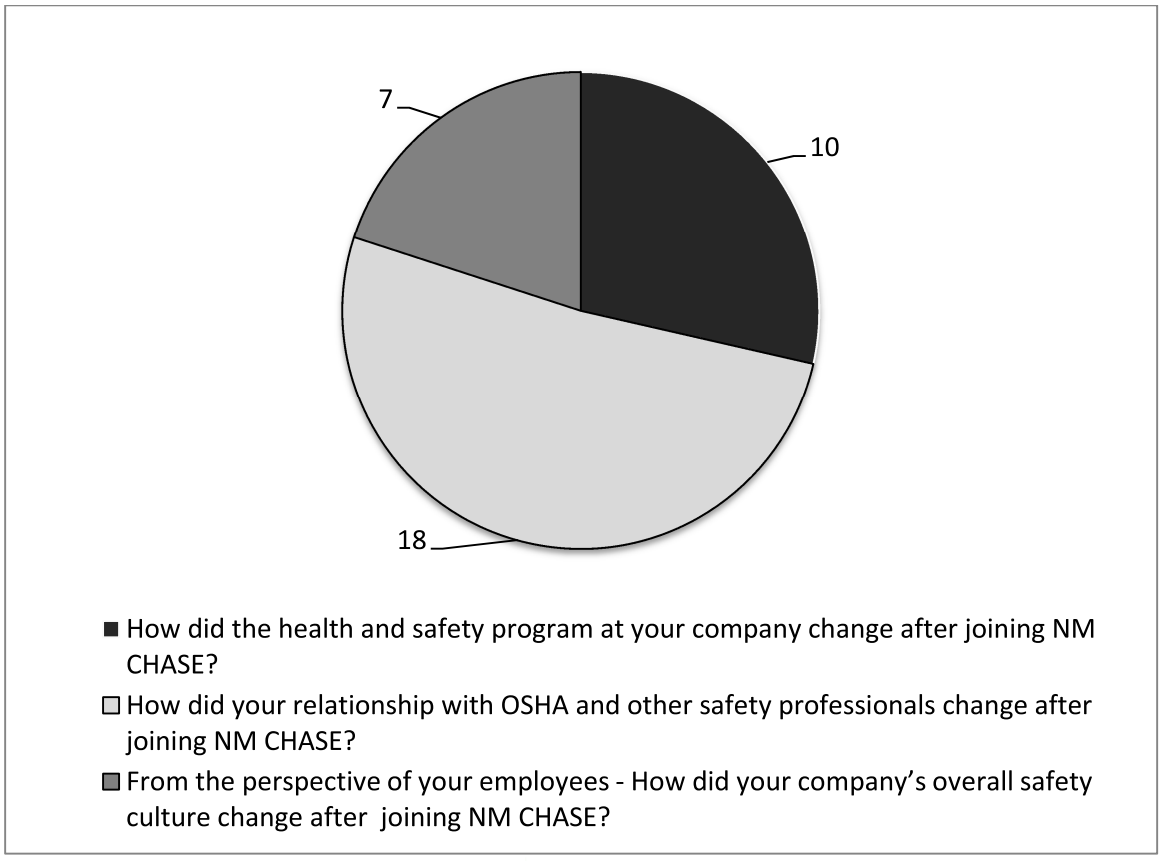


Figure 15: Count of Statements by Topic

Figure 16 gives a count of how many statements fall into each category. The most common group of statements refers to the company's relationship with OHSB with five hits. Every interviewee stated that NM CHASE improved their relationship with OHSB and some reported this in multiple ways. Several categories had only two statements. These categories include "that there is no competition among safety people," the idea "NM CHASE is about teaching safety," and "the police vs. partner theory."

