FALLS: A CAST OF THOUSANDS COST OF MILLIONS

The number of slip and fall injuries can be reduced if workers learn to recognize hazards.

By Barrett C. Miller

Falls are consistently the leading cause of injury-producing accidents. They account for more than one million injuries each year in the United States.

Why are there so many falls? In part, it is because we fail to understand the complexity of slip and fall accidents. We assume that people fall because the floor is slick, because they are clumsy or careless, or that they step on a foreign object. These assumptions lead to investigations that are one-dimensional, and to repeated accidents at the same location.

To understand causality, and affix responsibilty for an accident, the investigator usually eliminates many possible causes. But people can fall for numerous reasons. Reasons include: The interaction of the walking surface with the shoes chosen by the pedestrian; the environment, along with its inherent distractions, where the pedestrian walks; and, the physical and mental limitations brought to a walking environment by a victim of a slip or fall.

The Mechanics of Walking

The study of energy, as applied in motion, is called kinesiology. Kinesiology provides us with a model to understand normal and abnormal movement patterns. Anything can be analyzed, from a golf swing to a child climbing a flight of stairs.

Most movements involve the expansion and contraction of muscles in relation to joints and bones. Man uses levers to perform the work of moving his body. When we understand the normal patterns in which these levers work, we can determine the cause of deformities and incapacities on a person involved in an accident. We can't assume, however, that abnormal patterns of movement are responsible for an accident until there is evidence proving this.

Walking and most other motions involving the whole body involve the body's center of mass. This theoretical area, commonly called "the center of gravity" (COG), can be understood as the body's balance point around which a given human movement operates. While complex measurements are necessary to determine the exact location of the center of gravity, it is estimated that the COG in the average person who is standing is approximately 55 per cent of the distance between the floor and the person's height.

This COG is located in the center of the body, as viewed from the side. The location of the center of gravity affects the way a person walks, the way he or she falls, and may even affect the severity of a fall.

The COG changes during various activities and postures, and also varies according to the build of the person. Leonardo da Vinci observed that this center of gravity changes during motion. "He who descends takes short steps because the weight rests upon the hinderfoot. And, he who mounts takes long steps because his weight remains on the forward foot."

Walking is a type of locomotion in which the center of gravity is carried alternately over the right and left feet. The average human walking pattern is called "striding bipedalism" because we stand and walk with two feet in contact with the walking surface.

Each step begins with the weight supported over the trailing foot. We swing the striding foot forward and begin to transfer our weight forward to its heel. Our weight rolls toward the toes as our momentum carries us forward, and we begin to swing the alternate leg

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