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16. Abstract A new approach to the investigation of aviation accidents has recently been initiated, utilizing a follow-on to the psychological autopsy. This approach, the psychosocial reconstruction inventory, enables the development of a dynamic, retrospective portrait of the pilot-in-command subsequent to an accident. Twelve fatal general aviation accidents were studied in this way in 1971. When routine accident investigation data are supplemented by a psychosocial or "lifestyle" reconstruction, a much deeper understanding of the cause of the accident often emerges. In addition to the traditional detailed explanation of what happened, it is often possible to determine why the pilot-in-command behaved in a fashion to produce the accident. By increasing pilot insight into the role of emotions and situational stress in accident causation, more effective accident prevention programs should result.					
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THE PSYCHOSOCIAL RECONSTRUCTION INVENTORY—A POSTDICTAL INSTRUMENT IN AIRCRAFT ACCIDENT INVESTIGATION

Introduction.

Aircraft operations at the 335 FAA-operated Traffic Control Towers numbered 55,280,498 during calendar year 1970, a doubling from the 1960 figure.¹ Of the above, 22,362,196 of the operations were conducted by general aviation. General aviation experienced 626 fatal accidents involving 1,273 fatalities in 1970 in their proportion of the above operations plus their operations to and from those of the 10,847 airports which did not have FAA control towers. FAA Office of Aviation Medicine accident records describe the circumstances surrounding each crash. A majority of these documentations, however, fail to indicate "why" the event occurred. Many of these incidents, perhaps a majority, resulted from intentional or subintentional pilot error.

Relatively scant literature exists concerning studies of the accident-facilitating behavior of pilots involved in aircraft crashes. Therefore, the senior author (Dr. Yanowitch) developed an instrument based upon the psychological autopsy and modified to "postdict" the behavior of the victim. This approach delineates the etiological factors underlying the accident by means of the psychosocial reconstruction inventory.

It is recognized that there is some degree of the unexpected in all occurrences and, therefore, almost all events can be studied with respect to "accidental" qualities. Most events, however, exhibit predictable qualities which comprise the prime etiological basis for the circumstances.

It is a common observation that persons often experience preconsciously determined "accidents" (loss of articles, forgetting appointments, and other similar occurrences). A great deal may be learned about accidental phenomena by studying all accidents rather than only those that result in injury or fatality; however, for practical reasons, this paper is primarily concerned with "post-dictal" studies of fatal aircraft accidents. The method under discussion is especially relevant to

accident prevention since it extracts information which will be employed to impart insight to individual pilots concerning specific periods of their lives when they are ill-advised to pilot aircraft. High risk factors appear to prevail under given circumstances of personal life.

In view of the foregoing, the development of the psychosocial reconstruction inventory involves the collection of psychological data concerning the developmental behavior and functioning of the deceased from birth to the time of traumatic death, the latter possibly self-determined. Information is particularly significant concerning the period of time immediately preceding the fatal episode.

Historically, it is noted that the psychological autopsy originated in 1955 at the Suicide Prevention Center in Los Angeles under the guidance of Dr. Edwin S. Shneidman and Dr. Norman L. Farberow, in liaison with Dr. T. Curphy, the Los Angeles County Coroner.^{2 3 4} Vital services and research functions were carried out through the coroner's office in the investigation of cases of equivocal deaths (i.e., in which the mode of death was uncertain, possibly suicidal). The staff members investigated these cases by obtaining a psychological picture of the deceased through interviews of survivors. The coroner found that the addition of this information to that data available through routine investigation resulted in a more meaningful certification of the mode of death. It was also discovered that mourners were often assisted in adjusting to their period of grief through the interviews associated with the psychological autopsy.

Method of Procedure.

A prescribed procedure for developing a lifestyle "postdictal" profile was applied in 1971 to the pilots of over a dozen fatal general aviation accidents. Each profile consists of an in-

ventory of personal information derived from interviews of family members and close associates of the deceased by a psychiatrist; individuals chosen for interview were those who might significantly affect the behavior of the subject and those in a position to objectively observe it. The derived information presents a history of the psychosocial development of the individual and any pre-accident deterioration. Essentially, the inventory consists of the key elements in an individual's life insofar as they may be determined retrospectively. It may be conducted by any professional or paraprofessional well acquainted with the psychodynamics of behavior.