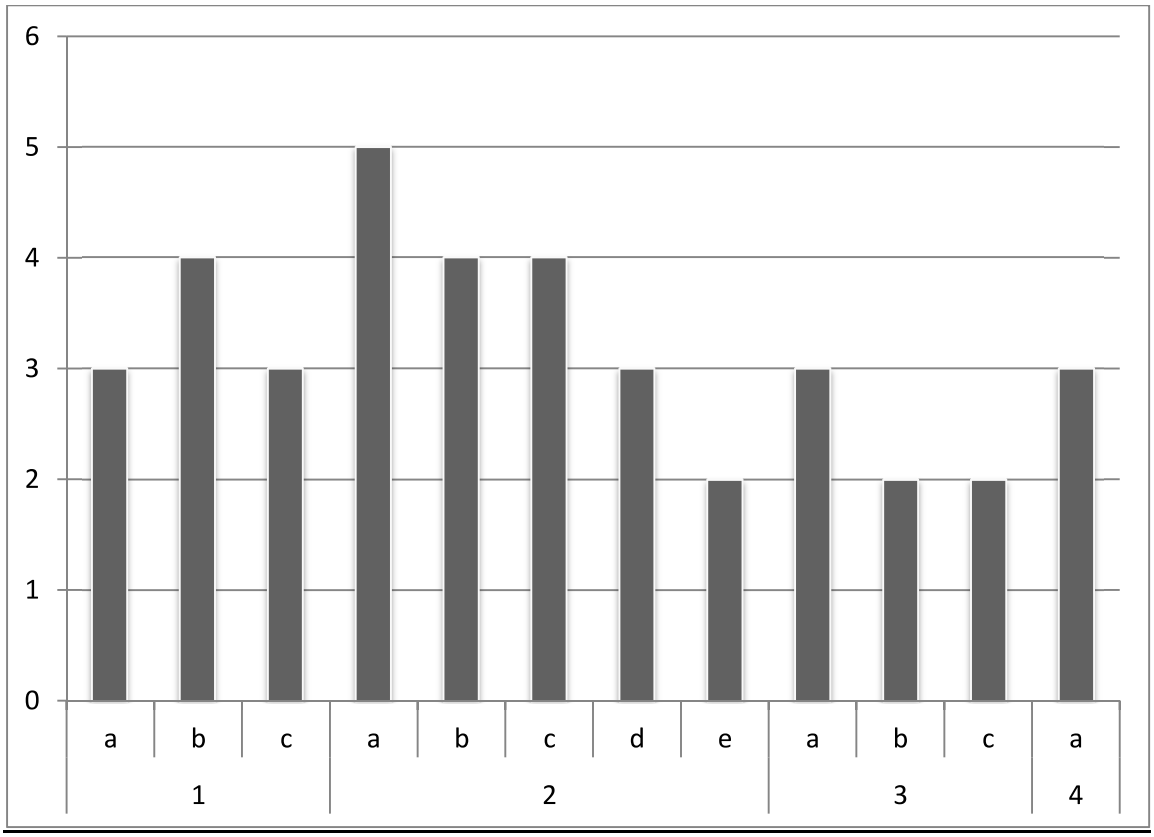


Figure 16: Count of Statements by Category

Table 9 gives an example statement from each topic. The interviews were not directly transcribed thus the statements are close paraphrases of the interviewee's comments.

Table 9: Sorted examples of interviewee's statements

1) How did the health and safety program at your company change after joining NM CHASE?	
1a) Management's Commitment to Safety	Being a member of NM CHASE is definitely a sign of management's commitment to safety.
1b) Company's attitude towards safety	It is about attitude, how people see the company. It is about creating a positive attitude.
1c) Company's Ability to Improve Safety	NM CHASE could help companies that do not have a good safety record because it gives them access to a network of mentors.
2) How did your relationship with OHSB and other safety professionals change after joining NM CHASE?	
2a) Company's Relationship with OHSB	By removing OHSB from the adversarial role OHSB and the company have better communication.
2b) Forgiveness from OHSB	If something went wrong the company is not necessarily punished by OHSB, "What's an honest mistake?"
2c) Improvement to Contractor's Network	There is access to a network of people who are resources for safety. Everyone is partners and friends with the common goal of keeping people safe.
2d) Flexibility in Work Practices	The truth about construction is that it is not possible within all the rules of OHSB. Being part of NM CHASE allows for the rules to be bent, for the workers to be kept safe, and for the work to be done.
2e) Competition Among Safety People	Our bosses might compete but safety people do not. There is a team with the goal of keeping people safe.
3) From the perspective of your employees - how did your company's overall safety culture change after company joining NM CHASE?	
3a) Craft Worker's Knowledge about NM CHASE	There is not a good understanding of what the NM CHASE program is, or why it matters among the craft workforce.
3b) Teaching Safety	In the end it is about people, not about rules or regulations. It is about teaching people to be safe instead of teaching them rules.
3c) How the Safety Program is Implemented – Partner vs. Police	There are two ways of enforcing safety. You can be a mentor or you can be cop. The mentor options works better.

5.4 Non-CHASE Members

The case study results showed a large number of responses that related to the improvement in contractor's relationship was OSHB. Due to this frequency it was decided that the relationship between non-NM CHASE members and OSHB should be considered. Two contractors who are members of AGC but not members of NM CHASE were interviewed. Both were asked about their relationship with OSHB. Both contractors indicated that through AGC they were learning to respect and work with OSHB. One interviewee explained how they used to avoid OSHB but due to training and information received from AGC NM they were learning to respect and work with OSHB. Their reason for not joining CHASE was financial. The company was too small to meet all the requirements. These interviews show that there are many ways that contractors can build relationships with OSHB.

5.5 Case Study Results

To answer the second question presented in this research, a case study was performed. The case study was populated with statements gleaned from five interviews completed by the researcher. Using affinity diagrams these statements were sorted into categories. From these categories the researcher was able to determine that joining NM CHASE did affect two areas of a company. The areas affected were: the overall health and safety program of the company and the company's relationships with other contractors and OHSB.

Every interviewee spoke about how NM CHASE affected their overall health and safety program. Some interviewees spoke about how it improved people's

attitude towards safety, while others spoke about the fact that joining NM CHASE was a definitive sign that upper management was committed to safety. In order to join NM CHASE a company must already have a rigorous health and safety program in place. This case study showed even that with these programs in place NM CHASE can continue to add value.

Every interviewee spoke in depth about how joining NM CHASE changed their relationships with both OHSB and other contractors. There was consensus the joining NM CHASE had a positive impact on contractor's relationship with OHSB. This positive impact included increased levels of communication between the contractor and OHSB, a lessening in the contractor's fear of OHSB, and it removed OHSB from being an adversary of the contractors. All of these changes lead to perceived improvement of safety.

The interviews conducted for this research indicated that joining NM CHASE did not have a large effect on how workers perceived a company's safety culture. Most interviewees did discuss the need to better inform workers about the NM CHASE program, both in terms of what it was, and how it affected their company. This lack of perceived change in safety culture was mostly attributed to the fact each company interviewed had a rigorous safety program in place before joining NM CHASE.

