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Creating the Climate for Making Ergonomic Changes

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Creating the Climate for Making Ergonomic Changes

May 2012

A research study by the
State Building and Construction Trades Council of California

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Creating the Climate for Making Ergonomic Changes

ABSTRACT:

Purpose: The purpose of this study is to learn about attitudes toward implementing ergonomic change in California construction work in the unionized sector. Our specific goal was to assess current perceptions and attitudes among construction professionals toward overcoming barriers and obstacles and voluntarily implementing ergonomic solutions. We hope the results will inform future training projects, education efforts, and social marketing campaigns.

This study relates directly to the NORA Construction Sector Strategic Goal #7.6—to improve the acceptance, diffusion and adoption of Work-Related Musculoskelatal Disorder (WMSD) workplace solutions by contractors, owners, suppliers and workers, and addresses both goals 7.6.1—evaluating previously implemented work practice innovations and 7.6.2— pilot studies toward developing dissemination strategies for workplace solutions to evaluate the factors that facilitate and inhibit intervention adoption and diffusion.

Methodology: Our primary method of gaining this information was through conducting 50 individual key informant interviews with contractor representatives and union staff and holding four focus groups with workers. In total, we interviewed 23 construction contractors (7 general and representatives from 7 different crafts); 27 union representatives from 16 different trades; and we talked to 48 workers in focus groups (one multi-craft, and three single-craft groups). The interviews lasted an average of 45 minutes, and the focus groups were 90 minutes.

Key Findings:

1. *Knowledge and Awareness:* While there was varying understanding of the very term "ergonomics," survey participants were fully engaged in addressing the issue, which they saw as having major impact on the construction workforce. Contractors are particularly looking for hard data on cost-effectiveness, to ensure that any solutions not inhibit production and be at a reasonable price. Workers wanted to know how the hazards impact their bodies long-term, and wanted real-world solutions. Unions are looking for hard data that they could use for negotiating, and good training materials for training apprentices and journeymen. All groups felt that different kinds of training would be needed on all levels—including workers, front line supervisors; contractors and project owners, and unions and apprenticeship programs.
2. *Control strategies currently being utilized:* No pattern emerged to illustrate what's currently being done on construction worksites to implement ergonomic solutions. While we heard about some use of new tools, changes in how materials are handled, and some attention being paid to job rotation and hazard analysis, the one solution being increasingly adopted and credited with reducing injuries is "Stretch and Flex" programs at the worksite.
3. *Attitudes***:** Contractors generally agreed that they were uninterested in trying any solution that would negatively impact production. Their primary concern was about

cost, but they could be motivated by a good "return on investment" argument. They were also concerned about "holding the bag" for cumulative injuries. Unions were in a more reactive position; their primary concern is to keep their members employed, so they're not likely to fight the contractors for costly ergonomic changes unless their members demand it. The workers are also concerned about being good producers and therefore tend to work through pain, assuming it's inevitable in the industry. In today's economy, they also fear losing their job and/or career, or drawing the brunt of peer pressure by complaining.

4. *Obstacles*: The key obstacles raised are the availability of tested and effective tools, equipment and processes, the pace of production they perceive is needed to keep union contractors competitive, and the expense of purchasing new tools and implementing other solutions. Contractors would need to be convinced that there was a financial and/or production benefit to adopting any ergonomic innovation. However, they and their workers understand that the cost of worker injuries, losing skilled workers, and rising workers' compensation premiums must be factored in to any cost-benefit analysis. Other obstacles are the repetitive nature of construction work, and a lack of awareness among workers and contractors of the hazards and of available solutions.
5. *Messaging*: While contractors' top messages had to do with productivity and saving money, workers' and unions' top messages had to do with health, their family, and not being able to afford to get injured; productivity was a close #4. For a campaign to be successful, it would need to address the very different concerns held by contractors and workers.

Recommendations: Educational and marketing campaigns directed separately at workers and contractors are the key to getting them to take the next steps to addressing WMSD. Contractors need to see hard statistics on how addressing ergonomic issues will benefit them; they need to be introduced to new tools and safer products; and they need to train their frontline staff to support workers in implementing ergonomic practices. Unions will be on the forefront of providing training and pushing their members to identify and address injuries when they occur. The workers themselves need to get beyond their "tough guy" attitudes and be willing to advocate for safety. We recommended a variety of partnerships to help promote ergonomic solutions, including Workers' Compensation insurers and Cal/OSHA.

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A. INTRODUCTION

If you were to walk around any busy construction site you would see workers lifting heavy materials and equipment, repeating the same motion over and over, bending, climbing ladders, working in awkward postures, and using hand tools that have not changed in a century. Something you would not likely hear in that work environment is the word "ergonomics," even though years of research have shown that principles of ergonomics can help prevent injuries, improve efficiency and create a better environment for workers. Not so many years ago the word might have been dismissed altogether by many construction professionals.

The State Building and Construction Trades Council of California (SBCTC) experienced this first-hand in 2002 when recruiting participants for a train-the-trainer class on ergonomics in construction. Under that name, interest was difficult to generate, and some people even had an aversion to it. When we began marketing the training as "preventing strains and sprains," their tone changed and people welcomed the chance to attend. Although anecdotal, this experience piqued our interest in exploring why construction professionals reacted to ergonomics this way despite the fact that work-related musculoskeletal disorders (WMSDs) were common.

We initiated this study nine years later to learn the current attitudes and perceptions that contractors, unions and workers have about ergonomics and what its status is in practice and in their safety mindset. Our primary goals were to:

1) Understand how construction professionals deal with the issue of WMSDs on today's worksites, and
2) Collect information that would form the basis for exploring the possibility of carrying out a social marketing campaign.

Our project "Creating the Climate for Making Ergonomic Changes" is about engaging people who are not researchers, scientists or ergonomists. We wanted to hear from the people who are getting injured, who have spent entire careers doing this hard, physical labor and from those who are in positions to make change. The SBCTC is in an excellent position to reach workers, union leaders, and contractors. Contractors hold the key to changing the way work is done; they decide how many workers will be on a job, which equipment will be available for them to use, how hazards will be assessed and mitigated, and set schedules for production. Union building trades workers are skilled, proud, strong individuals who are willing to push themselves hard to get the job done, even to the point of injury. Unions straddle both worlds, protecting members while also helping contractors maintain a healthy business.

We know the principles of ergonomics can help construction employers and workers prevent WMSDs. What we hope to achieve through this study is to find ways to motivate contractors, unions, and workers to embrace ergonomics by transcending barriers and translating its science into practical, real-world solutions for construction. What follows in the body of this report is

the voice of interviewees speaking about the complexities of applying ergonomics to construction.

The work environment on a construction site is unique. When a construction worker reports to work, their "office" could be a narrow steel beam 40 stories above ground in intense sun and wind, or inside a small confined space on hands and knees, on a ladder all day or in a damp trench below grade. Ergonomic solutions that have gained acceptance in other industries with more "static" work environments, through equipment modification, work station adjustment and policy change, are often considered "not applicable" to a construction work environment. Certainly the challenges of applying ergonomic solutions to construction work are many. For example, we have multiple employers on our job sites, constantly changing work areas and conditions, a mobile workforce composed of many individual trades each with their own tasks, tools and equipment, complex scheduling issues, ongoing materials management, and harsh environments. We hear the caveat from all levels of the industry that construction work is just hard and there is simply no way to avoid wear and tear on workers' bodies. Indeed workers themselves seem to have bought into that belief. But is this an accurate assessment of the industry or is it a perceived reality based on a set of beliefs that have persisted for decades?

The 98 participants in this study had a lot to say on this issue and we are grateful to them for their time and commitment to this project. This report compiles the information collected from those interviews. We hope these opinions and views can inform future training projects, education efforts, and social marketing campaigns. We discovered many positive ways that ergonomics is being used in construction today and we found some "old school" attitudes as well. People in construction are natural problem solvers; they have to think on their feet every day. For every tough obstacle we identified, we learned ideas about how to overcome it.

The construction professionals we interviewed shared a deep concern for the safety and health of workers. WMSDs can be a burden for contractors and can be painful, disabling, career-ending, and life-changing for workers. We found a common desire to make positive changes to help eliminate these and a willingness among this diverse group to work together to achieve that end.

This study relates directly to the NORA Construction Sector Strategic Goal #7.6—to improve the acceptance, diffusion and adoption of WMSD workplace solutions by contractors, owners, suppliers and workers, and addresses both goals 7.6.1—evaluating previously implemented work practice innovations and 7.6.2— pilot studies toward developing dissemination strategies for workplace solutions to evaluate the factors that facilitate and inhibit intervention adoption and diffusion.

B. METHODOLOGY

Because of its diverse workforce and dynamic nature, construction work is extremely difficult to pin down within the context of ergonomics.

We sought to investigate patterns that emerge in thinking among a cross-section of California employers, unions and workers on the topic of applying ergonomics to construction today. To decipher what may be behind attitudes about ergonomics and if they can change, we wanted to first establish a framework of practical information about the actual work as perceived by our study participants and how they view the impact of WMSDs on their industry. This included learning what policies, procedures, tools and equipment came to the minds of construction professionals when asked about ergonomics. We addressed solutions that work and do not work in the eyes of each group, perceived obstacles and how to overcome these obstacles. Along with this practical information, we attempted to identify triggers that move construction professionals to implement ergonomic changes and the type of messaging approach that would have the most impact in the construction industry.

Our primary method of gaining this information was through 50 individual key informant interviews with contractor representatives and union staff, and four focus groups with workers. Each group was surveyed with questions addressing the following:

- Understanding of ergonomics;
- Attitudes relative to impact of WMSDs;
- Strategies currently used on-the-job to address WMSDs;
- Work role and approach to ergonomic solutions on-the-job;
- Obstacles to addressing WMSD hazards and attitudes about ergonomics and ways to overcome those obstacles;
- Knowledge of ergonomic standards;
- Information about ergonomics: where it's currently found and what is needed;
- Messaging: what resonates for construction professionals about ergonomics and WMSDs.

B1. Recruitment

The SBCTC has an established network of affiliate unions and signatory contractors, and joint labor/management apprenticeship programs. We put out a call for participants via fax and email to this group. This initial "shotgun approach" elicited several survey participants, but did not yield an adequate response.

We then conducted personal, one-on-one recruitment to achieve the numbers of surveys we desired. We contacted individual labor leaders, contractors, contractor association representatives, apprenticeship coordinators, and former SBCTC safety training program participants via phone and email. We also made presentations about the project at safety meetings, local building trades council meetings and trainings to gain support and contacts. We

encountered some skepticism and trepidation from potential subjects, particularly among contractors, regarding the purpose of our study; they wanted to know how the results of the study would be used. They expressed concern that it may lead to new regulatory action, which they opposed. When they learned the primary goal was to gain information and feedback, we had no problem getting voluntary participation. In fact, people had more to say on the issue than we originally anticipated.

Each interview was scripted for consistency and tape-recorded with the permission of the interviewee for accuracy. We stressed that there were no "right or wrong" answers, but that we sought their honest opinions and experiences on the topic. Each participant's identity was kept strictly confidential, no individual names or company names are used in any references, and no responses are tied to any individual respondent. Interviews were identified by a code for organizational and transcription purposes. We did not have any participant decline to be recorded, nor did any person express any objection to a question, refuse to answer or wish to stop the interview at any time.

Key Informant Interviews

- Conducted via telephone and in-person
- Average duration 45 minutes
- Administered to two groups for a total of 50 interviews (see Appendix for details):
  23—Contractor representatives
  27—Union representatives (business representatives, union officers, apprenticeship instructors/coordinators)
- 18-question scripted survey, slightly varied to be relevant to each group (See Appendices 1 & 2)
- Survey approved by CPWR IRB

Focus Groups

- Conducted in person
- Average duration 90 minutes
- Administered to four groups of apprentices and journeymen craft workers:
  —Multi-craft tradeswomen at conference (12)
  —Plasterers and Plaster Tenders (19)
  —Roofers and Waterproofers (8)
  —Iron Workers (9)
- Survey approved by CPWR IRB (Appendix 3)

B2. Demographics of Study Groups

Our goal was to survey a cross-section of the unionized construction industry (Appendix 4). The demographic breakdown of our survey groups demonstrates the diversity we achieved, surveying a combined total of 98 individuals, the majority of which represented unionized companies and workers. We did have three non-union contractor representatives join the study group through the outreach we conducted to trade associations; we combined all of the contractor responses and did not attempt to draw specific conclusions about the non-union sector because it was such a small sample.

We also had a good range of age groups, a mix of journeymen and apprentices, males and females, and a mix of labor and management. For contractors, we got a mix of general and specialty companies to participate. While we did not reach every trade, we did get a good cross-section including union representatives from 16 crafts and workers from 10.

Our union and contractor representatives were very experienced, averaging 29 and 19 years working in the trades, respectively. The age group with the highest number of participants (48%) for both contractor and union representatives was 46-55 years. This is consistent with statistics for the average age of construction workers generally. It is interesting to note that, of the 41 workers interviewed who completed their demographic information, a plurality (42%) was in the 25-35 year age bracket, but the second largest age group (24%) was 46-55. We did find that half of the workers in the oldest age group were apprentices, which means they are perhaps entering the trades as a second career or were transitioning into union programs as apprentices after working construction in the non-union sector.

The majority (65%) of contractor representatives we interviewed held positions as safety professionals in their companies and did not come from a background as a construction worker; others (26%) worked as journeymen and moved into management safety positions or foreman positions. We were not able to interview any construction business owners – which is unfortunate, the owners are the ultimate decision-makers in terms of setting safety as a priority and buying tools and equipment. Most of the union representatives no longer worked with tools and had moved into staff and leadership positions in their local unions.

We wanted to know something about the role contractor and union representatives played in their various positions to get a better understanding of our target audience. We went through a checklist with each interviewee and asked them if they had authority to make decisions on each topic. The roles we identified were:

Safety policy
Selection/Purchasing of tools and equipment
Work schedules (Contractors only)
Training
Regulatory compliance
Work practices and procedures
Hazardous conditions at the job site
Contract negotiation/contract language
Enforcement of company policy
Worker Complaints (Contractors only)

The majority of contractor representatives held positions as safety managers. The things they had most authority over were: training, enforcing policy, handling worker complaints, safety policy and regulatory compliance, work practices/procedures and selection of tools/equipment. Only four played any role in controlling work schedules or negotiating union contract language. The fact that they didn't have much say over work schedules could limit them in using some ergonomic control strategies such as job rotation and rest breaks. It may also limit them on influencing the pace at which workers are doing their jobs.

Some union representatives had a level of involvement in all the roles. The majority had most control over training and regulatory compliance, with slightly less power over job site conditions and safety policy. About half of the interviewees were involved in negotiating union contracts, but most said they could have input. Those union representatives who worked for apprenticeship programs said that they help their students select the hand tools used on the job, but have no say in the tools that contractors purchase, such as power tools and larger equipment. They also oversee policy at the apprenticeship program, but not on the job; however, these policies are useful learning tools that may be carried over to the worksite. Union representatives are often the intermediary between workers and contractors when it comes to safety issues. They may not become aware of a worksite safety condition unless a problem is brought to their attention; they act based upon the concerns expressed by union members. Some said if the union membership wanted to make ergonomics and preventing WMSDs a higher priority, the union would follow. Apprentice programs are run by joint labor-management committees, so they have input from both union and contractor.

B3. Terminology and language

We learned quickly that the term "ergonomics" in popular use is chameleon-like in meaning. Does it refer to a hazard, an injury, an action, a solution, or all of the above? The terminology for injuries is also confusing with umbrella terms within umbrella terms. For the purposes of this study we needed to decide upon which terms would best fit our target audience. For our interviews we settled on using "ergonomic injuries" as an easy way to describe a group of injuries that include: repetitive motion injuries, back problems, sprains and strains, and injuries like carpal tunnel syndrome (CTS), tendinitis, and rotator cuff tears. We used "ergonomic hazards" in reference to the work conditions and tasks in construction that may result in these types of injuries. In our report we use the term *work-related musculoskeletal disorders (WMSDs)* to refer to disorders of the muscles, nerves, tendons, ligaments, joints, cartilage, or spinal discs to which the work environment and the performance of work contribute significantly or that are made worse or longer lasting by work conditions. Terms such as repetitive motion injuries, repetitive strain injuries, and cumulative trauma injuries came up in the interviews and are used in this report where appropriate as subsets of WMSDs because they more clearly differentiate musculoskeletal disorders that happen over a period of time, from acute injuries which occur instantly and have an easily identifiable cause.

C. RESULTS/DATA SUMMARY

Due to the diversity of the study groups and the vast amount of data collected, we will present the data in aggregate form within the following four main themes that emerged:

1. Knowledge and Awareness
   Level of current understanding of ergonomics as it relates to construction work: what people know and what is being done to address WMSD in the industry.

2. Challenges and Opportunities to Applying Ergonomics to Construction
   Perception of obstacles and what can be done to overcome them.

3. Motivations and Triggers
   What moved subject group to either accept or reject actions/solutions related to ergonomics as applied in construction?

4. Messaging
   What potential messages and motivators resonate with each target group and will move them to address ergonomics as a safety issue in construction and to make changes to reduce WMSDs?

C1. Knowledge and Awareness

To assess what employers, unions and workers understand about the application of ergonomics in the construction industry, it is essential to establish the baseline of knowledge about the topic within each subject group. We know that a wide range of information is available through both public and private sector sources addressing how to apply ergonomics to the construction work environment. What we do **not** know is to what extent the unionized sector of California construction has embraced or implemented these principles in practice. Furthermore, we want to determine if there is any indication of change over time, any shift toward greater acceptance or decreased resistance to ergonomics and what led to those changes.

