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Friday  
March 15, 1991

**14 CFR Parts 61 and 141**

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**Part II**

**Department of  
Transportation**

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**Federal Aviation Administration**

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**14 CFR Parts 61 and 141  
Pilot, Flight Instructor, and Pilot School  
Certification; Final Rule**

## DEPARTMENT OF TRANSPORTATION

## 14 CFR Parts 61 and 141

[Docket No. 25910; Amdts. 61-490, 141-4]

RIN 2120-AB12

## Pilot, Flight Instructor, and Pilot School Certification

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final rule.

**SUMMARY:** This final rule amends the Federal Aviation Regulations (FAR) governing pilot and flight instructor initial and recurrent training and the operations of Federal Aviation Administration (FAA) certificated pilot schools. The amendments address concerns identified by the National Transportation Safety Board (NTSB) and the public, and issues raised in petitions for exemption from the rules. This action is intended to update standards of pilot and flight instructor performance and to respond to technological advances in pilot training since the current rules were issued.

EFFECTIVE DATE: April 15, 1991.

**FOR FURTHER INFORMATION CONTACT:** Edna French, Manager, or John Lynch, Regulations Branch, AFS-850, General Aviation and Commercial Division, Office of Flight Standards, Federal Aviation Administration, 800 Independence Avenue SW., Washington, DC 20591; Telephone (202) 267-8150.

## SUPPLEMENTARY INFORMATION:

## Background

In 1987 the FAA began a regulatory review of FAR parts 61, 141, and 143. The review was undertaken to update the rules in light of advances in aircraft technology and the increasing complexity of the National Airspace System since the last revisions to these parts in the early 1970's. A major goal of the review is to identify areas of disparity between the rules and the level of training demanded of pilots in today's aviation environment. The review was prompted, in part, by a history of 22 amendments and approximately 3,585 exemption actions to FAR parts 61 and 141 since their last major revisions in 1973 and 1974, respectively. Recommendations and comments from the NTSB, the public, and the FAA have also demonstrated the need for the regulatory review.

In support of this regulatory review, the FAA completed a historical review of parts 61, 141, and 143, in January 1988. The "Review of Historical FAA Actions in Support of Regulatory Review of FAR

parts 61, 141, and 143" (U.S. Department of Transportation, Transportation Systems Center), which is on file in Docket No. 25627, examined items related to pilot training and certification, pilot schools, and ground instructors. The FAA also received communications and input from pilot schools and aviation departments at colleges and universities operating under parts 61 and 141 which aided in determining the focus of this regulatory review.

The FAA identified three needs within this review: first, issues of immediate concern recommended by the NTSB and public comments; second, the requirements for aircraft operations in today's environment; and finally, the requirements for pilots in the year 2010 and beyond. Accordingly, the regulatory review was broken down into three phases corresponding to the needs identified above.

This final rule completes Phase 1 of the regulatory review with amendments to the regulations regarding immediate issues. The amendments to this rule are based on recommendations from the NTSB and comments from training schools, aviation associations, aviation industries, and the public. Two public hearings for this Phase 1 rulemaking were held prior to the drafting and publishing of Notice of Proposed Rulemaking (NPRM) No. 89-14 (54 FR 22852; May 26, 1989). The two hearings were held in Washington, DC (July 26-27, 1988) and in Oshkosh, Wisconsin (August 3-4, 1988) (53 FR 24178; June 27, 1988).

Phase 2 of the regulatory review addresses parts 61 and 141 issues that require more extensive research. Any proposed changes to part 143 will also be addressed in this phase. Phase 2 began simultaneously with Phase 1 and will culminate in a second rulemaking action. Additional public hearings to discuss issues under study in Phase 2 were held in Washington, DC (September 12-13, 1989); Chicago, Illinois (September 19-20, 1989); Los Angeles, California (October 3-4, 1989); and Orlando, Florida (October 16-17, 1989). A Notice of Hearings (54 FR 22732; May 25, 1989) outlined the general topics for the public hearings; transcripts are available for review in Docket No. 25627. Phase 2 also includes a Pilot/Flight Instructor Job/Task Analysis (JTA), completed on March 31, 1989, which incorporated the results of a study on areas of pilot knowledge, skills, abilities, and attitudes required in today's aviation environment. The JTA will provide a foundation for the regulatory review in the development of testing requirements and training standards and materials. A Notice of

Availability published in the Federal Register (54 FR 22735; May 25, 1989) announced that the JTA is available for examination in Docket No. 25627 or for purchase on a floppy diskette from the National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22161.

Phase 3 is currently in a preliminary stage of development. It will be a broader, long-term approach that will address pilot and flight instructor requirements for the year 2010 and beyond. Although there is no schedule for completion of Phase 3, an NPRM and Final Rule will be published in the Federal Register for public comment as that stage develops.

## Discussion of Public Comments and the Amendments

This final rule is based on NPRM No. 89-14 (54 FR 22852; May 26, 1989). The rule amends parts 61 and 141, which address pilot and flight instructor training and certification.

Within part 61, the rule establishes the following: a requirement for a flight instructor endorsement for pilots operating tailwheel airplanes; a training requirement for high altitude airplanes; a training requirement for pilots obtaining airplane type ratings; the addition of aeronautical knowledge training on stall and spin awareness and recovery techniques to the basic subject areas of required training; a requirement for a flight instructor endorsement certifying that initial flight instructor candidates have received flight instruction and are proficient in spin and spin recovery techniques; and a requirement for a spin demonstration on a retest for flight instructor certification if the candidate fails either the oral or flight portion of the practical test due to deficiencies in stall/spin awareness and associated procedures and techniques. In response to public comments received on NPRM No. 89-14, the proposed modification of part 61 flight review requirements is not contained in this rulemaking. With regard to the flight review, this final rule instead contains a provision that allows satisfactory completion of a phase of an FAA-sponsored pilot proficiency award program (described in Advisory Circular No. 61-91F, which will be discussed in further detail under the flight review section of this preamble) to suffice for the flight review requirements.

Within part 141, this final rule modifies the requirement that chief instructors be on site while a school is conducting instruction by permitting chief instructors to be available by electronic means; permits pilot schools

to establish satellite bases beyond the present 25-nautical mile limit; eliminates the 100-hour recency of instruction experience requirement for designation of chief flight instructors; and reduces the total experience time required of assistant chief flight instructors.

This final rule contains certain amendments to part 61 that were not discussed in the NPRM because of a separate rulemaking action concerning recreational and non-instrument-rated private pilots, that did not become effective until after NPRM No. 89-14 was published. These additional amendments, discussed in more detail later in this section, make this rule consistent with Amendment 61-82, "Certification of Recreational Pilots and Annual Flight Review Requirements for Recreational Pilots and Non-Instrument-Rated Private Pilots with Fewer than 400 Flight Hours" (54 FR 13028; March 29, 1989). These additional amendments (§§ 61.97 and 61.98) conform to changes already adopted and codified in the FAR.

In addition, this rule contains certain "cleanup items." For example, certain rules have been eliminated because those rules contain expiration dates that have passed. The FAA agrees with public comments that the use of gender classification in the regulations is not appropriate, and has made revisions in the terminology of sections where gender-specific pronouns were used. Other editorial and cleanup changes that are not addressed by this rulemaking will be addressed in Phase 2 of this regulatory review.

Two dockets, Nos. 25627 and 25910, were opened to receive comments on Phases 1 and 2 of this regulatory review. The first docket, Docket No. 25627, was established to receive comments throughout the entire regulatory review and will remain open until the FAA makes notification of its closing. Docket No. 25627 was established to facilitate the orderly flow of collecting comments, recommendations, and ideas from the public. The second docket, Docket No. 25910, was established to receive specific comments from the public on NPRM No. 89-14 upon which this final rule document is based. As a result of the two dockets, there was some confusion among the public as to which docket pertained to NPRM No. 89-14. Because some comments were addressed to the incorrect docket, the FAA has considered public comment on NPRM No. 89-14 from several official sources. These sources are as follows:

- Docket No. 25910. This docket was established under NPRM No. 89-14 (54 FR 22852; May 26, 1989) with publication of the proposed rule. The FAA requested

that written public comments on this NPRM be submitted to Docket No. 25910 on or before August 24, 1989. Also, the FAA invited interested persons to participate in the making of the proposed rules by submitting written data, views, or arguments. Comments concerning the economic, environmental, federalism- or energy-related implications of the proposals contained in the notice were also invited.

- Docket No. 25627. As discussed above, this docket was established to receive comment on the entire regulatory review. The Notice of Hearings (54 FR 22732; May 25, 1989) and the Notice of Availability (54 FR 22735; May 25, 1989) for Phase 2 requested that written comments related to those hearings and the JTA be submitted to Docket No. 25627. A number of the written submissions received in that docket, however, referred to Phase 1 proposals. The FAA stated in NPRM No. 89-14 that Docket No. 25627 would remain open until the FAA gives notice that the docket is closed, as a means of receiving information from the public throughout the regulatory review.

- The Phase 2 public hearings. Although these hearings were not intended to discuss the Phase 1 NPRM, members of the public took the opportunity to address, through oral presentations as well as written submissions to Docket No. 25627, proposals contained in NPRM No. 89-14. The notice announcing those hearings invited the public to address specific questions related to Phase 2 of the regulatory review, but also to express any additional views and recommendations for changes to parts 61, 141, and 143. Thus, these recent hearings became a forum for discussing the Phase 1 NPRM.

Thus, the FAA sought to give every possible consideration to issues raised and data presented by the public at all stages of the rulemaking. Authority for consideration of comments received after the official closing date is found in § 11.47, which permits consideration of late filed comments so far as possible, without incurring expense or delay. The FAA believes that all interested persons have been given an opportunity to participate in the rulemaking and due consideration has been given to all views presented.

From the sources described above, the FAA recorded a total of 297 specific comments from 112 commenters responding to proposed amendments addressed in NPRM No. 89-14. Many comments focused on the expanded flight review proposal and on the

proposed endorsement for tailwheel airplanes. Seventy-eight comments referred to the proposed changes to the flight review; 64 of these comments opposed the proposal. Forty-four comments referred to the proposal for changes to tailwheel airplane operations; 26 of these comments opposed the proposal.

All comments received on the following three proposals were in support: the requirement that flight instructor candidates receive flight instruction and demonstrate proficiency in spin and spin recovery techniques (18 comments); the clarification of the requirement for chief and assistant chief instructor availability to include availability through electronic means (17 comments); and the elimination of the 25-nautical mile limit between satellite bases and the main operations base (12 comments).

In addition to specific proposals, some commenters raised other related issues. One commenter recommended a change in the pass-rate requirement for part 141 school recertification. Although related, the pass-rate requirement was not an issue in NPRM No. 89-14 and has therefore not been addressed in this final rule. The Aircraft Owners and Pilots Association (AOPA) and several other commenters stated that they see no need for a regulatory review on parts 61, 141, and 143. However, as stated in the background section of this preamble, the FAA found sufficient amendments and exemption actions since the last major revisions to parts 61 and 141 in the mid-1970's to warrant this review.

Other comments that did not specifically apply to any particular proposal addressed in NPRM No. 89-14 included 12 comments opposing Amendment 61-82, "Certification of Recreational Pilots and Annual Flight Review Requirements for Recreational Pilots and Non-Instrument-Rated Private Pilots with Fewer Than 400 Hours" (54 FR 13028; March 29, 1989). One of these commenters suggested that the annual flight review contained in that amendment be a function of how frequently a pilot flies, not cumulative flight hours. The commenter suggested that a pilot who has flown fewer than 12 hours in the previous year be required to complete an annual flight review regardless of the pilot's total flight time. A pilot who has flown more than 12 hours in the previous year would be required to complete a biennial review, under that suggested system. The annual flight review is not an issue within this regulatory proposal. However, the FAA has received a petition for rulemaking from AOPA to delete the annual flight

review rule. AOPA, in its petition, took issue with the data used by the FAA for implementing new § 61.56(d). The FAA is reviewing AOPA's petition. When completed, the FAA response will be published in the *Federal Register*.

The comments received on NPRM No. 89-14 reflect the views of a broad spectrum of the aviation public. These included individuals, organizations representing professional and general aviation pilots, major training organizations, industry representatives, and state aviation agencies. Twelve of the principal organizations to respond to NPRM No. 89-14 were the Air Line Pilots Association (ALPA), AOPA, AOPA Air Safety Foundation (AOPA ASF), Experimental Aircraft Association (EAA), Embry-Riddle Aeronautical University (ERAU), FlightSafety International, General Aviation Manufacturers Association (GAMA), Michigan Aeronautics Commission, National Air Transportation Association (NATA), Society of Experimental Test Pilots (SETP) in association with Safe Action in Flight Emergency (SAFE), Soaring Society of America (SSA), and the Wisconsin Bureau of Aeronautics.

The following is a discussion of issues addressed in the comments in accordance with the major areas covered by the proposed amendments in NPRM No. 89-14. These areas are tailwheel operations, high altitude training, airplane type rating curricula, flight reviews, spin awareness training, flight instructor spin training, spin demonstration on a retest for flight instructor certification, chief instructor availability, chief and assistant chief flight instructor qualifications, and satellite bases. The discussion includes an explanation of the FAA's views on each issue and a description of the final amendment.

#### *Tailwheel Airplanes*

NPRM No. 89-14 proposed a requirement for pilots to receive a one-time flight instructor endorsement in order to act as pilot in command of a tailwheel airplane. The endorsement would certify that the pilot is competent in normal and crosswind takeoffs and landings, wheel landings, and go-around procedures. The proposal was aimed primarily at new tailwheel airplane pilots with experience only in tricycle gear airplanes.

Forty-four comments were received on this proposed amendment. Eighteen commenters favored the endorsement and 26 opposed it. Principal supporters of the amendment were ERAU, the Michigan Aeronautics Commission, SSA, SETP, and the Wisconsin Bureau of Aeronautics. These and other entities

expressed their support of the proposed amendment by citing the unique characteristics of tailwheel airplanes, particularly in the take-off and landing phases of operations.

Several commenters suggested modifications to the proposed amendment. For example, SSA suggested that proposed § 61.31(g) and related advisory materials refer specifically to "normal full-stall landings" and to "situations which may call for wheel landings."

**Note:** A "normal full-stall landings" is a landing where the airplane is landed with the engine at idle power upon touchdown and just a few inches prior to touchdown the airplane is fully stalled. A "wheel landing" is where some engine power is used to assist the airplane to touchdown on its front main wheels. SSA pointed out that many poor landings in tailwheel airplanes are often attributed to a pilot's over-reliance on wheel landings.

The Wisconsin Bureau of Aeronautics recommended changing the wording of proposed § 61.31(g) to read: "Tailwheel Airplanes. No person may act as pilot in command \* \* \*" to standardize the tailwheel endorsement requirement. This change would make the requirement mandatory for all pilots who are making a transition to tailwheel airplanes and who have had no tailwheel experience prior to the effective date of this amendment. The proposal, drafted before the Recreational Pilot final rule was issued, referred to holders of private, commercial, or airline transport pilot (ATP) certificates.

