

Using the Underlying Factors to Analyze the Accident Process in Cold, Wet & Alive

by

Robert B. Kauffman, Ph.D.

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We took an early spring canoe trip and the trip didn't go exactly as planned. That trip is depicted in the video Cold, Wet, and Alive. The trip is examined using the underlying factors to help avoid injury, damage, or loss.

Robert B. Kauffman, Ph.D.
Professor
Dept of Kinesiology & Recreation
270 Cordts Building
Frostburg State University
Frostburg, MD 21532
e: rkauffman@frostburg.edu



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Overview – One approach used in studying the accident process identifies the human, environmental and equipment factors that contribute to the accident. Since the objective is to avoid accidents, most of these factors can be flipped or easily converted into factors used to analyze accidents. By identifying and addressing these factors, programmers and leaders conducting outdoor activities or for that matter any activity, are less likely to have an accident. *Cold, Wet, and Alive* is a movie with two parallel themes that complement each other. It is a movie about how you get hypothermia. The second track focuses on the accident process. It is a canoe trip that results in a hypothermic accident. Although it is technically a leaderless trip, it is easy to project a leadership role into the trip and to use the trip to illustrate trip planning principles in an effort to reduce accidents.

This handout breaks the accident factors into their human, environmental and equipment sub-factors. These factors are easily converted into trip planning skills. These factors can dovetail with barrier analysis where the categories become potential barriers. The text boxes in this handout apply the underlying factors specifically to *Cold, Wet, and Alive*.

1.0 HUMAN FACTORS:

Human factors are the underlying cause of most incidents. This is expected since people who are attempting to do things will often have problems associated with what they do. Human factors include what is going on physiologically within the body, the mental state of the individual, the knowledge, skills, and motivation of the individual, the group and the dynamics of the group, and the amount of and types of preparations made.

1.1 Physical or Physiological Capabilities/Stress – A physical or psychological capability is the body's capacity to handle the stress placed on it. For example, as people grow older, their coordination tends to become less responsive, their hearing and vision become impaired, they become more susceptible to fatigue than their younger counterparts. Using this as the base condition of the person, activity and the environment can also place a stress on these capabilities. Completing a hike is a stressor on the body. In general, an older person is more susceptible to this physical stress than a younger person. However, an older person in good shape and who has prepared himself is often better able to handle the stress than their younger counterpart who has more capabilities but less conditioning.

Prior to the Activity:

- proper conditioning
- restricted range of motion
- proper coordination
- age related issues (young and old)

During the Activity:

- fatigue due to increased physical exertion
- fatigue due to lack of rest
- fatigue due to sensory overload
- exposure to extreme temperatures (hypo/hyperthermia)

¹ Source: Kauffman, R., and Moiseichik, M., (2013). *Integrate Risk Management in Leisure Services*. Champaign, IL: Human Kinetic. ² *Cold, Wet, and Alive*.(1989). Fredericksburg, Virginia: American Canoe Association.

Prior to the Activity:

- hearing and vision deficiencies
- disabilities
- allergies
- prior injuries
- illnesses
- prescription or recreational drugs

During the Activity:

- inadequate food intake during the activity

In *Cold, Wet, and Alive*, at least three of the factors were present. First, there was ***exposure to temperature extremes*** (hypothermia/hyperthermia). Stated another way, the topic of the video was the accident process applied to hypothermia. However, it was not until late in the day after 4:15 p.m. when David became truly hypothermic. Second was ***inadequate food intake***. While the others in the group nibbled on food, David left his gas tank run low. Third, there was ***fatigue due to increased physical exertion***. This became evident at the lunch stop (4:15 PM) when David comments that “What I wanted to do more was to finish the trip and get warm.”

1.2 Mental or Psychological Capabilities/Stress – Most often these factors work in conjunction with each other, and in some cases, they can cascade in their effects. For example, poor decisions resulting from poor judgement leads to emotional overload. Emotional overload results from having too many decisions to make, inexperience which leads to confusion and emotional overload. In a sense, the dominos compound each other and build upon each other until finally an incident occurs that leads to injury, damage, or loss. Examples of mental or psychological capabilities include the following:

Prior to the Activity:

- inexperience
- fears and phobias

During the Activity:

- poor judgement
- poor decisions
- emotional overload
- extreme judgement/decision demands
- extreme concentration/perception demands
- confusing directions
- conflicting demands
- preoccupation with problems
- frustration

In the video *Cold, Wet, and Alive*, there were at least three of these factors present. First and second, there were numerous instances of ***poor judgement*** and ***poor decisions***. Some examples include not taking out at the lunch stop at 4:15 p.m., not leaving a car at the half-way point, David not eating, David and Michael not wearing the proper clothes. They did bring a “ton of clothes” with them which suggests good judgement. The decision making process at the lunch stop is an example of Jerry Harvey’s *Abilene Paradox*. Third, they were ***inexperienced***. This factor could be argued either way. David had practiced his Eskimo role, but it wasn’t reliable.