C1a. Reaction to the term "ergonomics"

Key points: *Overall, contractors and union representatives demonstrated a high level or recognition of the term, while about 40% of the workers were unfamiliar with it. When describing ergonomics, respondents made references to body mechanics, types of tool modifications and injuries that could result, but the most commonly used descriptors related to "better fit for your body to avoid wear and tear."*

The interview was opened with an unprompted question asking each participant to share the first thing that comes to mind when they hear the term 'ergonomics' as a way to gauge familiarity with the term. Contractor and union representatives were also asked how they would describe ergonomics to workers.

Amongst contractor and union representatives, responses indicate a high level of recognition of the meaning of the term, generally, without any prompts. Only one respondent initially admitted not knowing what the term meant and three union representatives were not sure how they would explain ergonomics to a worker without getting further information.

We found that we could organize responses into five categories or distinct areas of recognition. These categories are listed below, along with samples of actual responses from contractor and union representatives, both for their initial reaction to the word and how they would explain its meaning to a worker. Feedback from workers on this subject is covered later in this section.

- **Body mechanics/using the body/fitting work to the person**
  Typical comments included: proper posture; efficiency; making a job easier or more fluid; reducing stress on your body; comfort and how to avoid wear on the body when doing repetitious work; the interface between the human being and the equipment; proper body use; proper body mechanics; movement; trying to fit the work to the person/to the body so that the body doesn't have to strain to accomplish the act.

  When describing the term to workers, typical comments included: study of body positioning; study of motion and how you do your daily tasks; design to alleviate work strain and injuries; how the body is physically affected by work or environment; things that are set up to reduce injuries; wear/tear on body—repetitive motion; day to day application of the job and how it affects the body related to physical and mental stress; better and safer for your body; something healthier for you; something that fits your body—helps you operate in manner that doesn't put muscles/joints out of place; how you can make your workplace safer/reduce injuries; a better/safer way to work long-term; height/accessibility of tools, tables, chairs—availability of things to make your life easier; doing simple things on a daily basis to keep from getting cumulative trauma injuries; proper work techniques; ability to work without your body feeling uncomfortable; process that makes physical work easier, such as modifying a workstation or work practice; more natural body movements; designed to work with body.

- **Injuries**
  Typical comments included: carpal tunnel; repetitive motion injuries; wear and tear on joints; back injuries; neck strain; vibration injuries; soft tissue injuries; muscle stress and strain; body fatigue; ligament and muscle damage; back spasms; stress on body--overextension.

  When describing ergonomics to workers, typical comments included: results from repetitive motion of hands and feet; relate past injuries—techniques that have changed because of injuries; soft tissue injuries and muscle strains; musculoskeletal injuries due to repetitive motion; way to prevent subtle injuries and future problems—strains, back/neck.

- **Tools and Equipment**
  Typical comments included: work-friendly; use of proper/correct tools; making the tool fit the job; modify tool to have less impact on the worker; comfortable/non-injuring tool; big heavy tools doing big heavy jobs constantly beating on your body eight hours a day; electrical cutter; something shaped in way to be easy to handle/grab; for employees in the field making sure they're using right tools in proper manner.

  When describing to workers, typical comments included: tools designed to fit body; the right tool to do the job; switching out different tools—engineering out body fatigue; the way we use tools; a hammer or tool should be something that comfortably fits your hand; use mechanical means possible to do task; way to use tools as comfortably/healthy as possible—especially hand and power tools; changing/improving tools so body is not making same motion over and over again; maneuver tools/machinery without body being uncomfortable; effect of piece of equipment on somebody's body.

- **Specific action/process/task**
  Typical comments included: planning and organizing to alleviate injuries on the worksite; help with the way things are processed; lifting/squeezing/twisting; proper lifting; lift with your legs not your back—that's ergonomics; stretching/preparing before work.

  When describing ergonomics to workers, typical comments included: stretch and flex program prior to work; raising work up off the ground to a comfortable height so you don't have to bend over; how we do material handling—moving—planning our motion; if something's too heavy/awkward get help; use proper lifting techniques; something you do over and over like swinging a hammer or turning a screwdriver; mechanics of lifting; the way you hold the shovel will affect how your joints are going to wear.

- **Office association**
  Typical comments included: sitting at my desk slumped; chairs and keyboards; keyboards are now more comfortable for a person; being behind a desk—the chair and computer, never thought about it in the field—I get more backaches sitting at a desk than when I was in the field; adjusting chairs so you can sit with proper posture.

  When describing to workers, typical comments included: new concept to construction—always assumed it had more to do with office personnel and keyboards.

The top answer for both questions fell into the category of body mechanics: how one used his/her body to do the work and fitting the work to the person. This indicated that most interviewees were aware of the basic definition for ergonomics in common use. The next answer, more prevalent among contractors than union leaders, referred to common injuries caused by ergonomic hazards in their particular craft or that they've seen on jobsites. Next, they associated ergonomics with tools and equipment, primarily citing ease of use, fitting the

tool to the job and how to use tools repetitively without getting injured. While some respondents (union more than contractor) initially associated ergonomics specifically with office work, they were in the minority. When thinking about how to define ergonomics to workers, body mechanics and tools and equipment were the top two categories. Overall the initial, unprompted responses to the term "ergonomics" were positive with beneficial aspects identified in each category.

Among workers, responses were less consistent and not as clearly defined into categories. Eleven of the 19 plasterer and plaster tender participants, five of the 11 roofers and one ironworker admitted not knowing what the term ergonomics meant. Moreover, it seemed as if the few who *had* heard the word only heard it in context of recruitment for the focus group or "in commercials." A few thought it had something to do with "economics."

Of those who had definitions for the term, an equal number (seven each) thought it had to do with body mechanics and tools: "the right tool for the right job for the right person." One roofer defined it as "Ergonomics and Safety: the right tools for the right job means I'm going home safely."

Among the tradeswomen, when defining ergonomics, they were equally split between body mechanics and tools. One tradeswoman defined ergonomics as "having the tools you work with fit your body well so you don't get injuries from repetitive motion." Although another noted that ergonomic tools are "harder to find." However, when thinking about how to talk to peers and the employer about ergonomics, all of the responses had to do with saving money and increasing production. As one stated, it's about "trying to convince the contractor that something that fits you right could reduce injury and saves money."

One ironworker noted that ergonomics are "new rules imposed on apprentices," learned in apprenticeship classes. But "if you said ergonomics to half the people in construction trade, they'd think you were insulting them. A lot of people don't know what it means, especially the older generation."

C1b. Perception of how ergonomics impacts construction

Key points:

1. Contractors and union representatives surveyed had a high level of comprehension of the meaning of the term. Most of these interviewees readily associated body movements and postures, fitting the job to the worker, musculoskeletal injuries, and specific tools and tasks to the word ergonomics without any prompting from the interviewer. Workers, however, generally did not know or use the term "ergonomics."

2. All three groups surveyed believed strongly that ergonomics relates to construction work because of the type of body movement required to do work (especially repetitive motion), specific tools or work tasks that put workers at risk, the prevalence of injuries (particularly back and shoulder issues and CTS), and ways that ergonomic solutions are being applied at worksites to reduce risk of WMSDs such as training, tool/equipment innovations, job rotation, and stretching programs.

3. Both contractor and union groups indicated that they see more WMSDs than other types of injuries. However, opinions differed between contractors and union representatives as to whether ergonomics and WMSDs get the same level of attention as other injuries or hazards—contractors think no, unions think yes.

4. More contractor representatives thought that workers tend to report these injuries, whereas most union representatives and focus group participants agreed that workers do ***not*** *report these kinds of injuries for a variety of reasons.*

Having established each subject's initial, unprompted understanding of the term ergonomics, we moved to questions that sought to determine how people connect ergonomics to the work they do and how they perceive the risk for WMSDs relative to other job hazards. Here we provided a working definition for "ergonomic injuries" and "ergonomic hazards" as follows, which would be used when considering all remaining questions. Doing this created a consistent starting point from which to focus on the specific issues of interest in this study.

Definition used in survey: *In the remaining survey questions, we'll use words such as, "ergonomics" and "ergonomic injuries" as an easy way to describe a group of injuries that include: repetitive motion injuries, back problems, sprains and strains, and injuries like CTS, tendinitis, and rotator cuff tears. When we say "ergonomic hazards" we are referring to the work conditions and tasks in construction that may result in these types of injuries.*

Our goal in asking these questions was to determine the following: are these injuries and hazards viewed as applicable to construction work and, if yes, what specific risk factors do respondents identify as significant; how concerned are the respondents with regard to WMSDs; how is risk for WMSDs perceived relative to other construction hazards. For contractor and union representatives, we began by asking directly how ergonomics impacts you and the workers on your construction crews or in your trade. When posed to 50 different respondents from all levels of construction, this open-ended question elicited a wide range of responses. Forty-nine out of 50 respondents listed multiple ways that ergonomics impacts workers in construction, with only one person simply responding with the statement "that's a broad

question." Common themes that emerged from the variety of answers could be grouped as follows:

- Type of body movement required to do work
- Specific tools or work tasks that put workers at risk
- Injuries
- Positive impacts of ergonomics

Type of body movement: The most frequent response by both contractor and union representatives was the type of body movements and postures required to perform the work. Twenty-two of 27 union representatives and 15 of 23 contractors gave responses falling into this group. Within this category, the top risk factor cited by union representatives was repetitive motion, with lifting and bending being second and third. For contractors, bending was first, with repetitive motion a close second, and awkward postures third.

Specific tools or work tasks: 15 of 33 contractors listed various tools or work tasks as having the top impact on workers. While 19 out of 27 union representatives responded with an extensive list of tools and tasks that put their members at risk, within their group the impact of injuries was mentioned slightly more often. Because each trade has its own set of tools and tasks associated with the specific work they do, responses were extremely varied in this category. Contractors most often mentioned drilling, performing work overhead, and tying rebar. Among union representatives, hammers, drills, and small power tools were cited most often across the trades. What seemed more important to them was not the type of tool they were using but rather the amount of time they had to spend using it each workday --i.e., repetitive motion.

Injuries: With regard to injuries, union representatives (20 of 27) recognized their impact on workers more often than contractors (12 of 23) did. Of all injuries cited as having an impact, back issues were the most frequently mentioned by both contractors and unions. CTS came in second amongst both groups, although union representatives mentioned it more often than did contractors. Rotator cuff/shoulder injuries were also cited repeatedly by union representatives but were not mentioned by the contractor group at all. Two union representatives, both from the pipe trades, shared personal experiences to illustrate the impact of WMSDs. The first noted that he had endured three knee surgeries himself and knew of colleagues who had needed shoulder surgery and knee replacements. The second said that he had CTS as a result of his work in the trade using pipe wrenches. Only one contractor, and five union representatives, observed that the type of injuries being addressed were cumulative, happening over a workers' career.

Positive impacts of ergonomics: Our fourth category of responses includes any mention of a positive application of ergonomic solutions or control strategies implemented at worksites, including engineering controls, administrative controls, personal protective equipment, and stretch and flex programs. These are discussed in detail in section C1c.

Once given a working definition of ergonomics, the workers had many ideas about how ergonomics impacts them on the jobsite, and none expressed a belief that it didn't apply to construction. "Everyone's concerned," said one tradeswoman. "Your body is your job. If your body can't work to capacity, you can't do your job."

Each focus group reviewed the myriad of tasks that they do that cause WMSDs. Roofers talked about working on their knees all day using drills, nail guns and circular saws—"everything that we use will hurt our body." As one ironworker said, "every day, we do a type of work that puts strain on different parts of our body. When you're doing iron, bending down doing rebar, you have to deal with those strains and little injuries every day. No way you can come out of it without injury." One plaster tender/plasterer said: "I'm very concerned. I want to keep working. If you get hurt, you're going to go home. You have to be safe, aware of your surroundings." Another explained, "we work with shovels… swinging motion…sometimes bending….when you first start, it's easier…When you're done, you're bending down and my back was hurting. My brother showed me how to get more sand in the shovel without my back hurting. Doing it right got me a good workout instead of aches and pains."

Overall, workers didn't think about administrative or engineering controls. Rather, the only control they could apply was to work smarter, not harder. One tradeswoman said that as females, they were trained to do "focal points, pivot points because of physical ability. I'm not saying because we're not strong, but instead of using brute strength, we have to think ahead." They talked about stretch and flex as a way of not "working cold," paying attention to a task before they started, and being careful. While some tried to get better hand tools, others didn't think that was an option.

The next series of questions focused on specific WMSDs to assess perceptions of risk and determine how these types of cumulative injuries compared to other more immediate injuries faced in the construction industry. Contractors and union representatives were asked all questions, focus groups were just asked about their concern for these injuries.

Q. From your perspective as a construction employer/union rep, on a scale of 1 to 5, where 1 = no concern and 5 = very concerned, how concerned are you about the following worker injuries and health issues:

a. Shoulder problems
b. Sprains
c. Back and joint pain
d. Tendinitis
e. Carpal Tunnel Syndrome
f. Fatigue/Overexertion

The issue of greatest concern to union representatives and contractors (receiving the most 4s and 5s) was back and joint pain. Next was fatigue and shoulder problems; sprains, tendinitis and CTS also were of concern, but somewhat less so. Virtually no one thought that any of these issues were unimportant or not worthy of concern. CTS and tendinitis were of less concern to a

small group, mostly mechanical contractors. One general contractor noted that in his previous position in the framing industry, workers used a pneumatic nail gun consistently throughout the 8-hour day and CTS would have been a "5" there, but it wasn't as much of a problem in his current position. One insulation contractor noted that fatigue contributes to strains/sprains and pulled muscles.

Workers in each of our focus groups responded that they were very concerned about these types of injuries. "We want to keep working," said one plaster tender. One roofer said, "I'm concerned because I understand the seriousness of them [having taken care of his/her mother for a year when she injured her back]. If I do something all day long, what happens if I really strain my back and I try to do something simple…it'll be worse." The roofers all indicated concern about their backs and knees. "You're gonna be on your knees, doing details. It's gonna be sore. You just have to be really careful not to get hurt," said one. And another said, "We need to find better ways so that we don't have to be lifting stuff. There has to be an easier way to put a roof on." The ironworkers agreed: "You can see the effects of doing this over the years. Take precautions to save yourself in the long run. For a career as a rodbuster, you're always bunched over. You can always tell a rodbuster by how they look."

Q. Do you see more or less of these injuries/issues occurring as compared to injuries from other hazards (such as falls, electrocutions, operating machinery, etc.).

Contractor responses:		**Union responses:**	
More	12	More	20
Less	9	Less	5
Same (including no injuries)	2	Same (including no injuries)	2

By far, the interviewees believe that they see more ergonomic injuries than other injuries. Thirty-two of the 50 interviewees noted that there were more ergonomic injuries. 14 thought there were fewer of these injuries, and four thought it was about the same, although contractor responses were somewhat more balanced between the two options than were those of the union representatives. Some reasons for the reduction in injuries that interviewees noticed include: effective safety training; the relative newness of ergonomics in construction, and increased awareness among contractors; stretch and flex program that have eliminated injuries; the contractor has invested a lot of money into stopping these injuries. Two contractors noted that there may be fewer injuries due to underreporting; this issue is discussed in more detail later in the report. Those who answered "more injuries" mentioned that these types of injuries are more prevalent among older workers than with apprentices and are therefore seen more due to the aging workforce. Others thought that WMSDs are being reported more due to increased awareness of these types of injuries. One union representative said "there are not necessarily more [of these injuries,] but they're inevitable."

Contractor Question: *Do you think ergonomic injuries are given as much attention as these other injuries?*	
Yes	6
No	15
Yes—in own company/no in construction generally	2

Union Question*: Does your union give the same attention to ergonomic injuries as to these other injuries?*		No	9
		Ergo gets more attention:	1
		No answer	2
Yes	15		

On this question, contractors and union representatives reported opposite opinions. While union representatives, by a margin of 15 to 9, felt that the union gave the same attention to ergonomic injuries as to other types of injuries, contractor representatives said they were not given as much attention, by a similar margin (15 to 6). The two groups come from different standpoints, one on the job and the other in the union.

One general contractor summed up the majority contractor viewpoint when he said, "Because it's not an acute thing…not as obvious as seeing blood, or a very distinct injury that someone will see, it's just under the radar for a lot of companies out there." A pipefitter contractor understood that ergonomic injuries may be crippling "but no fatality is associated with it; it's not seen as serious. Something that can kill you is far worse. Everybody expects that if you're in construction, you're going to have a bad back at some point in your life." A roofing contractor didn't think that workers were as concerned about ergonomic injuries because "they're perceived as not serious." He went on to say, "contractors tend to be more concerned because they often involve workers' comp claims."

Where one heavy construction contractor stated that his company took all injuries seriously and treated them all the same, a mechanical/HVAC contractor felt that there was little concern unless you got to the bigger contractors.

On the union side, a Boilermakers' Union representative said that his union stressed ergonomic injuries more "because those injuries are more prevalent with us." A Steamfitters' Union representative said that in training, he tries "to get the guys to understand all the safety issues on jobs, not just the big safety issues, but the issues that cause ergonomic injuries also."

Q. Do workers tend to report these injuries when they become aware of them? If not, why not?

Contractor responses:		**Union Responses:**	
Yes	9	No	14
No	7	Yes	8
Some do/some don't	6	Some do/don't mixed	4
Can't say/don't know	1	Don't know	1

The answer to this question is important because it indicates several factors:

• Do workers consider the injuries serious enough to report? Do they understand that they're work-related? How does the culture of the construction industry impact their decision either to complain about hazards or to report injuries?

• For employers, do they discourage reporting for financial or other considerations? If there's no reporting, can they claim that there isn't a problem that needs a solution?

