There’s an old saying that “accidents just happen.” Unfortunately, when accidents occur in the Army, our soldiers are seriously injured or killed. In training or combat, daily life in the military is dangerous. Safety mitigates these dangers and must be encouraged to our leaders and soldiers early in their introduction to military life.

Everyone shares the duty of making the job safer. Most training accidents don’t “just happen”; they’re preventable when leaders and soldiers focus on safety. We must teach safety in a way that breaks out of the normal methods we habitually use to discuss and think about it. For example, as most of us have experienced, the military accustoms its members to compulsory safety briefings in formations before a training event, mission or long weekend off. Although the briefings are necessary, the soldiers’ facial expressions show that many are not paying attention or taking the warnings seriously. Safety – and more importantly, the act of being safe – isn’t comprised of simply talking about safety, but rather thinking about it and taking action based on those thoughts or observations.

So how do our leaders and soldiers learn to take a more focused approach to safety? This article describes a mental model for teaching safety to our soldiers and leaders.

The ‘critical path to failure’

When an incident causes serious injury or death, an investigation to determine its root cause occurs. The investigation also determines key events that led to the incident and possible responsibility or culpability. These investigations also determine a critical point: was the accident preventable and, if so, why was nothing done to avoid it? Investigations normally use a deliberate method of tracing the series of events – either from the beginning to the end of the tragedy or systematically backwards – to develop a comprehensive understanding of the accident. This process, much like a television police drama, allows investigators and leaders to develop a clear picture of what happened through understanding the linkage and sequence of actions that created conditions for the accident.

In most cases, when an investigation concludes and the results are published, we find two key points: the accident was preventable and, had someone seen the warning signs and taken action, it could have been avoided. Understanding this chain of events requires viewing it as a path with several crossroads and alternative routes. On each path, conditions change and decisions or actions taken set a course for success or critical failure – i.e., disaster. The “critical path to failure” is the accumulation of events and negative actions that, when not identified or acted upon, creates the conditions for disaster. It serves as a mental model that focuses on looking for, identifying and understanding the events that lead to tragic accidents to prevent them. Achieving this end state requires visualizing and taking preventive actions to break the chain of events causing accidents.

This holistic approach requires leaders to see beyond isolated events that occur in training or combat. It also compels leaders to identify connections between actions and events that set the course conditions for poor decision-making. Many times mishaps occur because those involved or supervising fail to connect the dots. They
fail to see how taking no action on certain events creates conditions increasing the probability of a serious incident.

**Example**

Let’s examine the following situation to better understand the critical path to failure. A group of soldiers begins their day by going to a marksman range to qualify on their weapons. By the end of the day, one is dead and three are in the hospital. How did this happen? What turned a simple task into a day of tragedy?

By looking at the individual events occurring that day, a chain of events forms. First, the driver responsible for picking up the range detail overslept and arrived late to work. This mistake, by itself, seems quite harmless, but it sets off a chain of events and decisions within the unit, creating the conditions for disaster. Because the driver arrived late in the morning, the preparation and range setup scheduled to be complete by the time the main body of soldiers arrived was also running an hour behind schedule. Afraid the late start would cause the unit to look bad, the unit leader orders the range-detail supervisor to “hurry up and get more people out there to the range” so the unit is ready as soon as possible. The chain of events on the critical path to failure has now begun.

Instead of loading the five-ton truck, according to regulation, with 14 soldiers, the supervisor adds six more soldiers, totaling 20 personnel. More soldiers are now required to prepare the range for the unit on time, he reasons. After receiving several reprimands for his tardiness, the driver now feels pressured make up for his “costly mistake.” With the 20 soldiers loaded on the truck, he drives as quickly as possible to get to the range, ignoring the posted speed limits because he received orders “to get out there as quickly as possible.” While enroute to the range, the driver misjudges his speed—which is 10 miles greater than posted speed limit – and the truck’s ability to negotiate a turn. He loses control of the vehicle and flips the five-ton truck, ejecting half its occupants and pinning one soldier under the truck’s massive weight. The result is one dead, three in the hospital. Another unit has traveled along the critical path to failure.

**How could this happen? Simple, single, insignificant events – combined with other factors – sets off a chain reaction of risky actions, perceived pressure to deviate from appropriate procedures and poor decision-making.** In the case of this terrible accident, the truck driver’s tardiness set the underlying condition within the unit of increased pressure on all decision-makers. Leaders, in turn, placed unnecessary pressure on the personnel involved, leading to several poor decisions that further aggravated the situation. This is evident in the unit leader placing pressure on the range-detail supervisor to hurry up and get the range ready for the unit. The soldier receiving a reprimand from his superior, although warranted, then focuses on making up for his mistake. Thus, he drives fast rather than following safety protocols.

**As this chain reaction begins, anyone within the unit or chain of command should identify the various events occurring and take preventive action.** However, all stakeholders saw single events that occurred as separate actions without a link to other actions or decisions made that morning. They failed to look at all the events holistically and put the pieces together. **To do this requires developing a mental acuity and intuition to connect the dots – a mental model to train our minds and senses that can see when a path to failure is emerging and quickly take action.**

**Analyzing the critical path to failure**

Figure 1 depicts the various possible end states based on actions or variances taken along the path. Importantly, it also shows actions that will lead to catastrophe. Critical to this model is following the impact and flow of negative or risky actions. Poor decision-making or inaction compounds the situation, worsening overall conditions. Altering the path’s direction can occur if identifying the conditions and acting on them correctly happens early. The middle box on the diagram depicts the area along the path to failure where a proper action may deviate a unit or individual off the road to disaster or where, unchecked, an improper action will propel events along their destructive course.

