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Five Types of Same-Level Falls

Same-level or same-surface falls, that include falls on relatively level surfaces, ramps, and stairs (opposed to fall-from-elevation or fall-to-below type falls) are caused by a disruption of normal or expected walking gait that results in a sudden loss of balance, and may be separated into five different categories based on the underlying mechanism of the fall process:

1. **Slip-type falls** (slip-and-fall) incidents occur when there is insufficient coefficient of friction or slip-resistance between a person's foot and the floor, typically at the moment of *heel strike*, resulting in a sliding motion, causing one's center of gravity (that remains behind such foot slip) to be unsupported,¹ producing imbalance and a potential fall.²
2. **Trip-type falls** (trip-and-fall) incidents occur when a person encounters an unnoticed raised object or surface in one's walking path.^{1,2}
3. **Stump-type falls** (stump-and-fall) incidents occur when a moving foot encounters an impediment in the walking surface such as a heaved or lifted section of flooring (or a sticky surface) that interrupts the normal movement of the foot.^{1,2} Expecting to continue at the established pace, a person falls when his or her foot is unable to respond properly.²

A "stump" is the part of a tree trunk left protruding from the ground after the tree has fallen or been cut down. One definition of "to stump" is to *catch, snag*, or "**stub** one's toe or foot."³

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Stump-type falls may be thought of as a subset of trip-type falls involving relatively small defects in flooring that are close to a walking surface that "catch" or "snag" one's foot, causing one to "stumble," disrupting one's normal or anticipated gait to prevent the normal foot swing that is necessary to maintain balance during the walking process.

4. **Step-down-type fall** (Step-and-fall) incidents occur when the foot encounters an unexpected step down,² a hole,¹ or depression in a walking surface.²

A step-down-type fall occurs when one encounters an unnoticed or inconspicuous single step down (to include a curb, a small change of elevation, and some 2-3 step stairs) located in a normally anticipated level surface. This also may occur when someone thinks the bottom of a set of stairs has been reached when, in reality, there is one more step, or when a 6 inch curb step-down is anticipated, but rather, a 9 inch step-down is actually encountered.

5. **Forced-rotation-type fall** incidents occur when someone's foot encounters an unexpected object or the edge of a change in surface elevation (hole, depression, curb, step, stone, uneven surface crack or floor plate, ramp flare, or an excessively steep cross slope) that causes a person to *turn an ankle* or otherwise be unable to place their foot on a walking surface as anticipated to properly support one's weight.

¹Miller, Barrett C., "Falls: A Cast of Thousands Cost of Millions," *Safety & Health*, February 1988, pp. 22-26.

²Goetsch, David L., *Industrial Safety and Health in the Age of High Technology*, 1993, p. 160.

³American Heritage® Dictionary of the English Language, Fourth Edition, 2000, Houghton Mifflin Company, Merriam-Webster, Inc.