This question elicited vastly divergent responses between the union representatives and workers and the contractor representatives. By a two to one margin, union representatives felt

that workers did not usually did not report these types of injuries. They cited a variety of reasons, ranging from machismo and trying to show they are tough; always ready to "grit it out"; fear of losing their jobs if their bosses know that they're hurting and may slow production; missing paychecks if they took time off. "If you don't work, you don't get paid, so you ignore it, and don't complain about it and don't take care of it until you're not working or are toward retirement age. When work slows down, we see a lot of guys going on disability because their shoulders hurt, they're getting their carpal tunnel and knee surgery," said one union representative.

On the other hand, contractors were divided – some believed workers usually reported these types of injuries, others did not. Seven contractor representatives stated that it is their company policy to report all injuries with one general contractor saying that their company focuses on soft tissue injury prevention and worker education. The contractor representatives who said that workers underreport these injuries attributed this to peer pressure, lack of recognition of risk factors, injuries going un-noticed because they are cumulative, WMSDs being looked upon by workers as "personal issues", that it is "normal to hurt on the job" so there is embarrassment in reporting these when everyone is hurting, the "macho" factor or "bullet-proof" attitude where workers may be perceived as weak if they complain about these injuries, worker fear of being replaced by another worker if they complain, lack of understanding that these are work-related rather than being caused by off-work activities such as extreme sports. Interviewees from both groups cited the current economy as discouraging workers from reporting injuries: a shrinking labor market created an atmosphere where workers would rather ignore injuries than risk jeopardizing their employment. This sentiment was echoed among workers themselves in our focus groups.

Several tradeswomen lamented the fact that these types of injuries are cumulative. "You can't blame the injury on the contractor you're working for at that point in time – it's part of your career." Many agreed that they couldn't even tell when a problem started during a day. "The problem could have started at one point, then you only notice the problem when you're doing a similar task three or four jobs later." Another woman stated, "After 30 years, everything hurts. Many times you wake up sore, but it could be gone in a few days. You don't realize you have a long-term injury from repetitive motion until you go back to doing the job."

Not knowing whom to blame was one reason they didn't report ergonomic injuries. Another was not wanting to be perceived as being a "complainer." One ironworker said, "If we're constantly complaining on the job, we will not get re-hired." A plasterer summed it up: "If you're out sick, they get someone else… If one guy is missing, it's harder on everybody else. If you leave because you're shoulder is hurting, it puts pressure on the rest of the crew."

And the pressure is not only about workloads. Peer pressure not to report is strong. "You don't want to be seen as a crybaby or a whiner," so you don't report. "Take Motrin or Aleve, and work through it," said one ironworker.

C1c. Actions taken to control risk of WMSD

Key Points: *The top three solutions cited by contractors and union representatives as being implemented at worksites are: changes in tools and equipment; stretch and flex programs; and training and education. Further down the list are job rotation, job organization and pre-planning, personal protective equipment, and job hazard analysis.*

We now move to looking at whether contractors and unions are taking action to address these issues and what they are doing to reduce WMSDs and to communicate with workers about the tools and tasks that put them at risk for injuries.

Q. *(Contractors) What programs or activities do you employ on construction job sites to address ergonomic injury prevention?*
(Unions) As a union rep have you seen programs or activities on construction job sites or through your union that address ergonomic injury prevention?

Again, this open-ended question yielded a large variety of responses. Since contractors, as employers, have the primary responsibility to implement safety programs at the worksite, we probed those interviewees more deeply for information about specific activities their companies undertake. Because of the wide range of answers we obtained, we again grouped them into categories. Many interviewees reported using combinations of these different types of actions. We have listed a summary of responses in the following table. The number shown next to the category heading indicates the number of respondents who had an answer in that category.

Contractor Responses (23 surveyed)	**Union Responses (27 surveyed)**
Change in Tools and Equipment (12)	Change in Tools and Equipment (18)
Stretch and Flex Programs (11)	Training and Education (15)
Training and Education (10)	Stretch and Flex Programs (12)
Job Rotation (8)	Policy for Lifting (5)
Job Organization and Pre-Planning (8)	Personal Protective Equipment (4)
Personal Protective Equipment (5)	Job Hazard Analysis/Safety Task Analysis (3)
Job Hazard Analysis/Safety Task Analysis (4)	Job Rotation (2)
	Alter Work Practices (2)

The top three actions used to address WMSDs for both contractors and unions were the same, with stretch and flex programs being the most popular stand-alone program. It is not surprising that for union representatives, training and education would be high due to the responsibility the unions have in joint apprentice and journeyman training centers for their individual crafts. This is the area where unions seem to have the most decision-making power. We'll look at the top three in greater detail.

Tools and Equipment

Several times, interviewees mentioned that they thought tools had greatly improved in recent years. Some examples of the innovations they noted were: availability of lighter weight and

more balanced power tools; hand tools with better handles—available in different sizes, padded and made to better fit the hand; vibration dampening on breakers and rotary hammers; shock absorbing seats in heavy equipment and forklifts; improvement in batteries for and durability of cordless power tools; height adjustable handles on equipment; rebar-tying gun and other tool extensions to reduce bending; power tools that replace manual work, such as motorized wire pullers and power stretchers for floor covering installation; overhead drilling equipment; mechanical lifts and carts for easier material handling. An electricians' union rep described "tools that are task-oriented, so with a selection of tools you're not necessarily using an 'atom bomb' for every minor task."

Training and Education

Both contractors and unions are implementing training programs to raise overall awareness about preventing repetitive strain injuries, but the predominant topic cited is proper lifting technique and back injury prevention. Examples of training mentioned by respondents are: on-the-job tailgate/toolbox training; OSHA 10-hour training; soft tissue injury prevention training for foremen and supervisors; hands-on demonstrations of tools; Smart Mark curriculum; awareness training given during stretch and flex sessions; handouts, posters and safety sheets. A union representative from the Bricklayers noted that, "Training is more prevalent than 10 years ago in our craft…just being aware of the kinds of damages that can come from some of these things can drastically reduce people suffering from them." Some union representatives felt that bigger contracting companies are more likely to have ergonomics training than smaller companies. A general contractor mentioned that they have, "tailgate topics that explain the hazards when doing repetitive motion issues, to take breaks in between, break-up workload, rotate employees through, don't have one person doing for eight hours, or break tasks over two days." Generally the tone was positive about training as a solution for WMSDs.

Stretch and Flex Programs

Twenty-three out of 50 contractor and union interviewees noted using daily stretching exercise programs on the job. These were generally viewed as a positive activity that has helped to reduce injuries and build teamwork. Most were described as 10-30 minute stretching sessions led by a foreman or designated worker at the beginning of each day, using a series of predetermined exercises designed to warm up the body and prepare for a strenuous day of work. As one union cement mason described it, "Exercise programs for warm-up prior to going to work; companies spend up to 1/2 hour of an 8-hour day to do before work and give pep talk to get them excited to start the day. Very good program and more companies are doing it because it helps their insurance costs and keeps ergo problems down." A union representative from the Electricians mentioned that some general contractors started these programs in the 1990s and that they were very helpful in reducing injuries. A few contractors stressed that their policy was to have every employee do stretch and flex daily.

Personal Protective Equipment

Mention of this was limited to padding for knees, elbows and working on the ground; wrist braces; anti-vibration gloves; work boots to protect/support ankles. Back braces were also

mentioned as being helpful reminders of how to lift properly. However, more people had negative comments about back braces.

Other Programs

Other programs identified in our survey use administrative controls to address repetitive motion injuries. These include pre-job planning for materials handling, staging of materials so they are easier for workers to access, scheduling of work crews to allow job rotation, availability of equipment like hoists, lifts, scaffolds, and carts. Use of job task analysis and daily job hazard analysis requires foremen and superintendents to assess where the risks are and how to mitigate them before injuries happen. These often use a walk-around checklist that is completed daily as the job changes. This also gives workers an opportunity to give feedback and for work crews to discuss safety for the specific tasks to be performed that day and coordinate the job site.

Contractors also mentioned some incentive programs that they felt were successful in getting workers to buy in and be creative with ergonomic solutions. One described an "opportunities and improvement" program where workers can win money for ideas on how to do the job safer, more productively and cost-effectively. Others mentioned having safety suggestion boxes on the job sites and "huddles" at the start of each shift where workers can express concerns or share ideas. Some include ergonomics in their Code of Safe Practices or safety manuals however only two contractors said it was addressed specifically in their Injury and Illness Prevention Program (IIPP).

We also asked contractors and union representatives to rank which type of solutions they were most likely to implement or advocate.

Q. On a scale of 1-5, where 1= no chance and 5= very likely, how likely are you/is your local to advocate for the following types of actions to reduce ergonomic injuries:
-Purchasing/Using redesigned tools, equipment or materials
-Develop a written ergonomics policy (could cover: job/task analysis, materials handling/lifting guidelines, and mechanism for worker input).
-Provide worker training on ergonomics.
-Re-organize work to provide: reasonable workload, sufficient breaks, controlled pace, task variety, job rotation, etc.

The results, as expected, paralleled the previous responses. Contractors and union representatives agreed on their #1 and #2 choices, being most likely to provide training and next to purchase and use new tools and equipment. These are areas where the two groups are more equal in influence. Unions provide training for both apprentices and journeymen and often are the place a new worker learns what tools are required for their trade. Typically, workers purchase hand tools and contractors provide power tools and other equipment. The workers themselves have discretionary power when choosing tools that have been redesigned to be "ergonomic" and the union is in a position to make recommendations. Union representatives were quick to point out, however, that cost is a major factor for the workers

when purchasing tools, and this may affect their ability or desire to buy redesigned or specialty tools. Throughout the survey, many interviewees commented that basic tools of the trade had not changed much over the last 100 years. So although they were more likely to choose that kind of solution, there may not be much innovation in the tools workers use most frequently. Also, new workers are trained on the job by journeymen and likely to use the same tools that their mentor uses. If journeymen do not accept tool innovations or resist changing tools they have used throughout their career, apprentices are likely to follow their lead. (More will be discussed on this issue later in the report.)

For the remaining two choices, the groups diverged. Contractors were more likely to develop policy than they were to reorganize work, whereas union representatives favored the opposite. This may simply reflect the different roles that each group plays in the industry. Union contracts often include language on number and length of breaks required for workers and ways to resolve disputes but typically do not get involved in establishing employer policies. Some contractors expressed that, when working under a union contract, they must abide by the established terms for breaks. Contractors do ultimately control work scheduling and staffing levels, which are critical when considering job rotation, pace, and coordination among various trades.

C1d. How Do Workers Respond to WMSD?

> ***Key points:*** *Workers tend to believe that WMSDs are somewhat inevitable or acceptable as part of the job and that avoiding injuries is a personal responsibility. They're also skeptical that their employers are committed to making the workplace safer.*

One general contractor representative made the following comment, "the workers always have the solution if you just ask them. They're the guys who do the work. They always have a great idea of how to solve the problem." The programs and activities described in the previous section are those used largely by employers who control policies and manage resources. Another perspective that is critical to this discussion is that of the workers themselves and the unions that represent their interests and negotiate on their behalf. We asked both union representatives and the worker focus groups what they believe workers are doing to protect themselves from WMSD. The picture painted by the workers is very different from management.

Union representatives noticed a range of responses to ergonomic hazards, including exercising and conditioning, getting better tools and adapting tools to make them easier to use, wearing braces and pads, self-medicating with Motrin or Advil, attempting to rotate tasks or switch hands, and getting educated and talking with others to learn "tricks of the trade."

These were essentially identical to the responses that the workers made. Some talked about trying to use lighter power tools, adapting tools, stretching, staying hydrated, getting enough rest, slowing down and thinking ahead, asking for help; thinking of how to do things "better, safer, faster," planning out the work and "thinking smart,"knowing your limits.

This next series of questions gave the workers the chance to describe their experience on the job with WMSD controls.

Q. Complete this sentence: Contractors I work for try to prevent these injuries by _____.

All of the focus groups talked about safety meetings (held daily, weekly, monthly, or quarterly) and about safety information stuffed in paychecks—but there were varying opinions on how useful this information is. The plasterers and plaster tenders laughed at the question, saying that they'd go to a safety meeting and be told how to do something, and then immediately afterwards, as they're doing it, the foreman would tell them *not* to do it that way. A roofer mentioned that the safety meetings addressed the need to stretch and flex, but didn't actually do it. A plasterer mentioned that his contractor provides some safety equipment and tools, and changes how materials are set up to make it easier to work, such as using pulleys to lift material up a scaffold. A tradeswoman said that she's seen incentives in play for workers to come up with better and safer ways to do work. The Ironworkers were even more skeptical. One said that the only company that provided the tools he needed to work without accidents was on a "high profile job that he wants done without accidents. Money's not the issue and the company stands by the slogan 'safety first.'" One roofer felt that job rotation was only employed for purposes of production, not safety. "If you're good at something, they'll keep you doing it."

In response to what workers do if they experience symptoms of ergonomic injuries, each group's first answer was "Advil." Some suggested taking breaks, trying to get assigned to do a different task. "Suck it up. Work even though you hurt. That's what a man does," said one plasterer. "Go to the doctor on your own after work, but don't tell the employer," said another.

Clearly there is some cynicism among workers from these different crafts about preventing WMSDs, coupled with an acceptance of pain as part of their job. In each focus group, at least one worker responded that they would deal with an injury by self-medicating; there was no argument or discussion over this statement. A significant number of participants said they would prefer to work through the pain rather than report it to their employer, either because of fear of losing their job or being perceived negatively by their peers. This verifies what union representatives said when asked if workers would report injuries. While some indicated that they receive on-the-job safety training, they made it sound as if it was not relevant to their work and was perceived as more of a legal necessity for the contractor than something for the workers' benefit. The workers did not show confidence that their employers would take action to resolve safety problems or control risk. Also, none of them mentioned going to their unions for help in these situations although they were asked directly about this.

The workers we interviewed often indicated that they take a high level of personal responsibility for what happens to them at work. A roofing apprentice said, "Blame the foreman if you don't have the right tools, but if you got hurt just for doing something, blame yourself." When asked who is responsible for preventing injuries, six out of eight roofers answered that "it's your responsibility" and two indicated it's the employer's responsibility.

After further consideration, five said it was both. Combining the perception that WMSDs are somewhat inevitable or acceptable as part of the job with the belief that avoiding injuries is a personal responsibility is key to understanding the way workers approach these issues.

C1e. What "solutions" work and do not work well to prevent injuries?

> ***Key Points:*** *Answers to "what worked well" were all over the map, with no clearly-defined trends. For what didn't work, most union representatives and contractors agreed that back belts were an unsuccessful "solution." They were also concerned about the quality and durability of newly-designed tools and said that too often, tools redesigned to fix one problem caused another, and that worker attitudes discouraged adoption of innovations.*

We collected a great deal of information from interviewees about the types of programs they use to address WMSD risks. But simply having a program in place doesn't tell us if they are effectively controlling injuries or to what extent these programs are accepted and endorsed. As we moved toward exploring what motivates employers and unions to take action and ultimately what messaging strategies would be most effective, we wanted to know what they viewed as viable solutions and where there was resistance. In what direction would they be willing to move, and where might we find areas for development of new ideas, innovations and improvements?

Q. (to Union representatives) What has worked well in addressing ergonomic hazards? What has not worked in addressing ergonomic hazards?

There was no clearly-defined answer to this question. No definitive trend emerged. Examples from each of the categories used earlier -- tool/equipment innovation, stretch and flex programs, training, job rotation, personal protective equipment, and job hazard analysis -- all made the list. Mentioned more consistently than others was raising awareness of what can happen due to repetitive motion. Union representatives also pointed out that contractors' willingness to work with unions to make the job easier would help. The importance of training journeymen so that they could promote ideas on the job was also mentioned. For training, union representatives liked using tailgate meetings and the train-the-trainer model. They also thought it would be helpful to see how an actual, successful application of ergonomics works.

The number one innovation that union representatives identified as *not* working well was back belts. Many respondents saw them as potentially more of a problem than a benefit, as they could lead to a false sense of protection and make workers believe they could lift more weight than they should. Some other responses were:

- *Company policies:* Incentive programs don't work if they discourage workers from reporting injuries. Job rotation is not a feasible solution for trades where workers all do the same work all day, for example bricklayers. Smaller contractors don't invest money into these programs.

- *Worker attitudes:* Despite training, workers are still habitual and do things the way they want or prefer to continue to use old tools. Stretch and flex is sometimes seen as a joke and not taken seriously by either the foremen leading it or the workers. Every worker is different, what works for one doesn't work for another.
- *Tools and equipment:* New tools are not built to withstand the abuse they get on-the-job so they break down. Poorly maintained equipment negates the ergonomic design features on heavy equipment, so they may not work.
- Some safety rules conflict with ergonomics (e.g., mandatory fall protection harnesses worn at all times with lanyard dragging behind)

When we asked contractors to tell us what did not work for them as successful solutions, they expressed concerns about back belts and tool quality/durability similar to the union representatives. They also mentioned that they had tried some ergonomic solutions, such as putting ladders on trucks and using new scaffolding, that led to other problems. Interviewees also noted encountering worker resistance to ergonomic programs like stretch and flex and productivity programs because of "old-school mentalities" and resistance to change.

C1f. Sources of Information

> ***Key Points:*** *When seeking information about ergonomics, contractor and union representatives first go to the internet. A good campaign must have an online presence.*

After teasing out what contractor and union representatives know about ergonomics, we felt it would also be useful to learn where they get their information on the topic. Both groups overwhelmingly chose the internet as the first place they would go to find information. Contractors also mentioned government agencies such as Cal/OSHA, OSHA, NIOSH, and state occupational health departments. They also relied upon their workers' compensation insurance carriers for guidance and information. Lower on their list were associations and industry groups, consultants, and health care professionals. After the internet, union representatives cited their union's safety department or training centers, with government agencies next, and workers' compensation representatives and health care professionals lower on their list. A few other sources were mentioned as credible, including our organization—the State Building and Construction Trades Council (SBCTC) – as well as the University of Oregon, University of California—Berkeley, tool manufacturers, colleagues, eLCOSH on Twitter, and You Tube videos.

