1 Status

1.1 Update of existing policy, effective 09/20/10.

2 Purpose

2.1 The purpose of ergonomics is enhancing human performance while improving health, comfort, safety and job satisfaction. Fitting the job to the team member not the team member to the job is one of the main goals of ergonomics.

3 Applicability

3.1 This policy applies to all subsidiary companies and departments of the Cianbro Companies.

3.2 All organizations are required to comply with the provisions of this policy and procedure. Any deviation, unless spelled out specifically in the policy, requires the permission of the Corporate Safety Officer or designee.

4 Definitions

4.1 Ergonomics: The science of designing the job, equipment and workplace to fit the team member.

4.2 MSD: Musculoskeletal disorder

4.3 OSHA Guidelines: A guideline is a tool to assist employers in recognizing and controlling hazards. It is voluntary. Failure to implement a guideline is not itself a violation of the General Duty Clause of the OSHA Act. Guidelines that OSHA develops will provide information to help employers identify ergonomic hazards in their workplace and implement feasible measures to control those hazards.

5 Policy

5.1 Prior to any work, ergonomic hazards will be identified and a job or task specific activity plan developed.

6 Responsibilities

6.1 The top Cianbro manager on the job site is responsible for the implementation of this policy on the project.

6.2 The corporate safety department is responsible for maintaining this document.
7 Ergonomics Index

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7.1 Overview

7.1.1 Ergonomics is a reasonable and applied science used to design an environment which eliminates the opportunity for soft tissue pain or a Musculoskeletal Disorder (MSD). Soft tissue pain, unlike a sudden traumatic event (slip, trip or fall) that causes a broken bone or other visible injury may come on slowly; over time it is often hard to see the evidence of the problem.

7.1.2 These disorders affect the muscles, tendons, ligaments, joints, cartilage, nerves, blood vessels and spinal discs.

You must ask yourself these questions when assessing a job:

- **How long** is the duration of the exposure?
- **How often** is the frequency of the exposure?
- **How much** is the intensity of the exposure?

7.2 Prevention

7.2.1 These MSDs are preventable. Working smarter not harder, having basic knowledge about causes of these types of injuries are key to prevention. Early reporting of aches and pains can reverse or minimize soft tissue injury, with or without medical attention. Ergonomic safeguards can be put into action before the injury occurs, preventing the need for medical care in many cases. The longer a person works with an ache or pain, the longer it will take to recover.

7.2.2 Prevention is the key. Short breaks, stretching and sometimes just stopping to take a few deep breaths are all preventative measures. Frequent stretching is an important tool we tend to under use. Stretches help prevent MSDs. Warming up before work is the best way to reduce the risk of these injuries. Cold joints, tendons and muscles are more likely to get strained by sudden movement or exertion. Benefits of pre-work stretches are:

- Raises the heart rate (the body is prepared for physical exertion).
- Speeds up nerve impulses (reflexes are enhanced).
- Reduces muscle tension while reducing the risk of injury, particularly to connective tissue like tendons.
- Increases flexibility, joint mobility and sends oxygenated blood to the muscles groups.

7.2.3 Stretches should be done at a minimum of least once a day on projects in the morning. Please refer to Cianbro.net under Resources for our company stretches.

7.2.4 Don’t forget job rotation. Keep in mind that effective job rotations are when you work different muscle groups between repetitive job functions.

7.2.5 To protect your upper extremities, be sure the grips on your hand tools are not so large that it is difficult to grasp or too small that you must use your fingertips. Be sure that sharp edges are covered with padding. Power demolition tools must be kept sharp and tuned up, so that the tool does the work and not the person holding it. Do not work overhead for extended periods of time. Bring yourself up to the work. If you must do
overhead work, take frequent breaks to allow the blood to flow back into your hands as the heart does not pump blood above shoulder level efficiently. Arms outstretched and elbows raised also place someone at risk of injury. Frequent breaks and regular stretching are very important in these situations. If there is vibration exposure; consider anti-vibratory gloves.