This case study has shown that joining NM CHASE can have positive benefits for a company. These benefits include a more positive relationship with OHSB and other contractors and a better overall attitude towards safety.

Chapter 6: Summary and Conclusion

The construction industry is an incredibly dangerous field to work in. Lowering the rate of illnesses, injuries, and fatalities is good for everyone involved in the construction industry from workers, to contractors, to owners. The method in which safety programs are enforced may have an effect on the outcome of said safety programs. This research examined "command-and-control" vs. self-regulation by studying the NM CHASE program which promotes a self-regulation approach. The goal of this research was to determine if the NM CHASE program had an effect on incident rate.

This chapter will discuss the research questions presented in the Introduction Chapter and determine if they were answered by the results of this study. In addition this chapter will present possible areas for future research.

6.1 Is the NM CHASE program effective at lowering incident rates?

The first research questions presented asked, "Is the NM CHASE program, a self-regulatory program, effective at lowering incident rates below that of the standard "command-and-control" program?" To answer this question a survey was completed. The methodology for the survey can be found in Chapter 3 and the results from the survey can be found in Chapter 4.

The results from the survey are summarized in Figure 3: Median Number of Incident Rates and EMR. This figure shows that the median number of incidents rates for NM CHASE members is lower than that of non-NM CHASE members across three categories. The three categories are based on the OHSB 300a

form and are: rate of days away from work, rate of days with transfer or restriction, and rate of other recordable incidents. Figure 3 also shows that the median EMR rate for NM CHASE members is lower than that of non-NM CHASE members.

This data does indicate that NM CHASE members overall have a lower incident rate than non-NM CHASE members. However, there are some limitations to this research. The first was the sample size, this research gathered only fourteen valid survey responses, only three of which were non-NM CHASE members. This limits how transferable the results are to other companies or other self-regulation programs. The survey gathered five years of historical data. To truly determine if joining NM CHASE will lower a company's incident rates, a comparison must be done of pre- and post-NM CHASE incident rates. This will help determine if joining NM CHASE makes a company safer or if safer companies join NM CHASE.

Even with the ambiguity over if joining NM CHASE lowers incident rates contractors who are members of NM CHASE believe that the NM CHASE program is critically important. One member to the researcher: "NM CHASE is hugely beneficial to the state of NM." These beliefs, that the NM CHASE program is important and efficient, lead the researcher to ask if joining NM CHASE changed a company's safety culture.

6.2 How does joining the NM CHASE program change safety culture within a company?

The second research question asks, “How does joining the NM CHASE program change safety culture within a company?” In order to answer such a broad question three sub-questions were developed.

- How did the health and safety program at your company change after joining NM CHASE?
- How did your relationship with OHSB and other safety professionals change after joining NM CHASE?
- From the perspective of your employees - how did your company’s overall safety culture change after company joining NM CHASE?

A series of semi-structured interviews were conducted with local safety managers. The methodology for the case study can be found in Chapter 3 and the results can be found in Chapter 5. In order to answer the three sub-questions, an affinity diagram was created with the statements gathered during the case study. Based on the statements different categories were developed for each sub-question.

Every interviewee had a response to the first sub-question, “How did the health and safety program at your company change after joining NM CHASE?” They all spoke about how NM CHASE had affected their overall health and safety program. Some interviewees spoke about how it improved people’s attitude towards safety, while others spoke about the fact that joining NM CHASE

was a definitive sign that upper management was committed to safety. The responses about changes to the health and safety program all indicated that the NM CHASE program changes attitudes more then it changes actual written documents. Since every construction company has a written health and safety plan, joining NM CHASE may help a company change their attitude about using knowing, respecting, and following the plan.

Every interviewee also spoke in depth about the second sub-question, “How did your relationship with OHSB and other safety professionals change after joining NM CHASE?” They all spoke about how joining NM CHASE changed their relationships with both OHSB and other contractors. There was consensus that joining NM CHASE had a positive impact on contractor’s relationship with OHSB. This positive impact included increased levels of communication between the contractor and OHSB, a lessening in the contractor’s fear of OHSB, and it removed OHSB from being an adversary of the contractors. All of these changes lead to perceived improvement of safety.

Interviewees also spoke about how joining NM CHASE was like joining a community. The NM CHASE community is centered on keeping workers safety. Everyone in the community participates and helps each other, by loaning safety gear, giving advice, or going on walk-through. This team approach had also lead to perceived improvement of safety culture.

Responses to the third question, “From the perspective of your employees - how did your company’s overall safety culture change after company joining NM

CHASE?" were much more limited. The interviewees indicated that joining NM CHASE did not have a large effect on how workers perceived a company's safety culture. This was often attributed to a company having a safety program in place that foster a strong safety culture before joining NM CHASE.

The interviewees also felt that the craft workforce did not have a strong understanding of the NM CHASE program. Most interviewees discuss the need to better inform workers about the NM CHASE program, both in terms of what it was overall, and how it affected their company.

This case study has shown that joining the NM CHASE program does change the safety culture of a company in two ways. The first is that companies have a more positive attitude towards safety and the second is that companies have a better relationship with OHSB and other contractors.