Several commenters, including ERAU and the Michigan Aeronautics Commission, expressed concern about flight instructors who issue the endorsement, recommending that those instructors should have some specified minimum experience in tailwheel equipped airplanes. None of the supporters favored requiring a flight review for tailwheel airplanes.

AOPA, AOPA ASF, EAA, and NATA were among the principal opponents of the tailwheel endorsement requirement. Several of the opponents noted that the FAA had previously rejected NTSB Safety Recommendations A-80-24 and A-80-25, which called for both increased currency requirements and an instructor endorsement for tailwheel airplane operations. The recommendations cited a fatal 1979 landing accident involving a Piper PA-18 Super Cub flown by a pilot with limited experience in tailwheel airplanes.

These organizations stated that an adequate flight check of tailwheel pilots should suffice because a flight check

requires the same basic skills and knowledge as learning to fly any other airplane. NATA and other commenters noted that insurance companies and aircraft rental companies normally require a checkout as a prerequisite to rental, and that responsible individuals request proper training before operating a tailwheel airplane. NATA suggested that the FAA encourage student pilot awareness rather than enact what the organization described as an unnecessary additional regulatory requirement. AOPA said that on the basis of NTSB data for 1983-1988, it concluded that approximately 6 percent of all tricycle gear airplanes and 5 percent of all tailwheel airplanes were involved in landing accidents, and that 9 percent of all tricycle gear airplanes and 12 percent of all tailwheel airplanes were involved in takeoff accidents.

The FAA has examined accident data for tailwheel airplanes, as well as comparisons of data for tricycle gear and tailwheel airplanes. These comparisons are based on estimates, because the FAA does not maintain statistics on the composition of the general aviation fleet by type of landing gear; that is, the FAA lacks exact figures on the number of active tailwheel vs. tricycle gear airplanes. However, based on overall fleet information, the FAA has updated its estimates of fleet composition in order to have a basis for estimating relative accident rates. NTSB accident reports do indicate the airplane's landing gear configuration, and the FAA has examined these data in the context of the fleet composition estimates. This review reaffirms the FAA's belief that the data support its previous conclusions, as well as the NTSB's conclusion in the study *Single-Engine, Fixed-Wing General Aviation Accidents, 1972-1976* (NTSB-AAS-79-1), that tailwheel airplanes have proportionately more takeoff and landing accidents than tricycle gear airplanes.

As part of this review, a comparative study was done of tailwheel versus tricycle gear takeoff, landing, and taxi accidents using 1983-1988 data compiled from the NTSB Data Research Branch, the *1988 General Aviation Activity and Avionics Survey*, and the *1988 Census of U.S. Civil Aircraft*. This study focused on takeoff, landing, and taxi accidents, because they are more likely to reflect the different landing gear configurations than are accidents in cruise flight.

The FAA estimates that, in 1988, tailwheel airplanes comprised about 19 percent of the total active general aviation piston-powered airplane fleet—about 37,000 tailwheel compared with

approximately 155,000 tricycle gear airplanes, including both retractable and fixed gears. Nevertheless, tailwheel airplanes accounted for 26 to 29 percent of accidents in landing, takeoff, and taxi phases of flight for that group of airplanes. For example, in 1988, tricycle gear airplanes had 1,098 accidents in these phases of operation, compared with 455 for tailwheel airplanes.

If the data are converted into accident rates (accidents per aircraft), the results show a much higher rate for tailwheel than for tricycle gear airplanes. In 1988, the rate of tailwheel accidents in the takeoff, landing, and taxi phases of flight on a per aircraft basis was 74 percent higher than for tricycle gear airplanes. For the period covered by the study, tailwheel accidents per aircraft averaged 60 percent higher than tricycle gear accidents per aircraft.

In addition, the FAA is persuaded that this amendment will not impose a significant burden on pilots. Many commenters, although opposed to the amendment, assert that most pilots already obtain an adequate "checkout" prior to renting or insuring a tailwheel airplane. However, if this is the case, the FAA believes that this amendment will mainly serve to ratify an already common practice and, additionally, will extend this worthwhile practice to that minority of pilots who would not otherwise obtain sufficient initial tailwheel training.

The higher accident rate and the fact that this type of initial or transition tailwheel training is already commonplace indicate that the proposed instructor endorsement is both warranted and reasonable. The FAA is therefore adopting the proposed amendment in this final rule.

This final rule adds § 61.31(g) to the FAR, requiring a one-time flight instructor endorsement for a person to act as pilot in command of a tailwheel airplane. Advisory Circular No. 61-98A, "Currency and Additional Qualification Requirements for Certificated Pilots," has been prepared to address this new training requirement and other requirements for maintaining currency as a certificated pilot, and will be available at Flight Standards District Offices (FSDO's). The requirement for this endorsement will apply to new tailwheel pilots only. Pilots who have logged pilot-in-command time in tailwheel airplanes prior to the effective date of this rule are excepted from this requirement. However, the FAA highly encourages all pilots who operate tailwheel airplanes to receive training in those airplanes.

The final wording has been modified in accordance with the Wisconsin

Bureau of Aeronautics' suggestion noted previously. Thus, instead of referring to specific pilot certificates such as private, commercial, or ATP, the rule refers to any person who acts as pilot in command. This wording is simpler and more comprehensive than the version contained in the proposal.

A second modification made to the originally proposed amendment is in the description of maneuvers to be covered by the flight instructor prior to issuing the endorsement. The NPRM proposed normal, crosswind, and wheel landings. The following qualification has been added to the requirement for wheel landings: "unless the manufacturer has recommended against such landings." The intent of the rule, as observed by SSA in its comment on the proposal, is to ensure that pilots are trained in performing wheel landings in situations that may call for wheel landings, but not to have pilots conduct operations unsuitable for a particular aircraft.

A third and final change in the tailwheel endorsement requirement in this final rule entails eliminating the reference in the rule to "recovery from bounced landings." The rule instead refers to go-around procedures in a general sense. The phrase "recovery from bounced landings" was deleted to eliminate any implication of intentional bounced landings to meet this requirement. Reference to go-around procedures in the regulation is intended to cover go-arounds from unsatisfactory landings, including bounced landings. The intent of this rule is not to require tailwheel pilots to intentionally put the airplane in a situation that could result in an unsatisfactory or unsafe landing, but rather to train in recovery procedures.

This amendment does not contain a requirement for a flight review in a tailwheel airplane nor does it contain a minimum tailwheel hour requirement for instructors providing the endorsement. The FAA continues to believe that additional currency requirements are unnecessary. Likewise, the FAA has seen no justification thus far for a minimum hour requirement for tailwheel flight instructors. However, as a result of this amendment and other amendments included in this final rule, a clarification has been made to § 62.193 "Flight Instructor Authorizations," to authorize flight instructors to provide the training and endorsements required by the tailwheel amendment, the high altitude training and type rating amendments to be discussed in the next section, and the high performance endorsement requirement.

#### *Special Requirement: High Altitude Training and Airplane Type Rating Training*

NPRM No. 89-14 proposed two related requirements aimed at pilots who progress to sophisticated, high altitude airplanes. Most of these airplanes require type ratings. Other airplanes, however, are pressurized and capable of high altitude operations, but do not require type ratings. This final rule, as proposed in the NPRM, includes new training requirements for pilots making a transition to high performance, high altitude airplanes. Advisory Circular No. 61-107 ["Operations of Aircraft at Altitudes Above 25,000 feet MSL and/or MAC Numbers (Mmo) Greater Than .75"] will be available to guide both pilots and training organizations in the implementation of the new training requirements. The material is based on current practices, Advisory Circulars, manufacturers' information, and other sources.

#### (a) High Altitude Flight and Ground Training Requirements

NPRM No. 89-14 proposed a requirement for pilots to complete ground and flight training on high altitude flight prior to transitioning to a pressurized airplane with a service ceiling or maximum operating altitude, whichever is lower, above 25,000 feet mean sea level (MSL).

Some of the pressurized airplanes that will be affected by this new high altitude training rule are:

1. Piper Aircraft Company: Piper Cheyenne Series 31T, 31T-1, 31T-2, 42-700, and 42-1000; Piper currently does not manufacture any single engine airplanes that will be affected;
2. Cessna Aircraft Company: Cessna 414, 421, 425, 340, and 441; Cessna 500 series; and Cessna 600 series; Cessna currently does not manufacture any single engine airplanes that will be affected;
3. Beech Aircraft Company: Beech King Air Series 90, 100, 200, 300, 350; Beech 2000 (Starship); and Beech 400 (Beech Jet); Beech currently does not manufacture any single engine airplanes that will be affected;
4. Mooney Aircraft: Mooney currently does not manufacture any single engine airplanes that will be affected; and
5. Others: EMB-120; MU-300; G-1159; SA-226/227; SF-340; and F-28.

Note: This is not an all-inclusive list, but merely a representative sample of pressurized airplanes that will be affected by this new high altitude training rule.

Thirty-three comments on high altitude training were received. Eighteen

respondents favored the requirement and 15 opposed it. Opponents of the proposal generally favored maintaining present regulations. Several commenters said that the industry has policed itself by including this training in its own programs.

AOPA ASF expressed limited support for such an amendment. In lieu of adding a new section, AOPA ASF suggested an addition to current § 61.31(e) (which requires an instructor endorsement for high performance airplanes) that would require an endorsement for a pilot to fly a pressurized airplane that has "a service ceiling or maximum operating altitude, whichever is lower, above 25,000 feet MSL."

GAMA and SSA, both supporters of the proposal, recommended deleting from the proposed rule the reference to including in the curriculum "the history and causes of some past accidents and incidents involving the pressurization of systems of the airplane." SSA questioned the availability of the historical information, and said other aspects of the proposal would cover the most likely accident causes related to pressurization systems. GAMA found the language inappropriate for a regulation, even though the concept of learning from past mishaps may be a useful learning tool.

ALPA, which also supported the proposal, stated that a pilot who flies at an altitude where hypoxia or other physiological problems may affect performance should understand those phenomena.

AOPA and EAA both said that the FAA had not presented significant evidence in support of the proposal. They said they believe that the selection of 25,000 feet MSL was arbitrary and without foundation. AOPA said it would support an Advisory Circular outlining recommended high altitude training. One other commenter recommended a generic high altitude rating for pilots who fly above 14,000 feet MSL.

As stated in the NPRM, there has been concern among the NTSB, the FAA, and the public about the ability of general aviation pilots to make a transition to pressurized high performance airplanes, including turbine-powered airplanes capable of high altitude flight, without sufficient appreciation of the capabilities and limitations of these airplanes. The proposed training requirements include ground training on high altitude aerodynamics and meteorology, hypoxia and other high altitude sickness problems, the effects of prolonged usage of supplemental oxygen, and other physiological aspects of high

performance, high altitude flight. There also is a flight training requirement to perform a flight in an airplane or an approved simulator at an enroute altitude above 25,000 feet MSL at normal cruise. While current criteria may require a pilot to demonstrate ability to control the airplane under normal flying conditions, they do not ensure that the pilot is competent to cope with other demands consistent with the unique characteristics of the airplane in a high altitude environment.

The determination of 25,000 feet MSL as high altitude for the purpose of these amendments has been made on the basis of established requirements including § 91.32(b)(i), which requires supplemental oxygen for pressurized aircraft flying above flight level (FL) 250, and §§ 121.417(e) and 135.331(d), which require advanced instruction in hypoxia, respiration, and other factors and emergencies related to high altitude flight for crewmembers who serve in operations above 25,000 feet MSL. Certain supplemental oxygen requirements under §§ 121.331 and 121.333 also begin above FL 250.

The FAA has also taken note of comments in support of adding a requirement for pilots to attend a physiological training course including the use of a high altitude chamber. Although such additional training would be beneficial, this issue goes beyond the scope of the initial NPRM, and would therefore be inappropriate to add at this time. However, the FAA invites further public comment and may consider the issue in Phase 2 of the regulatory review.

As a matter of clarification, and in response to recommendations received at the public hearings, § 61.31(f)(1)(ii) has been modified from the wording published in NPRM No. 89-14. The FAA wants instructors to understand that the intent of this rule is to require rapid descents only to simulate emergency "rapid decompression" procedures, not to perform any act that would actually depressurize the airplane. In one specific accident that occurred a few years ago, evidence indicated that the instructor may have deliberately depressurized the airplane. The FAA wants it known that it does not condone any deliberate rapid depressurization of an airplane in a nonemergency situation. Rapid depressurization of an airplane is an extremely dangerous procedure and should never be done intentionally for training purposes. The FAA has determined that a transfer of knowledge and skills can be obtained by receiving training on emergency descent procedures. This training will require the trainee to don the oxygen mask, turn on

the supplemental oxygen controls, configure the airplane for an emergency descent, and perform the emergency descent.

Based on public comment and NTSB Safety Recommendations A-82-127 and A-82-128, the FAA believes that aviation safety would be served by requiring high altitude training, as proposed. Simply requiring an instructor's endorsement for high altitude airplanes, without specifying the training in the rule, as AOPA ASF suggests, would fall short of the intent of this regulation. The rule establishes that training in high altitude operations is specifically required for the pilots of the affected airplanes. The flight training above 25,000 feet MSL required by this amendment is intended for normal cruise flight. Simulated depressurizations and rapid descents required by this rule can be practiced below 25,000 feet MSL. Additional guidance on high altitude training will be available in Advisory Circular No. 60-21, "Announcement of Availability: A Series of Aeronautical Decision Training Manuals."

Section 61.31(f)(1)(ii) permits the flight training to be accomplished in a simulator that meets the requirements of § 121.407. An additional rulemaking is in progress to expand the use of simulators under part 61 and eliminate the need for cross references.

The rule contains a "grandfather" provision, so that pilots already qualified in a pressurized airplane with a service ceiling or maximum operating altitude, whichever is lower, above 25,000 feet MSL would not be required to undergo the training. In addition, prior accomplishment of a pilot proficiency check for a pilot certificate or rating, either in an appropriate airplane or in a simulator that meets the requirements of § 121.407, would meet the intent of the "grandfather" provision. The rule also contains a provision allowing a pilot-in-command check by the U.S. military or one completed under part 121, 125, or 135 to substitute for the requirement if that check is either in an appropriate airplane or in a simulator that meets the requirements of § 121.407.

The FAA invites further public comment during Phase 2 of this regulatory review, on the issue of special qualifications or requirements for flight instructors who provide this high altitude training. For example, the Michigan Aeronautics Commission expressed concern over the lack of experience requirements in the amendment for flight instructors giving training above 25,000 feet MSL. The Commission proposed that the

requirements for flight instructors who perform this training include training in a high altitude chamber, attending ground training on physiological effects of high altitude flight and aerodynamics, and establishing a base level of flight experience.