7.3 Risks

7.3.1 Construction is one of the highest at risk industries when it comes to ergonomics because it involves work above the shoulders and below the knees. The factors that can contribute to soft tissue injuries are very complex and a checklist cannot cover all of the variables. However, the following are some key factors that should be eliminated or minimized:

- Working with a bent or flexed wrist.
- Working with the neck bent at more than a 15 degree angle.
- Vibration from power hand tools.
- Hand tools that are not balanced as they are difficult to hold.
- Hand tools with an overly large grip.
- Hand tools with a trigger-grip span of more than 4 inches between the thumb and forefinger.
- Hand tools with sharp edges or ridges.
- Hand tools with direct air exhaust onto the hand.
- Hand tools that do not meet the requirements of the job.
- Using body parts for hammers (hands, feet, etc.).
- Repetitive hand, arm and shoulder motions.
- Arms and elbows held high or outstretched.
- Controls, tools or materials beyond easy reach.
- Controls that require too much force to operate easily.
- Working with the body leaning forward.
- Handling materials from heights above the shoulder or below the knee.
- Handling large bulky material regardless of its weight.
- Over excessive twisting or stretching.
- Repetitive pushing or pulling, including requirements for high strength.
- Standing or sitting for long periods of time.
- Working in an immobile position for extended periods.
- Static muscular work.
- Lack of adjustable or poorly designed work surfaces and chairs.
- Work space that doesn’t accommodate the smallest person for reach and the largest person for clearance.
- Inadequate lighting and visibility.
- Peak loads of muscular effort.

7.3.2 Most injuries are caused by awkward postures. The risk factors include: force, repetition, vibration, contact stress, posture, and the environment. The following are some of the most common tasks or exposures that can produce soft tissue aches and pains:

- Repetitive load handling.
- Handling loads that require awkward body postures, such as bending and reaching out to an object that cannot be held close to the body in an erect posture.
- Handling excessively heavy and/or bulky, difficult-to-hold materials.
- Twisting the torso to one side while lifting.
- Repetitive or sustained bending over.
- Handling demands beyond the capabilities of team members assigned to the job.
- Unprotected, prolonged use of vibrating tools and equipment.
- Repetitive flexion (wrist bent inward toward palm), extension (wrist bent upward toward outer forearm) or deviation (wrist bent to the side in either direction) of the wrist, especially while exerting force or grasping an object.
- Direct pressure on or compression of delicate parts of the hand or wrist.
- Repetitive twisting hand motions or repetitive forceful hand work.
• Poor body mechanics.
• Exposure to cold temperatures.
• Stress

7.4 Lifting

7.4.1 **Team members will not lift over 50 pounds alone.** If a load is too heavy to lift alone, seek additional help. Mechanical means are encouraged. We provide lifting/force aids from come-a-longs, chain falls, to forklifts and overhead cranes, depending on the nature of the job. Proper lifting techniques are essential and are illustrated at the end of this Safety Policy and Procedure. Individual lifts over 50 lbs will require additional planning and approval by the project manager to evaluate materials and/or individuals capabilities. Cianbro will work team members within the doctor's prescribed work modifications.

7.4.2 Back pain injuries/illnesses can be prevented. Understand your back and take proper care of it. It's the only one you'll ever have! Here are some basic guidelines to follow:
• Warm up before you lift – it's an athletic task! Bend or stretch gently to get ready.
• Use proper lifting techniques, as illustrated on attached sheets.
• Never twist at the waist. Pivot from your feet.
• Push, rather than pull. It’s much easier on your back. Brace your hands on the object, set your back in an extended position, then do all the pushing and moving with your legs.
• If you’re lifting or working overhead, get closer to the object or the work you’re doing.
• Get help. If you must lift something that feels heavy or awkward to you, ask someone to help, or get equipment to help. Use dollies, carts or mechanical assistance at all times.
• Take your time. Hurrying causes your muscles to act inappropriately, increasing the chance of injury.
• STRETCH. Maintaining any position too long can be harmful. If you’re sitting, kneeling or bent over for any length of time, stop frequently, stand and stretch your back, placing your hands just above your waist, against your back. If you’re working in a standing position, or with arms overhead, stop frequently, squat and stretch.
• If you have a back problem, whether job related or not, inform your supervisor immediately.
• Exercise daily. Keep the muscles that surround your spine strong and flexible. Please refer to 9.2 Appendix B for some simple back strengthening stretches to do at home.

7.5 Injuries

7.5.1 Back injuries are the most common soft tissue event and can be painful and debilitating. MSDs affect the back, neck, shoulders, arms, elbows, wrist and fingers. Carpal tunnel syndrome, tendonitis, tenosynovitis, bursitis, Raynaud’s syndrome (white finger), trigger finger, thoracic outlet syndrome, epicondylitis (tennis elbow), carpet layers knee and rotator cuff strain are some of the most common soft tissue complaints.

7.5.2 Immediately report any new aches and pains to your supervisor or safety specialist. You will be asked to complete a First Report of Incident and taken to a clinic to be checked and possibly placed on work modifications. You may also need to take an over-the-counter anti-inflammatory to reduce inflammation in the area of the discomfort. The sooner a soft tissue problem is detected and treated, the greater opportunity for a quick and successful healing.
7.6 OSHA Enforcement & Guidelines

7.6.1 OSHA will conduct inspections for ergonomic hazards and issue citations under the General Duty Clause and issue ergonomic hazard alert letters where appropriate.

