ERGONOMICS AND MATERIAL HANDLING

Plan the Work, Control the Load and Reduce Physical Strain

POLICY STANDARD	Work shall be arranged to reduce excessive force, awkward posture, repetition, vibration and uncontrolled material movement. Mechanical assistance, improved positioning and team handling shall be used whenever an employee cannot safely control the load or task.

PHEIFER BROTHERS CONSTRUCTION CO., INC.

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USE OF THIS POLICY	This policy is not all-inclusive and does not set one universal employee lifting limit. Load weight is only one factor; frequency, reach, posture, grip, distance, footing, environment and individual capability also determine the safe method.

Primary Regulatory References

- OSHA Act General Duty Clause and OSHA Ergonomics guidance
- 29 CFR 1926.20 and 1926.21 - Accident prevention and employee instruction
- 29 CFR 1926.250 - Material storage
- 29 CFR 1926.251 - Rigging equipment for material handling
- Applicable Powered Equipment, Rigging, Crane, PPE and Housekeeping policies

1. Purpose, Scope and Responsibilities

Purpose and Scope

- Prevent strains, sprains, back injuries and other musculoskeletal disorders while lifting, lowering, carrying, pushing, pulling, holding, positioning, stacking or using tools.
- Applies to field, bridge, roadway, shop, yard, warehouse, delivery and office/support work, including employees, temporary workers and subcontractors under company control.

Management / Project Management

- Plan deliveries, staging, access, equipment and staffing so employees are not expected to manually overcome a hazard that can reasonably be engineered out.
- Provide carts, dollies, forklifts, loaders, cranes, hoists, vacuum/magnetic devices, lift tables, adjustable work supports, low-vibration tools and other aids suited to the task.
- Review trends, employee concerns and corrective actions; involve workers in selecting and evaluating improvements.

Foreman

- Address ergonomic risk in the daily JHA: load, route, landing area, grip, posture, frequency, duration, weather, PPE and mechanical assistance.
- Verify operators/riggers are trained, equipment is inspected and rated, and handling does not expose employees to suspended loads, traffic, falls or pinch/crush hazards.
- Stop and redesign the task when the planned method does not match field conditions.

Employees

- Use the planned aid and method; inspect equipment; communicate before moving material; keep clear of line-of-fire and report changing conditions.
- Report discomfort, numbness, tingling, weakness, swelling, reduced motion or recurring pain early without fear of retaliation. Early reporting is intended to prevent worsening injury.
- Do not attempt a lift or movement that cannot be safely controlled. Ask for help or mechanical assistance.

Safety / Program Owner

- Support assessments, training and follow-up; coordinate occupational medical evaluation and restrictions through authorized company procedures while protecting confidentiality.

2. Ergonomic Hazard Assessment

Assess the Whole Task

- Do not judge safety by weight alone. Evaluate load size/shape, center of gravity, stability, handles/grip, sharp/hot/wet surfaces, pickup and set-down height, horizontal reach, travel distance and frequency.
- Evaluate bending, twisting, overhead reach, kneeling/squatting, static holding, one-handed work, forceful grip, vibration, contact stress and recovery time.
- Consider fatigue, cold/heat, rain/ice/mud, uneven slopes, bridge vibration, restricted access, lighting, PPE, traffic and simultaneous operations.

High-Risk Conditions

- Load is bulky, unstable, shifting, difficult to grip or blocks vision; weight or center of gravity is unknown.
- Pickup is below knee level, set-down is above shoulder level, load must be held away from the body, or movement requires twisting/side bending.
- Task is repeated, sustained or performed at a fast pace; tool transmits strong vibration or requires high trigger/grip force.
- Route includes ladders, steep slopes, rebar congestion, narrow beams, formwork, scaffolds, traffic, water, excavation edges or slippery/uneven ground.
- Employee reports symptoms, recent fatigue or loss of control, or the task differs materially from normal conditions.

Individual Variation

- Physical capability varies and may change with fatigue, prior injury, illness, medication, heat/cold and work duration. The company will not rely on a single universal manual-lifting number.
- Employees are not required to disclose diagnoses to the crew. They must follow documented restrictions and promptly report inability to safely perform the assigned method.