As a mental model, understanding the concept can assist leaders and decision-makers in comprehending the correlation of the various factors at work. Then, by analyzing them together, leaders can anticipate possible
outcomes based on snapshot events. Why employ such a method? Because most post-accident investigations teach us the following key points:

• The incident or accident was preventable.
• Someone in the chain of command failed to take an action that could have prevented the accident.
• The indicators and warning lights were flashing but were not noticed or understood.
• Leaders and key personnel involved missed the warning signs and made poor decisions.
• Everyone knew better.
• No one connected the dots.

Teaching soldiers and leaders to think using the CPTF addresses these areas by building the mental sharpness of all individuals involved in training. CPTF teaches leaders to identify situations others may not and identify when actions or pressure are creating conditions that lead units to make poor decisions. It trains us to make smarter decisions or take appropriate actions by visualizing the possible results.

Teach a mental model

After watching my own unit conduct training and discussing safety with my cadre, I realized that the mental focus I wanted was missing in our approach to thinking about safety. The cadre knew the battle drills in case of an emergency and the requisite steps to take to mitigate risk in training by using composite risk management, but thinking critically about safety was challenging. I decided to try something different, avoid the normal emphasis on safety through standard briefings and talk about safety by introducing the CPTF model to the entire group.

My purpose was to get them to think about safety along a mental model rather than with a checklist mentality. A mental model explains the thought process involved in how something works. It establishes relationships between its various parts and a person’s perception regarding their actions and resulting consequences. Mental models are powerful tools because they can shape what we pay attention to and what we do.

One the greatest attributes to training a model is its impact on decision-making. The Army’s CRM process has drastic impact on reducing the amount of accidents in training and combat through a deliberate process of identifying risks and placing measures to mitigate them with varying control measures. The issue is how we influence decision-making during situations not covered in our CRM or accounted for as events unfold. What mental tool can we provide to those making decisions without the ability to foresee the consequences of those decisions? The CPTF model provides such a tool. It expands on cognitive capabilities to rapidly process varying actions and decisions that occur in time, establishes possible cause-and-effect relationships and identifies probable outcomes. When things appear normal, it causes us to question unknowns in situations that may occur. The result is individuals taking an extra second to think carefully and make well-informed decisions.

How do we teach the model to an organization and its individuals?

How to employ a new way of thinking

The first step in changing the organization’s approach to safety is through leader involvement and education. Teaching leaders to use critical thinking skills is a necessary task. It’s also important to instill a command climate that focuses on great training and safety while not confusing it with risk aversion. Subordinates shouldn’t think of safety as the commander’s pet peeve but rather as a fundamental principle of the entire organization, understood and embraced by all within the unit. To achieve this outcome, the commander must create the dialogue from the highest to the lowest level about thinking safely.

Don’t delegate

Within our unit, I personally conduct a formal safety stand-down discussion every quarter, where we apply the model with vignettes and lessons-learned over the previous quarter. I don’t delegate this responsibility because there’s nothing that makes a greater statement than the chain of command being personally involved. If it’s important to the command, then the commander should address it. To effectively educate unit members about the path to failure, leaders should gradually apply instruction within the processes they use to develop and execute
operations in both training and combat. This concept isn’t understood overnight and requires constant discussion and reiteration. A good method is to take a training- or mission-concept plan, along with a CRM matrix, and sketch out a possible CPTF.

This activity allows a commander and his subordinates to visualize possible outcomes they may not have planned for, as well as develop decision points and triggers based on possible warning signs and changing conditions. Figure 2 depicts applying the CRM with a CPTF model in preparing a squad live fire exercise. After reviewing the concept plan and the CRM matrix, we develop possible flow patterns that may create a CPTF. Possible conditions, unforeseen events and decisions that may turn a normal situation into a hazardous one receive further review so leaders and individuals are better prepared. This process is similar to the military decision-making process and wargaming the worst-case scenario in course-of-action development. It serves as a tool for all participants to make smarter decisions and take appropriate action when required.

![Figure 2. Analyzing a squad live-fire exercise using the CPTF model.](image)

### Safety a hallmark

In today’s complex environment, we need critical thinkers at all levels with a higher level of mental sharpness to identify risks and hazards so they can take appropriate actions. The only way for a unit to succeed in executing tough, realistic and safe training or to reduce the risk of accidents in combat is to provide the individuals conducting and supervising these operations with the tools they require to be safe and smart.

Accidents in the Army are preventable. They don’t “just happen,” but they do occur every day. The CPTF is one method of building increased mental capacity within an organization and its individuals. Safety is a hallmark of a good, disciplined unit. We should all strive to reduce the chance of losing or injuring a soldier due to unfortunate accidents.

**LTC Bryan Hernandez commands 3rd Battalion, 34th Infantry Regiment. He has served in various light and airborne infantry assignments in the United States and overseas, and has deployed several times during the global war on terror, serving as Combined Arms Assessment Team leader during Operation Enduring Freedom; G-3 plans officer during Operation Iraqi Freedom; and battalion executive officer, also during Operation Iraqi Freedom. His joint assignments include chief of plans in J-3 Plans and secretary of the Joint staff, both at U.S. Southern Command. His military education includes the Infantry Officer Advanced Course, Defense Language**
Institute, Brazilian Command and General Staff College (Rio de Janeiro, Brazil), U.S. Army Command and General Staff College and School of Advanced Military Studies. He holds master’s degrees in Latin American studies from the University of Alabama and in military arts and science from the School of Advanced Military Studies. The Bronze Star recipient is fluent in both Brazilian Portuguese and Spanish.