7.6.2 OSHA has established ergonomic guidelines. These voluntary guidelines will provide information to help employers identify ergonomic hazards in their workplaces and implement feasible measures to control those hazards. Only one currently relates to our industry, “Shipyards”. For more information please refer to our Marine Safety Policy and Procedure.

8 Budget / Approval Process

8.1 It is the responsibility of each jobsite to procure and provide all materials required and PPE requirements under this policy and to provide necessary training.

9 Related Documents

9.1 See attachments.

9.2 Documents available on Cianbro.net

Cianbro Stretches Poster
9.1 Appendix A

Proper Lifting Techniques:
- **Take your time:** Stretch slowly and smoothly; never bounce.
- **Do each stretch gently:** Maintain normal breathing during each movement.
- **You should not feel pain while stretching:** If any stretch causes continued discomfort, you should avoid it.
- **Do not rush through stretches.**
- **Focus attention on muscle being stretched; try to limit movement in other body parts.**

Back injuries can be avoided if your back is maintained in good normal alignment and if you abide by the following rules:

1. **Keep a wide base of support.**
   Spread your feet apart to make yourself more stable. One foot may be placed ahead of the other.

2. **Keep the object close to you.**
   The farther the object is from you, the more pressure you will have on your low back. A forty pound box held two feet in front of you could increase your low back pressure by as much as 400 pounds.

3. **Bend your knees and hips.**
   You need to bend your hips and knees in order to lower yourself at the same time.
4. **Maintain your lumbar curve.**
   This is the key. You should extend your back slightly to allow your butt to stick out. This will keep your back muscles in a position where they can work with the most strength and maintain the normal curve in the low back to prevent disc injuries. Keep your lumbar spine in its normal inward curve during the lift.

5. **Do not twist or bend sideways.**
   Set your spine in the normal position with your back slightly extended. Face the object you are picking up or working on. If you must turn to change your direction, pivot with your feet.
FLEXIBILITY AND STRENGTH

The lack of flexibility is a major risk factor in back injuries. There are many muscles in the thighs, the buttocks, the abdomen, and the back area itself that attach to the spine and the pelvis. When any of these muscles become tight and lose their flexibility (due to excessive sitting, standing, over-working, sustained positioning or pain) they produce a pulling or holding force on the spine or pelvis. This removes some of the spine’s ability to move fully and safely.

Muscle stretching is very important to spine health but must be done properly. Fast, bouncing stretches will irritate the muscle fibers and can actually cause them to tighten in response. Effective and safe stretching must be done slowly and deliberately, always trying to coax the muscle into a more lengthened position. Stretching can be uncomfortable but should not result in pain that lasts after the exercise. Muscle strength is important to the prevention of injury. Muscles need enough strength to move vertebrae while protecting the joints and ligaments. Muscles need a balance of flexibility and stability.

Physical therapists have identified some simple quick exercises that are good for your back to build flexibility and strength of muscles and provide repair and nutrition of discs and joints. Start gently and do not push yourself too much. These exercises are intended to preserve a normal back. They are often used to treat certain back pain problems. If you have back pain, or if these exercises bother your back, notify your supervisor and you may wish to consult a physical therapist for some different exercises.

1. To stretch hamstrings.
   Lie on your back with legs flat. Pull one knee toward your chest. Grasp your thigh under your knee and hold it firmly to your chest as you try to straighten your leg at your knee. Make it a slow stretch-and-relax process for about a minute to each leg.
2. **Prone press-ups.**
This is valuable to increase joint mobility and disc nutrition and repair. It also stretches hip flexor muscles in the groin. This exercise must be done gently. Lie flat on your belly. Place your hands on the surface, so that you bend backwards at your lower back. Move gently. Hold the position three seconds. Repeat three times only. Do not over-do this one.

3. **Diagonal half sit-ups.**
The safest and most effective sit-ups are done only part way up and on a diagonal, with knees bent. This helps low back mobility and trunk muscle stability. This exercise is done lying on your back with your legs bent. Reach your hands forward and curl up half way turning your body to one side. Hold briefly. Lie back and relax a second. Then sit up again toward the other direction. Repeat to fatigue.

4. **Active back extension**
Do this one slowly and gently. Lie flat on your belly with your arms down at your sides. Lift your head, chest, and arms up off the surface a few inches. Do not extend your head back. Hold a few seconds. Relax. Repeat to fatigue.

5. **Passive flexion stretch.**
Lie on your back. Pull your knees into your chest and hold them there relaxed for 30 seconds. Do a gentle standing back-bend after this.