6.3 Future Research

The research provided in this thesis provides a new way of looking at the NM CHASE program, however this research is only the beginning. The framework presented here can be expanded. Areas for future study should include a larger survey and cases studies of companies before and after joining NM CHASE. This framework can also be used to study CHASE programs in other states. In addition, there are other self-regulation programs within the construction industry that should studied. The Associated Builders and Contractors have a similar merit-based safety recognition program, Safety

Training and Evaluation Process (STEP) which could be compared to the findings from this research.

Future study should also be done to determine if this partnership frame work can be applied to contractor/owner relationships.

Appendix A – Survey

Cover letter attached to e-mail requesting ACG-member to take survey.

UNM

Department of Civil Engineering

December 2, 2010

To AGC NM Building Branch Members:

UNM is conducting a research project to explore the question: *Are partnerships between OSHA and contractors an effective tool to lower incident rates?*

Your assistance is being requested because you are a member of Associated General Contractors (AGC) of America, New Mexico Building Branch. The goal of the study is to compare incident rates from Construction Health and Safety Excellence (CHASE) partnership members with non-CHASE partnership members.

The link below will connect you to a survey. The survey will ask about your CHASE membership status, historical data from the OSHA 300a form, and EMR rates. The survey will NOT ask for your company name, your name or any other identifying factors. There will be no way to trace the data back to your company. The survey asks for five years worth of data in order to see if there is a trend in incident rates. If you cannot provide five years worth of data please provide all the data you can. Everything is helpful.

If this research can show that the CHASE partnership is effective at lowering incident rates then the partnership will have a good case to expand. This in turn will lead to a greater number of safe construction sites.

If you have any questions or comments, or if you would like a copy of the research report you can contact me by e-mail at schara@unm.edu or phone (505) 503-3753.

Thank you for your time!

Sincerely,

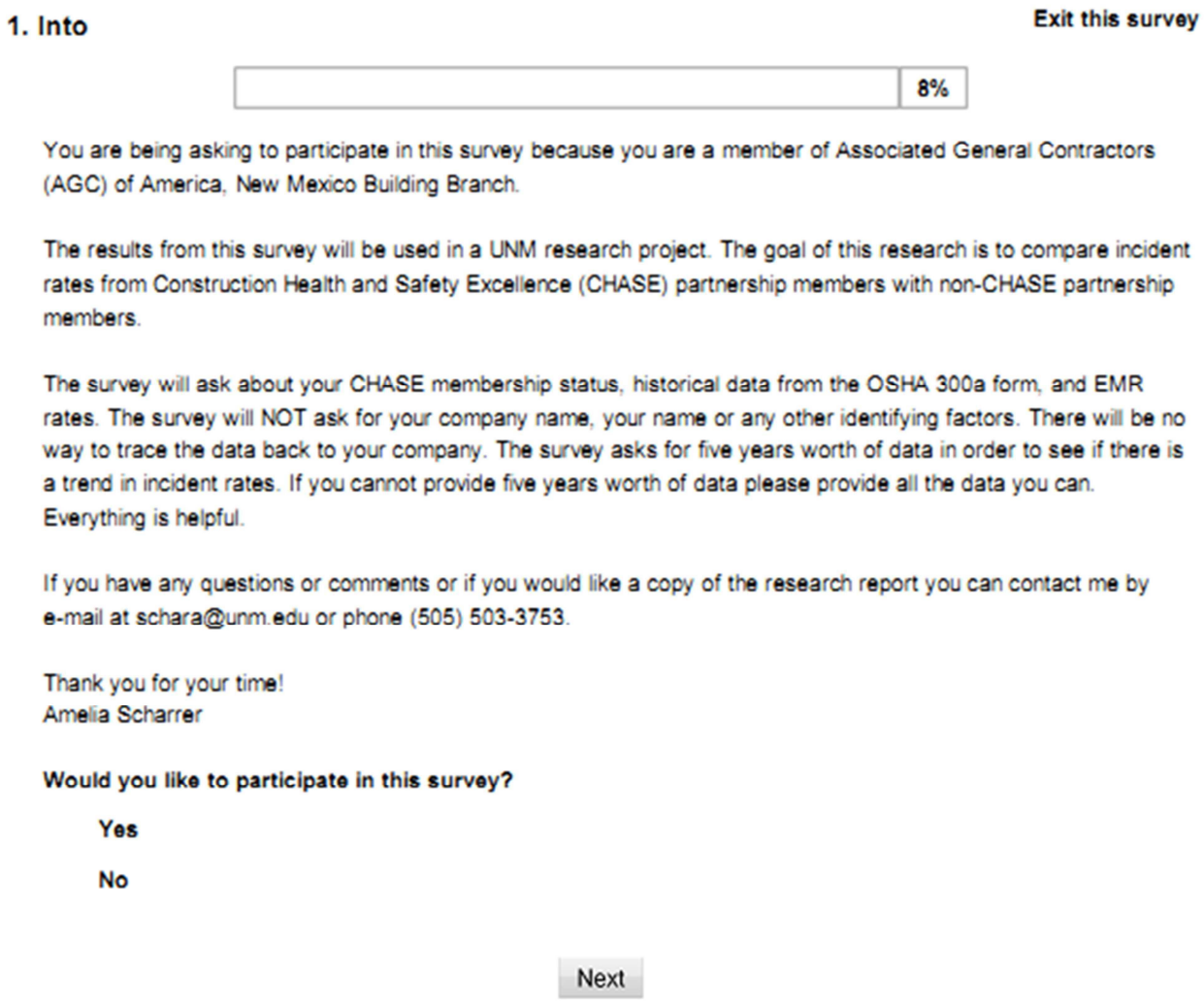
Amelia Scharrer

Amelia Scharrer

http://www.surveymonkey.com/s/WHHX8VD

The University of New Mexico • MSC01 1070 • 1 University of New Mexico • Albuquerque, NM 87131-0001 • Phone 505.277.2722 • Fax 505.277.1988 • www.unm.edu
CENT Room 3020 • www.unm.edu/~civil

The survey was conducted with surveymonkey.com. The survey contained logic which allowed respondents to see different pages based on answers to questions.



