

# HIRING PILOTS DURING A SHORTAGE: SOME CAUTIONS



## ABOUT DIANE DAMOS

Dr. Diane Damos has been involved in pilot selection for over 40 years. She was a professor of human factors for 19 years, teaching courses in aviation human factors and conducting research on pilot selection for both the U.S. Air Force and the Navy. In 1995 she founded Damos Aviation Services, Inc., a company specializing in pilot selection. She has worked as a consultant for many US air carriers and for carriers, training schools, and governments in Africa, the West Indies, and Asia. She has lectured and taught courses and seminars on pilot selection in Taiwan, South Africa, Spain, and Canada as well as in the United States. She has authored over 25 articles in scientific publications and 50 technical reports and proceedings articles on training and cognition as well as on selection. Dr. Damos has a Commercial Pilots Certificate with instrument and multi-engine ratings. She also holds the Instrument and Advanced Ground Instructor Certificates.

✈ The international aviation community is experiencing a shortage of qualified pilots (Boeing Commercial Airplanes, 2012). Air carriers want to hire the most qualified pilots available, but the number of applicants may be so small that not enough pilots can be hired to meet the company's flying requirements. Air carriers can change their hiring process in a number of ways to deal with the shortage. Two types of changes are common and will be discussed in this article. Both of these changes result in the air carrier hiring more pilots. However, if the changes are implemented incorrectly, they can increase training costs and have other adverse impacts on training.

Before describing the changes and their effects, we should discuss two major parts of a pilot hiring process: the screening system and the selection system.

The purpose of the screening system is to identify those applicants with the required experience and education. Most carriers specify a minimum amount of flight time, a minimum number of years of education, and specific certifications. If an applicant meets all of the minimum requirements, he/she begins the selection process. If not, the applicant is given no further consideration.

The purpose of the selection system is to identify those applicants with the greatest amount of certain attributes, such as those with the highest level of spatial ability or those with the greatest flying skills (for more information see Damos, 2001; International Air Transport Association, 2010). A selection system usually consists of several selection instruments, such as standardized tests (professionally developed tests assessing abilities or personality traits), a simulator evaluation, and at least one interview. If an applicant passes all of the selection instruments, he/she is given a job offer and starts initial training.

The first type of change involves the screening system. Air carriers often reduce the required amount of a background variable to increase the number of applicants. For example, assume that an air carrier requires applicants to take courses in mathematics and physics during secondary school. Because of the pilot shortage, the carrier eliminates the requirement for these courses. In this example, the Training Department can compensate for this reduction in educational requirements by adding ground school classes covering the missing material. The initial costs associated with this change (the purchase of new training material, curriculum development expenses, and increased instructor salary and benefits) usually are foreseen by management. However, one long-term cost that often is unanticipated involves the increased footprint: the carrier must spend more on salary and/or stipends for the newly hired pilot before he/she becomes productive. A second unanticipated cost is that the new curriculum may not compensate perfectly for the lack of secondary-school courses. Some trainees may struggle and require more resources to complete initial training, increasing overall training costs.

As another example, assume that the air carrier reduces the total number of multi-engine hours required to apply. Such a change, again, should increase the number of applicants. If the Training Department is given adequate warning of this change, it can adjust the initial training curriculum by adding more ground school classes and/or increasing the number of training sessions in a flight training device. As in the previous example, the company will incur initial costs associated with the changed curriculum and long-term costs associated with the increased footprint.

The second type of change involves the selection system itself. In my experience, air carriers will lower the cutoff score on one or more of the standardized tests that assess abilities to increase the number of applicants who successfully complete the selection process. To understand the consequences of this type of change, it is necessary to discuss a little test theory. Professionally developed selection tests typically have scores that are normally distributed. Therefore, if hundreds of applicants took the test, their scores would be distributed as in Figure 1. A test is used in a selection system because those applicants who do well in training and in operational flying (good performers) have higher test scores on average than those who do poorly in training and operational flying (poor performers). Therefore, pilot applicants can be thought of as coming from two different normal distributions as shown in Figure 2.

