

# Incident Hazard Animation Guide

## Description:

Suggestions and information about the recommended way to develop incident simulation on the virtual construction scene.

## Background:

As project work continues to become more refined it's important to consider the user's experience and how to animate in a way that furthers the team mission of effective safety training. Leap Motion's [VR Best Practices Guidelines](#) has an in-depth look on different VR user interface and interaction points and is worth reading. This document will be focusing on the best ways to animate the incident/hazards that the user will experience on site. It is important to incite emotion in the user because this will help them remember the training better, but simultaneously not make the graphics too visual or the haptics too jarring since this is a work application.

There are three things to consider for effective simulation:

1. [Place Illusion](#): the illusion of being in the virtual place
2. [Plausibility](#): the illusion that the events are really occurring
3. [Body Ownership](#): the illusion of ownership over the virtual body that is seen from first person perspective as visually substituting the person's own body.
  - a. Note that we can increase sense of body ownership even more through proper use of the haptic technology

## Incidents:

- Sever incident
  - Construction worker hit with pipe or other large object
    - The user should see the construction worker fall over
    - The haptics vest should lightly vibrate to connect the user to the feeling of impact on the construction worker
  - Construction worker falls from a great height OR Scaffolding/ladder collapses
    - Animate only part of the fall, not the worker hitting the ground
    - Before the construction worker would hit the ground, add in a scene transition
  - Trench collapses
    - Animate the dirt collapsing on the worker to the point where the worker is not see but do not show the worker being injured
    - The haptics vest should vibrate
- Other incident
  - Electric shock of user
    - Animate slight sparks. Make sure not to make the sparks too bright or move fast because the user could become disoriented or confused as to what just happened
    - The haptics should be a sharp vibration
  - Fall on wet surface
    - Develop it so that the surface is clearly wet and distinguishable from the dry part of the surface
    - Animate the construction worker falling to the ground, but with no serious injury

### **Things to avoid and consider:**

- Avoid animating falls relating to the user, the rapid motion that would be required could easily cause motion sickness or disorientation, and would happen too fast for the user to manage or learn from.
  - If you wanted to identify a hazard such as the user tripping over debris/liter on the site, this could just be shown through haptic vibration or just something the user has to identify.
- Minimize fade-to-black transitions as they can be disorienting, and take the user out of the virtual experience, reducing its overall effectiveness. There is more information and research on scene transitioning in the “VR scene transition best practices” document.