1. Into **Exit this survey**

8%

You are being asking to participate in this survey because you are a member of Associated General Contractors (AGC) of America, New Mexico Building Branch.

The results from this survey will be used in a UNM research project. The goal of this research is to compare incident rates from Construction Health and Safety Excellence (CHASE) partnership members with non-CHASE partnership members.

The survey will ask about your CHASE membership status, historical data from the OSHA 300a form, and EMR rates. The survey will NOT ask for your company name, your name or any other identifying factors. There will be no way to trace the data back to your company. The survey asks for five years worth of data in order to see if there is a trend in incident rates. If you cannot provide five years worth of data please provide all the data you can. Everything is helpful.

If you have any questions or comments or if you would like a copy of the research report you can contact me by e-mail at schara@unm.edu or phone (505) 503-3753.

Thank you for your time!
Amelia Scharrer

Would you like to participate in this survey?

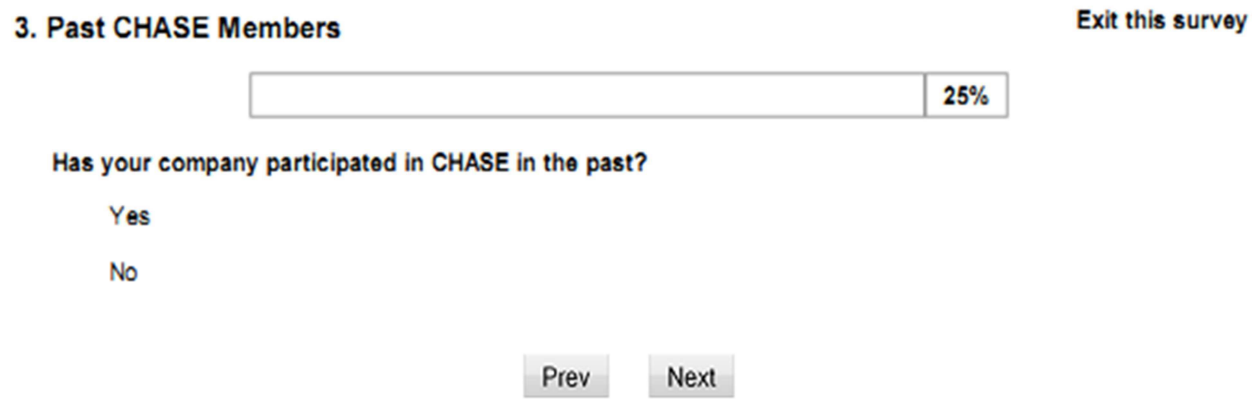
Yes

No

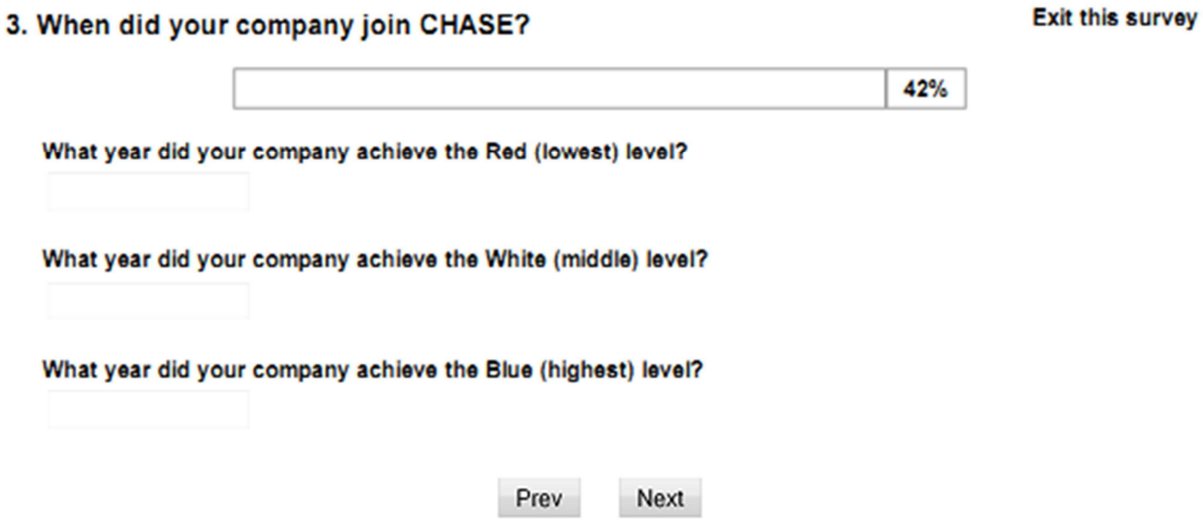
Next

If the respondent answer No to question one they were taken straight to the thank you page of the survey. Otherwise they continued the survey.

