

COMBINATION THEORY OF ACCIDENT CAUSATION

There is often a degree of difference between any theory of accident causation and reality. The various models presented in this chapter attempt to explain why accidents occur. For some accidents, a given model may be completely accurate. For others, it may be less so. Often the cause of an accident cannot be adequately explained by just one model or theory; thus, according to the combination theory, the actual cause may combine parts of several different models. Construction professionals should view these theories as being appropriate for both accident prevention and accident investigation. However, they should avoid the tendency to apply one model to all accidents.

Combination Theory in Practice

Crestview Construction Company (CCC) maintains four large warehouses for storing tools, equipment, and supplies. Since construction material and equipment generate fine dust and fumes, ventilation of the warehouses is important. Consequently, all of CCC's warehouses have several large vents. Each of these vents uses a filter similar to the type used in home air conditioners, which must be changed periodically.

There is an element of risk involved in changing the vent filters because of two potential hazards. The first hazard comes from unvented dust and fumes that can make breathing difficult or even dangerous. The second hazard is the height of the vents. Each warehouse has a catwalk that runs around its inside circumference near the top. These catwalks give employees access to the vents that are also near the top of each warehouse. The catwalks are almost 110 feet above ground level, they are narrow, and the guardrails on them are only knee-high. A fall from a catwalk would probably be fatal.

Consequently, CCC has well-defined rules that employees are to follow when changing filters. Because these rules are strictly enforced, there had never been an accident in one of CCC's warehouses—that is, until the Juan Perez tragedy occurred. Perez was not new to the company. At the time of his accident, he had worked at CCC for more than five years. However, he was new to the job of warehouse maintenance. His inexperience, as it turned out, proved fatal.

It was time to change the vent filters in Warehouse 4. Perez had never changed vent filters himself. He had not been in the job long enough. However, he had served as the required “partner” when his supervisor, Bao Chu Lai, had changed the filters in Warehouses 1, 2, and 3. Since Chu Lai was at home recuperating from heart surgery and would be out for another four weeks, Perez decided to change the filters himself. Changing the filters was a simple enough task, and Perez had always thought the “partner” concept was overdoing it a little. He believed in taking reasonable precautions as much as the next person, but in his opinion, CCC was paranoid about safety.

Perez collected his safety harness and four new vent filters. Then he climbed the ladder to the catwalk platform near the top of Warehouse 4 and strapped on his safety harness. Following procedure, Perez attached a lifeline to his safety harness, picked up the new vent filters, and headed for the first vent. He changed the first two filters without incident. It was while changing the third filter that tragedy struck.

The filter in the third vent was wedged in tightly. After several attempts to pull it out, Perez became frustrated and gave the filter a good jerk. When the filter suddenly broke loose, the momentum propelled Perez backward, and he toppled off the catwalk. At first it appeared that his lifeline would hold, but without a second person to pull him up or call for help, Perez was suspended by only the lifeline for more than 20 minutes. He finally panicked, and in his struggle to pull himself up, he knocked the buckle of his safety harness open. The buckle gave way, and Perez fell to the concrete floor, breaking his neck.

The accident investigation that followed revealed that several factors combined to cause the fatal accident—the combination theory. The most critical of these factors were as follows:

- Absence of the supervisor
- Inexperience of Perez
- A conscious decision by Perez to disregard CCC's safety procedures
- A faulty buckling mechanism on the safety harness
- An unsafe design (only a knee-high guardrail on the catwalk).

BEHAVIORAL THEORY OF ACCIDENT CAUSATION

The behavioral theory of accident causation and prevention is often referred to as **behavior-based safety (BBS)**. BBS has both proponents and critics. One of the most prominent proponents of BBS is E. Scott Geller, a senior partner of Safety Performance Solutions, Inc., and a professor of psychology. It is appropriate that Geller is a professional psychologist because BBS is the application of behavioral theories from the field of psychology to the field of occupational safety. According to Geller, there are seven basic principles of BBS:

1. Use intervention that is focused on employee behavior.
2. Identify external factors that aid in understanding and improving employee behavior.
3. Direct behavior with activators or events antecedent to the desired behavior, and motivate employees to behave as desired with incentives and rewards that follow the desired behavior.
4. Focus on the positive consequences that result from the desired behavior as a way to motivate employees.
5. Apply scientific method to improve attempts at behavioral interventions.