

Ergonomics

Conveyors - Ergonomics

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How are conveyors used in industry?

Conveyors are common equipment found in industry. They are used to connect areas in workplaces in a manufacturing system and move products and supplies in and out of a work site, from one part of the plant to another, and between workstations. Conveyors are found in all kinds of assembly operations, ranging from microelectronics to the automotive industry. Conveyors can be powered or unpowered, roller or belt, overhead or on the floor.

Factors such as the conveyor's height, width, speed and position in relation to the worker determine the overall workload and the way workers do their job. To lessen the likelihood of adverse effects when working on a conveyor line, ergonomic and design issues should be considered.

How high should a conveyor be?

Wherever the tasks at the conveyor require wide-ranging bodily motion and/or physical exertion, then the work should be done from a standing position.

Conveyor height should be determined by the degree of exertion required and the dimensions of the objects being moved or worked upon. A height range of 65 to 120 cm can accommodate the majority of the workforce and a variety of tasks. As most conveyors have a fixed height surface, one recommendation is to adjust the belt to a height suitable for the tallest workers, and to provide adjustable work platforms or chairs for shorter workers. More information on working in standing positions can be found in our OSH Answers section under:

- [Working in a Standing Position](#)

- [Working in Standing/Sitting Positions](#)
- [Fish Processing](#)

However, it is important to consider the type of work being done when determining the conveyor height. For example:

- Conveyor height for precision work such as microelectronic assembly should be from 95 to 120 cm, ideally 5 cm above one's elbow height.
- Seating for precision work should be as described in the following OSH Answers documents, plus the use of elbow supports:
 - [Working in a Sitting Position -Alternative Chairs](#)
 - [Working in Standing/Sitting Positions](#)
- Conveyor height for light work should have an optimal working height of the hands of 107 cm (42 in.) and should be about 5 to 10 cm below one's elbow height. Seating is optional.
- Conveyor height for heavy work requiring large downward or sideward forces should be 91 cm (36 in.) and should be about 20 to 40 cm below one's elbow height. Seats for other than resting are not recommended.
- Conveyor height for tasks requiring large upward forces, such as clearing machine jams and removing components, is 81 cm (32 in.).

What are other ergonomic considerations when working at a conveyor?

In all cases, consider that the more a worker is exposed, the higher the risk of developing injuries.

- Be sure that workers are actively involved, such as being involved with procedure development, design of the work space, and providing feedback and consultation.
- The reach distance includes the distance in front and to the side of the worker's body. The width of the conveyor should be chosen so that the reaching distance for repetitive movements is within 45 cm (18 in) from the front of the operator's body.
- Alternately, diverters can be installed that will direct the material towards the worker to reduce or eliminate the need to lean or reach.
- Small racks or shelves for containers should be within easy reach; containers should be tilted to avoid repetitive awkward movements.

- Regardless of whether they work while sitting or standing, workers should have adequate knee and leg clearance.
- Aisles should be wide enough so that the workers can perform their tasks without obstruction.
- Consider the force required (e.g., strength required by hands (grip), arms, back, and legs).
- Consider if the worker must twist their torso or maintain awkward positions (e.g., bending forward, sideways, or backwards)
- Is there contact stress, such as hard or sharp objects into the skin? (e.g., does the worker have to lean on or over the conveyor?)
- Consider installing tool balancers where heavy powered hand tools are used.
- Consider installing over-conveyors workstations to provide easy access to materials and tools and to free floor space.
- Consider installing [anti-fatigue matting](#); it may alleviate tiredness and feet problems that might arise from working long hours on hard floors.
- Even if the work is done from only one side, the conveyors should be accessible from both sides. This access is for maintenance, housekeeping, and emergency reasons.
- Where people need to move over the conveyor, a crossover (pedestrian bridge) should be built, with appropriate guards installed.
- Be aware that other factors may increase the effects on the worker, including the use of tools that vibrate, and when the work is done in colder temperatures.
- Provide education and training which includes awareness of ergonomics, techniques to reduce injury, and the importance of early reporting of symptoms of musculoskeletal injury.

What should be considered when determining the pace of work?

The pace of work must consider the time required for rest and recovery, and the length of time that the worker performs the tasks.

- The pace of a conveyor should be set between the capabilities of the most- and least-skilled worker; the highest speed should not exceed 10 m/min., as individuals may develop conveyor sickness symptoms at speeds in excess of this rate.
- For assembly work, the workers should have some control over the pace of their tasks.

- Consider placing more workers on the line, or rotating workers between tasks (especially those tasks that require the use of other muscle groups).
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