SYSTEM/COMPONENT FAILURE OR MALFUNCTION (POWERPLANT) (SCF–PP) SUBCATEGORY

DEFINITIONS AND USAGE NOTES

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Commercial Aviation Safety Team

COMMON TAXONOMY TEAM

International Civil Aviation Organizaion

Focuses on building an extension of the Occurrence Category SCF–PP coding down to the specific engine occurrence level. This would constitute a subtaxonomy of the SCF–PP occurrence category.

RECORD OF REVISIONS

Date	Version	Section	Revision
4/2013	1.2.1	Introduction	Added text to “occurrence” definition to include unmanned aircraft systems with design and/or operational approval.
10/2012	1.2	Document	Formatted document and made minor editorial changes
5/2011	1.1	Document	Re formatted document
4/2011	1.1	Introduction	Added Introduction to document
4/2011	1.1	Document	Re organized topics alphabetically
9/2008	1.0	Document Creation	Document Creation

TABLE OF TERMS

CASE BURNTHROUGH *(SCF–PP–CB)* 3
CASE RUPTURE *(SCF–PP–CR)* 3
COMPARTMENT OVERHEAT/AIR LEAK *(SCF–PP–COAL)* 3
COWL SEPARATION *(SCF–PP–CS)* 4
ENGINE FAILURE RECOGNITION AND RESPONSE *(SCF–PP–EFRR)* 4
ENGINE OVERSPEED *(SCF–PP–EOS)* 4
ENGINE SEPARATION *(SCF–PP–ES)* 4
FALSE/MISLEADING INDICATION *(SCF–PP–FMI)* 5
FLAMMABLE FLUID LEAK *(SCF–PP–FFL)* 5
GEARBOX/STARTER UNCONTAINMENT *(SCF–PP–GBXU)* 5
IN-FLIGHT SHUTDOWN (IFSD) *(SCF–PP–IFSD)* 6
LOSS OF ENGINE FUNCTIONALITY/ENGINE MALFUNCTION PROCEDURAL TRIGGER *(SCF–PP–LOE)* 6
MAINTENANCE FINDING *(SCF–PP–MF)* 6
MULTIPLE ENGINE POWER LOSS *(SCF–PP–MEPL)* 7
OTHER ENGINE MALFUNCTION *(SCF–PP–OTHEM)* 7
PROPELLER AUTOFEATHER/PITCH LOCK *(SCF–PP–PAPL)* 7
PROPELLER SEPARATION/DEBRIS RELEASE *(SCF–PP–PS)* 7
PROPULSION SYSTEM FIRE *(SCF–PP–PSF)* 8
PROPULSION SYSTEM FUME EVENT *(SCF–PP–PSFE)* 8
RECIPROCATING ENGINE UNCONTAINMENT *(SCF–PP–REU)* 8
REVERSER/BETA MALFUNCTION—FAILURE TO DEPLOY *(SCF–PP–RFD)* 8
REVERSER/BETA MALFUNCTION—IN-FLIGHT DEPLOY *(SCF–PP–RMID)* 9
TAILPIPE FIRE *(SCF–PP–TPF)* 9
UNCONTAINED *(SCF–PP–UNC)* 9

INTRODUCTION

The International Civil Aviation Organization (ICAO) and the Commercial Aviation Safety Team (CAST), which includes Government officials and aviation industry leaders, have jointly chartered the CAST/ICAO Common Taxonomy Team (CICTT). The team was charged with developing common taxonomies and definitions for aviation accident and incident reporting systems. The common taxonomies and definitions are intended to improve the aviation community's capacity to focus on common safety issues. CICTT includes experts from air carriers, aircraft manufacturers, engine manufacturers, pilot associations, regulatory authorities, transportation safety boards, and ICAO, and members from Canada, the European Union, France, Italy, Japan, the Netherlands, the United Kingdom, and the United States. CICTT is co-chaired by a representative from ICAO and a representative from CAST.

To accomplish its objectives, CICTT has developed the following:

- International Standard for Aircraft Make, Model and Series Groupings
- International Standard for Engine Make, Model and Submodel Groupings
- Human Factors
- Aviation Occurrence Categories
    - System/Component Failure or Malfunction (Powerplant) (SCF–PP) Subcategory
- Phase of Flight
- Positive Taxonomy

It is important to note that CICTT does not expect governments, international organizations, and corporations to change existing data systems or existing definitions immediately. The intent is to provide "target" taxonomies and definitions for adoption by organizations planning for, and implementing new safety systems.