Observation and Worker Input

- Ask employees which steps require the most force, awkward reach, repetition or recovery. Review near misses, first-aid reports, equipment damage and rework.
- Observe actual work, not a demonstration with an empty load. Consider peak production, worst route and end-of-shift conditions.

Reassessment Triggers

- New material/equipment, different crew, increased production, changed access, weather, near miss, symptoms, injury, repeated dropped loads or control that is not being used effectively.

3. Planning and Control Selection

Control Priority

- Eliminate unnecessary handling: deliver closer, change package size, preassemble, prefabricate, use concrete/material chutes or change the sequence.
- Use engineering controls: crane/forklift/loader, hoist, cart/dolly, pallet jack, lift table, pipe/rebar cart, roller, lever, clamp, handle, tool balancer, work platform or adjustable support.
- Use administrative controls to support—not replace—engineering controls: team handling, task rotation, planned micro-breaks, reduced frequency/distance, extra staffing and staged materials.
- PPE protects against cuts, impact and grip loss but does not make an excessive manual load safe. Back belts are not a substitute for task redesign.

Plan the Route and Landing

- Clear, level and light the route; remove trip hazards; control mud, ice and water; provide ramps or grading between elevations.
- Select a stable landing area before pickup. Use dunnage/spacers so hands can be removed without pinch exposure and the load cannot roll, slide or tip.
- Do not carry loads on ladders or across unprotected edges when hands, balance or three-point contact cannot be maintained. Use hoisting or another access method.

Know the Load

- Verify weight from markings, drawings, shipping data or calculation. Include attachments, trapped water/mud/concrete, bundled items and uneven distribution.
- Identify center of gravity and movement of contents. Secure loose components and test the load at low height before full movement.
- For mechanical handling, confirm equipment, attachment, rigging and supporting surface capacity.

Work Height and Reach

- Stage frequently handled material between knee and shoulder height where practicable. Bring the work closer and face it directly.
- Use platforms, stands, turntables, extensions or repositioning to reduce floor-level work, overhead reach, deep bending and long static holds.

JHA Hold Point

- Do not begin until load, route, landing, roles, communication, assistance, exclusion zones and emergency actions are understood.

4. Manual Lifting, Lowering and Carrying

Before the Lift

- Test the load cautiously without committing to the lift. If weight, balance, grip or route is uncertain, stop and obtain assistance.
- Remove loose material, verify stable footing and make room at pickup/set-down. Wear task-appropriate gloves and footwear; protect from sharp edges, hot surfaces and chemicals.
- Face the load and position close enough to avoid reaching. Do not lift while standing on loose debris, a slope edge, ladder, moving platform or unstable form.

Lift and Lower

- Use a stable stance and secure grip. Bend through hips and knees as comfortable, keep the load close and rise smoothly without jerking.
- Keep the torso aligned with the feet. Turn by stepping; do not twist while lifting, carrying or lowering.
- Maintain control through the entire motion. Lower smoothly to the prepared landing and keep fingers/toes out of pinch points.
- There is no single mandatory posture for every body or object; use the planned method that minimizes force, reach, twisting and loss of balance.

Carry

- Keep the load close and within a range that permits clear vision and stable walking. Do not carry a load that blocks the route or traffic view.
- Use shorter trips, smaller packages or mechanical assistance instead of prolonged carrying. Stop and rest/reposition before grip or posture fails.
- Never walk backward with a load unless unavoidable, the path is controlled and a spotter directs movement.

Special Shapes

- Long material such as conduit, rebar, lumber or pipe requires awareness of both ends, overhead lines, traffic and nearby workers. Use a team, cart or equipment when one person cannot control swing.
- Sheets, panels and forms can catch wind and obstruct vision. Reduce size, use panel carriers/vacuum devices, team handling and stop during unsafe wind.
- Do not place hands under an unsupported load. Use blocking, pry tools, handles or other positioning devices.