1.3 Knowledge – Most activities require a knowledge set to perform the activity. Does the leader and/or participant possess this knowledge set? Items relating to knowledge factors include:

Prior to the Activity:

- lack of knowledge about the subject matter
- inadequate orientation
- inadequate training (initial and updates)
- not knowing the accident process (i.e. All this stuff)

1.4 Skill – It is one thing to know what to do. It is another thing to be able to perform the task. Do the people involved in the activity have the necessary skill set to adequately perform the activity. Examples of skill factors include the following examples:

Prior to the Activity:

- inadequate initial instruction
- inadequate practice
- infrequent performance of activity
- inadequate skill level for the activity or setting

During the Activity:

- lack of coaching

In *Cold, Wet, and Alive*, the factor of ***inadequate practice*** may have been an issue with David. He practiced his roll over the winter (**adequate practice**). So he had some skill but he is by no means an expert. At 11:25 a.m., David indicates that he was not going to come out of his boat again, yet he is seen swimming several times in the video (**inadequate practice, inadequate skill level**).

1.5 Motivation – Cultural norms and their effect on motivation are easily overlooked. Yet, cultural norms can have a significant impact on facilitating accidents. Our society tends to be high achievement oriented and this is reflected in people’s activities. People seek to get to the top. They want to be the best at what they do. If they climb a mountain, They want to reach the top. If they start a project, they want to finish it. Examples of motivation factors include the following examples:

Prior to and during the Activity:

- improper attempt to save time or effort
- improper attempt to avoid discomfort
- cultural norms
- aggressive behavior
- passive behavior
- peer pressure

In *Cold, Wet, and Alive*, at least one motivational factor, ***cultural norms***, is in play. Consider David’s response to the group at the lunch stop when they asked him whether they should continue. His response was “We came to paddle”. Implied in his statement and in their behavior is their desire to complete what they started and run the river. To take out at the lunch stop which was the halfway point at 4:15 PM in the late afternoon was the equivalence of failure.

1.6 Leadership and Group Dynamics – Human factors focus on the group and group dynamics as well as on the individual. Examples of problems with leadership and group dynamics include the following examples:

During the Activity:

- mis-communications
- inappropriate leadership style
- cultural norms affecting group behavior
- organizational norms
- lack of experience
- lack of experience in a similar setting
- inappropriate goals
- trying to adhere to a schedule

In *Cold, Wet, and Alive*, at least three of the factors were present. First, the factor of ***inappropriate leadership style*** was potentially present. Although Dean was the defacto leader, the group was really leaderless. Second, the group had ***inappropriate goals***. Their goal of running the entire river turned out to be too much. Third, in the gorge where the group was fatigued and hypothermic, there is ***mis-communications*** when David mistakenly thinks that Dean was waving him on through the rapids. “Chalk it up to my dull brain” was David’s reflection of the scene.

1.7 Preplanning – Preplanning is synonymous with the program plan and the planning that you do for the activity. Examples of problems in preplanning include not having an adequate risk management plan, or inadequate planning for any of the human, environmental and equipment factors.

Prior to the Activity:

- inadequate or no risk management plan
- inadequate trip planning for the human, environmental and equipment factors

In *Cold, Wet, and Alive*, their preplanning was really faulty. Their entire trip is testimony to ***inadequate trip planning***. This includes not allowing appropriate time for the trip, or not leaving a car at the half-way point at the bridge.

1.8 Unsafe Travel Speed – Examples of problems in unsafe travel generally include traveling to fast or traveling too slow. Most people think of vehicles, however, it can include pedestrian travel also.

During the Activity:

- travel to fast
- travel to slow

In *Cold, Wet, and Alive*, a case could be made that the group was ***traveling to slowly*** although the group’s problem was less a problem of traveling to slowly than one where they bit off more than they could chew.

2.0 ENVIRONMENTAL FACTORS

Generally, environmental factors include terrain and weather conditions and changes that occur in weather or terrain. It also includes the impact of plants and animals. In addition, it is easy to think of environmental factors in terms of outdoor related activities. However, this need not be the case. A broken air conditioner, or an improper heating system can adversely affect an indoor program. Weather conditions and changes in weather conditions can affect all types of traditional programming. A heat wave can affect an outdoor concert, thunderstorms can affect pool events, or rain or snow can easily affect whether you can put on the event as planned. In *Cold, Wet, and Alive*, environmental factors have a major impact on the group.

2.1 Weather and Changes in Weather Conditions – Weather can easily affect both indoor and outdoor activities. It can cause the postponement of events due to in-climate weather. Conceptually, weather can be expanded to include indoor and other man-made environments. Air conditioning and heating created indoor environments and can have important considerations for groups such as the elderly. Insufficient long term heating can lead to long term or chronic hypothermia among the elderly.