If the respondent answer no to question 2 regarding current CHASE memberships they were taken to the following page:

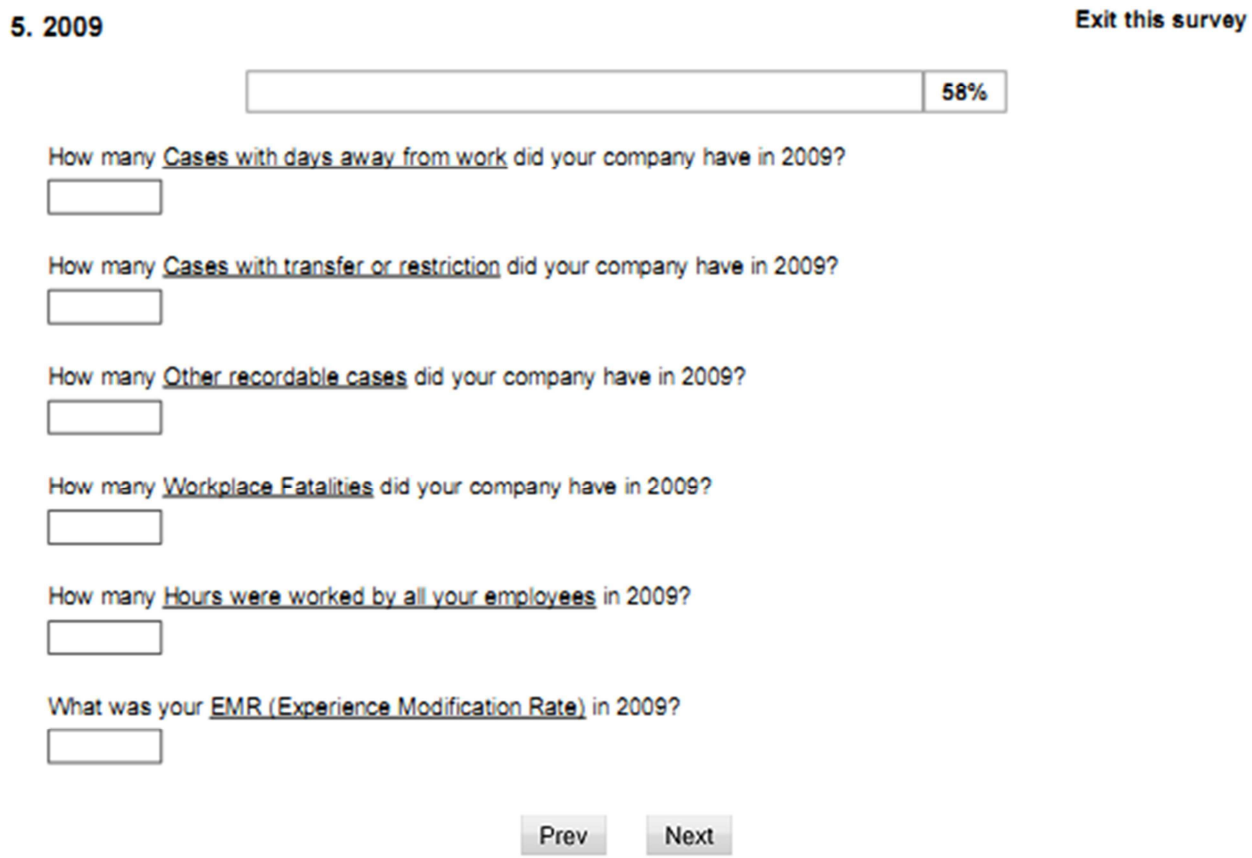


After answering about past CHASE membership the survey respondents were taken to question 5, regarding OSHA 300a and EMR data.



Questions regarding when a company joined CHASE were answered via a drop down box with years 2001-2010 available for selection. Only respondents who had confirmed current CHASE membership saw this question.

After questions regarding CHASE membership had been asked all survey respondents saw question 5, regarding information from the OSHA 300a form and EMR.



The same question was asked five times with only the date changing. OSHA 300a and EMR data was gather for years 2005-2009.

Lastly all survey respondents saw the Thank You page

Appendix B – Collected Survey Data

Respondent ID	CHASE Member Since	What year - Blue level?	What year- White level	What year - Red level?	Company currently participate CHASE	2009					
						EMR	Hours worked	Fatalities	Other recordable cases	Transfer or restriction	Days away from work
Respondent 1					No	0.88	163797.8	0	4	0	5
Respondent 2					No	1.29	270402	0	0	2	0
Respondent 3	2010	2010			Yes	0.69	597447	0	3	3	0
Respondent 4	2008	2008			Yes	0.84	339255	0	1	3	0
Respondent 5	2007	2007			Yes	0.98	138540	0	0	0	1
Respondent 6	2007	2007			Yes	0.74	524895	0	3	4	1
Respondent 7	2004	2004	Have not achieved	Have not achieved	Yes	0.95	45849	0	0	0	1
Respondent 8	2003	2003			Yes	0.65	304237	0	2	0	1
Respondent 9	2002	2005	2002	Have not achieved	Yes	0.89	50000	0	0	2	0
Respondent 10	2001	2007	2001	2001	Yes	0.64	87428	0	1	1	0
Respondent 11	2001	2001			Yes	0.89	704108	0	4	4	0
Respondent 12	2001			2001	Yes	0.9	55450	0	0	0	0
Respondent 13	2001	2001			Yes	0.72	272399	0	1	0	0
Respondent 14	2001	2004	2001		Yes	0.79	83835	0	2	0	0