This information may be useful for messaging and dissemination of ideas.

C1g. Regulations and standards

> ***Key Points:*** *Only a small group of contractor and union representatives were aware of California's ergonomics standard or ANSI's Standard on Reduction of Musculoskeletal Problems in Construction and Demolition, and even fewer did anything to comply.*

Conspicuous by its *absence* was any mention of regulations or standards governing preventing WMSDs in construction. California has an ergonomics standard governing repetitive strain injuries that includes the construction industry in its scope. We know from Cal/OSHA that they have never issued a citation in construction based on the standard, and wanted to know how the standard influenced contractors and unions and if it was effective in preventing injuries. We asked both groups to tell us how familiar they were with the California ergonomics standard and what steps, if any, they took or knew that contractors took to comply with the regulation. Additionally, we asked them if they were aware of the American National Standards Institute (ANSI) Standard on Reduction of Musculoskeletal Problems in Construction and Demolition. The results were somewhat surprising.

Only 9 of 23 contractors and 3 of 27 union representatives were even aware that Cal/OSHA *had* an ergonomics standard. Of the 12 interviewees who knew the standard existed, only one could accurately state the key elements that would trigger enforcement of the standard. And of the contractors who were aware of it, only two felt that they were well-versed in it. One of those felt that he complied with it because his company made sure all equipment was working properly and used as intended, that jobs were rotated, and that lifting techniques were appropriate. The other didn't see much implemented as an "ergonomic program." Another contractor wrongly believed "there is no repetitive type of thing and construction is exempt; we're not in the standard, it's a general industry standard." Five contractors assumed their companies were in compliance with the standard because of their overall emphasis on worksite safety; however, they could not identify anything specific their company did to comply with the ergonomics standard.

Knowledge of the ANSI standard was not much better. Five of 23 contractors and six of 27 union representatives had heard that there was an ANSI standard for musculoskeletal problems, but only one contractor and two union representatives felt they had any real familiarity with it. Most people had heard of ANSI, but had no idea that ANSI had any standards relating to ergonomics in construction.

While one contractor representative voiced strong concern about any new standards or regulations, several union representatives suggested that if a standard were in place and enforced, they would have some leverage to get employer compliance.

C2. Challenges and opportunities to applying ergonomics to construction

Up to this point we have been gathering information to form a basis for what contractors, unions and workers know about ergonomics and what they are doing to prevent musculoskeletal and repetitive strain injuries on the job. In this next section we address their feedback regarding obstacles to applying ergonomic principles to construction work. This information is critical when considering social marketing strategies, as it reflects current perceptions and attitudes about what needs to change in order to increase levels of acceptance of ergonomics in the industry. It also guides us in understanding what employers and workers

view as viable solutions to overcome the obstacles they have identified. This points us in a direction for each group that speaks directly to the issues they hold most important.

In gathering this feedback we quickly discovered that consistent themes emerged across all three groups. These themes are listed below and will be addressed individually:

- Business and Financial Concerns
- Attitudes and Perceptions
- Lack of Knowledge and Understanding
- Availability of Solutions

The questions we posed were *"What do you think are the obstacles that stand in the way of addressing ergonomic hazards in construction?"* and *"How can we overcome these obstacles?"* We will summarize the obstacles first.

While some interviewees gave very clear, direct answers such as "cost," "awareness," and "attitudes," the majority of answers described multiple issues that crossed the themes. In the table below find their initial responses, given without any prompting or discussion:

	Contractors (23)	**Union representatives (27)**
Attitudes	10	8
Knowledge/Awareness	7	5
Business/Financial	5	11
Availability of Solutions	1	3

For workers it was more difficult to categorize answers because of the different way we interviewed them in focus groups. Each focus group mentioned the pace of production and staffing levels as major obstacles to preventing WMSDs. We placed this within the business/financial theme. Workers were also concerned about losing their jobs, being replaced, peer pressure, foremen who didn't understand or didn't buy in to ergonomics, unwillingness of older workers to change habits, "hard-headed" attitudes, tight budgets, lack of training by employers, and lack of coordination on job sites. We'll look at each theme separately to identify the issues brought out in each one.

C2a. Business and Financial Concerns

> ***Key points****:*
> *Production is the key concern held by contractors, union representatives and workers. Any proposed solutions must not negatively impact production.*

We found that this theme resonated with each of the groups but with a slightly different tone. While each of the three groups—employers, unions and workers—are inextricably woven

together in the success of a construction business, the contractors are clearly responsible for meeting the financial obligations and making certain the business is profitable. Naturally they are concerned about practical issues that would impact their ability to do the work profitably, safely and competitively. Their top business concerns when considering ergonomics were: impact on production, cost, competing in the current economic downturn, and bidding on jobs.

It was repeated throughout the interviews that production is driving the industry today. Many explained that production is an integral part of cost, bidding, staying competitive and weathering today's struggling construction economy. One mechanical contractor rep summed it up this way, "…it's not a company thing it's an industry-wide cultural thing that's out there—of course it's production that's the money, but to be competitive now, especially in this economy, that has taken the lead and the other two [referring to safety and quality] have fallen behind—production at all expense because it's a cost-driven thing which is one of the reasons we're struggling. It used to be the safest company got weighted, meaning they would take us. But it's not that way anymore; [project owners] will take anybody that is less than us on big projects." This sentiment echoes the concerns of the workers from the plasterers/plaster tenders group who said, "it's all about production, production, production." A union representative from the Bricklayers stated, "Our field has become so competitive, the contractors are putting out lower numbers to get the jobs; they're pushing their workforce harder. They want more productivity. That leaves the door wide open for injuries." It was generally believed that any ergonomic innovation to prevent WMSDs that might have a negative impact on productivity would not be considered.

In addition to the impact on production and the current economy, contractors shared concerns about the cost of buying new equipment, hiring extra people, and inheriting the financial burden of a worker's claim for a cumulative injury that may not have happened while working for their company.

About 40% of the union representatives identified production and financial issues as the number one obstacle to preventing "ergonomic" injuries. "These days it's all about production; go, go, go, get it done, get me my money and move on to the next one," said a floor coverers' representative. "It's about pace in our line of work." Similarly, an electricians' representative said that schedules could be unrealistic. "If the general contractor did a better job of designing their schedule of work, you would allow the small amount of time and preparation needed to avoid these types of injuries." For a plaster tenders' representative, "companies are more focused on productivity than safety…. It's not so much that they're negligent, but they're constrained by the situation. Being competitive plays a big role."

While the contractor representatives generally expressed concern for the workers' safety, they also acknowledged that they are balancing costs, competition, how many workers are "on the bench" or laid-off, workers' compensation insurance rates, winning bids, and showing return on investment. Every group of workers we talked to expressed concern about pace of work and accelerated schedules, the way construction generally is driven by production in today's market

and the dampening effect these have on their ability to "work smarter not harder" even if they receive training on ergonomics and preventing WMSD.

C2b. Attitudes and Perceptions as Barriers

> ***Key points:*** *Resistance to change and macho/tough guy attitudes make implementation of ergonomic solutions more challenging to achieve.*

All groups surveyed identified attitudes that affect the way WMSD and repetitive strain injuries are approached in construction. For contractors, this was the most cited obstacle with 43% of interviewees believing that personal attitudes and the work culture create resistance to making positive change toward accepting ergonomics and preventing injuries. Both union representatives and workers cited attitudes as second to business/financial concerns in their responses. Resistance to change among workers and contractors was cited repeatedly among all groups. There are a couple of things we noticed about this mindset as described by interviewees.

First is the personal level of how work is actually being done. The idea that "that's the way it's always been done" and that workers who are used to doing something one way for 20 years do not want to learn something new or different was prevalent. Apprentices saw this attitude among older workers who preserve a trade tradition and will not take the chance of doing something differently. One plumber/pipefitter union representative states, "There's the recommended way of doing things, the way you're supposed to do them, then there's the way things actually get done." Union representatives saw it as inertia—how, at various levels of the industry, people don't want to add more to what they have to do already. One contractor said that many other contractors are "old school" and believe in old methods so they do not voluntarily want this ergonomic information to get out. Others cited the learning curve required to adopt something new – for example, how some thought stretch and flex programs were awkward and did not understand their purpose. Once they got past this curve, they found greater acceptance of the program as workers discovered that it benefitted them and made them feel better.

The other form of attitudinal resistance was a cultural issue within the construction industry. Respondents believed that the work is just difficult by its nature and that this would never change, or they simply could not envision *how* it could change. One general contractor noted, "It's cultural. The majority of people don't want to touch ergonomics with a 10-foot pole either through ignorance, or resistance to new ideas." They acknowledged acceptance of an inherent level of danger that some referred to as the "tough guy mentality," where injuries and pain "go with the territory." This mentality made it difficult to get owner and worker buy-in for ergonomic solutions. Some believe that risks are unavoidable in construction and that you "just need to get the job done." One contractor expressed the opinion that there was "nothing we can do" to change the repetitious nature of the work because it was "just the nature of the beast." So we face a systemic view that, by its very nature, construction is predetermined to stress and injure workers. There are people at all levels of the industry who have bought into

this idea. As one plumber/pipefitter representative said, “Our whole world is about wearing ourselves out to get the building built.”

This mentality was identified on a more individual level as what several people called the “macho” mentality. Contractors cited a perception that dealing with ergonomics is seen as “weak” in some people’s minds. This was evident in the responses we saw earlier when we asked if workers would report WMSDs. We heard that they “grit their teeth, suck it up and go back to work” or say “I’m a construction worker, I’m tough, gonna grit this thing out.” Workers expressed the fear of losing their jobs or being replaced if they appear weak or unable to do the work. This fear feeds the mentality and is perpetuated by peer pressure. One union representative pointed out that members refuse to be educated, believing that the faster and harder they work, the better off they will be, even when working to the point of self-injury. Another union representative observed that construction workers are very conscientious of not wasting time and that ergonomic-safe techniques are seen as a “time-waster”; he perceived that stretch and flex time was time that could have been spent on something better.

Another attitudinal issue involves the separation of theoretical and practical views of ergonomics. One mechanical contractor said that if workers take breaks every 10 minutes, in “real life,” work would never get done. This was also mentioned by a union rep who commented that contractors “preach but do not practice” ergonomics; they have a policy in place but do not enforce it because it takes too long. The iron worker focus group saw training as available but that workers were not willing to do it unless paid by the company. The plasterers/plaster tender workers group cited bad foremen as a problem, commenting, “they have to teach the foremen and contractors; we’re just the worker ants. For us to become better, we need good leadership. We learn what’s right, but then the foremen don’t want us to do it.”

C2c. Lack of Knowledge and Understanding

> ***Key points:*** *Across the board, there is a lack of awareness of the connection between the hazards and injuries, often because the injuries are cumulative and not taken seriously until a worker is unable to perform their job.*

For contractors, this was the second most frequently cited obstacle, and for union representatives, the third. Workers also mentioned a lack of education about ergonomics among the older workers. The issues identified by contractors were poor hazard recognition; lack of education at all levels; not realizing long-term effects and costs associated with WMSDs; not understanding how ergonomics could help work practices and benefit employees; and lack of awareness of ergonomics as a “health and life span issue.” In addition to lack of general awareness, union representatives added that some workers take hazards and potential injuries for granted until it is too late. They also indicated that the word “ergonomics” is not user-friendly, so workers don’t recognize exactly what it means. This reinforced what we had learned earlier in the study.

Overall respondents worried that there was little awareness of the connection between the hazards and injuries, often because the injuries are cumulative and not taken seriously until a worker is unable to perform his or her job. Because of this lack of understanding, workers did not realize how the repetitive work they performed could injure them; they were not aware of the consequences to their life and career. A contractor indicated that ergonomics has "never been analyzed" or included in Job Hazard Analyses, possibly because relatively few claims resulted from these hazards (as opposed to falls). However, most of the 50 contractors and union representatives interviewed thought that WMSDs happened more frequently than injuries from other hazards.

C2d. Availability of ergonomic tools and other solutions

> ***Key points:*** *Many tools have not been redesigned to be ergonomically-friendly and those that have are often more expensive, and therefore not accessible to apprentices. Also, some tools redesigned for safety are less effective in the field.*

A small group of contractor and union representatives raised concerns about a lack of available solutions. A plumber/pipefitters union representative summed this up, saying, "a pipe wrench has been a pipe wrench since my grandfather's day." An insulators union representative agreed that there was a lack of technology and equipment for their craft. Another concern was that some tool innovations are not worker-friendly. For example, power tools that were made safer proved to be more cumbersome and frustrating so that the worker could not get the job done as quickly or efficiently. The solution was, therefore, not feasible in practice. One roofers' union representative pointed out that hand tools, such as utility knives and hammers redesigned to be more "ergonomic," are often too expensive for apprentices – so even though they may be available, they are not necessarily affordable to all workers. Along these same lines, one boilermakers' representative said that carts and forklifts may not be available at all job sites and it was just too time-consuming to wait for them. One union representative thought that ergonomic problems in certain situations, such as confined spaces, were simply unavoidable and that no solution existed for such situations. Another union representative similarly believed there was no getting away from certain aspects of the job, that certain hazards could not be eliminated, like crawling on your knees.

C2e. Ideas for Overcoming Obstacles

This section addresses the solutions each group proposed for the obstacles they identified.

Business and Financial

Contractors offered a variety of recommendations toward getting buy-in for ergonomic solutions; these generally called for keeping production high while saving workers from getting injured. They felt it would be important to show employers a cost/benefit analysis proving that they could increase production by having workers at full capacity. Several felt that workers compensation and other insurance companies were key to pushing best practices, and that it would help if they provided statistics about the relationship between the cost of coverage and these types of injuries. Two contractors suggested that contractors receive a break on premium costs by instituting ergonomic practices.

Several suggested ways that better planning could be instituted to advance safety goals. One thought that general contractors and subcontractors could come together in advance to organize the work with attention to safety, and another suggested that safety hazards be identified in the first walkthrough of the job. He felt that engineers and schedulers should be educated on this process. One contractor suggested that the customer also be educated to understand about why a slower pace on the project would be beneficial to the workers. Another contractor suggested "engineering the job so that no one is at risk." One innovative

suggestion was to create a permissible exposure limit (PEL) for ergonomics that would, in effect, limit how long someone can do a task repetitively without getting injured.

As one contractor said, “the bottom line is to care for employees. Provide them the tools so they’re not going home injured.” However, the concept of return on investment ruled, as one contractor hoped that the cost of ergonomic tools could be lowered, and another suggested that workers use the new tools on the job with the goal of seeing if it translates to better production.

Union recommendations echoed many of those the contractors expressed. “The math has to overwhelm drawbacks. It’s all about accounting in the end. Show contractors that even if the work is slower, they’re making more money due to savings on ‘plan B’ injury costs.” Union representatives were concerned about having an “even playing field” for bidding and pricing, because they want to ensure that union contractors, whom they believe provide higher quality work and safer jobsites, are also financially competitive with the non-union sector. Union representatives were also concerned with return on investment questions, wanting proof that working “ergonomically” would help productivity and reduce injuries and workers’ comp claims, and that medical costs are greater than training and education costs.

While one contractor was clear that ergonomics should not be imposed by law or regulation, a few union representatives mentioned that OSHA regulation would be a strong motivator to contractors, and that they could then play a greater role in promoting ergonomic solutions.

Workers, too, understood that making the economic case would likely motivate contractors to implement ergonomic solutions, and suggested showing evidence that employing ergonomic solutions would make workers more productive and last longer, and that workers’ comp rates no doubt go up because of injuries. One even suggested giving contractors a tax break for taking action for safety. But workers’ primary concern was around planning: having the right amount of employees to do a job right. “There should be some standards for a minimum number of people that should be worked to get the job done. Every job gets bid for injuries. If they have too many knocks on safety record, they’re not allowed to bid some jobs.”

Attitudes and Perceptions

Several contractors thought that the “tough guy mentality” (I can tough it out or work through the pain) was prevalent in the older workers. If true, then they suggested that education campaigns focus on showing injured long-term workers as an example of “what not to do,” and having older workers tell their stories to younger workers.

While several contractors praised the use of stretch and flex, they noted that the workers initially resisted it when it was introduced. “There’s always a one-year learning curve,” one contractor stated. Others said that once workers got used to doing it, they saw its benefits.

Union representatives also acknowledged that the macho attitude of construction workers must be addressed. Two mantras were cited repeatedly as obstacles to change in construction, "It's the way we've done it for 100 years; why change?" and the belief that workers are just "hired from the neck down," implying that they are hired only for their physical strength and not their minds. This stands in contrast to the message often identified with ergonomics, "work smarter not harder." For those who embrace this image, this contrast may reinforce the belief that ergonomics does not apply to the rigors of construction. Construction workers need to be empowered to use their heads, ask for help when needed, and break through the inertia of working in ways that are ultimately injurious.

According to one electricians' union representative, those attitudes are slowly breaking down. "Over time, the 'old dogs' will retire," he said. "I've seen where the mindset of younger electricians is displacing that of older electricians. Younger workers seem more willing to learn how to do this work any way we want to guide them—they're easy to convince to be a safer workforce." For that reason, several suggested that training be focused on the younger workers.

One union representative lamented what he believes is the reality of the work: "We're still doing repetitive motions and each individual's body will handle it differently. It's a physical, heavy trade where you're constantly moving and doing repetitive motion. Even though we can improve it and educate our members to work smart, it'll always be there."