"Occurrence" is defined as "accident or incident" throughout this document. This includes accidents or incidents, as defined in Annex 13 to the Convention on International Civil Aviation, involving manned aircraft or unmanned aircraft that have a design and/or operational approval. Generally, accidents and incidents differ only in the degree of injury sustained by persons involved or in damage sustained to the aircraft. Each category has a unique name and identifier to permit common coding in accident/incident systems, a text definition, and usage notes to further clarify the category and aid in coding occurrences. This version focuses on powered fixed wing land and rotorcraft operations. Future updates will cover other aircraft operations.

An important element of the occurrence category design is that it permits the association of multiple categories with an occurrence. Meaning, for example, if a flammable fluid leak contributed to a propulsion system fire, the occurrence would be coded in both categories. Multiple coding supports the primary focus of CICTT—accident prevention—in which every pertinent element should be investigated, recorded, and analyzed.

The System/Component Failure or Malfunction (Powerplant) (SCF–PP) Subcategory Definitions and Usage Notes (subject of this release) are intended to provide CICTT users with a more specific set of definitions to use when an engine occurrence has taken place.

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CASE BURNTHROUGH *(SCF–PP–CB)*

A local case penetration that initiates from local overtemperature of the case external wall due to an internal engine malfunction (e.g., fuel nozzle leakage, internal bearing compartment fires, titanium fires).

Usage Notes:

- Burnthroughs are distinguished from ruptures by their lack of an explosive release of high-pressure gas.
- Events involving accessory component cases also contribute to this category, for example, sump fires that propagate internally and result in burnthrough of piping or that initiate gearbox fires.
- The key aspect, whether in the primary gas path or accessories, is that fire initiates from an internal malfunction and proceeds to burn through a case, tube, or gearbox to reach external regions.

NOTE: A common cause of case burnthrough is localized penetration due to fuel nozzle malfunction.

CASE RUPTURE *(SCF–PP–CR)*

The sudden rupture of a high-pressure vessel or case, which results in the release of high-pressure gases into the under cowl cavity.

Usage Notes:

- Case ruptures resulting from uncontained release of debris from a rotating component malfunction are excluded.
- Case ruptures include those events that propagate from fatigue type cracks as well as ruptures related to secondary malfunctions (e.g., flame impingement).

COMPARTMENT OVERHEAT/AIR LEAK *(SCF–PP–COAL)*

High-pressure or temperature air leaks due to casing or high-pressure/temperature air duct system malfunctions within the nacelle or in the pylon.

Usage Notes:

- None at this time.

COWL SEPARATION *(SCF–PP–CS)*

Separation of nacelle components such as inlets, cowls, thrust reversers, exhaust nozzles, tail plugs, etc.

Usage Notes:

- Events resulting from ground contact are excluded.

ENGINE FAILURE RECOGNITION AND RESPONSE *(SCF–PP–EFRR)*

An event initiating from a single propulsion system (including propeller system) malfunction, which, by itself, does not hazard the aircraft, but is compounded by suboptimal response (e.g., crew did not execute checklist/normal flying duties).

Usage Notes:

- Not counted are cases of gross error or negligence (such as deciding to take off with an engine known to be inoperative).

NOTE: An example is an In-Flight Shutdown (*SCF–PP–IFSD*) followed by crew failure to maintain airspeed that leads to stall and loss of control.

ENGINE OVERSPEED *(SCF–PP–EOS)*

Acceleration of engine rotating components to a speed above that sanctioned in the type certificate datasheet.

Usage Notes:

- None at this time.

ENGINE SEPARATION *(SCF–PP–ES)*

Separation of the engine, with or without the strut/pylon or attaching structure.

Usage Notes:

- Events resulting from ground contact are excluded.

FALSE/MISLEADING INDICATION *(SCF–PP–FMI)*

Powerplant or propeller indication that was appreciably different from reality, to the point where an indication difference was noticed by the pilot or subsequent investigation.

Usage Notes:

- Includes parameters that were higher than actuality, lower than actuality or completely absent, and discrete warnings or alerts that were falsely present or absent.

FLAMMABLE FLUID LEAK *(SCF–PP–FFL)*

Leak of fuel, oil, or hydraulic fluid into the pylon or dry bay, or under the engine cowls, which could credibly lead to a fire.

Usage Notes:

- Leaks collected from shrouds and components and drained directly overboard by a dedicated drain are excluded, as are drips and seeps.

GEARBOX/STARTER UNCONTAINMENT *(SCF–PP–GBXU)*

The release of debris originating in the gearbox and/or starter outside of the engine nacelle.

Usage Notes:

- Other gearbox/starter malfunctions are documented as Other Engine Malfunction (*SCF−PP−OTHEM*).

IN-FLIGHT SHUTDOWN (IFSD) *(SCF–PP–IFSD)*

Engine ceases to function between aircraft rotation and touchdown and slows down to sub-idle whether self-induced, flight crew initiated or caused by an external influence.