One modification to the NPRM proposal requires a high altitude logbook "endorsement" rather than a "written statement" as stated in NPRM No. 89-14. This change was made throughout the rule to make the terminology of the new amendments consistent with current regulations. Current regulations require either a logbook "endorsement" or simply that a flight instructor "certify" in the pilot's logbook or training records that training has been provided. A "sign-off" on a part 61 or 141 training record would be acceptable for purposes of high altitude training. The addition of the new term "written statement" would only create confusion.

A second modification to the proposal stated in the NPRM deletes the clause "the history and causes of some past accidents and incidents involving the pressurization of systems of the airplane" from proposed § 61.31(f)(1)(i). This clause was removed after consideration of comments received from GAMA and SSA.

#### (b) Airplane Type Rating Training

NTSB Recommendations A-82-127 and A-82-128 state that a structured training curriculum for pilots applying for a type rating in turbojet airplanes would ensure an acceptable level of knowledge of turbojet performance characteristics and operating environment. Public comments on this issue prior to formulation of the NPRM, including statements from AOPA, AOPA ASF, and NATA, generally supported the tenor of this recommendation.

NPRM No. 89-14, therefore, proposed to establish a training curriculum requirement appropriate to the airplane type rating being sought. The NPRM proposal extended the scope of the NTSB recommendations to include all airplanes requiring type ratings rather than limiting the training to pilots of turbojet airplanes.

Seventeen public comments were received on the issue of airplane type rating curricula. Eleven favored the amendment and 6 opposed it.

AOPA, AOPA ASF, and EAA expressed opposition based on the present flexibility of curricula available to ATP and airplane type rating applicants. They stated that inclusion of a curriculum in the FAR would unnecessarily require future amendments to follow the rulemaking

process, thus slowing the process of meeting new demands, technologies, and innovations.

GAMA, SETP, FlightSafety, and other supporters of the amendment expressed views on the importance of improved training. ALPA expressed support of the proposal and stated that the proposal would provide for standardized and appropriate airplane type rating training. GAMA supported the proposal and said it believes the curriculum should include all items currently required by the ATP practical test. GAMA recommended revising the proposed curriculum to include standards for crew coordination, use of standard operating procedures, and judgment/pilot decision making. Resolving these issues is beyond the scope of this final rule, but further consideration will be given in Phase 2 of the review.

The FAA understands the concern regarding limited flexibility in adjusting curricula to meet changing technology. However, AOPA, AOPA AFS, and EAA appear to have misunderstood the NPRM proposal to read that the curriculum itself would be included in the rule. The amendment proposed in NPRM 89-14 would simply have established a requirement for a minimum airplane type rating curriculum. The FAA believes that an appropriately structured curriculum can permit sufficient flexibility, while at the same time respond to an identified need for more standardized training as the number and sophistication of turbine powered aircraft increase. A sample curriculum is outlined in Advisory Circular No. 61-89D; "Pilot Certificates: Aircraft Type Ratings" and is discussed in further detail later in this preamble.

This rule amends §§ 61.63, 62.157, and part 141 Appendix F and Appendix H to add completion of specific training to the list of requirements for obtaining an airplane type rating. The training will include the maneuvers and procedures of part 61 Appendix A "Practical Test Requirements for Airplane Airline Transport Pilot Certificates and Associated Class and Type Ratings," as appropriate to the airplane for which the type rating is sought. Pilots who obtain airplane type ratings through other approved programs, such as programs under parts 121, 135, and 141, or training centers operating under exemption, already receive training under approved curricula and therefore already meet the intent of this rule. They will face no additional training requirement.

The FAA has deleted the words "minimum curriculum" and "approved curriculum" from the proposed type-rating amendment in NPRM No. 89-14 to eliminate the requirement for FAA

approval of training curricula. After review of the potential paperwork burden on the public and the additional workload on the FSDO's, the FAA has agreed to delete the FAA approval requirement. By providing a generic curriculum in Advisory Circular format and by specifically requiring that the training include the maneuvers and procedures of part 61, Appendix A, the FAA sees no need for required approval.

Advisory Circular No. 61-89D will be available at FSDO's, and contains a generic curriculum that will serve as a base upon which the school can elaborate in accordance with specific airplane data. The Advisory Circular emphasizes the building block method of learning.

#### Flight Reviews

Notice 89-14 proposed modification to the flight review requirements of § 61.57 (now covered in § 61.56). Under the proposal, pilots would have been required to complete a flight review in every category and class of aircraft in which they desired to exercise pilot-in-command privileges. The flight review would have consisted of ground and flight training appropriate to the level of certificate held for that category and class of aircraft. Multiengine airplane flight reviews would have sufficed for single-engine airplane reviews.

The proposal was formulated in part on the basis of input from the NTSB and the public. The NTSB, in its Recommendations A-79-96 and A-79-97, focused on multiengine airplanes. The Board cited a higher rate of fatal accidents related to engine failure in light twin-engine airplanes than in single-engine airplanes, and urged the FAA to adopt a requirement that the pilot in command of a multiengine airplane have successfully completed, within the previous 24 calendar months, a flight review in a multiengine airplane.

Some members of the public, prior to publication of NPRM No. 89-14, had advocated that flight reviews be taken in the most "complex" aircraft flown by a pilot. However, certain segments of the public, notably representatives of AOPA, advocated that changes affecting the scope and content of flight reviews be handled through advisory rather than regulatory methods.

The FAA's intent with the proposal was to respond to the increasing demands of aviation technology and the National Airspace System, and issues of pilot training and recurrent training requirements. General aviation pilots increasingly use sophisticated avionics and aircraft, and some representatives of helicopter, glider, and balloon pilot

groups and industry stated that category-specific flight reviews, at least, are necessary. The FAA, as well as the NTSB and segments of the aviation community, have noted with some concern that under current regulations, pilots may never need to seek additional training or evaluation by an instructor in a particular category or class of aircraft after receiving their initial certification. A flight review in a light single-engine airplane or a glider is legally sufficient under the existing rules for exercising pilot-in-command privileges in a sophisticated twin-engine airplane or helicopter.

Public reaction to the proposed revisions in NPRM No. 89-14 was largely negative. Seventy-eight comments were received on the flight review proposal in NPRM No. 89-14. Of those, 64 opposed the amendment. Opponents included AOPA, AOPA ASF, EAA, and NATA. The 13 commenters who favored the flight review proposal in NPRM No. 89-14 included ALPA, ERAU, FlightSafety, GAMA, the Michigan Aeronautics Commission, SSA, and the Wisconsin Bureau of Aeronautics.

The public, while expressing a widespread interest in continuing education for pilots, indicated significant disagreement with the approach set forth in the flight review proposal. Much of the general aviation community indicated that many or most pilots, due to prudence, insurance policy stipulations, or continued strong personal interest in maintaining and improving their piloting skills, already seek more than the legal minimum of recurrent training. However, many of those commenting stated that additional regulatory requirements would constitute a significant burden.

Opposition to the proposal centered on expected costs to individual pilots with multiple category and class certificates and ratings who currently fly different types of aircraft. In addition, a number of commenters expressed the view that pilots sufficiently regulate themselves in terms of recurrent training and do not need additional FAA-imposed requirements. One commenter stated that the FAA had substantially underestimated the number of pilots that would be affected. Based on airman registration data, the commenter said 66,755 pilots had multiple certificates and ratings. The FAA's projected costs were based on an estimate that 55,000 pilots would be affected by the multiple category and class flight review aspect of the proposal.

Although AOPA supported encouraging that a flight review be accomplished in the "most complex

class of aircraft" to be flown, AOPA, AOPA ASF, and EAA commented that there were no safety data to justify the proposal. AOPA ASF said its review of NTSB data indicated that of pilots involved in accidents while flying a multiengine airplane, 80 percent had taken a flight review in a multiengine airplane and only 13 percent had taken a flight review in a single-engine airplane. EAA and AOPA expressed their opinion that the class of aircraft the biennial flight review (BFR) is conducted in should continue to be left to the discretion of the individual and their instructor by mutual agreement. They emphasized that the FAA had not substantiated a need for adopting the proposal.

On the other hand, supporters of the flight review proposal, such as GAMA, stated that differences between categories are too great to allow one to suffice for another. GAMA said that the same applied to aircraft classes. ALPA expressed concern that a pilot could take a single-engine airplane flight review and fly multiengine airplanes.

Several commenters, including some who generally supported most aspects of the proposal, objected to a provision that would have required the flight review training to be appropriate to the level of pilot certificate for that category and class. Other commenters suggested modifications to the proposal, such as rotating flight reviews in different categories and classes, or grouping aircraft in more general classifications for purposes of the flight review. For example, a multiengine airplane flight review would suffice for all other fixed-wing aircraft, including gliders, landplanes, and seaplanes.

The FAA has given extensive consideration to the comments submitted, and acknowledges that further analysis of the flight review issue is needed. As stated in the NPRM, it is difficult to derive actual cost figures for requiring flight reviews in each category and class of aircraft that a pilot exercises pilot-in-command privileges. This is because there are gaps in the registration statistics, and because it is difficult to verify how many pilots with more than one category and class on their certificate actively fly all those categories and classes of aircraft on their certificate.

AOPA ASF's research showing that 80 percent of pilots involved in multiengine accidents had taken flight reviews in multiengine aircraft appears significant. AOPA ASF's written comments did not specify the time period covered, total number of accidents, or other details. In response to EAA, AOPA, and AOPA ASF's comments, the FAA collected

recent data on accidents, incidents, pilot deviations, and near mid air collisions. This data was analyzed in conjunction with NTSB data files on accidents following engine failures or malfunctions in light twin-engine aircraft that occurred from 1972 through 1976. The FAA found that the percentage of fatal light-twin accidents following engine failures is more than four times that for single-engine aircraft. However, recent accident, incident, pilot deviation, and near mid air collision data revealed a significant decrease in each category between 1987 and 1989. In analyzing these decreased numbers, the FAA examined NTSB accident and BFR data. A sampling taken of 1985-1987 NTSB accident records showed that 96 percent of the pilots involved in accidents conducted their BFR's in the same category and class of aircraft that the accident occurred in. The FAA found that 56 percent of those pilots conducted their BFR in the same make and model of aircraft. Furthermore, only 2 percent of the accidents occurred in multiengine airplanes where the pilots had taken their BFR in a single-engine airplane.

**Note:** There were 3,301 accident records reviewed which represent 42 percent of total general aviation accidents for the years 1985 through 1987.

Therefore, the analysis of the accident data does not support the flight review proposal in NPRM No. 89-14. The FAA believes the decrease in accidents over the period reviewed may be attributed in part to increased voluntary proficiency training. This training can be seen, for example, in the increased number of instrument ratings issued between 1986 and 1988, and in increased participation in the Pilot Proficiency Award Program (also known as the "Wings" Program) over the same period.

Throughout this regulatory review, the FAA has sought to remain responsive to public input on the issues and proposals at hand. Full public participation has been sought and received throughout each step of the process, and the participation was particularly forceful in response to the flight review proposal of NPRM No. 89-14. Based on review of the public comments and data submitted, as well as further analysis of FAA data, the flight review amendment as proposed in NPRM No. 89-14 is not contained in this final rule. After reviewing the accident information, the FAA agrees that available data is insufficient to identify a direct link between safety problems and the expanded flight reviews proposed in NPRM No. 89-14.

The FAA believes in the value of recurrent training, and recognizes

support within the aviation community for regular training. The Pilot Proficiency Award Program (Wings Program), outlined in Advisory Circular No. 61-91F, is open to participation by all pilots holding a private pilot certificate or higher and a current medical certificate. The program provides for both recurrent ground and flight training. As stated earlier, this voluntary training program has gained increased recognition and support from the general aviation community over the past several years. Participation in the program increased by 32 percent from 1986 to 1987, and by 10 percent from 1987 to 1988.

Each phase of the Wings Program may entail some ground training and attendance in at least one safety meeting, and 2 or 3 hours of dual flight training. The safety meeting requirement can be met by attending an FAA or FAA-sanctioned aviation safety seminar, an industry-conducted recurrent training program, or a physiological training course conducted by the FAA, U.S. Air Force, or U.S. Navy. The training profile chosen for the program represents those phases of operation for each category of aircraft that have been identified from accident reports as most likely to produce accidents.

A number of commenters at the public hearings and in written comments received to the docket stated that successful completion of a phase of the Wings Program should satisfy the requirement for a BFR. The commenters believed that the Wings Program should have the same status as that afforded persons who satisfactorily complete a pilot proficiency check for a pilot certificate, rating, or operating privilege, as allowed by § 61.56(e). It is the FAA's desire to encourage further participation in the Wings Program and to accord it the proper significance for meeting recurrent training requirements. Thus the final rule provide successful completion of a phase of the Wings Program satisfies the flight review requirements of § 61.56. Advisory Circular No. 61-91F is being modified to provide for the review of part 91, "General Operating and Flight Rules." The endorsement described in that Advisory Circular must be present in the pilot's logbook or training record to meet the flight review requirements.

During the public hearings held in September and October 1989, the FAA also took note of public requests for increased standardization and guidelines for flight reviews. Several commenters noted that the approach, cost, and quality of flight reviews can vary widely from instructor to

instructor. The FAA agrees that substantially greater uniformity in flight reviews is important, and therefore is including an outline for flight reviews, appropriate to each category and class, in Advisory Circular No. 61-98A, "Currency and Additional Qualification Requirements for Certificated Pilots."

The FAA appreciates the aviation community's participation in this rulemaking process. It is important to note that the FAA seeks and encourages public comment because the agency recognizes the need to obtain data and expertise from as many knowledgeable sources as possible. This input has received and will continue to receive serious consideration.

#### *Stalls and Spins: Pilot Awareness, Training, and Testing*

NPRM No. 89-14 included three proposals regarding stall/spin training for pilots and stall/spin training and testing for flight instructors of airplanes and gliders. The spin, a controlled or uncontrolled maneuver or performance in which the glider or airplane descends in a helical path while flying at an angle of attack greater than the angle of maximum lift, was a required training maneuver for pilot certification until 1949. It was deleted from the pilot certification requirements based on the high number of fatal stall and spin accidents, most of which occurred during training. The FAA has since placed greater emphasis on spin avoidance, particularly on training in the avoidance of unintentional stalls or unwanted unusual attitudes. This shift in training requirements resulted in a significant decrease in the number of stall/spin accidents since 1949. NTSB statistics indicate that stall/spin accidents fell from 48 percent of fatal general aviation accidents during the period 1945-48, to 22 percent during 1967-69, and to 12 or 13 percent in the 1970's. The stall/spin proposals in NPRM No. 89-14 constitute an effort to further reduce the already declining incidence of spin-related accidents in general aviation. The amendments contained in this rule will broaden stall and spin awareness training by emphasizing avoidance of unintentional stalls in addition to what is currently the more common procedure of practicing recovery from intentional stalls.

