

7. The best accident-prevention techniques are analogous with the best quality and productivity standards.
8. Management should assume responsibility for safety because it is in the best position to get results.
9. The supervisor is the key person in the prevention of workplace accidents.
10. In addition to the direct costs of an accident (i.e., compensation, liability claims, medical costs, and hospital expenses), there are also hidden or indirect costs.<sup>5</sup>

According to Heinrich, these axioms encompass the fundamental body of knowledge that must be understood by decision makers interested in preventing accidents. Any accident-prevention program that takes all these 10 axioms into account is likely to be more effective than a program that leaves one or more axioms out.

### Heinrich's Domino Theory

Perhaps you have stood up a row of dominoes, tipped the first one over, and watched as each successive domino topples the one next to it. This is how Heinrich's theory of accident causation works. According to Heinrich, there are five factors in the sequence of events leading up to an accident. These factors can be summarized as follows:

1. *Ancestry and social environment.* Negative character traits that may lead people to behave in an unsafe manner can be inherited (**ancestry**) or acquired as a result of the **social environment**.
2. *Fault of person.* Negative character traits—**fault of person**—whether inherited or acquired, are why people behave in an unsafe manner and why **hazardous conditions** exist.
3. *Unsafe acts and mechanical or physical hazards.* Unsafe acts committed by people and **mechanical or physical hazards** are the direct causes of accidents.
4. *Accident.* Typically, accidents that result in injury are caused by falling or being hit by moving objects.
5. *Injury.* Typical injuries resulting from accidents include lacerations and fractures.<sup>6</sup>

Heinrich's theory has two central points: (1) Injuries are caused by the **preceding factors** and (2) removal of the **central factor** (an unsafe act or hazardous condition) negates the action of the preceding factors and, in so doing, prevents accidents and injuries.

### Domino Theory in Practice

Construction Products Company (CPC) is a distributor of lumber, pipe, and concrete products. Its customers are typically small building contractors. CPC's facility consists of an office in which orders are placed and several large warehouses. Contractors place their orders in the office. They then drive their trucks through the appropriate warehouses where the trucks are loaded by CPC personnel.

Because the contractors are small companies, most of their orders are also relatively small and can be loaded by hand. Warehouse personnel go to the appropriate bins, pull the material needed to fill their orders, and load the materials on customers' trucks. Even though most orders are small enough to be loaded by hand, many of the materials purchased are bulky and cumbersome to handle. Because of this, CPC's loaders are required to wear personal protective gear, such as hard hats, padded gloves, steel-toed boots, and low back support belts.

For years, CPC's management team had noticed an increase in minor injuries among warehouse personnel during the summer months. Typically, these injuries consisted of nothing worse than minor cuts, scrapes, and bruises. However, this past summer had been different. Two warehouse workers had sustained serious back injuries. These injuries were costly to the CPC both financially and in terms of employee morale.

An investigation of these accidents quickly identified a series of events and a central causal behavior that set up a domino effect that, in turn, resulted in the injuries. The investigation revealed that CPC's warehouses became so hot during the summer months that personal protective gear was uncomfortable. As a result, warehouse personnel simply took it off. Failure to use appropriate personal protective gear in the summer months had always led to an increase in injuries. However, because the injuries were minor in nature, management had never paid much attention to the situation. It was probably inevitable that more serious injuries would occur eventually.

To prevent a recurrence of the summer injury epidemic, CPC's management team decided to remove the causal factor—failure of warehouse personnel to use their personal protective gear during the summer months. To facilitate the removal of this factor, CPC's management team formed a committee consisting of one executive manager, one warehouse supervisor, and three warehouse employees.

The committee made the following recommendations:

- (1) Provide all warehouse personnel with training on the

### SAFETY FACTS & FINES

Failure to maintain power tools and machines can introduce hazards into the workplace. But just performing repairs and maintenance is not enough. Companies must also check to make sure that repairs and maintenance are performed properly. An improperly maintained or repaired machine can be dangerous. A company in Kenova, West Virginia, found this to be the case when leaky machines that were supposed to have been repaired released chlorofluorocarbons into the atmosphere. The company was fined \$20,460 by the Environmental Protection Agency (EPA) for failing to verify whether equipment leaks had been properly repaired.