

Ergonomics – From the Bottom Up Lifting, Tilting and Turning Solutions for Manual Material Handling

Michael Adel, PE
Director of Engineering, Autoquip Corporation

For over 60 years, Autoquip has been at the forefront of the material handling industry as a provider of equipment solutions for ergonomic applications. Ergonomics is simply the science of designing work to fit the capabilities of the worker. Because worker capabilities vary due to differences in age, physical condition, strength, gender, stature, etc., Autoquip designs and manufactures a wide range of products which can compensate for these differences by bringing the work to each worker's unique ergonomic "power zone" (above the knees, below the shoulders, and within 18" of the torso). By improving the fit between the demands of the work tasks and the capabilities of the workers, Autoquip material handling solutions have benefited companies throughout the world by:

- Reducing or preventing injuries
- Increasing productivity & product quality by eliminating product bottlenecks and reducing error rates & rejects
- Decreasing worker efforts and improving worker morale
- Lowering costs by reducing or eliminating: use of medical services for musculoskeletal disorders (MSD's), workers' compensation claims, excessive employee turnover, absenteeism, and re-training

Manual material handling tasks have the potential to expose workers to physical risk factors. If these tasks are performed repeatedly or over long periods of time, they can lead to fatigue and injury. The main risk factors or conditions associated with the development of injuries in manual material handling tasks include:

- Awkward postures (bending, twisting, etc.)
- Repetitive motions (frequent reaching, lifting, carrying, etc.)
- Forceful exertions (pushing, pulling, carrying, lifting heavy loads)

Again, these risk factors have historically represented the largest single contributor to worker injuries in the United States, and the application of good ergonomic solutions can reduce these incidences and improve productivity. Autoquip offers a wide variety of equipment solutions which serve to reduce worker exposure to these risk factors. These designs fall into the primary categories of LIFT, TILT, and TURN, and have the following characteristics and impact on ergonomics at the work station:

LIFTS

Lifts can generally be described as industrial mechanisms, typically scissors, which move vertically to raise or lower the height of the work (or worker) in order to place the work at an appropriate ergonomic height (between the knees and shoulders, and head tilted forward no more than 30 degrees). Industrial lifts can be manual or powered, portable or stationary, and can be actuated mechanically, hydraulically, or pneumatically – depending on available utilities & other aspects of the work environment. Lifts help to eliminate harmful bending and repetitive or excessive lifting.



Portable lift with casting



Lift used in an assembly process



Lift used in build-up or break-down of a layered product



Lift bringing the worker to the work in a parts-pulling application

TILTERS

Tilters are industrial devices which do exactly as their name implies – tilt the work through a range of angular motion to place the work at an appropriate ergonomic height (between knees and shoulders) and distance from the worker (18"). Industrial tilters can be portable or stationary, and can be actuated mechanically, hydraulically, or pneumatically – depending on available utilities & other aspects of the work environment. Tilters assist in the elimination of injuries due to harmful bending and repetitive reaching.



Floor-mounted tilter for Gaylord basket with bulky parts



Lift and Tilt with accordion skirts for pulling parts from baskets



Combination Lift and Tilter for bins of castings in assembly process



Portable tilter used to load/unload sheets of dunnage

TURNTABLES

Industrial turntables rotate the work to the worker. Turntables can be manual or powered, and are often mounted to lifts for the build-up and break-down of palletized loads, or when handling smaller unit loads. Turntables help to improve productivity and reduce injuries by eliminating repetitive walking around the load, harmful reaching, and the forceful exertion of pushing or pulling loads into place.



End-of-conveyor lift & turntable combination to load/unload pallets



Combination lift & turntable to build up and/or break down pallets of casting

What to Look For

How can a person recognize whether an ergonomic problem, or problems, exists within their facility? How do you identify the potential need for material handling equipment to improve productivity and/or safety? The best place to start is to walk through the manufacturing plant or operating facility and look for any number of these indicators:

- Workers that squat, reach, or stretch to gain access to their work
- Any repetitive assembly task
- Heavy work pieces moved or positioned
- Large work pieces that require operation on more than one surface
- Workstations with step stools, or extension arms for tools
- High volume production machines
- Workstations modified by employees (without authorization) to make work easier

Or, simply call your nearest Autoquip dealer or representative for a no-cost ergonomic assessment of your process or operation. Good ergonomics makes great economic sense!