#### (a) Stall and Spin Awareness Training

The first of the three basic proposals would improve stall and spin awareness ground and flight training for airplane and glider pilots at the recreational, private, and commercial levels. As a result of the creation of the recreational pilot certificate, this final rule broadens

the scope of the amendments to cover recreational pilots. This additional required training will incorporate the most effective types of training discussed in the FAA's 1976 report entitled *General Aviation Pilot Stall Awareness Training Study* (FAA-RD-77-26, September 1976). The study's emphasis is on training involving slow flight with realistic distractions and additional ground training in the subject of stalls and spins.

The new training will incorporate the essential elements of the *General Aviation Pilot Stall Awareness Training Study* in both ground and flight training for airplane and glider pilots, as recommended by the NTSB in its Recommendation A-78-43. As stated in the NPRM, the 1976 study concluded that additional ground training on stalls and spins tended to reduce the occurrence of unintentional stalls and spins. While the study concluded that "additional flight training on stall awareness and/or intentional spin training has a positive influence toward reducing inadvertent stalls and spins," it went on to state that "the most effective additional training was slow flight with realistic distractions, which exposed the subjects to situations where they are likely to experience inadvertent stalls." The study cited some examples of realistic distractions including asking the trainee to radio for weather information, getting something out of the glove compartment, picking up a dropped pencil, getting something from the rear seat, or computing true airspeed or density altitude with a flight planning computer. Indeed, the study found that spin training "might not be feasible."

General reaction to the proposal was favorable. Twenty-four commenters favored the requirement to enhance stall and spin awareness and recovery training, as proposed. All of the principal organizations commenting on the proposal, including ALPA, AOPA, and AOPA ASF favored, in varying degrees, were in favor of the expanded stall and spin awareness training. The Michigan Aeronautics Commission stated, "with additional stall awareness training, is the most germane and realistic method to teaching stalls/spins, without imposing unrealistic demands on general aviation. We believe that mandatory demonstration of spins for private and commercial pilot applicants is not in the best interest of pilots, [flight instructors], pilot examiners, and the general aviation community." SSA concurred with the revisions, but suggested a clarification in §§ 61.105 and 61.125, "aeronautical knowledge," in

which stall and spin awareness will be included.

Ten commenters opposed the stall and spin awareness training amendment. Much of this opposition was based on a preference for reinstating a requirement for actual spin training for all pilots.

SETP, in association with SAFE, was concerned that the NPRM proposal advocated ground training only. They suggested mandatory spin training in an approved utility class aerobatic trainer.

**Note of Clarification:** The required flight training for pilot applicants includes flight at slow airspeeds with realistic distractions and the recognition of and recovery from stalls entered from straight flight and from turns, but do not include a requirement for actual spin training for pilot applicants. However, actual spin entry, spins, and spin recovery training in flight is required for flight instructor-airplane and flight instructor-glider applicants.

Proponents of more extensive flight training that would include spin training maintained that stall and spin awareness and spin avoidance training make pilots afraid of spins and are ultimately unsafe. One commenter called spin awareness training a "failed concept." Other commenters said that many instructors are afraid of spins and pass that fear along to their students.

NATA, on the other hand, while supporting the NPRM proposal, said it was "disturbing that spins and stalls are always grouped together. In our view, a flight instructor should not demonstrate spins to student pilots, but rather, should concentrate on stall recognition and recovery. What should be stressed in training is the avoidance of conditions leading to a stall so that a spin is not entered into by the pilot."

That concept is the essence of what the NPRM proposed and of the amendment adopted in this final rule. While the FAA has no basis for discouraging qualified instructors from demonstrating spins or training pilots in spin entry and recovery under appropriate circumstances, the FAA is not requiring such demonstration or training. From a safety point of view, the critical element remains heightened awareness of recovery from stalls before a spin develops, as well as recognition of the conditions that can lead to inadvertent stalls. This was the conclusion of the *General Aviation Pilot Stall Awareness Training Study*.

Although the NTSB recommended in 1972 that the FAA evaluate the feasibility of requiring at least minimal spin training of all pilot applicants, the NTSB's statistics indicate that most spin accidents occur at altitudes too low for spin recovery to be effected. The 1972 NTSB *Special Study, General Aviation*

*Stall/Spin Accidents 1967-69*, found that of 1,261 stall/spin accidents during that 3-year period, 60 percent occurred during takeoff or landing. Of the remaining 40 percent, most were related to acrobatics or low-level flight from which recovery from a fully developed spin would have been unlikely. Only about 7 percent were associated with cruise flight.

Thus, based on the 1976 FAA study and accident trends, this final rule does not require spin training at any certificate level other than flight instructor. The amendments incorporate into the regulation the types of training found to be most effective by the *General Aviation Pilot Stall Awareness Training Study*, namely, slow flight with realistic distractions and additional ground training in the subject of stalls and spins, in addition to current training in stall recognition and recovery. In conjunction with the issuance of this rule, the FAA is preparing Advisory Circular No. 61-67B: "Stall Awareness and Spin Training" to clarify the additional stall and spin awareness training and to ensure that the contents of the *General Aviation Pilot Stall Awareness Training Study*, including the complete list of realistic distractions cited in that study, are made available to all pilots and pilot training schools. Additional requirements for flight instructors are discussed in the following section.

As stated in the NPRM, the rule changes affect §§ 61.105 and 61.125, aeronautical knowledge requirements for private and commercial pilot applicants. Sections 61.107 and 61.127, "flight proficiency requirements" are also affected. The new requirements will also be incorporated into pilot certification under part 141, including appendix A, Private Pilot Certification Course (Airplanes), and appendix D, Commercial Pilot Certification Course (Airplanes). And, even though the proposed amendments in the NPRM referred to private and commercial pilot training, this final rule contains additional amendments to include recreational pilot training. Accordingly, additional amendments are contained here, affecting subpart C, Student and Recreational Pilots, §§ 61.97 and 61.98. This is in keeping with the spirit and intent of the proposed amendments to emphasize the importance of increased stall and spin awareness and training for all airplane and glider pilots.

One such amendment includes the deletion of the word "critically" in § 61.98(a)(5) as applied to slow airspeeds in recreational pilot flight proficiency requirements. This was done for purposes of consistency. Eliminating

the word "critically" leaves the selection of airspeed, below cruise, to the examiner's discretion for safely testing proficiency of training in this area.

#### (b) Spin Training for Flight Instructors

The other 2 stall/spin proposals presented in the NPRM concerned satisfactory demonstration of spin entry, spins, and spin recovery by flight instructor-airplane and flight instructor-glider candidates. NPRM No. 89-14 proposed a requirement for a logbook endorsement for flight instructor-airplane and flight instructor-glider candidates that states the candidates received training in spin entry, spins, and spin recovery techniques and demonstrated satisfactory proficiency in those maneuvers. At the discretion of the FAA Inspector or Designated Pilot Examiner conducting the practical test, they may accept the logbook endorsement in lieu of an actual demonstration of spin entry, spins, and spin recovery maneuver on the practical test. The FAA also proposed in Notice No. 89-14 that flight instructor-airplane and flight instructor-glider candidates who fail the practical test due to unsatisfactory knowledge of stall awareness, spin entry, spins, or spin recovery techniques would be required to bring an aircraft to the retest that is certificated for spins. The candidate would then be required during the retest to demonstrate satisfactory knowledge and skills on stall awareness, spin entry, spins, or spin recovery techniques.

Eighteen comments were received on the issue of spin training for flight instructors. All favored the requirement for a logbook endorsement showing that flight instructor candidates have received spin entry and recovery training. AOPA also favored continued discretion for inspectors conducting examinations. FAA policy that will be maintained.

The FAA agrees with SSA's comment that any applicant seeking flight instructor certification in any airplane or glider class should be required to receive spin training. However, SSA also noted that proposed § 61.163(e) did not require spin training to be performed in the aircraft category in which the applicant seeks flight instructor certification. This would have allowed a flight instructor-glider applicant to receive required spin training in airplanes without holding an airplane category rating, as long as the flight instructor providing the training was appropriately certificated and rated in gliders as well as in airplanes. SSA also commented on the reference in

§ 61.183(e) to "an applicant for a flight instructor-airplane single-engine land." SSA said it noted no provision in § 61.5(c)(2) for the inclusion of "land" or "sea" on the flight instructor certificate, and stated that any applicant seeking flight instructor certification in any airplane class or in gliders should be required to receive spin training.

Twenty-three comments were received on the issue of flight instructor candidates demonstrating spins on the retest if the candidate failed the practical test due to deficiencies of knowledge or skills relating to stall and spin awareness. Seventeen commenters favored this amendment and 6 opposed it. ERAU stated that additional instruction and practice in spins with properly logged documentation of the instruction would be more appropriate than requiring a spin demonstration on the retest for flight instructor certification. Other commenters opposed to the amendment cited the limited number of spinable aircraft available and the additional burden of requiring more than one aircraft on the practical test in some cases. The FAA believes that the additional burden of locating a spinable aircraft and requiring more than one aircraft on the practical test in some cases, will be justified by improved safety and assurance that all flight instructors are competent and knowledgeable in the subject of spin entry and recovery. Most commenters appeared to recognize the importance of flight instructor skill and knowledge in the area of stalls and spins.

This rule amends §§ 61.49, 61.183, and 61.187 to require that applicants for flight instructor certificates, airplane and glider, present a logbook endorsement of spin training, and to require a mandatory demonstration of spins on a retest for flight instructor certification if a candidate for the aforementioned certificates failed either the oral or flight portion of the practical test due to deficiencies in stall/spin awareness and associated procedures and techniques. The examiner has the option of requiring spins on the initial flight test and retains discretion to require a spinable aircraft for that test. Thus, while the FAA intends that spin demonstration still may be required on the initial flight instructor test, airplane or glider, a demonstration of spin entry and recovery will be required on the flight instructor retest if the candidate failed because of deficiencies in knowledge or skill related to stalls or spins.

It is the intent of the FAA to ensure that all glider and airplane flight instructors can safely recognize and

recover from spins. This will require the applicant to initiate the entry into the spin maneuver, complete at least one full turn (360 degrees of rotation), and recover using acceptable FAA standards.

This final rule includes several minor changes to §§ 61.183(e) and 61.187 as proposed in the NPRM that clarify the intent of the rule. The rule specifically requires flight instructor applicants, airplane and glider, to have accomplished spin training in an aircraft of the appropriate category that is certificated for spins. Multiengine airplanes may be used for this required spin training by multiengine flight instructor-airplane applicants, only if the airplane is spin-certificated. Such airplanes exist, but are not common.

Therefore, the FAA has not included a class requirement for spin training, thus allowing multiengine flight instructor-airplane candidates to receive their spin training in single-engine, spin-certificated airplanes. The original proposal in NPRM No. 89-14 would have required only applicants for a flight instructor-airplane single-engine land or flight instructor-glider certificate to present the logbook endorsement from an appropriately certificated and rated flight instructor. Under that proposal, an applicant for a flight instructor certificate intending to take the practical test in a multiengine airplane, having never accomplished a previous flight instructor practical test in a single-engine airplane, conceivably might have by-passed this requirement. This final rule is, therefore, clarified to reflect the FAA's intention that the required logbook endorsement reflect spin training in the category in which the applicant seeks certification. These modifications respond to the comments and queries from SSA cited earlier. "Single-engine land" has been eliminated from §§ 61.49(b) and 61.183(e) and replaced with "in an aircraft of the appropriate category that is certificated for spins." This clause was also added to proposed § 61.187. The endorsement must certify that the flight instructor has given the applicant training in spin entry, spin, and spin recovery in an aircraft of the appropriate category that is certificated for spins and has found the applicant competent and proficient in those training areas.

In § 61.183(e) the word "those" was changed to "all" in describing the items in which instruction is required by § 61.187. This modification eliminates any ambiguity about which items are required for flight instructor training. For certification purposes, however, it is the

FAA's intention to maintain the current policy of allowing examiner discretion on the practical test with regard to spin demonstration. Section 61.183 has been amended to make this policy clear in the regulation.

#### *Pilot Schools—Chief Instructor Availability*

NPRM No. 89-14 proposed modifications to §§ 141.35 and 141.85 to define more clearly the supervisory role of chief instructors and to clarify the requirement for chief instructor availability during the time that instruction is given for an approved course of training. The FAA has noted different interpretations of what availability means for chief instructors or their assistants at part 141 schools. The FAA believes that a person can be on duty and immediately "available" for the purpose of supervisory duties via various common electronic means, such as telephone, radio, and paging systems, without hampering safety. These changes were intended to reconcile potential conflicts in chief instructor duties while maintaining stringent standards for designating chief instructors under part 141.

A total of 17 comments were received on the proposal to clarify chief instructor availability requirements to include electronic means. All comments, including those from principal organizations, indicated overwhelming acceptance of this proposed amendment. Comments cite the elimination of an undue burden on industry and the use of modern communications to allow easy contact with the chief and assistant chief instructor if needed. AOPA and EAA agree that someone of authority should be available at all times when flight instruction is in progress, but physical on-site availability is unnecessary. ERAU stated that chief instructor availability through electronic means will adequately cover any situation in which direct involvement becomes necessary.

This final rule changes §§ 141.35 and 141.85(b) to clarify the availability of the chief and assistant chief instructor to include electronic means. Availability in the local flying area by telephone or radio while instruction is being given would satisfy the intent of the rule and provide a favorable training atmosphere. This change to § 141.85(b) serves to define more clearly the chief instructor's role as supervisory, rather than requiring the chief instructor's physical presence at all times during which instruction is being given. This change is designed to enhance efficiency and align

the FAR with FAA policy as expressed in FAA Order 8710.5 and Advisory Circular 141-1.

#### *Satellite Bases*

NPRM No. 89-14 proposed to amend § 141.91(a) to eliminate the 25-nautical mile maximum limit on the distance between satellite bases and the main operations base. The intent of § 141.91(a) has been to ensure that a chief instructor is readily available for consultation. The proposed amendment to § 141.91(c) requires the designation of an assistant chief instructor in charge at each satellite base.

The FAA has granted exemptions from § 141.91(a) when petitioners demonstrated that more distant satellite bases could be supervised in a manner that satisfied the intent of the rule without adversely affecting safety. As a result of experience in a number of exemption cases, the FAA believes that improvements in transportation and communications systems no longer require that pilot schools' operations be confined to satellite bases within very limited distances from the main base. It is feasible for pilot schools to establish satellite schools and ensure adequate home base control, including supervision by a chief or assistant chief instructor as well as FAA surveillance.

