

CHAPTER 10 – CAUSE FACTORS IDENTIFICATION

References:

- A. James Reason (1990) *Human Error*; Cambridge UK, Cambridge University Press
- B. Wiegmann DA, Shappell SA (2003). *A human error approach to aviation accident analysis: The human factors analysis and classification system*. England: Ashgate Publishing Ltd

PURPOSE OF CAUSE FACTOR IDENTIFICATION

1. The purpose of FS occurrence investigation is to determine cause and contributing factors and to establish PMs that will reduce the likelihood of recurrence. Identification of cause factors assists with a comprehensive and thorough understanding of the reasons why an accident or incident occurred. The “why” is an essential step toward the ultimate goal of finding relevant and effective PMs.
2. The use of standardized cause factor terminology assists with tracking and examination of cause factors. Tracking cause factors helps to determine the effectiveness of recommended PMs. A common definition and categorization of cause factors allows data to be collected in the FS database for analysis; this facilitates analysis of not only individual occurrences, but also of cause factor trends and PM effectiveness across the full spectrum of CF air operations.

DEFINITION OF CAUSE FACTOR

3. A cause factor is defined as the presence or absence of an action, condition or circumstance that leads to a FS occurrence. Cause factors are assigned for FS purposes only, they do not assign blame and they do not need to be substantiated in the strict legal sense or be in accordance with QR&O 21.47 concerning causes of injuries or death for Pension Board purposes.

ASSESSMENT OF CAUSE FACTORS IN FS REPORTS

4. Cause factors derived from the CF Human Factors Analysis and Classification System (CF HFACS) will be assigned for all FS reports that involve human factors. For the Class I FSIR report, causal and contributing human factors will be stated in plain narrative form. DFS will then convert the plain narrative form to CF HFACS for recording in the FS database. For CR, SR, and ESR formats, CF HFACS cause factors will be recorded in the FS database. The final authority for cause factor assignment and publication is DFS
5. The recommended PMs should normally address all cause factors. Therefore:
 - a. Each cause factor will typically be associated with at least one corresponding PM;
 - b. A number of related cause factors may all be addressed by one PM, or
 - c. One cause factor may generate multiple PMs.

NOTE

It is rare that an assigned cause factor is not associated with a PM; however, a PM may not necessarily relate to any assigned cause factor.

NOTE

Any example given in this chapter for a specific condition does not exclude that other conditions were at play during the occurrence.

TYPES OF CAUSE FACTORS

6. There are six types of cause factors that are applied to CF aviation occurrences:
 - a. Personnel;
 - b. Material;
 - c. Environmental;
 - d. Operational;
 - e. Foreign Object Debris; and
 - f. Undetermined

PERSONNEL CAUSE FACTORS

DEFINITION PERSONNEL CAUSE FACTOR

7. A Personnel cause factor is an act of omission or commission by an individual or individuals or organization that lead to a FS occurrence.

BACKGROUND OF PERSONNEL CAUSE FACTOR CLASSIFICATION SYSTEM

8. There are many ways to define errors and to classify human factors. Prior to 2003 the FS Program used a different taxonomy for the assignment of personnel cause factors. On 1 January 2003, the CF adopted CF HFACS V1.0 to document personnel cause factors. Subsequently, V2.0 was implemented in 2007 and the current iteration, V3.0, in 2013. For statistical research, details of the old classification system can be obtained by contacting DFS 3.

IDENTIFICATION OF PERSONNEL CAUSE FACTORS

9. The FS investigator should identify the most relevant cause factors when investigating occurrences. The process of deciding which cause factors are most relevant can be subjective, requiring critical evaluation. Though there can be multiple cause factors identified, it is important to note that some of them play only a minor role and may not be a productive area of focus. Identifying too many cause factors can dilute the impact of those most important, while not identifying enough can neglect a vital causal component. The investigator will often have to balance between these two extremes. Notwithstanding this, if a cause factor leads to an effective PM, it shall be listed in the report.

10. It is important to ensure that the most significant Unsafe Acts and Latent Conditions are identified and investigated. What constitutes the most important contributory conditions is context-dependant. Making one Unsafe Act may increase the chances of making a subsequent one, so some Unsafe Acts simply follow sequentially from the ones before in what can be called an “error cascade.” Acts that initiate an error or deviation, or a cascade of either, may be more significant than those at the end of the sequence that are closer in time and space to the occurrence. Additionally, it is most likely that an error or deviation was facilitated by a Latent Condition that was even further removed in time and space from the initiating act that led to the occurrence. In sum, it is important to identify the conditions that:

- a. Initiated an unsafe act or sequence of acts;
- b. Had the greatest consequence in the occurrence; and
- c. Were central, causal and contributory to the event.

JUST CULTURE

11. As described in Chapter 1, the analysis of human factors in the FS Program is done solely to prevent future occurrences, not to assign blame. The promotion of a “just culture,” along with the accurate identification of critical human errors and suitable PMs will reduce the probability of reoccurrence.

12. A “just culture” lies between a non-punitive culture and one of sanction and punishment. A non-punitive environment is fundamental to a good reporting culture; however, negligence or a wilful, deliberate or malicious act shall not be tolerated by leadership. A “just culture” recognizes that certain circumstances may require punitive or administrative action in order to define the line between acceptable and unacceptable behaviour. Accordingly, acts that are negligent or of a wilful, deliberate or malicious nature may also need to be addressed outside of the FS Program. When investigators encounter this kind of situation, DFS shall be notified

13. When circumstances described above are present, the *Aeronautics Act* section 23 provisions may become active where the AIA may decide to give access to an OBR when “the public interest in the proper administration of the Canadian (Armed) Forces outweighs in importance the privilege attached to the OBR by virtue of section 22.” Of note, an OBR that is made available to a section 45 BOI may be used in other proceedings related to competence of any person subject to the Code of Service Discipline.

CF HFACS V3.0 DESCRIPTION

14. The CF HFACS is the method used by the FS investigator to categorize human cause and contributing factors. The system is based on the work of James Reason (Ref A) and Shappel and Wiegmann (Ref B). Since its 2004 introduction, the CF HFACS model has undergone two modifications with notable changes to the taxonomy, grouping of factors and factor definitions. The complete CF HFACS model is now significantly different than the Shappel and Wiegmann model.

15. DFS extensively studied current literature on HFACS modeling and working systems prior to introducing CF HFACS V3.0. The most significant observation from this study was that any human factors model generates classifications that are subjective in nature and express differences of investigator opinion. The problem is compounded by variances in investigators’

familiarity with the system. Consequently, different conclusions may be reached by different investigators or re-examination of an occurrence may not provide repeatable results. Therefore, HFACS data mining will not yield data that is scientifically beyond reproach, but rather data that provides a general understanding of those human factors involved in CF air operations.

16. Notwithstanding the above, the CF HFACS provides a taxonomy that analyzes and identifies, in general terms, the human element of an occurrence so that conclusions can be reached and PMs can be formulated. This endeavour is not a science with all its inherent certainty, but rather an art. The important point to the conduct of this analysis is not to document absolutely the HF involved in an occurrence, but rather to identify elements of the HFACS model that will aid in the determination of appropriate PMs.

17. The CF HFACS, referred to hereafter as HFACS, is divided into two major sections:
- a. First, the Unsafe Act covering the unsafe acts that lead directly to the occurrence; and
 - b. Second, the Latent Conditions covering the underlying conditions that influence or predisposed the Unsafe Acts to take place. Latent Conditions are categorized according to the source of the factors that influenced an Unsafe Act to take place or how it influenced those individuals who were contributory to the occurrence. They are divided into three groups according to:
 - (1) Personnel Influence
 - (2) Supervision Influence; an
 - (3) Organizational Influence

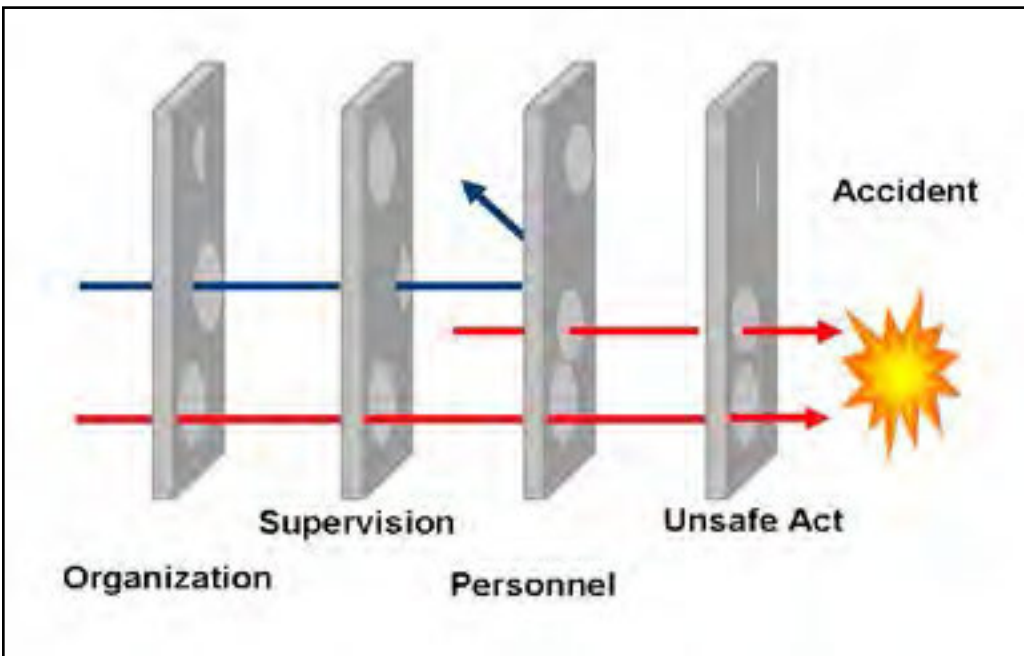


Figure 1: Reason's "Swiss Cheese" Model Applied to CF HFACS 3.0

18. The HFACS model is often referred to as a systems model, assuming that many elements of a system must interact successfully for efficient and safe operation. Accordingly, more than one aspect of the system is normally implicated when an unsafe event takes place. Thus, a FS occurrence can be conceptualised as a combination of issues at several levels of an organization where gaps in the defence layers line up like holes in Reason’s “Swiss Cheese Model,” Figure 1.