Usage Notes:

- Excludes:
  - The airborne cessation of the functioning of an engine when immediately followed by automatic engine relights.
  - When desired thrust or power is not achieved and engine is not shut down.
- Includes IFSD for all causes: for example, flameout, internal failure, flight crew initiated shutdown, foreign object ingestion, and icing.
- Multiple shutdowns of an engine for the same cause, followed by restarts, should be considered as one event.

LOSS OF ENGINE FUNCTIONALITY/ENGINE MALFUNCTION PROCEDURAL TRIGGER *(SCF–PP–LOE)*

An event caused by a propulsion system (including propeller system) malfunction or improper operation that was initiated by crew action.

Usage Notes:

- Excludes sabotage, gross negligence, and suicide.
- Not counted are events from very indirect means such as engine malfunction resulting from flying the airplane into the ground or running the airplane into equipment on the taxiway/runway.

MAINTENANCE FINDING *(SCF–PP–MF)*

A finding resulting in an engine being removed from service due to potential result of an engine event.

Usage Notes:

- None at this time.

MULTIPLE ENGINE POWER LOSS *(SCF–PP–MEPL)*

No definition at this time.

Usage Notes:

- There are different types (categories) of multiple engine power loss:
  - Environmental—An event initiating from essentially simultaneous power loss from multiple propulsion systems for an environmental cause (e.g., bird, ice, rain, hail, or volcanic ash ingestion).
  - Maintenance—An event initiating from multiple propulsion system power loss from clearly improper maintenance (e.g., failure to restore oil system integrity after inspection).
  - Other/unknown—An event initiating from multiple propulsion system power loss for reasons other than those characterized elsewhere, or where the initiating event(s) are unknown. This includes unrelated events of engine power loss within the same flight.

OTHER ENGINE MALFUNCTION *(SCF–PP–OTHEM)*

An engine malfunction or abnormal behavior not specified elsewhere.

Usage Notes:

- None at this time.

PROPELLER AUTOFEATHER/PITCH LOCK *(SCF–PP–PAPL)*

Propeller system malfunction leading to inability to control the propeller.

Usage Notes:

- Control hunting is excluded as a normal product behavior.

PROPELLER SEPARATION/DEBRIS RELEASE *(SCF–PP–PS)*

Separation of single or multiple blades, large piece(s) thereof, or entire propeller.

Usage Notes:

- None at this time.

PROPULSION SYSTEM FIRE *(SCF–PP–PSF)*

A fire involving combustion external to the engine casings.

Usage Notes:

- This includes internal pylon fires, including events in which fuel leaks from the pylon and initiates a fire elsewhere.
- Propulsion system fires may be within fire zones or flammable fluid zones.
- Tailpipe fires, and hot air leaks resulting in fire warnings, without combustion, are excluded from the definition and documented under Tailpipe Fire (*SCF–PP–TPF*) or Compartment Overheat/Air Leak (*SCF–PP–COAL*), respectively.
- Fires that remain internal to the engine casing are excluded.
- Grass, brush, or pooled fuel fires are also excluded.

PROPULSION SYSTEM FUME EVENT *(SCF–PP–PSFE)*

Significant smoke and/or fumes on the flight deck or cabin that are generated by the propulsion system.

Usage Notes:

- None at this time.

RECIPROCATING ENGINE UNCONTAINMENT *(SCF–PP–REU)*

Engine debris that completely exits the engine compartment.

Usage Notes:

- None at this time.

REVERSER/BETA MALFUNCTION—FAILURE TO DEPLOY *(SCF–PP–RFD)*

The failure of a thrust reverser to deploy or a propeller to enter beta mode when commanded.

Usage Notes:

- None at this time.

REVERSER/BETA MALFUNCTION—IN-FLIGHT DEPLOY *(SCF–PP–RMID)*

The in-flight deployment of a thrust reverser, or in-flight beta mode for the propeller (exclusive of design intent).

Usage Notes:

- None at this time.

TAILPIPE FIRE *(SCF–PP–TPF)*

Fire within the tailpipe, where visible sustained flames exit the tailpipe.

Usage Notes:

- None at this time.

UNCONTAINED *(SCF–PP–UNC)*

The uncontained release of debris from a rotating component malfunction (blade, disk, spacer, impeller, drum/spool).

Usage Notes:

- In order to be categorized as uncontained, the debris must pass completely through the nacelle envelope. Parts that puncture the nacelle skin but do not escape or pass completely through are considered contained.
- Fragments that pass out of the inlet or exhaust opening without passing through any structure are not judged to be uncontained.
- Starter and gearbox uncontainments are excluded and documented under Gearbox/Starter Uncontainment (*SCF–PP–GBXU*).