Twelve comments were received on this issue. All commenters expressed support of the proposed amendment. NATA noted that by allowing satellite bases to be established more than 25 nautical miles from the main operations base, flight schools will gain flexibility and the quality of training may be enhanced by exposing students to a wider variety of operating environments. NATA also expressed concern about the impact this amendment could have on economic activities at airports by allowing a flight school to operate a satellite base on a regular basis without an operating agreement with that airport and/or one of its tenants. ERAU stated that the FAA will have to provide additional guidance for the designation of responsible district offices and approval of training course outlines (TCO's) when a school establishes one or more satellite bases.

This final rule modifies § 141.91 by eliminating the 25-nautical mile maximum limit on the distance between satellite bases and the main operations base, and by requiring the designation of an assistant chief instructor in charge at each satellite base. Policy will be set by a central chief instructor and standards set forth in the school's master TCO will be maintained. The assistant chief instructors in charge at the satellite base will be responsible for remaining

"available" for supervisory purposes at the satellite bases to which they were assigned, either in person or via the electronic or telephonic means discussed in the changes to § 141.85(b).

#### *Chief and Assistant Chief Flight Instructor—Experience Criteria*

The last rulemaking action presented in NPRM No. 89-14 proposed eliminating the need for a chief flight instructor candidate who meets all other criteria to have instructed 100 hours in the preceding year, and proposed reducing by one-half the prerequisite hours and years of experience required of assistant chief flight instructor applicants. The NPRM also proposed adding a new section to separately list experience criteria for assistant chief flight instructors.

These amendments recognize the need for chief flight instructors and assistants who can meet demands as senior management personnel as well as flight instructors. Requiring recent instruction experience impedes more senior personnel whose substantial experience includes supervisory experience from designation as chief flight instructors. Exemption activity has indicated the value of such personnel, and the FAA believes it is desirable to stress the supervisory aspect of the chief flight instructor's job.

Given the largely supervisory nature of the chief flight instructor job, it is important to facilitate designation of assistant chief flight instructors to whom responsibility can be delegated. The present total experience time requirements are the same for chief and assistant chief flight instructors. The FAA believes it is possible to halve the total required hours for assistant chief flight instructors, who will continue to face stringent FAA-administered oral and flight examining procedures.

Twenty-one comments on the chief and assistant chief flight instructor experience criteria proposal were received. Nineteen commenters, including the principal organizations, favored the proposal in the NPRM and two commenters opposed it. AOPA ASF, NATA, and ERAU said they believe that the 100-hour requirement for chief flight instructor candidates constitutes an obstacle to highly qualified candidates who have substantial and varied flight experience and who meet all other criteria. ERAU suggested that the FAA, in revising chief flight instructor qualifications, should have considered the requirements of § 141.79(c) and eliminated the requirement for annual refresher courses which are designed primarily for the least active flight instructors. AOPA and EAA said they

believe that reducing experience criteria for chief and assistant chief flight instructor candidates will provide a stepping stone earlier in a pilot's career and will enhance the status of flight instructors. One commenter noted that the status of flight instructing as a profession, and not as an early stepping stone to the airlines, needs to be enhanced. The commenter supported the NPRM proposals as a means of providing an opportunity for greater responsibility earlier in a flight instructor's career. Commenters opposed to the amendment said they find present criteria adequate.

Requests to allow the assistant chief flight instructor to do phase checks have been received from the public. Under the current rule, an assistant chief flight instructor can be designated to do phase checks. The chief flight instructor can designate almost all duties to a qualified and designated assistant chief flight instructor. Assistant chief flight instructors are subject to the same stringent requirements as chief flight instructors and will continue to be required to take a flight test given by the FAA. The amendment reduces experience requirements, but maintains a high standard of proficiency for assistant chief flight instructors.

The comments received supported the NPRM, and after due consideration, no changes to the proposal have been made. The final rule amends § 141.35 by eliminating the 100-hour recency of experience requirement for chief flight instructors. The final rule establishes flight time and experience requirements for assistant chief flight instructors to one-half that of chief flight instructors. This rule also establishes the requirement that chief flight instructor candidates hold a valid flight instructor certificate and meet pilot-in-command recent flight experience requirements as set forth in § 61.57. Section 141.36 is added to separately list such criteria for assistant chief flight instructors. These criteria are different enough from those for chief flight instructors to warrant a separate listing. The FAA believes that safety standards can be maintained and that flight training operations can be facilitated by reducing the total hour requirements that assistant chief flight instructors must meet. The additional requirement for assistant chief instructors at satellite bases provides increased opportunity for professional development. The purpose of this rule is to emphasize the supervisory responsibility of the chief instructor over the activities of instructors, assistant chief instructors, and other aspects of school operations.

**Additional Changes**

SSA pointed out that the current wording of §§ 61.105(b)(4) and 61.125(c)(4) implies that glider pilots must be familiar with both ground and aero tow procedures. They went on to point out that ground launches are used at relatively few glider sites nationwide, and that private and commercial glider pilot privileges are limited to the launch method satisfactorily demonstrated on the flight test. The FAA agrees with the comment, and this final rule modifies those sections to include "ground and/or aero tow procedures as appropriate." This modification clarifies that the requirement applies only to the type of tow in which the pilot has been certificated on the practical test. Although this change was not contained in the NPRM, the FAA believes it is appropriate to make the change at this time, because it does not increase requirements and is in conformance with standard industry practice.

**Editorial Changes to the NPRM**

This final rule includes several non-substantive editorial changes made to NPRM No. 89-14, and to affected paragraphs of the current rule that have been modified as a result of this rulemaking action but that were not included in NPRM No. 89-14. These include the addition or deletion of articles such as "an," punctuation, and correction of typographical errors.

**Obsolete Dates and Gender References**

The parts 61 and 141 sections from which obsolete dates and gender references have been removed are:

Obsolete dates (§§)	Gender references (§§)
61.1(b) .....	61.49.
61.58(a) .....	61.57(a)(1),(a)(2),(b)(2).
61.71(b) .....	61.59(a).
61.113(a),(b),(d),(e) .....	61.71(b).
61.131(a),(b) .....	61.193.
61.195(b) .....	61.195(b).
61.201(a) .....	61.201(a).

- 141.29(a),(b)
- 141.35(a)(1),(a)(1)(i),(a)(2)
- 141.85(b)

**Paperwork Reduction Act Approval**

Information collection requirements for Parts 61 and 141 have previously been approved by the Office of Management and Budget (OMB) under the provisions of the Paperwork Reduction Act of 1980 (Pub. L. 96-511). Part 61, §§ 61.13 through 61.197, and part 141 have been assigned OMB control numbers 2120-0021 and 2120-0009, respectively.

**Regulatory Evaluation Summary**

The FAA's analysis indicates that the amendments in this revision to parts 61 and 141 would not have a significant economic impact on the public or any level of government on an annual basis. The amendments are intended to update certain requirements, and in some cases relax requirements when compensating factors can ensure that safety standards will be maintained. This section summarizes the conclusions of the regulatory evaluation of the comparative costs and benefits of the amendments. The complete Regulatory Evaluation, Regulatory Flexibility Determination, and International Trade Impact Assessment have been placed in the docket.

The FAA concludes that the amendments to parts 61 and 141 are economically justified. Benefits stemming from averted accidents due to the amended rules would compensate for the additional training expenditures resulting from the revised requirements. The FAA projects the ratio of benefits to costs to be approximately 1.6:1. Over a 10-year period, estimated discounted costs of implementing the amendments would total \$51.8 million, compared with an estimated discounted potential savings of \$85.2 million in averted accidents. Many of the amendments would have little impact on training costs or pilot school operational expenditures other than to help improve efficiency. The amendments to part 141 update the rules on pilot school operations and relax certain requirements which no longer serve their original purposes. The economic effects of the amendments, if any, would favor the schools. In no case are any adverse effects on safety foreseen.

*Section 61.31(g) Tailwheel Airplanes*

As the general aviation fleet has been modernized, fewer pilots receive training in tailwheel airplane operations. In response to this trend, the change in § 61.31(g) requires a one-time flight instructor endorsement indicating that a pilot is competent to operate tailwheel airplanes. The endorsement certifies that the pilot is competent in normal and crosswind takeoffs and landings, wheel landings unless the manufacturer has recommended against such landings, and go-around procedures.

In NPRM No. 89-14, the FAA noted that recent statistics show that tailwheel airplanes continue to experience a disproportionate share of general aviation accidents. In its comments on the NPRM, the Aircraft Owners and Pilots Association (AOPA) provided accident data for the years 1983-1988.

According to AOPA, 6 percent of tricycle gear airplanes and 5 percent of tailwheel airplanes were involved in accidents during the landing phase of flight. AOPA also stated that 9 percent of tricycle gear airplanes and 12 percent of tailwheel airplanes were involved in accidents during the takeoff phase of flight.

Another commenter to NPRM No. 89-14 stated that the analysis should focus on accidents that occur in the taxi, takeoff, and landing phases of flight. The commenter stated that the primary problems of tailwheel airplanes occur on the ground and during takeoff and landing.

These comments prompted the FAA to reexamine the accident statistics for tailwheel airplanes versus tricycle gear airplanes (piston powered only in both types) in the taxi, takeoff, and landing phases of flight.

This re-examination of accident data confirmed the previous conclusions that tailwheel airplanes have a disproportionately high accident rate. For example, between 1983 and 1988, tailwheel airplanes had an average rate of 14.46 accidents per 1,000 active tailwheel airplanes as opposed to tricycle gear airplanes which had an average accident rate of 9.05 accidents per 1,000 active tricycle gear airplanes. The average accident rate per 1,000 tailwheel airplanes from 1983 to 1988 is approximately 60 percent higher than for tricycle gear airplanes.

The FAA believes that the required endorsement would affect only pilots changing from tricycle gear to tailwheel airplanes. Pilots who initially train in tailwheel planes are already required to receive flight instructor endorsements for solo practice and cross-country operations, including an endorsement of pilot competency in airport and traffic pattern operations. The rule change is intended to preclude a certificated pilot from making a transition from tricycle gear airplanes to tailwheel airplanes without receiving sufficient training.

One commenter noted that in the initial regulatory evaluation, the FAA used a ratio based on the number of student pilots to estimate the number of pilots who transfer to tailwheel airplanes. The commenter felt that this was not an accurate ratio because very few pilots take primary training in tailwheel airplanes. In response to this comment, the FAA has researched additional data on the number of tailwheel airplanes and pilots who may be affected by the required endorsement by estimating the number of tailwheel airplanes used primarily for instruction.

The FAA estimates that of the total number of pilots who make a transition to tailwheel airplanes each year, 4,500 would incur additional costs as a result of the amendment. Not all transitioning pilots have been considered for purposes of this evaluation because public response, including from commenters opposed to the requirement, generally agreed that this training is already standard practice in general aviation. Therefore, relatively few pilots should actually be affected by the rule in practical terms. Using average operating costs of \$40 per hour for a single-engine piston tailwheel airplane, \$20 per hour for a flight instructor, and 5 hours training time, it would cost each pilot an estimated \$300 to obtain this training and endorsement. This would not include recurrency training in operations and maneuvers not unique to tailwheel airplanes for a pilot who is out of practice, because such training is not discussed in this amendment. If 4,500 pilots per year received transition instruction as a result of the rule, the annual implementation cost of the amendment would be \$1.35 million in 1989 dollars. This would be equivalent to the savings realized if 0.6 fatal accidents were prevented each year as a result of the amendments (single-engine piston airplane, 1.5 fatalities per accident). If the rule reduced tailwheel accidents by 2 percent per year, the benefits in 1989 dollars would be about \$15 million, nondiscounted, and \$11.25 million, discounted, over 10 years. This would average \$1.23 million discounted per year. Over 10 years, the discounted benefits-to-cost ratio would be 1.1:1.

#### *Section 61.31(f) High Altitude Operations*

Amended § 61.31(f) requires completion of specified flight and ground training by pilots intending to act as pilot in command of pressurized airplanes with service ceilings or maximum operating altitudes, whichever is lower, above 25,000 feet MSL. Most airplanes that fit this description also require type ratings; thus the high altitude training would be incorporated into the type rating training requirement in § 61.63. Section 61.31(f) is designed to extend the high altitude training to pilots making a transition to reciprocating engine and turboprop airplanes that do not require type ratings but that are pressurized and operate at high altitudes. The requirements under § 61.31(f) are analyzed in relation to airplanes that do not require type ratings. This training was specifically omitted from the part 141 appendixes A, F, and H proposals in NPRM No. 89-14.

Based on the general aviation fleet and airman statistics, the FAA estimates that 1,250 pilots annually make a transition to airplanes that operate at high altitudes but do not require type ratings. A special 3-hour ground training session for high altitude flight plus 1 hour of flight training might typically cost a pilot \$450. This cost estimate takes into account the possibility that a pilot might accomplish the required flight training in a simulator and also the development costs for the high altitude training. Commenters to NPRM No. 89-14 who opposed the amendment noted that this type of training is frequently a condition for pilots to obtain insurance. The FAA acknowledges that a growing number of pilots are taking advantage of transition programs offered by manufacturing and major training enterprises, thus reducing the number of pilots who would require the additional training as a result of the amendment. The FAA estimates that each year one-half (625) of these pilots may be affected by the additional training as a result of this amendment; thus, the cost increase in 1989 dollars would be approximately \$281,250.

If the additional training requirement prevents 0.5 percent of the current number of fatal turboprop airplane accidents for which type ratings are not required, the savings in 1989 dollars would be about \$300,000 per year. The FAA projects that over a 10-year period, the discounted benefits-to-cost ratio would be 1.2:1.

#### *Section 61.63 Type Rating Training*

Amendments to §§ 61.63(d) and 61.157(f) and part 141 appendix F require training for pilots seeking type ratings. These amendments require completion of training appropriate to the airplane for which the type rating is sought. Most airplanes for which type ratings are required are pressurized and have service ceilings or maximum operating altitudes, whichever is lower, above 25,000 feet MSL, and thus pilots who receive type rating training for these aircraft must have received the high altitude training required by § 61.31(f) prior to acting as pilot in command. Therefore, the cost of the type rating training required under §§ 61.63(d) and 61.157(f) and part 141 appendix F examined here includes costs associated with the high altitude requirement for airplanes requiring type ratings.

Implementing the amendments could increase training expenses for pilots or their employers, which in many cases are corporate flight departments and other operations under part 91. Advisory Circular No. 61-89D, which is being issued in conjunction with this

amendment, contains a generic curriculum that will serve as a base upon which schools can elaborate in accordance with specific airplane data.

In *FAA Aviation Forecasts Fiscal Years 1989-2000*, the FAA forecasts that the turbine-powered segment of the fixed wing fleet will grow more quickly than the piston fleet during the next decade. From 1980 to 1988, the piston airplane fleet grew from 193,500 to 194,400 airplanes. However, the general aviation turbine-powered fleet grew from 6,200 in 1980 to 9,700 in 1988, an increase to 4.8 percent of the total fixed wing fleet. The FAA projects that by the year 2000 there will be 15,600 turbine-powered airplanes making up 7.8 percent of the total fixed wing fleet. Approximately 2,000 piston-powered airplanes requiring type ratings are currently estimated to be in the general aviation fleet. This number is less than 21 percent of the current number of general aviation turbine-powered airplanes and is 13 percent of the number of turbine-powered airplanes projected for the fixed wing fleet in the year 2000. Furthermore, a significant number of those piston-powered airplanes are expected to be out of service and more are expected to be retired gradually. Thus, the rule primarily pertains to turbine-powered airplanes.