UNSAFE ACT GROUP

19. The Unsafe Act Group describes the actions or inactions of personnel who directly contributed to the occurrence. The most direct causes, or those most closely tied to an occurrence or safety of flight compromise are referred to as Unsafe Acts. Unsafe Acts tend to be close to the occurrence in both time and/or space, but they may also be distant from the event as well. For instance, an investigator determines that the unsafe act in a gear-up landing occurrence was the pilot’s omission to lower the landing gear while conducting the pre-landing check. Conversely, the investigator determines that the unsafe act in a near mid-air collision was ATC’s incorrect assignment of an altitude clearance; in this case the controller passed the instruction several hours prior to the occurrence and from an ATC installation far away. Occurrences may involve many Unsafe Acts since multiple or compounding actions or omissions can be directly causal to the occurrence.

20. The Unsafe Act Group is shown at Figure 2. It is broken down based on the intention of the individual and is divided into two categories:

- a. Error: When a planned or actual action did not go as intended; and
- b. Deviation: When an individual intentionally did not follow approved procedures and regulations.

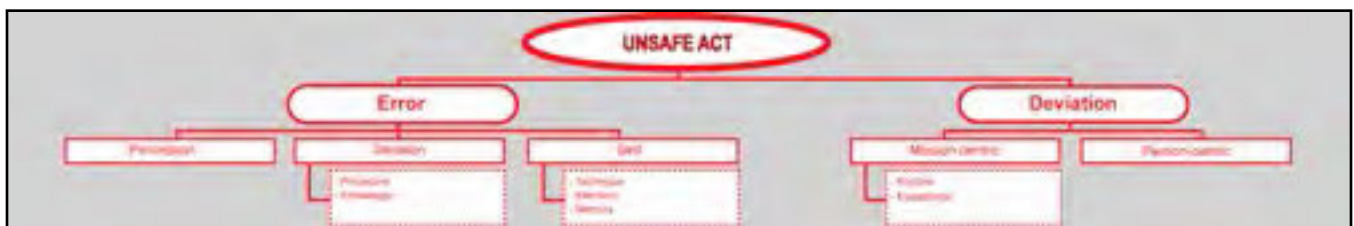


Figure 2 – CF HFACS Unsafe Act Group

ERROR CATEGORY

21. The Error Category refers to well-intentioned mental or physical actions, or inactions that were incorrect, that compromised safety of flight. It is often referred to as an honest mistake where the intended outcome differed from the actual outcome. The Error Category is divided into three sub-categories:

- a. Perception: A misperception of the situation, the occurrence happened due to the presence of this misperception;
- b. Decision: An inappropriate selection of a course of action; or
- c. Skill: A flaw in the execution of a course of action

NOTE

There is a clear distinction between an Error and a Personnel Pre-Condition. The latter consists of one or more latent conditions that increase the individual's vulnerability to err, such as when fatigue increases the chance of making an error or deviation.

Perception Sub-Category

22. The Perception Sub-Category refers to the erroneous conversion of physical stimuli into a meaningful understanding of a situation; this involves both sensing and interpreting sensory information. A mistaken perception of the situation that differs from reality can lead to errors. Perception may involve any or a combination of visual, auditory, olfactory (smell), touch, proprioceptive (relative position of parts of the body), or vestibular senses.

23. Perception is not a passive process and processing can be influenced by one's background, training, memory, and expectation. Perception requires that physical inputs are received by detectors (detection). These inputs either are or are not attended to depending on the situation, environment, the nature of the stimuli, and the mental and physical states of the individual (awareness). The inputs that are unconsciously selected for attention then undergo a complex process of human information processing (understanding).

24. Perception requires information processing and interpretation; it is strongly influenced by one's expectation and understanding of the current situation. In other words, humans tend to see what they expect to see. It is important for the investigator to ask "what did you think was happening?" Perception is also influenced by an individual's training, experience, interruptions, time pressure, fatigue, distraction, preoccupation, etc, includes misidentification of objects or signals, and non-detection of problems during inspection or monitoring steps, and is present if the occurrence happened due to its' presence. The Decision Sub-Category might apply if the individual could have been reasonably expected to anticipate and counteract the misperception, such as a pilot who does not use flight instruments in IMC or a technician who does not make sure his work area is sufficiently illuminated for the task

25. The Perception Sub-Category also relates to an individual who either does not detect elements of the environment accurately or who does not process information correctly, or when there is accurate detection and a conscious awareness of the elements of the environment but there is an erroneous interpretation of its meaning or significance. Examples of the Perception Sub-Category include:

- a. Spatial Disorientation: The inability of a person to determine his true position, motion, or attitude relative to the earth or his surroundings;
- b. Visual Cue: The false or unreal visual perception of reality. There are many different types of visual illusion, the most commonly known of which are the black hole, false horizon, or the height-depth misperception when flying over an area devoid of visual references;
- c. Auditory Cue: Not detecting an unusual engine noise or mistaking it with another engine malfunction;

- d. Olfactory Cue: Not detecting acrid smell of an electrical fire
- e. Proprioceptive Cue: Not detecting change in relative body position under G; and
- f. Vestibular Cue: An illusion of the balance senses caused by movement of vestibular fluids. A Somatogyral illusion (the leans) occurs during angular acceleration while a somatogravic illusion occurs during linear acceleration.

Decision Sub-Category

26. The Decision Sub-Category relates to an occurrence where a deliberate and conscious action was intended and executed as anticipated, but it did not achieve the desired outcome. Decision-making begins after conclusions have been formed about the situation (for example, perception takes place and then a decision is made). Decision-making is a function of relevant training and knowledge of the task, the system and operations. It is influenced by previous experience and proficiency. The Decision Sub-Category, then, may be evident during the assessment of the situation or may be present right from planning the action.

NOTE

It can be challenging for the investigator to evaluate the Decision Sub-Category since the optimal decision may not be known. The investigator should ask the witness what he was trying to do.

27. It is important to note that simply not achieving the desired outcome does not necessarily imply a mistake was made. Every plan has a process and an outcome. The process could be sound but circumstances beyond the control of the planner can lead to an undesirable outcome. Similarly, an inadequate plan could lead to a good outcome. The Decision Sub-Category is divided into two sub-sub-categories:

- a. Procedure; and
- b. Knowledge.

Procedure Sub-Sub-Category

28. The Procedure Sub-Sub-Category relates to the incorrect application of a procedure despite correctly detecting and understanding the situation. Personnel tend to look for a pattern in a given situation and normally apply a pre-learned problem-solving action set. Often, choosing to carry out the correct procedure is based on the level of training and experience. For many situations there is a set response based on rules, SOPS, checklists, CFTOs, etc. The Procedure Sub-Sub-Category is present when the selected response to the situation was inappropriate. Examples of the Procedure Sub-Sub-Category include:

- a. Misdiagnosed Situation: A normally good procedure is used in a situation for which it is not appropriate, e.g. the decision to takeoff after a pilot received a communication from ATC that was interpreted incorrectly as a takeoff clearance would be an application of a good rule set (correct takeoff procedures) that does not match the situation (takeoff without clearance);

- b. Unrecognized or Ignored Situation: The appropriate procedure is not applied, e.g. a warning indicator is noted, but the decision is made to not apply the checklist procedure (failure to apply a good rule set); and
- c. Suboptimal Procedure Applied: The situation is diagnosed correctly, but the selected action is flawed. Of note, the individual may not realise the procedure is flawed. This flawed rule set may have worked many times in the past, but on this occasion the flaw makes a difference. Application of a “bad” (suboptimal) rule set is often referred to as a bad habit, e.g. a technician that bends the tips of wires out of the way rather than cutting them off.

Knowledge Sub-Sub-Category

29. The Knowledge Sub-Category relates to when, in the absence of a set procedure, an original solution is applied that is not suitable for the situation. There are many situations that may be new to the individual and require an original solution rather than applying a pre-learned solution. The situation must be assessed and a choice must be made by drawing from knowledge to consciously find a solution. When combined with well-developed procedures, effective training and relevant experience the likelihood of an individual applying an unsuitable solution is lowered. There are no routines or rules involved in knowledge-based performance; slow and conscious thought is involved in these situations. New or unfamiliar tasks, unusual modifications or hard-to-diagnose system faults are typical circumstances that can lead to errors in knowledge. Examples of the Knowledge Sub-Sub-Category include:

- a. Knowledge or Information: A lack of knowledge or missing information concerning the task, mission, tactics, systems, orders, directives, procedures, checklists, etc, interfered with optimal decision making; and
- b. Problem Solving or Risk Management: Reasoning and risk management processes are needed to develop a proper course of action. If these processes are not employed properly then a Problem Solving or Risk Management element may be present. For example, the bias and thought processes that shape the way individuals process information (e.g. confirmation bias is the tendency to interpret information in a way that confirms one's preconceptions) may lead to an incorrect course of action.

Skill Sub-Category

30. The Skill Sub-Category relates to an occurrence where an individual performed a routine action that did not go as planned. Skill-based behaviours are automated routines that require very little conscious attention. Once they are learned, control to non-conscious habit sequences is delegated. Therefore, skill-based acts consist of pre-set, rehearsed action patterns such as riding a bike.

31. While the Decision Sub-Category relates to when the intended course of action is flawed, the Skill Sub-Category relates to when the execution of the action is flawed. If there is no intent to act then the action may still be a learned automatic reaction and could also be classified within the Skill Sub-Category, such as, the reflex of a fixed wing pilot who is learning to accelerate a helicopter by raising collective, but inadvertently moves the collective like advancing his fixed-wing throttle and moves the collective down by mistake and this results

in unintended deceleration. Skill-based behaviour is vulnerable to a variety of human factors; often there will be associated issues of attention (distraction), memory (missed items on a checklist), forgotten intentions, or, particularly, a lack of proficiency .