Do Not

- Do not catch a falling load, jump from equipment while holding material, throw material between employees or use sudden momentum to overcome an excessive load.
- Do not carry material beneath suspended loads or through operating-equipment zones without controlled separation.

5. Team Lifts and Mechanical Assistance

When to Use a Team

- Use team handling when size, length, shifting center of gravity, route, wind or landing prevents one employee from maintaining control, even if the weight seems manageable.
- Team lifting does not automatically make an unsafe task safe. Mechanical handling is preferred for very heavy, awkward, frequent, elevated or long-distance movement.

Team-Lift Plan

- Select employees who can perform the assigned position and establish one leader. Agree on pickup, direction, turns, obstacles, set-down, stop command and what happens if anyone loses grip.
- Balance the load and assign positions based on load distribution and route—not employee rank. Use enough people without crowding or creating uneven timing.
- The leader gives clear commands: ready, lift, walk, turn, lower and stop. Any team member may call stop; everyone stops together.

During the Lift

- Maintain communication and pace. Do not change grip, step over major obstacles or alter direction without warning.
- Keep feet/hands clear of the landing; use dunnage. If balance, grip or route changes, set the load down safely and reassess.
- Do not allow one person to take an unexpected share because another releases early.

Mechanical Aids

- Use only equipment rated and suitable for the load and surface. Inspect wheels, handles, brakes, forks, chains, hooks, attachments, controls and guards before use.
- Secure the load against rolling, sliding, tipping or shifting. Keep the center of gravity within the equipment stability zone and stay within rated capacity.
- Push carts where visibility and design allow; avoid pulling from an awkward posture. Control grades and never ride on material-handling aids not designed for passengers.
- Forklifts/loaders/cranes/hoists require authorized operators and the applicable company policy. Rigging shall be identified, rated, inspected before the shift and removed if defective.

Line-of-Fire

- Use exclusion zones and taglines/positioning tools where appropriate. No employee under a suspended load or between a load and fixed object/equipment.
- Never use hands/feet as stops for rolling steel, pipe, forms or pallets. Chock/block before releasing equipment.

6. Pushing, Pulling and Material Positioning

Plan the Force

- Assess startup force, sustained force, grade, surface, wheel condition, load stability, handle height, distance and stopping control.
- Reduce load, improve wheels/bearings, clear the route, use powered assistance or add controlled help rather than using excessive body force.
- Pushing is often preferable because it allows body weight and forward vision, but use the method designed for the equipment and route.

Body Position

- Face the direction of force, use a stable stance and keep hands between approximately waist and shoulder height where practical.
- Apply smooth force using body weight and legs; avoid jerking, twisting, one-handed pulling behind the body or prolonged force at full reach.
- Do not push/pull from a ladder, unprotected edge, slick slope or position where sudden release would cause a fall.

Carts and Dollies

- Do not overload above rated capacity or stack so high that vision/stability is lost. Secure tall, round or shifting material.
- Use brakes/chocks for loading and unloading. Control downhill movement from the safe side; do not place the body in front of a runaway load.
- Keep hands inside handles and feet away from wheels. Use spotters at blind corners, doorways, ramps and live-traffic interfaces.

Prying and Positioning

- Use rated pry bars, jacks, come-alongs, chain falls, rollers and blocking on stable support. Inspect and stay outside the release, snapback and crush path.
- Never use makeshift cheater bars, damaged tools, excavator buckets or rigging beyond design to force alignment.
- Block/crib progressively; never rely solely on hydraulics or place a body part beneath an unsupported object.

Pinch and Crush Prevention

- Identify squeeze points at forms, beams, bearings, pallets, truck beds, tailgates, doors and equipment attachments.
- Use handles, taglines, spacers and tools to keep hands out. Establish one signal person when equipment and employees position the same load.

7. Repetition, Awkward Posture, Contact Stress and Vibration

Repetitive and Sustained Work

- Identify tasks that repeat the same force/posture or require static holding: tying rebar, drilling anchors, chipping, grinding, screeding, fastening forms, flagging, driving and prolonged equipment operation.
- Reduce repetitions through mechanization, work batching, tool changes and improved layout. Rotate only among tasks that use meaningfully different muscles/postures.
- Use brief recovery opportunities before fatigue degrades grip, posture or control; hydration and heat/cold controls also affect physical capacity.