Illustratively, the inventory may be outlined as follows:

- I. Informants
 - A. Spouse (including previous spouses, fiancé/fiancée if applicable)
 - B. Parents
 - C. Siblings
 - D. Children (mature)
 - E. Airport Personnel
 - F. Close Friends.
 - G. Business Associates
 - H. Flying Associates (including instructors)
- II. Areas of Dynamic Influence
 - A. Familial Constellation
 - B. Procreational Family
 - C. Economic, Social and Educational History
 - D. Physical and Mental Health
- III. Pre-Accident Influences and Behavior
 - A. Influences (Any psychosocial deterioration is noted, including development of depressive episodes, occurrence of guilt feelings, lack of self-esteem or sense of identity; likewise such situations as economic reverses, loss of loved ones or marital discord.)
 - B. Behavior (Specific behavior prior to the final flight may be very instructive, particularly if there is obvious variation from established behavior patterns. A good example is adherence to pre-flight procedures.)

Synthesis of the above information yields a lifestyle picture, touching on basic beliefs, attitudes, aptitudes, experiences and accomplish-

ments of the victim. General behavioral characteristics are noted and interpreted in dynamic context. Relatively recent changes in the individual's personality may reflect an increasing difficulty with emotional control and coping mechanisms, involving status of relationships with family and friends, perhaps a deterioration culminating in the fatal crash. Thus, a coherent summary personality profile relative to flight activities and the fatal flight is sought, with the ultimate goal of prevention.

To date the psychosocial reconstruction inventory has been applied to fatal aircraft accidents when the Regional Flight Surgeon of the involved FAA region has requested additional information.

Three examples drawn from the preliminary case files are provided below:

1. *Case Number 70-4213*: The 52-year old male subject crashed in his light twin-engine aircraft four minutes after normal take-off. The aircraft struck the ground nose-down at a 45° angle and was completely demolished. The physical autopsy disclosed no alcohol, drugs or CO factors in the "accident." No mechanical failure was found.

The psychosocial reconstruction inventory disclosed the following information pertaining to recent problems facing the subject:

- A. A criminal charge of arson was pending against the victim.

- B. A civil suit was being considered against him by an insurance company.

- C. The U.S. Internal Revenue Service was claiming a large arrears in his income taxes.

- D. The victim's wife was suffering from advanced cancer.

- E. A pending separation from the wife was becoming more pressing.

- F. The completion of certain projects placed his future occupational status in jeopardy.

- G. A recent inability to keep up payments on his aircraft threatened its continued availability.

- H. An inability to keep up repairs on his aircraft jeopardized its airworthiness.

- I. A self-need to undertake "masculine" activities became increasingly difficult to fulfill as the aging process continued.

- J. A recent suicide attempt by his wife was extremely upsetting.

In context, the above items suggest the life-style of a man who never developed beyond the oedipal stage and who had a deep need to assert his masculinity in overt manners such as hunting, game fishing, scuba diving and flying. The strong self-imposed pressures to accomplish these manly activities derived from his lack of identity. The over-all anxiety led the subject to attempt to be everything-to-everybody-at-all-times in order to make himself acceptable to all. His final behavior appears to be a regression to the infantile omnipotent state in an effort to control the uncontrollable events which were causing his progressive deterioration. This information indicates that the probable mode of death was intentional suicide.

2. *Case Number 71-2433*: The 47-year old male subject crashed his light twin-engine aircraft on a clear night, killing himself and his female companion. It was found that he had been heavily consuming alcohol in the period immediately prior to the crash, and that the bartender of the last bar where the pilot and passenger had imbibed together had called the airport and advised that they be prevented from initiating flight. Later that night, a tower controller recorded communications demonstrating that the pilot had slurred speech, geographic disorientation in spite of good weather, and increasing confusion in the operation of the light twin-engine aircraft. The aircraft crashed when it ran out of fuel following improper navigation by the pilot.