32. The Skill Sub-Category includes performing a task in the wrong sequence or using an inappropriate technique, tool, equipment, control or switch, etc. It also includes performing a task with a subtle lack of finesse (e.g. a hard landing may occur despite the application of correct technique but still be suboptimal). When one has not learned or practiced the skill adequately, skill-based performance will suffer (lack of appropriate training or a deficiency in proficiency or currency). The Skill Sub-Category is divided into three sub-sub-categories:

- a. Technique;
- b. Attention; and
- c. Memory.

Technique Sub-Sub-Category

33. The Technique Sub-Sub-Category relates to an individual performing a task with workmanship, mechanical skills or any other aspect of operation that is below the level expected from an individual of their level of training and task experience. These are often linked to proficiency , training and currency deficiencies. Examples of the Technique Sub-Sub-Category include:

- a. Inappropriate or Poor Technique: E.g. overcontrol, undercontrol, lack of appropriate visual scan technique, inadvertent activation or operation or non-operation of a pump or lever, unsuitable handling of a delicate component, using the inappropriate tool or equipment, etc;
- b. Timing of Response: E.g. control inputs initiated too early or too late to correct for crosswind on landing; and
- c. Finesse: Lacking delicacy or subtlety in performance of an action or skill. The individual's technique included correct elements but the overall performance was suboptimal.

Attention Sub-Sub-Category

34. The Attention Sub-Sub-Category relates to when an individual has difficulty maintaining attention and it compromises the safety of the task. Deterioration in attention can be the result of maintaining sustained attention to one task to the exclusion of others, overload by too many elements of one or multiple tasks, or stress, whether self-imposed or external. Conversely, it can be difficult to sustain attention when under-stimulated, such as when conducting an automated routine like driving to work when you intended to go a different route to get groceries. Examples of the Attention Sub-Sub-Category include:

- a. A technician attempts to complete a repair task while pre-occupied with stressful family problems and commits a mistake;
- b. The wandering mind of a radar controller monitoring an inactive screen over a long period of time causes him to miss a lone radar contact; and

- c. A pilot channelized attention on a minor emergency to the detriment of proper aircraft control.
- d. Un-Noticed condition such as a pilot not recognizing a hand signal or a technician not noticing a missing documentation entry; and
- e. Negative transfer such as when an individual reverts to a highly learned skill routine used in a previous system or situation.

Memory Sub-Sub-Category

35. The Memory Sub-Sub-Category relates to when an individual does not remember, or recalls incorrectly, information that is required to complete a task. A memory lapse can be either detected immediately by the individual or remain undetected. Memory functions are very susceptible to interruption and distraction. Examples of the Memory Sub-Sub-Category include:

- a. Information Recall when one knows but cannot bring to mind at that moment, such as the name of a particular switch;
- b. Information Store such as when one loses place in a series of actions, e.g. forgetting a checklist item; and
- c. Automatically performing actions without remembering them, e.g. having no memory of performing a routine maintenance or pre-flight action

DEVIATION CATEGORY

36. A Deviation refers to an act that is intentionally carried out in contradiction of approved procedures, rules or regulations. A Deviation may be done for many reasons. Most Deviations are deliberate departures from procedure, rules or regulations made with the best of intentions; the person intends to deviate from procedure with the goal being consistent with the task, e.g. taking a “short cut” to get the job done faster. The decision not to abide by rules is influenced by motivation, context and social factors. There is often a cost-benefit consideration in which a shortcut or modification appears to save time, make the task easier, or more efficient

37. The difference between a Deviation and an Error can at times be blurred, particularly since not following a procedure may be the result of a simple mistake. The principle difference between a Deviation and an Error is the intent of the individuals involved in the occurrence. A Deviation is an intended departure from the norm or procedures, whereas an Error is not.

38. A Deviation does not necessarily indicate an inadequate performance. On occasion, it may be difficult to do a job without deviating from the accepted norm. The Deviation may be the symptom of deficient, conflicting or insufficient rules, organizational problems or flawed procedures and regulations, and may point to an important FS issue with respect to those rules or regulations. The rule or regulation may be the primary issue rather than the action by the individual or team. The Deviation may have been recognized, assessed and sincerely determined by the individual to be the best course of action.

39. The Deviation Category relates to the motives that drove the actions of the individual and is divided into two sub-categories:

- a. Mission-Centric; and

- b. Person-Centric.

Mission-Centric Sub-Category

40. The Mission-centric Sub-Category relates to a deviation with the intent of ultimately achieving the mandate of the task at hand keeping in mind the best interests of the CF, e.g. a pilot flies under a bridge to avoid cloud in order to complete a SAR mission or a technician uses amended procedures in order to expedite the turnaround of aircraft. Mission-centric Deviations can at times include actions that are entirely appropriate under specific circumstances, such those listed in the B-GA-100 National Defence Flying Orders.

41. The Mission-centric Sub-Category is divided into two sub-sub-categories:
- a. Routine; and
 - b. Exceptional.

NOTE

A Routine and Exceptional Deviation is differentiated primarily by whether the act is the norm within the organization (Routine) or is inconsistent with the culture or norms of the organization (Exceptional).

Routine Sub-Sub Category

42. The Routine Sub-Sub-Category relates to the organization's common and accepted use of an unapproved procedure to complete a task; inherent in it is the supervisor's awareness and tolerance of the unapproved procedure's use. It is often referred to as "bending the rules." Routine deviations normally have related latent conditions involving supervisors at multiple levels of the organization. It is important to consider that the Routine deviation may at times be a sign of a problem with rules and regulations rather than the supervision, culture, or structure of the organization. Routine deviations may require investigation of the supervisory chain or the unit culture to determine the extent of the acceptance of the behaviour. Examples of the Routine Sub-Sub-Category include:

- a. Routine "Workarounds" or Shortcuts: Sometimes it is not possible to get the job done effectively by following the rules or the rules seem unnecessarily lengthy or laborious, e.g. an inspection procedure may call for multiple time-intensive steps to be done in sequence. In order to optimize the inspection, the steps are usually conducted all at once rather than sequentially at this particular unit. The "shortcut" version of the procedure may lead to missing a critical item and damage or injury; and
- b. Lack of Time or Resources: An act intended to optimize time or resources but still get the job done, e.g. a crew on a busy squadron decides to skip a mission pre-brief so that they can meet their takeoff time and this is done regularly by other crews.

Exceptional Sub-Sub-Category

43. The Exceptional Sub-Sub-Category relates to a unique or isolated departure from established rules or regulations in order to complete the task. The deviation is totally unusual for that organization and is isolated to specific individuals. The Exceptional deviation is neither sanctioned nor condoned by supervisors, leadership, or peers. Conversely, supervisors, leadership or peers may be unaware of the exceptional deviation. The Exceptional Sub-Sub-Category should be assigned only when an Error has been ruled out, e.g. flying an aircraft beyond operating limits even with a valid operational reason could be, depending on the context, an Exceptional Deviation if it was done deliberately; however, if flying outside the operating limits was not intended, the act is an Error. Examples of the Exceptional Sub-Sub-Category include:

- a. Ad-hoc Workarounds: E.g. a technician replaces a damaged part with another similar yet unapproved one in order to get the aircraft serviceable;
- b. A technician knowingly conducts an unapproved repair action by not following the CFTO; or
- c. A crew intentionally exceeds aircraft limits during a training flight to complete the mission within the scheduled timeframe.

Person-centric Sub-Category

44. The Person-centric Sub-Category relates to a deviation contrary to established procedures based on personal motives, gains or goals; this type of deviation can be said to be discordant. The Person-centric Sub-Category involves reckless, wilful, or negligent behaviour or misconduct that may be carried out to demonstrate perceived prowess or skills. The discordant action may or may not be condoned by supervisors or peers. Examples of the Person-centric Sub-Category include:

- a. An impromptu air show at low level to show off personal flying skills; an
- b. Skipping procedural steps in order to leave work early for a social engagement.

<p>NOTE</p> <p>The Person-Centric Deviation is very rare in a professional organization.</p>

<p>NOTE</p> <p>When aware that a Person-Centric Deviation has taken place, the FS Investigator shall notify DFS so that a decision about engagement with the chain of command is coordinated concerning a separate investigation; the scope of the FS Investigation may be modified at this stage. The FS Investigator shall at no time provide to the chain of command any evidence that is privileged under the <i>Aeronautics Act</i>.</p>
--

LATENT CONDITIONS

45. Latent Conditions describe a broad spectrum of underlying conditions that predispose individuals to commit Unsafe Acts. In fact, Unsafe Acts are only a small part of the causal picture of an occurrence. Once Unsafe Acts are identified and categorized, the next step is to find out why they occurred. The “why” will normally be found within their Latent Conditions.
46. There could be a few or many Latent Conditions influencing an occurrence, an often they interact with one another, e.g. mental fatigue is a pre-condition that can increase susceptibility to another pre-condition such as emotion, which in turn can lead to an individual compromising safety of flight
47. Establishing Latent Conditions encourages the investigator to consider factors beyond the Unsafe Acts attached to an occurrence. Latent Conditions can be recent or longstanding and may have a direct or indirect influence on the occurrence. Some latent conditions may appear quite removed from the occurrence, but they may also have a strong role in causation that is extremely important. They often lead to the production of very effective, pertinent and worthwhile PMs.
48. Latent Conditions are divided into three different groups:
- a. The Personnel Influence Group describes the working and personnel condition and personnel practices that influenced personnel in an occurrence
 - b. The Supervision Influence Group describes the supervisory aspects involved in an occurrence; and
 - c. The Organizational Influence Group describes the roles and influence organizations in an occurrence.

PERSONNEL INFLUENCE GROUP

49. The Personnel Influence Group covers conditions, excluding those related to Supervision and the Organization, that predisposed occurrence personnel to commit an unsafe act. The Personnel Influence Group is shown at Figure 3 and is divided into three categories
- a. Personnel Condition: Describes individual factors that had a direct influence on personnel;
 - b. Work Environment: Describes the surrounding job elements that personnel were confronted with while on-task; and
 - c. Team Practice: Describes how personnel interacted with each other during the planning and conduct of the occurrence task or mission.



