

# HUMAN FACTORS ANALYSIS AND CLASSIFICATION SYSTEM (HFACS)

The list of HFACS begin on page 2 of this document. HFACS replace what was known as causal factors in previous versions of WESS. HFACS involve an unsafe act with preconditions for that unsafe act. Think of it in these terms:

Unsafe act = “what happened”. Example – failed to yield right of way

Precondition = “Why did unsafe act happen”. Example – fatigue and slippery road surface

For PMV/GMV WESS, at least one factor is required for each mishap. Each factor will have one and only one unsafe act. For the selected unsafe act, the user will add all applicable preconditions. Multiple preconditions are allowed and at least one precondition is required for each unsafe act.

If the event involved more than one factor, additional unsafe acts may be added with the appropriate preconditions. An example follows of an event that has two factors:

Event involved a single car mishap. The driver was drunk and speeding.

Factor 1:

Unsafe Act = Drunk-driving ( $BAC \geq .08\%$ )

Preconditions for unsafe act

Stress

Lack of sleep

Inappropriate peer pressure

Factor 2:

Unsafe Act = Speeding 20–29 MPH over speed limit

Preconditions for unsafe act

Complacency

Overconfidence

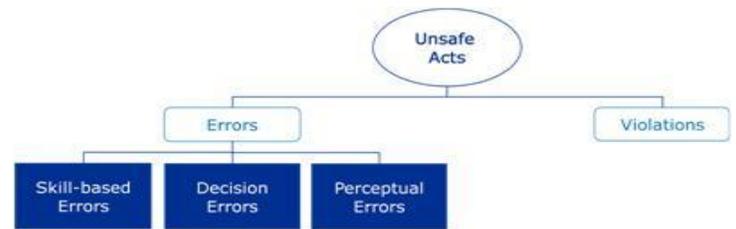
Misunderstood instructions

Note: Each factor has ONE unsafe act with multiple preconditions

There is one exception to the rule that requires at least one precondition for each unsafe act. If the unsafe act involved “Outside Influences”, then preconditions are optional. An example of an “Outside Influence” is “rear-ended by civilian PMV”. The user will see the list of “Outside Influences” on page three of this document.

The list of Unsafe Acts are on pages 2 and 3 of this document. The Preconditions are on pages 4 and 5. When ready to begin entering HFACS, click on the green plus sign on the factors page of the application.

# UNSAFE ACTS



## SKILL BASED ERRORS

Occur during highly automated tasks, often without thought;  
Vulnerable to attention, memory, and/or technique failures

### ATT – Attention Failures

1. Forgot to check blind spot
2. Forgot to use communication device (e.g. horn or turn signal)
3. Didn't keep eyes on the road
4. Inadvertent operation of wrong control (e.g. pressed gas instead of brake or put vehicle into reverse instead of drive)
5. Inadvertently drifted out of lane (*note: not due to falling asleep*)

### POS – Postural Error

1. Operated vehicle from an awkward position/posture

### TQ – Technique Error

1. Improper passing maneuver (e.g. passed without looking at the road situation – enough room, vehicle approaching, etc.)
2. Improper application of acceleration or brakes
3. Usual method of executing procedure is flawed/improper/imperfect
4. Failed to maintain a sufficient following distance (due to speed and/or distance between vehicles; *not due to misjudgment of distance or speed*)
5. Over-steered/overcorrected when avoiding collision
6. Over-steered/overcorrected when attempting to regain position on roadway
7. Failed to negotiate curve/turn/bend/ramp
8. Failed to negotiate lane change/passing maneuver

### TM – Timing Error

1. Reacted too slowly
2. Reacted too quickly

### LCU – lost control for an unknown reason

### SO – Other

## DECISION ERRORS

Chosen action is inadequate or inappropriate for the situation.  
“Honest mistake”, poor choice; often due to inadequate knowledge

### IP – Information Processing

1. Misinterpreted information

### PLA – Planning

1. Poor travel planning (e.g. starting a long trip at 2 a.m. or after being awake for a long period of time)
2. Selected a poor or unfamiliar route for travel (e.g. selected a route that was shorter, faster, etc.)

### PRI – Prioritization

1. Misplaced prioritization (e.g. swerved into traffic to avoid a small animal)
2. Ignored caution or recommendation (e.g. from a friend)
3. Wrong response to abnormal situation

### DPRO – Procedural Decision Error

1. Failed to give way/yield
2. Inappropriate behavior/maneuver
3. Improper passing or lane change (without adequate passing room, within a turn, in the oncoming traffic lane, etc.)