As for convincing management to care about the workers in the field, one union representative said "All we can do is speak to them. The only way to learn on their own is if they get fines for being unsafe." But given the short staffing at Cal/OSHA, he wasn't hopeful.

Workers just advocated for more education about the hazards and hoped that the contractors would cooperate.

Lack of Knowledge and Understanding

Contractors had numerous suggestions for how to educate workers on ergonomic hazards. Topics included addressing the "tough guy" mentality; showing that it "doesn't hurt now, but over time, the body breaks down"; explaining the types of injuries that result from specific tasks; showing the benefits to working "ergonomically"; offering pamphlets with good stretch and flex exercises; presenting ergonomic solutions in "practical ways that are easy to understand"; offering more tailgate topics that specifically address construction activity and how to use tools; showing that stretch/flex doesn't take more time or money if done right and that each employee should start each morning with five minutes of simple stretching exercises.

Ways to provide information included using actual worker case studies; posters, cards with basic steps for preventing soft tissue injury; teaching stretch and flex in conjunction with tailgate training. "Training is the only answer and it has to come from lots of places: the union hall, apprenticeship, then through additional training." We heard from several contractors that

they do training about lifting techniques, training in conjunction with stretch and flex, training on specific injuries, hands-on demonstrations and tailgate training, but nobody mentioned a comprehensive training program on identifying risk factors and hazards and utilizing control strategies.
Contractors also had ideas about who should be trained. These included educating owners and general contractors that stretch and flex is not the only answer to ergonomic issues; raising awareness of customers so that they understand the impact of pushing for faster schedules; training people in the field who are responsible for hazard recognition so they can then train workers on hazards to avoid and proper tool use; training new workers so they don't develop bad habits; giving contractors a clear definition of how ergonomics benefits them (injury reduction that improves workers' comp premiums)—"that would go a long way to getting them to try new things."

Union representatives shared many of these suggestions and offered many more: produce more bilingual videos, booklets and pamphlets; demonstrate actual tools and equipment; offer good, up-to-date charts and graphs showing how many people are injured doing a task; create trade-specific training materials (mentioned by several participants); create laminated posters for job sites showing how to properly stretch and lift; show a healthy body at 50 years vs. that of someone who didn't take care of their body; relate the cost/benefit to the worker ("what happens after eight hours, one week, 20 years"); show the number of injuries caused by repetitive motion—by age group most affected, time of day, causes; give examples of contract language and quantifiable incidence, which would help when negotiating contracts; do a study on the cost of ergonomic equipment.

As for how to provide the training, some suggested getting both contractors and unions to team-teach, to show that they are on the same page and that they care for the workers. Several union representatives suggested educating contractors, union representatives, and workers on what they each can do; one suggested that it's important to train jobsite leadership better: "foremen and crew leaders are the ones pushing the guys to work faster." Do ongoing and continuous training, not just once. "The challenge," said one rep, is that the "old ones are riding it out and younger ones don't feel the need yet, their back is strong so they just do it."

The workers agreed with the union representatives on the need to teach foremen and contractors. "To become better, we need good leadership." Most of their suggestions had to do with learning to speak up for themselves and advocate to work safer with employers, contractors and at union meetings.

Availability of Solutions
A few contractors noted that new ergonomic equipment is coming out that's more user-friendly. They were learning about new tools primarily from salespeople, and seemed willing to try them. As one union representative said, "If the ergo-friendly tools are faster and more efficient to use, it's not hard to get contractors to buy-off on them."

Union representatives talked about the need to make ergonomic tools affordable for workers. In light of the fact that most workers must provide their own hand tools, "Price has a lot to do with it; older workers who are starting to pay attention to their bodies will pay a higher cost for tools. But it'll be tough selling the young guy who 'doesn't give a rip about his body' on the more expensive tools."

One cost-free recommendation was to ensure that a worker has easy access to the tools needed for the job. "If you have everything you need right where you're working, you don't have to search for anything; you're more likely to get your job done quickly and safely."

C2f. Is the ergonomics climate changing for construction?

Key points: Some interviewees believed that they have witnessed:

- Increased focus on awareness and training, leading to a shift in behavior
- Improvements in tools and how materials are packaged, helping change work processes
- An influx of younger workers slowly creating a shift away from "tough guy" attitudes
- Contractors and unions increasingly encouraging workers to report all injuries, immediate and cumulative

We did not have a direct survey question asking what has changed over time regarding ergonomics in construction but we found that contractor and union representative responses were peppered with signs of change indicating that some perceive an encouraging shift. In their replies to other questions we counted 32 comments expressing the opinion that positive change has taken place in addressing WMSDs. The majority of comments referred to changes noticed over the last 10-15 years; a few others referred back 20-30 years.

Interviewees noticed ways that new tools/equipment and material packaging are helping contractors and workers to get away from "old school ideas" and look at new processes and techniques. Some specific things mentioned were power tools, cushioned handles, gloves, rolling carts and rolling tool boxes. A plasterers' representative noted changes in the way materials are packaged to reduce weight, citing that bags have gone from 100/90 pounds to 50 pounds and buckets have gone from 5 gallon to 3.5 gallon. An electricians' representative noted that he saw more tool innovations in trade magazines. A mechanical contractor said, "Manufacturers are really coming to the plate; [they've] got better tools each day. Keeping up on that is hard to do because there's such good stuff coming out. Go to safety expos, there's tons of products good for other trades. Have to help foremen pick stuff that's good for us." Other comments had to do with workers' willingness to try ways to prevent WMSDs. One mechanical contractor noted that workers are now using personal protective equipment such as knee pads, when they would not have "in the old days."

Others have seen an increase in awareness and understanding about the benefits of applying ergonomics to construction as more training is in place and younger workers are entering the workforce. One electricians' union representative said that younger workers are more inclined to get help to do heavy lifting, as opposed to workers 10 years ago who felt they were

"indestructible." A painters' representative said, "Everything's evolving and so is the workforce. Younger kids coming out, they're not used to the work that people like I did 26 years ago. The workforce is changing, things are developing and contractors are seeing the benefit of ergonomics versus an injury." One bricklayers' representative felt that ergonomics training was more prevalent in the craft than it was 10 years ago and that this has resulted in "a lot of people using different techniques—how you use the tools—seen a change over years as people are aware that it can damage the body."

Contractor representatives also cited ways that the culture is changing. A general contractor's representative noted that it was "getting better, can see the word ergonomics versus 10 years ago it only affected office personnel or perceived as in the office; but turn it into sprains and strains, workers actually relate to that better." A mechanical contractor's representative observed, "One of those things with time, we're starting to see the 'tough guy mentality' leave our job sites; that comes through the training they've received. I guess it's the way the culture's changing as younger guys are coming in." One general contractor's representative said that they are trying to correct old habits of workers who have done the same thing for 30 years. Some specific programs cited as making a difference were stretch and flex, job task analysis, pre-planning, and organizing tasks on the job site.

Some contractor and union representatives thought that reporting of injuries had improved because a bigger focus was being put on WMSDs and they were being taken more seriously than they were 20 years ago. This was attributed to better education and company policies that required reporting of all work-related injuries. One general contractor said, "We've grown internally, a few years ago people wouldn't have reported because they thought it will get better; but we've actually got within our district a huge focus on soft tissue injury prevention. Have tried to educate workers on what it is and something they need to address right away before it gets worse. They're not going to get fired if they are injured; have seen increase in soft tissue injuries that have been reported." A boilermakers' representative described it this way: "Contractors are learning that it's costing two times the manpower, but if it prevents injuries, it's saving five times as much. Contractors are slowly (years/decades) coming around to our way of thinking." Another union representative said his union was stressing to members that they should report injuries and noted that reporting is going up and injuries are going down.

These comments indicate that the construction industry has been changing over time, and that awareness of ergonomic hazards and solutions exists and has been increasing, particularly over the last 10-15 years.

C3. Motivation and Triggers

Key points:

1. *The top motivation identified by more than 50% of contractors and union representatives was lowering injury rates and reducing workers' compensation costs. Preventing injuries was typically linked to productivity, lowering workers' compensation*

insurance rates, and reducing liability as benefits of an overall good safety culture. Coming in second was concern for protecting workers.

2. *It is apparent that workers' compensation insurance providers are in a position of power and could influence employers to adopt better ergonomic practices.*
3. *With an aging construction workforce, cumulative trauma injuries are becoming more prevalent.*
4. *Generally workers expressed that they simply wanted to preserve their ability to work, earn a living, and have a full career.*
5. *Programs, tools or changes in work procedures must first pass the production and cost tests and show they actually reduce injuries before they will be evaluated at a more detailed level.*

One of the objectives of this study was to get interviewees to tell us what would motivate them to apply ergonomics to construction work. We have established that employers, unions and workers are all very concerned about repetitive strain and cumulative trauma injuries even if they do not use those exact terms to describe them; and, although they may not use the word ergonomics, they are already applying ergonomic principles to prevent injuries on the job. Through the responses discussed so far, we have learned that there is enough awareness of ergonomics to show that it does apply to the construction industry. Interviewees did not demonstrate any aversion to or dismissal of ergonomic issues in construction, but rather, readily described actions, attitudes, obstacles and solutions in an overall positive way. Many of the contractors and union representatives alluded to how much the industry has changed in this regard over the last 10-15 years. What forces have been at work within the industry to bring about this shift? And, despite advances in understanding the relevance of ergonomics to construction, why do attitudes persist that stand in the way of preventing injuries?

We wanted to uncover why our study groups care about ergonomics now more than ever before. Our survey sought detailed information about what contractors, unions and workers are doing to prevent ergonomic injuries. We then asked them to describe what motivated them, their company, and/or their union to use the solutions they outlined. A clear, resounding motivation identified by more than 50% of contractors and union representatives was to lower injury rates and reduce workers' compensation costs. While several other factors were given, which will be summarized below, this factor outweighed all others by a substantial margin.

Unions and contractors are bound together in the common interest of keeping the business healthy. For contractors this means a robust "bottom line" and for unions it means keeping their members gainfully employed. Unions have a vested interest in making sure contractors are making money, thereby staying competitive, winning bids for new work and keeping members off the bench. There is mutual benefit for both contractor and union in addressing these issues, keeping their workforce productive and able to meet the demands of construction in the 21st century while keeping the cost of doing business down. Usually they were driven to take action because injuries were costing money. Several respondents indicated that they fully believed stretch and flex programs directly resulted in a decrease in injury incidence. Once this worked for a few contractors, others followed suit. Interviewees did not share any quantitative

data on the efficacy of using stretch and flex programs to reduce injury rates, but all survey groups shared the perception that it worked. This appeared to be a relatively low-overhead solution with a positive return.

For contractors, the second most cited motivation was concern for protecting their workers. One general contractor said, "We just consider it part of our general duty to protect our employees and that's part of the way we have to do it." Others stated, "A happy employee is a good employee" and, "As a safety professional, I want everyone to go home from work the same way they came to work." While this altruistic motivation was echoed by others, preventing injuries was typically linked to productivity, lowering workers' compensation insurance rates, and reducing liability as benefits of an overall good safety culture. It is apparent that workers' compensation insurance providers are in a position of power to persuade and motivate companies to implement ergonomic programs.

Generally unions and contractors agreed about motivational factors. Another motivation expressed by both groups was the fact that, with an aging construction workforce, cumulative trauma injuries are becoming more prevalent. This makes sense since these injuries can take time to impact a worker's job performance. In this challenging economy, workers are staying in their jobs longer, and even entering the construction workforce for the first time at ages 40 and over as a second career. This is evident in the demographic information we gathered about worker participants in this study. Of the apprentices who gave their age, 15% were in the 46-55 year age group and 9% were in the 36-45 age group. For journeymen, working longer in their careers motivated them to take care of themselves, because they didn't want to become injured and be replaced by a younger worker. Maintaining worker productivity and longevity was important to both groups. Both also cited the bidding process as a motivator to having a better safety program to secure future jobs. Two union representatives noted that workers are motivated to take care of themselves after watching co-workers and friends get hurt and be forced into early retirement from their trade. They see the impact on their peer's career and want to avoid similar injury themselves.

For workers, motivations were not as clear-cut. Generally workers expressed that they simply wanted to preserve their ability to work, earn a living, and have a full career. They definitely took note of the way older workers suffered from the pain of repetitive strain injuries and expressed that they did not want to end up that way. Some came from multi-generational families in the trade and knew first-hand what body issues their older relatives were dealing with as they aged. Mentoring and advice they received from older workers also had an influence. As one ironworker apprentice described hearing from an "old timer," "look at me, my back's all f***ed-up from doing what you're doing. Be careful because you have a lot of years left to be doing this." One tradeswoman from the bricklayers said she was given advice from an old mason when she started her career in the trade to "never walk on a jobsite with your body being cold." She followed this advice and has done her own stretching program from her first day on the job and has not had a repetitive strain injury in 20 years. Some workers are motivated by company incentive programs that offer financial rewards for coming up with ideas of ways to do things better or finding new tools to try.

Since contractors have primary responsibility for implementing solutions on the job, we asked them an additional question to get at a slightly different perspective about motivation. We asked them to tell us their top three most important considerations when making decisions about adopting solutions to prevent ergonomic injuries. This question was unprompted, as we wanted them to describe their thought process in their own words. The following answers were repeated most often by interviewees:

Consideration #1: How will it impact production and will it prevent injuries
#2: Cost
#3: Cost, availability and does it work?

While respondents ranked their choices differently in terms of first, second and third considerations, the actual considerations given were consistent. It was clear that when thinking about ergonomic solutions, safety managers were most concerned with practicality, financial prudence, efficacy, predictability, and overall benefit. Two considerations tied for #1 with four interviewees mentioning each of them: the impact on production and whether it would prevent injuries. The concern about production was consistent with the feedback we collected when discussing challenges to implementing ergonomic programs. It was generally agreed that production rules the construction industry today. Feasibility/practicality, effectiveness (including worker acceptance), cost, and benefit to employee and company were also mentioned multiple times. Other answers included: time it takes to set up (tools/equipment); employee buy-in; proof that solution works or prior success; whether it will lower modification rates for insurance. When looking at these responses in aggregate, it appears that the top concern safety managers had when thinking about using an ergonomic solution is whether it would work without negatively impacting production.

Cost was mentioned most often (by 9 people) as the second consideration when deciding about using a solution. Other responses included considerations about the benefit, ease of use/implementation, repeatability from job-to-job, potential return on investment, feasibility, impact on productivity, turn-around time, and making sure it would not be a hindrance or make anything worse. At the level of the third consideration it was harder to identify any single concern. Cost was again mentioned most often (3 people), but availability and efficacy were also high on the list. Many of the concerns mentioned previously were repeated, but some new ones emerged as well. Sustainability, durability, and quality, primarily in reference to tools and equipment, also came in at this level, along with measurement of actual success. It seemed that potential programs, tools or changes in work procedures must first pass the production and cost tests and show they actually reduce injuries before they will be evaluated at a more detailed level. One interviewee mentioned that they would consider regulatory compliance as a factor at this level. This was the one and only time anyone mentioned regulation as a consideration for ergonomics even though we do have a California standard that applies to construction.

C4. Messaging

Key Points:

1. *The term "ergonomics" has negative associations and would be a turn-off for employers and workers.*
2. *Most workers did not have a clear understanding of the word, and about a third of them admitted that they had never heard of it.*
3. *The most popular substitute term among union representatives was "repetitive motion injuries." Most respondents believed that referencing injuries that could happen, including specific body parts and cumulative stress on the body, would paint the most vivid picture for people in construction.*
4. *Messaging about applying ergonomics to construction work would be most effective if it were to stay positive and highlight the business rewards contractors could realize through more efficient production, reduced cost of injuries, and protection of their skilled workforce; for workers, protecting their ability to keep working, support their families, and sustain a full career in their trade; for unions, the strength to support their members' health and welfare by educating them and advocating on their behalf to prevent injuries while also working to assure the financial health of signatory contractors.*
5. *For a campaign to be successful, it would need to address the very different concerns cited by contractors and workers.*

The final data we collected from each survey group involved opinions about what type of messaging would resonate most for contractors, unions, and workers. What message would serve to move workers away from the "tough guy" image that may be putting them at risk for injury? How could we get unions to choose to do something to change the "inertia" that keeps work the same as it was 100 years ago? Is there an approach that would appeal to the needs of contractors' practical realities? We began by asking for feedback on the word "ergonomics" itself, to determine if the term is accepted or if it is detrimental to encouraging change to reduce WMSDs. Next we asked participants to pick from several brief messaging phrases we created based upon which they thought would be most effective within their own groups.

We phrased the question on the word ergonomics this way: Some people don't like the term "ergonomics." What is the best term to use when we're talking to contractors and workers about this safety issue?

Only three of 27 union representatives felt comfortable using the term "ergonomics," while contractors (seven of 23) were somewhat more comfortable with the term. Five contractor representatives and six union representatives actually thought the term would have negative associations or would be a turn-off for employers and workers. One electricians union representative described it this way: "Yes, it is rejected, eyes roll back in their head and these individuals that do that get a mental picture of a little girl trying to do construction work that they think in the beginning has no business being there anyway, so yes, it does have some

negativity with some people." A majority of respondents from both groups felt that, while it wouldn't have a negative effect, people simply would not understand what it meant, therefore it would not be effective. Some interviewees identified problems with the term as follows: it is too scientific or sounds too medical; not associated with the construction trades; don't know what it is; sounds like and gets confused with economics; sounds like something more you will have to do; associated with regulations; brings to mind something dry and dull. Additionally, seven contractor representatives and two union representatives thought the term would be equated with office work environments and typing or sitting at a desk so that construction workers would not think it applied to them. One contractor rep said, "I don't talk about ergonomics because then they think of Carpal Tunnel and 90% of people think 'I don't type'…that's something a secretary gets and these guys are tougher than that, right?" This dovetails with what respondents identified as the "macho" attitude that is an obstacle to preventing WMSDs.