	2008						2007					
Respondent ID	EMR	Hours worked	Fatalities	Other recordable cases	Transfer or restriction	Days away from work	EMR	Hours worked	Fatalities	Other recordable cases	Transfer or restriction	Days away from work
Respondent 1	1.05	155514.3	0	10	0	0	1.05	160654	0	8	0	1
Respondent 2	0.98	315479	0	0	2	6	1.25	356456	0	1	0	3
Respondent 3	0.82	435454	0	3	2	0	0.79	406584	0	2	1	1
Respondent 4	0.99	161055	0	1	1	0	1	52280	0	1	0	0
Respondent 5	0.98	132191.5	0	1	0	1	0.75	138853	0	2	0	1
Respondent 6	0.71	576192	0	3	5	1	0.81	569641	0	3	7	0
Respondent 7	0.97	36116	0	1	0	0	1	33089	0	0	0	0
Respondent 8	0.71	449486	0	2	0	0	0.67	372080	0	3	0	0
Respondent 9												
Respondent 10	0.71	96291	0	0	1	0	0.66	106447	0	1	1	0
Respondent 11	0.94	815413.5	0	5	3	1	0.74	519318.3	0	4	0	0
Respondent 12	0.88	72755	0	2	0	0	0.95	128367	0	13	0	2
Respondent 13	0.72	293864	0	0	2	0	0.73	296486	0	0	0	0
Respondent 14	0.84	113876	0	0	0	0	0.86	135154	0	1	1	0

	2006						2005					
Respondent ID	EMR	Hours worked	Fatalities	Other recordable cases	Transfer or restriction	Days away from work	EMR	Hours worked	Fatalities	Other recordable cases	Transfer or restriction	Days away from work
Respondent 1	1.03	222461	0	0	0	2	0.81	165084	0	0	1	2
Respondent 2												
Respondent 3	0.79	463236	0	4	1	0	0.68	453685	0	0	1	1
Respondent 4												
Respondent 5	0.77	132922	0	1	0	1	0.74	121497	0	0	1	0
Respondent 6	0.74	545514	0	3	6	1	0.95	524895	0	2	5	1
Respondent 7	0.92	29754	0	0	1	1	1	30937	0	0	0	0
Respondent 8												
Respondent 9												
Respondent 10	0.66	96967	0	0	1	0	0.66	81915	0	0	1	0
Respondent 11	0.75	526083.8	2	8	3	1	0.7	370424.3	0	3	2	0
Respondent 12	0.82	99312	0	4	0	3	0.8	64070	0	1	0	0
Respondent 13	0.75	309500	0	4	1	0	0.72	261392	0	0	3	1
Respondent 14	0.81	116247	0	0	1	0	0.79	92062	0	0	0	1

Appendix C – Collected Case Study Data

Interviewee	Case Study Category	Sub-Category	Statement
Subject 2	1	Company's Ability to Improve Safety	If a company is unsafe, joining NM CHASE will not change that. You get out of the program what you want to get out of it.
NM CHASE Liaison	1	Company's Ability to Improve Safety	NM CHASE would help companies that do not have a strong safety record because of the mentoring. If there are red or white level contractors on a site with a blue level contractor they might offer to do walk through or help the other contractors in other ways.
Subject 3	1	Company's Ability to Improve Safety	NM CHASE could help companies that do not have a good safety record because it gives them access to a network of mentors.
NM CHASE Liaison	1	Company's Attitude Towards Safety	Being a member of NM CHASE is something the companies are proud of.
Subject 1	1	Company's Attitude Towards Safety	It is about attitude, how people see the company. It is about creating a positive attitude.
Subject 2	1	Company's Attitude Towards Safety	There are more eyes watching if you are a member of NM CHASE, this leads to more accountability about safety.
Subject 3	1	Company's Attitude Towards Safety	NM CHASE tells people that your company is safe and that you care about safety.
NM CHASE Liaison	1	Management's Commitment to Safety	Being a member of NM CHASE is definitely a sign of management's commitment to safety.
Subject 1	1	Management's Commitment to Safety	NM CHASE is about a commitment from management. It makes people feel accountable.
Subject 4	1	Management's Commitment to Safety	Being a member of NM CHASE showed a commitment to safety. It puts more pressure on the company to be safe.
Subject 2	2	Competition Among Safety People	There is no competitiveness in safety.
Subject 3	2	Competition Among Safety People	Our bosses might compete but safety people do not. There is a team with the goal of keeping people safe.

Case Study Category
1) How did the health and safety program at your company change after joining NM CHASE?
2) How did your relationship with OHSB and other safety professionals change after joining NM CHASE?