<u>List Weather Conditions Here:</u>	<u>List Possible Changes in Weather Conditions Here:</u>
1)	1)
2)	2)
3)	3)
4)	4)
5)	5)

In *Cold, Wet, and Alive*, the weather factors had a major impact as did the changes in the weather, the next factor. It was a 70°F spring day. The weather front moved in earlier than expected and it began to rain.

2.2 Terrain Conditions and Changes in Terrain Conditions – The conditions of the terrain and surface of travel affect the activity. Most of the factors listed are self-evident. Also, consider urban and indoor environments. Playground standards include a discussion of acceptable (e.g. pea gravel, mulch, rubberize materials) and unacceptable surfacing materials (e.g. grass, asphalt, ground). Also, the standards include a discussion of trip hazards (National Playground Institute, 1994). Indoors, it includes the choice of rugs, tile, wood, or non-slip surfaces for surfacing. Not all surfacing materials are suitable in all situations. Also, the surfacing material affects the initial design of facilities.

Changes in terrain conditions include any changes in the terrain conditions, or a change in the intensity of the terrain conditions. The hiker comes to a river crossing. The river rises. The ocean waves and swells become bigger. If you are driving on a highway, bridges tend to freeze before the highway. The freezing roadway on the bridge is a changing terrain condition that can potentially create a hazardous situation.

In park design, changing the paving material is often used to indicate a changing situation such as an intersection, a stop sign, or a boundary. Groves along the side of the highway rumble when driving over them are also a positive application and example of the change in terrain.

List Terrain Conditions Here:

- 1) _____
- 2) _____
- 3) _____
- 4) _____
- 5) _____

List Possible Changes in Terrain Conditions Here:

- 1) _____
- 2) _____
- 3) _____
- 4) _____
- 5) _____

In *Cold, Wet, and Alive*, the group entered the gorge where the river dropped more quickly. The increase in gradient is a **change in terrain**. The group noted that the river was rising. Again, this is a **change in the conditions**.

2.3 Animals/Plants – The last environmental factor is animals and plants. Examples of problems with animals and plants include: jellyfish, sharks, poison ivy, or plants that cause allergies. In urban and indoor environments, mold, cockroaches, mice, and rats are common environmental problems associated with animals and plants.

List Animals/Plants that Might Pose a Problem Here:

- | | |
|----------|-----------|
| 1) _____ | 6) _____ |
| 2) _____ | 7) _____ |
| 3) _____ | 8) _____ |
| 4) _____ | 9) _____ |
| 5) _____ | 10) _____ |

3.0 EQUIPMENT FACTORS

Generally, equipment factors account for the fewest incidents. However, having the appropriate equipment is fundamental to creating a safe environment for the participants. If you are conducting a biking event, be sure to use biking helmets and not whitewater helmets. Again, make sure that the equipment you use is consistent with the common practices of your activity and industry.

3.1 Inadequate/Inappropriate Clothing – Examples of problems with inadequate or inappropriate clothing includes providing the body with proper thermal protection. This can include using a wetsuit/drysuit or other cold weather/water protection when needed. For a race car driver, this may include a flame retardant protective suit.

List Needed Clothing:

- 1) _____
- 2) _____
- 3) _____
- 4) _____
- 5) _____

List Specialized Clothing Needed:

- 1) _____
- 2) _____
- 3) _____
- 4) _____
- 5) _____

In *Cold, Wet, and Alive*, David dressed for the moment. Dean and Becky wore wetsuits. Although they all experienced some degree of hypothermia, David became hypothermic more quickly. A major contributing factor was the inadequate and inappropriate clothing that he wore.

3.2 Inadequate/Inappropriate Equipment – Use the equipment made for your activity and be careful whenever you use equipment designed for one activity that is different from the activity in which you are using it. The first group is a form of omission where you don't use equipment that everyone else does or which represents the common practices in your activity or industry. If everyone else has a cutoff switch on the electric kiln in a ceramics class, you might want to have one also. If you are on a backcountry trip three days out from the frontcountry and if everyone else has a satellite phone, you might want to consider investing in one yourself. If you are using the 1980s version of a piece of equipment, you might want to upgrade to the 2010 version, particularly if there are substantive improvements.

The second type of inadequate or inappropriate equipment is using equipment in ways for which it was not designed or using equipment designed for one type of activity in another activity. The previously mentioned use of a whitewater helmet is questionable when used in a bicycling event. Normally, you should use a bike helmet designed for use with bicycles, not a whitewater helmet.

List Equipment Needed:

- 1) _____
- 2) _____
- 3) _____
- 4) _____
- 5) _____

List Specialized Equipment Needed:

- 1) _____
- 2) _____
- 3) _____
- 4) _____
- 5) _____

3.3 Inadequate Maintenance/Wear and Tear – In accidents there is generally little or no excuse for using worn out equipment or equipment that hasn't been properly maintained.

Prior to the Activity:

- use of old or worn out equipment
- check for material fatigue