Figure 3 – CF-HFACS Personnel Influence Group

PERSONNEL CONDITION CATEGORY

50. The Personnel Condition Category describes factors that had a direct influence on personnel and is divided into three sub-categories:

- a. Mental State;
- b. Physiological State; and
- c. Professional Status.

Mental State Sub-Category

51. The Mental State Sub-Category relates to psychological conditions that adversely affect performance. A deficiency in mental preparedness can reduce cognitive performance; in this sense, cognitive refers to mental processes such as attention, perception, and reasoning. The Mental State Sub-Category is divided into five sub-sub-categories

- a. Mental Fatigue;
- b. Personality;
- c. Emotion;
- d. Attitude; and
- e. Mental Limitation.

Mental Fatigue Sub-Sub-Category

52. Mental Fatigue occurs when the safety of a task is compromised by an individual's low alertness or cognitive impairment usually associated with prolonged mental activity or stress. Many aviation tasks require individuals to process large amounts of information in a short period of time and to do this on a continuous basis, leading to a condition referred to as acute fatigue. The long-term demands of sustained operations can also degrade an individual's performance, which is referred to as chronic fatigue. Mental fatigue can manifest itself both as somnolence (decreased wakefulness) or a general decrease of attention and performance, not necessarily including sleepiness. Examples of the Mental Fatigue Sub-Sub-Category include:

- a. An inexperienced Air Traffic Controller deploys to an operational airfield and overwhelmed by high traffic density during a long shift, consequently delivering an invalid clearance; and
- b. A Squadron Commander suffers a "burn-out" during a period of prolonged deployed operations.

Personality Sub-Sub-Category

53. The Personality Sub-Sub-Category relates to a person's enduring and consistent character traits that affect the individual's ability to perform the task safely. An individual's personality may affect their performance, decision-making, or communication and should not be confused with the transient Emotion or Attitude Sub-Sub-Categories. An individual's drive, hesitancy, overconfidence, ego or stubbornness, etc, can impede their ability to safely complete a task. Examples of the Personality Sub-Sub-Category include:

- a. An authoritarian aircraft captain matched with a submissive co-pilot in a multi-crewed aircraft creates a breakdown of cockpit communications that leads to a missed ATC clearance and subsequent airspace violation; and
- b. An aggressive maintenance supervisor who is not satisfied with maintenance results of the inexperienced crew is causal to the crew's omission of a maintenance check.

Emotion Sub-Sub-Category

54. The Emotion Sub-Sub-Category relates to the individual's compromised ability to perform the task safely due to a strong emotional response. Certain strong emotions, such as anger, frustration, sadness or happiness, may influence their ability to perform safely. Examples of the Emotion Sub-Sub-Category include:

- a. An angered technician who was chastised by his supervisor performs a pre-flight inspection and misses a component unserviceability; and
- b. A pilot frustrated with a recently announced posting carries out a maintenance test flight and records as serviceable an element of the flight when it was not.

Attitude Sub-Sub-Category

55. The Attitude Sub-Sub-Category relates to the individual's compromised ability to perform the task safely due to a negative or positive belief, feeling, value or disposition to act in a certain way. Examples of Attitude Sub-Sub-Category include:

- a. Expectancy: People function with a mental framework or model of the situation they are in. This mental framework can create an expectation of what will happen next. When an individual's expectation of what is going to occur interferes with the processing of the actual environmental cues (what is actually taking place) expectancy is said to occur. Expectancy can predispose one to illusions and other information processing errors. Expectancy is generally part of a subconscious process of building mental models of the world so humans can function efficiently, e.g. a pilot carry out a pre-flight inspection sees a switch in the off position, when it is on;
- b. Motivation: There are several aspects to motivation, including peer pressure, pride, misdirected motivation, inadequate or excessive motivation and hidden agenda. Misdirected motivation may include replacing the primary goal of a mission with a personal goal, or losing the "big picture" to focus on a subtask, e.g. a SAR pilot proceeds with the rescue mission when weather conditions are below acceptable minimums;
- c. Complacency: Complacency refers to a rare attitude in which a person knows they are not employing the mandated care and attention to a task but believes this makes no difference. When an investigator suspects complacency, the investigation should focus on why an individual's impression of contentment or satisfaction with a situation or procedure existed, and why it interfered with the assessment of a hazard or taking action, e.g. a maintenance crew not wearing proper protective equipment;

- d. Overconfidence or Overaggressiveness : Too great a reliance on one's own skills, team or equipment, e.g., a macho pilot performs aggressive manoeuvres when the mission does not call for it;
- e. Can-do Attitude: Overestimating one's own or crew's ability to perform a task, e.g. an aircraft commander accepts a mission even though he and his crew are completely fatigued due to previous taskings; and
- f. Pressing or Haste: A type of misplaced motivation relating to time pressure, e.g. a crew pressing in marginal weather in order to return to home base (get home-itis).

NOTE

Situation awareness (SA) does not appear in the CF HFACS taxonomy. Although situation awareness is often discussed in aviation, the concept is very broad and ill-defined. For instance, geographical awareness (knowing where you are on a map) is a subset of SA that might describe what happened, but not why. The focus of a human factors investigation should be on the factors that lead to "loss of SA" or the "inability to achieve SA." Contributory issues often include reduced attention, workload, fatigue, time stress, inadequate proficiency or experience and many physiological states. Finding these contributing factors will guide the PM selection.

Mental Limitation Sub-Sub-Category

56. The Mental Limitation Sub-Sub-Category relates to limitations in the faculty of consciousness and thought of the human brain that impair an individual's ability to perceive and process the information required to safely complete the task. This may refer to limitations common to most people in general, or to a specific individual. Examples of the Mental Limitation Sub-Sub-Category include:

- a. Human Capability Exceeded: The demands of the task exceeded the capability of the typical person. Humans have given limitations with respect to amount or complexity of data that can be processed, e.g. an excessively long and complicated approach clearance may be misinterpreted; and
- b. Limited Aptitude: Inability to execute a mental task. The cognitive challenges involved with managing multiple tasks can result in either incomplete or inaccurate processing of information. Specifically an individual may have difficulty absorbing or processing a variety of information, adequately acquiring or remembering new information or lapsing in the recall of past experiences, e.g. the ATC controller's inability to maintain aircraft separation was due to the loss of air picture resulting from his not being capable of handling more than three contacts and this aircraft was the fifth contact

Physiological State Sub-Category

57. The Physiological State Sub-Category relates to the physical capacity or medical conditions that impair performance.

58. Certain physiological and medical conditions can predispose the individual to adverse reactions and inaccurate sensations in an aviation environment. Important physiological conditions that can have a catastrophic influence on performance include spatial disorientation, illusions, G-induced loss of consciousness (G-LOC), almost loss of consciousness (A-LOC), hypoxia, and physical fatigue. Further, there are numerous occupational health, pharmacological, and medical circumstances that can influence performance. The Physiological State Sub-Category refers to predictable and normal human performance limitations or the capability specific to an individual to carry out a task in that the task requirements may exceed the capabilities of the individuals involved. If the task exceeds the capabilities of many individuals, then human-machine interface or aspects of the task itself should be examined. If the task exceeded the capability of one specific individual, then examination of the tasking assignment, supervision, training or selection of standards, etc, may be necessary.

NOTE

Consult with a flight surgeon before assigning any
Physiological State cause factor.

59. The Physiological State Sub-Category is divided into six sub-sub-categories:

- a. Medical Condition;
- b. Toxicological Exposure;
- c. Physical Fatigue;
- d. Physiological Effect;
- e. Physical Limitation; and
- f. Physiological Preparation.

Medical Condition Sub-Sub-Category

60. The Medical Condition Sub-Sub-Category relates to any medical illness or injury condition identified by a qualified medical professional or any direct, secondary or residual pharmacologically-induced effects from prescribed medication that compromised the individual's ability to perform the task safely. This includes mental illness determined when an individual meets diagnostic criteria for a personality, psychological or psychosocial disorder. Consultation with a Flight Surgeon should be undertaken before assigning this sub-sub-category. Examples of the Medical Condition Sub-Sub-Category include:

- a. A pilot flying with an ear infection suffering from spatial disorientation; and
- b. A maintenance technician operating specialized machinery while taking prescription medication that makes him drowsy.

NOTE

Non-prescribed, recreational, and homeopathic supplements are categorized in Physiological Preparation.

Toxicological Exposure Sub-Sub-Category

61. The Toxicological Exposure Sub-Sub-Category refers to exposure to a dangerous substance that degraded the performance and compromised the individual's ability to perform the task safely. Consultation with Preventative Medicine or a Flight Surgeon should be undertaken before assigning this sub-sub-category. Examples of the Toxicological Exposure Sub-Sub-Category include:

- a. A technician exposed to fumes in an aircraft fuel tank is injured after collapsing; and
- b. A loadmaster becomes drowsy from carbon monoxide emitted from an unattended external aircraft power unit while he is loading an aircraft.

Physical Fatigue Sub-Sub-Category

62. The Physical Fatigue Sub-Sub-Category refers to non-mental fatigue. The source and kind of fatigue, whether acute or chronic, can vary greatly. It may be due to a lack of quality sleep or circadian rhythm changes, a build-up of sleep debt, or excessive physical effort to complete a work task. Examples of the Physical Fatigue Sub-Sub-Category include:

- a. Inability to sleep in an unairconditioned tent prior to reporting for a night flight and
- b. A weapons loader drops a manually loaded weapon after loading 40 other similar weapons without proper rest between loads.