The psychosocial reconstruction inventory indicated that the subject was characterized by an impulsive personality, and maintained his emotional equilibrium by violently acting out against those who "stepped on his toes." Other significant factors indicate that his behavior was the product of specific family relationships in his early history. The subject and his wife had recently separated and he had suffered the additional stress of being arrested as an "ordinary criminal" in the presence of his children, a circumstance based upon his violation of visitation rights. The victim did not trust banks and routinely carried huge sums of cash, as was the case on his final flight.

Although the subject was inebriated when he took off on his final flight, his wife noted that this was not a previous practice of his. She did state that she had known him to take a jigger

of scotch on some occasions immediately before flying.

Based upon the collected information, it is construed that the motivation for attempting the final flight was supplied by the sociopathic personality of the female companion. Briefly, she had made several suicide gestures and attempts in the recent past and actually had been released from a mental institution on the day of the fatal crash. The psychosocial reconstruction inventory indicates that she was able to influence the subject's behavior as a pilot to the extent that she caused her own death and that of the pilot, an unusual case of suicide by "homicide": she the instigator, he the instrument, both the victims.

3. *Case Number 102-AM 120*: The 51-year old, highly educated male subject departed in his single engine aircraft, ostensibly for a specific destination near a scientific meeting site. The aircraft was found in a bay, far off course, and the subject's body was found floating nearby. This type of occurrence is traditionally reported as a water impact. However, the subject was in a "wet-suit" of the "frog man" type and his clothes were in a waterproof bag tied to him.

The psychosocial reconstruction inventory revealed that the victim, who held a Ph.D. in psychology, had been raised by a compulsive, dominant, frequently absent father within a high socio-economic setting. A reconstruction of the situation revealed that the lack of a mother's hand and the absence of sibling interplay had permitted the victim to develop fantasies of being totally self-sufficient. This self-sufficiency served as a protective screen in that it indicated that the subject controlled his destiny and environment with little input from others, precluding the possibility of failure in accomplishing the tasks he set for himself. This led to compulsive behavior, and the particular attitude that the subject must be totally "in charge."

The information developed indicated that the subject was highly suggestible (this may have been auto-suggestibility) and that he had personal desires to assume the identity of a fictitious person. He was confronted with an essentially unsolvable dilemma concerning his role in life and "took flight" toward an assumed identity in an attempt to escape a personal life he could no longer tolerate. In addition, the pressure derived from his socio-economic background and his inability to control his wife's probable mental

deterioration appear to have triggered the necessity of separating from the disturbing domestic influence. The subject determined that the manner of separation could not be of the usual form.

The subject chose a method of separation which evidently was disturbing in that the plan consisted of a practiced deceit which he could not well tolerate by virtue of his psychodynamic make-up, since the approach consisted of frank hypocrisy. As the subject could not tolerate deceit and hypocrisy, unconscious machinations forced the inclusion in his grand plan of an event of such great challenge and requiring such skill that if the challenge were not properly met or the skill were lacking, the price would be loss of his life. If successful, the plan would prove to the subject that he was in complete control of his destiny and he could carry on in a totally different identity. He successfully ditched the aircraft but subsequently drowned before reaching shore in his wetsuit. However, this variable was deliberately written into his life script and the mode of death, based upon the available life history, is a probably subintentional suicide. The degree of risk in his plan was unnecessarily great to accomplish his goal.

Discussion.

The reconstruction of the psychosocial process leading to an accident requires data collection in addition to that routinely collected by the FAA, NTSB and other authorities. The routine information is often sparse, especially when a tense emotional state existed prior to the accident between the victim and those close to him. At times, the emotional reaction of the lay investigator to his own feeling of concern for the victim's family can interfere with an objective judgment about the circumstances that contributed to or provoked the accident. Too frequently, an official investigation amounts to a description of what happened and avoids that body of information which indicates why. Upon collection of psychosocial background information, a case conference and investigative review should become important elements in getting to the "why" of an accident.

