

# TEAM FIGHTS WORKER INJURIES

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## SPRAINS, STRAINS AND SLIPPED DISKS

These are often the results of physical labor, particularly when three risk factors are involved: heavy materials, repetitive motion and awkward postures. But a proactive team of people from Gunderson Inc, Oregon OSHA, and the Oregon Manufacturing Extension Partnership (OMEP) came up with an innovative product to mitigate these factors when performing metal fabrication tasks.

Gunderson Inc is the largest steel fabricator in the state of Oregon. A subsidiary of the Greenbrier Cos., Gunderson has been located at Northwest Front Avenue in Portland since 1918. Consistently rated as one of the finest producers of rail cars and marine vessels for cargo movement, the employees handle some 320 tons of steel a day.

Gunderson is concerned about employee injuries and recognizes the very tangible negative physical and mental effects for both employee and employer when they occur. Their employees have experienced low back and other musculo-skeletal injuries, common in this industry. Metal fabrication activities include cutting, bending, welding and grinding of steel plate parts requiring repetitive motions of bending, lifting and loading by employees. Varying from 15-60 lb and palletized in sizes of 36X36" to 42X48", there is great variability in material weight, lift frequency, parts positioning (height and horizontal location) and employee practices. Add to this the variety of employee heights and arm lengths and it is easy to see the problem. Those of us who have experienced back problems wince at the possible scenarios. While Gunderson has an ongoing comprehensive screening, prevention, awareness and training program for workers, staff felt there were possibilities in designing a new generation of 'scissor lift' table, commonly used on shop floors. Specific requirements for the lift unit included a 10,000 lb load rating, with a retractable wheel system to allow the device to be easily moved to different work locations within the shop.

With Oregon Department of Consumer and Business Services funding and approval for development of a prototype, Gunderson employees defined their requirements and built an initial lift. OMEP was later brought in to assist as project managers on a second prototype. OMEP project managers are experienced in the OR-OSHA program and have a mission to increase Oregon manufacturers' productivity and profitability. A natural strategic partner for Gunderson, they helped to enhance the shortcomings of the first prototype. Gathering necessary experts when needed, the assigned team had several concept meetings to review the requirements and evaluate proposed designs. This prototype was built and a comprehensive pre and post ergonomic evaluation measured the change in risk of worker injury when compared to an initial baseline assessment done at the start of the project. This included detailed analysis of worker satisfaction with the lift in production.

In defining requirements, the first priority was a platform height adjustment range of 18 to 54 inches. This would eliminate the first major problem of heavy pallets being positioned next to the operator and the operator needing to lift individual parts from ground level to a 36 inch high work bench on a repetitive basis. The pallet may be placed directly on the platform. As tasks are completed and material depleted, the platform can be elevated to optimize the lifting height from the pallet. The next priority was a 10,000 lb lift capacity. Several bins and pallets of steel can weigh up to 8,000 lbs. With limited forklift drivers and production support, bin breakdowns or repalletizing were not always feasible; this increased the stretch and reach of the operator. Note that the weight of steel parts are between 15 and 60 lbs, and operators may stoop and lift from the bin or pallet to the tabletop up to 200 times per hour. Even with the best safety and body mechanics training for the strongest and fittest of operators, the risk of injury is high. A 360-degree platform rotation was a necessity. Bring the material to the operator rather than have him reach out across the pallet to get the material. With limited shop floor space for multiple fixed lifts, and an uneven concrete floor a final requirement was the ability to move the lift over rugged terrain and fix it into position once at the required work area. This would provide flexibility in use of the lift depending on the material handling tasks in the schedule and the machines that would require the use of the device.

The end product is a mobile scissor lift with 10,000 lb capacity. The unit has a 360 degree powered rotation of the lift platform. A steel framework with retractable wheels provides mobility and prevents movement after positioning in the work location. The lift platform is 48" square with a height adjustment range of 18" to 54" vertically. A hand control pendant powers height adjustments and indexing functions. A rechargeable, battery operated push device with hand controls is used to move and locate the lift as needed. A custom fabricated dolly couples the push device to the lift for transportation and movement in confined spaces.

The lift is a hit with Gunderson employees. Once a forklift places a pallet of parts on the lift, the operator changes the height to an appropriate level using the hand control. As the operator progresses and parts are removed from the pallet, he rotates the platform and adjusts the height so the parts are as close as possible for unloading. Bending, lifting, and stretching are minimized and contribute to reduced physical demand, lessening the risk of injury.

Greg Miller, Gunderson Inc.'s energetic and enthusiastic employee health manager comments, "The positive approval of the mobile lift, by a consensus of the employees who have used it, has been validated in the results of the post ergonomic assessment". The post ergonomic assessment report computes lift indexes for various situations using the NIOSH work practices guide for manual lifting. Indexes were calculated with various material weights, operation frequencies and pallet heights, both with and without the lift. This analysis determined an estimated 32 to 55% potential reduction in risk of employee injury through use of the lift. This is a direct result of reduction of forces and loads from manual lifting, plus reduction in awkward body postures. Other operational efficiencies were found including elimination of the wait time for a forklift operator to move and position the lift, and elimination of breakdown times for pallet loads which exceeded 4000 lb, the limit of the original prototype.

Key success factors were employee participation, development methodology, effective teams, and innovative state policies and programs supporting injury reduction. Very satisfied with the results of the project, Greg is enthusiastic about the development of the product by OMEP and the financial support of Oregon OSHA: "Oregon companies are fortunate that this state has very proactive health and safety programs. In regard to work injuries, the Employer at Injury Program (EAIP) is a financial incentive as it provides 50% wage reimbursement to employers. Oregon also has worksite modification funds available to employers' for those employees' who require an accommodation following a documented work related injury. As someone who has seen other state's Workers' Compensation programs, Oregon is one of the most forward thinking and accommodating states from both a humanitarian and a financial standpoint. It makes sense for employers' to capitalize on these benefits to reduce production down time and claims costs while supporting their employees' recovery on the job".

Pat Kraft, OMEP's Operations Manager, notes that repetitive motion is a key concern for many companies.

Oregon OSHA's (OR-OSHA) Worksite Redesign Grant program provided \$101,700 in grant monies. This covered the costs of design, development and evaluation of 2 prototype lifts, as well as the documentation of the results, so that others could benefit from the research. Gunderson Inc contributed well in excess of the required 10% match. This product was designed for the special needs of metal fabrication, but Gunderson Inc employees believe it could be invaluable to any company with manual material handling tasks.

All products developed through this program are public property. The design is complete, and will be freely available to anyone wishing to duplicate or further develop the mobile lift. A web based project archive is in the process of being constructed, that will provide details on this and many of the 35 to 40 grants being completed. It will be linked from the main Oregon OSHA website and will provide information such as project overviews, ergonomic reports on the projects, as well design and vendor information so that anyone may research the results and adopt the technologies.

Information about developments and the status of this program can be obtained from Oregon OSHA ([www.oroosha.org](http://www.oroosha.org)).

Phone: 509/453-7690.

Phone: 503/947-7448.

<http://www.cbs.state.or.us/osha/grants/worksitere redesign.htm>

Information about OMEP can be obtained from their website or from Patrick Kraft, Operation's Manager

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