Figure 1: A normal distribution of test scores

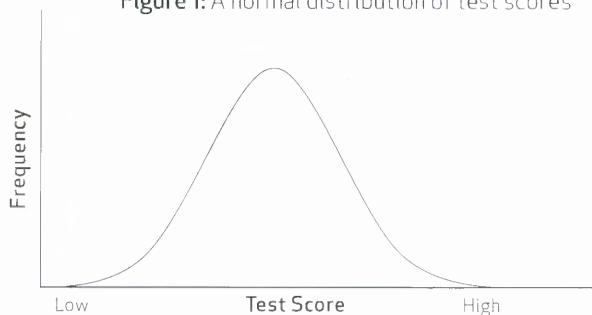
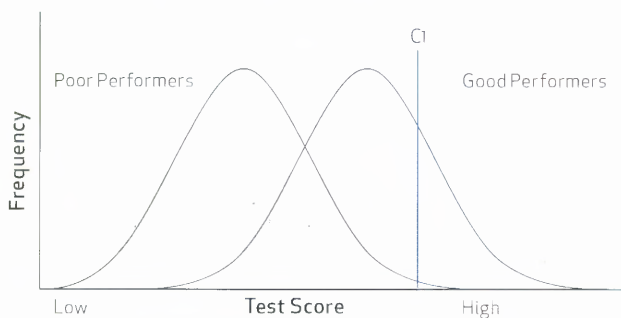


Figure 2: Distributions for applicants who do poorly in training versus those who do well in training. A high cutoff score, C1, is shown

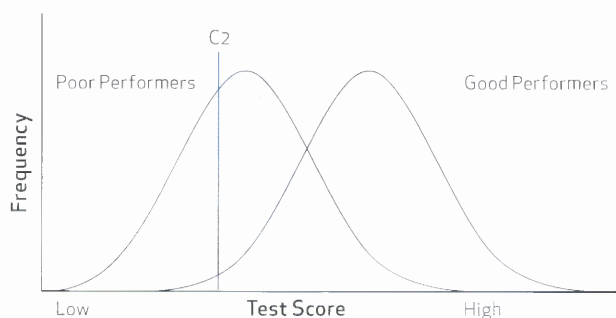


For simplicity, assume that the air carrier only has one selection instrument, a standardized test assessing an ability, and that this

instrument predicts performance in training. Assume that the cutoff score is set at C1 (see Figure 2). Everyone who scores at or above C1 will be given a job offer and accepted for training; everyone who scores below C1 will be rejected. C1 is a high cutoff score. Almost no applicants from the "Poor Performers" distribution get test scores at or above C1, and relatively few applicants from the "Good Performers" score at or above C1. Because the selection test predicts performance in training, almost everyone who scores above C1 will do well in training. However, because so few applicants score at or above C1, few applicants receive job offers and start training.

Assume that the carrier decides to lower the cutoff score on this selection instrument to C2 (See Figure 3). Nothing else in the selection process is changed. By lowering the cutoff, almost everyone from the "Good Performers" group will receive a job offer and begin training because almost all of this group will score at or above C2. This is exactly what the carrier wants: more pilots receiving job offers. However, more pilots from the "Poor Performers" group also will score at or above C2 and will receive a job offer and start training.

Figure 3: Distributions for applicants who do poorly in training versus those who do well in training. A low cutoff score, C2, is shown



By lowering the cutoff to C2, the air carrier increases its training costs significantly; the carrier may have to increase the number of instructors and buy additional training equipment, such as flight training devices, to accommodate the increased number of trainees. Again, these training costs are usually anticipated. In contrast, carriers rarely appreciate that a much higher percentage of the trainees will fail unless the training standards are lowered, which is unlikely. These failures result in wasted instructor time with its associated cost and increased idle time for flight training devices. Additionally, the pay and stipends given to the unsuccessful trainees are completely lost to the company.

Another cost associated with a lower cutoff is more subtle and often unforeseen by the company. The Training Department now must assume an "evaluation/selection" role in addition to its training role. Thus, it must be prepared to fail a larger percentage of trainees. Trainee evaluations may become more frequent and more standardized, and the progress of individual trainees may be

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scrutinized more carefully. Instructors may dislike the evaluation portion of their job and resist change. Additionally, many instructors think of themselves primarily as teachers, i.e., they feel that their job is to train students, not to fail them. Failing a trainee may be personally difficult for some instructors, and they may go to extreme lengths to help the student succeed, such as scheduling extra simulator sessions, providing special tutoring, allowing the student to retake exams, etc. These types of efforts waste more resources and further increase training costs.



A pilot shortage will exist for the foreseeable future, and air carriers must adapt to this reality. The long-term solution to this problem is evident: interest large numbers of young people in an aviation career, preferably while they are in secondary school, and provide a clear career path for them (See both Samarajewa (2012) and Weissmuller (2012) for examples of this approach). The short-term solution involves changing the screening and selection systems in an informed manner. Human Resources and Training Departments should discuss the problems associated with changing either the selection or the screening process, and the Training Department should be given sufficient time and resources to make the appropriate adjustments to the training curriculum. Both groups should be aware that not all impacts can be foreseen and that good communications are essential to a smooth transition and dealing effectively with unanticipated impacts of changes. ■

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