

Hazards are ever-present in the steel plant environment, and a heightened awareness and emphasis on safety is a necessary priority for our industry. This monthly column, coordinated by members of the AIST Safety & Health Technology Committee, focuses on procedures and practices to promote a safe working environment for everyone.



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Comments are welcome.

If you have questions about this topic or other safety issues, please contact [safetyfirst@aist.org](mailto:safetyfirst@aist.org).

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## Slip, Trip and Fall Prevention: Balance

Falls continue to be one of the leading causes of injuries. In fact, there were more than 9.1 million people injured by slip, trip and fall injuries in 2014, according to the National Center for Injury Prevention and Control.<sup>1</sup> Balance can help keep a slip from becoming a fall. Balance should be addressed when considering the aging workforce; after age 30, the muscles for balance begin to weaken.<sup>2</sup> Balance can be maintained with an active lifestyle, but sitting at a desk for more than eight hours a day, driving and sitting in the evenings after work do not contribute to an active lifestyle.

### Discussion

Slips, trips and falls are not industry-specific. Every industry, including manufacturing, construction, energy, healthcare, retail and office environments, has individuals that have been injured from falls. Walking surfaces, housekeeping and trip hazards may cause slips, trips and falls. Other, not so obvious, factors may include the individual's vision, hearing, medications, fatigue or illness. It is possible to remove the physical hazards that cause the falls, but the human factors remain. What can be done to help improve balance?

The ability to balance is dependent on the vestibular system, the somatosensory system and the visual system. The vestibular system (inner ear) regulates the equilibrium, providing directional information to the brain. The somatosensory nerve receptors are related to balance through touch, pressure, position, and movement dependent on the muscles, joints and skeletal system. The visual system addresses spatial

location and balance. Degeneration of any of these systems as a result of aging, eyesight, sedentary lifestyle, fatigue or illness can affect balance. The good news is that the balance system can be improved.

In an effort to provide a safe work environment and reduce injuries, simple timed balance tests can be completed to help individuals understand their current "balance age." Daily exercises can then be introduced to help improve their ability to balance. Monthly timed tests can help individuals see the improvement in their balance skills.

### Guidance

**Balance Tests** — Static balance can be tested with a hard floor surface, bare feet and a stopwatch. It is important to have a wall, chair or railing nearby to prevent falls. At any point when an individual has concerns about balance, the test should be stopped and he/she should seek medical attention. These tests are not medical exams, but provide an objective method to measure balance and compare the balance data with the slip, trip and fall loss experience.

The Romberg test, better known as the sobriety test, can be used to determine balance. It was determined that the three systems (vestibular, somatosensory, and visual) must work together to maintain balance.<sup>3</sup> The progression for the balance tests go from:

1. Standing with feet together.
2. Standing with one foot in front of another with the heel directly in front of the toe.
3. Standing on one foot.

**Testing Process** — Have the individual being tested stand without shoes on a hard, flat, slip-resistant surface, beside a railing, chair or table to prevent falls.<sup>4</sup> The test administrator should explain that this is a test to measure balance. The individual should relax and breathe normally.

**Test One — The Basic Romberg Test:** The individual should stand with feet side by side, heels and ankles together or as close together as possible, and arms crossed in front. After the individual is comfortable in this position, the test administrator should first ask the individual to close his/her eyes and then start the stopwatch. The test should be stopped and the time recorded when the individual opens their eyes, takes a step, uncrosses their arms or has completed 30 seconds.

**Test Two — The Tandem Romberg Test:** The individual being tested should stand heel to toe with arms crossed in front. The individual should choose which foot is placed in front based on ease and comfort. When the individual is comfortable in this position, the test administrator should ask him/her to close their eyes and then start the stopwatch. Once again, the test should be stopped and the time recorded when the individual opens their eyes, takes a step, uncrosses their arms or has completed 30 seconds.

**Test Three:** The individual being tested should stand on his or her dominant foot and raise the other foot about six inches from the floor without touching the other leg. Arms should be crossed in front and eyes closed. The administrator should then start the stopwatch. The test should be stopped and the time recorded when the individual opens their eyes, uncrosses their arms, lowers the other foot to the floor or has completed 30 seconds.

**Table 1**

*Determination of “Balance Age” for Standing on One Leg With Eyes Closed*

Balance time	Balance-based age
28 seconds	25 to 30 years
22 seconds	30 to 35 years
16 seconds	40 years
12 seconds	45 years
9 seconds	50 years
8 seconds	55 years
7 seconds	60 years
5 seconds	65 years

The determination of “balance age” for standing on one leg with eyes closed can be seen in Table 1.

These tests are only a quick screening tool. By recording the times each month and following up with exercises to improve balance, one should be able to measure improvement in the individual’s ability to balance. It is also an opportunity to identify individuals that might have difficulty balancing and may need medical screening.

## Improving Balance

Balance can be improved with some simple exercises. There are many opportunities throughout the workday and evening to improve balance. Identify times such as waiting for an elevator, talking on the phone or standing in line at the store to work in a balance workout.

Options for improving balance can include:

- Repeating the three tests listed earlier.
- Walking heel to toe in a straight line 20 steps forward and 20 steps backward (sobriety test).
- Strengthening abdominal muscles and building quadriceps with squats. Start by sitting and standing from a chair or bench 10 times, keeping abs tight, back straight, arms straight out in front and knees above ankles. The chair can be removed as the individual becomes stronger.

Classes such as yoga, taekwondo and ballet can help increase balance along with other physical activities, such as walking, bike riding, line dancing or skating. As always, individuals should be sure to check with their physician prior to starting any physical activity.

## Conclusion

Improving the ability to balance can help reduce the likelihood of slip, trip and fall incidents. This can be accomplished by making individuals aware of their current balance age and promoting opportunities throughout the work shift to improve balance by using the simple exercises discussed (e.g., stand on one foot, squat or walk the line).

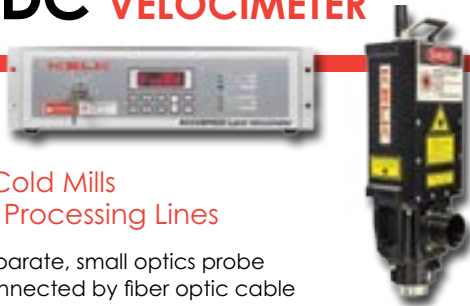
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