

of part 121 pilots to which the Age 60 Rule applies. The studies do not look at pilot performance, indeed, they count all accidents regardless of cause (not just those caused by pilot error), and do not count incidents of pilot incapacitation that did not result in accidents.

Debate surrounding the reliance to be placed on these studies illustrates the difficulty of the task. The changes in accident rates identified in the Hilton Study were small, and its conclusions, therefore, were appropriately cautious. In view of the lack of consensus among the best experts who have looked at this matter, the FAA considers caution appropriate in declining to consider the Hilton Study warranting a change to the Age 60 Rule at this time.

II(c). Performance

Many commenters assert that older pilots have more experience and better performance capability than younger pilots, while other commenters state that older pilots lose performance ability. First, age does not necessarily imply quantity or quality of experience. Experience is valuable, but it does not offset all risks or decrements associated with aging. Also, at some point, the law of diminishing returns comes into play. Once a pilot achieves a certain level of expertise, additional flight time will not significantly improve pilot performance.

It must also be pointed out that reference to "younger" pilots may be misleading in this context. It is the FAA's experience in the industry that retiring age 60 pilots (who generally are captains) are not replaced by very young and inexperienced pilots. Rather, they are replaced by pilots who have substantial experience as pilots in the first officer position, and often as flight engineers before that.

In addition, some commenters state that pilots near age 60 have performed heroically, proving that performance does not degrade with age and experience, while other commenters state that courageous performances by pilots who were near age 60 are not reasons for abandoning the rule. While the FAA recognizes that certain older pilots have performed heroically in specific circumstances, the decision to change the Age 60 Rule cannot be based on isolated commendable acts. The FAA must make a decision on whether change to the rule is called for based on the totality of evidence available on the safety implications of aging.

II(d). Health and Technology

Many commenters state that since the rule was issued medical technology has advanced and life expectancy has

increased; hence, they conclude, the rule is obsolete. In addition, they reference that medical technology is now more capable of screening out pilots with medical risks and that fatigue is no longer an issue due to more modern aircraft that reduce workload and stress levels. Many commenters also state that the aging process can vary markedly among individuals and that some individuals are in worse physical or mental condition at age 40 than others are at age 60. Hence, these commenters do not believe that age should be a means for determining capability. Many other commenters, however, state that older pilots are not in good physical shape and improvements in medical screening do not detect the subtle impairments with age that can undermine the margin of safety.

As noted earlier, the incidence of cardiovascular disease rises with age, and it remains that most frequent cause of death in pilots and the general population. Though the FAA relies on sophisticated medical assessment and monitoring to permit the certification of carefully selected pilots with known heart disease, the need for the highest level of safety in air carrier operations has required that the increasing, unpredictable danger associated with aging be limited.

In addition, there has been an increasing awareness of the more subtle adverse conditions affecting performance, those related to cognitive functioning. Current medical certification procedures identify those individuals who are at most risk and are adequate for assessing many medical problems in pilots. The significance of the known as well as the potential unknown or unmeasurable adverse factors increases with aging, however, and reduces confidence in the sensitivity of the medical certification process. The Age 60 Rule recognizes this reduction of sensitivity in the context of the statutory recognition that the highest possible degree of safety is required in air carrier operations. As both the incidence of incapacitation risk factors and other adverse effects increase with age, the Age 60 Rule provides additional confidence in air transportation safety.

II(e). Multicrew Concept

Some commenters point out that operations under part 121 use 2-pilot crews, and some also have a flight engineer on board. They state that if one pilot becomes incapacitated, the other crew member(s) can take over. The FAA agrees that the multicrew concept provides an additional measure of

safety. Indeed, redundancy in safety features is an important part of the overall safety benefits in part 121 operations, including not only pilots but also other personnel, aircraft structures, and procedures. The safety benefits of redundancy would be reduced, however, if the level of safety of any of the elements were to degrade. The sudden incapacitation of a pilot is not without risk even in a multiple-member crew and is to be avoided. Of equal concern is the prospect of subtle degradation in the judgment, cognitive function, and crew coordination that may accompany advancing age. Unlike the case of sudden incapacitation, such degradation may not be readily apparent to the other crew, and it may be difficult for the crew to deal with the results.

The FAA does not consider the fact that part 121 operations have multiple pilots to be a basis for permitting one (or both) of those pilots to be at unacceptable risk for age-related problems.

III. Alternatives to an Age Limitation

III(a). Performance Checks

Some commenters suggested that the FAA can do performance checks for pilots past age 60 in simulators to ensure that they meet the performance standards. Periodic proficiency and competency checks are intended to detect a pilot's performance deficiency and to correct those deficiencies before the pilot is returned to flight operations. These checks only verify the state of a pilot's performance at the time of the checks. They are not useful for detection of early or subclinical cognitive defects that may subtly degrade performance or which, in time, may progress to risks for errors in judgment or other actions that may jeopardize safety. The checks do not predict whether an individual pilot's performance will degrade at any time in the future as a result of age. In addition, in its 1981 report, NIA noted that proficiency checks and simulator checks usually are designed to train pilots to meet standards of proficiency under optimal testing conditions using known routines and maneuvers. Although the proficiency checks suffice for pilot performance purposes, they are not suitable for testing complex cognitive functions under actual conditions, such as fatigue and stress; nor are they used to determine at what rate the skills learned in the training sessions decline between two consecutive checks. Standard maneuvers used in proficiency tests are inappropriate for measuring any but obvious decrements in pilot performance. Their inadequacy stems