The FAA expects the demand for pilots with type ratings to increase over the next decade. In addition, the FAA expects the size of air carrier and regional/commuter airlines fleets to increase. Airlines are expected to face rapid pilot attrition during the next 10 to 15 years. In 1988, 27 percent of ATP holders were age 50 or older, and 43 percent were at least 45 years old. The FAA believes that new airline pilots will increasingly be drawn from the general aviation community. The FAA amendments are intended to ensure that this surge in type-rated pilot hiring will take place within a context of proper training.

The FAA's estimates show that approximately 11,000 general aviation pilots hold type ratings. Due to a large turnover in general aviation, an estimated one-third (33 percent), or approximately 3,600 pilots, may receive new type ratings each year. Based on current costs of type ratings courses offered by some of the major training organizations, the average cost of the training is estimated to be \$8,000 per pilot. The FAA estimates that approximately 800 type ratings are issued each year to pilots whose present training does not meet the standards of this proposal, and who would be

required to receive the additional training. The FAA estimates that these 800 pilots could require some additional ground and flight training at \$1,000 per type rating. The FAA estimates that the net total additional training cost of requiring pilots to receive training prior to issuance of an airplane type rating will be approximately \$800,000 in 1989 dollars. A 1.5 percent reduction in the fatal accident rate of general aviation turboprop airplanes that require a type rating and of turbojet airplanes would lead to a savings/benefit of \$600,000. The FAA projects a 10-year discounted benefits-to-cost ratio of 1.1:1.

#### *Flight Review*

NPRM No. 89-14 proposed modifications to the flight review requirements of § 61.57 (now covered in § 61.56). Under the proposal, pilots would have been required to complete a flight review in every category and class of aircraft in which they desired to exercise pilot-in-command privileges. As noted earlier, based on a review of the public comments and data submitted, the flight review amendment as proposed in the NPRM is not contained in the final rule. However, comments were received on the cost and safety data presented in NPRM No. 89-14.

One commenter noted that the number of pilots who hold more than one category and class rating estimated by the FAA in the notice was incorrect. Using information in the *U.S. Civil Airman Statistics* and ratios based on the fleet size, the FAA had estimated that 55,000 pilots would be affected by the proposed rule. The commenter, using airman statistics and other data, estimated that 66,755 pilots would be affected by the proposed rule. Although the commenter also noted that the FAA statistics lacked detailed information, the difference between the two estimates stemmed largely from different assumptions about how many pilots certificated in more than one category and class actively fly all the aircraft for which they are certificated.

Research done by AOPA ASF suggesting that 80 percent of pilots involved in multiengine accidents had taken flight reviews in multiengine aircraft appears significant; however, AOPA ASF's written comments did not specify the period covered, the total number of accidents, or other details. NTSB 1985-1987 accident statistics show that 96 percent of the pilots involved in the 3,301 accidents reviewed conducted their BFR's in the same category and class of aircraft that the accident occurred in. Fifty-six percent of those pilots conducted their BFR in the same make and model of aircraft, while

only 2 percent of the accidents occurred in multiengine airplanes where the pilots had taken their BFR in a single-engine airplane.

AOPA estimated that the cost of each flight review would range from \$75 to \$250, with a total biennial cost of \$650 to more than \$1,200 for pilots with multiple category and class ratings. In its Initial Regulatory Evaluation, the FAA estimated that each flight review would cost between \$110 and \$520. However, the FAA has determined that the original proposal is not supported by available accident data. Therefore, that proposal is not contained in this final rule. Instead, and in response to public comment, the FAA is amending § 61.56 to permit pilots to substitute completion of a phase of a pilot proficiency award program for a flight review.

The FAA believes that the amendment to § 61.56 allowing satisfactory completion of a pilot proficiency award program (or any phase of such a program) to fulfill the requirement for a flight review would not impose any economic burden on pilots since no additional requirement is being imposed. The number of pilots who have satisfactorily completed a phase of the FAA's current Pilot Proficiency Award Program has risen from 9,217 pilots in 1983 to 12,109 pilots in 1989. By not requiring participating pilots to incur the cost of participation in both the Pilot Proficiency Award Program and a flight review, the FAA believes that this amendment could be an economic benefit for participating pilots. Although many pilots who participate in the Pilot Proficiency Award Program may combine some of the flight instruction phase requirements with the flight review requirement, those who do not would save the cost of the flight review. Assuming approximately 10,000 pilots participate annually in the Pilot Proficiency Award Program, of which 2,500 do not combine their flight review with that program, total savings estimated for those pilots would be \$375,000, given that the average cost of a single-engine airplane flight review is \$150. Furthermore, this amendment could encourage more pilots to participate in the Pilot Proficiency Award Program with a potential safety benefit for all general aviation.

#### *Stall and Spins: Pilot Awareness, Training, and Testing*

Stall training is currently an integral part of pilot training. Studies have shown, however, that there is a need to enhance pilot awareness of the relationship between stalls and spins, and to improve understanding of the spin hazard in general. A 1976 study

done for the FAA also distinguished between the stall maneuvers routinely practiced in flight training, and scenarios involving pilot distraction that can lead to inadvertent stalls. These concerns are addressed in a series of amendments to §§ 61.97, 61.98, 61.105, 61.107, 61.125, 61.127, 61.183, 61.187, and part 141, Appendixes A and H. The changes would add airplane and glider stall and spin awareness and recovery techniques to the areas of aeronautical knowledge and basic operations covered in student, recreational, private, and commercial pilot training.

The intent of the amendments is to increase pilot awareness of the stall/spin hazard. The likely effect will be a modification of ground instruction programs to reflect the insights of the FAA's 1976 *General Aviation Pilot Stall Awareness Training Study* (FAA-RD-77-26, September 1976) and the addition of up to one hour of flight training to recreational, private, commercial, and flight instructor pilot programs. The cost increase resulting from the proposed expansion of stall/spin awareness training would be moderate because the FAA is not incorporating the element of spin training, which was included in the 1976 study.

The study suggested two flights of approximately 1 hour each, including spin training, and 2 hours of additional ground school. This ground training, or variations of it, could be incorporated into most existing ground training programs by modifying those programs rather than by lengthening them. Under the amendments, flight instructors might spend an additional hour discussing stalls and spins with students. The stall awareness study also proposed two additional 1-hour flights that would include situations leading to inadvertent stalls/spins, stall and spin practice and avoidance, and full spin training. The FAA amendment excludes the spin training component, which alone would take nearly 1 of the 2 hours. Therefore, additional training for a typical student might include approximately 1 hour of ground training and 1 hour of dual flight instruction. The cost of the additional training would be approximately \$85 for airplane students and \$65 for glider students.

Based on the average number of certificates issued to glider-only pilots from 1984 to 1988, the total expenditure for glider pilots is estimated to be \$28,700 per year. Based on the average number of private, commercial, and initial flight instructor certificates issued from 1984 to 1988, the total expenditure for recreational, private, commercial, and flight instructors would be \$4.45

million, assuming all other initial certificates were obtained in airplanes rather than in helicopters or other aircraft. (Because the recreational pilot certificate did not become effective until August 31, 1989, for the purposes of this regulatory evaluation, the number of recreational pilots that will be affected was included in the average past issuances of private pilot certificates.)

The results of the FAA's stall awareness study are available in Advisory Circular 61-67A. Further dissemination of this information can be in the form of other training materials or within routine work programs since no additional research is required. The stall awareness study's main contribution was that it emphasized the need for additional training in stall and spin avoidance and the need for additional flight training in slow flight with realistic distractions.

Stall awareness training is effective. After the United States dropped the spin training requirement in June 1949 in favor of increased stall training, stall/spin accidents dropped dramatically. Although other factors such as improved stall warning devices undoubtedly contributed to this decrease, several studies indicate that the revised training approach was a main factor in reducing stall/spin accidents. In the 4-year period from 1945 to 1948, stall/spin accidents accounted for 48 percent of all fatal accidents. This proportion dropped to 27 percent from 1965 to 1968. The NTSB conducted a study of the period from 1967 to 1969, and found that stall/spin accidents caused 22 percent of all "fatal occurrences." That study, the *Special Study General Aviation Stall/Spin Accidents, 1967-1969* (National Transportation Safety Board AAS-72-8, September 13, 1972), examined the 1,261 stall/spin accidents recorded for the period and noted that, while they accounted for only 8 percent of the total number of accidents, they caused 23 percent of the fatalities or serious injuries.

A total of 2 single-engine piston airplane accidents would have to be prevented per year to realize savings equal to the cost of implementing spin training, as measured in the statistical value of fatal and nonfatal accidents in which stall/spin was a main cause or factor. In the 5-year period from 1983 to 1987, an average of 33 fatal accidents and an average of 57 fatalities occurred per year. If the improved stall/spin training leads to a 10 percent improvement in the stall/spin accident rate, a total of 3.3 fatal accidents and 5.7 fatalities would be averted. Assuming that all of the airplanes were

reciprocating single-engine airplanes rather than a mix of multiengine and turbine-powered airplanes, the potential savings could be at least \$8.6 million in 1989 dollars. The FAA projects that over 10 years the discounted benefits-to-cost ratio would be 1.9:1.

Other amendments regarding stall and spin awareness training modify §§ 61.183 and 61.187, which govern areas in which flight instructor candidates must receive training and be tested. The amendments require flight instructor candidates, airplane or glider, to receive training and demonstrate proficiency in stall awareness, spin entry, spins, and spin recovery techniques. The amendments make the logbook endorsement of spin competency an eligibility requirement rather than an option for candidates seeking the flight instructor ratings affected by these amendments. Currently, this endorsement is optional for those flight instructor candidates, particularly airplane flight instructor candidates, who perform their flight tests in airplanes not approved for intentional spins. FAA guidelines now permit those candidates to present the endorsement in lieu of demonstrating a spin on their flight tests. The stall/spin training, while already required under FAA guidelines, is given greater emphasis in the amended rules, but the amended rules do not substantially alter the procedures and maneuvers that the flight instructor candidates are currently expected to cover. The FAA believes that these changes in §§ 61.49, 61.183, and 61.187 will significantly increase flight instructor awareness and understanding of the stall/spin issue. However, the FAA believes that only the mandatory spin demonstration required under § 61.49 carries with it a potential cost implication.

Amended § 61.49 will require flight instructor applicants in airplanes or gliders to demonstrate spin entries, spins, and spin recoveries on their flight tests if they have previously failed the oral or flight portion of a test due to deficiencies in the stall/spin area. The retesting requirement is unlikely to have an important economic impact. In 1988, 6,121 applicants took initial flight instructor examinations, the majority of which was probably in airplanes. Twenty-one percent of those applicants failed. If as many as 10 percent of the pilots who failed in 1988 failed because of deficiencies in stall/spin knowledge, they would collectively spend about \$2,500, excluding additional examiner fees, to meet the retesting requirement. This figure is based on a \$40 airplane cost and 30 minutes for the spin

demonstration plus flight time to and from practice areas. The cost of the bulk of the flight test, which must be taken in a complex airplane and includes other tasks, is not included in the additional costs because those tasks are not subject to this amendment. If this additional requirement leads to even a 0.1 percent improvement in stall/spin accidents, the annual savings would be approximately \$80,000. Based on these estimates, the ratio of benefits to costs would be approximately 34.3:1.

#### *Flight Instructor Authorizations*

Amendments have been made to § 61.193 that include authorizations for flight instructors to provide the endorsements required under amendments to §§ 61.187, 61.31, 61.157, and/or 61.183. No additional cost is associated with the amended § 61.193, however.

#### *Chief Instructor Availability*

Section 141.85 is amended to clarify that chief instructors on duty do not necessarily have to be present at their flight school while instruction is being given. The change is designed to enhance efficiency and align the FAR with FAA policy as expressed in FAA Order 8710.5 (June 20, 1979) and Advisory Circular 141-1A (August 29, 1974). The measure involves no implementation costs.

If any changes in school operations do occur as a result of this amendment, it would be to permit schools more efficient use of personnel. However, the amendment would have little if any impact since present industry practice appears to be based on FAA Order 8710.5 and Advisory Circular 141-1, which state that the chief flight instructor need only be available for consultation at the school's base of operations.

#### *Satellite Bases*

The amendment to § 141.91 eliminates the 25-nautical mile maximum distance limit for establishing satellite school operations bases as long as an assistant chief instructor is designated for each satellite base, and is available for consultation when instruction is given at the satellite base.

The FAA does not expect this change to compromise safety because the amendment ensures adequate supervision. If the schools choose to take advantage of the rule change, this presumably would be an informed decision made on the basis of expected costs, revenues, and potential profits.

Potential long-term benefits include promoting economies of scale in school

operations, permitting development of regional and national chains of schools, utilization of master TCO's and avoiding the need for multiple Part 141 certificates.

#### *Chief and Assistant Chief Flight Instructors—Experience Criteria*

Criteria for designating both chief and assistant chief flight instructors have been substantially modified by amending § 141.35 and creating § 141.36. These amendments eliminate the 100-hour recent instruction requirement for designating chief flight instructors, and reduce by half the current total prerequisite times for assistant chief flight instructors.

The amendment's rationale is that requiring recent instruction experience may prevent senior personnel with substantial experience, including supervisory experience, from designation as chief flight instructors. Exemption activity has revealed the value of such personnel, and the FAA believes it is desirable to stress the supervisory aspect of the chief flight instructor's job.

Given the largely supervisory nature of the chief flight instructor's job, it is important to facilitate the designation process for assistant chief flight instructors to whom responsibility can be delegated. The present total experience time requirements are the same for chief and assistant chief flight instructors. Under these conditions, flight instructors often quit instructing after acquiring hours but before they meet these minimum experience requirements. The FAA believes that the total required times can be reduced by half for assistant chief flight instructors, who will continue to face stringent oral and practical examining procedures.

Given the safeguards of the proposed supervisory arrangement with the chief flight instructor and the current examining requirements, safety standards should not be endangered. In addition, concrete economic benefits may result in terms of reduced time in pursuing exemption alternatives, and reduced or eliminated program interruptions caused by the inability to fill vacancies. However, it does not seem feasible to attempt to quantify the amount of time and expense saved by avoiding exemption requests.

#### **International Trade Impact Analysis**

This final rule will not have any significant impact on trade opportunities for either U.S. firms doing business overseas or foreign firms doing business in the United States. The rules primarily affect the domestic activity and operations of individual pilots and pilot

schools. The FAA believes that the rules will not affect part 141 schools in the training of foreign citizens who accomplish pilot training in the United States.