Interviewee	Case Study Category	Sub-Category	Statement
Subject 2	2	Flexibility in work practices	There is some work that cannot be done within the OHSB rules, partnership with OHSB allows for flexibility while keeping everyone safe.
Subject 3	2	Flexibility in work practices	NM CHASE allows companies to work with OHSB is non-adversarial manner.
Subject 4	2	Flexibility in work practices	The truth about construction is that it is not possible within the rules of OHSB. Being part of NM CHASE allows for the rules to be bent, for the workers to be kept safe, and for the work to be done.
NM CHASE Liaison	2	Forgiveness from OHSB	It is not about finger pointing it is about fact finding. It is about asking the question what do we do now?
Subject 1	2	Forgiveness from OHSB	If something went wrong the company is not necessarily punished by OHSB, "What's an honest mistake?"
Subject 2	2	Forgiveness from OHSB	Help is freely given with no concern for penalty.
Subject 3	2	Forgiveness from OHSB	It is nice not to be afraid of OHSB.
NM CHASE Liaison	2	Improvement to Contractor's Network	NM CHASE is useful because it brings together a group. It allows people to share lessons learned. It also allows for mentoring. It increases community.
Subject 2	2	Improvement to Contractor's Network	There is access to a network of people who are resources for safety. Everyone is partners and friend with the common goal of keeping people safe.
Subject 3	2	Improvement to Contractor's Network	Other contractors respect you more if you are member of NM CHASE. People look up to the blue members.
Subject 3	2	Improvement to Contractor's Network	Being a member of NM CHASE give a common understanding. If you are working with another blue level contractor on a job site you know where they are coming from and what their priorities are.

Case Study Category

2) How did your relationship with OHSB and other safety professionals change after joining NM CHASE?

Interviewee	Case Study Category	Sub-Category	Statement
NM CHASE Liaison	2	Relationship with OHSB	The NM CHASE program change how people perceive OHSB. Before everyone bad mouthed OHSB there was not respect. With the partnership is place there is room to work together, room to respect OHSB and see their value. There is less fear among contractors now about OHSB.
Subject 1	2	Relationship with OHSB	There is better communication between the company and OHSB.
Subject 2	2	Relationship with OHSB	It is more than a partnership it is friendship, each party can call one another for advice.
Subject 3	2	Relationship with OHSB	The biggest bonus is the relationship with OHSB.
Subject 4	2	Relationship with OHSB	By removing OHSB from the adversarial role OHSB and the company have better communication.
Subject 2	3	How the Safety Program is Implemented – Partner vs. Police	There are two approaches that can be taken to safety. You can try to police everyone or you can partner with everyone and make them the safety officials. Policing does not work.
Subject 3	3	How the Safety Program is Implemented – Partner vs. Police	There are two ways of enforcing safety. You can be a mentor or you can be cop. The mentor options works better.
NM CHASE Liaison	3	Craft Worker's Knowledge About NM CHASE	There is a lack of knowledge among the craft workforce about NM CHASE. They do not know what it means or why they should care. We are working on an educational program to try and change this.
Subject 1	3	Craft worker's Knowledge About NM CHASE	There is not a good understanding of what the NM CHASE program is or why it matters among the craft workforce.
Subject 2	3	Craft worker's Knowledge About NM CHASE	When people start with the company they often say they wanted to work there because of the safety record.

Case Study Category

2) How did your relationship with OHSB and other safety professionals change after joining NM CHASE?

3) From the perspective of your employees - how did your company's overall safety culture change after company joining NM CHASE?

Interviewee	Case Study Category	Sub-Category	Statement
Subject 1	3	Teaching Safety	In the end it is about people, not about rules or regulations. It is about teaching people to be safe instead of teaching them rules.
Subject 2	3	Teaching Safety	When asked how many safety official the company has the subject always responses 300, because every employee is a safety official. You must assimilate to the safety culture or move on.
NM CHASE Liaison	4	Allow OHSB to focus	NM CHASE does allow OHSB to spend their time on companies that are not committed to safety.
Subject 3	4	Allow OHSB to focus	By having NM CHASE and other partnerships in place OHSB knows who the contractors who care about safety are and they can spend their energy on contractors who do not care about safety.
Subject 4	4	Allow OHSB to focus	The NM CHASE program identifies companies that OHSB does not need to worry about.

Case Study Category
2) How did your relationship with OHSB and other safety professionals change after joining NM CHASE?
3) From the perspective of your employees - how did your company's overall safety culture change after company joining NM CHASE?

Appendix D – IRB Approval

THE UNIVERSITY of
NEW MEXICO

Main Campus Institutional Review Board
Human Research Protections Office
MSC08 4560
1 University of New Mexico~Albuquerque, NM 87131-0001
http://hsc.unm.edu/som/research/HRRC/

15-Apr-2011

Responsible Faculty: Susan Halter
Investigator: Amelia Scharer
Dept/College: Civil Engineering Civil Engr

SUBJECT: IRB Determination of Exempt Status
Protocol #: 11-179
Project Title: The effectiveness of the Construction Health and Safety Excellence (CHASE) partnering program at increasing the perception of safety among construction companies
Approval Date: 13-Apr-2011

The Main Campus Institutional Review Board has reviewed the above-mentioned research protocol and determined that the research is ***exempt*** from the requirements of Department of Health and Human Services (DHHS) regulations for the protection of human subjects as defined in 45CFR46.101(b) under category 2, based on the following:

1. Exempt Application dated March 29, 2011

2. Letter to Participant dated March 24, 2011

3. Interview Questions dated March 24, 2011

Because it has been granted exemption, this research project is not subject to continuing review.

Changes to the Research: It is the responsibility of the Principal Investigator to inform the IRB of any changes to this research. A change in the research may disqualify this project from exempt status. Reference the protocol number and title in all documents related to this protocol.

Sincerely,

J. Scott Tonigan, PhD
Chair
Main Campus IRB

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