It is noted that difficulty in collecting data arises from deliberate or unintentional distortions of information recalled by informants. Evasion may at times be encountered, as may denial, even direct suppression of evidence. In

some cases, suicide notes may be deliberately destroyed by survivors after a fatal crash.

It may be necessary to explain to informants that self-destructive tendencies do develop in responsible, religious, or "successful" persons and the fact that the deceased may have made plans for the next day or week is not sufficient reason to rule out a simultaneous preoccupation with suicide or a suicide plan. In this connection, it has been found that the interview exchange often reduces grief in the survivors and makes it easier for them to accept the death of the victim. These interviews may thus be not only purely investigative but therapeutic as well.

Since some accidents involve frankly suicidal or "subintentionally" suicidal psychodynamic mechanisms, attention must be given these possibilities in assessing the preventability of air crashes. Suicidal actions take a great variety of forms, and the reasons, motives, and psychological intentions of suicidal persons are quite complex. Some of the most prominent motivational reasoning of suicidal persons involves (1) a wish for surcease, escape or rest; (2) a feeling of anger, rage, or revenge; (3) notions of guilt, shame, or atonement; and (4) wishes to be rescued, reborn, or to "begin again." Suicidal actions also contain important communications and appeal elements which are too frequently ignored until it is too late. It has been found that destructive ideas or impulses ordinarily are well-controlled and most unconscious. However, these impulses can be brought to the fore and released under influences of mental stress, physical exhaustion, frustration, alcohol, drugs, and other tangible or intangible agents.

An important additional consideration with respect to suicidal activity is that the continuum of behavior in suicide ranges from detailed planning with direct consummation of death to that characterized by a confused approach involving carelessness and self-negligence (intentional or subintentional). The present legal classification of death into "natural," "accidental," "suicidal," and "homicidal" categories is derived from ancient tradition and later legal procedures. The social benefits of this classification are in assignation of responsibility for the death in the moral or the legal sense. The individual, himself, often plays the deciding role

in causing his own demise, and this self-destructive effort may result in death in many circumstances that ordinarily are not considered suicidal.

The "psychological autopsy" seeks to clarify the immediate psychodynamic processes leading to death. It is accomplished by interviewing those who knew the deceased, including close family members, business associates, friends and neighbors. The "psychosocial reconstruction inventory" is an extension of this approach, and seeks to collect life information derived throughout the lifespan of the deceased, even as far back as his prenatal experience.

In relation to the above, it is stressed that the airplane, as with other "human-guided" transportation vehicles, is often symbolically much more than a traveling machine that takes the driver from A to B. It actually represents an extension of the individual and to a greater or lesser extent enhances the self-concept of the pilot. Consequently, considerations, especially emotional factors, have a very significant part in determining safe flight activities on behalf of a given pilot. The changing interplay between rationality and emotionality determines the outcome of a specific flight. The changing characteristics of the pilot with age and with his life-experience, must be comprehended by the pilot, assisted through safety educational activities.

Conclusions.

Despite concentrated airman proficiency programs, periodically strengthened FAA enforcement activities and broadened general aviation safety education activities, a seemingly irreducible number of fatal general aviation accidents occurs each year. In these cases the pilot, not the aircraft, is the predominant causal factor.⁵ Current routine accident investigation procedures do not elicit the accident-related psychosocial factors which are the basic determinants of a significant proportion of today's accidents. The psychosocial reconstruction inventory has demonstrated considerable promise in delineating the psychodynamic factors which led to the pilot behavior causing an accident. When a sufficient number of case histories and the associated psychodynamics are catalogued and made available to pilots in general, many pilots, with the exception of those of the most marked psychosocial deterioration, will, it is hoped, have sufficient self-insight through "pre-programming" to forestall undertaking pilot-in-command duties during those periods when emotional factors tend to override reason.

It is concluded that if efforts are made to extend the psychosocial reconstruction inventory to a significant number of general aviation accidents, the derived information will yield a new and clearer understanding of the causal aspects of these accidents and will result in the addition of this new dimension to aviation safety programs of the future.

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