Awkward Posture

- Raise/lower or rotate the work to reduce deep bending, kneeling, overhead reach, neck extension and twisting. Move feet and reposition access instead of reaching farther.
- Use kneeling pads/creepers/platforms where compatible; select tools with extensions, angled heads or auxiliary handles.
- Do not work beneath a load or defeat fall protection merely to improve posture; redesign access safely.

Hand Tools and Contact Stress

- Choose the correct size, weight and grip shape; keep cutting edges sharp and equipment maintained so excess force is not required.
- Use padded handles/edges or supports to prevent concentrated pressure on palms, wrists, forearms, knees or shoulders. Do not use the hand as a hammer.
- Keep wrists near neutral where practical; avoid prolonged pinch grip and forceful trigger use. Alternate hands only when it can be done safely and effectively.

Hand-Arm and Whole-Body Vibration

- Select lower-vibration tools/equipment and manufacturer anti-vibration features; maintain bits, bearings, isolators, seats, tires/tracks and suspension.
- Limit continuous exposure through task planning and recovery; keep hands warm/dry and use only manufacturer-compatible gloves/PPE. Anti-vibration gloves do not eliminate the hazard.
- Operators adjust seat, steering and controls; use suspension and maintain roads/working surfaces. Avoid excessive speed over rough ground.

Early Warning Signs

- Numbness, tingling, blanching fingers, reduced grip, persistent soreness, swelling, weakness, limited motion or symptoms that continue after rest require prompt reporting and reassessment.

8. Bridge and Highway Work Applications

Rebar and Structural Steel

- Stage bundles close with equipment; use rebar/pipe carts, cranes or loaders. Control long pieces at both ends and keep clear of power lines, traffic and impalement hazards.
- Use proper dunnage/chocks. Do not manually stop rolling bar, pipe, diaphragms, angles or bearings. Cut bundles only after restraining stored movement.
- Use mechanical positioning for heavy plates/bearings and hands-free alignment tools; protect against sharp edges and pinch points.

Forms, Falsework and Lumber

- Preplan panel size, pick points, wind and landing. Use crane/forklift/panel devices when size or elevation prevents safe control.
- Remove/bend nails, stack on stable level supports and keep access clear. Avoid carrying forms on ladders or across unprotected bridge edges.
- Use stands/benches for assembly and stripping to reduce floor work and overhead force.

Concrete and Masonry

- Use carts, buggies, pumps, chutes and planned hose-handling crews. Wet concrete, block and bagged material are heavy and may shift; account for buildup and residue.
- Support/control pump hoses and avoid prolonged static holding, hose whip and pinch points. Use washout/cleaning methods that do not require unsafe manual force.
- Rotate/reposition screeding, finishing and vibrator work; use extended or powered tools where feasible.

Tools and Anchor Work

- Use drill stands, vacuum bases or supports where appropriate; select low-vibration tools, sharp bits and correct feed pressure.
- Position work to avoid sustained overhead drilling and ladder force. Use platforms/aerial lifts and dust-control systems without creating excess hose/cord drag.
- Move adhesive, grout and fasteners in smaller staged quantities or carts; follow chemical/PPE requirements.

Bridge Access, Water and Traffic

- Do not carry material where it prevents three-point contact, fall protection use, PFD performance or awareness of live traffic/equipment.
- Use hoists/taglines/material platforms for elevation changes. Secure material against wind, bridge vibration, passing traffic and water movement.
- At night or in winter, improve lighting, traction, warm-up and staging; cold can reduce grip and dexterity.

Shop and Yard

- Use lift tables, forklifts, cranes and stands for parts, tires, attachments and cylinders. Control tailgates, ramps and truck-bed edges.
- Plan loading/unloading so employees do not climb on unsecured loads or enter between equipment and material.