Among the workers we talked with in the focus groups, we found that most did not have a clear understanding of the word and about a third of them admitted that they had never heard of it. One worker said they had heard it on a commercial. Many knew that it pertained to physical work and health but none could really define the word. A union rep pointed out that many construction workers have a high school education and may not have been exposed to the term very much. A contractor rep pointed out that there is a language barrier here the same as when acronyms (like IIPP and PPE) are being used on-the-job; they have to be explained first. Another union rep commented that especially for bilingual Spanish/English speaking workers, the term would be problematic. As he put it, "I'm from Mexico and I don't find that word in my dictionary…as a Hispanic person I don't relate ergonomics to Spanish language."

Whether the word evokes negative impressions or is simply not recognized, what are better terms to use when addressing injury prevention and ergonomics in construction?

Our interviewees had many suggestions for better terms to use in place of ergonomics. The most popular among union representatives was repetitive motion injuries (12 of 27 respondents). Among contractors a group of terms used to describe the type of injuries were most popular including strains and sprains, soft tissue, repetitive motion and cumulative trauma injuries. Most respondents from both groups believed that referencing injuries that can happen, including specific body parts and cumulative stress on the body, would paint the most vivid picture for people in construction. Other ideas related to actual work practices and activities that can cause the injuries along with body positioning and fitness. One contractor rep stressed that we need to use terms that are relative, something that "lights the bulb" and says, "Yeah, that means me." For example, talking about better techniques, tools and planning as well as treating repetitive motion hazards as another safety issue, would help to make ergonomics resonate more for construction.

Next we looked at sample messages with each group to determine which, if any, would resonate with their group. Wording of the messages was varied slightly to be appropriate for each group; however, we tried to keep the tone of the messages the same so that we could

observe if any broader messaging trends would emerge. Contractors were asked to think about messaging that would work for contractors generally. We gave union representatives and worker focus groups exactly the same choices as we asked union representatives to think about what would resonate most for their members. The results are summarized below for each group, ordered by the number of times they were chosen.

Rank	Contractors (23)	Union Representatives (27)	Workers (43)
1	It'll help workers be more productive (11)	For my family (22)	For my family (26)
2	It saves money (10)	I can't afford to get injured (20)	I can't afford to get injured (24)
3	It's the right thing to do (9)	For my health (12)	For my health (23)
4	For good health (8) I'll be more competitive (8) It's worked for others like me (8)	It's the right thing to do (11)	It'll help me be more productive (19)
5	It's easy to do (7)	For the workers' health (9)	It's the right thing to do (11)
6	For the workers' health (6)	It'll help me be more productive (7)	It'll help me do a better job (10)
7	It'll help workers do a better job (5)	It'll help me do a better job (5) It's easy to do (5) It saves money (5) It's worked at other job sites like mine (5)	It's easy to do (6)
8	It's the law (3) I can't afford injuries (3)	It's my right (4)	It's my right (4) It saves money (4)
9			It's worked at other job sites like mine (1)

Interviewees were not asked to rank their choices in any order of preference - they were simply asked to pick which phrase(s) they thought would resonate most within their group. We also asked them to comment if they *disliked* any particular phrase.

The top messages chosen by contractor representatives were very consistent with attitudes expressed throughout our survey. The message chosen most often by almost half of contractor interviewees (48%) related to production and the second most-chosen (43% response) related to money. When it comes to ergonomics, an effective message for contractors might be one that stresses the benefits of using control strategies to increase productivity and lower costs by controlling injury rates. This is no surprise, as we have already seen that keeping the business competitive and profitable are top concerns for employers; to do this in today's economy means winning bids and is intricately tied to production rates and cost. The third most popular phrase, however, touched on the more altruistic element that we saw earlier when looking at motivations to make change. This involved taking action because it is the "right" thing to do. We are not sure exactly what this meant for interviewees, if it related to protecting workers or following policies, and no one gave any clarifying comments about this issue. But it did imply taking action for the sake of something bigger than pure business interests. It is interesting to note, however, that while these were the messages chosen most often from a provided list, the

margin of difference among the top six phrases chosen was not very large. Contractors seemed to spread out their choices more broadly than either union representatives or workers. However the theme that emerged from the phrases selected leaned toward what would be best practice from a bottom-line perspective.

The least favorite messages were more clearly defined. The one that garnered the most negative comments was "it's the law." Eight interviewees disliked this phrase and thought it would be a negative message, a turn-off and that forcing action would encourage "going through the motions" and would not be the way to motivate contractors on this issue. They believed that explaining the positive aspects of ergonomics would be better. However, one person expressed the opposite opinion and believed that obeying the law is number one for contractors. The other phrase that got the fewest responses was "I can't afford injuries." This was again viewed by some as negative, who suggested that turning it into a more positive version such as "it'll help prevent injuries" would be a better messaging choice.

For union representatives and workers, we saw a very different response pattern. The top three choices were the same for both groups and all message phrases related to more personal issues like family, the cost of being injured, and one's own health. There was strong agreement about the main message that would get a response from workers, with 81% of union representatives and 60% of workers surveyed choosing the phrase "for my family" most often. Generally we heard that union members were very family-oriented and that this message would hit home for many. It was also clear that when workers became injured, they lost their ability to make a living and perhaps jeopardized their longevity in the trade. The physical strength required to do construction work, coupled with today's pace of production, demand that workers be fully able to perform whatever is asked of them to remain competitive. The demands of a construction career are unforgiving, and construction is not a career that guarantees steady work: workers often must be able to weather gaps in employment due to the economy and seasonal shifts. For a construction worker, maintaining personal health and avoiding injury are tied to supporting themselves and a family.

We saw a slight divergence between union representatives and workers as we moved through the remaining messaging choices. For 44% of workers, the message about being more productive resonated quite highly. The workers had emphasized in previous responses that production demands were a major concern for them on today's work sites. In this climate, being more productive would help a worker be more competitive in getting work. Union representatives and workers showed less interest in messages relating to ease of work, saving money and doing a better job. Several workers initially reacted to "it's easy to do" by viewing this as an insult to the fact that their work is very hard; the phrase was not perceived as being about ergonomics being easy to do on the job. This sentiment was echoed by one union representative who commented, "We know it isn't an easy job and anyone looking for an easy way out doesn't have their heart in it." Another trait common among most union workers was intense pride in what they do and how hard they work to achieve their skills. Any message about ergonomics being easy would have to take this into account. It is not surprising that among union representatives, 41% liked "it's the right thing to do" and 33% chose "for the

workers' health" since unions advocate for their members in contract negotiations and in resolving issues at the worksite. Interestingly, union representatives and workers agreed with contractors in placing a message about mandatory compliance at the bottom of their lists. We already looked at the negative impressions among contractor representatives about invoking the law in messaging. For union representatives and workers this was stated as "it's my right," which did not seem to influence them very much. A union representative said, "Don't use this; you may be empowering the member but you're also offending the contractor." Unions defend workers' rights, but, as we have seen in previous sections of this study, they are also bound with the contractors in the mutual success of the business and in keeping members employed.

Overall this feedback shows that messaging about applying ergonomics to construction work would be most effective if it were to stay positive and highlight the business rewards contractors can realize through more efficient production, reduced cost of injuries, and protection of their skilled workforce; for workers, protecting their ability to keep working healthy, support their families, and sustain a full career in their trade; for unions, the strength to support their members' health and welfare by educating them and advocating on their behalf to prevent injuries while also working to assure the financial health of signatory contractors.

C41. Best Ways to Deliver Information

Key points:

1. *For contractors, use larger union organizations, general contractors, trade organizations, contractor associations, and Workers' Compensation insurers, as well as websites and social networking sites to distribute information.*
2. *It's very important to provide training about the hazards and solutions across the board: contractors, union staff, foremen, supervisors, journeymen, apprentices, and even project owners.*
3. *Safety representatives appreciate hands-on demonstrations by tool manufacturers to ensure that new tools are effective.*

We asked contractor and union representatives what they thought would be the most effective ways to deliver information about ergonomics to their peers and the workers. The two groups were agreed that both training sessions and stand-alone informational materials would be the best ways to get the material to the people who need it. They recommended using larger union organizations, general contractors, trade organizations, contractor associations, and Workers' Compensation insurers to distribute information. They thought using online resources like union websites and Facebook would be good, as well as social networking tools like Twitter and anything that could be quickly accessed via devices like the iPhone, especially for the younger workers. Some union representatives noted that workers share information by word-of-mouth among peers and that they like talking face-to-face. Others mentioned monthly newsletters that are mailed to union members and posted online would be a good place to put this information. One union representative said, "The most effective way to educate our workforce is hardly ever used and that is through the employer. Our employers hold far more influence

with the members of our local than anything the union can do. We can demand, as a union, that something get done and it rarely gets done; an employer thinks that it might be a good idea and over half the workforce will stumble to try to accomplish it immediately because they want to please their employer."

For training they recommended safety training at job sites and union halls; tailgate training; train-the-trainer classes; journeyman upgrade classes, and apprenticeship classes. They believed it was very important to train union staff, foremen and supervisors because they are the people communicating directly with the workers. It was mentioned that safety representatives like attending half-day luncheon seminars where they can meet tool/equipment manufacturer representatives and get hands-on demonstrations. Several said that regular training needs to happen, perhaps quarterly rather than once per year, to keep awareness of the issue alive. The type of materials interviewees thought would work best were case studies; handouts; pamphlets, books, videos, hands-on demonstrations; hard data and examples; mailers to union members.

D. DISCUSSION

We initiated this study project with the vision that it would lay the foundation for a social marketing campaign to reduce WMSDs in the construction industry. Our specific goal was to assess current knowledge, perceptions, and attitudes held by the different players in the construction industry—the potential target audiences for any social marketing campaign—toward voluntarily implementing ergonomic solutions. We would also attempt to determine what would move them to change behavior. In this section, we look at the broader implications of the data we collected and what it may mean for the development of a social marketing campaign.

D1 Knowledge and Understanding

We sought to learn from contractors, union representatives and workers what they already knew about ergonomics and what further information they might need to promote ergonomics as a way to reduce WMSDs. Generally, we found that all three study groups were willing to speak openly about ergonomics and WMSDs; we did not encounter resistance or aversion to the topics. Busy contractor and union representatives were willing to spend the 45 minutes of their time to complete the survey interview and were open and eager to express their thoughts and experiences on the issue. Indeed, several commented that participating in our survey stimulated their interest in the topic and that they were interested in seeing the study results.

We discovered that each group had some level of cognition of ways in which elements of ergonomics, such as fitting the job to the worker, analyzing tasks to assess hazards, altering work practices and modifying worksites to mitigate risk factors, would apply to and benefit construction work. Contractor and union representatives demonstrated a better initial understanding of what ergonomics means than did workers. It is important to note that the word itself was the barrier, not that they did not have an understanding of how these issues impact them and their work.

The term “ergonomics” as a stand-alone term, does not have a clear meaning, especially for workers, but for some contractors and union representatives as well. Even for those who felt they could define it, its meaning was muddled and all over the map. It could represent injuries, hazards, or solutions. For workers, ergonomics is not a term they would commonly hear used on construction job sites. However, when we provided a working definition that spoke about ergonomics in the context of WMSDs and work tasks that may create risk for WMSDs, they readily connected these concepts to their work.

Contractor and union representatives clearly understood the impact of WMSDs in construction and were informed about the tools, tasks and working conditions that contribute to their occurrence. Even those who indicated they had not received specific training on ergonomics could identify risk factors and hazards. Interviewees showed an awareness of possible solutions and indicated they were open to receiving more information. Workers experientially understood that performing particular work tasks put strain on their bodies and that there was

potential for injury over time. What seemed lacking was any uniform training that would develop a consistent baseline of education for all workers. Knowledge varied from trade to trade and worker to worker; some had received ergonomics training on the job or in apprenticeship classes, whereas others picked up tips on how to avoid injury from more experienced journeymen or relatives in the same trade.

D2 Control strategies currently being utilized

In terms of what is being done currently, we heard of solutions from each category in the hierarchy of controls. However, examples of individual interventions were referred to more often than comprehensive programs. Of these, personal protective equipment was the most limited, referring primarily to padding, support braces and gloves.

Training and planning stood out as frequently cited administrative controls. The most prominent example of a program that was recognized as successful by all groups and touted by contractors for actually reducing repetitive strain injuries was stretch and flex. What can we learn about the qualities of this program that might transfer to other solutions and messaging strategies? For contractors, it is easily replicated from job to job, it can fit into time that is already allocated for safety training, is implemented by existing employees, and it is relatively low cost so even small gains would secure a positive return on investment For workers, it connects with their team spirit, can be fun and, after a short learning curve, it has a tangible effect on the way they feel at the end of the day. On the downside, it can appear as a "silver bullet" solution to the exclusion of using any other controls, isolate or embarrass workers who may not be able to physically perform the exercises as well as others, place the responsibility for preventing WMSDs on individual workers, and be inconsistent or improperly executed, which may cause more harm. While stretch and flex programs do not solve all the issues that result in WMSDs, they do represent an example of how combining awareness with direct action produces results.

Engineering controls included a variety of tool modifications and redesign that reduced vibration, improved grips, made power tools lighter and easier to handle. The availability of a larger variety of specialty tools enables contractors to fit the right tool to the job. We also heard success stories about material handling and positioning equipment that reduced heavy lifting and awkward postures. Contractor and union representatives also indicated that purchasing tools and equipment and providing training would be the types of solutions they would be most likely to use.

Conpsicuous by its absence from the responses was regulation and enforcement. Regulatory standards for other construction hazards such as falls and confined spaces are clearly defined and enforced – contractors and unions have guidelines that promote straightforward compliance. This is not the case with ergonomics. Although California has an ergonomics standard that includes construction, the way the standard is written and the requirements to trigger it make it very difficult to enforce. It is so insignificant for construction that most contractor and union representatives we interviewed had little or no awareness of the standard

at all. All three study groups placed phrases that alluded to enforcement of law or workers' rights at the bottom of their lists as possible messages in a campaign to reduce WMSDs. It is unclear whether they would feel the same if a strong regulation were being enforced. A few interviewees said that they felt forcing contactors to take action on WMSD hazards would not be productive and might even increase resistance.

D3 Attitudinal Themes

Some key attitudes surfaced from the groups regarding what would move people to take action. These emerged as both beliefs that can be capitalized upon as well as mindsets that stand in the way of making change in the context of ergonomics.

D3a. High level of concern about impact of injuries

On the positive side, contractor and union representatives indicated high levels of concern about WMSDs. Ergonomics and WMSDs elicited a lot of discussion, indicating a level of genuine desire to address the issues. Workers cared deeply about the impact WMSDs have on their lives and their ability to continue working. This acknowledgement that WMSDs affect various levels of the industry is an open door for advocating change.

D3b. If it negatively impacts production, we won't do it

All three study groups shared the belief that construction today is driven by production; some interviewees saw production as a much higher priority than safety. This is a complex issue in that production is tied to cost and winning competitive bids. Union representatives and workers spoke of the relentless pace of production in today's competitive construction industry. Workers believed that they had to demonstrate their ability to keep up production to remain competitive in their trade but felt that the pressure to build things faster and cheaper was placing them at higher risk for WMSDs. Neither workers nor contractors were interested in using new tools and techniques that might hamper their productivity. Learning the actual cost of adding more workers to a job, rather than working a limited number of workers harder, would be a useful topic for further research.

However most contractor and union representatives also believed that the primary reason ergonomic control strategies have shown up on job sites was to lower injury rates and thus reduce Workers' Compensation costs. Contractors were concerned with direct costs associated with injuries but also the loss of skilled workers, which would affect production levels. Union representatives are in the middle, needing to promote work while also protecting and being accountable to their members.

These attitudes about production can be used as a positive when it comes to implementing change. An emphasis on production could persuade contractors to expend time and money on ergonomic programs if a cause-effect relationship can be proven between specific changes and reducing injuries and lost work time. Another compelling argument would be to show a correlation between reducing stress on workers and increasing productivity. Interviewees indicated that they need hard data that illustrate the bottom-line benefits of ergonomic

solutions. Workers asked for two things to solve this problem: more workers on the job, and project planning to have a more reasonable production schedule.

D3c. Things will never change

The attitude of inertia arose from each group. Contractors expressed the attitude that older workers are set in their ways and are not open to new ideas. Workers had little optimism that employers would make changes that address some of the root causes of ergonomic injuries, namely workload and staffing. Union representatives agreed with both of these opinions. All three groups generally agreed that education was the key to changing this attitude. A good program would establish a clear connection between specific WMSDs and work practices and demonstrate how new techniques and tools could improve the work experience. Training materials would have to be highly relevant for workers. All levels of the construction industry, from project owners and contractors, to foremen and supervisors and union apprenticeship programs, would need to be trained so that they could better plan jobs with ergonomics in mind and would support workers in implementing ergonomic interventions.

D3d. Keep up with competition

It appears that seeing what other contractors are doing (due to presence of multiple trades on one site) may have a level of influence on contractors. If something appears successful for one, others will be more apt to try it themselves. We learned that this is one way that contractors discover new tools and equipment and may be motivated by keeping up with the competition.

D3e. Pain comes with the job; the work is tough and so are construction workers

Pain and fatigue were viewed as common among construction workers and something to be endured or worked through. This ties in to what were identified as “macho” and “tough guy” mentalities and the belief that injuries and pain “just go with the territory” and should be accepted without complaint. Workers expressed fears both of peer pressure and of losing their jobs if they were to complain or be perceived as being a “cry baby.” “Grit it out” and “take Motrin” was the predominant attitude among workers. Education would help workers understand the long-term effects of WMSDs and how, over time, they can become debilitating enough to cut a worker’s career short and diminish their quality of life. Case studies and having older workers, who suffer from these injuries, tell their personal stories were suggested as ways to get through to workers on this issue.