#### **Regulatory Flexibility Determination**

The Regulatory Flexibility Act of 1980 was enacted to ensure that small entities are not unnecessarily or disproportionately burdened by Government regulations. The Act requires a Regulatory Flexibility Analysis if a rule has a significant economic impact, either detrimental or beneficial, on a large number of small business entities. The size threshold for pilot schools is 10 employees, as set forth in the Department of Transportation (DOT), FAA Order 2100.14A, September 16, 1986. The threshold for annualized cost levels for pilot schools is \$1,115 in 1989 dollars.

FAA Advisory Circular 140-2S, July 10, 1987, identifies approximately 830 pilot schools certificated under FAR part 141 as of June 2, 1987. The FAA believes that a significant number of these schools employ fewer than 10 persons and are, therefore, small business entities, and that more than one-third of these schools would be affected.

However, these amendments would have minimal economic impact on the pilot schools. No comments received on NPRM No. 89-14 implied that there would be a significant economic impact on pilot schools. Modification of training course materials or internal operational procedures may incur minor costs; however, costs exceeding \$1,115 are not anticipated. Moreover, the FAA believes that some schools may realize cost reductions as a result of some of the amendments to part 141. In the past, for example, flight schools may have had to expend a certain amount of additional time and expense advertising for and interviewing chief instructor candidates. Modifications to the requirements for chief and assistant chief instructors are expected to facilitate school operations. Some savings may accrue to the schools as a result of the measures. Small schools may even gain revenue as a result of the increased training requirement. However, because of inadequate data on market shares, it is not feasible to describe how much additional revenue these businesses would earn.

The FAA has sought to respond to the needs of these entities within the limits permitted by safety considerations. The FAA has reviewed the rules affected by these amendments to determine the extent to which requirements could be relaxed without compromising safety, and the FAA believes that these

amendments are as relaxed as possible without compromising safety.

Other amendments are expected to have an impact on individual pilot training and recurrent training costs. The FAA believes that these amendments reflect common practice within the industry and will, therefore, not impose a significant burden on firms that may be characterized as small entities. Some small companies that employ pilots flying professionally under part 91 may face additional training costs as a result of the amendments. However, small companies rarely have corporate flight departments, and the cost of determining how many such companies would be affected by the amendment would probably be out of proportion to the actual number of companies involved.

The FAA certifies, that under the criteria of the Regulatory Flexibility Act of 1980, the amendments to the regulations will not have a significant economic impact on a substantial number of small entities, and that a Regulatory Flexibility Analysis is not required.

#### **Federalism Implications**

The amendments in this final rule would not have substantial direct effect on the States, on the relationship between the National Government and the States, or on the distribution of power and responsibilities among the various levels of government. Therefore, in accordance with Executive Order 12612, it is determined that these amendments would not have sufficient federalism implications to warrant the preparation of a Federalism Assessment.

#### **Conclusion**

For reasons discussed in the preamble, and based on the findings in the Regulatory Evaluation Determination and the International Trade Impact Analysis, the FAA has determined that these amendments do not qualify as a major rule under Executive Order 12291. In addition, the FAA certifies that these amendments will not have a significant economic effect, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act. These amendments are considered significant under DOT Regulatory Policies and Procedures (44 FR 11034; February 26, 1979). A regulatory evaluation of these amendments, including a Regulatory Flexibility Determination and Trade Impact Analysis, has been placed in the

regulatory docket. A copy may be obtained by contacting the person identified under "FOR FURTHER INFORMATION CONTACT".

#### List of Subjects

##### 14 CFR Part 61

Aircraft, Aircraft pilots, Airmen, Airplanes, Air safety, Air transportation, Aviation safety, Balloons, Helicopters, Rotorcraft, Students.

##### 14 CFR Part 141

Aircraft, Aircraft pilots, Airmen, Airplanes, Air safety, Air transportation, Aviation safety, Balloons, Business and industry, Education, Educational facilities, Helicopters, Pilots, Rotorcraft, Schools, Students, Teachers.

#### The Rule

In consideration of the foregoing, the Federal Aviation Administration amends parts 61 and 141 of the Federal Aviation Regulations (14 CFR parts 61 and 141) as follows:

#### PART 61—CERTIFICATION: PILOTS AND FLIGHT INSTRUCTORS

1. The authority citation for part 61 is revised to read as follows:

Authority: 49 U.S.C. app. 1354(a), 1355, 1421, 1422, and 1427; 49 U.S.C. 106(g) [Revised, Pub. L. 97-449; January 12, 1983].

2. Section 61.1 is amended by revising paragraph (b) to read as follows:

##### § 61.1 Applicability.

(b) Except as provided in § 61.71, an applicant for a certificate or rating must meet the requirements of this part.

3. Section 61.31 is amended by redesignating paragraph (f) as paragraph (h), and adding new paragraphs (f) and (g) to read as follows:

##### § 61.31 General limitations.

(f) *High altitude airplanes.* (1) Except as provided in paragraph (f)(2) of this section, no person may act as pilot in command of a pressurized airplane that has a service ceiling or maximum operating altitude, whichever is lower, above 25,000 feet MSL unless that person has completed the ground and flight training specified in paragraphs (f)(1) (i) and (ii) of this section and has received a logbook or training record endorsement from an authorized instructor certifying satisfactory completion of the training. The training shall consist of:

(i) Ground training that includes instruction on high altitude aerodynamics and meteorology; respiration; effects, symptoms, and

causes of hypoxia and any other high altitude sicknesses; duration of consciousness without supplemental oxygen; effects of prolonged usage of supplemental oxygen; causes and effects of gas expansion and gas bubble formations; preventive measures for eliminating gas expansion, gas bubble formations, and high altitude sicknesses; physical phenomena and incidents of decompression; and any other physiological aspects of high altitude flight; and

(ii) Flight training in an airplane, or in a simulator that meets the requirements of § 121.407 of this chapter, and which is representative of an airplane as described in paragraph (f)(1) of this section. This training shall include normal cruise flight operations while operating above 25,000 feet MSL; the proper emergency procedures for simulated rapid decompression without actually depressurizing the airplane; and emergency descent procedures;

(2) The training required in paragraph (f)(1) of this section is not required if a person can document accomplishment of any of the following in an airplane, or in a simulator that meets the requirements of § 121.407 of this section, and that is representative of an airplane described in paragraph (f)(1) of this section:

(i) Served as pilot in command prior to April 15, 1991;

(ii) Completed a pilot proficiency check for a pilot certificate or rating conducted by the FAA prior to April 15, 1991;

(iii) Completed an official pilot-in-command check by the military services of the United States; or

(iv) Completed a pilot-in-command proficiency check under parts 121, 125, or 135 conducted by the FAA or by an approved pilot check airman.

(g) *Tailwheel Airplanes.* No person may act as pilot in command of a tailwheel airplane unless that pilot has received flight instruction from an authorized flight instructor who has found the pilot competent to operate a tailwheel airplane and has made a one time endorsement so stating in the pilot's logbook. The endorsement must certify that the pilot is competent in normal and crosswind takeoffs and landings, wheel landings unless the manufacturer has recommended against such landings, and go-around procedures. This endorsement is not required if a pilot has logged flight time as pilot in command of tailwheel airplanes prior to April 15, 1991.

4. Section 61.49 is revised to read as follows:

##### § 61.49 Retesting after failure.

(a) An applicant for a written or practical test who fails that test may not apply for retesting until 30 days after the date the test was failed. However, in the case of a first failure, the applicant may apply for retesting before the 30 days have expired provided the applicant presents a logbook or training record endorsement from an authorized instructor who has given the applicant remedial instruction and finds the applicant competent to pass the test.

(b) An applicant for a flight instructor certificate with an airplane category rating, or for a flight instructor certificate with a glider category rating, who has failed the practical test due to deficiencies of knowledge or skill relating to stall awareness, spin entry, spins, or spin recovery techniques must, during the retest, satisfactorily demonstrate both knowledge and skill in these areas in an aircraft of the appropriate category that is certificated for spins.

5. Section 61.56 is amended by redesignating paragraph (f) as paragraph (g), and adding a new paragraph (f) to read as follows:

##### § 61.56 Flight review.

(f) A person who has, within the period specified in paragraphs (c) and (d) of this section, satisfactorily completed one or more phases of an FAA-sponsored pilot proficiency award program, need not accomplish the flight review requirements of this section.

6. Section 61.58 is amended by revising paragraph (a) to read as follows:

##### § 61.58 Pilot-in-command proficiency check: Operation of aircraft requiring more than one required pilot.

(a) Except as provided in paragraph (e) of this section, no person may act as pilot in command of an aircraft that is type certificated for more than one required pilot crew member unless the proficiency checks or flight checks prescribed in paragraphs (b) and (c) of this section are satisfactorily completed.

7. Section 61.63 is amended by revising paragraph (d)(3)(i) and adding a new paragraph (d)(6) to read as follows:

##### § 61.63 Additional aircraft ratings (other than airline transport pilot).

(d) \* \* \*  
(3) \* \* \*

(i) The applicant must have met the requirements of this paragraph in a

multiengine airplane for which a type rating is required.

(6) On and after April 15, 1991, an applicant for a type rating to be added to a pilot certificate must—

(i) Have completed ground and flight training on the maneuvers and procedures of Appendix A of this part that is appropriate to the airplane for which a type rating is sought, and received an endorsement from an authorized instructor in the person's logbook or training records certifying satisfactory completion of the training; or

(ii) For a pilot employee of a part 121 or part 135 certificate holder, have completed the certificate holder's approved ground and flight training that is appropriate to the airplane for which a type rating is sought.

8. Section 61.71 is amended by removing the concluding flush text and by revising paragraph (b) to read as follows:

**§ 61.71 Graduates of certificated pilot schools: Special rules.**

(b) An applicant for a certificate or rating under this part is considered to meet the aeronautical knowledge and skill requirements, or both, applicable to that certificate or rating if the applicant applies within 90 days after graduation from an appropriate course given by a pilot school that is certificated under part 141 of this chapter and is authorized to test applicants on aeronautical knowledge or skill, or both.

9. Section 61.97 is amended by revising paragraphs (f) and (g) and adding paragraph (h) to read as follows:

**§ 61.97 Aeronautical knowledge.**

(f) Weight and balance computations;  
(g) Principles of aerodynamics, powerplants, and aircraft systems; and  
(h) Stall awareness, spin entry, spins, and spin recovery techniques.

10. Section 61.98 is amended by revising paragraph (a)(5) to read as follows:

**§ 61.98 Flight proficiency.**

(a) \* \* \*  
(5) Flight at slow airspeeds with realistic distractions and the recognition of and recovery from stalls entered from straight flight and from turns;

11. Section 61.105 is amended by revising paragraphs (a)(4), (a)(5), (b)(3) and (b)(4), and adding paragraphs (a)(6) and (b)(5) to read as follows:

**§ 61.105 Aeronautical knowledge.**

(a) \* \* \*

(4) The safe and efficient operation of airplanes or rotorcraft, as appropriate, including high-density airport operations, collision avoidance precautions, and radio communication procedures;

(5) Basic aerodynamics and the principles of flight which apply to airplanes or rotorcraft, as appropriate; and

(6) Stall awareness, spin entry, spins, and spin recovery techniques for airplanes.

(b) \* \* \*

(3) Recognition of weather situations of concern to the glider pilot, and the procurement and use of aeronautical weather reports and forecasts;

(4) The safe and efficient operation of gliders, including ground and/or aero tow procedures as appropriate, signals, and safety precautions; and

(5) Stall awareness, spin entry, spins, and spin recovery techniques for gliders.

12. Section 61.107 is amended by revising paragraphs (a)(4) and (d)(5) to read as follows:

**§ 61.107 Flight proficiency.**

(a) \* \* \*

(4) Flight at slow airspeeds with realistic distractions, and the recognition of and recovery from stalls entered from straight flight and from turns;

(d) \* \* \*

(5) Flight at slow airspeeds with realistic distractions, and the recognition of and recovery from stalls entered from straight flight and from turns; and

13. Section 61.113 is amended by revising paragraphs (a) introductory text, (b) introductory text, and (c), and removing paragraphs (d) and (e) to read as follows:

**§ 61.113 Rotorcraft rating: Aeronautical experience.**

(a) *Helicopter class rating.* A total of 40 hours of flight instruction and solo flight time in aircraft, including at least—

(b) *Gyroplane class rating.* A total of 40 hours of flight instruction and solo flight time in aircraft, including at least—

(c) An applicant who does not meet the night flying requirement in paragraph (a)(1)(ii) or (b)(1)(ii) of this section is issued a private pilot certificate bearing the limitation "night flying prohibited." This limitation may be removed if the holder of the certificate demonstrates compliance with the requirements of paragraph (a)(1)(ii) or (b)(1)(ii) of this section, as appropriate.

14. Section 61.125 is amended by revising paragraphs (a)(2), (a)(3), (c)(3) and (c)(4), and adding paragraphs (a)(4) and (c)(5) to read as follows:

**§ 61.125 Aeronautical knowledge.**

(a) \* \* \*

(2) Basic aerodynamics and the principles of flight which apply to airplanes;

(3) Airplane operations, including the use of flaps, retractable landing gears, controllable propellers, high altitude operation with and without pressurization, loading and balance computations, and the significance and use of airplane performance speeds; and

(4) Stall awareness, spin entry, spins, and spin recovery techniques for airplanes.

(c) \* \* \*

(3) The recognition of weather situations of concern to the glider pilot from the ground and in flight, and the procurement and use of aeronautical weather reports and forecasts;

(4) The safe and efficient operation of gliders, including ground and/or aero tow procedures as appropriate, signals, critical glider performance speeds, and safety precautions; and

(5) Stall awareness, spin entry, spins, and spin recovery techniques for gliders.

15. Section 61.127 is amended by revising paragraphs (a)(2) and (d)(4) to read as follows:

**§ 61.127 Flight proficiency.**

(a) \* \* \*

(2) Flight at slow airspeeds with realistic distractions, and the recognition of and recovery from stalls entered from straight flight and from turns;

(d) \* \* \*

(4) The correct use of the glider's performance speeds, flight at slow airspeeds with realistic distractions, and the recognition of and recovery from

stalls entered from straight flight and from turns; and

16. Section 61.131 is amended by revising paragraphs (a) introductory text and (b) introductory text, and removing paragraphs (c) and (d) to read as follows:

**§ 61.131 Rotorcraft ratings: Aeronautical experience.**

(a) *Helicopter class rating.* A total of 150 hours of flight time, including at least 100 hours in powered aircraft, 50 hours of which must be in a helicopter, including at least—

(b) *Gyroplane class rating.* A total of 150 hours of flight time in aircraft, including at least 100 hours in powered aircraft, 25 hours of which must be in a gyroplane, including at least—

17. Section 61.157 is amended by adding a new paragraph (f) to read as follows:

**§ 61.157 Airplane rating: Aeronautical skill.**

(f) On and after April 15, 1991, an applicant for a type rating to be added to an airline transport pilot certificate, or for issuance of an airline transport pilot certificate in an airplane requiring a type rating, must—

(1) Have completed ground and flight training on the maneuvers and procedures of appendix A of this part that is appropriate to the airplane for which a type rating is sought and received an endorsement from an authorized instructor in the person's logbook or training records certifying satisfactory completion of the training; or

(2) For a pilot employee of a part 121 or part 135 certificate holder, have completed ground and flight training that is appropriate to the airplane for which a type rating is sought and is approved under parts 121 and 135.