9. Material Storage, Stacking and Access

General Storage

- Stack, rack, block, interlock or otherwise secure tiered material against sliding, falling, spreading, tilting or collapse.
- Do not exceed safe floor/deck/scaffold/runway load. Post maximum safe loads where required and account for equipment, material, impact and changing structural condition.
- Keep aisles and passageways clear, in good repair and wide enough for employees/material-handling equipment. Use ramps, blocking or grading between levels.

Location

- Do not store material where it blocks emergency access, electrical panels, fire equipment, ladders, traffic sight distance, guardrails, exits or rescue equipment.
- Inside buildings under construction, comply with OSHA separation from hoistways, floor openings and unsupported exterior walls. Do not stage bridge material at edges without engineered/load review and restraint.
- Keep only supplies needed for immediate operations on scaffolds/runways.

Specific Materials

- Structural steel, pipe, poles, bar stock and other cylindrical material shall be racked or blocked against spreading/tilting.
- Stack lumber on level, solidly supported sills so it is stable/self-supporting; remove nails from used lumber before stacking.
- Stack bagged material to remain stable; step back and cross-key at least every 10 bags high. Segregate incompatible materials.
- Store sheet goods and forms in racks or restrained stacks; protect against wind. Secure compressed gas cylinders under their separate policy.

Access and Retrieval

- Store frequently used/heavier items at accessible heights where practical. Avoid climbing stacks or reaching beneath/behind unstable material.
- Use equipment to retrieve elevated/heavy items. Do not stand on forks, pallets, buckets, material or makeshift platforms.
- Open bands/straps from a position outside the release path and restrain material before cutting.

Housekeeping

- Remove banding, dunnage, wrapping, protruding nails and scrap promptly. Maintain vegetation/pest and fire controls in storage areas.
- Inspect after deliveries, weather, equipment impact or evidence of shifting/settlement.

10. Symptoms, Stop Work and Emergency Response

Early Reporting

- Report work-related or work-aggravated discomfort as soon as practical: pain, soreness, tingling, numbness, weakness, swelling, reduced motion, cramping, loss of grip or symptoms that persist/return.
- Early reporting does not automatically mean an OSHA-recordable injury or discipline. It allows task review, prompt first aid/medical evaluation when appropriate and prevention of worsening symptoms.
- Foremen shall listen, protect privacy, stop/reassign the aggravating task as needed and notify the designated company contact. Do not diagnose or direct an employee to work through pain.

Immediate Stop-Work Triggers

- Load weight, balance, grip, route or landing is unknown or cannot be controlled; required aid/help is unavailable.
- Footing, lighting, weather, traffic, edge protection or access makes handling unsafe.
- Load shifts, stack moves, equipment/rigging defects, communication fails or an employee enters a pinch/crush/suspended-load zone.
- Pain, numbness, weakness, dizziness, shortness of breath, loss of grip/balance or any employee calls stop.

Response to Symptoms

- Set the load down or secure the task safely; do not make a sudden release that endangers others. Notify the foreman and change the method before continuing.
- Provide first aid and arrange medical evaluation under company procedure. Follow documented restrictions and evaluate the task for others with similar exposure.
- Do not use stretching, medication, braces or back belts as permission to continue an uncontrolled hazard.

Serious Injury / Crush Event

- Call 911 for suspected fracture, severe crush, amputation, uncontrolled bleeding, loss of consciousness, chest pain, severe breathing difficulty, spinal injury or other emergency.
- Do not move an injured person unless necessary to prevent greater harm and trained to do so. Control equipment/energy, protect from traffic/falling material and guide responders.
- Do not lift or roll a heavy object off a trapped person by unplanned manual effort. Use trained rescue and controlled stabilization/lifting.

Incident Review

- Preserve relevant equipment/material and document task, load, route, frequency, staffing, environment, symptoms, controls and corrective actions.
- Reassess similar tasks and communicate improvements without disclosing confidential medical information.

11. Training, Records and Program Review

Training

- Before assignment, train employees to recognize ergonomic risk factors, assess loads/routes, select aids, use safe handling methods, control pinch/line-of-fire hazards and report symptoms early.
- Provide practical instruction on carts, dollies, hoists and other aids employees use. Operator, rigger and signal-person work requires separate qualification/training.
- Retrain after new equipment/material/process, observed unsafe method, symptoms/injury, near miss or evidence understanding is inadequate. Toolbox talks supplement required training.

