

line operating flight time, either as PIC or SIC." The cost of implementing crew pairing guidelines would be that of developing software for a scheduling program to pair newly-qualified pilots with experienced pilots. To estimate this cost, the FAA surveyed part 121 Principal Operations Inspectors (POIs) to learn how many carriers currently have internal crew pairing guidelines that will be in compliance with the requirement. Numbers of pilots, airplanes, and airplane types were obtained from FAPA's Pilot Directory of Employers.

Based on the make-up of the airline pilot population, the FAA contends that it should not be difficult to pair a newly qualified pilot with one that already has the required operating experience. For instance, the number of pilots that need operational experience is relatively small compared to the number of experienced pilots. The FAA estimates that approximately 13 percent of pilots employed by major airlines, 7 percent employed by national airlines, and 38 percent employed by regional airlines are currently subject to crew pairing restrictions. In addition, many airlines operate only a few different types of airplanes. Among the majors, where there are an average of 14 pilots per airplane, there are 620 pilots per type of airplane. Among the national air carriers, there are 10 pilots per airplane and an average of 45 pilots per type. Finally, among the regional air carriers, there are 7 pilots per airplane and 76 pilots per type.

The crew pairing requirement could be implemented at a minimal cost to those air carriers that currently do not have crew pairing guidelines. This is because of the large number of pilots per airplane type and because of the number of air carriers that already have established crew pairing guidelines in the absence of this regulation. The cost of implementing crew pairing restrictions would be that of developing a software program to pair newly-qualified pilots with experienced pilots. The FAA estimates that this development will take one programmer one week to modify existing software programs and write the necessary documentation at a cost of \$1,300. Based on the survey of POIs, the FAA estimates that 76 air carriers will have to develop a computer program for crew pairing. Thus, the one-time cost of this requirement will be \$98,800 ($\$1,300 \times 76$).

Benefits

The final rule will help to prevent accidents that result from the pairing of under-experienced pilots or in which

in-type flight skill and knowledge are not consolidated. The FAA has identified two accidents over the past 10 years in which the NTSB determined that the inexperience of the pilots was the probable cause. Of the 145 passengers that were on board these the two airplanes, 30 (20.7 percent) were killed and 31 (21.4 percent) were seriously injured. Both airplanes were destroyed. The airplane in the New York accident also caused damage to a pier and to the approach lighting at LaGuardia Airport.

The benefits of the final rule will be, in part, the number of casualties that it will help to prevent over the next 10 years. To estimate the potential fatal and serious injuries over the next 10 years, the FAA calculated the proportion of passengers killed or seriously injured in such accidents and applied those proportions to the expected average enplanement levels over the next 10 years. The FAA estimates that from 1994 to 2003, the average air carrier airplane will have 183 seats and will carry, on average, 128 people on board—121 passengers and 7 crew members. If this "average" airplane were to be involved in an accident similar to the ones in Denver and New York, the FAA estimates the casualty rate of the "average" accident would approach that of the Denver and New York accidents. Thus, the number of fatalities would be 26 ($128 \times .207$) and the number of serious injuries would be 27 ($128 \times .214$).

The FAA uses a value of \$2.6 million to estimate the benefit value of preventing a fatality and \$500,000 to prevent a serious injury. Thus, the value of preventing the estimated number of fatalities and serious injuries will be \$67.6 million ($26 \times \2.6 million) and \$13.5 million ($27 \times \$500,000$) respectively. Added to these amounts are the average replacement value of an air carrier airplane, \$11 million, and the value of a major NTSB investigation, \$433,500. This brings the total value of preventing one crew-pairing related accident over the next 10 years to \$92.5 million ($\67.6 million + $\$13.5$ million + $\$11.0$ million + $\$433,500$).

Based on the number of air carrier operations and the number of accidents that have occurred over the past 10 years, the FAA projects that over the next 10 years, in absence of this final rule, another two accidents could occur. The benefits of preventing both of those accidents is \$185 million, with a present value of \$130 million.

How much of these benefits can be attributed to this final rule is not certain. However, since pilot error and crew inexperience were the probable

causes of the Denver and New York accidents, the FAA estimates that the final rule will prevent at least one of the future accidents. Thus, the present value benefits of this final rule will be \$65 million ($\130 million/2).

Benefit-Cost Comparison

The present value cost of the final rule to require several new and modified operating experience requirements for PICs and SICs will be \$33.4 million over the next 10 years. The present value benefit of the final rule by preventing one accident over the next ten years will \$65 million. Thus, the FAA has determined that the final rule is cost-beneficial.

Final Regulatory Flexibility Determination

The Regulatory Flexibility Act of 1980 (RFA) was enacted by Congress to ensure that small entities are not unnecessarily and disproportionately burdened by Federal regulations. The RFA requires agencies to review rules which may have "a significant economic impact on a substantial number of small entities."

The FAA has adopted criteria and guidelines for rulemaking officials to apply when determining whether a proposed or existing rule has any significant economic impact on a substantial number of small entities. Based on these criteria, a small air carrier is one that owns 9 or fewer aircraft and a substantial number of carriers is one that is not less than 11 or which is more than one-third of affected small entities.

The FAA has determined that approximately 35 air carriers operating under part 121 could be considered small entities. Based on the FAA's criteria and guidelines, a significant regulatory cost impact to these air carriers ranges from \$4,300 for an unscheduled carrier to \$61,600 for a scheduled carrier to \$110,100 for scheduled carriers whose entire fleet has a seating capacity of more than 60. These values are annualized costs and are expressed in 1993 dollars. Typically, there are about 11 pilots per aircraft for carriers operating Group II airplanes and 6 pilots per aircraft for carriers operating Group I airplanes. Approximately half of these pilots act as PICs, while the other half act as SICs.

For a small scheduled carrier having a fleet seating capacity of more than 60 seats, owning 9 group II airplanes, and employing 99 pilots, the FAA estimates that 5 PICs would need 10 hours of additional transition operating experience at a cost of \$6,350 ($5 \times 10 \times \$127/\text{hr}$). Small entities will no