18. Section 61.183 is amended by revising paragraph (e) to read as follows:

**§ 61.183 Eligibility requirements: General.**

(e) Pass a practical test on all items in which instruction is required by § 61.187 and, in the case of an applicant for a flight instructor-airplane or flight instructor-glider rating, present a logbook endorsement from an appropriately certificated and rated flight instructor who has provided the applicant with spin entry, spin, and spin recovery training in an aircraft of the appropriate category that is certificated

for spins, and has found that applicant competent and proficient in those training areas. Except in the case of a retest after a failure for the deficiencies stated in § 61.49(b), the person conducting the practical test may either accept the spin training logbook endorsement or require demonstration of the spin entry, spin, and spin recovery maneuver on the flight portion of the practical test.

19. Section 61.187 is amended by revising paragraph (a)(6) to read as follows:

**§ 61.187 Flight proficiency.**

(a) \* \* \*

(6) Performance and analysis of standard flight training procedures and maneuvers appropriate to the flight instructor rating sought. For flight instructor-airplane and flight instructor-glider applicants, this shall include the satisfactory demonstration of stall awareness, spin entry, spins, and spin recovery techniques in an aircraft of the appropriate category that is certificated for spins.

20. Section 61.193 is revised to read as follows:

**§ 61.193 Flight instructor authorizations.**

(a) The holder of a flight instructor certificate is authorized, within the limitations of that person's flight instructor certificate and ratings, to give the—

(1) Flight instruction required by this part for a pilot certificate or rating;

(2) Ground instruction or a home study course required by this part for a pilot certificate and rating;

(3) Ground and flight instruction required by this subpart for a flight instructor certificate and rating, if that person meets the requirements prescribed in § 61.187(b);

(4) Flight instruction required for an initial solo or cross-country flight;

(5) Flight review required in § 61.56 in a manner acceptable to the Administrator;

(6) Instrument competency check required in § 61.57(e)(2);

(7) Pilot-in-command flight instruction required under § 61.101(d); and

(8) Ground and flight instruction required by this part for the issuance of the endorsements specified in paragraph (b) of this section.

(b) The holder of a flight instructor certificate is authorized within the limitations of that person's flight instructor certificate and rating, to endorse—

(1) In accordance with §§ 61.87(m) and 61.93 (c) and (d), the pilot certificate of a student pilot the flight instructor has

instructed authorizing the student to conduct solo or solo cross-country flights, or to act as pilot in command of an airship requiring more than one flight crew member;

(2) In accordance with §§ 61.87(m) and 61.93 (b) and (d), the logbook of a student pilot the flight instructor has instructed, authorizing single or repeated solo flights;

(3) In accordance with § 61.93(d), the logbook of a student pilot whose preparation and preflight planning for a solo cross-country flight the flight instructor has reviewed and found adequate for a safe flight under the conditions the flight instructor has listed in the logbook;

(4) In accordance with § 61.95, the logbook of a student pilot the flight instructor has instructed authorizing solo flights in a terminal control area or at an airport within a terminal control area;

(5) The logbook of a pilot or another flight instructor who has been trained by the person described in paragraph (b) of this section, certifying that the pilot or other flight instructor is prepared for an operating privilege, a written test, or practical test required by this part;

(6) In accordance with §§ 61.57(e)(2) and 61.101(d) the logbook of a pilot the flight instructor has instructed authorizing the pilot to act as pilot in command;

(7) [Reserved]; and

(8) In accordance with §§ 61.101 (g) and (h), the logbook of a recreational pilot the flight instructor has instructed authorizing solo flight.

21. Section 61.195 is amended by revising paragraph (b) to read as follows:

**§ 61.195 Flight instructor limitations.**

(b) *Ratings.* Flight instruction may not be conducted in any aircraft for which the flight instructor does not hold a category, class, and if appropriate, a type rating, on the flight instructor's pilot and flight instructor certificates.

22. Section 61.201 is amended by revising paragraph (a) to read as follows:

**§ 61.201 Conversion to new system of flight instructor ratings.**

(a) *General.* The holder of a flight instructor certificate that does not bear any of the new class or instrument ratings listed in § 61.5(c) (2), (3), or (4) for a flight instructor certificate, may not exercise the privileges of that certificate. The holder of a flight instructor certificate with a glider rating need not

convert that rating to a new class rating to exercise the privileges of that certificate and rating.

#### PART 141—PILOT SCHOOLS

23. The authority citation for part 141 is revised to read as follows:

Authority: Sections 313(a), 314, 601, 602, and 607 of the Federal Aviation Act of 1958 (49 U.S.C. app. 1354(a), 1355, 1421, 1422, and 1427), and section 8(c) of the Department of Transportation Act (49 U.S.C. app. 1855(c)).

24. Section 141.29 is removed and reserved.

#### § 141.29 [Reserved]

25. Section 141.35 is amended by revising paragraphs (a), (b) introductory text, (b)(1), (b)(3)(ii), (c) introductory text, (c)(1), (c)(4)(ii), (d) introductory text, (d)(1), (d)(3)(ii), and (e), and by removing paragraphs (b)(4), (c)(5), and (d)(4) to read as follows:

#### § 141.35 Chief instructor qualifications.

(a) To be eligible for a designation as a chief flight instructor for a course of training, a person must meet the following requirements:

(1) Possess a commercial pilot or airline transport pilot certificate and a valid flight instructor certificate,

(2) Meet the pilot-in-command recent flight experience requirements of § 61.57 of this chapter,

(3) Pass an oral test on teaching methods, applicable provisions of the Airman's Information Manual, parts 61, 91, and 141 of this chapter, and the objectives and approved course completion standards of the course for which the person seeks to obtain designation,

(4) Pass a flight test demonstrating satisfactory performance of and the ability to instruct on the flight procedures and maneuvers appropriate to that course, and

(5) Meet the applicable requirements of paragraphs (b), (c), and (d) of this section. However, a chief flight instructor for a course of training for gliders, free balloons, or airships is only required to have 40 percent of the hours required in paragraphs (b) and (c) of this section.

(b) For a course of training leading to the issuance of a private pilot certificate or rating, a chief flight instructor must have—

(1) At least a commercial pilot or airline transport pilot certificate and a valid flight instructor certificate, each with a rating for the category and class of aircraft used in the course;

(3) \* \* \*

(ii) 1,000 flight hours.

(c) For a course of training leading to the issuance of an instrument rating or a rating with instrument privileges, a chief flight instructor must have—

(1) At least a commercial pilot or airline transport pilot certificate and a valid flight instructor certificate, each with an appropriate instrument rating;

(4) \* \* \*

(ii) 400 flight hours.

(d) For a course of training other than those that lead to the issuance of a private pilot certificate or rating, or an instrument rating or a rating with instrument privileges, a chief flight instructor must have—

(1) At least a commercial pilot or airline transport pilot certificate and a valid flight instructor certificate, each with a rating for the category and class of aircraft used in the course of training and, for a course of training using airplanes or airships, an instrument rating on the instructor's commercial pilot certificate;

(3) \* \* \*

(ii) 1,500 flight hours.

(e) To be eligible for a designation as a chief instructor for a ground school course, a person must have 1 year of experience as a ground school instructor in a certificated pilot school.

26. Section 141.36 is added to read as follows:

#### § 141.36 Assistant chief instructor qualifications.

(a) To be eligible for a designation as an assistant chief flight instructor for a course of training, a person must meet the following requirements:

(1) Possess a commercial pilot or airline transport pilot certificate and a valid flight instructor certificate,

(2) Meet the pilot-in-command recent flight experience requirements of § 61.57 of this chapter,

(3) Pass an oral test on teaching methods, applicable provisions of the Airman's Information Manual, parts 61, 91, and 141 of this chapter, and the objectives and approved course completion standards of the course for which the person seeks to obtain designation,

(4) Pass a flight test on the flight procedures and maneuvers appropriate to that course, and

(5) Meet the applicable requirements of paragraphs (b), (c), and (d) of this section. However, an assistant chief flight instructor for a course of training for gliders, free balloons, or airships is only required to have 40 percent of the hours required in paragraphs (b) and (c) of this section.

(b) For a course of training leading to the issuance of a private pilot certificate or rating, an assistant chief flight instructor must have—

(1) At least a commercial pilot or airline transport pilot certificate and a valid flight instructor certificate, each with a rating for the category and class of aircraft used in the course;

(2) At least 500 hours as pilot in command;

(3) Primary flight instruction experience, acquired as either a certificated flight instructor or an instructor in a military pilot primary flight training program, or a combination thereof, consisting of at least—

(i) One year and a total of 250 flight hours; or

(ii) 500 flight hours.

(c) For a course of training leading to the issuance of an instrument rating or a rating with instrument privileges, an assistant chief flight instructor must have—

(1) At least a commercial pilot or airline transport pilot certificate and a valid flight instructor certificate, each with an appropriate instrument rating;

(2) At least 50 hours of flight time under actual or simulated instrument conditions;

(3) At least 500 hours as pilot in command;

(4) Instrument flight instructor experience, acquired as either a certificated instrument flight instructor or an instructor in a military pilot basic or instrument flight training program, or a combination thereof, consisting of at least—

(i) One year and a total of 125 flight hours; or

(ii) 200 flight hours.

(d) For a course of training other than those that lead to the issuance of a private pilot certificate or rating, or an instrument rating or a rating with instrument privileges, an assistant chief flight instructor must have—

(1) At least a commercial pilot or airline transport pilot certificate and a valid flight instructor certificate, each with a rating for the category and class of aircraft used in the course of training and, for a course of training using airplanes or airships, an instrument rating on the instructor's commercial pilot certificate;

(2) At least 1,000 hours as pilot in command;

(3) Flight instruction experience, acquired as either a certificated flight instructor or an instructor in a military pilot primary or basic flight training program or a combination thereof, consisting of at least—

(i) One and one half years and a total of 500 flight hours; or  
(ii) 750 flight hours.

(e) To be eligible for a designation as an assistant chief instructor for a ground school course, a person must have one year of experience as a ground school instructor in a certificated pilot school.

27. Section 141.85 is amended by revising paragraph (b) to read as follows:

**§ 141.85 Chief instructor responsibilities.**

(b) The chief instructor or designated assistant chief instructor shall be available at the pilot school or, if away from the premises, by telephone, radio, or other electronic means during the time that instruction is given for an approved course of training.

28. Section 141.91 is amended by revising paragraphs (a) and (c) to read as follows:

**§ 141.91 Satellite bases.**

(a) An assistant chief instructor is designated for each satellite base, and that assistant chief instructor shall be available at the satellite pilot school or, if away from the premises, by telephone, radio, or other electronic means during the time that instruction is given for an approved course of training;

(c) The instructors are under the direct supervision of the chief flight instructor or assistant chief flight instructor for the appropriate training course, who is readily available for consultation in accordance with § 141.85(b); and

29. Part 141, appendix A is amended by adding new paragraphs (2)(e) and by

revising paragraph (3)(c)(4) to read as follows:

**Appendix A—Private Pilot Certification Course (Airplanes)**

- 2. . . . .
- (e) Stall awareness, spin entry, spins, and spin recovery techniques.
- 3. . . . .
- (c) . . . . .
- (4) Flight at slow airspeeds with realistic distractions, recognition of and recovery from stalls entered from straight flight and from turns.

30. Part 141, appendix F is amended by redesignating and revising paragraph (F)(IV) as paragraph (F)(IV)(a) and adding a new paragraph (F)(IV)(b) to read as follows:

**Appendix F—Rotorcraft, Gliders, Lighter-than-Air Aircraft and Aircraft Rating Courses**

- F. . . . .
- IV. *Aircraft type rating.*
- (a) An aircraft type rating course must include at least 10 hours of ground training on the aircraft systems, performance, operation, and loading. In addition, it must include at least 10 hours of flight instruction. Instruction in a pilot ground trainer that meets the requirements of § 141.41(a)(1) may be credited for not more than 5 of the 10 hours of required flight instruction. Instruction in a pilot ground trainer that meets the requirements of § 141.41(a)(2) may be credited for not more than 2.5 of the 10 hours of required flight instruction.
- (b) For airplanes that require type ratings, the aircraft type rating course must include ground and flight training on the maneuvers and procedures of part 61, appendix A that is appropriate to the airplane for which a type rating is sought.

31. Part 141, appendix H is amended by revising paragraphs 3(a)(2)(i) and

4(a)(2)(i), and by adding a new paragraph 6(a)(3) to read as follows:

**Appendix H—Test Preparation Courses**

- 3. . . . .
- (a) . . . . .
- (2) . . . . .
- (i) 10 hours of flight instruction in the analysis and performance of flight training maneuvers, which for students enrolled in a flight instructor airplane certification course and a flight instructor glider certification course includes the satisfactory demonstration of stall awareness, spin entry, spins, and spin recovery techniques in an aircraft of the appropriate category that is certificated for spins; and
- 4. . . . .
- (a) . . . . .
- (2) . . . . .
- (i) 10 hours, or 10 flights in a glider in the case of a glider instructor rating course, performing analysis of flight training maneuvers, which in the case of an airplane instructor rating course and a glider instructor rating course includes the satisfactory demonstration of stall awareness, spin entry, spins, and spin recovery techniques in an aircraft of the appropriate category that is certificated for spins; and
- 6. . . . .
- (a) . . . . .
- (3) In airplanes that require type ratings, the course must include ground and flight training on the maneuvers and procedures of Part 61, Appendix A that are appropriate to the airplane for which a type rating is sought.

Issued in Washington, DC, on March 7, 1991.

**James B. Busey,**  
*Administrator.*

[FR Doc. 91-6070 Filed 3-14-91; 8:45 am]

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**Corrections**

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**DEPARTMENT OF TRANSPORTATION****Federal Aviation Administration****14 CFR Parts 61 and 141****[Docket No. 25910; Amdts. 61-90, 141-4]****RIN 2100-AB12****Pilot, Flight Instructor, and Pilot  
School Certification***Correction*

In rule document 91-6070, beginning on page 11308, in the issue of Friday, March 15, 1991, make the following correction:

1. On page 11308, in the first column, the docket number should read as set forth above.

**BILLING CODE 1505-01-D**