Supervisor Expectations

- Foremen shall not use production pressure, teasing or arbitrary weight assumptions to discourage requests for help.
- Observe real work, ask for employee input, correct staging/access and verify controls remain effective throughout the shift.
- If a task repeatedly requires workers to exceed control, redesign it rather than relying only on reminders.

Records

- Maintain JHAs/assessments, inspection and equipment records, training, reported hazards, corrective actions and incident documentation.
- Medical information and restrictions are handled confidentially through authorized company procedures and stored separately from routine safety records.
- Track patterns by task, body area, crew, equipment and condition without waiting for a recordable injury.

Evaluation

- Verify improvements reduce force, reach, repetition, vibration and uncontrolled movement without creating new hazards such as pinch points, traffic exposure or excessive pace.
- Seek employee feedback after changes and adjust tools, staging, staffing or sequence as necessary.

Program Review

- Review at least annually and after a significant incident, trend, equipment/process change or regulatory guidance change.
- Printed copies are uncontrolled unless formally issued. This Revision 1 remains in effect until replaced.

Enforcement

- Bypassing mechanical aids, overloading equipment, entering line-of-fire, unsafe horseplay with loads or directing work after a stop condition is subject to corrective action.

12. Material-Handling Assessment Checklist

VERIFY	EXPECTATION
Load	Weight, size, center of gravity, stability, grip and surface verified
Task	Lift/lower/carry/push/pull/hold frequency, distance and duration assessed
Posture	Reach, height, bend, twist, overhead work, kneeling and static hold reduced
Route	Clear, lighted, level/controlled; traffic, edges, stairs and obstacles addressed
Landing	Stable, restrained and prepared with dunnage/spacers; pinch points controlled
Assistance	Mechanical aid selected first; capacity, inspection and operator confirmed
Team handling	Leader, positions, commands and stop method understood
Environment	Wind, heat/cold, rain, ice, mud, vibration and lighting acceptable
PPE / grip	Correct gloves/footwear/eye protection; sharp/hot/chemical surfaces controlled
Storage	Safe load, stack/rack/blocking, access and housekeeping acceptable
Symptoms	Crew reminded to report early; restrictions/concerns addressed privately
Emergency	Equipment shutdown, 911 access and crush/rescue response reviewed

PROJECT: _____	DATE / SHIFT: _____
FOREMAN / LEADER: _____	MATERIAL / TASK: _____
CHANGES / CORRECTIVE ACTIONS:	

13. Test Your Knowledge

Circle the best answer. Review missed questions with your foreman before performing material-handling work.

1. What determines whether a manual lift is safe? A. Weight alone B. Weight plus the full task and conditions C. Employee job title	2. What is preferred for a heavy or awkward load? A. A back belt B. Lift faster C. Mechanical assistance
3. How should a worker turn while carrying? A. Step with the feet B. Twist at the waist C. Lean sideways	4. Who may call stop during a team lift? A. Only the foreman B. Any team member C. Only the strongest worker
5. What should happen before cutting bands on a bundle? A. Stand in the release path B. Ignore load movement C. Restrain it and stand clear of release	6. What should a worker do with recurring tingling or weakness? A. Report it early B. Hide it C. Work faster
7. What is required before using a cart or hoist? A. Assume it is suitable B. Inspect it and verify capacity C. Overload it briefly	8. How should cylindrical material be stored? A. Loose on a slope B. At an unprotected edge C. Racked or blocked against movement
9. What should happen when a route becomes icy or obstructed? A. Stop and correct/reassess B. Carry the load anyway C. Walk backward	10. What does a back belt do? A. Makes any lift safe B. It does not replace hazard controls C. Establishes a universal lifting limit

EMPLOYEE: _____ DATE: _____

ANSWER KEY: 1-B | 2-C | 3-A | 4-B | 5-C | 6-A | 7-B | 8-C | 9-A | 10-B