Physiological Effect Sub-Sub-Category

63. The Physiological Effect Sub-Sub-Category refers to medical effects resulting from the flight environment that compromised the individual's ability to perform the task safely. Examples of Physiological Effect Sub-Sub-Category include:

- a. Motion Sickness: Sickness caused by exposure to movement, e.g. flight simulator, etc;
- b. Acceleration Effect: Relative incapacitation caused by application of positive or negative G, e.g. grey-out, black-out, G-LOC, A-LOC;
- c. Decompression Sickness (DCS): Also known as the 'bends,' DCS symptoms follow exposure to a reduced atmospheric pressure, e.g. an aircraft with failed pressurization system, a hypobaric chamber run, or scuba diving;
- d. Hypoxia: Hypoxia is an inadequate supply of oxygen to the tissues. Generally in aviation the hypoxic effect on the brain is most important and includes a potentially insidious and dramatic decrease in coordination, memory and

judgement. This can happen following an aircraft depressurization or a malfunction of an oxygen regulator;

- e. Hyperventilation: Hyperventilation is a rapid rate of respiration that decreases carbon dioxide and causes symptoms of anxiety, dizziness and decreased performance. Hyperventilation can be caused by anxiety, motion sickness, pain, high ambient temperatures, hypoxia, etc; and
- f. Trapped Gas Disorder: A trapped gas disorder is an expansion or compression of gas contained in closed and semi-closed cavities of the body that may lead to severe sinus pain, eardrum pain or perforation, lung rupture, or bowel discomfort. This can be caused by aircraft ascent or descent or loss of cabin pressurization, and can rapidly change the volume of gas held in closed areas of the body.

Physical Limitation Sub-Sub-Category

64. The Physical Limitation Sub-Sub-Category relates to any human physical limitation that impairs an individual's ability to perform a task safely, e.g. size, strength, dexterity, mobility, task-specific physical fitness level, psychomotor skills, or other biomechanical limitation
Examples of Physical Limitation Sub-Sub-Category include:

- a. Anthropometric Limitation: E.g. body weight, arm reach, eye-height;
- b. Visual Limitations: E.g. visual acuity, color vision, contrast sensitivity;
- c. Auditory Limitation: E.g., hearing acuity, speech discrimination;
- d. Motor Skill Limitation: E.g. coordination or reaction time is inadequate, "poor hands and feet coordination;" and
- e. Strength Limitation: E.g. the inability of a helicopter pilot to fly with a hydraulic flight control system malfunction

Physiological Preparation Sub-Sub-Category

65. The Physiological Preparation Sub-Sub-Category relates to self-generated physical or mental stress or an unreported medical condition that impairs performance and ability to complete the task safely. Each individual is expected to arrive at work ready to perform at optimum levels, but there are many factors that may cause performance to suffer. Additionally, Physiological Preparation deals with aspects of physical or mental preparation that are typically under the individual's control. Sometimes Physiological Preparation has associated rules and regulations, but much of the time it involves personal habits or judgement; it includes the self-evaluation of fitness to work with respect to illness. Examples of the Physiological Preparation Sub-Sub-Category include:

- a. Poor Physical Fitness: Fitness in terms of a regular exercise program or a physically active lifestyle to meet task requirements;
- b. Inadequate Rest: The individual did not rest appropriately after an extreme physical work out prior to reporting for a maintenance shift;

NOTE

Lack of sleep and “jet lag” from crossing several time zones or shift work can lead to either acute or chronic fatigue.

- c. Unreported Medical Condition: An individual performs a task or mission with a known but unreported medical condition, e.g. flying with a cold or upper respiratory tract infection; and
- d. Inappropriate Consumption: Self-imposed stresses such as poor nutrition, consumption of alcohol, dehydration, recreational drugs, supplements or self-medication (including over-the-counter drugs) that result in degraded performance. Examples of Inappropriate Consumption include:
 - (1) A technician shows up for work without having eaten breakfast, and faints while working on an aircraft;
 - (2) A pilot is legal to fly, but latent effects of alcohol impaired his performance; and
 - (3) An ATC controller is impaired by over-the-counter cold medication.

NOTE

Inappropriate Consumption could, in certain circumstances, constitute a Deviation.

Professional Status Sub-Category

66. The Professional Status Sub-Category covers the qualifications, currency, and proficiency of the individual to carry out assigned duties; it is divided into three sub-sub categories as follows:

- a. Qualification
- b. Currency; and
- c. Proficiency.

NOTE

Professional Capability issues are often related to Supervision issues.

Qualification Sub-Sub-Category

67. The Qualification Sub-Sub-Category relates to the level of training or qualification standard provided to, or demonstrated by, an individual not being appropriate for the safe conduct of the assigned task. Examples of the Qualification Sub-Sub-Category include

- a. A pilot training syllabus that did not cover night unaided approaches to unprepared surfaces;
- b. A technician performed a maintenance task for which he was not qualified; an

- c. A newly qualified pilot on type using inappropriate automated procedures on fully automated aircraft.

Currency Sub-Sub-Category

68. The Currency Sub-Sub-Category relates to a lack of recent task experience that led to the erosion of skill and knowledge. Normally, this currency status translates in a number of hours or sequences to be completed per month, quarter or year. Examples of the Currency Sub-Sub-Category include:

- a. A pilot who did not complete the required number of quarterly instrument flight hours experienced an occurrence while flying in IMC; and
- b. A flight engineer did not carry out the requisite number of maintenance actions to maintain his annual certification

Proficiency Sub-Sub-Category

69. The Proficiency Sub-Sub-Category relates to an individual who is qualified and current but is not sufficiently competent or skilled to conduct the task safely or efficiently. Examples of the Proficiency Sub-Sub-Category include

- a. A fully qualified and current pilot descended below MD during an instrument approach; and
- b. A fully qualified air traffic controller who just returned from leave provided conflicting flight instructions that caused a near mid-air collision

WORK ENVIRONMENT CATEGORY

70. The Work Environment Category relates to the working conditions and immediate environment affecting the occurrence personnel. This category is divided into three sub-categories:

- a. Documentation;
- b. Technological; and
- c. Physical.

Documentation Sub-Category

71. The Documentation Sub-Category relates to publications, rules, regulations, orders, policies, instructions, standard operating procedures, forms, informal guidelines, safety procedures, checklists, etc, or lack thereof, that contributed to an occurrence. This includes not just the content of procedures or regulations, but also the format and ability to convey information of documents, charts, maps, manuals, computer applications, and other automated systems. The content and organisation or physical arrangement of documents or computer applications can impede an individual's ability to perform safely and effectively. In order to achieve optimal operations, it is important to ensure that procedures are feasible and practical. The Documentation Sub-Category is appropriate when provided information is unclear or inadequate. Examples of this condition include:

- a. A manual is wordy and difficult to understand
- b. A checklist layout is difficult to use
- c. A publication uses confusing symbology;
- d. An approach chart is cluttered;
- e. An operations manual content is not presented in a rational way;
- f. A CFTO describes a procedure in unclear terms or lacks detailed step by step instructions; and
- g. A touch down zone on an approach plate is incorrectly depicted.

NOTE

When the Documentation environment is a contributing factor the investigator should look closely at the Organizational Influence (typically in the Resource or Management areas), especially if policy or higher level guidance is at play.

Technological Sub-Category

72. The Technological Sub-Category relates to tools used to perform a task or to the interaction of the individual with that equipment. Technological issues may involve the design of equipment and controls, display or interface characteristics, confusion between automation modes, and automation. Equipment or vehicle design can influence performance when size, shape, arrangement, location, compartment space or other physical aspects of equipment negatively affect performance. Automation can include the function, reliability, use, guidance, symbology, logic or other aspects of automated systems that can influence performance

73. The conditions of the Technological Sub-Category create circumstances in which an individual is forced to “make do” or adapt to the equipment, thus increasing the potential for error. The Technological Sub-Category is divided into two sub-sub-categories:

- a. Equipment Suitability; and
- b. Equipment Design.

Equipment Suitability Sub-Sub-Category

74. The Equipment Suitability Sub-Sub Category relates to equipment that is unsuitable for the task or impedes the individual’s ability to perform the task safely and effectively. Examples of the Equipment Suitability Sub-Sub-Category include:

- a. An unapproved vehicle is used as a tow vehicle; and
- b. An unauthorized tool is used for a given maintenance activity.

Equipment Design Sub-Sub-Category

75. The Equipment Design Sub-Sub Category relates to design, layout, control interface or automation of the equipment where an individual is unable to or has difficulty accessing or processing information, rendering the completion of the task unsafe. Poor conceptual design of computer-based systems can have a profound impact on human performance. Examples of the Equipment Design Sub-Sub-Category include:

- a. A software design that does not allow the operator to trouble shoot an aircraft malfunction; and
- b. A display screen colour that is not compatible with NVGs and reduces the operator-machine interface in night operations.

Physical Sub-Category

76. The Physical Sub-Category includes workspace elements that impede the completion of the task. The Physical environment can adversely affect vision, hearing, physical ability or information processing, e.g. vision might deteriorate due to poor lighting, smoke, haze, adverse weather, dust, etc. Further, mental processing can be impacted by noise, vibration, temperature, etc. The use or non-use of Personal Protective Equipment may be a factor. The Physical Sub-Category is divided into two sub-sub-categories:

- a. Climate; and
- b. Workspace.

Climate Sub-Sub-Category

77. The Climate Sub-Sub-Category refers to exposure to climatic conditions, potentially also in the confines of a cockpit or hangar, that impede the ability of the individual to perform the task. Conditions applicable to the Climate Sub-Sub-Category include:

- a. Temperature;
- b. Cloud;
- c. Precipitation;
- d. Wind or Turbulence;
- e. Density Altitude;
- f. Lightning; and
- g. Visibility.

Workspace Sub-Sub-Category

78. The Workspace Sub-Sub-Category refers to an inadequate work area that physically influences the safe completion of a task. The work area includes the cockpit, hangar, flight line, office, lab or other workspace where an individual performs a task. Examples of the Workspace Sub-Sub-Category include:

- a. The poorly marked propeller danger zone allowed the civilian contractor to walk in front of an engine propeller;
- b. The inadequately lit workbench prevented the technician from noticing an equipment failure; and
- c. The flight line ambient noise level prevented good communications between the pilot and technician.

