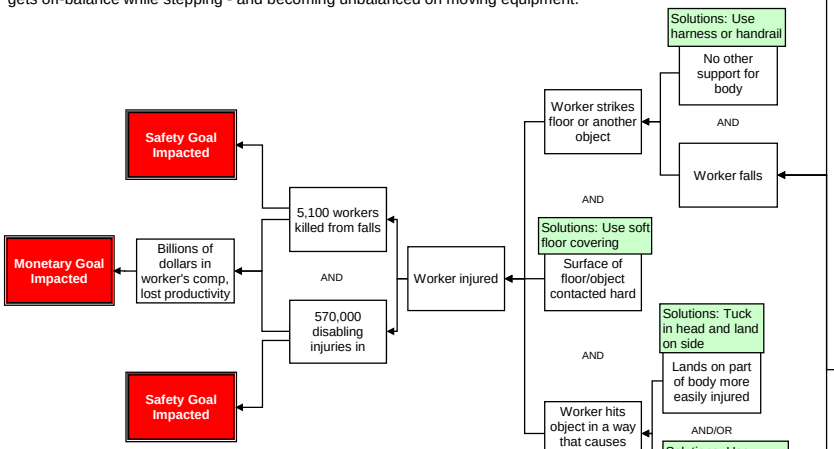
Slips, Trips and Falls: A Root Cause Analysis Primer

Slips, trips and falls happen every day. Falls are responsible for tens of thousands of deaths each year. (Slips and trips are considered a subset of falls, and are included in these numbers.) Falls on the job account for 12-15% of all worker's comp costs. The direct and indirect costs of workers injured and killed on the job are estimated to be billions of dollars each year, both in worker's comp claims and in lost productivity. In 1999, as an example, 5,100 workers were killed by falls and over 570,000 injuries were reported. However, there are many things that can be done to prevent and lessen the impact of falls. Performing a cause map - a visual root cause analysis - will allow us to identify all the potential causes of falls. A thorough root cause analysis built as a Cause Map can capture all of the causes in a simple, intuitive format that fits on one page. Once we've done that, we can identify all the solutions.

A worker is injured during a fall because the worker strikes the floor, or another object, and the object contacted is hard, and the worker hits in a way that causes injury. When I say that workers are injured becauese they hit an object in a way that causes injury, what I am really talking about is factors that worsen a fall, and make injury more likely. The worker could land on a part of his or her body that is more easily injured. Another way that injuries can be worsened is if a worker falls farther than his or her height (i.e., not a same-level fall).

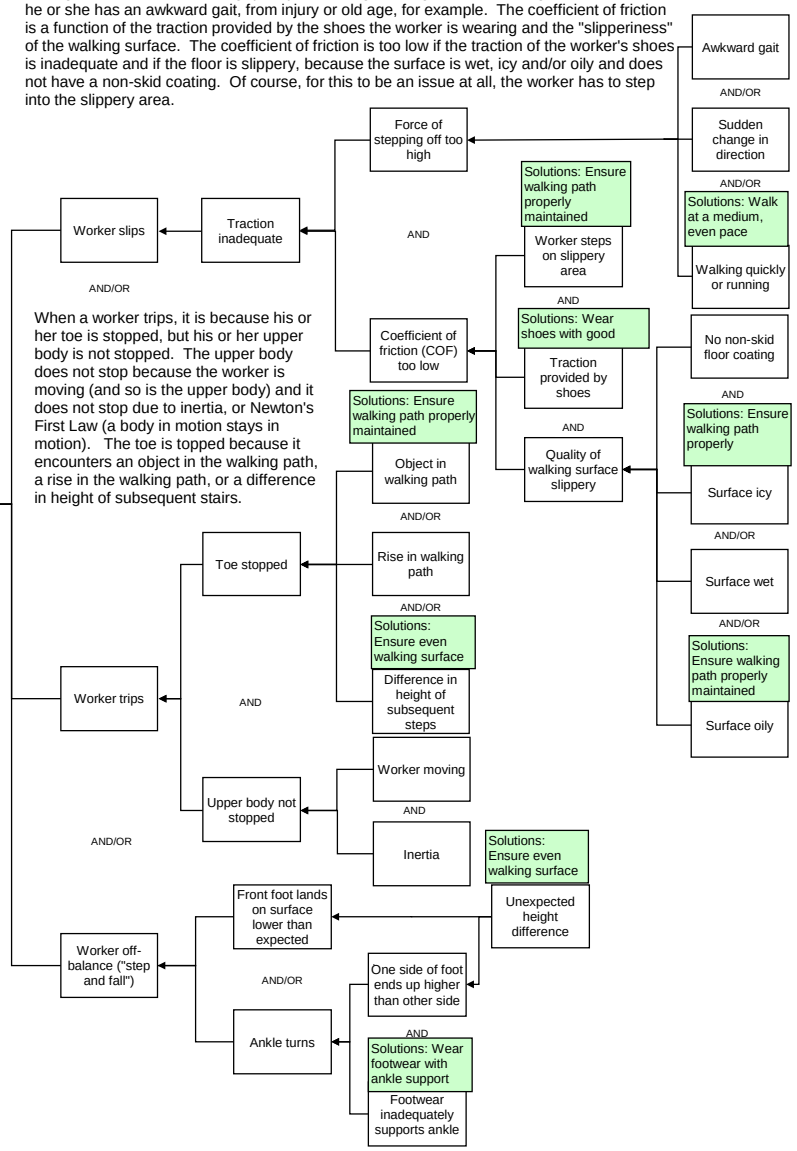
The worker strikes the floor or other object because he or she falls, and there is no other support for the body, such as a handrail, or a harness. There are four different ways to fall: slips, trips, the "step and fall" - where a person gets off-balance while stepping - and becoming unbalanced on moving equipment.



A worker can become off-balance by encountering an unexpected height difference (known as the "step and fall"). This occurs in one of two ways. Either the front foot lands on a surface lower than expected, or the ankle turns due to one side of the foot ending up higher than the other side, with footwear that inadequately supports the ankle. These are both due to an unexpected height difference.

A worker slips when there is inadequate traction, either because the force of stepping off is too high, or the coefficient of friction is too low. The force of stepping off can be higher than average if the worker is walking quickly or running, making a sudden change in direction, or if he or she has an awkward gait, from injury or old age, for example. The coefficient of friction is a function of the traction provided by the shoes the worker is wearing and the "slipperiness" of the walking surface. The coefficient of friction is too low if the traction of the worker's shoes is inadequate and if the floor is slippery, because the surface is wet, icy and/or oily and does not have a non-skid coating. Of course, for this to be an issue at all, the worker has to step into the slippery area.

When a worker trips, it is because his or her toe is stopped, but his or her upper body is not stopped. The upper body does not stop because the worker is moving (and so is the upper body) and it does not stop due to inertia, or Newton's First Law (a body in motion stays in motion). The toe is topped because it encounters an object in the walking path, a rise in the walking path, or a difference in height of subsequent stairs.



Cause Map
Detail Level

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Why?

Effect ← Cause

NOTE: Read the Cause Map from left to right with the phrase "Was Caused By" in place of each arrow.