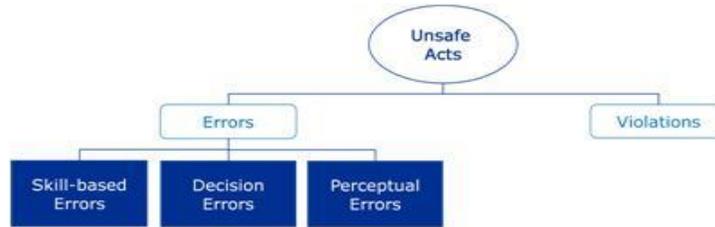
### SA – Situational Assessment

1. Failed to recognize hazardous conditions
2. Failed to modify behavior to protect against potentially hazardous conditions (e.g. decide to press on when tired)

### DPMV – Vehicular

1. Inadvertently exceeded capabilities of PMV
2. Inadequate loading/securing of items within PMV
3. Improper loading/securing of items on top of PMV
4. Poor maintenance of PMV (e.g. failure to change oil regularly)
5. Inadvertently used defective/inadequate PMV

### DO – Other



## PERCEPTUAL ERRORS

Degraded or “unusual” sensory input leads to an error

### PE – Perceptual Errors

1. Misjudged distance
2. Misjudged speed
3. Misjudged depth
4. Misjudged height
5. Misjudged surface conditions
6. Missed information due to degraded sensory input (e.g. sensory information led to misreading a sign or equipment)
7. Misheard traffic cue (e.g. horn) due to noise issues/degradation

### PEO – Other

## VIOLATIONS

Conscious decisions to bend/break existing rules/regulations

### VPRO – Procedural Violations

0. Illegal but unknown speed
1. Speeding 10–19 MPH over the speed limit
2. Speeding 20–29 MPH over the speed limit
3. Speeding 30–39 MPH over the speed limit
4. Speeding 40+ MPH over the speed limit
5. Illegal passing or lane changing behavior
6. Reckless/erratic operation of PMV
7. Racing with another vehicle
8. Excessive risk taking
9. Violation of training rules/laws
10. Disregard of traffic signals

### VKNO – Knowledge Violations

1. Operated PMV without a valid license/endorsement
2. Entry into unauthorized areas

### VDD: Drunk-driving (BAC ≥ .08%)

### VO – Other

## OUTSIDE INFLUENCES

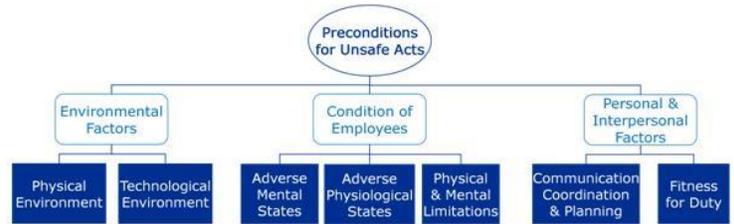
Causes completely outside the control of the military PMV operator;  
Often due to other drivers/riders not following safe road procedures

### OI – Outside Influences

1. Civilian PMV turned onto or entered roadway on which military PMV travelling
2. Civilian PMV changed lanes or merged while travelling the same direction on roadway
3. Civilian PMV turned off or exited roadway on which military PMV travelling
4. Civilian PMV failed to yield at intersection
5. Civilian PMV travelled in wrong direction/opposite direction of traffic; military PMV struck head-on by civilian PMV
6. Rear-ended by civilian PMV
7. Civilian PMV performed a U-turn in path of travel
8. ---
9. Civilian PMV operator intoxicated

### OIO – Other

# PRECONDITIONS



## PHYSICAL ENVIRONMENT:

Operational and ambient environment

### SC – Surface Conditions

1. Slippery road surface (e.g. due to ice, rain)
2. Debris on road surface (dirt/loose rocks, stick in road, etc.)
3. Inadequate maintenance of road surface/potholes or ruts

### VIS – Visibility

1. Inadequate visibility due to sun/sun glare, rain, snow, or fog
2. Inadequate visibility due to insufficient lighting
3. Obscured view of traffic due to interaction of vehicle and environment (e.g. obscured view of environment due small vehicle, like a motorcycle, travelling behind larger vehicle, like a truck or bus)

### MIS – Miscellaneous

1. Clutter/loose items inside vehicle
2. Congestion due to traffic
3. Noisy environment
4. Wind

### PHYO – Other

## PHYSICAL/MENTAL LIMITATION:

Situation exceeds capability

### ML – Mental Limitations

1. Pre-existing psychological disorder
2. Incompatible intelligence/aptitude
3. Not familiar with job performance standards
4. Limited experience/proficiency