TEAM PRACTICE CATEGORY

79. Team Practice Category relates to deficiencies and breakdowns identified within the team in preparation for and during the execution of a task. In the context of this category, the term “team” refers to the interrelationship within a crew and those personnel immediately involved with that crew during the occurrence. All phases of air operations and maintenance require successful teamwork. An effective team must be appropriately constituted, should make use of the knowledge, skills and abilities of all members involved and build on the interactions among them. It assumes that someone will effectively lead the team and that the team members will support and execute their roles as assigned. Deficiencies and breakdowns in human performance in military aviation (HPMA) can impact an individual or worse, the team performance. The Team Practice Category is divided into two sub-categories:

- a. Planning; and
- b. Command and Control (C2).

Planning Sub-Category

80. The Planning Sub-Category refers to a failure at any stage of the task to collect information, analyze it, and integrate it within the activities of the team; to perform deliberate and contingency planning; or to properly risk assess, thus compromising the safe completion of the task. It may involve personnel actively conducting a task or supporting personnel and external agencies. It refers to all activities done by those intimately involved with the occurrence. This sub-category covers not just the pre-task planning but also the ongoing assessment and adjustment of the plan during task execution. Examples of the Planning Sub-Category include:

- a. A loadmaster does not inform the AC of a change in cargo weight; and
- b. A tow crew chief does not assign specific positions to his tow crew.

Command and Control (C2) Sub-Category

81. The C2 Sub-Category relates to any command and control activities that hinder safe task completion. It includes poor communication or coordination among a crew or between different crews or other organizations, such as ATC, maintenance, or support staff interfaces that may be involved in the occurrence. This sub-category covers all elements of interpersonal interrelations (HPMA, etc.) related to the execution of the task. Examples of the C2 Sub-Category include:

- a. Leadership: Detrimental aspects such as an ineffective crew climate, not establishing and maintaining an accurate and shared understanding of the evolving task, or poor distribution of duties;
- b. Communication: Verbal, written, or visual communication that results in misspoken, misread, misheard, incorrect, or otherwise misunderstood communications within the team. This includes miscommunication of critical information, use of non-standard or imprecise terminology, inappropriate challenge/reply/acknowledgement, inadequate shift turnover, inadequate log entry, e.g. an ATC controller does not brief his incoming replacement;
- c. Performance Monitoring: Not monitoring crew or performance, assisting or providing back-up when needed, e.g. inadequate monitoring of the flying pilot by the non-flying pilot during an instrument approach or inadequate supervisory assistance provided to the apprentice technician during an aircraft repair; and
- d. Authority Gradient: Inadequate communication of critical information due to a lack of persistence or assertiveness by a subordinate to a superior. This authority gradient exists in crews with members of mixed rank, age, qualification experience, etc. Though the authority gradient is inherent in our organizations, how it is handled determines its role in mission outcome, e.g. a young co-pilot is afraid to warn his unit CO, who is at the controls, of the impending aircraft stall.

SUPERVISION INFLUENCE GROUP

82. The Supervision Influence Group of conditions relates to methods, decisions, policies or implementation of doctrine used by the supervisors within the unit's chain of command and how this influenced and predisposed the occurrence personnel to commit one or more unsafe act. Supervisors often have a substantial influence on the Unsafe Acts committed by the occurrence personnel. Supervisory conditions may lie dormant or undetected for long periods but still contribute to an occurrence sequence of events.

NOTE

Standards, evaluation and testing, and work relating to staff functions of the headquarters are typically captured in the Organizational Influence Group of Latent Conditions

83. The Supervision Influence Group is shown at Figure 4 and is divided into four categories:

- a. Planned Activity;
- b. Level of Supervision;
- c. Problem Correction; and
- d. Supervisory Deviation.



Figure 4 – CF HFACS Supervision Influence Group

PLANNED ACTIVITY CATEGORY

84. The Planned Activity Category relates to when the supervisor’s assessment of hazards or resource provisioning hinders the individual’s or team’s ability to conduct its task. Good supervisors assess risks appropriately and plan and supply the resources needed for task completion. The Planned Activity Category is divided into three sub-categories:

- a. Risk Assessment;
- b. Planning Beyond Capability; and
- c. Provision of Resources.

Risk Assessment Sub-Category

85. The Risk Assessment Sub-Category refers to when a supervisor who does not adequately evaluate the risks associated with the task, misjudges the crew pairing, or misjudges other factors affecting the performance of the individual or the crew. Examples of the Risk Assessment Sub-Category include:

- a. A unit CO authorized a mission manned with an unqualified crew without conducting a risk assessment; and
- b. A maintenance shift supervisor who approved a non-standard aircraft repair.

NOTE
 This sub-category applies to those actions before a task is executed; actions that apply during task execution apply to the Level of Supervision Category.

Planning Beyond Capability Sub-Category

86. The Planning Beyond Capability Sub-Category refers to when supervisors knowingly allow or authorize personnel to undertake a task beyond their ability, training, or qualification; the limitations of their equipment; or the limitations of their working environment etc. The analysis of these factors should reasonably have raised safety concerns in the mind of the supervisor. Examples of the Planning Beyond Capability Sub-Category include:

- a. A supervisor allowed an inexperienced ATC to control two busy active runways;
- b. A supervisor misjudged the impact of an unrealistic work tempo and caused a fatigued technician to work on an aircraft;

- c. A supervisor authorized a pilot who has lost his night qualification to lead formation at night; and
- d. A supervisor directed crews to alternate too frequently between day and night shifts.

Provision of Resources Sub-Category

87. The Provision of Resources Sub-Category applies when the task is planned without proper manning and resources or when the composition of the crew is inadequate for the task at hand. Inadequate provision of support to meet basic individual needs and normal comfort such as food, water, heat, appropriate quarters, adequate work environment, etc, are part of this category. It also relates to the inadequate provision of training in terms of quality, quantity or timeliness within the span of the supervisor's control. Examples of the Provision of Resources Sub-Category include:

- a. A supervisor assigns fewer aircraft than the mission called for, resulting in a task overloading of the assigned aircraft or the aircraft being overloaded to exceed weight limitations;
- b. A supervisor fails to schedule NVG training prior to a night operational deployment; and
- c. A supervisor tasks a tow crew with less than the minimum number of personnel.

LEVEL OF SUPERVISION CATEGORY

88. The Level of Supervision Category relates to inappropriate supervision or a lack of guidance, oversight, or training, etc. Supervisors at all levels should provide leadership, sound professional guidance, oversight, training opportunities, constructive feedback, motivation and be a positive role model to ensure that work is done safely and effectively. The Level of Supervision Category is divided into two sub-categories:

- a. Leadership; and
- b. Local Policy.

NOTE

This also applies to the inadequate identification and control of hazards and risk while the task is underway; if the task is in the planning stage hazard and risk recognition control fall under the Planned Activity Category.

Leadership Sub-Category

89. The Leadership Sub-Category relates to when the chain of command's availability, competency, and timeliness of decisions negatively affect the safety of the assigned tasks. Inadequate leadership includes poor supervision, weak oversight and lack of guidance by supervisory personnel within the unit of occurrence. Examples of Leadership Sub-Category include:

- a. Inadequate Communication: An inaccurate exchange of information or a style or tone of interaction that interferes with an individual succeeding at a task. This can include personality conflict, incorrect information, inadequate feedback or handover based on quality or timeliness, and miscommunication of intent, e.g. an ATC supervisor confronts a ground controller regarding his performance, causing the ground controller to miss an important radio call; and
- b. Inadequate Oversight or Guidance: Relates to a supervisor's unavailability, inadequate performance tracking, low proficiency, insufficient qualifications, expired currency, invalid authorizations, improper inspection of work, etc, for the personnel under their control, e.g a check pilot pressures an aircraft captain to continue an instrument approach after the overshoot was initiated.

Local Policy Sub-Category

90. The Local Policy Sub-Category relates to the efficiency of local guidelines, policies, etc, or lack thereof, in terms of quality, quantity, dissemination or updating that is under the control of the supervisor to provide, that influence the safe conduct of the task. Examples of the Local Policy Sub-Category include:

- a. Local ramp procedures not covering known conflict between taxing aircraft and ramp inspection crew;
- b. A new piece of ALSE is fitted to an aircraft and although everyone is briefed on its use, no formal record of the training is made; and
- c. Cadet glider summer camp ramp procedures not being published, resulting in numerous runway incursions by personnel and vehicles.

PROBLEM CORRECTION CATEGORY

91. The Problem Correction Category refers to instances when deficiencies concerning individuals, equipment, training or related safety areas are known to the supervisor, yet are allowed to continue uncorrected. This includes instances when a supervisor does not take the time to identify individuals who exhibit risky behaviour or unsafe tendencies. Additionally, it includes when a supervisor does not do a risk assessment or institute remedial actions when an unreasonable risk is known. This category may be related to a Supervisory Deviation. The Problem Correction Category is divided into three sub-categories:

- a. Correction of Performance;
- b. Correction of Equipment; and
- c. Correction of a Procedure.

Correction of Performance Sub-Category

92. The Correction of Performance Sub-Category relates to a supervisor's failing to correct the behaviour or performance of personnel impeding the safe completion of a task. Examples of the Correction of Performance Sub-Category include:

- a. A supervisor ignores routine deviations carried out within his section;

- b. A supervisor does not take action when observing substandard performance in his section;
- c. A supervisor does not adequately correct known training deficiencies; and
- d. A supervisor ignores warning signs given by an individual regularly reporting to work fatigued.

Correction of Equipment Sub-Category

93. The Correction of Equipment Sub-Category relates to supervisor who does not correct deficiencies in relation to material or associated documentation. Examples of the Correction of Equipment Sub-Category include:

- a. A supervisor who does not submit a UCR for a known tow bar deficiency; and
- b. A supervisor ignores the accumulation of minor discrepancies in an aircraft maintenance set.

Correction of Procedure Sub-Category

94. The Correction of Procedure Sub-Category relates to a supervisor who does not correct deficiencies or discrepancies in relation to standard operating procedures, regulations, standards or policy. Examples of the Correction of Procedure Sub-Category include:

- a. A new regulation not documented in Unit Flying Orders; and
- b. A supervisor allows a Unit Standards Officer to perform an unauthorized abbreviated Unit Checkout.