D3f. Need to earn a living

Workers' main motivation was to keep working to earn a living for themselves and their families. Considering the physicality of the work, their bodies are their greatest asset. When we asked for their feedback on messaging, "for my family" was the message chosen most often by workers. Their motivation and that message are tied together: if they lose their ability to work, they can no longer support their families. Being able to increase production, on the other hand, was seen as something that would make them more valuable to contractors.

D3g. If I report a WMSD, I'll lose my job

Similarly, the fear of losing their jobs or being laid off also motivated workers to keep quiet and work through symptoms. This perception was pervasive among all groups of workers and it was echoed by union representatives. The attitude is that contractors will simply replace a worker who is not working at 100% rather than address the hazard. The current economy was seen as exacerbating this problem. Workers did not seem to feel that they had any protection from this treatment. Workers need to learn that they are not helping themselves or the contractors by hiding these injuries when they occur.

D3h. We have a policy to report all injuries; therefore all injuries are being reported

Some of the contractors we interviewed indicated that they have a policy that encourages workers to report all injuries when they first occur, even WMSDs, so that they can be addressed early. They believed that catching injuries early was in their own interest so that they could address them before they became more serious. If few of these injuries are reported, as workers and union representatives indicated, the contractors will assume that this is not a problem and therefore does not need a solution. Further, if contractors perceive the implementation of ergonomic programs as leading to increased reporting of injuries and therefore increasing their workers' compensation costs, then some contractors may be less likely to want to make changes and implement ergonomic programs. We presume that, if in fact this happens, these would be temporary increases and that ultimately the costs would decrease as hazards are controlled and injuries decline under a comprehensive ergonomics program. This would be an important area of future study to determine if this perception is supported by actual data, and to uncover success stories of actual companies that have realized long-term benefits from embracing ergonomic solutions.

D3i. Cumulative injuries are too hard to pinpoint

There are different aspects to this attitude depending on which group is speaking. For workers the cumulative nature of WMSDs and inability to tie them to one specific incident leads to a perception that they are minor. We learned from union representatives and workers that one reason workers are not likely to report injuries is because they are perceived as not serious enough or something for which you need to seek help. They think they can deal with them on their own by taking medication or going to a chiropractor. The workers also acknowledged the dilemma of having multiple employers in not knowing when they should report a WMSD. Do they report to their employer when minor symptoms first appear or to the company they're at when the symptoms have become debilitating enough to impact their work? The problem for contractors is similar in that they don't want to shoulder the burden for injuries that developed

over an entire career. Contractors who have invested in programs to prevent WMSDs don't want to inherit the cost of a worker's injury claim.

D4. Overcoming additional obstacles

A key obstacle is the very nature of construction work. It's repetitive, it's heavy, and it requires awkward postures. Until all work is automated, some aspects of the job will, of necessity, burden workers' bodies. As one bricklayers' representative stated, "We can't do job rotation because this *is* the job." While this may or may not be true, a lack of awareness about the hazards means that no solutions are being implemented. If workers and their supervisors recognize the hazards, then they may be able to take small steps that will help mitigate them, such as taking breaks, ensuring that they have tools and supplies easily accessible for the job, and taking other steps to reduce the wear and tear on their bodies.

Another obstacle is the limited availability and accessibility of tested and effective tools, equipment and processes. While there have been numerous important tool innovations over the years, some tools and processes have not changed in decades, and some innovations that may be improved ergonomically may cause other safety issues or not be as effective in getting the job done. Further, workers are generally responsible for providing their own hand tools; for apprentices, especially, cost may be a limiting factor in their ability to buy the most ergonomic tools. Apprenticeship program representatives are eager to learn about new tools so that they may advise their students about better ones to purchase. Similarly, company safety staff representatives are always on the lookout for better, safer equipment to purchase for the jobsite. Manufacturers need to be encouraged to develop ergonomically-friendly tools and may need some support in promoting them to contractors, unions and workers.

Any campaign needs to identify a "call to action"' or recommended solutions that are being promoted to address an issue. People indicated ways that they are taking action to reduce WMSDs and some believed there had been positive change in this direction over the past 10-15 years. However no consistent, comprehensive plan emerged that we could rally around as a success. One challenge in promoting ergonomic solutions in construction through a campaign pertains to the complexity of the building trades. There is a diversity of trades—each with their own unions, tools, training and work processes. It may be difficult to select a uniform "call to action" when the audience is so diverse.

As our most highly skilled workers are aging, not only would we expect more cumulative trauma injuries to begin surfacing among them, but they are also the workers for whom it is more difficult to convince to try new tools and techniques. Many of the attitudes outlined in the previous section are roadblocks to making change. But we have seen how programs are already working to address WMSDs, so we know that some viable solutions exist. What will stimulate contractors, unions and workers to want to try new solutions and believe that they can work?

Contractors, unions and workers need to work together to find actions that work within the parameters of the current economic environment. To change worker attitudes, we need to

educate them on how their lives will be impacted by cumulative injuries and tie the tools they use and the tasks they perform directly to those injuries. We can create a picture of what their life will be like in the future if they don't take care of themselves in the present. For unions we can develop information to make representatives more aware of the benefits ergonomic solutions offer for both business health and to protect their members and keep them productive. We can make sure apprenticeship programs have information on ergonomic training materials. Contractors need research and hard data to show that ergonomic programs actually reduce injuries without having a negative impact on production. They need to see how it pays them in the long run to protect their skilled workforce.

D5. Messaging and Promotion

In order to appeal to our target audience, solutions have to be grounded in the realities of construction. A campaign that appears "pie in the sky" or too academic will not gain acceptance. What we found about construction worker attitudes is that they are very production-oriented and practical about their jobs, priding themselves in "getting the job done." The contractor representatives we interviewed were open to new ideas and willing to try solutions but would be more likely to go for those that had already been proven effective. Unions are in the position of supporting both contractors and workers by making sure workers are prepared and ready for work when dispatched and assuring that contractors are enforcing the policies and programs that protect workers.

We explored possible channels of communication and whether there were potential sources of information that were considered trustworthy by our interviewees. Contractors see Workers' Compensation insurance providers as being helpful in promoting solutions. We learned from our interviews that insurers have a lot of power and influence when it comes to motivating contractors. They need to be used as a resource and could be a potential delivery mechanism for a social marketing campaign. International unions have the power to reach their local unions and promote campaigns and education programs nationwide. Workers receive training through their unions as apprentices and through journeymen upgrade training so this would be a venue for delivering social marketing messages to young and experienced workers. Unions are well-positioned to take a leadership role in a campaign to prevent WMSDs if they have the supporting information to back it up.

Messaging needs to talk about ergonomic hazards and resulting injuries in a familiar and accessible style. For instance, a good approach would be to speak in practical, realistic terms that make direct correlations between the tasks workers are doing day after day and the injuries that can happen over time. The term "ergonomics" does not resonate with enough people in construction. We didn't use the term workplace musculoskeletal disorders (WMSDs) in our interviews, though it was our chosen term for this report. WMSD was never used by any of our interviewees. Contractor and union representatives said they prefer the terms repetitive motion injuries, strains and sprains, soft tissue injuries, and cumulative trauma injuries because they are more descriptive. Finding a familiar term that's evocative but not overly scientific and could be used consistently among contractors, union representatives and workers would help build recognition and momentum in a campaign.

An effective message aimed at a worker would show a link between protecting oneself from WMSDs and taking care of one's body to increase one's chances of having a full career and taking care of one's family. Another messaging area to explore would propose that making a job easier on the body does not equate with weakness or making a worker less strong or able. Some ways to counter the acceptance of pain as a badge of honor might be to show the damage inflicted on the body by years of ignoring symptoms of WMSDs or the physical effects of cumulative wear and tear and the impact on one's quality of life.

Developing a way for contractors to share their favorite innovations and network about their experiences using different tools and equipment would be helpful. Seeing that an innovation has worked for others can be a key motivator, as well as seeing hands-on demonstrations about how they work. The opportunity to see a tool in action and be able to handle it personally coupled with the chance to ask questions of the manufacturer is an effective way to expose contractors to new solutions. Raising awareness of the variety of tools available and where to find them would be helpful; perhaps an online blog could be created where contractors can share their favorite innovations and network about their experiences using different tools and equipment. This can also be done in venues such as workshops and trainings that foster exchange of ideas across trades and among different contractors.

Creating a climate for making ergonomic change will require the skills and ingenuity of the people who are on the construction front lines dealing with all the day-to-day, real-world issues. Ultimately they are the problem solvers, the planners, the people responsible for making worksites safer, and the people who are getting injured. The insights they shared with us are invaluable in understanding the needs and conditions that inform a social marketing campaign. They are our best hope for making ergonomics a success story for construction.

E. RECOMMENDATIONS

A strategy for a social marketing campaign for ergonomics in construction must address the diversity of the industry. Rather than focusing on a single message, there may need to be several that hone in on what is most important to each segment of the target audience. As we have just discussed, motivations and needs are different for the three study groups. Certainly there are common themes to which most or all workers respond, but this audience is also very trade-identified; construction workers take pride in and have strong loyalty to their craft. Providing a variety of solutions that are clear, direct, cost-effective, and practical, is the key to addressing WMSDs.

1. Show cause/effect relationships

Compile statistical information that shows the relationship between specific types of solutions and positive end results. Present and package the information clearly and concisely so that it is easy to interpret. Contractor representatives and unions need this information to justify investing resources in ergonomics programs. They expressed a need for hard data in order to lobby business owners for change. In the highly competitive world of construction, planning for production schedules, staffing levels, equipment needs, and cost is all determined as part of the bidding process before any actual construction work takes place. Actual cost and savings data for ergonomics programs needs to be available throughout the entire planning process.

2. Standardize terminology

The word "ergonomics" is used in so many different forms that its meaning has become confusing. For workers who have little or no exposure to the word on job sites, it often has no meaning at all. Additionally, numerous terms are regularly used when referring to the hazards and injuries associated with ergonomic risk factors. Terms such as work-related musculoskeletal disorders, repetitive motion injuries, repetitive strain injuries, and cumulative trauma disorders are often used to describe groups of injuries that overlap. Some terms have gained popular acceptance, while others are used more often by ergonomists and researchers. Also it is common to see acronyms used for these terms that may look confusing to workers. Developing a standard, consistent terminology that contractors, unions and workers can all relate to would be very helpful for doing worker training and outreach.

3. Develop separate campaigns for contractors and workers

When it comes to ergonomics, the ultimate goal is to change the work culture to eliminate WMSDs. The complexity of construction makes this a daunting task. It may be more effective to break it into manageable parts. Developing different campaigns that incorporate the most popular messages identified by contractors and workers in this study would be a first step. For contractors that message track would speak to increasing productivity and saving money. For workers and unions the message would be more personal, addressing how staying healthy and working "smarter not harder" benefits not only them, but their family. These messages are on target with the motivational factors identified by the study groups.

4. Do a pilot program for one trade

Rather than initially attempting a broad scale campaign, it would be valuable to start small and pilot test a campaign within one craft group. This would be more manageable and allow the opportunity to test different styles of messaging to see what is most effective. Lessons learned from this experience could then be used to replicate the campaign on a larger scale. This would also isolate which issues are best addressed on a trade-specific level and which can be effectively addressed on a larger scale. The obstacles that might emerge would be easier to evaluate at this scale and simple solutions for that craft may be transferable to the needs of other trades. It might be easier to get buy-in and participation working with one trade union than trying to coordinate several. Once a campaign establishes a successful track record for one group, it would become more marketable to other groups with similar interests.

5. Develop contractor success stories

We learned that contractors are looking for solutions that are proven to be effective. A positive way to promote different types of control strategies for ergonomics is to use peer-to-peer messages. Researching which strategies have been most effective in reducing WMSDs and developing testimonials that feature stories from contractors themselves would be a credible way to encourage other contractors to take action. Multi-media packages that include short video clips, brochures and posters would give contractors the chance to highlight their successes and emerge as leaders in addressing an issue that costs the industry a lot of money. Forming partnerships with Workers' Compensation carriers could be a way to find contractors to feature as well as serving to distribute the end product. The contractor and union representatives in our study indicated that the first place they go for information is the internet. These testimonials could be designed to capitalize on all the social networking and media sharing opportunities currently popular online.

6. Form partnerships with Cal/OSHA

Launch a campaign in partnership with Cal/OSHA to educate the industry about the existing ergonomics standard and encourage voluntary compliance. Although the standard is weak from an enforcement standpoint, it may serve as a platform to do outreach on ergonomics and start a social marketing campaign. The Cal/OSHA consultation department has already developed employer and trade-specific materials to promote ergonomics in construction. It is not clear how many construction professionals are using these. Combining a marketing effort in partnership with the resources of a regulatory agency could increase credibility and acceptance among contractors and unions.

7. Develop educational components

Study groups identified education and awareness as the best way to change the attitudes that undermine the success of ergonomic programs. A social marketing campaign must have educational components that are simple, practical, and compelling. Educational materials need to be highly visual, designed for low literacy, and multi-lingual. Training for supervisory levels of construction should also be developed so that they can be informed and prepared to implement the various types of ergonomic interventions.

A large number of excellent educational resources are available on the topic of ergonomics. Compiling a comprehensive list of reputable resources specific to construction ergonomics would help union trainers and contractors and would save them the time of searching online. It would also be helpful to contact the tool manufacturers and engage them in giving hands-on demonstrations of the features they've incorporated in their equipment to address ergonomic issues. Contractors indicated that they like to be able to see and try tools for themselves and hear about their features directly from the manufacturer. Potential educational components of a marketing campaign could include:

Train-the-trainer classes
Hazard awareness seminars
Posters, brochures, fact sheets
Short video clips
Tool demonstration seminars

8. Further Research

Our study revealed these areas that would benefit from further research:

- Our study targeted the union construction sector. Similar evaluation may need to be done for non-union contractors and workers to understand how ergonomics and WMSDs impact the entire construction industry.
- The contractor representatives we spoke with primarily held positions in safety management. A survey that specifically targets business owners would be help determine if their perception of ergonomics agrees with or differs from that of their safety managers.
- References were made about several tool innovations, but the scope of our study did not permit detailed exploration of these advances or their efficacy. This information would be very helpful for contractors, unions, and workers.
- Contractor and union representatives were very interested in seeing good cost/benefit and return on investment studies to show how much it would cost to establish ergonomic programs (new tools, increased staffing, training, job rotation, etc.), and if they actually result in increased accident reporting and lowering workers' compensation costs.

F. CONCLUSION

Ergonomic solutions exist and are already helping the construction industry protect workers and reduce injuries. There is great potential for further, more widespread application. However, the barriers to implementing more solutions, while not insurmountable, will require the participation and cooperation of all levels of the industry: contractors, unions, and workers. Without doubt, construction is tough, repetitive, physically demanding work. For some workers it is these very qualities that attract them to the work. If the principles of ergonomics are integrated into all phases of construction, such as bidding, engineering, pre-planning, purchasing, materials handling, job site management, and training of supervisors and workers, we can take the burden off of workers for conditioning their own bodies and can successfully mitigate hazards and reduce, if not eliminate, WMSDs.

For each major obstacle outlined in this study, construction professionals we interviewed offered a variety of solutions. If they can generate ideas while taking a short survey with no preparation, the potential is great for problem solving in a concerted effort on a larger scale. This study shows that people know what needs to be done, but they need help in overcoming inertia and facing the juggernaut that is the construction industry. We have already seen positive change in this direction and it is our hope that this study will help in taking the next steps to continue that movement.

G. APPENDICES:

APPENDIX 1.
SBCTC Ergonomics Study Survey—CONTRACTOR VERSION

INTRODUCTION

Thank you for participating in this survey. You have been selected because you are a construction contractor employing workers (or contractor safety rep) in California. We are interviewing people like you to look at what is currently being done around ergonomic injuries in the California construction industry. I have about 18 questions I'd like to ask you, and I'd like you to speak from your experience as a contractor.

I want to assure you that confidentiality will be strictly maintained.

- We will not use your name in any summaries, reports or publications.
- With your permission, I will tape record and take notes during the interview. This is to make sure that I capture everything that you say accurately. May I have permission to record?
- Participation is completely voluntary.
- If you agree to the audiotape but feel uncomfortable at any time during the interview, I can turn off the tape recorder at your request.
- You do not have to answer any question that you don't want to and you can stop the interview at any time.

Do you have any questions about this survey or process before we begin?

[START TAPE]
Do you give permission for me to record the interview?

PARTICIPANT INFO

Trade/Type of Contractor:
Are you an: employer employee
Title/Position:
In your work role, do you have authority to make decisions about the following:

- ☐ Safety policy
- ☐ Selection/Purchasing of tools and equipment
- ☐ Work schedules
- ☐ Training
- ☐ Regulatory compliance
- ☐ Work practices and procedures
- ☐ Hazardous conditions at the job site
- ☐ Contract negotiation/contract language
- ☐ Enforcement of company policy
- ☐ Worker complaints

ERGONOMICS DEFINITION

1. Let's start by talking about the term ergonomics. When I mention the word "ergonomics," what is the first thing that comes to mind?

2. If I were a worker who did not know the meaning of the term "ergonomics", how would you describe it to me?

In the remaining survey questions we'll use words such as, "ergonomics" and "ergonomic injuries" as an easy way to describe a group of injuries that include: repetitive motion injuries, back problems, sprains and strains, and injuries like CTS, tendinitis, and rotator cuff tears. When we say "ergonomic hazards" we are referring to the work conditions and tasks in construction that may result in these types of injuries.

Do you have any questions before we continue?