### SD – Sensory Deficiencies

1. Visual limitations or deficiencies
2. Hearing limitations or deficiencies

### PL – Physical Limitations

1. Lack of competency
2. Lack of proficiency
3. Incompatible physical capabilities
4. Inadequate practice of skills
5. Musculoskeletal disorder
6. Inability to sustain body movement
7. Restricted range of body movement
8. Inappropriate height, weight, size, strength, etc.
9. Motor skill, coordination, or timing deficiencies
10. Substance sensitivities or allergies

### PMO – Other

## TECHNOLOGICAL ENVIRONMENT:

Vehicle and road environment

### PPE – Protective Devices on Road

1. Median: inadequate or missing
2. Guardrail: inadequate or missing
3. Traffic control: inadequate/defective or missing; poor location
4. Signs (informational/warning): inadequate/defective or missing; poor location

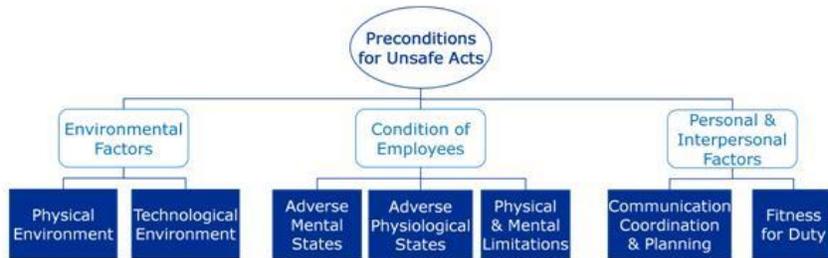
### TPMV – Vehicle

1. Defective or dysfunctional vehicle
2. Defective or dysfunctional vehicular equipment
3. Inadequately maintained vehicle/vehicular equipment

### DES – Design

1. Inadequate design of control systems/signs/displays
2. Inadequate road design (e.g. extremely curvy, too narrow, etc.)
3. Inadequate road gradient
4. Inadequate shoulder for road (e.g. missing or very narrow)
5. Inadequate placement of objects alongside the road
6. Inadequate ergonomic design/Poor man-system interface (in vehicle)

### TEO – Other



**ADVERSE MENTAL STATE:**

Mental condition affects performance

**A – Attitude**

1. Overconfidence/Lack of confidence
2. Get-home-it is
3. “It won’t happen to me” attitude
4. Complacency
5. Overaggressive
6. Frustration
7. Stress
8. Focus/attitude towards task

**AW – Awareness**

1. Attention: Inattention; Distraction; Channelized attention; Task fixation; Preoccupation with problems
2. Time pressure: perceived haste to complete task/rushing
3. Confusion
4. Boredom
5. Extreme concentration/perception demands
6. Inappropriate peer pressure

**AMF – Fatigue**

1. Mental fatigue (e.g. after a taxing workday; *note: differs from fell asleep*)

**PSY – Psychology**

1. Personality style
2. Pre-existing personality disorder
3. Fears or phobias
4. Emotional overload
5. Expectancy

**AMO – Other**

**FITNESS FOR DUTY:**

Mentally/physically prepared for duty

**FD – Fitness for Duty**

1. Inadequate rest requirements
2. Self medicating
3. Use of illicit drugs and alcohol
4. Hung-over
5. Inadequate nutrition/diet
6. Overexertion off duty
7. Lack of sleep

**FDO – Other**

**ADVERSE PHYSIOLOGICAL STATE:**

Medical/physiological condition

**PC – Physiological Condition**

1. Visual illusions
2. Impairment due to drugs or alcohol
3. Overexertion of physical activities

**MC – Medical Condition**

1. Medical illness
2. Dehydration
3. Inability to sustain body position
4. Previous injury or illness
5. Influenced by medication

**APF – Fatigue**

1. Physical fatigue (due to workload)

**INC – Incapacitation**

1. Fainted/passed out
2. Fell asleep

**APO – Other**

**COMMUNICATION & COORDINATION:**

Poor coordination/ communication among personnel

**COR – Coordination**

1. Failed to use all available resources
2. Lack of teamwork

**COM – Communication**

1. Ineffective/no communication methods
2. Misunderstood instructions (e.g. verbal training or written manuals)
3. Inadequate communication of hazards
4. Incorrect instructions provided
5. Inadequate knowledge transfer

**CCO – Other**