SUPERVISORY DEVIATION CATEGORY

95. The Supervisory Deviation Category definitions match the Unsafe Act Deviation definitions. The category Deviation relates to the action or inaction of the immediate unit supervisors. In this case, the investigation should focus on the factors predisposing the supervisor to carry out a deviation. A Supervisory Deviation includes actions such as directing an individual to violate existing regulations, instructions, technical guidance, SOP or rules. The Supervisory Deviation sub-categories are also identical to the Deviation sub-categories. The Supervisory Deviation Category is divided into two sub-categories:

- a. Mission-Centric; and
- b. Person-Centric.

Mission-Centric Sub-Category

96. The Mission-centric Sub-Category relates to the supervisor's intent to ultimately achieve the mandate of the task at hand while keeping in mind the best interests of the CF, e.g. a supervisor extends his flying crew's duty day beyond published limits. A Mission-Centric Deviation can at times include actions that are entirely appropriate under specific circumstances, such as defined in the B-GA-100. The Mission-centric Sub-Category is divided into two sub-sub-categories as follows:

- a. Routine; and
- b. Exceptional.

Routine Sub-Sub Category

97. The Routine Sub-Sub-Category relates to the unit's common and accepted use of an unapproved procedure to complete a task; inherent in it is the supervisor's awareness and tolerance of the unapproved procedure's use. It is often referred to as "bending the rules." It is important to consider that the Routine deviation may at times be a sign of a problem with rules and regulations or inadequate structure rather than the supervision or culture within the unit.

Examples of the Routine Sub-Sub-Category include:

- a. Routine "Workarounds" or Shortcuts: Sometimes it does not seem possible to get the job done effectively by following the rules or the rules seem unnecessarily lengthy or laborious, e.g. an inspection procedure may call for multiple time-intensive steps to be done in sequence. In order to reduce the time for carrying out the inspection and improve productivity, the supervisor permits personnel to conduct the steps all at once rather than sequentially. The "shortcut" version of the procedure may lead to missing a critical item or other unintended results such as overtorqued bolts or gaskets; and
- b. Lack of Time or Resources: An act that appears to optimize time or resources but still get the job done, e.g. the OpsO on a busy squadron allows crews to skip mission pre-briefs so that they can meet their takeoff times.

Exceptional Sub-Sub-Category

98. The Exceptional Sub-Sub-Category relates to a unique or isolated departure by a supervisor from established rules or regulations in order to complete the task. The deviation is totally unusual for that unit and is isolated to a specific supervisor. The exceptional deviation is neither sanctioned nor condoned by the supervisor's peers or leadership. Examples of the Exceptional Sub-Sub Category include:

- a. A supervisor knowingly directs a technician to conduct an unapproved repair action to return the aircraft to the flight line as soon as possible; o
- b. A supervisor allows a pilot to carry out a training mission below minimum weather limits so that pilot does not lose his currency.

Person-Centric Sub-Category

99. The Person-centric Sub-Category relates to a deviation contrary to established procedures based on the supervisor's personal motives, gains or goals that reflects badly on the professionalism of the organization and its members; this type of deviation can be said to be discordant. The Person-centric Sub Category involves reckless, wilful, or negligent behaviour or misconduct that may be carried out to falsely inflate one's reputation or for motives not in line with the objectives of the Canadian Forces. The discordant action may or may not be condoned by the supervisor's peers. Examples of the Person-centric Sub-Category include:

- a. A deployed maintenance detachment supervisor releases an aircraft for flight despite a lack of qualification and authorization to do so in order to meet mission requirement and maintain an untarnished record;
- b. A pilot intentionally flies an aircraft under a bridge or too low to the ground to impress peers; and
- c. A flying supervisor accepts a tasking from a higher authority and then, in order to maintain credibility in the eyes of the higher authority, authorizes the mission to be flown knowing that the crew is not qualified to conduct it

ORGANIZATIONAL INFLUENCE GROUP

100. The Organizational Influence Group refers to methods, decisions or policies made above the unit level that contributed to the occurrence. This can include equipment, resources, procedures, manning, procurement, etc. Senior leadership decisions have a profound impact on the organization and its function, including supervisory practices or an individual’s pre-conditions or actions. Organizational Influences, therefore, are an important set of Latent Conditions as the organization’s leaders set the foundation for all of its activities.

101. The Organizational Influence Group is shown at Figure 5. It is divided into three categories:

- a. Resource;
- b. Culture; and
- c. Management.



Figure 5 – CF HFACS Organizational Influence Group

RESOURCE CATEGORY

102. The Resource Category refers to management’s and leadership’s allocation of proper and sufficient resources to the team for the safe conduct of the task. It is divided into four sub categories:

- a. Personnel;
- b. Financial;
- c. Equipment; and
- d. Facility.

NOTE

Training issues at the organizational level may be implicated if any of these four sub-categories are selected. Additionally, training issues dealing with documentation may be present in the Documentation Sub-Category found under the Work Environment Category within the Personnel Influence Group

Personnel Sub-Category

103. The Personnel Sub-Category refers to the lack of or inadequate allocation of human resources, including maintainers, operators, staff and support personnel. This could include deficiencies in staffing, manning, enrolment quotas, and availability of training programs. Examples of the Personnel Sub-Category include:

- a. An improper unit manning level that forces excessive individual or unit workloads; and
- b. OTU training that is unreasonably shortened in order to increase throughput.

Budget Sub-Category

104. The Budget Category refers to the lack of or improper apportioning of financial resources for assigned tasks, such as for funding of acquisitions, maintenance, and operation of equipment. Examples of the Budget Sub-Category include:

- a. Flying gloves are not replaced in a timely manner due to a lack of funding, forcing aircrew to buy their own non-standard gloves externally; and
- b. Runway maintenance unreasonably postponed due to budgetary reductions.

Equipment Sub-Category

105. The Equipment Sub-Category refers to issues related to unsuitable equipment in relation to design, or failure to correct known design flaws with aircraft, tools, support equipment, publications, etc. Examples of the Equipment Sub-Category include:

- a. An aircraft CFTO supplied to maintenance units is out of date;
- b. An aircraft hoist control switch design that lead to inadvertent cargo release; and
- c. An organization did not action a UCR reporting a long-standing hydraulic test stand problem.

NOTE

Should an Organizational level documentation issue dealing with clarity or practical usability be present, it would be annotated in the Policy Sub-Category of the Management Category. However, should the documentation be out of date, not have a user-friendly format or not be accessible using supplied government documentation systems, it would be annotated in Equipment Sub-Category or the Resource Category.

Facility Sub-Category

106. The Facility Sub-Category refers to the inadequate design of workspaces or a failure to correct infrastructure issues. This includes inadequate design of workspaces such as cockpits, control towers, or hangar facilities, and suboptimal use and maintenance of training facilities, simulators, ranges, etc. Examples of the Facility Sub-Category include:

- a. An ALSE workshop operating out of a very small and cluttered work space that results in missing an item during a survival kit inspection; and
- b. Improper hanger lighting compromises a visual inspection of an aircraft component.

CULTURE CATEGORY

107. The Culture Category refers to the prevailing organizational cultural climate that adversely affects the team's performance and safety. It is made up of elements such as stress, cohesiveness, and morale, and it greatly influences the behaviour of personnel within an organization.

108. The Culture Category also relates to norms, values, attitudes, beliefs and customs within the organization that adversely influence safety in general. This includes misconceived rules, acceptance of lowered standards, misaligned values, negative attitudes, flawed beliefs, misplaced customs, and the lack of occurrence reporting and discussion. Elements of the organizational culture, such as the presence of "Group Think," disintegrating esprit de corps and discipline, or ill-conceived traditions can adversely influence safety and the way the task is conducted. Examples of the Culture Category include:

- a. Pre- or post-flight debriefings that are superficially conducted;
- b. The non-reporting of FOD hazards in the belief that the FOD walk will resolve a flight line FOD issue

MANAGEMENT CATEGORY

109. The Management Category refers to how higher HQs being ill-structured to manage and provide proper oversight of the team and the units for the safe conduct of a task. It is divided into three sub-categories:

- a. Planning;
- b. Policy; and
- c. Command and Control (C2).

Planning Sub-Category

110. The Planning Sub-Category refers to undesirable characteristics or conditions of work established by leadership that ultimately impaired the safe completion of the task. These characteristics include unrealistic operational tempo, unreasonable workload, unworkable time constraints, overly optimistic production quotas, non-motivating incentive systems, impractical schedules, and inadequate training, standards, or certification plans. It can also include the lack of contingencies for unforeseen problems in complex operations. Examples of the Planning Sub-Category include:

- a. The introduction of a new capability in an operational theatre without a proper risk assessment;
- b. A capability that is not suitable for the roles assigned; and
- c. A risk management process that is not followed thoroughly for a high risk operation.

Policy Sub-Category

111. The Policy Sub-Category relates to the inefficiency of documented rules, regulations, procedures, guidelines, etc. It relates to doctrine, or its lack thereof, in terms of quality, quantity, or dissemination that influences the safe conduct of the task. It also relates to poorly formulated directives, guidelines, etc, that negatively influence or compromise the safety of a task. This includes the policies and the handling of documents within the organization with respect to recruiting, promotion, posting, retention and release, or those that are ill-defined, adversarial, overly complex, conflicting or supplanted by unofficial rules or values. Examples of the Policy Sub-Category include:

- a. A CFTO on a maintenance procedure is poorly written with overly complex or impractical processes;
- b. A deployed unit has no means to consult or download electronic records or procedures for the aircraft with which they are deployed;
- c. A personnel reduction program severely impacts unit supervision levels; and
- d. The introduction of an untested electronic maintenance records system leads to multiple missed inspections.