ATTITUDE

3. How does ergonomics impact you or the workers on your construction crews?

Follow-up: From your perspective as a construction employer, on a scale of 1-5, where 1= no concern and 5= very concerned, how concerned are you about the following worker injuries and health issues:
-shoulder problems 1 2 3 4 5
-sprains 1 2 3 4 5
-back and joint pain 1 2 3 4 5
-tendonitis 1 2 3 4 5
-CTS 1 2 3 4 5
-fatigue 1 2 3 4 5

Do you see more or less of these injuries/issues occurring as compared to injuries from other hazards (such as falls, electrocutions, operating machinery, etc.)

Do you think ergonomic injuries are given as much attention as these other injuries?

4. Do workers tend to report these injuries when they become aware of them?
   If not, why not?

PREVENTION STRATEGIES CURRENTLY USED ON THE JOB

We'd like to know more about what happens on your job sites to prevent these specific types of injuries.

5. What programs or activities do you employ on construction job sites to address ergonomic injury prevention?

   Prompts:
   -Do you provide training?
   -Does anyone analyze tasks and identify solutions?
   -Do you provide tools or equipment specially designed to prevent ergonomic injuries?
   -Do you have a written program or policy that addresses ergonomic hazards?
   -Does your IIPP address ergonomic hazards?
   -Do you have lifting/materials handling policies?
   -Is work organized to provide scheduled breaks, extra help when needed, job rotation, and efficient management of materials?
   -Do you get feedback from workers?

6. What motivated you to use those solutions?

7. Have you tried anything that did **not** work as a successful solution?

YOUR ROLE AND SOLUTIONS

8. On a scale of 1-5, where 1= no chance and 5= very likely, how likely are you to use the following types of solutions for reducing ergonomic injuries:

   -Purchasing/Using redesigned tools, equipment or materials 1 2 3 4 5
   -Develop a written ergonomics policy (could cover: job/task analysis, materials handling/lifting guidelines, and mechanism for worker input). 1 2 3 4 5
   -Provide worker training on ergonomics 1 2 3 4 5
   -Re-organize work to provide: reasonable work load, sufficient breaks, controlled pace, task variety, job rotation, etc. 1 2 3 4 5

9. What would be your top 3 most important considerations when making decisions about adopting solutions to prevent ergonomic injuries?
    1.
    2.
    3.

    Examples:
    Cost
    Knowing about available products (tools, equipment, etc.)
    Workers' Compensation rates
    Regulations/Cal/OSHA enforcement
    Productivity levels
    Workers' willingness to accept solutions
    Responsibility to protect workers
    Recommendations from Joint labor/management committees
    Union contracts

10. What do you think are the obstacles that stand in the way of addressing ergonomic hazards in construction?
    Prompts: lack of hazard awareness, not considered serious, don't know of solutions, worker attitudes, it's too complicated, too costly, takes too much time….etc.

11. How can we overcome these obstacles?

    Prompts:
    -What type of information do you need?
    -What would help contractors make it a higher priority?
    -If costs were lower
    -Better understanding of consequences to workers' lives
    -If steps are made easy to take
    -If there were enforcement by Cal/OSHA
    -If there were actually tools and equipment already available

LEGAL RESPONSIBILITIES

12. How familiar are you with California's ergonomics standard?

13. What steps do you currently take to comply with the standard?

14. Are you aware of the American National Standards Institute (ANSI) Standard on Reduction of Musculoskeletal Problems in Construction and Demolition?

SOURCES OF INFO:

15. Where do you go to get information about ergonomic injuries and how to prevent them?

    Which sources of info are most credible or helpful to you? Why?

    What are the best ways of delivering information about ergonomic hazards and prevention to contractors and workers in your trade?

16. Does your workers' comp rate information indicate what amount is related to ergonomic injuries? Would you find that information of interest?

MESSAGING

17. Some people don't like the term "ergonomics." What is the best term to use when we're talking to contractors and workers about this safety issue?
    Prompts: Sprains and strains? What do you use?

18. As we continue our efforts to promote prevention of these injuries, we are thinking about how to frame a message for contractors. We want to target the issues that are most important to you in terms of making changes to reduce ergonomic hazards. I'd like to read some phrases to you and have you tell me which phrase or phrases you think would resonate most for contractors. We have 2 groups of phrases for ease of discussing them, but the groupings do not imply any priority or ranking. I'll read the first group through once and then go over them again and ask you to pick 2 phrases that stood out most for you. We'll repeat the process for group 2.

Group 1:	Group 2:
For good health	For the workers' health
It'll help workers do a better job	It'll help workers be more productive
It's easy to do	I can't afford injuries
I'll be more competitive	It's the right thing to do
It saves money	It's worked for others like me
It's the law	

ADDITIONAL PERSONAL INFORMATION

Union: Y N

Level of experience: Journeyman Apprentice

How many years have you worked in construction:

Are you still actively working with the tools:

Gender: M F

Age Group:
18-24
25-35
36-45
46-55
56-65
over 65

APPENDIX 2.
SBCTC Ergonomics Study Survey—UNION STAFF VERSION

INTRODUCTION

Thank you for participating in this survey. You have been selected because you are a union representative in the building and construction trades. We are interviewing people like you to look at what is currently being done around ergonomic injuries in the California construction industry. I have about 20 questions I'd like to ask you, and I'd like you to speak from your experience as a union staff person (apprenticeship instructor/coordinator) representing (training) construction workers.

I want to assure you that confidentiality will be strictly maintained.

- We will not use your name in any summaries, reports or publications.
- With your permission, I will tape record and take notes during the interview. This is to make sure that I capture everything that you say accurately. May I have permission to record?
- Participation is completely voluntary.
- If you agree to the audiotape but feel uncomfortable at any time during the interview, I can turn off the tape recorder at your request.
- You do not have to answer any question that you don't want to and you can stop the interview at any time.

Do you have any questions about this survey or process before we begin?

[START TAPE]
Do you give permission for me to record the interview?

Participant Info
Trade:
Are you an: employer employee
Title/Position:

ERGONOMICS DEFINITION

19. What's the first thing that comes to mind when I say the word 'ergonomics'?

20. If I were a worker who did not know the meaning of the term "ergonomics", how would you describe it to me?

In the remaining survey questions we'll use words such as, "ergonomics" and "ergonomic injuries" as an easy way to describe a group of injuries that include: repetitive motion injuries, back problems, sprains and strains, and injuries like CTS, tendinitis, and rotator cuff tears. When we say "ergonomic hazards" we are referring to the work conditions and tasks in construction that may result in these types of injuries.

Do you have any questions before we continue?

ATTITUDE

21. How does ergonomics impact workers you represent in your trade?

Follow-up: From your perspective as a union rep, on a scale of 1-5, where 1= no concern and 5= very concerned, how concerned are you about the following worker injuries and health issues:
-shoulder problems 1 2 3 4 5
-sprains 1 2 3 4 5
-back and joint pain 1 2 3 4 5
-tendonitis 1 2 3 4 5
-CTS 1 2 3 4 5
-fatigue 1 2 3 4 5

Do you see more or less of these injuries/issues occurring as compared to injuries from other hazards (such as falls, electrocutions, operating machinery, etc.)

Does your union give the same attention to ergonomic injuries as to these other injuries?

22. Do workers tend to report these injuries when they become aware of them?
If not, why not?

PREVENTION STRATEGIES CURRENTLY USED ON THE JOB

We'd like to know more about what happens to prevent ergonomic injuries on construction job sites that you visit.

23. As a union rep have you seen programs or activities on construction job sites or through your union that address ergonomic injury prevention?

What motivated your local to use/advocate for these solutions?

Prompts:
-Worker training about ergonomics? Have you personally received training? Y N
-Job task analysis to see where there are risks for ergonomic injury?
-Have ergonomic issues been on your joint labor/management safety committee agenda?
-Tools or equipment in use that are specially designed to prevent ergonomic injuries in your trade?
-Written programs or policies that specifically address these types of injuries?
-Are they in any IIPPs?
-Any union contract language that is relevant? (i.e. rest break requirements, job rotation, scheduling of work)
-Project planning or pre-project meetings that address how the work is organized: i.e. materials handling, pace of production, staffing levels, equipment?

24. What are workers in your trade already doing to protect themselves from these injuries?

25. What has worked well in addressing ergonomic hazards?

26. What has **not** worked in addressing ergonomic hazards?

YOUR ROLE and SOLUTIONS
In your role as a union representative, do you get involved in the decision-making process for the following work-related issues:

- ☐ Safety policy (for job sites)
- ☐ Selection/Purchasing of tools and equipment used by workers
- ☐ Training
- ☐ Regulatory compliance
- ☐ On-the-job work practices and procedures for union members (incl. work scheduling)
- ☐ Hazardous conditions at job sites (incl. worker complaints)
- ☐ Contract negotiation/contract language
- ☐ Enforcement of company policy

27. On a scale of 1-5, where 1= no chance and 5= very likely, how likely is your local to advocate for the following types of actions to reducing ergonomic injuries:

-Purchasing/Using redesigned tools, equipment or materials 1 2 3 4 5
-Develop a written ergonomics policy (could cover: job/task analysis, materials handling/lifting guidelines, and mechanism for worker input). 1 2 3 4 5

-Provide worker training on ergonomics 1 2 3 4 5
-Re-organize work to provide: reasonable work load, sufficient breaks, controlled pace, task variety, job rotation, etc. 1 2 3 4 5

28. What do you think are the obstacles that stand in the way of preventing ergonomic injuries in construction?
    Prompts: lack of awareness of hazards, don't know of solutions, worker attitudes, contractor attitudes, it's too complicated, too costly, take too much time….etc.

29. How can we overcome these obstacles?

    Prompts:
    -What type of information do you need?
    -What would help unions make it a higher priority?
    -If costs were lower
    -Better understanding of consequences to workers' lives
    -If steps are made easy to take
    -If there were enforcement by Cal/OSHA
    -If there were actually tools and equipment already available

LEGAL RESPONSIBILITIES

30. How familiar are you with California's ergonomics standard? What are some of the requirements that come to mind?

31. Do you know of any contractors who take steps to comply with the standard?

32. Have you heard of the American National Standards Institute (ANSI) Standard on Reduction of Musculoskeletal Problems in Construction and Demolition?

SOURCES OF INFORMATION

33. If one of your members came to you for help on an ergonomic issue, where would you go for help or more information?
    Which sources of information are most credible or helpful to you? Why?

    What are the best ways of delivering information about ergonomic hazards and prevention to unions in your trade?

MESSAGING

34. Some people don't like the term "ergonomics." What is the best term to use when we're talking to contractors and workers about this safety issue?
    Prompts: Sprains and strains? What do you use?

35. As we continue our efforts to promote prevention of these injuries, we are thinking about how to frame a message for union workers. We want to target the issues that are most important to them in terms of making changes to reduce ergonomic hazards. I'd like to read some phrases to you and have you tell me which phrase or phrases you think would resonate most for your members. We have 2 groups of phrases for ease of discussing them, but the groupings do not imply any priority or ranking. I'll read the first group through once and then go over them again and ask you to pick 2 phrases that stood out most for you. We'll repeat the process for group 2.

    Group 1:
    For my health
    It'll help me do a better job
    It's easy to do
    For my family
    It'll help me be more productive
    It's my right

    Group 2:
    It saves money
    I can't afford to get injured
    It's the right thing to do
    For the workers' health
    It's worked at other job sites like mine

36. Can you provide me with names of any contractors who you think would be willing to participate in taking this survey, or any who have instituted ergonomic changes on their job sites?

37. Can you provide me with names of other people from your union (foremen and/or safety committee members) who might be good to talk to about these issues?

ADDITIONAL PERSONAL INFORMATION

Level of experience: Journeyman Apprentice

How many years have you worked in construction?

Are you still actively working with the tools? Y N

Gender: M F

Age Group:
18-24
25-35
36-45
46-55
56-65
over 65

APPENDIX 3

Focus Group Questions for SBCTC Small Study project on Ergonomics in Construction:

1. Let's start by talking about the term ergonomics. What's the first thing that comes to mind when I say the word 'ergonomics'?

   Prompts:
   *How would you describe what this word means?
   *If you were talking to peers or your employer about this safety issue, what words would you use?

2. So when we talk about ergonomic injuries, we are talking about work-related injuries of the muscles, tendons, joints, and nerves. Some examples of these types of injuries are: muscle strains (such as back and neck strain), tendonitis, CTS, and herniated discs.

   How concerned are you and your coworkers about these types of injuries? Why? Are there any that are of greater concern?

3. In your trade, what specific tasks do you perform, or tools do you use that may put you at risk for these types of injuries? Prompt examples?
   Are there any that are of greater concern? Why?

   *Do you think the risk is different for male and female construction workers? Why?
   *Who is responsible for preventing these types of injuries from occurring on the job?

4. What do you or other workers in your trade do to protect yourselves from these injuries?

   Prompts:
   *Have you used any new tools or equipment, or changed your work practices in any way to reduce your risk for these injuries?
   *What in particular influenced you to try these changes?
   *What else would you like to be able to do to avoid these types of injuries?

5. Complete this sentence: Contractors I work for try to prevent these injuries by _____.

   Prompts:
   *Do they offer you training about ergonomics? What did it cover?
   *Have they talked about or provided any new tools or ways to use tools or equipment to address the hazard? What type?
   *Are there any policies in place: such as stretch breaks or rest breaks, job rotation, lifting guidelines, hazard analysis, that are designed to reduce the risk?
   *How effective were these efforts? Did they work well for workers? Why or why not?
   *What else do you wish employers were doing?

6. What obstacles stand in the way of preventing these types of injuries in construction?

   How can we overcome these obstacles?

7. What do you and your coworkers do on the job if you experience symptoms of ergonomic injuries, for example pain or discomfort in your shoulders, back or other areas…or issues like CTS and tendinitis?

   Prompts:
   *Do you or your coworkers tend to report these issues to your employer or union when you become aware of them? Are there certain symptoms or problems you are more likely to report than others?
   *If no, what prevents workers from bringing this up or reporting the injuries?
   *Do you know anyone who reported this type of injury? What happened?

8. If we wanted to create a message for union workers to help prevent repetitive strain injuries and raise awareness of construction ergonomics, what would you recommend we say or include in this message? What would resonate most with workers and motivate them to reduce these injuries?

   *What would workers see as a key benefit to them of having hazards addressed so these injuries are less likely? What stands in the way for workers?

9. Is there anything else you would like to say about ergonomics in construction?

[ON A SEPARATE HANDOUT PAGE]

As we continue our efforts to promote prevention of these injuries, we are thinking about how to frame a message for union workers. We want to target the issues that are most important to you in terms of making changes to reduce ergonomic hazards.

Circle the top 3 phrases that resonate with you from the list below. If you don't like any of the phrases, indicate why.

For my health

It'll help me do a better job

It's easy to do

For my family

It'll help me be more productive

It's my right

It saves money

I can't afford to get injured

It's the right thing to do

It's worked at other job sites like mine

Appendix 4
Demographic Breakdown

Contractor Representatives	**Union Representatives**	**Workers**
Total Surveyed = 23 Union = 20 Non-union = 3	Total Surveyed = 27	Total Surveyed = 48 (all union)
Self ID as employer = 7 Self ID as employee = 16 Journeymen = 6 Not from a trade = 15 Not declared = 2	Self ID as employee = 27 Journeymen = 26 Not declared = 1	[41 gave demographic info] Apprentices = 34 Journeymen = 7 (1 is a Foreman)
Male = 18 Female = 5	Male = 26 Female = 1	Male = 34 Female = 14
Age group: 25-35 = 3 36-45 = 6 46-55 = 11 56-65 = 3	Age group: 25-35 = 1 36-45 = 5 46-55 = 13 56-65 = 8	Age group: 18-24 = 6 25-35 = 17 36-45 = 5 46-55 = 10 Not declared = 3
Job Titles: Safety Manager/Director = 11 Safety Liaison = 1 Vice President-Safety = 1 Field Superintendent/Safety Coordinator = 4 Purchasing/Shop Manager = 1 Operations Administrator = 1 General Superintendent = 1 Foreman = 1 Risk Manager = 1 Safety Engineer = 1	**Job Titles**: Business Agent/Business Rep = 11 Apprenticeship Coordinator or Instructor = 9 Business Manager = 1 Field Rep = 1 Foreman = 1 Journeyman = 1 Organizer = 1 Dual Business Rep & Apprenticeship Coordinator = 2	
Average Years worked in Construction: 19 (shortest term 7.5 yrs; longest term 35 yrs)	Average Years worked in Construction: 29 (shortest term 10 yrs; longest term 42 yrs)	Average Years worked in Construction: 6 (shortest term 6 months; longest term 23 yrs)

1 person still actively performs their trade	3 people still actively perform their trade	
Type of Contractor: General = 7 Roofing/Waterproofing = 1 Heavy construction, underground utility, heavy road work = 4 Electrical = 3 Mechanical-HVAC, Pipefitters = 4 Insulation = 2 Rebar/Reinforcing steel = 1 Specialty (Iron Workers, Carpenters, Laborers, Roofers) = 1	**Trades Represented:** 16 Boilermakers Bricklayers and Allied Crafts Cement Masons Drywall Finishers (Painters) Electrical Workers Floor Coverers (Painters) Glaziers (Painters) Heat & Frost Insulators Iron Workers Plaster Tenders (Laborers) Plasterers (Cement Masons) Plumbers/Pipefitters/HVAC Roofers & Waterproofers Sheet Metal Workers Steamfitters Teamsters	**Trades Represented:** 10 Bricklayers/Masons Carpenters Electricians Gas/Electrical Service Iron Workers Plasterers (Cement Masons) Plaster Tenders (Laborers) Roofers & Waterproofers Sheet Metal Workers Tile Setters

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