Command and Control (C2) Sub-Category

112. The C2 Sub-Category relates to higher headquarters in terms of their oversight, structure, delegation of authority, and communications that influenced a subordinate unit's safe conduct of the task. This includes ambiguous delegation of authority, poor monitoring and scrutiny of resources used, unrealistic risk assessment and flawed processes that impaired the safe completion of a task and hindered the work environment. Examples of the C2 Sub-

Category include:

- a. An orphan unit not receiving proper oversight and guidance from higher HQs;
- b. An aviation resource is assigned to an operational theatre with a mitigation strategy to deal with environmental challenges but the higher levels in the chain of command do not check to ensure that they are put in place; and
- c. The assignment of a detachment to a UN mission without proper rules of engagement.

MATERIAL CAUSE FACTOR

DEFINITION MATERIAL CAUSE FACTOR

113. A Materiel cause factor relates to a failure of any aircraft component, support equipment or facility used in the conduct and support of air operations that lead to a FS occurrence.

ASSIGNMENT OF MATERIAL CAUSE FACTOR

114. A Materiel cause factor can be assigned in a FS occurrence which identify:
- a. A flaw in the basic material used to manufacture a part
 - b. An improper design, manufacture, construction or assembly; or
 - c. A failure or malfunction of components when there was no overstress, abuse or misuse, and proper maintenance practices were carried out (undetected progressive breakdown).

NOTE

Although the improper design, manufacture, construction or assembly could ultimately have been caused by personnel at the OEM or fourth line level, these kind of flaws are categorized as Material cause factor rather than Personnel because the Canadian Forces had no control on how these activities were conducted.

115. Materiel cause factor includes all aircraft and / or engines, equipment and facilities used in the conduct and support of air operations. Although most materiel failures may be traced ultimately to some human origin, personnel causes are assigned only when failures result from incorrect maintenance by CF or contracted parties or from incorrect operating procedures. It is preferable, both statistically and realistically, to consider the remaining cases as materiel failures of the items in themselves, regardless of the reason or mode of failure. Materiel cause factors are divided into the following categories.

116. The Material cause factor is divided in two categories:
- a. Aircraft or Engine Component; and
 - b. Related Facility.

AIRCRAFT OR ENGINE COMPONENT CATEGORY

117. The Aircraft or Engine Component category relates to equipment failure or malfunction. The failed or damaged component must be specified in the investigation report. If it is beyond the capability of the unit to precisely determine the technical nature of the fault, then the component need only be identified. For example, it may require a repair contractor to determine that a bushing has failed in a generator. The unit should specify “generator” as the component.

RELATED FACILITY CATEGORY

118. The Related facility category relates to failure or malfunction of facilities or equipment that is not part of, but relevant to, the operation of aircraft, such as maintenance support equipment. The nature of the item is to be specified in the investigation report, for example

- a. Ground vehicles, test stands, ladders, chocks, tow bars, helicopter ground handling wheels, and similar equipment used in the vicinity of aircraft;
- b. Personal safety equipment;
- c. Ground equipment supporting air navigation and ground / air communication; or
- d. Helicopter securing device such as the bear trap used in shipborne helicopter operations.

119. Materiel cause factors should be amplified with a short descriptive narrative including, when possible:

- a. The mode of failure, e.g. fatigue, shear, corrosion, wear, seizure, overheat, out of adjustment; and
- b. The reason for failure, if known, e.g. improper design, manufacture, construction or assembly.

ENVIRONMENTAL CAUSE FACTOR

DEFINITION ENVIRONMENTAL CAUSE FACTOR

120. An Environmental cause factor relates to external factors that affect the flight or aviation activity, be it a climatic (temperature, humidity, turbulence, convective weather, ceiling, wind, visibility, precipitation) or environmental (light conditions, degraded visual environment caused by snow, sand or lack of contrast) or other condition that leads to a FS occurrence despite all reasonable precautions being taken by the personnel involved.

ASSIGNMENT OF ENVIRONMENTAL CAUSE FACTOR

121. An Environmental cause factor is assigned when the condition encountered was beyond human control to predict with the present state of the art equipment and when all reasonable precautions had been taken and applicable SOPs applied; reasonable precautions includes, but are not limited to, the full use of weather forecast information, use of airborne weather radar, requesting updated weather information, timely abort or turnaround, delaying launch, seeking shelter or taking alternative action decisions, as applicable, for vectoring to avoid

areas of hazardous weather or bird concentrations.

122. The Environmental cause factor is divided in five categories
- a. Weather;
 - b. Unusual Phenomena;
 - c. Surface operating area;
 - d. Wildlife; and
 - e. Atmospheric Pressure, Simulator or Centrifuge.

WEATHER

123. The Weather category relates to normal environmental phenomena such as cloud, hail, lightning, rain, ice, snow, sea state and wind.

UNUSUAL PHENOMENA

124. The Unusual Phenomena category relates to all other environmental conditions exclusive of weather that cannot be easily predicted, e.g. tidal waves (tsunami), earthquakes, landslides, avalanches etc.

SURFACE OPERATING AREA

125. The Surface Operating Area category relates to a condition where the landing/take-off area is causal in the occurrence, e.g. earth surface, water surface or landing/take-off manoeuvring area generating FOD, a degraded visual environment, a hidden object (snow covered stump), etc.

WILDLIFE

126. The Wildlife category relates to a condition where wildlife activity is causal in an occurrence, bird / bat strike, bird avoidance manoeuvring, wildlife strike or presence, etc.

ATMOSPHERIC PRESSURE, SIMULATOR OR CENTRIFUGE

127. The Atmospheric Pressure, Simulator or Centrifuge category relates to a condition where involved personnel suffer adverse physiological consequences during or after exposure to a change of atmospheric pressure, a simulator or centrifuge. Consultation with a Flight Surgeon is recommended when considering this cause factor area. Examples of Atmospheric Pressure, Simulator, Centrifuge include:

- a. High altitude decompression sickness;
- b. Disorientation or after-effects caused by simulator or centrifuge training; and
- c. Neck or other body strains from centrifuge.

NOTE

The Atmospheric Pressure, Simulator or Centrifuge cause factor could be assigned independently, especially in the case in an hypobaric chamber where there is no intent to fly. For instance, the investigation could reveal that an individual suffered from decompression sickness, a trapped gas disorder, hypoxia, etc, and that no further safety of flight compromise was present. These occurrences are valuable for statistical tracking and possible PMS.

OPERATIONAL CAUSE FACTOR

DEFINITION OPERATIONAL CAUSE FACTOR

128. An Operational cause factor relates to a condition or situation where the CoC has formally accepted higher risk estimated to be above an acceptable level of safety to achieve an operational mission objective and when the risk was present and causal, either in whole or in part, to the FS occurrence.

ASSIGNMENT OF OPERATIONAL CAUSE FACTOR

129. An Operational cause factor can only be assigned by the AIA when the applicable formation Comd or legally authorized individual has lawfully accepted a higher risk in accordance with the provisions of individual CDS (delegation) Orders as part of the Airworthiness Program or as stipulated by the B-GA-100-001/AA-000 National Defence Flying Orders, Volumes 1 and 3.

130. The assignment of an Operational cause factor can be done in isolation or in combination with other cause factors.

FOREIGN OBJECT DEBRIS (FOD) CAUSE FACTOR

DEFINITION OF UNIDENTIFIED FOD CAUSE FACTOR

131. An Unidentified FOD cause factor relates to a condition where the presence of a foreign object in or around an aircraft leads to a FS occurrence and where the type of FOD cannot be established.

ASSIGNMENT OF UNIDENTIFIED FOD CAUSE FACTOR

132. Usually, the Unidentified FOD cause factor should not be assigned in conjunction with or in addition to any other cause factor type. On the other hand, when the source of the debris is known, e.g. Material, Personnel or Environment, the applicable cause factor Type shall be selected. Examples of FOD that should not be assessed against Unidentified FOD include any FOD generated by aircraft systems or component failures, loose or lost parts or pieces, personal equipment misplaced in the aircraft and FOD ingestion related to environmental factors like birds, ice, etc..

NOTE

If FOD is present in an occurrence, the Event Descriptor FOD shall be selected as well as any other pertinent Event Descriptors applicable to the occurrence. This ensures that FOD-related occurrences are tracked accurately.

UNDETERMINED CAUSE FACTOR

DEFINITION OF UNDETERMINED CAUSE FACTOR

133. An Undetermined cause factor relates to a condition where the investigation was unable to reasonably determine the probable cause of an occurrence.

ASSIGNMENT OF UNDETERMINED CAUSE FACTOR

134. An Undetermined cause factor should only be assigned as a last resort when all investigative avenues have been exhausted and when the investigation does not provide enough evidence to reasonably determine a specific cause factor. Prior to assigning an Undetermined cause factor, the investigation shall consider assigning cause to one or more of the three main cause factor categories (Personnel, Materiel and or Environmental). If the assessment of the evidence eliminates all other cause factors as causal and there is no reasonable means to determine that one of the three main cause factor categories was causal, then an Undetermined cause factor will be assigned.

UNDETERMINED CAUSE FACTOR

DEFINITION OF UNDETERMINED CAUSE FACTOR

135. An Undetermined cause factor relates to a condition where the investigation was unable to reasonably determine the probable cause of an occurrence.

ASSIGNMENT OF UNDETERMINED CAUSE FACTOR

136. An Undetermined cause factor should only be assigned as a last resort when all investigative avenues have been exhausted and when the investigation does not provide enough evidence to reasonably determine a specific cause factor. Prior to assigning an Undetermined cause factor, the investigation shall consider assigning cause to one or more of the three main cause factor categories (Personnel, Materiel and or Environmental). If the assessment of the evidence eliminates all other cause factors as causal and there is no reasonable means to determine that one of the three main cause factor categories was causal, then an Undetermined cause factor will be assigned.

NOTE

PMs can still be recommended when the occurrence cause is undetermined.

INTENTIONALLY LEFT BLANK

Annex A
Chapter 10
A-GA-135-001/AA-001

ANNEX A – PRE-HFACS PERSONNEL CAUSE FACTORS

NOTE

The Pre HFACS Personnel cause factors used before the introduction of HFACS in January 2004 are available from DFS if required for statistical analysis.

INTENTIONALLY LEFT BLANK

Annex B
 Chapter 10
 A-GA-135-001/AA-001

ANNEX B – CF-HFACS V 3.0 CHART

